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ROYAL BOTANIC GARDENS, KEW

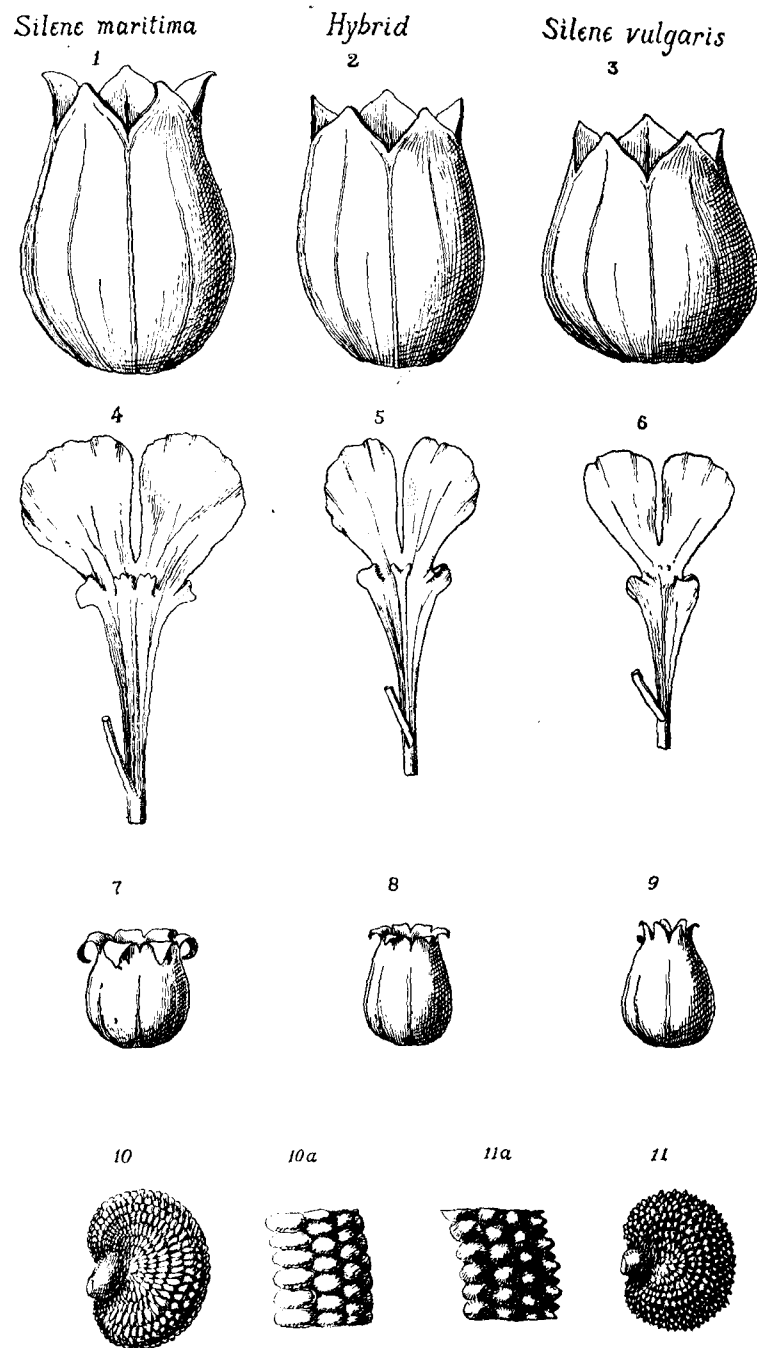
I.—RESEARCHES ON *SILENE MARITIMA* AND *S. VULGARIS*: I. E. M. MARSDEN-JONES AND W. B. TURRILL.

The exact significance to be attributed to the term "species" has been a subject of continuous interest, at least since the publication of "The Origin of Species." During the present century the modern development of such standpoints as the genetical and ecological has led to a realization that this old problem has many hitherto unrecognized aspects. An all-round observer might well conclude that while controlled breeding and field and garden researches have thrown light on many subsidiary problems, they have also clearly indicated that the main problem of what is the real nature of a plant species is more complex than has yet been realized.

Desirous of contributing towards the solution of the species problem as it affects some familiar plants, we have for several years been concentrating on two groups, viz., *Silene maritima* and *S. vulgaris** and *Centaurea nigra* and *C. jacea*, using these names, for the moment, in the widest sense. Investigations of certain other species are also in progress. The general principles on which we are working are as follows: (1) a systematic investigation of material accumulated in herbaria, correlating this with a critical reading of all published literature relevant to the subject; (2) a field investigation, by both phytogeographical and ecological methods, of the distribution of the species concerned in all their varieties and forms; (3) controlled selfing and growing in our experimental grounds; (4) growing pure line material under different environmental conditions to study the modifying effects of external factors. It is hoped later, to add (5) cytological, and (6) anatomical investigations.

It is obvious that this comprehensive programme will take many years to complete, and, indeed, it is probable that we alone shall not attain our ideals. Nevertheless, we feel it is very desirable to emphasize our belief that it is only by a combination of all methods, herbarium, library, laboratory, field, and breeding, that there is any hope of obtaining satisfactory evidence on the nature and genesis of taxonomic units. No method is sufficient by itself, yet each is essential.

*This species has been variously termed *S. cucubalus*, *S. venosa*, *S. inflata*, *S. latifolia*, *S. angustifolia*, and *S. vulgaris* in recent works. T. A. Sprague in Journ. Bot. lxii. 45 (1924) has concluded that according to the Vienna Rules one of the last two names must stand. He has since informed us that he is now definitely of the opinion that *vulgaris* is the correct trivial. We concur and accordingly have adopted this view.



Silene maritima, 1 calyx, 4 petal, 7 capsule. Hybrid, 2 calyx, 5 petal, 8 capsule. *S. vulgaris*, 3 calyx, 6 petal, 9 capsule. (All $\times 2$).
Seed, 10 ($\times 12$), 10a ($\times 36$), armadillo type; 11 ($\times 12$), 11a ($\times 36$), tubercled type.

We propose to publish our results from time to time in separate papers, each relatively complete in itself yet forming one of a series. The first paper presented here deals almost entirely with the results of crossing reciprocally *Silene maritima* and *S. vulgaris* and of selfing the F_1 . In these experiments we have obtained considerable information concerning the genetical value of various morphological characters, and, though some of the figures are not yet satisfactorily interpreted, this preliminary work is sufficient to form a basis for extended genetical research.

Origin of parents.

Two plants of *Silene maritima* and one of *S. vulgaris* formed the original stocks for the experiments detailed below. They were all collected in the wild state and their identity numbers are:

A 1. *S. maritima*, hermaphrodite, and

A 2. *S. maritima*, female, both from Tilly Whin, near Swanage, Dorset, 1923.

B 1. *S. vulgaris*, hermaphrodite, from a roadside near Winchester, Hants, 1923.

Excepting for the sex of A2 the above plants were in every respect "normal" individuals quite comparable with what are understood by taxonomists as the type varieties of the two species. Their important characters are now described.

S. maritima A1.

Habit: compact, spreading, stems prostrate, up to 4.5 dm. long; with barren stems.

Leaves very uniform for the different plants considered as wholes but fluctuating on the same plant from oblanceolate or narrowly oblong-elliptic to narrowly ovate or obovate, apex acute to obtuse, slightly apiculate, often conspicuously narrowed to base especially in the lower ones, uppermost pair slightly amplexicaul, middle leaves (average) 2 cm. long, 8 mm. broad, margins distinctly ciliate, texture thicker and stiffer than in *S. vulgaris*, colour glaucous green.

Inflorescence of 1-3 flowers, erect when in bloom. Bracts all strongly ciliate, lower green, herbaceous, similar to uppermost leaves, ovate, acute, upper smaller and narrower and becoming completely scarious.

Calyx broadly ellipsoid in flower, becoming broadly obovoid in fruit.

Corolla with petals divided $\frac{3}{4}$ length of lamina, segments and petals contiguous, 2.5 cm. long, 1.4 cm. broad. Corona of well developed scales. Corolla 2.6 cm. diam.

Immature seeds all pink ("pale Laelia pink" Ridgeway pl. xxxviii. 67 VR. f.).

Ripe capsules broadly ovoid, 10 mm. long (without teeth), 9 mm. broad (in broadest part below middle). Teeth each an isosceles triangle 4 mm. long, 2.5 mm. broad at base, strongly recurved.

Carpophore 3.5-4 mm. long, 3 mm. broad.

Mature seeds in flat outline broadly hemispherical, 1.5 mm. long, 1.25 mm. broad, distinctly tubercled with tubercles in well defined concentric half rings.

S. maritima A2 agrees with A 1 except

- (1) pale purplish, not pure white, stigmas ;
- (2) *seeds* (mature) in flat outline broadly hemispherical, 1.75 mm. long, 1.5 mm. broad, armadillo-pattern, i.e. without raised tubercles coming to a point, but marked out in low oblong smoothly flattened bosses or plates arranged in concentric half circles ;
- (3) mainly female not hermaphrodite flowers (see below).

S. vulgaris B1.

Habit erect ; stems ascending below then straight erect, 3-9 dm. long ; with no barren shoots.

Leaves on the whole uniform except for fluctuations on same plant from broadly lanceolate, or ovate-lanceolate, to narrowly elliptic, apex acute apiculate, lower narrowed to the base, upper with subcordate to amplexicaul base, middle leaves (average) 4.5 cm. long, 1.2 cm. broad (actually the leaves on an individual shoot vary very greatly in size) ; margins ciliate, with variation in degree ; texture thinner and more flaccid than in *S. maritima* ; colour distinctly green.

Inflorescence up to 30 flowers, more or less dropping when in bloom ; bracts all at first green-herbaceous, many becoming later scarious, all very sparingly ciliate or lowest without cilia, lowest ovate, acuminate.

Calyx ovoid, contracted at apex, 1.3 cm. long, 1 cm. diam. ; teeth equilaterally triangular, apex acute apiculate.

Corolla with petals divided $\frac{2}{3}$ length of lamina, segments and petals not contiguous, 1.9 cm. long, 3-5 mm. broad ; corona only represented by the merest bosses ; corolla diam. 2.1 cm.

Immature seeds all white.

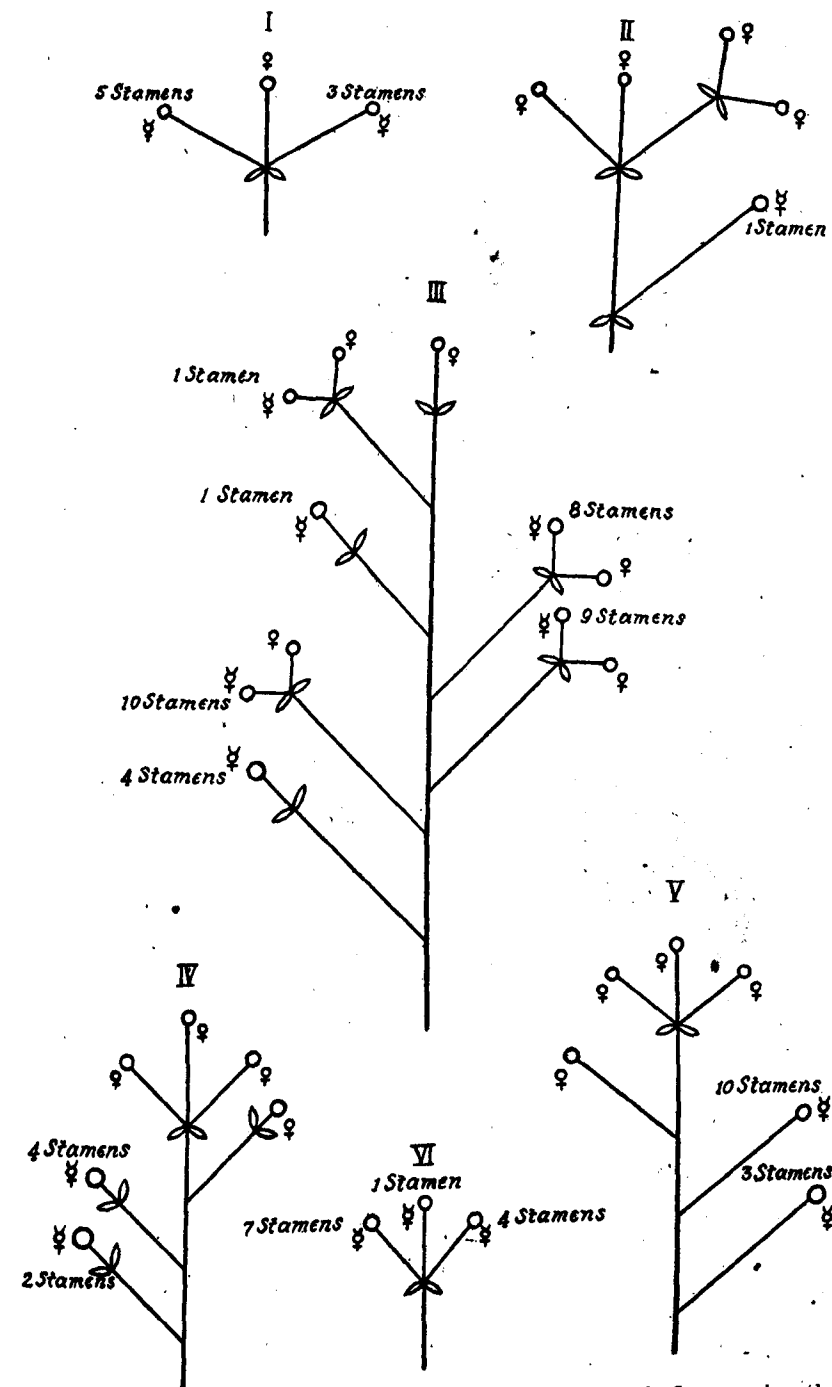
Ripe capsules broadly ovoid-ellipsoid, 8 mm. long (without teeth), 7 mm. diam. ; teeth equilaterally triangular, 1 mm. long, erect.

Carpophore 2.5 mm. long, 2.5 mm. diam.

Mature seeds in flat outline broadly hemispherical, 1.5 mm. long, 1.25 mm. broad ; distinctly tubercled with tubercles in rows not sharply defined.

The sex of the *S. maritima* plants.

One matter, which is here considered subsidiary and which is not followed up in this paper, may be mentioned for the sake of accuracy and general interest. The *S. maritima* A 1 plant has produced only hermaphrodite flowers since 1924, but the A 2 plant when collected in the wild and in 1924 had only functionally female flowers. In July, 1925, that is towards the end of its flowering period, it was



Silene maritima. Diagrams illustrating the sex of flowers in the inflorescence. I July, 1925. II July, 1926. III-VI All August, 1926. (See p. 4.)

noticed that two flowers on one branch were in a hermaphrodite condition, one having five stamens and the other three. The plant had been worked with during the summer and only female flowers had been observed up to that date. In the middle of the summer of 1926 the same individual again produced a limited number of hermaphrodite flowers, most of them with an incomplete set of stamens. The diagrams on page 5 illustrate the position of these flowers in the inflorescences.

Natural hybrids between *S. maritima* and *S. vulgaris*.

In the London Catalogue, ed. 10, p. 9 (1908), the natural hybrid (as *maritima* $\times$ *latifolia*) is given as recorded from two vice counties. Seed collected from a wild plant of *S. vulgaris* growing on the Little Orme, North Wales, when sown in our experimental ground produced plants of obviously hybrid origin in addition to plants of typical *S. vulgaris*. Two of the former and one of the latter are still (Nov. 1927) growing at Potterne. In Sept. 1926 a plant was collected on the Chesil Beach, Dorset, and examination showed it was probably *maritima* (seed parent) $\times$ *vulgaris* (pollen parent). In July, 1927 another plant, discovered on Hurst Castle shingle beach with the two species, was probably *vulgaris* (seed parent) $\times$ *maritima* (pollen parent).

On several nights during June, 1924, moths were seen freely visiting *S. vulgaris* in the experimental ground at Potterne, and occasionally they flew straight to *S. maritima* growing near. The moths seemed to prefer *S. vulgaris* to *S. maritima*, the visits to the former being very much more numerous. It is thus evident that natural cross-pollination can occur where the two species grow near together.

Results of selfing two of the parent plants.

A 1. *S. maritima* selfed. Seed set freely and 24 plants were raised. These plants were like the parent in all the characters studied except that segregation occurred in testa characters. The ratio for these was 8 tubercled : 6 armadillo, seed not being obtained from 10 plants.

B 1. *S. vulgaris* selfed. Seed set freely and 27 plants were raised. These plants were like the parent in all the characters studied, except that segregation occurred in testa characters. The ratio for these was 12 tubercled : 2 armadillo, seed not being obtained from 13 plants, mainly owing to seasonal conditions.

Reciprocal crossings of the two species.

The following crosses were made :

- N.3. *S. maritima*, plant A 2 (seed parent) $\times$ *S. vulgaris*, plant B 1 (pollen parent).
- N.4. *S. maritima*, plant A 1 (seed parent) $\times$ *S. vulgaris*, plant B 1 (pollen parent).
- N.5. *S. vulgaris*, plant B 1 (seed parent) $\times$ *S. maritima*, plant A 1 (pollen parent).

Descriptions of F₁ of above crosses.

N.3 and N.4. 61 plants raised.

Habit. Height of stems up to 3-6.5 dm. long ; general habit distinctly spreading ; stems ascending at least towards the ends ; no barren procumbent stems ; stems all glabrous (as were those of both parents).

Leaves. Fairly uniform in size and shape ; in size intermediate between those of the parents, but decidedly nearer to *S. vulgaris* ; shape ovate-lanceolate, oblanceolate, or elliptic-lanceolate, varying thus even on one and the same shoot, but on the whole tending towards *S. vulgaris* rather than to *S. maritima* ; margins ciliate, with slight variations in degree of ciliation ; texture on the whole intermediate, transverse sections of leaves varying a little in thickness. There are very slight differences in the shade of the green.

Inflorescence. Intermediate in degree of luxuriance and in number of flowers which are more or less drooping. Bracts ovate, distinctly acuminate, herbaceous and scarious (as in both parents) ; all plants had some bracts with some cilia, majority intermediate between parents.

Calyx intermediate in shape ; less contracted at apex than *vulgaris* but more ovoid than *maritima*.

Corolla with the petals divided $\frac{3}{4}$ length of lamina (as *maritima*), segments and petals not over-lapping, intermediate in breadth ; 2.1-2.3 cm. diam. ; corona intermediate in degree of development, but a scale not a boss.

Stigmata coloured and uncoloured.

Immature seeds pale Laelia pink (*maritima* parent pale Laelia pink, *vulgaris* parent white).

Ripe capsules : (1) cross N.3 ellipsoid-ovoid, 8 mm. long (without teeth), 7 mm. diam. ; teeth 3 mm. long, equilateral triangles, spreading ; carpophore 3 mm. long, 2 mm. diam.

Mature seeds : (1) cross N.3 in flat outline broadly hemispherical, length 2 mm., breadth 1.5 mm., tubercled or armadillo pattern.

Ripe capsules : (2) cross N.4 broadly ellipsoid-ovoid, 7 mm. long (without teeth), 7 mm. diam. ; teeth 2.5 mm. long, equilateral triangles, spreading ; carpophore 2.5 mm. long, 2.5 mm. diam. (with 2 exceptions).

Mature seeds : (2) cross N.4 in flat outline broadly hemispherical, length 2 mm., breadth 1.5 mm., tubercled or armadillo pattern.

N.5. 30 plants raised.

Habit, leaves, inflorescence, calyx, corolla, stigmata, and immature seeds as former.

Ripe capsules broadly ellipsoid-ovoid, 7 mm. long (without teeth), 7-8 mm. diam. ; teeth 2 mm. long, equilaterally triangular, spreading ; carpophore 2 mm. long, 2-2.5 mm. diam. (for 1 exception see below).

Mature seeds in flat outline broadly hemispherical, length 1.5 mm., breadth 1.25 mm., tubercled or armadillo pattern.

Comments on the plants of the F₁ generation.

All of the individuals of the three crosses made are extremely uniform in all the characters studied with the exceptions now enumerated. In most of the characters the F₁ plants are exactly intermediate between the characters of the parents, as, for example, in calyx shape, scale and boss of petal, and capsule shape and teeth (see page 2, figs. 1 to 9). That the F₁ generation is, for the majority of the characters, strikingly intermediate needs particular emphasis, because we are forced now to occupy a good deal of space in dealing with the exceptions to this generalization.

Stigma colour. Preliminary observations showed that some plants in the F₁ generation had coloured (i.e., purplish), and others colourless stigmata. Exact counts for each cross yielded the following figures:—

N.3.	17 purplish : 13 colourless.
N.4.	14 purplish : 16 colourless.
N.5.	11 purplish : 19 colourless.

It may seem that these results could be explained by accepting two complementary factors as necessary for the production of colour in the stigmata. If these be designated by A and B, then the parents might, on the above figures, be postulated as:—

in N.3 :	Aa Bb × aa BB.
in N.4 :	Aa bb × aa BB.
in N.5 :	aa BB × Aa bb.

Capsule shape and teeth. The essential differences between the capsules of *S. maritima* and *S. vulgaris* are clearly indicated in the descriptions and figures. With the exception of three plants out of a total of 91 in our F₁ generations all the individuals have an exactly intermediate type of capsule. In cross N.4 two plants and in cross N.5 one plant had capsules of the *maritima* type. At present we can offer no explanation of this. It is noteworthy that no *vulgaris* type of capsule appeared, nor any approaching it.

Testa characters. Usually it is quite easy to place all the mature seeds from any one plant into one or other of our two categories, tubercled and armadillo. There are, however, degrees in both. We know that our stock plants A 1 and B 1 are impure for these characters since they gave seeds of both types on selfing. On crossing segregation is also evident, as the following figures show:—

N.3.	Tubercled 14 : Armadillo 11
N.4.	Tubercled 11 : Armadillo 16
N.5.	Tubercled 15 : Armadillo 14
Totals	40 41

The evidence obtained from the F₂ generation shows as conclusively as we could wish that the armadillo character is recessive. N.3 is a cross between a recessive and a heterozygote and the ratio 14 : 11 may be considered, allowing for the small numbers, an approximation to the expected 1:1 ratio. On the other hand the ratios obtained for the F₁s from crosses N.4 and N.5 are at present inexplicable.

There are further complications in testa characters concerning which we are continuing our investigations.

The F₁ plants selected for selfing.

Six generations of F₂ plants were raised from seeds obtained by selfing as many individuals of the F₁ generations. The designations and origins of these F₂ generations are as follows:—

N.3 II.	from an N.3 plant with armadillo seeds.
N.3 III.	from another N.3 plant with armadillo seeds.
N.4 V.	from an N.4 plant with tubercled seeds.
N.4 VI.	from an N.4 plant with armadillo seeds.
N.5 VII.	from an N.5 plant with armadillo seeds.
N.5 VIII.	from an N.5 plant with armadillo seeds.

It may be explained that the counts given below do not always tally with the total number of plants raised in each generation, since it was not possible to determine the character concerned in every individual. Thus some plants failed to produce good capsules or mature seeds and the counts of such perforce fall below the total of the plants. The total number of plants of F₂ generations grown was 207.

Analyses of the characters of the F₂ generations.

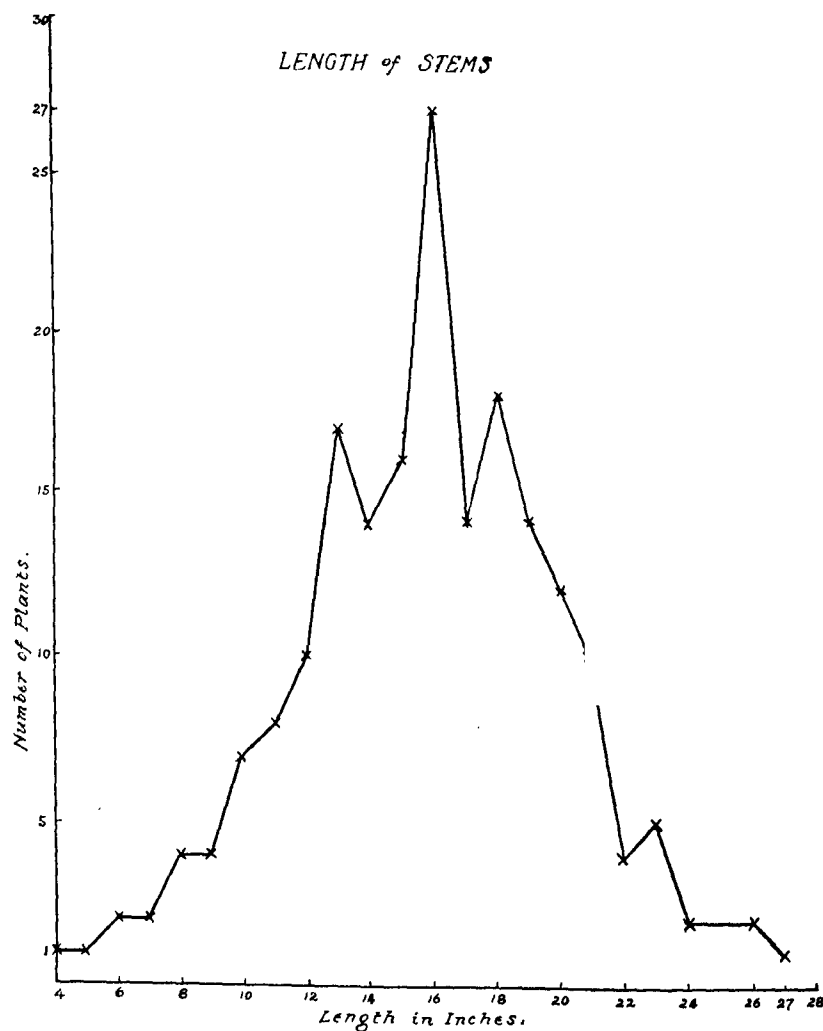
HABIT.	In 4 plants the branches spread out : in 11 they did not.						
N.3 II.	In	4					19
N.3 III.	"	4	"	"	"	"	6
N.4 V.	"	4	"	"	"	"	12
N.4 VI.	"	12	"	"	"	"	46
N.5 VII.	"	60	"	"	"	"	6
N.5 VIII.	"	15	"	"	"	"	100
Totals		99					100

	In 14 plants branches ascending : in 1 prostrate.				
N.3 II.	In	14			2
N.3 III.	"	21	"	"	3
N.4 V.	"	7	"	"	6
N.4 VI.	"	18	"	"	29
N.5 VII.	"	77	"	"	11
N.5 VIII.	"	10	"	"	52
Totals		147			52

N.3 II. In 13 plants barren shoots present : in 2 they were not.

N.3 III.	" 20	"	"	"	3	"	"
N.4 V.	" 10	"	"	"	0	"	"
N.4 VI.	" 22	"	"	"	2	"	"
N.5 VII.	" 85	"	"	"	21	"	"
N.5 VIII.	" 19	"	"	"	2	"	"

Totals	169				30		
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STEMS : all F_2 generations counted together.

Length in inches	...	4	5	6	7	8	9	10	11	12	13	14	15
Number of plants	...	1	1	2	2	4	4	7	8	10	17	14	16
Length in inches	...	16	17	18	19	20	21	22	23	24	25	26	27
Number of plants	...	27	14	18	14	12	10	4	5	2	2	2	1

LEAVES :

The following symbols are used here : M=as in *S. maritima*, HM=*maritima* verging towards the hybrid, MH=*maritima* verging still more towards the hybrid, H=hybrid, VH=hybrid verging towards *vulgaris*, HV=hybrid verging still more towards *vulgaris*, V=as in *S. vulgaris*.

	M	HM	MH	H	VH	HV	V
N.3 II.	...	8	1	5			1
N.3 III.	...	3		10	1	4	5
N.4 V.	...	1	1	3	1	2	2
N.4 VI.	...	1	5	1		9	8
N.5 VII.	...	2	8	1	31	13	51
N.5 VIII.	...	6	9	3	6	2	
Totals	...	9	34	7	56	2	67

FLOWERS : Numbers on flowering branches :

N.3 II.	In 2 plants many, in 13 plants few.
N.3 III.	" 2 " " 21 "
N.4 V.	" 3 " " 7 "
N.4 VI.	" 17 " " 6 "
N.5 VII.	" 55 " " 33 "
N.5 VIII.	" 14 " " 6 "
Totals	93 86

Position relative to the pedicel :

N.3 II.	In 1 plant erect, in 13 plants drooping.
N.3 III.	" 1 " " 19 " "
N.4 V.	" 1 " " 9 " "
N.4 VI.	" 1 " " 20 " "
N.5 VII.	" 9 " " 38 " "
N.5 VIII.	" 7 " " 10 " "
Totals	20 109

CALYX SHAPE : The same symbols are used as for the leaves.

	M	HM	MH	H	VH	HV	V
N.3 II.	...	3	2	9			
N.3 III.	...	7	8	1		3	1
N.4 V.	...	7		1		1	1
N.4 VI.	...	1		11		7	3
N.5 VII.	...	13	18	3	3	14	6
N.5 VIII.	...	5	2	3			11
Totals	...	36	30	5	59	3	22

PETALS : Degree of lobing :

N.3 II.	In	0 plants $\frac{2}{3}$, in	11 plants $\frac{1}{3}$ lobed.
N.3 III.	"	0	20 " "
N.4 V.	"	5	5 " "
N.4 VI.	"	6	16 " "
N.5 VII.	"	15	36 " "
N.5 VIII.	"	1	19 " "
Totals ...		27	107

Overlapping :

N.3 II.	In	0 plants contiguous or overlapping, in	13 not contiguous
N.3 III.	"	4	" " " " 17 " "
N.4 V.	"	2	" " " " 8 " "
N.4 VI.	"	4	" " " " 18 " "
N.5 VII.	"	10	" " " " 41 " "
N.5 VIII.	"	9	" " " " 10 " "
Totals ...		29	107

Coronal development :

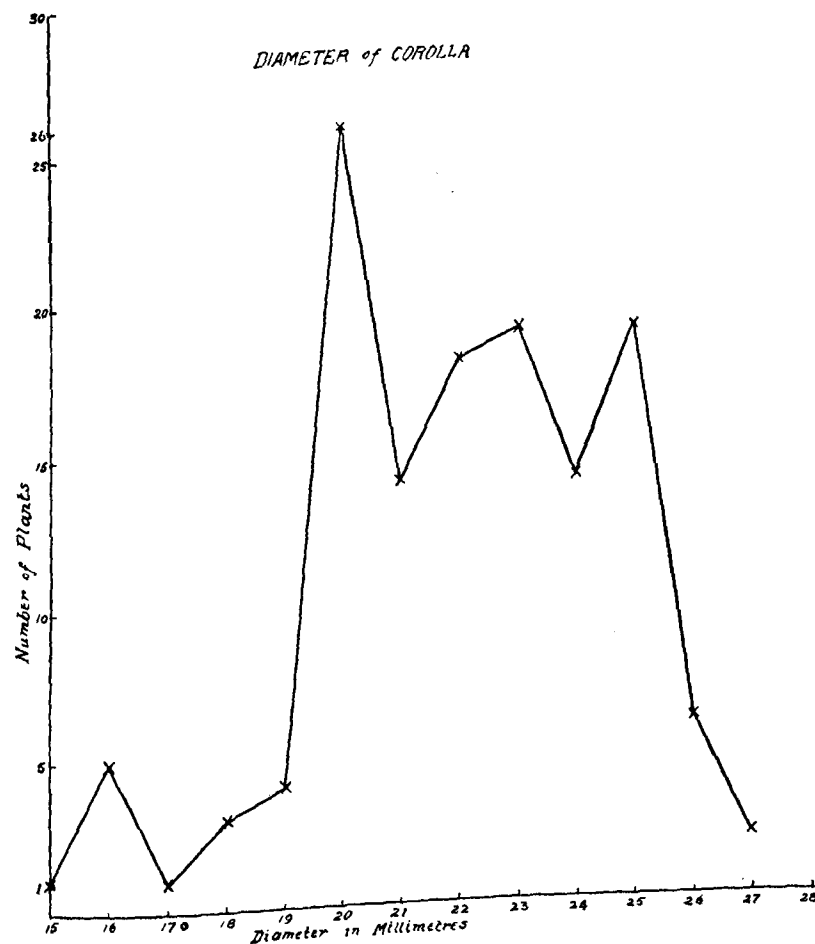
N.3 II.	In	0 plants scale, in	3 intermediate, in	10 boss
N.3 III.	"	3	" " 14	" 4 "
N.4 V.	"	3	" " 6	" 1 "
N.4 VI.	"	2	" " 13	" 7 "
N.5 VII.	"	17	" " 21	" 16 "
N.5 VIII.	"	4	" " 12	" 4 "
Totals ...		29	69	42

DIAMETER OF COROLLA :

In mm.	...	15	16	17	18	19	20	21	22	23	24	25	26	27
Number of plants	...	1	5	1	3	4	26	14	18	19	14	19	6	2

COLOUR OF STIGMATA :

N.3 II.	In	5 plants purplish, in	9 colourless.
N.3 III.	"	3	" " 19 "
N.4 V.	"	4	" " 6 "
N.4 VI.	"	0	" " 22 "
N.5 VII.	"	2	" " 68 "
N.5 VIII.	"	0	" " 21 "
Totals ...		14	145



COLOUR OF IMMATURE SEEDS :

N.3 II.	In	8 plants pale Laelia pink, in	6 colourless.
N.3 III.	"	15	" " " 7 "
N.4 V.	"	7	" " " 3 "
N.4 VI.	"	16	" " " 7 "
N.5 VII.	"	36	" " " 53 "
N.5 VIII.	"	15	" " " 5 "
Totals ...		97	81

MATURE SEEDS :

N.3 II.	In	0 plants tubercled, in	11 plants armadillo.
N.3 III.	"	0	" " 16 " "
N.4 V.	"	4	" " 1 " "
N.4 VI.	"	0	" " 15 " "
N.5 VII.	"	0	" " 62 " "
N.5 VIII.	"	0	" " 12 " "

CAPSULES: The symbols used have the same significance as for the leaves.

		M	HM	MH	H	VH	HV	V
N.3 II.	...		2		2		5	3
N.3 III.	...				10		7	1
N.4 V.	...	3	1		1			
N.4 VI.	...	2	1			2	5	1
N.5 VII.	...	6	13	2	5	5	3	7
N.5 VIII.	...	2	1		5	1		
Totals...	...	13	18	2	49	8	20	12

Note on a disease of *Silene*.

For the last two years (1926-27) we have been troubled both at Potterne and Kew with a fungus, which is one of the *Imperfecti* and has been determined very provisionally by Miss E. M. Wakefield as a species of *Marssonina*. The life-history of the fungus is being studied at Kew. The year 1927 was exceptional, since from the middle of June till nearly the end of August it was continually wet with comparatively little sun, conditions presumably very favourable for the spread of this fungus. Plants of *Silene vulgaris* suffered very badly indeed, leaves, stems, and calyces being affected. The stems are turned brown and brittle by the fungus, while the calyces become brown and semi-transparent. Nevertheless plants were able to ripen seeds and comparatively good crops of these have been obtained. For the first time *Silene maritima* was slightly affected in 1927, some of the stems turning brown. The leaves escaped, and in September no ill-effects could be seen. The plants of *S. vulgaris* at Potterne were completely devastated and had made little or no secondary growth, though those at Kew, of quite different stocks, had largely recovered. The F_1 hybrids and most of the F_2 segregates suffered badly at Potterne, but to a less extent than pure *S. vulgaris*, presumably as a result of the resistant factor from *S. maritima* coming into play. In September excellent secondary growth had been produced, and on the whole the plants looked green and healthy, though some further infection was noted. The same disease was seen in wild plants growing in arable land near Potterne in July.

Considerations of the results obtained in F_2 .

Habit. The ratio of 99:100 for the spreading or compact nature of the branch system does not appear to be a straightforward Mendelian ratio. Moreover, our field observations suggest that we are certainly not dealing here with specific characters. The figures for the separate crosses suggest an irregular fluctuation. On the other hand the ascending habit is a definite character of the *S. vulgaris* parent as opposed to the prostrate habit of the *S. maritima* parents. In the F_1 s the habit was ascending and the dominant nature of this character is clearly indicated by the F_2

ratio of 147:52. The third pair of habit characters, the presence and absence of barren shoots, has given what is almost certainly an abnormal result. As stated above, a fungus disease did very much damage to our plants. It is most probable that the killing off of flowering branches caused the development of buds from the lower parts, and these were unavoidably counted as barren shoots. The apparent very marked bias towards *S. maritima* in this character in the F_2 can thus be explained as due to stimulation by an exceptional environmental factor, dominance being overcome and the recessive character expressing itself.

Stems. The length of the stems is a fluctuating character in the parents, and though the maximum stem length for each plant was measured it was thought sufficient to summarize the results in a graph. The chief mode is at 16 inches, with subsidiary ones at 13 and 18, and a very insignificant one at 23. None of the F_2 plants reach the maximum attained in the parent *S. vulgaris*. The hairy character known in some varieties of *S. vulgaris* was not introduced and did not appear in the course of the experiments detailed here.

Leaves. Considered as a whole the foliage in F_2 shows a marked bias towards *S. vulgaris*. We have given a very detailed analysis, and taking the totals it may be suggested that by adding M, HM, and MH together, and contrasting with the totals obtained by adding together H, VH, HV, and V, a very approximate 1:3 ratio is obtained, i.e., 50:155.

Flowers. The number of flowers on the flowering branches is a fluctuating character and it is very doubtful if the character has any genetical significance. It will be recalled that the parent *S. maritima* plants had few flowers and the *S. vulgaris* parent many, while the hybrid on the average had many. Field observations have clearly indicated that in both species this character is easily modified by environmental conditions and certainly our figures appear to have no purely genetical explanation.

The flower position relative to the pedicel shows a very strong predominance towards the drooping habit of our *S. vulgaris* parent. The proportions have been much upset by the fungus attack, making it impossible to be certain of the character in many plants, but there is no reasonable doubt that drooping is dominant to erect.

Calyx shape. We have made a careful attempt to analyze this by using 7 categories. The results are somewhat puzzling. In the M column we placed only obvious *maritima* calyces. Possibly a few of the plants counted as HM should have been included under M. There is a well marked break between the H and HV columns, so that some justification may be found for adding the last two columns together. As our figures stand we can thus obtain a proportion of 36:97:47, which is an approximation to a 1:2:1 ratio.

Petals. The degree of lobing and the overlapping give figures which indicate a 3:1 ratio, namely $\frac{3}{4}$ -lobing 3:9 : $\frac{1}{4}$ -lobing 1, and also not-contiguous 3:6 : contiguous 1.

In coronal development dominance fails and the F_1 intermediate type reappears in the largest numbers in F_2 . While our figures do not give an exact 1:2:1 ratio they certainly point to this. Again we were very careful only to include very definite scales in the M column and were prepared to find an over-balance in the intermediate and boss columns. The exact figures obtained were 29:69:42.

Diameter of corolla. Field observations have shown that there is a very wide range of variation in this character, partly correlated with habitat and season. Our original *S. maritima* parents had larger flowers (26 mm.) than the *S. vulgaris* parent (21 mm.). The graph seems to indicate some sort of segregation, since there is a mode at 20 which would correspond to the *vulgaris* type and another at 25 which would correspond to the *maritima* type. The mode at 23 may be due to the overlapping of maximum *vulgaris* and minimum *maritima* measurements. The small mode at 16 does not seem to have any significance.

Colour of stigmata. The explanation which appeared possible for the F_1 plants, on the basis of two complementary factors, breaks down entirely in the F_2 and we content ourselves for the time being with stating the following facts. In N.3 II. and N.3 III. colour was introduced in the original *S. maritima* parent while the *S. vulgaris* parent had colourless stigmata. In the F_1 plants with purplish and others with colourless stigmata appeared. In F_2 again both types occurred. In the other families both the original parents had colourless stigmata yet plants with purplish and others with colourless appeared in both F_1 and F_2 . The degree of colouration varied, but we have not yet obtained a clue to any Mendelian explanation which will fit all our figures.

Colour of immature seeds. Both the original *S. maritima* parents had pink seeds and the *S. vulgaris* parent white. The F_1 generations had pink seeds. The expectation was to obtain a 3:1 ratio in F_2 . The ratio for the totals actually obtained was 97:81. All the way through, and also in wild plants of both species, there is a considerable range in the intensity of the colour. The colour of both the stigmata and of the immature seeds is being further investigated.

Capsules. The factor inheritance for capsule shape is very clear. The F_1 plants had all (with 3 exceptions) capsules intermediate between those of the parents (see page 2, fig. 8). In F_2 , taking the figures for M and HM together, those for MH, H, and VH, and those for HV and V, we obtain the ratio 31:59:32, that is, almost exactly, 1:2:1. A re-checking of the capsules for each plant has convinced us that we are perfectly justified in so interpreting our figures.

Mature seeds. Here we have to deal with the two seed-coat characters tubercled and armadillo. Of the original parents A1 (*S. maritima*) and B1 (*S. vulgaris*) were tubercled, and on selfing proved to be heterozygous, a fact confirmed in subsequent generations, while A2 (*S. maritima*) was armadillo, a character which has proved to be recessive. As two out of the three original plants were heterozygous

it is necessary to consider the F_2 families individually. N.3 II. and N.3 III. were plants of the F_1 generation selected for selfing and each had armadillo seeds. They yielded in the F_2 only armadillo seeds. N.4 V. and N.4 VI. were plants of another F_1 generation, the former having tubercled, the latter armadillo seeds. The offspring from the selfing of N.4 V. gave four tubercled plants and one armadillo. This certainly represents a 3:1 ratio and indicates that the selfed F_1 plant was heterozygous, the tubercled factor being dominant over the armadillo. N.4 VI. again gave only armadillo plants. N.5 VII. and N.5 VIII., from a third F_1 generation, were plants with armadillo seeds, and this character alone appeared when each was selfed.

Summary.

We here arrange under three headings the conclusions, so far reached, concerning the genetical behaviour of the characters studied.

Characters with a genetic basis.

- (1). Ascending or prostrate habit, the former dominant.
- (2). *Vulgaris* or *maritima* foliage, the former dominant.
- (3). Drooping or erect flowers, the former dominant.
- (4). *Vulgaris* or *maritima* calyx, dominance fails, F_2 1:2:1.
- (5). Lobing of petals $\frac{2}{3}:\frac{2}{3}$, the former dominant.
- (6). Petals not contiguous or contiguous (or overlapping), the former dominant.
- (7). Scale or boss on petals, dominance fails, F_2 1:2:1.
- (8). *Vulgaris* or *maritima* capsules, dominance fails, F_2 1:2:1.
- (9). Tubercled or armadillo seeds, the former dominant.

Characters not interpreted on a genetic basis and possibly not factorially inherited.

- (10). Compact or spreading nature of the branch system.
- (11). Length of stems.
- (12). Number of flowers on flowering branches.

Characters not yet interpreted genetically but probably segregating.

- (13). Presence or absence of barren shoots.
- (14). Diameter of corolla.
- (15). Colour of stigmata.
- (16). Colour of immature seeds.

Samples of the material dealt with in this paper are preserved at the Herbarium at Kew.

II.—NEW SPECIES OF NOTOTRICHE FROM CHILE WITH NOTES ON MALVASTRUM. A. W. HILL.

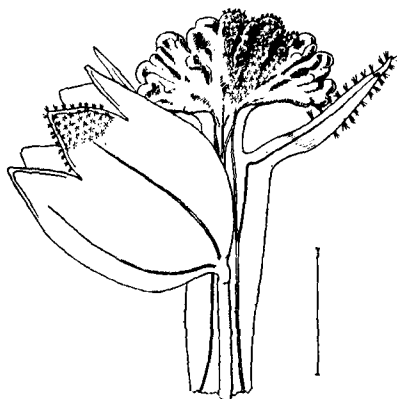
Among Dr. E. Werdermann's Chilean plants, collected in the year 1926 in the Provinces of Tacna, Tarapacá and Atacama, six distinct species of the genus *Nototriche* are represented, two of which are annuals.

Of the perennial species one, No. 973, from the Cordillera Rio Figueroa, Prov. Atacama, proves to be *Nototriche holoserica* A. W. Hill, described in *Kew Bulletin*, 1927, p. 248, from a specimen collected by Dr. Werdermann two years before and also by Dr. Ivan M. Johnston in the same region.

Another, No. 1085, from the Cordillera Arroyo Coyacagua, Peña blanca, at about 4000 m., is identical with *Nototriche rugosa* A. W. Hill, collected by Philippi in the Cordillera of Tarapacá, and does not appear to have been collected by anyone else.

A third perennial species, No. 1082, from the Cordillera Cerro Columfusca, Prov. Tarapacá, unfortunately bears no flowers, but it probably should be referred to *Nototriche Philippii* A. W. Hill. The leaves are covered with a fine grey velvety tomentum on both sides, thus differing from *N. rugosa* where the lower side of the leaf is almost glabrous, but the leaves are a good deal larger, and it may be a robust example of *N. Philippii*.

The other perennial species, No. 1071, also from the province of Tarapacá, appears to be allied to *N. pulvilla* A. W. Hill, but proves to be quite a distinct species. It is distinguished by the leaves being nearly glabrous and strongly nerved on the lower surface and in having the tips of the stipules projecting beyond the leaves and also in the long beaks to the carpels.



Nototriche pulvinata A. W. Hill ($\times 3$).

***Nototriche pulvinata* A. W. Hill**; species *N. Philippii* A. W. Hill affinis, sed foliis dorso subglabris conspicue nervatis, stipulis elongatis, carpellis longe rostratis praecipue differt.

Fruticulus depressus, caespitosus, pulvinatus, cinerascens; caudex subterraneus, crassus, lignosus, ramosus. *Folia* dense aggregata, rosulata; petiolus 1.2 cm. longus; stipulae fere usque ad apicem petioli adnatae et cum eo quasi vaginam subglabram 1 cm. longam formantes, parte libera membranacea lanceolata-acuta

6-7 mm. longa laminam superante, ad margines pilis stellatis sparsis instructae; lamina ambitu semicircularis vel obcuneata, 3-4 mm. longa, 6-8 mm. lata, supra pilis stellatis asperulis sparse instructa, infra subglabra, conspicue nervata, inter lobum medium et lobos laterales infra medium incisa, 7-9-fida, lobis lateralibus 3-5-fidis; lobulae carnosae, obtusae, dense confertae. *Calyx* circa 7 mm. longus, infra glaber, lobis 2 mm. longis extus pilis stellatis asperulis instructis intus glabris. *Corolla* 1.2 cm. longa; petala late obovata, apice emarginata, basi in tubum 5 mm. longum coalita; stamina pauca, in caput globosum aggregata. *Carpella* 7 mm. longa, birostrata, pilis stellatis asperulis instructa, rostris 3 mm. dorso longis, pilis longioribus, instructis.

CHILE. Prov. Tarapacá: Cordillera Cerro Columfusca; Aguada, circa 4400 m., *Werdermann* 1071.

The two annual species are of particular interest, and both come from the volcano of Tacora in the Province of Tacna. Both represent undescribed species, and neither very closely resemble the only two annual species hitherto discovered, *N. pygmaea* A. W. Hill, collected by D'Orbigny near the Laguna de Potosi, Bolivia, due east of Tacna, and *N. pusilla* A. W. Hill, collected by Weddell and again by Weberbauer in Peru to the north of Cerro de Pasco.

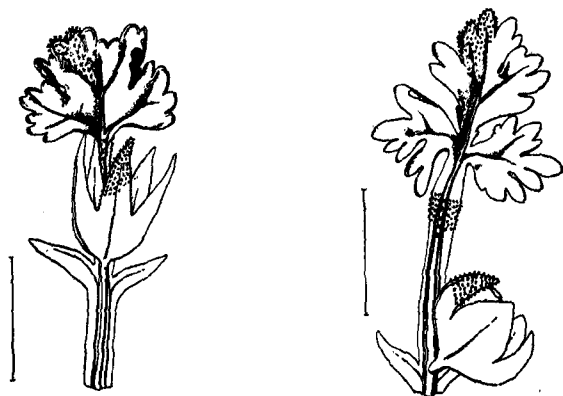
These two new plants differ from the earlier-known species especially in having the leaf lamina trilobed in one case about halfway and in the other completely to the base. They are evidently nearly allied to each other, but differ sufficiently in size, in the nature of the tomentum and in leaf and fruit characters to be regarded as distinct species.

The descriptions are as follows:—

***Nototriche nana* A. W. Hill**; species *N. pusillae* A. W. Hill assimilis, sed laminis ad basin tripartitis, carpellis erostratis praecipue differt.

Herba annua, prostrata, caespitosa, ramis axillaribus 1-3 cm. longis solo adpressis. *Folia* aggregata, rosulata, cinereo-viridia, uti rami minute et sparse stellato-tomentosa; petiolus circiter 0.5-1.5 cm. longus; stipulae 2-3 mm. longae, lineari-lanceolatae, inferne tantum petiolo adnatae, et cum eo vaginam brevissimam formantes; lamina herbacea, ambitu triangulari-semicircularis, circiter 5 mm. longa, 7 mm. lata, ad basin tripartita, venis palmatis instructa, segmentis ambitu rotundato-obcuneatis ad medium trifidis iterum multilobis, lobis obovatis obtusis vel subacutis. *Flores* prope basin petioli insidentes, sessiles. *Calyx* circiter 3 mm. longus, lobis 2 mm. longis triangulari-acutis, subglaber vel sparse hirsutus. *Corolla* 2.5 mm. longa; stamina in caput rotundum aggregata. *Carpella* 1.75 mm. longa, erostrata, dorso minute stellata.

CHILE. Prov. Tacna: Cordillera Volcan Tacora; Ancara, 4300 m., *Werdermann* 1121.



Left.—*Nototriche sarmentosa* A. W. Hill ($\times 3$).
Right.—*Nototriche nana* A. W. Hill ($\times 3$).

***Nototriche sarmentosa* A. W. Hill**; species *N. nanae* A. W. Hill affinis, sed planta maxima, ramis crassioribus, foliis majoribus circiter ad medium trifidis, carpellis minute rostratis differt.

Herba annua, prostrata, sarmentosa, ramis axillaribus 4-7 cm. longis solo adpressis. *Folia* arcte aggregata, rosulata, cinereo-viridia, uti rami et petioli pilis stellatis laxis sparse instructa; petiolus 0.8-1.1 cm. longus; stipulae usque ad medium petioli adnatae, lineari-lanceolatae, sparse stellatae; lamina herbacea, ambitu semicircularis, 4-5 mm. longa, 0.7-1.3 cm. lata, minute velutina, plus minusve ad medium triloba, lobo medio maximo, lobis iterum subtrilobatis, lobulis ipsis 4-7-lobulatis, lobulis ultimis crenatis. *Flores* ad medium petioli insidentes, sessiles. *Calyx* 5 mm. longus, ad medium 5-lobus, pilis stellatis instructus, lobis triangulari-acutis. *Corolla* circiter 2-2.5 mm. longa, tubo 0.5 mm. longo; stamina pauca, in caput rotundum coartata. *Carpella* 1.75 mm. longa, minute bi-rostrata, rostris 0.1 mm. longis apice pilis stellatis minutis instructis.

CHILE. Prov. Tacna: Cordillera Volcan Tacora; Ancara, 4300 m., Werdermann 1123.

Notes on *Malvastrum*.

***Malvastrum nubigena* Baker fil.**—In looking through the sheets of *Malvastrum*, in connection with the Werdermann collection, I find that *Malvastrum Buchtieni* Pax, described in Fedde's Repertorium, vii (1909), p. 243 (*Plantae novae bolivianae*, iii, Lingelsheim, Pax and Winkler), is identical with *Malvastrum nubigena* Baker fil., described in the year 1891 in Journ. Bot. xxix, p. 172.—See also amplified description with synonymy in A. W. Hill, Journ. Linn. Soc., Bot. xxxix, October 1909, p. 223.—The specimens and descriptions agree very closely and the locality is the same for both. *M. nubigena* Baker fil., being the older name, has precedence of *M. Buchtieni* Pax.

A. W. H.

PLATE I



Branching in the African Oil Palm.

To face page 21.]

Malvastrum coccineum (Pursh) A. Gray. The new combination *Nototriche coccinea* (Pursh) Nieuwl. & Lunell in Amer. Midl. Nat. iv, 476 (1916), is invalid for two reasons. In the first place it duplicates the already existing valid name *Nototriche coccinea* A. W. Hill in Engl. Jahrb. xxxvii, 583 (1906); and in the second place the authors have rejected the generic name *Malvastrum* A. Gray in favour of *Nototriche* Turcz. (sensu ampl.), on the ground that it was unsuitable or badly formed—"Name unfit as built on *Malva*." As this is contrary to the International Rules, Art. 50—"No one is authorised to reject, change or modify a name (or combination of names) because it is badly chosen, or disagreeable, or another is preferable"—the combination *Nototriche coccinea* is a nomen abortivum apart from the existence of the earlier *Nototriche coccinea* A. W. Hill.

M. L. G.

III.—BRANCHING IN THE AFRICAN OIL PALM. M. T. DAWE.

In a recent journey in the Colony of Sierra Leone my attention was drawn to a very remarkable case of branching in the Oil Palm (*Elaeis guineensis*).

The palm is growing in a clump of bush on the estate of Mr. M. S. Brown, situated at Pa Lokko near Waterloo. The bush surrounding it has evidently been preserved from early days in protection of this extraordinary palm. It is said that it was regarded as sacred by the people of the Koya country, and that in days gone by they actually made human sacrifices to the tree.

It is not surprising that such a remarkable and abnormal case of branching of an Oil Palm should be regarded by the natives as a very extraordinary abnormality, and looked upon by them as possessing some fetish significance. That the people of the present generation regard it with awe and fear is evident, as the owner informed me that he had the greatest difficulty in getting the natives to clear away the underscrub and bush in the immediate vicinity of the palm.

In the opinion of the older inhabitants this palm is over one hundred years old, and the owner informs me that it had never been known to bear any fruit. This further abnormal character may be an added reason for the natives regarding it as a fetish palm.

As will be seen from the accompanying photograph, the palm branches at the height of six feet or so, and sends up from a kind of fasciated growth eight normal-size branches which attain the usual height. A small anthill will be seen encrusted to the base of the main stem. A further remarkable feature is that two of the branches have also branched. One of these is on the extreme left of the photograph, the other is in the middle (top). It is presumed, in the case of the left branch, that one of the branchlets has been broken off by wind, and not that a new branch has been formed subsequent to the breaking off of a main branch. I assume this, as a large number

of palms are decapitated in times of scarcity for the sake of the "cabbage," which is eaten, and, I have never seen a case of a new growth forming on a decapitated palm.

Branching in palms is only habitual in the case of two species of *Hyphaene*, *H. thebaica*, the Doum Palm of Northern Africa, and also *H. Petersiana*. It is occasional in several other genera such as *Areca*, *Borassus*, *Oreodoxa*, *Phoenix*, *Cocos*, etc., but I cannot trace any record in literature of a case of branching in the Oil Palm. Sir Daniel Morris, in his interesting paper, "On the Phenomena concerned in the Production of Forked and Branched Palms" (Journ. Linn. Soc. xxix, 297) says, "In Coccineae the only branched specimens so far recorded belong to the single species *Cocos nucifera*. In the other genera of the tribe, for instance *Elaeis*, are included palms occupying the area of nearly half a continent, and yet not a single instance of branching appears to be recorded amongst them."

In many cases branching or forking in palms is due to some injury to, or the destruction of, the apical bud or growing point, which causes the development of axillary buds in the crown of the palm below the terminal bud; such buds lengthen out and become branches. It is, however, difficult to accept that the cases of branching represented in the palm here shown are each due to accidental causes, since the repeated branching would seem to indicate a physiological character.

It would be interesting to learn if any other cases of branching in the Oil Palm have been met with in any other part of West Africa or elsewhere.

IV.—TROPICAL AFRICAN PLANTS: II.* J. HUTCHINSON AND J. M. DALZIEL.

ARISTOLOCHIACEAE.

The genus *Aristolochia*, as at present defined, comprises a large group of species with considerable diversity of floral structure. A comprehensive study of the whole genus would probably show that a number of distinct genera could be established. In Africa, at any rate, and especially in West Africa, we have detected a group which is of very great interest from a phylogenetic point of view in that it apparently points to the origin of the genus and is evidently an ancestral type. These species, for which we have proposed the name *Pararistolochia* in the Flora of West Tropical Africa (pt. 1, p. 75), are characterised by having an actinomorphic more or less equally 3-lobed perianth-limb and a remarkable cucumber-shaped indehiscent fruit which is longitudinally ribbed and traversely locellate. This type of fruit is very different from the ordinary obovoid capsule of *Aristolochia* proper. We have seen fruits of only a small proportion of the species enumerated below, and some of them are very imperfectly known, so that considerably more collecting is necessary before an adequate account of the genus can be given.

*Continued from K.B. 1927, p. 157.

***Pararistolochia* Hutch. et J. M. Dalz.**; genus novum ab *Aristolochia* Linn. perianthii limbo regulariter 3-lobato, fructu elongato indehiscente transverse locellato lignoso valde costato differt.

Frutices volubiles. *Folia* alterna, petiolata, integerrima vel trilobata, basi rotundata vel cordata. *Perianthium* plerumque oblique tubulosum, basi globoso-inflatum, superne leviter sensim ampliatus, limbo subactinomorpha regulariter triangulari-trilobato, rarius lobulis intermediis. *Stamina* etcetera *Aristolochiae*, sed fructus elongatus indehiscens valde costatus lignosus transverse locellatus, seminibus planis duris.

Clavis specierum.

Perianthii lobi lobulis intermediis instructi; folia non visa...1. *ju-ju*.

Perianthii lobi lobulis intermediis haud instructi:

Folia basi rotundata, haud vel leviter cordata:

Perianthii lobi 10-12 cm. longi.....2. *Soyauxiana*.

Perianthii lobi usque ad 6 cm. longi:

Perianthii lobi 4-6 cm. longi:

Perianthii tubus circiter 6-7 cm. longus, basi conspicue inflatus:

Perianthii lobi 5-8 cm. longi:

Perianthii lobi haud caudati:

Perianthii lobi aequales, basi late ovati.....3. *Flos-avis*.

Perianthii lobi inaequales, lanceolati.....4. *Staudtii*.

Perianthii lobi longe caudati.....5. *Preussii*.

Perianthii lobi 2-2.5 cm. longi.....6. *Zenkeri*.

Perianthii tubus circiter 4 cm. longus, basi leviter inflatus, lobis 3-4 cm. longis.....7. *tribrachiata*.

Perianthii lobi circiter 1 cm. longi; flores racemosi:

Ramuli floriferi satis robusti; perianthii tubi pars inflata ambitu elliptica, circiter 1 cm. longa, lobis triangularibus

8. *leonensis*.

Ramuli floriferi graciles; perianthii tubi pars inflata ambitu subglobosa, circiter 0.7 cm. longa, lobis lineari-subulatis

9. *ceropegioides*.

Folia basi profunde cordata:

Folia plus minusve trilobata; perianthii tubus circiter 8 cm. longus:

Folia distincte trilobata, sino basale angusto.....10. *triactina*.

Folia undulate lobata, sino basale lato.....11. *Schweinfurthii*.

Folia haud lobata; perianthii tubus circiter 18 cm. longus.....12. *Goldieana*.

1. ***Pararistolochia ju-ju* Hutch. et J. M. Dalz.**, comb. nov. *Aristolochia ju-ju* S. Moore in Journ. Bot. 1920: 269. Nigeria: Southern Provinces; Degema, Talbot 3766.

2. ***Pararistolochia Soyauxiana* Hutch. et J. M. Dalz.**, comb. nov. *Aristolochia Soyauxiana* Oliv. in Hook. Ic. Pl. t. 1410 (1883).

Gabon : Sibange Farm, Nov., *Soyaux* 317 (type). Loango, Dec., *Soyaux* 182.

3. **Pararistolochia Flos-avis** Hutch. et J. M. Dalz., comb. nov. *Aristolochia Flos-avis* A. Chev. in Journ. de Bot., 1909 : 129. *A. Tessmannii* Engl. Bot. Jahrb. 46 : 413 (1911).

Sierra Leone : Commendi-Gengar Road, Nov., *Burbridge* 622. Ivory Coast : Guidéko, May, *Chevalier* 16434 (type); between Sampleu and Genhoué, in the forest, Apr., *Chevalier* 21145. Gold Coast : without locality, *Gould*. Nigeria : Southern Provinces; Oban, *Talbot* 213. Cameroons : Bipinde, *Zenker* 2261, *2792, 3484; Bitye, *Bates* 1250. Spanish Guinea : Bebai, Dec., *Tessman* 717.

4. **Pararistolochia Staudtii** Hutch. et J. M. Dalz., comb. nov. *Aristolochia Staudtii* Engl. Bot. Jahrb. 24 : 491 (1897).

Cameroons : Lolodorf, in damp shady places rich in humus in the forest, Mar., *Staudt* 186.

5. **Pararistolochia Preussii** Hutch. et J. M. Dalz., comb. nov. *Aristolochia Preussii* Engl. Bot. Jahrb. 24 : 492 (1897).

Nigeria : Southern Provinces; Barombi, between the station and Kumba, Apr., *Preuss* 108.

6. **Pararistolochia Zenkeri** Hutch. et J. M. Dalz., comb. nov. *Aristolochia Zenkeri* Engl. Bot. Jahrb. 24 : 490 (1897).

Cameroons : Bipinde, in shady forest, Dec., *Zenker* 1226 (type), 2056.

7. **Pararistolochia tribrachiata** Hutch. et J. M. Dalz., comb. nov. *Aristolochia tribrachiata* S. Moore in Cat. Talb. Nig. Pl. 92 (1913).

Nigeria : Southern Provinces; Oban, *Talbot* 213, 1542 (type).

8. **Pararistolochia leonensis** Hutch. et J. M. Dalz., comb. nov. *Aristolochia leonensis* Mast. in Journ. Linn. Soc. 30 : 95 (1894).

Sierra Leone : near Kassa, 1100 m., Mar., *Scott Elliot* 5062 (type); near Berria, Falaba, Mar., *Scott Elliot* 5401.

9. **Pararistolochia ceropegoides** Hutch. et J. M. Dalz., comb. nov. *Aristolochia ceropegoides* S. Moore in Journ. Bot. 58 : 269 (1920).

Cameroons : Bitye, *Bates* 1235 (type), 1446; Jaunde, Jan., *Mildbraed* 7848.

10. **Pararistolochia triactina** Hutch. et J. M. Dalz., comb. nov. *Aristolochia triactina* Hook. f. in Trans. Linn. Soc. 25 : 186 (1865).

Nigeria : Southern Provinces; Lagos, *Maloney* 18; *Dalziel* 1076; Itu, Apr., *Holland* 26. Gabon : Corisco Bay, *Mann* 1851 (type).

11. **Pararistolochia Schweinfurthii** Hutch. et J. M. Dalz., comb. nov. *Aristolochia Schweinfurthii* Engl. Bot. Jahrb. 24 : 492 (1897).

Eastern Sudan : Munza, Monbuttum-land, Apr., *Schweinfurth* 3507 (type); Yei River, Lado district, *Sillitoe* 354. Uganda : Entebbe,

Mahon. Mukono, Oct., *Dummer* 334. Angola : Quilemda, near Monte de légre, Nov., *Gossweiler* 4884.

According to Mahon, this is common in a small area on the lake shore near Entebbe; it is a vigorous climber with numerous flowers on the oldest stems.

12. **Pararistolochia Goldieana** Hutch. et J. M. Dalz., comb. nov. *Aristolochia Goldieana* Hook. f. in Trans. Linn. Soc. 25 : 185, t. 14 (1865).

Sierra Leone : Port Lokko, Apr., *Scott Elliott* 5747; Pendumbu, Apr., *Scott Elliot* 5682. Nigeria : Northern Provinces; near Lokoja, *Elliott* 250; Southern Provinces; Old Calabar, *Thomson* (type); Oban, *Talbot* 2340; Elugu, *Barter* 3427. Fernando Po, May, *Mann* 391. Cameroons : Dengdeng, *Mildbraed* 8812.

CAPPARIDACEAE.

Capparis biloba Hutch. et J. M. Dalz., sp. nov.; affinis *C. erythrocarpae* Isert, sed foliis utrinque rotundatis apice emarginatis, petalis apice profunde bilobatis, ovario haud costato differt.

Rami aculeati, minute ferrugineo-puberuli, aculeis recurvatis latere complanatis circiter 5 mm. longis. *Folia* late elliptica, utrinque rotundata, apice emarginata, 4.5–6 cm. longa, 2.5–3.5 cm. lata, glabra, nervis lateralibus utrinsecus 5–6 patulis utrinque prominulis; petioli 5–6 mm. longi, puberuli. *Flores* pauci, terminales, corymbosi, bracteis aculeatis, pedicellis usque ad 2 cm. longis minute puberulis. *Sepala* 1–1.5 cm. longa, late elliptica, marginibus tenuibus glabris, extra puberula. *Petala* profunde biloba, late obovata, circiter 2.5 cm. longa, intra arachnoideo-pubescentia. *Filamenta* rubescentia. *Ovarium* longe stipitatum, ovoideum, glabrum.

Gold Coast : Assuantsi, Sept., flowers pink and white, *Dalziel* 160.

Ritchiea obanensis Hutch. et J. M. Dalz., sp. nov.; affinis *R. oreophila* Gilg et Benedict, sed inflorescentiis multifloris differt.

Rami crassi, lenticellis numerosis notati. *Folia* magna, trifoliolata; foliola late elliptica vel ovato-elliptica, acute acuminata, basi rotundata vel brevissime cuneata, usque ad 30 cm. longa et 12 cm. lata, glabra, nervis lateralibus utrinsecus 6–8 infra valde prominentibus marginem versus prominenter conjunctis, nervis tertiariis paucis gracilibus; petioli usque ad 15 cm. longi, supra plani, petiolulis 0.5–1 cm. longis. *Inflorescentiae* ad apices ramulorum aggregatae, multiflorae, usque ad 15 cm. longae; bractee persistentes, subulatae, induratae, 1.5 mm. longae; pedicelli 1.5 cm. longi, puberuli. *Sepala* obovato-elliptica, acuminata, 2 cm. longa, marginibus puberulis. *Petala* lineari-filiformia, sepalis duplo longiora, marginibus corrugato-undulatis. *Stamina* numerosa; antherae 3 mm. longae. *Ovarium* longe stipitatum, oblongum, glabrum. *Fructus* immaturus obtuse longitudinaliter costatus, verruculosus.

Nigeria : Southern Provinces; Oban, *Talbot* 58 (type). Fernando Po, *Mann*.

CRUCIFERAE.

Nasturtium benuense Hutch. et J. M. Dalz., sp. nov.; affinis *N. humifuso* Guill. et Perr., sed foliis brevioribus, inflorescentiis in ramis foliatis ortis, fructibus oblongo-lanceolatis circiter 5 mm. longis stylo brevissimo differt.

Herba parva usque ad 6 cm. alta; rami glabri. *Folia* pinnata, segmentis alternatis ovatis usque ad 1 cm. longis et 0.8 cm. latis obtuse dentatis glabris nervis lateralibus utrinsecus 3-4. *Racemi* breviter pedunculati, 2.5 cm. longi; pedicelli 0.75 mm. longi, patuli. *Sepala* 1 mm. longa, glabra. *Petala* parva. *Ovarium* ellipsoideum, glabrum, stigmata sessile disciforme.

Nigeria: Northern Provinces; Abinsi, Apr., in stream beds of the Benue river, Dalziel 746.

VIOLACEAE.

Rinorea djalonensis A. Chev. Explor. Bot. Afr. Occ. Franç. 34, nomen; affinis *R. arenicolae* M. Brandt, sed connectivo integro, ramulis costa media et nervis lateralibus setoso-pilosis, foliis obovato-ellipticis subabrupte acute acuminatis basi obtusis vel subacutis 20 cm. longis vel ultra 8-10 cm. latis crasse serratis differt.

French Guinea: Labé, Mar., Chevalier 12394: between Ditinn and Diaguissa, Apr., Chevalier 12845; Kindia, Mar., Chevalier 13105; from Kala to Diaguissa, 1200-1400 m., Apr., Chevalier 13552; Futa-Jallon, Chevalier 18742 (type).

Hybanthus thesiifolius Hutch. et J. M. Dalz., comb. nov. *Ionidium thesiifolium* DC. Prodr. 1: 309 (1824). *I. thesiifolium* var. *chenopodioides* Guill. et Perr. Tent. Fl. Seneg. 35. *I. enneaspermum* Oliv. Fl. Trop. Afr. 1: 105, partim, non Vent. *Viola guineensis* Schum. et Thonn. Beskr. Guien. Pl. 133 (1827).

Senegal: St. Louis, Heudelot, Walo, etc., Heudelot; Roger 146. Gold Coast: Accra, Moloney; Brown 409; Deighton 570; Achimota, Irvine 129.

POLYGALACEAE.

Carpolobia glabrescens Hutch. et J. M. Dalz., sp. nov.; a *C. lutea* G. Don floribus majoribus, sepalis latioribus ovatis vel ovato-lanceolatis leviter ciliatis differt.

Frutex circiter 3 m. altus; ramuli leviter flexuosi, primum breviter pubescentes demum glabrescentes. *Folia* oblonga vel oblongo-elliptica, utrinque triangulari-attenuata, apice acute subcaudato-acuminata, 6-11 cm. longa, 2.5-4 cm. lata, integra, fere membranacea, glabra vel fere glabra, nervis lateralibus utrinsecus 4-6; petioli circiter 2 mm. longi, breviter pubescentes. *Racemi* axillares, 3-4-flori; pedicelli 5 mm. longi, minute puberuli; bracteae oblongo-subulatae, breviter pubescentes, 1.5-2 mm. longae. *Sepala* subaequalia, ovata ad ovato-lanceolata, apice rotundata, usque ad 8 mm. longa, ciliolata. *Petala* 1.5 cm. longa. *Stamina* petalis breviora. *Ovarium* glabrum. *Fructus* circiter 1.5 cm. diametro. *Semina* ellipsoidea, circiter 1 cm. longa, dense aureo-villosa.

Fernando Po: Mann 78 (type). Nigeria: Southern Provinces, Johann-Albrechtshöhe, Staudt 460. Cameroons: Bipinde, Zenker 1016, 1106, 1588, 2787, 2869, 3016a, 3656, 3842, 4443, 4489. Gabon: Sibange Farm, Soyaux 304. Angola; Golungo Alto, Welwitsch 996.

The plants here described have been previously named *C. alba* G. Don and *C. lutea* G. Don, and will be found under these names in herbaria. They may represent a hybrid of these two species, which are both rather variable.

ELATINACEAE.

Bergia guineensis Hutch. et J. M. Dalz., sp. nov.; affinis *B. suffruticosae* Fenzl., sed sepalis ovato-lanceolatis sensim acuminatis ad apicem pubescentibus, antheris haud mucronatis differt. *Bergia suffruticosa* Oliv. Fl. Trop. Afr. 1: 153, partim, non Fenzl. *Talinum crassifolium* A. Chev. Explor. Bot. Afr. Occ. Franç. 48, non Willd. *Lancretia suffruticosa* Guill. et Perr. Tent. Fl. Seneg. 108, non Del.

Suffrutex ericoideus, ramis patulis vel decumbentibus interdum elongatis molliter et albido-pubescentibus. *Folia* opposita vel verticillata, majora elliptica, breviter petiolata, basi plus minusve cuneata, usque ad 3 cm. longa et 1.3 cm. lata, plerumque minora, crebre serrata, utrinque scabrido-pubescentia, nervis lateralibus utrinsecus 4-5 prominulis; stipulae lineari-lanceolatae, foliaceae, dentatae, usque ad 0.5 cm. longae. *Flores* axillares, glomerati; pedicelli usque ad 0.5 cm. longi, pubescentes. *Sepala* ovato-lanceolata, longe et acute acuminata, 4-5 mm. longa, 2 mm. lata, dorso crasse carinata et ad apicem pubescentia, margine membranaceo. *Petala* obovata, acuta, sepalis paulo longiora, 3-nervia, 5 mm. longa. *Filamenta* 3 mm. longa, basi complanata; antherae 1 mm. longae, haud mucronatae. *Ovarium* ovoideum, 2.5 mm. longum; styli 5, fere 2 mm. longi.

Senegal: Roger (type); Heudelot. French Sudan: Niala, Chevalier 1134. Ivory Coast: near Assikasso, Chevalier 22577. Nigeria: Northern Provinces; Kuka, Vogel 14; Katagum, very common in bush and waste places, Dalziel 190; Sokoto, Moiser 192, 255.

MOLLUGINACEAE.

Mollugo Chevalieri Hutch. et J. M. Dalz., sp. nov.; affinis *M. Cervianae* Seringe, sed foliis caulinis anguste oblanceolatis, floribus glomeratis, glomerulis sessilibus vel breviter pedunculatis, seminibus nigris turgidis.

Herba multe ramosa, ramis flexuosis stramineis angulatis glabris. *Folia* radicalia obovato-spatulata, usque ad 1.5 cm. longa, mox decidua, caulina anguste oblanceolata, usque ad 4 mm. lata, 1-nervia, glabra. *Pedicelli* 2-3 mm. longi, glabri. *Sepala* ovato-elliptica, margine hyalina, 2 mm. longa, glabra. *Capsula* membranacea, ovoideo-globosa, 2.5 mm. longa. *Semina* laevia, nigra, nitida, turgida, 0.75 mm. lata.

French Sudan: San, banks of the Bani river, June, Chevalier 1080.

POLYGONACEAE.

Afrobrunnichia *Hutch. et J. M. Dalz.*; genus novum a *Brunnichia* Banks pedicellis fructiferis utrinsecus ala lata instructis, calycis lobis vix imbricatis, nuce turgido differt.

Frutex ramulorum apicibus tendriliformibus scandens. *Folia* alterna, elliptica, acuminata, petiolo basi angustissime amplexicauli, ocrea obsoleta. *Flores* racemoso-paniculati, hermaphroditi, parvi; pedicelli per anthesin anguste complanati, apicem versus articulati, fructiferi supra articulationem utrinsecus late alati et elongati. *Calyx* basi breviter tubulosus, lobis 5 anguste lanceolatis conniventibus. *Stamina* plerumque 8, e perianthii lobis longe exserta, filamentis filiformibus; antherae late ellipsoideae. *Ovarium* turgidum; styli 3, filiformes; ovulum e funiculo longo pendulum. *Nux* perianthio inclusa, ovoidea, cuspidata, turgida sed lineis 3 longitudinalibus leviter impressis notata. *Semen* ambitu nuce conforme, profunde longitudinaliter trisulcatum, albumine irregulariter ruminato.

Clavis specierum.

Ramuli teretes, glabri; cirrhi ramulos laterales foliatis terminantes
erecta.
Ramuli angulares, rubiginoso-puberuli; cirrhi axillares, haud vel
vix foliati.....*africana*.

Afrobrunnichia erecta *Hutch. et J. M. Dalz.*, comb. nov. *Brunnichia erecta* Aschers. in Jahrb. Königl. Bot. Gart. Berlin 1: 334 (1881); Baker and Wright in Dyer Fl. Trop. Afr. 6, 1: 119. *B. africana* Welw. var. *glabra* Dammer in Engl. Bot. Jahrb. 26: 357. *B. africana* Stapf in Johnston, Liberia 2: 644, non Welw.

Liberia: near Kakatown, *Whyte*. Ivory Coast: Bouroukrou, *Chevalier* 16692, 16803; Makougnié, *Chevalier* 17015; valley of the Agniéby, *Chevalier* 17137; basin of the Lower Cavally, *Chevalier* 19313; Morénou, *Chevalier* 22489. Gold Coast: Axim, *Burton*; Bompata, *Dalziel* 112. Nigeria: Southern Provinces; Ijan, fr. Jan., *Millen* 140; Oban, *Talbot* 1497. Cameroons: Duala, *Dalziel* 8152; Bipinde, *Zenker* 1125, 2031, 2272, 2272a, 2823, 3490; Bitye, near the river Ja, *Bates* 1783; between Ediki and Bakunda, *Winkler* 1046. Gabon: Sibange Farm, *Soyaux* 152 (type), 382; Libreville, *Klaine* 503. Belgian Congo: Mobwasa, *Vermoesen* 250.

Afrobrunnichia africana *Hutch. et J. M. Dalz.*, comb. nov. *Brunnichia africana* Welw. in Trans. Linn. Soc. 27: 61 (1869); Oliv. in Hook. Ic. Pl. 14: 21, t. 1328; Dammer in Engl. Bot. Jahrb. 26: 357; Hiern in Cat. Afr. Pl. Welw. 1: 905; Baker and Wright in Dyer Fl. Trop. Afr. 6, 1: 119.

Angola: Golungo Alto District; in forests near streams among mountains in Sobato de Bumba and at Capopa waterfall near Sange, *Welwitsch* 1754 (type).

CHENOPODIACEAE.

Chenolea muricata *Hutch. et J. M. Dalz.*, comb. nov. *Kochia muricata* Schrad. Neues Journ. 3: 86 (1809). *Echinopsilon muricatus* Mog. in Ann. Sc. Nat. Ser. ii. 2: 127 (1834); A. Chev. Expl. Bot. Afr. Occ. Franç. 533.

Mauritania: Dhreine, *Charles* 28877.

AMARANTACEAE.

Achyranthes Talbotii *Hutch. et J. M. Dalz.*, sp. nov.; inter species africanas foliis linearibus glabris spicis gracillimis valde distincta.

Caules glabri, internodiis 2-3 cm. longis. *Folia* opposita, linearia vel anguste lineari-lanceolata, acuta, basi sensim angustata, 5-7 cm. longa, 3-8 mm. lata, glabra, nervis lateralibus obscuris; petioli usque ad 0.5 cm. longi. *Spicae* terminales vel ramulos breves axillares terminantes, gracillimae, usque ad 15 cm. longae; axis subquadrangularis, pubescens; bracteae recurvae vel reflexae, ovato-lanceolatae, acutissime acuminatae, 2 mm. longae, hyalinae. *Flores* mox abrupte reflexi, 3.5-4 mm. longi. *Bracteolae* e basi orbitali hyalino subulatae, circiter 2 mm. longae. *Calycis* segmenta anguste lanceolata, acuta, viridia. *Stylus* 0.75 mm. longus.

Nigeria: Southern Provinces; Oban, *Talbot* (sine numero in Herb. Kew.).

LINACEAE.

Hugonia Chevalieri *Hutch. et J. M. Dalz.*, sp. nov.; affinis *H. spicatae* Oliv., sed foliis acutis acuminatis brevioribus, stipulis extralanatis, ovario glabro differt.

Ramuli novelli molliter lanato-tomentosi. *Folia* elliptica vel oblongo-elliptica, basi rotundata, apice acute et subabrupte acuminata, 9-14 cm. longa, 5-7 cm. lata, grosse crenato-dentata, supra demum fere glabra, infra molliter lanata; nervi laterales utrinsecus circiter 16, a costa sub angulo latissimo abeuntes, nervis tertiariis obscuris; petioli circiter 1 cm. longi, lanati; stipulae per anthesin persistentes, pinnatisectae, circiter 1 cm. longae, segmentis linearibus extra breviter lanatis. *Flores* axillares, subsessiles. *Sepala* ovato-lanceolata, subacute acuminata, extra lanato-tomentosa, 1 cm. longa. *Petala* anguste obovata, glabra, circiter 1.5-1.8 cm. longa, 6 mm. lata. *Ovarium* glabrum. *Fructus* obovoideus, 2 cm. longus, nitens, glaber.

Ivory Coast: basin of the Sassandra, at Guideko, May, 1907, *Chevalier* 16371.

Ochthocosmus Chippii *Sprague et Hutch.* in Chipp List Gold Coast Trees, etc., 11, nomen; affinis *O. calothyrsos* *Hutch. et J. M. Dalz.*, comb. nov. (*Phyllocosmo calothyrsos* Mildbr.), sed foliis minus dentatis, pedicellis multo brevioribus differt.

Frutex usque ad 3 m. altus. *Folia* anguste obovato-oblancheolata, apice rotundata, basi sensim angustata, 7-18 cm. longa, 2.5-6 cm. lata, distanter dentata, glabra; nervi laterales utrinsecus circiter

10, supra leviter impressi, infra prominuli marginem versus evanidi; petioli basi incrassati et transverse rugosi, usque ad 1.5 cm. longi. *Paniculae* terminales, laxiflorae, circiter 15 cm. longae; pedicelli 2-5 mm. longi, graciles. *Flores* albi vel rosei. *Sepala* suborbicularia, 2 mm. diametro, margine minute denticulata. *Petala* orbicularia, 4 mm. diametro, apice emarginata. *Stylus* 5 mm. longus. *Fructus* non visus.

Gold Coast: Axim, Apr., Chipp 424 (type); Princetown, Chipp 171.

GERANIACEAE.

Geranium brevipes Hutch. et J. M. Dalz., sp. nov.; affinis *G. favoso* Hochst., sed foliis solum ad medium lobatis, carpellis fructiferis inconspicue transverse lineatis nec tuberculatis differt.

Herba usque ad 1.25 m. alta; caules patule pilosi, pilis apice glandulosis, internodia elongata. *Folia* ambitu suborbicularia, basi late triangulari cordata, ad medium digitate 5-lobata, lobis irregulariter et profunde dentatis, infra tenuiter pilosa; petioli usque ad 4 cm. longi; stipulae subulato-lanceolatae; circiter 3-4 mm. longae, pilosae. *Flores* solitarii vel in pedunculo breviginati; pedicelli usque ad 1.5 cm. longi, graciles, pilosi. *Sepala* anguste ovata, acuminata, in nervis pilosa, 5 mm. longa. *Petala* late obovata, fere 1 cm. longa, purpurascens. *Carpella* fructifera inconspicue transverse lineata.

Cameroons Mt.: 2250 m., Dec., Mann 1261.

PITTOSPORACEAE.

Pittosporum Dalzielii Hutch., sp. nov.; affinis *P. abyssinico* Hochst., sed foliis apice longe acuminatis differt.

Arbor; ramuli teretes, glabri. *Folia* obovato-oblongeolata, acute et sensim acuminata, supra medium ad basin longe attenuata, 8-15 cm. longa, 3-5 cm. lata, obscure reticulata, glabra; nervi laterales utrinsecus 8-10, graciles, infra prominuli, inter costam et marginem bifurcati et evanidi; petioli 2-2.5 cm. longi, straminei, anguste alati. *Flores* non visi. *Fructus* valvae fere orbiculares, 5-7 mm. longae, utrinque transverse rugosae, stylo diviso persistenti brevi stigmate capitato coronatae. *Semina* ambitu suborbicularia, uno latere plana, nigra, circiter 5 mm. diametro.

Nigeria: Northern Provinces; R. Koriga, fr. Feb., Dalziel 417.

As we know at present only a fruiting example of this apparently distinct species, the description given above should be regarded as tentative.

FLACOURTIACEAE.

Dasylepis assinensis A. Chev. Expl. Bot. Afr. Occ. Franç. 39, nomen; affinis *D. brevipedicellatae* Chipp, sed foliis dentatis floribus subsessilibus differt.

Frutex? *Folia* oblango-elliptica, basi rotundata, apice obtuse et longe acuminata, circiter 12 cm. longa, 4-5 cm. lata, tenuia, dentata, glabra; nervi laterales utrinsecus 5, utrinque prominentes,

intra marginem conjuncti, inter nervos laxae et inconspicue venosi; petioli 0.5 cm. longi. *Flores* subspicati. *Sepala* late elliptica, circiter 5 mm. longa, glabra. *Antherae* 2 mm. longae.

Ivory Coast: Assinie, Apr., Chevalier 17872.

Scottellia coriacea A. Chev. Expl. Bot. Afr. Occ. Franç. 39, nomen; affinis *S. kamerunensi* Gilg, sed foliis basi cuneatis vel obtusis, petiolo longiori differt.

Arbor circiter 22 m. alta, cortice rugoso cinereo ligno pallide flavo; ramuli teretes, glabri. *Folia* elliptica vel elliptico-obovata, obtuse et subcaudato-acuminata, basi breviter cuneata, 5-9 cm. longa, 3.5-4.5 cm. lata, coriacea, nitida, superne obscure dentata; nervi laterales utrinsecus circiter 5, infra prominentes et intra marginem conjuncti et ramosi, inter nervos conspicue reticulati; petioli 1-1.5 cm. longi, apice leviter incrassati et transverse rugosi. *Flores* non visi. *Racemi* fructiferi axillares, fasciculati, usque ad 8 cm. longi; pedicelli 1 cm. longi, basi articulati, minute pubescentes. *Fructus* 1-spermus, oblique globosus vel ellipsoideus, 7 mm. diametro, crebre rugulosus. *Semina* ambitu fructui conformia, rugulosa, brunnea.

Ivory Coast: Alépé, fr. Mar., Chevalier 16231 (type); Yapo, Chevalier 22315.

Dioncophyllum Dawei Hutch. et J. M. Dalz., sp. nov.; foliis elongatis nervis lateralibus numerosissimis, seminibus crassis disciformibus valde distincta.

Frutex vel scandens; ramuli ultimi satis crassi, rubiginoso-tomentelli. *Folia* lineari-oblonga, basi subacuta, usque ad 27 cm. longa et 5.5 cm. lata, chartacea, glabra, nervis lateralibus numerosissimis utrinque prominulis a costa sub angulo fere recto abeuntibus; costa utrinque prominula, supra apicem laminae longe producta et bifurcata, segmentis valde recurvatis tendriliformibus; folia inflorescentiae elliptica ceteribus multo breviora; petioli circiter 1 cm. longi, puberuli, complanati. *Racemi* leviter supra-axillares, ubique rubinoso-tomentelli; bractae foliaceae, ovato-ellipticae, usque ad 2 cm. longae, pedicelli 1 cm. longi. *Sepala* lanceolata, acuta, 1-1.3 cm. longa, puberula. *Petala* alba, contorta, obovata, sepalis paulo longiora, glabra. *Stamina* 10, inaequalia. *Capsula* non visa. *Semina* crassa, magna, orbicularia, depressa, anguste alata, circiter 9 cm. diametro.

Sierra Leone: Pujehun District; Mano Bonjema, in sandy soil, fl. Feb., M. T. Dawe 466 (type); common in the Mano Salija to Juring area, in sand, F. C. Deighton 332.

According to Deighton this is a shrub which becomes a climber where other vegetation is available for support. The seeds are very remarkable, and at first sight resemble hard discoid fruits.

Dioncophyllum peltatum Hutch. et J. M. Dalz., sp. nov.; foliis oblanceolatis basi longe attenuatis, racemis brevibus, seminibus tenuibus latissime alatis distincta.

Frutex scandens usque ad 20 m. longus; ramuli ultimi teretes, glabri. *Folia* oblanceolata, basi longe attenuata, usque ad 15 cm. longa et 3.5 cm. lata, subcoriacea, glabra, nervis lateralibus vix distinctis; costa supra valde prominens, interdum supra apicem laminae producta et bifurcata, segmentis valde recurvatis tendriliformibus demum induratis; petioli circiter 1 cm. longi, pulvinati, minute lepidoto-rubiginoso-puberuli. *Racemi* fructiferi tantum visi, foliis multo breviores; bractee parvae, breviter subulato-lanceolatae, circiter 2 mm. longae; pedicelli usque ad 3 cm. longi. *Calyx* breviter cupulatus, triangulari-dentatus. Capsula juniora tantum visa, obovoidea, stipitata, glabra. *Semina* orbicularia, circiter 7 cm. diametro, peltata, corpore centrali orbiculare circiter 1.3 cm. diametro et ala circiter 2.5 cm. lata membranacea margine crenulata.

Sierra Leone: Lane-Poole 186 (type); Matotaka, Thomas 1287 (partly); Pihalla, Pujehun District, Dawe.

Known to the Mendi tribe as "Tomai."

V.—DIACRODON, A NEW GENUS OF RUBIACEAE FROM BRAZIL. T. A. SPRAGUE.

In a small collection of dried specimens from the State of Ceará, Brazil, received from Mr. B. G. C. Bolland in 1925, were flowering specimens of a Rubiaceae plant, which was identified as a *Borreria*, and assigned provisionally with some hesitation to *B. verticillata* (L.) G. F. W. Mey., as being possibly a form with abnormal flowers. Examination of good fruiting material recently received from Mr. Bolland in a second collection from the same region, however, has shown that the plant is not only specifically but generically distinct from *B. verticillata* in spite of the great similarity that subsists between it and that species, not only in general facies but also in many details of floral structure.

The fruits of Mr. Bolland's plant agree with *Borreria verticillata* in being crowned by the two persistent calyx-segments but differ in being strongly compressed, one-seeded and indehiscent, two of these characters suggesting the generic and specific names *Diacrodon compressus*. The tribe *Spermacoeae*, in which *Borreria* is included, may be regarded as the tropical analogue of the temperate tribe *Galieae*, from which it differs in the stipules being lacinate instead of foliaceous. Of the 18 genera recognized by K. Schumann (Engl. and Prantl, Pflanzenfam. iv. Abt. 4, 139: 1891), 8 have dehiscent fruits, 7 are schizocarpic and only 3, *Hydrophylax*, *Ernodea* and *Gomphocalyx*, have fruits which neither dehisce nor separate into mericarps. It is uncertain whether the fruit of the recently described genus, *Tobagoa* Urb. (Fedde, Repert. xiv. 341: 1916), is dehiscent or not. That of *Micrasepalum* Urb. (Symb. Antill. vii. 548: 1913) is unknown. Though the nature of the fruit of *Diacrodon* is so different from that of *Borreria verticillata*,

the agreement in other characters is so close that it might be regarded as a *Borreria* which has become monospermous and indehiscent. The primary division of the *Spermacoeae* by K. Schumann according to the character of the fruit is apparently artificial, the progression, capsule-schizocarp-achene, being one which may have occurred in more than one line of descent. According to Schumann's classification, which follows his clavis exactly, *Diacrodon* should be placed after *Ernodea*, but its real affinity, as indicated above, is with *Borreria*.

The flora of Ceará is evidently very imperfectly known. Mr. Bolland's first small collection from the country inland of Fortaleza included a new species, *Inga Bollandii*, described in *Kew Bull.* 1926, 241, and the second contained excellent material of the little-known *Stryphnodendron coriaceum* Benth., which was previously unrepresented in the Kew Herbarium, as well as a very distinct new species of *Tephrosia*, published in *Kew Bull.* 1927, 249.

Diacrodon Sprague [Rubiaceae-Spermacoeae]; genus novum, *Borreriae* G. F. W. Mey. affine, fructibus applanatis indehiscentibus monospermis necnon seminibus lateraliter compressis dignoscitur.

Calycis segmenta 2, tubo brevi hyalino connexa. *Corolla* tetramera, infundibulari-rotata, tubo intus circa medium annulo pilorum instructo. *Stamina* apice corollae tubi inserta, igitur longe exserta. *Ovarium* biloculare ovulis pro loculo solitariis circa medium septi affixis. *Fructus* valde compressus, indehiscens, loculo altero sterili, altero monospermo, pericarpio papyraceo. *Semen* oblongum, lateraliter valde compressum, hilo elongato bilineato, endospermio copioso, embryone recto, radícula inferiore. *Cymae* capitatum congestae, bracteis subulato-linearibus instructae.

D. compressus Sprague, species unica.

Herba tenax, caule quadrangulati angulis costatis, vix 2 mm. diametro 20 cm. infra apicem, laevi glabro. *Folia* subsessilia, anguste obovata vel oblanceolata, apice acuta, in basin angustata, 2-5 cm. longa, 0.5-1.3 cm. lata, supra nervis lateralibus occultis vel inconspicuis, subtus nervo medio prominente hinc inde tuberculo hyalino instructo, nervis lateralibus utrinque 4-7 valde ascendentibus prominulis; stipulae vaginantes ad 3 mm. altae, membranaceae, dentibus circiter 8 filiformi-subulatis circiter 3 mm. longis fimbriatae. *Inflorescentiae* capituliformes, terminales et in axillis foliorum superiorum; cymae bracteis numerosis subulato-linearibus usque ad 2.5 mm. longis hyalinis instructae. *Calycis segmenta* herbacea, anguste hyalino-marginata, linearia, acuta, 1.5 mm. longa, extra marginibusque pilis brevibus inflatis acutis hyalinis induta, inferne tubo calycino hyalino ciliato, ciliis glandulis stipitatis paucis intermixtis, circiter 0.4 mm. alto connexa. *Corolla* infundibulari-rotata; tubus 2 mm. longus, intus annulo pilorum medio instructus, corolla ceterum glabra; lobi deltoidei, 1.8 mm. longi, basi 1.5 mm. lati. *Stamina* incisuris corollae affixa; filamenta circiter 1.7 mm. longa;

antherae oblongae, 1.1–1.2 mm. longae, basi sinu angustissimo vix manifesto 0.5 mm. longo cordatae. *Discus epigynus* bilobus lobis circiter 0.2 mm. longis. *Ovarium* lateraliter applanatum, obovato-oblongum, 1.75 mm. longum, 0.8 mm. latum, marginibus incrassatis e calycis segmentis decurrentibus triente inferiore glabra excepta dense hyalino-pilosis; stylus 4 mm. longus; stigma capitatum, bilobum. *Ovula* infra medium septi affixa, circiter 0.7 mm. longa. *Achaenia* circuitu oblongo-turbinata, valde applanata, calyce persistente excluso 3–3.5 mm. longa, 1.7–2 mm. lata, superne albo-pilosula, inferne glabra, lineis brunneis multis longitudinalibus notata, calycis segmentis persistentibus parte connexo incluso circiter 1.3 mm. longis coronata. *Semina* obovato-oblonga, 2.2–2.5 mm. longa, 0.8 mm. lata, testa brunnea minute reticulata, hilo fere per totam longitudinem seminis currente bilineato lineis e squamis longitudinaliter dispositis constantibus. *Embryo* 2 mm. longus; cotyledones oblongae, apice rotundatae, 0.8 mm. longae, 0.25–0.3 mm. latae.

BRAZIL. Ceará: Fortaleza, 20 miles inland, on the plains, Bolland.

VI.—NOTES ON NEW CALEDONIAN ORCHIDS.

F. KRAENZLIN.

Aeranthus sphenochilus Kraenzl. nov. sp.; differt ab *A. cymbalariaefolio* F. Muell. et Kraenzl. statura etiam minore, labelli lobo intermedio triangulo-acuminato.

Plantula minuta, 2–5 cm. alta. *Caulis* tenuissimus, monophyllus. *Folium* plerumque medio in caule, latissime ovatum, brevissime acutatum, fere orbiculare, 7–10 mm. longum et latum; pedunculus ut videtur semper monanthus (vidi specimina 7), 10–15 mm. longus; bractea oblonga, acuta, 3 mm. longa, ovarium subaequans vel paulo brevior. *Sepala* linearia, longe et tenuissime acuminata, 8–9 mm. longa, 1 mm. lata. *Petala* ligulata vel oblonga, nervo medio in caudam filiformem producto, circiter 8 mm. longa, 2 mm. lata (excepta cauda filiformi). *Labellum* e basi cuneata sensim dilatatum, rotundatum, in apicem vel lobum intermedium productum (si mavis lobis lateralibus e basi ipsa obtriangulis ubique connatis, lobo intermedio anteposito), trinervium, totum labellum circiter 10 mm. longum, antice 3 mm. latum; lobus intermedius 1.5–2 mm. longus. *Gynostemium* 5–6 mm. longum, superne curvatum, pro rata crasse capitatum.—Fl. Maio.

NEW CALEDONIA. Sous les broussailles a l'entrée de la forêt du Mt. Roghi, 450 m., G. Bonati 814.

Aeranthus elegans Rchb. f. in Linnaea xli. 56 (1877).; [Diagnosis aucta.] Differt haec species a ceteris generis racemo plurifloro, floribus minutis, bracteis inferioribus pro rata magnis.

Caules 9–16 cm. longi, fragiles, semipellucidi. *Folia* paulo supra dimidium totius plantae inserta, ovato-triangula, acuta, margine

leviter repanda, basi profunde cordata, 1.2–3 cm. longa, 8–18 mm. lata, minute apiculata; pedunculus suprafoliaceus cum inflorescentia 3–10-flora interdum ad 8 mm. longus; bractee infimae late ovato-triangularae, acutae, trinerviae (addito interdum utrinque nervo vix conspiciendo), bractee superiores multo minores, anguste ovatae, omnes pedicellos sine ovariis aequantes, inferiores 5 mm. longae, basi 4 mm. latae. *Sepala* anguste linearia, 4 mm. longa, vix 0.5 mm. lata. *Petala* linearia, 2.5 vel 2 mm. longa. *Labellum* late oblongum, apiculatum, medio lineis 3 percursum, 3 mm. longum, circiter 2 mm. latum. *Gynostemium* e basi paulo latiore attenuatum, curvatum, apice capitatum.—De colore nil constat.—Fl. Maio. NEW CALEDONIA. Entrée de la forêt du Mont Roghi, G. Bonati 815.

I am convinced this is the plant described by Reichenbach in Linnaea xli. 56 (1877), from a specimen collected by Vieillard, though some characters seem to be similar but not identical. It is to be regretted, consequently, that Reichenbach suppressed the numbers by which Vieillard's plants are distributed. The description quoted above is too short and insufficient.

Dendrobium Comptonii Rendle, in Journ. Linn. Soc. Bot. xlv, 247 (1921).

NEW CALEDONIA. Gatope, Vieillard 2287.

I am not quite sure if this plant is not the same as *D. jocosum* Rchb. f. also collected by Vieillard, and described by Reichenbach on page 91 of the paper quoted under the preceding species. Reichenbach's original diagnosis is by no means satisfactory. Notes on the dimensions are wanting and also the collector's number.

VII.—NOTES ON AFRICAN GRASSES: VI.

NEW SPECIES.

Phacelurus caespitosus C. E. Hubbard, sp. nov.; affinis *P. specioso* C. E. Hubbard (comb. nov. ex *Andropogone specioso* Steud.), sed culmis caespitosis simplicibus 2–3-nodis, ligulis scariosis glabris, laminis anguste linearibus fere glabris, racemis solitariis erectis differt.

Gramen perenne, caespitosum, innovationibus intravaginalibus. *Culmi* erecti, e rhizomate brevi orti, 55–65 cm. alti, graciles, simplices, basi vaginarum basibus vetustis vestiti, inferne leviter compressi, superne teretes, glabri laevesque, 2–3-nodi. *Foliorum* vaginae moderate arctae, carinatae, striatae, pallidae, glabrae laevesque vel prope os sparse pilosae, internodiis breviores; ligulae truncatae vel rotundato-truncatae, 1.5 mm. longae, scariosae, glabrae; laminae anguste lineares, longe et tenuiter acutae, ad 23 cm. longae et 2 mm. latae, planae vel conduplicatae, rigidulae, striatae, basi et post ligulam sparse albo-pilosae, ceterum glabrae, glauco-virides, marginibus leviter incrassatis et costa tenuissima scaberulis. *Racemi* solitarii, spiciformes, 6–8 cm. longi, 3–3.5 mm. diametro, erecti,

graciles, stricti, purpurei, fere glabri, e vagina summa longe exserti; articuli lineares, 6-13 mm. longi, dorso pubescente striato convexi, facie concavi, apice oblique truncati ciliatique, marginibus breviter ciliatis; pedicelli lineares, 5.5 mm. longi, inarticulati, liberi, compressi, adpressi, marginibus breviter ciliatis. *Spiculae sessiles* anguste oblongae, 6-7 mm. longae, 1.5 mm. latae, purpureae, glabrae; callus truncatus, 1 mm. longus. *Glumae* aequales; inferior obtusa, integra, chartacea, dorso plana vel leviter rotundata, 2-carinata, marginibus tenuiter membranaceis anguste inflexis, carinis supra medium scaberulis, nervis inter carinas 5-8, extra eas 2; superior navicularis, latere oblonga, acuta, membranacea, 3-5-nervia, valide carinata, carina ad apicem scaberula. *Anthoecium inferius* sterile; lemma lanceolato-oblongum, obtusum, explanatum truncatum, 6.5-7 mm. longum, hyalinum, glabrum, 2-nervium; palea linearis, 2-fida, lemmati aequilonga, hyalina, 2-nervia. *Anthoecium superius* ♂ inferiori aequilongum vel paulo brevius; lemma explanatum oblongum, acutum, hyalinum, 3-4-nervium; palea linearis, lemmati aequilonga vel paulo brevior, hyalina, 2-nervia. *Spiculae pedicellatae* sessilibus similes, sed gluma superiore 7-nervia, anthoecio superiore ♂.

TROPICAL AFRICA. Rhodesia: Salisbury, in river bank sand, 1500 m., Nov. 1919, Eyles 1940.

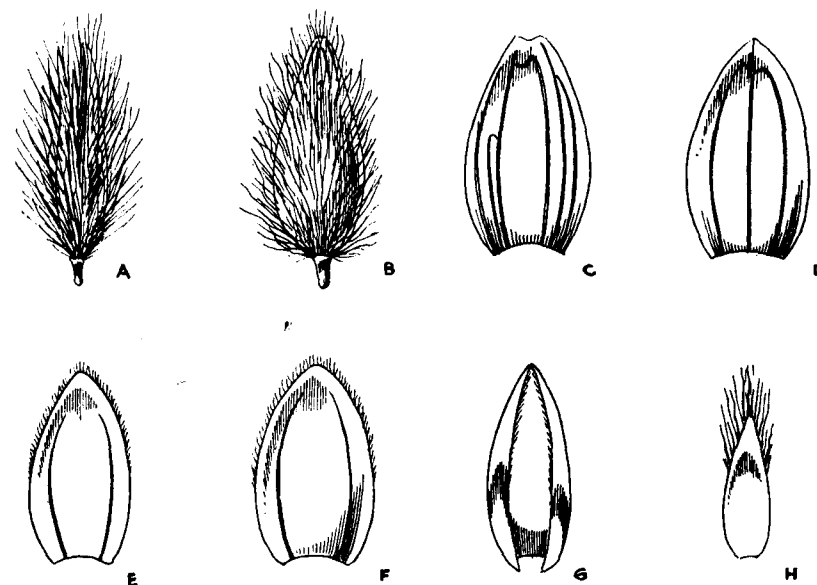
Miscanthidium erectum Stent et Hubbard, sp. nov.; affinis *M. Sorgho* Stapf, sed culmis validioribus, foliorum vaginis longe villosis, spiculis pallidis leviter minoribusque, glumis latioribus dense villosisque, lemmatibus superioribus integris differt.

Gramen perenne. *Culmi* erecti, e rhizomate obliquo orti, 2.2 m. alti, validi, teretes, solidi, simplices, 3-nodi, superne breviter sericeo-pilosi et ad nodos barbati, ceterum glabri laevesque. *Foliorum* vaginae firmae, arctae, pallidae, inferiores leviter compressae, tenuiter striatae, longe et molliter sericeo-villosae, superiores teretes, sparse adpresso-villosae vel glabrae; ligulae obtusae vel truncatae, 1-2 mm. longae, scariosae, breviter ciliatae; laminae anguste lineares, basi ad costam mediam reductae, longe et tenuiter acutae, 65-110 cm. longae, applanatae ad 11 mm. latae, firmae, glabrae vel supra laxae pilosae, basi pone ligulam longe pilosae, asperulae. *Panicula* erecta, lineari-oblonga, contracta, densa, 40 cm. longa, 6 cm. lata, argenteo-villosa; rhachis teres vel superne angulata, glabra, minute scaberula; rami suberecti vel leviter patentes, 3-16 cm. longi, a basi laxae ramulosi, graciles, filiformes, flexuosi, tenaces, asperuli, articulis breviter barbatis vel glabris; pedicelli filiformes, apice discoideo-incrassati, inaequales, unus 1-1.5 mm. longus, alter 3-3.5 mm. longus. *Spiculae* anguste oblongae vel dorso ovato-oblongae, pallidae, 3.75-4.25 mm. longae, callo et glumis pilis patulis sericeis albis 1.5-3 mm. longis dense villosis. *Glumae* aequilongae, chartaceae; inferior late oblongo-elliptica, emarginata, 2-carinata, nervis intra carinas 2, extra carinas utrinque 1-nervia; superior obtusa, 3-nervia. *Anthoecium inferius* ad

lemma vacuum reductum; lemma ellipticum, subacutum, 3.5-4 mm. longum, membranaceum, 2-nervium, ciliolatum. *Anthoecium superius* ♂; lemma late ellipticum, obtusum, 3.4-3.8 mm. longum, integrum, ciliatum, membranaceum, exaristatum et 2-nervium vel breviter aristatum et 3-nervium; arista ad 2 mm. longa; palea lanceolata vel ovata, acuta vel obtusa, 1.5-2.8 mm. longa, hyalina, enervia, apice longe ciliata. *Antherae* atropurpureae, lineari-oblongae, 1.75-2.5 mm. longae.

SOUTH AFRICA. Natal: Eshowe, March 1927, Kotze 246. Also common on the outskirts of Zululand forests (Kotze).

An awnless form of *M. Sorghum* Stapf, which may be referred to as f. *inermis*, has been collected by Pole Evans (No. 930) in Natal near Castle Howard. It differs from *M. erectum* in having less stout culms, slightly longer and pale brown spikelets, narrower glumes and valves.



Miscanthidium erectum Stent et Hubbard. A and B Spikelet, side and back views. C Lower glume. D Upper glume. E Lemma of lower floret. F and G Lemma of upper floret. F opened out. H Palea. (All $\times 14$).

Hyparrhenia Eylesii C. E. Hubbard, sp. nov.; affinis *H. grallatae* Stapf, sed multo densius caespitosa, culmis 3-nodis, foliorum vaginis tenuioribus prominenter striatis, laminis brevioribus marginibus scaberulis, spatheolis glabris, spiculis atrobrunneis laxae pilosis differt.

Gramen perenne, dense caespitosum, innovationibus intravaginalibus. *Culmi* erecti, 80-115 cm. longi, moderate graciles, ad 3.5 mm. diametro, teretes vel inferne leviter compressi, simplices, glaucescentes, glabri laevesque, infra paniculam 3-nodi. *Foliorum* vaginae arctae, teretes, tenuiter chartaceae, prominenter striatae,

glabrae laevesque vel eae innovationum sparse pilosae; ligulae rotundato-truncatae, 1-1.5 mm. longae, scariosae, ciliolatae; laminae lineares, longe et tenuiter acutae, 5-18 cm. longae, 2-6 mm. latae, planae, rigidulae, glaucae, eae innovationum pilis albidis laxae et molliter villosae vel villosae, eae culmorum demum glabrae, marginibus scaberulis, costa gracillima. *Panicula* angusta, 45-60 cm. longa, spatheata, 3-4-noda; internodia 9-19 cm. longa; rami simplices, solitarii vel 2-nati, ad 27 cm. longi, leviter patentes; spatheolae angustissimae, acuminatae, 7.5-10 cm. longae, arcte convolutae, tenues, glabrae laevesque, rubro-brunneae, purpurascens vel virides; pedunculi tenuiter filiformes, 10-14 cm. longi, spatheolas aequantes vel plerumque exserti, stricti vel leviter curvi, sparse pubescentes. *Racemi* graciles, moderate laxi, 3-4.5 cm. longi, 4-6-spiculati, laxae albido-pilosi; bases racemorum graciles, filiformes, pubescentes, inferior brevissima, superior 3-5 mm. longa; articuli 4-6, 2-3.5 mm. longi, tenuiter filiformes, valde oblique truncati, dorso sparse pilosi, dense albido-ciliati; pedicelli articulis similes. *Spiculae sessiles* lineari-oblongae vel lanceolato-oblongae, 6-7 mm. longae, 1.2 mm. latae, atrobunneae, laxae albido-pilosae; callus gracillimus, pungens, 3-4 mm. longus, dense albido-pilosus. *Glumae* aequales, firme chartaceae, pilis albis laxis 1-2 mm. longis pilosae; inferior truncata vel obtusa, dorso fere plana, 9-nervia, nervis viridibus, marginibus involutis; superior lanceolata vel lanceolato-oblonga, in aristam tenuissimam pallidam 7-13 mm. longam producta, 3-nervia, marginibus retrorso-ciliatis. *Anthoecium inferius* sterile; lemma applanatum oblongum, acutum vel truncatum, 5-5.5 mm. longum, obscure 2-3-nervium, hyalinum, purpurascens, retrorso-ciliatum; palea 0. *Anthoecium superius* ♀; lemma stipitiforme, 5-6 mm. longum, 2-lobum, lobis acutis ciliatis 2-3.5 mm. longis, hyalinum; arista gracilis, 2.8-4.2 cm. longa, geniculata, tenuiter pubescens; palea 0; caryopsis oblonga, 3 mm. longa. *Spiculae pedicellatae* ♂, anguste lanceolatae, 8-9 mm. longae, spiculis sessilibus similes; callus 2 mm. longus. *Glumae* aequales, firme chartaceae; inferior oblongo-lanceolata, tenuiter acuta, 9-11-nervia; superior lineari-lanceolata, tenuiter acuta, 5-nervia. *Lemma* anthoecii inferioris lanceolato-oblongum, acutum, 6-7.6 mm. longum, hyalinum, 2-3-nervium, retrorso-ciliatum. *Lemma* anthoecii superioris lineare, 2-fidum, 5-5.5 mm. longum, hyalinum, 1-nervium, purpurascens, apice ciliatum.

TROPICAL AFRICA. Rhodesia: Goromonzi, open sand veld, 1560 m., April 1927, Eyles 4880.

Hyparrhenia Snowdenii C. E. Hubbard, sp. nov.; affinis *H. hirtae* Stapf, sed culmis laxae caespitosis, laminis foliorum viridibus (non glaucis) molliter pilosis, spatheolis pedunculis et racemis brevioribus, racemis 2-aristatis differt.

Gramen perenne, laxae caespitosum, 50-180 cm. altum. *Culmi* erecti vel geniculato-ascendentes, ad 2 mm. diametro, graciles, teretes, ramosi, ramis sterilibus e nodis inferioribus, infra paniculam

2-4-nodi, glabri laevesque. *Foliorum* vaginae laxae, demum solutae, teretes, tenuiter striatae, internodiis breviores, laeves, glabrae vel superne pubescentes; ligulae truncatae, ad 1 mm. longae, scariosae, ciliolatae vel glabrae; laminae anguste lineares, longe et tenuiter acutae, 8-20 cm. longae, 2-5 mm. latae, planae, firmae, supra plerumque purpurascens vel purpureo-virides, infra virides, laxae et molliter pilosae, marginibus scaberulis. *Panicula* spatheata, elongata, angusta, laxa, 10-35 cm. longa, ad 5 cm. lata; internodia inferiora 4-11 cm. longa, tenuiter filiformia; rami ad 12 cm. longi, 1-4-nati, tenuissime filiformes; spatheolae lineari-lanceolatae, longe et tenuiter acutae, 3-4 cm. longae, glabrae, laxae, demum arctae, rubro-brunneae vel rubro-purpureae; pedunculi racemorum 2-3.5 cm. longi, curvati, plerumque spatheolis breviores, gracillimi, apices versus pilis albidis vel albido-fulvis patentibus laxis ad 5 mm. longis e tuberculis minutis pilosi. *Racemi* subcontigui demum divaricato-patentes, erecti vel nutantes, 1-1.5 cm. longi, 2-aristati, basi utriusque racemi uno pare spicularum homogamarum 5 mm. longarum; racemus inferior sessilis; basis racemi superioris gracillima, 2.5-4 mm. longa, tenuissime filiformis, longe et patente pilosa; articuli oblique truncati; articuli et pedicelli filiformes, gracillimi, 3.5-4.5 mm. longi, pilis ad 1.5 mm. longis dense ciliati. *Spiculae sessiles fertiles* lineari-oblongae vel lanceolato-oblongae, 4 mm. longae, glabrae, purpurascens vel virides; callus linearis, acutus, 1-1.5 mm. longus, breviter sericeo-barbatus. *Glumae* aequales; inferior truncata, dorso leviter concava vel plana, tenuiter chartacea, superne 9-nervia, marginibus involutis superne carinatis et minutissime setulosis; superior truncata vel rotundato-truncata, membranacea, 3-nervia, marginibus superne ciliatis. *Anthoecium inferius* ad lemma reductum; lemma lineari-oblongum, truncatum, 4 mm. longum, hyalinum, 2-nervium, superne retrorso-ciliatum. *Anthoecium superius* ♀; lemma anguste lineare vel stipitiforme, 3-3.5 mm. longum, 2-lobum, lobis brevibus angustis acutis ciliatis; arista 2.5-3 cm. longa, bigeniculata, columna minute fulvo-hirsuta; palea oblonga, dentibigeniculata, columna minute fulvo-hirsuta; palea oblonga, dentibigeniculata, ad 1 mm. longa, hyalina. *Spiculae pedicellatae* ♂, lineari-lanceolatae vel lineari-oblongae, tenuiter acutae, 5-6 mm. longae, glabrae. *Glumae* aequales; inferior 11-nervia, breviter aristata, arista ad 1.5 mm. longa, carinis superne ciliatis; superior 3-nervia, acuta, superne retrorso-ciliata. *Lemmata* lineari-oblonga, hyalina, retrorso-ciliata. *Antherae* lineares, 2-2.5 mm. longae.

TROPICAL AFRICA. Uganda: Budama; Samia, 1200 m., in savannah, July 1927, Snowden 1150.
Vern. name: *Bunyisi* (Samia).

Hyparrhenia Pilgeriana C. E. Hubbard, nom. nov. *Cymbopogon Stolzii* Pilger in Engl. Bot. Jahrb. liv. 286 (1917), non *Hyparrhenia Stolzii* Stapf in Prain, Fl. Trop. Afr. ix. 364 (1918).

TROPICAL AFRICA. Uganda: Mbale, near Mt. Elgon, moist places in savannah, 1200 m., June 1927, Snowden 1105. Tanganyika Territory: Kyimbila, 1350 m., Nov. 1911, Stolz 960! (type). Vern. names: *Lunyafa* (Lugishu); *Mbubu* (Luganda); *Lusane lunandi* (Kyimbila).

The specific name of *Cymbopogon Stolzii* Pilger has to be changed on transference of the species to *Hyparrhenia* as it is preoccupied in that genus.

Digitaria verrucosa C. E. Hubbard, sp. nov.; affinis *D. angolensi* Rendle, sed culmis paucinodis, laminis foliorum lanceolatis minoribus, racemis brevibus 2-3-natis, spiculis paulo majoribus ellipticis vel ovato-ellipticis differt.

Gramen annum. Culmi erecti, laxi, 50 cm. alti, graciles, teretes, glabri laevesque, glauco-purpurei, 3-4-nodi, inferne ramosi. Foliorum vaginae arctae, demum laxae, internodiis breviores, tenues, carinatae, glabrae laevesque vel ore raro pubescentes, purpureae vel virides; ligulae oblique truncatae vel rotundato-truncatae, 0.5-1.5 mm. longae, scariosae, glabrae; laminae anguste lanceolatae vel lanceolatae, acute acuminatae, basi valde inaequilatae, 2-7 cm. longae, 3-7 mm. latae, planae, glabrae, marginibus cartilagineis purpureis scaberulis, uno margine crispo, infra costa gracillima distincta, nervis primariis 6 tenuissimis. Racemi graciles, 2-3, sessiles in axi communi ad 1 cm. longo, 3.5-6.5 cm. longi, erecti vel leviter patentes, stricti vel leviter flexuosi; rhachis gracillima, triquetra, 0.5 mm. lata, scaberula; pedicelli 2-3-nati, inaequales, 2-5 mm. longi, erecti vel leviter patentes, tenuiter filiformes, angulati, minute scaberuli. Spiculae ovato-ellipticae vel ellipticae, acutae vel acute acuminatae, 2.5-2.9 mm. longae, 1-1.2 mm. latae, pallidae vel purpureo-suffusae, obscure sericeo-pilosae. Gluma inferior ad 0.4 mm. longa, truncata vel rotundato-truncata, tenuissima, hyalina; gluma superior anguste elliptica vel anguste elliptico-oblonga, acuta, spiculum aequans, tenuiter membranacea, 3-nervia, lineis quaternis pilorum subtiliter pilosa, pilis brevibus verrucosis purpureis sericeis adpressis. Anthoecium inferius sterile; lemma explanatum ellipticum, acutum, spiculum aequans, tenuiter membranaceum, 5-sub-7-nervium, quoad pubescentiam glumae superiori simile sed pilis exterioribus longioribus et ad 1 mm. longis; palea minuta, hyalina. Anthoecium superius ♀, anguste oblongo-ellipticum, acutum vel acute acuminatum, 2.5 mm. longum, pallidum, tenuiter chartaceum.

TROPICAL AFRICA. Rhodesia: Salisbury, dry edge of swamp, 1440 m., April 1927, Eyles 4859.

Paspalum scrobiculatum L. var. **Deightonii** C. E. Hubbard, var. nov.; affinis *P. scrobiculato* var. *Commersonii* (Lam.) Stapf, sed culmis reptantibus e nodis radicanibus, laminis foliorum latioribus obtusioribus tenuioribusque, rhachibus laevibus differt.

Gramen perenne. Culmi e basi nodis multis radicante atque innovationes breves emittente ascendentes, ad 40 cm. alti, simplices. Foliorum vaginae plerumque internodiis breviores, nodis et partibus inferioribus villosis; laminae lanceolato-lineares vel lineari-oblongae, subacutae, 3.5-13 cm. longae, 7-14 mm. latae, planae, glabrae, marginibus plerumque ciliatis. Racemi 2, 3.5-4.5 cm. longi; rhachis internodium 1.5 cm. longum; rhachis glabra, 1-1.5 mm. lata; pedicelli 0.5-1 mm. longi. Spiculae late ellipticae vel fere orbiculatae, rotundato-obtusae, 2.5-2.8 mm. longae, 2-2.4 mm. latae.

TROPICAL AFRICA. Sierra Leone: Freetown, in shade, August 1927, Deighton 777.

VIII.—CAMPHORINA AND SEPTINA. T. A. SPRAGUE.

According to Merrill (Bot. Gaz. 1920, lxx. 84), Farwell has adopted the generic name *Camphorina* Noronha (1790) in place of *Cinnamomum* Blume (1825), and has published a considerable number of new combinations under the former name in a strictly trade journal (Druggists Circular, lxii. 535: 1918), where they will probably not be noticed by systematists. Reference to Noronha's paper, however, shows that *Camphorina* was published *without description*, and is therefore invalid under International Rules; furthermore, there appears to be no evidence that it is congeneric with *Cinnamomum*, or even that it belongs to the Lauraceae. The only information about *Camphorina* given by Noronha was that the vernacular [Sundanese] name in Java was Kichantum, and that the genus consisted of a single (unspecified) species.

Hasskarl, who had made a special study of Sundanese plant-names, suggested (Tijdschr. Nat. Gesch. xi. 213: 1844) that it might be one of the Anonaceae, possibly *Polyalthia* Blume. The Sundanese name Ki-tjantoeng is applied to *Polyalthia subcordata* Blume (Filet, Plantk. Woordenb. Ned. Ind. 183, n.4767; De Clercq, Nieuw Plantk. Woordenb. Ned. Ind. 309, n.2803), and to *Goniothalamus macrophyllus* (Blume) Hook. f. (Blume, Fl. Jav. Anonac. 79; Koord. et Valet. in Meded. s'Lands Plantent. lxi. 309)—both Anonaceae. The compound name Ki-tjangtoeng-aroi is used (according to Filet, l.c., n.4765) for *Habzelia acuta* Miq., *Melodorum Kentii* Hook. f. et Thoms., *Oxymitra cuneiformis* Zoll., *O. latifolia* Hook. f. et Thoms., *Polyalthia elliptica* Blume and *Uvaria macrophylla* Roxb.—all also belonging to the Anonaceae.

There is thus no justification for substituting the name *Camphorina* for *Cinnamomum*, and it is to be regretted that Farwell did not verify the circumstances attending the publication of *Camphorina* instead of merely taking on trust the synonymy given by Dalla Torre and Harms. If he had even consulted Post and Kuntze's Lexicon Generum Phanerogamarum ("1904") he would have discovered that *Camphorina* was a *nomen nudum*. It is difficult to ascertain who was originally responsible for the suggestion that

Camphorina might be synonymous with *Cinnamomum*. It was reduced—with a query—to *Cinnamomum* in Index Kewensis, i. 407 (1893), but there is nothing to show from what source, published or unpublished, the reduction was derived, and the name *Camphorina* was not included in the synonymy of *Cinnamomum* given in Index Kewensis, i. 539. Dalla Torre and Harms (Gen. Siphonog. 176: 1901) definitely cited *Camphorina* Noronha as a synonym of *Cinnamomum*. Neither they nor the Index Kewensis mentioned that it was published without description.

Septina Noronha, which Dalla Torre and Harms also included under *Cinnamomum*, is likewise a *nomen nudum*, the only information supplied by Noronha being that the vernacular name in Java was Huru-mèra, and that the genus was monotypic. Hasskarl (l.c. 215) suggested that it might belong to the Lauraceae, and according to Filet (Plantk. Woordenb. Ned. Ind. 120) Hoeroe-meirah is the Sundanese name for *Cinnamomum iners* Blume. Blume (Bijdr. Fl. Ned. Ind. 570) cited it under that species in the form Huru mirha. Hence *Septina* may actually be a synonym of *Cinnamomum*, as has been suggested, but cannot replace it under any rules of nomenclature.

The citation of *Camphorina* Noronha given in Index Kewensis and by Dalla Torre and Harms is "Verh. Batav. Gen. v. (1790), ed. 1, Art. IV. 1". The writer has not had access to the first edition of vol. v., but has examined Noronha's paper in the second edition of that volume in the library of the British Museum (Nat. Hist.), which according to Scudder (Cat. Scient. Serials, 47, n. 725; 251, n. 3767c) is merely a reprint. In this reprint of vol. v., published in 1827, the Articles are not numbered, and the pagination is continuous, *Camphorina* occurring on p. 64 and *Septina* on p. 66.

IX.—CONTRIBUTIONS TO THE FLORA OF BURMA: V.*

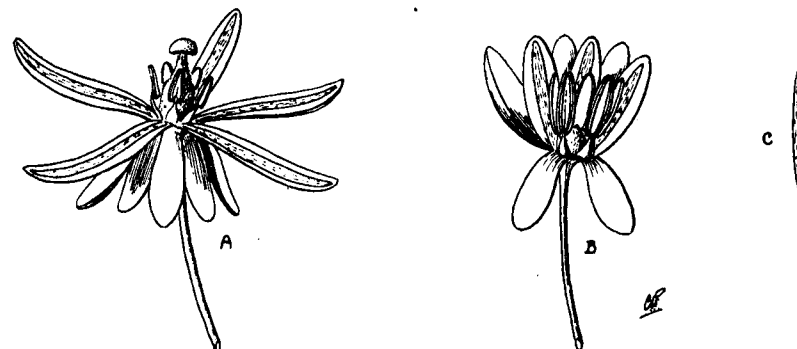
Hydnocarpus verrucosa Parkinson et Fischer [Flacourtiaceae]; affinis *H. castaneae* Hook. f. et T., sed foliis minoribus lanceolatis acuminatis basi aequalibus siccitate viridibus, fructu valde majore verrucoso differt.

Tree 20–25 m. high; bark thin, smooth, greenish-grey to brown; twigs brown, glabrescent, innovations fulvous-pubescent. *Leaves* rigidly chartaceous, lanceolate, apex tapering to an acuminate point, base equal, rounded or cuneate, 10–21 cm. long, 3–6 cm. wide, quite glabrous, midrib, 7–9 pairs of primary nerves and finely reticulate venation raised on both surfaces; petiole rugulose, channelled above, 1–1.5 cm. long. *Inflorescence* of few-flowered, axillary racemes; peduncles 2–3 mm. long, with a few minute bracts at the apex, fulvous-puberulous; pedicels erect, 3–3.5 cm. long, fulvous-puberulous. *Buds* subglobose. *Flowers* unisexual, dull-white.

*Continued from K.B. 1927, p. 314.

♂ *Sepals* 5, narrowly oblong, obtuse, 6–7 mm. long, fuscous-puberulous on both surfaces. *Petals* 5, lanceolate, subacute, 1.2–1.3 cm. long, glabrous. *Scales* 5, linear-lanceolate, as long as the petals, sparsely hairy. *Stamens* 5, nearly as long as the petals, glabrous; filaments longer than the filaments. *Rudimentary ovary* subglobose or narrowly conical, shorter than the stamens, densely fuscous-tomentose. ♀ *Sepals*, *petals* and *scales* slightly longer than those of the ♂. *Staminodes* 5, glabrous; filaments short, flat, broadly triangular-ovate; anther empty, elliptic-oblong or ovate, flat, longer than the filament. *Ovary* subglobose or ellipsoid, narrowed into a short beak, longer than the staminodes, densely fuscous-villous, stigma peltate, recurved. *Fruit* a woody, depressed-globose, thick-walled berry 8–11 cm. in diam., densely fulvous-villous when young; when mature glabrous, brown and densely warted and stalk much thickened. *Seeds* oblong, angular by compression, 2–3 cm. long.

Amherst District. Dawna Hills, 800 m., Feb., C. E. Parkinson 5240. Vernacular name: *Woh-panh* (Karen.).



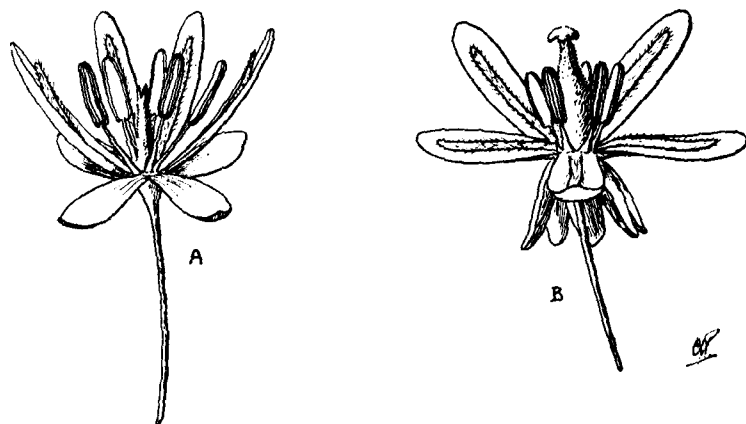
Hydnocarpus verrucosa. A ♀ flower; B ♂ flower; C scale of ♀. All × 2.

Hydnocarpus dawnensis Parkinson et Fischer [Flacourtiaceae]; affinis *H. verrucosae* Park. et Fisch., sed foliis basi inaequalibus, floribus polygamis, fructu valde minore non verrucoso differt.

A *tree*; branchlets pale-brown, glabrous, innovations scurfy fulvous-puberulous. *Leaves* rigidly chartaceous, lanceolate or linear-lanceolate, obtuse or subacute, base unequal, rounded or acute, 8–15 cm. long, 2.5–5 cm. wide, glabrous, midrib, 6–8 pairs of primary nerves and finely reticulated venation raised on both surfaces, petioles 0.7–1.4 cm. long, channelled above, glabrous. *Flowers* androgynous, in short, axillary, few-flowered racemes; peduncles very short, scurfy fulvous-puberulous with several minute bracts at the apex, pedicels slender, 2–2.5 cm. long, fuscous-pubescent. ♀ *Sepals* 5, shortly connate below, ovate-oblong, obtuse, about 8 mm. long, fuscous-pubescent on both surfaces. *Petals* 5, lanceolate, 1–1.2 cm. long, glabrous. *Scales* 5, linear, about $\frac{3}{4}$ the length of the

petals, subacute, ciliate and sparsely hairy. *Stamens* 5, glabrous, about $\frac{1}{2}$ the length of the scales; filaments coriaceous, flat, broadly triangular-ovate, shortly filamentous at the apex; anthers extrorse, linear-oblong, longer than the filaments. *Ovary* ellipsoid, narrowed into a short beak, slightly longer than the stamens, fuscous tomentose; stigma peltate, lobed. ♂ *Sepals, petals and scales* similar to those of the ♀. *Stamens* 5, as long as the scales, glabrous; filaments flat, narrowly ensiform, tapering to a short filamentous apex; anthers narrowly linear-oblong, as long as the filaments. Rudimentary *ovary* subulate, about $\frac{1}{4}$ the length of the stamens, apex toothed, fuscous-tomentose. *Fruit* an ovoid, woody berry 2–3 cm. long, fulvous-pubescent; stalk stout, woody.

Amherst District. Dawna Hills, 400 m., April, *Maung Soe Min* per C. E. Parkinson 432. Vernacular name: *Kalaw byu* (Burmese). "Growing in moist forest."



Hydnocarpus dawmensis. A ♂ flower; B ♀ flower. Both $\times 2$.

Cissus assamica Craib var. **pilosissima** Gagnep. [Ampelidaceae.] The typical form known from Assam and the variety from Indo-China.

Tavoy. Tenasserim River, Jan., R. N. Parker 2490. "Extensive climber."

Dracontomelum Duperreanum Pierre [Anacardiaceae].

Known only from Tonkin.

Katha District. Mawlu Range, May, *Forest Range Officer* per C. E. Parkinson 189. Vernacular names: *Tawtitcha*, *Ngabauk* (Burmese).

Shuteria hirsuta Baker [Papilionaceae].

Known from Khasia and Sikkim.

Tavoy. Tenasserim River, Jan., R. N. Parker 2418. "Prostrate climber rooting at intervals. Flowers purplish-blue. In dry bamboo forest."

The standard of the flower is minutely auriculate at the base of the limb. In the Kew Herbarium there are also the following specimens of this species: Shan hills, *Collett*; Katha District, J. H. *Lace*; Tenasserim, "Mowleyit," *Beddome*.

Pahudia cochinchinensis Pierre [Caesalpiniaceae].

Known from Indo-China.

Mandalay District. Kywet nāpā Reserve, 575 m., Dec., *Maung Mya* per *Forest Botanist Burma* 3683. Vernacular name:—*Thit lawt* (Burmese).

Ardisia sumatrana Miq. [Myrsinaceae].

Known from the Malay Peninsula and Archipelago.

Mergui. Tenasserim River, Jan., R. N. Parker 2498. "Tree 40 ft. high, 6 in. diam. Bark smooth; flowers white, waxy; fruit claret-coloured."

Peronema canescens Jacq. [Verbenaceae].

Known from the Malay Peninsula and Archipelago.

Mergui District. Lenya Valley, Feb., R. N. Parker 2716. "Medium sized tree, not uncommon. Leaflets about 8 pairs."

Sphenodesme mollis Craib. [Verbenaceae].

Known from Siam.

Tavoy. Tenasserim River, Jan., R. N. Parker 2436.

Balanophora indica Wall. [Balanophoraceae].

Known from Southern India.

Mergui District. Molodaung, Jan., R. N. Parker 2455. Also in Herb. Kew: Amherst District, Dawna Hills, 3000–5000 ft., J. H. *Lace* 5629.

Aporosa ficifolia Baill. [Euphorbiaceae].

Known from the Malay Peninsula and Indo-China.

Tavoy. Zimba Valley, Nov., R. N. Parker 2230.

Dalechampia bidentata Bl. var. **genuina** Pax. [Euphorbiaceae].

Known from the Malay Peninsula and Archipelago.

Tavoy. Tenasserim River, Jan., R. N. Parker 2412.

Debregeasia squamata King [Urticaceae].

Known from Siam and the Malay Peninsula.

Tavoy. Tenasserim River, Jan., R. N. Parker 2401. "Fruit orange."

Musa Bakeri Hook. f. [Musaceae].

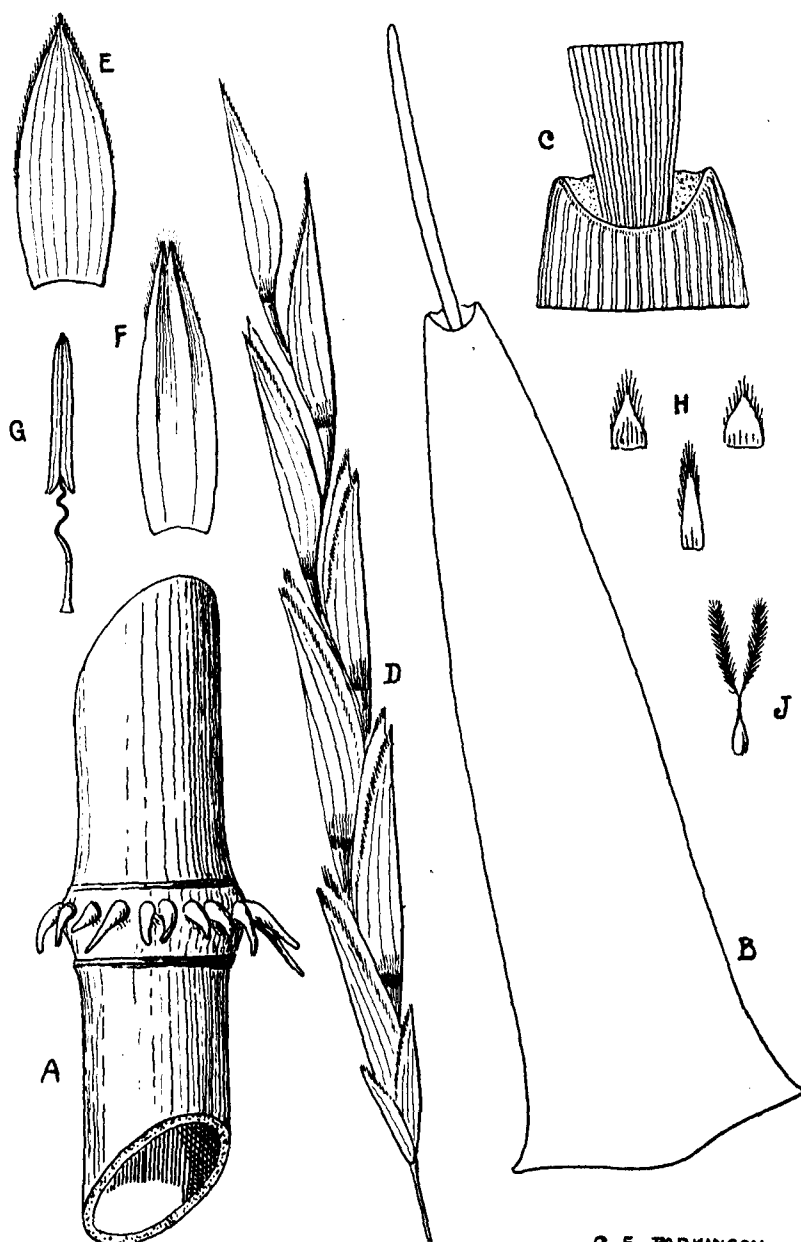
Known from Cochinchina.

Tavoy. Tenasserim River, Jan., R. N. Parker 2447. "Indigenous and common. Fruit said to be edible, but full of seeds."

Habenaria furfuracea Hook. f. [Orchidaceae].

Known from the Khasia Hills.

N. Shan States. Gokteik Gorge, 800 m., C. E. Parkinson 1726.



C. E. PARKINSON.

Arundinaria Gallatlyi Gamble. A Portion of culm showing node; B Culm sheath; C Top of culm sheath; D Spikelet; E Lemma; F Palea; G Stamen; H Lodicules; J Ovary.

A and B about natural size. C-J all enlarged $\times 3$.

***Arundinaria Gallatlyi* Gamble** [Gramineae]; Ann. Roy. Bot. Gard. Calc. vii. 23. The culm sheaths and inflorescence were unknown when the species was described by Gamble in 1896. No reference was made by him to the spinous nodes. The type specimen of this amplified description (C. E. Parkinson 5126 in Herb. Kew.) was collected in the same locality where Gallatly collected his specimen (Gamble's type) in 1877.

Densely tufted and attaining a height of 4.5-7.5 m. Culms cylindrical, 2-2.5 cm. diam., green, glabrous, hollow, the walls 2-3 mm. thick, the nodes 20-30 cm. apart, thickened and furnished with a ring of decurved blunt or sharp spines. Culm sheaths papery, finely striate, 10-15 cm. long, 3.5-5 cm. wide at base and 0.8-1.2 cm. wide at the top; blade narrowly lanceolate, 3-5 cm. long, ligule 1-2 mm. wide. Inflorescence much branched, forming lax compound terminal and axillary panicles; rachis fine and wiry. Spikelets linear, 4-6 cm. long, slender. Glumes 2, the lower 5 mm. long, oblong-lanceolate, margins ciliolate in the upper part, 3-nerved; the upper 7 mm. long, ovate-lanceolate, margins ciliolate in the upper part, 5-nerved. Florets about 5 to 7 in a spikelet, each about 1.2 cm. long; rachilla compressed and thickened towards the top, 7 mm. long, ciliolate along the two lateral edges, and furnished at the top with a ring of hairs which surround the base of the floret. Lemma (flowering glume) ovate-lanceolate, 1.1 cm. long, about 9-nerved, margins ciliate in the upper part. Palea 1.2 cm. long, 2-keeled, very slightly 2-cleft and with a few minute hairs at the apex. Lodicules 3, a narrowly triangular one 3 mm. long at the base of the palea and 2 ovate-triangular ones barely 2 mm. long opposed, all ciliate. Stamens 3 with free filaments, anthers 6 mm. long.

It is uncommon and grows gregariously in small patches at an elevation of about 1800 m. on Mulayit peak in the Dawna hills of Tenasserim in Burma. C. G. Rogers 335 T, collected at Maungpok, Nwalabo ridge, at about 1000 m. in the Tavoy District, about 150 miles south of Mulayit peak, is very likely the same species. Vernacular name:—*Wa-thon-dyan* (Karen). (C. E. Parkinson.)

X.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies:—MR. T. L. WILLIAMS, B.Sc., Economic Botanist, Gold Coast: Mr. P. M. MCCARTHY, A.R.C.S., and MR. J. F. WARD, B.A., Superintendents of Agriculture, Nigeria: MR. H. H. STOREY, Mycologist, Amani Research Institute, Tanganyika.

Shrubs.*—This is one of the Home Garden Handbooks. Though only a small volume of seventy-six pages, divided into ten chapters, the author has managed to condense within this small compass a

*By F. F. Rockwell, Macmillan & Co., Ltd., London and New York, 1927, pp. viii+76, text figs. Price 4s. 6d.

really extraordinary amount of useful cultural information. Coupled with this are very exhaustive lists to aid in the selection of shrubs for specific purposes. These include classifications by colour, height, and season of bloom; suitability for various purposes, backgrounds, hedging, shrubby groups, etc.; and also lists of shrubs for various soils and climates, city conditions, etc. The book is illustrated by a number of useful drawings designed to show, as the author aptly remarks, that "there is no more certain and satisfactory way of making your place more beautiful and more valuable than by planting shrubs." Though written for readers in America it contains matter of considerable interest for residents in this country.

Gladiolus.*—This handbook, although written for American readers, contains much useful information that is applicable to conditions in this country, as the cultivation on broad lines is very similar.

The book deals with the various details of cultivation, including several methods of planting, propagation, harvesting and storing. The cultural details are also given for growing for cut flowers and exhibition.

There are chapters dealing with the various types and varieties, hybridising, and the creation of new varieties. Insect pests and diseases and their remedies are also mentioned.

Plants of Trinidad and Tobago.†—This work gives short descriptions in alphabetical order of the many native and exotic plants that are cultivated for ornament or profit in Trinidad and Tobago. In the preface the authors direct attention to the need for such a book as there was no local book of reference dealing with the cultivated plants of those islands. The many species dealt with are usually described under their botanical names, but in most cases native names are also given. Following a brief description of each plant, its useful properties are dealt with, and when necessary this is followed by special cultural directions. The work ends with lists of plants for special purposes and a botanical Key.

*By F. F. Rockwell, The Home Garden Handbooks, Macmillan & Co., Ltd., London and New York, 1927, pp. viii+79, text figs. Price 4s. 6d.

†Memoirs of the Department of Agriculture, Trinidad and Barbados. Number 4. The Useful and Ornamental Plants of Trinidad and Tobago by W. G. Freeman and R. O. Williams, Government Printing Office, Port-of-Spain, Trinidad, 1927, pp. 198. Price 2s. 6d.

BULLETIN OF MISCELLANEOUS INFORMATION No. 2 1928 ROYAL BOTANIC GARDENS, KEW

XI.—NEW ASIATIC GENTIANAS. C. V. B. MARQUAND.

The new species described in this preliminary publication were found during a detailed study of the Asiatic Gentians for a monograph of the Chinese species which it is intended to publish shortly. I am greatly indebted to Professor W. Wright Smith, Regius Keeper of the Royal Botanic Garden, Edinburgh, for allowing the whole of the extremely rich material of the genus under his charge to be sent to Kew on loan, and also for permission to publish diagnoses of five new species, drawn up by the late Sir Isaac Bailey Balfour.

Gentiana anomala Marquand sp. nov. (Sect. *Amarella*); affinis *G. arrectae* Franch., sed foliis petiolatis, calycis lobis acuminatis, corollis 4-lobatis differt.

Annual 3–5 cm. high. *Stem* slender, rather wiry, much branched, scaberulous, purplish. *Rosette leaves* O. *Stem leaves* small, few, broadly ovate, petiolate; lamina 3–4 mm. long, 2.5–3.0 mm. wide, margin somewhat sinuose; petiole 2.0–2.5 mm. long. *Flowers* numerous, erect, purple. *Pedicel* slender, up to 15 mm. in length. *Calyx* as well as the leaves blackish in the dried state; tube only 1.0–1.5 mm. long; lobes 4, acute, 5–6 mm. long, 2 ovate spatulate, acuminate, widest at the middle, 2 mm. wide, 2 narrowly triangular, acute, 1 mm. wide at the base. *Corolla* 1 cm. long, divided to the middle; tube 2 mm. in diameter; lobes 4, equal, lanceolate, acute, 2 mm. wide. *Nectaries* multifid, inserted at the base of the corolla. *Ovary* oblong-lanceolate, sessile, 4 mm. long. *Seeds* ovoid-reniform, glabrous.

S. SZE-CHUAN. On sheltered limestone cliffs on the west flank of the Litang River divide 10 miles west of Muli, 3900–4200 m., Oct. 1, 1921, *F. Kingdon Ward* 4963 (type Herb. Edin.).

Gentiana burmensis Marquand sp. nov. (Sect. *Chondrophylla*); affinis *G. gratae* H. Sm., sed floribus roseis, corollae lobis apiculatis integris, calycis lobis latioribus differt.

Perennial? slender plant 4–6 cm. high. *Stems* sub-hyaline, slightly branched, erect or ascending. *Radical leaves* O. *Cauline leaves* ovate apiculate, sessile, 4–6 mm. long, 2.5–3.5 mm. wide, with a narrow hyaline margin. *Flowers* solitary, sub-erect, lavender-pink. *Pedicel* erect, 4–6 mm. in length. *Calyx* 4–5 mm. long, up to 2 mm. in diameter, lobes erect, narrow triangular acute, shorter than the tube; sinus subobtus. *Corolla* infundibuliform, 12–15 mm. long, 10–12 mm. in diameter at the mouth; lobes ovate triangular,

shortly apiculate, not erose, 2.5 mm. long, scarcely 2 mm. wide; plicae subtruncate, fimbriate, cilia filiform, subequalling the lobes, sinus between the lobes and the plicae narrow. *Stamens* reaching just below the mouth of the corolla; filaments slightly subulate, 3.5 mm. long; anthers erect, subcordate, 7 mm. long. *Ovary* long-stipitate, ellipsoid. *Style* 1.5 mm. long. *Stigmata* scarcely dilated. *Ovules* very immature. *Ripe fruit* not seen.

UPPER BURMA. Chaw-chi Pass, 3000–3600 m., Aug. 27, 1920; "Very local, but abundant in mossy pine slopes in the open of the glades. Flowers of a lively lavender pink irresistibly suggesting a *Primula*'s and exceedingly pretty, without any of the family weakness for shutting up when picked, or when under a cloud. It ascends in occasional specimens to the high-alpine region (Sept. 6)." *R. Farrer* 1850 (type Herb. Edin.). Wulaw Pass, 2700–3000 m., Nawugchang Valley, north of Hpimaw; flowers mauve fading to blue at the base outside, on open but sheltered moss covered cliffs of a ridge of igneous rocks, 26 Aug., 1914, *F. Kingdon Ward* 1900.

***Gentiana chungtienensis* Marquand** sp. nov. (Sect. *Chondrophylla*); ex affinitate *G. micantiformis* Burkill habitu erecto, corolla multo majore, lobis caudatis inter alia differt.

Annual. *Stems* erect, simple or slightly branched near the base, 2.5–5.0 cm. in height. *Rosette leaves* sessile, broadly ovate, acuminate, 5–6 mm. long, 3.5–4.0 mm. wide, with a distinct cartilaginous margin. *Cauline leaves* densely imbricate, $\pm$ naviculaeform, carinate, 3–5 mm. long, shortly cuspidate, with a rather broad hyaline margin. *Flowers* solitary, erect, bright blue, lined green on the exterior. *Pedicel* very short. *Calyx* 8–11 mm. long, 2.5–3.5 mm. in diameter, lobes narrowly triangular, acuminate, 3–4 mm. long, with a narrow hyaline margin, sinus acute. *Corolla* up to 2 cm. in length and diameter when fully expanded; lobes ovate, caudate, 2–3 mm. long, 2–2.5 mm. wide; plicae entire, triangular, acute, half the length of the lobes. *Stamens* considerably shorter than the corolla tube; filaments filiform; anthers 1.5 mm. long. *Ovary* subcylindrical to ellipsoid, stipitate. *Style* 1–2 mm. long. *Stigma* dilated at the apex. *Ovules* longitudinally striated. *Ripe seeds* not seen.

N.W. YUNNAN. Moist open pasture on the Chung-tien plateau; lat. 27° 45'N., 3400 m., June 1917, *G. Forrest* 13865 (type Herb. Edin.).

***Gentiana confertifolia* Marquand** sp. nov. (Sect. *Frigida*); ex affinitate *G. Georgei* Diels floribus folisque multo minoribus, staminibus pro ratione fere duplo longioribus, inter alia differt.

Perennial densely caespitose with spreading much branched underground stems. *Flowering stems* erect, scarcely exceeding 2 cm. high, very densely clothed with the imbricate leaves. *Leaves* coriaceous, linear-lanceolate, acute, 2–3 cm. long, 3–5 mm. wide, sessile, dead leaves of the previous year's growth persistent on the

lower part of the stem. *Flowers* solitary or 2–3 together, sessile, immersed in the uppermost leaves, "pale china blue with chocolate anthers." *Calyx* tube entire, 1 cm. long; lobes lanceolate or oblanceolate, 14 mm. long, 3 mm. wide, apex acute, slightly recurved; sinus rather narrow. *Corolla* infundibular, 3.5–4.0 cm. long; lobes 5, broadly ovate-apiculate, 7 mm. long, 8 mm. wide; plicae obtuse, entire, slightly broader than, and half the length of the lobes. *Stamens* nearly equalling the tube; filaments 2.5 cm. long, filiform, incurved at the apex; anthers 3.5 mm. long. *Ovary* shortly stipitate. *Style* 1 cm. long. *Ovules* reticulate. *Ripe seeds* not seen.

N.W. YUNNAN. Yungning, 3000–3400 m., on sunny limestone cliffs, April 20, 1922, *F. Kingdon Ward* 5058 (type Herb. Edin.).

***Gentiana damyonensis* Marquand** sp. nov. (Sect. *Otophora*); a specibus duabus (*G. otophora* Franch. et *G. otophoroidi* H. Sm.) sectionis antea descriptis seminibus ovoideis bialatis, foliis parvis lineari-lanceolatis differt.

Perennial, densely caespitose and spreading from a rather small rootstock. *Barren stems* numerous, bearing linear-lanceolate leaves 2.0–3.5 cm. long, 2.5–3.5 mm. wide. *Flowering stems* glabrous, up to 9 cm. in length, each with a solitary terminal flower. *Cauline leaves* few, linear-lanceolate, sessile, 8–11 mm. long, 3 mm. wide, apex subacute. *Flowers* sessile or shortly pedicellate, with the "inside of the petals milky white with a flush of dusky violet and a few violet spots; outer surface dusky violet." *Calyx* 3 mm. in diameter at the mouth; tube 4 mm. long, lobes erect, linear, acute, 2–3 mm. long, 0.5 mm. wide, each with 1 distinct nerve; sinus broad subtruncate. *Corolla* 2 cm. long, divided to near the base; lobes 5, lanceolate, sub-acute, 15–18 mm. long, 5–6 mm. wide; plicae 5, minute, triangular-subulate, on one side of each lobe near the base. *Stamens* 5, filaments 12–14 mm. long, filiform, with a minute triangular pouch on the corolla tube on each side of the point of attachment. *Ovary* subsessile. *Style* very short. *Seeds* ovoid with a small wing of hyaline cells at each end.

S.W. SZE-CHUAN. Alpine pastures at Damyon, 4800–5200 m., Sept. 5, 1922, *F. Kingdon Ward* 5377 (type Herb. Edin.).

***Gentiana ecaudata* Marquand** sp. nov. (Sect. *Frigida*); ex affinitate *G. Arethusae* Burkill foliis 4-verticillatis, corollae lobis ecaudatis, floribus majoribus inter alia differt.

Perennial, caespitose. *Barren stems* numerous, rosulate. *Flowering stems* ascending, 8–10 cm. in length, scaberulous. *Leaves* 4 in a whorl, increasing in size towards the apex of the stems, elliptic-lanceolate, acute below, gradually becoming linear-lanceolate above, 5–10 mm. long, 1.5–2.0 mm. wide, the uppermost surrounding the calyx. *Flowers* solitary, terminal, sessile, bright clear blue, deep blue and green on the exterior. *Calyx* green, up to 1.5 cm. long; lobes linear acuminate, 1 mm. wide, slightly shorter than the tube;

sinus broad, obtuse. *Corolla* completely closed in all the specimens examined, 3 cm. long; tube 7–8 mm. wide, bright clear blue interior, deep blue and striped on the exterior, 15-nerved; lobes 5, deltoid, 4.5 mm. long and wide, outside margin slightly serrulate and auriculate at the base, apex mucous or subapiculate, not caudate; plicae obtusely triangular, less than half the length of the lobes. *Stamens* inserted about the middle of the corolla tube, at the convergence of the nerves below the plicae; filaments subulate, 6 mm. in length; anthers small. *Ovary* stipitate, not exserted from the corolla tube. *Stigmata* reflexed, scarcely dilated at the apex. *Seeds* reticulate, alveolate.

S.E. TIBET. Tsarong; open moist moorland on the Salween-Kiuchang divide, north-west of Si-chi-to, lat. 38° 48' N., long. 98° 15' E., 4500 m., Oct. 1922, G. Forrest 22797 (type Herb. Edin., syntype Herb. Kew.).

***Gentiana Forrestii* Marquand** sp. nov. (Sect. *Chondrophylla*); ex affinitate *G. maeulchanensis* Franch. calycis tubo lobos duplo vel 3-plo superante differt.

Annual. *Stems* several, erect or ascending, glabrous, 5 cm. high, slightly branched. *Rosette leaves* sessile, broadly ovate or obovate, mucronate, up to 14 mm. long, 10 mm. wide; midrib strongly raised on the lower surface, scarcely visible above. *Cauline leaves* in 2 or 3 pairs, ovate or lanceolate, acute, sessile, scarcely exceeding 4 mm. long, 2 mm. wide, $\pm$ addressed to the stem, apex acute or mucronate. *Flowers* "blue, dark blue-green exterior." *Pedicel* erect, up to 1.5 cm. long, .5 mm. wide. *Calyx* tubular campanulate; tube 4.5 mm. long, 2.5 mm. wide; lobes 5, deltoid, shortly acuminate, 2 mm. long, 1.5 mm. wide, midrib distinct, lateral nerves slender, reticulate; sinus narrow, acute. *Corolla* infundibuliform, 12 mm. long; lobes 5, 3 mm. long, 2 mm. wide, apex sub-obtuse; plicae broad, obtuse or slightly emarginate, half the length of the lobes. *Stamens* inserted just above the base of the corolla tube; filaments much shorter than the tube; anthers oblong, 1 mm. in length. *Ovary* stipitate. *Style* scarcely 1 mm. long. *Seeds* trigonal, 1 mm. long, 0.5 mm. wide, angles carinate.

N.W. YUNNAN. Open moist stony pastures on the Mekong-Salween divide, 3600–3900 m., lat. 28° 12' N., July 1917, G. Forrest 14183 (type Herb. Edin., syntype Herb. Kew.).

***Gentiana hapalocaula* Marquand** sp. nov. (Sect. *Stenogyne*); affinis *G. serrae* Franch., sed corollae tubo angustiore, calycis lobis parvis filiformibus, plicis breviter fimbriatis differt.

Annual. *Stems* numerous, weak, straggling, glabrous, up to 30 cm. in length. *Internodes* long (2.5–6.0 cm.). *Basal leaves* O. *Cauline leaves* sub-membranous, cordate-ovate, 1.3–1.8 cm. long, 1.0–1.5 cm. wide, very shortly petiolate; both upper and lower surfaces glabrous, margin serrulate, slightly recurved, apex acute. *Flowers* solitary, terminal, sessile, on peduncles up to 9 cm. in length

with a single pair of leaf-like bracts. *Calyx* in the bud, while the corolla is still completely included, with recurved lobes: when the flower is expanded—tube 10–12 mm. long, 3.5 mm. wide at the mouth; lobes erect or recurved at the apex, filiform, 2.0–2.5 mm. long; sinus wide, obtuse. *Corolla* deep blue, 2.5 cm. long; tube scarcely exceeding 5 mm. wide at the mouth; lobes lanceolate, acute or acuminate, 10–12 mm. long, 3.5–4 mm. wide; plicae subtruncate, shortly fimbriate-dentate, more than half as long as the lobes. *Stamens* slightly longer than the corolla tube. *Ovary* stipitate. *Style* 4 mm. long. *Stigmata* strongly recurved. *Seeds* ovoid, smooth.

N.W. YUNNAN. Amongst grass in open situations on the Tongshan in the Yangtze bend, lat. 27° 20' N., 3000 m., Oct. 1913, G. Forrest 11444 (type Herb. Edin.).

***Gentiana muliensis* Marquand** sp. nov. (Sect. *Amarella*); affinis *G. Trailliana* G. Forrest, sed calycis lobis apice attenuatis acutis albo-setulosis duplo longioribus differt.

Annual. *Stems* rather slender, much branched, purplish, scabrid, up to 20 cm. high, internodes up to 6 cm. long. *Leaves* few, in pairs, sub-membranous, lanceolate, subsessile, 1.8–3.0 cm. long, 5–8 mm. wide; apex subacute. *Flowers* several on each stem, long pedicellate. *Pedicel* erect, 4–8 cm. long. *Calyx* 5-lobed nearly to the base, setulose throughout, equalling the corolla tube or nearly so; lobes erect, narrowly triangular-lanceolate, unequal, 12–14 mm. long, 1.5–3.0 mm. wide; apex acute. *Corolla* "deep purple-blue, throat white," 5-lobed to near the middle; lobes imbricate, broadly obovate or suborbicular, 9 mm. long, 8 mm. wide, apex entire obtuse. *Squamae* white, multifid, 4 mm. long, inserted across the corolla lobes at the mouth of the tube. *Stamens* equalling the squamae; filaments 6 mm. long; anthers deltoid. *Ovary* linear subsessile. *Style* very short. *Seeds* smooth, sub-globose.

S. SZE-CHUAN. Open alpine meadows and in pine forests, Muli mountains, lat. 28° 12' N., 3600–3900 m., Oct. 1918, G. Forrest 17040 (type Herb. Edin., syntype Herb. Kew.).

***Gentiana nanobella* Marquand** sp. nov. (Sect. *Chondrophylla*); distinctissima, habitu *G. pudicae* Maxim. similis, a qua ovulis alatis reticulatis, floribus multo majoribus, inter alia differt.

Annual? *Stem* erect, much branched, scaberulous, up to 8 cm. high (one specimen bearing some 40 flowering stems). *Rosette leaves* densely crowded, ovate or spatulate ovate, mucronate, sessile, 3–5 mm. long, with a cartilaginous margin. *Cauline leaves* sub-orbicular, spatulate, mucronate, minute at the base of the stem, increasing in size towards the apex, up to 9 mm. long, 6 mm. wide. *Flowers* erect, terminal, solitary. *Calyx* 1.5 cm. long, 6–7 mm. in diameter at the mouth, tinged reddish purple outside, lobes erect, triangular acute, 3 mm. long, 2 mm. wide. *Corolla* bright clear blue spotted within, up to 3 cm. long; lobes ovate subobtusate, 5–6 mm.

long, 4 mm. wide; plicae dark green, triangular acute, erose, slightly shorter than the lobes. *Stamens* shorter than the corolla tube; filaments slender filiform; anthers elongate, 2 mm. in length. *Ovary* stipitate. *Style* very short. *Stigmata* slightly dilated at the recurved apex. *Ovules* reticulate, winged. *Ripe seed* not seen.

N.W. YUNNAN. Open moist pasture on the Mekong-Salween divide, lat. 28° 10' N., 3900 m., Aug. 1914, *G. Forrest* 13220 (type Herb. Edin.).

***Gentiana praeclara* Marquand** sp. nov. (Sect. *Stenogyne*); affinis *G. lineolata* Franch., sed omnibus partibus majoribus differt.

Annual. *Stem* erect, scabrid, reddish-purple, much branched, up to 12 cm. high. *Basal leaves* 0 or very few. *Cauline leaves* lanceolate or ovate-lanceolate, acuminate, 1–2 cm. long, 4–9 mm. wide, rather crowded at the apex of the stem. *Flowers* large, deep rich purplish-blue with a greenish exterior, sessile. *Calyx* 3.0–3.5 cm. long, 1 cm. in diameter, divided to the middle, lobes lanceolate, acuminate, 5 mm. wide, margin cartilaginous towards the apex, with a broad wing on the exterior of each, extending throughout the length of the calyx (2 mm. wide in the middle, tapering towards the apex and base). *Corolla* infundibuliform, 4.5–6.0 cm. long: lobes ovate deltoid, slightly asymmetrical, 12 mm. long, 7 mm. wide, apex subacute; plicae short, lacinate. *Stamens* shorter than the corolla tube. *Ovary* linear oblong, stipitate. *Style* long. *Ovules* ovoid, exalate. *Ripe seed* not seen. In addition to the normal flowers described above, small much reduced flowers are seen in some of the specimens, near the base of the stem.

S.W. SZE-CHUAN. Open alpine meadows, Muli mountains, lat. 28° 12' N., 3400 m., Oct. 1918, *G. Forrest* 17075 (type Herb. Edin.). All over the open sloping pastures around Muli, 2400–2700 m., "a pretty little species now in full bloom and abundant," Oct. 15, 1921, *F. Kingdon Ward* 4968. In open moist stony meadows on the mountains S. E. of Muli, lat. 27° 50' N., long. 101° E., 4200 m., Oct. 1922, *G. Forrest* 22992.

Franchet placed *G. lineolata* in Sect. *Chondrophylla*; Kusnezow transferred it to Sect. *Frigida*: but its affinities as well as those of this species are rather with Sect. *Stenogyne*.

***Gentiana pterocalyx* Franch.** in Journ. Linn. Soc. Bot. xxvi. 132 (1890).

var. ***flavo-viridis* Marquand** var. nov., a typo differt floribus dilute flavidis, corollae plicis viridibus.

N.W. YUNNAN. In open stony mountain pasture on the eastern flank of the Lichiang Range, lat. 27° 30' N., 3400 m., Sept. 1910, *G. Forrest* 6531. In open woods on the south side of the snow-covered mountains near Lichiang, 3800 m., Sept. 2, 1914, *C. Schneider* 2340. In alpine meadows in the neighbourhood of Chungtien, 3600 m., Sept. 4, 1914, *C. Schneider* 3002. In stony

alpine meadows on the sides of the snow mountains near Lichiang, 3600 m., Sept. 4, 1914, *C. Schneider* 3135.

This appears to be a very well-marked variety, the corolla tube being on the whole wider than in the type, as well as the flowers having constantly pale yellow corolla lobes and greenish plicae, instead of deep blue flowers.

***Gentiana Purdomi* Marquand** sp. nov. (Sect. *Frigida*); affinis *G. apiatae* N. E. Brown, sed calycis lobis erectis, corolla epunctata, stylo multo longiore, differt.

Perennial. *Flowering stems* erect, 20 cm. high, purplish, indistinctly spirally twisted, glabrous. *Leaves* of the short leafy stems linear-lanceolate, up to 15 cm. long, 8 cm. wide, attenuate into the petiole, apex subacute; leaf sheaths rather conspicuous, membranous. *Cauline leaves* few, in pairs, 2.5 cm. long, .5 cm. wide, sessile, apex subobtus. *Flowers* 6–8 in a terminal inflorescence, pedicellate. *Bracts* like the cauline leaves. *Pedicels* up to 2 cm. long, smooth. *Calyx* tube entire, 7–9 mm. long, 3 mm. in diameter at the mouth; lobes erect, linear or linear lanceolate, acute, 3–6 mm. long, .7–1.5 mm. wide; sinus rather broad, truncate. *Corolla* (colour not noted by the collector) in the dried specimens yellowish with narrow greenish-purple lines over the three nerves below each lobe, narrowly infundibuliform, 3 cm. in length; lobes 5, deltoid, subacute, 3 mm. long, 2 mm. wide, plicae sinuose-dentate, shorter than the lobes. *Stamens* about half the length of the corolla tube. *Ovary* stipitate, attenuate at the apex. *Style* 3 mm. long. *Ovules* reticulate. *Ripe seed* not seen.

WEST KANSU. Minchow, 2700–3000 m., 1914, *W. Purdom* (sine numero) (type Herb. Kew.).

***Gentiana rhodantha* Franch.** in Journ. Linn. Soc. Bot. xxvi. 133 (1890).

var. ***Wilsoni* Marquand** var. nov., a typo differt foliis caulinis majoribus cordatis ad 2.5 cm. longis, floribus ad 4 cm. longis, plicis dense fimbriatis.

WESTERN HUPEH. Without precise locality or altitude, Nov. 1907, *E. H. Wilson* (Arn. Arb. Expedn.) 2455.

The comparatively large cauline leaves and large flowers with very densely fimbriate plicae give this plant a distinct appearance, but some specimens in Herb. Kew. collected by *A. Henry* in Yunnan connect it with the type of the species.

***Gentiana saltuum* Marquand** sp. nov. (Sect. *Chondrophylla*); affinis *G. panthaicae* Burkill, sed foliis ovatis obtusis calycisque lobis multo latioribus brevioribus triangularibus differt.

Annual without a distinct rosette of basal leaves. *Stem* erect, glabrous, solitary or slightly branched, 8–15 cm. high, semitranslucent. *Leaves* distant, ovate, obtuse, 4–7 mm. long, 2.5–4.0 mm. wide, entire, subsessile. *Flowers* solitary, terminal. *Pedicel*

1.0–1.5 cm. long. *Calyx* tube 5 mm. long, 3 mm. in diameter; lobes triangular, acute, 1.5 mm. long; sinus obtuse. *Corolla* bright blue; lobes 7 mm. long, 3.5 mm. wide, apex subapiculate; plicae fimbriate, scarcely half the length of the lobes. *Stamens* nearly equalling the corolla tube; filaments expanded into a broad wing at the point of insertion; anthers oblong. *Ovary* obovoid-oblong, long-stipitate. *Gynophore* dilated at the base. *Style* 1 mm. long. *Stigmata* scarcely dilated at the apex. *Seeds* elliptic-ovoid, smooth.

N. BURMA. In damp open grassy places among the canebreaks, Moku-ji Pass, 3500 m., Aug. 2, 1920, "flowers bright blue only opening in sunshine and shutting up as soon as picked," R. Farrer 1795 (type Herb. Edin.).

***Gentiana setulifolia* Marquand** sp. nov. (Sect. *Frigida*); affinis *G. heptaphyllae* Balf. fil. et Forrest, sed foliis angustioribus, calycisque lobis margine setis multo longioribus cinctis differt.

Perennial somewhat creeping. *Barren stems* numerous, short. *Flowering stems* erect, scabrid, 10–15 cm. high, with internodes 2–4 mm. long. *Rosette leaves* O. *Cauline leaves* 7-verticillate, patent, linear, acuminate, sessile, increasing in size towards the apex of the stems, up to 9 mm. long, 0.5–1.0 mm. wide; margin with distinct stiff subulate hyaline setae: leaves of the upper whorls surrounding the calyx. *Flowers* large, solitary, terminal, sessile. *Calyx* purplish; tube 7–9 mm. long, 5–6 mm. wide; lobes 7–8, linear acuminate, 6–8 mm. long, 0.5–0.7 mm. wide, with stiff hyaline setae on the margin; sinus rather broad, obtuse. *Corolla* campanulate-infundibuliform, "sea blue, tube striped blue on a whitish ground," 4.0–4.5 cm. long, 1.5 cm. wide at the mouth of the tube; lobes 7–8 (more rarely only 6), ovate acuminate or very shortly cuspidate, 5 mm. long, 4 mm. wide, margin minutely erose; plicae short, lacinate. *Stamens* equalling the lobes in number, about three-quarters the length of the corolla tube. *Ovary* stipitate. *Ripe seed* not seen.

FRONTIER OF BURMA AND TIBET. Valley of the Seinghku, lat. 28° 10' N., long. 97° 20' E., 3600–3900 m., Oct. 13, 1926, F. Kingdon Ward, with 7385 (type Herb. Kew.). Valley of the Seinghku, on granite slabs in shelter under cliffs, but in the open, 3000 m., F. Kingdon Ward 7485.

***Gentiana sichitoensis* Marquand** sp. nov. (Sect. *Otophora*); peraffinis *G. otophorae* Franch., sed foliis caulinis late ovatis breviter petiolatis vix ad 1 cm. longis, foliis rosularum iis *G. otophorae* minoribus corollis extus intense coeruleo-purpureis differt.

Perennial with a rather stout non-fibrous rootstock. *Flowering stems* ascending, purplish, glabrous, 10–15 cm. high. *Leaves* of the short barren stems oblanceolate-spathulate, up to 4.5 cm. long, 1 cm. wide, apex obtuse, attenuate at the base; petiole 1.5 mm. wide.

Cauline leaves in 3 or 4 pairs, broadly ovate, 8–10 mm. long, 6–7 mm. wide, cuneate below, apex obtuse, petiole 2 mm. long, 1.5–2.0 mm. wide. *Flowers* terminal, solitary, or 2–3 together at the apex of the stems. *Pedicel* 2–12 mm. long. *Calyx* campanulate, tube entire, 5 mm. long, lobes 5, erect, lanceolate or ovate lanceolate, sub-obtuse, 2 mm. long, 1–1.5 mm. wide; sinus broad obtuse. *Corolla* greenish-yellow, minutely spotted within, marked and lined deep blue-purple on the exterior, 2.5 cm. long; tube short; lobes lanceolate acute, 1.7 cm. long, .5 cm. wide; plicae linear, acute, 5 mm. long, 1 mm. wide, attached to one side of each lobe near the base. *Stamens* about half the length of the corolla lobes; filaments subulate; anthers linear, 2 mm. long. *Ovary* shortly stipitate. *Style* very short. *Ripe seed* not seen.

The androecium and gynoecium of most of the flowers examined were found on dissection to be destroyed by the larvae of an insect.

S.E. TIBET. Tsarong; open alpine meadows on the Salween-Kiu Chiang divide, north-west of Si-chi-to, lat. 28° 48' N., long. 98° 15' E., 4200 m., Oct. 1922, G. Forrest 22795 (type Herb. Edin., syntype Herb. Kew.).

***Gentiana sino-ornata* Balf. fil.** in Trans. Bot. Soc. Edin. xxvii. 253 (1918).

var. ***gloriosa* Marquand** var. nov. a typo differt caulibus gracilibus, foliis submembranaceis elliptico-lanceolatis basi attenuatis.

S.W. SZE-CHUAN. In open moist alpine meadows on the mountains east of Yungning, lat. 27° 50' N., long. 100° 56' E., 3400–3600 m., Oct. 1921, G. Forrest 20640.

This striking variety with slender stems and lax, submembranous, elliptic-lanceolate leaves up to 2.5 cm. long, 4.5 mm. wide, and handsome deep clear blue flowers up to 6.5 cm. long (one specimen bearing more than 40 stems 25–30 cm. long), is connected with the type of the species by the following:—

S.W. SZE-CHUAN. "Plant of 4–8 inches. Flowers deep clear blue lined green." Open moist pasture by streams in the Muli mountains, lat. 28° 12' N., 3600 m., Sept. 1918, G. Forrest 17015.

***Gentiana stictantha* Marquand** sp. nov. (Sect. *Frigida*); affinis *G. microdonta* Franch., sed calycis lobis revolutis, corolla maculata, inter alia differt.

Perennial (roots not seen) with the base of the stem surrounded by the membranous sheaths of the old dead leaves. *Stems* apparently erect, unbranched, 20–25 cm. in height, moderately stout and glabrous. *Basal leaves* few on short barren shoots, 8–14 cm. long, 3-nerved, the midrib visible from both sides, the 2 lateral nerves only from the under side; lamina narrowly oblanceolate, 8–12 mm. wide, apex acute; gradually attenuate below into a petiole of about equal length and 3 mm. wide. *Cauline leaves* usually in 2 pairs, up to 7 cm. long, 14 mm. wide. *Bracts* sessile, leaf-like, 3–4 cm. long,

6-8 mm. wide. *Flowers* minutely spotted yellow, tipped with blue in the dried specimens (colour not noted by the collector), 5-6 subsessile, terminal, rather dense, subcapitate, and 2 or more pedunculate, from the penultimate and lower nodes. *Calyx* streaked and tinged purple; tube 9 mm. long, 2.5-3.5 mm. in diameter, partly split down one side; lobes small, narrow, triangular acute, abruptly recurved. *Corolla* infundibular, 2.5 cm. long; lobes 5, ovate acuminate, 4 mm. long, 3.5 mm. wide; plicae very short, obliquely truncate or subacute. *Stamens* $\frac{3}{4}$ the length of the corolla tube: filaments subulate: anthers 3 mm. long. *Ovary* long-stipitate. *Style* very short. *Stigmata* deltoid. *Ripe seeds* not seen.

S.E. TIBET. Alpine turf on the Donker La, 4200-4500 m., 1913, F. Kingdon Ward 1134 (type Herb. Edin.).

***Gentiana suborbisepala* Marquand** sp. nov. (Sect. *Frigida*); affinis *G. tongolensi* Franch. floribus multo majoribus, staminibus inaequalibus differt.

Annual dense rosette plant 20-25 cm. in diameter. *Stems* very numerous, much branched, dark purple and scabrid throughout, bearing hundreds of flowers. *Basal leaves* 0. *Cauline leaves* few, spatulate; lamina obovate-rotundate, 3-6 mm. long; petiole broad, equalling the lamina in length. *Flowers* terminal, shortly pedicellate, "steely blue." *Calyx* tube 12 mm. long; lobes spatulate, closely resembling the leaves, orbicular-reniform, 6 mm. long, 4 mm. wide, apex subapiculate; sinus subacute, overlapped by the free truncate apex of the inner membrane. *Corolla* infundibular, 2.5 cm. long, slightly contracted just below the mouth; tube spotted; lobes spatulate-ovate, 4 mm. long, 3 mm. wide, apex sub-obtuse; plicae acute or bifid, about half the length of the lobes. *Stamens* 5, 3 long and 2 short; filaments subulate, expanded towards the base; anthers oblong. *Ovary* long-stipitate. *Style* slender, 4-5 mm. long. *Stigmata* very short. *Seeds* ovoid, reticulate alveolate.

S.W. SZE-CHUAN. On open shrub-clad slopes on the Litang-Yalung divide, 3600 m., F. Kingdon Ward 4941 (type Herb. Edin.).

***Gentiana Trailliana* G. Forrest** in Notes Bot. Gard. Edin. iv. 69, t. xii (1907).

Var. ***minima* Marquand** var. nov.; a typo differt omnibus partibus multo minoribus, caulibus 1-3 cm. altis, foliis breviter petiolatis.

G. Trailliana is a very variable species. In the present variety the stem is simple, only 1-3 cm. high, with the leaves rather crowded, shortly petiolate. "Flowers blue-purple, throat whitish," up to 1.5 cm. long.

S. SZE-CHUAN. Open, moist pasture on the Lei-lung Shan, lat. 28° 10' N., 4200 m., Aug. 1917, G. Forrest 15190.

***Gentiana trichotoma* Kusnez.** in Acta Horti Petrop. xiii. 61 (1893).

Var. ***albescens* Marquand** var. nov.; a typo differt floribus fere albis.

N.W. YUNNAN. In alpine meadows on the eastern side of the snow-covered mountains near Lichiang, 3600 m., Aug. 21, 1914, C. Schneider 3592.

In this whitish-flowered variety the flowers are smaller than in the type, being scarcely 2.5 cm. long, but other specimens connect it with Pratt 469 on which Kusnezow based his species; and a study of a large number of specimens shows *G. trichotoma* to be a very variable species. Not even does the character of the twisting of the corolla to the right, as seen from inside, which that author uses in his key to the section *Frigida* (l.c., p. 255) appear to be constant in this species as seen in the series of specimens in Herb. Kew.

***Gentiana Wilsoni* Marquand** sp. nov. (Sect. *Frigida*); affinis *G. microdontae* Franch., sed sepalis recurvatis, foliis lineari-lanceolatis angustioribus differt.

Perennial bearing several short leafy stems and erect or ascending, scabrous flowering stems up to 30 cm. high. *Leaves* of the barren stems linear-lanceolate, up to 15 cm. long, 1.2 cm. wide, gradually narrowed into the petiole; apex subacute. *Cauline leaves* only one or two pairs, oblanceolate, subsessile, apex attenuate, subacute, margin entire, smooth. *Flowers* sessile, 6-8 together at the apex of the stems and also 2-3 in the axils of the leaves of the penultimate node, or on a short branch arising therefrom. *Calyx* partly split down one side; tube 8-9 mm. long, tinged purple below; lobes linear, acute, 4-6 mm. long, recurved; sinus truncate with the inner membrane. *Corolla* (colour not noted by the collector): upper part blue in dried specimens, narrowly infundibuliform, 3-3.5 cm. long, 6 mm. in diameter at the mouth; tube slightly contracted just above the calyx; lobes 5, entire, triangular ovate, 5 mm. wide, apex subacute; plicae short, symmetrical, obliquely-truncate, $\pm$ denticulate. *Stamens* shorter than the corolla tube; filaments subulate; anthers linear, 3-4 mm. in length. *Ovary* linear, stipitate; stigmata sessile, recurved, not dilated at the apex. *Seeds* large, areolate, 1.5 mm. long.

WESTERN CHINA. Alpine meadows, precise locality and altitude not noted, Sept. 1904, E. H. Wilson (Veitch Expedn.) 4138 (type Herb. Kew.).

The name *Gentiana puberula* Franchet, which was published by Forbes et Hemsley, Journ. Linn. Soc. Bot. xxvi. 132 (1890) for a species in Sect. *Chondrophylla*, is invalid, the name having been used by Michaux in his Fl. Bor. Am. i. 176 (1803) for a species belonging to Sect. *Pneumonanthe*. I therefore propose the name ***Gentiana pubigera* Marquand** nom. nov. for the species which Franchet described.

In Kusnezow's monograph of *Eugentiana* in the Act. Hort. Petrop. xv. (1904) the same trivial name is employed for both species (No. 16, p. 197 and No. 149, p. 422).

***Gentiana filistyla* Balf. f. et Forrest** sp. nov. sectionis *Frigidae*; affinis *G. tubiflorae* Wall.

Perennis parvula, rosulata, uniflora, ex rosulis caules paucos breves emittens. *Folia* utrinque laete viridia, rosularum ovalia vel obovalia vel subspathulata ad 8 mm. longa, 4 mm. lata, apice rotundata, margine integra, obscure papillata, deorsum attenuata, caulis erecti subligulata, 2 cm. longa, 2 mm. lata. *Flos* sessilibus erectus. *Calyx* tubulosus, ultra folia ultima projectus, 1.8 cm. longus, viridis; limbi oblongi, obtusi, 5 mm. longi, aequales. *Corolla* intense indico-colorata, 4 cm. longa, in dimidio infero angusta, supra ampliata, infundibuliformis; lobi rotundati, 5 mm. longi, 6 mm. lati; plicae breves, vix 1 mm. alta, 6 mm. lata, erosa. *Stamina* ad medium tubi corollini inserta; filamentorum pars libera intense purpurea; antherae liberae, angustae. *Ovarium* calyce inclusum 8 mm. longum 2.5 mm. latum stipite crasso 6 mm. longo; stylus longus, tenuis, filiformis, 1.1 cm. longus corolla paullo brevior; rami stigmatiferi recurva.

N.W. YUNNAN. Mekong-Salween divide, July 1917, *Forrest* 14205 (type Herb. Edin.). Mekong-Yangtze divide, Lu-kong Shan, Sept. 1917, *Forrest* 14338.

S.E. TIBET. Tsarong, Ka-gwr-pw, Aug. 1917, *Forrest* 14561: Aug. 1918, *Forrest* 16882.

A small species in habit like *G. Wardii* W. W. Sm. but larger and easily recognised by its filiform long style.

[Differing from *G. tubiflora* Wall. ex Griseb., with which it is closely allied, in the obtuse leaves with rotundate apex, and calyx lobes not mucronate.—C.V.B.M.].

***Gentiana helophila* Balf. f. et Forrest** sp. nov. sectionis *Frigidae*; affinis *G. sino-ornatae* Balf. f.

Perennis. *Caulis* multiceps, ramulos plurimos biennes 15 cm. longos, adscendentes, nunc subprostratos nunquam radicanter emittens. *Folia* uniforme per paria connata (vagina 4 mm. longa), linearia, ad 4 cm. longa, 3.5 mm. lata, acuta, margine membranacea, scabriuscula, basi haud constricta. *Flores* solitarii, terminales, sessiles. *Calyx* angustus infundibuliformis, 3 cm. longus; tubus extus rubro-purpureo-lineatus, intus albidus, membranaceus, laevis, 1.2 cm. longus; lobi lineares, longe acuti, margine scabriusculi, basi haud contracti. *Corolla* ad 7 cm. longa, pallide purpurea supra tubum calycinum, infundibuliformis, vittis externis flavidis purpureo-maculatis et linea centrali purpurea notatis; lobi ad 8 mm. longi, triangulares-acuti, minutissime apiculati; plicae bidentatae, dentibus triangularibus, acutis, inaequalibus, longiore 3 mm. longo. *Staminum* filamenta albida; antherae liberae, basi rotundatae. *Stylus* 6 mm. longus, ramis stigmatiferis 3 mm. longis.

EASTERN N.W. YUNNAN. Lei-lung-shan, Aug. 1917, *Forrest* 15187 (type Herb. Edin., syntype Herb. Kew.)

A species easily distinguished from its allies by the long purple corolla with larger lobes.

***Gentiana stragulata* Balf. f. et Forrest** sp. nov. sectionis *Frigidae*.

Perennis prostrata, late patens, caules plures radicanter foliis siccis praeteritis vestitos emittens et rosulas floriferas gerentes. *Folia* per paria connata, ovalia, apice rotundata, 2 cm. longa, margine saepe rubra glandulosa, deorsum in petiolum attenuata; supra nitentia, laete virentia, glandulosa, subtus pallidiora. *Flores* 1-3 ad apicem ramulorum, flos terminalis sessilis, flores 2 laterales pedicellati. *Calyx* 2.5 cm. longus, infundibuliformis, plus minusve purpureus et purpureo-maculatus, glandulosus; lobi tubum aequantes, foliis similes. *Corolla* ad 5.5 cm. longa supra tubulosa purpurea; lobi coerulei, basi maculati, triangulares, 5-7 mm. longi, basi 5-6 mm. lati; plicae 2 mm. longae, 4 mm. latae, eroso-lobatae. *Stamina* inclusa. *Ovarium* angustum stipite 2 cm. longo; stylus 8 mm. longus, corollae tubum superans; stigma recurvum. *Capsula* semiexserta. *Semina* lamellosa-rugosa.

N.W. YUNNAN. Kari Pass, July 1914, *Forrest* 12890: Mekong-Salween divide, Sept. 1914, *Forrest* 13318; Aug. 1917, *Forrest* 14636 (type Herb. Edin.).

S.E. TIBET. Tsarong, Ka-gwr-pw, Sept. 1917, *Forrest* 14872.

A splendid hardy species forming a dense carpet of many flowering rosettes.

***Gentiana streptopoda* Balf. f. et Forrest** sp. nov. sectionis *Frigidae*; ex affinitate *G. chinensis* Kusnez.

Perennis ex apice radice caules quadrangulares papillatos plures prostratos breves 4-6 cm. longos emittens. *Folia* subcarnosula utrinque laetevirens, infera elliptica vel suborbicularia, supera late ovata vel oblonga ad 2.8 cm. longa 1.2 cm. lata, apice rotundata, margine papillata quasi ciliata, deorsum in petiolum latum attenuata. *Flores* 2-6 ad apicem ramosum congesti, sessiles. *Calyx* 4-6 lobatus dimidiatus nunc integer; tubus membranaceus 12 mm. longus; lobi a basi acuminati foliacei virides, 4 mm. longi, margine papillati sinibus rotundatis. *Corolla* 3 cm. longa, pallide coerulea, ad apicem calycis infundibuliformis, supra tubuloso-ampliata; lobi triangulares, acuti, 5 mm. longi, 3 mm. lati, plicae asymmetricae, 2 mm. latae, plerumque unidentatae, dente 1 mm. longo, nunc fere edentulatae. *Stamina* ad medium tubi corollini inserta; filamenta exalata; antherae liberae basi subsagittatae. *Ovarium* angustum 8 mm. longum, 3 mm. latum, stipite crasso corrugato deinde torto. *Stylus* 5 mm. longus, ramis stigmatiferis subulatis recurvis. *Capsula* inclusa? *Semina* nigra, diversiformia, isodiametrica lamellosa-rugosa.

N.W. YUNNAN. Mekong-Yangtze divide, Lu-kong Shan, Sept. 1917, *Forrest* 14827 (type Herb. Edin., syntype Herb. Kew.).

Easily diagnosed by its corrugate ultimately twisted stipe. Distinct from *G. sikkimensis* Clarke.

Gentiana tsarongensis Balf. f. et Forrest sp. nov. sectionis *Chondrophyllae*; affinis *G. decoratae* Diels.

Perennis caespitosa 2.5 cm. alta, radice crassiusculo brevi, ex rosula centrali caules bialatos adscendentes plures 6 cm. longos emittens. *Folia* per paria connata, inferioria subsquamiformia, superiora laete viridia, carnosula, ovalia, ad 8 mm. longa, 3.5 mm. lata, obtusa, margine tenuiter membranacea plana integra papillata basi quasi petiolata; supra basi puberula; infra pallidiora; vagina membranacea, vix 2 mm. longa. *Flos* solitarius, sessilis, foliis ultimis subfloralibus saepe coloratis involucrentibus. *Calyx* plus minusve coerulesco-coloratus et minute papillatus 6 mm. longus, ad medium 5-partitus; lobi oblongo-obtusi, basi haud contracti, sinibus obtusis. *Corolla* vix 2 cm. longa, intense coerulea, ad medium 5-partita; tubus calycem superans; lobi oblongi minutissime apiculati, 1 cm. longi, 5 mm. lati; plicae a basi lanceolatae membranaceae, 5 mm. longae, 1.5 mm. latae. *Stamina* ad medium corollae inserta, corolla paullo breviora; antherae tenues oblongae basi integrae. *Ovarium* angustum, stipite 3 mm. longo; stylus brevis 1.5 mm. longus, staminibus longior; stigma recurvum. *Capsula* 1.8 cm. longa, 2.5 mm. lata, subcurvulata, corolla inclusa. *Semina* ovalia, brunnea, testa striata exarillata.

S.E. TIBET. Tsarong, Doker-la, Aug. 1918, Forrest 16876 (type Herb. Edin., syntype Herb. Kew.).

[Differing from *G. decorata* Diels in the leaves and calyx lobes being obtuse at the apex.—C.V.B.M.].

XII.—CONTRIBUTIONS TO THE FLORA OF SIAM.* ADDITAMENTUM XXIV.

Spatholobus pallidus Craib [Leguminosae-Phaseoleae]; a *S. acuminato* Benth. vexillo basi cordato-truncato haud cuneato, a *S. compare* Craib foliolis tenuioribus, ab ambobus floribus saltem siccis pallidis recedit.

Frutex volubilis; ramuli annotini glabri, cortice cinereo-brunneo vel brunneo striato obtecti, lenticellis vix conspicuis; alabastra axillaria adpresse ferrugineo-pubescentia. *Folia* trifoliolata, petiolo 1.5–6.5 cm. longo praecipue ad basem incrassatam breviter adpresse ferrugineo-pubescente aliter mox saepe fere glabro subterete vel similia, oblongo-elliptica vel oblongo-ovata, apice obtuse acuminata, mucronata, basi rotundata, 4.8–12 cm. longa, 2–5.2 cm. lata, subcoriacea, sicco viridia, subtus parum pallidiora, supra glabra, subtus pilis brevibus albis adpressis inconspicuis sparse instructa, nervis lateralibus utrinque 8–10 supra conspicuis vel subprominulis subtus prominulis, nervulis rete gracile pagina utraque plus minusve conspicuum efficientibus, petiolulis 4–7 mm. longis densius breviter adpresse ferrugineo-pubescentibus demum fere glabris suffulta,

Continued from K.B., 1927, p. 395.

terminali a lateralibus 1–2 cm. distante; stipellae rectae, vix 2 mm. longae. *Paniculae* e ramulis defoliatis ortae, pedunculo communi 1–2 cm. longo incluso ad 12 cm. longae, ramulis ad 5 cm. longis, rhachi et ramulis pilis brevibus ferrugineis adpressis vel subadpressis densius tectis; bractee angustae, circa 2 mm. longae, deciduae; pedicelli ad 3 mm. longi, densius puberuli, fere ad medium bracteolis angustis cito deciduis alternis circa 1 mm. longis instructi. *Calyx* 4 mm. longus, basi postice parum gibbosus, extra breviter pubescens, intra fere ad medium glaber, superne breviter adpresse pubescens; lobi duo postici in unum oblongum apice emarginatum 2.25 mm. longum 2 mm. latum connati, laterales cum antico ad 2.25 mm. longi et 1.25 mm. lati, omnibus ciliatis. *Vexilli* lamina oblata, apice emarginata, basi cordato-truncata, 4.5 mm. longa, 7 mm. lata, ungui 2 mm. longo apice 1 mm. lato suffulta; alae, ungui 3 mm. longo incluso, 7 mm. longae, apice 2.5 mm. latae, basi latere uno cordatae; carinae petala, ungui 3 mm. longo incluso, 6.5 mm. longa, 1.75 mm. lata, basi latere uno rotundata. *Filamenta* saltem ad medium inter se libera, antheris parvis. *Pistillum* vix 6 mm. longum, ovario breviter adpresse pubescente, stylo pilis perpaucis inferne instructo.

Surat, Ta Kanawn, under 50 m., evergreen forest, Kerr 12317.

Bauhinia concreta Craib [Leguminosae-Bauhineae]; a *B. calcicola* Craib alabastris apice truncatis haud acuminatis, petalis inter se subaequalibus, a *B. Curtisii* Prain floribus minoribus, petalis dorso haud glabris inter alia recedit.

Frutex scandens; ramuli subgraciles, primo densius breviter adpresse ferrugineo-vel interdum cinereo-pubescentes, cito glabri, hornotini fusco-corticati, annotini pallidiores; cirrhi graciles, indumento et cortice iis ramulorum similibus obtecti. *Folia* ovata vel late ovata, apice obtusa vel obtuse acuminata, saepe retusa, rarissime sub-bilobulata, basi cordata vel altius cordata, 3.5–6 cm. longa, 1.2–4 cm. lata, chartacea vel rigide chartacea, sicco subviridia, subtus pallidiora, pagina superiore glabra, inferiore ima basi breviter plus minusve adpresse ferrugineo-pubescentia, aliter tantum ad nervos pilis paucis ferrugineis instructa, vetustiora glabra vel saepe ima basi plus minusve pubescentia, e basi 7-nervia, nervis cum costa supra conspicuis subtus subprominentibus, nervulis rete gracile pagina utraque conspicuum vel inferiore prominulum efficientibus, margine primo ciliata, cito glabra, petiolo 1–2.7 cm. longo gracili supra canaliculato indumento ei ramulorum simili tecto cito glabro suffulta; stipulae fugaces. *Racemi* et terminales et ramulos breves laterales terminantes, pedunculo communi 1–2 cm. longo incluso ad 18 cm. longi, paniculam terminalem circa 10 cm. diametro formantes, rhachi pedicellis et calyce breviter adpresse griseo-pubescentibus vel subtomentellis; flores albi (ex Kerr), pedicellis circa 8 mm. longis suffulti; bractee lineari-subulatae, circa 1.5 mm. longae, deciduae; bracteolae 2, alternae, paulo infra pedicelli medium positae, bracteis similes sed minores,

deciduae. *Sepala* sub anthesin plus minusve libera, ovato-lanceolata, apice incrassata, cucullata, obtusa, 3 mm. longa, 1.75 mm. lata, dorso breviter griseo-pubescentia, intra glabra. *Petala* inter se subaequalia, apice antica et lateralia retusa vel retuso-truncata, postico bilobulato, basi cuneata, ungui 1 mm. longo incluso ad 5 mm. longa, 3 mm. lata. *Stamina* fertilia 3, filamentis glabris 4.5 mm. longis, antheris 1.25 mm. longis, staminodiis evolutis. *Ovarium* glabrum, 2.5 mm. longum, stipite circa 1 mm. longo glabro suffultum, stylo glabro 1.5 mm. longo, ovulis 3.

Surat, Ban Kawp Kep, 100 m., rocky limestone hill, *Kerr* 13180.

Bauhinia tubicalyx Craib [Leguminosae-Bauhineae]; ab affini *B. strychnoidea* Prain inflorescentiae rhachi pedicellis et calyce haud glabris distinguenda.

Frutex scandens; ramuli subgraciles, primo angulati, densius puberuli vel laterales breves sparse breviter ferrugineo-pubescentes, mox teretes, glabri, cortice brunneo vel fusco-brunneo obtecti, lenticellis haud conspicuis; cirrhi graciles, apicem versus breviter ferrugineo-pubescentes, cito aliter glabri. *Folia* oblongo-lanceolata, oblonga, vel oblongo-elliptica, apice integra, acuminata, obtusa vel interdum retusa, basi cuneata vel rotundato-cuneata, 5-11 cm. longa, 2.5-5 cm. lata, chartacea vel rigide chartacea, sicco viridia, glabra, triplinervia, nervis secundariis (e costa ortis) utrinque 2-3, omnibus supra conspicuis, subtus costa prominente aliis prominulis, nervulis pagina utraque conspicuis vel saepe prominulis, petiolo 1-4 cm. longo basi et apice incrassato primo parce ferrugineo-puberulo cito glabro suffulta; stipulae circa 2 mm. longae, fugaces. *Racemi* terminales, pedunculo communi 1-2 cm. longo incluso ad 8 cm. longi, breviter albo-pubescentes; bractae subulatae, circa 2 mm. longae, cito deciduae; pedicelli ad 1.8 cm. longi. *Receptaculi* tubus circa 1.5 mm. longus. *Calycis* tubus ad 2.5 mm. longus, obsolete denticulatus, extra breviter pallide plus minusve adpresse pubescens, intra glaber. *Petala* 5, elliptica vel oblongo-elliptica, 4 mm. longa, 2.5-3.5 mm. lata, basi in unguem 2-3 mm. longum attenuata, ciliata, dorso, ungui incluso, glabra, intra postico glabro, lateralibus sparse pilosis ungui fere glabro, anticis pilosis ungui etiam piloso. *Stamina* fertilia 3, filamentis 7 mm. longis glabris, antheris 2.4 mm. longis, staminodiis 1.5-3.5 mm. longis. *Pistillum* 6 mm. altum, ovario sericeo basi in stipitem vix distinctum angustato, stylo crasso brevi superne fusco glabro, stigmate oblique discoideo, ovulis 6.

Surat, Sawng Pi Nawng, 100 m., evergreen forest on limestone hill, *Kerr* 12407.

Saraca Pierreana Craib [Leguminosae-Amherstieae]; a *S. bijuga* Prain bracteolis amplexicaulibus, receptaculi tubo longiore, floribus maioribus, a *S. indica* Linn. et *S. Zollingeriana* Miq. foliolis tantum 2-4 recedit.

Arbor circa 6 m. alta (ex *Kerr*); ramuli glabri, cinereo-corticati, lenticellis parvis prominulis. *Folia* sessilia vel subsessilia; stipulae inter se connatae, saltem 1 cm. longae; foliola 1-2-iuga, oblanceolata vel oblongo-oblanceolata, rarius oblonga, apice obtuse acuminata, basi inferiora cordata, terminalia inaequilaterialia, latere altero anguste cuneata vel acuminata, altero cuneato-rotundata vel subcordata, rarius in foliis uni-iugis elliptica, apice rotundata, basi inaequaliter cordata, 10-40 cm. longa, 4-10.5 cm. lata, chartaceo-coriacea, sicco viridia, subtus parum pallidiora, glabra, nervis lateralibus utrinque 7-12 supra conspicuis vel subprominulis subtus prominulis, nervulis rete subtus prominulum efficientibus, petiolulo crasso ad 5 mm. longo suffulta. *Corymbi* terminales vel e ramulis defoliatis orti, e basi ramosi vel pedunculo communi circa 5 mm. longo suffulti, ad 7 cm. longi et 9 cm. diametro, rhachi ramulis et pedicellis glabris; bractae oblongae vel ovato-oblongae, apiculatae, circa 2 mm. longae, facie utraque glabrae, ciliatae, sub anthesin persistentes vel deciduae; bracteolae 2, suboppositae, amplexicaules, divergentes, ovatae, acutae, 5 mm. longae, 4 mm. latae, apice ciliatae et saepe basi pauperius ciliatae, 1-1.8 cm. supra pedicelli basem positae; pedicelli inferiores ad 3 cm. longi; receptaculi tubus 1.7 cm. longus. *Sepala* 4, oblonga, apice rotundata, 1-1.2 cm. longa, 5 mm. lata. *Stamina* 8, filamentis gracilibus circa 3.5 cm. longis glabris. *Ovarium* 6 mm. longum, ad suturas pilosum, stipite 4 mm. longo piloso suffultum, stylo 2.5 cm. longo basi parce piloso, ovulis 5.

Surat, Panom, 50 m., by stream in evergreen forest, *Kerr* 12376.

Sindora fusca Craib [Leguminosae-Cynometreae]; a speciebus aliis stipulis parvis, foliolis 2-3-iugis inter minora graciliter reticulatis supra glabris subtus adpresse puberulis, legumine armato recedit.

Arbor circa 30 m. alta (ex *Kerr*); ramuli primo sparse adpresse ferrugineo-pubescentes, brunneo-corticati, cito glabri, cortice fusco obtecti, lenticellis parvis vix conspicuis. *Folia* petiolo 1.3-2 cm. longo incluso 7-14 cm. longa, petiolo cum rhachi sicco brunneo subterete plus minusve angulato sparse ferrugineo-puberulo vel glabro; stipulae deciduae, oblongae, parum obliquae, 5 mm. longae, 2 mm. latae, nervosae, dorso sparse ferrugineo-pubescentes; foliola 2-3-iuga, saepissime oblonga vel suboblonga, apice rotundata vel obtusa, parum retusa, basi parum inaequilaterialia, rotundata vel cuneato-rotundata, 3-8.5 cm. longa, 1.6-3.5 cm. lata, chartaceo-coriacea, supra glabra, subtus inconspicue adpresse puberula, costa supra conspicua subtus prominente, nervis lateralibus utrinque numerosis inter se parallelis ad marginem currentibus vel intra marginem furcatis et ramis ad marginem currentibus supra conspicuis subtus subprominulis, nervulis rete gracile supra prominulum subtus conspicuum vel subprominulum efficientibus, margine integra, cartilaginea, petiolulis 2-4 mm. longis puberulis subteretibus suffulta. *Legumen* ambitu oblongo-rotundatum, ad 7 cm.

diametro, valvis fuscis sparse breviter pubescentibus faciebus spinis puberulis validis ad 6 mm. longis armatis; semina 1-2, fusca, 1.7 cm. longa, 1.8 cm. lata, funiculo crasso arilliformi semine paulo minore.

Pattani, under 50 m., common in evergreen forest, *Kerr* 7842.

Acacia Meeboldii Craib [Leguminosae-Mimoseae]; a speciebus aliis asiaticis internodiis aculeatis et floribus capitatis, foliolis latis ea *Albiziae* vel *Calliandrae* simulantibus distinguenda.

Frutex lignosus, scandens, ramulis primo puberulis cito glabris, hornotinis sicco fuscis, vetustioribus subrubris vel cinereo-rubris, internodiis aculeis subrectis paulo deorsum directis vel paulo recurvatis ad 3 mm. longis sat numerosis armatis. *Folia* bipinnata, petiolo 2-7 cm. longo cum rhachi primo puberulo supra canaliculato subtus saepe sparse armato basi incrassato paulo supra basem glandula ovata instructo suffulta, rhachi ad bases pinnarum saltem duarum ultimarum glandulosa; stipulae deciduae, haud spinescentes, oblongae, obliquae, circa 5 mm. longae et 2 mm. latae; pinnae saepissime 3-iugae, rarissime 2- vel 4-iugae, ad 15 cm. longae, inferiores superioribus breviores, paribus inter se 1.3-2.8 cm. distantibus; foliola pinnarum inferiorum utrinque ad 4, superiorum utrinque ad 7, rhachilla puberula supra canaliculata saepe superne anguste alata apice 1-2-glandulosa ultra foliola producta; foliola omnia inaequilaterialia, apice subacuta vel obtusa, saepe subacuminata, latere inferiore dimidio ovata vel oblongo-elliptica, basi truncata, superiore dimidio lanceolata, basi cuneata vel truncato-cuneata, inferiora saepe stipuliformia, circa 4 mm. longa, mediana ad 4.5 cm. longa et 2 cm. lata, terminalia ad 7.5 cm. longa et 3.5 cm. lata, chartacea vel rigide chartacea, sicco viridia vel plus minusve brunnescentia, supra ad costam praesertim inferne crispatis puberula et ad nervos sparse puberula vel glabra, subtus ad costam nervosque pilis brevibus hic et illic instructa vel fere glabra, costa supra prominula subtus prominente, latere inferiore e basi 2-nervia et paulo supra basem nervo costae subaequivalido fere ad apicem currente oreunte, nervis lateralibus e costa ortis saltem ad 10 subtus prominulis, margine parum revoluta, sessilia. *Flores* capitati, capitulis sub fructu pedunculo lignoso 1 cm. longo suffultis. *Calyx* circa 1.6 mm. longus. *Corolla* circa 2.5 mm. longa. *Filamenta* inter se omnino libera. *Legumen* 10-14 cm. longum, 3-5 vel rarius usque ad 6 cm. latum, breviter stipitatum, ad suturas incrassatas puberulum, valvis brunneis vel rubro-brunneis transverse lineatis; semina compressa, ambitu oblonga, 15 mm. longa, 7 mm. lata, funiculo ad 2 cm. longo duro apice curvato instructa.

Langsuan, Pato, 200 m., common in evergreen forest, *Kerr* 12197.
Distr. Lower Burma (*Meebold* 15295, *Parkinson*, 1693).

Polyosma elongata *Geddes* [Saxifragaceae-Escalloniae]; a *P. conocarpa* Ridl. foliis fere glabris nonnullis serrulatis, floribus multo maioribus hirsutioribus differt.

Arbor circa 10 m. alta (ex *Kerr*), ramulis primo compressis mox teretibus. *Folia* opposita, elliptica vel obovata, apice acuminata, basi cuneata, 10-14.5 cm. longa, 3.2-5.5 cm. lata, supra brunnea, fere glabra, subtus viridia vel pallida, puberula, nervis lateralibus utrinque 8-9 vix adscendentibus, margine integra vel raro parte superiore serrulata, petiolo 1-1.3 cm. longo puberulo suffulta. *Racemi* elongati, 25 cm. longi, pubescentes; flores albi (ex *Kerr*), inferiores pedicellati, superiores subsessiles; pedicelli circa 1.5 mm. longi, 3-bracteolati, adpresse albo-pubescentes. *Receptaculum* adpresse albo-pubescent. *Calyx* circa 1.5 mm. longus, lobis 4 deltoideis acutis circa 1 mm. latis extra adpresse albo-pubescentibus intra glabris ciliatis. *Petala* 4, linearia, apice subacuta, 13 mm. longa, 1.75 mm. lata, intra pubescentia. *Stamina* 4, filamentis 5.5 mm. longis parte basali excepta pilosis, antheris 3 mm. longis breviter apiculatis. *Stylus* 9.5 mm. longus, stigmatibus capitato.

Doi Angka, 1300-1500 m., dense evergreen forest, *Kerr* 5289.

Polyosma odorans *Geddes* [Saxifragaceae-Escalloniae]; a *P. integrifolia* Wall. foliis subtus fere glabris, nervis minus numerosis, floribus maioribus differt.

Arbor circa 15 m. alta (ex *Kerr*). *Folia* opposita, elliptica, apice acuminata, basi cuneata, 8-14 cm. longa, 2.8-6.6 cm. lata, supra brunnea, nitentia, fere glabra, subtus glabrescentia, nervis lateralibus utrinque circa 9 vix adscendentibus pagina inferiore prominulis, margine revoluta, petiolo 1.8 cm. longo glabro suffulta. *Racemi* 10-14 cm. longi, floribus densis subsessilibus. *Calyx* lobis 4, deltoideis, circa 1.5 mm. longi, extra adpresse albo-pubescentes, intra glabri. *Petala* 4, linearia, subacuta, 13 mm. longa, 1.5-2 mm. lata, extra adpresse albo-pubescentia, intra pilosa. *Stamina* 4, filamentis crassis 6 mm. longis parte basali excepta pubescentibus, antheris 3.5 mm. longis quam filamentis angustioribus. *Ovarium* 1-loculare, pluriovulatum; stylus crassus, 8-9 mm. longus, pubescens.

Kanburi, Kao Ri Yai, 1500 m., evergreen forest, *Kerr* 10396.

Kalanchoe tetramera *Geddes* [Crassulaceae]; a *K. Craibii* R. Hamet foliis haud trisectis, inflorescentia densiore, staminibus 4, a *K. Dixoniana* R. Hamet cymis hirsutioribus, caulibus parte superiore pubescentibus, floribus luteis, staminibus 4 differt.

Herba erecta, caulibus succosis teretibus iuventute pubescentibus cito crassioribus glabris. *Inflorescentia* terminalis, late corymbosa, rhachi pubescens; pedicelli 5-6 mm. longi, pubescentes. *Calyx* segmenta 4, lanceolata, apice acuta, longitudinaliter venata, 7 mm. longa, 2.5 mm. lata, extra pilos perpaucos ferentia, intra breviter et parce pubescentia. *Corolla* lutea (ex *Kerr*); tubus urceolatus, 1.3 cm. longus, extra puberulus; lobis 4, obovatis, acutis, 10 mm. longi, 5 mm. lati, extra parce puberuli. *Stamina* 4, ad tubum corollae prope summum adfixa, filamentis 1 mm. longis, antheris parvis oblongis 1.3 mm. longis. *Carpella* 4, basi connata, multiovulata,

8-9 mm. longa, squamis 4 lineari-lanceolatis 2 mm. longis spinis instructa; styli quattuor, 1.4 mm. longi; stigmata capitellata, Korat, Chantuk, Tachang, 400 m., limestone rocks, *Kerr* 9988 ulu

Altingia siamensis Craib [Hamamelidaceae]; ab *A. chinense* Hance et *A. yunnanense* Rehder et Wilson foliis tenuioribus, ab hac capitulo fructifero multo minore recedit.

Arbor 20-25 m. alta (ex *Kerr*); ramuli iuventute parce pilosi, sicco fuscii, plus minusve striati, annotini pubescentes vel fere glabri, brunneo-rubro-corticati, lenticellis paucis, demum cinerei vel brunneo-cinerei. *Folia* saepissime oblongo-oblancoolata vel oblongo-lanceolata, interdum anguste oblonga vel lanceolata, apice obtuse vel subacute caudato-acuminata, basi saepe parum inaequilateralia, cuneata vel rotundato-cuneata, 8-12 cm. longa, 2.5-4.5 cm. lata, rigide chartacea, supra glabra, subtus ad nervorum axillos interdum conspicue pilosa et ad costam pilis paucis iuventute instructa, interdum fere glabra vel omnino glabra, summo apice primo pilis paucis instructa, costa supra conspicua subtus prominente, nervis lateralibus utrinque 7-8 bene intra marginem anastomosantibus supra gracilibus prominulis subtus prominentibus, nervulis rete laxum supra prominulum subtus magis elevatum formantibus, margine cartilaginea, parum revoluta, anguste distanter serrulata, petiolo 5-8 cm. longo supra canaliculato indumento ei ramulorum simili tecto suffulta. *Capitula* fructifera sessilia vel subsessilia, depressa, ad 12 mm. alta, 13-18 mm. diametro, capsulis calyces paululo superantibus.

Muang Pan, Doi Duan, 700 m., evergreen forest, *Kerr* 5110.

Terminalia glaucifolia Craib [Combretaceae-Combretaceae]; ab *T. bialata* Kurz petiolis crassioribus, inflorescentia longiore crassiore, fructu minore, alis late obovatis haud oblongis brevioribus crispatis puberulis recedit.

Arbor circa 8 m. alta (ex *Kerr*); ramuli annui ad 20 cm. longi, inferne ad 16 cm. nudi, apice folia et spicas gerentes, primo densius breviter adpresse pubescentes, cito glabri, fuscii, demum cortice brunneo vel cinereo obtecti. *Folia* ad apices ramulorum gesta, saepissime oblongo-elliptica, apice acuta vel obtusa, interdum breviter acuminata, basi rotundata cuneata, 6.5-15 cm. longa, 3.5-8 cm. lata, coriacea vel subcoriacea, supra sicco subviridia vel fusca, subtus matura glauca, supra pilis adpressis sparse instructa, 6-8 intra marginem anastomosantibus supra conspicuis subtus prominentibus, nervulis rete gracile subtus conspicuum formantibus, margine integra, anguste cartilaginea, petiolo 2.8-4 cm. longo eglanduloso puberulo vel glabro suffulta. *Spicae* axillares, ad 30 cm. (pedunculo communi petiolo paulo vel dimidio brevioribus inclusis) longae, rhachi et alabastris fulvo-tomentellis; bractae productae. *Calyx* ad medium 5-lobatus, lobis deltoideis acutis

recurvis, intra dense pilosus. *Filamenta* circa 5 mm. longa, superne angustata, antheris 0.75 mm. longis haud mucronatis, loculis basi liberis. *Stylus* parce pilosus, staminibus brevior; ovarium trigonum, circa 2 mm. longum. *Fructus* 2 cm. longus, alis duabus inclusis ad 8 cm. latis, alis late obovatis striatis crispatis puberulis.

Doi Sutep, 360 m., mixed forest, *Kerr* 1328 (flowers). Chawm Tawng, 270 m., mixed deciduous forest, *Kerr* 2935 (fruit).

Terminalia oryzetorum Craib [Combretaceae-Combretaceae]; ab affini *T. pyrifolia* Kurz ramulis, foliis juvenilibus, et inflorescentiae rhachi sericeis, foliis pro longitudine latioribus, fructu basi emarginato recedit.

Arbor circa 10 m. alta (ex *Kerr*); ramuli iuventute sericei, sicco glauci. *Folia* oblongo-oblancoolata vel obovata, apice obtuse vel subacute acuminata, basi cuneata, ad 12 cm. longa et 6 cm. lata, chartacea vel rigide chartacea, sicco viridia vel praesertim supra fuscescentia, iuventute sericea, cito pagina utraque pilis brevibus albis sparse instructa et pustulata, nervis lateralibus utrinque 6-8 intra marginem anastomosantibus pagina utraque conspicuis, nervulis rete gracile subtus conspicuum formantibus, margine anguste cartilaginea, petiolo 1-2 cm. longo eglanduloso primo sericeo suffulta. *Racemi* infructescentes ad 15 cm. longi, rhachi sericei. *Fructus* trigonus, 9-12 cm. longus, alis duabus late obovatis striatis ad 1.8 cm. longis et 2.5 cm. latis puberulis.

Muang Pichit, 50 m., scattered through paddy fields, *Kerr* 5671.

Combretum procursum Craib [Combretaceae-Combretaceae]; ab affini *C. quadrangulare* Kurz foliis maioribus, receptaculo supra ovarium distincte tubuloso-producto distinctum.

Frutex volubilis (ex *Kerr*); ramuli iuventute dense lepidoti, angulati, cito conspicue acute quadrangulares, demum obtuse quadrangulares, sparsissime lepidoti, cortice pallide brunneo vel cinereo-brunneo obtecti, lenticellis sparsis vix conspicuis. *Folia* opposita vel subopposita, elliptica vel oblongo-elliptica, rarius late lanceolata, apice acute vel obtuse acuminata, basi cuneata vel rotundato-cuneata, 3.5-11 cm. longa, 1.7-6 cm. lata, chartacea, sicco pallide viridia, primo pagina utraque dense mox superiore subsparsae lepidota, nervis lateralibus utrinque 5-7 intra marginem anastomosantibus, supra conspicuis subtus prominulis, nervulis pagina utraque subconspicuis, margine integra, petiolo 5-10 mm. longo lepidoto eglanduloso supra canaliculato suffulta. *Spicae* axillares, solitariae, rarius paniculatae vel etiam rarius paniculam terminalem efoliatam formantes, circa 5 cm. (pedunculo communi circa 1 cm. longo inclusis) longae, et rhachi et alabastris dense lepidotis. *Receptaculum* ad 1.25 mm. supra ovarium tubuloso-productum. *Calyx* 2 mm. longus, ad medium lobatus, lobis 4 deltoideis acutis, intra praesertim basi densius pilosus. *Petala* 4, obovata vel anguste obovata, subunguiculata, 1.25 mm. longa,

0.75 mm. lata. *Stamina* 8, filamentis 4 mm. longis superne angustatis antheris circa 0.5 mm. longis. *Stylus* staminibus paulo brevoir; ovarium 1.25 mm. longum, ovulis 4 pendulis. *Fructus* stipite quadrangulati 3 mm. longo suffultus, 4-alatus, alis inclusis ambitu rotundatus, ad 2.4 cm. diametro, lepidotus, alis horizontaliter striatis.

Kanburi, 50 m., common woody climber in bamboo forest, *Kerr* 10561.

Rhodomirtus parvifolia Craib [Myrtaceae-Myrteae]; ab affini *R. tomentosa* Wight foliis floribusque minoribus, bracteolis linearibus distinguenda.

Suffrutex circa 0.5 m. altus (ex *Kerr*); ramuli subgraciles, primo cinnamomeo-tomentosi, cito fusco-tomentosi, demum glabri, cortice brunneo obtecti. *Folia* ovata, interdum late ovata vel ovato-lanceolata, apice obtuse acuminata, basi rotundata, 1.8–3 cm. longa, 1.2–2 cm. lata, subcoriacea, sicco supra viridia vel saepe brunnescentia, subtus pallide viridia, pagina utraque iuventute cinnamomeo-tomentosa, cito superiore plus minusve glabrescentia vel omnino glabra, et inferiore cinereo-tomentosa, pellucido-punctata, trinervia, nervis supra impressis subtus prominentibus, nervis secundariis (e costa ortis) numerosis rectis inter se parallelis supra saepissime impressis subtus prominulis, margine integra, recurva, petiolo circa 2 mm. longo indumento ei ramulorum simili tecto suffulta. *Flores* lactei (ex *Kerr*), ramulis annotinis gesti, axillares, per 1–3 (saepissime 2); pedicelli 1.5 cm. longi, cinnamomeo-tomentosi, apice bracteolis duabus linearibus 2 mm. longis similiter tectis instructi; receptaculum circa 2.5 mm. longum, similiter tectum. *Sepala* 4, rarissime 3, oblonga vel subrotundata, 2.5–3.75 mm. longa, 2.75–3 mm. lata, utrinque pilosa. *Petala* 4, rarissime 3, late obovata vel rotundato-obovata, apice rotundata, basi late cuneata, 6 mm. diametro, dorso pilosa, intra glabra. *Filamenta* circa 3.5 mm. longa, glabra, antheris versatilibus circa 0.6 mm. longis. *Stylus* 5.5 mm. longus, glaber, stamina paululo superans; ovarium uniloculare, placentis 2 parietalibus, ovulis numerosis 3-seriatis, septis aut erectis aut transversis sub anthesin haud indicatis.

Lôi, Pu Tong, 1300 m., savannah, *Kerr* 8857.

Osbeckia parva Geddes [Melastomaceae-Osbeckieae]; ab *O. truncata* D. Don foliis minoribus, caulibus pilis adpressis instructis, ab *O. cochinchinense* Cogn. pilis stellatis differt.

Herba erecta, 6–33 cm. alta, tenuis; caules sicco pallidi, quadrangulares, pilos longos adpressos ferentes. *Folia* lineari-lanceolata vel ovato-lanceolata, apice acuta vel subacuta, basi obtusa, 1–2.7 cm. longa, 0.2–0.6 cm. lata, sicco luteo-viridia, pagina utraque pilis longis adpressis instructa, nervis tribus subtus prominentibus supra impressis, petiolis vix 1 mm. longis pilis longis instructis suffulta. *Inflorescentia* terminalis, bracteata; flores pauci. *Receptaculum* pilis longis instructum. *Calycis* segmenta 4 vel 5, lanceolato-ovata,

2 mm. longa, ciliata, tuberculis parvis plurisetulosus alternantia. *Corolla* purpurea (ex *Kerr*); petala glabra, 4 mm. longa. *Stamina* 8, inter se aequalia; filamenta 2 mm. longa; antherae oblongae, obtusae, truncatae, 1 mm. longae. *Ovarium* 3 mm. diametro, apice setosum, 4-loculare; stylus glaber, 4 mm. longus; stigma 0.75 mm. longum.

Doi Suteh, 1330 m., among grass in open forest, *Kerr* 2719 (*type*), 2236.

Osbeckia setoso-annulata Geddes [Melastomaceae-Osbeckieae]; ab *O. zeylanica* Willd. foliis minoribus, caulibus glabris, receptaculo annulato, annulis margine setulosus differt.

Herba erecta, ramosa, 14–23 cm. alta, caule quadrangulare nodis setosulo mox glabro. *Folia* opposita, lineari-lanceolata, apice acuta, basi cuneata, 1–3.3 cm. longa, 2–8 mm. lata, supra viridia, glabra vel parce setulosa, subtus pallida, glabra, nervis 3 pagina superiore impressis inferiore prominulis, margine denticulata, dentibus apiculatis, petiolo 0–2 mm. longo supra canaliculato glabro suffulta. *Cymae* terminales atque axillares, pauciflorae, subsessiles; pedicelli circa 2 mm. longi, glabri. *Receptaculum* annulis 3–4 margine superiore liberis et setulosus instructum. *Calycis* segmenta 4, ovato-lanceolata, acutissima, 4.5 mm. longa, 3 mm. lata, ciliata, dentibus semirotundatis setulosus alternantia. *Petala* 4, purpurea (ex *Kerr*), obovata, basi cuneata, 10 mm. longa, 9 mm. lata, membranacea, glabra. *Stamina* 8, inter se aequalia, filamentis 5.75 mm. longis, antheris 5 mm. longis attenuatis. *Ovarium* 4-loculare, apice setosum; stylus 11.25 mm. longus, glaber.

Kanburi, Wangka, 200 m., limestone rocks, *Kerr* 10470.

Sonerila gracilis Geddes [Melastomaceae-Sonerileae]; a *S. picta* Korth. foliis minoribus pilis longis tectis, inflorescentia pilos patentes ferente, petalis longe apiculatis differt.

Herba erecta, tenuis, 15 cm. alta, caule primo piloso mox glabro. *Folia* opposita inter se inaequalia, oblongo-lanceolata, apice acuta, basi obtusa vel cuneata, 1.8–7.2 cm. longa, 0.6–2.3 cm. lata, supra viridia, pilis longis parce instructa, subtus pallide viridia, parce setulosa, nervis lateralibus utrinque 2, margine denticulata, dentibus apiculatis, petiolo 0.7–2.5 cm. longo supra canaliculato parce setuloso suffulta. *Cymae* terminales, 3–5-florae, pedunculo erecto 3.3–4 cm. longo pilis patentibus instructo suffultae; flores subsessiles, 2.3 cm. longi. *Calycis* lobi 3, triangulares, acuti, 2.5 mm. longi, pilis paucis longis extra instructi. *Petala* 3, argentea (ex *Dr. Smith*), elongato-elliptica, apiculata, basi cuneata, 2 cm. longa, 0.4 cm. lata, extra medio pilis paucis glanduloso-capitatis instructa, aliter glabra. *Stamina* 3, filamentis 7 mm. longis, antheris 9–10 mm. longis attenuatis basi sagittatis. *Ovarium* 3-loculare, glabrum; stylus 1.6 cm. longus, glaber.

Nakawn Sritamarat, Kao Luang, jungle, *Dr. Eryl Smith* 759.

Sonerila parva Geddes [Melastomaceae-Sonerileae]; a *S. Kerrii* Craib et Stapf foliis non tam hirsutis pagina inferiore pallidis, floribus omnino minoribus differt.

Herba parva, 4-6 cm. alta; caulis parce setulosus. *Folia* fere verticillata, ovato-rotundata, apice obtusa, basi cordata, 2-4 cm. longa, 1.5-3 cm. lata, supra nervis exclusis parce setulosa, subtus praesertim ad nervos nervulosque setulosa, nervis lateralibus utrinque 4-5 supra impressis subtus prominulis, margine crenulato-setulosa; petioli 1-2.3 cm. longi, supra canaliculati, pilis paucis glanduloso-capitatis instructi. *Cymae* terminales, 3-4 florum; pedicelli 1-2 mm. longi, glabri, basi parvi-bracteolati. *Receptaculum* glabrum. *Calycis* segmenta 3, ovata, 1 mm. longa, margine ciliata excepta glabra. *Petala* 3, purpurea (ex *Kerr*), oblonga, basi cuneata, 6 mm. longa, 2.75 mm. lata, glabra vel dorso pilis perpauca medio instructa. *Stamina* 6, antheris inter se fere aequalibus 4 mm. longis apice attenuatis basi sagittatis, filamentis 4.5 mm. longis. *Ovarium* glabrum; stylus 6 mm. longus, glaber.

Sukotai, Kao Luang, 1000 m., rock crevices, *Kerr* 5919.

Anplectrum patens Geddes [Melastomaceae-Medinilleae]; ab *A. pallente* Blume foliis haud caudatis, floribus fructibusque maioribus, ab *A. glauco* Triana foliis haud coriaceis, floribus iuventute brevius acutissimis differt.

Frutex scandens, ramis primo quadrangularibus sulcatis puberulis mox teretibus glabris. *Folia* opposita, ovato-lanceolata, apice acuta, basi cordata, 5.4-7.6 cm. longa, 1.9-3.3 cm. lata, supra viridia, paulo nitentia, glabra, subtus paulo nitentia, ad nervos parcissime stellato-puberula vel glabra, nervis 5 pagina superiore impressis inferiore prominentibus, margine revoluta, petiolo 4 mm. longo supra canaliculato pilos minutos stellatos ferente saepe longe et parce pilato suffulta. *Inflorescentia* terminalis, paniculata, laxa. *Receptaculum* apice constrictum, dorso pilis minutis stellatis parce instructum. *Calycis* segmenta 4, brevissima. *Petala* 4, rosea (ex *Kerr*), ovata, basi cuneata, 7 mm. longa, 3.5 mm. lata, omnino glabra. *Stamina* 8, 4 magna et 4 parva, filamentis longioribus 5 mm. brevioribus 3 mm. longis, antheris maioribus 1 cm. longis curvatis attenuatis basi ante bituberculatis a tergo breve et late appendiculatis. *Ovarium* 4-loculare, apice septis 4 instructum; stylus 12 mm. longus, glaber. *Fructus* purpureus (ex *Kerr*), 7 mm. longus, 5.5 mm. diametro, ambitu rotundato-oblongus, glaber; semina oblonga, haud curvata.

Pattani, Bachaw, 50 m., climbing through bushes on edge of evergreen forest, *Kerr* 7215.

XIII.—DECADES KEWENSES PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM. DECAS CXIX.

1181. **Garcinia tenuifolia** Ridl. [Guttiferae]; arbuscula affinis *G. dumosae* King, foliis maioribus, staminibus floris masculi paucis,

filamentis distinctis nullis, stigmate in flore femineo haud costato dense tuberculato.

Arbuscula 2-3 metralis; foliis tenuibus nec coriaceis lanceolatis caudato-acuminatis basibus cuneatis, nervis 7-paribus subtus paullo elevatis alternis intra margines arcuatis, superne immersis, intermediis paucis, nervulis paucis inconspicuis irregularibus, costa subtus elevata, 5-14 cm. longis, 5-7 cm. latis (acumine 2 cm. longo), petiolis crassis rugosis flavidis 8 mm. longis; floribus masculis parvis pallide flavis in glomerulis densis sessilibus axillaribus, plurifloris, 5 mm. latis, pedicellis brevibus; sepalis 3 ovatis rotundatis; petalis 4 carnosius rotundatis 1 mm. longis; androecio basi columnari, antheris hippocrepiformibus 5, sessilibus; floribus femineis rubris singulis in axillis, multo maioribus; sepalis 3 rotundatis ovatis 3 mm. longis, petalis 4 ovatis rotundatis carnosius; ovario ovoideo-oblongo 5 mm. longo; stigmate hemisphaerico dense pustulato; staminodiis pluribus minutis, filamentis gracilibus, antheris minutis oblongis.

MALAY PENINSULA. Pulau Tioman, near Ayer besar, 800 ft. alt., shrub 6-8 ft. tall, flowers pale yellow, *Mahomed Nur* 18760 (male); Pulau Aor, 500 ft., shrub with small red flowers, *Henderson* 18361 (female).

This is one of the thin-leaved Garcinias. The few stamens in a short column, and the entire tuberculate stigma make it different from any of its allies.

1182. **Begonia tiomanensis** Ridl. [Begoniaceae]; species *B. Herveyanae* King affinis foliis late ovatis nervis et petiolis hirtis, floribus maioribus.

Herba; foliis late ovatis obtusis basibus rotundatis ferme aequilateris retusis superne glabris subtus costa nervisque hirtis, nervis primariis 4 paribus elevatis, secundariis dissitis, hirtulis, 24 cm. longis, 18 cm. latis, petiolis validis 24 cm. longis hirtis; pedunculo 35 cm. longo glabro bracteis oblongis 2 cm. longis et floribus masculis longe (5 cm.) dissitis; cyma terminali laxa floribus femineis; floribus masculis roseis; sepalis 2 oblongis obtusis 4 mm. longis, 8 mm. latis; petalis 2 late rotundatis 1 cm. longis, 1-2 cm. latis; staminibus plurimis; antheris oblanceolatis obtusis; capsulis (immaturis) tripteris, lobis 2 brevibus oblongis rotundatis, 5 mm. longis, uno oblongo apice rotundato 2 cm. longo, stigmatibus 5 mm. longis bifurcatis tortis.

MALAY PENINSULA. Pulau Tioman, near Gunong Rokam, 2500 ft., on rocks, flowers pink, *Mahomed Nur* 18796.

The specimens are rather incomplete but the species is clearly allied to *B. Herveyana* King; however, the veins on the petiole and on the leaf, which is broader and distinctly ovate, are hairy; the flowers are larger. The peduncle appears to have bracts in the axils of which are male flowers.

1183. *Eugenia ciliaris* Ridl. [Myrtaceae]; species affinis *E. Moonianae* Wight, floribus racemosis multo minoribus sepalis ovatis, petalis ciliatis differt.

Frutex 1.5–2-metralis; *foliis* coriaceis punctulatis obovatis basibus angustatis, apicibus obtusis, nervis tenuibus inconspicuis 10-paribus, intra-marginali 1 mm. a margine, 4–5 cm. longis, 2–3 cm. latis, petiolis crassiusculis 3 mm. longis racemis lateralibus paucifloris axillaribus 1 cm. longis; *floribus* dissitis ad 7, albis, 5 mm. latis; *bracteis* minutis lanceolatis acutis; *sepalis* 5 ovatis rotundatis; *petalis* liberis obovatis rotundatis marginibus ciliatis; *staminibus* plurimis petala haud superantibus, antheris rotundatis dorsifixis; *stylo* breviusculo, ovario obconico brevi.

MALAY PENINSULA. Pulau Tioman, near Gunong Rokam, 2700 ft., shrub 4 to 6 feet tall, flowers white, *Mahommed Nur* 18812.

This is the first of the short few-flowered axillary-racemed species to be found in this area. It is perhaps nearest to *E. Mooniana* Wight of Ceylon which it much resembles in habit, but the flowers are distinctly racemed, much smaller and on short pedicels. The ciliation of the petals is peculiar.

1184. *Eugenia saxitana* Ridl. [Myrtaceae]; species *E. inophyllae* Wall. affinis, foliis brevioribus crassioribus, nervis inconspicuis, calyce crassiore rugoso-angulato, staminibus brevibus.

Arbor glabra; *foliis* rigide coriaceis oblongo-lanceolatis obtuse acuminatis basibus brevissime cuneatis, nervis valde inconspicuis ad 30 paribus, marginibus incrassatis costa superne elevata canaliculata 6–8 cm. longis 3.5–5 cm. latis, petiolis crassis transverse rugosis 8–10 mm. longis; *cymis* terminalibus et in axillis supremis laxis paucifloris 3–4 cm. longis, pluribus, 4-floris, pedunculis 1–2 cm. longis; *pedicellis* 1 cm. longis crassiusculis longitudinaliter rugosis; *ovario* cupuliformi 3 mm. longo; *sepalis* vix distinctis brevissimis obtusis, *petalis* ovatis obtusis 2 mm. longis et latis; *staminibus* pluribus brevibus filamentis crassiusculis; *stylo* vix brevior crasso.

MALAY PENINSULA. Pahang, Gunong Tahan, 5000 ft., *Seimund* 357.

The petals, which are small, fall off separately. The stamens are moderate in number and short, hardly longer than the petals, and the short, thick, style is little longer. The pedicels and ovary have rather obscure elevated ridges. The plant is allied to *E. inophylla* Wall., but more compact, the leaves smaller and thicker, stamens shorter, calyx thicker, rugose and angled.

1185. *Didymocarpus Wengeri* Fischer [Gesneraceae]; species *D. Margaritae* W. W. Smith affinis, sed foliis et bracteis subtus glandis stellatis instructis, marginibusque breviter crenatis, floribus minoribus aliter coloratis differt.

Herba parva; *caulis* 0.5–1 cm. longus, hirsutus. *Folia* 1–2 paria, opposita, subradicalia, orbicularia, basi aequaliter cordata, 4–6 cm.

diametro, breviter crenata vel serrato-crenata, basi subpalmatim 5–7-nerva, superne utrinque nervis primariis 3–4, adscendentibus, arcuatis, supra distinctis, infra crassis, subprominentibus, in sicco brunneis, ciliata, supra villosa, subtus in venis parum hirsuta, glandis minutissimis turgidis, atris, plerumque sub lente cruciforme ornata; petiolis 2–5 cm. longis, plus minus hirsutis. *Scapus* gracilis, 5–8 cm. longus, parce hirsutus, apice versus capillis nonnullis glanduloso-capitatis, plus minus glandibus cruciformibus instructus. *Inflorescentia* cymosa, trichotoma; bractee ad furcas duo, oppositae, sessiles, orbiculares 1–2 mm. diametro, rubro-brunneae, rarus hirsutae, subtus glandibus cruciformibus dense ornatae; rami graciles et pedicelli capillares capillis glanduloso-capitatis instructi. *Flores* circiter 1 cm. longi, pedicelli 2–4 mm. longi. *Calyx* 3–4 mm. longus, glaber vel fere glaber, extus subrugosus, rubro-brunneus, fere ad basin in lobos 5 lineari-lanceolatis fissus. *Corolla* inaequaliter bilabiata, glabra vel superne capillis raris glanduloso-capitatis instructa; tubus anguste infundibuliformis circiter 1 cm. longus, roseo-ruber; lobi patentes, orbicularis, flavi, 3.4–5 mm. diametrales, 2.2 mm. diam. *Stamina* 2, inclusa, circiter in tubo medio inserta, glabra; filamentis rectis, antheris magnis, ovatis; staminodia in floribus dissectis desunt. *Discus* O. *Ovarium* sessile, lineare-ellipticum, glabrum; stylo equilongo, apice geniculato, stigmate peltato 2-lobato, subexserto. *Fructus* (juvenis solum visus) linearis.

ASSAM. South Lushai Hills, 2400 ft., *Revd. W. J. L. Wenger*.

"This is a charming little plant, and apparently scarce, at least in these Hills, for I have only found one small patch on a steep clayey bank" (Wenger in epistola).

1186. *Trigonostemon arboreus* Ridl. [Euphorbiaceae]; arbor, *T. sumatranae* affinis, floribus in glomerulis, bracteis foliaceis elongatis angustis, calyce subintegro, staminibus 3, disco trilobo carnosio, diversa.

Arbor, 5–7 metralis; *foliis* tenuiter coriaceis lanceolatis basibus attenuatis apicibus cuspidatis nervis 15-paribus subtus elevatis inter se arcuantibus, 30–35 cm. longis, 9.5–12 cm. latis, petiolis 10 cm. longis; *paniculis* racemiformibus lateralibus extra-axillaribus gracilibus 15–20 cm. longis; *floribus* in glomerulis dissitis longe pedicellatis; *bracteis* foliaceis anguste lanceolatis 6 cm. longis 5 mm. latis tenuibus in petiolo 2 cm. attenuatis pallidis; *floribus masculis* pallide viridibus 2 mm. latis in pedicellis gracillimis 8 mm. longis; *sepalis* brevissimis ovatis; *petalis* rotundatis marginibus laciniatis; *staminibus* 3 filamentis brevibus ad basin connatis; *antheris* bifurcatis loculis divaricatis, *disco* carnosio trilobo; *floribus femineis*, non visis; *capsula* (immatura) subglobosa 1 cm. longa calyce vix lobato pedicello 12 mm. longo.

MALAY PENINSULA. Pulau Tioman, Sedagong, 1000 ft., small tree 15 to 20 feet tall, flowers pale green, *Mahommed Nur* 18595.

This is perhaps nearest to *T. sumatranus*. The lateral racemes of distant glomeruli with thin, long narrow lanceolate bracts, and the arborescent habit are peculiar.

1187. **Bulbophyllum Frostii** *Summerhayes* [Orchidaceae—Epidendreae]; *B. Dayano* Rchb. f. simile sed scapo unifloro, sepalis extra superne longe et irregulariter papillois, labello sagittato laevi ecarinato facile distinguendum.

Pseudobulbi approximati e rhizomate repente, compressiuscule ovoidei, laeves, 1.5–2 cm. longi, monophylli. *Folia* sessilia, elliptica, obtusa, 3.5 cm. longa, 2 cm. lata, carnosa. *Scapus* brevis, crassiusculus, 1.5–2 cm. longus, uniflorus. *Flores* pro generi magni, purpurei. *Sepalum* dorsale orbiculari-ovatum, breviter acuminatum, basi rotundatum, 13 mm. longum, 9 mm. latum, valde convexum, extra longe et irregulariter papillosum, intus laeve, marginibus breviter ciliatis; sepala lateralibus oblique oblongo-lanceolata, subacuminata, circiter 2 cm. longa, 8–9 mm. lata, 7-nervia, extra basi excepta longe irregulariter papillosa, intus laevia, eciliata. *Petala* oblonga, obtusa, leviter convexa, circiter 1 cm. longa, 6 mm. lata, utrinque glabra, marginibus eroso-ciliatis. *Labellum* valde carnosum, sagittatum, curvatum, in toto 7–8 mm. longum, inter lobos basiales 5 mm. latum, utrinque lobis basilaribus flavido-pubescentibus exceptis glabrum, nervis 5 vix conspicuis usque ad medium decurrentibus. *Columna* 5 mm. longa, late alata, apice obtusa, integra, rostello minuto.

ANNAM. Coll. W. J. C. Frost. Imported and flowered by Messrs. Sander, St. Albans, November 1927.

1188. **Zeuxine Blatteri** *Fischer* [Orchidaceae]; propinqua *Z. affini* Benth., sed foliis latioribus, petiolis angustioribus, vaginis glabris, labelli sacco carnoso profundiore intus ecalcarato, limbi lobis orbicularis glabris distat.

Herba terrestris gracilis. *Rhizoma* tenue; *caulis* glaber exilis, 5–12 cm. longus. *Folia* 4–6, membranacea, ovata ad lanceolata, acuta, basi rotundata, 4–5 cm. longa, 0.8–2 cm. lata, glabra, olivacea vel rubro-brunnea; petiolus circiter 5 mm. longus, planus, in vaginam hyalinam tubulosam laxè amplexicaulem ampliatus, circiter 1 cm. longus. *Pedunculus* cum spica 15–25 cm. longus, gracilior, glanduloso-pubescentibus; vaginis duobus distantibus hyalinis laxè tubulosis, acuminatis, glabris amplexus. *Spica* 5–11 cm. longa, laxiflora. *Bractae* lanceolatae, acuminatissimae, 3–7 mm. longae. *Flores* sessiles. *Sepala* viridula apice pallida; dorsale late ovatum, subacutum, basi saccatum, extus minute pubescens, lateralibus libera, ovato-lanceolata, acuta vel subacuta, 1-nervia, dorsalibus paullo breviora. *Petala* sepalo dorsali adhaerentia et ei aequilonga, oblongo-lanceolata, obtusa, rubidula. *Labellum* 4 mm. longum, sepalo dorsali paullo longius, basi carnosum et profunde saccatum, saccus aurantiacus, margine parum lobulato, intus carinis 2 carnosus inconspicuis provisus, apice basique interdum cohaerentibus

ellipsem angustam formantibus; limbus albus, alis 2 orbicularis formatum in sacco sessilibus sinu brevi divisus. *Ovarium* anguste subulatum, 5–7 mm. longum, glanduloso-pubescentibus. *Capsula* anguste ellipsoidea, apice angustata, 8–9 mm. longa, glabrescentibus.

MADRAS PRESIDENCY. High Wavy Mountains, May, "in damp forest," *Blatter & Hallberg* 343.

1189. **Gagea kashmirensis** *Turrill* [Liliaceae]; ab affini *G. amblyopetala* Boiss. et Heldr. caulibus et saepissime foliorum caulinarum marginibus pilis albis distinctis instructis recedit.

Bulbi duo inaequales, minore superiore lateraliter sito, 5–7 mm. longi, vix 5 mm. diametro, laeviusculi, utrinque tunica communi inclusi. *Caulis* erectus, usque ad 1.4 dm. longus, pilis albis longiusculis plus minusve dense praeditus. *Folia radicalia* duo, angustissime linearia, fere filiformia, usque ad 1 dm. longa; *caulina* alterna, inaequalia, a dilatata basi lanceolata subspathacea, apicem versus subconvoluta attenuata, margine plus minusve longe albociliata, inferiore usque ad 5.5 cm. longa saepissime brevior, superiore 1–2.2 cm. longa, internodo 1.7–2.5 cm. longo. *Inflorescentia* 3–6-flora, pedicellis erectis vel suberectis saepissime 1–2 cm. longis pilis albis instructis; bractae lineares. *Flores* lutei in omnibus partibus glabri, perigonii segmentis anguste ellipticis vel elliptico-oblongatis basi leviter attenuatis 0.8–1.1 cm. longis circiter 3 mm. latis, exterioribus acutis 5–7-nerviis, interioribus subobtusis 3–4-nerviis. *Stamina* 6–7 mm. longa, antheris oblongis fere 2 mm. longis. *Ovarium* obovoideum, basi parce attenuatum, 2–2.5 mm. altum, 1.5–2 mm. diametro; stylus 5 mm. longus.

KASHMIR. Srinagar, 5100 ft., March 1926, *Canon Stokoe* 2.

In addition to the presence of a white-haired indumentum on the stems and leaves this species appears to differ from *G. amblyopetala* in the smaller and relatively more elongated bulbs and in a usually more pronounced internode between the two cauline leaves. The size of the flowers varies somewhat and in one individual the normal inflorescence is replaced by bulbils and elongated narrow linear bracts.

According to A. Terracciano in Bull. Herb. Boiss. Ser. 2, vi. 117 (1906), *G. amblyopetala* is known only from Italy, Sicily, Greece (Attica), Thessaly, Thrace, and Asia Minor. In addition I have records from Euboea and Macedonia. It is evident that *G. kashmirensis* is geographically widely separated from the known distributional area of the species showing the greatest morphological resemblance to it.

1190. **Carex leucostachys** *Ridl.* [Cyperaceae]; species *C. tricephalae* Boeck. affinis, differt utriculis fusiformibus, rostro longiore nec bidentato, stylo ad basin non incrassato, spiculis vix globosis.

Herba 50 cm. alta; foliis linearibus acuminatis 5.5 cm. longis, 1 cm. latis, marginibus et costis scabris; culmo brevior triquetro

scabrido, foliis 2 dissitis; *panicula* densa albescente 5 cm. longa; *spicis* subcylindricis 1 cm. longis congestis; *bracteis* foliaceis angustis vel angustissimis longioribus, inferioribus paniculam superantibus; *floribus masculis* in spicula paucis terminalibus; *floribus femineis* 2-3; *glumis* ovato-lanceolatis acuminatis hirtis; *nervis* 15, albescentibus, 4 mm. longis; *utriculis* longioribus hirtis fusiformibus triquetris basibus attenuatis rostro elongato haud bidentato; *stylo* ad basin haud incrassato, stigmatibus 3 longis rubris hirtis; *achenio* fusiformi-ovato obtuso triquetro.

MALAY PENINSULA. Pulau Tioman, Gunong Kajang, 2500 ft., Mahommed Nur 18912.

This belongs to Kukenthal's section *Scabrellae* and seems most closely allied to *C. tricephala* of Madura island, which, however, I have not seen. The whole set of these Carices are marked by their usually dense white panicles, which this plant shows very well.

XIV.—MISCELLANEOUS NOTES.

The Director, during his present visit to Australia (*K.B.* 1928, App. 1), has been honoured by having had conferred upon him the Degree of D.Sc. ad eundem gradum by the University of Adelaide.

It is with much pleasure that we record the following:—

In the recent New Year Honours List, Mr. O. T. FAULKNER, B.A., Director, Agricultural Department, Nigeria, received the Honour of the Companionship of The Most Distinguished Order of St. Michael and St. George.

Mr. CHARLES HENRY CURTIS, Managing Editor of The Gardeners' Chronicle, has received from His Majesty the King of the Belgians the decoration of Chevalier de l'Ordre de la Couronne. In May last the French Government honoured Mr. Curtis by conferring on him the decoration of Chevalier de l'Ordre du Mérite Agricole.

Dr. D. H. SCOTT, F.R.S., has been awarded the Wollaston Medal of the Geological Society for 1927.

The following appointments have been made by the Secretary of State for the Colonies:—MR. K. E. TOMS (Horticulturist, Zanzibar), Assistant Superintendent of Plantations, Amani Institute, Tanganyika Territory (*K.B.* 1925, p. 394): Mr. E. S. MCINTOSH, B.Sc., Assistant Geneticist, Barbados.

A British Garden Flora.*—The primary aim of Lt. Col. Kirk's new work is to enable the cultivator of any hardy plant to ascertain the genus to which it belongs and thus achieve the first step towards its identification. There is no doubt that such a work was greatly needed. The identification of a plant whose genus is not known presents an almost hopeless task to the average worker in the garden who has only the popular text-books to consult, for most of these in the descriptions they give presume a knowledge of the genus and confine themselves mostly to specific characters. They are in fact written more with the idea of informing the reader about a plant whose name is known than of pointing the way to ascertain the name of a plant whose identity is unknown or doubtful. Whilst, therefore, Col. Kirk's book is essentially a botanical one, its chief purpose is to help the cultivator. In this respect it breaks new ground and whilst it may be described as a gardener's book it is, so far as we know, the only one of its particular kind in English that deserves that title. One thing that will commend it to very many is the fact that the author uses ordinary language whenever he can and only reverts to technical terms when they are absolutely necessary to avoid obscurity or tiresome length of phrase.

The first requisite necessary to the use of this book is that the student should know something of plant structure, should be cognisant, that is, of the names of the different parts of a plant and the functions that each performs. Col. Kirk provides for this in a chapter on "Structure of Plants" admirable for its conciseness and clearness. Once this chapter is mastered the student is equipped with sufficient knowledge to enable him to assimilate the wonderful mass of information that follows.

The process of identifying a plant must commence by ascertaining the Family or Natural Order to which it belongs, and for this purpose the author provides a Key to the 140 families dealt with in this work. After that there follow Keys of the genera of each family, a description of each family and genus, and interesting information regarding their distribution on the face of the globe and any outstanding characteristics they may possess.

The following is a sample Key dealing with the hardy Lauraceae: Leaves all quite entire:

Sepals 4.....1. *Laurus*.
 Sepals 6
 Shrubs. Anthers 2-celled.....2. *Lindera*.
 Trees. Anthers 4-celled.....3. *Umbellularia*.
 Some leaves with one or two lobes4. *Sassafras*.

In all 1050 genera are dealt with. Very useful and interesting features of the book are the explanations of the derivation of the generic names, and an indication of how they should be pronounced.

A rather curious inclusion in the book, essentially botanical as it is, is a dissertation on such purely horticultural subjects as transplanting and pruning. Readers, however, have no reason to complain, for they are given an excellent exposition of the theory underlying both operations. We have not seen anywhere a better

explanation of the principles that should guide the cultivator engaged in them. In dealing with the transplanting of evergreens, the author points out the danger attending the operation that arises from the continuous activity of the leaves, thereby making an evergreen plant, especially one with a large leaf surface, very susceptible to the root injury that transplanting involves. But he does not advise what is a very useful antidote to the injury. This is the reduction of the leaf area by a drastic pruning, either by thinning or shortening (or both) of the leafy shoots. We consider this plan, restoring as it does to some extent the balance between root and leaf, a most effective help in the transplanting of difficult evergreens.

Col. Kirk is to be congratulated on the excellence of the numerous illustrations, almost entirely original. They are well reproduced and add greatly to the value of the work. The typography and printing are excellent.

Beautiful Flowers of Kashmir.*—Until the latter part of last century the "beautiful flowers of Kashmir" were largely unknown. But with the increasing number of travellers annually visiting this delightful region it has become more and more desirable to publish a popular flora. Mere descriptions of the plants would not be of much help. Pictures must be provided and a small illustrated Flora made available. Mr. Coventry made a beginning by giving us a number of unarranged autochrome photographs under the title "Wild Flowers of Kashmir." In the present publication we have the first volume of a systematic arrangement of the whole of the Kashmir flowers, and as Father Blatter has dealt with about half we may expect one other volume to complete the whole. The book is made intelligible to beginners by simple botanical descriptions and a glossary. The thirty-four plates are reproduced from Mrs. Wathen's beautiful water-colour drawings and from Haldar Joo Walli's pictures. Coventry's autochromes are cited.

S. T. D.

Wild Flowers of Kashmir.†—We are glad to see a second series of Mr. Coventry's attractive autochrome pictures, preceded by an autochrome frontispiece showing the appearance of the Liddar Valley when *Primula nivalis* is in flower. The whole is arranged with letterpress as in the series previously noticed. (K.B. 1924, p. 176).

*Beautiful Flowers of Kashmir, by Ethelbert Blatter. Illustrated by Mrs. Wathen and Haldar Joo Walli. Vol. i, London, 1927, John Bale, Sons & Danielsson, Ltd., London, pp. xv. + 198, pl. 33 and frontispiece. Price 21s. net.

†Wild Flowers of Kashmir (Series ii), by B.O. Coventry. Raithby, Lawrence & Co., London, 1927, pp. xxvi. + 100, 51 coloured plates. Price 16s.

BULLETIN OF MISCELLANEOUS INFORMATION No. 3 1928 ROYAL BOTANIC GARDENS, KEW

XV.—*ASPERULAE AUSTRALIENSES*. H. K. A. SHAW AND W. B. TURRILL.

The vast majority of the known species of *Asperula* occur in southern Europe and the Orient (in the sense of Boissier's *Flora Orientalis*). In the Northern Hemisphere the genus extends eastwards to Japan and southwards to Szechuan. It is not known from Africa south of those parts belonging to the Mediterranean Region, or from the New World, excluding a few obvious introductions. It is of special interest to note that no species are known from the Indo-Malayan Region and that there is therefore a wide gap in the distribution of the genus between the northern and the Australasian species. Probably two species at least occur in New Zealand, where they are endemic. These are certainly closely related morphologically to the Australian *A. subsimplex* Hook. fil.

In this paper 16 species are recognized, all endemic to Australia and limited to an area south-east of a line joining Gawler Range, S. Australia, with Rockingham Bay, Queensland. Thus they are more isolated from the main area of distribution of the genus than is evident from the mere statement that they are all endemic. We are at present unable to make any suggestions, which can be supported by phytogeographical and taxonomic facts, concerning the relationship of the Australasian *Asperulae* to the northern species. All of them are constantly dioecious, a character not yet found in the European and Asiatic species, but apart from this they appear to be typical of the genus in their vegetative and reproductive parts.

We are not yet prepared to discuss the relationship of *Asperula* to *Galium*. The latter is the larger and more widely distributed genus and it is probable that one is polyphyletic relative to the other. If the species of *Asperula* have evolved from *Galium* it is possible that the Australian species have had a separate origin from those of the Northern Hemisphere, perhaps directly or indirectly from South American species. There is a very decided similarity in habit, between *Galium hypnoides* Gay from Chile and *Asperula perpusilla* Hook. fil. from New Zealand, while the latter certainly exhibits points of relationship to the Australian *A. subsimplex* Hook. fil. through an intermediate New Zealand species whose identification is at present uncertain. The resemblance in general habit is emphasized by the leaf arrangement, size, and shape, and by the solitary, axillary, stalked flowers in the Chilean and New Zealand species. The South American *Galium hypnoides*, as represented by

the one sheet at Kew, has, however, hermaphrodite flowers, with erect corolla-lobes, but with practically no corolla-tube. This contrasts with the floral structure of *A. perpusilla* which is a dioecious species with a distinct corolla-tube, better developed in the male than in the female flowers.

The Australasian *Asperulae* therefore form a group worthy of separation from the European and Asiatic groups. With our present knowledge we prefer to consider them as a section, for which we propose the name *Dioicae*. This section is, as its name indicates, distinguished by the dioecism of the flowers, to which character we have found no certain exception in the abundant Australasian material which has passed through our hands. Further convenient subdivisions into 7 series can be made chiefly on the basis of general habit. A synopsis of these is followed by an artificial key to the species and varieties, and this by descriptions, full geographical distributions, and taxonomic notes on each species.

We take this opportunity of acknowledging our indebtedness to our colleague, Mr. V. S. Summerhayes, for his assistance in connection with the geography and literature, and also to express our thanks for the facilities afforded us for examining specimens presented or lent from the Herbaria at Brisbane, Sydney, Melbourne, and Hobart (Herb. Rodway.), and the Lindley Herbarium and the University, Cambridge; and in consulting specimens at the Department of Botany of the British Museum (Natural History).

SYNOPSIS SERIERUM.

§ Confertae.

Habitus varius, plerumque basi repente; folia semper sena, infima saepe reflexa; flores plerumque magni, infundibulares.

1. *conferta* 2. *scoparia*

§ Alpinae.

Plantae repentes et intricatae vel suberectae; omnes partes in siccitate fusco-brunnescentes, nonnunquam fere nigrescentes; folia propensionem quandam ad indolem quasi subcoriaceam exhibentia, numero varia.

3. *Gunnii* 4. *pusilla* 5. *minima*

§ Quadrifoliae.

Caules debiles, graciles, subcaespitosi; folia semper quaterna; inflorescentiae plerumque axillares, subterminales; flores parvi, tubo brevi.

6. *subsimplex*

§ Verticillatae.

Planta minuscula; caulis et folia gracilia, sed firma; folia sena; flores majusculi, subcapitati.

7. *wimmerana*

§ Scabridae.

Caulis parte inferiore gracilis, efoliatus, parte superiore validior, foliosus, cum foliis rigidus et scaberrimus; flores parvi; fructus leves, pallide brunnei.

8. *lissocarpa*

§ Lignosae.

Plantae fere suffruticosae, caudice crasso valde lignificato, caulibus erectis, rigidis, lignescentibus, saepe virgatis; folia plerumque erecta, quaterna vel sena; inflorescentiae terminales.

9. *Cunninghamii* 10. *subulifolia* 11. *ambleia*

§ Flaccidae.

Caules elongati, debiles, semi-scandentes; internodia plerumque longissima; folia flaccida vel tenuiter herbacea, forma varia, numquam rigida; flores ♂ et ♀ insigniter diversi, ♀ tubo brevissimo.

12. *euryphylla* 13. *asthenes* 14. *Charophyton* 15. *gemella* 16. *geminifolia*.

CLAVIS ANALYTICA.

A. Folia bina.

Flores subcapitati; ♂ tubus elongatus, infundibularis.....

16. *geminifolia*

Flores in cymis diffusis divaricatim ramosis dispositi; ♂ tubus brevissimus fere obsoletus.....

15. *gemella*

B. Folia quaterna.

Folia in quoque verticillo duo longiora, duo breviora:

Folia rigida, adpresso-erecta, subulata, obtusa.....

11. *ambleia*

Folia flaccida, patentia

Folia oblanceolata.....

13. *asthenes*

Folia linearia.....

15. *gemella*

Folia in quoque verticillo aequilonga:

Folia linearia, acuta.....

6. *subsimplex*

Folia haud linearia:

Folia latissime elliptico-obovata, 4-5 mm. lata.....

12. *euryphylla* var. *tetraphylla*

Folia obovato-oblonga, ad 2.5 mm. lata.....

3. *Gunnii*

C. Folia sena.

Folia stricta caulisque robustus valde deflexo-scaberrima et rigida; tota planta in siccitate pallescens.....

8. *lissocarpa*

Folia caulisque nunquam valde scaberrima (interdum pubescentia vel ciliata):

Planta caudice lignoso praedita, suffrutescens; folia plerumque erecta:

Folia subulata vel lineari-subulata, acutissima, tomentella; costa valida.....

10. *subulifolia*

Folia linearia, subacuta vel subobtusata, pubescentia; costa tenuis.....

9. *Cunninghamii*

Planta caudice lignoso carente, herbacea; folia plerumque patentia :
Folia pagina superiore plus minusve pubescentia :

Planta erecta, alta, in siccitate etiam virescens; folia lata
12. *euryphylla*
nigrescens :

Planta parva, muscosa; folia minima, linearia, acuta.....
5. *minima*

Planta major, tota hispido-pubescentia :

Folia elliptico-obovata, subacuta...3. *Gunnii* var. *curta*
Folia linear-oblonga vel oblanceolata, subobtusula.....

4. *pusilla*
Folia pagina superiore glaberrima, margine tamen saepe ciliata :
Folia (saepe longe) hyalino-acuminata :

Caulis tomentosus vel tomentellus.....2. *scoparia*
Caulis glaber.....1. *conferta* var. ? *scoparioides*

Folia plerumque acuta sed haud hyalino-acuminata :
Folia lata, plus minusve obovata :

Folia in siccitate nigrescentia, ad 2.5 mm. lata...3. *Gunnii*
Folia in siccitate etiam virescentia, ad 5 mm. lata.....
12. *euryphylla*

Folia anguste linearia

Folia elongata, flaccida, loriformia; caulis et internodia
plerumque elongata, subflexuosa; corollae brevissimae
14. *Charophyton*

Folia vix 1 cm. excedentia, rigidiora; caulis et internodia
breviora; corollae (♂ saltem) infundibulares

Folia plerumque erecta, flexuosa, subcartilaginea; caulis
gracilis, humilis, parum ramosus.....7. *wimmerana*

Folia plerumque patentia, inferiora reflexa; caulis elatior,
saepe pervagus.....1. *conferta*

D. Folia octona

Planta humillima, muscosa, repens; folia minima, linearia.....
5. *minima*

Planta mediocris, erecta; folia oblonga vel suboblanceolata, ad
9 mm. longa.....12. *euryphylla* var. *octophylla*

The following abbreviations are used in the citation of specimens :—N.D. when no date is recorded; B.M. when specimens are at the British Museum (Natural History); H. for specimens at Hobart (Herb. Rodway.); W. for specimens at the National Herbarium of New South Wales, Sydney. Where no indication is given the specimens are at Kew.

1. *Asperula conferta* Hook. fil. in Lond. Journ. Bot. vi. 464 bis (1847); Flor. Tasm. i. 169 (1857-58?). Benth. Flor. Austr. iii. 444 (1866) (p.p. et excl. var.). F. M. Bailey, Queensl. Flor. iii. 782 (1900) (excl. var.). L. Rodway, Tasm. Flor. 71 (1903).

Herba perennis. *Radix* fibrosa. *Rhizoma* longe repens, ramosa, lignosa, c. 1 mm. diametro. *Caules* numerosi, plus minusve caespitosi, 3-30 cm. longi, ad 1.0 mm. diametro, suberecti vel adscendentes, praecipue supra medium ramosi, subflexuosi, glabri vel glabrescentes vel asperuli; internodiis 0.3-4.0 cm. longis. *Folia* sena, patentia vel saepe reflexa, subrigida, linearia vel linear-oblonga, acuta vel breviter acuminata, 1-11 mm. longa, 0.3-1.0 mm. lata, margine plana vel recurva, glabra vel saepissime margine costaque aspera. *Inflorescentiae* terminales et subterminales, plerumque ternae, pauciflorae, vix subcapitatae, folia suprema plerumque superantes. *Flores* dioici, plerumque majusculi, rarius pusilli: ♂ *receptaculum* parvum, obovoideum, corollae tubo paullo latius (raro angustius); *corollae* ad 4.5 mm. longae, tubus infundibularis segmentis oblongis acutis vel subacutis, patentibus vel reflexis, aequilongus vel paullo longior; *staminum* filamenta gracilia, elongata, ad 1 mm. longa, antheris oblongo-ellipticis c. 0.5 mm. longis; *styli* obsoleti: ♀ *receptaculum* obovoideum vel obreniforme, subdidymum, ad 1.4 mm. diametro; *corollae* tubus subcylindricus vel superne levissime ampliatus ad 1.0 mm. longus segmentis oblongis vel linear-oblongis subacutis inflexo-cuspidatis subduplo brevior; *stamina* minuta; *styli* ad 3 mm. longi exserti, stigmatibus majusculis subglobosis. *Fructus* mericarpia globoso-reniformia, valde rugosa, atrobrunnescentia, 1-2 mm. diametro, altero saepe abortu.

QUEENSLAND. ♂: no locality or date, T. L. Mitchell [B.M.]; Killarney, Oct. 1891, F. M. Bailey; Jennings, Dec. 1903, J. H. Maiden and J. L. Boorman. ♀: Peak Downs, N.D., F. von Müller; Jimbour, Dec. 1875, F. M. Bailey (2 spms.: one dwarf and compact, the other branched and diffuse); Toowoomba, hill side, 9 Oct. 1886, T. S. Lea [B.M.]; Hendon, Dec. 1912, C. T. White. ♂ & ♀: Killarney, Nov. 1917, C. T. White; Silverwood, Aug. 1922, C. T. White 1747. Sex indet.: Morven, Dec. 1890, F. M. Bailey (leaves mostly very short and narrow); Roma, Apr. 1909, C. T. White; MacPherson Range, fairly high, open country amongst grass and stones, Feb. 1911, C. T. White; Toowoomba, Apr. 1916, C. T. White.

NEW SOUTH WALES. ♂: Parramatta, 1799-1810, G. Caley [B.M.]; cow pastures, no loc., Oct. 1801, G. Caley [B.M.]; no loc., 1818, Fraser 177 [B.M.]; Bathurst, Oct. 1822, A. Cunningham 86; Moonan Brook, nr. Scone, 1833, Miss Carter (flowers very large); Jenolan Caves, Oct. 1899, W. F. Blakely; South Goulburn, Oct. 1906, J. Lumsden 22 [W.]; South Goulburn, Nov. 1906, J. Lumsden; Hunter R., Lochinvar, 24 Aug. 1909, R. H. Cambage 2223 [W.]; Boggabri, Oct. 1912, R. H. Cambage; Temora, Sept. 1915, Rev. J. W. Dewyer [W.]; Temora, Oct. 1915, Rev. Dewyer (sic !); Gulgong, Sept. 1916, J. L. Boorman (flowers large); Tenterfield, no date or collector (? C. Stuart), ex Nat. Herb. Vict., Melb., no. 23, in Herb. Kew. ♀: no loc., 8 Jan. 1801, G. Caley; Bathurst, open plains, 1817, A. Cunningham 47, and 1822, A. Cunningham 86 [B.M.]; Western

Interior N.S.W., 24 Apr. 1817, *A. Cunningham* (Mr. Oxley's 1st Expedition); no loc., 24 Apr.—?, *A. Cunningham*; New Holland, N.D., *A. Cunningham* (Hooker, 1835); Hunter R., N.D., *U.S. Exploring Expedition*; near Appin, N.D., *Backhouse*; Armidale, Jan. 1883, *J. W. Statter* [B.M.]; between Lachlan R. and Darling R., 1885, *J. Bruchner* (dwarf and compact form); Nimitybelle to Cooma, Dec. 1896, *J. H. Maiden*; Warrah, Oct. 1897, *J. Gregson*; Bowral to Bullio, Oct. 1905, *J. H. Maiden* (leaves very long, flowers large); Goulburn, Jan. 1907, *S. Styles* (leaves nearly all reflexed); Denman, Sept. 1908, *W. Heron*; Barrington R., nr. Gloucester, Aug. 1909, *W. Heron*; Canberra, Nov. 1911, *R. H. Cambage*; Glen Innes, Nov. 1914, *E. Breakwell*; Georges R., Oct. 1918, *J. L. Boorman*; Casule—Glenfield, Geo. R., Oct. 1918, *J. L. Boorman*; Orange, N.D., *J. L. Boorman*; Cavan, nr. Yass, N.D., *J. T. Calvert*; Richmond R., N.D., *Dr. Curdie*; New England, forest land, N.D., ? *Clifton*. ♂ and ♀: Port Jackson, N.D., *R. Brown* 3499 [B.M.]; Rydal, Oct. 1897, *Mrs. J. McNab*; Moona Plains, Walcha Distr., Apr. 1903, *A. R. Crawford*. Sex indet.: Perth, nr. Bathurst, March 1901, *J. L. Boorman* (leaves crowded, reflexed); Georges R., Nov. 1910, *J. Staer* (leaves very long, distant, reflexed).

VICTORIA. ♂: Wendoo [? = Wando] Vale, [nr. Casterton], ? 14 Sept. 1843, *Robertson*; Yarra, N.D., *F. von Müller*; no loc. or date, *F. von Müller* (ex Phytol. Mus. Melb.); Upper Yarra, Oct. 1893, *C. Walter*; Hawkesdale, Oct. 1901, *H. B. Williamson*; Pearcedale, 1921, *A. G. F. Gates* (abnormal owing to disease). ♀: St. Kilda, 1852, *F. von Müller*; dry places on the Yarra-Yarra, Nov. 1853, *F. von Müller* [B.M.]; Melbourne, very common, 9 Oct. 1853, *F. M. Adamson* 157; nr. Mount McIvor, [1854], *Blandowski*; Pyrenean Mountains, Port Phillip, 1856, *D. E. Cooper* [B.M.]; Castlemaine, 15 Sept. 1860, *R. J. Kendall* 76; Victoria Ra., Grampians, N.D., *Carl Wilhelmi* (flowers very small); Hume R. [= Murray R.], 1874, no collector; Grampians, 1892, *C. Walter*.

SOUTH AUSTRALIA. ♂: hills above Magill, 26 Sept. 1885-6, *Rev. T. S. Lea* [B.M.]. ♀: Mount Gambier, N.D., *F. von Müller*; Port Pirie, Sept. 1901, *M. Koch*.

TASMANIA. ♂: no loc., 1831, *Lawrence* 115 (in Herb. Hook. in Herb. Kew.) (lectotype); no loc. or date, *Lawrence* "9 & 115"; New Norfolk, 9 Oct. 1839, *R. Gunn* 159 [B.M.]; "side of drain at my allotment," Launceston, 14 Oct. 1843, [*R. Gunn*] 159 [W.]; no loc. or date, *Archer* (Tasmanian forms of *A. oligantha*, no. 4). (The last three sheets quoted agree exactly with lectotype.) No loc. or date, *Archer* (Tasm. forms of *A. oligantha*, no. 3); wet places, Launceston, 14 Oct. 1843, *R. Gunn* 159; no loc., 1835, *R. Gunn* 159; Port Dalrymple, Van Diemen's Island, *Paterson* [B.M.]; no loc. or date, *Dr. Storey*. ♀: Hobart, 29 or 30 Nov. [sic], *G. Caley* [B.M.]; Hobart, 1834, *J. Backhouse* 174, 175 [B.M.]; St. Patrick's R., 14 Dec. 1843, *R. Gunn*; Ormley, N.D. *A. Simson*; no loc. or date, *Stuart*; Western Mts., 4000 ft., Dec. 1908, *L. Rodway* [H.]. ♂ & ♀:

Domain, Hobart, Sept. 1892, *L. Rodway* [H.]; Brighton, Nov. 1900, *L. Rodway* [H.].

β *abbreviata* nom. nov. *Habitus* humilis, compactus, fere pulvinatus, foliosus; *internodiis* plerumque folio brevioribus. TASMANIA. ♂ & ♀: "collected at Woolnorth 16 Oct. 1836 and 21 Sept. 1837. It is there common on sandy soil." *R. Gunn* 890.

γ *scoparioides* var. ? nov. *Folia* plerumque patentia, elongatiora, longius acuminata; ad typum transiens. QUEENSLAND. ♀: Mitchell (Camp 29), Aug. 1846, *T. L. Mitchell* 515 (type).

VICTORIA. Sex indet.: Port Philip, N.D., *S. Mossman* 443.

TASMANIA. ♂: New Norfolk, N.D., *J. D. Hooker* 1012; no loc., 1844, *R. Gunn* 159; no loc., 1831, *Lindley*; Golosa Road, Nov. 1922, *L. Rodway* [H.]. ♀: no loc., 1831, *Lindley*. Sex indet.: Clarence Plains, 12 Oct. 1840, [*R. Gunn*] 1125.

A. conferta is at once the most widespread, the most abundant and the most variable of all the Australian *Asperulae*. Its geographical range includes those of all the other species. In the Kew Herbarium, nearly 50% of the Australian *Asperula* material is *A. conferta*. On account of its great variability it is extremely difficult to characterize satisfactorily, yet perfectly easy of recognition, nor have we been able to separate more than two "varieties" (in a non-committal sense), worthy of distinct names, from the apparently heterogeneous mass of material before us.

We have made *Lawrence* 115 the lectotype, rather than *Gunn* 159, because the latter includes a number of different forms gathered at various times and places, whereas *Lawrence*'s is quite homogeneous. It should, however, be pointed out that *Lawrence*'s specimens are not quite "typical" examples of the species, being exactly matched only by the three sheets, also from Tasmania, quoted immediately after it, above. But we do not feel justified in separating the remainder of the material from these, either as varieties or forms, the differences not being sufficiently important.

The somewhat bewildering variation of this species is no doubt accountable for the fact that von Müller decided that all Australian *Asperulae* (with the exception of his own *A. geminifolia*) were simply forms of a single species to which he gave the name *A. oligantha*. (This name was never properly published.) He was followed in this opinion by Rodway in his *Tasmanian Flora* (1903, pp. 70, 71). A more intensive examination of the various forms, both in the field and in herbaria, would have sufficed to dispel this somewhat uncritical view.

The best characters for recognizing the plant (in the dried state) are: the leaves of the lower part of the main stems (frequently also of the upper part, and sometimes those of the branches) are

closely reflexed to the stem, except in young specimens, and are constantly senate, linear, acute (not long-acuminate as in *A. scoparia*); the habit is generally straggling and untidy, though sometimes erect.

The forms which we have grouped under the name γ *scoparioides* make a decided approach towards some lax forms of *A. scoparia*, but never possess the cauline indumentum nor the hyaline acuminate leaf-apex of that species.

The plant we have named β *abbreviata* is only known to us from the two gatherings of Gunn (no. 890) from Woolnorth, N.W. Tasmania. It is the "*var. β . internodiis folio brevioribus, caule abbreviato*" of Hooker (in Lond. Journ. Bot. vi. 464 bis, 1847). Though the internodes are rather shorter than usual, it appears to be a distinctly luxuriant form, judging by the breadth and consistency of the leaves.

2. *Asperula scoparia* Hook. fil. in Lond. Journ. Bot. vi. 463 bis (1847); Flor. Tasm. i. 169, t. XL A (1857-58?). Benth. Flor. Austr. iii. 444 (1866). F. M. Bailey, Queensl. Flor. iii. 782 (1900). L. Rodway, Tasm. Flor. 71 (1903).

Herba perennis. *Radix* fibrosa. *Rhizoma* longe repens, valde ramosa, lignosa, c. 1.0 mm. diametro. *Caules* numerosi, e nodis rhizomatis orientes, plerumque humiles, c. 4-10 (rarius ad 16) cm. longi, ad 1.0 mm. diametro, decumbentes, adscendentes vel suberecti, basi praecipue (superne brevius) ramosi, subflexuosi, brevissime et plerumque densissime (rarius sparse) puberuli; internodiis 0.5-2.0 cm. longis. *Folia* sena, adscendenti-patentia interdum recurva, subrigida, linearia, longe hyalino-acuminata, acutissima, 4-9 mm. longa, raro ad 1.0 mm. lata, margine plana vel recurva nonnunquam setuloso-ciliata, utraque pagina glaberrima. *Inflorescentiae* terminales, subpauciflorae, magna ex parte foliis supremis longis celatae. *Flores* dioici, majusculi: δ *receptaculum* inter species Australienses majusculum, truncato-reniforme, ad 1.2 mm. diametro, subdidymum, glabrum; *corollae* tubus longus, subcylindricus, sursum levissime ampliatus, c. 3 mm. longus, basi c. 0.8 mm., fauce c. 1.4 mm. diametro, segmentis oblongis subacutis 1.5-2.0 mm. longis, apice inflexo-cuspidatis; *staminum* filamenta brevissima, antheras oblongas subaequantia; *styli* longi, corollae tubum aequantes, stigmatibus globosis: ϕ *receptaculum* parvum, subglobosum, c. 1.0 mm. diametro; *corollae* tubus subcylindricus c. 1.5 mm. longus segmenta oblonga acuta subaequans; *stamina* minuta; *styli* c. 3.0 mm. longi exserti breviter furcati, stigmatibus majusculus globosis. *Fructus* raro didymi, mericarpiis (? maturis) parvis, c. 1.5 mm. diametro, globosis, rugosis, atrobrunneis.

NEW SOUTH WALES. δ & ϕ : near Appin, N.D., Backhouse. ϕ : Mt. Victoria, Oct. 1881, E. Betcher; Brown Mts., nr. Littleton, Feb. 1893, E. Betcher; Braidwood, Nov. 1908, R. H. Cambage; Booroomba, Queanbeyan, on granite, 6 Nov. 1911, R. H. Cambage 3017; Queanbeyan, Dec. 1911, R. H. Cambage.

VICTORIA. δ : Upper Yarra, Oct. 1893, C. Walter.

TASMANIA. δ & ϕ : Lawrenny (?), N.D., J. D. Hooker 1007 (type). δ : Glen Leith, 14 Oct. 1840, R. Gunn 1124; New Norfolk, 18 Nov. 1840, M.B. in Gunn's Herb. 1124. ϕ : New Norfolk, 6 Nov. 1840, M.B. in Gunn's Herb. 1124.

var. *ulicina* var. nov.

Folia rigidissima subulato-spinescentia plerumque parallela, costa pervalida; *fructus* mericarpiis duplo majoribus.

NEW SOUTH WALES. δ : Monga, Oct. 1926 (*sic!* sed fieri non potest), W. Bauerlen. ϕ : Riedsdale, Braidwood, Oct. 1890, W. B[auerlen?]; Yarrogobilly Caves, Feb. 1897, E. Betcher.

In general habit the specimens often recall forms of *Salsola Kali* L. This is especially true of Backhouse's specimen in Herb. Kew., quoted above. The species is readily distinguished from *A. subulifolia* Shaw et Turrill, the only other Australian species with a strongly acuminate leaf-apex, by the absence of the thick woody stock (*caudex*) and stems and of the fine continuous tomentum over the leaf-surface (though the margin may be ciliate), and by the leaves being parallel-sided (linear), not narrowed continuously from base to apex (subulate).

From its close morphological ally, *A. conferta* Hook. fil., *A. scoparia* may be separated by the acuminate leaf-apices referred to above and by the presence, to a greater or less degree, of a short tomentum on the stem. Typical examples have also a characteristic habit which is easier to recognise than to describe.

On the type-sheet there are two small specimens with quite glabrous stems. It is probable that these should be referred to *A. conferta* Hook. fil., var. ? γ *scoparioides* Shaw et Turrill.

The variety *ulicina* is merely an extremely rigid form and is connected by intermediates with the typical form.

3. *Asperula Gunnii* Hook. fil. in Lond. Journ. Bot. vi. 463 bis (1847); Flor. Tasm. i. 168 (1857-58?). Benth. Flor. Austr. iii. 445 (1866) (excl. var.). L. Rodway, Tasm. Flor. 71 (1903).

Herba perennis. *Radix* fibrosa, rubro-tingens. *Rhizoma* repens vel suberectum, 1.0-1.5 mm. diametro. *Caules* caespitosi, suberecti vel decumbentes, plerumque basi ramosi, ad 2 dm. longi, in regionibus alpinis nonnunquam humillimi 2 cm. tantum longi, quadranguli, subscabro-puberuli, parte inferiore glabrescentes; internodiis 0.5-3.0 cm. longis. *Folia* quaterna vel sena (raro terna vel quina), patentia, subcoriacea, obovata vel obovato-oblonga, rarius spathulata vel oblanceolata, basi angustata, raro breviter petiolata, apice acuta raro rotundata, 3-10 mm. longa, ad 2.5 mm. lata, utraque pagina glaberrima, margine anguste recurvo plerumque scaberulo, costa tenue. *Inflorescentiae* in siccitate raro conspicuae, terminales et axillares, pauciflorae, raro subcapituliformes. *Flores* dioici: δ *receptaculum* parvum, subglobosum; *corollae* c. 3 mm. longae

segmenta oblonga inflexo-cuspidata tubum subcylindricum levissime sursum ampliatus subaequantia; *staminum* filamenta breviter antheras elliptico-oblongas aequantia; *stylus* nullus: ♀ *receptaculum* paullo majus, subglobosum; *corollae* 2 mm. longae tubus amplius segmenta oblonga acuta inflexo-cuspidata subaequans; *stamina* minuta; *styli* corollam superantes, breviter furcati, stigmatibus magnis globoso-reniformibus. *Fructus* mericarpia globosa, 1-2 mm. diametro, nigra, glabra, ut videtur carnosae.

NEW SOUTH WALES. ♂: nr. Appin, N.D., *Backhouse*; Blue Mts. (Lithgow), Oct. 1881, *E. Bêche*; Mt. Bimberi, Queanbeyan, 6100 ft., 15 Jan. 1912, *R. H. Cabbage* 3302. ♀: Munyang [=Munioing] Mts., N.D., *F. von Müller*; Mt. Kosciusko, 6000-6500 ft., Feb. 1893, *R. Helms*; Mt. Kosciusko, 5500 ft. to summit, Jan. 1898, *J. H. Maiden*; Mt. Kosciusko, Jan. 1899, *J. H. Maiden and W. Forsyth*. VICTORIA. ♂: Mt. Feathertop, 4000 ft., N.D., *A. J. Tadgell*. TASMANIA. ♂ & ♀: Mt. Wellington, 31 Jan. 1840, *R. Gunn* 1123; Nive River, Oct. 1840, [*R. Gunn*] (type); Marlborough, 17 Oct. 1840, *J. D. Hooker* in *Gunn's Herb.* 1123; no loc., 1844, *R. Gunn* 1123; Arthur's Lakes, 17 Jan. 1845, *R. Gunn* 1123; Western Mountains, N.D., *Lawrence* 326; no loc. or date, *Archer*; Mt. Wellington, 1892, *L. Rodway*; St. Patrick's Plain, Dec. 1903, *L. Rodway*; Mt. Field, 3000 ft., Dec. 1906, *L. Rodway*.

var. *curta* (Hook. fil.) var. nov. *Galium curtum* Hook. fil. in *Lond. Journ. Bot.* vi. 462 bis (1847).

Caules humiles ad 6.5 cm. alti dense deflexo-pubescentes. *Folia* parva elliptico-oblonga plerumque subacuta ad 4 mm. longa, margine conspicue ciliata nonnunquam pagina superiore pubescentia. *Flores* non visi.

TASMANIA. Hampshire Hills, 1837, *R. Gunn* 892.

After *A. euryphylla*, this species has broader leaves than any other in Australia. The distinguishing marks between *A. Gunnii* and *A. euryphylla* var. *octophylla* (the only variety of the latter species with which the present is likely to be confused) will be found under that species.

Inconstancy in the number both of leaves in a whorl and also of parts of the flower appears considerably more frequent in this species than in any other we have observed. The leaves vary in number from three to six, four and six being the most frequent numbers. In the flowers, trimery and pentamery appear almost as common as tetramery, and all these may occur in the same inflorescence.

As pointed out (*infra*) under *A. pusilla*, the leaves are quite glabrous on the upper surface except in the var. *curta*. This plant is at present known only from a single gathering of *Gunn*, in *Herb. Kew.* and in *Herb. Lindl.* at Cambridge. The specimens are all flowerless. Since the pubescence of the upper leaf-surface invalidates

this character (as far as this variety is concerned) as a point of distinction from *A. pusilla*, another must be sought and is found in the shape of the leaves. Those of *A. Gunnii* var. *curta* are elliptico-obovate, subacute; in *A. pusilla* they are linear-oblong to oblanceolate, and subobtusae.

4. *Asperula pusilla* Hook. fil. in *Lond. Journ. Bot.* vi. 464 bis (1847); *Flor. Tasm.* i. 169, t. XL B (1857-58?). *A. Gunnii* Hook. fil. var. *pusilla* (Hook. fil.) Benth. *Flor. Austr.* iii. 445 (1866).

Herba perennis. *Radix* fibrosa. *Rhizoma* tenue, repens. *Caules* plerumque humiles, dense caespitosi, suberecti, ramosi, 3-12 cm. longi, scaberulo-pubescentes vel nonnunquam glabri, pro planta robustiores; internodiis plerumque confertis, inferioribus ad 3 cm. longis. *Folia* sena, patentia interdum recurva, subrigida, lineari-oblonga vel oblanceolata, 2-8 mm. longa, ad 1.5 mm. lata, utraque pagina pubescentia (rarissime glabrescentia), margine revoluta et costa inferne plus minusve scaberulo-ciliata. *Inflorescentiae* laterales vel subterminales, raro revera terminales, pauciflorae, diffusae, raro densiores subcapitati. *Flores* dioici: ♂ *receptaculum* subglobosum, 0.5 mm. diametro; *corollae* tubus breviter infundibularis vix 1 mm. longus segmenta oblonga subacuta inflexo-cuspidata subaequans; *staminum* filamenta breviter antheras lineari-oblongas vix aequantia; *styli* tubo paullo breviores: ♀ masculis similes, sed *receptaculo* paullo majore, *corollae* tubo subbreviore, magis cylindrico, *staminibus* valde redactis, *stylis* corollam multo superantibus stigmatibus ovato-reniformibus. *Fructus* brunnescentes vel nigri, mericarpiis globosis, rugosis, c. 1.5 mm. diametro.

NEW SOUTH WALES. ♂: Tingiring Mts., 4500 ft., 1887, *W. Bauerlen* 548; Mt. Kosciusko, 5500 ft. to summit, Jan. 1898, *J. H. Maiden*; Mt. Kosciusko, Feb. 1914, *J. H. Maiden*. ♀: Mt. Kosciusko, Feb. 1901, *R. Helms*.

VICTORIA. ♂: Wimmera (?), N.D., *Dallachy*. ♀: Watts Creek, McVeigh's, 29 Feb. 1924, *A. C. F. Gates*.

TASMANIA. ♂: Hampshire Hills, Feb. 1837, *R. Gunn* 557, 891 (type); no loc., 1844, *R. Gunn* 557; no loc. or date, *R. Gunn* 891; no loc. or date, *Lawrence* 329; no loc. or date, *J. D. Hooker* 1010; no loc. or date, *Archer*; Hampshire Hills, N.D., *J. Milligan* 1193 [B.M.]; Alpline, N.D., *Dr. Milligan*; Distillery Creek, nr. Launceston, Feb. 1920, *L. Rodway*. ♂ & ♀: Arthur's Lakes, 17 Jan. 1845, *R. Gunn* 557; on rocks, side of Western Mountains, alt. 3000 ft., 16 Feb. 1843, *R. Gunn* 557 [B.M.]. ♀: Arthur's Lakes, 17 Jan. 1845, *R. Gunn* 891; Hampshire Hills and Woolnorth, N.D., *R. Gunn* 557; Mt. Barrow, Dorset, Jan. 1922, *Rev. H. M. R. Rupp*. Sex indet.: St. Patrick's River, 16 Nov. 1844, *R. Gunn* 557.

In general habit *A. pusilla* is intermediate between the less robust *A. minima* and the generally larger *A. Gunnii*. The stems are usually numerous and caespitose, as in *A. minima*, but specimens are not infrequent with the laxer habit of *A. Gunnii*. The leaves also

are intermediate, except that they are more pubescent than in either of the last-named species.

Bentham reduced this species to a variety of *A. Gunnii* in the Flora Australiensis. In cases of doubt which may arise, there is always one definite distinguishing character between *A. pusilla* and *A. Gunnii*: the upper surface of the leaves of *pusilla* is always hispid-pubescent, whereas in *Gunnii* it is quite glabrous. We have never known this character to vary (except in the case of *A. Gunnii* var. *curta*, q.v.); and, taken in conjunction with other characters less easy to express, and perhaps less constant, it appears to be an infallible criterion.

A. pusilla seems to be essentially an inhabitant of the mountainous districts of south-eastern New South Wales, eastern Victoria and central Tasmania. We cannot therefore help regarding the specimen purporting to have been collected in Wimmera by Dallachy, with a certain amount of suspicion. That the specimen is *A. pusilla* we have no doubt, but that it came from Wimmera—low, flat country composed almost entirely of *Eucalyptus* scrub, and hundreds of miles away in the north-west of Victoria—seems extremely unlikely.

5. *Asperula minima* Hook. fil. in Lond. Journ. Bot. vi. 464 bis (1847); Flor. Tasm. i. 170 (1857-58?). Benth. Flor. Austr. iii. 445 (1866). L. Rodway, Tasm. Flor. 71 (1903).

Herba perennis. *Rhizoma* tenue, flexuosum, intricate repens. *Caules* humiles, caespitiosi, erecti vel adscendentes vel subprostrati; basi et apice ramosi ceterum plerumque simplices, 5-6 cm. longi, glabri vel raro parviscule scaberuli. *Folia* sena, interdum octona, patentia, anguste oblanceolata, subacuminata, acuta, 2-4 mm. longa, c. 0.5 mm. lata, pagina superiore densiuscule scaberula, margine revoluta rarius subplana, apice interdum brevissime hyalino-setifera. *Inflorescentiae* numerosae, terminales et subterminales, cymosae. *Flores* dioici: ♂ longiuscule pedunculati, pedunculis pedicellisque gracillimis; *receptaculum* parvum, obovoideum; *corolla* infundibularis, c. 1.5 mm. longa, segmentis recurvis deltoideo-oblongis tubum subaequantibus; *staminum* filamenta brevissima, antheris breviter oblongis; *styli* minuti, tubo duplo vel triplo breviores, stigmatibus globosis: ♀ breviter (1 mm.) pedicellati; *receptaculum* parvum, obovoideum, haud 1 mm. longum; *corollae* brevissime infundibularis minutissime (?glanduloso-) pubescentis segmenta oblongo-deltoidea c. 1 mm. longa tubo subduplo longiora; *stamina* minuta; *styli* alte connati robustiores tubo subduplo longiores, stigmatibus majusculis globosis. *Fructus* ignoti.

VICTORIA. ♂: Hall's Gap, Grampian Mountains, Dec. 1912, J. E. Tilden 850, 888 [B.M.].

TASMANIA. ♂: George Town, 21 Nov. 1842, 9 Jan. 1843, and 1844, R. Gunn 1251; Pt. Effingham, 3 Dec. 1841, R. Gunn "1251 or 557" (sic!) [W.]; no loc. or date, Archer; "Van Diem. Land", no date

or collector. ♂ & ♀: Port Dalrymple, Oct. 1804, R. Brown 3498 [B.M.].

A. minima is the smallest known Australian *Asperula*. The stems arise from a slender intricately branched rhizome but are usually sufficiently numerous to give a general caespitose appearance to the plants. The leafy and flower-bearing stems have many nodes and short internodes. The small leaves are usually in sixes and spread at right angles to the thin stems.

6. *Asperula subsimplex* Hook. fil. in Lond. Journ. Bot. vi. 463 bis (1847); Flor. Tasm. i. 168 (1857-58?). Benth. Flor. Austr. iii. 444 (1866). L. Rodway, Tasm. Flor. 71 (1903).

Herba perennis. *Radix* ignota. *Rhizoma* ut videtur tenuissimum, suberectum. *Caules* plurimi, conferti, erecti, raro decumbentes, graciles, flaccidi, stricte ramosi, 1-2 dm. longi, glaberrimi; internodiis c. 1-2 (raro ad 3.5) cm. longis. *Folia* quaternaria, patentia rarius suberecta, flaccida, linearia, lineari-lanceolata vel suprema brevissima ovato-lanceolata, utrinque angustata, acuta vel subacuta, 2-8 (plerumque c. 5) mm. longa, ad 1 mm. lata, utraque pagina glaberrima, margine anguste recurvo vel subplano, foliorum superiorum nonnunquam obscure scaberulo, costa tenuissima. *Inflorescentiae* axillares, numquam revera terminales etsi caulibus apicem interdum superantes, perpauciflorae (1-3); pedunculis strictis folia aequantibus vel subduplo superantibus, raro pedunculo subobsoletis et tunc pedicellis elongatis. *Flores* dioici, (rarissime, ut videtur, hemaphroditi), in siccitate inconspicui: ♂ *receptaculum* parvum, applanato-suborbiculare; *corolla* breviter infundibularis, c. 2 mm. longa, segmentis patentibus deltoideo-oblongis obscure cuspidatis tubum subaequantibus; *staminum* filamenta gracilia, antheris brevissime oblongis; *styli* brevissimi, distincti: ♀ *receptaculum* applanato-obovoideum, vix 1 mm. diametro; *corolla* ♂ similis, segmentibus tamen paullo latioribus tubo duplo longioribus; *stamina* minuta; *styli* exserti, divaricati, stigmatibus subglobosis nonnunquam setosis. *Fructus* maturi non visi; immaturi brunnescentes, subrugosi, vix 1.5 mm. diametro.

TASMANIA. ♂: no loc., 1835 & 1844, and Circular Head, in wet places, 25 Dec. 1837 [B.M.], R. Gunn 407; no loc. or date, Archer; Bellerive, Nov. 1891, L. Rodway. ♀: Circular Head, 25 Dec. 1837 (type), and Lake St. Clair, 13 Feb. 1845, and no loc. or date, R. Gunn 407; no loc. or date, R. Gunn 882; Formosa, N.D., Lawrence 242; Derwent R., Iter Austr. 1802-5, R. Brown 3488. ♂ & ♀: no loc. or date, R. Gunn 407. ♀ (?): no loc. or date, Dr. Storey.

forma *aquatica* f. nov.

Omnibus partibus (exc. floribus) majoribus, *caulibus* robustioribus ad 2.5 dm. longis, acutissime quadrangulis, *foliis* plerumque 5-10 mm. longis 1.0-1.5 mm. latis, aliquantulum scabridioribus.

VICTORIA. ♀: in the water, Wendee [=Wando] River, [nr. Casterton], 1 Dec. (12 Jan. ?) 1844, Robertson 694.

The species is recognisable by its slender, weak, erect, sparingly branched, generally crowded stems, with constantly quaternate leaves and by its very few-flowered inflorescences arising from the upper leaf-whorls, rarely terminal.

The extension of the range of *A. subsimplex* to Victoria (extreme south-west) is interesting. Whether it is really worth distinguishing this form (*aquatica*) as we have done, can only be decided when further material is available. The luxuriant habit of the only specimen known to us (Robertson 694) is no doubt due to its growing in the water.

The principal interest of *A. subsimplex*, however, is its apparently close affinity with the New Zealand species, particularly with certain undescribed specimens which may possibly turn out to be *A. fragrantissima* J. B. Armstrong. These specimens have the quaternate leaves, weak (though not erect) stems, few-flowered subterminal inflorescences and short broadly infundibular corollas characteristic of *A. subsimplex*. The last-named has no obvious affinity with any other known Australian *Asperula*.

7. *Asperula wimmerana* sp. nov. *A. conferta* Benth. in sched., non Hook. fil.

Herba perennis. *Rhizoma* horizontale vel adscendens, tenue, 0.75 mm. diametro, atro-brunneum. *Caules* humiles, adscendentes, graciles, subsimplices, quadranguli, reflexo-asperii vel subhispidi, 3–11 cm. longi, c. 0.5 mm. diametro; internodiis plerumque 5–7 mm. longis. *Folia* sena, suberecta rarius patentia, interdum homomalla vel circum caulem spiraliter torquentia, subcartilaginea, anguste linearia, acuta, 3–5 mm. longa, 0.5 mm. lata, pagina inferiore subhispidata, costa prominente, pagina superiore minus vestita, plana. *Inflorescentiae* terminales, 1–3 e verticillo summo orientes, subcapituliformes. *Flores* dioici: ♂ pro planta majusculi, cymas corymbosas hemisphaericas 7–8 mm. diametro efformantes; *receptaculum* minutum; *corollae* tubus infundibularis, 1.5–2.0 mm. longus, segmentis revolutis-patentibus, oblongis, acutis, brevissime incurvato-cuspidatis, trinerviis, tubo aequilongis vel paullo brevioribus, fere 1 mm. latis; *staminum* filamenta brevissima, antherae oblongae, in siccitate conspicuae; *styli* fere obsoleti: ♀ minores; *receptaculum* subreniforme, c. 1 mm. lata; *corolla* c. 2 mm. longa, forma ♂ similis, tubo segmentis aequilongis; *stamina* minuta; *styli* exserti, late divaricati, stigmatibus capitatis conspicue reniformibus. *Fructus* brunneo-nigri, rugosi, glabri, 1.5–2.0 mm. diametro.

VICTORIA. ♂: Wimmera, 1900, F. M. Reader (type). ♀: Wimmera, N.D., Dallachy. ♂ & ♀: Murray River, no date or collector (? F. v. Müller).

forma (?) *glaberrima* f. nov. *A. scoparia* Benth. in sched., non Hook. fil.

Caulibus, foliis pedunculisque undique glaberrimis.
VICTORIA. ♀: near Melbourne, 7 Sept. 1856, F. M. Adamson 486.

A small, neat species with a rather distinct habit. In the dried state the suberect (typically hispid) leaves exhibit a tendency to a slight spiral twist round the stem, or are almost secund. The stems are quite slender, yet fairly rigid, as also are the leaves. The inflorescences are terminal, somewhat convex, and the flowers (at least the males) large for the size of the plant, with a long tube and reflexed segments to the corolla.

Our material is scanty—four sheets—and from Victorian localities only (though the Murray River specimen with a label in von Müller's handwriting might also be from South Australia or New South Wales). Like *A. subsimplex*, the present species stands somewhat isolated among the Australian *Asperulae*.

8. *Asperula lissocarpa* sp. nov. *A. conferta* Benth. Flor. Austr. iii. 444 (1866) p.p., non Hook. fil. ? *Rubia syrticola* Miquel in Ned. Kruidk. Arch. iv. 111 (1859).

Herba perennis. *Rhizoma* ignotum (nisi fragmentum ut videtur lignosum). *Caudex* tenuis, teres, subsimplex, elongatus, repens adscendens vel suberectus, paulatim sursum ampliatus, subrubescens, lignificatus, 8–13 cm. longus, cortice membranacea laxissime annexa. *Caules* erecti, ramosi, 5–12 cm. longi (caudice excluso), c. 1.0 mm. diametro, quadranguli, scabridi, ramis ad 6 cm. longis; internodiis c. 0.5–2.0 cm. longis. *Folia* sena, erecto-patentia, rigida, recta vel leviter curvata, linearia, apice abruptiuscule acuta, c. 3–7 mm. longa, 0.5–1.0 mm. lata, glabra, margine scabrido revoluta, costa infra prominente leve. *Inflorescentiae* terminales, numerosiores, ut videtur subpauciflorae. *Flores* dioici: ♂ *receptaculum* ignotum; *corollae* c. 2.5 mm. longae segmenta oblonga subacuta tubum subcylindricum subaequantia; *staminum* antherae oblongae filamenta brevissima subaequantia; *stylus* ignotus: ♀ *receptaculum* ignotum; *corolla* forma ♂ similis, minor, segmentis reflexis; *stamina* obsoleta; *styli* alte connati, corollam longe superantes, stigmatibus subglobosis. *Fructus* conspicui, pallide brunnescentes, leves, mericarpiis subglobosis, 2.0–2.5 mm. diametro, corollam stylumque persistentem saepissime amplectentibus.

NEW SOUTH WALES. ♀: Darling River, N.D., Dallachy (type); ibid., 1858, collector unknown (? Dallachy).

This species is only known to us from two sheets, very probably the same gathering, from the Darling River. It is unfortunate that no accurate data are available for the locality. Dallachy is known to have collected on the Darling River in the year 1858.

A. lissocarpa appears to be morphologically closer to *A. Cunninghamii* Shaw et Turrill than to any other Australian species. It may perhaps be regarded as forming a transition between § *Lignosae* and § *Confertae*. The specimens before us are characteristic by reason of the long, slender, leafless, unbranched lower portion of the stem, dark brown in colour and loosely sheathed by the membranous cortex. Above, the stem is pale, very scabrid and repeatedly branched. The leaves also are very scabrid and, in common with

the species of § *Lignosae*, are generally suberect. All our specimens but one are in fruit: this is unusual in being light brown in colour and quite smooth (though minutely pitted or areolate under the lens).

We suspect that it is this species which was described by F. A. G. Miquel in Nederl. Kruidk. Arch. iv. 111, 112 (1859) under the name of *Rubia syrticola* Miq. This is unlikely to have been a true *Rubia*, as this genus is not known to occur in Australia; nor, in spite of its corolla being described as "rotata", is it likely to have been a *Galium*, since von Müller subsequently referred to this description as the place of publication of his *Asperula oligantha* [Fragm. Phyt. Austr. ix. 187 (1875)]. Specimens of *Asperula* are frequently written up *Galium* in herbaria, but we are unaware of instances of the opposite error. The points in Miquel's description which are particularly applicable to *A. lissocarpa* are the following (italics ours): "Caulibus e rhizomate repente . . . erectis rigidis, . . . retrorse aculeolatis scaberrimis, foliis . . . erecto-patulis . . . rigidis, marginibus recurvis, subtus in nervo medio prominente marginibusque hispidis, fructu . . . succulento glabro . . . Tota planta exsiccatione (excepto fructu) pallescit . . . Mericarpiis . . . siccitate . . . nitida." There seems to be no other species so well fitted by this description as *A. lissocarpa*. The matter cannot be finally settled until we have seen Miquel's type specimen, which he states was gathered "In interioribus Novae Hollandiae australis regionibus, ad Wallindango; m. Oct. (Ferd. Müller)." "Wallindango" is no doubt the same as the present Woollundunga, a short distance east of Port Augusta, Frome County, South Australia. Dallachy probably collected his specimen near the south-west end of the Darling River: if so, the two localities are comparatively close (200-250 miles).

In the event of this surmise proving correct, the name of the present species will have to be *Asperula syrticola* (Miquel), comb. nov.

Since writing the above, we have had the opportunity of examining one of Miquel's specimens* of *Rubia syrticola* from the Utrecht Herbarium. Unfortunately this is merely two erect stems 12 and 14 cm. long respectively, arising from a common (? creeping) base, with a very few shrivelled black fruits among the upper leaves and no trace of a corolla. It is therefore impossible to decide from

*Description of Miquel's specimen:

Herba perennis. *Rhizoma* repens, 1-2 mm. diametro, vix lignosum. *Caules* erecti, parum ramosi, 12-14 cm. longi, c. 1.0 mm. diametro, quadranguli, dense scabrido-pubescentes; ramis ad 3 cm. longis; internodiis ad 3 cm. longis. *Folia* sena vel octona, erecto-patentia, rigida, recta vel subflexuosa, lineari-subulata, apice (haud abrupte) acutissima, c. 4-8 mm. longa 0.5-1.0 mm. lata, margine revoluta costaque infra prominente setoso-scabrida. *Inflorescentiae* ignotae. *Fructus* pauci, axillares, nigri, glabri, mericarpiis globosis valde rugosis 1.5-2.0 mm. diametro.

Copy of label:

Rubia Syrticola Miq. / n.sp. / *Asperula oligantha* β deserti / Mull. herb. / In interiorib. Nov. Holl. aust. / ad Wallindunga, Oct. / Muller.

this material whether the specimen belongs to *Asperula* or not. All we can say is that it seems much nearer to *A. lissocarpa* nob. than to any other Australian species, and may quite possibly actually be that species. We are, however, not satisfied as to its identity from an examination of the vegetative parts and old fruits only. It is in some ways intermediate between *A. lissocarpa* and *A. Cunninghamii* nob., but certainly is not the latter species.

9. *Asperula Cunninghamii* sp. nov. *A. scoparia* Benth. Flor. Austr. iii. 444 (1866) p.p., non Hook. fil. *A. conferta* Benth. in sched. in Herb. Kew., non Hook. fil.

Herba suffrutescens, perennis. *Rhizoma* ignotum. *Caudex* pluriceps, erectus vel suberectus, crassus, valde lignificatus, 2-7 mm. diametro. *Caules* annotini persistentes, ramulis abruptis subsimplices, erecti, rigidi, lignosi, cortice fusco vel nigro evanescente teretes, ad 2 mm. diametro. *Caules* hornotini caespitosi, erecti vel adscendentes, robustiores, plerumque rigidissimi, stricte (rarius diffuse) ramossissimi, acute vel obtusiuscule quadranguli, raro subteretes, brevissime deflexo-tomentelli, 1.0-2.5 dm. longi, 0.5-1.5 mm. diametro; internodiis 0.5-3.0 cm. longis. *Folia* sena, stricte erecta, interdum paene cauli adpressa, rarius adscendentia vel patentia, rigida, linearia, subacuta vel subobtusata, infima in vaginam brevem membranaceam connata, 2-10 (plerumque c. 5) mm. longa, c. 0.5 mm. lata, margine revoluta costaque infra prominente pube brevissima vestita, pagina superiore glabra. *Inflorescentiae* terminales, pauciflorae, subcapituliformes. *Flores* dioici: ♂ *receptaculum* parvum, reniforme vel subglobosum; *corollae* c. 2-3 mm. longae segmenta oblonga trinervia subacuta interdum incurvo-cuspidata erecto-patentia tubo cylindrico subbreviora; *staminum* antherae oblongae filamenta breviter paullo excedentes; *stylus* nullus: ♀ minores; *receptaculum* subglobosum, fere 1 mm. diametro; *corollae* c. 1.0-1.5 mm. longae forma ♂ similis; *stamina* fere obsoleta; *styli* robustiores corollam aequantes vel superantes, stigmatibus majusculis capitatis reniformibus atro-rubentibus. *Fructus* hemisphaerice conglobati, atro-brunnei, c. 2 mm. diametro.

QUEENSLAND. ♂: [Mitchell, Maranoa Distr.], Sub-Tropical New Holland, [Aug.] 1846, *Lieut.-Col. Sir T. L. Mitchell* (incl. one ♀ spm.); Wyaga, Goondiwindi Distr., Sept. 1919, C. T. White; Mount Maria (sic; ? sphalm. pro Mt. Marra), Warrego, F. M. Bailey. ♀: St. George, Oct. 1893, Jos. Wedd-?

NEW SOUTH WALES. ♂: Lachlan River, April 1817, *A. Cunningham* 47; "very abundant in open clear flats of Field's Plains, especially on spots recently inundated," [10] May 1817, *A. Cunningham* 46 (type); Narramine, June 1901, J. L. Boorman; Narrabri, Aug. 1907, J. L. Boorman. ♀: Narramine, Sept. 1898, J. H. Maiden; Dubbo, Aug. 1903 & Oct. 1906, J. L. Boorman; Bedooba, nr. Gulgannia, Jan. 1904, W. Bauerlen; Cobar, Aug. 1911, L. Abrahams.

INCERT. ♀: Interior of New Holland, 1838, *Major Mitchell's Expedition*.

Apparently not an uncommon species in Southern Queensland and New South Wales. It is strange that neither Hooker nor Benth nor any subsequent author has ever described it as a distinct species, since it was collected as early as 1817 by Allan Cunningham, and also in 1838 and 1846 by Sir T. L. Mitchell. It is the commonest species of § *Lignosae*. The old woody stems of the previous year's growth either produce new shoots from their nodes, or else die and persist among the new growth from the stock. These old dead persistent stems are rather a feature of the species. We have observed occasional trimerous and pentamerous flowers.

10. *Asperula subulifolia* sq. nov. *Galium subulifolium* F. von Müll. in sched. in Herb. Kew. ? *A. scoparia* Benth. Flor. Austr. iii. 444 (1866) p.p., non Hook. fil.

Herba suffrutescens, perennis. *Rhizoma* ignotum. *Caudex* pluriceps, erectus vel adscendens, crassus, valde lignificatus, 2-3 mm. diametro; cortice striato vel fisso. *Caules annotini* adscendentes, rigidi, lignosi, teretes, ad 2 mm. diametro. *Caules hornotini* ex annotinis varie orientes, subcaespitosi, erecti vel adscendentes, rigidi, subdiffuse et angulariter ramosi, obtuse quadranguli vel subteretes, minutissime et densissime tomentelli, 1.0-2.5 dm. longi; internodiis 0.5-3.7 (plerumque 1.0-1.8) cm. longis. *Folia* sena, erecta vel erecto-patentia, subrigida, apicem versus flexuosa, anguste subulata, apice acutissima, basi vix vel brevissime connata, 2-8 mm. longa, costa robusta, lamina angustissima (vix ulla) deflexa, undique (ita ut caulis) tomentella, costa et margine superiore interdum glabrescentia. *Inflorescentiae* numerosae, terminales, eas *Bupleuri* spec. quarundam in siccitate aliquantulum revocantes, in verticillis foliorum supremis subsessiles, foliis flores aequantibus vel superantibus. *Flores* dioici: ♂ c. 3-8; *receptaculum* minutum; *corollae* 1.5-3.0 mm. longae lobi oblongi incurvo-cuspidati trinervi dorso brevissime setulosi tubum subcylindricum aequantes; *staminum* antherae filamenta aequantes vel superantes, oblongae, versatiles; *stylus* nullus: ♀ pauciores, 1-2; *receptaculum* (corolla jam cadente solum nobis cognitum) applanato-subglobosum, 1.3 mm. longum, 1.7 mm. latum; *corolla* forma ♂ similis, c. 1.5 mm. longa, lobis reflexo-patentibus; *stamina* minutissima; *styli* robusti, longiuscule connati, late divaricati, corollam longe superantes, stigmatibus obovato-oblongis, in stylum decurrentibus. *Fructus* (nisi immaturi—v. sub *receptaculo* supra) ignoti.

QUEENSLAND. ♂: Texas, Sept. 1910, J. L. Boorman (type).

NEW SOUTH WALES. ♂: Severn River, N.D., F. von Müller 172; New England, N.D., F. von Müller; nr. Tenterfield, C. Stuart. ♂ and ♀: Bingarra, Sept. 1907, J. L. Boorman.

Very closely allied to *A. Cunninghamii* Shaw et Turrill, but readily distinguished by the truly subulate, often flexuous leaves, of which

the greater part is formed by the broad midrib. The whole plant (except the flowers and fruit) is covered by an exceedingly fine and dense tomentellum, very much finer than the indumentum of *A. Cunninghamii*.

11. *Asperula ambleia* sp. nov. *A. conferta* Hook. fil., var. *elongata* F. M. Bailey Queensl. Flor. iii. 783 (1900), non Benth.

Herba suffrutescens, perennis. *Rhizoma* ignotum. *Caudex* (quatenus cognitus) crassus, valde lignificatus, 3-4 mm. diametro. *Caules annotini* adscendentes vel erecti, rigidi, lignosi, teretes, 1-2 mm. diametro, corticis angulis cartilagineis laxis persistentibus. *Caules hornotini* e nodis annotinorum singuli vel bini, subfastigiati, rigidi, ramosi, obtuse quadranguli vel subteretes, minutissime tomentelli rarius glabrescentes, 0.5-3.0 dm. longi, 0.3-1.2 mm. diametro; internodiis 0.3-1.4 cm. longis. *Folia* bina, decussata, erecta, interdum cauli arcte adpressa, rarius patentiora, rigida, cartilaginea, recta, lineari-subulata, 2-4 mm. longa, interdum 7 mm. raro 10 mm. attingentia, c. 0.3 (rarissime ad 1.0) mm. lata, apice obtusissima vel rotundata, costa robusta, laminae angustissimae margine deflexo, undique sparse tomentella vel glaberrima. *Stipulae interpetiolares* binae, basi foliis breviter connatae, forma foliis similes sed subduplo breviores. *Inflorescentiae* terminales, pauciflorae. *Flores* dioici: ♂ *receptaculum* minutum; *corollae* c. 2.3 mm. longae lobi anguste oblongi subacuti reflexo-patentes tubum cylindricum aequantes; *staminum* filamenta gracilia antheras lineari-oblongas subaequantia; *stylus* obsoletus; ♀ *receptaculum* reniforme c. 1 mm. latum; *corollae* c. 1.2 mm. longae lobi ovato-oblongi subobtusiusculi tubum breviter infundibularem paullo superantes; *stamina* fere obsoleta; *styli* robustiores altius connati corollam superantes, stigmatibus capitatis subglobosis. *Fructus* (vix maturi) nigri, subreniformes, c. 1.2 mm. longi, 2.0 mm. lati.

QUEENSLAND. ♂: Morven, Dec. 1890, F. M. Bailey; Stanthorpe, Nov. 1890, F. M. Bailey; ibid., Nov. 1904, J. L. Boorman (type); ibid., N.D., J. Davidson. ♀: Stanthorpe, N.D., J. Davidson.

NEW SOUTH WALES. ♂: Shoalhaven [River], W. Woolls.

Evidently near to the last two species, but quite distinct in having quaternate, not senate leaves, which are unequal in length, i.e. the interpetiolar stipules are here morphologically distinguishable from the true leaves. These organs are remarkably blunt, as though their tips had been worn off. They are cartilaginous in texture and shortly connate at the base. Though the general leaf-measurement is in the region of 3-5 mm. long, Bailey's specimen from Stanthorpe shows leaves 1 cm. in length. Our material is at present inadequate. It is remarkable that four out of the six specimens we have seen should all be from the same locality (Stanthorpe, Queensland, about 100 miles S.W. of Brisbane, close to the N.S.W. border). Of the remaining specimens one is from Morven, 350 miles N.W. in central Queensland, and the other from Shoalhaven, a river about 75 miles S.W. of Sydney, N.S.W.

12. *Asperula euryphylla* sp. nov. *A. Gunnii* Benth. Flor. Austr. iii. 445 (1866) p.p.?, non Hook. fil.

Herba perennis. *Radix* ignota. *Caules* adscendentes vel subscandentes, 2-3 dm. longi vel ultra, c. 1.0 mm. diametro, ramosi, quadranguli, ad angulos setulis minutissimis reflexis aspero-puberuli. *Folia* sena, patentia, obovata, subobtusata raro acuta, basi attenuata, 5-12 mm. longa, ad 5 mm. lata, pagina superiore marginem scabridulum reflexum versus hispidula, pagina inferiore glabra, costa media prominente setulis reflexis scabrida; internodiis 2-5 cm. longis. *Inflorescentia* cymosa, subramosa, terminalis. *Flores* dioici: ♂ 3-7 ad ramulos ultimos inflorescentiae subcapituliforme dispositi, pedicellis brevissimis; *receptaculum* parvum, semiglobosum; *corolla* infundibularis, tubo c. 1.5 mm. longo, segmentis patentibus, deltoideo-oblongis, c. 1.5 mm. longis, 1.0 mm. latis, acutis haud cuspidatis; *staminum* filamenta brevissima antheris ellipticis aequilonga; *styli* obsoleti: ♀ et *fructus* ignoti. VICTORIA. ♂: Dandenong Ranges, 1893, C. Walter (type); Dandenong, without collector's name or date (ex Nat. Herb. Vict., Melb., no. 28); Lilydale, Nov. 1885, A. H. Lucas.

var. *tetraphylla* var. nov.

Folia quaterna late elliptico-obovata, 7-8 mm. longa 4-5 mm. lata. SOUTH AUSTRALIA. ♂: Kangaroo Island, 1886, Otto Tepper.

var. *octophylla* var. nov.

Folia octona, oblonga vel suboblanceolata, 1-2 mm. lata, ad 9 mm. longa.

? VICTORIA. ♂: no loc., date or collector's name, ex Nat. Herb. Vict., Melb., no. 10, in Herb. Kew.

This species includes specimens with broader leaves than any others known from Australia. The number of leaves at a node ranges from four to eight; the breadth varies inversely as the number. The variety *octophylla*—unfortunately represented at present by a solitary specimen in Herb. Kew. from the National Herbarium of Victoria, Melbourne, without data of any kind—shows a very close approach to *A. Gunnii* Hook. fil. *A. euryphylla*, however, apparently always dries a light green, whereas *A. Gunnii* dries some shade of brown, generally very dark, indicating some biochemical difference between the two. Moreover we have seen no specimen of *A. Gunnii* with more than 6 leaves in a whorl.

13. *Asperula asthenes* sp. nov.

Herba perennis. *Radix* ignota. *Caules* subsimplices vel parte inferiore parcissime ramosi, graciles, flaccidi, subscandentes, 2-3 dm. longi (vel ultra?), vix 1 mm. diametro, quadranguli, laeves praeter angulos minutissime sparseque asperulos; internodiis 4-7 cm. longis. *Folia* bina, patentia, lineari-vel elliptico-oblanco-lata, 1.5-2.0 cm. longa, 2-4 mm. lata, vel obtusa submucronata

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vel subacuta, in petiolum c. 3 mm. longum sensim attenuata; pagina superiore et margine revoluta asperulis minutissimis sparsis obsita; pagina inferiore glaberrima, costa scabridula; nervi reticulati. *Stipulae interpetiolares* binae, forma foliis subsimiles longitudinis tamen tertiam partem vel duas partes solum attingentes. *Inflorescentia* terminalis, parce ramosa, cymosa. *Flores* dioici: ♂ diffusius dispositi, pedunculis pedicellisque evolutioribus gracilibus; *receptaculum* minutum; *corollae* tubo latiuscule infundibulari, 1 mm. longo, segmentis patentibus deltoideis subacutis trinerviis; *staminum* filamenta brevissima, antherae oblongae; *stylus* brevissimus simplex: ♀ subcapituliforme dispositi, pedunculis 1-7 mm. longis, pedicellis fere obsoletis; *receptaculum* subglobosum, laeve; *corolla* minuta 1 mm. longa, tubo cylindrico segmenta erecto-patentia obtusa aequante; *stamina* obsolescentia. *Fructus* ignoti.

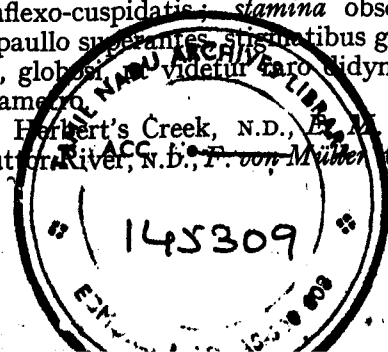
NEW SOUTH WALES. ♂: Wakivory Creek, Sept. 1897, J. H. Maiden. ♀: Bulladelah, Oct. 1923, Rev. H. M. R. Rupp (type).

A. asthenes is, as its name indicates, characterized by a weak stem with elongated internodes. The inequality in size of the leaves of each whorl is noticeable.

14. *Asperula Charophyton* sp. nov. *A. conferta* Hook. fil., var. *elongata* Benth. Flor. Austr. iii. 444 (1866); non F. M. Bailey Queensl. Flor. iii. 783 (1900).

Herba perennis, in siccitate plantam *Characeam* habitu revocans. *Radix* ignota. *Caules* suberecti, flexuosi vel substricti, 2-3 dm. longi, c. 1.0-1.5 mm. diametro, quadranguli, glabri vel minutissime aspero-puberuli; internodiis 2-7 cm. longis. *Folia* sena, lineari-loriformia, obtusa vel subacuta, 0.5-2.7 cm. longa, ad 1.5 mm. lata, basin versus sensim attenuata, flaccida, patentia vel erecto-patentia interdum recurva, utrinque glabra, margine plerumque revoluta rarius subplana. *Inflorescentiae* cymuli saepissime tres terminales subcapituliformes 2-6-flori e verticillo supremo cujusque ramuli orientes; cymulorum pedunculis 0.9-1.7 cm. longis, gracilibus, glabris vel minutissime puberulis. *Flores* dioici: ♂ pauci pedunculis gracilibus suffulti; *receptaculum* minutum; *corollae* tubus cylindricus 1 mm. longus, segmentis angustius oblongis apice inflexo-cuspidatis patentibus 1 mm. longis; *staminum* filamenta brevissima gracillima, antheris oblongis caducis; *stylus* obsoletus: ♀ confertiores, pedunculis brevioribus suffulti; *receptaculum* globosum; *corollae* perpaucae c. 1.0 mm. longae tubus brevissimus cylindricus ima basi constrictus segmentis suberectis apice inflexo-cuspidatis; *stamina* obsolescentia; *styli* recurvati corollam paullo superantes, stigmatibus globosis. *Fructus* brevissime stipitati, globosi, videntur raro didymi, atro-brunnescentes, 2-3 mm. diametro. QUEENSLAND. ♂: Herbert's Creek, N.D., E. D. Bowman; MacKenzie River and Suttor River, N.D., F. von Müller (type).

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NEW SOUTH WALES. ♂: Richmond, R. Brown [Iter Austr. 1802-5] 3497; ponds, Richmond, 1803, R. Brown [B.M.]; New England, N.D., C. Stuart. ♀: in a creek at Dovedale, 31 Nov. [sic!] 1807, G. Caley [B.M.]; nr. Tenterfield, N.D., C. Stuart; New England, without date or collector, 2 sheets in Herb. Kew. (ex Nat. Herb. Vict., Melbourne).

TASMANIA. ♂: River Severn, without date or collector, in Herb. Kew. (ex Nat. Herb. Vict., Melb.).

The general habit of this species, at any rate in the dried state, is strongly reminiscent of that of a Charophyte. The relatively long strap-shaped leaves are fairly constantly six at a node, the whorls being separated by internodes of rather varying lengths. We have so far seen no specimens from Victoria, but it is probable that the species occurs there as it is found in both New South Wales and Tasmania.

15. *Asperula gemella* sp. nov. *Galium geminifolium* F. von Müll. in Trans. Vict. Inst. [i.] 127 (1855); in Hook. Kew Journ. viii. 146 (1856); Plant. Vict. t. xxxi (1864-65). Miq. in Nederl. Kruidk. Arch. iv. 113 (1859). Benth. Flor. Austr. iii. 445 (1866). *Asperula geminifolia* F. von Müll. Key Syst. Vict. Pl. ii. fig. 75 (1885) (*non descr.*); *non* Fragn. Phytogr. Austr. v. 147 (1865-66).

Herba perennis. *Radix* (vel *caudex*) crassa, lignosa, 2-4 mm. diametro. *Caules* plurimi, gracillimi, flaccidi, ramosi plerumque dichotomi, decumbentes scandentes vel suberecti, quadranguli, glaberrimi, 2-6 dm. longi, 0.5-1.0 mm. diametro, basi lignescens repente in exemplari ♀ rubro-tincto vel potius -tingente; internodiis 2-8 cm. longis. *Folia* bina opposita, patentia vel reflexa, flaccida, anguste linearia, subacuta, basi subconnata, c. 5-15 mm. longa, 0.5-1.0 mm. lata, utrinque glabra, margine revoluta. *Stipulae interpetiolares* binae, lineares, foliis consimiles sed minores, c. 2-7 mm. longae vel ad dentes triangulares redactae vel omnino obsoletae. *Inflorescentiae* terminales et axillares, dichotomae, ramulis saepissime valde divaricatis, ultimis tenuissimis. *Flores* dioici, diffusi: ♂ pedicellis subcapillaceis breviusculis suffulti; *receptaculum* minutissimum; *corolla* infundibularis, tubo brevissimo, segmentis lineari-oblongis acutis patentibus c. 1.0 mm. longis, trinerviis, nervis lateralibus paene marginalibus; *staminum* filamenta tenuissima longiuscula, antheris parvis oblongis; *stylus* nullus: ♀ minuti, pedicellis quam in ♂ paullo robustioribus; *receptaculum* minutum (c. 0.5-1.0 mm. diam.) complanato-globosum; *corolla* primo cylindro-campanulata, deinde subrotata, c. 1.0-1.5 mm. longa, tubo brevissimo fere obsoleto, segmentis lineari-oblongis inflexo-cuspidatis acutis; *stamina* minutissima vel obsoleta; *stylus* breviter bifidus, corollam aequans vel paullo superans, stigmatibus majusculis ovato-globosis. *Fructus* mericarpi globosa, rugosa, nigra, 2-3 mm. diametro.

NEW SOUTH WALES. ♂: Lachlan River, 1828, F. von Müller; Warrego River, Sept. 1885, E. Bêche. ♂ and ♀: Darling River, N.D., *Victorian Expedition*.

VICTORIA. ♀: ad flumina Murray et Avoca, N.D., F. von Müller (type); Avoca, N.D., F. von Müller.

SOUTH AUSTRALIA. ♂: [not localised: ?Port Lincoln], N.D., Carl Wilhelmi.

The numerous stems of this species are by far the most conspicuous part of the plant.

It is separated from *A. geminifolia* F. von Müll., the only other Australian species with leaves in pairs, by the remarkably short corolla tube in the male flowers (as well as in the females). This fact led von Müller to describe this plant as a species of *Galium* under the name of *G. geminifolium* F. von Müll. Unfortunately this trivial cannot be retained owing to the existence already of the combination *A. geminifolia* which was attached to the above-mentioned distinct species by von Müller himself. The trivial *gemella* has been chosen as reminiscent of von Müller's trivial, and also as indicating the great resemblance between the two species.

The species is further distinguished from *A. geminifolium* by the remarkably divaricate branching of the stem and especially of the inflorescence, and also by the frequent development of the interpetiolar stipules. We have at present no record of *A. gemella* from Queensland, to which State *A. geminifolia* appears to be confined.

16. *Asperula geminifolia* F. von Müll. Fragn. Phytogr. Austr. v. 147 (1865-66); Key Syst. Vict. Pl. i. 291 (1887-88), *non fig.* Benth. Flor. Austr. iii. 443 (1886). F. M. Bailey, Queensl. Flor. iii. 782 (1900).

Herba perennis. *Rhizoma* ignotum. *Caudex* lignosus, c. 2 mm. diametro. *Caules* elongatissimi, subscandentes, flaccidi, tenues, parce ramosi, ad 7 dm. longi, c. 0.5 (numquam 1.0) mm. diametro, quadranguli, glaberrimi vel ad angulos sparse minute scaberuli; internodiis c. 5-12 cm. longis. *Folia* bina, patentia vel reflexa, rarius suberecta, flaccida, linearia vel lanceolato-linearia, acuta vel subobtusata, basi sensim attenuata, 0.5-3.0 cm. longa, 1-2 mm. lata, interdum ad 4.5 cm. longa, 4 mm. lata, glaberrima, raro costa marginibusque sparse scaberula, margine plana vel revoluta. *Stipulae interpetiolares* binae, minutae, dentiformes vel ad annulum foliorum bases conjungentem redactae. *Inflorescentiae* paucae, terminales, subcapituliformes, c. 6-florae, solitariae vel 2-3 umbellatae. *Flores* dioici, subsessiles: ♂ *receptaculum* minutum, didymum; *corollae* elongate infundibularis ad 3.5 mm. longae segmenta ovato-oblonga acuta subcallosa tubo duplo vel triplo breviora; *staminum* filamenta brevissima, antherae parvae anguste oblongae; *stylus* nullus; ♀ *receptaculum* subglobosum, c. 1 mm. latum; *corollae* c. 1.0-1.5 mm. longae tubus cylindricus segmentis callosis suberectis paullo longior vel subaequilongus; *stamina* minutissima;

stylis subrobusti, alte connati, corollam superantes, stigmatibus globosis. Fructus (?vix maturi) brunnescentes, rugosi, mericarpiis subglobosis, c. 1.5 mm. diametro.

QUEENSLAND. ♂: Indooroopilly, nr. Brisbane, 1908, C. T. White; "Southern Queensland", N.D., F. M. Bailey (incl. small fruiting branch). ♀: Brisbane River, New South Wales (sic!), Sept. 1828, A. Cunningham 153; on alluvial ground on the banks of the Brisbane River and Creeks falling into it, 1828, A. Cunningham; Burdekin [Riv.], N.D., Dr. Müller; "Queensland" & Connor's River, N.D., Bowman; prope Brisbane River, Australiae or., 1863-1865, Amalia Dietrich (ex mus. Godeff. Hamb.); Ipswich, 1909, T. F. Hall. Sex indet.: Wash Pool, Blackall, N.D., R. A. Ranking.

We have not seen an actual type specimen of this species. It appears to be confined to Queensland.

The interpetiolar stipules are never more than minute teeth and are frequently quite obsolete. The branching is much less conspicuously divaricate than that of *A. gemella*, the leaves are on the whole broader, and the tube of the male corollas is elongate-funnel-shaped.

**Asperula arvensis* Linn. Sp. Pl. 103 (1753). Boiss. Flor. Or. iii. 30 (1875).

NEW SOUTH WALES. Penshurst [nr. Sydney], Oct. 1909, E. Cheel.

Alien. Widely distributed and common in the Mediterranean Region from France, Spain and North Africa to Caucasus and Persia.

List of Identifications of Collectors' Numbers Quoted from Herb. Kew.

Adamson, F. M. 157 Melbourne, 9 Oct. 1853, *conferta*: 486 nr. Melbourne, 7 Sept. 1856, *wimmerana*, forma *glaberrima*.

Bauerlen, W. 548 Tingiring Mts., 1887, *pusilla*.

Brown, R. 3488 Derwent Riv. (Iter Austr., 1802-5), *subsimplex*: 3497 Richmond (Iter Austr., 1802-5), *Charophyton*.

Cabbage, R. H. 2223 Hunter R., Lochinvar, 24 Aug. 1909, *conferta*: 3017 Booroomba, Queanbeyan, 6 Nov. 1911, *scoparia*: 3302 Mt. Bimberi, Queanbeyan, 15 Jan. 1912, *Gunnii*.

Cunningham, A. 46 Field's Plains, May 1817, *Cunninghamii*: 47 Lachlan R., Apr. 1817, *Cunninghamii*: 86 Bathurst, Oct. 1822, *conferta*: 153 Brisbane R., "New South Wales", Sept. 1828, *geminifolia*.

Gunn, R. 159 no loc., 1835, *conferta*: 159 Launceston, 14 Oct. 1843, *conferta*: 407 no loc., 1835, *subsimplex*: 407 Circular Head, 25 Dec. 1837, *subsimplex* (type): 407 no loc., 1844, *subsimplex*: 407 Lake St. Clair, 13 Feb. 1845, *subsimplex*: 407 no loc. or date, *subsimplex*: 557 Hampshire Hills, Feb. 1837, *pusilla*: 557 St. Patrick's Riv., 16 Nov. 1844, *pusilla*: 557 no loc., 1844, *pusilla*: 557 Arthur's Lakes, 17 Jan. 1845, *pusilla*: 557 Hampshire Hills & Woolnorth, N.D., *pusilla*: 882 no loc. or date, *subsimplex*: 890 Woolnorth, 16 Oct. 1836 & 21 Sept. 1837,

conferta, var.? *abbreviata*: 891 Hampshire Hills, Feb. 1837, *pusilla* (type): 891 no loc. or date, *pusilla*: 892 Hampshire Hills, 1837, *Gunnii*, var. *curta*: 1123 Mt. Wellington, 31 Jan. 1840, *Gunnii*: (J. D. Hooker) 1123 Marlborough, 17 Oct. 1840, *Gunnii*: 1123 no loc., 1844, *Gunnii*: 1123 Arthur's Lakes, 17 Jan. 1845, *Gunnii*: 1124 Glen Leith, 14 Oct. 1840, *scoparia*: (M.B.) 1124 New Norfolk, 6 & 18 Nov. 1840, *scoparia*: 1125 Clarence Plains, 12 Oct. 1840, *conferta*, var.? *scoparioides*: 1251 Georgetown, 21 Nov. 1842, 9 Jan. 1843 & 1844, *minima*: "1251 or 557" Pt. Effingham, 3 Dec. 1841, *minima*.

Hooker, J. D. 1007 Lawrenny, N.D., *scoparia*: 1010 no loc. or date, *pusilla*: 1012 New Norfolk, N.D., *conferta*, var.? *scoparioides*.

Kendall, R. J. 76 Castlemaine, 15 Sept. 1860, *conferta*.

Lawrence. "9 & 115," no loc. or date, *conferta*: 115 no loc., 1831, *conferta* (lectotype): 242 Formosa, N.D., *subsimplex*: 326

Western Mountains, N.D., *scoparia*: 329 no loc. or date, *pusilla*.

Mitchell, T. L. 515 Camp 29, Aug. 1846, *conferta*, var.? *scoparioides*.

Mossman, S. 443 Port Philip, N.D., *conferta*, var.? *scoparioides*.

Müller, F. von. 172 Severn R., N.D., *subulifolia*.

Robertson. 694 Wendee (or Wando) R., 1 Dec. (or 12 Jan.) 1844, *subsimplex*, f.? *aquatica*.

White, C. T. 1747 Silverwood, Aug. 1922, *conferta*.

XVI.—AMOMUM MURICATUM. C. E. C. FISCHER.

In his monograph of the *Zingiberaceae* in Das Pflanzenreich, iv.: 46 (1904), K. Schumann described, on p. 256, a new species of *Amomum* under the name *A. Holmesii* and gave its locality as "Vorder-Indien: West Küste, in den Anamallay-Hügeln (Beddome)." Further, he stated that he found the specimens at the herbarium of the Pharmaceutical Society in London under the name of *Amomum cannaecarpum*, with which species its large appendaged connective did not agree.

By the courtesy of the Curator of the Pharmaceutical Society, Mr. T. E. Wallis, I have been able to examine the *Amomums* represented in the herbarium in question and did not find any specimens identified as *A. Holmesii* K. Schum. There are, however, three sheets of plants collected by Beddome in the Anamallay Hills which are inscribed in, apparently, Daniel Hanbury's handwriting as follows: 1, *Amomum aculeatum* Roxb. 2, *Elettaria cannaecarpa* Wight. 3, *Am. muricatum* Bedd. Mss.

There is also some material in spirit (spikes with flowers and fruit) of the same collection.

It is known that Beddome sent material of the *Amomums* and allies to D. Hanbury, who was making a special study of those genera.

The three sheets mentioned also bear a label printed with the words "Bearbeitet fur das Pflanzenreich," inscribed and initialed in Schumann's own writing as identified by him as *Amomum muricatum* Bedd.

The specimens of the Zingiberaceae in this herbarium were lent to Schumann for the preparation of his monograph.

It seems evident, therefore, that at some time Schumann had considered the three sheets mentioned to be Beddome's *A. muricatum* as described in the Madras Journal in 1864. Nevertheless, on page 238 of the monograph he has placed *A. muricatum* Bedd. among the "Species incertae sedis," merely quoting the Madras Journal but giving no description.

Beddome's description in the Madras Journ. Lit. and Sci. Ser. 3, vol. 1, p. 59 (1864), is as follows:—

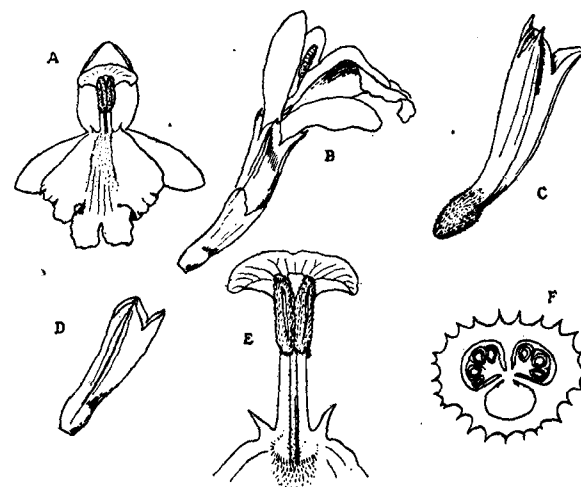
"*Amomum muricatum* (R.N.B.). 3-5 feet high, leaves broad-lanceolate, almost sessile from the apex of their sheaths which end in an entire ligula, and are furnished with a knob-like gland at the base of the very short petiole; leaves deep green shining, glabrous on both sides, 12 inches long 4 inches broad, spikes (at first appearing as a globular head) short-peduncled, radical, lower bracts small, pink, embracing the peduncle, upper ones crumpled, turning brown before the flowers expand, calyx double, the outer one tubular, shorter than the inner, 2 cleft at apex, inner one 3 cleft; exterior segments of corolla white to yellowish, lateral ones narrow, superior broad-ovate, not ending in a horn, lip deeply 3 parted, lower lobe protruded and emarginate, 2 spurred at the base, yellow with a broad streak of red spots, filament longish broad more than twice the length of the anther, anther-crest semilunar, very large, entire, yellow; scales of the germ 2 short and thick, the stigma rising up between them; capsule globular pink-coloured, size of a greengage, concave at the top, beset with numerous stout prickles. Anaimalais: moist forests, 2000 to 3000 feet."

This description agrees very well with the specimens, which differ slightly in the following respects: i. The leaves show a few rare hairs. ii. The leaves attain 16 inches in length. iii. The ligules occasionally are more or less 2-lobed and the knob-like gland on the petiole is not traceable. iv. The floral bract is either 2- or 3-lobed.

It is precisely in these same points that Schumann's description of *A. Holmesii* differs from the description of *A. muricatum* given above, though in addition there are other features mentioned by Schumann or Beddome on which the other is silent.

These considerations have led me to the conclusion that the two species are identical, and this being the case the older name must prevail for the species, namely *Amomum muricatum* Bedd. I am unable to suggest, however, how the confusion arose.

The accompanying figures are reproduced from drawings (by Beddome or D. Hanbury) attached to one of the sheets.



Amomum muricatum Bedd. A & B. whole flower, nat. size; C. calyx and ovary $\times 1\frac{1}{2}$; D. bract $\times 2$; E. base of lip and stamen $\times 2\frac{1}{2}$; F. section across fruit $\times 4$.

XVII.—NEW SPECIES FROM THE ANDES OF ARGENTINA: II.* N. Y. SANDWITH.

Mr. H. F. Comber's second expedition to the Andes covered an area lying considerably to the south of the ground which he had previously explored in the Territory of Neuquen. He took as his base the small town of San Martin de los Andes, which is situated at 40° S. at a height of about 2500 ft. on one of the numerous lakes running east and west on the eastern side of the frontier of Chile and Argentina. Leaving San Martin in November, 1926, Mr. Comber travelled north to Lago Lolog and Lago Huechulafquen, near which he crossed the frontier at 6000 ft. into the Chilean province of Valdivia and descended westwards to Lago Villarica. From here he turned south to the lakes of Calafquen, Neltume and Pirehuaico, recrossed the frontier and returned to San Martin in February, 1927. Almost immediately afterwards this circular itinerary was repeated, with considerable variations on the Chilean side. Mr. Comber also employed a native collector in the Zapala district, and many of the previous year's interesting plants were again found, including *Calceolaria poikilanthos*, which is locally abundant.

As with the first collection, only those specimens which are represented by seed numbers have been so far identified, and amongst these a few additional new species—all from Argentina—have been discovered. The descriptions of these new species are given below. A short paper on the species of *Viola* is being prepared by

*Continued from K.B. 1927, p. 188.

Dr. W. Becker. It is probable that the number of new species collected by Mr. Comber will be greatly increased when the whole of his collections has been worked out; but it is often difficult to assign definite and permanent names with any confidence, except in cases where the plants from this area are already represented at Kew by authentic material. At present the tendency in naming such plants is to attempt to match them with descriptions, allowing a considerable latitude for variation in characters the taxonomic value of which is uncertain. This course seems to be the least unsatisfactory. Many of Philippi's multitudinous types of Chilean species can be examined only at Santiago, whilst those of Argentina are scattered over the great herbaria of both hemispheres; and the over-hasty description of "new species" after so many expeditions to Argentina has led to confusion which is only too familiar to anyone who has worked on the flora of that country. It is not possible for botanists in either hemisphere to name collections from this area with any degree of accuracy and finality without paying lengthy visits to herbaria in other parts of the world.

Berberis lologensis *Sandwith* (*B. Darwinii* Hook. x *linearifolia* Phil.) hybr. nov. [Berberidaceae]; inter parentes crescens ac optime intermedia, *B. Darwinii* ramulis dense pilosulis, spinis ramulorum saepe 4-5-fidis, foliis plerisque spinoso-dentatis, inflorescentiis saepe racemosis; *B. linearifoliae* forma foliorum fructusque, inflorescentia pauciflora laxa proxima.

Ramuli annotini *B. Darwinii* sed minus teretes, parcius breviusque pilosuli. *Spinae* ramulorum 3-5-fidae, parte inferiore pilosulae, ad 7 mm. longae. *Folia* ramulorum hornotinorum obtriangularia vel rhomboideo-elliptica, fortiter irregulariter spinoso-dentata dentibus 3-6, aut linearia integra unove dente praedita, 2-4 cm. longa, cum dentibus 0.5-1.4 cm. lata. *Inflorescentia* nunc racemosa nunc umbelliformis nonnunquam etiam pedicello solitario e perula simul atque racemo surgente, pauciflora 3-4-flora; bractae ad 3.5 mm. longae; pedicelli 0.5-1.5 (vulgo circiter 1.2) cm. longi. *Flores* delapsi. *Fructus* ovoideus, saepius utrinque attenuatus, 7-9 mm. longus, ad 6 mm. diametro; stylus cum stigmate 3-3.5 mm. longus.

ARGENTINA. Lago Lolog, 40° S., February 20th, 1927, *Comber* 1061. "Three plants found growing with the other two species. Habit intermediate."

Menonvillea Comberi *Sandwith*, sp. nov. [Cruciferae-Lepidinaeae]; *M. patagonicae* Speg. forsan affinis, omnibus partibus multo majoribus praesertim pedicellis multo longioribus, floribus multo majoribus petalis sepala longe superantibus, siliquis majoribus pubescentibus optime differt.

Herba annua viridis hispida, radice deorsum ramoso-fibrosa apicem versus simplici crassiore circiter 3 mm. diametro, foliis radicalibus rosulatis coronata; caulis basi divaricate ramosus,

ramis 5-10 cm. longis, 1-1.5 mm. diametro axem centralem robustiorem ad 3.5 mm. diametro fere aequantibus vel etiam nonnunquam longe superantibus; rami omnes pilis albis tenuibus patentibus hirsuti. *Folia* radicalia dense conferta et persistentia, obovato-spathulata vel oblanceolata, versus apicem fortiter dentata vel fere pinnatifida, dentibus 2-3-jugis 1-5 mm. longis basi 2-4 mm. latis acutis dente terminali vulgo rotundato atque paulo latiore excepto, tum paulatim in petiolum laminiformem decrescentia, 1.5-4.5 cm. longa, apicem versus cum dentibus 0.6-1.4 cm. lata, mollia, utrinque ut caules hispida; folia caulina alterna saepe arcuato-falcata, radicalibus similia sed minora angustiora minus spathulata, ad 1.8 cm. longa, apice cum dentibus ad 0.6 cm. lata, dimidio superiore pinnatifida dentibus 1-3-jugis acutioribus saepe oppositis parallelisque 1-2 mm. longis. *Inflorescentiae* ramos terminantes dense corymboso-racemosae, 2-3.5 cm. diametro, fructiferae et praesertim ea axis centralis elongatae, floribus imis ex axillis foliorum superiorum surgentibus, ceteris ebracteatis; pedicelli 0.5-1.5 cm. longi, ut axis dense hirsuti. *Sepala* ovata obtusa, extra satis parce hispida, intus glabra, marginibus hyalinis, 3.5-4.5 mm. longa, ad 2.5 mm. lata. *Petala* magna alba spathulata unguiculata, 6.5-7.5 mm. longa, lamina 4-4.5 mm. lata. *Stamina* glabra cum antheris 3-4 mm. longa. *Ovarium* glabrum valvis scutatis 1.5 mm. longis atque latis; stylus crassus, cum stigmate ad 1.75 mm. longus, ad 1.2 mm. latus. *Fructus* distincte parce pubescens; valvae orbiculares 4-5 mm. longae, 4-4.5 mm. latae, dorso cum nervo medio distincto venisque radiantibus, marginibus alarum hyalinis 0.5 mm. latis; stylus cum stigmate 2 mm. longus.

ARGENTINA. Sierra Mamuil Malal, 40° S., 1650 m., December 29th, 1926, *Comber* 914. "Annual, growing in loose sandy soil in open places. Flowers pure white, sweet-scented. Leaves soft, greenish or reddish."

Oxalis Comberi *R. Knuth*, sp. nov. [Oxalidaceae]; *caudex* usque 15 cm. profundus, cortice brunneo obtectus, inferne 7 mm. crassus, repetite furcatus, superne caespitoso-ramosus, caespitem satis densum 10 cm. diametro efformans; ramuli reliquiis petiolorum emarcidis brunneis 6 mm. longis dense vestiti. *Folia* versus apices ramulorum dense congesta; petioli 1.5 cm. longi, 0.5-0.75 mm. crassi, pilis appressis obsiti; foliola 3 subsimilia, 3-4 mm. longa, 3 mm. lata, obtriangulo-cordata, antice usque ad quartam partem obcordato-incisa, lobulis rotundatis, breviter pilosa, margine anteriore carmineo-pustulata. *Flores* folia parum excedentes; pedunculi 2 cm. longi, 1-2-flori, pedicellis circiter 5 mm. longis, indumento aequali sicut petioli vestiti et eis aequicrassi. *Sepala* oblonga, pilosula, obtusa, exsiccata 4 mm. longa. *Corolla* usque ad tertiam partem inferiorem vel ad medium tubulosa, deinde late dilatata; petala e basi cuneata dilatata, exsiccata 1 cm. longa, antice plus minusve retusa, lutea, ad venas intense purpureo-notata. *Stamina* stylique dense puberula.

ARGENTINA. Chapelco Valley, 40° S., 660 m., December 15th, 1926, *Comber* 866 (type in Herb. Kew.). "Perennial, growing in sandy soil in full sun. Leaves dark green. Flowers yellow inside, lined with red outside. Makes patches twelve inches across. Common also in Cohunco."

This specimen was kindly examined by Dr. R. Knuth, who provided the above description. The affinity is with *O. erythrorrhiza* Gill.

Valeriana chionophila *Sandwith*, sp. nov. [Valerianaceae]; incertae sedis, *V. Foncki* Phil., *V. carnosae* Sm. vel *V. radicali* Clos fors. affinis, habitu radice insigni bracteis floribusque toto caelo differre videtur.

Herba perennis humilis glaberrima, more generis dioica, radice crassissima 1.2–2 cm. diametro foliis longe petiolatis scapisque floriferis folia paulo superantibus coronata. *Folia* radicalia petiolis purpurascensibus 4–5 cm. longis ad 2 mm. diametro suffulta, late ovata vel triangulari-ovata, apice obtusa, basi cuneata vel late obtusa fere truncata numquam cordata, 1.5–2 cm. longa, 1.2–2 cm. lata, laete viridia, carnosa, saepius per costam plicata, margine subcartilagineo irregulariter undulato-sinuato vel integro, costa nervisque primariis utrinque circiter 6 versus marginem rete venularum anastomosantibus subtus satis prominentibus. *Scapi* floriferi purpurascens ad 10 cm. alti, 2–3 mm. diametro, dimidio superiore uno pari foliorum spathulorum obtusorum circiter 2 cm. longorum, 7 mm. latorum, tum sub inflorescentiis ipsis duo paribus imbricatis foliorum minorum oblongo-ovatorum obtusorum sessilium circiter 1.2 cm. longorum 5 mm. latorum praediti. *Inflorescentiae* congeste corymbosae cymoso-thyrsoideae, 2–3 cm. longae, 2.5–3.5 cm. diametro, femineae pauperiores; bractee in pedunculis ramorum vel basi cymarum oblongae obtusae manifeste connatae, circiter 7 mm. longae, 3 mm. latae; bractee florum superiores conspicuae oblongae vel obovato-oblongae obtusae parvis minutissime ciliatae, 4–7 mm. longae, 1.5–2.5 mm. latae. *Corollae* pallide roseae. *Flores* ♂: corolla cum tubo circiter 5 mm. longa, lobis 1.75 mm. longis 1.5 mm. latis; stamina tubo 3 mm. supra basim inserta, parte libera cum antheris fere 3 mm. longa, igitur non longe exserta. *Flores* ♀: corolla cum tubo 3.5 mm. longa, lobis 1.5 mm. longis atque latis; stamina abortiva 1.2 mm. supra basim fere sessilia; stylus 3.5 mm. longus; ovarium glabrum, ad 2.5 mm. longum, 1.5 mm. latum. *Fructus* absens, teste lectore glaber atque papposus.

ARGENTINA. Cerro Colorado near Lago Lolog, 40° S., 1950 m., December 11th, 1926, *Comber* 861. "Perennial with big taproot. Dioecious, with shiny green leaves and purple stems. Flowers pale pink, sweet-scented. Usually found in the heavier soils near the snow."

This apparently belongs to the Section *Ewaleriana* Hoeck, and therefore—in spite of its root—has no affinity with the Section

Valerianopsis Wedd., series *Macrorrhizae* Briq. It is to be hoped that the characters of the fruit will be verified by cultivation.

Calceolaria cymbiflora *Sandwith*, sp. nov. [Scrophulariaceae-Calceolarieae]; veri similiter *C. lanceolatae* Cav. atque *C. chubutensi* Skotts. affinis, foliis supra plerumque glaberrimis margine pilis crispulis albis longiusculis multicellularibus vestito, scapis semper conspicue foliatis, floribus saepius duo e foliorum summo pari orientibus, sepalis magnis conspicuis, corollae labio inferiore majore postice apertissimo antice insigniter sursum arcuato inflexoque statim dignoscitur.

Herba perennis e radice surculos numerosos 2–3.5 cm. longos edens; surculi foliis rosulatis marcescentibus terminati e quibus surgunt scapi saepius complures foliati satis dense breviter albobipilosuli atque glandulosi 10–14 cm. alti. *Folia* basi scaporum compluribus paribus aggregata marcescentia, altius internodiis 1–2 cm. longis sejuncta, lanceolata apice obtusa in petiolum brevem attenuata vel fere sessilia, 2.5–3.7 cm. longa, 0.6–1.2 cm. lata, supra glabra nervis immersis, subtus dense breviter glandulosa nervosa, margine pilis albis longiusculis multicellularibus induta; folia superiora elliptica sessilia, 0.8–2.2 cm. longa, 0.3–0.8 cm. lata, indumento simili sed summa supra parce glandulosa; internodium summum 3.5–6 cm. longum. *Flores* scapos terminantes e summo foliorum pari solitarii vel saepius duo, pedicellis 3–6 cm. longis, in eodem scapo fere aequalibus vel eo floris lateralis nonnunquam multo brevior. *Sepala* magna conspicua, late ovata obtusa vel suborbicularia, dense breviter glandulosa, basi glabrescente multinervia excepta, 5–6.5 mm. longa, 3–5.5 mm. lata. *Corolla* magna speciosa, flavo-aurantiaca, intus maculata; labium superius glandulosum calyce brevius ad 5 mm. altum; labium inferius cymbiforme, extra satis dense glandulosum igitur pulvere adhaerente sordidum, late longeque apertum, siccitate ad 2 cm. longum, antice subito insigniter erecto-inflexum, ibi fere ad 1.5 cm. altum, 1.5–1.7 cm. latum (latitudine labii applanati aestimata).

ARGENTINA. Territory of Neuquen; Cerro Lotena, between Neuquen and Zapala, 900–1800 m., October 14th, 1925, *Comber* 82. "Perennial with creeping suckers from the sunny side of nearly all rocks, bushes and *Opuntia* clumps in exposed places, usually in sand, 4–8 in. high. Flowers orange-yellow, spotted inside. Leaves slightly hairy, often spotted. Good rock plant if hardy."

A very distinct and interesting species. The leaves are more spaced-out even than those of Cavanilles' much-maligned figure of *C. lanceolata*, and the true affinity remains doubtful. The correct application of the name *lanceolata* is a necessity for the determination of the species of this group, and it seems that Skottsberg's conception of it is the best. Specimens named by him *C. lanceolata* have been lately examined, as well as authentic examples of *C. acutifolia* Witasek, *C. mendocina* Phil., *C. chubutensis* Skotts., and *C. Bergii* Hieron.

XVIII.—MISCELLANEOUS NOTES.

We learn that the Director, who is on a visit to New Zealand on behalf of the Empire Marketing Board, has been made an Honorary Member of the New Zealand Institute.

The following appointments have been made by the Secretary of State for the Colonies :—MR. F. J. NUTMAN, B.Sc., A.R.C.S., Plant Physiologist, Amani Institute ; MR. W. O. SUNMAN, B.Sc., Assistant Agricultural Officer, Kenya ; MR. M. C. M. BRIDGES, Produce Inspector, Nigeria ; MR. J. W. WALLACE, B.Sc., Superintendent, Agricultural Department, Nigeria ; MR. H. MUSK, District Agricultural Officer, Tanganyika ; MR. F. G. HARCOURT (Curator and Agricultural Superintendent, Dominica) to be Superintendent of Agriculture, Grenada (*K.B.* 1920, p. 219).

Botanical Magazine.—Part ii of Vol. clii (1926) of the Botanical Magazine, which was published in January, 1928, contains the following illustrations :—

Venidium fastuosum Stapf (t. 9127)—a new combination for *Arctotis fastuosa* Jacq.—with large terminal heads of flowers whose ray-florets are orange with dark purple-brown bases, from Cape Colony and South-west Africa ; *Pleurothallis* (?) *ophiocephala* Lindl. (t. 9128), a species with four pollinia, grown at Kew from specimens received from Central America ; *Prunus* (*Cerasus*) *cantabrigiensis* Stapf (t. 9129), known only from cultivated specimens originally obtained from gardens in Canton ; *Celsia bugulifolia* Jaub. & Spach (t. 9130), with a curious yellowish-green corolla traversed by purple and green veins, from the Near East ; *Abelia triflora* R. Br. (t. 9131), a charming ornamental shrub with pink buds and white corollas, from the Western Himalaya ; *Rhododendron Kotschyi* Simonkai (t. 9132), a characteristic shrub with rose-coloured flowers, from the Transylvanian mountains ; *Erica pageana* L. Bolus (t. 9133), from Cape Province ; *Photinia prionophylla* C. K. Schneider (t. 9134), with corymbs of white flowers and crimson fruit, from Yunnan ; *Colchicum cilicicum* Dammer (t. 9135), a very handsome and freely flowering plant with large leaves, from Cilician Taurus at altitudes up to 2,200 m. ; *Calystegia tuguriorum* Hook. f. (t. 9136), from New Zealand, Chatham and Stewart Islands ; *Erythraea scilloides* Chaub. (t. 9137), a lovely little plant, first noticed in Pembrokeshire in 1918, and now added to the British flora ; *Primula pinnatifida* Franch. (t. 9138), a charming little Alpine plant with deep indigo blue flowers, from North-west Yunnan and Szechuan at altitudes of 3,500 to 4,500 m.

(159) Wt. 23/10 1m 3/28 S.E.R. Ltd. 6p. 9.

BULLETIN OF MISCELLANEOUS INFORMATION No. 4 1928 ROYAL BOTANIC GARDENS, KEW

XIX.—THE CORRECT SPELLING OF CERTAIN GENERIC NAMES. T. A. SPRAGUE.

The publication in *Kew Bull.* 1927, p. 320, footnote 2, of the statement that "*Mesembryanthemum* is the original and correct spelling of the name, not *Mesembrianthemum*," has evoked a letter of dissent from a correspondent, who pointed out that the historically earliest form of the name, as far as can be ascertained, was *Mesembrianthemum* Breyne, Prodr. fasc. rar. pl. secundus 67 (1689). This was accompanied by the explanation "sive Flos meridianus," so that there is no doubt that it was derived by Breyne from μεσημβρία noon, and ἄρθρον flower, in allusion to the fact that the flowers expanded at midday.

The name *Mesembrianthemum*, however, was rejected in favour of *Mesembryanthemum* by Dillenius, Cat. Pl. circa Gissam nasc., App. 148 (1719), who derived the latter from μέσος, medius, ἔμβρυον, tenellus fetus, and ἄθος, flos. Later on, Dillenius, Hort. Elth. 225, 226 (1732), explained his reasons for the change. He pointed out that the earliest name for the genus was *Ficoides* Herm. Hort. Acad. Lugd.-Bat. Cat. 244 (1687), *Mesembrianthemum* Breyne being two years later, and stated that of the two names he preferred the latter, but that it was unsuitable, as some of the species expand their flowers by night. He proceeded to suggest that one way out of the difficulty would be to split up the genus by excluding the night-flowering species, but that this would logically entail still further segregation, which would be inconvenient. He accordingly accepted the genus in a wide sense, but wrote its name *Mesembryanthemum* with a "y" in order to give it a different meaning and derivation from Breyne's *Mesembrianthemum* ("Quapropter ego quidem in uno *Mesembryanthemi* genere acquiesco, scribendo id per y, ut alius sensus et derivatio emergat. Flos nempe cui embryo est in medio").

Mesembryanthemum Dill. was thus not a new spelling of *Mesembrianthemum* Breyne, but a new name, with practically the same sound, it is true, and differing only in a single letter, but with an entirely different meaning.

Linné (Hort. Cliff. 221) adopted the name *Mesembryanthemum* from Dillenius, to the excellence of whose work he paid a high tribute. He regretted that it was unduly long, but justified its retention on the ground that no better synonyms were in existence (" *Ficoides* nomen absolute falsum et; *Mesembryanthemi* a tribus verbis graecis confectum et fere sesquipedale retineo cum Dillenio, cum quodammodo excusari queat, cumque synonyma meliora non prostant "). It is obvious that he had read the historical account of *Mesembryanthemum* given by Dillenius, and as he mentioned that the genus was unknown before the time of Hermann and Breynne he undoubtedly knew and rejected the name *Mesembrianthemum* Breynne. He consistently spelt the name of the genus with a "y" in the various editions of his *Systema Vegetabilium*, *Genera Plantarum*, and *Species Plantarum*, and, following Dillenius, derived it from μέσος and ἔμβρυον (Phil. Bot. 177).

Some botanists have considered that as the earliest spelling of the name was *Mesembrianthemum* (Breynne, 1689), this spelling should be retained under Art. 57 of the International Rules of Nomenclature: "The original spelling of a name must be retained, except in case of a typographic or orthographic error." Two arguments against this view may be brought forward.

(1) *Mesembryanthemum* Dill. was not a new spelling of *Mesembrianthemum* Breynne, but an entirely new name, and there is therefore no ground for altering it, since it was adopted by Linné in 1753 in preference to *Mesembrianthemum* Breynne.

(2) The words "original spelling" in Art. 57, taken in conjunction with Art. 19, under which the botanical nomenclature of Phanerogamae begins in 1753 (Linné, *Species Plantarum*, ed. 1), evidently mean the spelling when the name was first effectively published, that is, in 1753 or afterwards. Forms of spelling in vogue before 1753 are of significance only in so far as they may suggest that there was a typographic or orthographic error in the "original spelling." Two cases may be cited in support of this interpretation.

Briquet (Burnat, Fl. Alp. Marit. vi. 261: 1917) adopted the spelling *Elichrysum* Mill. (1754) in preference to *Helichrysum* Pers. (1807) on the ground that the former was the original spelling. He mentioned that both forms were etymologically admissible and were actually used in pre-Linnean works, so that there was no typographic or orthographic error in Miller's spelling.

Similarly Fawcett and Rendle (Fl. Jam. iii. 194) adopted the name *Annona* L., in preference to the historically earlier but pre-Linnean name *Anona*. The case is almost parallel to that of *Mesembryanthemum*. The original pre-Linnean spelling of the name was *Anona* from the vernacular name "anon" or "hanon" applied to one of the species, but Linné deliberately altered it to *Annona*, the addition of a single letter changing its meaning to "a year's produce."

It seems clear, therefore, that under International Rules, Art. 19 and 57, the correct spelling of the three generic names in question is *Mesembryanthemum* (not *Mesembrianthemum*), *Elichrysum* (not *Helichrysum*), and *Annona* (not *Anona*). Letters endorsing this conclusion have been received from Dr. John Briquet of Geneva, and Dr. Hans Schinz of Zürich.

XX.—THE GENUS *DICHAPETALUM* IN EAST, SOUTH TROPICAL, AND SUBTROPICAL AFRICA.

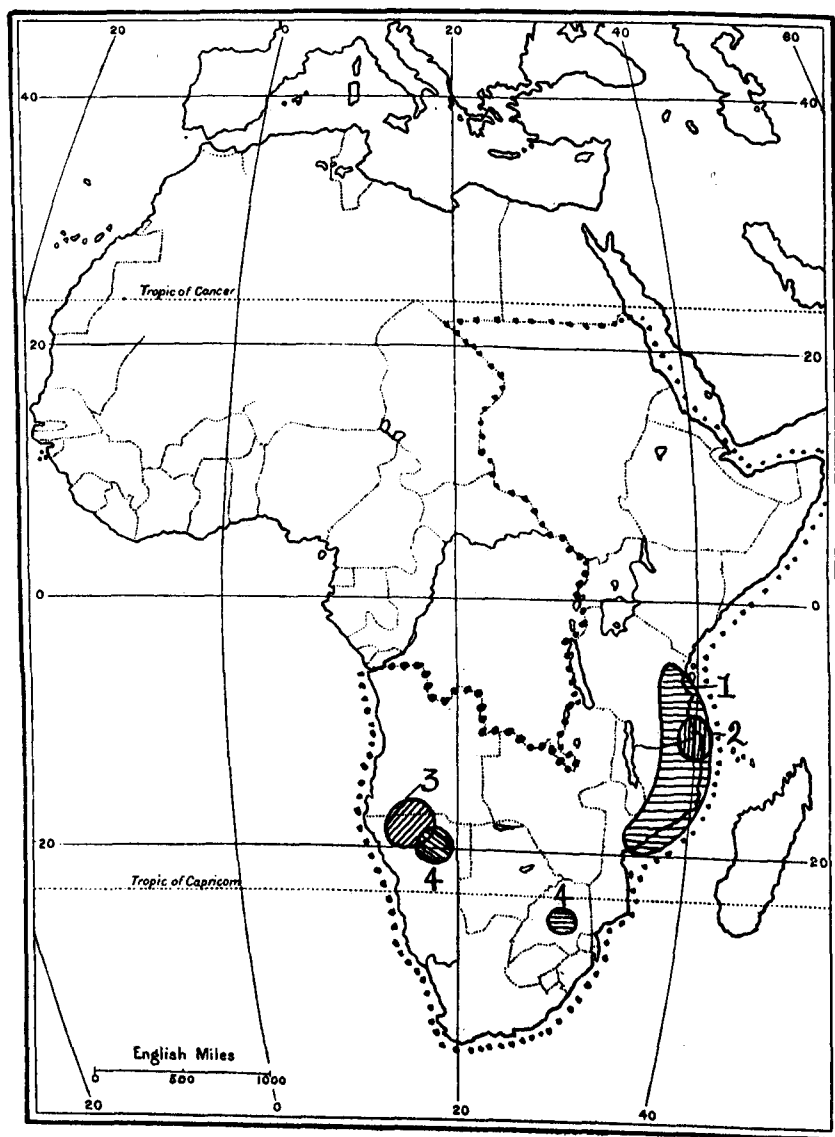
M. B. Moss.

The genus *Dichapetalum* is very richly represented in Tropical Africa, Engler¹ in 1912 enumerating as many as 117 species. The majority of these are found in the dense primæval forests of West Tropical Africa, from Sierra Leone to the Congo River. In the savannah or plateau region, however, they are much less numerous, and except in a very few cases the species in this area do not extend into the forests. Those from Upper West Tropical Africa have been revised in connection with the Flora of that region, and will appear in the next part² shortly to be published, whilst the species from the Cameroons and Congo have been enumerated recently by De Wildeman³. The present paper, therefore, deals with those species from East and South Tropical Africa, as shown in the accompanying map; but for convenience the only South African representative has also been included.

The work has been undertaken because of the importance of the genus to agriculturists, several species being reputed poisonous. In order to make it useful in the field, the more obvious vegetative features have been employed in framing the key, in preference to minute floral characters requiring observation under the microscope. In general the species are very limited in their distribution. The following are recorded as poisonous, further particulars concerning them being included under the description of each species, whilst their distribution is shown in the map:—*D. cymosum* Engl. (Transvaal and South West Africa), *D. venenatum* Engl. et Gilg. (Southern Angola and South West Africa), *D. macrocarpum* Engl., *D. mossambicense* Engl. and *D. Braunii* Engl. et Krause (East African Coast Region). In contrast to the poisonous properties of these species, it should be mentioned that at least one, *D. edule* Engl., is reputed to have an edible fruit.

Through the courtesy of the Director of the Berlin Botanic Gardens I have been able to examine certain types which were not represented at Kew or at the herbarium of the British Museum (Natural History). I am also indebted to Mr. J. Hutchinson for assistance.

¹Engl. Bot. Jahrb. 46: 562 (1912). ²Hutchinson & Dalziel, Flora of West Tropical Africa, Vol. I, Part ii, ined. ³Rev. Zool. Afr. Vol. 6, Suppl. Bot. (1919).



Map showing range of poisonous species of *Dichapetalum*; the area within the dotted line is the region dealt with in the present paper. 1, range of *D. mossambicense* Engl. 2, of *D. macrocarpum* Engl. and *D. Braunii* Engl. et Krause. 3, *D. venenatum* Engl. et Gilg. 4, *D. cymosum* Engl.

Key to the species.

Leaves thickly felted or woolly beneath at maturity :

Stipules pinnatipartite ; leaves cordate or subcordate at the base :

Peduncle adnate to the petiole ; branchlets with short crisped tomentum ; leaves obovate-oblong, tapering to a subcordate base ; venation not conspicuous below.....1. *angolense*.

Peduncle free from the petiole ; branchlets loosely villous ; leaves oblong-elliptic, distinctly cordate at the base ; venation very outstanding below :

Tomentum on under side of leaves short and woolly intermixed with a few long hairs.....2. *aureonitens*.

Tomentum on under side of leaves consisting of long hairs only with no woolly covering.....3. *mossambicense*.

Stipules entire ; leaves cuneate or only slightly cordate at the base :

Stipules very prominent, up to 1.5 cm. long, about 3 mm. broad at the base and tapering above ; inflorescence shortly pedunculate or subsessile :

Leaves sharply acuminate and mucronate at the apex, rounded at the base ; flowers nearly 1 cm. long.....4. *macrocarpum*.

Leaves at most obtusely pointed and mucronate at the apex, not apiculate, cordate at the base ; stipules smaller than in *D. macrocarpum* ; flowers only about 4 mm. long.....5. *edule*.

Stipules small and caducous ; inflorescence pedunculate ; petals much smaller than above :

Leaves cuneate at the base :

Leaves gradually long-cuneate at the base, long-petiolate ; stipules caducous.....6. *Stuhlmannii*.

Leaves shortly cuneate at the base ; petiole up to 7 mm. long ; stipules subpersistent.....7. *hypoleucum*.

Leaves rounded at the base, subsessile ; stipules not caducous... 8. *rhodesicum*.

Leaves glabrous or only slightly hairy at maturity :

Inflorescence shortly pedunculate or subsessile :

Peduncle adnate to petiole :

Pedicels short and stout ; flowers about 7 mm. long..... 9. *mombuttense*.

Pedicels very slender ; flowers 2 mm. long.....10. *Dummeri*.

Peduncle free from petiole :

Inflorescence compact and globose ; leaves rounded at the base ; indumentum on young stems fairly long...11. *Schweinfurthii*.

Inflorescence more loosely arranged than above ; leaves cuneate at the base :

Petals entire ; stems and under surface of the leaves glabrous ; leaves broadly elliptic, coriaceous.....12. *crassifolium*.

Petals bifid ; stems and leaves not glabrous ; leaves obovate-oblong, membranous :

Indumentum on under surface of leaves very slight, upper surface glabrous ; leaves cuneate at the base ; stems shortly hairy,:

Pedicels very short ; flowers in a cymule.....13. *Gossweileri*.
 Pedicels 1 cm. long ; flowers laxly fasciculate...14. *ugandense*.
 Indumentum on leaves fairly long ; leaves rounded at the base ; stems pilose.....15. *subsessilifolium*.
 Inflorescence distinctly pedunculate :
 Leaves subsessile, about 4 times as long as broad, venation very prominent ; stems short and subsimple from a woody rhizome :
 Stems and peduncles glabrous or nearly so.....16. *venenatum*.
 Stems and peduncles softly tomentose.....17. *cymosum*.
 Leaves petiolate, about twice as long as broad ; cymes and flowers shorter than above :
 Leaves usually cuneate at the base ; petiole about 1 cm. long :
 Leaves obovate, broadly rounded at the apex, with a short mucro.....18. *Ruhlandii*.
 Leaves elliptic, more or less distinctly acuminate :
 Petals entire ; leaves scarcely or shortly acuminate :
 Inflorescence both subsessile and pedunculate, up to 2.5 cm. long ; flowers about 2.5 cm. long ; leaves broadly elliptic.....12. *crassifolium*.
 Inflorescence only pedunculate, about 2 cm. long ; flowers about 6 mm. long, and not so densely arranged in *D. crassifolium* ; leaves not so broad ; and venation much more markedly reticulate than preceding.....19. *Braunii*.
 Petals bifid ; leaves usually distinctly acuminate ; inflorescence only pedunculate :
 Inflorescence lax.....20. *fructuosum*.
 Inflorescence more dense :
 Leaves rather broadly elliptic, cuneate to rounded at the base, venation conspicuous on both surfaces ; flowers 4-5 mm. long ; style exserted and shortly lobed.....21. *deflexum*.
 Leaves narrowly elliptic, cuneate at the base, venation hardly visible above ; flowers distinctly smaller than preceding :
 Style very short and lobed almost to the base ; peduncle and pedicels somewhat thick ; lateral nerves about 6 pairs.....22. *Eickii*.
 Style as long as the stamens, unequally and shortly bilobed ; peduncle and pedicels more slender than in preceding ; lateral nerves about 8 pairs.....23. *Wildemanianum*.
 Leaves rounded at the base ; petiole only about 2 mm. long :
 Inflorescence many-flowered ; peduncle up to 2 cm. long ; petals entire.....24. *umbellatum*.
 Inflorescence few-flowered ; peduncle rarely exceeding 1 cm. long ; petals bifid :
 Leaves at maturity glabrous above and almost so below, gradually acuminate ; stipules very small ; ovary pubescent.....25. *retroversum*.

Leaves at maturity hairy on both surfaces especially on the nerves and margin, scarcely acuminate ; stipules larger than preceding ; ovary with long woolly hairs.....21. *deflexum*.

1. ***D. angolense*** *Chod.* in *Bull. Herb. Boiss.* 3 : 672 (1895). *D. ferrugineo-tomentosum* *Engl. Bot. Jahrb.* 23 : 139 (1896).

A robust subscandent *shrub* ; branchlets with crisped brown indumentum ; internodes 5 cm. or more long. *Leaves* obovate to oblong, subtriangular-acute at the apex, rounded and asymmetric at the base, 10-17 cm. long, 4-7 cm. broad, sparsely hairy and becoming glabrous above except on the principal nerves, more densely hairy to almost velvety below ; lateral nerves about 8 pairs, immersed above, very prominent below, reticulations of tertiary nerves conspicuous ; petiole 1 cm. or more long, tomentose, caducous. *Cymes* much-branched, reaching half the length of the leaf when in fruit ; peduncle adnate to the petiole to within 5 mm. of the blade, tomentose ; bracts conspicuous, linear, up to 5 mm. long, tomentose. *Sepals* tomentose, about 2 mm. long. *Petals* bifid. *Fruit* slightly obovoid to almost globose, about 1.5 cm. diam., covered with brown indumentum intermixed with longer hairs.

ANGOLA. Golungo Alto : in primæval forests near Cacula and Cambondo, June, *Welwitsch* 4663 ! 4664 !

Extends to Cameroons Mt. and recorded from the Ivory Coast.

2. ***D. aureonitens*** *Engl. Bot. Jahrb.* 46 : 573 (1912). *D. mossambicense* *Engl. Pflanzenw. Ost-Afr. C* : 235, partly. *Chailletia mossambicensis* *Oliv. Fl. Trop. Afr. i* : 342, partly, not of Klotzsch.

Branchlets loosely villous with rusty brown hairs intermixed with a shorter indumentum. *Leaves* oblong to slightly obovate, tapering to a fine point at the apex, cordate at the base, 7-10 cm. long, 2.5-5 cm. broad, sparsely and adpressed-hairy on both surfaces, hairs more dense on the midrib, intermixed with a short woolly coating below ; lateral nerves about 7 pairs, impressed above ; petiole extremely short or absent ; stipules pinnatifid, about 1 cm. long, brown-villous. *Cymes* axillary, pedunculate, loosely branching, 4 cm. or more long, villous ; bracts linear, 0.5 cm. long, villous ; pedicels shortly hairy. *Sepals* oblong, 2 mm. long, white-woolly outside, glabrous and dark coloured inside. *Petals* about the same length as the sepals, obovate, bifid. *Stamens* twice the length of the petals. *Ovary* dense- and long-white-woolly ; style shorter than the stamens, stigmatic lobes short.

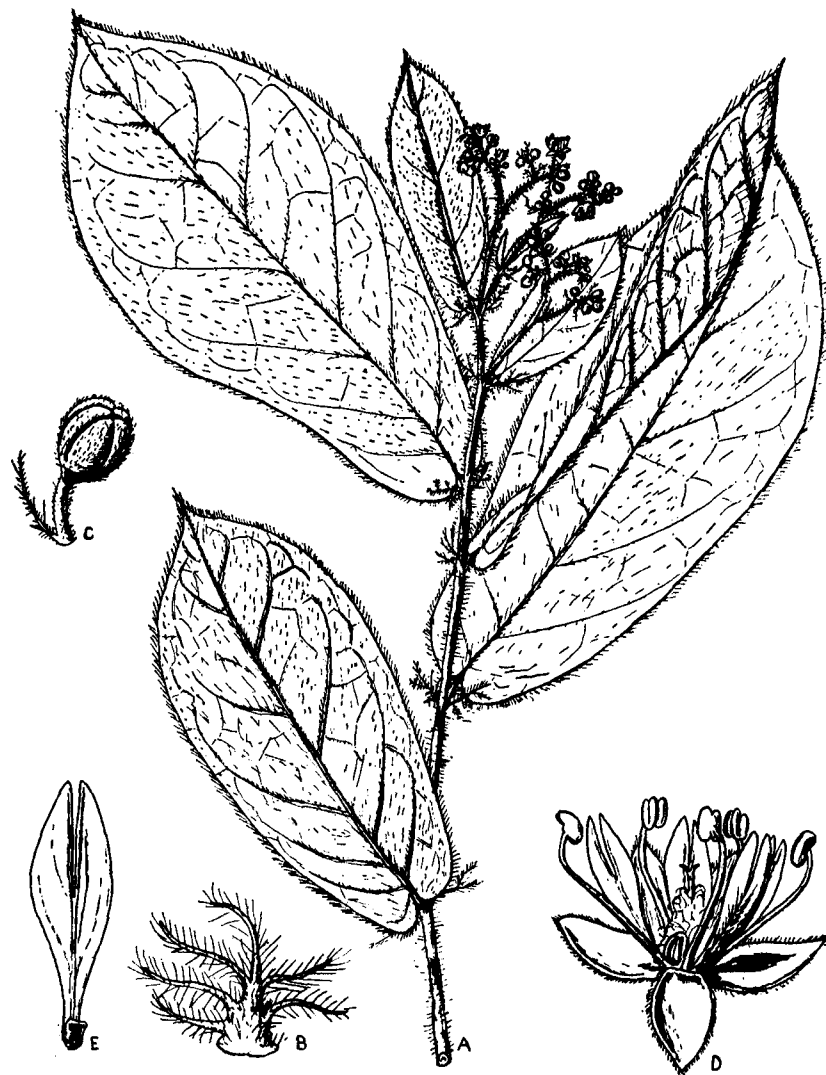
KENYA COLONY. Mt. Schimba, Mar., *Kassner* 180 !

TANGANYIKA TERRITORY. Usambara ; near Misosue, Feb., *Holst* 2218 ! Bagamoyo, May, *Stuhlmann* 7176 ! Usaramo, Feb., *Stuhlmann* 7150 ! Kilwa, Aug., *Kirk* ! N. Muera Plateau, *Busse* 2878. Rovuma River, 30 miles from the coast, Mar., *Kirk* !

PORTUGUESE EAST AFRICA. Hills at mouth of Msalu River, Oct., *Allen* 52 ! Jan., *Allen* 146 ! Mtamba, Nov., *Stocks* 64 !

3. *D. mossambicense* Engl. Pflanzenw. Ost-Afr. C : 235, partly (1895). *Chailletia mossambicensis* Klotzsch in Peters Mossamb. Bot. 108, t. 19 ; Oliv. Fl. Trop. Afr. i : 342, partly.

Branchlets loosely villous with long brown hairs intermixed with few short hairs. *Leaves* oblong-elliptic to slightly obovate, acute and long-mucronate at the apex, cordate at the base, 8-15 cm. long, 4-6.5 cm. broad, thinly pilose above, more densely pilose below ; lateral nerves about 7 pairs, impressed above, distinct below ; petiole about 4 cm. long, villous ; stipules pinnatipartite, about



Dichapetalum mossambicense Engl. A, flowering shoot. B, stipule. C, flower-bud. D, open flower. E, petal. (Except B adapted from Peters Mossamb. Bot. t. 19.)

1 cm. long, pilose, segments filiform. *Cymes* up to half as long as the leaves, pedunculate, villous ; pedicels 5 mm. long, woolly-pubescent. *Sepals* ovate, 2 mm. long, woolly-tomentose, reflexed in flower. *Petals* obovate, 4 mm. long, 2-lobed for about half their length, clawed at the base, distinctly veined. *Stamens* slightly longer than the petals. *Ovary* covered with very long woolly hairs ; style about 2 mm. long, glabrous, stigma shortly lobed.

TANGANYIKA TERRITORY. "Zanzibar Coast," Kirk ! Dar-es-Salaam, *Stuhlmann* 7468 !

PORTUGUESE EAST AFRICA. Sena, *Peters* (type) !

The vernacular names are "Chikwaya," "Chickwaya dume," "Mkwaya," "Nehenchure." According to Engler (Bot. Jahrb. 46 : 572) the fruit is a deadly poison and goats die of it. As *D. mossambicense* Engl. has been confused with *D. aureonitens* Engl., this remark may apply to the latter species.

4. *D. macrocarpum* Engl. Bot. Jahrb. 46 : 565 (1912).

Branchlets tomentose with spreading hairs ; lateral branchlets numerous ; internodes about 4 cm. long. *Leaves* elliptic to oblanceolate, sharply acuminate and mucronate at the apex, rounded at the base, often slightly unequal-sided, 6-14 cm. long, 2.5-5.5 cm. broad, glabrous above except for long hairs on the principal nerves, pilose below especially on the nerves and veins ; lateral nerves about 6 pairs, looped near the margin ; petiole up to 5 mm. long, pilose ; stipules entire, lanceolate, 1.5 cm. long, clothed with adpressed hairs especially on the outside, striate. *Cymes* subsessile, few-flowered ; bracts and bracteoles conspicuous ; bracts up to 5 mm. long, hairy ; pedicels about 2 mm. long, pilose. *Sepals* free almost to the base, 5 mm. long, hairy especially towards the base outside, glabrous within. *Petals* obovate, with clawed base, bifid for about $\frac{1}{4}$ their length, rounded at the apex, nearly 1 cm. long and 4 mm. broad, midrib marked. *Ovary* and lower part of the style with very long woolly hairs, stigma shortly lobed. *Fruit* 2-3-lobed, lobes rounded and often inconspicuous, about 2.5 cm. long, densely covered with long stiff hairs.

TANGANYIKA TERRITORY. Lindi district, in light dry *Brachystegia* forest, fr. June, *Busse* 2879 (type) !

PORTUGUESE EAST AFRICA. Msalu River, Jan., *Allen* 148 ! Mar., *Allen* 149 !

The vernacular name is "Chibwaya jika." According to Engler (l.c.) the fruit is a deadly posion.

5 *D. edule* Engl. Bot. Jahrb. 46 : 571 (1912).

Branchlets tomentose when young with dense rusty-brown hairs. *Leaves* elliptic, obtusely pointed and mucronate at the apex, rounded to subcordate at the base, 7-12 cm. long, 3-5 cm. broad, tomentose on both surfaces when young, more densely so below, becoming almost glabrous and glaucous above ; lateral nerves 6 pairs, widely

ascending; petiole not more than 4 mm. long, tomentose; stipules linear, up to 1 cm. long or more, tomentose. *Cymes* very shortly pedunculate or subsessile, tomentose. *Flowers* about 4 mm. long. *Sepals* tomentose outside, puberulous to almost glabrous inside. *Petals* obovate, clawed at the base, shortly bifid. *Ovary* and base of the style tomentose.

TANGANYIKA TERRITORY. Noto Plateau, in thick bush, fl. and fr. June, *Busse* 2928 (type)!

The vernacular name is "Mtosh." According to Engler (l.c.) the pericarp of the ripe fruit is eaten.

6. **D. Stuhlmannii** Engl. Pflanzenw. Ost-Afr. C: 235 (1895).

Branchlets pubescent with crisped yellow indumentum. *Leaves* obovate, obtuse at the apex, cuneate at the base, 7.5-8.5 cm. long, 2.5-4 cm. broad, pale on both surfaces with thin matted hairs above, more dense below; lateral nerves about 4 pairs, midrib impressed above, veins prominent on both surfaces; petiole 1 cm. long or more, pubescent, especially on the upper side; stipules narrowly lanceolate, up to 0.5 cm. long, tomentose. *Cymes* about 2.5 cm. diam.; peduncle up to 1 cm. long, tomentose like the pedicels, bracts and both surfaces of the sepals. *Flower* 0.5 cm. long. *Petals* obovate, apex bifid for less than 1 mm. *Filaments* of stamens flattened dorsi-ventrally, tapering above. *Ovary* tomentose; stigma shortly 2-3-fid.

TANGANYIKA TERRITORY. Usaramo, *Stuhlmann* 7145! 7146!

7. **D. hypoleucum** Hiern in Welw. Cat. i: 138 (1896).

Branchlets very shortly pubescent. *Leaves* elliptic or slightly obovate, long-acuminate, shortly cuneate at the base, about 15 cm. long and 6 cm. broad, dark green above and paler below with a close felt of woolly hairs; lateral nerves about 5 pairs, tertiary nerves lax and subparallel; petiole about 8 mm. long; stipules lanceolate, about 4.5 mm. long, persistent, glabrescent. *Inflorescence* very shortly pedunculate, subglomerate. *Pedicels* up to 5 mm. long. *Sepals* ovate, tomentose on the outside, about 3 mm. long. *Petals* bifid. *Fruits* globose, setose-tomentose.

ANGOLA. Without locality, *Welwitsch* 4667!

Also in French Cameroons.

8. **D. rhodesicum** *Sprague et Hutchinson* in Kew Bull. 1908: 433. *D. ellipticum* R.E. Fries Schwed. Rhod.-Kongo-Exped. i: 114, t. 12, fig. 10-12 (1914) (ex descriptione et icon.).

Branchlets densely tomentose with short brown hairs. *Leaves* oblong-elliptic, acutely acuminate, rounded at the base, 8-10 cm. long, 3-4.5 cm. broad, tomentose above, more densely so and paler below; lateral nerves about 4 pairs, slightly impressed below, marked on both surfaces by brown hairs like the leaf-margin; petiole up to 5 mm. long, brown-tomentose; stipules entire, linear, 6-7 mm.

long, tomentose. *Cymes* about 3 cm. long; peduncle brown-tomentose; pedicels about 2 mm. long, tomentose. *Sepals* ovate, 2 mm. long, pubescent outside, glabrous and dark coloured within. *Petals* about the same size as the sepals, pubescent outside, shortly clawed at the base and bifid at the apex. *Stamens* reaching to the top of the corolla, filaments thick, glabrous. *Ovary* densely villous; style reaching to the top of the petals, glabrous, stigma shortly bilobed.

RHODESIA. Gwaai forest, Jan., *Allen* 234 (type)! Sesheke District, *Macaulay* 86! North of Kasomo, climbing on trees, Sept., *Fries* 727. Kawendimusi, fr. Sept., *Fries* 727a.

From description *Fries' D. ellipticum* seems to be indistinguishable from this species. It is doubtful whether the climbing habit is of sufficient importance as a specific character, the habit being due perhaps to environment.

9. **D. mombuttense** Engl. Bot. Jahrb. 23: 135 (1896).

A shrub, 2 m. high; branchlets very thinly and shortly hairy, becoming glabrous. *Leaves* elliptic, obtuse at the apex, very shortly cuneate at the base, 10-11 cm. long, about 5 cm. broad, glabrous, except for a few hairs on the midrib above, shining; lateral nerves about 4 pairs, looped about 6 mm. from the margin, venation not very prominent on either surface; petiole 1-1.3 cm. long, as thick as the branchlets; stipules triangular, 1 mm. long, shortly hairy, obliquely inserted. *Cymes* loose-flowered, peduncle more densely hairy than the petiole and adnate to it to within 3 mm. of the blade; pedicels 3 mm. long, articulated and breaking off just below the flower; bracts minute. *Sepals* elliptic, 6 mm. long, thick, tomentellous outside. *Petals* narrowly obovate, bifid with rounded lobes, exceeding the sepals by 1 mm., puberulous outside, glabrous inside with a narrow wing down the centre for about half the length. *Stamens* 5, as long as the petals, filaments flattened dorsi-ventrally and 1 mm. broad at their base. *Ovary* pubescent; style scarcely exceeding the stamens in length and with a few ascending hairs, stigma shortly trifid with recurved lobes.

EASTERN SUDAN. Mombuttu Country; Munza, Mar., *Schweinfurth* 3454 (type)!

Also in Portuguese Congo (*Gossweiler* 6282).

10. **Dichapetalum Dummeri** M. B. Moss, sp. nov., foliis obovato-ellipticis, pedunculo petiolo adnato, floribus minimis fasciculatis distincta.

Small tree 10 m. high; branchlets flexuose, lenticellate. *Leaves* obovate-elliptic, obtusely acuminate, subacute at the base, 4-7 cm. long, 2.5-4 cm. broad, pubescent on the nerves below; petiole very slender, about 7 mm. long. *Flowers* fasciculate, 2-3 mm. long; peduncle adnate to the petiole its full length. *Sepals* small, united into a campanulate tube. *Petals* lobed for half their length, rather thick. *Ovary* globose, glabrous; style slender, stigma bifid.

UGANDA. Mabira, forest edge at Mulange, 1300 m., flowers white, fragrant, Sept., *Dummer* 4469 (type)! Jan., *Dummer* 3974!

11. **D. Schweinfurthii** Engl. Bot. Jahrb. 23: 140 (1896).

Branchlets loosely villous with spreading ferruginous hairs mixed with short stiff indumentum. *Leaves* obovate to oblong, abruptly and sharply acuminate, rounded at the base, frequently asymmetric, 10–16 cm. long, 3–6 cm. broad, shining above, glabrous except on the principal nerves with a few adpressed hairs especially on the nerves below; lateral nerves about 6 pairs, ascending at a wide angle and looped well within the margin, impressed above, distinct below; petiole up to 4 mm. long, pilose like the stem and midrib; stipules linear-subulate, about 6 mm. long, pilose. *Cymes* forming dense subsessile globose clusters about 1.5 cm. diam. *Sepals* ovate, 3.5 mm. long, connate for $\frac{1}{2}$ their length, pubescent outside and glabrous within. *Petals* exceeding the sepals, narrowly obovate, bifid for nearly half their length. *Stamens* the same length as the petals, filaments flattened. *Ovary* pubescent; style exerted for about 2 mm., stigma 2–3-fid. *Fruit* globose, about 1.3 cm. diam., covered with brown velvety tomentum, irregularly ridged.

EASTERN SUDAN. Niamniam Country; on the Mbrwole, Mar., *Schweinfurth* 3152! Mombuttu; Munza, Mar., *Schweinfurth* 3465! On the Kusumbo, Apr., *Schweinfurth* 3637! Lado; Yei River, fr. Oct., *Sillitoe* 386!

12. **D. crassifolium** Chod. in Bull. Herb. Boiss. 3: 672 (1895).

A robust scandent *shrub* with spreading branches; branchlets glabrous, with numerous small lenticels. *Leaves* broadly elliptic, shortly and bluntly acuminate, very shortly cuneate at the base, 11–15 cm. long, 5–8 cm. broad, glabrous, coriaceous; lateral nerves about 4 pairs looped well within the margin; petiole thick, up to 1 cm. long; stipules caducous. *Inflorescence* a dense many-flowered axillary cyme, both sessile and pedunculate, up to 2.5 cm. long; pedicels about 2.5 mm. long. *Sepals* lanceolate, concave, as long as the pedicels, tomentellous on the outside. *Petals* not exceeding the sepals, obovate, entire at the apex. *Stamens* about 1.5 mm. long; anthers equalling the filaments in length. *Ovary* pubescent; style short, stigma shortly lobed. *Fruit* laterally flattened, orbicular-rhomboid, 2.5 cm. diam., beaked by the excentric style, softly tomentose, the calyx and corolla persistent in fruit.

ANGOLA. Cazengo: in primæval forest of Cabondo, fl. and fr. in June, *Welwitsch* 4665! Pungo Andongo: in shady places among rocks by thickets, young fr. in Nov., *Welwitsch* 4666!

13. **D. Gossweileri** Engl. Bot. Jahrb. 46: 586 (1912).

Branchlets slender, striate, puberulous with prominent white lenticels, ultimate branchlets forming an angle of 90°. *Leaves* oblong to slightly obovate, acuminate at the apex, shortly cuneate at the base, 10–12 cm. long, about 5 cm. broad, glabrous above and below except for a slight hairiness on the principal nerves; lateral veins 4 or 5 pairs, very prominent on the lower surface, looped well within the margin; petiole 0.5–0.9 cm. long, puberulous; stipules

caducous. *Cymes* small, densely flowered and shortly pedunculate, puberulous; pedicels jointed just below the flower. *Calyx* campanulate, 3 mm. long, divided to the middle, glabrous within. *Petals* twice as long as the sepals, 2-lobed for over half their length. *Stamens* twice as long as the petals. *Ovary* densely pilose; style pilose at the base, stigmatic lobes spreading. *Fruit* obovoid, with a lateral style, velvety-puberulous, about 1.5 cm. long.

ANGOLA. Cazengo, *Gossweiler* 585!

14. **Dichapetalum ugandense** M. B. Moss, sp. nov., affinis *D. Gossweileri* Engl., sed floribus fasciculatis, pedicellis longioribus differt.

A tree, 30 ft. high; branches pubescent, marked with rather large lenticels, lateral branchlets spreading at an angle of 90°. *Leaves* elliptic to slightly obovate-elliptic, shortly acuminate at the apex, cuneate at the base, 7–8 cm. long, 3–3.5 cm. broad, tomentose on the nerves on the lower surface; lateral nerves about 6 pairs; petiole about 5 mm. long, tomentose; stipules entire, linear, 2 mm. long, tomentose. *Flowers* white, few, in axillary fascicles; pedicels 1 cm. long, tomentose; bracts very small, situated about half-way up. *Sepals* 3 mm. long, grey-tomentose on the outside, glabrous and dark coloured within. *Petals* slightly exceeding the sepals, bifid for about half their length. *Ovary* tomentose; style 5 mm. long, stigma very shortly lobed.

UGANDA. Mukoro, forest, 1300 m., Oct., *Dummer* 292! (type), May, *Dummer* 2445!

15. **D. subsessilifolium** Chod. in Bull. Herb. Boiss. 3: 671 (1895).

A widely climbing slender evergreen *shrub*; branchlets villous with spreading ferruginous hairs intermixed with short white tomentum. *Leaves* obovate-elliptic, shortly acuminate and mucronate at the apex, rounded and markedly asymmetric at the base, about 12 cm. long, 5–6 cm. broad, papery-coriaceous, hairs on the midrib above, on all the nerves below; lateral nerves about 6 pairs, prominent on the lower surface; petiole barely 3 mm. long, villous; stipules subulate, 6 mm. long, villous. *Inflorescences* forming sessile axillary clusters; bracts lanceolate, villous, up to 2 mm. long; pedicel about 1 mm. long, pilose. *Sepals* oblong, connate into a cup below, 2 mm. long, pubescent on the outside with a tuft of longer hairs at the apex. *Petals* narrowly lanceolate, about 4 mm. long, 2-lobed at the apex for nearly 2 mm. *Stamens* as long as the petals, filaments broad at the base and tapering to the small rounded anthers. *Ovary* rounded and pilose above; style glabrous, as long as the stamens, stigmatic lobes spreading.

ANGOLA. Golungo Alto: in primæval forest of Serra de Alto Queta, May, *Welwitsch* 469!; in very dense woods of Sobato de Quilombo-Quiacatubia, *Welwitsch* 3018! 3019! 4662! 4697! 6718!

16. *D. venenatum* Engl. et Gilg. in Warb. Kunene-Sambesi Exped. 280 (1903).

Stems simple from a creeping woody rhizome, glabrous, striate. *Leaves* subsessile, narrowly oblong to oblanceolate, rounded and minutely mucronate at the apex, narrowed at the base, 6.5 to about 10 cm. long, 2.5 cm. broad, papery when young, glabrous on both surfaces, paler green below; lateral nerves about 6 pairs, tertiary nerves markedly reticulate and outstanding below; stipules linear,



Dichapetalum venenatum Engl. et Gilg. A, flowering shoot. B, leaf (enlarged). C, flower-bud. D, petal. E, stamen. F, pistil.

2 mm. long, pilose. *Cymes* about 8-flowered, up to 4 cm. long; peduncles glabrous or sparsely hairy, partially adnate to the stem for about 5 mm. above the axil; pedicels 6 mm. long; bracts similar to the stipules but shorter. *Sepals* 7 mm. long, narrow, free almost to the base, tomentose at the apex becoming glabrous towards the base. *Petals* as long as the sepals, narrow, bifid for $\frac{2}{3}$ their length, prominently 3-nerved at the base, glabrous. *Stamens* reaching to the top of the petals; filaments flattened with membranous edges. *Style* about 6 mm. long, unequally bilobed for about 2 mm., villous in the lower part and on top of the ovary.

ANGOLA. Between Ediva and Humbe, 1200 m. alt., in sandy places, Sept., Baum 64 (type)!

SOUTH WEST AFRICA. Owamboland; near Gaub, fr. July, Schmidt!

The vernacular name is "Machau." According to Baum (l.c.) this species is a deadly poison, a few fresh leaves being fatal to cattle. The fruit is also poisonous although some kaffirs are able to eat the exocarp without ill effects.

17. *D. cymosum* Engl. in Engl. & Prantl, Pflanzenf. 3: 4, 349 (1890). *Chailletia cymosa* Hook. Ic. Pl. t. 591 (1843).

Stems subsimple, up to 12 cm. high, from a woody rhizome, softly tomentose especially at the base. *Leaves* subsessile, oblong-oblanceolate, rounded and slightly mucronate at the apex, obtuse or subacute at the base, 6-12 cm. long, 2-3.5 cm. broad, closely reticulate on both surfaces, glabrous; lateral nerves about 6 pairs, prominent on both surfaces; stipules linear-subulate, 4-5 mm. long, pubescent. *Cymes* towards the base of the stem, softly tomentose. *Sepals* oblong-oblanceolate, 6-7 mm. long, pubescent. *Petals* divided $\frac{1}{2}$ their length, glabrous. *Style* divided to below the middle, hairy in the lower part and on the ovary.

TRANSVAAL. Aapies River, Oct., Burke! Zeyher 536! Rehmann 4338. Meintjes Kop, Oct., Pole Evans! Premier Mine, Sept., Rogers 14781! Near Pretoria, Sept., Bolus 7696! Near Rustenburg, Mar., Brock in Herb. Macowan 1418. Between Silverton and Hatherly, Oct., Phillips 3039.

SOUTH WEST AFRICA. Between Grootfontein and the Okavango River, Sept.-Oct., Schmidt 5906! 5907!

Poisonous to stock and known in South Africa as the Gift-blaad or Gift-blaar (see Burt Davy in Kew. Bull. 1925, p. 37, and Phillips in Bot. Surv. S. Afr. 9: 14, pl. 8 (1926)).

18. *D. Ruhlandii* Engl. Bot. Jahrb. 34: 152 (1904).

Small tree up to 5 m. high; branchlets shortly tomentose when young, becoming glabrous. *Leaves* obovate-elliptic, broadly rounded to slightly emarginate at the apex, sometimes with a short mucro, very shortly and abruptly cuneate at the base, about 10 cm. long and 6 cm. broad, glabrous on both surfaces, shining; lateral nerves 4-5

pairs, impressed above, prominent below, tertiary nerves distinctly reticulate; petiole about 1 cm. long; stipules caducous. *Cymes* pedunculate, about 3 cm. long, densely flowered, velvety tomentose; peduncle 1.5 cm. long or more. *Sepals* oblong, 2-3 mm. long, tomentellous on the outside. *Petals* about the same length, shortly bifid. *Stamens* slightly exceeding the petals in length. *Ovary* puberulous; style about 4 mm. long.

TANGANYIKA TERRITORY. East Usambara: in dry forest in upper Lungusa, Sept., Engler 419 (type)!

19. **D. Braunii** Engl. et Krause in Engl. Bot. Jahrb. 51: 451 (1914).

Shrub; branchlets sparsely pubescent, striate. *Leaves* oblanceolate to elliptic, gradually and shortly acuminate, very shortly cuneate to almost rounded at the base, 6-10 cm. long, 3-4 cm. broad, glabrous on both surfaces except for a few hairs on the nerves; lateral nerves 5-6 pairs, midrib impressed above, very conspicuously reticulate especially on the lower surface; petiole up to 5 mm. long; stipules entire, linear, about 3 mm. long, tomentose, caducous. *Cymes* shortly pedunculate, up to 2 cm. long; peduncle and pedicels sparsely and very shortly hairy; bracts like the stipules but smaller. *Sepals* oblong, 6 mm. long, connate for about $\frac{1}{2}$ their length, puberulous. *Petals* 6 mm. long, narrow, entire. *Stamens* about the same length as the petals, anthers small and globose. *Ovary* puberulous, style slightly exceeding the petals, stigma shortly 2-3-fid.

TANGANYIKA TERRITORY. Lindi district; Mtua, June, Braun 606!

The vernacular name is "Nchenchere" (Braun). According to Engler & Krause (l.c.) this species is very poisonous.

20. **D. fructuosum** Hiern in Welw. Cat. 1: 138 (1896).

A scandent *shrub*; branchlets glabrescent, the younger stems puberulous. *Leaves* elliptic, acuminate with obtuse apex, cuneate at the base, 5-10 cm. long, 2-5 cm. broad, coriaceous, glossy and subglaucescent on both surfaces; petiole about 5 mm. long; stipules subulate, deciduous. *Inflorescence* lax, axillary and subterminal. *Peduncle* about 2.5 cm. long. *Fruit* oval, somewhat compressed, about 1.5 cm. long, shortly and closely hairy.

ANGOLA. Cazengo: in virgin forest near Cabondo, young fr. in June, Welwitsch 1233 (type)!

21. **D. deflexum** Klotzsch in Peters Reise Mossamb. Bot. 109, t. 20 (1861); Schnizlein Icon. 4: t. 240.

Shrub up to 2 m. high; branchlets tomentose when young, becoming glabrous. *Leaves* elliptic or ovate-elliptic, acutely acuminate, rounded to shortly cuneate and frequently asymmetric at the base, 5-8 cm. long, 3-5 cm. broad, inconspicuously hairy on both surfaces, becoming glabrous; lateral nerves about 5 pairs,

tertiary nerves markedly reticulate above and below; petiole about 5 mm. long, tomentose; stipules linear, 3 mm. long, tomentose. *Cymes* small and dense, 1-2 cm. long, pedunculate, tomentose; pedicels about 2 mm. long, puberulous. *Sepals* elliptic, 3 mm. long, tomentellous outside, glabrous within, reflexed in flower. *Petals* slightly longer than the sepals, less than 1 mm. broad, bifid for about $\frac{1}{2}$ their length, puberulous outside. *Stamens* slender, 3 mm. long; anthers very small, filaments glabrous. *Ovary* tomentose; stigma shortly 2-3-lobed. *Fruit* rounded or obscurely 2-3-lobed, obtusely apiculate, 1.5 cm. diam., symmetric or slightly excentric, velvety-tomentose, smooth or with reticulate ridges.

TANGANYIKA TERRITORY. Bagamoyo, Oct., Kirk! Dar-es-Salaam, Nov., Kirk 125! Amboni, Holst 2700!

PORTUGUESE EAST AFRICA. Cabaceira Peninsula, Peters (type)!

22. **D. Eickii** Ruhl. in Engl. Bot. Jahrb. 33: 80 (1902).

Shrub; branchlets pubescent, becoming glabrous, lenticels fairly numerous on older specimens. *Leaves* oblong-elliptic, gradually acuminate at the apex, cuneate at the base, 6-10 cm. long, 2-4 cm. broad, glabrous except for a few hairs on the midrib on both surfaces; lateral nerves 5-7 pairs, hardly visible above, fairly prominent below, midrib impressed above; petiole sparsely hairy when young, becoming glabrous, about 5 mm. long; stipules caducous. *Cymes* pedunculate, branched, about 2 cm. long; peduncle, pedicels and calyx-lobes covered with brown tomentum. *Flower-buds* globose. *Sepals* with a distinct groove down the middle. *Flowers* not more than 3 mm. long. *Petals* broadly obovate, bifid for about $\frac{1}{2}$ their length. *Stamens* about 1.5 mm. long; filaments rather thick. *Ovary* tomentose; style very short, 2-3-fid almost to the base. *Fruit* obovoid, about 2 cm. long and 1.5 cm. broad; style excentric, brown-tomentose, verrucose.

TANGANYIKA TERRITORY. Usambara: Kwai, Eick 132 (type)!

23. **D. Wildemanianum** Exell in Journ. Bot. 1927, Suppl. Polypet. 66.

Branchlets glabrescent. *Leaves* elliptic, gradually and sharply acuminate at the apex, cuneate at the base, about 6 cm. long and 2.5 cm. broad, glabrous on both surfaces, membranous; lateral nerves about 8 pairs ascending at rather a wide angle, tertiary nerves reticulate, venation not conspicuous; petiole about 3 mm. long, sparsely and shortly hairy; stipules caducous. *Inflorescence* pedunculate, about half the length of the leaves; peduncle 1.5 cm. long, puberulous. *Flowers* about 3 mm. long. *Sepals* oblong, grey-tomentose on the outside, glabrous and dark coloured within. *Petals* obovate, shortly bifid. *Stamens* exceeding the petals in length. *Ovary* woolly-tomentose; style as long as the stamens, stigma unequally bilobed.

ANGOLA. Primæval forest near the Villa Sange, Golungo Alto, fl. Oct., Gossweiler 4387! Between Monte Bello and Queta Railway Station, fl. Nov., Gossweiler (without number)!

24. *D. umbellatum* Chod. in Bull. Herb. Boiss. 3: 671 (1895).

A tall climbing shrub with long rambling branches; branchlets tomentose when young, becoming pubescent to almost glabrous; internodes up to 5 cm. long. Leaves elliptic to oblong, acutely and sharply acuminate, rounded at the base, 6-10 cm. long, 2.5-5 cm. broad, pubescent on both surfaces when young, becoming almost glabrous above except on the principal nerves; lateral nerves about 5 pairs, impressed above, petiole 2 mm. long; stipules subulate, 2 mm. long, pubescent, persistent. Cymes 2 cm. long; peduncle pubescent; bracts similar to stipules, bracteoles situated just beneath the flower; pedicel up to 3 mm. long, pubescent. Sepals broadly lanceolate, 2 mm. long, grey-tomentose on the outside, glabrous and dark-coloured inside. Petals as long as the sepals, linear, entire with truncate apex. Stamens exserted. Ovary and style glabrous.

ANGOLA. Golungo Alto: dense virgin forest at Capopa, Mar., Welwitsch 4651! 4652! 4653! 4654!

25. *D. retroversum* Hiern in Welw. Cat. 1: 139 (1896). *D. parvifolium* Engl. Bot. Jahrb. 23: 136 (1896).

Climber; branchlets slender, somewhat straggling, striate and covered with brown pubescence, the lateral spreading almost at a right angle. Leaves lanceolate to elliptic, gradually acuminate at the apex, mucronate, rounded and sometimes slightly asymmetric at the base, very variable in size from about 4-8 cm. long, 1.5-2.5 cm. broad, glabrous above, a few hairs on the principal nerves below; lateral nerves 4-5 pairs, broadly ascending and looped about 1 mm. from the margin, conspicuous below; pedicels up to 2 mm. long, pubescent; stipules linear, about 1.5 mm. long, pubescent. Flowers umbellate, few, up to 2 cm. long; peduncle, pedicels, bracts and outer surface of sepals covered with grey pubescence. Sepals 4 mm. long. Petals slightly longer, bifid for about half their length, clawed at the base, dark purple. Stamens far exserted, with slender filaments. Ovary pubescent; style glabrous, stigma very shortly lobed. Fruit oblong, beaked, sparsely hairy, with persistent calyx, yellow when ripe.

ANGOLA. Golungo Alto, 325-800 m., Welwitsch 4655! 4656! 4657! 4658! 4659! 4660! 4661! 4668! Cazengo, Apr., Pearson 2305! Gossweiler 4565! 4586! 4658! 4820! 4832!

XXI.—NOTES ON AFRICAN GRASSES, VII*.

UGANDA GRASSES.

These notes on the grasses of the slopes of Mt. Elgon and the surrounding districts have been compiled from letters received from Mr. J. D. Snowden, who is studying the grasses in that part of Uganda and has forwarded large collections to Kew.

*Continued from K.B. 1928, p. 41.

The following is a rough outline of the three main grazing lands for stock on the slopes of Mt. Elgon and the districts round about. First, at altitudes of 3500 to 5000 ft. (or to 6000 ft. in drier localities) there is the natural savannah or land cultivated so long ago as to have lost all trace of former cultivation. Here occur tall, strong-growing grasses, such as *Hyparrhenia rufa* Stapf, *Brachiaria brizantha* Stapf, *Themeda triandra* Forsk., *Panicum maximum* Jacq., *Setaria aurea* Hochst. ex A. Br., *S. longiseta* P. Beauv., *Sorghum rigidifolium* Stapf, *Echinochloa pyramidalis* Hitchc. et Chase, *Cymbopogon afronardus* Stapf, etc. In these parts *Pennisetum purpureum* Schum. is not common, but is sometimes found and then usually near streams.

At the same altitudes as the above, there is land which has been cultivated and then left. Here many shorter and weaker grasses have become established; these, if kept cut down or if closely grazed by stock (especially near house compounds, roadsides, etc.), form a short, but often rather open turf, which is liable to dry out and be eaten away by white ants during the dry season. In such places are found the following grasses, *Amphilophis insculpta* Stapf, *Paspalum scrobiculatum* var. *Commersonii* Stapf, *Digitaria abyssinica* Stapf, *D. ternata* Stapf, *Setaria rubiginosa* Miq., *Tricholaena rosea* Nees, *Aristida adscensionis* L., *Sporobolus pyramidalis* P. Beauv., *Perotis indica* O. Kuntze, *Harpachne Schimper* Hochst., *Eragrostis ciliaris* Link, *E. major* Host, *E. tenuifolia* Hochst., *E. tremula* Hochst., *Cynodon Dactylon* Pers., *Chloris Gayana* Kunth, *C. pycnothrix* Trin., *Eleusine indica* Gaertn., *Dactyloctenium aegyptium* Richt., etc.

In wet localities at higher altitudes (5000-8000 ft.), the natural vegetation is bush and forest with grasses only in the clearings; but after cultivation, which in these parts consists merely of removing the undergrowth and hoeing a few inches deep, the following grasses, etc. take possession of the ground:—*Sporobolus indicus* R. Br., *Setaria rubiginosa* Miq., *Eragrostis Taffzagra* Steud., *Digitaria abyssinica* Stapf, *Pennisetum clandestinum* Hochst., *Pennisetum Snowdenii* C. E. Hubbard, *Trifolium Johnstonii* Oliver, *Dolichos maranguensis* Taub. These form a thick matted turf which is eagerly and closely cropped by stock, and no other vegetation can exist except such bushes as were left standing at the time of cultivation. *Pennisetum clandestinum* Hochst. is found as low as 4000 ft. in wet valleys, but at these low altitudes species of *Eragrostis*, *Cynodon* and *Digitaria* are usually predominant. This *Pennisetum* is easily overlooked amongst other grasses, but its presence may be detected by the long white filaments of the stamens.

Oxytenanthera abyssinica Munro. Mr. J. D. Snowden has supplied us with the following information on this bamboo, which was enumerated in the *Kew Bulletin* 1927, p. 304.

"This species covers several square miles in the Simu valley, but at one time it evidently covered a much larger area, as I have

recently discovered quite a large patch of it near Mbale (about 15 miles from the Simu valley). On making enquiries I found that the chief who owns this land near Mbale stopped the natives from cutting down the bamboos, with the result that the land is rapidly reverting to bamboo forest again. I have also seen a few clumps here and there between this area and the Simu valley, suggesting that at one time the whole area was more or less connected up. The forest is not entirely confined to bamboos, but contains a few scattered trees, such as *Combretum splendens* Engl., *Entada abyssinica* Steud., *Gymnosporia senegalensis* Loes., *Bauhinia Thonningii* Schum., *Protea madiensis* Oliver, etc. The poles of the bamboo are much used by the natives for the roofs of their huts, for which purpose they are admirably adapted, although they are sometimes attacked by borers."

The following two new species have recently been received from Mr. Snowden.

Panicum Snowdenii C. E. Hubbard, sp. nov.; affinis *P. pusillo* Hook. f., sed culmis longioribus, spiculis glabris obtusis, gluma superiore 9-nervia, lemmate anthoecii inferioris 9-11-nervio differt.

Gramen annuum. *Culmi* laxi, 20-70 cm. longi, ad 0.6 mm. diametro, geniculato-ascendentes, tenuiter filiformes, debiles, teretes, striati, ramosi, multinodi, nodis inferioribus plerumque radicantes, glabri laevesque. *Foliorum* vaginae moderate laxae vel solutae, plerumque internodiis breviores et 1-2 cm. longae, subherbaceae, tenuiter striatae, nodis et ore laxe pilosae, marginibus longe ciliatis; ligulae brevissimae, membranaceae, ciliolatae; laminae lanceolato-lineares, basi rotundatae, longe et tenuiter acutae vel lineari-oblongae vel lanceolatae et subacutae, 1-3 cm. longae, 2-4 mm. latae, planae, tenues, molles, patentes, demum reflexae, laxae et molliter pilosae vel fere glabrae, ciliatae, obscure nervosae. *Panicula* ovata vel pyramidata, exserta vel basi in vagina summa inclusa, erecta, 1.5-4.5 cm. longa, 1-2.5 cm. lata, laxissima; rhachis filiformis, teres, tenuiter striata, nodis pubescens, cetera glabra vel obscure et sparse glanduloso-pilosa, internodiis inferioribus 0.7-1.2 cm. longis; rami solitarii, erecto-patentes, horizontaliter patentes vel deflexi, capillares, glabri vel sparse pubescentes, inferiores 0.5-1.8 cm. longi, 1-divisi, superiores simplices; pedicelli 1-4 mm. longi, minute scaberuli. *Spiculae* oblongae vel anguste elliptico-oblongae, obtusae, 2.5 mm. longae, circ. 1 mm. latae, glabrae, tenuiter nervosae, pallide virides. *Glumae* inaequales, tenuiter membranaceae; inferior explanata ovata, subacuta, 1.5-2 mm. longa, 1-sub-3-nervia, nervis lateralibus tenuissimis brevibus; superior explanata elliptico-oblonga, rotundato-obtusa, spiculam aequans, 9-nervia. *Anthoecium inferius* vacuum; lemma glumae superiori simile sed 9-11-nervium; palea ovata, obtusa, 1.5-1.7 mm. longa, hyalina, carinis scaberulis et plerumque basi sparse ciliatis. *Anthoecium superius* ♂; lemma elliptico-oblongum, subacutum, 2 mm. longum, albidum, laeve, tenuiter coriaceum;

palea lemmati aequilonga. *Antherae* lineares, 1.2 mm. longae, sanguineo-purpureae.

TROPICAL AFRICA. Uganda: Mt. Elgon; Butandiga, 2100-2400 m., in shade of and near bushes, following cultivation, August, 1927, Snowden 1188.

Pennisetum Snowdenii C. E. Hubbard, sp. nov.; affinis *P. geniculato* Leeke, sed culmis gracilioribus plerumque brevioribus plurinodis, laminis foliorum angustioribus, panicula tenuiore minus densa plerumque angustiore atque brevior, setis minus numerosis, lemmate anthoecii inferioris brevior uninervio magis abrupte acuminato mucrone brevior differt.

Gramen perenne, laxae fasciculatum. *Culmi* e rhizomate tenui geniculato-ascendentes, 10-45 cm. alti, graciles, inferne compressi, simplices vel inferne ramosi, ad 7-nodi, glabri laevesque. *Foliorum* vaginae tenuiter striatae, internodiis breviores, ore sparse pilosae ceterum glabrae laevesque, inferiores carinatae, solutae, persistentes, latae, chartaceae, pallide stramineae, superiores arctae demum laxae; ligulae ad seriem ciliatorum densorum minorum reductae; laminae lineares, basi angustatae, longe et tenuiter acutae, 4-10 cm. longae, ad 3 mm. latae, conduplicatae vel leviter involutae, firmae, glabrae laevesque. *Panicula* spiciformis, 1.5-4 cm. longa, 4-7 mm. diametro (setis exclusis), cylindrica, densa, stricta vel leviter flexuosa, purpurascens; rhachis scaberula; pedicelli minutissimi, scaberuli; involucri setae paucae (circ. 6), inaequales, 3-8 mm. longae, scaberulae, liberae, tenuissimae, flexuosae, purpureae. *Spiculae* solitariae, ambitu lanceolatae, e dorso ovato-lanceolatae vel lanceolato-oblongae, acutae, 3.5-4 mm. longae, pallide virides, apice purpureae. *Gluma* inferior absens; gluma superior truncata, 0.5 mm. longa, hyalina, enervia. *Anthoecium inferius* ad lemma reductum; lemma explanatum oblongo-ellipticum, acuminatum, mucronatum, ad 1.8 mm. longum, tenuiter membranaceum, 1-nervium. *Anthoecium superius* ♂; lemma explanatum oblongo-ellipticum, abrupte acuminatum, breviter mucronatum, 3.5-4 mm. longum, 5-nervium, apice et mucrone scaberulum; palea ovata, truncata, 3 mm. longa. *Lodiculae* minutissimae vel nullae. *Antherae* lineares, 2 mm. longae, apice penicillatae. *Styli* usque ad medium connati; stigmata libera.

TROPICAL AFRICA. Uganda: Mt. Elgon; Bulago, 1800-2100 m., in short grass turf following cultivation, August, 1927, Snowden 1181.

Vern. name: *Nabidulungu* (Lugishu).

XXII.—ON SOME VIOLETS FROM THE ANDES. WILHELM BECKER.

The Director of the Royal Botanic Gardens, Kew, has kindly sent me a number of South American species of *Viola* to examine and name. Some of these were collected by himself in Peru and Bolivia

in 1903. The remainder were collected by Mr. H. F. Comber during his two expeditions to the Andes of Argentina in 1925-1927, and comprise the whole of his gatherings of this genus. The material is very interesting, and I have found a large number of new species which belong to the sections *Andinium* and *Chilenium*. The following is a complete enumeration.

Viola Hillii W. Bckr., sp. nov. (§ *Andinium* W. Bckr.)

Herba perennis; rhizoma crassum, perpendiculare, lignosum, circiter 10 cm. longum, circiter 5 mm. crassum, in parte suprema breviter 2-4-partitum et reliquiis foliorum demortuorum instructum. *Rosulae* parvae, circiter 1.5 cm. latae, foliis erectis angustis circiter 8 mm. longis formatae. *Folia* lineari-oblonga, utrinque pubescentia, crassiuscula, supra subfoveolata, distincte 4-5-repando-crenata; stipulae rudimentariae. *Flores* vix 5 mm. longi, breviter pedunculati, basi bracteolati; bracteolae oblongae, margine subciliatae; pedunculi retrorsum hispidi. *Sepala* oblonga, acutiuscula, ciliata. *Petala* superiora atque lateralia anguste oblonga, tri-longinervia; petalum infimum obcordato-triangular, valde dilatatum, plane emarginatum, brevissime calcaratum. *Ovarium* globulosum, distincte longinervium; stylus basi distincte geniculatus, sub-horizontaliter rostellatus, apice utrinque lobulo rotundiusculo breviter stipitato ornatus.

BOUNDARY OF PERU AND BOLIVIA: on red sandstone hills between Moho and Vilque Chico, north-east of Lake Titicaca, 4050-4200 m., Feb. 1903, *A. W. Hill* 28 (type in Herb. Kew.).

This species occupies an isolated position among the previously known types of the section *Andinium*. It is proposed to figure it in the *Icones Plantarum*.

V. Weberbaueri W. Bckr. in Engl. Bot. Jahrb. xxxvii. 588 (1906).

PERU: on dry sandy hillsides near the coast at Mollendo, Jan. 1903, *A. W. Hill* 29.

V. pygmaea Juss. ex Poir. in Lam. Encycl. viii. 630 (1808); Wedd., Chlor. And. ii, t. 87 B (1857).

BOLIVIA: hills around Capacabana, Lake Titicaca, 3900 m., Jan. 1903, *A. W. Hill* 27; peaty moorland between San Pablo and Achacacha, 4200 m., Feb. 1903, *A. W. Hill* 26.

V. Cotyledon Ging. in DC. Prodr. i. 300 (1824).

ARGENTINA, 38-41° S: Pulmari, 900 m., Jan. 1926, *H. F. Comber* 369a; "A thick-rooted species with blue flowers and fleshy leaves, making clumps 6 inches across. Found in sand near river." Los Helechos, near Lago Huechulafquen, 1050 m., Dec. 1926, *H. F. Comber* 901; "A tap-rooted perennial forming large tufts 6-18 inches across. Flowers large, white or pale lilac, variable. Leaves hard, fleshy. Grows on sandy tracts in full sun." *Ibid.*, *H. F. Comber* 900; "As the last, but flowers deep blue, bearded inside with white hairs."

Viola Cotyledon Ging. subsp. **lologensis** W. Bckr., subsp. nov.

Flores albi, violaceo-lineati, in omnibus partibus glaberrimi et minores, circiter 1.2 cm. lati. *Petala* superiora oblongo-obovata, 5 mm. longa, 3.5 mm. lata; petala lateralia oblique oblongo-obovata, ebarbata, 6-7 mm. longa, vix 4 mm. lata; petalum infimum obcordato-triangular, in fronte emarginatum, planum vel basi naviculare et flavo-maculatum, horreolum pollinis non pilosum gerens, 6 mm. longum et in parte anteriore 6 mm. latum. *Sepala* lanceolata. *Stylus* clavatus, in fronte breviter semi-rostellatus crista tripartita munitus; 2 lobuli laterales penduli, 1 lobulus breviter retrorsum directus, ergo ut in *V. Cotyledon* typica. *Calcar* vix 2 mm. longum.

ARGENTINA, 40° S: Vega Lolog, 810 m., Dec. 1926, *H. F. Comber* 816 (type in Herb. Kew.); "A long-rooted perennial from sandy stony places. Flowers white with violet lines and yellow eye. Whole plant tinged purplish. Leaves with translucent margin." Hill near Vega Lolog, 1380 m., Dec. 1926, *H. F. Comber* 853; "Perennial with long taproot, from sandy hilltop. Leaves purplish. Flowers white with blue lines and yellow eye."

Viola dasphylla W. Bckr., sp. nov (§ *Andinium* W. Bckr.)

Herba perennis; rhizoma verticale, crassum, non valde elongatum, valde radicum, in parte superiore multipartitum. *Caules* circiter 5 cm. alti, ovoidei, 2-3 cm. lati (foliis inclusis). *Folia* inferiora siccata, nigrescenti-fusca; superiora fuscilla usque dilute viridia, circiter 1.5 cm. longa; lamina late oblonga, acuminata, basi sensim angustata, 5 mm. longa, 3 mm. lata, margine albido-cartilaginea; margo cartilagineus vix 0.5 mm. latus; petioli circiter 1 cm. longi. *Corollae* ad plantae apicem coronam formantes, folia vix superantes, dilute coloratae, pallide flavae (teste lectore albae) et violaceo-afflatae atque lineatae, vix 1 cm. latae. *Petala* superiora oblongo-obovata, apice submarginata; petala lateralia oblique obovata, subtruncata, non barbata; petalum infimum obcordatum, profunde emarginatum, basi pollinis horreolum flavum non pilosum gerens, breviter calcaratum; calcar tenue, subrecurvatum, 1 mm. longum. *Stamina* non ciliata. *Ovarium* globulosum; stylus basi geniculatus, adversus apicem subclavatus, apice breviter suberecto-rostellatus et crista plane semi-infundibuliformi in fronte aperta subtriloba ornatus; margines cristae laterales in lobulos horizontales deorsum curvatos breves transeuntes.

ARGENTINA, 40° S: Cerro Colohuincul, between San Martin de los Andes and Lago Huechulafquen, 2100 m., Dec. 1926, *H. F. Comber* 884 (type in Herb. Kew.); "Perennial. Flowers striped with blue. Leaves green or purplish. Common and rather variable." *Ibid.*, *H. F. Comber* 883; "Flowers white with yellow eye, sweet-scented."

V. petraea W. Bckr. in Fedde Repert. xxi. 354 (1925).

ARGENTINA, 38-41° S: Barda Las Lajitas, 2100 m., Dec. 1925, *H. F. Comber* 302; "Flowers white and blue-lined, or lilac, or even

blue. Leaves dull olive-green, white-edged. Common." Sierra Mamuil Malal, near Lago Huechulafquen, 1800 m., Dec. 1926, *H. F. Comber* 917; "Deep-rooted perennial from near the snowline. Flowers deep blue or pink, bearded inside. Leaves dark green or purplish, with white margin. On stony soil with loam beneath. Variable." *Ibid.*, *H. F. Comber* 919; "As the last but with pale blue flowers and rounder leaves."

f. **albida** *W. Bckr.*, f. nov.; flores albid.

Ibid., *H. F. Comber* 918 (type in Herb. Kew.); "White form of last from same place. Flower large, good, variable."

V. Cotyledon, *V. dasyphylla* and *V. petraea* stand together among those species of the Section *Andinium* which possess a narrow cartilaginous leaf-margin. *V. petraea* has the broadest leaves, which in shape approach those of *V. Cotyledon*. *V. dasyphylla* and *V. Cotyledon* subsp. *lologensis* exhibit points of strong resemblance. Both have small flowers with completely glabrous petals and shorter spurs. *V. Cotyledon* has the most strongly hairy petals; moreover the lower petal of this species is particularly hairy, whereas in *V. petraea* it is glabrous or shows a more or less strong indumentum only on the margin.

V. cyathiformis *W. Bckr.* in Fedde Repert. xxi. 355 (1925) must also be placed near the above species. It has a cup-shaped three-lobed style-crest, easily distinguished by this upward inflexion from the flat three-lobed style-crests of its allies. In *V. petraea* the inner, central, point of the crest does not develop in extreme forms (e.g., the type) and the lateral points hang down.

***Viola Comberi* *W. Bckr.*, sp. nov. (§ *Andinium* *W. Bckr.*).**

Herba perennis; rhizoma verticale, crassum, lignosum, verisimiliter in parte superiore non partitum, in caulem dense foliatum circiter 4 cm. longum transiens. *Planta* ovoidea, circiter 3 cm. lata foliis inclusis. *Folia* circiter 1 cm. longa, inferiora siccata nigrescenti-fusca, superiora dilute viridia; lamina orbiculari-spathulata, circiter 5 mm. longa et lata, apice subacuminata et in mucronulum transiens, margine albido-cartilaginea, in petiolum aequilongum subabrupte angustata; margo cartilagineus vix 0.5 mm. latus, nec denticulatus nec ciliatus, adversus apicem non angustior. *Flores* subconspicui, circiter 1 cm. lati, ad plantae apicem coronam formantes, folia vix superantes, flavi, dense obscure lineati. *Sepala* lanceolata, 5 mm. longa, dilute viridia, margine hyalina. *Petala* superiora oblongo-obovata; lateralia obovata, clavato-barbata; infima obcordata, profunde et subanguste emarginata, basi subelongata, horreolum pollinis non pilosum gerens, calcar recurvato circiter 4 mm. longo. *Stamina* dense ciliata. *Ovarium* globulosum; stylus vix geniculatus, adversus apicem sensim clavatus, apice breviter suberecto-rostellatus et subtrilobo-cristatus; crista non infundibuliformis, sed 2 lobis horizontalibus lateralibus

subdeorsum curvatis et uno lobo medio retrorsum directo brevior ornata.

ARGENTINA, 40° S: Cerro Colohuincul, between San Martin de los Andes and Lago Huechulafquen, 2100 m., Dec. 1926, *H. F. Comber* 882 (type in Herb. Kew.); "Only one plant seen. Flowers yellow, striped with brown lines."

***Viola coronifera* *W. Bckr.*, sp. nov. (§ *Andinium* *W. Bckr.*).**

Herba perennis; rhizoma verticale, crassum, lignosum, in parte superiore verisimiliter nunquam partitum; planta ex eo interdum regulariter clavaeformis vel habitu ovoideo (foliis inclusis); caulis dense foliatus, circiter 7-9 cm. altus, in medio 5-6 cm. latus foliis inclusis. *Folia* longe petiolata, circiter 2 cm. longa petiolis inclusis, inferiora siccata nigrescenti-fusca, superiora dilute viridia; lamina orbiculari-spathulata, circiter 5-6 mm. longa et lata, apice subacuminata et in mucronulum transiens, margine albido-cartilaginea, in petiolum circiter 1.5 cm. longum subabrupte angustata; margo cartilagineus vix 0.5 mm. latus, nec denticulatus nec ciliatus, adversus folii apicem non angustior. *Flores* subconspicui, 1.2 cm. lati, ad plantae apicem coronam formantes, folia vix superantes, aurantiaci. *Sepala* lanceolata, pallidissime viridia, margine hyalina, trinervia, circiter 8 mm. longa. *Petala* 7-9 mm. longa; superiora oblique oblongo-obovata, unguiculata; lateralia obovata, apice subtruncata, basi distincte clavato-barbata; petalum infimum late obcordatum, apice emarginatum, basi horreolum pollinis non pilosum gerens, longe calcaratum; calcar circiter 1 cm. longum, deorsum recurvatum, apice sulcatum. *Stamina* non ciliata. *Ovarium* globulosum; stylus basi vix geniculatus, clavatus, apice breviter erecto-rostellatus et crista infundibuliformi tamen in fronte aperta circumdatus.

ARGENTINA, 38-41° S: Cerro Colohuincul, between San Martin de los Andes and Lago Huechulafquen, 2250 m., Dec. 1926, *H. F. Comber* 881 (type in Herb. Kew.); "A hard-leaved perennial with long tap-root from bare windy mountain top, growing in sand, stones and a little fine soil. Flowers yellow or soft orange, sweet-scented. A beautiful plant." Vega Lolog, 840 m., Dec. 1926, *H. F. Comber* 854; "Perennial from small hill in valley. Usually simple rosette. Leaves light green or yellow. Flowers past, but show dry yellow petals. Confined to an area 30 yards square, and growing in stones, gravel and sand."

It is proposed to figure this species, which is very well-marked by reason of the long spurs, in the Icones Plantarum.

Var. **minoriflora** *W. Bckr.*, var. nov.; flores flavi vel obscure fusi, minores; petala 6-8 mm. longa.

Barda las Lajitas, 670 m., Dec. 1925, *H. F. Comber* 324 (type in Herb. Kew.); "Flowers yellow or dark brown. Exposed site on top of mountain ridge."

***Viola escondidaensis* W. Bckr., sp. nov. (§ *Andinium* W. Bckr.)**

Herba perennis; rhizoma subterraneum, ramosum, in caules circiter 8-10 cm. altos suberectos subdense foliatis transiens; planta plus minusve pallide viridis, dense albido-hispida et pubescens. *Folia* superiora circiter 2 cm. longa, inferiora sensim breviora, angusta, 1.5-2 mm. lata, adversus apicem elongato-spathulata et apiculata, supra sublaevia et glabrescentia, subtus distincte hispida, integerrima, crassiuscula; stipulae non observatae. *Flores* in caulis parte superiore inserti, longius pedunculati, pallide virides, violaceo-lineati (teste lectore); pedunculi circiter 2 cm. longi, plus minusve dense hispidi, basi infima brevissime bracteolati. *Sepala* oblongo-lanceolata, margine hyalina et disparsa ciliata. *Petala* omnia dense longitudinali-nervata, nervis adversus apicem saepius ramosis; superiora spathulata, 7 mm. longa, 6 mm. lata, adversus basim usque ad 3 mm. latitudinem angustata, basi violaceo-maculata; lateralia late spathulata, 8 mm. longa, 7 mm. lata, adversus basim usque ad 2.5 mm. latitudinem angustata, basi pilis paucis ornata; petalum infimum calcar recurvo 3 mm. longo, elongato-obcordatum, apice profunde emarginatum, violaceo-afflatum, adversus basim aurantiaco- atque flavo-maculatum et horreolum pollinis bifariam longe et dense pilosum gerens. *Stamina* breviter pilosa; connectivi processus aurantiacus, basi dilatatus et hyalinus. *Ovarium* globuloso-conoideum; stylus basi geniculatus, valde clavatus, apice derupte-deplanatus et breviter acuteque rostellatus, 2 lobulis angustis retroversis subdivaricatis adhaerentibus munitus.

ARGENTINA, 38-41° S: Valle Escondida, Territory of Neuquen, 1925-6, *H. F. Comber* 241 (type in Herb. Kew.); "Perennial with underground stems. Flowers pale green with blue lines."

This species is allied to *V. sacculus* Skottsb. in Svensk. Vet. Akad. Handl. n.s. lvi, no. 5, 266, tt. 20, f. 5 and 23, f. 2 (1916). It is proposed to figure it in the Icones Plantarum.

***Viola squamulosa* W. Bckr., sp. nov. (§ *Andinium* W. Bckr.)**

Rhizoma perenne, verticale, elongatum, circiter 2 mm. crassum, sublaeve, subterraneo-ramosum, in caulem gracilem indivisum dense foliatum circiter 10 cm. longum glaberrimum transiens. *Folia* glaberrima, carnosula, dense disposita, 1-1.5 cm. longa, longe petiolata; lamina oblonga, circiter 5 mm. longa et 2.5-3 mm. lata, apice obtusiuscula, adversus basim in petiolum 6-9 mm. longum sensim angustata, adversus margines obscure lineata; stipulae distincte conspicuae, breves, ovato-lanceolatae, virides, 1.5 mm. longae, ad caulem squamiformiter adjacentes. *Flores* folia vix superantes, albidii, violaceo-afflati, cum calcar circiter 1 cm. longi; pedunculi basi infima bibracteolati; bracteolae anguste lanceolatae, 2 mm. longae. *Sepala* lanceolata, breviter et truncate appendiculata, margine hyalina. *Petala* superiora atque lateralia plus minusve oblique obovata, subunguiculata, circiter 7 mm. longa et 2.5-3 mm. lata, non barbata; petalum infimum basi flavum, naviculare, carinatum, curvatum, in calcar rotundatum transiens,

in parte anteriore late obcordatum, horreolum pollinis non pilosum gerens; calcar 2 mm. longum et latum. *Ovarium* globoso-conoideum; stylus basi non geniculatus, subito clavato-incrassatus, semi-erecto-rostellatus, decliviter truncatus, super capitulum appendicibus 2 brevissimis crassiusculis vix pendentibus instructus.

ARGENTINA, 40° S: Cerro Colohuincul, between San Martin de los Andes and Lago Huechulafquen, 2250 m., Dec. 1926, *H. F. Comber* 885 (type in Herb. Kew.); "Perennial with fleshy, but not hard, brownish leaves from mountain top. Propagation by means of underground stems. Flowers white, tinged with blue."

The style agrees with that of *V. sacculus* Skottsb., to which this species is allied. The stems are taller; the leaves not spathulate; the petioles narrower than those of *V. sacculus*; whilst the stipules which lie on the stems like scales, and the dark lines on the leaf-margins, are characteristic features.

V. auritella W. Bckr. and *V. patagonica* W. Bckr., both found in Patagonia, are also related to *V. squamulosa* and *V. sacculus*; and *V. escondidaensis* W. Bckr., described above, also belongs to this group.

***Viola tectiflora* W. Bckr., sp. nov. (§ *Andinium* W. Bckr.)**

Herba annua; rosula densifolia, plana atque circularis, usque ad 6 cm. lata. *Folia* ovato-oblonga, basi in petiolum plus minusve angustata, lamina 5-7 mm. longa, 2.5-4 mm. lata, utrinque plerumque 4-5-inciso-crenata, excisuris obtusis rotundatis distinctis, supra glabra, laevia, obscure viridia, explanata, subtus glabra, tamen adversus margines et praecipue adversus basim et ad partem superiorem petiolorum longe ciliata, ceterum glandulis linearibus fuscis munita; petioli longi, basi glabri, adversus medium rosulae sensim breviores; stipulae hyalinae, anguste lineares, breves. *Flores* folia non superantes, albidii, violaceo-afflati, cum calcar brevissimo 6-7 mm. longi. *Sepala* ovato-oblonga, margine hyalina, obtusiuscula, 4 mm. longa, glandulifera, infima longe ciliata, brevissime appendiculata. *Petala* superiora oblique oblongo-obovata, sensim angustata, unguiculata, 5 mm. longa, apice subtruncata, basi late unguiculata, adversus marginem superiorem papillis pilisque clavatis dense munita; petalum infimum triangulari-obcordatum, subcarinatum, in fronte 5 mm. latum plane emarginatum, in medio apiculatum, cum calcar 7 mm. longum; horreolum pollinis modo ad basim pilis instructum. *Processus staminum* calcaratorum hyalini, transversim rugosi. *Ovarium* ovoideum; stylus suberectus, basi vix geniculatus, clavatus, horizontaliter rostellatus, crista semiorbiculari erecta paullum tripartito-incisa ornatus.

ARGENTINA, 38-41° S: Zapala to Palau Mahuida, Territory of Neuquen, 900-1800 m., Nov. 1925, *H. F. Comber* 115 (type in Herb. Kew.); "Annual, plentiful in sand. Leaves purplish-brown with

purple oil-glands, quite hiding all the flowers and fruits. Flowers white, tinged with lilac. A most curious plant."

V. argentina W. Bckr. is similar to this, but has longer and broader stipules, and thicker leaves without glands. The leaves are less deeply cut, and the outer leaves have much shorter petioles. The style-crest is directed backwards, whilst that of *V. tectiflora* is quite erect.

V. microphyllus Poir. in Lam. Encycl. viii. 628 (1808); Skotts. loc. cit., 265, t. 23, f. 5.

Sepala ovato-lanceolata, acuminata, pilosa, 4-5 mm. longa, 1.5-1.75 mm. lata; calcar appendices calycis brevissimas non superans, apice sulcatum. *Petala* flava; superiora obovato-oblonga, obtusa, 9 mm. longa, 3.5 mm. lata; lateralia oblique oblonga, adversus apicem subangustata, basi barbata, 11 mm. longa, 4 mm. lata; petalum infimum obtriangulare, apice truncatum et apiculatum, adversus basim longe angustatum subcarinatum, cum calcari 1 cm. longum, antice 8 mm. latum. *Stamina* calcari rotundato munita. *Ovarium* praecipue adversus apicem plus minusve pilosum; stylus basi geniculatus, clavatus, apice truncatus et in fronte rostello brevissimo erecto instructus.

ARGENTINA, 38-41° S: Barba Las Lajas, Territory of Neuquen, 630 m., *H. F. Comber* 270.

V. maculata Cav. Ic. vi, 20, t. 539 (1801); Skotts. loc. cit., 262-3, t. 23, f. 6.

Sepala oblongo-lanceolata, glabra, 6 mm. longa, 1.5-2 mm. lata. *Calcar* breve, subrecurvatum. *Petala* obscure flava; superiora obovato-oblonga, 1.2 cm. longa, 5 mm. lata; lateralia obovata, clavato-barbata, 1.3 cm. longa, 6 mm. lata; petalum infimum late obtriangulare, carinatum, non barbatum, apice truncatum et apiculatum, marginibus lateralibus convexis angustatum, cum calcari 1.2 cm. longum, antice 1 cm. latum. *Stamina* pilosa, calcari rotundato instructa; pollinis granula fertilia globulosa, trisulcata. *Ovarium* glabrum; stylus geniculatus, apice truncatus, utrinque pone submarginatus, et in fronte rostello erecto brevi munitus.

ARGENTINA, 40° S: San Martin de los Andes, 720 m., Nov. 1926, *H. F. Comber* 756; "Perennial with yellow flowers. 'Violeta amarilla.' Common in all parts."

V. Buchtieni Gandoger in Bull. Soc. Bot. France lix. 705 (1912); Skotts., loc. cit. 263.

ARGENTINA, 38-41° S: Polcahue, Territory of Neuquen, 1200 m., Jan. 1926, *H. F. Comber* 464; "Perennial from shady 'Lenga' forest, growing in leaf mould. Flower a beautiful yellow."

V. Reichei Skotts. loc. cit. 265, t. 23, f. 7.

ARGENTINA, 38-41° S: on the same mountain range as Palau Mahuida, Territory of Neuquen, 1927, *H. F. Comber* 1174.

XXIII.—DECADES KEWENSES PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM. DECAS CXX.

1191. **Lobelia Eryliae** Fischer [Campanulaceae]; affinis *L. neriifoliae* A. Gray, sed caule fistuloso, foliis minoribus lineari-lanceolatis, glanduloso-serratis, floribus minoribus, ovarioque 10-costato differt.

Frutex. Caulis glaber, fistulosus, foliorum basi pulvinis magnis provisus. *Folia* superne aggregata, membranacea, lineari-lanceolata, acuminata, basi angustata, secus petiolum decurrentia, 6-14 cm. longa, 0.7-1.5 cm. lata, paucis minimis interspersa, supra sparse albo-hirsuta, infra densius, praecipue in costa nerviisque, marginibus glanduloso-serratis, costa et nerviis 8-10 paribus acute adscendentibus irregularibus supra impressa infra sub-prominentibus, minute reticulatis. *Racemi* terminales axillaresque, rachides glabri sulcati; bracteae lineares, acutae, 2 mm. longae; pedicelli glabri, graciles, 1.3 cm. longi; bracteolis 2, parvis, linearibus, oppositis vel suboppositis, paullo infra flore. *Calyx* ad basin in segmentis 5 linearibus, acutis, glabris, dorso 1-costatis, 8-9 mm. longis, divisis. *Corolla* 1.5 cm. longa, uno latere ad basin fissa, lobis 5, lineari-spathulatis, acutis, 2 lobis, fissuro proximis angustioribus, linea mediana in parte inferiore pubescente excepta glabris. *Stamina* 5, 1-1.1 cm. longa; filamenta plana, in tubo cohaerentia, ima basi excepto; antherae cohaerentes, 2 inferioribus paullo minoribus, apici setis coronatae, ceteris glabris. *Ovarium* turbinatum, glabrum, 5 mm. longum, 10-costatum, costis cum eis sepalorum continuantibus; stylus columnaris, intra stamina inclusus; stigmata 2, late ligulata, crassa, extra antheris paullo exserta. *Capsula* turbinata, apice conica, styli basi persistente terminata, 1 cm. longa.

CELEBES. Peak of Bontain, Febr., 2000 m., *Dr. Eryl Smith* 0012. "Evergreen jungle, corolla mauve. Free part of calyx dull red, under surface and edges of leaves purplish-red."

1192. **Gaertnera lushaiensis** Fischer [Loganiaceae]; affinis *G. oblanceolatae* King & Gamble, sed ramulis teretibus, foliis elliptico-lanceolatis, nerviis primariis pluribus et corollae tubo calyce multo longiore intus glabro distat.

Frutex; ramuli teretes, fistulosi, annulo hirsuto et fibrilloso intra stipulis excepto glabri. *Folia* opposita, membranacea, anguste elliptico-lanceolata, falcata, acuminata vel subcaudata, basi in petiolum attenuata, glabra, 12-30 cm. longa, 3-7 cm. lata, costa prominente, nerviorum primariorum circiter 20 paribus, infra prominentibus, supra obscuris, paullo arcuatis; petioli 0.5-2.5 cm. longi; stipulae conjunctae, parte superiore caduca, basin coriaceam pallidam relinquentes. *Cymae* densiflorae, parvae, pedunculatae, paniculam terminalem glabram formantes; bracteae apud furcas inferiores ovatae, cuspidatae, 7 mm. longae, superioribus minores; bracteolae parvae, dentatae vel lobatae. *Gemmae* anguste clavatae 5-costatae,

ad 1 cm. longae. (Flores aperti non visi.) *Calyx* cupularis, 1 mm. longus; lobi 5, triangulares, acuti. *Corolla* calyce saltem sexies longior, lobi 5, breves, acuti, albo-cerini apice rubidi. *Stamina* 5, in medio tubo corollino inserta; filamenta brevia, subulata; antherae lineares, basi 2-lobae, dorsifixae, filamentis multo longiores. *Ovarium* truncato-conicum, apice concavum, cum calyce aequilongum, 2-loculare; stylus filiformis; stigmata 2, elongata, subulata. *Fructus* non visus.

INDIA. Assam, Lushai Hills at Toxzawl, 600 m., May, Mrs. N. E. Parry 180. "Undergrowth in jungle; growing in shady damp places. Leaves long, curved, hanging."

This appears to be the first record of the genus in the Himalayan Range.

1193. **Didymocarpus Parryorum** Fischer [Gesneraceae]; affinis *D. tristi* Craib, sed foliis rotundatis majoribus, subtus glandulosis, cymis esquamatis, bracteis et sepalis majoribus, corollis erectis minoribus, differt.

Herba. *Caulis* validus, 5-8 cm. altus, ad 8 mm. crassa, fusco-hirsuta, radicans. *Folia* 4 opposita, supra cum 1-2 minimis, paria subaequalia, rotundata, apice breviter apiculata, basi cordata, 6-12 cm. diam., supra fusco-adpresse-hirsuta, denseque minute variolata, infra in nerviis adpresse-hirsuta, in intervallis sparse pilosa, glandulis stellatis 4-cornutis minutis punctata, basi 9-nervata, supra basin circiter 3-paribus nerviorum lateralium provisa, nervii primarii supra obscuri, infra prominentes; nervii secundarii obscuri, marginibus acute serratis. *Petoli* graciles, supra juxta apicem paullo canaliculati, 4-9 cm. longi, adpresse fusco-hirsuti. *Cymae* dichasiales, axillares; pedunculi ad 25 cm. longi, siccitate sulcati, glabri; bracteae in furca quaque 2, suborbiculares, apice rotundatae vel subacutae, glabrae, venosae, in furca infima 8 mm. longae, supra minores; pedicelli 5 mm. longi. *Flores* 2-5 cm. longi. *Sepala* 5, libera, lineari-oblongata, subacuta, venosa, glabra, 1 cm. longa, flavida. *Corolla* glabra, aurantiaca, tubus anguste cylindricus, 1.3-1.9 cm. longus, 1.5 mm. latus, limbo 2-labiato, labio posteriore 2-lobo, 2 mm. longo, labio anteriore 3-lobo, lobis suborbicularibus, 5-8 mm. longis. *Stamina* 2, glabra, $\frac{1}{3}$ ab ore inserta. *Antherae* magnae, inclusae. *Staminodia* 2, brevia, linearia. *Discus* pulvinaris vel quasi-cupularis, 1 mm. longus. *Ovarium* lineare, vix stipitatum, 1.1 cm. longum in stylum brevem, columnarem angustatum; stigma magnum, peltatum. *Capsula* linearis, acuminata, glabra, 1.7-2.4 cm. longa, 1 mm. lata. *Semina* minuta, ellipsoidea, muriculata.

INDIA. Assam, Lushai Hills at Sairep, 1700 m. July, Mrs. N. E. Parry 7. "Grows on rocky cliffs. Leaves pale-green, silvered when dry, calyx light yellow, corolla orange red."

1194. **Strobilanthes Parryorum** Fischer [Acanthaceae]; affinis *S. glutinoso* Nees, sed foliis majoribus supra glabris, bracteis majoribus, calyce longioribus, staminibus ciliatis, capsula glabra distat.

Frutex alta; ramuli teretes, inferne glabri, superne bruneo-tomentosi. *Folia* ovato-elliptica, denticulata, acuminata, basi acuta, 11-21 cm. longa, 4-11 cm. lata, minute lineolata, tandem supra glabra, semper infra in costa nerviisque plus minusve hispida; costa et 8-12 pares regulorum arcuatorum nerviorum supra subprominentes infra prominentes; petioli 1.5-8 cm. longi, glabrescentes. *Spicae* terminales et axillares, compositae, interruptae; rachis dense bruneo-glanduloso-tomentosa. *Flores* per paria oppositi; bracteae oblongo-spathulatae, apice rotundatae ut bracteolae dense bruneo-tomentosae, pilis glanduliferis ciliatae, 1.25-3 cm. longae; bracteolae 2, lineares, obtusae, 1-1.3 cm. longae. *Calycis* segmenta 5, subaequalia, fere libera, linearia, obtusa, bracteolis similia et aequilonga. *Corolla* tubulosa, ventricosa, paullo curvata, 3.5 cm. longa, alba, lutescens, extra parce puberula, intus glabra lineis 2 ciliatis stamina continuantibus exceptis, parte basale anguste cylindrica 1.5 cm. longa, sursum ad orem 1-1.3 cm. latum ampliata; lobis subaequales late oblongi obtusi, 5 mm. longi. *Stamina* 4; filamenta infra ligulam latam cohaerentia; ligula corollae parti basali $\frac{2}{3}$ adhaerens sed marginibus fortiter albo-ciliatis liberis, apice in filamenta 4 plana, ciliata, 2 longiora 2 breviora, divisa. *Antherae* lineares, 4 mm. longae, paucis ciliis ventralibus provisae, basi breviter bilobae. *Ovarium* anguste fusiforme, lateraliter compressum, inter semina paullo indentatum, apiculatum, glabrum, 6-7 mm. longum; ovula 4; stylus filiformis, glaber, staminibus longior, infra stigma lineare paullo incrassatus. *Capsula* anguste clavata, apiculata, glabra, 1.5 cm. longa. *Semina* 4, suborbicularia, 4 mm. longa, hygroskopice hirta.

INDIA. Assam, Lushai Hills, Darzo, 1400 m., March, Mrs. N. E. Parry 155.

1195. **Ruprechtia (§Pseudotriplaris) exploratricis** Sandwith [Polygonaceae-Triplariidae]; *R. molli* Wedd. et *R. fagifoliae* Meisn. forsan affinis, ab ambabus foliis angustis subtus fortiter multinerviis reticulatisque, praeterea ab illa floribus hexasepalis nec trisepalis foliis coriaceis, ab hac foliis subtus satis dense pilosulis differt.

Arbor vel frutex, teste lectore 4.5 m. altus, ramulis teretibus cinereis 20 cm. infra apicem 3-4 mm. diametro. *Folia* petiolis glabrescentibus vel minute pubescentibus 4-6 mm. longis 1-1.5 mm. latis suffulta, lanceolata vel oblongo-lanceolata vel rarius anguste ovato-lanceolata, apice acuta, basi acuta attenuata vel obtusa atque fere rotundata, 5-8.5 cm. longa, 1.5-2.5 cm. lata, coriacea, integerima sed margine nonnunquam undulata, supra olivaceo-nigrescentia nervis venulisque immersis sed satis conspicuis, subtus plerumque pallidiora nervis primariis pro genere multis 16-25 fortiter prominentibus subparallelis marginem versus sursum sensim arcuatis anastomosantibusque praeterea rete venularum intricato fortiter reticulata, supra glabra, subtus per nervos reticulationesque dense pilosiuscula,

juniora etiam fere velutina et secus marginem costae barbata, sed senectute glabrescentia pilis in reticulationibus multo minus obviis. *Inflorescentiae femineae* tantum visae, axillares simplices vel apice ramulorum fasciculatae paniculatae, racemosae, ad 5 cm. longae; rhachis teres dense pubescens; bracteae 1-2-florae, late ovatae, dense pubescentes et ciliatae, 1-1.2 mm. longae, ad 1.5 mm. latae; bracteolae ocreiformes, pubescentes et ciliatae, circiter 1 mm. longae; pedicelli filiformes dense pubescentes, ad 3.5 mm. longi. *Flores* hexasepali, tubo pubescente ad 2 mm. longo 1.5 mm. lato; segmenta exteriora utrinque pubescentia, oblonga, 2-5 mm. longa, 1-1.5 mm. lata; segmenta interiora tubo adnata, minuta, glabrescentia vel parce pilosula, 1-2 mm. longa, ad 0.5 mm. lata. *Ovarium* 2-3 mm. longum, ad 1 mm. diametro, basi excepta dense allopilosum; styli pilosi 0.5 mm. longi, stigmatibus papillosis anguste ovatis circiter 0.8 mm. longis. *Perianthium fructiferum* 1.5-2 cm. longum, tubo obconico dense pubescente 2 mm. longo, segmentis exterioribus auctis obovato-spathulatis utrinque pubescentibus chartaceis trinerviis reticulatisque versus apicem 5-6 mm. latis. *Fructus* anguste ovoideus, ut ovarium sulcatus angulis obtusis inferne teretibus, supra medium pilosus, 7-8 mm. longus, ad 3 mm. diametro.

BRAZIL. Matto Grosso; Corumbá, in secondary growth, April 1927, Miss Gwen Dorrien Smith 45.

The reticulation of the lower surface of the leaves recalls that of the Mexican species *R. fusca* Fernald and *R. macrosepala* Standley.

1196. *Cleistanthus discolor* Summerhayes [Euphorbiaceae-Brideliaceae]; affinis *C. perakensis* Gage, a quo foliis pro rata latioribus supra viridibus subtus cinnamomeo-vestitis nervis secundariis distantibus nervarum reticulatione differt.

Ramuli teretes, juventute ferrugineo-vestiti, demum glabri, leviter rugulosi. *Folia* breviter petiolata, elliptica vel rarius oblongo-elliptica, apice breviter acuminata, basi cuneata, annotina 8-15 cm. longa, 3.5-8.5 cm. lata, hornotina 3-7.5 cm. longa, 1.2-4 cm. lata, margine basi leviter recurvata, tenuiter coriacea, supra primum sparse adpresse pilosa, deinde glabra, subtus dense cinnamomeo-vestita; costa supra leviter impressa vel in folio maximo prominula, subtus prominens, nervis lateralibus utrinsecus 3-5 e costa angulo acuto orientibus leviter arcuatis subtus prominentibus, reticulatione supra prominula; petiolus 5-7 mm. longus, primum ferrugineo-pilosus, demum glaber, ruguloso-corticatus. *Flores* axillares, glomerati, sessiles, dense bracteati; bracteae deltoideae usque ovatae, apiculatae, carinatae, ferrugineo-pilosae. *Flores* ♂ ignota. *Flores* ♀ 5 mm. longi, glabri; calycis lobi lanceolati, subacuti, 3 mm. longi, basi 1.5-1.75 mm. lati; petala obovata, saepe plus minusve retusa, circiter 1 mm. longa, discum paulo superantia; discus irregulariter lobatus, ovarium cingens et

aequans; ovarium ellipsoideo-globosum, longiuscule adpresse pilosum; styli semel bifidi, stigmatibus clavatis. *Capsula* ignota.

QUEENSLAND. Kuranda, North Queensland, Aug. 1927, Du Rietz 7275.

This plant belongs to the section *Chartacei* Jabl., in which it is closely allied to *C. chartaceus*, *C. vestitus*, *C. perakensis* and *C. rufus*. The only other Australian species in the section is *C. Cunninghamii* Müll.-Arg., which is easily distinguished by its smaller leaves which are glabrous below.

1197. *Eria* (§*Aeridostachyae*) *Cooperi* Summerhayes [Orchidaceae-Epidendreae]; affinis *E. falcatae* J. J. Sm. et *E. Junghuhnii* J. J. Sm., quibus caulibus plurifoliatis, foliis acuminatis, floribus albido-pubescentibus, sepalo dorsali brevior, petalis pro rata latioribus differt.

Pseudobulbi cauliformes, teretes, circiter 10 cm. alti, basi vaginis 4 acutis carnosus cincti, apice circiter 6-foliati. *Folia* e basi vaginante late linearia, apice sensim acutissima, usque ad 33 cm. longa, 2 cm. lata, subcarnosa. *Racemus* ex axilla folii superioris oriens, 30 cm. longus, erectus vel curvulus, dense multiflorus, basi cataphyllis paucis subacutis imbricatis instructus; pedunculus 12 cm. longus, foliolis triangularibus acutis subremotis praeditus; rhachis 18 cm. longa, teres, breviter albido-pubescentis; bracteae oblongae, acutae, reflexae, circiter 2 mm. longae; pedicelli brevissimi, 2-3 mm. longi, dense pubescentes. *Sepalum* dorsale anguste oblongo-ovatum, obtusum, concavum, incurvum, 2.5-3 mm. longum, 1.75 mm. latum; sepala lateralibus oblique triangularia, mentum obtusum, 4 mm. longum formantia, in toto 6 mm. longa, obtusa, margine antico rotundato; sepala omnia extra sordide albido-pubescentia. *Petala* oblique oblongo-lanceolata, semifalcata, acuta, 2.5-3 mm. longa, medio 1.5 mm. lata. *Labellum* columnae adpressum, simplex, subspathulatum, obtusum, 4-4.5 mm. longum, superne 2-2.5 mm. latum, versus apicem marginibus leviter undulatis. *Columna* complanata, circiter 2 mm. longa, pede 4 mm. longo, auriculis subnullis.

Imported from Java and flowered in January 1928, by Messrs. Sander, St. Albans.

Lateral sepals red with yellowish border, apex of mentum yellowish. Dorsal sepal and petals dark red. Lip pale pinkish-red with short white claw. Column yellow with red streaks down sides. Outside of flower covered with short yellowish-white pubescence.

1198. *Epistephium ellipticum* R. O. Williams & Summerhayes [Orchidaceae-Neottiae]; species propter folia elliptica petiolata, racemum brevem folia non excedentem distinctissima.

Herba terrestris, usque ad 30 cm. alta, radicibus carnosus, caule saepius simplici erecto 3 mm. diametro. *Folia* breviter petiolata, elliptica vel oblongo-elliptica, apice abrupte acuta vel acuminata,

basi angustata, 4-6.5 cm. longa, 2.5-3 cm. lata, tenuiter coriacea, glabra, utrinque venis subprominentibus, venis primariis utrinsecus 4, infimis marginalibus, duabus intermediis costae subparallelis superne cum vena marginali conjunctis, supremis costae parallelis et cum ea fere confluentibus. *Racemi* terminales vel axillares, foliis breviores, usque ad 12-flori; bracteae triangulares, acuminatae, sub fructu persistentes et tum 3-4 mm. longae. *Sepala* spathulata, acuta, 2 cm. longa, 3 mm. lata, alba. *Petala* spathulata, 2 cm. longa, 4 mm. lata, alba. *Labelli* duae trientes inferiores columnam circumdantes et ei adnatae; labelli triens supremam dilatata, rotundata, integra, 8 mm. longa, ciliata, medio supra carnosopilosa. *Columna* 1.7 cm. longa, 1.5 mm. diametro, rosea; pollinia 2. *Capsula* linearis, circiter 3.5 cm. longa, 1.5-2 mm. diametro, longitudinaliter nervata, calyculo integro vel breviter dentato 1 mm. longo coronata. *Semina* minuta, plana, ala membranacea pellucida circumdata, vix 1 mm. longa.

TRINIDAD. Valencia Road, Mora Forest end, Sept. 1926, *Freeman, Williams, & Cheesman in Herb. Trinit.* 11324 (type): near Aripo Pool, Dec. 1927, *Freeman & Williams in Herb. Trinit.* 11903.

This species differs markedly from the other Trinidad species, *E. parviflorum* Lindl., and grows in a different habitat, i.e. in the shade of deep forest. *E. ellipticum* with its low stature, and crowded racemes among the elliptical shortly-stalked leaves is not closely related to any of the species described up to the present. Only *E. parviflorum* and *E. petiolatum* Huber have petiolate leaves but these differ in other respects, being tall plants with a long terminal raceme.

1199. *Arisaema Monbeigii* Gamble ms. ex Fischer [Araceae-Arinae]; ab affinis *A. Wattii* Hook. f., folio unico, appendice brevestipitata basi latiore recedit.

Herba dioica, circiter 30 cm. alta, tuberosa, tubere brevi basi complanato, superne bracteae primae laciniis circa 1 cm. longis, bracteis duabus roseis fere ad spatham attingentibus instructo. *Folia* solitaria, trisecta, petiolo 30 cm. longo; segmenta latissima ovata, sessilia, glabra, medium apice repente acuminatum, basi contractum, 15 cm. longum, 13 cm. diametro, lateralia inaequilatera, ad 15 cm. longa, 10 cm. lata, nervis lateralibus sub-parallelis irregulariter distantibus cum nervo intramarginali junctis, utrinque prominulis, nervulis irregulariter reticulatis conspicuis. *Spathae* pars tubulosa circiter 6 cm. longa, 1.5 cm. lata, purpureo-striata; limbus basi paullo cordatus, multum curvatus et gradatim in caudem gracilem desinens, circa 10 cm. longus, lineis purpureis et albis alternantibus instructus. *Flores*: ♀ tantum notus, ovarium depresso globosum, stigmatibus panicellato. *Spadix* breviter (ad 5 mm.) stipitata; appendix basi 1 cm. lata, 7 cm. longa, curvata, sensim ab apicem obtusam, 2.5 cm. latam attenuata.

BURMA. Southern Shan States, Taunggyi crags, 1700 m., June, W. A. Robertson 347.

CHINA. Yunnan, Tsekou, *Father T. Monbeig*.

1200. *Panicum Cooperi* C. E. Hubbard [Gramineae]; affinis *P. Hochstetteri* Steud., sed spiculis paulo minoribus obtusis obscure nervosis differt.

Basis ignota. *Culmus* unus visus, geniculato-ascendens, 60 cm. longus, filiformis, teres, ramosus, multinodus, glaber laevisque. *Foliorum* vaginae arctae, demum solutae, subauriculatae, internodiis breviores, tenuiter striatae, laeves, ore et marginibus ciliatae, ceterum glabrae; ligulae minutae, membranaceae, glabrae; laminae lanceolato-lineares, basi leviter rotundatae, longe et tenuiter acutae, 3-6 cm. longae, 3-7 mm. latae, planae, pallide virides, tenuiter et obscure nervosae, glabrae laevesque. *Panicula* laxa, flexuosa, 4-6 cm. longa; rhachis tenuiter filiformis, glabra laevisque; rami solitarii, flexuosi, inferiores ad 5 cm. longi, laxe divisi, glabri laevesque; pedicelli capillares, flexuosi, 1-5 mm. longi, laeves. *Spiculae* ovato-oblongae vel elliptico-oblongae, obtusae, ad 1.8 mm. longae, pallide virides et purpureo-suffusae. *Glumae* inaequales, obscure et minute pubescentes, tenuiter membranaceae, marginibus hyalinis; inferior explanata ovata, obtusa, 1.5 mm. longa, 3-nervia; superior explanata late elliptico-ovata, obtusissima, 1.8 mm. longa, 7-nervia. *Anthoecium inferius* ♂; lemma explanatum late oblongo-ellipticum, rotundato-obtusum, 1.8 mm. longum, 5-nervium, sparse et minute pubescens, tenuiter membranaceum, marginibus hyalinis; palea ovata, obtusa, 1.8 mm. longa, hyalina. *Antherae* lineari-oblongae, circ. 1 mm. longae, flavae. *Anthoecium superius* ♀; lemma anguste ellipticum vel anguste elliptico-ovatum, subacutum, 1.6 mm. longum, albidum, tenuiter coriaceum, laeve; palea 1.5 mm. longa.

TROPICAL AFRICA. Abyssinia: Addis Alam, 2400 m., Sept. 1926, *Cooper*.

XXIV.—SETARIA GLAUCA AND S. LUTESCENS.

O. STAFF.

In U.S. Dept. Agr. Bur. Pl. Ind. Invent. Seeds & Plants Import. no. 31, 84, 1914, Stephen C. Stuntz has this paragraph:—“33428—*Pennisetum glaucum* (L.) R. Brown. (*Panicum glaucum* L., Species Plantarum, p. 56, 1753)—This species which has been listed in previous numbers of the inventories as *Pennisetum americanum* (L.) Schum. and in the Index Kewensis as *P. typhoideum* Rich., was first described by Linnaeus (Species Plantarum, p. 56, 1753) as *Panicum glaucum*, based on a specimen from Ceylon. This specimen, which is still preserved in the British Museum, has been identified by Trimen (Journal Linnean Society, vol. 24, p. 136, 1896) as the pearl millet, and it is therefore necessary to use the name *Pennisetum glaucum* for this plant.” On p. 86 the following occurs:

"33615. *Chaetochloa lutescens* (Weigel) Stuntz (*Panicum lutescens* Weigel, Observationes botanicae, p. 20, 1772). Seeds of this species have been listed in previous numbers of these inventories as *Chaetochloa glauca* (L.) Scribner, based on *Panicum glaucum* L. (Species Plantarum, p. 56, 1753). The type of Linnaeus's species has been determined as *Pennisetum glaucum* (L.) R. Br., hitherto listed in these inventories as *Pennisetum americanum* (L.) Schum. It is necessary, therefore, to adopt for the plant under discussion the earliest specific name, *lutescens*."

The shuffle of names involved in the paragraphs quoted concerns a common and well-known weed and indirectly an important cereal of tropical countries. As the names of both of these run through the botanical literature of over 150 years, it is necessary to proceed with great caution. What then are the facts? This is what Linnaeus says of *Panicum glaucum* in the first edition of his Species Plantarum, p. 56.

- (1) *glaucum*. 2. *Panicum* spica tereti, involucellis bifloris fasciculato-pilosis. *Fl. zeyl.* 44.
- (2) *Gramen alopecuroides maderaspatanum*, spica quasi geniculata molli. *Pluk. alm.* 177 t. 190. f. 6.
- (3) β *Gramen paniceum* s. *Panicum sylvestre*, simplici spica, *Scheuchz. gram.* 46.
- (4) γ *Panicum* spica simplici, aristis aggregatis flosculo subjectis, *Gron. virg.* 134.
- (5) *Panicum indicum altissimum*, spicis simplicibus mollibus in foliorum alis, pediculis longissimis insidentibus. *Tournef. inst.* 515.
Habitat in Indiis.

Setae in spica longitudine flosculorum. Foliorum vaginae oris pilosae. Dum spica recens prodiit. Flosculi in series dispositi observantur.

This paragraph consists of 5 synonyms (name phrases with references to their authors), an indication of the distribution of the grass and a short description. Of the synonyms

- (1) represents *Pennisetum spicatum* Roem & Schult. (= *P. typhoideum*, Rich.), as is evident from Linnaeus' description in *Flora zeylanica* and the specimen in Hermann's herbarium (at the British Museum) from which, no doubt, this description was drawn up.
- (2) is *Elytrophorus articulatus* Beauv. (see Vines and Druce, Morison, Herb. 106).
- (3) is *Setaria viridis* Beauv. to judge by the very full and excellent description.
- (4) is *Setaria glauca* Beauv. (see Hitchcock in Contrib. U.S. Nat. Herb. xii. 129).
- (5) is doubtful. It may be a *Pennisetum*, but if so, it cannot well be *P. spicatum*.

The plural "Indiis" is no doubt due to the inclusion of Gronovius's plant. The description is evidently not a paraphrase of that given in *Flora zeylanica* sub no. 44. It has nothing in common with the latter except the reference to the hairs at the mouth of the sheaths, and omits much that would obviously suggest itself for inclusion. I do not know when Linnaeus returned Hermann's plants to their owner (A. Gunther in Copenhagen), but it is very probable that they were no longer at his disposal in 1753, so that species of the first edition of Species Plantarum, connected by the author, inter alia, with *Flora zeylanica*, need not necessarily rest on Hermann's material; in other words Hermann's specimens cannot be accepted as "types" in such cases without further evidence. This evidence is wanting in the case of *Panicum glaucum*. On the other hand we know that Linnaeus had at that time Gronovius's specimen of *Setaria glauca* Beauv., in his own herbarium (it is written up by him as *Panicum glaucum* and numbered 2 by himself, the number of the species in the first edition of the Species Plantarum), and that he became soon aware of the incongruity of the contents of the *Panicum glaucum* of 1753; for in 1758 in his Systema, ed. x 870, he confined his *Panicum glaucum* to γ of the Species Plantarum, that is Gronovius's plant, the *Panicum glaucum* or *Setaria glauca* of all subsequent authors. Moreover, he now distinguishes it from β (Scheuchzer's plant, which becomes *Panicum viride*) by the characteristic addition "seminibus undulato-rugosis." In doing so he simply made use of the right, if not obligation, of the author, who breaks up a heterogeneous species, of indicating to which part the original name should adhere in the future. There was now no longer any ambiguity as to what Linnaeus meant by his *Panicum glaucum* and the specimen in his herbarium which corresponded to the revised conception became its "type." It is true, he referred under *Panicum glaucum* once more to *Flora zeylanica* 44, namely in the 2nd edition of the Species Plantarum, 83, where the reference follows the revised diagnosis of the Systema. It is obviously out of place. The only synonym admitted is Gronovius's; the description is that of the first edition with the addition of "semina striis undulatis notata." The distribution is given still "in Indiis" but with the extension "et Italia."

There seems thus no reason to connect the name *Panicum glaucum* of Linnaeus with any other grass than that to which generations of botanists have been used to apply it. To supersede it by Weigel's name *Panicum lutescens* becomes at the same time unnecessary. In fact, Weigel hardly proposed it seriously. Having given a good description of the grass as he found it in his neighbourhood (Stralsund) he merely says "*lutescens nominaverim*," i.e., I should have called it *lutescens*.

XXV.—NEW PLANTS FROM SPAIN. C. E. HUBBARD AND N. Y. SANDWITH.

The collections of Spanish plants in the Herbarium at Kew have been considerably enriched by additions kindly presented by the Rev. E. Ellman as a result of his recent botanical expeditions to Spain, when he was accompanied by C. E. Hubbard in 1924, N. Y. Sandwith in 1926, and E. Nemes in 1927. These collections have now been fully worked out and incorporated in the general Herbarium. The complete list numbers over twelve hundred species, besides a very large number of varieties and forms, and a few hybrids. It is hoped that it may be found possible to publish this list elsewhere, with notes on the distribution and nomenclature of each species, and on the many points of taxonomic interest which the investigations have revealed. The present paper comprises the descriptions of three new species and one new variety, the elevation of one presumed hybrid to specific rank, and a number of new combinations which have been found to be necessary.

The Spanish collections at Kew are very rich in valuable syntypes collected by the more famous earlier botanical explorers, and would provide a good basis for a modern flora of Spain, but a very large number of recently described species are quite unrepresented, although several have been added as the result of Mr. Ellman's three expeditions. Sets of the extensive and well-known collections of Porta and Rigo, and of Reverchon, are now being laid in from the Willmott and Churchill Herbaria, but their determination is evidently in need of careful revision. It is certain that many more expeditions might be profitably made to this remarkable and still only partially explored region before its extensive flora could be said to be satisfactorily represented in the Herbarium.

Chrysanthemum paludosum Poir. Voy. Barb. ii. 241 (1789) var. **pinnatifidum** (Willk.) Hubbard et Sandwith, comb. nov. *Hymenostemma Fontanesii* Willk. var. *pinnatifidum* Willk. in Bot. Zeit. xxii. 253 (1864) et in Willk. et Lge. Prodr. Fl. Hisp. ii. 103 (1870). *Leucanthemum murcicum* Gay ex Willk. in Bot. Zeit. l.c., nomen.

Alicante: Orihuela; rocky slopes of the Sierra de Callosa, April 28th, 1926, Ellman and Sandwith 422.

A small, slender plant, with very small heads and very deeply, narrowly cut leaves.

Distr. South-east Spain and North Africa. Coutinho records typical *C. paludosum* (as *C. glabrum*) from Portugal.

Limonium carthaginense (Rouy) Hubbard et Sandwith, comb. nov. × *Statice carthaginensis* (*S. pubescens* DC. × *S. virgata* Willd.) Rouy in Rev. Bot. Syst. Geogr. Bot. i. 182 (1903). *S. carthaginensis* Pau in sched. (1902).

Murcia: Cartagena; on bare hillsides above Santa Lucia, April 25th, 1926, Ellman and Sandwith 376. Cartagena, 1902, Pau.

Distr. South-east Spain; Cartagena, where it is frequent. Endemic?

Nothing like this plant was found in the Herbarium at Kew, so it was sent to Don Carlos Pau who replied as follows: "It belongs to a specific type which is peculiar to Cartagena and of which I possess a large supply of material. One form has the leaves almost oblong-linear; those of yours are twice as short, spatulate and emarginate. I have it in my herbarium under the name *Statice carthaginensis* Pau, n. sp. In the leaves it resembles *S. emarginata*; it is very like *S. cossyrensis*; and also allied to *S. minutiflora* and *S. cordata*." He enclosed a small flowering specimen collected at Cartagena by himself in 1902. There can be little doubt that this is the plant described by Rouy, and that he was wrong in believing it to be a hybrid. It is evidently plentiful at Cartagena and has very distinctive features in the habit, leaves and slightly furfuraceous stems and branches, which might indeed induce a student working with herbarium material only to place it somewhere between *S. pubescens* and *S. virgata*. It may occur in Oran.

Limonium spathulatum (Desf.) O. Kuntze, Rev. Gen. Pl. ii. 396 (1891) var. **emarginatum** (Willd.) Hubbard et Sandwith, comb. nov. *Statice emarginata* Willd. Enum. Hort. Berol. 335 (1809). *S. spathulata* Desf. Fl. Atl. i. 275 (1798) var. *emarginata* Boiss. in DC. Prodr. xii. 650 (1848).

Gibraltar: Europa Point, frequent on rocks, May 20th, 1924, Ellman and Hubbard 737.

Distr. Gibraltar and Morocco.

Cynoglossum cheirifolium L. Sp. Pl. ed. i. 134 (1753) var. **immarginatum** Hubbard et Sandwith, var. nov.; a typo differt nuculis immarginatis facie exterior rotundata convexa tereti aequaliter glochidiata nec concava depressa.

Malaga: shaly slopes east of Malaga, 60 m., May 7th, 1927, Ellman and Nemes 26.

The variety differs from the type only in the characters described above, but these are sufficient to give the nutlets a perfectly distinct appearance. No other material of it has been seen, although the species is very well represented in the Herbarium at Kew.

Teucrium Ellmanii Hubbard et Sandwith, sp. nov.; affinis *T. eriocephalo* Willk., indumento passim densissimo lanato, habitu pulvinato densissime fastigiato-ramoso, capitulis minoribus multo densioribus, floribus minoribus differt.

Planta perennis, suffrutescens, fere pulvinata, ad 26 cm. alta, tota lana densa alba vel siccitate flavescenti-alba vestita. *Caules* e basi complures, sublignosi, 2.5–3 mm. diametro, centralis erectus,

laterales decumbenti-ascendentes, omnes ramis permultis gracilibus floriferis densissime fastigiatis praediti; rami internodiis 1-2.5 cm. longis, in axillis foliorum inferiorum ramulos minutos foliatis, superiorum capitula subsessilia vel saepius pedunculata gerentes. *Folia* oblonga vel cuneata, obtusa, amplexicaulia, 4-8 mm. longa, 1.5-2.5 mm. lata, vetustiora reflexa, juniora patentia vel saepe arcuato-ascendentia, crassa, fragilia, valde revoluta, marginibus undulato-crenatis. *Inflorescentia* e capitulo terminali et paribus 2-5 erecto-ascendentibus composita; paria inferiora fere sessilia, superiora ad 3-18 mm. conspicue pedunculata. *Capitula* globoso-oblonga, 7-10 mm. longa, 7-8 mm. diametro, densissima, albosericosa, lanata; bractae ad 3.5 mm. longae. *Flores* albi, subsessiles. *Calyx* campanulatus, 3 mm. longus, ad 1.75 mm. latus, extra lanato-villosus, intus minute sparse pilosulus, dentibus triangularibus 1 mm. longis ad 0.75 mm. latis. *Corolla* ad 5 mm. longa, tubo incluso extra versus apicem intus fauce albo-piloso; labium inferius lobo medio concavo rotundato dorso piloso versus basim utrinque minute gibboso-lobulato tum lobulis conspicuis ovato-oblongis obtusis, lobis lateralibus obtuse triangularibus margine superiore longe ciliatis. *Staminum* filamenta longiorum 3.5 mm. longa, breviorum 2.5 mm. longa, versus basim pilosa. *Stylus* glaber, cum stigmatibus fere 5 mm. longus.

SPAIN. Almeria; on limestone mountains near the sea west of Almeria, growing with *T. intricatum* and *Galium ephedroides*, May 29th, 1924, *Ellman and Hubbard* 925 (type in Herb. Kew.).

This species and the next are clearly allied to *T. eriocephalum* Willk., and have probably been confused with that species by botanists visiting Almeria; but no unprejudiced observer who has seen the true *T. eriocephalum* from Lanjaron and the neighbouring villages can fail to distinguish them at a glance both by their habit and their facies. Specimens of *T. eriocephalum* from Lanjaron collected by Winkler, and cited in Suppl. Fl. Hisp. as seen by Willkomm himself, are in the Herbarium at Kew, and exactly match the figure and description in Willk. Illustr. The red, loosely hairy stems of the fully-grown plant are very characteristic. It evidently flowers much later than both of the new species at Almeria, as *Ellman and Sandwith* 719 collected at Lanjaron on May 15th was showing no sign of flowering for a considerable time.

Teucrium almeriense *Hubbard et Sandwith*, sp. nov.; affinis *T. eriocephalo* Willk. atque *T. Ellmanii* *Hubbard et Sandwith*, ab illo statura humili, indumento albo densissimo, capitulis subsessilibus parvis globosis densis approximatis, floribus minoribus; ab hoc habitu multo simpliciore ac humiliore, indumento multo minus dense lanato, capitulis subsessilibus globosis approximatis, calycis dentibus dentatis differt.

Planta humilis, laxa caespitosa, perennis, suffrutescens, 8-12 cm. alta, tota lana brevi alba vestita. *Caules* e basi complures subignosi 1-1.5 mm. diametro, ramis floriferis gracilibus fere simplicibus

suberectis, internodiis 4-10 mm. longis, in axillis foliorum inferiorum ramulos minutos foliatis, superiorum capitula omnia aequaliter subsessilia fere spicata gerentibus. *Folia* lineari-oblonga, obtusa, amplexicaulia, 4-6 mm. longa, ad 1.5 mm. lata, patentia reflexa vel ascendentia, crassa, fragilia, valde revoluta, marginibus undulato-crenatis. *Inflorescentia* e capitulo terminali atque paribus 2-7 subsessilibus vel brevissime pedunculatis satis approximatis vel etiam apice aggregatis composita. *Capitula* parva, globosa, 5-7 mm. longa atque diametro, densa. *Flores* albi, subsessiles. *Calyx* ut in *T. Ellmanii* sed dentibus 2-3-dentatis. *Corolla* ad 5 mm. longa; labium inferius ut in *T. Ellmanii* sed pilis in dorso loborum basi conspicue tuberculatis, lobis lateralibus sparsius ciliatis.

SPAIN. Almeria: rocky slopes of the Sierra de Gador, Almeria, May 24th, 1927, *Ellman and Nemes* 350 (type in Herb. Kew.).

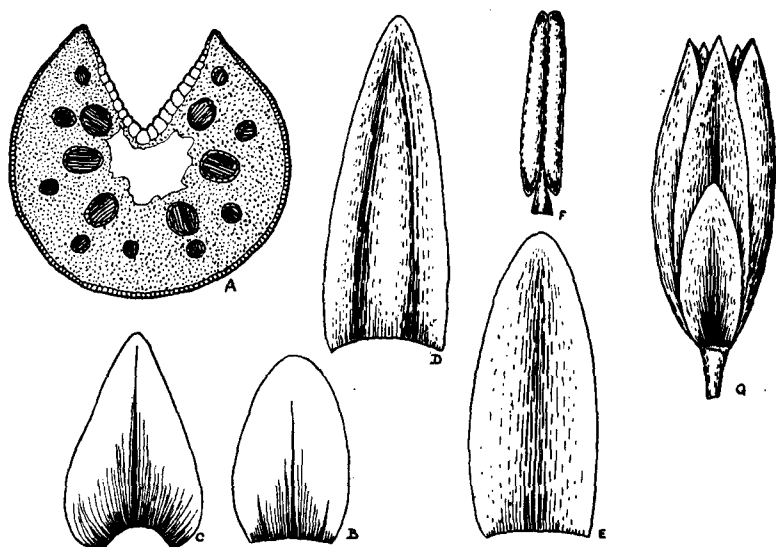
Juncus Ellmanii *Hubbard, Sandwith, et Turrill*, sp. nov.; affinis *J. squarrosus* L., sed culmis plerumque altioribus in medio vel supra medium unifoliatis, foliorum radicalium vaginis angustioribus, laminis multo gracilioribus flaccidioribus glaucioribusque, floribus antherisque paulo longioribus, capsula tepalis conspicue brevioribus differt.

Planta perennis, dense caespitosa. *Caules* erecti, 30-55 cm. alti, graciles, stricti, rigidi, solidi, laeves, inferne compressi canaliculatique, superne teretes, basi foliati, in medio vel supra medium unifoliati. *Folia* basalia numerosa; vaginae breves, 1-4 cm. longae, angustae, pallide fuscae; laminae tenuiter filiformes, setaceae, gracillimae, strictae vel flexuosae, teretes, supra leviter canaliculatae, erectae vel patentes, flaccidae, glabrae, laeves, basales 6-30 cm. longae, 0.5-0.6 mm. diametro, caulinae 1-6 cm. longae. *Inflorescentia* terminalis, 5-10 cm. longa. *Flores* 5-6.5 mm. longi. *Tepala* subaequilonga, oblonga, lanceolato-vel ovato-oblonga, obtusa vel apice involuta acuta, olivacea, apice marginibusque latis scariosis albis, interiora exterioribus paulo breviora. *Stamina* 6; antherae lineares, 3-3.5 mm. longae, flavae, filamentis basi dilatatis 0.75 mm. longis. *Ovarium* pallide fuscum, 1.75 mm. longum; stylus 1.5 mm. longus; stigmata 2 mm. longa, purpurea. *Capsula* ellipsoidea, obtusa, 3.2 mm. longa, 2.2 mm. lata, tepalis longe superata; semina ut in *J. squarrosus*.

SPAIN. Madrid: Escorial; in moist places on slopes of Cerro de los Avantos, 1350 m., June, 1924, *Ellman and Hubbard* 1023 (type in Herb. Kew.); in meadows near Escorial, June-July, *Graells* (Herb. Mus. Brit.); Sierra de Guadarrama, above Chozas, June 1854, *Bourgeau* 2298 (Herb. Kew.). Avila: near Bohoyo, in damp pastures at the base of the Sierra de Gredos, July 1863, *Bourgeau* 2551 (Herb. Mus. Brit.).

This species has been confused with *J. squarrosus* L., which grows in Northern Spain and Portugal, and may possibly occur in Central Spain. The specimens cited are remarkably uniform and have a strikingly distinct facies; the cauline leaf, long flaccid radical

leaves, long pale perianth segments and short capsules distinguish it at once from its ally. Cross-sections of the leaves of the two species have been found to be extraordinarily different from one another. *J. Ellmanii* may prove to be plentiful on the mountain ranges of Central Spain. The description of the capsule was taken from *Bourgeau 2551*.



Juncus Ellmanii Hubbard, Sandwith, et Turrill. A Transverse section of lamina, from dried specimen ($\times 70$). B and C Bracts ($\times 7$). D and E Outer and inner tepals ($\times 7$). F Stamen ($\times 7$). G Flower ($\times 7$).

Avenastrum albinerve (Boiss.) Hubbard et Sandwith, comb. nov. *Avena albinervis* Boiss. Voy. Esp. 656, t. 176 (1839-45); Willk. et Lge. Prodr. Fl. Hisp. i. 69 (1861).

Cadiz: Algeciras; abundant towards the summit of the Sierra de Palma, May 16th, 1924, *Ellman and Hubbard 593*.

Distr. South-west Spain, Portugal and Morocco.

Avenastrum bromoides (Gouan) Hubbard et Sandwith, comb. nov. *Avena bromoides* Gouan, Hort. Monsp. 52 (1762); Willk. et Lge. Prodr. Fl. Hisp. i. 69 (1861).

Segovia: in rocky places near Segovia, June 7th, 1924, *Ellman and Hubbard 1157*. Malaga: hills outside Malaga, May 21st, 1924, *Ellman and Hubbard 744*. Granada: on mountains south-east of Granada, 900 m., May 23rd, 1924, *Ellman and Hubbard 763*; on Silla del Moro at Granada, May 18th, 1926, *Ellman and Sandwith 734*.

Distr. Western Mediterranean Region from Italy and Algeria westwards (excluding the Atlantic islands).

Avenastrum sarracenorum (Gdgr.) Hubbard et Sandwith, comb. nov. *Avena sarracenorum* Gdgr. in Bull. Soc. Bot. France,

lx. 420 (1913). *A. filifolia* var. *velutina* Boiss. Voy. Esp. ii. 655 (1839-45); Willk. et Lge. Prodr. Fl. Hisp. i. 68 (1861).

Granada: on slopes of Cerro Calar north-east of Guejar-Sierra, 1350 m., May 24th, 1924, *Ellman and Hubbard 814*.

Distr. South Spain; Sierra de Alfacar and Sierra Nevada. Endemic.

Avenastrum sulcatum (J. Gay) Hubbard et Sandwith, comb. nov. *Avena sulcata* J. Gay in Delastre Fl. Vienne, 477, t. 4 (1842); Willk. et Lge. Prodr. Fl. Hisp. i. 69 (1861).

Cadiz: Algeciras; common on slopes of Sierra de Palma, May 16th, 1924, *Ellman and Hubbard 606*.

Distr. Iberian Peninsula and West France.

XXVI.—THE LAST ISSUE OF THE JOURNAL DE BOTANIQUE. M. L. GREEN.

In preparing the manuscript of the Index Kewensis, Supplement VII, for the press, the writer was confronted with the difficulty of assigning the correct date to those new names that appeared in Journal de Botanique, 1910-13, xxii (Sér. II. t. iii.) pp. 1-104. This was received at Kew in June, 1925, together with a postcard from the Muséum National d'Histoire Naturelle (Phanérogamie) Paris, explaining that the issue was printed but not distributed at the time of the death of the Editor, M. Louis Morot, and that it had recently been found in a cupboard in the Laboratoire d'Organo-graphie.

In order to ascertain whether any copies were distributed before 1925, a letter was sent to Professor Lecomte of the Muséum d'Histoire Naturelle Botanique, who replied that although the issue was printed in 1914, it was not distributed till 1925. This, therefore, according to the International Rules, is the correct date of publication.

The possibility that reprints of one or more of the three papers included in this unfinished volume may have been distributed prior to 1925 cannot entirely be excluded. The papers are (1) Dubard & Dop, Étude de quelques types nouveaux ou peu connus de Rubiacées de Madagascar. (2) A. Renard, De l'action germinatrice des différents corps alimentaires. (3) R. Viguier, Contribution à l'étude de la Flore de la Nouvelle-Calédonie.

Information regarding dates of receipt of reprints of any of these papers would be much appreciated.

The following is a list of the new genera, species and transferences contained in the work.

Princea, Dubard & Dop in Journ. de Bot. 1910-13, xxii. 2 (impress. 1914, distrib. 1925)—gen. nov. (Rubiaceae).

„ *arcuata*, Dubard & Dop, l.c.—Madag.

Alleizettea, Dubard & Dop, l.c. 6.—gen. nov. (Rubiaceae).

„ *bracteata*, Dubard & Dop, l.c.—Madag.

- Chomelia cinerea*, Dubard & Dop, l.c. 11 : *Ixora cinerea*.
 „ *Alleizetti*, Dubard & Dop, l.c. 12.—Madag.
Enterospermum pruinatum, Baill. ex Dubard & Dop, l.c. 13 : *Ixora pruinosa*.
Gallienia, Dubard & Dop, l.c. 18.—gen. nov. (Rubiaceae).
 „ *sclerophylla*, Dubard & Dop, l.c.—Madag.
Pyrostria buxifolia, Hochr. ex Dubard & Dop, l.c. 23 : *Plectronia buxifolia*.
 „ *Alleizetti*, Dubard & Dop, l.c. 24.—Madag.
Psychotria Princei, Dubard & Dop, l.c. 28.—Madag.
Myodocarpus Baillonianus, Harms ex Vig. l.c. 45, in adnot.—N. Caled.
 „ *intermedius*, Baill. ex Vig. l.c. 46, in syn. : *M. involu-cratus*.
Delarbrea Harmsi, Vig. l.c. 52.—N. Caled.
 „ *longicarpa*, Vig. l.c. 53.—N. Caled.
 „ *oblonga*, Baill. ex Vig. l.c. in syn. : *D. longicarpa*.
 „ *montana*, Vieill. ex Vig. l.c.—N. Caled.
 „ *arborea*, Vieill. ex Vig. l.c. 54, in syn. : *D. montana*, var. *arborea*, Vig.
 „ *crassiuscula*, Baill. ex Vig. l.c. in syn. : *D. montana*.
 „ *Balansae*, Baill. ex Vig. l.c. 55, in syn. : *D. paradoxa*, var. *Balansae*, Vig.
Tieghemopanax Lecardi, Vig. l.c. 66.—N. Caled.
 „ *Schlechteri*, Vig. l.c. 71 : *Polyscias Schlechteri*.
Polyscias gigantea, Vig. l.c. 72.—N. Caled.
Botryodendrum lobatum, Panch. ex Vig. l.c. 80, in syn. : *Meryta microcarpa*.
Chondylophyllum, Panch. ex Vig. l.c. in syn. : *Meryta* Forst. (Araliac.).
 „ *lobatum*, Panch. ex Vig. l.c. in syn. : *Meryta microcarpa*.
 „ *Guilleini*, Panch. ex Vig. l.c. in syn. : *Meryta microcarpa*.
Botryomeryta, Vig. l.c. 84.—gen. nov. (Araliaceae).
 „ *Lecardi*, Vig. l.c.—N. Caled.
Dizygotheca coenosa, Vig. l.c. 93.—N. Caled.
Schefflera LeRati, Vig. l.c. 99.—N. Caled.
 „ *Pancheri*, Baill. emend. Vig. l.c. 103.—N. Caled.

XXVII.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies :—Mr. J. L. ILLINGWORTH, B.A., Curator and Agricultural Superintendent, Virgin Islands ; Mr. C. B. C. HANDLEY, B.Sc., Assistant Agricultural Officer, Kenya ; Mr. R. E. MOREAU, Secretary and Librarian, Mr. P. J. GREENWAY, Systematic Botanist, Captain E. M. NICHOLL, Manager, Kwamkoro Estate, East African Agricultural Research Institute, Tanganyika Territory ; Mr. H. MARSLAND, B.Sc., Cotton Investigator, Agricultural Department, Tanganyika Territory.

Mr. C. A. SMITH, B.Sc., of the Division of Botany, Horticulture and Entomology, Department of Agriculture, Pretoria, has been appointed by the Government of the Union of South Africa, Assistant for South Africa in the Herbarium at Kew, in succession to Miss I. C. Verdoorn, who returned to South Africa on completion of her term at Kew (*K.B. App. I.* 1928, p. 1).

LAURENCE ATHELSTAN MOLESWORTH RILEY.—By the death on March 13th, at the early age of 39, of L. A. M. Riley, Kew has lost a valued collaborator. Laurence Riley was the eldest son of Athelstan Riley of Trinity Manor, Jersey, and was educated at Eton and Pembroke College, Oxford, where he took the degree of B.A., eventually proceeding to M.A. in 1927. After leaving college he engaged in journalism for a few years until the outbreak of the war, when he obtained a commission in the Royal Jersey Militia. To his great disappointment, however, he was unable to see active service owing to his suffering from chronic asthma, to which he had been a martyr from boyhood.

In 1920 Riley came to work in a voluntary capacity in the Herbarium at Kew, and carried out a much needed re-arrangement of the *Onagraceae*, which led to a paper on *Raimannia* and allied genera. As a sequel to naming a collection of dried plants from Sinaloa, N.W. Mexico, he undertook a critical enumeration of the known flora of that State, publishing five parts, covering the whole of the Polypetalae, during 1923-24. In 1924 he was appointed Botanist to the "St. George" Pacific Expedition, and proceeded on the "St. George" to Madeira, Trinidad and Panama, making botanical collections at each of these places. Unfortunately while at Panama he became seriously ill, and on medical advice returned to England. However, his scientific colleagues continued the botanical work of the Expedition, and the plants which they collected were forwarded to him for determination. The botanical results of the "St. George" Expedition were published by Riley in a series of papers dealing with the floras of Madeira, Trinidad, the Galapagos Islands, Rapa and Panama, while shortly before his death he was engaged on the study of the remaining collection, that from the little-known island of Gorgona off the coast of Colombia.

Some years ago he settled at North Warnborough, near Odiham in Hampshire, and commenced the formation of what was virtually a private botanic garden, from which all plants of horticultural origin were rigorously excluded. He was particularly successful in the cultivation of new introductions, and raised numerous Balkan plants of which seeds had been sent to him from Kew, generously supplying material, both living and dried, for study and preservation in the Kew Herbarium. The garden in 1927 contained 438 species, and as about 700 packets of seeds had been received for sowing in 1928, at least 1,000 species would have been in cultivation by the end of the year. The collection is being transferred to Mr. W. E.

Th. Ingwersen, who will carry it on as the "Laurence Riley Memorial Collection" in a special part of his Alpine and Hardy Plant Nursery near East Grinstead, where the plants will be available for study by botanists.

Riley's published work was characterized by thoroughness and polish, and was highly esteemed not only in this country but by botanists in the United States. His varied interests, which included history, music, literature and entomology, in addition to botany, brought him into touch with a wide circle of friends, to whom his charm of manner and quaint humour endeared him. His loss will be keenly regretted not only by his personal friends and colleagues at Kew, and those on the scientific staff of the "St. George" Expedition, but by all engaged in the study of the Tropical American Flora.

T. A. S.

LIST OF BOTANICAL PAPERS BY THE LATE MR. L. A. M. RILEY.

- Oecology of *Montia fontana* L. (Journ. Bot. 1907, xlv. pp. 211-12; 1908, xlv. p. 92).
 Notes on *Raimannia* and Allied Genera (with T. A. Sprague) (Kew Bull. 1921, pp. 198-201).
 Meristic Floral Variation in *Galieae* i., ii. (Journ. Bot. 1922, lx. pp. 230-232; 1924, lxii. pp. 20-21).
 Contributions to the Flora of Sinaloa, i.-v. (Kew Bull. 1923, pp. 103-115, 163-175, 333-346, 388-401; 1924, pp. 206-222).
 Variable aestivation of *Ranunculus bulbosus* and *R. acer* (Journ. Bot. 1923, lxi. pp. 209-212).
 Materials for the Flora of British Honduras, i. (with T. A. Sprague) (Kew Bull. 1924, pp. 1-20).
 The Mexican and Central American Species of *Ouratea* (Kew Bull. 1924, pp. 101-111).
 Further Notes on *Ouratea* (Kew Bull. 1924, pp. 363-365).
 A Recension of *Lopezia* (with T. A. Sprague) (Journ. Bot. 1924, lxii. pp. 7-16).
 Notes on Madeira Plants ("St. George" Pacific Expedition, 1924) (Kew Bull. 1925, pp. 26-33).
 Critical Notes on Trinidad Plants ("St. George" Pacific Expedition, 1924), (Kew Bull. 1925, pp. 133-142).
 Critical Notes on Galapagos Plants ("St. George" Pacific Expedition, 1924), (Kew Bull. 1925, pp. 216-231).
 Notes on the Flora of Rapa ("St. George" Pacific Expedition, 1924-5) (Kew Bull. 1926, pp. 51-56).
 Revision of the Genus *Calycolpus* (Kew Bull. 1926, pp. 145-154).
 New Species from Panama, Coiba and Cocos Islands ("St. George" Pacific Expedition, 1924-5) (Kew Bull. 1927, pp. 119-127).

On the 14th March a pleasant ceremony took place at the residence, in London, of the American Consul-General, when Mr. H. N. RIDLEY, C.M.G., F.R.S., F.L.S., was presented with the Frank N. Meyer Medal for Distinguished Services in Plant Introduction. This medal is in honour of a distinguished American Agricultural Explorer of the Office of Plant Introduction, who travelled extensively in Asia for thirteen years and lost his life in the waters of the Yangtzi Kiang River. The award of the medal is entrusted to the President of the American Genetic Association by the staff of the Office of Foreign Plant Introduction of the Department of Agriculture of the

United States Government. This year it has been presented to Mr. Ridley in recognition of the important part he played in establishing plantations of the Para Rubber Tree in the Oriental Tropics. The American Consul-General, Mr. Horace L. Washington, who was accompanied by Mrs. Washington, made the presentation in the presence of Mr. Boylston A. Beal, Honorary Counsellor to the American Embassy, Mr. Robert L. Buell, Second Secretary to the Embassy, the Assistant Director and Dr. J. M. Dalziel.

Botanical Magazine.—Part iii of Vol. clii (1926) of the Botanical Magazine, which was published in March, 1928, contains the following illustrations:—

Watsonia Beatricis Math. & L. Bolus (t. 9139), with scarlet-orange flowers, considered to be the most strikingly beautiful of the *Watsonias*, from Cape Colony; *Actinidia coriacea* Dunn (t. 9140), from Central Szechuan to North-eastern Yunnan; *Halimium umbellatum* Spach. (t. 9141), a small evergreen shrub with white flowers, from South-west Europe and North Africa, figured from a plant grown in a border at Kew; *Clematis macropetala* Led. (t. 9142), with axure- to purple-blue flowers, from the mountains of Northern China; *Trollius yunnanensis* Franch. (t. 9143), common in the Alpine meadows of North-western Yunnan, figured from a plant grown in a boggy corner of the Rock Garden at Kew; *Phlomis Bovei* Noé (t. 9144), figured from a plant raised at Kew from seed collected by Mr. St. Quintin in Algeria; *Primula bella* Franch. (t. 9145a), conspicuous for the ball of white hairs which closes the throat of the purple-rose corolla, a tiny plant from Yunnan at 3000-4000 m. altitude; *Raoulia subsericea* Hook. f. (t. 9145b), an early coloniser of shingle in the mountains of the South Island, New Zealand; *Schizandra rubriflora* Rehder & Wilson (t. 9146), a handsome climber with deep crimson flowers and claret-red fruits, from Central Szechuan; *Rhododendron semibarbatum* Maxim. (t. 9147), with solitary, short-stalked, pinkish-white flowers almost hidden below the terminal leaves, from Japan; *Fritillaria acmopetala* Boiss. (t. 9148), from Western Syria and Southern Asia Minor (this name was formerly given to *F. Elwesii* Boiss.); *Primula involucreta Wardii* Stapf (t. 9149), with pale mauve to pink or purple, rarely white, flowers, the Chinese representative of the Himalayan *P. involucreta*; *Trias picta* Parish (t. 9150), with yellowish-green to yellowish flowers densely spotted with red, from lower Burma.

Journal of the Botanical Society of South Africa.—Part xiii, 1927, of the Journal of the Botanical Society of South Africa has recently been received. This issue consists of thirty pages of text, which are liberally illustrated with fine photographs and plates. Two of the plates contain coloured figures of new species of *Mesembryanthemum* and its allies. The principal contributors are Mrs.

L. Bolus, with several papers on *Mesembryanthemum* and allied genera, Mr. J. W. Mathews, who writes on South African succulents, and Prof. R. S. Adamson, who gives an interesting account of the alien trees of Kirstenbosch. An increased list of members of the Society completes an attractive publication.

Department of Agriculture, Central Provinces*.—Bulletin xxii of the Department of Agriculture, Central Provinces, India, is devoted to the cultivation of Groundnuts. Though written primarily for the cultivator in the Central Provinces this Bulletin contains much which is of interest to those concerned with the cultivation of this crop in other parts of the world. After describing its place in rural economy the authors deal with varieties, climatic conditions, seed selection, cultivation, harvesting, costings, marketing, diseases and pests.

Harvard Botanical Gardens, Cuba†.—This is the first published report of these Gardens, which were started in 1900, and covers a period of over a quarter of a century. The bulletin is divided into sections, which deal with the meteorology of the station, the work carried out on cane breeding, and a descriptive list of the trees grown in the arboretum. This last is alphabetically arranged and gives information as to the size, rate of growth, and the object for which the tree is grown. The section on fruit gives a list of the fruit collection and short notes on the Avocado pear and Citrus fruits. Suitable stocks of the latter are discussed. The seedling Tangerine and *Citrus decumana* are said to give excellent results, while the defects of the sour orange, the rough lemon and the native lime are mentioned. The results of various trials of legumes, tropical cereals, forage grasses and fodder legumes are fully dealt with. Vegetables receive considerable attention and the time of planting and time of maturity for a very large number of named varieties are stated.

The bulletin closes with the Annual Report for 1926 and in this the flowering seasons of over 500 species grown in the Gardens are tabulated.

*By W. Youngman and D. L. Janoria. The Government Press, Nagpur, 1927, pp. 16. Price 2 annas.

†Report of the Harvard Botanical Gardens, Soledad Estate, Cienfuegos, Cuba (Atkins Foundation), 1900–1926, by Robert M. Grey. Cambridge; Harvard University Press, pp. 113, 1927.

BULLETIN OF MISCELLANEOUS INFORMATION No. 5 1928 ROYAL BOTANIC GARDENS, KEW

XXVIII.—COVER CROPS IN TROPICAL PLANTATIONS. H. C. SAMPSON.

The term "Cover crop" is in this article applied to herbaceous plants and the coppiced growth of shrubs which are cultivated among plantation crops for the purpose of soil conservation and soil improvement.

Uses of a cover crop.

A cover crop may fulfil one or more of the following functions:—

- (a) Its foliage may protect the soil from the effects of heavy rain or water drip from the plantation crop. This water action can affect the soil in two ways. It can cause soil denudation and it can pack the soil.
- (b) The foliage of the cover crop may also check surface wash, by preventing the collection of surface water and by checking its rate of flow when it does collect.
- (c) In the case of a young plantation crop where the tree canopy is not complete, a dense cover crop will protect the soil from the effects of the sun's rays, thus checking the loss of humus.
- (d) A dense cover crop will act as a "smother crop" and will check the growth of weeds.
- (e) The root system of a cover crop may help to bind the soil and thus check surface erosion.
- (f) If a cover crop has a deep root system it will assist in the drainage of the soil and subsoil. This will increase the water-holding and water-absorbing capacity of the soil and will thus enable the roots of the plantation crop to penetrate the soil more deeply.
- (g) The natural leaf fall, or the green dressings made available by cutting back the cover crop, will by the addition of organic matter improve the texture of the surface soil as well as its fertility. If a cover crop belongs to the family Leguminosae, it may enrich the soil in nitrogen, especially if it is turned in or utilised as a green dressing.

Selection of suitable cover crops.

The choice of a cover crop is not a simple matter, and it by no means follows that what is found suitable for this purpose in one country for a particular plantation crop will prove equally suitable in another. Again, what is found to be quite suitable as a cover crop among one plantation crop may not be suitable if tried among another plantation crop. A cover crop may thrive under certain

local conditions governed by seasons, soils and elevation, but not under others. The following examples are cited. The cultivation of *Centrosema pubescens* Benth. is favourably reported on as a cover crop in established rubber in the Cochin rubber districts of S. India, while in Malaya it is stated that this cover crop cannot stand the shade of mature healthy rubber. In the former area there is a natural leaf fall in the dry weather preceding the monsoon, which is followed by "secondary leaf fall" during the heavy rains of the monsoon; thus for a great part of the year there is never that heavy leaf canopy which one sees in Malaya and which there prevents the cover crop from thriving. To follow up the same example, *Centrosema pubescens* is recommended in Malaya for renovating mature rubber which has been allowed to deteriorate by excessive soil erosion, and it is said that its cultivation will restore the leaf canopy, but that *Dolichos Hosei* Craib (the Sarawak Bean) should be grown when once this canopy is restored. Similarly *Centrosema pubescens* makes quite a suitable cover crop for coconut plantations in Malaya, but, as stated above, will not thrive under the heavy shade of mature healthy rubber. Another example may be given. *Tephrosia candida* DC. is a recognised "contour hedge crop" for tea in Java, Ceylon, and Assam, but in the tea districts of N. Travancore this dies out when the heavy rains of the monsoon set in. The conditions here, however, are perhaps unique, as the June to August rainfall is over 200 inches following on a dry season.

The necessity for further and continued research.

It does not follow that the cultivation of a cover crop is in all cases beneficial. Though this may prove quite valuable when grown on a type of soil which is capable of retaining moisture, it might prove even injurious to the plantation crop when this is grown on a light soil in countries where the conservation of soil moisture is of importance. Whether such injury could ultimately be overcome by the addition of organic matter, which the cover crop would supply, and by the increased moisture-retaining capacity of the soil which would necessarily follow, remains to be proved. Recent work at Peradeniya, Ceylon, indicates that this may be the case.

There are other questions also which have to be considered. Many of the plants which have been tried as cover crops have a tendency to climb, and this naturally rules out many of them for use among certain plantation crops. For example, there is little doubt that *Mucuna aterrima* Holland would make an excellent annual cover crop but for the fact that it is such a strong climber that it would very likely choke out a plantation crop such as tea or coffee. Other cover crops have had to be ruled out as they have been found to harbour some disease from which the plantation crop is also liable to suffer. Then again the cover crop may itself succumb to disease or may die out and something else may have to be found to replace it. There is no doubt that land does get "sick" of growing one

particular crop, and this appears to be specially the case where legumes are concerned, so that it may prove necessary to have a rotation of cover crops. In any case research on this question of suitable cover crops cannot be allowed to stand still, as one never knows when disaster will overwhelm any which is now being grown, and in many areas it is essential that there should be some form of cover crop.

The majority of cover crops now being grown are plants which have been brought into cultivation comparatively recently, and in some cases a considerable amount of research has been necessary to find out how best these are to be treated. There is usually difficulty in getting seed of the wild Leguminosae to germinate readily. Most of these will yield to a treatment with concentrated sulphuric acid for a varying length of time. Work in this direction has been carried out in Sumatra with a large number of possible cover and shade tree crops, and a bulletin has been published¹ giving the results of these trials. In some cases vegetative propagation is the only feasible method, and work in this direction has been carried out at Peradeniya in Ceylon with *Dolichos Hosei* and *Indigofera endecaphylla* Jacq., two of the most important cover crops now being grown there under rubber and tea respectively.

Another line of research is also indicated which up to the present has received little attention. It is that connected with growing mixed cover crops. An instance of this is the mixing of *Centrosema pubescens* with *Dolichos Hosei*. The former is grown in Malaya as a cover crop in young rubber, but is not suited for old rubber as it cannot stand the shade of the latter; there is, however, an intermediate stage when the former cover is tending to die out on account of the increasing shade, and it is then that a mixture of the two cover crops is suggested. In the case of sisal, *Phaseolus lunatus* Linn. has in Java been found to be one of the best cover crops to grow, but this has the disadvantage that it takes a long time to cover the ground and, unless great expense is incurred in weeding, the cover crop may be suppressed before it is fully established. In such a case a mixture of a quick-maturing cover crop with the slower growing *Phaseolus lunatus* might be found to solve this difficulty.

The simplest form of cover crop is one which has only within recent years been introduced, and this is what is now termed "selective weeding." In the early days of plantation industries "clean weeding" was the rule. The disastrous results of this soon became apparent. Soil erosion naturally followed, and the crops showed the effects of this. Recourse was then had to the use of concentrated fertilisers and artificial manures. Many planters then abandoned "clean weeding" on this account and allowed the natural vegetation to remain, keeping it in check by cutting back.

¹ Med. Alg. Proefstation der A.V.R.O.S. Alg. Serie. No. 27. Germinating experiments with seeds of different species of green manures. Dr. Maas.

As such vegetation consisted largely of grasses, this operation was termed "grass knifing." Then the question was raised whether it would not be better to have controlled growth of some plant which would protect the ground more efficiently than a miscellaneous growth of weeds, and the possibility of some of these being able to enrich the soil with nitrogen led to trials with plants of the family Leguminosae. As it is not always practicable to grow a definite cover crop for reasons such as excessive rainfall, badly distributed rainfall, poverty of the surface soil, excessive shade, etc., a system has of recent years sprung up known as "selective weeding," *i.e.*, plants which are considered desirable from the point of view of soil cover are allowed to remain, while grasses and other plants which are liable to choke these are removed.

Though the value of Leguminous crops has been well known to arable farmers for centuries, and though such crops have been used for ploughing in, or composting, the study of cover crops in connection with the plantation industry is of comparatively recent date. At the close of last century the number of plants which had been tried as cover crops was very small indeed, but at the present time a very large number have been tried, and of these probably about a score have been found to be distinctly useful and have been taken up by the planting community and grown for one purpose or another. Even at the present time this line of investigation is mainly confined to the planting countries of the East. Nowhere has this work been carried out so thoroughly as in the Dutch East Indies, and it is from there that most of the cover crops now cultivated in Malaya and Ceylon have been introduced. The results of the work done in Java are described by W. M. van Helten² in a publication of the Department of Agriculture. Recently this line of research has begun to receive attention in the newer planting countries of Africa, but there so far the work has got little beyond the experimental stage.

An aspect in connection with cover crops which has occasionally been referred to, but which up to the present appears not to have received sufficient attention, is the question of manuring to promote the growth of the cover crop with a view to manuring the plantation crop ultimately, though indirectly. This aspect has received a certain amount of attention in arable farming when growing a green manure crop for ploughing in. It is understood that this used to be a sound agricultural practice among the indigo planters in Bihar, and it is in use in English farming, especially in the manuring of temporary pastures to encourage the growth of clovers and other legumes which enrich the soil in nitrogen. A considerable amount of attention has been paid to this aspect of the question by the Scientific Staff of the Indian Tea Association.

An endeavour has been made to summarise such information as is available regarding cover crops which have been tried and which

² Mededeelingen van het Algemeen Proefstation voor den Landbouw. No. 16.

are in use. These are arranged under the different plantation crops among which they are being grown or tried, and as in some cases the same cover plant has been found of use when grown among different plantation crops, a certain amount of what may seem to be repetition is inevitable. Such an arrangement, however, appears to be advisable as it serves to indicate more clearly the conditions under which such plants will grow, and will thus better serve as an indication as to what, after trial, may be suitable as a cover crop with other plantation crops such as sisal and cocoa, about which little information appears to be available.

Tea.

The tea bush in a plantation is an artificial plant in that it is kept cut back, in order to make it produce a flush of leaf which can easily be picked by the pluckers from the ground.

The nature of the crop therefore precludes the cultivation of many cover crops which would be suitable among a tall-growing plantation crop. Nothing which has a strong tendency to climb, and thus smother the tea bush, can be grown.

Cover crops in tea are grown with two main objects in view, firstly to check soil erosion, and secondly to maintain or increase the supply of humus and plant food in the soil.

In Java, where tea is planted on the contour, a method of planting which is beginning to claim attention in Ceylon, the cover crop is grown in contour hedges which alternate with catch drains, and usually there are one or two rows of tea between the contour cover crop and the catch drain according to the steepness of the ground. As the soil and debris which accumulates in the catch drain is always thrown up hill, it can easily be understood that in time terraces are formed with the catch drain at the back and the contour hedge crop in the middle of the terrace. The cover crop is sown or planted in a double line. When well established it is cut back to about nine inches from the ground so as to make it bush out. This is pruned back four or five times a year, and the cuttings are spread on the floor of the terrace where they are hoed in. A description of these Java methods is given by Hope.³

Somewhat similar contour hedges are now used both in Assam and in Ceylon. In the S. Indian tea estates of N. Travancore there is no record of any plant having been discovered for this purpose which would suit the rather unique climatic conditions which are experienced there.

Besides these contour hedge crops there are other plants which are grown as ordinary ground cover crops. In Assam these are chiefly plants which are treated as green manure crops and are usually turned in when three to four months old. In Ceylon and S. India, where there is greater necessity to protect the steeper slopes against soil erosion, certain perennial cover crops have been

³ Agricultural Journal of India. Vol. xi. p. 134.

tried and several of these are now being extensively grown. The main object of such cultivation is to lessen the serious loss caused by soil erosion of what might be termed chemical and mechanical soil fertility.

It must always be remembered that complete cover crops such as these are in direct competition with the tea bush in utilising the plant food and moisture in the soil, and it is a question whether the immediate effect of growing such is beneficial to the tea. Recent work in Ceylon, where *Indigofera endecaphylla* has been grown as a cover crop, indicates that its cultivation has not had a depressing effect on the tea. The cultivation, however, of crops of this type opens up a large field for investigation regarding soil management, the manuring, cultivation, treatment and utilisation of the cover crop. In Assam, where cover crops are largely grown for the purpose of turning in when three or four months old, experiments carried out indicate that while these are growing and utilising plant food and moisture from the soil they are in direct competition with the feeding system of the tea bush, and do have a decided depressing effect on the yields of tea plucked, but when they have been turned in a marked improvement is noticed in the amount of tea plucked, as soon as such green dressings have become incorporated with the soil.

Contour hedge crops.

The three well-recognised contour hedge crops in Java are *Clitoria cajanifolia* Benth., *Leucaena glauca* Benth., and *Tephrosia candida* DC.

Clitoria cajanifolia Benth. A sub-erect perennial shrub indigenous in Malacca, the Straits Settlements, Java and Tropical America. The plant is propagated from seed which is sown in situ.

Java. This has been used for many years as a contour hedge crop as well as a soil binding crop along the margin of field drains.

Assam. Introduced from Java in about 1915, and has been found to be equally satisfactory here. It has to be cut back three or four times a year.

Ceylon. Introduced from Java in 1922. In a trial cultivation at Peradeniya a sowing in June gave a dense bushy growth 5-6 feet high within six months. Since then this has been repeatedly cut back and soon makes fresh vigorous growth. Sown in March on a bare, washed slope, where many other possible cover crops had been tried and failed, it soon became established and in nine months an excellent hedge was formed.

Leucaena glauca Benth. A small tree, probably a native of Tropical America, but common both in the new and old world tropics. This is commonly grown as a contour hedge crop in Java, propagated by stakes and cuttings, and thrives up to an altitude of 4000-5000 feet. It is very suitable for this purpose as its procumbent branches assist in checking soil erosion, but the hedges must be cut back three or four times a year. It is also grown as a wind

break and shelter belt among tea and the light shade which it casts is said to be of benefit.

Indigofera suffruticosa Mill. Tropical America and the W. Indies. This has been tried both in Assam and Ceylon and is favourably reported on.

Indigofera arrecta Hochst. A native of E. and S. Africa.

In Assam this is reported to do well in all tea districts and is suitable for contour hedge planting. In Ceylon this has been tried at Peradeniya as a contour hedge plant and it is reported that though it starts well it dies out when about eighteen months old and after three loppings.

Indigofera Gerardiana R. Grah. (*Indigofera dosua* Wall.).

Assam. This crop is grown from seed and is stated to do well in all hill districts; it is also being tried on the plains, treated as a contour hedge crop.

Tephrosia candida DC. India, Malaya, naturalised in Jamaica. "Boda medaloa." A sub-erect perennial shrub. The plant is propagated from seed which is sown in situ. Germination is improved if the seed is soaked in concentrated sulphuric acid for from 10-20 minutes. This has been cultivated now for many years in Ceylon, Malaya, Java and India. It is grown much in the same way as *Clitoria cajanifolia*, but must be cut back before it flowers and seeds if it is to persist for any length of time. If treated in this way it is said to last for from 4-7 years in Ceylon and for 3 years in Assam. In the latter place it is recorded that its cultivation had no effect on the growth of tea for the first two years, but in the third year there was a significant increase. Its cultivation is reported to have met with indifferent success in the tea districts of Palni and Travancore in S. India as most of it died out in the heavy monsoon rains. Details of numerous trials with this in various parts of the Dutch East Indies are recorded by van Helten (l.c.).

Tephrosia Hookeriana var. *amoena* Prain. In Java this is stated to form a compact hedge when grown in lines, but it does not last more than a year or two.

Perennial ground cover crops.

Indigofera endecaphylla Jacq. A spreading procumbent perennial belonging to the Old World tropics.

Travancore, S. India. Reports from the Peermade Tea Station state that this is the most promising cover crop as yet tried but even it may die out during the heavy monsoon rains.

Ceylon. This plant was introduced to Ceylon from S. India and was first grown at Peradeniya in 1921. Planted two feet apart between rows of tea bushes it will make a complete ground cover in about five months. It has been tried with success at elevations ranging from 500 to 6000 feet. Reports on definite experiments with regular planting in tea are all quite recent and, though the tea

bushes look well and flush freely, no definite increases in yield have as yet been recorded. All that can be said is that the bushes have not gone back in condition. The method of propagation recommended is to grow this in a nursery either from seed or from cuttings and to cut off the procumbent shoots from the nursery plants when these are about a foot long. Three or four cuttings are planted together at intervals of about two feet between the rows of tea bushes. One acre of nursery is stated to be sufficient to plant up seventy acres of tea garden.

Java. Referred to in Java publications of 1925 and 1926 as most promising not only as a cover crop but also as a fodder crop for livestock.

Desmodium triflorum DC. (*Desmodium heterophyllum* Wall.). A native of the tropics generally.

Ceylon. There is stated to be a certain demand for seed. Probably referring to this species The Tropical Agriculturist states that the plant adversely affects the tea bush when the growth becomes too dense, and it should be forked through occasionally to assist soil aeration. Burnett of Dickoya Estate, in a recent article in the same publication, states his opinion that its effect is detrimental to tea as its matted root system prevents soil aeration.

Travancore, S. India. The report on the Peermade Tea Station states that this plant covered the ground during the rains but that it died out in the dry weather.

Desmodium polycarpum DC. (*Desmodium heterocarpum* DC.). Tropical Asia and Australia.

Assam. This is a common plant in grass jungles and is stated to be suitable for planting on terraces and slopes to prevent wash. If sown in the nursery in February, cuttings for planting can be taken in the following August. When once established it gives no trouble. Suitable for contour planting.

Java. This plant has been grown experimentally here.

Desmodium purpureum Fawcett and Rendle (*Desmodium stipulaceum* DC.; *Desmodium tortuosum* DC.). Florida, West Indies and tropical America.

Assam. Stated to grow well on very poor soils. It can either be sown directly among the tea or can be propagated by means of cuttings.

Desmodium retroflexum DC. Burma and the Himalaya region, Assam. Stated to be very similar to *D. purpureum*, but makes a better cover crop.

Oxalis corniculata Linn. Cosmopolitan.

Travancore, S. India. Reported to be a great success as a cover crop. Petch in The Tropical Agriculturist also makes mention of this as a possible cover crop.

Another species of *Oxalis* not identified, which has a purple flower, is also stated as being successful as a cover crop in Travancore.

Eupatorium pallescens DC. Brazil.

In Java this is stated to be useful in establishing vegetation on worn-out slopes where nothing else will grow. It can be profitably utilised by being brought in and buried in trenches among the tea.

Annual ground cover crops.

The practice of growing quick-maturing crops for turning under seems to be largely confined to Assam, where the following have been tried for this purpose. These are turned in when about twelve weeks old.

Cajanus cajan Millsp. (*Cajanus indicus* Spreng.). Tropics and subtropics of the Old World. The use of this has given remarkable increases in tea yields.

Glycine hispida Maxim. The native variety of this has been grown with success for many years.

Sesbania bispinosa Steud. (*Sesbania aculeata* Pers.), and *Sesbania aegyptiaca* Poir. Old World tropics. These are both stated to be useful on "red bank" and light soils.

Cyamopsis psoraloides DC. This has been tried but no information is available as to how far this is useful.

Crotalaria juncea Linn. Tropics. This has given good results on all soils.

Crotalaria striata DC. Tropics. Commonly found growing wild on the sandy flats of the Brahmaputra and on the sandy soils of the Dooars. It grows well on the poorest soils.

Crotalaria sericea Retz. This species appears to be suggested as a suitable crop though it had not been tried (1918). The leaves are larger and appear more succulent than those of *C. striata* DC.

Phaseolus lunatus Linn. Tropics generally. Bush forms of this are being tried for the Mlange tea districts of Nyasaland as a soil cover.

Mucuna spp. Bush types of the imported velvet beans are being tried for the Mlange tea districts of Nyasaland as a soil cover.

Crotalaria usaramoënsis E. G. Baker. E. Africa. This is grown in Java between the rows of tea for cutting as green dressings. It is somewhat similar to *C. striata*, but is said to give heavier cuttings. It is also being tried in the same way in Ceylon. It must be cut before it is allowed to seed, otherwise it is liable to die out.

Crotalaria anagyroides H.B.K. Tropical America. This is similar to *C. usaramoënsis*.

Coffee.

The question of cover crops for coffee is more complicated than for tea; for not only are there several species of coffee under cultivation, many of which require special conditions of soil and climate, but the question is further involved by the system of pruning adopted and the necessity or otherwise of top shade. These conditions

regulate the intensity of the shade on the ground and therefore the suitability of any particular plant as a cover crop.

In the case of *Coffea arabica* almost every country has its own method of cultivation, varying from the widely spaced unpruned trees as grown in Brazil to the close planted, topped and heavily pruned bushes in S. India. Different systems of pruning also affect the amount of shade. In parts of Central America new wood is encouraged and all coffee is borne on primaries, while in the East, where the tree is trained to a single permanent stem, the coffee is borne on secondaries and tertiaries which are encouraged by the system of pruning adopted. This latter method means a much heavier ground shade and one which is much nearer to the ground. This would at once rule out any plants which require full sunlight and which have a tendency to climb. Then again large-leaved species such as *C. excelsa* Cheval. and *C. liberica* Hiern throw a much denser shade than do the varieties of *C. arabica* Linn.

Little information is available as to what effect cover crops have on the yield of coffee, but considering that coffee does not require the same amount of rainfall as is required for tea and that it is always regarded as a surface-feeding crop, it is likely that there would be greater competition between the plantation and the cover crop both for plant food and for soil moisture than there would be in the case of tea.

There can be no doubt, however, that where coffee is planted on land which is liable to surface wash, contour hedge planting on the lines which have been adopted for tea can with advantage be tried—in fact in Java such a system is adopted in the case of *C. robusta*, and the same plants are utilised as contour hedge crops as for tea. Similarly *Leucaena glauca* is used there for light lateral and top shade.

Clitoria cajanifolia Benth. is recommended in the Dutch East Indies as a contour hedge in *robusta* coffee up to elevations of 2000 feet.

Indigofera arrecta Hochst. has been tried as a contour hedge crop in *robusta* coffee at Peradeniya, Ceylon, and is said to have made good growth.

Tephrosia Hookeriana var. *amoena* Prain is stated also to do well as a contour hedge crop in Java at elevations varying from 600 to 2000 feet, though it is stated that the plants are not quite so vigorous if planted under half shade. It is said to be very sensitive to heavy rain when young.

Desmodium gyroides DC. A native of tropical Asia. This has been found to be most useful in Java up to an elevation of 2500 feet and stands cutting back well. It produces numerous leaves and forms a fairly thick humus layer.

Perennial ground cover crops.

Indigofera Anil Linn. Java. This is reported to make a nice bushy growth. Sown in line 18 inches to 2 feet apart, it covers the

ground with a dense growth within three months, and the plants can be cut back after six months. The plant lives for about two and a half years. A certain amount of difficulty is experienced in weeding the crop when young.

Indigofera endecaphylla Jacq. From the trials made with this at Peradeniya, Ceylon, the opinion has been formed that this appears to be suitable as a cover crop for *robusta* coffee.

Centrosema pubescens Benth. Tropical America. Experiments carried out at Ituri, Belgian Congo, have made a favourable impression as to the possibilities of this plant as a cover crop for *robusta* coffee. The points which are emphasised are that the plant is a perennial and never completely sheds its leaves even in the dry weather, that it is deep-rooted and opens up the soil, and that a complete cover is procured in 4-5 months. An objection to this plant which is not raised in the report is its climbing habit.

Trifolium Johnstoni Oliv. E. Africa. A report on the trial of green manure and cover crops at the Scott Laboratories, Kenya, states that this produced a wonderful mat of growth and would stop wash very well on slopes.

Annual ground cover crops.

Cassia hirsuta Linn. Tropical America. This has been tried at the Coffee Station at Sidapur, Coorg, S. India, but without much success. It would only grow in the open and could not stand the shade of *Grevillea robusta* A. Cunn.

Crotalaria semperflorens Vent. Tropical Asia. This is also under trial at the Sidapur Coffee Station but there is no record of its success or otherwise.

Numerous species and varieties of plants likely to prove suitable as green manure and cover plants are being grown at the Scott Laboratories, Kenya. These include both indigenous and exotic plants, and a full list of these is published in the Annual Report of the Department of Agriculture, 1926. Among these the following appear to be worthy of mention.

Crotalaria intermedia Kotschy. Tropical Africa. "Very promising."

Crotalaria incana Linn. Tropics and subtropics. "Most promising for coffee."

Vigna unguiculata Walp. (*Vigna catjang* Walp.). Tropics and sub-tropics of the whole world. A native variety named "Embu," with an erect habit, is stated to be promising for coffee.

Astragalus Aucheri Boiss. (*Astragalus venosus* Aucher). "Most promising."

Phaseolus lunatus Linn. Tropics and subtropics.

Phaseolus lunatus var. "Madagascar bean" "Promising."

Phaseolus lunatus Linn. (*Phaseolus inamoenus* Linn.) "pois du cap." "Very fine growth."

"New Zealand grass pea." Probably *Lathyrus sativus* Linn. "Very fine growth. Possibly suited for high elevations."

Lupinus polyphyllus Lindl. "Good growth. Suitable for coffee."

Plantation Tree Crops.

This name is here applied to tree crops where the growth of the tree is unrestrained, as distinct from such crops as tea and coffee where the growth is usually kept in check by pruning. Such tree crops would include Para Rubber, Coconuts, Oil palms, Cloves, Nutmegs, etc. The three first mentioned are those which are generally grown on a large scale. From the nature of these crops the trees have to be widely spaced, and it is some considerable time before a complete leaf canopy is formed. During the young stages care must be taken to keep noxious weeds in check, such as the Lalang (*Imperata arundinacea* Cyrill.) of the East, and the Para grass (*Panicum muticum* Forsk.) of the West. In the past very considerable expenditure used to be incurred in weeding charges and there were also large capital losses of soil and soil fertility. Latterly this expense and loss has to a great extent been saved by a system of growing ground cover crops or, as they are sometimes called, "smother crops."

In reading reports of trials of plants which are likely to be useful for this purpose, there are two points which are generally raised: first their ability to keep such weeds as Lalang in check, and second whether they are liable to be dangerous in case of fire when they wither or die. In the case of some plants which are grown for this purpose, they can be made much more effective if they are prevented from flowering and fruiting. For example, *Mimosa invisa* Mart. has a varying reputation. By those who understand how to deal with this cover crop it is claimed that there is nothing to equal it. It must be prevented from seeding either by rolling or by beating it down, which causes it to make fresh growth immediately. If it is left to itself it will die out naturally, and not only become a danger from fire, but will let the Lalang through, which, now that the soil has been made richer by the growth of this cover crop, will grow stronger than ever before.

When tree crops have grown up and formed a canopy, the cover crop is grown more for the purpose of maintaining soil fertility, and though the ground cover crops of the type mentioned above may prove generally suitable for all such crops when they are young, the choice of a suitable cover crop for the grown plantation will depend on the amount of shade which the trees themselves throw.

COCONUTS.

This crop opens up the possibility of a different class of cover crops from those referred to under tea or coffee. In the case of a young plantation, cover crops are grown to all intents and purposes in the open, and therefore shade-bearing cover crops need not necessarily be considered. Some of the pulse crops also which can be

grown may, if necessary, be treated as catch crops and harvested for their grain.

In the case of grown plantations the trees of the plantation crop throw a fairly light top shade on the ground. Any plants which are grown under coconuts therefore must be able to stand a certain amount of shade, but as the coconut palm has a clean smooth stem there is not much fear that climbing plants will prove to be objectionable. There is one point, however, to be borne in mind and that is that the leaf drip from the palms may damage a cover crop if it has a soft succulent leaf. The rigid leaf of the palm and the smooth straight leaflets tend to concentrate drip on particular spots, in fact, where coconuts are grown on sandy soil one can often see the outline of the leaf pricked out on the soil by this water drip.

With the wide spacing required, coconuts are usually planted on land which is fairly level, and therefore the question of contour hedge crops has not received much attention. Under special circumstances these may prove necessary. The only mention of such cover crops is from Malaya, where *Clitoria cajanifolia* Benth. is mentioned as being likely to prove suitable for this purpose. This is the conclusion drawn from a trial cultivation on the Castleton station. *Tephrosia candida* DC. could also be used if necessary. This is a common cover crop under coconuts in Ceylon. On terraced land something is required to protect the edge of the terrace, but nothing is mentioned in any reports as to any plant having been tried for this purpose. *Indigofera endecaphylla* Jacq. is a possibility. It grows successfully under low-country rubber in S. India and it is said to thrive in Ceylon at elevations varying from 500 to 6000 feet.

Perennial cover crops in young coconut plantations.

Tephrosia candida DC. This thrives in both young and old plantations, but if the land is rich it will, unless lopped, grow too tall and thus adversely affect the young trees by its shade.

Indigofera hirsuta Linn. Old World Tropics. Tried at the Castleton Station, F.M.S., and reported as promising. It covers the ground in four months, grows to a height of two feet and thrives both in and out of coconut shade.

Calopogonium mucunoides Desv. Guiana. First tried as a possible cover crop in Java in 1923. Tried at the Castleton Station, F.M.S., in 1926 and reported to do well among young coconuts, though it has a tendency to climb. Planted 3 feet by 3 feet it made a complete cover within three months and a cover two feet thick within five months. It is stated to die out after about twelve to eighteen months, but by that time will in all probability have seeded itself.

As much more attention has been paid to cover crops among young low-country rubber reference should be made to this (see page 176). It is probable that what would grow among the one will grow among the other provided soil conditions are suitable.

Annual cover crops in young coconut plantations.

These include a large number of tropical pulse crops of which the following are the more important :—

Phaseolus lunatus Linn. ; *Phaseolus calcaratus* Roxb., Tropics of Asia ; *Phaseolus mungo* Linn. ; *Dolichos biflorus* Linn. ; *Dolichos Lablab* Linn., Old World Tropics ; *Vigna unguiculata* Walp. (*Vigna catjang* Walp.) ; *Canavalia ensiformis* DC., Tropics.

As there are many cultivated forms of these different pulses which have been adapted to suit different seasons and varying agricultural conditions, an extended trial of these may bring to light some particular strain which would adapt itself to local requirements. There are also "bush" forms of some of these which, if procurable, might prove more easy to deal with.

Crotalaria usaramoënsis E. G. Baker. Tropical E. Africa. This has been tried with success in Java. It seeds very freely, and if it is to last for any length of time it should be cut back before it can seed.

In addition to the pulse crops named above, the following are referred to as suitable cover crops for coconuts in Porto Rico⁴ for both young and old plantations, especially those on coast sandy soils. In the case of the former emphasis is laid on the necessity for preventing the plants from covering the trees even for a short period, and it is stated that where young trees have been smothered even for three weeks the effects of this are still apparent after six months.

Mucuna capitata Sweet (*Mucuna velutina* Hassk.). *Mucuna aterrima* Holland (*Stizolobium aterrimum* Piper). These two species are said to make about equal development, and they also make heavier growth and have a longer growing season than the Florida Velvet bean, *Mucuna Deeringiana* Merrill (*Stizolobium Deeringianum* Bort), or the Lyon bean, *Mucuna nivea* DC. (*Stizolobium niveum* Kuntze). *M. capitata* did not mature till nine months after planting. In the case of all these the vines have to be periodically cut back from around the young trees.

Jack beans and Sword beans, *Canavalia ensiformis* DC. and *Canavalia gladiata* DC., have also been tried, and though they grow well they do not make such a complete and heavy cover nor do they last as long as the two species of *Mucuna* recommended above.

Cajanus Cajan Millsp. is also said to make thrifty growth on coconut land. It is valuable for killing out wild vegetation and for providing wind protection.

Mention is also made of a wild *Canavalia* known as "Mato de la Playa" which is very common on the sandy coast, *Canavalia obtusifolia* DC. This is suggested as likely to be useful for binding loose sand. The same plant is common on the sandy coast of Trinidad.

Vigna marina Merr., known as "Solani," is reported as being a promising cover crop recently introduced into the Philippines,

⁴ Porto Rico Agricultural Experiment Station. Bull. no. 19. Cover crops for Porto Rico. C. F. Kinman.

though it is not stated with which crop it has been grown. It closely resembles *Dolichos Hosei*.

Perennial cover crops in grown coconut plantations.

One point must be borne in mind in deciding what cover crop to grow under coconuts, and that is the method of harvesting the nuts. If these are left on the tree till the nuts are dead ripe and have commenced to fall at harvest, or if nuts are only collected off the ground having fallen when ripe, then a tall-growing cover crop, unless it is kept lopped down, is objectionable, since many nuts which have fallen are likely to be overlooked at harvest. Another objection to cover crops which are inclined to grow tall is that it is very difficult to supervise labour at work.

Calopogonium mucunoides Desv. Trials at Castleton Station show that this will not thrive under shade and therefore it is unsuitable as a cover crop under grown coconuts.

Indigofera hirsuta Linn. At the above station this is reported to thrive under coconut shade.

Clitoria cajanifolia Benth. This is favourably reported on in the Philippines. In Malaya the impression is that it does not make a sufficiently dense cover. The tough leaf of this plant would be an undoubted advantage.

Centrosema Plumieri Benth. Tropical America. First introduced to the East as a possible cover crop by Dr. C. J. J. van Hall, Java, in 1912. This is favourably reported on both in the Philippines and in Malaya, though in the latter country it is stated to thrive only under good soil conditions. Though a climber it does not readily climb the coconut stems.

Centrosema pubescens Benth. Tropical America. Introduced into the Dutch East Indies in 1922. Favourably reported on in Malaya, though it will not thrive on badly drained land. It is excellent where the drainage is good, and far excels *C. Plumieri*.

Tephrosia candida DC. Favourably spoken of in the Philippines. On the Castleton Station, F.M.S., it is reported to have grown ten feet high and would therefore have to be cut back and be used as a green dressing. In Ceylon the extending use of this plant as a cover crop is reported, and it is stated that the practice of alternating the growing of this with a period of cultivated fallow is finding favour among coconut growers.

Tephrosia Vogelii Hook. f. The "fish poison bean" of East Africa. In the Philippines it is stated that this is a useful cover crop for coconuts. As it is a coarser-growing plant than *T. candida* its growth would probably have to be kept in check by lopping.

Tephrosia Hookeriana var. *amoena* Prain. Trials at Castleton Station, F.M.S., are reported to be promising, and suggestion is made that it should be sown thicker than 3 feet by 3 feet if a complete cover is to be formed.

Leucaena glauca Benth. has been tried at the Castleton Station in Malaya, but its growth was found too open to make a good cover.

Cassia mimosoides Linn. (*Cassia Leschenaultiana* DC.). Tried at the Castleton Station, F.M.S. Growth was very slow when young, but later it formed a dense impenetrable mass 10-12 feet high and therefore cannot be recommended.

Cassia hirsuta Linn. Tried at Castleton Station, F.M.S. It did not do well. (It probably cannot stand the shade, as when tried in coffee in S. India it was found that it would only grow in open spaces.)

Mimosa invisa Mart. Tropical America. Tried at Castleton Station, Malaya. Reported to be very good on heavy soil, and when sown three feet by three feet apart formed a complete cover in three months' time. It is inclined to die out when one-and-a-half to two years old, but will last much longer if beaten down or rolled. It is objected to by some on account of the spines and the difficulty of getting labour to work among it.

Mikania scandens Willd. Tropical America. Known in Malaya as the "mile a minute" plant. This is suggested as a possible cover crop in Malaya. One plant planted in the centre of a square of four coconut trees will in a very short time completely cover the ground.

PARA RUBBER.

There are two distinct problems connected with cover crops in rubber. The first is to find suitable plants which will grow under the partial shade of young rubber, and the second is to find something which will grow under old rubber, which in countries such as Malay, with a well-distributed rainfall, throws an almost complete shade throughout the greater part of the year.

Cover crops grown are very similar to those grown among young coconuts, except that there is not the same fear of climbing plants smothering the trees, since rubber will form a stem in a comparatively short space of time, while the coconut will take anything from three to seven years to do this.

Young rubber. Annual cover crops.

Phaseolus lunatus Linn. (patani). Recommended in the Philippines.

Phaseolus calcaratus Roxb. (palawan beans). Recommended in the Philippines.

Crotalaria striata DC. In the F.M.S., where this was tried at the Castleton Station, it is reported that within a few weeks of sowing it makes a dense growth and smothers all weeds. At the Moopley Rubber Station, Cochin, S. India, it is reported to do well in the dry weather, but it is not able to stand the heavy rains of the S.W. Monsoon, nor can it stand heavy lopping.

Crotalaria usaramoënsis E. G. Baker. Tropical E. Africa. In Malaya this is stated to be very similar to *C. striata* except that its growth is denser and more rapid. It is said to stand cutting back, but presumably this must be done before it seeds, as reports from Java say that it does not last long if allowed to seed. It has also been reported to have done well in Ceylon at Peradeniya, but there it also requires periodic cutting back.

Crotalaria anagyroides H.B.K. Tropical America. Reports from Malaya and Ceylon are similar to those above relating to *C. usaramoënsis*.

Dolichos biflorus Linn. Reported to be very successful in young rubber in Ceylon.

Young rubber. Perennial ground cover crops.

Centrosema Plumieri Benth. Under good soil conditions this has proved very satisfactory in Malaya.

Centrosema pubescens Benth. In Malaya this is said to be much superior to *C. Plumieri* on well drained land, and in Ceylon it is reported that it is commonly used in young plantations.

Calopogonium mucunoides Desv. In Malaya this is found to be very useful in young areas and is recommended for sowing in new clearings. It is specially useful for the suppression of weeds.

Indigofera endecaphylla Jacq. Tried at the Moopley Rubber Station, S. India, and said to be good. At the Tenmalai Rubber Station, S. Travancore, it was found to die out during the hot weather.

Tephrosia candida DC. This as recently as 1926 is referred to as the standard cover crop for young rubber in Ceylon.

Passiflora laurifolia Linn. Tropical America. Mentioned as a cover crop in young rubber in the Philippines.

Passiflora foetida Linn. Brazil. This has been tried in Malay.

Old Rubber. Perennial cover crops.

In Malaya, with its continuous growing season, there appears to be only one Leguminous cover crop which has so far been found to thrive under the shade of old rubber, though one or two of those which do well among young rubber have been found to be useful for renovating old rubber which has been allowed to "go back," and which in consequence does not form a complete shade canopy.

Under the system known as "selective weeding" there are several plants which are now being left to form a ground cover when the plantations are weeded.

In South India, where there is a very different distribution of rainfall, there is not the same permanent shade canopy over the ground. There is also a "secondary leaf fall" which occurs during the heavy S.W. Monsoon rainfall, as well as the normal dry weather leaf fall, and thus the leaf cover is never as heavy as in Malay. There are several cover crops which are reported to grow here under old rubber which are not suitable for Malayan conditions.

Dolichos Hosei Craib (*Vigna oligosperma* Back.), the Sarawak Bean. This is the standard cover crop for old rubber in Malaya, Ceylon, and the Dutch East Indies. The main difficulty is in establishing the crop. Seed is scarce, and when sown under rubber germination is unreliable. In Ceylon it is recommended that plants should be grown in nurseries in the first instance. They can be established either from seed or by rooted cuttings. The cuttings should be rooted in coconut "sawdust," and when planting out takes place the planting holes should be manured with a little general fertiliser.

Mimosa invisa Mart. Tropical America. Very satisfactory results have been obtained both in the Dutch East Indies and in Malaya with this. It can be propagated by seed sown 3 feet by 3 feet apart. Its disadvantages compared with *D. Hosei* are that it dies out when eighteen months to two years old, and it cannot stand the same amount of shade.

Mikania scandens Willd. is stated to stand the shade of mature rubber well, and it is suggested that in Malaya this might prove a suitable cover crop.

Teramnus labialis Spreng. (*Teramnus mollis* Benth.). Tropics. This is reported to be doing well on one rubber estate in the neighbourhood of Kandy, Ceylon, and it is recommended by the Agricultural Department as useful at higher elevations where it is difficult to establish *Dolichos Hosei*.

The following have been tried in S. India as possible cover crops for old rubber.

Centrosema pubescens Benth. This is reported as promising. It retains its leaf in the hot weather.

Phaseolus Dalzellii T. Cooke. This is reported to make an excellent cover, but the plant dies away in the hot weather.

Phaseolus sublobatus. Tropical Asia. There is no information as to whether this is *P. sublobatus* Buch.-Ham. or *P. trilobus* Ait. (*P. sublobatus* Roxb.). It is very similar to the preceding except that it may survive the hot weather if in heavy shade.

Phaseolus mungo Linn. is stated to keep green and grow in the hot weather.

Indigofera endecaphylla Jacq. is spoken well of in old rubber.

Tephrosia candida DC. is also commended.

Uraria Lagopus DC. and *Uraria lagopoides* DC. India and Malaya. These have been tried with some success, but "pink disease" has been found on them. These plants have been quoted under the name of *U. hamosa* Wall.

Smithia geminiflora Roth., India, Malaya and Australia; *Crotalaria evolvuloides* Wight, India, and *Crotalaria quinquefolia* Linn., India, have all been tried with a certain amount of success.

Besides these plants which have been definitely planted and tried there are others which have been encouraged by selective weeding. "Ferns" are reported to be allowed to grow among old rubber to

prevent soil erosion on certain estates in Malaya, and as long as these are cut down annually their effect is considered to be good. A similar statement has been made about the growth of ferns on the peaty soils of British Guiana and their beneficial effect on Liberian coffee. Lycopods (Staghorn Moss) are also allowed to grow in the same way on some Malayan estates.

Lotus corniculatus Linn. is mentioned as being similarly useful in the Dutch East Indies.

OIL PALM.

The cultivation of the Oil Palm, *Elaeis guineënsis* Jacq., as a definite plantation crop is of so recent a date that such work as has been done on the use and value of cover crops is confined almost entirely to Sumatra.

In young plantations *Calopogonium mucunoides* has been found to be most suitable: for, though it does not kill out the lalang, it effectively checks its growth and prevents it from spreading. In older plantations where there is a leaf canopy this cover crop cannot stand the shade, and in its place *Dolichos Hosei* has been found to be most suitable.

Mimosa invisa is sometimes grown but it is not so popular on account of its spines, which interfere with the work of the labourers; nor does it check lalang so well.

CACAO, CLOVES, NUTMEGS.

No information is available about the use of cover crops for Cacao, Cloves or Nutmegs, except that *Cajanus Cajan* is mentioned as being useful as a ground and wind protection for young Cacao.

Sisal.

The question of growing cover crops among sisal is one which has received a certain amount of attention in the Dutch East Indies, and it is understood that the Agricultural Department in Tanganyika is also paying attention to this matter. The main problem in connection with this plantation crop is to supply a ground cover which will smother weeds and thus reduce the cost of maintenance as well as the serious danger that there is from fire. It is essential, therefore, that any cover crop grown should be able to remain green during the dry season when wild fire is likely to occur. It is also essential that such a crop should be capable of quickly covering the ground after it has been sown, so that it will be able to smother weeds before these become too big, especially such weeds as the rank-growing annual grasses which are such a serious menace to the sisal plantations of East Africa. Further, any cover crop grown must be such that it does not itself tend to over-grow the sisal.

A number of possible cover crops have been tried in Java and of these *Phaseolus lunatus* has proved one of the most satisfactory up to the present.

Indigofera tinctoria Linn. (*Indigofera sumatrana* Gaertn.). This grows well enough, but when the dry weather sets in the plants tend to become bare.

Crotalaria usaramoënsis E. G. Baker. This does not maintain its cover for a sufficient length of time.

Canavalia obtusifolia DC. (*Canavalia lineata* DC.). This is not as good as *Phaseolus lunatus* Linn.

Tephrosia Vogelii Hook. f. Grows too tall.

Passiflora foetida Linn. On good soil this is apt to smother the sisal while on poor land the growth is thin, yellow and weakly.

Dolichos Hosei Craib. Cannot stand exposure to the full light and only grows around the base of the sisal plant. Even here it is apt to die out.

Calopogonium mucunoides Desv. has proved satisfactory except that it has a tendency to climb.

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XXIX.—MALAYAN MAGNOLIEAE. J. E. DANDY.

Aromadendron elegans Bl. Bijdr. Fl. Nederl. Ind. : 10 (1825).

Var. **glaucom** (Korth.) Dandy, comb. nov. *Aromadendron glaucum* Korth. in Nederl. Kruidk. Arch. 2, Versl. : 98 (1851). *Talauma glauca* Miq. Ann. Mus. Bot. Lugd.-Batav. 4 : 70, excl. syn. *Manglietia Oortii* (1868). *Magnolia glauca* Pierre Fl. For. Cochinch. 1 : sub t. 2 in obs. (1879).—non *Magnolia glauca* L. (1759). *Talauma elegans* var. *glauca* P. Parment. in Bull. Sci. France et Belg. 27 : 336 (1896).

SUMATRA. Westkust : Kassan, *Korthals* (type; Herb. Kew, Herb. Leyden).

Except for the glaucescence of the under-surface of its leaves this plant is indistinguishable from some of the more slender Sumatran examples of *A. elegans*. Korthals' plant is therefore better regarded as merely a variety of *A. elegans* than as a distinct species.

Aromadendron nutans Dandy, sp. nov.

Ramuli glabri. *Folia* obovata vel obovato- vel elliptico-oblonga, basi cuneata vel obtusa, apice breviter acuminata vel subacuminata, usque ad c. 12 cm. longa et 6 cm. lata, coriacea, utrinque glabra, supra levia, subtus in sicco laxe conspicueque reticulata; nervi laterales utrinsecus c. 9-12, non prominentes; petiolus usque ad c. 2.5 cm. longus, glaber; stipulae glabrae. *Alabastrum* ovoideum, bractea spathoidea glabra intervallo nullo sub tepalis inserta; pedunculus recurvus, gracilis, c. 1 cm. longus (in fructu 2 cm. attingens), glaber. *Tepala* 18, glabra, 3 exteriora lineari-oblonga c. 2 cm. longa. *Stamina* c. 10-12 mm. longa, connectivi appendice antherae vix aequilonga. *Gynaecium* late ellipsoideum, basi paulum decurrens; carpella glabra. *Fructus* immaturus oblongo-globosus.

BORNEO. Sarawak : *Beccari* 2661 (Herb. Berlin, Kew), 3660 (type in Herb. Kew; Herb. Berlin).

Beccari's specimens include both flowers and immature fruits, but have not previously been described, evidently because of

uncertainty as to the correct genus. From *A. elegans* the new species differs in the differently shaped more coriaceous leaves which possess fewer lateral nerves and are more laxly reticulate beneath, in the ovoid flower-buds, in the shorter peduncles, in the smaller flowers, and in the connective-appendage being scarcely as long as the anther. The flowers droop owing to the recurved peduncles.

The two specimens cited were enumerated as *Magnolia* by Ridley (in Sarawak Mus. Journ. 1, 3 : 72 (1913)), and under *M. Maingayi* King by Merrill (in Journ. Straits Br. R. As. Soc., Special No. (1921) : 251).

***Elmerrillia mollis* Dandy, sp. nov.**

Arbor, altitudine c. 30 m. attingens; ramuli juniores dense fulvo- vel rufo-tomentosi vel -pubescentes. *Folia* oblongo-elliptica vel oblonga vel anguste elliptico-oblonga, basi obtusa vel cuneata, apice acuminata vel acuta, usque ad c. 33 cm. longa et 13 cm. lata, chartacea, supra primum dense adpressequae griseo-vel fulvo- vel rufo-pubescentia deinde plus minusve glabrescentia, subtus praesertim ad costam nervosque dense molliterque griseo-vel fulvo-pubescentia interdum primo glaucescentia; nervi laterales utrinsecus c. 18-26, subtus conspicui; petiolus usque ad c. 2 cm. longus, primo dense fulvo- vel griseo- vel rufo-pubescentia, glabrescentia; stipulae extus fulvo- vel rufo-tomentosae. *Flores* solitarii vel saepe 2- vel raro 3-nati, albi vel pallido-flavi, fragrantia; alabastrum ovoideo-ellipsoideum, bracteis spathoideis extus adpressequae fulvo- vel rufo-tomentosis; pedunculus c. 1.5-6 cm. longus, fulvo- vel rufo-tomentosus. *Tepala* 9-12, 3-4 exteriora anguste oblonga c. 2-2.5 cm. longa glabra vel extus minute adpressequae pubescentia, 6-8 interiora glabra. *Stamina* c. 12-15 mm. longa. *Carpella* fulvo- vel griseo-tomentella; ovula 2. *Fructus* subcylindricus, c. 6-8 cm. longus, carpellis maturis liberis dehiscentibus. *Semina* 1-2.

BORNEO. South and East Borneo: Koetei, *Endert* 2246 (Herb. Kew), 2282 (Herb. Kew), 5252 (type in Herb. Kew); Hayoep, *Winkler* 2345 (Herb. Berlin, Buitenzorg, Kew). In forests at low altitudes.

Vernacular names: *arau*, *arau-mindak*, *arau-niam* (Koetei).

This fine species is remarkable for the fact that the flowers are frequently paired or rarely even in threes, one flower developing much in advance of its fellow or fellows. Such a feature is unknown elsewhere in the family *Magnoliaceae* (sensu stricto) except as an abnormality. In the present species, however, it is apparently quite characteristic, for it occurs in both *Endert's* and *Winkler's* material. *E. mollis* is in other respects closest in affinity with *E. pubescens* Dandy from the Philippines, but the latter species has an indumentum greyish throughout, somewhat larger flowers, and 4-ovulate carpels.

***Elmerrillia papuana* (Schltr.) Dandy in Kew Bull. 1927 : 261.**

Var. ***adpressa*** Dandy, var. nov.; a typo differt ramulis junioribus saltem ad nodos pubescentibus sed vix villosis, foliis junioribus subtus in costa nervisque pubescentibus et alibi minute stricteque adpresso-pubescentibus.

Foliorum petiolus primo saltem supra rufo-pubescentia; stipulae extus adpressequae rufo-tomentosae. *Alabastris* bractee spathoideae extus adpressequae rufo-tomentosae; pedunculus rufo-tomentosus. *Carpella* adpressequae rufo- vel griseo-tomentella.

NEW GUINEA. Kaiser Wilhelm Land: Sepik region, *Ledermann* 7603 (Herb. Kew), 10213 (Herb. Kew), 13089 (type in Herb. Kew). At about 400-1500 m. alt.

This variety is identical with the type except for the scantier and less villous indumentum, which is mostly appressed especially on the lower surface of the leaves, where the hairs recall those of *E. celebica* Dandy.

The specimens cited were enumerated as *Talauma? papuana* Schltr. by Diels (in Engl. Bot. Jahrb. 54 : 239 (1916)).

Var. ***glaberrima*** Dandy, var. nov.; a typo et var. *adpressa* Dandy (supra descripta) differt omnibus partibus glabris.

NEW GUINEA. Kaiser Wilhelm Land: Sepik region, Etappenberg, *Ledermann* 9509 (type in Herb. Kew). At about 850 m. alt.

This plant was cited by Diels (l.c.) as *Talauma? papuana* Schltr.

***Magnolia aequinoctialis* Dandy, sp. nov.**

Arbor; ramuli juniores dense fulvo-pubescentes. *Folia* persistentia, elliptica vel elliptico-oblonga vel anguste elliptico-oblonga vel interdum oblanceolato-oblonga, basi cuneata vel obtusa nunc inaequalia, apice sensim acuminata vel subacuminata, usque ad c. 17 cm. longa et 7 cm. lata, chartacea, supra primo saltem costae basin versus fulvo-pubescentia, subtus primum praesertim in costa fulvo-pubescentia; nervi laterales utrinsecus c. 12-20; petiolus eicatricatus, usque ad c. 0.8 cm. longus, dense fulvo-pubescentia; stipulae a petiolo liberae, extus dense fulvo-pubescentes. *Flores* albi, fragrantia; alabastrum in bractea spathoidea unica extus fulvo-pubescenti intervallo nullo sub tepalis inserta inclusum; pedunculus gracilis, c. 3-5 cm. longus, dense fulvo-pubescentia. *Tepala* 9, subsimilia, 3 exteriora anguste oblonga vel oblanceolato-oblonga c. 2.5-3 cm. longa glabra vel extus ima basi fulvo-pubescentia, 6 interiora multo crassiora glabra. *Stamina* c. 9 mm. longa, anthera lineari introrse dehiscenti, connectivo ultra loculos in appendicem brevem acutam producta. *Gynaecium* sessile, cylindricum vel anguste ellipsoideo-oblongum, carpellis fulvo-pubescentibus vel -tomentosis. *Fructus* typice subcylindricus sed plerumque ob carpella abortiva distortus, c. 2-2.5 cm. longus (fortasse interdum

longior), carpellis maturis liberis haud vel brevissime rostratis prompte dehiscentibus.

SUMATRA. Oostkust: Karolanden, *Houtvester Sumatra's Oostkust* 11 (Herb. Buitenzorg), 25 (type in Herb. Buitenzorg), *Brandts Buijs* 14 in *Boschproefstation* BB6798 (Herb. Buitenzorg), 19 in *Boschproefstation* BB6803 (Herb. Buitenzorg). Westkust: Goenoeng Singalang, *Beccari* 84 (Herb. Kew), 116 (Herb. Brit. Mus., Kew). In forests at about 1400–1600 m. alt.

Vernacular names: *chinch-urat*, *kaepoh* (Karolanden).

This species is closely allied to *M. Macklottii* Dandy, which inhabits both Sumatra and Java. In *M. Macklottii*, however, the carpels are glabrous, and the leaves, which are glabrous above, are usually larger and more oblanceolate than in *M. aequinoctialis*.

***Magnolia pachyphylla* Dandy, sp. nov.**

Ramuli juniores adpresse fulvo-tomentosi. *Folia* elliptica vel ovato-elliptica vel -oblonga, basi cuneata vel obtusa, apice rotundata vel obtusa saepe leviter emarginata, usque ad c. 15 cm. longa et 8 cm. lata, rigidissime coriacea, supra glabra vel juniora ima basi adpresse fulvo-pubescentia, subtus primum adpresse fulvo-tomentosa deinde glabrescentia; nervi laterales utrinsecus c. 14–16, subtus inconspicui; petiolus supra cicatrice stipulari notatus, usque ad c. 2.5 cm. longus, primo adpresse fulvo-tomentosus, glabrescens; stipulae petiolo adnatae, extus adpresse fulvo-tomentosae. *Alabastrum* ovoideum, bracteis extus adpresse fulvo-tomentosis summa spathoidea; pedunculus erectus, crassus, adpresse fulvo-tomentosus. *Tepala* 9, subsimilia, 3 exteriora extus adpresse fulvo-pubescentia, 6 interiora glabra. *Staminum* anthera linearis introrse dehiscens, connectivo ultra loculos in appendicem brevem acutam producto. *Gynaecium* sessile; carpella c. 12, glabra.

PHILIPPINES. Palawan: *Curran* in *Forestry Bureau* 3864 (type in Herb. Kew; Herb. Berlin).

Along with the two following species this belongs to a group of Asiatic Magnolias, including *M. coco* DC. and *M. Championii* Benth., whose members, apart from the fruit, are very similar in appearance to species of *Talauma*. Amongst this group *M. pachyphylla* is easily recognized by means of its very rigidly coriaceous leaves, which are broadest below or about the middle, rounded to obtuse at the apex, and at first appressedly tomentose beneath. The tomentum of the bracts and young branchlets is often so densely packed as to form a felt-like covering.

***Magnolia persuaveolens* Dandy, sp. nov.**

Ramuli juniores dense adpresseque fulvo-pubescentes. *Folia* obovata vel oblongo-obovata, basi cuneata vel obtusa, apice rotundata leviter emarginata, usque ad c. 9 cm. longa et 4.5 cm. lata, rigidissime coriacea, supra glabra, subtus dense adpresseque fulvo-pubescentia; nervi laterales utrinsecus c. 10–12; petiolus supra cicatrice

stipulari notatus, usque ad c. 1 cm. longus, primo adpresse fulvo-pubescent, glabrescens; stipulae petiolo adnatae. *Flores* c. 5–10 cm. diametro, flavi, persuaveolentes; alabastrum ellipsoideum, bractea spathoidea extus dense adpresseque fulvo-pubescenti; pedunculus erectus, crassus, dense adpresseque fulvo-pubescent. *Tepala* 9, subsimilia, glabra, 3 exteriora oblongo-ovata. *Staminum* anthera introrse dehiscens, connectivo ultra loculos in appendicem brevem acutam producto. *Gynaecium* sessile, ellipsoideum; carpella ut videtur vix numerosa, fulvo-villosa.

BORNĒO. British North Borneo: Keppel Prov., Mt. Kinabalu, Maripari Spur, *Low* (type in Herb. Kew). At about 1500 m. alt.

The available material is very meagre, but merits description since it represents a very distinct species apparently most closely allied to *M. pachyphylla* Dandy (described above) from the Philippine island of Palawan. The leaves resemble those of *M. pachyphylla* in being very rigidly coriaceous, but differ in being smaller and differently shaped, with fewer lateral nerves. The carpels are villous, whereas those of *M. pachyphylla* are glabrous.

The Magnolia, which, according to Stapf (in Trans. Linn. Soc., Ser. 2, Bot. 4: 128 (1894)), who treated Low's plant as *Michelia* (?) sp., is mentioned by Burbidge in one of his note-books, was found in the same locality and is undoubtedly the same species. Burbidge describes the leaves as ovate and coriaceous, and the flowers as 5–10 cm. in diameter, of a yellow colour "inclining to fuscous," and of the most delicious fragrance.

***Magnolia pulgarensis* (Elmer) Dandy, comb. nov.** *Talauma pulgarensis* Elmer Leaf. Philipp. Bot. 5: 1809 (*pulgarensis*) (1913).

PHILIPPINES. Palawan: Puerto Princesa, Mt. Pulgar, *Elmer* 13192 (type; Herb. Edinburgh).

This species was originally described as a *Talauma*, but although its fruit is still unknown it can safely be transferred to *Magnolia*, for it is manifestly a close ally of *M. coco* DC. and the related species.

***Manglietia glauca* Bl.** in Verh. Batav. Genootsch. 9: 150 (1823).

Var. *lanuginosa* Dandy, var. nov.; a typo et var. *sumatrana* Dandy (inferne proposita) recedit ramulis junioribus stipulisque pedunculisque dense rufo- vel fulvo-pubescentibus indumento vix adpresso, foliis saltem junioribus subtus dense molliterque rufo- vel fulvo-pubescentibus.

Folia supra glabra vel primum pubescentia mox glabrescentia; petiolus supra tantum ad basin cicatrice stipulari notatus, primo rufo- vel fulvo-pubescent, glabrescens; stipulae petioli basi adnatae.

SUMATRA. Oostkust: Simeloengoen, near Girsang, *Woudenberg* 10 in *Boschproefstation* BB8531 (type in Herb. Buitenzorg); Karolanden, Doloe, *Brandts Buijs* 57 in *Boschproefstation* BB6841 (Herb. Buitenzorg); Sibolangit, Siboeetan, *Schnepper* 3 (Herb. Buitenzorg). In forests at about 1200–1500 m. alt.

Vernacular names: *atuwang*, *jatuh*.

Var. **sumatrana** (Miq.) Dandy, comb. nov. *Manglietia Oortii* Korth. in Nederl. Kruidk. Arch. 2, Versl. : 97 (1851). *Manglietia sumatrana* Miq. Fl. Ind. Batav., Suppl. 1 : 367 (1860).

SUMATRA. Westkust: Boekiet Sieliet, *Teijsmann* (type in Herb. Leyden; Herb. Utrecht); Goenoeng Singalang, *Beccari* 334 (Herb. Kew, Leyden); Goenoeng Merapi, *Bünnemeijer* 4843 (Herb. Buitenzorg).

Korthals and Miquel regarded this plant as a distinct species, but the differences separating it from *M. glauca* are only of varietal value, consisting chiefly of the stouter pubescent peduncle with its usually more numerous annular scars.

Miquel (Ann. Mus. Bot. Lugd.-Batav. 4: 70 (1868)) finally reduced *M. Oortii* to *Talauma glauca* Miq. (*Aromadendron elegans* var. *glaucum* Dandy), which was based upon *A. glaucum* Korth. But Korthals' description of *M. Oortii* runs "petalis exterioribus obovatis, basi subspathulatis, interioribus carnosissimis spathulatis," and applies to the present plant and certainly not to an *Aromadendron*. The probable explanation of Miquel's reduction of *M. Oortii* to *T. glauca* is that Korthals' labels were confused, for a Korthals specimen in Herb. Leyden, labelled as *M. Oortii*, is obviously part of the type-collection of *A. glaucum*, which Korthals described at the same time as *M. Oortii*. Miquel (Fl. Ind. Batav. 1, 2: 15 (1859)) had previously interpreted *M. Oortii* correctly by referring to it *Teijsmann's* Boekiet Sieliet specimen, which he afterwards distinguished and described as a new species, *M. sumatrana*. Since I have seen *Teijsmann's* plant, but not Korthals' type of *M. Oortii*, I have adopted Miquel's name *sumatrana* as a varietal appellation.

***Michelia sumatrae* Dandy, sp. nov.**

Ramuli juniores dense adpresseque rufo-pubescentes. *Folia* anguste elliptico-oblonga vel anguste oblonga vel lineari-oblonga vel rarius oblanceolata, basi cuneata vel attenuata, apice acuminata, usque ad c. 13 cm. longa et 3.5 cm. lata, tenuiter coriacea, supra primo adpresse rufo-pubescentia glabrescentia, subtus glaucescentia minute adpresseque rufo-pubescentia, in sicco utrinque dense reticulata; nervi laterales utrinsecus c. 12-16, inconspicui; petiolus ecicatrissatus, gracilis, usque ad c. 1.5 cm. longus, juvenilis dense adpresseque rufo-pubescent, glabrescent; stipulae a petiolo liberae, extus adpresse splendenti-rufo-tomentosae. *Flores* pro genere parvi; alabastrum ovoideo-ellipsoideum vel -oblongum, bracteis spathoideis extus adpresse splendenti-rufo-tomentosis; pedunculus c. 0.5-0.7 cm. longus, adpresse rufo-tomentosus. *Tepala* 12, subsimilia, glabra, 3 exteriora oblanceolato-oblonga ut videtur infra 2 cm. longa. *Staminum* connectivum ultra antherae loculos in appendicem brevem acutam productum. *Gynaecium* adpresse rufo-tomentellum; carpella numerosa; ovula 4. *Fructus* immaturi carpella libera, sessilia.

SUMATRA. Westkust: Goenoeng Singalang, *Beccari* 118 (type in Herb. Kew; Herb. Brit. Mus.).

Amongst those species of *Michelia* in which the stipules are free from the petiole *M. sumatrae* is very distinct, being easily recognized by its combination of an appressed rufous indumentum, narrow leaves with the lower surface glaucescent and pubescent, small flowers, and 4-ovulate carpels.

***Talauma athliantha* Dandy, sp. nov.**

Frutex, c. 3 m. altus; ramuli juniores dense adpresseque fulvo-pubescentes. *Folia* elliptica vel elliptico-oblonga vel anguste elliptico-oblonga, basi cuneata, apice acuminata vel acuta, usque ad c. 22 cm. longa et 9 cm. lata, plus minusve coriacea, supra glabra vel primo costae basin versus adpresse fulvo-pubescentia, juniora subtus adpresse fulvo-pubescentia; nervi laterales utrinsecus c. 10-15; petiolus usque ad c. 2.5 cm. longus, primum adpresse fulvo-pubescent, glabrescent. *Flores* albi, ramulos saepe breves axillaresque terminantes; alabastrum ellipsoideum, bractea spathoidea extus adpresse fulvo-pubescenti; pedunculus gracilis, dense adpresseque fulvo-pubescent. *Tepala* 9, 3 exteriora oblonga vel elliptico-oblonga c. 1-1.5 cm. longa extus ad basin adpresse fulvo-pubescentia, 6 interiora exterioribus subaequilonga glabra. *Stamina* c. 6 mm. longa, connectivo ultra antherae loculos in appendicem brevem acutam producto. *Gynaecium* ex carpellis c. 5-7 glabris conflatum.

SUMATRA. Oostkust: Berastagi, *Ridley* (type in Herb. Kew). In wooded ravines.

This species belongs to the *T. Candollei* group, and comes nearest to *T. Candollei* Bl. and *T. Forbesii* King, both of which occur in Sumatra, the latter being confined to the south of the island. From these two species, and indeed from all its congeners, *T. athliantha* can be distinguished by its diminutive flowers, which are the smallest known in the genus *Talauma*. *Ridley's* plant was a spreading shrub growing in a wooded ravine. The flowers appear to be borne in great profusion, often on abbreviated axillary branchlets.

Ridley (in Journ. Mal. Br. R. As. Soc. 1: 51 (1923)) enumerated this plant as *T. pumila* Bl. (*Magnolia coco* DC.).

***Talauma betongensis* Craib** in Kew Bull. 1925: 7.

MALAY PENINSULA. Kedah: Kedah Peak, *Bell and Haniff* (Herb. Kew).

Also in the adjacent Pattani Circle of Siam.

Bell and Haniff's specimen was cited under *Manglietia glauca* Bl. by *Ridley* (Fl. Mal. Penins. 1: 14 (1922)).

***Talauma gitingensis* Elmer** Leaf. Philipp. Bot. 4: 1479 (1912); Dandy in Kew Bull. 1927: 420.

Var. **glabra** Dandy, var. nov.; a typo differt planta omnino glabra.

Folia elliptica vel lanceolato-elliptica vel -oblonga vel anguste elliptico-oblonga, usque ad c. 18 cm. longa et 6 cm. lata.

PHILIPPINES. Mindoro: Mt. Calavite, Ramos in *Bureau of Science* 39436 (type in Herb. Brit. Mus.). Panay: Iloilo Prov., Miagao, Vidal 2041 (Herb. Kew). Mindanao: Bukidnon Prov., Mt. Dumalucpihan, Ramos and Edaño in *Bureau of Science* 39000 (Herb. Brit. Mus.).

Var. *rotundata* Dandy, var. nov.; a typo et var. *glabra* Dandy (supra descripta) differt foliis apice rotundatis saepe emarginatis, magis coriaceis.

Folia oblongo-oblancheolata, basi cuneata, usque ad c. 15 cm. longa et 5.5 cm. lata, glabra, in sicco utrinque conspicue reticulata.

PHILIPPINES. Palawan: Vidal 2554 (type in Herb. Kew).

Talauma gracilior Dandy, sp. nov. *Talauma longifolia* Ridl. in Journ. Fed. Mal. St. Mus. 7: 38 pro parte, quoad spec. ex Kedah Peak (1916).

Frutex vel *arbuscula*; ramuli juniores dense adpresseque fulvo-pubescentes, glabrescentes. *Folia* anguste elliptico-oblonga vel oblonga vel oblanceolata-oblonga, basi cuneata vel attenuata, apice acuminata vel subcaudata, usque ad c. 22 cm. longa et 7 cm. lata, tenuiter coriacea, glabra vel juniora subtus ad costam adpresse fulvo-pubescentia; nervi laterales utrinsecus c. 12-16, a costa angulo plerumque fere recto abeuntes deinde adscendentes; petiolus usque ad c. 2 cm. longus, glaber vel primo adpresse fulvo-pubescent. *Flores* flavido-albi vel gilvi, fragrant; alabastrum ovoideo-ellipsoideum, bractea spathoidea extus dense adpresseque fulvo-pubescenti; pedunculus satis gracilis, adpresse fulvo-villosus. *Tepala* 9, 3 exteriora obovato-oblonga vel oblonga vel lineari-oblonga c. 2-2.5 cm. longa extus ad basin adpresse fulvo-pubescentia, 6 interiora exterioribus subaequilonga vel breviora glabra. *Stamina* c. 7-8 mm. longa, connectivo ultra antherae loculos in appendicem c. 2-3 mm. longam lineari-lanceolatam producta. *Gynaecium* ex carpellis c. 9 saltem apicem versus laxe pilosis conflatum. *Fructus* ellipsoideus, c. 4 cm. longus, carpellis maturis rostro terminali brevi plerumque recurvo praeditis usque ad c. 3 cm. longis singillatim dehiscentibus.

MALAY PENINSULA. Kedah: Kedah Peak, Robinson and Kloss 6040 (Herb. Kew), 6110 (type in Herb. Kew), Bell and Haniff (Herb. Kew), Ridley 5369 (Herb. Brit. Mus.). At about 750-1200 m. alt.

This species is closely allied to *T. Kunstleri* King and *T. Candollei* Bl., but is in general smaller and more slender in all parts than those two species, while the usually spreading lateral nerves give the leaves a very distinctive appearance. In addition *T. gracilior* differs from *T. Kunstleri* in the smaller stamens with a longer connective-appendage, and from *T. Candollei* in the pilose carpels. Ridley (l.c.) recognized it as a distinct species, but he unfortunately confused it with *T. mutabilis* var. *longifolia* Bl., and therefore elevated the latter, which is no more than a form of *T.*

Candollei, to specific rank as *T. longifolia* Ridl. *T. gracilior* is apparently confined to Kedah Peak, where it has been collected several times.

Talauma intonsa Dandy, sp. nov.

Ramuli juniores fulvo-villosissimi. *Folia* oblonga, basi cuneata, apice acuminata, usque ad c. 33 cm. longa et 8.5 cm. lata, tenuiter coriacea, utrinque glabra, subtus glaucescentia; nervi laterales utrinsecus c. 16-18, a costa angulo fere recto abeuntes deinde adscendentes; petiolus usque ad c. 2 cm. longus, fulvo-villosus. *Alabastrum* ovoideum, bractea spathoidea extus densissime hispideque fulvo-villosa; pedunculus fulvo-villosissimus. *Tepala* 9, 3 exteriora ovata extus ad basin fulvo-villosa, 6 interiora glabra. *Staminum* connectivum ultra antherae loculos in appendicem brevem acutam productum. *Carpella* ut videtur vix numerosa, dense fulvo-villosa.

BORNEO. Sarawak: Beccari 3331 (type in Herb. Kew).

The dense fur-like indumentum of the flower-buds, and the leaves with their glaucescent under-surface and their distinctive nervation with the lateral nerves leaving the midrib almost horizontally and afterwards ascending, give this species a peculiar appearance which enables it to be easily distinguished from all other known *Talaumas*. In affinity it may be placed next to *T. villosa* Miq. (including *T. lanigera* Hook. f. et Thoms.) from the Malay Peninsula and Sumatra.

Talauma levissima Dandy, sp. nov.

Arbor; ramuli glabri. *Folia* plus minusve elliptico-oblonga, basi cuneata vel obtusa, apice acuta vel subacuminata, usque ad c. 29 cm. longa et 9 cm. lata, coriacea, utrinque glabra etiam in sicco levia; nervi laterales utrinsecus c. 10-14, subtus vix prominentes; petiolus usque ad c. 4 cm. longus, glaber. *Pedunculus* crassus, juvenilis apice inter florem et bracteam spathoideam fulvo-villosus, alibi glaber. *Tepala* 9, 6 interiora oblanceolata c. 2.5-3 cm. longa. *Carpella* ut videtur vix numerosa, glabra.

BORNEO. British North Borneo: Myburgh Prov., near Sandakan, Ridley 9047 (type in Herb. Kew), Ramos 1785 (Herb. Kew).

The type-specimen possesses the fragments of a single flower from which the stamens and outer three tepals are missing, while Ramos' specimen is sterile. Nevertheless the species merits description, its affinities being clearly with *T. obovata* Korth. from Dutch Borneo, from which it differs in having smaller differently shaped leaves with fewer lateral nerves. These two species are alike in being glabrous throughout except for the villous uppermost internode of the peduncle between the flower and the point of insertion of the spathaceous bract.

Ridley's plant was formerly identified with *T. Candollei* Bl. (Ridl. in Sarawak Mus. Journ. 1, 3: 72 (1913); Merr. in Journ. Straits Br. R. As. Soc., Special No. (1921): 251).

Talauma oblanceolata Ridl. Fl. Mal. Penins. 5: 286 emend., excl. spec. ex Borneo et Banca (1925).

MALAY PENINSULA. Pahang: Sempang, Fraser Hill, Semangkok Pass, Ridley 15590 (type in Herb. Kew).

Ridley cited his Pahang specimen as the type of this species, to which he also referred two plants, one from Borneo and the other from Banca, which rightfully belong to *T. singaporensis* Ridl. The specific epithet *oblanceolata* was unfortunately apparently derived from the shape of the leaves in these two plants, which are here excluded from *T. oblanceolata*. The leaves of the type-specimen are not oblanceolate but elliptic-oblong.

Talauma peninsularis Dandy, sp. nov.

Arbor parva; ramuli juniores adpresse fulvo-pubescentes, glabrescentes. *Folia* elliptico-oblanceolata, basi attenuata, apice acuminata, usque ad c. 50 cm. longa et 17 cm. lata, tenuiter coriacea, glabra; nervi laterales utrinsecus c. 24; petiolus usque ad c. 6.5 cm. longus, glaber. *Alabastrum* ovoideum, bractea spathoidea extus primum adpresse fulvo-pubescenti; pedunculus saltem primo adpresse fulvo-pubescent. *Tepala* 9, glabra, 3 exteriora ovata longitudine minimum 3 cm. attingentia. *Gynaecium* ex carpellis c. 20-25 glabris conflatum.

MALAY PENINSULA. Pahang: Jerantut, Burkill and Haniff 16053 (type in Herb. Kew).

The nearest ally of this plant is another Pahang species, *T. oblanceolata* Ridl., which, however, differs in being glabrous throughout, in possessing much smaller leaves with fewer lateral nerves, and in having a gynaecium composed of only about sixteen carpels.

Talauma sebassa Miq. Fl. Ind. Batav., Suppl. 1: 367 (1860). *Manglietia sebassa* Miq. Ann. Mus. Bot. Lugd.-Batav. 4: 71 (1868).

MALAY PENINSULA. Perak or Selangor: Ulu Kal, Kunstler 10790 (Herb. Kew).

SUMATRA. Palembang: near Moeara Enim, Goenoeng Megang, Teijsmann (type in Herb. Leyden; Herb. Utrecht).

Miquel originally referred this species to *Talauma*, but supplemented his description with the remark that the ovule-number was doubtful and the plant should be compared also with *Manglietia*. Subsequently he transferred the species to *Manglietia*, stating that he had observed the number of ovules to be six or more. The fruit is still unknown, but it is evident at a glance that the plant is a *Talauma* and certainly not a *Manglietia*. This is confirmed by a re-examination of the carpels of the type-material, for the ovules are only two in number, and Miquel must have miscounted them.

Talauma singaporensis Ridl. in Kew Bull. 1914: 323. *Talauma oblanceolata* Ridl. Fl. Mal. Penins. 5: 286 pro parte, quoad spec. ex Borneo et Banca (1925).

MALAY PENINSULA. Singapore: Chan Chu Kang, Ridley 5091 (type in Herb. Brit. Mus.; Herb. Berlin); Bukit Mandai road, Ridley 2110 (Herb. Kew), 3656 (Herb. Brit. Mus. in carp. coll.).

SUMATRA. Simaloer: Achmad 575 (Herb. Buitenzorg), 689 (Herb. Buitenzorg), 1103 (Herb. Buitenzorg). Banca: Blinjoe, Teijsmann (Herb. Buitenzorg, Kew).

BORNEO. Without locality: Low (Herb. Kew).

This very distinct species has hitherto been supposed to be restricted to Singapore. Its known range is now considerably extended by the addition of Achmad's material from Simaloer and of the two specimens from Borneo and Banca, which were included by Ridley in his *T. oblanceolata* (see remarks on p. 192 under *T. oblanceolata* Ridl.).

Talauma soembensis Dandy, sp. nov.

Arbor; ramuli glabri. *Folia* elliptica vel elliptico- vel obovato-oblonga, basi cuneata vel obtusa, apice rotundata vel obtusa saepe emarginata, usque ad c. 25 cm. longa et 13.5 cm. lata, tenuiter coriacea, glabra; nervi laterales utrinsecus c. 10-15; petiolus longitudine c. 4.5 cm. attingens, glaber; stipulae glabrae. *Pedunculus* in fructu crassus glaberque. *Tepala* ex cicatricibus 9. *Carpella* c. 40, in fructu glabra. *Fructus* in specimine viso carpellis nonnullis abortivis subglobosus c. 6 cm. longus, sed fortasse normaliter carpellis pluribus fertilibus magis elongatus; carpella matura rostro subterminali brevissimo praedita, usque ad c. 4.5 cm. longa, singillatim dehiscentia.

LESSER SUNDA ISLANDS. Soemba: Laora, Boendohero, Iboel 311 (type in Herb. Buitenzorg).

Vernacular name: rowo.

The discovery of a species of *Talauma* in Soemba (or Sandalwood) is of especial interest in that this island now becomes the southernmost known Asiatic station of the genus. *T. soembensis* is quite distinct in appearance from all its congeners, but in being everywhere glabrous it can be compared among Malayan *Talaumas* with *T. oblanceolata* Ridl. The latter species, however, has a gynaecium composed of far fewer carpels, and leaves which are acuminate at the apex and have rather more numerous lateral nerves.

XXX.—NOTES ON THE FOREST FLORA OF SOUTH CENTRAL AFRICA. P. J. GREENWAY.

The specimens included in the following enumeration have been collected in Northern Rhodesia, Nyasaland and surrounding country, by members of the Staffs of the Imperial Forestry Institute and the Forest Services of the Colonies mentioned.

The identifications were made by the writer at the Imperial Forestry Institute Herbarium and at Kew. Thanks are due to the Director of the Royal Botanic Gardens, Kew, for permission

to consult the herbarium, and to members of the herbarium staff, particularly to Mr. J. Hutchinson for suggestions based on the unpublished MS. of the Flora of West Tropical Africa, in cases where genera had been revised recently. Three of his new combinations in *Isoberlinia*, and a new combination in *Dichrostachys*, are published here for the first time, with his permission.

Much of the material was collected by Mr. R. Bourne, of the Imperial Forestry Institute, while on a tour of inspection on behalf of the Northern Rhodesian Government. The time of year (July to September) was not favourable for securing good botanical specimens, very little flowering material being obtainable.

The collections represent 131 species, comprised in 80 genera and 34 families. The three families of Leguminosae furnish the largest number of species; the Caesalpiniaceae contain 26, including two new species of *Brachystegia*, *B. Bournei* Greenway and *B. nchangensis* Greenway; Mimosaceae 9 species, of which 5 are Acacias; and Papilionaceae 12 species. In the Myrtaceae there is a new species of *Syzygium*, *S. mumbwaense* Greenway.

Only two genera of the Dipterocarpaceae, *Monotes* and *Marquesia*, are met with in tropical Africa; of the former there are several reputed species, which are fairly common in the dry savannah-forest. *Marquesia macroura* Gilg, the "Musesjie," is one of the most abundant trees in Northern Rhodesia and the Katanga, where it attains a height of 65 to 80 feet; the wood is described as very hard and of good quality and is used for finishing houses and in carriage-building. In view of the great economic interest of the Dipterocarps in the Indo-Malayan Region, the African species are worth careful investigation.

Of especial interest is the occurrence of a species of *Hirtella* (Rosaceae). This genus is chiefly American in its distribution, being represented by about 40 species in Central and South America; no representatives have yet been recorded from West Africa, but two are found in Madagascar, and one is described from East Africa, *H. zanzibarica* Oliver, which was figured in the *Icones Plantarum* (12: 81, t. 1193, 1876). To this single species from continental Africa should now be added *H. eglandulosa* Greenway, and a third species, *H. bangweolensis* (Fries) Greenway, originally described under the name *Parinarium bangweolense* R. E. Fries (in Fedde, Repert. 12: 540, 1913). Further study of the African material of *Hirtella* in European herbaria is desirable, as it may possibly prove necessary to separate it as representing a distinct genus.

In this paper the citation F. T. A. refers to Oliver, Thiselton-Dyer (and others): *Flora of Tropical Africa*.

ANONACEAE.

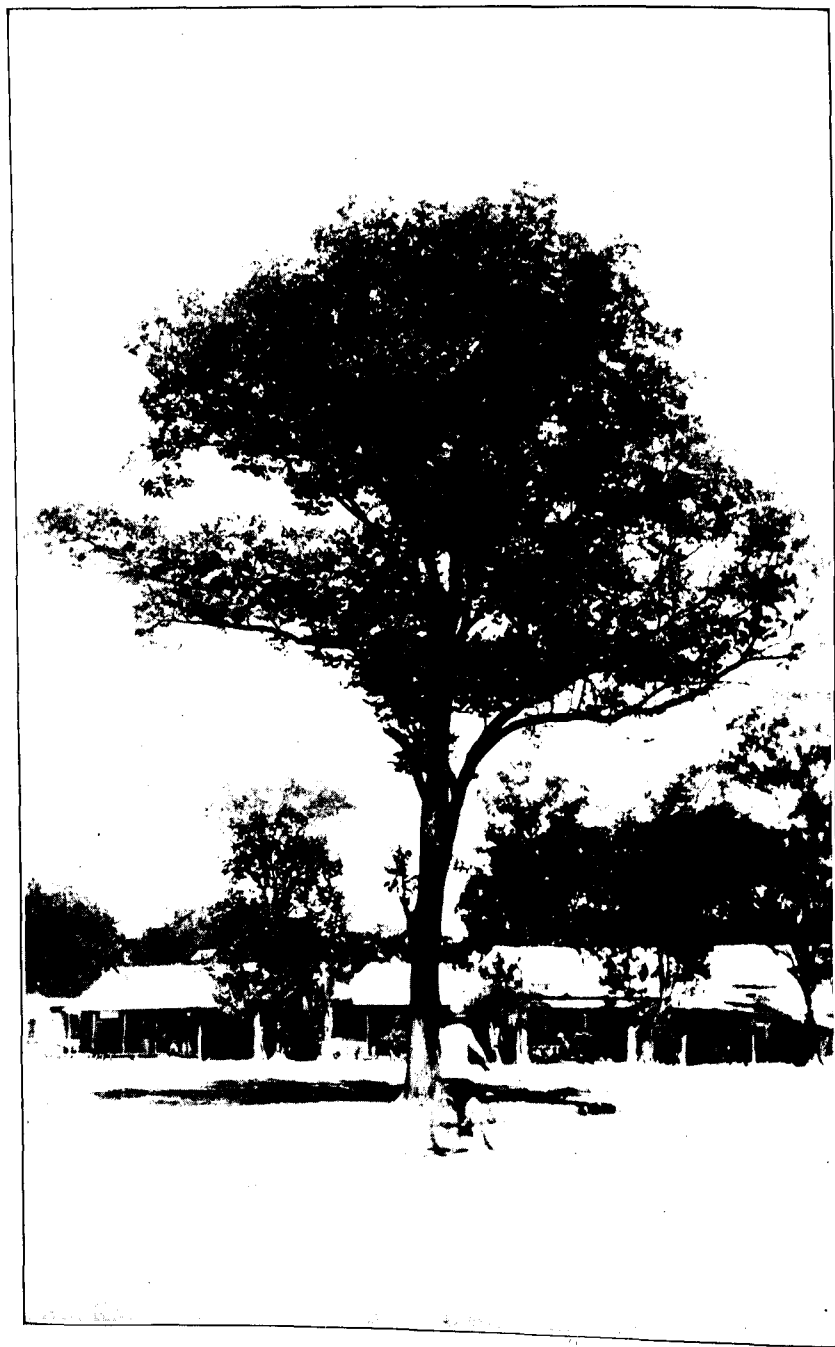
Hexalobus sp.

N. Rhodesia: Nchanga, Bourne 80!

Xylopia sp.

N. Rhodesia: River bank, Chambezi, Bourne 96!

PLATE II.



Marquesia macroura Gilg, at Elisabethville.

Photograph by J. Burtt Davy.

Xylopi sp.

N. Rhodesia : Kasama to Luwingu, *Bourne* 124 ! Belgian Congo : Katanga Prov., *Ringoet* 47 ! in *Herb. Kew*.

POLYGALACEAE.

Securidaca longepedunculata Fres. in Mus. Senck. 2 : 275 (1837).

N. Rhodesia : Kafue Gorge, *Bourne* 62 ! Nyasaland : Neno, 2500 ft. alt., *Carver* 89 !

Native name : Bwaze (Chinyanja), Chosi (Chiyao).

Uses : Bark cloth (*Carver*).

LINACEAE.

Phyllocosmus candidus Engl. & Gilg in Baum, Kunene-Sambesi Exp. p. 269 (1903).

N. Rhodesia : Nchanga, *Bourne* 73 !

PROTEACEAE.

Faurea speciosa Welw. in Trans. Linn. Soc. 27 : 63, t. 20 (1869) ; F.T.A. 6, 1 : 211 (1910).

N. Rhodesia : Kalomo to Choma, *Bourne* 42 !

Protea Busseana Engl. (?) in Engl. Jahrb. 33 : 131 (1902) ; F.T.A. 6, 1 : 200 (1910).

N. Rhodesia : Kalomo to Choma, *Bourne* 43 !

Protea uhehensis Engl. in Engl. Jahrb. 28 : 380 (1900) ; F.T.A. 6, 1 : 202 (1910).

N. Rhodesia : Nchanga, *Bourne* 74 ! This specimen does not quite agree with the type, which is described as having its perianth "very densely clothed with hairs, brownish in the lower part, rosy above." It has smaller flower-heads than any of the specimens at Kew, with finer and shorter hairs on the perianth ; these are white in the lower part and brown above.

PASSIFLORACEAE.

Paropsia sp., near *P. Brazzeana* Baill.

N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 117 !

OCHNACEAE.

Ochna pulchra Hook. Ic. Plant. t. 588 (1843).

N. Rhodesia : Thorn belt, Sesheke, Zambesi, *Bourne* 31 !

Ochna sp.

N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 108 !

DIPTEROCARPACEAE.

Marquesia macroura Gilg ex descript., in Engl. Jahrb. 40 : 485 (1908) ; R. E. Fries in Engl. Jahrb. 51 : 349 (1914).

N. Rhodesia : Nchanga, *Bourne* 81 ! Belgian Congo : Katanga Prov. ; a very common tree in the dry deciduous forest around Elisabethville, *Burtt Davy* 17977 ! Lukasie, North of Elisabethville, *Burtt Davy* 18064 !

COMBRETACEAE.

Combretum imberbe var. **Petersii** (Klotz.) Engl. & Diels in Monogr. Afrik. Pflanzenfam. Combretaceae 3 : 14 (1899).

N. Rhodesia : Kazangula, Zambesi, Bourne 10 !

Combretum splendens Engl. in Pfl. Ost Afr. C. : 289 (1895).

N. Rhodesia : Chinsali to Shiwa Ngandu, Bourne 109 !

Combretum transvaalense var. **villosissimum** (Engl. & Diels) Burt Davy in Burt Davy Fl. Pl. & Ferns of Transvaal 1 : 37 (1926).

N. Rhodesia : Thorn belt, Kazangula, Zambesi, Bourne 19 !

Combretum Zeyheri Sond. in Linnaea 23 : 46 (1850).

N. Rhodesia : Choma, Bourne 50 !

Combretum (?) sp.

N. Rhodesia : Choma to Pemba, Bourne 51 !

Terminalia sericea Burch. ex DC. Prodr. 3 : 13 (1828).

N. Rhodesia : Sesheke, Zambesi, Bourne 24 ! Nyasaland : common everywhere, does best on well-drained slopes at 2000 to 5000 ft. alt., Carver 12 !

Native name : Napini or Mpini (Chinyanja) ; Napini (Chiyao) ; Nalinsi ; Nyapini ; Gonono (Carver).

Uses : Building beams, poles, furniture ; very hard and difficult to work (Carver).

Terminalia torulosa F. Hoffm. in Beitr. Kenntn. Fl. Centr. Ost Afr. 27 (1889).

N. Rhodesia : Chambezi to Kasama, Bourne 100 !

Terminalia sp., cf. *T. stenostachya* Engl. & Diels.

N. Rhodesia : Thorn belt, Kazangula, Zambesi, Bourne 21 !

RHIZOPHORACEAE.

Anisophyllea pomifera Engl. & v. Brehmer in Engl. Jahrb. 54 : 376 (1917).

N. Rhodesia : Mpika to Chambezi, Bourne 92 !

STERCULIACEAE.

Dombeya reticulata K. Schum. in Engl. Monogr. Afrik. Pflanzenfam. Sterculiaceae 5 : 36 (1900) non Mast.

N. Rhodesia : Chinsali to Shiwa Ngandu, Bourne 112 !

Dombeya sp., cf. *D. mupangae* K. Schum.

N. Rhodesia : Chinsali to Shiwa Ngandu, Bourne 115 !

Sterculia triphaca (Lour.) R. Br. in Benn. Pl. Jav. Rar. 228 (1844) ; K. Schum. in Engl. Monogr. Afrik. Pflanzenfam. Sterculiaceae 5 : 105 (1900).

Nyasaland : dry low levels, 1000 to 2000 ft. alt., Carver 54 !

This specimen has entire cordate leaves, whereas *S. triphaca* usually has lobed leaves.

Native name : Ngoza (Chinyanja) ; Mgoza (Chiyao) ; Msetenyani (Carver).

Uses : Beams, furniture, buildings ; not commonly known, a soft wood easily worked (Carver).

Native name : Moosesjie ; Mutoola (Burt Davy).

Uses : Wood said to be yellow in colour, good quality, hard and used locally for finishing houses and for carriage building (Burt Davy).

Monotes glaber Sprague in Kew Bull. 1909, 305.

N. Rhodesia : Kalomo to Choma, Bourne 44 !

MYRTACEAE.

Eucalyptus redunca J. C. Schauer ?

N. Rhodesia : Cultivated at Sesheke, Bourne A !

Eucalyptus saligna Sm. in Trans. Linn. Soc. 3 : 285 (1797).

N. Rhodesia : Cultivated at Sesheke, Bourne B !

Eucalyptus paniculata Sm. in Trans. Linn. Soc. 3 : 287 (1797) ; Maiden, Crit. Rev. Eucalypt. 2 : 104 (1910).

N. Rhodesia : Cultivated at Chilanga, Bourne D ! " Grey Ironbark."

Eucalyptus rostrata Schlecht. in Linnaea 20 : 655 (1847) ; Maiden, Crit. Rev. Eucalypt. 4 : 65 (1927).

N. Rhodesia : Cultivated at Chilanga, Bourne C ! " Red Gum."

Syzygium guineense (Willd.) DC. Prod. 3 : 259 (1828).

N. Rhodesia : River bank, Sesheke, Zambesi, Bourne 28 ! Nchanga, Bourne 72 ! Isoka Chinsali, Bourne 105 !

Bourne 72 best matches the species ; his Nos. 28 and 105 may be edaphic forms, or may prove, on further study of more complete material from Sesheke and Isoka Chinsali, to be distinct species.

Syzygium mumbwaense Greenway, sp. nov. ; affinis *S. huillensi* (Hieron.) Engl., sed teretioribus foliis, obscuris glandibus numerosis, petiolisque corpulentis differt.

Tree, branches sub-terete, glabrous, internodes 1.5-4 cm. long. Leaves 4.4-9.3 cm. long, 2.4-5.5 cm. broad, opposite, rarely sub-opposite, coriaceous, with numerous dark glandular dots on both surfaces ; ovate to ovate-oblong, sometimes more or less rounded, apex rarely sub-acute, usually obtuse to rounded, base more or less cuneate ; venation prominently reticulate, with a distinct marginal nerve. Inflorescence terminal, cymose-paniculate, bracts very minute, flowers in subsessile clusters of three or more on the branches of the inflorescence. Calyx 4-lobed. Corolla 4-partite, calyptrate, early caducous. Stamens many. Ovary inferior ; fruits not seen.

N. Rhodesia : Mumbwa, Mrs. Macaulay 995 AEGM ! (type in Herb. Kew.) ; fair-sized tree generally on stream banks but also seen in the understory in dry evergreen forest. Mumbwa, Bourne 91 ! The latter specimen (vegetative shoots only) has internodes up to 5 cm. long, and rigid coriaceous leaves 6.5-14.5 cm. long, 4.8 cm. broad.

Syzygium sp. ?

N. Rhodesia : Chinsali to Shiwa Ngandu, Bourne 119 ! A very distinct looking specimen with opposite, lanceolate, long-acuminate, gland-dotted leaves but no flowers.

MALVACEAE.

Thespesia sp.

N. Rhodesia : Kafue Flats, Mazabuka, *Bourne* 55 !

EUPHORBIACEAE.

Antidesma venosum Tul. in Ann. Sc. Nat. 3me ser. 15 : 232 (1851) ; F.T.A. 6, 1 : 646 (1913).

N. Rhodesia : Kasaia to Zambesi River Junction, *Bourne* 23 ! Kafue Gorge, *Bourne* 55 bis !

Bridelia micrantha Baill. in Adansonia 3 : 164 (1862-3) ; F.T.A. 6, 1 : 620 (1913).

Nyasaland : River banks above 2500 ft. alt., *Carver* 24 !

Native name : Mpasa (Chinyanja), Msopa (Chiyao).

Uses : Furniture. Timber somewhat like oak, strong and durable (*Carver*).

Paivausa dactylophylla Welw. ex Oliv. in F.T.A. 1 : 328 (1868) ; F.T.A. 6, 1 : 626 (1912).

N. Rhodesia : Chishimba, *Bourne* 122 ! This species is described in Fl. Trop. Afr. as having "alternate" leaves, but in this specimen they are opposite, as well as being sub-opposite to alternate.

Pseudolachnostylis Dekindtii Pax in Engl. Jahrb. 28 : 20 (1899) ; F.T.A. 6, 1 : 673 (1912).

N. Rhodesia : Katapasi Forest, Livingstone to Zimba, *Bourne* 36 !

Pseudolachnostylis glauca (Hiern) Hutch. in F.T.A. 6, 1 : 671 (1912).

N. Rhodesia : Nchanga, *Bourne* 77 !

Uapaca Kirkiana Müll. Arg. in Flora, 1864, 517 ; F.T.A. 6, 1 : 636 (1912).

N. Rhodesia : Katapasi Forest, Livingstone to Zimba, *Bourne* 38 ! Nyasaland : no locality stated, *Carver* 47 !

Native name : Msuku (*Carver*).

Uapaca sp. near *U. Kirkiana* Müll. Arg.

N. Rhodesia : Chishimba, *Bourne* 123 ! This specimen is not unlike *U. Kirkiana* except that the leaves are quite glabrous.

Uapaca sansibarica Pax in Engl. Jahrb. 34 : 370 (1904) ; F.T.A. 6, 1 : 636 (1912).

N. Rhodesia : Nchanga, *Bourne* 71 ! Mpika to Chambezi, *Bourne* 95 ! Nyasaland : Neno, at 3000 ft. alt., *Carver* 88 !

Native name : Kasakalowi (Chinyanja).

Uses : Fruits eaten. Wood for poles (*Carver*).

Uapaca sp. near *U. nitida* Müll. Arg.

N. Rhodesia : Mpika to Chambezi, *Bourne* 94 ! Nyasaland : Tuchun, 2500 ft. alt., *Carver* 22 !

Native name : Msechira (*Topham*).

Both these specimens may prove to be *U. nitida*, but their leaves are much larger than those described for that species, with longer petioles and more numerous lateral nerves.

ROSACEAE.

Hirtella eglandulosa Greenway, sp. nov. ; affinis *H. zanzibaricae* Oliv., sed bracteis, bracteolis, lobisque calycis non glandulosis, inflorescentia longa racemosa paniculata, ramis pilosis, basibusque foliorum cuneatis distincta.

Tree, branches terete, young branches densely pilose becoming pubescent and lenticellate in age ; internodes about 1.5 cm. long. *Leaves* alternate, more or less subsessile, 6-9 cm. long, 3.1-4.3 cm. broad, stipulate, stipules 4-7 mm. long, subulate, pubescent ; blade dark and shining above, paler below, glabrous except on the nerves ; elliptic to obovate, obtuse to shortly apiculate, base cuneate rarely slightly rounded ; venation reticulate, mid-rib pubescent above and below becoming glabrescent towards the apex of the blade ; secondary nerves 6-12, slightly prominent above, very prominent below, ascending and anastomosing more or less towards the margin of the blade. *Inflorescence* brown, pilose, racemose-paniculate, terminating short lateral branches ; rhachis 16 cm. long or more, lateral branches up to 8 cm. long. *Bracts* ; lower ligulate falcate, 8-12 mm. long, upper smaller and subulate falcate ; bracteoles minute ; pedicels up to 8 mm. long ; flowers up to 1 cm. long. *Calyx* tube 6 mm. long, densely pubescent within, gibbous at the base ; lobes 5, about 4 mm. long, ovate, imbricate, pubescent without. *Petals* 5, about 5 mm. long, glabrous, more or less orbicular, slightly clawed. *Stamens* about 8 ; filaments 3-4 mm. long, glabrous except at the base ; anthers 1 mm. long, 2-lobed, basifixed. *Ovary* inserted on the side of the calyx tube near the apex, densely pubescent ; style basal, glabrous, about 3 mm. long ; fruits not seen.

N. Rhodesia : Barotseland, small tree in open forest at 3000 ft. alt., Sefula, *Madam J. Borlé* 254 ! type in *Herb. Kew*.

Hirtella bangweolensis Greenway comb. nov. *Parinarium bangweolense* R. E. Fries in Fedde, Repert. 12 : 540 (1913) ; Wiss. Ergebn. Schwed. Rhod.-Kongo-Exped. 1 : 61, t. 2, fig. 2, and t. 7 (1914).

N. Rhodesia : near Bangweolo, S. and S.W. of the lake, seldom to the north ; Mano river ; Kawendimusi ; and Kamindas, *Fries* 732, 780, 780a, types. Nchanga, *Bourne* 70 !

Parinarium Bequaertii De Wild. in Fedde, Repert. 13 : 108 (1914).

N. Rhodesia : Nchanga, *Bourne* 82 ! Belgian Congo : Katanga Prov. ; tree standing just below the mine manager's house, Kambove, *Burt Davy* 18031 !

Parinarium mobola Oliv. in F.T.A. 2 : 368 (1871).

N. Rhodesia : Sesheke, Zambesi, *Bourne* 27 ! Nyasaland : on tableland at 3000 to 5000 ft. alt., *Carver* 16 ! "African Plum."

Native name : Maula (Chinyanja), Mpemba (Chiyao).

Uses : Fruit eaten ; timber tree, used for planks, also village tree (*Carver*).

Afzelia quanzensis Welw. Apont. Phytogeogr. No. 35 (1858).
A. cuanzensis Auct.

N. Rhodesia: Zimba to Kalomo, *Bourne* 41! Mpika to Chambezi, *Bourne* 93!

Baikiaea plurijuga Harms in Warb. Kunene-Sambesi Exped. 248 (1903).

N. Rhodesia: Malanda Forest, Kazangula, Zambesi, *Bourne* 1!

Bauhinia Thonningii Schum. in Guin. Pl. 203 (1827). *B. reticulata* Auct., non DC.

N. Rhodesia: Thorn belt, Kazangula, Zambesi, *Bourne* 22! Chinsali to Shiwa Ngandu, *Bourne* 114! Nyasaland: without precise locality, *Carver* 8!

Native name: Chitimbi (Chinyanja).

Brachystegia Bournei Greenway, sp. nov.; affinis *B. apertifoliae* Hutch. & Burt Davy sed omnino glabra; affinis *B. reticulatae* Hutch. & Burt Davy sed foliis minoribus, venisque minus reticulatis differt.

A fair sized tree with thick, coarse, dark-coloured bark. Branches terete, older reddish brown, finely striate, younger glaucous. Leaves alternate, paripinnate, 7-9-jugate, glabrous; stipules 0; stipels distinct; rhachis 7.5-10.5 cm. long, sub-terete, upper surface channelled. Leaflets 1.8-3.9 cm. long, 0.5-1.3 cm. broad, intermediate about 3 by 1 cm., discontinuous, lanceolate to oblong-lanceolate, apex obtuse to sub-acute, base obliquely truncate, midrib more or less medial with 1-2 lateral nerves arising from the base and ascending and anastomosing with the tertiary nerves along the margin. Flowers not seen. Pods (immature) 9-10 cm. long, 2.8-3.3 cm. broad, woody, more or less oblong in shape, brown, broadened and slightly winged on the upper suture.

N. Rhodesia: A not particularly flat-crowned tree in semi-deciduous forest, very common and widely distributed in the N. and N.E.; leaves multicoloured when young, dark green when old, Nchanga, collected August 1927, *R. Bourne* 78; (type in *Herb. Kew.*).

Native name: Muwombo (Chilamba and Chiwamba).

Brachystegia flagristipulata Taub. in Engl. Pfl. Ost Afr. C: 198 (1895); Burt Davy & Hutchinson in Kew Bull. 1923, 152.

N. Rhodesia: Serenje, *Bourne* 87! Nyasaland: throughout the country at 1500 to 6000 ft. alt., *Carver* 18!

Native name: Mombo (Chinyanja), Mjombo (Chiyao).

Uses: Bark cloth, poles and firewood (*Carver*).

Brachystegia Hockii De Wild. in Fedde, Repert. 11: 512 (1913); Burt Davy & Hutchinson in Kew Bull. 1923, 159.

N. Rhodesia: Zimba to Kalomo, *Bourne* 39! Nchanga, *Bourne* 75!

Brachystegia longifolia Benth. in Hook. Ic. Pl. 14: t. 1359 (1881); Burt Davy & Hutchinson in Kew Bull. 1923, 154.

N. Rhodesia: Katapasi Forest, Livingstone to Zimba, *Bourne* 37!



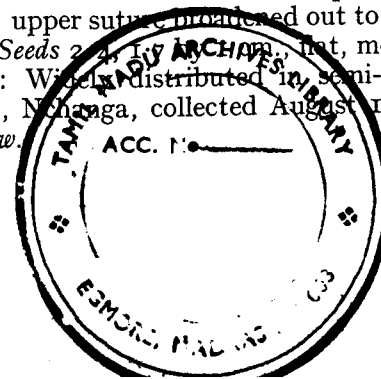
Left. *Brachystegia nchangensis* Greenway. Leaf from type specimen *Bourne* 68. ($\times \frac{3}{8}$).

Right. *Brachystegia Bournei* Greenway. Leaf from type specimen *Bourne* 78. ($\times \frac{3}{8}$).

Brachystegia nchangensis Greenway, sp. nov.; affinis *B. Bussei* Harms, sed foliis 2-jugis, foliolisque elliptico-lanceolatis vel lanceolatis distincta.

A small flat-crowned tree that pollards freely, with thin bark and light green leaves. Branches terete, with fissured greyish-brown bark. Leaves alternate, paripinnate, 2-jugate; stipules and stipels 0; rhachis sub-terete, glabrous, 7-9.5 cm. long. Leaflets 4-8.8 cm. long, 1.5-2.8 cm. broad, glabrous, chartaceous to subcoriaceous, discontinuous, elliptic-lanceolate to lanceolate, usually acute to obtuse; apex often very slightly emarginate, base unequally rounded to cuneate; midrib excentric; lateral nerves inconspicuous, ascending, numerous. Flowers not seen. Pods 9-13 cm. long by 3.5-4 cm. broad at the widest part, woody, glabrous, purplish-brown; upper suture broadened out to form a narrow wing on each valve. Seeds 2-4, flat, more or less reniform.

N. Rhodesia: Widely distributed in semi-deciduous forest in the N. and N.E., Nchanga, collected August 1927, *R. Bourne* 68! type in *Herb. Kew.*



Native name : Kasalwa (Chilamba), Musompa (Chiwemba).
The affinity with *B. Bussei* Harms is not very close ; nor does it show close alliance to any *Brachystegia* yet described.

Brachystegia mimosaeifolia *Hutchinson & Burt Davy* in Kew Bull. 1923, 153.

N. Rhodesia : Lusaka to Chisamba, *Bourne* 65 ! Nchanga, *Bourne* 79 !

Brachystegia mpalensis *Micheli* in Compt. Rend. Soc. Bot. Belg. 36 : 73 (1897) ; *Burt Davy & Hutchinson* in Kew Bull. 1923, 158.

N. Rhodesia : Serenje, *Bourne* 89 !

Brachystegia polyantha *Harms* in Engl. Jahrb. 30 : 319 (1901) ; *Burt Davy & Hutchinson* in Kew Bull. 1923, 157.

N. Rhodesia : Chiwelewe, *Bourne* 84 !

Brachystegia puberula *Hutchinson & Burt Davy* in Kew Bull. 1923, 156.

N. Rhodesia : Nchanga, *Bourne* 76 !

Brachystegia tamarindoides *Welw. ex Benth.* in Trans. Linn. Soc. 25 : 312 (1865) ; *Burt Davy & Hutchinson* in Kew Bull. 1923, 153.

N. Rhodesia : Luwingu to Fort Rosebery, *Bourne* 125 !

Brachystegia utilis *Hutchinson & Burt Davy* in Kew Bull. 1923, 155.

N. Rhodesia : Lusaka to Chisamba, *Bourne* 63 ! Nchanga, *Bourne* 67 ! Serenje, *Bourne* 88 !

Brachystegia velutina *De Wild.* in Fedde, Repert. 11 : 512 (1913) ; *Burt Davy & Hutchinson* in Kew Bull. 1923, 150.

N. Rhodesia : Serenje, *Bourne* 86 !

Burkea africana *Hook.* in Hook. Ic. Plant. 6 : 583-4 (1843).

N. Rhodesia : Malanda Forest, Kazangula, Zambesi, *Bourne* 2 !
Nyasaland : chiefly dry areas but extended range at 1500 to 4500 ft. alt., *Carver* 17 !

Native name : Mkalati (Chinyanja and Chiyao), Kalati (*Carver*).

Uses : Railway sleepers, bridges, and buildings. Wood very hard and tough, not easily cut with an axe (*Carver*).

Cassia Petersiana *C. Bolle* in Peters Mossamb. Bot. 13 (1862).

Nyasaland : common at Tuchila, 2000 ft. alt., *Carver* 19 !

Native name : Mtuwelele (Chinyanja).

Uses : The natives use the pods for food (*Carver*).

Copaifera coleosperma *Benth.* in Trans. Linn. Soc. 25 : 316, t. 43a (1865).

N. Rhodesia : Malanda Forest, Kazangula, Zambesi, *Bourne* 4 !

Copaifera mopane *Kirk ex Benth.* in Trans. Linn. Soc. 25 : 317 (1865).

N. Rhodesia : Thorn belt, Kazangula, Zambesi, *Bourne* 15 !

Erythrophloeum africanum (*Welw.*) *Harms* in Fedde, Repert. 12 : 298 (1913).

N. Rhodesia : Malanda Forest, Kazangula, Zambesi, *Bourne* 3 !
Roan Antelope Mine, *Bourne* 83 ! Belgian Congo : Katanga Prov., Wireless Station, Elisabethville, a large deciduous tree, *Burt Davy* 17996 ! Footpath near entrance to wireless station, *Burt Davy* 18010 !

Native name : Moosaasi ; Mawfui (*Burt Davy*).

Erythrophloeum guineense *Don* in Gard. Dict. 2 : 424 (1832).

Nyasaland : On river banks at over 2500 ft. alt., *Carver* 110 !
Belgian Congo : Katanga Prov. ; a large tree, Elisabethville, *Burt Davy* 17970 ! and 17999 !

Native name : Mwabui (Chinyanja), Mwai (Chiyao), Muafi (*Burt Davy*).

Uses : Native witch doctors use the bark of this tree ground up with water as an ordeal poison, small quantities of which are deadly (*Carver*). Timber used for canoes and furniture (*Carver*).

Isoberlinia globiflora *Hutchinson* comb. nov. *Brachystegia globiflora* *Benth.* in Hook. Ic. Pl. 14 : 43 (1881). *Berlinia globiflora* *Hutchinson & Burt Davy* in Kew Bull. 1923, 162.

N. Rhodesia : Katapasi Forest, Livingstone to Zimba, *Bourne* 35 ! Serenje, *Bourne* 85 ! Chambezi to Kasama, *Bourne* 99 !
Nyasaland : very common at 1500 to 5000 ft. alt., *Carver* 21 !

Native name : Kamponi (Chinyanja), Mchenga (Chiyao), Mchumoe (*Carver*).

Uses : Bark cloth, poles, and firewood (*Carver*).

Isoberlinia paniculata *Hutchinson* comb. nov. *Berlinia paniculata* *Benth.* in Trans. Linn. Soc. 25 : 311 (1865).

N. Rhodesia : Nchanga, *Bourne* 69 !

Isoberlinia tomentosa *Hutchinson* comb. nov. *Berlinia tomentosa* *Harms* in Engl. Jahrb. 30 : 321 (1901).

N. Rhodesia : River Bank, Chambezi, *Bourne* 98 !

Peltophorum africanum *Sond.* in Linnaea 23 : 35 (1850).

N. Rhodesia : Thorn belt, Kazangula, Zambesi, *Bourne* 14 !

Tamarindus indica *L.* Sp. Pl. ed. 1 : 34 (1753).

Nyasaland : Dry country at 2000 ft. alt., *Carver* 31 !

Native name : Mbwebemba (Chinyanja), Nkwezu (Chiyao).

Uses : Wood used for poles (*Carver*).

MIMOSACEAE.

Acacia albida *Delile* in Delile Fl. Egypt. 142, t. 52, fig. 3 (1813).

N. Rhodesia : Kazangula, Zambesi, *Bourne* 12 ! Nyasaland : low levels, at about 1500 ft., *Carver* 56 !

Native name : Nsangu (Chinyanja), Nsanguangu (Chiyao).

Uses : Making canoes, and good for firewood (*Carver*).

Acacia campylacantha *Hochst. ex A. Rich.* in A. Rich. Tent. Fl. Abyss. 1 : 242 (1847).

N. Rhodesia : Kafue Flats, Mazabuka, *Bourne* 54 !

Acacia giraffae *Willd.* in Willd. Enum. Hort. Berol. 1054 (1809).

N. Rhodesia : Thorn belt, Kazangula, Zambesi, *Bourne* 17 !

This specimen is unusually hairy for *A. giraffae*. Apparently this is about the northernmost range of the species.

Acacia pallens Rolfe in Kew Bull. 1907, 361.

N. Rhodesia : Sesheke, Zambesi, *Bourne* 25 ! This is a hairy form.

Acacia Rehmanniana Schinz in Bull. Herb. Boiss. 6 : 525 (1898).

N. Rhodesia : Kazangula, Zambesi, *Bourne* 9 !

Albizzia Antunesiana Harms in Engl. Jahrb. 30 : 317 (1901).

N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 107 !

Albizzia sp.

N. Rhodesia : Choma to Pemba, *Bourne* 52 !

Amblygonocarpus obtusangulus (Welw.) Harms in Engl. Jahrb. 26 : 256 (1899). *Tetrapleura obtusangula* Welw. ex Oliv. in F.T.A. 2 : 331 (1871).

N. Rhodesia : Thorn belt, Kazangula, Zambesi, *Bourne* 18 ! Kafue Gorge, *Bourne* 58 !

Dichrostachys glomerata Hutch. & Dalz. Fl. W. Trop. Afr. 1, part 2, ined. *D. nutans* Benth. in Hook. Journ. Bot. 4 : 353 (1842).

N. Rhodesia : Thorn belt, Kazangula, Zambesi, *Bourne* 16 !

PAPILIONACEAE.

Afrormosia angolensis (Bak.) Harms in Engl. & Prantl Nat. Pflanzenfam., Nachtr. 3 : 158 (1908).

N. Rhodesia : Choma, *Bourne* 47 ! Nyasaland : common at over 2500 ft. alt., *Carver* 91 !

Native name : Mwanga or Muwanga (Chinyanja), Mbanga (Chiyao).

Uses : Poles, and timber generally, but wood very hard (*Carver*).

Baphia Bequaertii De Wild. in Fedde, Repert. 13 : 116 (1914).

N. Rhodesia : Nchanga, *Bourne* 66 !

Cordyla africana Lour. Fl. Cochinch. 412 (1790).

Nyasaland : Plains at 1900 to 2500 ft. alt., *Carver* 63 !

Native name : Ntongo (Chinyanja), Mtondo (Chiyao), Mtwana (*Carver*).

Uses : Fruits eaten. Wood for furniture and building. Trees left by natives in gardens ; fruiting in December. (*Carver*).

Dalbergia melanoxydon Guill. & Perr. Fl. Seneg. 227, t. 53 (1830-3).

Nyasaland : Shores of lakes and big rivers at 1000 to 2000 ft. alt., *Carver* 79 !

Native name : Mpingo (Chinyanja and Chiyao).

Uses : African ebony, black and heavy ; never grows above 18 inches in diameter. Used by natives to make curios (*Carver*).

Dalbergia nitidula Welw. ex Oliv. in F.T.A. 2 : 235 (1871).

N. Rhodesia : Mpika to Chambezi, *Bourne* 90 !

Dalbergia sp. ?

N. Rhodesia : Lusaka to Chisamba, *Bourne* 64 !

Derris Stuhlmannii (Taub.) Harms in Engl. Jahrb. 28 : 408 (1900).

N. Rhodesia : Choma, *Bourne* 49 !

Erythrina Livingstoniana Baker in F.T.A. 2 : 182 (1871).

Nyasaland : without locality, *Carver* 30 !

Native name : Mwali (Chinyanja).

Lonchocarpus capassa Rolfe in Oates, Matabele-land ed. 2 : 397 (1889).

N. Rhodesia : Thorn belt, Kazangula, Zambesi, *Bourne* 20 !

Lonchocarpus Nelsii Schinz ex Heering & Grimmer. Untersuch. Weideverhaltn. Deutsch-Sudwestaf. 25 (1911).

N. Rhodesia : Malanda Forest, Kazangula, Zambesi, *Bourne* 5 ! Thorn belt, Sesheke, Zambesi, *Bourne* 30 !

Lonchocarpus sp. ?

N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 113 !

Pterocarpus angolensis DC. Prodr. 2 : 419 (1825).

Nyasaland : on gravel on well drained hill slopes at 1500 to 5000 ft. alt., *Carver* 11 !

Native name : Mlombwa (Chinyanja), Mtumbati (Chiyao).

Uses : Very commonly used for furniture, also for lintels, beams, and handles. Hard to work and plane but takes good polish (*Carver*).

Swartzia madagascariensis Desv. in Ann. Sc. Nat. Sér. 1, 9 : 424 (1826).

N. Rhodesia : Kalomo to Choma, *Bourne* 46 ! Nyasaland : low levels at 1500 ft. alt., *Carver* 7 !

Native name : Dzungo (Chinyanja), Chinyenye (Chiyao), Kochokoetto (*Carver*).

MORACEAE.

Ficus dekdekana A. Rich. Tent. Fl. Abyss. 2 : 268 (1851) ; F.T.A. 6, 2 : 211 (1917).

N. Rhodesia : Kazangula, Zambesi, *Bourne* 7 ! This specimen may prove to be *F. Erics-Rosinii* R. E. Fries, on comparison with the type.

Ficus gnaphalocarpa (Miq.) A. Rich. Tent. Fl. Abyss. 2 : 270 (1851) ; F.T.A. 6, 2 : 104 (1916).

N. Rhodesia : Sesheke, *Seiner* 54.

Ficus sycomorus L. Sp. Pl. ed. 1 : 1059 (1753) ; F.T.A. 6, 2 : 95 (1916).

N. Rhodesia : Monze to Mazabuka, *Bourne* 53 ! This specimen is so incomplete that it might be *F. gnaphalocarpa* ; both species have been included because they are recorded from Rhodesia.

CELASTRACEAE.

Gymnosporia senegalensis (Lam.) Loes. in Engl. Jahrb. 17 : 541 (1893).

N. Rhodesia : Kalomo to Choma, *Bourne* 45 !

RHAMNACEAE.

Berchemia discolor (Klotz.) Hemsl. in F.T.A. 1 : 381 (1868).

N. Rhodesia : Kazangula, Zambesi, *Bourne* 8 !

Zizyphus jujuba Lam. Encyc. 3 : 318 (1789).
N. Rhodesia : Choma, *Bourne* 48 !

HETEROPYXIDACEAE.

Heteropyxis natalensis Harv. Thes. Cap. 2 : 18, t. 128 (1863).
Nyasaland : Neno at 3000 to 4000 ft. alt., *Carver* 109 !
Native name : Kangalogwe (Chinyanja), Ntibulo (Chiyao).

MELIACEAE.

Entandrophragma sp.
N. Rhodesia : Malanda Forest, Kazangula, Zambesi, *Bourne* 6 !
Khaya nyasica Stapf ex E. G. Baker in Journ. Linn. Soc. Bot. 40 : 42 (1911).
Nyasaland : river banks and mountain rain forests at 2000 to 5000 ft. alt., *Carver* 13 !
Native name : Mbawa (Chinyanja, Chingoni) ; Atonga ; Muwawa (*Carver*).

Uses : Excellent mahogany furniture, panelling, and building. Supply limited, only dead trees sold (*Carver*).

Trichilia emetica Vahl, Symb. Bot. 1 : 3 (1790).
N. Rhodesia : river bank, Sesheke, Zambesi, *Bourne* 29 !
Nyasaland : low country at 1100 to 2500 ft. alt., *Carver* 33 !
Native name : Msikitsi (Chinyanja and Chiyao).

Uses : Planks, furniture, and building timber. Gives a good red mahogany wood, sometimes called Cape Mahogany (*Carver*).

Trichilia sp. cf. *T. capitata* Kl.
N. Rhodesia : Sesheke, Zambesi, *Bourne* 26 ! Shupanga, Dr. Kirk ! collected July 1862, in *Herb. Kew*.

MELIANTHACEAE.

Bersama andongensis Hiern, Cat. Welw. Afr. Pl. 1 : 174 (1896).
N. Rhodesia : River bank, Chambezi, *Bourne* 97 !

ANACARDIACEAE.

Heeria sp.
N. Rhodesia : Abercorn to Mwenzo, *Bourne* 104 !

CONNARACEAE.

Byrsocarpus orientalis Baill. Adansonia 7 : 230 (1866).
N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 111 !

ERICACEAE.

Agauria salicifolia Hook. f. ex. Oliv. F.T.A. 3 : 483 (1877).
N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 120 !
Philippia benguelensis (Engl.) Welw. ex Engl. in Abh. Preuss. Akad. Wiss. 1891, 328 (1892).
N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 118 !

EBENACEAE.

Diospyros batocana Hiern, Monog. Eben, p. 174 (1873).
N. Rhodesia : Katapasi Forest, Livingstone to Zimba, *Bourne* 33 !

Diospyros mespiliformis Hochst. ex A. DC. in DC. Prodr. 8 : 672 (1844).
N. Rhodesia : Kazangula, Zambesi, *Bourne* 13 !

LOGANIACEAE.

Strychnos pungens Solered. in Engl. Jahrb. 17 : 554 (1893) ; F.T.A. 4, 1 : 530 (1903).
N. Rhodesia : Katapasi Forest, Livingstone to Zimba, *Bourne* 34 !

APOCYNACEAE.

Diplorrhynchus mossambicensis Benth. in Hook. Ic. Pl. t. 1355 (1881) ; F.T.A. 4, 1 : 107 (1902).
N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 106 !
Landolphia Kirkii Dyer in Kew Report, 1880, 39, 42 ; F.T.A. 4, 1 : 55 (1902).
N. Rhodesia : Chambezi to Kasama, *Bourne* 121 ! Nyasaland : Msitu, and thick forest country, top of mountains above 3000 ft. alt., *Carver* 105 !

Native name : Mpira (Chinyanja and Chiyao).

Uses : Rubber, sometimes collected commercially (*Carver*).

Rauwolfia natalensis Sond. in Linnaea 23 : 78 (1850) ; F.T.A. 4, 1 : 111 (1902).
N. Rhodesia : Kafue Gorge, *Bourne* 56 !

RUBIACEAE.

Adina microcephala (Del.) Hiern in F.T.A. 3 : 40 (1877).
Nyasaland : river banks at over 2000 ft. alt., *Carver* 14 !
Native name : Mwenya (Chinyanja and Chiyao).
Uses : Timber, furniture, and bridge building ; strong but liable to break under sudden strain (*Carver*).
Canthium opimum S. Moore in Journ. Linn. Soc. Bot. 37 : 308 (1906).
N. Rhodesia : Chinsali to Shiwa Ngandu, *Bourne* 110 !
Mitragyna macrophylla (Perr. & Lepr.) Hiern in F.T.A. 3 : 41 (1877).

N. Rhodesia : Lake Tanganyika, *Bourne* 102 !

Randia physophylla K. Schum. in Engl. Jahrb. 28 : 64 (1899).

N. Rhodesia : Kasama to Abercorn, *Bourne* 101 !

Vangueria tomentosa Hochst. in Flora 25 : 238 (1842).

N. Rhodesia : Zimba to Kalomo, *Bourne* 40 ?

Vangueriopsis lancifolia (Hiern) Robyns. Mss.

N. Rhodesia : Zimba to Kalomo, *Bourne* 40 ? As there are no flowers with this specimen it may be either *Vangueria tomentosa* or *Vangueriopsis lancifolia*. Both these species have been recorded from Rhodesia, and they have been included on that account.

COMPOSITAE.

Vernonia senegalensis (Pers.) Less. in Linnaea 4 : 265 (1829).
N. Rhodesia : Kafue Gorge, *Bourne* 57 !

BIGNONIACEAE.

Kigelia pinnata (Jacq.) DC. Prodr. 9: 247 (1845); F.T.A. 4, 2: 537 (1906).

N. Rhodesia: Kafue Gorge, Bourne 59!

Kigelia pinnata var. **tomentella** Sprague. F.T.A. 4, 2: 537 (1906).

N. Rhodesia: Kazangula, Zambesi, Bourne 11!

Markamia lanata K. Schum. in Engl. & Prantl, Pflanzenfam. 4. 3b: 242 (1895); F.T.A. 4, 2: 527 (1906).

Nyasaland: without locality, common at 1500 to 2500 ft. alt., Carver 51!

Native name: Mwananbewe (Chinyanja), Msewa (Chiyao).

Uses: Handles for hoes (Carver).

VERBENACEAE.

Vitex Hildebrandtii Vatke var. **glabrescens** Pieper. Mss.

N. Rhodesia: Kafue Gorge, Bourne 60!

Vitex milanjensis Britten in Trans. Linn. Soc. ser. 2, Bot. 4: 36 (1894); F.T.A. 5: 330 (1900).

N. Rhodesia: Chinsali to Shiwa Ngandu, Bourne 116!

LILIACEAE.

Dracaena reflexa Lam. var. **nitens** Baker in F.T.A. 7: 441 (1898).

N. Rhodesia: Luwingu to Fort Rosebery, Bourne 126!

PALMAE.

Phoenix reclinata Jacq. Fragg. 1: 27, t. 24 (1809); F.T.A. 8: 103 (1901).

Nyasaland: without precise locality, Carver 103!

Native name: Kanjedza (Chinyanja), Mchidwe (Chiyao).

Raphia vinifera P. Beauv. Fl. Owar. 1: 77, t. 44, f. 1, t. 45; t. 46, f. 2 (1804-7); F.T.A. 8: 106 (1901).

Nyasaland: River banks above 2000 ft. alt., Carver 106!

Native name: Chiwale (Chinyanja).

Uses: Mats from leaves; building, poles, and ladders (Carver).

GRAMINEAE.

Phragmites vulgaris (Lam.) Crép. Man. Fl. Belg. ed. 2: 345 (1866).

N. Rhodesia: Simaraha Flats, Zambesi, Bourne 32!

FILICES.

Pteridium aquilinum subsp. **centrali-africanum** Hieron. Wiss.

Erg. Schwed. Rhodesia-Kongo Exp. 1911-12, Bot. 1: 7 (1914).

N. Rhodesia: Abercorn to Mwenzo, Bourne 103.

BULLETIN OF MISCELLANEOUS INFORMATION

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ROYAL BOTANIC GARDENS, KEW

XXXI—THE NOMENCLATURE OF "BROMUS."

O. STAPP.

Linnaeus's original concept of *Bromus* (Gen. Pl. 15; 1737) was entirely that of the *secalinus*-group, that is, of *Serrafalcus* Parl. This is evident from his description and the figures which he quotes to illustrate it. In Species Plantarum he widened the concept so as to include species not referable to the *secalinus*-group, heading, however, his list of species with *B. secalinus*. This should therefore technically be considered as the standard species of the genus and any subsequent segregation would have to treat the group which included *B. secalinus* as representing *Bromus*. Panzer's* procedure in giving the *sterilis*- and *erectus*-group a new name (*Zerna*) was so far quite correct; but he vitiated his definition of *Zerna* by including such grasses as *Vulpia ligustica* and *V. myurus*, *Brachypodium distachyum* and even *Bromus macrostachyus*, a true *Bromus*, suo sensu. Hence Parlatore's observation "hinc patet Zernae suae, quae multas diversorum generum species comprehendit, characteres minime exactos tribuisse" (Rar. Pl. Sic. fasc. ii. 5; 1844) and his consequent rejection of Panzer's definitions of *Bromus* and *Zerna*. Having thus got rid of Panzer's proposal, Parlatore proceeds (l.c. p. 6) to a more homeogenous grouping which has found general approval except in so far as the taxonomic rank of the groups is concerned. The two segregates of Linnaeus's *Bromus* proposed by Parlatore are *Bromus*, comprising "Bromos Linnaei genuinos alioquorumque botanicorum ut et Bertolonii, Kochii, etc.," and *Serrafalcus* represented by "Bromis secalinis."

The term "*Bromi Linnaei genuini*" was unfortunately chosen, as the genuine bromuses of Linnaeus of 1737 were evidently all species of the *secalinus*-series and the genuine bromuses of his Species Plantarum equally evidently a medley of species of *Bromus* sens. lat., *Festuca*, *Vulpia* and *Brachypodium*. He expressed no doubts about any of them. It was just a case of an originally clear concept becoming blurred by the addition of incongruous elements. Bertoloni and Koch did in fact not propose a group of "*Bromi Linnaei genuini*," but merely of "*Bromi genuini*," that is species of *Bromus* which in their opinion constituted a group typical of the genus *Bromus* as revised by them. It was a new start and a new sectional name. Their concepts of *Bromus* were so much clearer and

*In Denkschr.-Akl. München, 1813, 296 (1814).

infra minute puberula, nervis lateralibus utrinsecus 10 a costa sub angulo 45° abeuntibus, tertiariis laxis subparallelis; petioli 1 cm. longi, tomentelli. *Inflorescentia* axillaris, usque ad 8 cm. longa, tomentella. *Flores* breviter pedicellati, pedicellis basi articulatis.

Nigeria: Southern Provinces; Ikoyi Plains, Jan., *Dalziel* 1356; Lagos, *Dalziel* 1259 (type); Iddo, Dec., *Millen* 42.

Homalium djalonis A. Chev. Explor. Bot. Afr. Occid. Franç. 283, nomen; affinis *H. molle* Stapf, sed indumento longe piloso differt.

Arbor; ramuli juniores molliter villosi. *Folia* oblique ovato-elliptica, breviter acuminata, basi inaequilatera, 15–18 cm. longa, 7–10 cm. lata, obtuse serrata, infra costa et nervis lateralibus longe pilosa, nervis lateralibus utrinsecus 5–6 arcuatis. *Inflorescentia* paniculata, ubique molliter pilosa; pedicelli 2 mm. longi. *Calyx* pilosus, lobis linearibus 3 mm. longis. *Petala* fructifera oblanceolata, 8 mm. longa, 3 mm. lata, breviter pubescentia.

French Guinea: Diaguissa Plateaux, Apr., *Chevalier* 12692 (type).

Homalium alnifolium Hutch. et J. M. Dalz., sp. nov.; foliis crasse crenatis late ellipticis basi cuneatis distincta.

Arbor magna; ramuli glabrescentes. *Folia* late et breviter elliptica, basi cuneata, abrupte acuminata, usque ad 12 cm. longa et 6.5 cm. lata, crasse crenata, glabra, nervis lateralibus utrinsecus 6–8 a costa sub angulo acuto abeuntibus. *Inflorescentia* axillaris, elongata, usque ad 20 cm. longa, puberula; pedicelli brevissimi, supra medium articulati. *Calyx* puberulus, lobis triangularibus 1 mm. longis. *Petala* fructifera oblanceolata, 8 mm. longa, 2 mm. lata.

Sierra Leone: Pujehun, Feb., *Lane-Poole* 141 (type); Panguma, Mar., *Lane-Poole* 19; Bunabu, Mar., *Lane-Poole* 16; Makump, July, *Thomas* 948; Mayoso, Aug., *Thomas* 1477. Nigeria: Southern Provinces; Modakeke, *Foster* 206; Degema, *Talbot* 3791.

Homalium dolichophyllum Gilg ms.; species foliis magnis usque ad 30 cm. longis basi cordatis distincta.

Arbor usque ad 16 m. alta; ramuli glabri. *Folia* ovato-elliptica, basi cordata, breviter obtuse acuminata, 12–30 cm. longa, usque ad 12 cm. lata, obscure crenata, glabra, infra crebre et oblique reticulata, nervis lateralibus utrinsecus circiter 10 arcuatis. *Inflorescentia* paniculata, usque ad 30 cm. longa, minute puberula; flores subsessiles. *Calyx* turbinatus, puberulus, lobis oblongo-lanceolatis 3 mm. longis. *Petala* fructifera oblongo-lanceolata, 1–1.3 cm. longa.

Extends from French Guinea to Gabon. We have seen the following specimens:—*Lane-Poole* 150. *Scott Elliot* 5532. *Farmar* 249A. *Vigne* 230. *Pobéguin* 640. *Dalziel* 8302. *Mann* 232. *Yates* 35. *Talbot* 1419, 1514. *Zenker* 1305, 1659, 2669, 2799,

3411, 4404, 4417. *Staudt* 242. *Preuss* 1379. *Bates* 1833. *Mildbraed* 8064. *Soyaux* 72.

Homalium Aylmeri Hutch. et J. M. Dalz., sp. nov.; foliis subintegris, inflorescentia paniculata distincta.

Arbor magna; ramuli glabri. *Folia* late obovato-elliptica, basi cuneata, breviter acuminata, 10–12 cm. longa, 5–6 cm. lata, subintegra, glabra, nervis lateralibus utrinsecus 8 arcuatis infra reticulatis; petioli 1 cm. longi. *Inflorescentia* paniculata, minute puberula; pedicelli brevissimi. *Calyx* puberulus, lobis triangularibus 1 mm. longis. *Petala* fructifera oblanceolata, 8 mm. longa, brevissime pubescentia.

Sierra Leone: Kambui, Mar., *Aylmer* 580.

Homalium Smythi Hutch. et J. M. Dalz., sp. nov.; affinis *H. africano* Benth., sed axe inflorescentiae pilis longis patulis, floribus distincte pedicellatis, petalis fructiferis 8 mm. longis differt.

Arbor; ramuli juniores tenuiter pilosi. *Folia* oblongo-elliptica, basi rotundata, apice obtuse acuminata, 12–18 cm. longa, 5–6 cm. lata, obscure crenata, glabra, infra crebre reticulata, nervis lateralibus utrinsecus 6 arcuatis laxe reticulatis. *Inflorescentia* laxa paniculata, tenuiter pilosa et puberula. *Calyx* adpresse tomentellus, lobis lineari-lanceolatis 1.5 mm. longis. *Petala* fructifera oblanceolata, minute puberula, 5 mm. longa.

Sierra Leone: *Smythe* 55 (type); Pujehun, Febr., *Aylmer* 7.

Casearia inaequalis Hutch. et J. M. Dalz., sp. nov.; affinis *C. Dinklagei* Gilg, sed foliis basi inaequalibus oblongo-lanceolatis acuminatis crenulatis differt.

Arbor parva; ramuli leviter angulati, glabri. *Folia* oblongo-lanceolata, acuminata, basi valde inaequilatera, 10–12 cm. longa, 3–3.5 cm. lata, crenulata, glabra, nervis lateralibus utrinsecus circiter 8; petioli 5–8 mm. longi. *Flores* glomerati, pedicellis 3–4 mm. longis. *Sepala* obovata, glabra, 3 mm. longa. *Staminodia* villosa.

Sierra Leone: Bandajuma, May, *Aylmer* 73.

Casearia bridelioides Mildbr. ms.; affinis *C. Barteri* Mast., sed floribus subsessilibus, sepalis pubescentibus, foliis obovato-ellipticis nervis lateralibus utrinque prominentibus differt.

Arbor usque ad 27 m. alta; ramuli angulares, glabri, internodiis 2 cm. longis. *Folia* obovata vel obovato-elliptica, basi cuneata, breviter obtuse acuminata, 7–9 cm. longa, 4–5 cm. lata, glabra, integra, nervis lateralibus utrinsecus 6–7 utrinque prominulis. *Flores* glomerati, subsessiles; bractae tomentellae. *Sepala* extra pubescentia. *Fructus* obovoideus, 3 cm. longus, glaber.

Nigeria: Southern Provinces; Ovi River, *Sankey* 17. French Cameroons: Dengdeng, Mar., *Mildbraed* 8768 (type).

PASSIFLORACEAE.

Soyauxia velutina Hutch. et J. M. Dalz., sp. nov.; affinis *S. floribundae* Hutch., sed stipulis sub anthesin persistentibus, ramulis pilosis, costa infra pilosa differt.—*S. laxiflora* A. Chev. Explor. Bot. Afr. Occid. Franç. 288, non Gilg.

Frutex; ramuli juniores tenuiter pilosi. *Folia* oblongo-lanceolata, acutissime acuminata, basi subobtusata, 8–13 cm. longa, 2–4 cm. lata, costa pilosa excepta glabra, nervis lateralibus utrinsecus 10–12; stipulae lineari-lanceolatae, 6–7 mm. longae, pubescentes. *Inflorescentia* axillares, simplex vel pauca ramosa, velutina. *Flores* sessiles. *Sepala* oblongo-elliptica, adpresse velutina, circiter 0.5 cm. longa. *Petala* patula, oblongo-elliptica, 6 mm. longa, intra glabra. *Fructus* ellipsoideus, apice pubescens.

Ivory Coast: Bingerville, etc., *Chevalier* (type). Nigeria: Southern Provinces; Atigere, Febr. *Millen* 147.

Adenia tenuispira Hutch. et J. M. Dalz., comb. nov.—*Modecca tenuispira* Stapf in Journ. Linn. Soc. 37: 102 (1905). *M. nigricans* A. Chev. Explor. Bot. Afr. Occid. Franç. 287.

Liberia: Sinoe Basin, *Whyte* (type); Gbanga, *Linder* 731. Ivory Coast: Bouroukrou, Jan., *Chevalier* 17002; Aboisso on the Sanvi, Mar., *Chevalier* 17812.

Adenia Dinklagei Hutch. et J. M. Dalz., sp. nov.; affinis *A. gracili* Harms, sed sepalis inferne connatis, foliis majoribus integris facile distinguenda.

Frutex scandens; ramuli teretes, glabri, glaucescentes. *Folia* late ovata, late et leviter caudata, obtuse et breviter acuminata, 6–10 cm. longa, 5.5–9 cm. lata, integra, glabra, supra atrobrunnea, infra pallidiora, nervis lateralibus utrinsecus circiter 4; petioli 6 cm. longi; cirrhi axillares, spiraliter contorti, apici breviter bifurcati. *Paniculae* elongatae, usque ad 25 cm. longae, ramulis cymulosis brevibus paucifloris; pedicelli 4 mm. longi, apice articulati. *Sepala* infra medium connata, oblongo-elliptica, 8 mm. longa.

Liberia: Grand Bassa, *Dinklage* 2109.

CUCURBITACEAE.

Trochomeria Dalzielii Bak. f. ex Hutch. in Flora West Trop. Afr. 1: 177, fig. 78; species foliis digitate 3–7-lobatis lobis linearibus ad anguste ovatis infra scabrido-setosis distincta.

Scandens; caules graciles, sulcati, glabri, e rhizomate dioscorei-forme carnosio oriundi. *Folia* ubique dense scabrido-setosa, fere ad basin digitate 3–7-lobata, segmentis linearibus ad anguste ovatis acutis integris vel triangulari-lobatis vel dentatis. *Flores* ♂ et ♀ subfasciculati vel breviter cymosi; pedicelli usque ad 1.5 cm. longi. *Calycis* lobi ♂ triangulari-subulati, minuti. *Petala* lineari-lanceolata, acuta, usque ad 5 cm. longa, glabra. *Fructus* turbinatus, glaber.

Nigeria: Northern Provinces; Kontagora, Dec., *Dalziel* 280 (type); Abinsi, *Dalziel* 736; Katagum, *Dalziel* 374; Nassarawa Prov., Hepburn 686 A; Mada Hills, Hepburn 70; Nupe, *Barter*; Vom, Bauchi Plateau, *Dent-Young*; Jira, *Lely* 126.

Gerrardanthus nigericus Hutch. et J. M. Dalz., sp. nov.; foliis ovato-rotundatis basi cordatis integris glabris distincta.

Scandens; caules graciles, cirrhis axillaribus gracillimis spiraliter contortis; ramuli glabri, sulcati. *Folia* ovato-rotundata, basi late cordata, acute, cordato-acuminata, 9–12 cm. longa, 7–9 cm. lata, tenuissima, integra, basi eglandulosa et pedatim 6–7-nervia, glabra; petioli usque ad 5 cm. longi. *Sepala* ovata, circiter 2 mm. longa, glabra et venosa. *Petala* inaequalia, oblonga, circiter 1 cm. longa. *Fructus* junior oblongo-oblanco-latus, 2 cm. longus, apice cornutus, glaber.

Gold Coast: Kumasi, *Cummins* 146. Nigeria: Southern Provinces; Oban, *Talbot* 1454 (type); Degema, *Talbot* 3628.

Melothria fernandensis Hutch. et J. M. Dalz., sp. nov.; floribus numerosis fasciculatis breviter pedicellatis, foliis breviter 5-lobatis ambitu pentagonis late cordatis distincta.

Scandens, usque ad 7 m. alta; ramuli fere glabri. *Folia* ambitu pentagona, leviter 5-loba, basi late cordata, apice acute apiculata, 4–6 cm. longa, usque ad 5 cm. lata, supra scabrida, infra setulosa; petioli 2–3 cm. longi; cirrhi gracillimi, simplices, usque ad 8 cm. longi. *Flores* axillares, fasciculati; pedicelli 3–5 mm. longi; flores ♂ calyce tubuloso 5 mm. longo glabro. *Fructus* subglobosus, apiculatus, circiter 4 mm. diametro, reticulatus.

Fernando Po.: 1000 m., *Mann* 628.

Rhaphidiocystis Caillei Hutch. et J. M. Dalz., sp. nov.; valde affinis *R. Mannii* Hook. f., sed ramulis pubescentibus, foliis haud acuminatis, petiolis scabridis nec setosis, sepalis florum masculorum integris, fructibus ellipsoideis setis aurantiacis ornatis differt.—*R. Mannii* A. Chev. Explor. Bot. Afr. Occid. Franç. 295, non Hook. f.

French Guinea: Kouria, Aug., *Caille in Herb. Chevalier* 15006; Bilima, Sept., *Caille in Herb. Chevalier* 15036 (type).

Momordica bracteata Hutch. et J. M. Dalz., sp. nov.; affinis *M. Charantiae* Linn., sed floribus masculis umbellatis, pedunculo apice bractea magna orbiculari cordata ornato differt.

Scandens; ramuli graciles, minute puberuli. *Folia* latissime ovata, breviter et acute lobato-dentata, interdum profunde 3-lobata, late cordata, acute triangulari-acuminata, circiter 10 cm. longa et 8 cm. lata, infra leviter puberula; petioli 3 cm. longi, leviter alati; cirrhi inaequaliter furcati. *Flores* ♂ plurimi, umbellati, bractea magna latissime ovato-cordata circumdati; pedunculi 4–5 cm.

longi; pedicelli circiter 0.5 cm. longi, puberuli. *Calycis lobi* triangulari-lanceolati, 3 mm. longi, puberuli. *Petala* tomentella.

Nigeria: Southern Provinces; Eket, Talbot 3133.

Phyzedra eglandulosa Hutch. et J. M. Dalz., comb. nov.—*Adenopus eglandulosa* Hook. f. in Oliv. Fl. Trop. Afr. 2: 529. *Phyzedra elegans* Harms et Gilg in Engl. Bot. Jahrb. 34: 353 (1904). *P. macrantha* Gilg l.c. *P. djaloni*, *P. ivorensis*, *P. sylvatica* A. Chev. Explor. Bot. Afr. Occid. Franç. 294, nomina. *Cephalandra ivorensis* et *C. sylvatica* A. Chev. l.c. 295, nomina.

French Sudan: near Timbuktu, Chevalier. French Guinea: Kouria, July, Caille in Herb. Chevalier, 14942, 14943. Sierra Leone: Karema, Addison: Port Loko, Sept., Addison: without locality, Morson.

Liberia: Fishtown, Dinklage 1846: Monrovia, Linder 34. Ivory Coast: various localities, Chevalier 22235, 22610, 22673, 21548, 22294, 22379, 16063, 16506, 16585, 16658, 17074, 20030, 16433, 19523. Gold Coast: Akwapim, Dec., Johnson 514. Togo: Beaumann 495. Nigeria: Northern Provinces; Yates 40; Southern Provinces; near Lagos, Moloney.

OCHNACEAE.

Ochna elegans Hutch. et J. M. Dalz., comb. nov.—*Monelasmum elegans* Van Tiegh. in Ann. Sci. Nat. Ser. 8, 16: 329. *Ouratea elegans* A. Chev. Explor. Bot. Afr. Occid. Franç. 108.

Ivory Coast: Upper Cavally, top of Mt. Dô, 950 m., May, Chevalier 21426. Togo: Lome, Warnecke 83: Atakpame, Nov., Mildbraed 7462.

Ochna Smythi Hutch. et J. M. Dalz., sp. nov.; affinis *O. eleganti* Hutch. et J. M. Dalz., sed foliis ellipticis vel obovato-ellipticis abrupte acuminatis latioribus marginibus dentibus incurvis differt.

Ramuli glabri. *Folia* elliptica vel obovato-elliptica, subabrupte acuminata, basi acuta, circiter 11 cm. longa et 4-4.5 cm. lata, crenulata, membranacea, nervis lateralibus utrinsecus circiter 15 utrinque prominulis. *Inflorescentia* racemoso-paniculata, usque ad 15 cm. longa. *Flores* glomerati, longe pedicellati, pedicellis gracilibus usque ad 1 cm. longis basin versus articulatis. *Sepala* elliptica, 4 mm. longa. *Petala* late obovata, 6-7 mm. longa.

Sierra Leone: near Heirakakum, Smythe 124.

Ochna kibbiensis Hutch. et J. M. Dalz., sp. nov.; affinis *O. Afzelii* R. Br., sed foliis acute acuminatis elliptico-lanceolatis latioribus sepalis fructiferis usque ad 3 cm. longis differt.

Frutex parvus; ramuli laxi lenticellati; stipulae lineari-lanceolatae, usque ad 1 cm. longae. *Folia* elliptico-lanceolata, utrinque acuta, 12-18 cm. longa, 3-6 cm. lata, utrinsecus acute serrulata, glabra, nervis lateralibus circiter 12-15 utrinque prominulis.

Flores non visi. *Calyx* fructiferus ruber, lobis obovato-lanceolatis 3 cm. longis, usque ad 1.5 cm. latis nervosis. *Receptaculum* crassum, 1 cm. diametro. *Carpella* oblongo-ellipsoidea, nitida, 1.3 cm. longa, demum nigra.

Gold Coast: Kibbi Hills, fr. Dec., Johnson 266: Akim, Adjapoma, Mar., Glover (type): Amentia forest, Irvine 528: without locality, Evans 19.

Ouratea Cameronii Hutch. et J. M. Dalz., sp. nov.; affinis *O. Mannii* Engl., sed floribus breviter subcorymboso-racemosis, foliis crebre serrulatis differt.—*O. corymbosa* A. Chev. Explor. Bot. Afr. Occid. Franç. 107, non Engl.

Frutex parvus usque ad 0.5 m. altus. *Folia* conferta, elongato-obovata, basi longe attenuata, apice late triangulari-acuminata, usque ad 30 cm. longa et 10 cm. lata, irregulariter serrulata, nervis lateralibus utrinsecus circiter 25 a costa sub angulo lato abeuntibus, nervis tertiariis crebris undulatis. *Racemi* subcorymbosi, breves, circiter 6 cm. longi; pedicelli robusti, 6 mm. longi. *Sepala* ovato-lanceolata, 8 mm. longa. *Petala* obovata, vix matura circiter 6.5 mm. longa. *Fructus* non visus.

Ivory Coast: various localities, Chevalier 16364, 16441, 17411, 17795, 19229. Gold Coast: Burton & Cameron (type).

Ouratea subcordata Hutch. et J. M. Dalz., comb. nov.—*Gomphia subcordata* Stapf in Journ. Linn. Soc. 37: 88 (1905). *Ouratea Mannii* A. Chev. Explor. Bot. Afr. Occid. Franç. 108, non Engl.

Sierra Leone: near Laoma, Nov., Smythe 89. Liberia: Kakatown, Whyte. Ivory Coast: in the virgin forest between the middle Sassandra and the middle Cavally, Chevalier 19209; on the railway near Azaguie, Sept., Chevalier 22278.

Ouratea amplexans Hutch. et J. M. Dalz., comb. nov.—*Gomphia amplexans* Stapf in Journ. Linn. Soc. 37: 87 (1905).

Liberia: Kakatown, Whyte.

Ouratea Turneræ Hutch. et J. M. Dalz., comb. nov.—*Gomphia Turneræ* Hook. f. in Hook. Niger Fl. 273 (1849). *Ouratea Afzelii* Gilg in Engl. Bot. Jahrb. 33: 267 (1903). *O. excavata* A. Chev. Explor. Bot. Afr. Occid. Franç. 108, nomen.

Sierra Leone: Leicester Peak, Dec., Scott Elliot 3834; without locality, Turner; Vogel 104, 134; Don. Ivory Coast: from Ahinta to Aboisso, Mar., Chevalier 17763.

Ouratea Morsonii Hutch. et J. M. Dalz., sp. nov.; foliis obscure et distanter dentatis dentibus longe setosis, stipulis subpersistentibus distincta.

Ramuli glabri. *Folia* oblongo-elliptica, basi breviter cuneata, apice late sed acute acuminata, 9-13 cm. longa, 3-3.5 cm. lata,

obscure et distanter setoso-serrata, nervis lateralibus utrinsecus circiter 15 prominulis intermediis minus distinctis; petioli 5 mm. longi, transverse rugosi. *Racemi* (imperfecti tantum visi) terminales; flores geminati; pedicelli 1 cm. longi. *Sepala* elliptica, 8 mm. longa. *Fructus* non visus.

Sierra Leone: without locality Morson.

Ouratea ambacensis Hutch. et J. M. Dalz., sp. nov.; affinis *O. congestae* Engl., sed nervis lateralibus utrinque prominentibus, inflorescentiis elongatis longe pedunculatis differt.

Arbor parva; ramuli stipulis persistentibus triangulari-acutis circiter 4 mm. longis ornati. *Folia* elongato-oblonga, basi breviter cuneata, acute acuminata, usque ad 25 cm. longa et 8 cm. lata, minute serrulata, nervis lateralibus utrinsecus circiter 18 arcuatis et intra marginem elongatis. *Inflorescentia* elongata, longe pedunculata, multiflora. *Flores* glomerati; pedicelli 5-6 mm. longi, basin versus articulati. *Sepala* ovata, obtusa, 5 mm. longa. *Petala* obovata, late unguiculata, 8 mm. longa. *Fructus* non visus.

Nigeria: Southern Provinces; Ambas Bay, Feb., Mann 12 (type); Tiko, Dunlap 171.

Ouratea Barteri Hutch. et J. M. Dalz., sp. nov.; affinis *O. pauciflorae* Gilg, sed petiolis multo longioribus, bracteis basi inflorescentiae deciduis differt.

Frutex 4 mm. altus; ramuli graciles, cinerei. *Folia* lanceolato-elliptica vel leviter obovata, longe et sensim acuminata, 5-11 cm. longa, 2-3.5 cm. lata, minute serrulata, nervis lateralibus numerosissimis parallelis; petioli 6 mm. longi. *Inflorescentia* parva, pauciflora; flores geminati vel solitarii; pedicelli fere 1 cm. longi, basin versus articulati. *Sepala* oblongo-elliptica, 8 mm. longa.

Nigeria: Southern Provinces; Brass, Barter 13, 1876 (type).

Ouratea calophylloides Hutch. et J. M. Dalz., sp. nov.; ab *O. calophylla* Engl. pedicellis supra basin articulatis, inflorescentiis longioribus robustis differt.

Ramuli teretes; stipulae triangulares, 2-3 mm. longae. *Folia* elongato-obovata, abrupte acuminata, basi cuneata, 5-20 cm. longa, 4-8 cm. lata, integra, nervis lateralibus numerosissimis inconspicuis a costa sub angulo fere recto abeuntibus; petioli 5 mm. longi. *Racemi* densiflori, circiter 10 cm. longi; flores glomerati; pedicelli 1 cm. longi, supra basin articulati. *Sepala* oblonga, 1 cm. longa, 4-5 mm. lata, glabra. *Petala* non visa.

Fernanda Po: Vogel 104.

ANCISTROCLADACEAE.

Ancistrocladus uncinatus Hutch. et J. M. Dalz., sp. nov.; affinis *A. guineensi* Oliv., sed foliis tenuiter coriaceis ellipticis in petiolum alatum abrupte attenuatis apice rotundatis supra crebre

reticulatis 6-8 cm. longis 3-4 cm. latis, nervis lateralibus utrinsecus circiter 5, uncis gracilibus, inflorescentia breviter corymbosa, pedicellis 3 mm. longis, petalis extra tomentosis differt.

Nigeria: Southern Provinces; Eket., Talbot 3108.

MYRTACEAE.

Eugenia nigerina A. Chev. Explor. Bot. Afr. Occid. Franç. 268, nomen subnudum; affinis *E. uniflorae* Linn., sed pedicellis brevissimis, ramulis molliter pubescentibus, foliis haud acuminatis differt.

Frutex 5-8 m. altus, cortice albedo, ramulis molliter pubescentibus. *Folia* subopposita, ovata, basi cordata, apice rotundata vel emarginata, 2.5-4 cm. longa, 2-3 cm. lata, utrinque punctata, nervis lateralibus utrinsecus circiter 5 intra marginem conjunctis. *Flores* axillares, albi, odoriferi; pedicelli 8 mm. longi, glabri. *Receptaculum* late, turbinatum, 2 mm. longum. *Calycis* lobi rotundati, 2.5 mm. diametro, glabri. *Petala* late obovata, 3.5 mm. longa.

French Sudan: between Dialiba and Langan, Jan., Chevalier 260; San, June, Chevalier 1075; Koulikoro, Oct., Chevalier 3010. Ivory Coast: Bettié, on the dunes of the Comoé River, Mar., Chevalier 17556.

Eugenia salacioides Laws. ex Hutch. et J. M. Dalz., sp. nov.; affinis *E. leonensi* Engl. et Brehm., sed pedicellis brevioribus differt. — *E. salicifolia* Laws. non DC., nec Berg.

Arbor parva vel frutex; ramuli molliter pubescentes vel subglabri. *Folia* lanceolata vel oblongo-lanceolata, basi acute cuneata, obtuse acuminata, usque ad 8 cm. longa et 3 cm. lata, supra subnitida infra minute punctulata, nervis lateralibus utrinsecus circiter 10 infra prominulis; petioli graciles, circiter 5 mm. longi. *Flores* axillares, fasciculati, pedicellis gracilibus usque ad 6 mm. longis apicem versus bracteis duabus ovatis ciliatis 0.5 mm. longis instructis. *Receptaculum* glabrum. *Sepala* suborbicularia, 2.5 mm. longa. *Petala* late obovata, apice ciliata, 2.5 mm. longa.

Sierra Leone: Bagroo River, Apr., Mann 842 (type); near Kubusa, Apr., Scott Elliot 5476; near Kafogo, Apr., Scott Elliot 5483; near Kurusu, Apr., Scott Elliot 5542; Kahreni, Apr., Scott Elliot 5622.

Eugenia Dawei Hutch. et J. M. Dalz., sp. nov.; affinis *E. memecyloidei* Benth., sed foliis oblongo-lanceolatis, nervis lateralibus ascendentibus 6 late arcuatis differt.

Ramuli elongati, fere glabri. *Folia* oblongo-lanceolata, utrinque subacuta, apice breviter acuminata, 6-11 cm. longa, 2.5-3.5 cm. lata, infra minutissime puberula, nervis lateralibus utrinsecus circiter 6 intra marginem conjunctis; petioli 5 mm. longi. *Flores* axillares, dense glomerati, albi, pedicellis 4-6 mm. longis breviter pubescentibus. *Receptaculum* appresse pubescens. *Calyx* circiter 2.5 mm. diametro. *Petala* suborbicularia, 4.5 mm. diametro.

Sierra Leone: Mata Kakun, Mar., Dawe 454. Vernacular name "Lalikipoi."

LECYTHIDACEAE.

Napoleona lutea Bak. f. ex Hutch. et J. M. Dalz., sp. nov.; affinis *N. imperiali* P. Beauv., sed floribus luteis axillaribus subsessilibus differt.

Ramuli flexuosi, glabri. *Folia* obovato-elliptica, late acuminata, basi late cuneata, 15–20 cm. longa, 6–9 cm. lata, glabra, nervis lateralibus untrinsecus circiter 8 inter nervos oblique venosis; petioli 1 cm. longi. *Flores* axillares, subsessiles, lutei. *Calyx* 0.8 cm. longus, extra glaber, lobis ovatis acutis 0.5 cm. longis apicem versus glandulis duabus nigris ornatis. *Corolla* 1.5 cm. longa, apice dentata.

Nigeria: Southern Provinces; Eket, Talbot 3173.

Napoleona reptans Bak. f., ex Hutch. et J. M. Dalz., sp. nov.; species foliorum nervo intramarginale haud evoluto floribus e ramis vetustioribus ortis distincta.

Ramuli glabri. *Folia* oblongo-elliptica, obtuse cuspidato-acuminata, basi rotundata, 15–20 cm. longa, 5–8 cm. lata, glabra, nervis lateralibus utrinsecus circiter 8 infra prominulis; petioli 0.5 cm. longi. *Flores* in ramis vetustioribus glomerati, subsessiles. *Calyx* patulus, profunde lobatus, extra papillosus, lobis ovato-triangularibus acutis 8 mm. longis apicem versus glandulis nigris ornatis. *Corolla* 2 cm. longa, margine crenulata. *Corona* cupularis, 1 cm. longa, apice breviter multilobata.

Nigeria: Southern Provinces; Eket, Talbot 3175.

Napoleona leonensis Hutch. et J. M. Dalz., sp. nov.; affinis *N. reptanti* Bak. f., sed floribus axillaribus, foliis intra margines nervo instructis differt.

Arbor parva; ramuli glabri, angulati. *Folia* oblonga vel oblongo-elliptica, abrupte et longe acuminata, 12–15 cm. longa, 4–5.5 cm. lata, infra laxe reticulata, glabra, nervis lateralibus utrinsecus circiter 6 intra marginem prominenter conjunctis inter junctos et marginem nervo continuo instructis. *Flores* axillares, subsessiles, roseo tincti; bracteae 3-seriatae, superpositae, orbiculares, usque ad 5 mm. diametro. *Calycis* lobi triangulares, dense papilloosi, 6 mm. longi. *Corolla* multidentata, usque ad 1.5 cm. longa.

French Guinea: Kouria, Nov., Chevalier 15054. Sierra Leone: Talla Hills, Feb., Scott Elliot 4892. Commendi, Aylmer 264 (type). Liberia: Banga, Oct., Linder 1236.

MEIASTOMATACEAE.

Phaeoneuron gracile Hutch. et J. M. Dalz., comb. nov.—*Dicellandra gracilis* A. Chev. Explor. Bot. Afr. Occid. Franç. 276, nomen; affinis *P. Moloneyi* Stapf, sed pedicellis fere 1.5 cm. longis, foliis oblongo-lanceolatis acute acuminatis basi leviter cordatis 10 cm. longis 4.5 cm. latis tenuibus glabris acute denticulatis, inflorescentia glabra differt.

Ivory Coast: several localities, Chevalier 19360, 19361, 19635, 19733, 21206.

Calvoa monticola A. Chev. Explor. Bot. Afr. Occid. Franç. 275, nomen; a *C. hirsuta* Hook. f. ubique glabra, foliis obovatis basi inaequilateris differt.

Herba usque ad 30 cm. alta, glabra. *Folia* obovata, basi inaequilatera, apice obtuse acuminata, 4–6 cm. longa, 2.5–3.5 cm. lata, prominenter 3-nervia, setoso-denticulata; petioli plani, purpurascens, usque ad 2.5 cm. longi. *Flores* breviter cymosi, rosei; pedicelli 2 mm. longi. *Receptaculum* turbinatum, 4 mm. longum, glabrum. *Calycis* lobi triangulares, 1.5 mm. longi. *Petala* obovata, 1 cm. longa. *Fructus* turbinatus, 8 mm. longus, squamis late emarginatis venosis coronatus.

French Guinea: Nzerekore, 600 m., Collenette 37. Liberia: Kassa Ta, Linder 829. Ivory Coast: various localities, Chevalier 19218, 19476, 19537, 21187, 21259.

Amphiblema grandifolium A. Chev. Explor. Bot. Afr. Occid. Franç. 276, nomen; affinis *A. cymoso* Naud., sed caulibus pilosis, foliis ovatis cordatis acutis usque ad 20 cm. longis et 15 cm. latis fere glabris setuloso-denticulatis basi circiter 7–9-nervis, cymis fructiferis haud secundis differt.

Ivory Coast: between Ft. Binger and Toula, July, Chevalier 19541; between Nekaougnie and Grabo, July, Chevalier 19599; Grabo, Aug., Chevalier 19710.

Dissotis Pobeguini Hutch. et J. M. Dalz., sp. nov.; affinis *D. cinerascens* Hutch., sed calycis lobis setis tenuibus longis intermediis instructis, foliis 5-nervis differt.

Herba usque ad 45 cm. longa; caulis erectus, glaber. *Folia* lanceolata vel elliptico-lanceolata, subsessilia, acuta, usque ad 7 cm. longa et 3 cm. lata, glabra, margine remote setoso-ciliata, conspicue 5-nervia. *Flores* paniculati, speciosi. *Calycis* tubus campanulatus, glaber, lobis late lanceolatis acutis ciliatis circiter 1 cm. longis lobulis setiformibus intermediis instructis. *Petala* ovato-elliptica, circiter 3 cm. longa.

French Guinea: Douné, Aug., Pobéguin 1695.

Dissotis rupicola Hutch. et J. M. Dalz., sp. nov.; affinis *D. cinerascens* Hutch., sed calycis lobis et pedicellis brevioribus, foliis basi breviter angustatis differt.

Herba ramosa ad nodos radicans. *Folia* lanceolata, basi breviter angustata, apice acuta, usque ad 3 cm. longa, circiter 0.5 cm. lata, obscure trinervia, parce setosa, infra pallidiora. *Flores* solitarii, breviter pedicellati, bracteis duabus lanceolatis circiter 1 cm. longis instructi. *Receptaculum* fructiferum glabrum, ellipsoideum, 1 cm. longum. *Calycis* lobi lanceolati, acute acuminati, 1 cm. longi, persistentes.

Sierra Leone : Sugar Loaf Mt., Dec., *Scott Elliot*, 3977 (type) : without locality, *Hart*.

Dissotis leonensis *Hutch. et J. M. Dalz.*, sp. nov.; floribus preceis breviter cymosis, calycis lobis deciduis, receptaculo verrucoso distincta.

Frutex ramosus, ramulis scabridis internodiis brevibus. *Folia* elliptica, basi rotundata, apice acuta, 5 cm. longa, 3 cm. lata, prominenter 5-nervia, supra scabrido-puberula, infra molliter tomentella; petioli 1 cm. longi, tomentosi. *Flores* precei, cymosi; pedicelli 3-4 mm. longi. *Receptaculum* late campanulatum, 6 mm. longum, extra rugoso-tomentosum. *Calycis* lobi late lanceolati, 6 mm. longi, extra stellato-tomentelli. *Petala* obovata, 1.5 cm. longa, margine puberula.

Sierra Leone : Kessewe Hills, 500 m., Apr., *Lane-Poole* 126.

Dissotis Gilgiana *Hutch. et J. M. Dalz.*, sp. nov.; affinis *D. incanae* Triana, sed foliis late ovatis amplexicaulibus circiter 7-9-nerviis differt.—*D. incana* var. *Gilgiana* A. Chev. Explor. Bot. Afr. Occid. Franç. 274.

Herba usque ad 1 m. alta; rami robusti, molliter tomentelli. *Folia* ovata, amplexicaulia, subacuta, 2-3 cm. longa, 1.5 cm. lata, 7-9-nervia, utrinque stellato-tomentella. *Flores* racemosi, rubri; pedicelli 5 mm. longi. *Receptaculum* globosum, scabrido-puberulum, circiter 7 mm. longum. *Calycis* lobi ovato-triangulari, 5 mm. longi, intra prominenter nervosi. *Petala* margine puberula.

French Sudan : Sicro, Jan., *Chevalier* 228 (type); between Taranora and Kangola, May, *Chevalier* 846. French Guinea : Toukan to Bouria, Apr., *Chevalier* 12924; Douné, Dec., *Chevalier* 14634. Sierra Leone : near Erimakuna, *Scott Elliot* 5218. Ivory Coast : Mankono circle, July, *Chevalier* 21997.

Dissotis Lecomteana *Hutch. et J. M. Dalz.*, sp. nov.; affinis *D. capitatae* Hook. f., sed caulibus pilis mollibus glandulosis, calycis lobis medio linea pilorum differt.

Rami hirsuti. *Folia* ovata, acute acuminata, basi rotundata, 6-8 cm. longa, 2.5-4 cm. lata, prominenter 5-nervia, supra setulosa, infra laxè pubescentia, nervis hirsutis; petioli 1.5-2 cm. longi. *Flores* capitati. *Involucri bracteae* ovatae, acutae, foliaceae, 1.5 cm. longae et 1 cm. latae. *Receptaculum* glabrum. *Calycis* lobi triangulari-lanceolati, 8 mm. longi, medio longe setosi, margine breviter ciliati. *Petala* glabra.

French Guinea : Dindea, Sept., *Pobéguin* 1699 (type). Sierra Leone : near Falaba, *Scott Elliot* 5174; Erimakuna, Mar., *Scott Elliott* 5241.

Memecylon Bakerianum *Hutch. et J. M. Dalz.*, sp. nov.; affinis *M. Zenkeri* Gilg, sed foliis longe petiolatis obovato-ellipticis basi longe cuneatis, floribus fasciculatis differt.—*M. Machairacme* Bak. f. in Cat. Talb. Nig. Pl. 128, non Gilg.

Frutex; ramuli minute verrucosi. *Folia* obovato-elliptica, sensim acuminata, basi longe cuneata, 12-16 cm. longa, 6-8 cm. lata, glabra, nervis lateralibus utrinsecus circiter 8 a costa sub angulo lato abeuntibus nervum intramarginalem formantibus; petioli 1 cm. longi. *Flores* axillares, fasciculati; pedicelli 2-3 mm. longi, glanduloso-scabridi. *Calyx* extra glanduloso-verrucosus, lobis ovatis 3.5 mm. longis. *Petala* late elliptica, 8 mm. longa.

Nigeria : Southern Provinces; Oban, *Talbot* 203.

Memecylon viride *Hutch. et J. M. Dalz.*, sp. nov.; affinis *M. candido* Gilg, sed foliis caudato-acuminatis floribus glomeratis differt.

Frutex; ramuli glabri, cortice cinereo. *Folia* oblongo-elliptica, longe caudato-acuminata, basi breviter cuneata, 10-14 cm. longa, 3-5 cm. lata, acumine circiter 2 cm. longo, nervis lateralibus numerosis vix prominulis; petioli brevissimi. *Flores* minimi, glomerati, numerosi; pedicelli usque ad 2.5 mm. longi. *Alabastra* leviter pentagona, 1 mm. longa. *Petala* late obovata, glabra.

Nigeria : Southern Provinces; Oban, *Talbot* 496.

Memecylon Aylmeri *Hutch. et J. M. Dalz.*, sp. nov.; affinis *M. Doniano* Planch., sed pedunculo commune brevissimo, fructibus ellipsoideis, foliis abrupte acuminatis distincte petiolatis differt.

Frutex; ramuli glabri. *Folia* oblonga, abrupte acuminata, basi breviter cuneata, 10-15 cm. longa, 3-5 cm. lata, enervia, glabra, acumine 1.5 cm. longo. *Flores* axillares, glomerati; pedunculus 2 mm. longus. *Calyx* cupulatus, 1 mm. longus. *Fructus* ellipsoideus, 1.5 cm. longus, stramineus, glaber, calyce persistente coronatus.

French Guinea : Mt. Nzo, 600-700 m., *Chevalier* 21002. Sierra Leone : Kennema, Oct., *Aylmer* 627 (type).

Memecylon Dinklagei *Gilg ex Hutch. et J. M. Dalz.*, sp. nov.; affinis *M. strychnoides* Baker, sed costa et nervis lateralibus foliorum supra impressis, pedicellis brevissimis differt.

Frutex; ramuli leviter flexuosi, elongati, glabri. *Folia* ovata vel ovato-elliptica, obtuse acuminata, basi brevissime cuneata et rotundata, 8-12 cm. longa, 5-6.5 cm. lata, coriacea, rugosa, basi prominenter trinervia, nervis lateralibus indistinctis supra impressis. *Flores* parvi, breviter cymosi, perdecidui; pedicelli 1-2 mm. longi. *Calyx* breviter dentatus, glaber.

Sierra Leone : Yonibana, Nov., *Thomas* 4816. Liberia : Grand Bassa, Sept., *Dinklage* 2032 (type).

Memecylon Fosteri *Hutch. et J. M. Dalz.*, sp. nov.; affinis *M. cinnamomoides* Gilg, sed foliis breviter et sensim acuminatis brevioribus, pedunculis 2-3-floris, pedicellis brevioribus differt.

Ramuli ciherei, juniores purpurascens. *Folia* elliptica, utrinque subacuta, 6-8 cm. longa, 3-4 cm. lata, basi trinervia,

nervis lateralibus utrinque prominulis. *Cymae* fasciculatae, breviter pedunculatae, triflorae, pedicellis 4 mm. longis. *Calyx* turbinatus, medio contractus, 2.5 mm. longus. *Petala* coriacea, 2.5 mm. longa, stylum exsertum setiformum amplexantia.

Nigeria: Southern Provinces; without locality, Oct., Foster 359.

COMBRETACEAE.

Combretum bauchiense Hutch. et J. M. Dalz., sp. nov.; affinis *C. herbaceo* G. Don, sed foliis infra glandulosis vel glabris, ovario et calyce leviter pubescente differt.

Caules erecti, annui, e rhizomate lignoso, glabri. *Folia* juniora lanceolata, acuta, 4.5 cm. longa, usque ad 1 cm. lata, glabra, resinosa, infra reticulata; petioli usque ad 8 mm. longi. *Racemi* axillares, usque ad 10 cm. longi; axis tenuiter pubescens. *Ovarium* molliter pubescens, 3 mm. longum. *Calyx* late turbinatus, 3 mm. longus, late dentatus, extra parce pubescens. *Petala* obovato-spathulata, 1.5 mm. longa.

Nigeria: Northern Provinces; Vom, Bauchi Plateau, 1000-1500 m., Dent Young 92 (type).

A specimen collected in French Guinea (without locality) by *Farmar*, No. 286, may be a more mature condition of this species; the leaves are long-petiolate, broadly oblong-lanceolate, about 12 cm. long and 4 cm. broad; young fruits narrowly elliptic, 2 cm. long.

Combretum platypterum Hutch. et J. M. Dalz., comb. nov.—*Cacoucia platyptera* Welw. Sert. Angol. 24 (1869); Hemsl. in Hook. Ic. Pl. t. 2549. *Cacoucia villosa* Laws. in Oliv. Fl. Trop. Afr. 2: 433, partim. *C. paniculata* Laws, l.c. 434 (non *Combretum paniculatum* Vent.). *Cacoucia Barteri* Hemsl. in Kew Bull. 1897: 267. *Combretum Lawsonianum* Engl. et Diels in Engl. Monogr. Afr. Pfl. 3: 96 (1899). *Campylochiton platypterus* Hiern in Cat. Welw. Afr. Pl. 1: 354 (1898).

A common climbing shrub with showy red flowers, widely distributed from Sierra Leone to the Nile districts, the Belgian Congo and Angola.

Combretum crotonoides Hutch. et J. M. Dalz., sp. nov.; affinis *C. collino* Fres., sed axe inflorescentiae glabro vel fere glabro differt.

Ramuli leviter lepidoti. *Folia* elliptica, apice brevissime et obtuse acuminata, basi anguste rotundata, 7-10 cm. longa, 3-3.5 cm. lata, supra leviter infra densissime lepidota, squamis imbricatis cinereo-viridibus, nervis lateralibus utrinsecus 9 infra prominulis marginem versus ramosis; petioli 1-1.5 cm. longi, laxe lepidoti. *Racemi* axillares, circiter 6 cm. longi; axis glaber. *Ovarium* dense lepidotum, 4 mm. longum. *Calycis* tubus late turbinatus, 3 mm. longus, extra laxe lepidotus, lobis late triangularibus extra glabrescentibus ciliatis. *Fructus* non visus.

Senegal: without locality, Heudelot 187.

Combretum relictum Hutch. et J. M. Dalz., sp. nov.; affinis *C. sokodensi* Engl., sed ramulis puberulis, foliis ovatis infra breviter et dense tomentellis differt.

Ramuli puberuli, costati. *Folia* ovata vel subtriangulari-ovata, acuta, basi late cuneata, 10-11 cm. longa, 5-6.5 cm. lata, supra glabra, infra breviter et dense tomentella, nervis lateralibus utrinsecus circiter 9 infra conspicuis, nervis tertiariis obliquis; petioli usque ad 1 cm. longi, supra tomentelli. *Racemi* axillares, fasciculati, usque ad 6 cm. longi; axis molliter tomentosus. *Ovarium* tomentosum. *Calyx* extra pubescens.

Senegal: without locality, Heudelot 747.

Combretum Mildbraedii Hutch. et J. M. Dalz., sp. nov.; foliis magnis basi cordatis infra minute lepidoto-glandulosis, floribus laxè paniculatis distincta.

Ramuli purpurascens, rufo-puberuli, mox glabri. *Folia* oblongo-elliptica, breviter et obtuse acuminata, basi cordata, 14-16 cm. longa, 6-8 cm. lata, infra squamis glandulosis minutis numerosis instructa, nervis lateralibus utrinsecus 6-8; petioli 1 cm. longi, subteretes, supra leviter pubescentes. *Inflorescentia* terminalis, laxè paniculata, ubique puberula. *Ovarium* breviter tomentosa. *Calycis* tubus 1 mm. longus. *Petala* clavato-orbicularia, parva.

French Guinea: Timbo, Kouria and neighbourhood, Nov., Chevalier 14792. Togo: Misahöhe, Nov., Mildbraed 7305 (type).

Combretum homalioides Hutch. et J. M. Dalz., sp. nov.; affinis *C. obanensi* Hutch. et J. M. Dalz., sed foliis late ovatis infra obscure glandulosis differt.

Arbor 8 m. alta; ramuli glabri. *Folia* ovata vel ovato-elliptica, obtuse acuminata, basi subacuta, 10-16 cm. longa, 6-9 cm. lata, infra obscure et minute glandulosa, nervis lateralibus utrinsecus circiter 8 infra prominentibus, tertiariis numerosis obliquis; petioli 1 cm. longi. *Inflorescentia* laxè paniculata, ubique puberula, ramis spiciformibus gracilibus. *Flores* albi, fragrant. *Ovarium* viscidum, glabrum. *Calyx* extra glaber. *Discus* villosus.

Nigeria: Southern Provinces; Onitsha, Barter 1803.

Combretum Dalzielii Hutch., sp. nov.; affinis *C. ghasalensi* Engl. et Diels, sed axe inflorescentiae et calyce viscido vix pubescente, foliis acute acuminatis differt.

Arbor vel frutex; ramuli teretes, straminei, glabri. *Folia* 2-3-nata, ovato-lanceolata, acute acuminata, basi cuneata, 8-14 cm. longa, 3-4.5 cm. lata, margine undulata, utrinque glabra, interdum viscida, nervis lateralibus utrinsecus circiter 9 utrinque prominentibus; petioli 1-2 cm. longi. *Inflorescentia* ramosa, fere glabra. *Ovarium* laxè pubescens. *Calycis* lobis ovato-triangulares, intra villosi. *Fructus* late ellipticus, emarginatus, 3 cm. longus, 2 cm. latus, glaber.

Gold Coast: Northern Territories, Daboiya, *Dudgeon* 102.
Nigeria: Northern Provinces; Katagum, Dec., *Dalziel* 221 (type);
Elliott 167; Mutwe, *Foster* 76.

A tree yielding a gum, called "Mumie"; Vernacular name
"Wiyandamo" (Foster).

Combretum obanense *Hutch. et J. M. Dalz.*, sp. nov.; affinis
C. homalioides *Hutch. et J. M. Dalz.*, sed foliis ellipticis infra glabris,
nervis tertiariis obscure reticulatis differt.—*C. paucinervium* *Engl.*
et *Diels*, var. *obanense* *Bak. f.*

Ramuli breviter puberuli. *Folia* elliptica, breviter et obtuse
acuminata, ad basin subacutam rotundata, 8–11 cm. longa,
4.5–5.5 cm. lata, glabra, nervis lateralibus utrinsecus 5–6 arcuatis
marginem versus ramosis; petioli 1 cm. longi. *Flores* numerosi,
laxe paniculati. *Ovarium* puberulum, 2 mm. longum.

Nigeria: Southern Provinces; Oban, *Talbot* 1676.

RHIZOPHORACEAE.

Anisophyllea purpurascens *Hutch. et J. M. Dalz.*, sp. nov.;
ab *A. laurinae* *R. Br.*, foliis basi cordatis junioribus sericeo-pilosis
et roseo-purpureis differt.

Arbor; ramuli juniores purpurascens adpresse pilosi, maturi
brunnei, glabri. *Folia* ovato-oblonga, acute et longe acuminata,
basi cordata et 5-nervia, 6–8 cm. longa, 2.5–3 cm. lata, juniora
purpurascens et sericea, demum glabra; petioli 3 mm. longi.
Racemi axillares, pauciflori, laxe pilosi; bracteae lineares, 2.5 mm.
longae. *Alabastra* late ovoidea, 1.5 mm. longa, pubescentia.

Nigeria: Southern Provinces; Oban, *Talbot* (Herb. Kew.).

HYPERICACEAE.

Psorospermum umbellulatum *Hutch. et J. M. Dalz.*, sp. nov.;
affinis *P. glauco* *Engl.*, sed foliis obovatis minoribus infra leviter
punctatis differt.—*P. tenuifolium* *A. Chev. Explor. Bot. Afr.*
Occid. Franç. 51, partim, non *Hook. f.*

Frutex, ramulis glabris, lenticellatis, junioribus molliter tomen-
tosis. *Folia* obovata, utrinque acuta, 4–6 cm. longa, 2–3 cm. lata,
infra glabra et leviter punctulata, nervis lateralibus utrinsecus 8
utrinque prominulis; petioli 0.5 cm. longi. *Inflorescentia* axillaris,
pauciflora; pedicelli usque ad 0.5 cm. longi, pubescentes. *Sepala*
oblongo-ovata, 2–3 mm. longa, extra pubescentia, demum glabra.
Petala obovata, intra villosa. *Fructus* junior glaber.

French Guinea: Ditinn, Apr., *Chevalier* 12949; Timbo, Mar.,
Chevalier 12447, 12548; between Ditinn and Timbo, Mar., *Chevalier*
12629; Kouria, *Dumas in Herb. Chevalier* 18186. Sierra Leone:
Kamakuia, May, *Thomas* 267 (type); without locality, *Burbridge*
542, 545.

Psorospermum Thompsonii *Hutch. et J. M. Dalz.*, sp. nov.;
affinis *P. laxifloro* *Engl.*, ramulis molliter tomentosis, foliis ovato-
ellipticis infra nervis pubescentibus differt.

Frutex parvus, ramulis cano-tomentosis. *Folia* ovato-elliptica,
basi cuneata, apice subacuta, 8–11 cm. longa, 3–5 cm. lata, infra
glauca et nervis pubescentibus, parce punctulata, nervis lateralibus
utrinsecus circiter 6 intra marginem elongatis et remote conjunctis;
petioli vix 1 cm. longi, tomentosi. *Inflorescentia* terminalis, late
cymosa, demum glabrescens; pedicelli fructiferi usque ad 1.5 cm.
longi. *Sepala* oblonga, 4 mm. longa, extra costata, glabra. *Fructus*
globosus, 8 mm. diametro, stylis clavatis coronatus.

Gold Coast: near Drobo, Apr., *Thompson* 64 (type); Kratchi,
Anderson 40. Togo: Kpedji, June, *Von Doering* 13.

Vismia leonensis var. **macrophylla** *Hutch. et J. M. Dalz.*, var.
nov.; a typo foliis circiter 15 cm. longis et 5–6 cm. latis basi
rotundatis nervis lateralibus utrinsecus 14 differt.

Ivory Coast: Baoulé-Sud; Toumodi, fr. Aug., *Chevalier* 22384.

GUTTIFERAE.

Symphonia gabonensis var. **macrantha** *Hutch. et J. M. Dalz.*,
var. nov.; a typo floribus majoribus ultra 1 cm. longis differt.

Throughout the coastal region from Sierra Leone to Angola and
in Uganda. We have seen the following specimens:—*Aylmer* 55.
Johnson 913. *Talbot* 368, 220. *Mann* 2279. *Zenker* 3660, 4364.
Dawe 52, 251. *Gossweiler* 8696. *Welwitsch* 1052. *Brown* 150.

Garcinia granulata *Hutch. et J. M. Dalz.*, sp. nov.; affinis *G.*
nobili *Engl.*, sed nervis lateralibus utrinsecus minoribus differt.

Arbor parva; ramuli angulares vel sublati, glabri, internodiis
elongatis. *Folia* late elliptica, abrupte acuminata, basi rotundata
et leviter inaequilatera, 10–15 cm. longa, 6–8 cm. lata, chartacea,
supra nitida, nervis lateralibus utrinsecus 8, nervis tertiariis incon-
spicuis; petioli 1 cm. longi. *Flores* non visi. *Fructus* late ellip-
soideus, utrinque acutus, circiter 4 cm. longus, 3 cm. diametro,
crebre et grosse verrucosus.

Sierra Leone: Gola, *Unwin & Smythe* 58.

Garcinia gnetoides *Hutch. et J. M. Dalz.*, sp. nov.; affinis *G.*
densiveniae *Engl.*, sed foliis acutis vix acuminatis venis supra
obscuris, racemis longioribus differt.—*Xanthochymus quadrifarius*
A. Chev. Explor. Bot. Afr. Occid. Franç. 54, non *Oliver*.

Arbor parva; ramuli acute quadrangulares vel sublati, glabri.
Folia elliptica, basi subacuta, acute acuminata, 14–15 cm. longa,
5–6 cm. lata, glabra, nervis lateralibus utrinsecus circiter 8 basalibus
tribus a costa sub angulo acuto ceteris sub angulo lato abeuntibus;
petioli 1 cm. longi, carinati. *Inflorescentia* quadrifaria, circiter 3 cm.
longa, pluriflora; pedicelli vix 1 cm. longi. *Calycis* lobi ovati,
1.5 mm. longi. *Petala* orbicularia, 6–7 mm. diametro.

Ivory Coast: Bingerville region, *Chevalier* 15157 (type);
Abidjean railway, *Chevalier* 15620. Gold Coast: Bonsa River,
Vigne 222.

Garcinia laurifolia Hutch. et J. M. Dalz., sp. nov.; affinis *G. punctatae* Oliv., foliis late ellipticis, nervis lateralibus paucioribus intermediis prominentibus differt.

Ramuli lenticellati. Folia late elliptica, basi cuneata, apice longe acuminata, 10–18 cm. longa, 4–7 cm. lata, pellucido-punctata glabra, infra nitidula, nervis lateralibus utrinsecus circiter 12 gracilibus marginem versus conjunctis et laxe ramosis, secundariis prominulis cum lateralibus parallelis; petioli 1 cm. longi, apicem versus incrassati. Flores non visi. Pedicelli fructiferi 0.8 cm. longi, crassi, angulares. Fructus junior globosus, parce pubescens, stigmatibus 4 spongiosis parvis coronatus.

Sierra Leone: Ninia, Talla Hills, Scott Elliot 4806.

Garcinia golaensis Hutch. et J. M. Dalz., sp. nov.; affinis *G. laurifoliae* Hutch. et J. M. Dalz., sed foliis breviter et sensim acuminatis basi subrotundatis differt.

Arbor mediocris; ramuli subteretes, juniores leviter complanati. Folia oblongo-elliptica, basi fere rotundata, breviter et sensim acuminata, 8–12 cm. longa, 3–5 cm. lata, opaca, infra verruculoso-punctata, nervis lateralibus numerosis supra prominentibus infra laxioribus marginem versus laxe ramosis; petioli 1 cm. longi, transverse verrucosi. Flores et fructus non visi.

Sierra Leone: Gola, Unwin & Smythe 67.

Garcinia brevipedicellata Hutch. et J. M. Dalz., sp. nov.; affinis *G. ovalifoliae* Oliv., sed alabastris majoribus, foliis obovatis subabrupte acuminatis distincte resinosis differt.

Arbor usque ad 8 m. alta; ramuli teretes, juniores costati. Folia anguste obovata, abrupte acuminata, basi breviter cuneata, circiter 12 cm. longa et 5 cm. lata, sicco laete viridia, chartacea, nervis lateralibus numerosis arcuatis prominulis, infra lineis resinosis obliquis notata; petioli vix 1 cm. longi. Flores axillares, glomerati, cymulis trifloris brevissime pedunculatis. Sepala ovato-orbicularia, 6 mm. longa, glabra, lineis crebris resinosis ornata. Petala obovata, 1.3 cm. longa. Stamina 3 mm. longa.

Nigeria: Southern Provinces; Oban, Talbot 1503.

SCYTOPETALACEAE.

Scytopetalum Tieghemii Hutch. et J. M. Dalz., sp. nov.; foliis anguste oblongo-ellipticis basi acute cuneatis longe acuminatis distincta.—*Rhaptopetalum Tieghemii* A. Chev. Explor. Bot. Afr. Occid. Franç. 122, nomen.

Arbor parva, densifoliata; ramuli graciles, purpurascens, glabri. Folia lanceolata vel oblongo-elliptica, basi acute cuneata, longe caudato-acuminata, 4.5–9 cm. longa, 2–3.5 cm. lata, chartacea, nervis lateralibus utrinsecus circiter 5. Flores breviter racemosi, pauci; pedicelli complanati, 3–4 mm. longi, fructiferi vix 1 cm. longi. Calyx patelliformis, 1.5 mm. longus. Petala infra connata,

6 mm. longa. Fructus ovoideus, acutus, 2 cm. longus, leviter costatus.

Sierra Leone: Matotoka, Thomas 1269, 1341. Ivory Coast: various localities, Chevalier 15423, 15580, 16192, 16231, 16252 (type), 17681. Gold Coast: Bawdia, Apr., Vigne 953, 974; Tarkwa, Thompson 44.

TILIACEAE.

Glyphaea lateriflora Hutch. et J. M. Dalz., comb. nov.—*Grewia lateriflora* G. Don Gen. Syst. 1: 549 (1831). *Glyphaea grewoides* Hook. f. Ic. Pl. t. 760 (1848); Oliv. Fl. Trop. Afr. 1: 267.

Widely distributed in Tropical Africa.

Desplatzia lutea A. Chev. Explor. Bot. Afr. Occid. Franç. 88, nomen; species foliis elongato-oblongis longe acuminatis crasse et distanter dentatis distincta.

Arbor parva; ramuli leviter flexuosi, lenticellati, glabri. Folia elongato-oblonga, longe acuminata, ad basin rotundatum leviter angustata, 12–25 cm. longa, 4–6.5 cm. lata, crasse et distanter dentata, infra glabra, nervis lateralibus utrinsecus circiter 10 a costa sub angulo 45° abeuntibus; petioli 1–1.5 cm. longi; stipulae triangulares, acuminatae, 3–4 mm. longae, tomentellae. Sepala lineari-lanceolata, 1.2 cm. longa, tomentella.

Ivory Coast: Dyola country, Apr., Chevalier 21323 (type). Nigeria: Southern Provinces; Ibadan, Nov., Punch 50.

Duboscia viridiflora Hutch. et J. M. Dalz., comb. nov.—*Diplanthemum viridiflorum* K. Schum. in Engl. & Prantl. Nat. Pflanzenf. Nachtr. 1: 234 (1897).

Extends from Southern Nigeria (Oban) to the Congo region.

Grewia cissoïdes Hutch. et J. M. Dalz., sp. nov.; affinis *G. suffructicosae* K. Schum., sed petalis angustioribus basi rotundatis, gynophorio breviori differt.

Frutex usque ad 1.25 m. altus; caules simplices, tomentosi, internodiis elongatis. Folia late ovato-elliptica, basi plus minusve cordata, usque ad 15 cm. longa et 11 cm. lata, serrulata, supra scabrida vel subbullata, infra molliter tomentosa, basi digitate 5-nervia; petioli usque ad 2 cm. longi; stipulae lineares vel filiformes, 1 cm. longae, pubescentes. Cymae pluriflorae, subsessiles; pedicelli 1 cm. longi. Sepala linearia, 1 cm. longa. Fructus carpellis 3–4 fere liberis tuberculatis.

French Sudan: near Bama, Chevalier 941. Dahomey: Djongon, Chevalier 23851; Atacora Mts., 500 m., Chevalier 23949. Nigeria: Northern Provinces; Nupe, Barter 1662, 3438; Yola, Apr., Dalziel 54 (type); Kontagora, Jan., Dalziel 108.

XXXIII.—THE ORCHID-FLOWERED BUTTERWORKS.

T. A. SPRAGUE.

The orchid-flowered butterworks would hardly be recognized without close inspection as belonging to the genus *Pinguicula* by those familiar only with the common butterwort, *Pinguicula vulgaris* L., and the related species, placed by Alphonse De Candolle in his section *Pionophyllum* (DC. Prodr. viii. 28). The general appearance of the flowers is very like that of some orchids, balsams or violets, hence the sectional name *Orcheosanthus* ("Orchid-flower") given to the group by Alphonse De Candolle. The diagnostic characters of this section are derived from the corolla, which has a flat limb with subequal lips, an extremely short tube, and a long spur.

So far as is known, *Pinguicula* sect. *Orcheosanthus* is confined to the mountains of Mexico and Guatemala. A. De Candolle recognized four species: (1) *P. oblongiloba* A.DC., based on a coloured drawing from Mociño and Sessé's Mexican collection; (2) *P. orchidioides* A.DC. from the State of Oaxaca; (3) *P. moranensis* H.B.K. from Hidalgo; and (4) *P. caudata* Schlecht., first discovered by Schiede in Vera Cruz. A fifth species, *P. flos-mulionis*, also from Vera Cruz, was added by Morren (Belg. Hort. 1872, 371, t. 27), and the new name *P. Bakeriana* Hort. Sander was proposed for a plant exhibited at the Royal Horticultural Society in 1881, and figured in "Gardeners' Chronicle," 1881, xv. 541, fig. 102, 103. In the following year, however, *P. Bakeriana* was reduced to *P. caudata* (Bot. Mag. t. 6624). The name *P. Rosei* was given in 1911 by W. Watson to a plant which was closely related to *P. caudata*, but differed slightly in the form of the leaves and the colour of the flowers. This was figured in "Gardeners' Chronicle," 1911, Ser. 3, xlix. 82, fig. 42. In the same year the most distinct of all the orchid-flowered butterworks was described by T. S. Brandege (Univ. Calif. Publ. Bot. iv. 190) under the name *P. gypsicola*. This is a native of San Luis Potosí, and differs from all the other species of Sect. *Orcheosanthus* in its lanceolate-linear leaves. It was subsequently figured in the Botanical Magazine, t. 8602 (1915).

Apart from *P. gypsicola* T. S. Brandege, the species of sect. *Orcheosanthus* are very critical. Hemsley (Biol. Centr.-Amer., Bot. ii. 471) came to the conclusion that all those described up to the beginning of 1882 were forms of a single species, but this view is not confirmed by a study of the published and unpublished illustrations of the "forms" in question, nor by their geographical distribution. The group is one in which comparative study of living plants of the various species is required in order to arrive at a satisfactory classification. The leaves exhibit seasonal dimorphism, winter rosettes of small leaves alternating with summer rosettes of large ones. Important characters are drawn from the shape and pose of the winter and summer leaves, the general appearance of the rosettes, the pose of the flowers and in particular the direction of the

spur, whether spreading or descending. Some of these characters cannot be verified from dried specimens however carefully prepared these may be. Unfortunately the greater part of the dried material contained in herbaria has been pressed without any special precautions, so that in many cases even the shape of the corolla-lobes cannot be ascertained without difficulty.

In collecting herbarium material of one of the orchid-flowered butterworks, a photograph should if possible be taken of the entire plant. A rosette should be pressed horizontally so as to show the number and arrangement of the leaves, and detached leaves illustrating the variations in shape and size should be dried separately. A coloured sketch of the flower showing the pose of the corolla-lobes and spur is important. One or more corollas should be detached and dried separately so as to show the exact shape of the lobes. The shape of the filaments may yield useful characters, so these also should be drawn. Owing to the numerous gaps in our knowledge of the several species, a satisfactory analytical key cannot at present be supplied, but it is hoped that the following annotated enumeration of the described species will be of assistance in determining material belonging to this Section. The species are arranged in chronological order with their more important references, brief descriptive notes, and an indication of their "type-locality" or geographical distribution.

Enumeration of described species.

***P. moranensis* H.B.K.** Nov. Gen. ii. 226 (1818); Alph. DC. in DC. Prodr. viii. 27 (1844).

Flowering from winter rosette. Leaves sessile, spatulate, obtuse, 1.2 cm. long. Peduncles 10 cm. long. Corolla violet, lower lip white-blotched near the base. Ovary violet.—Kunth's description of the corolla as "ringens" might suggest that *P. moranensis* belonged to the section *Pionophyllum*, but for the fact that the spur is described as filiform, longer than the corolla.

MEXICO. Hidalgo: Moran, 2400 m., *Humboldt & Bonpland* (type).

A specimen, *Coulter* 932, from Zimapan, Hidalgo (Herb. Kew.) has been referred tentatively by Dr. Stapf to *P. moranensis*, and agrees fairly well with the very incomplete description of that species (except that the corolla is not ringent). The leaves, however, are distinctly petiolate, and rather smaller, the peduncles only 5-7.5 cm. long, and the flowers smaller. It may be a starved or juvenile state of *P. moranensis*.

***P. caudata* Schlecht.** in Linnaea, vii. 393 (1832); Alph. DC. in DC. Prodr. viii. 28 (1844).

Flowering from a rosette of small leaves surrounded by a few larger ones. Leaves "oval or suborbicular," 1.2-3.8 cm. long, narrowed below, and more or less petiolate. Peduncles 5-12.5 cm.

long. Corolla purple, lower lip 1.2 cm. long, deeply tripartite, lobes narrowly cuneate, spur descending (*Schiede*), 2.5–3 cm. long.
MEXICO. Vera Cruz: Cuesta grande de Chiconquiaco, Sept. 1829, *Schiede* (type).

P. orchidioides *Alph. DC.* in *DC. Prodr.* viii. 27 (1844).—*P. caudata* Benth. *Pl. Hartweg.* 70 (1840), non Schlecht.

Flowering from the summer rosette. Leaves oblong, narrowed into a distinct petiole, reflexed, 1.7–2.5 cm. long. Peduncles 7.5–13 cm. long. Corolla purple, spur apparently spreading, 2–2.5 cm. long. Closely related to *P. caudata*, but apparently differing in the sharply reflexed oblong leaves.

MEXICO. Oaxaca: San Felipe, July, *Andrieux* 130 (type); Totontepeque, *Hartweg* 509.

The plant figured in *Bot. Mag. t.* 4231 (1846) as *Pinguicula orchidioides* seems to differ in several respects. The summer leaves are spatulate and proceed from the centre of a dense winter rosette of small ovate acute leaves: the latter, however, may be merely the exposed upper parts of more or less spatulate leaves. The corolla-lobes appear to be considerably broader, but this may be due to the type-specimens of *P. orchidioides* being badly dried. The spur is shown as spreading, and the two upper corolla-lobes as overlapping. The lower corolla-lobes are obovate-cuneate. The plant is stated to have been introduced from Real del Monte, and specimens collected at that locality by Coulter, no. 930, may perhaps represent the same species. The winter leaves of no. 930 (*Herb. Hook.*), however, are narrowly spatulate or linear-spathulate, while in no. 930 (*Herb. Benth.*) there are a few lanceolate acute scales round the summer-leaves.

P. oblongiloba *Alph. DC.* in *DC. Prodr.* viii. 27 (1844); *Calques Dess. Fl. Mex. t.* 1071, fig. 2 (1874).

Flowering from the summer rosette. Leaves spatulate-orbicular, 3.5–4 cm. long. Peduncles 8–9.5 cm. long. Corolla purple-violet, lobes obovate-oblong, spur spreading, 2–3 cm. long.

MEXICO. Locality not known, described from a drawing in Mociño and Sessé's collection.

A specimen, *Pringle* 2554 (*Herb. Kew. et Mus. Brit.*) from Guadalajara, Jalisco, distributed as *P. caudata*, resembles the drawing except that the corolla-lobes appear to be broader.

P. flos-mulionis *Morr.* in *Belg. Hort.* 1872, xxii. 371, t. 27.

Flowering from the summer rosette. Leaves obovate, 5 cm. long, 3–3.5 cm. broad. Peduncles 5–7.5 cm. long. Corolla purple-violet, throat and base of lobes white, lower lobes broadly obovate-cuneate, spur spreading, 3 cm. long.

MEXICO. Vera Cruz: Paso del Macho. Raised by Messrs. Jacob-Makoy of Liège from seeds collected by M. Omer de Malzinne.

P. Bakeriana *Hort. Sander ex Gard. Chron.* 1881, xv. 541, fig. 102, 103.—*P. caudata*, *J. D. Hook. in Bot. Mag. t.* 6624 (1882); Duchartre in *Bull. Soc. Bot. France*, xxxiv. 207–215 (1887); non Schlecht.

Flowering both from the winter and summer rosettes (*Bot. Mag.*). Leaves of winter rosettes numerous, densely imbricate, ovate, acute, those of summer rosettes few, spreading and recurved, obovate, 2.5–10 cm. long. Peduncles 12.5–17.5 cm. long. Corolla rosy-lilac (*Gard. Chron.*) or deep bright violet-purple (*Bot. Mag.*), lower lobes obovate-cuneate, more or less overlapping, at least in the lower half, spur descending, 3–4 cm. long. The corolla varies greatly in size, the limb being 3 cm. long in one flower and 4.5 cm. long in another flower of the plant figured in *Bot. Mag. t.* 6624.

MEXICO OR CENTRAL AMERICA. The only information about the native country of *P. Bakeriana* is the editorial statement in *Gard. Chron.* 1881, xv. 541: "we believe the plant comes from Central America."

A specimen collected by Parry and Palmer, no. 694, in the region of San Luis Potosí, at an altitude of 1800–2400 m., closely approaches the type material of *P. Bakeriana*, apparently differing only in its elongated petioles (6 cm. long) and the relatively narrower corolla-lobes. It seems very probable that it is a mere form of *P. Bakeriana*, and that the latter may have come originally from San Luis Potosí. What appears to be another form of the same species has been collected by Schaffner, no. 321 (*Mus. Brit.*) in San Luis Potosí. It seems to differ in having obovate corolla-lobes, much narrowed at the base.

P. Rosei *W. Wats.* in *Gard. Chron.* 1911, Ser. 3, xlix. 82, fig. 42; *Gard. Chron.* 1919, lxxv. 31, fig. 12.

Flowering both from the winter (fig. 42) and summer rosettes (fig. 12). Winter leaves very numerous, all small. Corolla violet or violet-purple, lobes broadly cuneate, spur descending.—Very incompletely described, but evidently closely related to *P. caudata*. It is represented by a photograph and a coloured drawing in the collection at the Kew Herbarium.

MEXICO. Locality not known. A small plant stated to have been collected by Dr. J. N. Rose somewhere in Mexico was received at Kew from the United States Department of Agriculture in or about 1908.

P. gypsicola *T. S. Brandege* in *Univ. Calif. Publ. Bot.* iv. 190 (1911); *Stapf in Bot. Mag. t.* 8602 (1915).

Flowering from the summer rosette, which has numerous lanceolate-linear leaves 4–6 cm. long. Peduncles 4–8 cm. long. Corolla rose-purple, lobes oblong, spur spreading, 2–3 cm. long.

MEXICO. San Luis Potosí: Minas de San Rafael, on wet gypsum rocks, fl. Nov. 1910, *C. A. Purpus* 4486 (type); fl. June 1911, *C. A. Purpus* 4886A (both numbers in *Mus. Brit.*).

In herbaria all the species except *P. gypsicola* are generally included under *P. caudata* (sensu lato), as suggested by Hemsley, and it is admittedly very difficult, if not impossible, to identify much of the dried material in a more definite manner. Comparison of published illustrations, however, suggests that there are several distinct species of this group in addition to *P. gypsicola*. Thus *P. flos-mulionis* and "*P. orchidioides*" (Bot. Mag. t. 4231) are shown with more or less spreading spurs, whereas the spur in *P. Bakeriana* and *P. Rosei* is sharply descending. The upper corolla-lobes of "*P. orchidioides*" overlap, whereas those of *P. flos-mulionis* and *P. Bakeriana* are divergent. The lower corolla-lobes of *P. Rosei* are broadly cuneate, whereas the other three have them obovate-cuneate, and those of *P. caudata* are narrowly cuneate. *P. flos-mulionis* and *P. Bakeriana* have the corolla nearly as broad as it is long, while *P. caudata* and *P. orchidioides* have relatively narrower corollas. When along with these floral characters the differences in the shape of the summer-leaves is taken into consideration, it is difficult to escape the conclusion that more than one species is represented in these various illustrations.

For the solution of the problem, however, living plants of the following species are required from their type-localities: *P. moranensis*, from Moran, Hidalgo; "*P. orchidioides*" (as figured in Bot. Mag. t. 4231), from Real del Monte, Hidalgo; *P. caudata* from Chiconquiaco, between Misantla and Jalapa, Vera Cruz; *P. flos-mulionis* from the Paso del Macho, between Vera Cruz and Cordoba; *P. orchidioides* from San Felipe, Oaxaca; and *P. Bakeriana* (the form collected by Parry and Palmer) from San Luis Potosí. It would then be possible to give adequate descriptions of these species, and to indicate their diagnostic characters. Their inter-relationships and geographical distribution, however, could not be satisfactorily investigated except by study in the field.

XXXIV.—CONTRIBUTIONS TO THE FLORA OF SIAM.* ADDITAMENTUM XXV.

Hydnocarpus calvipetala Craib [Flacourtiaceae-Pangieae]; a speciebus aliis ad subgenus *Taraktogenos* (Hassk.) relatis foliis haud tomentosis, floris masculi petalis pagina utraque et filamentis glabris distinguenda.

Arbor circa 8–10 m. alta (ex Kerr); ramuli iuventute angulati, pilis paucis fulvis adpressis instructi, rubri, cito glabri, mox cinereo-corticati. *Folia* saepissime oblata, apice longius acuminata vel caudato-acuminata, basi saepe parum inaequilateralia, cuneata vel latere altero cuneata, altero rotundata, usque ad 24 cm. longa et 7 cm. lata, rigide chartacea, sicco subtus pallidiora, pagina utraque glabra, nervis lateralibus utrinque 6–7 sat obliquis saltem superioribus intra marginem conspicue anastomosantibus supra conspicuis

vel subconspicuis subtus prominentibus, nervis transversis numerosis inter se parallelis pro parte maxima horizontalibus pagina utraque prominulis, margine integra, anguste cartilaginea et recurva; petioli circa 2 cm. longi, basi et apice incrassati, primo rubri, mox cinerei. *Inflorescentia* ♂ axillaris, pedunculo communi circa 1 cm. longo suffulta, umbelliformis; pedicelli ad 1.5 cm. longi, glabri. *Sepala* 5, imbricata, saepissime elliptica, apice rotundata, 8–9 mm. longa, 5–6 mm. lata, utrinque glabra, margine ciliolata. *Petala* 9, rotundata, vel elliptica, apice rotundata, circa 4 mm., rarius ad 5.5 mm., diametro, facie utraque glabra, margine praesertim superne longe ciliata. *Squamae* carnosae, ambitu late oblongae, usque ad 3 mm. longae et 2.5 mm. latae, apice pilosae. *Stamina* circa 17, filamentis glabris ad 6 mm. longis, antheris 3 mm. longis apiculatis longitudinaliter dehiscentibus, connectivo lato.

Langsuan, Ban Kraye, 100 m., common in evergreen forest, Kerr 11994.

Impatiens Putii Craib [Balsaminaceae]; herba annua, glabra, stipulis deficientibus, foliis alternis subcarnosis paucinervosis, floribus solitariis axillaribus inter maiores, sepalo postico limbo saccatim infundibulari, alis inter se connatis, vexillo basi ad 9 mm. horizontali dein recto distincta.

Herba ut videtur annua, glabra, caule erecto anthesi ineunte 9 cm. alto circa 3 mm. diametro terete basi rubro apicem versus rubro-maculato. *Cotyledones* sub anthesin persistentes, limbo elliptico-oblato apice emarginato basi late rotundato ad 13 mm. longo et 16 mm. lato sat carnosus integro, petiolo suberecto 12 mm. longo. *Folia* inferiora subalterna, superiora distincte alterna, inferiora suboblata, superiora ovata, apice acute acuminata, basi subcordata, circa 18 mm. longa, 15–18 mm. lata, viridia, subtus pallidiora, sat crassa, glabra, nervis lateralibus utrinque 2–3 supra obscuris vel fere obscuris subtus conspicuis vel obscuris, nervulis omnino obscuris, serrulata, petiolo 1–1.5 cm. longo glabro apice canaliculato foliorum inferiorum suberecto superiorum obliquo suffulta; stipulae omnino deficientes. *Pedicelli* axillares, solitarii, ad 3.5 cm. longi, purpureo-puniceo-maculati, circa 1.3 cm. supra basem articulati et ibi bracteola lineari circa 2 mm. longa instructi. *Sepala* 3; duo lateralia inaequilateralia, latere postico dimidio ovata, antico suboblata, viridi-cuspidata, 8 mm. longa, 5.5 mm. lata, basi purpureo-punicea, apicem versus pallescentia; posticum (labellum) limbo saccato-cymbiformi 2 cm. longo ore elliptico 2 cm. longo 1.3 cm. lato extra postice purpureo-puniceo-venoso antice pallescente intra inferne antice sulphureo, calcare inflexo 1 cm. longo apice integro obtuso pallide viridi. *Vexillum* oblato-obovatum, apice emarginatum, basi ad 9 mm. horizontale dein ad 1.2 cm. erectum dorso medio carinatum, apice et margine pallide purpureo-puniceum, medio et inferne pallescens; alae inter se connatae, stipite 1 cm. longo suffultae, lobo basali subelliptico 9 mm. longo 8 mm. lato

*Continued from K.B., 1928, p. 72.

apiculato distali oblongo 2 cm. longo 1 cm. lato apiculato, apice fere ad medium inter se liberes. *Filamenta* pallida, 6 mm. longa, apice inter se libera, antheris lacteis 2.25 mm. longis. *Ovarium* pallidum, glabrum, 6 mm. longum.

Described from plants which flowered at Aberdeen in May of this year. These were raised from seed collected in Bangkok by Dr. Kerr, the Bangkok plants having been raised originally from seed collected at Sapli.

Surat, Chumpawn, Sapli, *Put* 1020.

Anplectrum stellatum *Geddes* [Melastomaceae-Medinilleae]; ab *A. glauco* Triana ramis foliis cymisque hirsutioribus differt.

Frutex scandens, ramis primo quadrangularibus minute stellato-hirsutis mox teretibus glabris. *Folia* opposita, ovato-lanceolata, apice obtuse acuminata vel caudata, basi subcordata, 8.5-13 cm. longa, 2.6-4.3 cm. lata, supra viridia, nitentia, minute stellato-puberula vel glabra, subtus, praesertim ad nervos, stellato-pubescentia, nervis 5 pagina superiore impressis inferiore prominentibus, margine revoluta, petiolo 4-6 mm. longo dense et ferrugineo-stellato-hirsuto et patente setoso suffulta. *Panicula* laxa, ramulis stellato-hirsutis, nonnullis patente glanduloso-pilosis. *Receptaculum* minute stellato-hirsutum, parte inferiore glanduloso-pilosum. *Calyx* fere truncatus. *Petala* 4, pallide rosea (ex *Kerr*), triangulari-ovata, acuta, basi cuneata, 9 mm. longa, 6 mm. lata, glabra. *Stamina* 4 maiora, 4 minora, filamentis 4.5-5.5 mm. longis, antheris maioribus circa 9 mm. longis basi ante bituberculatis post appendiculatis, antheris minoribus 4 mm. longis. *Ovarium* 4-loculare, apice septis 4 instructum; stylus 12.5 mm. longus, glaber. *Fructus* subglobularis, calyce persistente, 8 mm. longus, 6.5 mm. diametro, glaber; semina obovoidea.

Nakawn Tai, 200 m., evergreen forest, *Kerr* 5870.

Blastus stellatus, *Geddes* [Melastomaceae-Oxysporeae]; a *B. Cogniauxii* Stapf foliis pagina inferiore ad nervos stellato-hirsutis, receptaculo stellato-hirsuto differt.

Frutex erectus, ramis pallide brunneis primo sulcatis vel paulo compressis dense stellato-hirsutis mox teretibus glabris. *Folia* opposita inter se aequalia, lanceolata, apice longe et gracile acuminata, basi late cuneata, obtusa, 8-17 cm. longa, 2.4-4 cm. lata, supra fusco-viridia, glabra, subtus pallidiora, dense et minute glanduloso-punctata, ad costam nervosque pilis stellatis instructa, nervis e basi 3 vel 5, nervo intramarginali tenui, nervis transversis subhorizontalibus inter se parallelis et sat distantibus supra conspicuis vel subconspicuis subtus prominulis, margine crenulata, petiolo 1-1.7 cm. longo primo dense stellato-hirsuto mox plus minusve glabrescente suffulta. *Inflorescentia* terminalis, paniculata, 4-5 cm. longa, floribus umbellatis; pedicelli 1.5-2 mm. longi, pilis stellatis dense instructi. *Receptaculum* dense stellato-hirsutum. *Calycis* segmenta 4, brevissima. *Petala* 4, luteo-rubra (ex *Dr. Smith*), rotundata,

subito caudata, 2.5 mm. diametro, extra pilis stellatis perpaucis ornata. *Stamina* 4, filamentis 3.5 mm. longis, antheris 4-5 mm. longis attenuatis. *Ovarium* 4-loculare; stylus 10 mm. longus, glaber.

Nakawn Sritamarat, Kao Luang, 1600 m., *Dr. Eryl Smith* 721.

Eugenia Collinsae *Craib* [Myrtaceae-Eugenieae]; species quoad folia *E. gratae* Wight similis sed fructu pallido *E. zeylanicae* Wight affinis a qua receptaculo haud verrucoso recedit.

Ramuli glabri, primo paulo compressi, graciles, mox teretes vel plus minusve angulati, cortice rubro-brunneo obtecti. *Folia* opposita vel interdum subopposita, lanceolata, oblongo-lanceolata, vel suboblunga, apice acuminata vel subacuminata, basi cuneata vel rotundato-cuneata, interdum parum inaequilateralis, 4-10.5 cm. longa, 1.5-4.2 cm. lata, coriacea, supra sicco brunnescentia vel pallide viridia vel subglauca, subtus glauca vel subglauca, supra distanter punctata, subtus costa excepta eglandulosa vel inferne costam versus parce glandulosa, costa supra impressa subtus glandulosa prominente, nervis lateralibus utrinque numerosis (circa 20 aliis paulo minus conspicuis interiectis) supra vix conspicuis subtus gracilibus prominulis rectis intra marginem anastomosantibus, margine integra, parum revoluta, petiolo 3-6 mm. longo supra acute canaliculato suffulta. *Inflorescentia* axillaris, rarius etiam terminalis, pedunculo communi brevi incluso circa 8 cm. longa, e cymis racemosim dispositis inferioribus pedunculo vix 1 cm. longo suffultis superioribus sessilibus constituta, et rhachi et pedunculo paulo angulatis, bracteis parvis deciduis, floribus sessilibus vel pedicellis ad 3 mm. longis suffultis. *Receptaculum* circa 4 mm. longum, sicco plus minusve glaucum, corrugatum sed haud verrucosum, apice ad 2.5 mm. excavatum. *Sepala* circa 1 mm. longa. *Petala* calyptratim decidua. *Stamina* usque ad 1 cm. longa, antheris parvis. *Stylus* staminibus paulo brevior; ovarium 2-loculare. *Fructus* sicco pallidus, subglobosus, saepissime circa 7 mm. diametro; semen solitarium, cotyledonibus convolutis.

Between Sriracha and Nawng Yai Bu, 30 m., *Mrs. D. J. Collins* 782.

Barringtonia Marcanii *Craib* [Myrtaceae-Barringtonieae]; species quoad folia *B. Helferi* C. B. Clarke similis sed floribus sessilibus, ovario angulato recedens, a *B. pterocarpa* Kurz petiolis brevioribus, floribus maioribus, sepalis oblongis haud triangulari-ovatis distinguenda.

Arbor 4-5 m. alta (ex *Kerr* et *Marcan*); ramuli interrupte fistulosi, ad 16 mm. diametro, cortice pallide brunneo vel stramineo obtecti. *Folia* late oblanceolata vel oblongo-oblanceolata, apice acuminata, basi angustata, decurrentia, 37-74 cm. longa, 11-18.5 cm. lata, coriaceo-chartacea vel subcoriacea, glabra, sicco viridia, subtus

longae, circa 6 mm. latae, glabrae. *Ovarium* 3-alatum, ala maiore circa 2 cm. lata apice truncata horizontali, alis minoribus circa 2 mm. latis, 2-loculare, placentae lamellis loculo quoque 2, glabrum; styli 3, haud connati; stigmata contorta.

Nakawn Sritamarat, Kao Luang, 1800 m., *Dr. Eryl Smith* 714.

Uncaria quadrangularis *Geddes* [Rubiaceae-Naucleae]; ab *U. glabrata* DC. foliis maioribus haud nitentibus subtus pubescentibus, corolla extra pubescente differt.

Frutex scandens, ramis quadrangularibus uncatis primo pubescentibus deinde glabris. *Folia* ovato-elliptica, apice acuminata, basi truncata, 7.5–11.5 cm. longa, 2.5–4.5 cm. lata, supra rubro-brunnea, praesertim ad nervos puberula, subtus luteo-brunnea, pubescentia, nervis lateralibus utrinque 6 pagina inferiore prominentibus, petiolo 6 mm. longo supra canaliculato pubescente suffulta; stipulae lanceolatae, bifidae, 5 mm. longae. *Flores* in capitula axillaria solitaria 2.5 cm. diametro pedunculo 3–4 cm. longo puberulo mox uncato suffulta dispositi, bracteolati. *Calycis* tubus 2 mm. longus, basi pilos longos ferens; lobi 5, lineares, 1 mm. longi, ciliati. *Corollae* tubus 6 mm. longus, extra pubescens; lobi 5, obtusi, 2 mm. longi, pagina superiore pubescentes. *Stamina* 5, filamentis brevissimis, antheris apice obtusis basi sagittatis 1.5 mm. longis; situ staminum ad basem tubi corollae distat 5 mm.; summis antheris usque ad summum corollae tubum distat 1.5 mm. *Ovarium* 2-loculare; stylus circa 11 mm. longus; stigma fusiforme, 2.75 mm. longum.

Nan, Pu Huat, 1300 m., scrub, *Kerr* 4995.

Adina nobilis *Geddes* [Rubiaceae-Naucleae]; ab *A. racemosa* Miq. petiolis crassioribus brevioribusque, inflorescentia maiore differt.

Arbor circa 20 m. alta (ex *Kerr*), ramis rubro-brunneis striatis lenticellatis glabris. *Folia* elliptica, apice acuminata, basi cuneata, 6–11 cm. longa, 4–6 cm. lata, supra passim viridia, passim brunnea, nitentia, subtus pallidiora, nitentia, omnino glabra, chartacea, nervis lateralibus utrinque 9–11, petiolo 1.5–2.5 cm. longo suffulta. *Capitula* in racemum terminalem rhachi puberulo disposita, inferiora axillaria, pedunculo usque ad 5 cm. longo ut rhachi puberulo suffulta, circa 2 cm. diametro, floribus sessilibus, bracteolis inter flores interspersis. *Calyx* brevis; lobi 4–5, obtusi, circa 1 mm. longi, pubescentes. *Corolla* aestivatione valvata; tubus 6 mm. longus, extra pubescens; lobi 4–5, lanceolati, 1.5 mm. longi, dorso et intra ad marginem pubescentes. *Stamina* 4–5, filamentis 0.5–0.75 mm. longis, antheris 1.5 mm. longis mucronatis; situ staminum ad basem tubi corollae distat 4 mm.; summis antheris usque ad summum corollae tubum 1.75 mm. distat. *Ovarium* 2-loculare, ovulis in loculo quoque numerosis; stylus 10–11 mm. longus, filiformis, stigmate capitellato 0.5 mm. diametro.

Dan Sai, Kao Keo Kang, 1100 m., evergreen forest, *Kerr* 5767.

Adina parvula *Geddes* [Rubiaceae-Naucleae]; ab *A. polycephala* Benth. foliis omnino minoribus breviter et obtuse acuminatis ad nervorum axillos subtus haud puberulis, pedunculis puberulis recedit.

Arbor circa 8 m. alta (ex *Kerr*), ramis primo brunneis striatis mox griseis lenticellatis. *Folia* elliptico-lanceolata, apice obtuse acuminata, basi cuneata, 9–12 cm. longa, 2.5–4 cm. lata, supra luteo-brunnea vel viridia, subtus pallidiora et minute nigro-maculata, omnino glabra, nervis lateralibus utrinque circa 8 pagina inferiore prominentibus, nervulis paulo conspicuis, petiolo 1.5–2 cm. longo supra canaliculato glabro suffulta. *Capitula* in cymas terminales laxas pedunculo communi 1–2 cm. longo suffultas disposita, pedunculo circa 1 cm. longo suffulta, floribus luteo-albis fragrantibus (ex *Winit*), bracteolis inter flores 1.5 mm. longis filiformibus. *Calycis* tubus 1 mm. longus; lobi 4–5, obtusi, 0.5 mm. longi, pubescentes. *Corollae* aestivatio valvata; tubus 2 mm. longus; lobi 4–5, obovati, 1.5 mm. longi, extra puberuli. *Stamina* 4–5, filamentis 0.5 mm. longis, antheris linearibus apiculatis 1 mm. longis 0.5 mm. latis; situ staminum ad basem tubi corollae distat 1.5 mm.; summis antheris usque ad summum corollae tubum 1.5 mm. distat 0.75 mm. *Ovarium* 2-loculare, ovulis in loculo quoque numerosis; stylus 3.5–4 mm. longus; stigmata globularia, 0.7 mm. diametro.

Lampang, Ban Ton, 280 m., open deciduous forest, *Winit* 675 (*type*). Lampang, 300 m., open deciduous forest, *Kerr* 4813.

Hedyotis sessilifolia *Geddes* [Rubiaceae-Hedyotideae]; ab *H. flexuosa* Ridl. foliis sessilibus angustioribus, cymis haud tam laxis rhachi brevioribus differt.

Herba circa 45 cm. alta, ramis sicco pallide viridibus striatis glabris. *Folia* elliptico-lanceolata, apice obtuse acuminata, basi cuneata, 3–10 cm. longa, 1.4–2.4 cm. lata, supra luteo-viridia, subtus albo-viridia, omnino glabra, nervis lateralibus utrinque circa 5 haud conspicuis, margine revoluta; stipulae ovatae, cuspidatae, 2 mm. longae. *Inflorescentia* terminalis, laxa, rhachi glabra; bractae foliaceae, sessiles; bracteolae lanceolatae, 0.6 mm. longae. *Calycis* lobi 4, subacuti, 1.25 mm. longi, 1 mm. lati, glabri. *Corollae* tubus 1.9 mm. longus, extra glaber, intra ore hirsutus; lobi 4, lineari-lanceolati, 4 mm. longi, 1 mm. lati, dorso glabri, pagina superiore nisi apice pubescentes. *Stamina* 4, ore corollae tubi sita, filamentis circa 2 mm. longis, antheris 1.4 mm. longis. *Ovarium* 2-loculare, ovulis parvis loculo quoque numerosis; stylus 1.25 mm. longus; stigmata 2, linearia, 0.9 mm. longa.

Lôi, Pu Tong, 1000–1200 m., open grassy forest, *Kerr* 8838.

Hedyotis similis *Geddes* [Rubiaceae-Hedyotideae]; ab *H. molle* Wall., var *laxa* King foliis basi latis, cymis haud laxis, pedicellis brevioribus differt.

Herba scandens (ex Kerr), caulibus hirsutis. *Folia* ovato-lanceolata, apice acuminata, basi lata, nonnulla cuneata, 4.7-6.7 cm. longa, 2-3 cm. lata, supra sicco viridia, pubescentia, subtus praesertim ad nervos hirsuta, nervis lateralibus utrinque 4 pagina superiore impressis inferiore prominentibus, petiolo 2-4 mm. longo hirsuto suffulta; stipulae circa 8-fidae, hirsutae. *Inflorescentia* terminalis atque axillaris, axibus hirsutis; flores lutei (ex Kerr), umbellati; pedicelli circa 1 mm. longi, parte dimidia inferiore pilosi. *Calycis* tubus longitudinaliter 4-striatus; lobi 4, acuti, 0.5 mm. longi, ciliati. *Corollae* tubus 1.5 mm. longus, glaber; lobi 4, deltoideo-lanceolati, acuti, 2.25 mm. longi, glabri. *Stamina* 4, ad os tubi corollae adfixa, filamentis 1.25 mm. longis crassis, antheris oblongis 0.5 mm. longis. *Ovarium* 2-loculare, ovulis in loculo quoque numerosis; stylus stigmatibus duobus 0.75 mm. longus. *Fructus* 4-striatus, apice super calycem productus, 2.25 mm. longus, 2 mm. diametro; semina numerosa.

Pattani, Kao Kalakiri, 600 m., climbing on bushes in evergreen forest, Kerr 7761.

Oldenlandia rosettifolia Geddes [Rubiaceae-Hedyotideae]; ab *O. ovatifolia* DC. foliis modo basi caulis positus sessilibus glabris, cymis minoribus differt.

Herba erecta, 5-27 cm. alta, caule aut singulo aut ad quattuor a foliis oreuntibus glabro vel puberulo. *Folia* ad caulis basem 4-verticillata, radice 2 foliis parvis, oblongo- vel rotundato-ovata, apice obtusa vel acuta, basi rotundata vel subito cuneata, sessilia, 1-6.5 cm. longa, 0.8-4.2 cm. lata, supra fusco-viridia, minute maculata, glabra, subtus albo-viridia, nervis lateralibus utrinque circa 5 pagina inferiore prominulis. *Inflorescentia* terminalis, cymosa, laxa, rhachi pedunculisque capillaribus glabris vel puberulis; pedicelli 1-2 mm. longi, filiformes; flores rosei (ex Kerr). *Calycis* lobi 4, deltoidei, obtusi, minuti. *Corollae* tubus 0.5 mm. longus; lobi 4, lanceolati, subacuti, 1.9 mm. longi, 0.7 mm. lati, intra parce puberuli. *Stamina* 4, ore corollae tubi sita, filamentis circa 0.8 mm. longis, antheris linearibus oblongis apice obtusis basi emarginatis 1.25 mm. longis. *Ovarium* 2-loculare, ovulis in loculo quoque numerosis; stylus circa 2 mm. longus; stigmata 2, linearia. *Fructus* 2.5 mm. longus, 2.75 mm. diametro, parce puberulus; semina numerosa, deltoidea.

Saraburi, Muak Lek, Kao Pang Sawang, Noe 118 (type). Saraburi Muak Lek, 200 m., bamboo forest, Kerr 9141.

Gardenia fusca Geddes [Rubiaceae-Gardenieae]; a *G. Collinsae* Craib foliis elliptico-lanceolatis sicco fuscis pubescentibus, floribus maioribus, calycis lobis latioribus pubescentibus differt.

Frutex usque ad 1 m. altus (ex Kerr), ramulis primo puberulis mox glabris. *Folia* elliptico-lanceolata, apice subacuta, basi late cuneata, 3.7-7.7 cm. longa, 1.8-3.4 cm. lata, supra fusca, iuventute pubescentia, mox glabrescentia, subtus pubescentia, nervis

lateralibus utrinque 10-12 pagina utraque conspicuis, margine ciliata, petiolo 1-4 mm. longo hirsuto suffulta; stipulae inter se connatae. *Inflorescentia* axillaris et terminalis; flores 1-3, aut sessiles aut breve pedicellati, bracteolati. *Calycis* tubus 6 mm. longus, 3 mm. diametro, extra pubescens, intra hirsutus; lobi 5-6, linearilanceolati, 2 mm. longi, 1.2 mm. lati, puberuli, ciliati. *Corolla* alba (ex Kerr); tubus 2.1 cm. longus, basi 4 mm. latus, apice 1.2 cm. latus, parte inferiore constrictus, pubescens; lobi 5-6, ovato-oblongi, subacuti, venati, 1.3 cm. longi, 7-8 mm. lati, dorso pubescentes, margine ciliati. *Stamina* 5-6, ad corollae tubum infra os adfixa, filamentis 4 mm. longis tenuibus, antheris 14.5 mm. longis 1.8 mm. latis linearibus oblongis apice obtusis basi emarginatis dorso reticulatis glabris. *Ovarium* 1-loculare, ovulis numerosis; placentae bifidae; stylus 1.5-1.7 cm. longus, glaber; stigmata contigua, unum fusiforme 15 mm. longum 4 mm. latum simulantia. *Fructus* subglobularis, calyce persistente ornatus, 10-17 mm. longus, 7-13 mm. diametro; semina compressa, nigra, reticulata, 4 mm. longa, 2.5 mm. lata.

Muang Pichit, 50 m., open scrub jungle, Kerr 5666.

Gardenia magnifica Geddes [Rubiaceae-Gardenieae]; a *G. cambodiana* Pitard floribus multo maioribus differt.

Ramuli pallide grisei. *Folia* obovata, apice obtusa, basi cuneata, 4-5 cm. longa, 2.8-3.2 cm. lata, supra brunnea, resinifera, nitentia, parce pilosa, subtus viridia, resinifera, nitentia, nervis prope costam hirsutis, nervis lateralibus utrinque circa 9 adscendentibus conspicuis, margine revoluta, ciliata, petiolo 1-4 mm. longo pubescente suffulta. *Flores* terminales, solitarii. *Calyx* resiniferus; tubus 3 mm. longus; lobi 6, foliacei, 13 mm. longi, 3.5 mm. lati. *Corollae* tubus 2.6 cm. longus, parte superiore circa 8 mm. latus, parte inferiore 3.5 mm. latus, extra glaber, intra partis inferioris summo hirsutus; lobi 6-7, rotundato-obovati, 2.4 cm. longi, 1.6 cm. lati, fere glabri. *Stamina* 6-7, ad summum corollae tubum adfixa, antheris linearibus apice mucronatis basi sagittatis 1.5 cm. longis circa 1.5 mm. latis. *Stylus* 2.7 cm. longus, glaber.

Prachuap, Sam Roi Yawt, under 50 m., open space in evergreen forest, Kerr 10894 (type). Buriram, Nang Rawng, dry sandy forest, Anuwat 12.

Gardenia saxatilis Geddes [Rubiaceae-Gardenieae]; a *G. gummi-fera* Linn. f. foliis minoribus, corollae tubo multo brevior et angustiore differt.

Frutex circa 2 m. altus, multum divaricatus, cortice albo (ex Kerr). *Folia* obovata, obtusa, circa 2 cm. longa et 1.4 cm. lata, supra albo-viridia, nitentia, primo puberula, mox glabra, subtus albo-viridia, iuventute subtomentosa, deinde glabra, nervis lateralibus utrinque circa 9 pagina superiore impressis inferiore prominulis, margine inconspicue ciliata, petiolo 1 mm. longo pubescente suffulta; stipulae ut annuli saepe persistentes. *Flores* albi (ex Kerr),

Nakawn Panom, Muk Tahan, 100 m., rocky ground, *Kerr* 8409 (*type*). Saraburi, Ménam Sak, 100 m., common among rocks on limestone hill, *Kerr* 7040.

Frutex circa 3 m. altus, armatus, ramulis elongatis pubescentibus, brevibus barbatis. *Folia* fasciculata, obovata, apice obtusa, basi cuneata, 12-18 mm. longa, 5-8 mm. lata, supra luteo-viridia, nitentia, glabra, subtus parce pilosa, nervis lateralibus utrinque 2-3 supra impressis subtus prominulis, costa pagina inferiore valde prominente, margine revoluta, ciliata, lamina decurrente, petiolo 2 mm. longo subtus piloso suffulto. *Flores* axillares, 1-3-fasciculati; receptaculum pubescens; pedicelli brevissimi, apice bibracteolati, bracteolis inter se connatis ciliatis. *Calycis* tubus 0.5 mm. longus; lobi 5, deltoidei, acuti, 0.75 mm. longi, ciliati. *Corollae* tubus urceolatus, apice constrictus, 2 mm. longus, 2.5 mm. latus, intra praeter partem inferiorem dense barbatus; lobi 5, ovato-lanceolati, acuti, 3.5 mm. longi, 1.25 mm. lati, omnino glabri. *Stamina* 5, ad summum corollae tubum posita, filamentis subulatis 0.75 mm. longis, antheris circa 2 mm. exsertis ovatis apice acutis basi emarginatis 1.25 mm. longis 0.6 mm. latis dorso albo-maculatis. *Ovarium* 2-loculare, ovulis in loculis solitariis, sericeo-hirsutis; stylus 2 mm. longus, basi sericeo-hirsutus; stigma globulare, mitriforme, bilobatum, 1 mm. longum et latum.

Sriracha, Ao Kasu, under 10 m., scrub jungle, *Kerr* 4183 (*type*).
Sriracha, Mrs. D. J. Collins 1458, *Marcan* 1370. Rachaburi, 80 m.,
open deciduous forest, *Winit* 517.

Coelospermum acuminatum *Geddes* [Rubiaceae-Morindeae];
a *C. scandente* Blume foliis maioribus ellipticis aut elliptico-lanceo-
latis, nervis magis numerosis, inflorescentia longiore differt.

Frutex scandens (ex Kerr), ramis involutae brunneis paulo compressis striatis lenticellatis glabris mox albo-griseis. Folia elliptica vel elliptico-lanceolata, apice acuminata, basi cuneata, 9-12 cm. longa, 3-3.5 cm. lata, supra brunnea vel luteo-viridia, nitentia, glabra, subtus pallidiora, glabra, nervis lateralibus utrinque 7

pagina superiore haud conspicuis inferiore prominentibus, costa robusta, petiolo 1-1.5 cm. longo apice paulo alato glabro suffulta; stipulae inter se connatae, oblongo-lanceolatae, 5 mm. longae, 4 mm. latae, minute puberulae. *Inflorescentia* terminalis et axillaris, cymosa, axibus striatis glabris; flores umbellati, albi (ex Kerr), pedicellis 3-5 mm. longis suffulti. *Calyx* truncatus, circa 2 mm. longus. *Corollae* aestivatio valvata; tubus 4 mm. longus, extra glaber, intra circum filamentorum insertionem hirsutus; lobi 5-6, lineares, obtusi, 6 mm. longi, glabri. *Stamina* 5-6, ad tubum corollae supra medium adfixa, filamentis 2.5 mm. longis ad medium antherarum adfixis, antheris linearibus versatilibus 5 mm. longis circa 1 mm. latis; situ staminum ad basem tubi corollae distat 4 mm.; summis antheris usque ad summum corollae tubum 5 mm. distat. *Ovarium* 2-loculare, ovulis magnis et paucis; stylus 5.5 mm. longus, striatus; stigmata 2, linearia, 2.5 mm. longa.

Lôi, Kao Krading, 1200 m., edge of evergreen forest, Kerr 8736.

Coelospermum luteum Geddes [Rubiaceae-Morindeae]; a *C. biovulato* C. B. Clarke foliis haud coriaceis, inflorescentia multo longiore, floribus magis numerosis differt.

Frutex scandens (ex Kerr); ramuli primo subquadrangulares, breve puberuli, mox teretes, lenticellati, glabri. *Folia* elliptica, apice subito et breve caudata, basi cuneata, 9-13.5 cm. longa, 3.5-6.2 cm. lata, supra brunnea, nitentia, glabrescentia, subtus pallide brunnea, nitentia, glabra, nervis lateralibus utrinque circa 8 pagina utraque conspicuis, petiolo circa 1.5 cm. longo canaliculato glabro suffulta; stipulae 2 mm. longae, inter se connatae, ovato-rotundatae, glabrae. *Cymae* terminales, laxae, patentes, axibus minute pubescentes; pedicelli 8 mm. longi, pubescentes; receptaculum pubescens. *Calyx* truncatus, 1 mm. longus, 2.5 mm. latus, extra pubescens. *Corolla* lutea (ex Kerr); tubus 5 mm. longus, basi 1.9 mm. apice 2.5 mm. latus, extra striatus et puberulus, intra parte superiore pubescens; lobi 5, lineari-lanceolati, apicibus inflexi, 8.5 mm. longi, circa 2 mm. lati, extra et apud marginem inconspicue puberuli. *Stamina* 5, ad summum corollae tubum sita, filamentis 3 mm. longis a basi tubi 5 mm. distantibus, antheris 4 mm. longis tenuibus linearibus apice apiculatis basi sagittatis 5 mm. exsertis versatilibus. *Ovarium* 2-loculare, ovulis per loculum duobus; stylus filiformis, 5 mm. longus, glaber; stigmata 2, linearia, revoluta, basi connata, circa 3 mm. longa.

Sriracha, Ban Dan, 70 m., evergreen forest, Kerr 4150 (type),
 Marcan 175.

Lasianthus longisepalus Geddes [Rubiaceae-Psychotrieae]; a
L. rhinocerote Blume foliis omnino latioribus basi cuneatis, petiolis
 longioribus, calycis lobis multo longioribus differt.

Frutex ad 2 m. altus (ex Kerr), ramis sicco dense luteo-tomentosis. *Folia* elliptico-oblonga, apice anguste acuminata, basi breve cuneata, 11-15 cm. longa, 3.4-5.5 cm. lata, supra luteo-viridia, nitentia,

glabra, subtus sicco luteo-tomentosa, nervis lateralibus utrinque circa 11 pagina superiore impressis inferiore prominentibus, margine late revoluta, petiolo 1-1.5 cm. longo crasso tomentoso suffulta. *Flores* albi (ex *Kerr*), axillares, solitarii, sessiles. *Calyx* dense pilosus; tubus 5-6 mm. longus; lobi 5-7, lineares, 13-14 mm. longi. *Corollae* tubus circa 13 mm. longus, extra et intra parte superiore dense pilosus, parte inferiore extra intraque glaber; lobi 5-7, lanceolati, apicibus saepe inflexi, 8 mm. longi, 2.5 mm. lati, omnino dense pilosi. *Stamina* 5-7, prope summum corollae tubi adfixa, filamentis circa 2.5 mm. longis, antheris oblongis circa 4 mm. longis ad marginem parce puberulis. *Ovarium* 5-7-loculare, ovulis in loculis singulis; stylus 5-7-lobatus, 11 mm. longus.

Chantabun, Kao Soi Dao, 1200-1400 m., common in evergreen forest, *Kerr* 9632.

***Galium petiolatum* Geddes** [Rubiaceae-Galieae]; a *G. rotundifolium* Linn. foliis petiolatis differt.

Herba sub frutices crescens (ex *Kerr*), tenuis; caules quadrangulares, nodis pubescentes, primo inter nodos adpresse puberuli, mox glabri. *Folia* 4-verticillata, late elliptica, apice subacuta, basi subito cuneata, 1.3-2.5 cm. longa, 1.2-1.6 cm. lata, supra fusco-viridia, glabra vel parce puberula, subtus albo-viridia, puberula, nervis lateralibus 3 paginis ambabus conspicuis, margine ciliata, petiolo circa 3 mm. longo pubescente lamina decurrente suffulta. *Cymae* terminales et laterales, patentes, axibus puberulis bracteatis; pedicelli 1-3 mm. longi, arcuati, minute puberuli; flores minuti. *Calycis* tubus brevis, carnosus, 0.5 mm. longus. *Corollae* tubus 0.3 mm. longus; lobi 4, ovati, subacuti, 0.5-0.75 mm. longi. *Stamina* 4, inter corollae lobos sita, filamentis 0.25 mm. longis, antheris parvissimis obtusis. *Stylus* brevis; stigmata 2, linearia, stylo longiora. *Fructus* bilobatus, circa 1 mm. diametro, uncato-pilosus.

Doi Chiengdao, 1800 m., under bushes in evergreen clearing, *Kerr* 6577.

***Solanum Sanitwongsei* Craib** [Solanaceae-Solaneae]; species nova haud armata foliis pinnatim lobatis, inflorescentia triflora subumbellata, calyce brevi vix accrescente, fructu globoso ad 1 cm. diametro distincta.

Frutex circa 1 m. altus (ex *Kerr*), partibus omnibus iuventute pilis stellatis tomentosus, ramulis teretibus demum parum glabrescentibus. *Folia* ambitu oblonga ovatave, apice obtusa, basi cordata, truncata, vel cuneata, saepissime inaequilateralia, 5-8 cm. longa, 3.5-7 cm. lata, chartacea, sicco supra saepissime pallide viridia, subtus cinereo- vel pallide fulvo-viridia, supra pilis stellatis brevibus rigidis sat densis scabridiuscula, subtus pilis stellatis tomentella, nervis lateralibus utrinque 3-5 cum costa supra conspicuis subtus prominentibus, nervulis obscuris, margine altius pinnatim lobata, lobis utrinque 2-3 saepissime apice rotundatis usque ad 2 cm. longis et latis petiolo 1-2 cm. longo supra canaliculato suffulta.

Inflorescentia racemosa, e floribus tribus subumbellatim dispositis constituta, apicem versus internodii orta, pedunculo communi brevi vel subnullo suffulta; flores cyanei (ex *Kerr*), pedicellis 8-15 mm. longis apicem versus paulo incrassatis indumento ei ramulorum simili tectis suffulti. *Sepala* 5, basi inter se breviter connata, quoad formam parum variabilia, saepissime oblongo-cuneata, apice obtuse acuminata, circa 4 mm. longa et 2 mm. lata, dorso stellato-tomentosa, intra ad acumen pilis paucis stellatis instructa, aliter glabra. *Petala* 5, basi ad 4 mm. inter se connata, dorso primo stellato-tomentosa, lobis oblongo-lanceolatis apice subacutis circa 8 mm. longis et 5 mm. latis supra parce pubescentibus. *Stamina* inter se aequalia; filamenta 1 mm. longa, glabra, antheris 6 mm. longis. *Discus* brevis. *Ovarium* 1.25 mm. altum, summo apice pilis paucis stellatis instructum, aliter glabrum; stylus 1 cm. longus, pilis stellatis nisi apice tectus, stigmatibus parvo subcapitato. *Fructus* maturus aurantiacus, subglobosus, ad 1 cm. diametro, nitidus; semina compressa, pallida, copiose punctulata, circa 2 mm. diametro.

Bangkok, cultivated, *Kerr*.

XXXV.—NEW CHINESE SPECIES OF VIOLA.

WILHELM BECKER.

Herr W. Becker has kindly undertaken the critical identification of a considerable amount of the material of the genus *Viola* in the Kew Herbarium. The following new species have been found amongst the Chinese specimens.

1. ***Viola serrula* W. Beck.** sp. nov. (Sect. *Nomimium* Ging.); a *V. grypocerate* A. Gray foliis minoribus crassiusculis obscure viridibus plus minusve fuscis, floribus minoribus brevius calcaratis et calcari subinflato diversa.

Planta in herb. fusca, 5-10 cm. alta. *Caules laterales* adsunt, procumbentes et adscendentes, breviter articulati, e rhizomate orientes, adversus finem foliati et florentes. *Folia* basi cordata, late ovata, acuta, repando-serrata, breviter pubescentia, subtus glabra. *Stipulae* fuscae, angustae, longifimbriatae. *Rhizoma* verticale, reliquiis petiolorum stipularumque dense instructum. *Pedunculi* tenues, glaberrimi, folia superantes, circ. 2-3, in parte superiore bracteolis angustissimis circ. 3 mm. longis oppositis muniti. *Flores* parvi; *sepala* ovato-lanceolata, acutissima, fusco-punctata, appendicibus subelongatis angustis; *petala* lateralalia papillaceo-pilosa; *calcar* crassiusculum, circ. 2-2.5 mm. longum, horizontaliter directum; *antherae thecis* dilute viridibus et connectivo fusco; *connectivi processus* triangularis, subelongatus, acutiusculus; *stylus* tenuis, erectus, basi non geniculatus, disperse fusco-lineatus, apice papillaceo-hirtellus, in rostellum semirecto-curvatum transiens. *Capsula* glabra, fusco-punctata.

oblonga, lateralia barbata; *calcar* circ. 2 mm. longum, crassiusculum, subrecurvatum; *ovarium* conoideum; *stylus* basi geniculatus, apice horizontaliter deplanatus triangularis brevissime rostellatus.

Plant in the flowering stage c. 10-12 cm. high; *leaves* (including petioles) c. 8-10 cm. long, lamina c. 3 cm. long and 1.5 cm. broad; *stipules* c. 1 cm. long, lacinae free c. 3 mm. long; *sepals* (including appendices) 7 mm. long; *petals* 8-9 mm. long and c. 3 mm. broad; *spur* 2 mm. long.

5. **Viola Hancockii** W. Bckr. sp. nov. (Sect. *Nomimium* Ging.); foliis late ovatis profunde cordatis, subconspicuis, distincte crenatis, stipulis latius et floribus albis suaveolentibus a *Viola metajaponica* Nakai, *V. pekinensi* W. Bckr. et specibus similibus diversa.

Planta acaulis. *Rhizoma* crassum, anguste articulatum, abbreviatum, radicibus nonnullis sublaevibus munitum. *Stipulae* albiae, membranaceae, distincte latae, multum adnatae, laciniis liberis lanceolatis. *Folia* basi anguste profundeque cordata sinibus rotundatis, ceterum late ovata, subinciso-crenata, supra disperse pubescentia, subtus adversus basin subpubescentia et glabrescentia; *petioli* angusti. *Flores* folia vix superantes, conspicui, cum calcar circ. 2 cm. longi; *sepala* lanceolata vel late lanceolata, non conspicue appendiculata; *petala* alba, suaveolentia, oblongo-obovata, lateraliter barbata; *calcar* elongatum, 6-7 mm. longum, deorsum curvatum; *ovarium* subglobosum; *stylus* basi vix geniculatus, apice deplanatus breviter rostellatus.

CHINA: Peking, western hills, in shady places; very rare; 1887, W. Hancock 99 (Herb. Kew.); Peking (1876-78), W. Hancock 52 (Herb. Viol. W. Bckr. ex Herb. Kew.).

Roots elongate; stipules c. 3 mm. broad and 1 cm. long; leaves c. 4 cm. long, 3 cm. broad, some narrower; *petioles* narrow, c. 3-5 cm. long; *bracteoles* of the peduncle c. 5 mm. long; *petals* 12-13 mm. long.

6. **Viola Duclouxii** W. Bckr. sp. nov.; species ex affinitate *V. sikkimensis* W. Bckr. et specierum similium.

Plantula acaulis, perennis, stolonifera. *Stolones* plures, procumbentes, 10–15 cm. longi, tenues, ad finem radicales et plantas novellas rosulantes formantes, foliati et floriferi. *Stipulae* fuscae, novellas rosulantes formantes, foliati et floriferi. *Folia basilaria* circ. 9, lanceolata, ad finem longe fimbriata. *Folia basilaria* circ. 9, lanceolata, ad finem longe fimbriata. *Folia* subprofunde cordata, supra adversus rotundata, plane serrata, basi subprofunde cordata, supra adversus margines subpubescentia et glabrescentia, subtus glabra; *fol. stolonum* minora. *Sepala* lineari-lanceolata, fusca, longe et tenuiter fimbriata. *Flores* basilares et in stolonibus in fol. sinibus, breviter pedicellati; *corolla* ?; *sepala* lineari-lanceolata; *capsula* parva, subglobulosa.

subglobulosa.
CHINA: Yunnanfu, *Ducloux* 550; sine floribus collecta.

CHINA BOREALIS: Kansou, S.E.; Pei la hia, 1919, *E. Licent* sub 5137.

Stipules 1-1.2 cm. long; their *fimbriae* 2-3 mm. long; their greatest breadth in the middle as in typical *V. rupestris*; *leaves* rather small, c. 2 cm. broad and 1-3 cm. long or less, subreniform or roundish; *sepals* c. 7 mm. long, narrowly lanceolate. Undoubtedly belonging to *V. rupestris* and probably the representative of the type in China.

3. **Viola Monbeigii** W. Bckr. sp. nov. (Sect. *Nomimium* Ging.); foliis basi profunde cordatis in acumen sensim angustatis subglaberrimis crenato-serratis valde excellens.

Acaulis subglaberrima. *Rhizoma* elongatum, flexuosum, lignosum, disperse longiradicatum et subfibrillosum. *Stipulae* angustae, multum adnatae, usque circiter 1.5 cm. longae, albae vel dilute virides. *Folia* obscure viridia, longe petiolata; petioli subalati; limbus foliorum basi profunde cordatus, in acumen sensim angustatum elongatus, subglaberrimus, crenato-serratus. *Flores* folia superantes, circ. 2-4, conspicui, in pedicellis subcrassis adversus medium bracteolatis apice vix curvatis; *bracteolae* circ. 5 mm. longae; *corolla* verosimiliter dilute colorata (albida?) cum calcar circ. 2 cm. longa; *sepala* ovato-lanceolata usque lanceolata, appendicibus distinctis subdilatatis et fisso-acutidentatis munita; *petala* obovata, lateraliter subbarbata; *calcar* subrecurvatum, deorsum directum, *stylus* basi vix geniculatus, apice derupte deplanatus, vix rostratus.

CHINA AUSTRO-occIDENTALIS: sine loco indicato, T. Monbeig (Herb. Kew.): Yunnan; Tsekou, T. Monbeig (Herb. Kew.).

Plant with flowers up to 10 cm. high; petioles c. 3 cm. long; lamina of the leaves 2-3.5 cm. long, 1-2 cm. broad at the base; sepals (excluding appendices) 5-7 mm. long and up to 2.5 mm. broad.

4. ***Viola yunnanfuensis* W. Bckr. sp. nov.** (Sect. *Nomimium* Ging.).

Planta acaulis perennis, caespitosa, polyphylla. *Rhizoma* abbreviatum, radicibus numerosis sublaevibus crassiusculus obsitum. *Stipulae* multum adnatae, angustae. *Folia* basi subcordata, ovata vel oblonga, glaberrima, obscure viridia, obtusa, plane vel subrotundato-crenata, longe petiolata. *Flores* folia paullum superantes, non conspicui; *pedunculi* breviter bracteolati; *sepala* lanceolata, appendicibus angustioribus subrectangularibus munita; *petala*

Basal leaves (including petiole) c. 4 cm. long; petiole 2-2.5 cm. long; lamina c. 1.5-2 cm. long and broad; stolons 10-12 cm. long; leaves of the stolons c. 1 cm. long and broad, shortly petiolate; capsule 4-5 mm. long.

7. *Viola grandisepala* W. Bckr. sp. nov.; ex aff. *V. Smithianae* W. Bckr. et spec. aff. sepalis late ovatis conspicuis distinguenda.

Planta acaulis vel subcaulescens, stolonifera. *Rhizoma* verticale, elongatum. *Stolones* tenues, elongati. *Stipulae* fuscae, ovato-lanceolatae, acuminatae, integrae. *Folia* longe petiolata, basi profunde cordata, rotundata, plane rotundato-crenata, obtusiuscula vel subacutiuscula, adversus margines pubescentia et glabrescentia. *Flores* non conspicui, folia superantes; *sepala* late ovata, appendicibus latis truncatis, acutiuscula, ciliata; *petala* oblongo-obovata; *calcar* appendices calycis non superans; *stylus*?

CHINA OCCIDENTALIS: Omi, 1904, E. H. Wilson (Exped. Veitch.) 4748, cum *V. Smithiana* W. Bckr.

Leaves c. 3.5 cm. long and 3 cm. broad, also smaller; *stipules* c. 12-14 mm. long and 3-4 mm. broad; *sepals* (including appendices) c. 8 mm. long and 4.5 mm. broad. *Whole plant* 7-10 cm. high.

8. *Viola lucens* W. Bckr. sp. nov. (Sect. *Nomimium* Ging.); ex aff. remota *V. Hookeri* W. Bckr. et *V. sikkimensis* W. Bckr.

Planta humilis, acaulis, albido-villosa, tenera, circ. 5-7 cm. alta, perennis, stolonifera. *Rhizoma* verticale, breviter articulatam, 1-2 mm. crassum, radicellatum, stolones tenues pilosos plantas novellas formantes emittens. *Stipulae* fuscae, lanceolatae, longifimbriatae. *Folia* longe petiolata, breviter albido-pilosa, basi profunde et anguste cordata, ceterum rotundiusculo-ovata, indistincte crenata, acutiuscula vel obtusiuscula; *petioli* longius villosi. *Flores* folia superantes; *pedicelli* pilosi, supra medium bibracteolati; *bracteolae* oppositae, angustae; *sepala* anguste lanceolata, pilosa, interdum glabrescentia, brevissime appendiculata; *petala* superiora et lateralalia anguste oblonga, 10-11 mm. longa, haec basi pilis taeniaeformibus munita; *pet. infimum* naviculare, cum calcari 1-1.5 mm. longo latoque 9 mm. longum; *ovarium* globulosum; *stylus* basi geniculatus, apice pone marginatus in fronte derupte deplanatus, vix rostellatus.

CHINA: Pin-fa, 1907-08, J. Cavalerie 3084 (Herb. Kew.) cum *V. pulla* W. Bckr.; Kouy-Tcheou, Gan-pin, 1910, J. Cavalerie 3084, sub nom. *V. diffusae* Ging. (Herb. Delessert.)

9. *Viola pulla* W. Bckr. sp. nov. (Sect. *Nomimium* Ging.); cum *V. Hookeri* W. Bckr. et *V. sikkimensis* W. Bckr. remote affinis.

Planta mox obscure fusco-colorata, acaulis, humilis, stolonifera. *Rhizoma* verticale, articulatam, elongatum, radicellatum; *radicellae* firmas. *Stipulae* latae, ovato-lanceolatae, fuscae, dense fimbriatae; *fimbriae* latitudinem stipularum non superantes.

Folia obscure viridia, posterius fusca, rotundata, rotundato-crenulata, acutiuscula, basi non profunde cordata, strigoso-pubescentia, breviter petiolata; *petioli* pilis rigidis distantibus dense instructi. *Flores* folia vix superantes; *pedicelli* villosi, supra medium longe bracteolati; *bracteolae* 8-9 mm. longae, oppositae; *sepala* lanceolata, pilosa, 5-6 mm. longa, appendicibus brevibus; *petala* 6 mm. longa, oblonga; *pet. lateralalia* papillari-hirta; *pet. infimum* breviter calcaratum; *ovarium* conoideum; *stylus* basi subgeniculatus, apice truncatus et deruptus, breviter rostellatus.

CHINA: Pin-fa, 1907-09, J. Cavalerie 3084 (Herb. Kew.) cum *V. lucente* W. Bckr.; Gan-chouen, Cavalerie sub 7171 (Herb. Kew.), cum *V. betonicifolia* Sm. sbsp. *nepalensi* W. Bckr. et *V. grypocerate* A. Gray.

10. *Viola gan-chouenensis* W. Bckr. sp. nov. (Sect. *Nomimium* Ging.); aliis speciebus non affinis.

Planta acaulis circ. 8 cm. alta (cum floribus longe pedicellatis), floribunda. *Radix* verticalis, sursum partita. *Stipulae* anguste lanceolatae, breves. *Folia* oblongo-ovata vel sublata, plane crenata, acutiuscula, basi subtruncata et in petiolum decurrentia, utrinque adpresso-pilosa. *Flores* folia superantes, subconspicui, *pedicelli* circa medium bracteolis angustis sublongatis 5 mm. longis instructi, glabri vel pilosi; *sepala* ovata et ovato-lanceolata, appendicibus angustioribus subconspicuis subquadratis; *petala* superiora obovata 9 mm. longa et 4.5 mm. lata; *pet. lateralalia* oblonga 1 cm. longa et 3 mm. lata, barbata; *pet. infimum* elongato-triangulari-obovatum, 9 mm. longum; omnia petala apice rotundata; *calcar* subelongatum circ. 6 mm. longum, subinflatum, subsursum curvatum; *stylus* basi subgeniculatus, clavatus, apice deplanatus et utrinque dilatatus et plane marginatus, in fronte distincte suberecto-rostellatus.

CHINA: Gan-chouen, J. Cavalerie 7168 (Herb. Kew.) cum *V. serrula* W. Bckr. et *V. diffusa* Ging.

11. *Viola diffusa* Ging. in DC. Prodr. i. 298 (1824) var. *brevisepala* W. Bckr. var. nov.; a typo sepalis ovato-lanceolatis, foliis ovatis differt.

Sepala ovato-lanceolata, circ. 4 mm. longa et 1.5 mm. lata; *folia* late ovata, apice obtusa.

CHINA: Kiukiang Lushan, 1889, W. Hancock 8 et 9.

12. *Viola wilsonii* W. Bckr. sp. nov. (Sect. *Nomimium* Ging.); similis *V. diffusae* Ging., sed rhizomate perenni crasso et planta villosa-tomentosa differt.

Planta perennis. *Rhizoma* crassum; planta in omnibus partibus dense albido-tomentosa; *corolla* subconspicua, circ. 1 cm. longa, major quam in *V. diffusa*. In forma foliorum et stipularum a *V. diffusa* vix diversa.

Syn: *V. diffusa* var. *tomentosa* W. Bckr. in Beih. Bot. Centrbl. xx. 2. 127 (1906).
CHINA CENTRALIS: W. Hupeh, 1900, *E. H. Wilson* 245; typ. in Kew et Dahlem.

13. *Viola Pricei* W. Bckr. sp. nov. (Sect. *Nomimium* Ging.; *Diffusae* W. Bckr.); ex affin. *V. diffusae* Ging. et huic speciei similis, etiam stolonifera; tamen forma foliorum distincte diversa.

Folia triangulari-ovata, basi plane cordata, *adversus basin latissima*, circ. 8-10 inciso-crenulata, excisuris rotundatis, utrinque disperse pubescentia, circ. 2.5 cm. longa et basin versus 1-1.2 cm. lata, longe petiolata; *stolones* tenues. *Flores* subconspicui.
FORMOSA: Urai, 1912, *W. R. Price* 306.

XXXVI.—DALZELLIA OR BELOSYNAPSIS. T. A. SPRAGUE AND C. E. C. FISCHER.

In connection with the preparation of Part viii. of Gamble's Flora of the Presidency of Madras it became necessary to determine the correct name under International Rules of the small genus of Commelinaceae originally described by Hasskarl (Flora, 1865, 593) under the name *Dalzellia*. This was based on *Cyanotis vivipara* Dalz. (Hook. Journ. Bot. 1851, iii. 226) a native of Western India. In 1881 *Dalzellia* Hassk. was treated by C. B. Clarke (DC. Monogr. iii. 242) as a section of *Cyanotis* D. Don, and widened to include *Cyanotis uniflora* Hassk., *Tradescantia capitata* Blume, and *Belosynapsis kewensis* Hassk. (Flora 1871, 259). *Dalzellia*, as thus enlarged, seems to be a very natural group, characterized by the absence of imbricating bracts, and is best treated as an independent genus. The question is whether it should bear the name *Dalzellia* Hassk. (1865) or *Belosynapsis* Hassk. (1871). *Dalzellia* had been previously used by Wight (Ic. v. part 2, 34: 1852) for a genus of Podostemonaceae originally published as *Lawia* Griff. ex Tul. (Ann. Sc. Nat. sér. 3, xi. 112: 1849), which itself is antedated by *Lawia* Wight (Calc. Journ. Nat. Hist. vii. 14: 1846), a genus of Rubiaceae. *Dalzellia* Hassk. (1865) can be valid only if *Dalzellia* Wight (1852) is invalid. Before this point can be settled, the correct names for the two genera *Lawia* Wight (Rubiaceae) and *Lawia* Griff. (Podostemonaceae) must be determined.

The generic name *Lawia* Wight (1846) was based on *Lawia acuminata* Wight, a new species of Rubiaceae from Madras, and was accompanied by a generic description. It is therefore nomenclaturally valid under the International Rules, although it is now treated as a taxonomic synonym of *Mycetia* Reinw. in Syll. Ratisb. ii. 9 (1828). Hence the name *Lawia* Griff. ex Tul. (1849) is invalid under Art. 51 (2°) of the International Rules.

Two generic names, *Dalzellia* Wight and *Terniola* Tul. were proposed independently in 1852 to replace *Lawia* Griff. The first

was published in Jan. 1852 (*vide* Wight, Ic. vi. preface, p. viii). The second bears the date 1852, the month not being stated; it was presumably published before June, as it was reviewed in the "Gardeners' Chronicle" for June 12, 1852, p. 374. In the absence of further evidence *Dalzellia* Wight and *Terniola* Tul. must be regarded as being of the same date. In such a case Art. 46 of the International Rules provides that the name adopted by the first author who chose one of them in preference to the other must be retained. The name *Dalzellia* was adopted in 1860 by Thwaites (Enum. Ceyl. Pl. 223), but he cannot be said to have chosen it in preference to *Terniola*, as he did not mention the latter among the synonyms of *Dalzellia*, and apparently did not know of it or of Tulasne's monograph. The first author who made a choice seems to have been Weddell (DC. Prodr. xvii. 46: Oct. 1873), and he adopted *Terniola*, citing *Dalzellia* as a synonym. Hence *Terniola* should be used for the genus in question. The possibility that further evidence may come to light establishing the priority of *Dalzellia* cannot, however, be entirely excluded, and it is therefore not certain that that name is invalid under the International Rules. Hence the later homonym *Dalzellia* Hassk. (1865) is not available for the genus of *Commelinaceae*, and the latter should be called *Belosynapsis* Hassk.

The synonymy of the three genera mentioned above is as follows:—

Mycetia Reinw. in Syll. Ratisb. ii. 9 (1828); K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. iv. Abt. 4, 66 (1891); Gamble, Fl. Madras, 611 (1921).

Adenosacme Wall. Cat. n. 6280-6282 (1832), sine descr.; Endl. Gen. i. 552 (1838), descr.

Lawia Wight in Calc. Journ. Nat. Hist. vii. 14 (April 1846); Wight Ic. iii. part 4, p. 5, t. 1070 (Sept. 1846).

An Indo-Malayan genus of Rubiaceae.

Terniola Tul. in Arch. Mus. Par. vi. 189 (1852, semester 1); Weddell in DC. Prodr. xvii. 46 (1873); Hook. f. Fl. Brit. Ind. v. 62 (1890).

Lawia Griff. ex Tul. in Ann. Sc. Nat. sér. 3, xi. 112 (1849); Warming in Engl. & Prantl, Nat. Pflanzenfam. iii. Abt. 2A, 18 (1890); Gamble, Fl. Madras 1195 (1925); non Wight (1846).

Dalzellia Wight, Ic. v. part 2, p. 34 (Jan. 1852); Thwaites, Enum. Ceyl. Pl. 223 (1860).

Tulasnea Wight l.c. 35, tt. 1919, 1920, pro syn., non Naud. (1844).

Mnianthus Walp. Ann. iii. 443 (1853).

A genus of Podostemonaceae confined to India and Ceylon.

Belosynapsis Hassk. in Flora, 1871, liv. 259; hic emend. a C.E.C. Fischer.

Dalzellia Hassk. in Flora 1865, xlviii. 593, non Wight (1852).

Erythrotis Hook. f. Bot. Mag. t. 6150 (1875).

Cyanotis, sect. *Dalzellia* C. B. Clarke in DC. Monogr. iii. 242 (1881).

An Indo-Malayan genus of Commelinaceae comprising the following species: *Belosynapsis uniflora* C. E. C. Fischer, comb. nov. (*Cyanotis uniflora* Hassk.); *B. capitata* C. E. C. Fischer, comb. nov. (*Tradescantia capitata* Blume); *B. kewensis* Hassk., the type-species; and *B. vivipara* C. E. C. Fischer, comb. nov. (*Cyanotis vivipara* Hassk.).

XXXVII.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies:—MR. S. GILLET, Assistant Agricultural Officer, Kenya; MR. R. A. ALTON, formerly Assistant Botanist and Mycologist, British Guiana, to be Assistant Mycologist, Department of Agriculture, Federated Malay States and Straits Settlements; MR. J. C. NAUEN, a Student Gardener, Royal Botanic Gardens, Kew, Horticulturist, Department of Agriculture, Bermuda; MR. T. C. CAIRNS, B.Sc., Cotton Investigator, Tanganyika Territory; MR. I. G. C. SQUIRE, Assistant Manager, Oil Palm Plantation, Sierra Leone; MR. A. S. WALFORD, B.A., Agriculturist, Jeanes School, Kenya Colony; MR. M. T. DAWE, O.B.E., Commissioner of Lands and Forests, Sierra Leone, to be Director of Agriculture, Cyprus (*K.B.* 1902, 24; 1911, 65; 1915, 206; 1922, 198.)

We learn that Professor J. H. FAULL, of the Department of Botany, University of Toronto, has been appointed Professor of Forest Pathology at Harvard University.

E. J. WALLIS.—We regret to have to record the death of Mr. E. J. Wallis, which occurred on the 23rd February last. His health had been failing for some years past. He was certainly one of the most talented photographers of trees, plants and garden scenery of his time, and it may safely be asserted that as long as any interest is taken in the gardening literature and plant portraiture of the early XXth century his name will be secure from oblivion. Trained in youth to the profession of wood engraving he found by middle age this source of livelihood slipping away from him. By the time of his death it had become virtually non-existent. He was not without private means, but as an alternative occupation and source of income he turned to photography; and his love of plants, together with the attraction of the open air, induced him to take up the portraiture of plant life. As no place could provide him with such a number and variety of subjects as Kew, he settled in the neighbourhood and for at least twenty years spent most of his working time in the Gardens. During this period he must have taken some thousands of photographs of landscape scenes, plants and flowers, many of which were

reproduced in current periodical literature. His pictures were also used for the *Illustrated Guide* to the Gardens and in horticultural and botanical books of the period, such as Watson's *Gardeners' Assistant*, Bean's *Trees and Shrubs*, and Dallimore & Jackson's *Handbook of Coniferae*. A considerable number of his photographs have been placed in No. IV Museum to show the habit of trees whose timber or other products are on exhibition there.

Wallis, besides being an expert in the technique of his profession, had also a strong artistic feeling. Given a subject to photograph he might always be trusted to make the best of it. In taking pictures of trees and open-air scenes especially he was wonderfully patient, waiting sometimes for hours to obtain the most suitable light and necessary stillness of the atmosphere.

Icones Plantarum Sinicarum.* Under this title the Department of Botany, College of Agriculture, National South-eastern University, Nanking, China, is issuing a folio publication. The first fascicle comprises 50 plates from original drawings with dissections, accompanied by descriptive letterpress in English with a translation in Chinese below. After the description in each case the distribution of the species is given throughout the Provinces of China where it is known to occur. This is followed in most cases by notes by one or other of the authors.

The first 14 subjects are Gymnosperms; these are followed by a number of Dicotyledonous trees and Monocotyledons. Plate 50 is devoted to a new species of *Zephyranthes* from the Province of Chekiang, described here for the first time, and is interesting in adding another example to the list of genera found both in America and China.

The work, which is dedicated to Charles Sprague Sargent, is very well printed with ample margins, and many of the illustrations are excellent.

C. B. V. M.

The Agricultural Journal of British Guiana.†—The Journal of the Board of Agriculture of British Guiana, which has been in existence since 1907, has now ceased to exist, and has given place to a new Journal, published by the Department of Agriculture, under the Editorship of the Director assisted by some of the senior officers of the Department.

Mr. Dash, the new Director of Agriculture, introduces this new Journal with a short account of the evolution of his Department.

*"Icones Plantarum Sinicarum." Edited by H. H. Hu and W. Y. Chun: The Commercial Press Ltd., Shanghai, Feb. 1927. Fasc. I. Tab. i-1. Price \$5.00.

†The Agricultural Journal of British Guiana. Vol. No. 1. March, 1928. Published by the Department of Agriculture, Georgetown, British Guiana, pp. 68, plates 2. Price 6d.

The inception of this was the Botanic Garden and Station at Georgetown, which Jenman took over in 1879 when he was appointed Government Botanist. About the same time Harrison was appointed Government Analyst, and for some years these two officers worked in collaboration over the many problems connected with agriculture and horticulture, where mutual assistance was necessary. On Jenman's death, Harrison was appointed Director of Science and Agriculture, which post included not only the work already mentioned but also that of Geologist. Under him the work was divided between a Government Botanist and Superintendent of the Gardens, and a Deputy Analyst and Geologist. As time went on other posts were created or merged. The Government Botanist became Assistant Botanist and Mycologist, and an Economic Biologist subsequently styled an Entomologist was appointed.

Sir John Harrison was also instrumental in starting in 1919 the British Guiana Sugar Planters' Experimental Station, and as Chairman had control though the station was not a part of the Department. An officer, trained as a chemist, was appointed as Superintendent of the Sofia Sugar Station, and various so-called Agricultural Instructors were locally recruited and appointed for work in the districts, but no attempt was made to develop Agricultural Research apart from that connected with the work of technical officers.

Mr. Dash, in his contribution to the first Number, gives an outline of his proposals for re-organizing the Department and the development of agricultural research, with the separation from the Department of those branches of science which have no direct bearing on agricultural improvement. This creates the opportunity for agricultural research on which all extension work in the districts must be based.

A marked feature of this new Journal is the inclusion of original articles which are likely to appeal to all branches of agriculture in the Colony. Among these is an article on the Imperial College of Tropical Agriculture at Trinidad, and its functions in the Caribbean, by Mr. G. Evans, the Principal of the College, a valuable paper on the biological control of insect pests, by Mr. L. D. Cleare, the Government Entomologist, a short note on the impermeability of Cane soils in British Guiana, its consequences and its amelioration, by Mr. M. Bird, and an "A.B.C." of Rice Culture, which should prove extremely useful to all rice growers in the Colony.

Besides these original articles the Journal contains selected Articles, Notes and Departmental News. The Journal is well got up and well printed. Its style is similar to that of the Agricultural Journal of India and the Tropical Agriculturist of Ceylon.

BULLETIN OF MISCELLANEOUS INFORMATION

No. 7 1928

ROYAL BOTANIC GARDENS, KEW

XXXVIII.—THE GENUS *ASTREBLA* OR MITCHELL GRASSES. C. E. HUBBARD.

The genus was first proposed by F. Mueller (Fragm. Phytogr. Austral. x. 76: 1876) for *Danthonia pectinata* Lindl. and *D. triticoides* Lindl. Two years later a generic description was given in the Flora Australiensis (vii. 602), when the above two species were transferred to *Astrebla*. A variety was at the same time added by Bentham, namely *A. triticoides* var. *lappacea*, based on *Danthonia lappacea* Lindl.; this has recently been revived as a species by Domin (Biblioth. Bot. lxxxv. 372: 1915) under the name *Astrebla lappacea* Domin. A fourth species *A. elymoides* was described by F. Mueller (ex F. M. Bailey in Illustr. Monogr. Grasses Queensl. t. 8: 1879).

With regard to the affinities of this endemic Australian genus, relationships with other genera are best sought for among Australian grasses. The genus appears to be most closely allied to *Triodia*, especially such species as *T. lanigera* Domin and *T. Mitchellii* Benth. These species have very similar florets to those of *Astrebla*. The lemma is conspicuously three-lobed, rounded and pilose on the back, and becomes indurated at maturity, whilst the palea also resembles that of *Astrebla*. The rhachilla of the spikelet however is articulated between the florets, while the inflorescence is paniculate. The genus also shows affinities with *Danthonia*, especially with some of the Australian species.

The species of *Astrebla* are well known Australian grasses, renowned for their drought resistance and fodder value and prized by pastoralists in Australia. Breakwell (Grasses and Fodder Plants of New South Wales, p. 285) states that from a pastoral standpoint they are to be considered as one of "our great national assets." Their thick wiry roots penetrate the earth to a great depth and enable the plants to withstand the most protracted drought, their foliage remaining green when many other kinds of grasses are withered up. They quickly respond to rain, their growth being stated as phenomenal; old root stocks send out shoots and the stems sprout at the nodes, producing shoots which rapidly grow to maturity. Although grasses of coarse habit with stems and leaves comparatively tough, they are nevertheless said to be much relished by stock and to make excellent hay. According to Turner the seeds at one time furnished the aborigines with a large proportion of their food.

The species of *Astrebula* are widely distributed throughout Central and Northern Australia, preferring the heavier alluvial soils and are practically absent from the southern portion of the continent. They are commonly known as "Mitchell Grasses," after their discoverer, Sir. T. L. Mitchell; *A. pectinata* is known as "Common Mitchell Grass," *A. squarrosa* as "Bull or Wheat-eared Mitchell Grass," *A. lappacea* as "Curly Mitchell Grass," and *A. elymoides* as "Hoop or Weeping Mitchell Grass."

In Queensland the species of *Astrebula* are among the commonest and most valuable of grasses and it is at the request of Mr. C. T. White, of Brisbane, that this revision has been undertaken. He has kindly forwarded abundant Queensland material to Kew, and it is hoped that the confusion in the nomenclature has now been settled as far as it can be done from herbarium specimens.

GENERIC DESCRIPTION.

Spikelets lanceolate to broadly elliptic-oblong in profile, sometimes becoming cuneate, laterally compressed to almost terete, sessile or subsessile, alternately biseriate and secund, generally loosely to densely imbricate on the continuous tough triquetrous rhachis of solitary or paired terminal spikes or spike-like racemes; rhachilla disarticulating above the glumes and not between the lemmas. *Florets* 2-9, the lower 2-4 perfect, the upper sterile and reduced, the uppermost frequently reduced to the entire part of the lemma. *Glumes* slightly unequal, keeled, subpersistent, usually acute or acuminate, sometimes mucronate, glabrous, firmly membranous to chartaceous; lower glume linear-lanceolate to ovate, 2-9-nerved; upper glume ovate-lanceolate to broadly elliptic, 7-13-nerved. *Lemmas* usually deeply 3-lobed, coriaceous, dorsally rounded, silky-villous at the base and on the entire part of the back; middle lobe tapering from a broad base into a tough straight or curved bristle which is sometimes hooked; lateral lobes similar to the middle lobe or wider and flattened, ranging from linear or lanceolate to semi-ovate, usually more erect, tough, or scarious and shining, 1-5-nerved. *Paleas* lanceolate to elliptic, acuminate, dorsally compressed, 2-keeled, with the keels ciliate, firmly membranous to chartaceous. *Lodicules* 2, truncate. *Anthers* 3, linear. *Ovary* glabrous; styles distinct, short, terminal; stigmas plumose, terminally exserted. *Caryopsis* oblong or elliptic in outline, dorsally compressed, loosely enclosed in the hardened lemma and palea; hilum basal; embryo small. *Tufted perennial grasses*; blades narrow; ligules reduced to ciliate rims.

KEY TO THE SPECIES.

Spikelets 3-8 mm. wide (excl. bristles), ovate, oblong to broadly oblong or elliptic, becoming wedge-shaped and gaping, loosely to densely imbricate in slender to stout spike-like racemes 4-30 cm. long by 0.75-2 cm. wide (excl. bristles) or sometimes

distant in the lower part of the racemes; internodes between the spikelets in the middle portion of the raceme usually 3-6 cm. long; rhachis scaberulous; spikelets 3-9-flowered, rhachilla joints between the florets less than 1 mm. long:

Lobes of lemmas similar, finely acuminate and tapering into rigid and tough bristles, middle lobe 6-10 mm. long, becoming reflexed, lateral lobes 5-8 mm. long, all or some occasionally hooked; lemmas densely and long silky-villous on and around the inner lateral nerves from the base upwards, the remainder glabrous or nearly so.....1. *squarrosa*.

Lobes of lemmas different in shape, middle lobe narrowed from a triangular base into a slender rigid unhooked bristle, lateral lobes semi-lanceolate to semi-ovate; lemmas villous all over the entire portion of the back:

Racemes 4-13 cm. long by 1-2 cm. wide; spikelets densely imbricate; lower glume 5-9-nerved; lateral lobes of lemmas very conspicuous, chartaceous with broad scarious margins2. *pectinata*.

Racemes 5-30 cm. long, 0.5-1 cm. wide; spikelets usually loosely imbricate; lower glume usually 1-3-nerved; lateral lobes of lemmas firmly chartaceous to coriaceous...3. *lappacea*.

Spikelets 2-3 mm. wide, lanceolate to linear-oblong, from more than their own distance apart to overlapping up to half their length, in slender racemes 12-35 cm. long by up to 0.3 cm. wide; internodes between the spikelets in the middle portion of the raceme 6-11 mm. long; rhachis usually smooth, rarely scaberulous; spikelets 2-4-flowered, rhachilla joints between the florets 2-4 mm. long.....4. *elymoides*.

1. *Astrebula squarrosa* C. E. Hubbard, sp. nov.; affinis *A. lappaceae* (Lindl.) Domin, sed foliis et tuberculatis, racemis latioribus, spiculis majoribus, lobis lemmatum similibus tenuiter acuminatis differt.

Astrebula triticoides var. *lappacea* Benth. Fl. Austral. vii. 603 (1878) quoad specim. et descr. Turner, Grasses N.S.W. 8 (1890); Austral. Grasses, 14 (1895); in Agric. Gaz. N.S.W. i. 312 (1890), ii. 646 (1891); Proc. Linn. Soc. N.S.W. xxix. 179 (1904), xxx. 88 (1905). Maiden, Usef. Nat. Pl. Austral. 78 (1889); Man. Grasses N.S.W. 144 (1898). Maiden and Betche, Census N.S.W. Pl. 23 (1916).

Astrebula lappacea Domin in Biblioth. Bot. lxxxv. 372 (1915) quoad ic. et specim., non *Danthonia lappacea* Lindl. The specimens, etc. cited by Domin and Benth. are not conspecific with those of *coides* var. *lappacea* respectively. Both the specimens and figures cited by *Danthonia lappacea* Lindl. Domin and Benth. will have to form the basis of a new species, *A. squarrosa* C. E. Hubbard.

Astrebula triticoides F. M. Bailey, Syn. Queensl. Fl. 660 (1883) ?, Cat. Queensl. Pl. 57 (1890)? Ewart and Davies, Fl. North. Territ. 45 (1917). Breakwell, Grasses and Fodder Pl. N.S.W. 237, f. 118, no. 1 (1923) non F. Muell.

A leafy tufted *perennial*, densely coated at the base with persistent leaf-sheaths. *Culms* erect from a short rhizome, eventually spreading, 20-150 cm. high, slender to moderately stout, terete above, more or less compressed below, finely striate, simple or branched upwards, up to 7-noded, glabrous, rough just beneath the inflorescence. *Leaves* glabrous; sheaths slightly compressed and keeled to terete, loose to moderately tight, firm, smooth; ligules reduced to very narrow ciliate rims up to 0.5 mm. long; blades linear, from a narrow base long and finely acute, 7-40 cm. or more long, 3-6 mm. wide, flat or folded, ascending, flexuous to rigid, smooth or with the upper surface and margins rough. *Spike-like racemes* solitary, flattened, including the bristles 7-18 (rarely less to 4) cm. long and 1.5-3 cm. wide (1-1.75 cm. wide, excl. bristles), long exserted or enclosed at the base in the uppermost leaf-sheath; rhachis 1-1.25 mm. wide, rounded and very finely striate on the back, densely scaberulous; pedicels 1.5-2.5 mm. long, adpressed, densely scaberulous. *Spikelets* closely imbricate, oval-oblong to broadly elliptic-oblong, slightly laterally compressed to almost terete, usually 8-11 mm. long by 4-8 mm. wide (excl. the bristles) or up to 2.5 cm. long in the lowest spikelet of the raceme. *Lower glume* linear-lanceolate to lanceolate when flattened, finely acute to acuminate and shortly mucronate, 5-10 mm. long (except in the lowest spikelet), firmly membranous to subchartaceous, glabrous, 2-3-nerved; *upper glume* elliptic-ovate to elliptic, finely acute to acuminate and shortly mucronate, 6.5-11 mm. long (except in the lowest spikelet), subchartaceous with scarious margins, 7-12-nerved. *Florets* 6-9, densely imbricate, becoming smaller upwards, the lower 3-4 perfect, the remainder sterile, the uppermost reduced to the entire portion of the lemma. *Lowest lemma* including the lobes 12-15 mm. long, the entire portion broadly oblong-elliptic to almost square when flattened, 4.5-6.5 mm. long by 4.5-5.5 mm. wide, coriaceous, 5-7-nerved, densely and long silky-villous from the base upwards on and around the inner lateral nerves, the margins and central portion of the back glabrous or nearly so; lobes very similar, rigid, tough, of equal length or the middle longest, at first erect, afterwards spreading, the middle lobe or all becoming reflexed and frequently hooked; lateral lobes subulate, finely acuminate, 5-8 mm. long, 1-2-nerved; middle lobe 6-10 mm. long, gradually tapering from a triangular base into a cylindrical stout bristle. *Palea* elliptic, acuminate, 6-7 mm. long, firmly membranous, keels densely ciliate. *Anthers* 1-2.5 mm. long, orange-yellow. *Caryopsis*

NORTHERN AUSTRALIA: Sturt's Creek and Hooker's Creek,
Mueller!

NEW SOUTH WALES: between Darling River and Cooper's Creek, *Neilson*!

2. *Astrebla pectinata* (Lindl.) F. Muell.
Danthonia pectinata Lindl. in Mitch. Three Exped. Austral. ii.
 26 (1838). F. Muell. Fragm. Phytogr. Austral. viii. 134 (1873),
 x. 76 (1876). This species was based on specimens collected by
 Mitchell in New South Wales near Condobolin, on April 6th, 1836.
 The type specimen is in the herbarium of the Cambridge Botanical
 Museum and consists of two pieces. On the same sheet are three
 fragments of the same species collected by Mitchell on his 1846
 expedition, labelled "Victoria R." This is the species which is
 now called *Astrebla pectinata* F. Muell.

Astrebla pectinata var. *pectinata* F. M. Bailey in Queensl. Dept. Agric. Bot. Bull. xiii. 15 (1896); Queensl. Fl. vi. 1897 (1902). A specimen in the Kew Herbarium communicated by F. M. Bailey, bearing the above name and a printed description is typical *A. pectinata* F. Muell.

A densely tufted *perennial*. Culms erect from a short rhizome clothed with short firm cataphylls, 40-90 cm. high, slender, more or

less compressed below, terete above, simple or branched, 6-8- or more-noded, glabrous and smooth. *Leaf-sheaths* tight, finely striate, all glabrous and smooth or bearded at the mouth; ligules reduced to densely ciliate rims up to 1 mm. long; blades linear, from a narrow or slightly rounded base long and setaceous acute, 7-25 cm. long, 3-6 mm. wide, erect or spreading, flat, firm, glaucous, loosely and sparsely hairy above from tubercles to entirely glabrous, margins scaberulous. *Spike-like* racemes solitary, rarely paired, erect, compressed, 4-13 cm. long, 1.2-2 cm. wide, dense, straw-coloured; rhachis striate on the back, scaberulous; pedicels stout, adpressed, 0.5-2 mm. long, rarely almost obsolete. Spikelets oblong, becoming cuneate, densely imbricate, usually 10-17 mm. long, by 4-8 mm. wide, laterally compressed. *Lower glume* lanceolate to ovate, acute, sometimes mucronate, rarely obtuse, 7-14 mm. long, 5-9-nerved, chartaceous with scarious margins; upper glume ovate-lanceolate to ovate or elliptic, acute, mucronate, rarely obtuse, 8-13 mm. long, closely 7-16-nerved, chartaceous with scarious margins. *Florets* 4-7, the upper reduced and barren. *Lowest lemma* 12-17 mm. long, oblong when flattened, the entire portion 3-5 mm. long by 3-4 mm. wide, coriaceous and densely villous all over, 3-nerved; lateral lobes lanceolate to lanceolate-oblong, acute, 7-12 mm. long, 1-1.75 mm. wide, 3-5-nerved with the nerves towards the inner margin, outer margin broadly scarious; middle lobe tapering from a cuneate base into a bristle up to 12 mm. long; *upper lemmas* with shorter lobes, the uppermost reduced to the entire portion. *Paleas* ovate, acuminate, 4-6 mm. long, chartaceous, keels densely ciliate.

QUEENSLAND: between Cloncurry and Camooweal, McKinlay Ranges and Buckley River, June-Dec. 1889, *Burton*! Blackall, *Ranking*! Longreach, April 1913, *Bick*! Hermitage, State farm, near Warwick, *Liverseed*!

NEW SOUTH WALES: Belfield station, near Armidale, June 1922, *Helms*! Mt. Murchison, *Dallachy*! *Hance* 18555! (Herb. Mus. Brit.); near Condobolin, April 6th, 1836, *Mitchell* 60! (type of *Danthonia pectinata* Lindl.); Plains on the Bogan, August 15th, *Mitchell* 27! (Herb. Mus. Brit.); near Lachlan River, June 23rd, 1817, *Cunningham* 69! (Herb. Mus. Brit.); Strangford Plains, *Fraser*! (Herb. Mus. Brit., probably collected at the time same as *Cunningham* 69 on Oxley's Expedition); Murrumbidgee River, *Mueller*! (Herb. Mus. Brit.). Darling River, *Mueller*!

SOUTH AUSTRALIA: Vicinity of Lake Eyre, *Andrews* 19! 32! 33! 37! 204! Mt. Lyndhurst, March 1898, *Koch* 1!

WESTERN AUSTRALIA: Sturt's Creek, *Mueller*! Mulyie Station, Roebourne, March 1899, *Morrison*!

The leaves of this species are usually minutely tuberculate on the upper surface and margins and this character may aid in distinguishing sterile specimens of it from *A. squarrosa*. One of the specimens collected by Andrews (no. 32) near Lake Eyre was written

up by Bentham as *A. triticoides* var. *lappacea* and is apparently the specimen referred to by him from Lake Eyre, under that variety in the Flora Australiensis; it is, however, quite typical *A. pectinata*. This species shows very little variation in regard to the lobation of the lemmas and is easily distinguished from the other species on account of the prominent, papery and shining lobes.

3. *Astrebla lappacea* (Lindl.) Domin.

Danthonia lappacea Lindl. in Mitch. Three Exped. Austral. i. 313 (1838). F. Muell. Fragm. Phytogr. Austral. viii. 134 (1873); x. 76 (1876). This species was based on specimens collected by Mitchell in New South Wales near Bourke, on August 15th, 1836. Lindley's type specimen is in the herbarium of the Cambridge Botanical Museum and consists of two pieces, which are rather poorly developed, while several of the spikelets have already shed their florets. The specimens are identical with those of the species which has been known by most authors from Bentham onwards, as *Astrebla triticoides* F. Muell. They are quite different from the specimens and figures quoted by Bentham and Domin under *Astrebla triticoides* var. *lappacea* and *A. lappacea* respectively, which are referable to *A. squarrosa*.

Danthonia triticoides Lindl. in Mitch. Journ. Exped. Trop. Austral. 365 (1848). F. Muell. Fragm. Phytogr. Austral. viii. 134 (1873), x. 76 (1876). This species was based on specimens collected by Mitchell in Queensland, in the neighbourhood of Mitchell, on October 21st, 1846. The type specimen is in the Cambridge Botanical Museum Herbarium. It consists of three well developed pieces, which are identical with those which were described by F. Muell. ex Bentham in the Flora Australiensis as *Astrebla triticoides* and accepted as such by most later authors. They are, however, conspecific with the type specimens of *Danthonia lappacea* Lindl. and the name *Astrebla lappacea* (Lindl.) Domin must replace *Astrebla triticoides* (Lindl.) F. Muell., as it is based on the older of the two names proposed by Lindley.

Astrebla triticoides (Lindl.) F. Muell. ex Benth. Fl. Austral. vii. 602 (1878). F. Muell. First Census Austral. Pl. 134 (1882); Second Census, 225 (1889). F. M. Bailey, Syn. Queensl. Fl. 660 (1883)?; Cat. Queensl. Pl. 57 (1890)? Woolls. Pl. N.S.W. 103 (1885). Turner, Grasses N.S.W. frontisp., 8 (1890); Austral. Grasses, 13, f. (1895); in Agric. Gaz. N.S.W. i. 312, f. (1890); ii. 646, t. lix (1891). Tate, Handb. Fl. Extratr. S. Austral. 196, 269 (1890). Moore, Handb. Fl. N.S.W. 490 (1893). Maiden, Usef. Nat. Pl. Austral. 78 (1889); Man. Grasses N.S.W. 144 (1898). Peacock, in Agric. Gaz. N.S.W. xiv. 580 (1903). Maiden and Betche, Census N.S.W. Pl. 23 (1916) excl. syn. Domin in Biblioth. Bot. lxxxv. 374, f. 87 (1915). Black, Fl. South Austral. 83, 84 (1922). Breakwell, Grasses and Fodder Pl. N.S.W. 237, f. 118, no. 2 (1923). *Astrebla triticoides* var. *lappacea* (Lindl.) Benth. Fl. Austral. vii. 603 (1878) excl. specim. et descr.

Astrebla pectinata Breakwell, Grasses and Fodder Pl. N.S.W. 237, f. 118, no. 3 (1923) non F. Muell.

Astrebla pectinata var. *curvifolia* F. M. Bailey in Queensl. Dept. Agric. Bot. Bull. xiii. 15 (1896); Queensl. Fl. vi. 1897, t. lxxxii (1902); Conpreh. Cat. Queensl. Pl. 628 (1913). There is a specimen in the Kew Herbarium, communicated by F. M. Bailey bearing the above name and a printed description. This is typical *Astrebla lappacea* (Lindl.) Domin.

Astrebla lappacea (Lindl.) Domin in Biblioth. Bot. lxxxv. 372 (1915) excl. ic. et specim. This is based on *Danthonia lappacea* Lindl.

A densely tufted *perennial*. Culms erect or geniculately ascending, eventually spreading, 30–80 cm. or more high, slender, compressed, usually branched, several-noded, glabrous and smooth. *Leaf-sheaths* tight, glabrous and smooth or hispid and tuberculate upwards; ligules reduced to densely ciliate rims up to 0.75 mm. long; blades linear, from a narrow or slightly rounded base long and finely acute, 8–30 cm. long, 4–5 mm. wide, flat, firm, glaucous, glabrous, usually tuberculate and scaberulous. *Spike-like racemes* solitary, or paired, slender to stout, straight, flexuous or curved, 5–30 cm. long, 5–13 mm. wide; rhachis 0.8–1.5 mm. wide, finely striate on the back, scaberulous; pedicels up to 0.8 mm. long. *Spikelets* very loosely to somewhat densely imbricate or distant in the lower part of the raceme, oblong or elliptic-oblong, becoming wedge-shaped, 7–13 mm. long (excl. awns), 2.5–5 mm. wide. *Lower glume* linear-lanceolate to ovate, acuminate and sometimes mucronate, 4.5–10 mm. long, 1–5 (rarely 7)-nerved, thinly chartaceous with scarious margins; upper glume ovate-elliptic to broadly elliptic, acuminate and sometimes mucronate, 7–13 mm. long, 7–13-nerved, chartaceous with scarious margins. *Florets* 4–6, the uppermost much reduced. *Lowest lemma* oblong when flattened, 8–13 mm. long, 3–5-nerved, shortly and densely villous all over the entire portion, the latter 2.5–4 mm. long by 3–4 mm. wide, firmly coriaceous; lateral lobes semi-lanceolate to semi-ovate, finely acute, 4–9.5 mm. long, 1–1.75 mm. wide, 3–4-nerved, firmly chartaceous to coriaceous with scarious margins; middle lobe tapering from a cuneate base into a rigid unhooked bristle 4–14 mm. long. *Palea* ovate, acuminate, 5 mm. long, chartaceous, keels densely ciliate.

QUEENSLAND: Townsville, 1908, *Weston*! Hughenden, June 1919, *Hawthorn*! Jondaryon, near Toowoomba, March 1916, *Mackenzie*! Muttaborra, north of Longreach, April 1919, *White*! Longreach, April 1913, *Bick*! Darr River, near Longreach, *Dallachy*! Peak Downs, near Clermont, *Burkell*! Bungeworgorai, between Roma and Mitchell, March 1914, *Soutter*! Currawillinghi, Belmore County, *Looker*! Near Mitchell, Oct. 21st 1846, *Mitchell*, 573! (type of *Danthonia triticoides* Lindl.); Boulia, *Bailey*! (Herb. Mus. Brit.).

NEW SOUTH WALES: near Bourke, August 15th, 1836, *Mitchell* 15! 27! (type of *Danthonia lappacea* Lindl.), both numbers are on the same label.

SOUTH AUSTRALIA: Mt. Lyndhurst, *Koch* 124! and without number!

WESTERN AUSTRALIA: between Gascoyne and Fortescue Rivers, *Mueller*! (Herb. Mus. Brit.).

A rather variable species which requires further study in the field in order to separate out the different forms. It varies in the size and habit of the racemes, in the density and size of the spikelets and in the length of the lobes and middle bristle of the lemmas. Like the preceding species, the upper surface and margins of the leaves are usually minutely tuberculate.

4. *Astrebla elymoides* F. Muell.

Astrebla elymoides F. Muell. ex F. M. Bailey, Illustr. Monogr. Grasses Queensl. t. 8 (1879). F. M. Bailey, Syn. Queensl. Fl. 660 (1883); Cat. Queensl. Pl. 57 (1890). Maiden, Usef. Nat. Pl. Austral. 77 (1889). Moore, Handb. Fl. N.S.W. 490 (1893). Turner, Grasses of N.S.W. 7 (1890); in Agric. Gaz. N.S.W. i. 310, f. (1890), ii. 647, t. lx. (1891); in Proc. Linn. Soc. N.S.W. xxviii. 441 (1903); xxix. 179 (1904); xxx. 88 (1905). Peacock in Agric. Gaz. N.S.W. xiv. 580 (1903). Domin in Biblioth. Bot. lxxxv. 376, f. 88 (1915). Maiden and Betche, Census N.S.W. Pl. 23 (1916). Ewart and Davies, Fl. North. Territ. 46, 365, t. v. (1917). Breakwell, Grasses and Fodder Pl. N.S.W. 238, f. 117 (left), f. 118, no. 4 (1923). I have been unable to find an earlier description and have accepted F. M. Bailey's description as the first valid publication of the species.

Astrebla pectinata var. *elymoides* F. M. Bailey in Queensl. Dept. Agric. Bot. Bull. xiii. 15 (1896); Queensl. Fl. vi. 1897, t. lxxxiii. (1902); Conpreh. Cat. Queensl. Pl. 628 (1913); Maiden, Man. Grasses New South Wales, 144 (1898).

Danthonia elymoides F. Muell. ex F. M. Bailey, Illustr. Monogr. Grasses Queensl. t. 8 (1879).

A tufted leafy *perennial grass* up to 80 cm. or more high. Culms erect or geniculately ascending from a decumbent base, eventually spreading and drooping, slender, weak, more or less compressed, simple or more often branched, up to 5-noded, glaucous, glabrous and very smooth right up to the inflorescence. *Leaf-sheaths* firm, more or less keeled, glaucous, glabrous and smooth; ligules reduced to very shortly ciliate rims; blades linear, from a slightly narrowed to contracted base tapering to a long fine point, up to 20 cm. or more long, by 3–5.5 mm. wide, flat or rolled when dry, firm, erect or spreading, glabrous, usually rough above and on the margins. *Spike-like racemes* solitary, very slender, straight or curved, 12–35 cm. long, up to 0.3 cm. wide, eventually becoming long exserted from the uppermost leaf-sheath; rhachis up to 1.5 mm. wide, smooth or minutely scaberulous and finely striate on the slightly rounded back; pedicels reduced to short stout stumps up to 1 mm.

long. *Spikelets* distant by more than their own length in lower part of racemes, becoming loosely imbricate upwards, lanceolate to linear-oblong, 10–20 cm. long, 2–3 mm. wide, terete or slightly laterally compressed. *Lower glume* linear to lanceolate, 4.5–12 mm. long, 1-nerved; upper glume lanceolate to oblong-lanceolate, 11–17 mm. long, 7–11 nerved. *Florets* 2–4, the lower 1–2 perfect, the upper reduced. *Lowest lemma* with the entire portion 6–7 mm. long by 2–3 mm. wide, very shortly villous at the base; lateral lobes tough, rigid, linear, 1–9 mm. long by up to 0.5 mm. wide; middle lobe tapering into a slender rigid bristle 5–15 mm. long. *Palea* lanceolate, up to 7 mm. long, keels shortly ciliate. *Caryopsis* oblong, very obtuse, 4–6 mm. long.

NORTHERN AUSTRALIA: Upper Victoria River, Jan. 1856, Mueller!

QUEENSLAND: Hughenden, June 1919, Hamilton! Blackall, Ranking! Darr River, near Longreach, Burgh-Birch! Muttaborra, White! Iffley Station, Gulliver! Boulia, Bailey! (Herb. Mus. Brit.).

NEW SOUTH WALES: Murrumbidgee River, Mueller! (Herb. Mus. Brit.).

WESTERN AUSTRALIA: East Kimberley, 1901, Connor!

This species, as in the case of *A. lappacea* Domin, requires further study in the field. There are three distinct forms which may possibly be due to differences in habitat, etc.

I. Represented by a specimen sent out by F. M. Bailey with a printed description of *A. pectinata* var. *elymoides*; it is unlocalized and is not enumerated above. It is the only specimen seen which has a rough, striate rhachis; the spikelets are also above the average size and the middle lobe of the lemma is short.

II. Specimens collected by White at Muttaborra and at Iffley Station by Gulliver have spikelets much above the average size; the lobes of the lemma are longer, the lateral lobes ranging from 6–9 mm. long and the middle lobe and bristle from 13–15 mm.

III. The remainder of the specimens listed above fall into this group and may be considered typical of the species. They have the spikelets averaging 11–13 mm. in length; lower glume about 6.5 mm. long; upper glume 13–14.5 mm. long; lowest lemma 10–14 mm. long, with the lateral lobes 2–4 mm. long and the middle bristle 4–6 mm. long.

XXXIX.—A NEW SPECIES OF LILAEOPSIS FROM NEW ZEALAND. ARTHUR W. HILL.

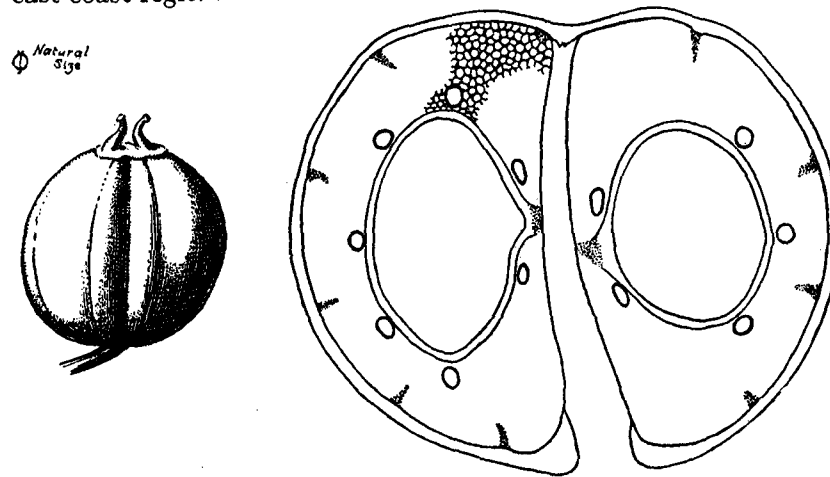
In my paper on the genus *Lilaeopsis* (Linn. Soc. Journ. xlvii, 1927, p. 551) I doubtfully referred a specimen collected near Auckland by Cheeseman, to *L. lacustris*. When in New Zealand in January and February last, I had the pleasure of meeting Mr. H. Guthrie Smith of Tutira, Hawke's Bay, who in his interesting book "Tutira—The story of a New Zealand Sheep Station",—dealing

with the changes in the vegetation which have taken place on his Sheep Station due to the introduction of sheep, weeds, etc., during the past forty years, records the occurrence of *Lilaeopsis* (*Crantzia*) in one or two localities on his estate.

He has now kindly sent a set of specimens in flower and fruit to Kew which prove to be identical with Cheeseman's imperfect specimen, preserved at Edinburgh, and they represent a new species.

The Tutira *Lilaeopsis* is distinct from all others in the smooth rounded orbicular fruits, which are about as broad as they are long without any distinct ribs, the fruit wall being composed of a broad band of parenchymatous cells with an almost complete absence of sclerous tissue.

The genus is of common occurrence in New Zealand and specimens were found near the Franz Joseph Glacier, South Island, and on the shores of Lake Rotorua, North Island, forming almost a turf-like mat, but in neither case did they belong to the species from the east coast region.



Lilaeopsis orbicularis A. W. Hill.

Lilaeopsis orbicularis A. W. Hill, sp. nov.; species fructibus orbicularibus sine costis conspicuis distincta.

Rhizoma repens. *Folia* 2.5–7 cm. longa, 0.5–1 mm. lata, attenuata vel folia breviora paullo spathulata, septis numerosis. *Umbella* 2–5-flora; pedunculi breves; pedicelli 0.75–1 cm. longi, fructu maturo curvati; bractee involucri 1–2 mm. longae, ovoideae. *Fructus* orbicularis, 2–2.5 mm. longus, 2.25–2.5 mm. latus, costis rotundatis inconspicuis in sectione transversali, pericarpio magnis e cellulis parenchymatis sine cellulis scleroticis composito; vittae 5–7, quarum 2 commissurales.

NEW ZEALAND. North Island: Hawke's Bay; Tutira, Guthrie Smith (March 1928) in Herb. Kew (type); Auckland, Cheeseman (Dec. 1878) in Herb. Edin.

XL.—THE GENERIC NAMES MICONIA AND MYCONIA.
T. A. SPRAGUE.

The fact that the three generic names *Myconia* Neck. (1790, Compositae), *Miconia* Ruiz et Pav. (1794, Melastomaceae) and *Myconia* Lapeyr. (1813, Gesneriaceae) were given in honour of the same botanist, Francisco Micó of Vich in Catalonia, appears to have been generally overlooked.

Necker (Elem. i. 22) founded a new genus *Myconia* on "Quaed. Chrysanth. Linn." i.e. on *Chrysanthemum Myconis* L. Sp. Pl. ed. 2, 1254, which itself was based on *Chrysanthemum Miconi* (*Myconi*) Dalech. Hist. i. 873 (1587); this was one of over twenty Spanish species of which specimens, descriptions and figures were sent by Micó to Dalechamps, who included them in his 'Historia.' Micó's name was usually latinized by Dalechamps as "Myconus" but in at least five instances it appeared as "Myconius" (pp. 577, 656, 672, 736, 786).

Ruiz et Pavon (Prodr. 60) dedicated their genus *Miconia* as follows: "Genus nuncupatum D[omino] . . . Micon, Barcinonensi Medico egregio, et Botanico haud ignobili, ut patet ex Jacobi Dalechampii Historia plantarum Lugdunensi, ad quem earum figuras descriptiones et virum a se exploratorum notitiam mittebat."

Lapeyrouse (Hist. Pl. Pyren. i. 115) based his new genus *Myconia* on *Verbascum Myconi* L. Sp. 179, which is *Auricula ursi Myconi* Dalech. Hist. i. 837, another of the species sent by Micó to Dalechamps, and now known as *Ramondia Myconi* Reichb. Lapeyrouse quoted the following passage from Tournefort in explanation of the generic name "In ipso (Monteserrato) nascuntur rariores plantae. . . . Quamplures ex his descripsit olim Franciscus Myconus, medicus Ausoniensis (de Vic), qui Barcinone degebat ante plures annos; quas hodie plane ignoraremus, nisi ad Jacobum Dalechampium egregius ille vir eas perhumane misisset".

Colmeiro (Bot. Penins. Hesp.-Lusit. 213) listed the two names *Miconia* Ruiz et Pav. and *Myconia* Lapeyr. as having been dedicated to Francisco Micó, but overlooked *Myconia* Neck. His account (l.c. 155) of Micó may be translated as follows: "MICÓ (FRANCISCO). A physician and botanist, who was born at Vich in 1528 and studied pharmacy as well as medicine at Salamanca. He botanized in both Old and New Castile and in Extremadura, particularly in the Sierra de Guadalupe, as well as on Monserrate and other mountains of Catalonia. His excursions resulted in the discovery of various new species, of which he sent descriptions and figures to Dalechamps, in whose 'Historia generalis plantarum', published at Lyon in 1587, about thirty of them appeared, accompanied by eulogies well deserved by the botanist of Vich, who was then practising medicine at Barcelona."

At least two Spanish plants seem to have been first discovered by Micó, namely *Ramondia Myconi* (L.) Reichb. and *Thalictrum tuberosum* L. (*Oenanthe Myconi* Dalech. Hist. 785). *Chrysanthemum*

Myconis L. had been previously discovered in Italy. According to Caruel (Ill. Hort. Sicc. Caesalp. 48) it is represented in Cesalpino's herbarium (1563), and was recorded in his book, 'De Plantis', 494 (1583) in the following words: "Ad *Chrysanthemum* reduci videtur etiam apud nos quaedam in arvis folia ferens subhirsuta, in ambitu serrata, ut *Bellis maior*: caulem quoque rectum; flores aureos, specie *Chrysanthemi*."

Wittstein (Etym.-bot. Handwörterb. ed. 2, 577, 600, 601) derived *Miconia* from "D. Micon", mistaking the "D" of Dominus for the initial letter of a Christian name. He stated that *Myconia* Lapeyr. was derived from the mythical bear Mycon! This error seems to have arisen in the following way: Dalechamps figured the species now known as *Ramondia Myconi* under the name *Auricula Ursi Myconi*. This appears to have been mistranslated by Wittstein as "the ear of the bear Mycon" instead of "Micó's Bear's-Ear." The fact that *Auricula ursi Matthioli* is figured on the previous page should have prevented such an absurd blunder, as even Wittstein, who is responsible for many fantastic derivations, could hardly have mistaken the celebrated Italian botanist Mattioli for a mythical bear. Probably he did not consult Dalechamps' Historia. Under *Myconia* Neck., Wittstein states that Necker gives no derivation, though the derivation is obvious to a botanist, as soon as he finds that *Chrysanthemum Myconis* L. was the type-species.

Since *Miconia* Ruiz et Pav., *Myconia* Neck. and *Myconia* Lapeyr. were all derived from the name of the Spanish botanist Micó, latinized either as Miconius or Myconius, it seems clear that they should be regarded as mere orthographic variants of the same name. Hence under International Rules, Art. 51, 2°, only one of them can be accepted, and since *Miconia* Ruiz et Pav. is a nomen utique conservandum, the two others must be rejected.

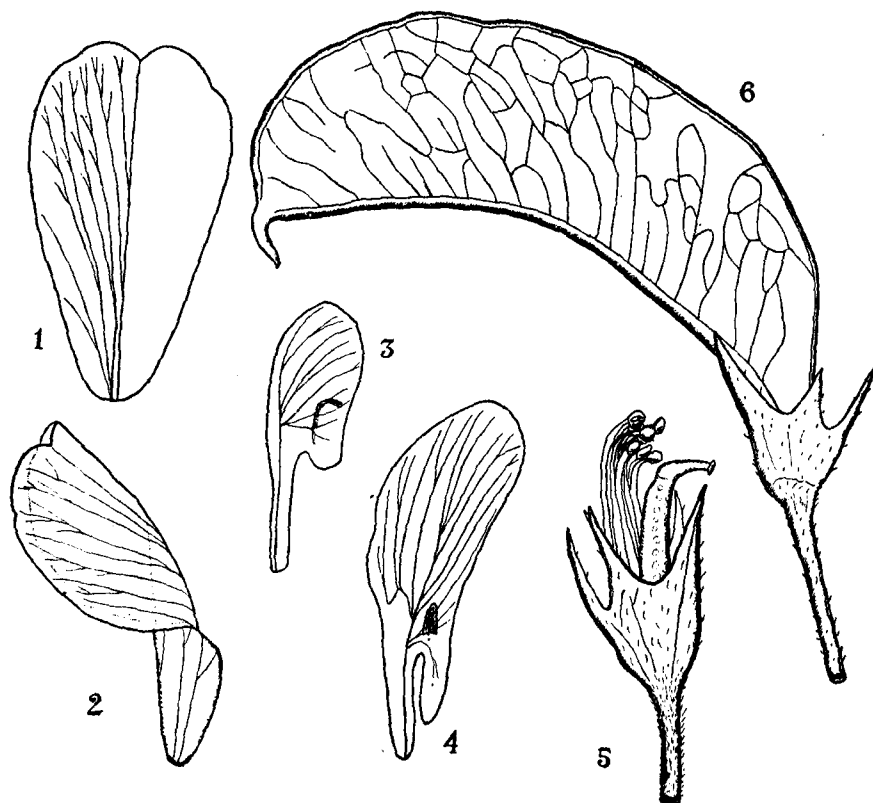
Myconia Lapeyr. is already treated as a synonym of *Ramondia* Rich. (1805), which is not invalidated by the prior homonym *Ramondia* Mirb. (1802) since the latter is itself invalid, being an absolute (i.e. nomenclatural) synonym of *Lygodium* Sw. (1801). *Myconia* Neck., however, has been accepted as a generic name by Schulz-Bipontinus (Webb et Berth. Phyt. Canar. ii. 245), and by Briquet and Cavillier (Burnat, Fl. Alp. Marit. vi. 76: 1916). The latter authors seem to have been unaware that the Spanish botanist commemorated in *Chrysanthemum Myconi* Dalech. was Micó, not Mycon. Since *Myconia* Neck. is invalid, the new name **Myconella** is here proposed for the genus typified by *Chrysanthemum Myconis* L. The type-species will now be known as **Myconella Myconis** (L.) comb. nov.

In order to avoid possible future disputes regarding the orthography of *Myconella*, it seems desirable to state that this spelling has been adopted deliberately, in order to obtain a euphonious name recalling *Myconia*. It is not intended for a diminutive of the latter, and there is therefore no justification for the addition of an "i" after the "n."

XLI.—A NEW MEDICAGO FROM CHINA. G. ŠIRJAEV.

Dr. G. Širjaev, of the Botanical Institute, Brno, Czechoslovakia, who has recently examined the material of *Medicago* and *Trigonella* in the Kew Herbarium, has forwarded the following description of a new species of *Medicago*.

***Medicago archiducis-Nicolai* Širjaev** sp. nov.; affinis *M. hybridae* Trautv. sed vexillo obovato-late-clinoideo alis subaequilongis nec obovato alis triente longiore, dentibus calycinis triangulari-lanceolatis tubo aequilongis nec linearibus tubo sesqui-duplo longioribus distincta est.



Medicago archiducis-Nicolai G. Širjaev. Fig. 1 et 2, vexillum; 3, carina; 4, ala; 5, calyx; 6, legumen. All $\times 2$.

Perennis? *Caules* tetragoni pilosiusculi. *Stipulae* superiores 7–13 mm. longae semiovatae basi sagittatae denticulatae acutae glabrae. *Folia* trifoliata petiolata, foliolis late ellipticis v. rarius late ovatis levissime denticulatis fere subintegris, apice retusis et breviter apiculatis, glabris, foliolis lateralibus 17–20 mm. longis, 13–14 mm. latis, terminali paulo majore et petiolulato (petiolulus 6–7.5 mm. longus). *Pedunculus* florifer folio duplo brevior, 1–2 cm. longus pilosus, fructifer plus minusve paulo elongatus (usque

3.5 cm. longus), folio paulo brevior. *Racemus* capitulatus 4–5 florus. *Pedicelli* 2 mm. longi pilosi, ante anthesin plus minusve stricti, florigeri fructiferique patuli; bractea lineari-subulata circiter 1 mm. longa, pedicello brevior. *Calyx* 4 mm. longus campanulatus pilosus, corolla duplo brevior, dentibus triangulari-lanceolatis tubo calycino aequilongis. *Corolla* 7–8 mm. longa, vexillo obovato-late-clinoideo emarginato alis subaequilongis, carina late ovata in parte quarta alis brevior, alis ovato-oblongis subobliquis auricula longa deorsum directa et dente conjunctivo instructis. *Ovarium* lineare apice curvatum multiovulatum, stigmate stylo latiore capitato. *Legumen* oblongo-falciforme (suturis ambobus curvatis et paulo incrassatis nec carinatis), glabrum reticulato-nervosum planum obtusum v. acutiusculum (?), 2–3-spermum, 13 mm. longum, 4 mm. latum; semen. . . .

ASIA MEDIO-ORIENTALIS. Kansu et Tibet bor.-or., (? 1921), Frank D. Learner (typus! Herb. Kew.; pars plantae tantum superior 12.5 cm. longa florifera fructiferaque asservatur).

A satis affini *M. platycarpus* Ledeb. nostra species foliolis margine fere integris nec acute denticulatis, vexillo obovato-late-clinoideo nec oblongo-elliptico et praecipue leguminibus minoribus 13 mm. longis oblongo-falciformibus suturis ambobus curvatis nec ovato-oblongis 20–22 mm. longis rectis sutura seminifera recta differt. Affinitas nostrae speciei *M. hybridae* Trautv., cui *M. archiducis-Nicolai* affinium quam praecedenti est, quae etiam ejusdem formae foliola margine subintegro et stipulas habet et in Gallia merocc. habitat, valde notabilis est. Area *M. platycarpus* Sibiria mer. (incl. Altai) et Mongolia bor. est. Sectio, ad quam *M. platycarpus*, *M. hybrida*, *M. archiducis-Nicolai* et praeterea *M. Popovii* Šir. (Turkestan) et *M. ruthenica* Ledeb. (Sibiria transbaicalica et China bor. ad Pekin [var.]) pertinent, inter sectiones gen. *Medicaginis* primigenia est et sect. *Ellipticis* Boiss. generis *Trigonellae* affinis est. De facto hae ambae sectiones inter gen. *Medicaginem* et *Trigonellam* positionem mediam occupant et alis dente cum carina conjunctis et cotyledonibus articulationis destitutis (vidi apud *M. platycarpus*!) nec articulatis (vide apud *T. Emodi* Benth!) et forma leguminis differunt. Magna disjunctio, quae aream *M. archiducis-Nicolai* (Kansu et Tibet bor. or.) ab eadem *M. hybridae* (Gallia) separat, has species ad antiquam origine tertiaria sectionem pertinere docet.—Nostra *Medicago* habitum *M. hybridae* similem, verisimiliter, habet.—Hanc speciem Celestissimo Principi Magno Nicolaj Nicolajevič dedicare mihi persolvo.

NOTA: Supra commemorata *M. Popovii* Šir. cum *Trigonella Popovii* E. Korov. identica est. Ob proximam affinitatem (alae clente cum carina conjunctae) *M. ruthenicae* Led. nec. *Trigonellae Emodi* Benth. illam ad genus *Medicaginem* refero. Ob eandem causam (corolla ejusdem typi) etiam *Trigonella pubescens* Edgew. ad genus *Medicaginem* nec *Trigonellam* pertinet (= *M. pubescens* Šir. comb. nov.).

**XLII.—DECADES KEWENSES PLANTARUM NOVARUM IN
HERBARIO HORTI REGII CONSERVATARUM. DECAS CXXI.**

1201. *Triumfetta longicornuta* Hutch. et M. B. Moss [Tiliaceae]; species distinctissima, affinis *T. macrocomae* K. Schum., sed sepalis longissime cornutis, aculeis fructuum multo brevioribus crassis rigidis differt.

Caulis pilis reflexis dense villosus. *Folia* digitate 5-partita, utrinque laxè pilosa, circiter 7 cm. longa, segmentis oblanceolatis, acute acuminatis, irregulariter et grosse dentatis, dentibus pilis numerosis indutis; petioli 2.5 cm. longi, villosi; stipulae mox deciduae, lineari-lanceolatae, 1 cm. longae, villosae. *Inflorescentia* cymosa, circiter 7 cm. diametro; bractae stipulaeformes sed minores; pedicelli usque ad 3 cm. longi. *Sepala* linearia, apice longissime cornuta, circiter 1.5 cm. longa, extra dense villosa. *Petala* oblanceolata, glabra, circiter 1 cm. longa. *Stamina* numerosa. *Discus* ciliatus. *Ovarium* 8-loculare. *Fructus* depresso-globosus, 2.5 cm. diametro, sublignosus, aculeis brevibus numerosissimis circiter 2 mm. longis dense pilosis instructus. *Semina* late ovato-orbicularia, mucronata, complanata, 6 mm. diametro.

KENYA COLONY: near Fort Hall, 1400 m., W. Lyne Watt 1165.

1202. *Pelargonium hemicyclum* Hutch. et C. A. Smith [Geraniaceae]; affinis *P. Meyeri* Harv., sed foliis basi rotundatis, bracteis minoribus, pedunculorum pilis glanduloso-capitatis (haud setosis), floribus atropurpureis emaculatis differt.

Herba acaulis, usque ad 12 cm. alta. *Tuber* parvus, circiter 2 cm. diametro, squamis brunneis membranaceis obiectus. *Folia* radicalia petiolata, elliptica, apice subobtusata, basi inaequaliter rotundata, 2-4.5 cm. longa, usque ad 2.5 cm. lata, supra glabra, infra et margine pilis curvatis setuloso-pilosa, petioli usque ad 2.5 cm. longi, superne teretes, setoso-pilosi, basin planum versus stipulis adnatis setiformibus instructi. *Pedunculi* erecti, pilis brevibus glanduloso-capitatis et longioribus eglandulosis dense induti. *Umbellae* 6-10-florae; bractae subulato-lanceolatae, 3 mm. longae, pubescentes, apicem versus setosae; pedicelli usque ad 1.5 cm. longi, glanduloso-pubescentes; calcar pedicello aequilongum. *Sepala* anguste oblongo-linearia, 7 mm. longa, rubro-striata, extra glanduloso-pubescentia, margine pallidiora, apicem versus pilis longis eglandulosis ornata. *Petala* superne atropurpurea, sepalis duplo longiora, duo adaxialia erecta oblongo-lanceolata emaculata unguiculata, nervo rubro. *Stamina* filamentis rubro-tinctis.

SOUTH AFRICA: Cape Region. Described from a living specimen at Kew, the tuber collected by Mr. Ingram.

1203. *Scutia buxifolia* Hutch. et M. B. Moss [Rhamnaceae]; species foliis parvis obovato-ellipticis vix nervosis mucronatis vel interdum etiam emarginatis a *S. indica* Brogn. facile distinguenda.

Arbor frutescens usque ad 5 m. alta; ramuli biennes circiter 4 mm. crassi, cortice pallide brunneo obiecti, hornotini angulares, minute puberuli, aculeis brevibus leviter recurvatis armati. *Folia* obovato-elliptica, apice mucronata et interdum etiam emarginata, basi late cuneata vel rotundata, 1.5-3 cm. longa, 1-2.5 cm. lata, integra, coriacea, glabra, supra leviter nitida, vix nervosa; petioli 3-4 mm. longi, glabri. *Flores* virides, brevissime cymosi, axillares; pedicelli crassi, fructiferi vix 2 mm. longi. *Alabastra* late ovoidea, mucronata, minute puberula. *Calycis* lobi triangulares, acuti, 1 mm. longi. *Petala* minuta. *Ovarium* glabrum, stylo brevissimo minute bilobato coronatum. *Fructus* subglobosus, circiter 6 mm. diametro, calycis basi incrassata cinctus.

KENYA COLONY: Laikipia, 2300 m., in open forest and grassland, H. M. Gardner 1477 (type); Coles Mill, Fries 1013. Vernacular name *Mutandambogo*.

1204. *Begonia lushaiensis* Fischer [Begoniaceae]; ab affini *B. modestiflora* Kurz foliis pilosioribus stipulis majoribus florum multo majorum perianthii segmentis exterioribus setosis distinguenda.

Herba erecta, caulescens. *Caulis* sparse puberulus, interdum angulatus flexuosus, saepe supra angulatus sulcatusque siccitate. *Folia* alterna, interdum summa opposita, ovata, acuminata vel caudata, basi maxime inaequalia, truncata, emarginata vel cordata, margine sinuato-dentato vel dentibus magnis denticulatis instructo, dentibus mucronulatis, nervis palmatis latere costae altero 2-4, altero 2-3, venulis inconspicuis, supra et subter ad nervos tenuiter pilosa, 5-13 cm. longa, 3-6.5 cm. lata; petioli graciles, tenuiter pilosi vel glabrescentes, 1-8 cm. longi. *Stipulae* lanceolatae vel lineari-lanceolatae, glabrae, marginibus setosae, 0.9-1.3 cm. longae. *Cymae* axillares et terminales hae floribus racemose dispositis; rhachis siccate angulata sulcataque, sparse crispato-pilosa, 0.5-2 cm. longa; bractae tenues, albescentes, oblongae, venosae, extus crispato-pilosae, 0.9-1.2 cm. longae, marginibus apiceque profunde setoso-incisis. *Flores* clari carnosius; bracteolae hyalinae, anguste lanceolatae, glabrae, setose dentatae. *Flores* ♂ in cymis vel terminalibus vel axillaribus superioribus dispositi; pedicelli graciles, usque ad 1 cm. longi; perianthii segmenta 2 exteriora suborbicularia vel subcordata, apice rotundata vel subacuta, 1 cm. longa, extus medio setosa, segmenta 2 interiora lanceolata vel lineari-lanceolata, acuta, 5 mm. longa; stamina 18-20, subtus brevissime connata, inaequalia, usque ad 4 mm. longa; antherae oblongae; connectivum truncatum, non productum. *Flores* ♀ in cymis axillaribus infra ♂ dispositi; pedicelli graciles, usque ad 1.5 cm. longi; perianthii segmenta 5, extremum suborbiculare, rotundatum vel subacutum, 1-1.3 cm. longum, glabrum vel ad costam leviter setosum, segmentum intimum lanceolatum, acutum, 5 mm. longum, tria alia intermedia. *Ovarium* elliptico-oblongum, 5-6 mm. longum, 3-loculare, 3-alatum, glabrum; styli 3, infra connati minute

papilloso; stigmata lunata, pubescentia. *Capsula* alis inclusis obpyramidalis usque ad 1.5 cm. longa, 3-locularis, faciebus medianis lineatis; alae 3, 2 circiter apice 5 mm. latae, angulis exterioribus subacutis, tertia usque ad 2 cm. lata angula exteriora acuta; placentae bifidae.

INDIA. Lushai Hills, Sialsuk, 1,300 m., July, Mrs. N. E. Parry 39. Vernacular name: *Seikhupthur Ata*.

1205. **Mussaenda Parryorum** Fischer [Rubiaceae]; ab affini *M. pubescente* Ait. foliis amplioribus, nervis numerosioribus aequalius dispositis magis pubescentibus, inflorescentia maiore diffusiore floribus majoribus, corollae segmentis latioribus, bacca brunneo-pubescente distinguenda.

Frutex scandens; rami teretes, brunnei, appresse fulvo-pubescentes praesertim ad nodos, plus minusve lenticellati; ramuli novissimi subtomentosi, elenticellati. *Folia* opposita, aequalia, elliptica, acuminata, basi sensim attenuata, 7.5-17 cm. longa, 3.5-7 cm. lata; nervi primarii utrinque 7-9, supra perspicui, subtus subprominentes, regulares, reticulationes ultimae minutae; folia novissima subtomentosa, matura supra costa nervisque primariis appresse brunneo-pubescentia, nervis secundariis reticulationibusque pilis brunneis sparsis instructis, subtus costa nervisque primariis et reticulationibus novissimis villis mollibus albis indutis; petioli 0.3-1.5 cm. longi, appresse brunneo-pubescentes. *Stipulae* triangulari-lanceolatae, acuminatae, apice saepe bifidae, 4-5 mm. longae, appresse fulvo-pubescentes, caducae. *Cymae* sessiles, diffusae; rami tenuiter griseo-tomentosi; bracteae ad furcas 2, bracteolae 3, lineari-ensiformes, pubescentes, 4-8 mm. longae. *Pedicelli* breves. *Calyx* 3-4 mm. longus; tubus brevissimus; lobi 5, rarissime 6, lineari-ensiformes, brunneo-pubescentes, caduci; lobus florum nonnullorum foliaceus, albus viridi-reticulatus siccitate, ellipticus, acutus vel acuminatus, usque ad 8 cm. longus et 4 cm. latus, basi 7-nervis, in petiolum longum gracilem hirsutum constrictus, nervis venulisque tenuiter pubescens. *Corolla* 2.5 cm. longa; gemma clavata, acuta; tubus anguste cylindricus, supra vix inflatus, extus pilis viridi-griseis substrigosus, basi intus glaber, sursum villis gradatim crebrioribus planis luteis os claudentibus indutus; lobi 5, patentes, suborbiculares vel reniformes, cuspidati, 2 mm. longi, intus papillis claro-luteis (siccitate citro-brunneis) vestiti. *Stamina* 5, supra basin circiter 0.8 cm. affixa; filamenta breviter; antherae lineares, 5 mm. longae. *Ovarium* turbinatum, 3-4 mm. longum, hirsutum; stylus filiformis, supra dilatatus; stigmata 2, plana, ad corollae os attingens. *Bacca* subglobosa, 8 mm. longa, siccitate nigra, tenuiter brunneo-pubescentia.

INDIA. Assam, at N. Vanlaphai in the Lushai Hills, 1500 m., Oct., Mrs. N. E. Parry 359 (type).

I consider a specimen in the Kew Herbarium, collected by Dr. A. Henry 8270 at Hainan in China in 1889, to be this species.

1206. **Mussaenda pentasemia** Fischer [Rubiaceae]; ab omnibus ceteris speciebus calycis segmentis cunctis 5 in appendices filiformes evolutis recedit.

Frutex vagans, 2-3 m. altus; ramuli teretes, brunnei, pilosi; ramuli novissimi obtuse triangulares, dense ochraceo-villosi. *Folia* opposita, per paria subaequalia disposita, elliptica vel late ovata, acuta vel acuminata, subundulata, basi frequenter attenuata et plus minusve decurrentia raro rotundata, 7-15 cm. longa, 3.5-8 cm. lata, supra tenuiter pilosa, subtus ad costas nervos reticulationesque appresse pilosa, ad dimidiam inferiorem densius pilosa; costa subtus prominens; nervi primarii utrinque 9-12; nervi secundarii transversarii; reticulationes tenues; petioli 0.5-2 cm. longi, primum dense villosi, demum sparse pilosi. *Stipulae* late vel anguste ovatae, 5-10 mm. longae, subacutae, apice saepe bifidae, dense brunneo-villosae. *Cymae* terminales, bracteatae, 3-5 cm. longae; rhachis ramulique villosi; bracteae usque ad 1.5 cm. longae, lanceolato-caudatae vel trifidae, segmentum medium lineari-lanceolatum, lateralia multo breviora, linearia, omnia caudata, setosa. *Flores* subsessiles. *Calycis* tubus nullus; lobi 5, albi, elliptico-lanceolati, acuminati, basi attenuati, unguicula inclusa 4-6 cm. longi, 1-1.5 cm. lati, demum elliptico-oblongi vel suborbiculares, cuspidati, usque ad 12 cm. longi (unguicula setosa 2-3.5 cm. longa inclusa) et 6.5 cm. lata, primum utrinque setosi, demum glabrescentes reticulationibus plus minusve setosis exceptis; nervi ad basim 5-9, vix curvati, supra saepe furcati; reticulationes transversae. *Corollae* tubus anguste cylindricus, in dimidiam superiorem leviter ampliatus, intus et ad os dense luteo-pilosus, 2 cm. longus, brunneo-luteus; lobi 5, patentes, rotundati, 5-6 mm. longi, extra setosi, intus glabri. *Stamina* 5; antherae lineares, inclusae, ad basim partis ampliatae corollae tubae sessiles, 5 mm. longae. *Ovarium* angustissime infundibuliforme, 4-5 mm. longum, dense villosum; stylus filiformis, apice clavatus, bifidus, glaber, corollae os attingens. *Bacca* oblonga, 9-10 mm. longa, siccitate nigra, glabrescens; folia sepalaque ante tempus fructus caduca. *Semina* minuta, suborbicularia, compressa; testa nigra, foveolata.

INDIA. Assam, in the Lushai Hills at Nhatial, 925 m., Mrs. N. E. Parry 275. Vernacular name, *Vakep*. "A very handsome shrub."

1207. **Schizoglossum divaricatum** N. E. Br. [Asclepiadaceae]; affinis *S. cordifolio* E. May., sed floribus minoribus et coronae lorum appendicibus divaricatis differt.

Caulis 20-25 cm. altus, basi 1-2 mm. crassus, pubescens. *Folia* opposita, petiolo 2 mm. longo et lamina 15-25 mm. longa, 5-10 mm. lata, oblonga, subacuta vel obtusa, basi hastata, tenuiter scaberulo-puberula. *Umbellae* pedunculatae cum 5-8 floribus. *Pedunculi* 5-12 mm. longi, puberuli. *Pedicelli* 4-6 mm. longi, puberuli. *Sepala* 2 mm. longa,

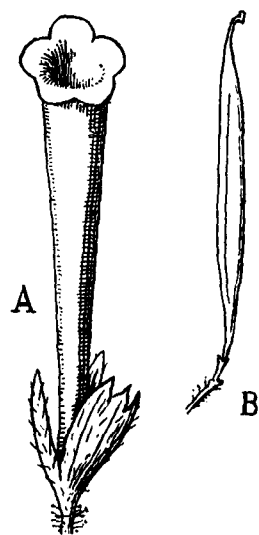
lanceolata, puberula. *Corollae* lobi 4 mm. longi, ovati, acuti, marginibus reflexis, utrinque glabri, luteo-virides. *Coronae* lobi circa 1 mm. longi subquadrati, appendicibus filiformibus duabus divaricatis fere 1 mm. longis supra staminum columnam inflexis.

TRANSVAAL. Lomati Valley, near Barberton, *Thorncroft!* sine num., in herb. Kew.

1208. ***Schizoglossum hirtiflorum*** N. E. Br. [Asclepiadaceae]; similis *S. glabrescenti* Schlechter et *S. filifolio* Schlechter, sed eis corollae lobis pilis longis statim distinguitur.

Caulis simplex, circa 45 cm. altus, gracilis, fere glaber. *Folia* opposita, erecta vel adscendentia, 17-25 mm. longa, vix 1 mm. lata, filiformi-linear, glabra. *Umbellae* sessiles, circa 6-florae. *Pedicelli* 4-8 mm. longi, puberuli. *Sepala* 2 mm. longa, anguste ovata, acuminata, puberula. *Corollae* lobi 3.5-4 mm. longi ovato-oblongi, apice oblique obtusi, extus glabri, intus longe pubescentes, flavo-virentes. *Coronae* lobi circa 1 mm. longi, subquadrati, apice truncati, luteo-albi, appendice filiformi 3 mm. longo erecto et simul valde revoluti instructi.

TRANSVAAL. Lomati Valley, near Barberton, *Thorncroft*, sine num., in Herb. Kew.



Trisepalum lineicapsa Fischer.

A. Flower $\times 3$. B. Capsule $\times 2$.

1209. ***Trisepalum lineicapsa*** Fischer [Gesneraceae]; a ceteris speciebus caulibus longioribus, corolla anguste tubulosa, capsula lineari calycem aliquoties excedente differt.

Herba humilis; rhizoma crassiusculum; caules complures, erecti, teretes, usque ad 12 cm. longi, dense ochreo-tomentosi, foliati. *Folia* opposita, anguste vel late elliptica, saepe altero latere gibbosa,

acuta vel subacuta, basi angustata, inaequilateralia, 3-9 cm. longa, 1.5-3.5 cm. lata, utrinque ochreo-tomentosa, dentata, summa interdum sessilia; nervi primarii utrinque 8-10, subtus distincti; petioli usque ad 2.5 cm. longi. *Cymae* axillares; rami 4, 2 uniflora, 2 iterum divisi; pedunculi 1.75-4.5 cm. longi, ramis pedicellisque gracilibus pilis patentibus apice glandulosis pubescentes; pedicelli usque ad 2 cm. longi; bractee ad furcas late ovatae vel suborbiculares, subobtusae, 4 mm. longae, venosae, glanduloso-pubescentes, pilis multicellularibus ciliatae, citius caducae. *Calyx* 3-partitus, 3-5 mm. longus, extra glanduloso-pubescent; segmenta 2 lineari-lanceolata acuta, tertium oblongum 3-dentatum quam cetera brevius. *Corolla* tubularis, gracilis, supra vix ampliata, glabra, 1.5-1.8 cm. longa, vinosa, bilabiata; lobi 5, rotundata. *Stamina* 2. *Staminodia* 0. *Discus* 0. *Ovarium* lineare, glabrum; stylus brevis; stigma oblique subcapitatum. *Capsula* linearis, 1.5-1.8 cm. longa, apice basique attenuata, stylo persistente aristato terminata, brunnea. *Semina* minuta, ellipsoidea, basi apiceque acuta, levia.

INDIA. Assam, Lushai Hills, Aijal, 1225 m., Sept. Mrs. N. E. Parry 79.

1210. ***Commelina Jacobi*** Fischer [Commelinaceae]; ab affini *C. benghalensi* L. foliis acutis seminibus costatis distincta.

Herba ramosa, diffusa, 3-8 dm. alta; radices fibrae dense brunneo-pilosae; caulis ramique graciles, striati, glabrescentes. *Folia* ad vaginas sessilia, ovata vel ovato-lanceolata, acuta vel acuminata, basi rotundata vel subcordata, 2.5-6 cm. longa, 0.9-3 cm. lata, glabra, ad margines crispata; nervi 7-9; vagina 1-2 cm. longa, ore minute ciliato. *Spatha* solitaria, cucullata, ovato-falcata, basi rotundata, apice acuta, 1.7-2.3 cm. longa, 0.8-1 cm. lata, extra puberula; pedunculus 1-1.7 cm. longus, sulcatus angulatusque, supra incrassatus puberulusque; pedicelli in spatha inclusi, glabri. *Sepala* 3, membranacea, 2 interiora rotundata, exterius anguste oblongum. *Petala* 3, coerulea, 2 longe unguiculata, tertium naviculare acutum. *Stamina* 3 fertilia, unum anthera magna lunata instructum. *Staminodia* 3. *Ovarium* 3-loculare; loculi laterales 2-ovulati, dorsalis 1-ovulatus. *Capsulae* quadratae, late marginatae, 5-7 mm. longae, aliae loculis binis 2-spermis, aliae loculis ternis, his ventralibus duobus 2-spermis, dorsali 1-spermo. *Semina* oblonga, leviter curvata, 3-4 mm. longa, costis transversis obtusis vel subacutis instructa, grisea.

INDIA. Agricultural College Farm, Coimbatore, 500 m., Jan. K. Cherian Jacob 15893 (type); Buddireddipatti, Salem District, December, K. Cherian Jacob 9661.

XLIII.—MARICA AND NEOMARICA. T. A. SPRAGUE.

A proposal to conserve the generic name *Marica* Ker (1803) against *Bauxia* Neck. (1790) has been submitted to the writer for preliminary examination with a view to its being eventually brought before the International Committee on general Nomenclature, provided that a prima facie case for conservation could be established. The history of the application of these names has accordingly been investigated.

A genus of Iridaceae, comprising eight species from tropical America and one from West Africa, was recognised by the late J. G. Baker in his 'Systema Iridacearum' under the name "*Marica* Ker" (Journ. Linn. Soc., Bot. xvi. 77, 149: 1877), and was accepted under that name by Klatt (Abh. Nat. Ges. Halle, xv. 374: 1882), Bentham (Benth. & Hook. f. Gen. Pl. iii. 689: 1883), Pax (Engl. & Prantl, Nat. Pflanzenfam. ii. Abt. 5, 147: 1888) and Dalla Torre & Harms (Gen. Siphonog. 8: 1900).

The name *Marica*,* however, was originally proposed by Schreber (Gen. Pl. i. 37: 1789) merely to replace the valid name *Cipura* Aubl. (1775), and was consequently invalid, being entirely superfluous (International Rules, Art. 51, 1°). *Marica* Schreber was adopted during the period 1803—1827, by John Gawler (afterwards John Bellenden Ker), in an extended sense, covering at least nine genera now recognised as distinct, but still including *M. paludosa* Schreb., the type-species alike of *Cipura* Aubl. and *Marica* Schreb. (Bot. Mag. tt. 646, 654, 655; Journ. Sc. & Arts, 1816, i. 174; Bot. Reg. sub t. 229, fol. 2, verso; Irid. Gen. 18). Gawler himself ascribed *Marica* to Schreber and remarked: "Why has Schreber changed Aublet's original name of *Cipura* for *Marica*?" (Bot. Mag. t. 646). A manuscript note by Bentham in his copy of the Botanical Magazine, vol. xviii, supplies the reason: "Because he did not like Aublet's name". There is therefore no justification for attributing "*Marica*" to Ker (Gawler).

The first author who used "*Marica*" in the sense of Baker was William Herbert (Bot. Mag. sub t. 3809: 1840), who entirely changed the original application of the name by excluding *Cipura* Aubl. (*Marica* Schreb.) and retaining *Marica* for a group of five or six species, typified by *Marica Northiana* (Schneev.) Ker-Gawl., and previously included erroneously in *Marica* Schreb. Herbert thus in reality established a new genus, and should have given it a new generic name. There was no justification either for his adoption of *Marica* for this new genus, or for his attribution of the name to Ker. The latter author had a very much wider concept of genera in Iridaceae, and when he did propose a new genus, was careful to give it a new name.

*The derivation of *Marica* is not given by Schreber, but it is probably from the nymph Marica, the fabled mother of the Latins. Wittstein's suggestion (Etym.-botan. Handwörterbuch, ed. 2, 557: 1856) that it was an abbreviated anagram of "America," because the genus is American, hardly merits serious consideration.

The question thus arises: what name should Herbert's and Baker's "*Marica*" bear under International Rules? Dalla Torre and Harms cite *Bauxia* Neck. and *Galathea* Liebm. as synonyms of it. But *Bauxia* Neck. (Elem. iii. 160: 1790) was merely a new name for *Cipura* Aubl., and should be cited as a synonym under that genus. *Galathea* Liebm. (Ind. Sem. Hort. Haun. 1855, 26: Linnaea, xxviii. 361: Walp. Ann. vi. 43) was based on *G. speciosa* Liebm., a supposed new species from Rio de Janeiro, Brazil. Klatt, however, referred it (by a *lapsus calami* as "*Galathea coerulea* Liebm.") to *Cypella caerulea* Seub. (*Marica caerulea* Ker-Gawl.), which is a typical "*Marica*" in the sense of Herbert and Baker.

Unfortunately, the name *Galathea* Liebm. is not available for this genus. It is antedated by *Galatea* Salisb. (1812), *Galatea* Cass. (1818), and *Galatea* Herb. (1820). Salisbury's *Galatea* is invalid because it was published without a generic description, and it is furthermore an absolute (i.e. nomenclatural) synonym of the conserved name *Eleutherine* Herb. (International Rules, ed. 2, 83). *Galatea* Herb. is invalid, being an absolute synonym of another conserved name, *Nerine* Herb. (l.c. 82), though it was not included among the nomina rejicienda.

Galatea Cass., however, is apparently a valid generic name. It was published with a generic description. Cassini actually called *Galatea* a subgenus, but he treated it as a genus, making binary combinations under it for all its component species. He afterwards changed the name to *Galatella* Cass. on account of *Galatea* having been previously used in Zoology. Lessing (Syn. Gen. Comp. 187: 1832) accepted *Galatea* Cass. as a genus, and Nees (Gen. & Sp. Ast. 158: 1832) and De Candolle (DC. Prodr. v. 254: 1836) also gave the group generic rank, as *Galatella* Cass. The fact that it is now treated as a section of *Aster* is immaterial as regards its nomenclatural validity.

The names *Galatea* and *Galathea* are mere orthographic variants, as is indicated by the fact that Steudel (Nomencl. ed. 2, i. 654) employed the latter spelling for *Galatea* Salisb. and *Galatea* Herb. Hence since *Galatea* Cass. (1818) is a valid name, *Galathea* Liebm. (1855) is invalid. The genus called "*Marica*" by Herbert and Baker is thus without a name. It is undesirable in the writer's opinion to conserve "*Marica* Herb.", as that was an unjustifiable transference of the name of one genus to another that had been confused with it. Hence the new name *Neomarica* is now proposed for the genus, generally, but erroneously, known nowadays as "*Marica* Ker." The synonymy of *Cipura* (*Marica*) and *Neomarica* is given below.

Cipura Aubl. Hist. Pl. Guiane Franç. i. 38 t. 13 (1775); Benth. & Hook. f. Gen. Pl. iii. 694; Engl. & Prantl, Nat. Pflanzenfam. ii. Abt. 5, 149; Dalla Torre & Harms, Gen. Siphonog. 81, n. 1280. *Marica* Schreb. Gen. Pl. i. 37 (1789), nomen abortivum; Ker-Gawl.

in Bot. Reg. sub. t. 229, fol. 2 verso (1817), excl. sp.; Ker-Gawl. Irid. Gen. 18 (1827), excl. sp.

Bauxia Neck. Elem. iii. 160 (1790), nomen abortivum.

Type-species: *Cipura paludosa* Aubl.

Neomarica *Sprague*, nom. nov.

Marica ["Ker"] Herb. in Bot. Mag. sub t. 3809 (1840); Baker in Journ. Linn. Soc., Bot. xvi. 77, 149 (1877); Benth. & Hook. f. Gen. Pl. iii. 689; Engl. & Prantl, Nat. Pflanzenfam. ii. Abt. 5, 147; Baker, Handb. Irid. 61; Dalla Torre & Harms, Gen. Siphonog. 80, n. 1268; non Schreb. (1789).

Galathea Liebm. in Ind. Sem. Hort. Haun. 1855, 26; Linnaea, xxxviii. 361; Walp. Ann. vi. 43; non *Galatea* Salisb. (1812), nec Cass. (1818), nec Herb. (1820).

Cypella Klatt in Linnaea, xxxi. 538 (1862), partim; Klatt in Mart. Fl. Bras. iii. pars 1, 518 (1871), partim; non Herb. (1826).

Type-species: *Neomarica Northiana* (Schneev.) Sprague.

The eleven species enumerated under "*Marica*" by Baker in his 'Handbook of Irideae', pp. 61-63 will now bear the following names:

1. **Neomarica caerulea**—*Marica caerulea* Ker-Gawl. in Bot. Reg. t. 713 (1823). *Cypella caerulea* Seub. ex Hook. f. in Bot. Mag. t. 5612 (1866). *Marica Sabini* Lindl. in Trans. Hort. Soc. vi. 75, t. 1 (1826). *Galathea speciosa* Liebm. in Ind. Sem. Hort. Bot. Haun. 1855, 26; Linnaea xxxviii. 361; Walp. Ann. vi. 43; teste Klatt in Mart. Fl. Bras. iii. pars 1, 519 (sub nomine "*Galathea caerulea* Liebm." cit.).
2. **N. glauca**—*Cypella glauca* Seub. ex Klatt in Linnaea, xxxi. 542 (1862). *Marica glauca* Baker in Journ. Linn. Soc., Bot. xvi. 149 (1877).
3. **N. Warmingii**—*Marica Warmingii* Klatt in Abh. Naturf. Ges. Halle, xii. 375 (1882).
4. **N. Northiana**—*Moraea Northiana* Schneev. Ic. Pl. Rar. tt. 41, 42 (1793); Andr. Bot. Rep. t. 255 (1802). *Marica Northiana* Ker-Gawl. in Bot. Mag. t. 654 (1803). *Iris Northiana* Pers. Syn. i. 52 (1805). *Cypella Northiana* Klatt in Mart. Fl. Bras., iii. pars 1, 520 (1871). *Ferraria elegans* Salisb. Prodr. 42 (1796). *Marica coelestis* Lemaire, Hort. Univ. iv. 138 (1843), non Lehm. var. **undulata**—*Cipura Northiana* var. *coelestis* Morr. in Ann. de Gand. v. 209, t. 258 (1849); non *Marica coelestis* Lemaire.
5. **N. gracilis**—*Marica gracilis* Herb. in Bot. Mag. t. 3713 (1839). *Cypella gracilis* Klatt in Mart. Fl. Bras. iii. pars 1, 521 (1871).
6. **N. brachypus**—*Cypella brachypus* Baker in Gard. Chron. 1876, v. 138. *Marica brachypus* Baker in Journ. Linn. Soc., Bot. xvi. 150 (1877); et in Bot. Mag. t. 6380.
7. **N. longifolia**—*Marica longifolia* Link et Otto, Ic. Pl. Sel. 123, t. 58 (1828).

8. **N. lutea**—*Marica humilis* var. *lutea* Herb. in Bot. Mag. t. 3809 (1840). *Marica lutea* Herb. l.c.

9. **N. vittata**—*Marica humilis* Lodd. Bot. Cab. 1081 (1825), non Roem. et Schult. (1817). *Marica humilis* var. *princeps* Herb. in Bot. Mag. sub t. 3809 (1840). *Cypella humilis* Klatt in Linnaea, xxxi. 540 (1862). *Marica Northiana* var. *splendens* Cogn. in Ill. Hort. xlii. 249, t. 40 (1895).

In order to avoid confusion with *Marica humilis* Roem. et Schult. (*Cipura humilis* H.B.K.), a new specific epithet has been chosen. *N. vittata* may possibly be a variety of *N. Northiana* (Schneev.).

10. **N. bulbosa**—*Marica bulbosa* Klatt in Abh. Naturf. Ges. Halle, xii. 374 (1882). *Cypella lutea* Klatt in Mart. Fl. Bras. iii. pars 1, 522 (1871), non *Marica lutea* Herb.

11. **N. Martii**—*Marica Martii* Baker, Handb. Irid. 63 (1892). *Cypella flava* Mart. ex Baker, l.c., pro syn.

Three new species of "*Marica*" described since Baker's Handbook will bear the following names under *Neomarica*:

N. occidentalis—*Marica occidentalis* Baker in Gard. Chron. 1892, xii. 150.

N. imbricata—*Marica imbricata* Hand.-Mazz. in Denkschr. Akad. Wiss. Wien, Math.-Nat., lxxix. 215, t. 20 (1908).

N. candida—*Marica candida* Hassler in Physis, vi. 359 (1923).

Species dubiae vel minus cognitae.

Marica acorifolia Mart. et Gal. in Bull. Acad. Brux. x. no. 2, 111 (1834).—Mexico (Oaxaca).

Marica bicolor Regel, Cat. Pl. Hort. Aksakov. 90, nomen.—Hab.?

Marica coelestis Lehm. Ind. Sem. Hort. Hamb. 1826, 17; et in Linnaea, v. 379 (1830).—Evidently not a *Neomarica*. The bulb, plicate leaves, and petaloid stigmas suggest *Cipura*.

Marica Helenae Worsley in Journ. Roy. Hort. Soc. xxviii. 530 (1904).—Possibly a variety of *Neomarica caerulea* (Ker-Gawl.).

Marica splendens Regel, Cat. Pl. Hort. Aksakov. 90, nomen.—Hab.?

Marica variegata Mart. et Gal. in Bull. Acad. Brux. x. no. 2, 112 (1843).—Mexico (Vera Cruz). Said to be near *Neomarica Northiana* (Schneev.).

Marica zebrina Hoffm. Verz. Pflanzenkult. 76 (1824), nomen.—Hab.?

XLIV.—THE FLORA OF MADRAS: VI.

The eighth part (pp. 1347-1532) *Ulmaceae* to *Xyridaceae* has now been published and Mr. Fischer has drafted the following notes in continuation of those previously published.*

*See K.B. 1916, p. 57; 1918, p. 222; 1920, p. 49; 1921, p. 312; 1924, p. 235.

NOTES ON THE FLORA OF MADRAS: PART VIII.
C. E. C. FISCHER.

FICUS.

Page 1353. *Ficus altissima* Bl.; F.B.I. v. 504 includes the Deccan Peninsula in the habitat of this species and Beddome, For. Manual ccxxiii, gives "Malabar." I have seen no specimens from South India nor is the locality included in King's monograph (Ann. Calc. 30).

Ficus Trimeni King. The F.B.I. v. 509 gives Deccan Peninsula as the habitat, probably following King, Ann. Calc. 46, who states "Canara, Dhawar and Bellary Districts, Law." But the single specimen of Law in the Kew Herbarium bearing this name is, in my opinion, a form of *F. retusa* Linn. and does not at all agree with the description of *F. Trimeni*, which is a Ceylon tree. Bourdillon, For. Trees of Travancore, p. 361, writes "said to occur in the forests of Travancore, though I do not know it." I have seen no specimens from S. India and I have therefore, omitted it.

F. guttata Kurz. Though I have examined a considerable number of receptacles I have failed, as did Sir G. King, to find any male flowers.

GIRARDINIA.

Page 1374. The typical *Girardinia heterophylla* Decne. does not extend to S. India. The two species *G. palmata* Gaud. and *G. zeylanica* Decne. treated as varieties in F.B.I. v. 551 are sufficiently distinct to rank as good species.

ELATOSTEMMA.

Page 1372. *E. lineolatum* Wight. I agree with T. Cooke, Fl. Bomb. ii. 635 that there are no good characters for distinguishing the varieties *major* and *integrifolia*, F.B.I. v. 565.

E. cuneatum Wight. I can find no authority for Weddell's statement in Monogr. Urt. 331 for the occurrence of this species in the Nilgiris.

POUZOLZIA.

Page 1381. All the south Indian species are exceedingly variable. It is not difficult to separate extreme forms but with a large series of specimens one finds an almost imperceptible gradation. Consequently with 240 sheets of the South Indian Pouzolzia's before me I am unable to agree with some of the distinctions laid down by Weddell in Monogr. Urtic., or even in the F.B.I. I have considered it necessary to reduce *P. tuberosa* Wight and *P. vesicaria* Wight to *P. indica* Gaud. On the other hand I consider Hooker's var. *cymosa* of *P. auriculata* Wight sufficiently distinct to make it a good species.

SALIX.

Page 1390. With a large range of specimens I am unable to maintain *S. tetrasperma* Roxb. and *S. ichnostachya* Lindl. apart,

even as varieties. None of the distinguishing characters I find to be constant; they merge insensibly from one extreme to the other.

BURMANNIA.

Page 1399. Hooker in Fl. Brit. India. v. 665, ventures the opinion that *B. pusilla* Thw. is a small state of *B. coelestis* D. Don, and states that he can distinguish *B. candida* Griff. "from small forms of *B. coelestis* or *pusilla* only by the absence of radical leaves, possibly the effect of growing in water." I entirely concur.

B. Wallichii Hook. f., F.B.I. v. 666 is a species from Mergui. I do not consider that any of the South Indian specimens so determined are this species but that they are variations of *B. coelestis*. *B. Wallichii* has, therefore, been excluded.

MICROSTYLIS.

Page 1407. As pointed out by T. Cooke, Fl. Bomb. ii. 678, Lindley's name *M. versicolor* antedates Wight's name *M. Rheedei* (Ic. t. 902) by over 13 years, consequently *M. versicolor*, Wight Ic. t. 901 is an invalid name and the plant must take the name *densiflora* after A. Richard, who called it *Liparis densiflora* (Ann. Sc. Nat. sér. 2, xv. 18).

DENDROBIUM.

Page 1612. *D. Gamblei* King and Pantl. In Ann. Calc. ix. 299, Duthie states: "It has been found also on the Nilgiris by Mr. Proudlock." This statement is based, I presume, on a sheet, so determined, collected by Mr. Proudlock at Ootacamund in 1896 and now in the Calcutta Herbarium. I have examined this sheet which has only three dilapidated flowers and half a dozen young leaves, the remainder consisting of stems from which the flowers have fallen. It is certainly not *D. Gamblei* and is probably *D. macrostachyum* Lindl. As this is the sole authority for the appearance of *D. Gamblei* in S. India (quoted by Kränzlin in Pflanzenreich iv. 50. 11. B, 21, 60) I have excluded it.

D. Pierardi Roxb. is identical with Roxburgh's *Limodorum aphyllum*, Cor. Pl. t. 41 (1795). *Dendrobium aphyllum* Roxb., doubtfully connected by Lindley (Gen. et Sp. Orch. 1830-40) with *D. amoenum* Wall. is invalid as it was not accompanied by a description. In the F.B.I. v. 739 *D. cucullatum* R. Br. is suggested as the earliest name, but it dates only from 1821. It follows that the earliest valid name is *aphyllum*.

EULOPHIA.

Page 1433. *E. virens* R. Br. The first name of this species is *Serapias epidendraea* Retz. the trivial portion of which Willdenow (Sp. Pl.) changed unwarrantably to *Bletia epidendroides*. Schlechter (Die Orchideen, 346) has made the new combination *Eulophia epidendroides*, erroneously quoting the original name as *Serapias epidendroides*. The correct name is *Eulophia epidendraea*.

E. Cullenii Fischer. In F.B.I. vi. 7, *Cyrtopera Cullenii* Wight Ic. t. 1754 is cited under *Eulophia flava* Hook. f. which latter species is accordingly shown as occurring in Travancore. I am unable to agree to this identification and I have, therefore, had to create a new combination as above and to exclude *E. flava*.

AERIDES.

Page 1441. *A. ringens* Fischer. This species is named *A. radicosum* A. Rich. in the F.B.I. vi. 46, but its earliest names are *Saccolabium ringens* and *S. Wightianum* of Lindley in Wall. Cat. 7313 and 7303 and Gen. and Sp. Orch. 221. Both descriptions are on the same page but the former comes first and moreover the latter has also been used for another plant (*Vanda parviflora*). The correct combination, therefore, is as above.

SACCOLABIUM.

Page 1445. *S. nilagiricum* Hook. f. The first name of this species was *Vanda pulchella* Wight. Ic. t. 1671, the correct name, therefore is *Saccolabium pulchellum*.

HABENARIA.

Page 1461. *H. subpubens* A. Rich. After a careful examination of a number of sheets I am unable to keep this species separate from *H. Heyneana* Lindl. All the features cited as distinctive by the several authors who keep them apart vary considerably and in some cases the characters mentioned do not agree with the descriptions and figures. I could find no one constant distinguishing feature and must combine the two under the older name of Lindley.

H. macrostachya Lindl. In the F.B.I. vi. 134, this species is shown as occurring in "Travancore on the Anamallay hills, Beddome (in Herb. Calcutt.), Ceylon, Macrae."

I have seen Beddome's specimen and find that it does not agree with the type specimen (Macrae's) in the Lindley collection. It differs in the leaves, the bracts which are shorter than the ovary, the acute, not filiform, tips of the sepals, the side lobes of the lip being much longer than the mid-lobe, the fantastic convolutions of the filiform tips of the petals, the much stouter and more curved spur which is rather abruptly enlarged at the apex.

I have not seen the specimen on which Sedgwick based his *H. multicaudata* (Rec. Bot. Surv. Ind. vi. 352) but his description leaves me in no doubt that Beddome's plant is this species. I have seen two other sheets. One collected in the Nilgiri hills in 1860, without collector's name but probably also of Beddome's collecting, and one collected by myself (No. 4475) at Karianshola in the Anaimallais in the Coimbatore District in August 1920 at 2200 feet. Beddome's specimen in Herb. Calc. is No. 38 of 1859 from "Anamallas." It was probably not collected in Travancore as assumed by Hooker, but in the Coimbatore Anaimallais where Beddome worked as a Forest Officer for several years. The spot where I found the plant (once only) is within a mile of the former site of Beddome's residence.

In life the flower has a striking resemblance to an ichneumon fly, a similarity which it shares apparently with a tropical African species, *H. ichneumonina* Lindl., and with *H. ichneumoniformis* Ridl. from Madagascar.

H. decipiens Wight is intermediate in almost every character between *H. longicornu* Lindl. and *H. longicalcarata* A. Rich. It is found, as far as I have been able to ascertain from the scrutiny of a large number of specimens, only in the localities where both the other two occur. I suspect that it is a natural hybrid between them.

H. fusifera Hook. f., F.B.I. vi. 147. I have examined the type (and only) specimen, which is in the Herb. Calc., and I am of opinion that it is identical with *H. marginata* Coleb.

ZINGIBERACEAE.

Page 1478. Most of the genera are exceedingly difficult to deal with from dried material, especially in the genera *Curcuma*, *Amomum* and *Zingiber*, partly because the floral parts are extremely delicate and almost impossible to expand again once they have dried and partly because the shape and internal colour of the roots, parts not usually collected, afford good characters. These genera require careful study in the field, and herbarium specimens should be completed with roots and with detailed notes on the critical features made from fresh plants. With most of the species I have had to accept the descriptions and verdicts of other authors, doing the best I could with the dry material at my disposal.

LILIACEAE.

Page 1514. *Asparagus capitatus* Baker. The F.B.I. vi. 315 cites "Nilgiri Hills; Wight" as part of the habitat of this species. I do not know on what specimen this locality is based as I cannot find any specimen among Wight's plants in the Herb. Kew. to support it. Moreover, Baker, who saw Wight's specimens, has not given this locality. As I have seen no specimen from S. India I have excluded this species.

XLV.—THE CORRECT SPELLING OF CERTAIN GENERIC NAMES: II.* T. A. SPRAGUE.

Enquiries regarding the correct spelling, according to International Rules, of the generic names *Ailanthus*, *Amaranthus* and *Borago* have been received for investigation by the writer since the appearance of the first article of this series (on *Mesembryanthemum*); and as these cases and that of *Prunella* (*Brunella*) are typical of many others, it seems desirable to publish the results. The case of *Euonymus* (*Evonymus*) is also discussed, as it raises the question of the precise interpretation of Art. 38, regarding which a difference of opinion has been found to exist.

*Continued from K.B. 1928, page 115.

2. Ailanthus or Ailantus.

The generic name of the 'Tree of Heaven' has been spelt in four different ways: *Ailanthus*, *Ailantus*, *Aylanthus*, *Aylantus*. It was originally published in the form *Ailanthus* by Desfontaines in Mém. Acad. Sc. Par. 1786, 265, t. 8 (1788). The type-species of *Ailanthus* was *A. glandulosa* Desf. (*A. altissima* Swingle), but the generic name was derived indirectly from the native name, Aylanto, under which another species (*A. integrifolia* Lam.) was known in Amboina, Dutch East Indies. "Il [*Ailanthus glandulosa*] est originaire de la Chine, et l'arbor coeli de Rumphius, Hort. Amboin., que les Indiens appellent ailanthe, dans leur langue, est une espèce qui nous paroît appartenir au genre que nous venons de décrire, c'est pourquoi nous avons conservé cette dénomination pour nom générique" (Desf. l.c. 271). This statement by Desfontaines is not strictly accurate: the vernacular name actually cited by Rumphius for his arbor coeli was Aylanto (not ailanthe), and from this a "popular" French name ailanthe* was coined by Desfontaines, who made the latter the basis of his generic name *Ailanthus*. At that time the practice of coining a French name for every plant which did not possess one was very general, as may be seen from almost any page of Lamarck's Encyclopédie.

In 1789 Jussieu (Gen. 373) altered the spelling to *Aylantus*, so as to make it correspond more closely with the Amboina name Aylanto. In 1799 Ventenat (Tabl. iii. 450) modified it to *Aylanthus*, and in 1825 De Candolle (Prodr. ii. 88) proposed a fourth form, *Ailantus*. During the period 1804-1815 Desfontaines (Table École Bot. ed. 1, 199; Hist. Arbres, ii. 341; Table École Bot. ed. 2, 228) had accepted Jussieu's modification of the generic name, i.e. *Aylantus*, but in 1829 he finally returned to his own original spelling *Ailanthus* (Cat. Pl. Hort. Par. ed. 3, 330).

The native name of *Ailanthus integrifolia* (*A. moluccana*) current in the Moluccas was given as Aijlanto by Filet (Plantk. Woordenb. Ned.-Ind. ed. 2, 4, no. 57: 1888), while De Clercq (Nieuw Plantk. Woordenb. Ned. Ind. 8: 1909) cited the three variants, Ail lanit, Ail laniol, and Ail lanitol, as being used respectively on the south coast of Ceram, and in the neighbouring islands of Nusa Laut and Saparua.

Under Art. 24 of the International Rules, Desfontaines was at liberty to form his new generic name in any way he pleased, while Art. 50 states that no one is authorised to change or modify a name because it is badly chosen or disagreeable. Hence the later variants *Aylantus* Juss., *Aylanthus* Vent. and *Ailantus* DC. are invalid, and the genus stands under its original name, *Ailanthus* Desf. This contains no typographic or orthographic error such as might be corrected under the provisions of Art. 57. That Article appears to have been widely misinterpreted, owing to the absence of examples of the kinds of errors which may be corrected: when read in

*vide Desf. l.c. 265, t. 8 (l'ailanthe glanduleux), 268 footnote, 271 (ailanthe).

conjunction with Articles 24 and 50, however, there should be no doubt as to its meaning. In this connection Briquet's remarks concerning the generic names *Alchemilla*, *Dorycnopsis* (Prodr. Fl. Corse, ii. 199, 320), *Valantia* and *Kentranthus* (Burnat, Fl. Alp. Marit. v. 171, 186) may be consulted.

3. Amaranthus or Amarantus.

The Amaranth of ancient Greece, ὁ ἀμάραντος* (Diosc. lib. iv. cap. 57) was so-called because the flower was everlasting (adj. ἀμάραντος, unfading). The Latin form of the name was amārantus (Pliny, lib. xxi. cap. 8, sect. 23; cap. 11, sect. 39), the admittedly corrupt spelling amaranthus being the result of false analogy and etymology. The real question at issue, however, is not the correct spelling of the classical Latin word amarantus, but that of the botanical generic name *Amaranthus* L. (1753) according to the International Rules of Nomenclature.

The form *Amarantus* was used by Ruellius, De Nat. Stirp. 31, l. 14 (1537), Fuchs, Hist. 98 (1542), Gesner, Cat. 5 (1542), Mattioli, Comm. 464 (1554), Cordus, Annot. Diosc. 168 (1561), and Mattioli, Comm. 549 (1563). The spelling *Amaranthus*, on the other hand, was adopted by Dorstenius, Botanicon, 126 (1540), Turner, New Herball, fol. C1 verso (1551), Tragus, Hist. i. 330 (1552), Dodonaeus, Hist. i. 108, 206 (1553), Pena et Lobel, Stirp. Advers. 95 (1571), Mattioli Epit. ed. Calceol. 791 (1586), Dalechamps, Hist. i. 870 (1587), Lobel, Ic. 250-252 (1591) and Plukenet, Alm. 26 (1596), so that it was at least as common as *Amarantus* in the sixteenth century.

In the seventeenth century the spelling *Amaranthus* was employed by most authors, including C. Bauhin, Pinax, 120 (1623), Parkinson, Parad. 370 (1629), and Theatr. 753 (1640), J. Bauhin, Hist. ii. 968 (1651), Morison, Hist. ii. 601 (1680), Mentzel, Ind. Nom. Pl. Univ. 18 (1682), and Tournefort, Elem. Bot. i. 201 (1694). Tournefort gave the following derivation. "*Amaranthus* vient des mots grecs ἄνθος, fleur, et μαραίνω, se flétrir, et de la particule privative α, comme qui diroit une fleur qui ne se flétrit pas". *Amarantus* was adopted, however, by Besler, Hort. Eystett., Class. Autumn., Ord. 2, fol. 6-8, (1613),† and Ray, Hist. i. 201 (1686). The latter author pointed out that the form *Amaranthus* was corrupt: "*Amarantus* male cum 'th' scribitur *Amaranthus*. Nam Graece est ἀμάραντος, quod et florem notat, et adjective significat immarcescibilis, ab α privativa et μαραίνω marceo."

Also in the first half of the eighteenth century *Amarantus* was less common than *Amaranthus*. The spelling *Amarantus* was chosen by Boerhaave, Ind. Alt. Pl. Hort. Lugd.-Bat. ii. 97 (1720), and Hist. Pl. Lugd.-Bat. 563 (1727), although in the latter work he accepted Tournefort's derivation from ἄνθος and μαραίνω. Burmann, Thes.

*Paulus Aegineta, lib. viii. sect. 3, has το ἀμάραντον, and Galen (Opera, ed. Kühn, xi. 824) has το ἀμάρανθον in one instance. Joannes Agricola, Medicinæ Herbariae libri duo, 39 (1539) has *Amaranthos* Galeni.

† *Amaranthus* occurs, however, on one of the plates.

Zeylan. 16 (1737) also used *Amarantus*. On the other hand the form *Amaranthus* was accepted by a majority of authors, including Barrelier, Pl. Gall. Hisp. et Ital. 45 (1714), Martyn, Hist. Pl. Rar. 6, 7 (1728), Royen, Fl. Leyd. Prodr. 419 (1740), Haller, Enum. Stirp. Helv. 176 (1742), Dalibard, Fl. Paris. Prodr. 290 (1749), and Hill, Gen. Nat. Hist. 605 (1751). Linné—except in Syst. Nat. ed. 10, 1268 (1759), where the spelling *Amarantus* occurs—consistently spelt the generic name as *Amaranthus*: vide Gen. Pl. ed. 1, 286 (1737), Hort. Cliff. 443 (1737), Gen. Pl. ed. 2, 454 (1742), Fl. Zeylan. 160 (1747), Phil. Bot. 45, n. 68, 69 sub voce “Dehiscencia,” 140, 177 (1751), Sp. Pl. ed. 1, 989 (1753), Gen. Pl. ed. 5, 427 (1754), Sp. Pl. ed. 2, 1403 (1763). In his ‘Philosophia Botanica’ Linné accepted Tournefort’s etymology of *Amaranthus*, from $\mu\alpha\rho\alpha\lambda\omega$ and $\xi\nu\theta\omega\varsigma$. The form *Amarantus* occurs only once in the text of that work, namely, in his list of names of plants used by the ancient Greeks and Romans (Vocabula plantarum, veteribus usitata), as “*Amarantus*. $\alpha\mu\alpha\rho\alpha\nu\tau\omega\varsigma$ D [ioscorides]” (Phil. Bot. 188). There is thus no doubt that Linné knew both forms, and deliberately rejected the classical spelling *Amarantus* (derived from $\alpha\mu\alpha\rho\alpha\nu\tau\omega\varsigma$) in favour of the later spelling *Amaranthus* (derived from α privative, $\mu\alpha\rho\alpha\lambda\omega$ and $\xi\nu\theta\omega\varsigma$).^{*} Accordingly, under International Rules, Art. 24, 50 and 57, *Amaranthus* must stand. This was the conclusion reached by Briquet (Prodr. Fl. Corse, i. 470: 1910), but certain authors who attach greater relative importance to correct classical spelling have nevertheless retained the form *Amarantus*, hence the necessity for the present investigation.

4. Borago or Borrigo.

The correct form of this generic name has been the subject of dispute for at least seven centuries. The spelling *Borago* was adopted in the second edition of Schinz and Keller’s ‘Flora der Schweiz’ (1905) in place of *Borrigo*, which had been used in the first edition; and in 1907 Schinz and Thellung (Bull. Herb. Boiss. sér. 2, vii. 338) stated that this change had been made in accordance with Art. 57 of the International Rules. *Borrigo*, however, continued to be used by some authors, including Dalla Torre and Sarnthein, Fl. Tirol (1912), Fritsch, Exkursionsfl. Österr. ed. 3 (1922), Prodan, Fl. Romania (1923), and Jávorka, Magyar Fl. (1925); and a difference of opinion as to the correct spelling was also manifested in Brooklyn Botanic Garden, International Seed Exchange, Communication no. 7, p. 28 (1926). Hence it seems desirable to consider the case in some detail.

The etymology of the name *Borago* or *Borrigo* is uncertain. Apparently most authors nowadays, however, accept the derivation from late Latin “burra” (Ital. Span. Port. “borra”), coarse wool

^{*}As pointed out by the late Prof. Thellung (Aschers. & Graebn. Syn. Mitteleur. Fl. v. Abt. 1, 225, adnot. 1: 1914), the spelling should have been *Amarananthus*, if $\xi\nu\theta\omega\varsigma$ entered into the composition of the name.

or hair (vide Diez, Etym. Wörterb. Roman. Sprach. ed. 3, i. 77: 1869; New English Dict. i. 999; 1888; Encycl. Britann. ed. 11, iv. 242: 1910) in supposed allusion to the rough hair characteristic of the genus and of many other *Boraginaceae*. It has also been suggested that the name was a variant either of *Bovago* (from “bos”, an ox, *Buglossum*, i.e. ox-tongue, being an alternative name), or of *Corago* (from “cor”, the heart, and “agere”, to stimulate) the latter name supposedly alluding to the reputed tonic action of the plant on the heart.

In the Latin editions of ‘Ortus Sanitatis’ published in 1490, 1491, 1511 and 1517, cap. lxxviii. the name *Borago* is attributed to Ysidorus lib. ethimo. [Isidorus, Etymologiarum libri xx]. Isidorus, however, apparently does not mention *Borago*, though he includes *Buglossos* (Isidorus, Etymol. ed. Lindemannus, 551, lib. xvii. cap. ix. no. 49: 1833).

The name *Corrago* occurs in the Bury St. Edmunds codex (written about A.D. 1100) of the Herbal of Apuleius Barbarus, where it was given as a synonym of No. viii, oxes-tunge, along with *Buglossa*, *Lingua bubula*, *Bovis lingua* etc. Gunther (Herbal of Apuleius Barbarus, 101: 1925) identified the figure as *Lycopsis arvensis* L., but to the writer the reproduction is suggestive rather of *Echium vulgare* L., which was figured as *Buglossa sylvestris*, Wild Ochsenzunge, by Brunfels, Herb. i. 111 (1530).

Platearius (‘De simplicibus medicinis’, alias ‘Circa instans’), a twelfth century author, is quoted by Leonicens (De Plinii erroribus, 241: 1529) as follows: “*Buglossum Romani linguam bubulam*, Lucani *corago*, nascitur locis cultis et sabulosis”. This was evidently taken from Apuleius Barbarus. The Bodley MS. 130, however, attributes the name “*Corrago*” to the “Daci”, whereas Platearius attributes “*Corago*” to the “Lucani”, as in Hummelberg’s edition of Apuleius, De Medic. Herb. 147 (1537).

Albertus Magnus (A.D. 1193-1280), who gave a wonderfully good description of the flower of borage (De Veget. lib. vi. sect. 291) used the spelling *Borago* (lib. iv. sect. 116; lib. vi. sect. 215, 291, 434), but the forms *borrago*, *pirago*, *parago*, *perago* etc. also occur in some of the codices (Meyer et Jessen, Alberti Magni, De Vegetabilibus, 447, adnot. ψ : 1867).

Simon Genuensis or Januensis (end of the thirteenth century) is quoted by Leonicens (De Plinii erroribus, 239: 1529) as follows: “*Borago* herba nota cibo apta, et medicinae, et flos, et folia, et semen, *buglossa* dicitur species ejus sylvestris. Non reperio aliquem autorem autenticum, facientem capitulum de utraque: si scribit de una, non scribit de alia.” This quotation is apparently from the ‘Clavis sanationis’, a work which I have not seen.

Matthaeus Sylvaticus (fourteenth century, d. 1342) Liber Pandectarum, cap. 107, has the spelling *Borrigo* (but *Borago* occurs in the index). Immediately after his account of *Borrigo* is the following definition: “*Borra* est quedam albedo cum aliquali pilositate: ut

apparet in foliis calamenti et iusquiami et aliis". There is, however, nothing to indicate whether he recognised any etymological connection between *Borrigo* and *Borra*, or not. Matthaeus Sylvaticus also gave an account of Bugloss under the heading *Lingua bovis* (cap. 512).

The German edition of the *Ortus Sanitatis* published at Mainz in 1485 has the spelling *Borago*, with the German equivalents *porrich* or *borrich*: "*Borago* latine et grece. In dem buoch genant circa instans stat geschrieben das borrich sy heysz und feucht an dem anfang des ersten grats. Das krut ist uns woel bekant; und hait breyt bletter die synt ruch; und so sie grune synt so bruchet man sie in der artzney und nit dorre. Der same ist fast guot genutzt und weret zwey iare."

Nicolaus Leoniceus, *De Plinii erroribus*, 239-242 (Basileae, 1529*), has a long account of *Buglossa* and *Borago*, including the quotations from Platearius and Simon Genuensis given above. He consistently uses the spelling *Borago*, and has the following comment on the extract from Platearius: "Forte autem pro *borago* verbo, *corago* vitiose scribitur, aut nomen *coraginis* una litera variata est in *boraginem* versum". He therefore kept an open mind as to the derivation of the name *borago* or *corago*.

Hermolaus Barbarus, *Corollarii*, 84 (1516) writes of *Cirsion*: "nec dissimilis huic videtur, quam *Porraginem* sive *Borriginem* olitores nostri vocant".

The following extract from Marcellus Vergilius, *Pedacii Dioscoridae Anazarbei de materia medica libri sex* (Florentiae, 1518) is quoted by Brunfels (*Herb.* i. 114: "credamus, quam veteres *Buglosson* dixerunt, nostrae aetatis *Boraginem* esse". Brunfels also quotes "*Buglosson* quam *Boraginem* vocant" from Johannes Manardus, *Epistolae medicinales* (Ferrariae, 1521).†

Brunfels himself (*Herb.* i. 114: 1530) adopted the spelling *Borago*,‡ and so did Tragus (*New Kreütter Buoch*, fol. lxxv, verso: 1539; *Hist.* i. 237: 1552), but the latter gave *Porrago* and *Corago* as alternative spellings (l.c. 238): "ea planta, quae Germanis *Burres*, Latinis *Borago*, *Porrago*, seu ut Leonice placuit *Corago* dicitur".

Fuchs adopted the form *Borago* in his *Plant. Pharmac. Nomencl.* (1541), but the next year he accepted the name *Buglossum* for *Borage*, and cited the form *Borrigo* as being used in the druggists' shops and by the herbalists: "officinis et herbariis *Borrigo*, Germanis *Burretsch* dicitur." *Borrigo* was used also by Valerius Cordus (*Annot.* fol. 71, verso: 1561), and Gesner (*Hort. Germ.* fol. 250, verso, in eodem tomo).

*First published at Ferrara in 1492.

†A second edition was published at Venice in 1557. In this we have "vera *Buglossus*, ea s. quae vulgo dicitur *Borago*" (561, l. 33) and "veramque *Buglossum* quam *Boraginem* [vocant]."

‡Brunfels, however, had the spelling *Borrigo* in his *Onomastikon Medicinae*, sub voce *Buglossos* (1534).

Among other pre-Linnean authors who chose the spelling *Borrigo* were the following: Champerius, *Rosa Gallica*, fol. lxxv, verso (1518); and *Hort. Gall.* 45 (1533); Stephanus, *De Latinis et Graecis Nominibus Arborum*, 28 (1548), et op. cit. 18 (1554); Amatus Lusitanus, *In Diosc. Mat. Med. Comment.* 456 (1554); Mattioli, *Comm. Diosc.* 513 (1554); Pinaeus, *Hist. Pl.* 574 (1561); Mattioli, *Compend.* ed. Calceol. 826 (1571); Pena et Lobel, *Nov. Stirp. Advers.* 246 (1571); Lobel, *Obs.* 309-311 (1576); Lobel, *l.c.* 575 (1581); Mattioli, *Epit. ed. Calceol.* 914 (1586); Dalechamps, *Hist.* 578, 581 (1587); Tabernaemontanus, *Eicones*, 417, 418 (1590); Tabernaemontanus, *Neuw Kreuterbuch*, ii. 126 (1591); Porta, *Villae Libri*, 670 (1592); C. Bauhin, *Phytopinax*, 493 (1596); Zaluzanius, *Meth. Herb. cap. x.* fol. Y 2 (1604); Besler, *Hort. Eystett.*, *Class. Vernal.*, ord. 6, fol. 14, *Class. Hybern.* fol. 4 (1613); C. Bauhin, *Pinax* 255 (1623); Parkinson, *Theatr. Bot.* 765 (1640); J. Bauhin, *Hist.* iii. 574 (1651); Ambrosini, *Phytolog.* 107 (1666); Pancovius, *Herb. ed. Zorn* 71 (1673); Ammannus, *Char. Pl. Nat.* 75, 199 (1685); Hermann, *Hort. Lugd.-Bat.* 93 (1687); Tournefort, *Elem. Bot.* i. 109 (1694); Weinmann, *Phytanth. Iconogr.* i. 175 (1737); Zwinger, *Theatr. Bot.* 1012 (1744).

On the other hand the form *Borago* was chosen by the following: Petrus de Crescentiis, *Rur. Comm. lib. vi.* fol. 113 (1471); Herbarius (Maguntiae, 1484); *Ortus Sanitatis*, *De Herbis*, cap. lxxviii. (1491); Arnoldus de Villa Nova, *Tract. Virt. Herb.* fol. xxiii. (1499); Aemilius Macer, *De Virtutibus Herbarum*, fol. i. 1, recto (Venetiis, 1506); Humelbergius, *Lib. Apulei Platonici*, 148 (1537); Ruellius, *De Nat. Stirp.* 635 (1537); Stephanus, *De Re Hortensi Libellus*, 68 (Lugduni, 1539), 75 (Parisiis, 1539); Dorstenius, *Botanicon*, fol. 49, C (1540); Dioscorides, *Medic. Mat.*, interpr. Ruellius, ed. Ryff, 348 (1543); Duchesne, *In Ruellium de Stirp. Epit.* 17 (1544); Petrus de Crescentiis, *Agric. Pl. Anim.* 197 (1548); Turner, *New Herball*, fol. G 4 (1551); Dodoens, *Cruydeboeck*, p. xvi (1554); Mesue, *Medic. Pract.*, annot. Manardus et Sylvius, *De Consol. Medic.*, fol. 122, recto, col. 2, A (Venetiis, 1558); Mesue, *Opera*, fol. 120, verso, col. 2, F (1562); Lonicus, *Kreuterbuch*, 176 (1578); Dodonaeus, *Stirp. Hist. Pempt.* 615 (1583); Gerarde, *Herball*, 653 (1597); Mesue, *Opera*, fol. 123, verso, col. 2, F (1602); Pilleterius, *Plantarum Synonymia*, 66 (1610); Spigelius, *Isagoges Libri duo*, 230 (1633); Tradescant, *Musaeum Tradescantianum*, 92 (1656); Ray, *Hist.* i. 492 (1686); Commelin, *Pl. Us. Hort. Med. Amstel. Cat.* 10 (1698); Morison, *Hist.* iii. 436 (1699).

In several works both forms were employed: thus in Aemilius Macer, *De Virtutibus Herbarum*, cap. 49, p. 119 (Basileae, 1559) the chapter is headed "*De Boragine*", but the spelling *Borrigo* occurs in the table of simples following the dedicatory epistle, and in the index. The spelling with two "r"s seems to have been the one more commonly used in the druggists' shops and by the herbalists: thus Joannes Agricola, who mentions "*Borago sylvestris*" and "*Boraginis*"

flores" (Medic. Herb. 30: 1539) states that *Buglossum* is said to be the herb which is commonly called *Borrage*. Similarly Porta, Phytognom. 164 (1591), who has "*Buglossi flores sive vulgaris boraginis*" quotes the semi-popular doggerel "*Dicit borrago gaudia semper ago*", and has the spelling *Borrage* in the Index (l. c. 502). Ryff, Deutsche Apotheck, fol. 9, verso (1573), who accepted the derivation from "*cor*", gave the three forms *Corago*, *Borago* and *Borrage*; Lonicerus, Kreuterbuch 176 (1578), who adopted the spelling *Borrage*, mentioned that the species was commonly known as *Borrage*; and Durante, Tesoro della Sanita, 93 (1588) gave both *Borrage* and *Corago*. Stephanus has "*Borrage quasi Corrago*" (De Latinis et Graecis Nominibus Arborum, 28); and Zaluzanius (Meth. Herb. cap. x, fol. Y 2) has "*Borrage quasi Bovago*".

During the period 1735-1751 Linné employed the form *Borrage*: vide Syst. Nat. ed. 1 (1735), Gen. Pl. ed. 1. (1737), and ed. 2 (1742), Hort. Cliff. (1737), Hort. Upsal. (1748), Mat. Med. (1749), Phil. Bot. 32, 103, 141, 167 (1751). In the last work he accepted the derivation of the name from *Corago*, "*Cor agens veteribus*". Probably on this account he subsequently accepted the spelling *Borago*: vide Sp. Pl. ed. 1 (1753), ed. 2 (1762), Gen. Pl. ed. 5 (1754), ed. 6 (1764), Syst. Nat. ed. 10 (1759).

The etymological origin of *Borago* (*Borrage*) being doubtful, and both forms being current in pre-Linnean literature, it cannot be maintained that there is any orthographic error in the "original spelling", *Borago* L. (1753). Hence under Art. 57, that form of the generic name should be used by botanists. In accordance with this result, the correct spelling of the family name is *Boraginaceae* (not *Borraginaceae*, as adopted in Engl. & Prantl., Nat. Pflanzenfam., Engl. Pflanzenreich, etc).

The case of *Borago* shows that it may be impossible, even after very detailed investigation, to establish the etymological derivation of a generic name, even with a moderate degree of probability. It was doubtless for this reason that the Vienna Congress decided that the "original spelling" of a name (when first effectively published) must be retained, except in so far as that spelling contains *undisputed*, and apparently *unintentional*, typographic or orthographic errors. The onus of demonstrating the existence of such errors lies on the botanist who seeks to modify the name.

5. Brunella or Prunella.

Reference to Pfeiffer's Nomenclator, i. 478, ii. 847, shows that *Brunella* was used by a large number of authors during the period 1700-1857, although the form *Prunella* was more widely accepted. Subsequently *Brunella* was chosen by Bentham (Benth. et Hook. f. Gen. Pl. ii. 1203: 1876), Briquet (Engl. & Prantl, Nat. Pflanzenfam. iv. Abt. 3 A, 241: 1896), and Ascherson & Graebner (Fl. Nordost-deutsch. Flachl. 608: 1899), whereas *Prunella* was adopted by B. D. Jackson (Index Kewensis, ii. 634: 1894).

Schinz and Thellung stated in 1907 that under Art. 57 the correct form of the generic name was *Prunella* (Bull. Herb. Boiss. sér. 2, vii. 340), but the spelling *Brunella* is still current, occurring for example in the following works published since 1905: Blytt, Haandb. Norges Fl. ed. Dahl, 614 (1906), Lázaro é Ibiza, Comp. Fl. Esp. ii. 569 (1907), Krailov, Fl. Altaya, iii. 1045 (1907), Thonner, Blütenpfl. Afr. 507 (1908), Rouy et Foucaud, Fl. France, xi. 271 (1909), Heukels, Fl. Nederl. iii. 245 (1910), Coutinho, Fl. Port. 524 (1913), Vollmann, Fl. Bayern, 623 (1914), Knoche, Fl. Balear. ii. 333 (1922), and Stoyanov & Stefanov, Fl. Bulgar. 935 (1925). Two new species have also been published under *Brunella*, namely *Brunella prunelliformis* Makino (1912) and *B. cretensis* Gandoger (1916), and Panini adopted *Brunella* in a paper on natural hybrids in this genus (Bég. Arch. Bot. ii. 63, 179: 1926).

The earliest mention of the name which I have been able to trace is in the German 'Ortus Sanitatis' (Herbarius zu Teutsch) published at Mainz in 1485, De Herbis, cap. lxxii., as *Brunella*, Brunellen. In the Latin edition of 1491, De Herbis, cap. cccclxxix, it appears as *Prunella*, and this spelling was also adopted by Hieronymus von Braunschwyg, Buoch von Distillierung, fol. 1, verso (1515). Brunfels, Herb. iii. 27 (1536) mentioned that *Brunella* was a specific against the disease then known as Die Breüne, and gave the vernacular name as Braunellen. Fuchs, Hist. 622 (1542), who adopted the form *Prunella*, stated that it was known under that name by the general body of physicians and herbalists. Tragus, Hist. 309-312 (1552) chose the spelling *Prunella*, citing the following verse from Hieronymus von Braunschweig: "Braunell so bin ich genant: Ein braune bluom ist mir bekant." He translated this as: "*Prunella ego vocata sum: Purpureo etenim flore sum praedita*". According to this verse, Braunell was so-called because the flowers were "braun" (i.e. purple). On p. 312, however, Tragus derived the *Prunella* or Braunell of Strasburg from the disease 'Die Breüne.' He thought that it was a distinct species, being misled by the figure of *Trifolium pratense* erroneously associated with the text of *Brunella* in the third (posthumous) volume of Brunfels's herbal.

The spelling *Brunella* was accepted by the following pre-Linnean authors, among others: Dodoens, Cruydeboeck, fol. clxii, recto (1554); Lobel, Obs. 251 (1576); C. Bauhin, Pinax, 260 (1623); Spigellius, Isagoge, 264 (1633); Ambrosini, Phytologia, 112 (1666); Hermann, Hort. Lugd.-Bat. 94 (1687); Rivinus, Ord. Pl. Monopet. 24, t. 29 (1690); Tourn. Élem. 151 (1694), Inst. 182 (1719); Weinmann, Phytanth. Iconogr. i. 190 (1737); Haller, Enum. Stirp. Helv. 636 (1742).

On the other hand *Prunella* was adopted in about the same number of pre-Linnean works including: Anguillara, Semplici, 225 (1561); Pena et Lobel, Stirp. Advers. Nov. 199 (1571); Lonicerus, Kreuterbuch, fol. cxxx, recto (1578); Caesalp. De Plantis 453 (1583); Dalechamps, Hist. 1310 (1586); Tabernaemontanus, Kreuterbuch, ii. 256 (1591); Gerarde, Herball, 507 (1597); Parkinson,

Theatr. Bot. 526 (1640); J. Bauhin, Hist. iii. 428 (1651); Ray, Hist. i. 551 (1686); Morison, Hist. iii. 363 (1699).

Ambrosini (1666) who adopted *Brunella* (Phytolog. 112) has a cross reference, "*Prunella vulgaris* et *Pruneola Officinarum*, lege *Brunella*" (l.c. 442). He derived *Brunella* from the purplish colour of the inflorescence: "*Brunella* dicitur a colore bruno, sive fusco, quo praedita est: hic enim color apud multos brunus vocatur, idest subniger, non plane niger." He mentioned that it was also called *Prunella* on account of the leaves being like those of *Prunus* in shape: "*Prunella* nuncupatur a forma foliorum, nam folia huius herbae formam foliorum *Pruni* prae se ferunt." Morison, who accepted the spelling *Prunella* (Hist. iii. 363), also considered that that name was derived from the resemblance of the leaves to those of *Prunus*: "*Prunella* a foliorum forma, *Pruni* folia referentium a quibusdam nuncupatur". At the same time he accepted the derivation of *Brunella* from its use as a specific for 'Die Braüne': "*Brunella* ab effectu dicitur; eo quod faucium et linguae ardentibus affectibus, Causo Ungarico, maloque castrensi Die Braun et Brune dictis medeatur".

Linné at first chose the form *Brunella*: vide Syst. Nat. ed. 1 (1735), Hort. Cliff. 316 (1737), Class. Pl. 339 (1738), Gen. Pl. ed. 1, 177 (1737), ed. 2, 279 (1742), Fl. Suec. 180 (1745), Phil. Bot. 34, 121 (1751); Gen. Pl. ed. 5 (1754). In his Materia Medica, 108 (1749) he used the botanical name *Brunella*, but cited *Prunella* Pharm. as a synonym.

In his Flora Lapponica, 193 (1737) he had adopted *Prunella* and he returned to that spelling in Sp. Pl. ed. 1, 600 (1753), ed. 2, 837 (1763), Fl. Suec. ed. 2, 210 (1755), Syst. Nat. ed. 10, 1106 (1759), ed. 12, 404 (1767), and Gen. Pl. ed. 6, 301 (1764). He did not make the change in the fifth edition of the Genera Plantarum, but as he made it in the sixth, the retention of *Brunella* in the fifth edition was evidently due to an oversight. The starting-point of botanical nomenclature being 1753, Linné's deliberate choice of *Prunella* in that year must be accepted as determining the correct name for the genus. Both forms had been current for 250 years, so that there was no "orthographic error" on his part, and even if it could be proved definitely that *Brunella* was the historically earliest and etymologically correct form, this would not affect the position under the International Rules.

6. Euonymus or Evonymus.

Linné adopted *Evonymus* in Sp. Pl. ed. 1, 197 (1753) and *Euonymus* in Gen. Pl. ed. 5, 91 (1754). Schinz and Thellung (Bull. Herb. Boiss. sér. 2, vii. 190: 1907) adopted the spelling with a "v" on the ground of priority of publication, thus assigning precedence, as regards a generic name, to the first edition of the Species Plantarum, which has no generic descriptions, over the fifth edition of

the Genera Plantarum, which contains the corresponding descriptions. Robinson & Fernald (Gray's New Man. Bot. ed. 7, 556: 1908) took the same view. The position held by these authors is based on Art. 38 of the Rules, which validates the generic names of Species Plantarum, ed. 1 (1753), by association with the descriptions given in Genera Plantarum, ed. 5 (1754). The object of that provision was to secure priority for these Linnean generic names over those published by other authors in 1753 or 1754. I venture to think that there was no intention in the minds of those who drafted or voted for Art. 38 that the particular spelling adopted in the 'Species' should have precedence over that adopted in the 'Genera', where the two were different.

The case of *Guerezia* versus *Queria* shows that in order that a generic name in the 'Species' may be validated by the description in the 'Genera' it must be accepted in the latter work. *Guerezia* was published in Sp. Pl. ed. 1, 89 (original leaf 89-90). After the issue of the first part of the 'Species', the leaf 89-90 was reprinted,* the name *Guerezia* being replaced by *Queria*. In the 'Genera' Linné chose *Queria* as the name for the genus, and this later name is accordingly recognised as valid, because it was the one which appeared with his description in 1754.

The specific names published on the original leaf 89-90 are valid, since they are accompanied by descriptions. Thus Mattfeld (Fedde, Repert. Beih. xv. 74: 1922) accepted *Minuartia hispanica* L. Sp. Pl. 89 (original leaf 89-90), citing *M. dichotoma* L. l.c. (substitute leaf 89-90) as a synonym. Under Art. 50 Linné was not at liberty to change the name *hispanica*.

When Art. 38 was prepared, the occasional occurrence of different spellings of generic names in the 'Species' and 'Genera' respectively was apparently overlooked, so that no provision was made for this eventuality. I suggest that where there is a difference in spelling, (1) the more correct form should be adopted, whether it occurs in the 'Species' or the 'Genera', and that where the two spellings are equally correct, (2) general usage, or (3) established custom in transliteration should be followed. Thus the form *Amethystea* L. (Sp. Pl. 21) should be adopted in preference to *Ametystea* (Gen. 13), because it is more correct, being derived from ἀμέθυστος. Similarly *Ortegia* L.† (Gen. 21; Loefl. Iter, 122) should be preferred to *Ortega* L. (Sp. 560) because it is contrary to general usage to employ the unaltered name of a person as a generic name (*Maranta* L. being an exception). *Ludwigia* (Gen. 55) should be preferred to *Ludvigia* (Sp. 118) because it has been more widely adopted, and is furthermore in accordance with Rec. IV b.

*An account of the two leaves which were replaced is given in Bot. Centralbl. lxvii. 5 (1896).

†Formed from the name of the Spanish botanist Ortega, just as *Pontederia* was formed from Pontedera. As pointed out by Post et Kuntze, Lexic. Gen. Phan. 405 (1903), the best form would have been *Ortegaea*, in accordance with Rec. IVa, but Linné did not employ that form.

In the case of *Euonymus* or *Evonymus*: (1) it is a matter of opinion which is the "more correct" form, and (2) both are very widely employed in botanical literature. *Euonymus* was adopted for example in Benth. et Hook. f. Gen. Pl. i. 360 (1862); Index Kewensis, i. 913 (1893); Rouy et Fouc. Fl. France, iv. 158 (1897); Aschers. & Graebn. Fl. Nordostdeutsch Flachl. 479 (1899); Heukels, Fl. Nederl. ii. 389 (1909); Britton and Brown, Ill. Fl. ii. 490 (1913); Babington, Man. Brit. Bot. ed. 10, 82 (1922); Merrill, Enum. Philipp. Fl. Pl. ii. 480 (1923); Bailey, Man. Cult. Pl. 464 (1924). *Evonymus* was accepted, on the other hand, in Engler & Prantl, Nat. Pflanzenfam. iii. Abt. 5, 199 (1892); Dalla Torre et Harms, Gen. Siphonog. 289 (1901); Lázaro é Ibiza, Comp. Fl. Esp. ii. 88 (1907); Gray's New Man. Bot. 556 (1908); Lindman, Svensk Fanerogamfl. 405 (1918); Schinz & Keller, Fl. Schweiz, ed. 4, Theil 1, 443 (1923); Jávorka, Magyar Fl. 692 (1924); and Rehder, Man. Cult. Trees & Shrubs, 567 (1927). Many other examples might be cited of both forms. As neither form is definitely "more correct" than the other, and as there is no great preponderance in usage either way, resort may be had to the third method suggested above of deciding between alternative names: and since the Greek "eu" is customarily transliterated as "eu" in botanical names, *Euonymus* should be adopted in preference to *Evonymus*.

The attention of botanists is drawn to the vexed question of the "priority", as regards generic names, of Species Plantarum, ed. 1, over Genera Plantarum, ed. 5 (vide p. 294), in order that it may receive adequate consideration before 1930.

XLVI.—TROPICAL AFRICAN PLANTS: IV.*

J. HUTCHINSON AND J. M. DALZIEL.

STERCULIACEAE.

Scaphopetalum amoenum A. Chev. Explor. Bot. Afr. Occid. Franç. 85, nomen; affinis *S. Blackii* Mast., sed foliis elongato-obovatis nervis lateralibus numerosioribus, floribus cymulosis differt.

Frutex usque ad 3 m. altus, ligno mucilaginoso; ramuli pubescentes. *Folia* elongato-obovata, supra medium ad basin angustata, usque ad 18 cm. longa et 7 cm. lata, glabra costa media parce puberula excepta, nervis lateralibus utrinsecus circiter 12 leviter arcuatis a costa sub angulo 65° abeuntibus intra marginem elongatis; petioli 1 cm. longi. *Flores* cymulosi, axillares, pauci; pedicelli 3-4 mm. longi, puberuli. *Calycis lobi* ovati, 6 mm. longi, extra laxè pubescentes. *Petala* carinaeformia, 6 mm. longa, extra minute pubescentia.

Ivory Coast: Bingerville region, *Chevalier* 15519: Bouroukrou, Dec.-Jan., *Chevalier* 16578, 16586, 16896: Indénié, Mar., *Chevalier* 17682, 17788 (type).

*Continued from K.B. 1928, p. 229.

Melochia mollis Hutch. et J. M. Dalz., sp. nov.; affinis *M. melissifoliae* Benth., sed caulibus et innovationibus ubique pilis sericeis longis dense indutis, bracteis longe linearibus dense plumoso-pilosis differt.

Herba vel suffrutex, ubique pilis longis sericeis induta. *Folia* ovato-lanceolata, acuta, basi rotundata vel truncata, 4-8 cm. longa, 2-3.5 cm. lata, utrinque pilosa, acute serrulata, nervis lateralibus utrinsecus circiter 8, basalibus ascendentibus; petioli circiter 1 cm. longi, longe plumosi; stipulae lineares, 1 cm. longae, longe ciliatae. *Flores* glomerati, axillares; bractee longissimae, lineares, dense plumoso-pilosae. *Sepala* lineari-lanceolata, 8 mm. longa, longe pilosa. *Petala* 1 cm. longa. *Fructus* subglobosus, 0.5 cm. longus, pubescens.

Liberia: Monrovia, Whyte. Nigeria: Southern Provinces, Eket, Talbot. Shari: Dar Banda, Dec., *Chevalier* 6573. Eastern Sudan: on the Roah River, Dec., *Schweinfurth* 2771 (type). Uganda: Mawokota, Febr., *Brown* 152; Busoga, *Brown* 267; Entebbe, *Maitland* 739; Kivuru, May, *Dümmer* 881; Kalungu, *Scott Elliott* 7359.

Sterculia elegantiflora Hutch. et J. M. Dalz., sp. nov.; affinis *S. Tragacanthae* Lindl., sed foliis basi leviter cuneatis, petiolis brevioribus, calycis lobis longioribus differt.—*S. oblonga* A. Chev. Explor. Bot. Afr. Occid. Franç. 76, non Mast.

Arbor; ramuli hornotini molliter tomentosi. *Folia* elliptica, basi leviter cuneata, plus minusve acuminata, 8-14 cm. longa, 5-8 cm. lata, supra glabra, infra tenuiter stellato-pubescentia, nervis lateralibus utrinsecus circiter 12 a costa sub angulo 65° abeuntibus infra prominentibus; petioli circiter 2 cm. longi, tomentosi; stipulae mox deciduae, lineari-subulatae, 1 cm. longae. *Flores* pauci, breviter racemosi; pedicelli 2 mm. longi. *Alabastra* ovoidea, 5 mm. longa, tomentosa.

Ivory Coast: Bouroukrou, *Chevalier* 16136 bis, 16137: Sanvi, *Chevalier* 17693 (type): Yapo, *Chevalier* 22316: Middle Comoé, *Chevalier* 22633: Attié, *Chevalier* 22668.

Sterculia Thompsonii Hutch. et J. M. Dalz., sp. nov.; foliis ovato-orbicularibus, nervis lateralibus utrinsecus circiter 5, calycis lobis lanatis distincta.

Arbor. *Folia* ovato-orbicularia, basi rotundata vel truncata, breviter acuminata, 9-13 cm. longa, 7-11 cm. lata, nervis lateralibus utrinsecus 5 infra valde prominentibus, tertiariis obliquis arcuatis; petioli usque ad 5 cm. longi, glabri. *Inflorescentia* non visa. *Calycis lobi* obovati, circiter 4 mm. longi, intra densissime lanati.

Nigeria: Southern Provinces, without locality, *Thompson* 6.

Vernacular name "Orodo."

Cola Johnsonii Hutch. et J. M. Dalz., sp. nov.; affinis *C. cauliflorae* Mast., sed floribus e ramulis foliatis ortis, foliis breviter oblongo-ellipticis minoribus, floribus subsessilibus differt.

Arbor parva; ramuli glabri, cinerei. *Folia* oblongo-elliptica, basi breviter cuneata, obtuse acuminata, 6–12 cm. longa, 2.5–4 cm. lata, infra reticulata, glabra, nervis lateralibus utrinsecus circiter 6 arcuatis; petioli usque ad 1 cm. longi. *Flores* subsolitarii et subsessiles. *Calyx* 1 cm. longus, late campanulatus, extra scabridus, lobis triangularibus acutis margine puberulis. *Ovarium* tomentosum; stylus brevis, tomentosus.

Gold Coast: Kwahu, 580 m., Mar., *Johnson* 619.

Cola lanata *Bak. f. ex Hutch. et J. M. Dalz.*, sp. nov.; ubique pilis longe plumosis et stellatis brevibus dense induta, floribus in ramis vetustioribus subsessilibus et glomeratis distincta.

Folia digitate composita; foliola ambitu obovata, petiolulata, circiter 35 cm. longa et 15 cm. lata, pinnate 3–5-lobata, utrinque molliter lanato-tomentosa, lobis oblongo-lanceolatis usque ad 4 cm. latis. *Flores* subsessiles, calycis lobi pubescentes.

Nigeria: Southern Provinces, Oban, *Talbot* 1299.

MALVACEAE.

Hibiscus comoensis *A. Chev. Explor. Bot. Afr. Occid. Franç.* 65, nomen; species foliis ambitu suborbicularibus crasse 6–7-dentatolobulatis, floribus umbellatis, bracteis epicalycis 5–6 spatulato-oblancoelatis longissimis distinctissima.

Rami setuloso-tomentosi. *Folia* ambitu suborbicularia, circiter 18 cm. diametro, basi cordata, digitate 6–7-nervia et lobulata, supra ferè glabra, infra breviter stellato-pubescentia; petioli usque ad 5 cm. longi; stipulae subulatae, 3 mm. longae. *Flores* umbellati; pedicelli usque ad 2.5 cm. longi, pubescentes. *Epicalycis bractee* 5–6, spatulato-oblancoelatae, calyce multo longiores, superne setosociliatae. *Calyx* campanulatus 6–7 mm. longus, breviter lobatus, extra tenuiter pubescens, lobis triangularibus. *Corolla* circiter 3 cm. longa. *Fructus* ovoideus, 1.5 cm. longus, breviter puberulus, bracteis epicalycis et calyce persistente circumdatus.

Ivory Coast: Middle Comoé, between Akabossué and Ebrinahoué, Dec., *Chevalier* 22613.

Hibiscus Gourmania *Hutch. et J. M. Dalz.*, sp. nov.; species habitu fruticis parvae, foliis anguste lanceolatis crenatis distincta.—*Gourmania grewoides* *A. Chev. Explor. Bot. Afr. Occid. Franç.*, 86, nomen.

Frutex parvus, demissus, ramulis scabridis dense stellato-pubescentibus. *Folia* anguste lanceolata, crenata, 5–6 cm. longa, circiter 1 cm. lata, infra parce stellato-pubescentia, ad basin infra prominente trinervis; petioli 1 cm. longi, stellato-pubescentes; stipulae lineares, 5 mm. longae, setosae et stellato-pubescentes. *Flores* axillares, solitarii; pedicelli 3–4 mm. longi. *Epicalycis lobi* circiter 7, lanceolati, 3 mm. longi, stellato-setosi. *Calyx* campanulatus, 9 mm. longus; lobi lanceolato-triangulares, parce stellato-pubescentes. *Corolla* 1 cm. longa. *Fructus* vix 1 cm. longus, depresso-globosus.

French Sudan: Gourma, July, *Chevalier* 24514 (type); Mossi, Aug., *Chevalier* 24717.

Kosteletzkya stellata *Hutch. et J. M. Dalz.*, sp. nov.; affinis *K. adoensi* *Hochst.*, sed foliis pentagonis, pedicellis brevioribus differt.—*Hibiscus solandra* *A. Chev. Explor. Bot. Afr. Occid. Franç.* 67, non L'Hérit.

Planta usque ad 4 m. alta; ramuli breviter stellato-pubescentes. *Folia* pentagona, basi lata, circiter 7 cm. diametro, glabrescentia, crenata; stipulae lineares, parvae. *Flores* axillares, breviter cymosae. *Epicalycis bractee* 7, lineares, calyce breviores. *Calycis lobi* ovati, 5 mm. longi, pubescentes. *Corolla* 1.3 cm. longa. *Fructus* depressus, prominenter 5-angularis, angulis setosis. *Semina* minute muricata.

Gold Coast: Anum, Nov., *Johnson* 816 (type). Dahomey: Abbo, Feb., *Chevalier* 22965. Nigeria: Southern Provinces; Iddo Island, *Millen* 44; Ebute Metta, *Millen* 53.

MALPIGHIACEAE.

Rhinopteryx Kerstingii *Hutch. et J. M. Dalz.*, comb. nov.—*Acridocarpus Kerstingii* *Engl. Bot. Jahrb.* 43: 383 (1909).

French Guinea: without locality, *Pobéguin* 2143. Togo: Sokode-Basari, near Bangeli, *Kersting* 507 (type).

EUPHORBIACEAE.

Maesobotrya edulis *Hutch. et J. M. Dalz.*, comb. nov.—*Baccaurea edulis* *A. Chev. Explor. Bot. Afr. Occid. Franç.* 563, nomen. *M. cauliflora* *Hutch. ex Chipp List Gold Coast Trees*, etc. 34, nomen; valde affinis *M. sparsiflorae* *Hutch.*, sed inflorescentiis e trunco, foliis ellipticis abrupte acuminatis basi rotundatis infra glabris 10–22 cm. longis 5–10 cm. latis undulatis vel subintegris differt.

Ivory Coast: Agniéby valley, *Chevalier* 17116 (type); between Soubiré and Yaow, *Chevalier* 17746. Gold Coast: Tanosu, Feb., *Chipp* 264, 348; Beyin, July, *Brent* 7 DD.

Drypetes ivorensis *Hutch. et J. M. Dalz.*, sp. nov.; affinis *D. Talbotii* *S. Moore*, sed foliis minoribus ellipticis obtuse acuminatis differt.—*D. Pierreana* *A. Chev. Explor. Bot. Afr. Occid. Franç.* 561, non *Hutch.*

Frutex usque ad 3 m. altus; ramuli breviter pubescentes. *Folia* elliptica, obtuse acuminata, basi leviter inaequilateralia, 12 cm. longa, 4 cm. lata, integra vel minute denticulata, glabra, nervis lateralibus utrinsecus 5–6 intra marginem prominenter conjunctis; petioli 5 mm. longi. *Flores* e trunco glomerati; pedicelli 8 mm. longi, graciles, glabri. *Alabastra* depresso-globosa, circiter 3 mm. longa, glabra. *Fructus* breviter pedicellatus, globosus, 2–2.5 cm. diametro, breviter pubescens, siccitate transverse rugosus.

Ivory Coast: Bouroukrou, Dec., *Chevalier* 16694; between the Middle Sassandra and Middle Cavally Rivers, *Chevalier* 19227; Yabas, July, *Chevalier* 19496 (type).

Drypetes Aylmeri Hutch. et J. M. Dalz., sp. nov.; affinis *D. floribundae* Hutch., sed sepalis extra minute puberulis, pedicellis brevioribus differt.

Arbor parva, ligno albo; ramuli glabri. *Folia* oblonga, obtuse acuminata, basi breviter cuneata, circiter 16 cm. longa et 5.5 cm. lata, distincte denticulata, glabra, nervis lateralibus utrinsecus 6 arcuatis marginem versus crenato-ramosis; petioli 1 cm. longi. *Flores* ♂ e trunco glomerati; pedicelli 5 mm. longi, puberuli. *Sepala* orbicularia, 2.5 mm. longa, extra minute puberula. *Stamina* 8.

Sierra Leone: Jerihun, Sept., *Aylmer* 603.

Croton Collenettei Hutch. et J. M. Dalz., sp. nov.; affinis *C. macrostachyi* Hochst., sed foliis basi breviter cuneatis obovato-ellipticis glandulis basalibus sessilibus differt.

Arbor circiter 8 m. alta; ramuli elongati, stellato-puberuli. *Folia* obovato-elliptica, basi breviter cuneata, abrupte acuminata, 7-9 cm. longa, 3.5-5 cm. lata, submembranacea, utrinque sparse stellato-pubescentia, remote et obscure denticulata; glandulae basales sessiles; petioli 2 cm. longi, puberuli. *Racemi* elongati, unisexuales, ♂ circiter 20 cm. longi; axis tomentellus; flores lactei, fasciculati; pedicelli graciles, 8-10 mm. longi, puberuli. *Sepala* suborbicularia, 3 mm. longa, extra parce pubescentia. *Flores* ♀ ignoti.

French Guinea: Maceuta, 600 m., May, *Collenette* 15.

Croton penduliflorus Hutch., sp. nov.; affinis *C. Lehmbachii* Hutch., sed glandulis basalibus longe stipitatis differt.

Arbor; ramuli mox glabrescentes. *Folia* late elliptica vel ovato-elliptica, breviter et abrupte acuminata, basi rotundata vel late cuneata, 8-14 cm. longa, 5-8 cm. lata, crenata, infra fere glabra; glandulae basales longe stipitatae; petioli 3-5 cm. longi, mox glabrescentes. *Racemi* bisexuales, penduli, elongati, usque ad 30 cm. longi; axis laxo tomentellus; flores ♂ fasciculati; pedicelli breves, laxo tomentelli. *Sepala* stellato-pubescentia. *Ovarium* tomentellum.

Sierra Leone: Kennema, May, *Lane-Poole* 269 (type); *Aylmer*, 138. Gold Coast: Sra, June, *Mrs. H. W. Moor* 305.

According to Mrs. Moor, the native names are *Nyamrim* (Twi) and *Doodwacho* (Krobo). The wood is used for rafters, and an infusion made from the leaves is used externally for fever.

Tetracarpidium conophorum Hutch. et J. M. Dalz., comb. nov.—*Plukenetia conophora* Muell. Arg. in *Flora* 47: 530 (1864); Prain in *Dyer, Fl. Trop. Afr.* 6, 1: 949. *Mallotus Preussii* Pax, in *Engl.*

Bot. Jahrb. 23: 525 (1896). *Tetracarpidium Staudtii* Pax, *Engl. Bot. Jahrb.* 26: 329 (1899). *Cleidion Preussii* Bak. in *Kew Bull.* 1910: 343. *Angostylidium conophorum* Pax et K. Hoffm. in *Engl. Pflanzenr. Euphorb.-Plukenetia.-Epiprinin.-Ricin.* 17: (1919).
Extends from Sierra Leone to the Belgian Congo.

XLVII.—MISCELLANEOUS NOTES.

The Secretary of State for the Colonies has appointed DR. H. A. TEMPANY, Director of Agriculture, Mauritius, to be Director of Agriculture, Federated Malay States and Straits Settlements. (*K.B.* 1916, p. 277).

MR. H. BRUINS-LICH, Student Gardener, Royal Botanic Gardens, Kew, has been appointed by the Secretary of State for the Colonies, Horticultural Officer, Saint Helena.

MR. F. W. THORNS, Student Gardener, Royal Botanic Gardens, Kew, has been appointed by the Government of the Sudan, Assistant Superintendent of Gardens, Khartoum Province.

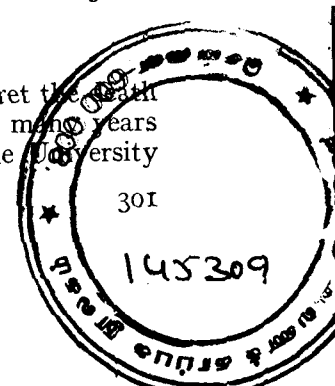
RETIREMENT OF MR. WALTER IRVING.—On 2nd August MR. WALTER IRVING retired, under the age limit, from the post of Assistant Curator in charge of the Herbaceous Department.

Mr. Irving came to Kew in October, 1890, as a Student Gardener. He was promoted to Sub-foreman in January, 1893, and a month later was appointed Foreman in charge of the collections of herbaceous and alpine plants, which post he has held ever since. The title of his appointment was changed from Foreman to Assistant Curator in 1922.

In succession to Mr. Irving the Minister of Agriculture and Fisheries has appointed MR. ALEXANDER EDWARDS to be Assistant Curator. Mr. Edwards was for three years with Messrs. Hayes, of Keswick, the well-known rock garden specialists. He then served two years at the Royal Botanic Garden, Edinburgh, as a probationer Gardener, and for the past two years has been a Foreman in the Manchester Public Parks Department.

PROFESSOR H. O. JUEL.—We learn that Prof. Juel, who since 1907 has been Professor of Botany in the University of Upsala and Director of the Botanical Museum, resigned these offices last June. He has been succeeded by PROF. N. E. SVEDELIUS.

JULIO AUGUSTO HENRIQUES.—We record with regret the death at the age of ninety of Prof. J. A. Henriques, for many years Director of the Botanic Garden and Herbarium of the University



of Coimbra. Prof. Henriques was an old and valued correspondent of Kew, especially in connection with his work on the Portuguese flora and the flora of the Portuguese Colonies in West Africa. His botanical contributions were published in the "Boletim de Sociedade Broteriana," the journal which he founded and edited.

JOSEPH NELSON ROSE.—We greatly regret to hear the news of the death of Dr. J. N. Rose, the well-known Associate Curator of the United States National Herbarium. Dr. Rose was born in Indiana on January 11th, 1862, and died after a brief illness on May 4th, 1928.

He had made repeated botanical expeditions in many parts of North and South America, and was known especially for his work on *Umbelliferae* in connection with Professor J. M. Coulter and also on several groups of Succulents, notably *Crassulaceae* and *Cactaceae*, the latter family in co-operation with Dr. N. L. Britton, of the New York Botanical Garden.

Plant Research Institute, New Zealand.—We learn with interest that the New Zealand Government have recently established a Plant Research Institute at Palmerston North, North Island, New Zealand, which is independent of the recently established Massey Agricultural College, situated near the same town.

The new Plant Research Institute is the old Biological Laboratory, Department of Agriculture, enlarged and transformed for the investigation of scientific problems connected with Agriculture.

The Director of the new Institute is Mr. Alfred Cockayne who will also retain his post as Director of the Field Division, Department of Agriculture, and the members of the staff of the Institute are as follows:—Messrs. G. H. Cunningham and J. C. Neill (Mycologists), Dr. H. H. Allan (Systematic Botanist), Mr. E. B. Levy (Pasture Ecologist), Mr. N. R. Foy (Seed testing investigations), Mr. W. B. Reid (Bacteriologist).

A Chemist and a Plant Breeder will shortly be appointed.

The Institute possesses suitable laboratories and a large area of ground for experimental work, and it is hoped to bring together a large collection of hybrid trees and shrubs which form so striking a feature of the vegetation of New Zealand. It is also hoped that in the course of time an Herbarium representing the history of all the plants under investigation will be formed at the Institute.

Sapodilla Plum.—In "De Indische Mercur" of March 28th, 1928, an interesting account* is given of recent experiments in the shipment of the "Sapodilla Plum" or "Chikko" (*Achras Sapota* L.)

*Reprint—"Invoer van Sawa Manila te Amsterdam" door Ir. W. Spoon. No. 35 Berichten van de Afdeling Handelsmuseum van de Kon. Vereeniging Koloniaal Instituut, pp. 1-10, 1928. Published by J. H. de Bussy, Amsterdam.

from Java to Holland. This tropical American fruit is now extensively grown in Malaya and the East Indies and is much relished by both Europeans and Asiatics. In some localities the fruit is produced more or less continuously throughout the year.

For the trial shipments good quality fruit from the fruit districts of west Java was used. The fruit was packed in small crates with coconut fibre, but without paper wrappers, and shipped from Batavia. At first crates containing several layers of fruit were despatched, but it was found that better results were obtained, though at a higher cost, by utilizing flat boxes containing only one layer of fruit: each box containing about three dozen fruits. On the voyage cold storage of $+3^{\circ}\text{C}$. was used for the fruit, which was found to arrive at Amsterdam in excellent condition without having depreciated in flavour or lost any of its natural aroma. At Amsterdam propaganda for disposal of the fruit had been arranged and a printed pamphlet describing the fruit and the manner in which it should be eaten was distributed with each box. The reception the fruit received at Amsterdam is claimed to have been very good.

From an examination of the figures given for charges, freight, etc., the cost of the fruit delivered in Amsterdam is not as high as might be expected on a new undertaking of this nature. In the event of regular shipments being made overhead charges could no doubt be considerably reduced. The total expenditure per box is given at guilders 2.60-2.70, which works out at guilders .08-.09 per fruit (approx. 2d.). The fruit in Java costs guilders 1.50-2.50 per hundred.

F. N. H.

Flora of West Tropical Africa.*—The second Part, concluding Volume i of this Flora, consists of pp. 247-523 and text figures 109-177. It contains the Families *Sterculiaceae*—*Umbelliferae*. This part contains the Families of most economic importance in West Africa. The *Meliaceae*, which includes the "West African Mahogany" (*Khaya ivorensis*) and allied trees exported under the general trade name of Mahogany, and Cedar (*Entandrophragma*), have now been definitely worked out, and for the first time their identity can be ascertained and the confusion which has always existed in connection with these trees is cleared up. The dominant forest Family of Leguminosae is recorded under the three Families *Caesalpiniaceae*, *Mimosaceae*, and *Papilionaceae*, and with the aid of the excellent figures depicting typical fruits of these trees the chief components of the forest will now be readily recognisable. Other Families commonly occurring in the forest, such as the *Sterculiaceae*, *Euphorbiaceae*, *Moraceae*, *Rhamnaceae* and *Sapindaceae*, also come into this Part. Most of these Families were last enumerated in the early volumes of the Flora of Tropical Africa, and the need of an up-to-date treatise embodying the study of the large quantity of

*Price 8s. 6d. The Crown Agents for the Colonies, 4, Millbank, London, S.W.1.

material which has accumulated in the intervening period has been acutely felt for some years by those whose work has in any way been connected with the West African vegetation. The text figures generally have been well chosen and are well reproduced.

The Care of Ornamental Trees.*—During recent years a business called "tree surgery" has developed in the United States of America, and the principles of this business are set out in the book under notice. The chief items dealt with are planting and care of trees, pruning, fertilization (manuring) of shade trees, spraying, cavities and cavity-filling materials, and some ailments of trees. Generally, the advice given is good and to the point, although in some instances the author seems inclined to recommend calling the doctor without much cause. For instance he appears to over-estimate the necessity for feeding trees growing on lawns, and to recommend the application of fertilizers every few years. Whether fertilizers are required depends upon local circumstances. In the British Isles there are many thousands of lawn and park trees up to 100 or more years of age that are well developed and in perfect health, and have never been artificially fertilized. In all its essentials "tree surgery" is the kind of work that has been practised in some places in this country, particularly at Kew, for a considerable number of years under the less pretentious title of "pruning and care of trees," work that is in every way necessary for the well-being of trees, whether it be carried out by the tree surgeon or the humble garden labourer.

W. D.

Pioneers of Plant Study.†—This Publication was originally planned, and some parts of it written, in collaboration with the late Professor G. S. Boulger. It makes no claim to being a complete history of plant study, but contains nevertheless some interesting features. The first few chapters are devoted to a discussion of the plants of ancient Egypt, Assyria, China, and elsewhere, brought to light by archaeological undertakings or mentioned in myth and legend. Then follows a history of the development of the science of Botany, mainly in the form of biographical accounts of botanists and their activities from the period of Aristotle to the 19th century. A chapter is included giving a brief history of the origin and development of the Royal Botanic Gardens, Kew. The work contains an exhaustive index, including the names of all persons mentioned in the book, and a number of portraits of celebrated botanists.

*The Care of Ornamental Trees, by C. F. Greeves-Carpenter. The Macmillan Company, New York (Messrs. Macmillan & Co., Ltd., London), 1928, pp. 70, plates 7. Price 5s. 6d. net.

†Pioneers of Plant Study, by Ellison Hawks. The Sheldon Press, Northumberland Avenue, London, W.C. 2, 1928, pp. x + 288, plates 17. Price 12s. 6d.

BULLETIN OF MISCELLANEOUS INFORMATION

No. 8 1928

ROYAL BOTANIC GARDENS, KEW

XLVIII.—THE BANANA IN SOME TROPICAL EASTERN COUNTRIES—ITS FORMS AND VARIATIONS.

F. N. HOWES.

During the early part of the year visits were paid to certain countries in the East, chiefly for the purpose of obtaining living material of some of the better forms of cultivated banana. These visits were carried out under the auspices of the Empire Marketing Board in connection with the campaign that is now being carried on against "Panama Disease" (*Fusarium cubense*) in the commercial banana growing areas of the Empire. It is a matter of common knowledge that the "Gros Michel" or "Jamaica" banana, which is the variety extensively grown in the West Indies and Caribbean region, is a ready victim to the ravages of this disease, and the desirability of obtaining a variety that complies with the demands of the trade, and which is at the same time highly resistant to, or immune from "Panama Disease" is obvious. The extent to which the varieties chosen may be resistant to the disease can, of course, only be ascertained after they have been established in the West Indies from young plants of these varieties sent out from Kew.

In addition to forms of cultivated banana (seedless), material of the larger fingered seeding Musas was required. The possible value of these seeding types lies in their use as female parents in breeding work. They have proved largely to be resistant to "Panama Disease," and the possibility of obtaining eventually a hybrid, or strain, combining the resistance of the original female parent with the fruit characters of an "edible" male parent is apparent.

Among cultivated bananas, material was selected only of those that possessed superior edible qualities and were regarded as being promising commercial types. As this selection involved a survey of all the varieties encountered in the East it was possible to make observations on a large number of varieties and to record their characteristics, and to a certain degree their distribution, particularly of those that are extensively cultivated and occur in several distinct regions. It is proposed in this article, therefore, to deal with this aspect of the investigation, and, in dealing with the more important varieties, not to be limited entirely to those that are regarded as potential shipping bananas. The countries visited were British Malaya, Java, Siam, Burma, S. India and Ceylon.

In dealing with varieties it will be noticed that they are referred to entirely by vernacular names. The reason for this is that a botanical nomenclature, or systematic classification for cultivated bananas has not as yet been drawn up for any of the countries visited. Furthermore, European common names for varieties exist in only a very few instances. The names used throughout this article are those that are well recognised and established in the better known languages such as Siamese, Burmese, Malay, Tamil and Ceylonese. Names belonging to any of the lesser-known dialects have been excluded. To attempt to draw up a botanical classification of banana varieties in any of the countries visited was, in the circumstances, quite impossible, as anyone familiar with the multiplicity of forms occurring in the East will readily recognise. This is a task that can only be attempted by one who is resident for some time in one of these countries and is able carefully to observe the different varieties in their different stages of development.

Although the number of varieties cultivated in all the Eastern tropical countries visited is large, it is usual for almost all the fruit produced in any one area to be supplied by some three or four varieties only. In some areas—particularly Siam—some of the varieties are very rare and are seldom met with for sale on the native markets. They are reserved as far as possible for festive occasions and are given as presents to priests and other dignitaries. Some varieties are very localised in their distribution and are very probably endemic. Others on the other hand have a wide range of distribution, existing under different native names in different countries. A glance at the table of synonyms on page 307 illustrates this point. The varieties most esteemed by Asiatics are not necessarily those favoured by Europeans. Similarly in some cases varieties thought highly of by Europeans have no such great appeal to the Oriental. The distinction between table and cooking bananas, or “bananas” and “plantains,” is not so marked in the East as in Africa and elsewhere, probably on account of the far greater number of varieties. Those that are used both for eating in the uncooked state and for cooking form a very large class.

It is interesting to note the wide range and extent of cultivation of the Cavendish or Canary banana (*Musa Cavendishii* Lam.) in the East. It was encountered in all the countries visited except Siam. The “Cavendish” is commonly regarded as a sub-tropical rather than a tropical species and its success in some of the low-lying areas of Burma and Southern India is therefore all the more remarkable.

With regard to bananas of the “Gros Michel” type, these were met with in Malay, Java, Siam, Burma and Ceylon, but not in southern India. In Malay the varieties “Pisang embon” and “Pisang hijau” fall under this category; in Burma two forms of the variety known as “Thihmwe,” and in Siam the several forms belonging to the group “Klui-hom.” In Ceylon the “Anamalu” forms may be taken as the representatives. My observations lend

TABLE SHOWING SYNONYMOUS NATIVE NAMES OF CULTIVATED VARIETIES.

MALAY and JAVA (Malay)	Pisang maas	Pisang embon	Klui nam wa	Klui ferong	Pisang serendah	Pisang batu (of Java)	Pisang abu	Pisang masak hijau	Pisang raja udang	Pisang batu (of Malay)
*SIAM (Siamese)	Klui kai	Klui hom	Klui nam wa	Klui ferong		Klui humuk		Klui hom kieu	Klui naak	Klui tani
BURMA (Burmese)		Thihmwe	Yakhine	Htaw-bat	Wet-ma- lut	Hpi-gyan		Thihmwe	Shwe- hngat- pyaw	
S. INDIA (Tamil)				Rastali	Pacha- wara	Pajan			Sawara	Puven
CEYLON (Singalese)		Anamalu				Monthan	Alu kehel	Hapu- mal anamalu	Ratem- bala	Puvalu

Names in the same vertical column refer to the same variety.

support to the theory that south-eastern Asia is the original home of the "Gros Michel" type. It must be remembered, however, that these observations were limited to a portion of south-eastern Asia only. The large number of forms that occur here, closely allied to, if not altogether identical with, the "Gros Michel," point to the antiquity of this type. Its presence in several forms in Ceylon, but its absence from southern India, as far as could be ascertained, is peculiar and suggests that the Ceylon forms may have originated through the agency of man from countries further East—the Malay Archipelago or Indo-Malaya. What part of south-eastern Asia is to be regarded as the original home of the "Gros Michel" type will no doubt always remain a mystery.

A number of varieties in the East which are usually seedless were occasionally found with one or two apparently normal seeds in a finger. Possibly if grown at a fairly high altitude in Jamaica or the West Indies, seeding would be found to be less sporadic and the varieties would prove of use as female parents in breeding work. Furthermore, the subsequent elimination of the seeding factor would probably present no great difficulty as may be found to be the case with the wild seeding Musas.

I am indebted to numerous people in the countries visited for the assistance and information they so kindly gave. In British Possessions the Directors of Agriculture and members of their staffs were most helpful. In Java the Director and Curator of the Botanic Gardens, Buitenzorg, and in Siam, Dr. Kerr of the Ministry of Commerce, members of the Agricultural Department, and Mrs. Collins of Sriracha, very kindly gave me great help with their knowledge of local conditions, and rendered me every possible service.

Cultivated Bananas.

MALAYAN VARIETIES.

In Malaya the Malay word "pisang" is used throughout for banana and the different varieties are denoted by the word "pisang" plus a descriptive adjective which has a bearing on some peculiarity about the variety, *e.g.*, "Pisang serandah," the Dwarf or Cavendish Banana (serandah=short).

"Pisang embon." (Plate III, fig. 2).

This variety is very largely grown in most parts of Malay and is quite one of the most popular varieties among both Asiatics and Europeans. The bunches, except when adverse conditions prevail, are large and compact. The hands are evenly spaced and the fingers, which are large, well filled, and of uniform thickness, are generally curved in the neighbourhood of the pedicel and lie adjacent to one another throughout the greater part of their length.

The fruit is of excellent flavour with a pale cream-coloured flesh, rather dry and of a close even texture. On ripening it assumes generally a dull yellow colour. So closely does this variety resemble the "Gros Michel" or "Jamaica" that it is regarded by many as

PLATE III.



Fig. 2. Pisang embon, Malay.



Fig. 4. Pisang rastali, Malay.



Fig. 1. Pisang rajah, Malay.

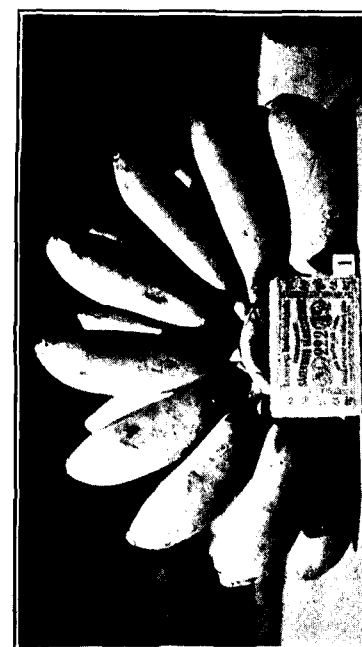


Fig. 3. Pisang maas, Malay.

PLATE IV.



Pisang serendah, Malay.

being identical with it. Well grown plants up to fifteen feet in height were seen in some localities, with sturdy erect pseudostems generally mottled a good deal with black markings. The leaf sheaths near the point of attachment to the petiole are covered with a white waxy substance in the young stages. The usual number of hands per bunch in the Serdang area, near Kuala Lumpur, F.M.S., was 8 or 9, and the number of fingers per hand 16 or 17. The fingers are from 7 to 8 inches in length and $1\frac{1}{2}$ inches in diameter.

This variety is regarded as likely to comply with the demands of the trade in every way, but it is feared that it offers very poor resistance to certain vascular diseases (Panama?), as will be seen from observations made in the State of Negri Sembilan which are dealt with among the remarks on Cultivation and Diseases (page 325). This variety, it was found, was known as "Pisang embon" over the greater part of Malay, but in and around Penang the name "Pisang bunga" was frequently used.

"Pisang masak hijau."

This variety, sometimes called "Pisang hijau" (masak=ripe: hijau=green), is characterised by being yellow-green when ripe and never attaining to a truly yellow colour. This feature distinguishes it from all other Malayan varieties and accounts for the descriptive Malay name by which it is known.

The habit of the plant, size and shape of the bunches and fingers, are identical with those of "P. embon." The flesh, however, is not so dry and is of a sweet sub-acid flavour. It is regarded as a good dessert banana, but its failure to assume an attractive colour would probably be a serious drawback from the commercial point of view. Furthermore, a tendency for the fingers to fall away from the bunch at an early stage is noticeable in some cases.

"Pisang maas." (Plate III, fig. 3).

This variety, known also as the "Golden Banana" (maas=golden) no doubt on account of the rich orange colour of the ripe fruit, is regarded by many as the most choice of the Malayan varieties. It is cultivated very extensively in some areas and always commands a higher price than other varieties. The fingers are small, not more than 3 inches in length and $1\frac{1}{2}$ inches in diameter, and stick out more or less at right angles to the stalk of the bunch. The skin is extremely thin, rendering the fruit very liable to bruising. The flesh is orange in colour and of a rich aromatic flavour. In spite of the choice flavour of this variety it could hardly be considered for the export trade, firstly on account of the delicate nature of the fruit, and secondly on account of its small size and bad shape for carrying.

Near Jelibu, in the State of Negri Sembilan, this variety is cultivated very extensively, several hundred acres being under cultivation almost as a pure stand. Though "P. maas" is always a small banana, normally only one third the size and weight of "P. embon," it invariably commands a much higher price than "P.

embon," or any other variety. At the Chinese coffee stalls at Jelibu (Jan. 1928) the price asked for "P. embon" was one cent per banana and for "P. maas" two cents. This indicates that the value of "P. maas" per unit is six times the value of "P. embon" or other varieties according to local native market valuations. Although the quality and flavour of "P. maas" is admittedly good and superior to other varieties, it is difficult to understand why such an elated monetary value should be attached to it. "Pisang maas" is known by the synonym of "Pisang ama manis" in parts of Johore.

"Pisang rajah." (Plate III, fig. 1).

This variety is grown to a fairly large extent but is not so common in Malay as the three varieties already dealt with. In Java, however, it is quite one of the most popular and extensively grown varieties. The plant is of sturdy habit—8 to 12 feet in height, with a purple marking on the two margins of the leaf petiole. The bunches are compact with generally 7 to 8 hands and 14 to 16 fingers per hand. The fingers have rather a pronounced apex and taper gradually to the pedicel at the base, being generally 5 to 6 inches in length. Three or four rather prominent ridges are generally present and the skin is of medium thickness. Ripe fruit is buff in colour with a tendency to retain the green colour slightly along the ridges. The flesh is rather coarse in texture and is cream-coloured round the periphery and orange in the centre. Though of a sweet taste the flavour can only be described as fair. It is a good cooking banana but is rather coarse to find much favour as an eating banana with Europeans.

"Pisang rajah udang."

This is one of the red bananas, and the only red variety encountered in Malay. Pigmentation extends throughout the whole plant except the lamina and is particularly noticeable on the pseudostem and leaf mid-rib. Bunches with 8 to 9 hands were generally seen but no doubt under very favourable conditions considerably larger bunches could be expected. The fruit is a dark red brown when immature, but on ripening assumes a yellow tinge, particularly when exposed to full sunlight. Ripe fruit is well filled with little or no sign of ridging, 5 to 5½ inches in length and 1½ inches in diameter. The flesh is yellow or pale orange in colour and of good flavour.

This variety is not much grown by the native cultivators in Malay, no doubt on account of the popular belief among Malays that it causes a skin complaint to affect those who consume the fruit.

An interesting example of a yellow bud mutant of the red banana ("Pisang rajah udang") was observed on a rubber estate in Eastern Johore. From a single plant of the red banana one of the suckers in a subsequent season was found to bear yellow fruit in place of red. Out of interest the owner removed this sucker and later established other stools from it. Except for lack of pigment throughout, and a

slightly paler flesh, this yellow mutant in no wise differs from the original red form.

"Pisang serandah." (Plate IV).

This variety is undoubtedly one of the Cavendish forms (*Musa Cavendishii* Lam. var.) as can be seen from a glance at the dwarfed broad-leaved habit of the plant.

It is the only representative of the Cavendish species seen in Malay and may possibly be of fairly recent introduction, as it appears to be by no means widespread throughout the Peninsula, in spite of the excellent qualities of the fruit and the fact that it grows readily. The fruit of this variety does not assume a rich yellow on ripening but remains green-yellow. Otherwise it is similar to the typical "Canary" banana and is of excellent flavour. This variety is probably identical with the "Wet-ma-lut" of Burma and "Pachawara" of Madras.

"Pisang rastali." (Plate III, fig. 4).

The "Pisang rastali" of Malay is quite a distinct banana from the "Rastali" of Southern India. It is grown a great deal in some areas, particularly Western Johore where an alternative name for the variety is "Pisang Kling." These names are suggestive of the variety having been introduced from India at one time or another.

A feature about this variety is that the fruit is not at its best when full yellow but improves in quality and flavour as the skin becomes brown and black. By some it is regarded as not worth eating until it has reached this stage and is almost completely discoloured. Fingers are generally 4 to 4½ inches long and 1½ inches in diameter; of uniform thickness and ridges not at all pronounced. The skin is very thin and quickly becomes covered with brown spots, commencing usually at the apex. The flesh is white and of rather a watery, soapy texture. The flavour is pleasant and slightly acid. It is regarded as a good dessert and cooking banana and is a heavy yielder.

In the State of Johore "P. rastali" is a very popular variety and is grown extensively, whereas farther north its occurrence is less common. In parts of Batu Pahat, in the west of the State, it is grown more or less to the exclusion of other varieties.

"Pisang awak betol."

This variety is interesting in that seeds are frequently found in the fruit. Bunches with 10 hands and 15 to 17 fruits per hand were seen. The fruit tapers to rather a sharp point and is usually 3½ to 4 inches long and 1½ inches in diameter, not unlike "P. rastali" in shape. The skin is frequently spotted and the flesh pale cream with a sub-acid flavour. Together with "Pisang awak legor" the variety is cultivated a good deal in parts of Selangor and fruit can be purchased on the Kuala Lumpur market.

"Pisang kapas."

The name given to this variety (kapas=fan) no doubt has reference to the manner in which the young fruits stand out at right angles to the rachis and show no signs of curling over until fairly well developed. This feature is all the more noticeable on account of the hands being situated some distance from one another on the rachis. Bunches with 9 hands averaging 17 fingers per hand were seen. The fingers, 4 to 4½ inches long and only slightly curved, are yellow when ripe with yellow flesh. The lack of compactness in the bunches and tendency for the fingers to stick out disqualified this variety from being of any value as a shipping variety. The flavour furthermore is not good.

"Pisang brok bakul."

"Brok bakul," signifying "full basket," is probably given to this variety on account of its being regarded as a heavy yielder. The plant is characterised by a certain amount of red or pinkish colouration, noticeable particularly on the mid-rib and leaf petiole. Bunches with 8 hands averaging 16 fingers per hand were noticed. The fruit, 5½ inches long, is plump and well filled, with a pedicel about half an inch long. The flesh is pale yellow with a darker area located in the centre. Though a by no means common variety the fruit is of good flavour.

"Pisang abu."

"Pisang abu" or the "ash banana" (abu=ash) is a very distinctive variety in that the fruit is covered with a "bloom" or light coating of a white waxy substance. The fruit is 4-4½ inches long and close on 2 inches in diameter with a yellow skin when ripe and white flesh. It is regarded as a cooking variety, and sub-varieties exist.

"Pisang nangka."

"Pisang nangka," one of the larger cooking bananas, is grown a great deal in Johore. It appears to be sometimes eaten in the raw state when ripe but it is generally picked green and used for cooking purposes. The fruit is 8 to 9 inches in length and up to 1½ inches in diameter, with a pale yellow flesh.

"Pisang talon."

This is no doubt the largest fingered variety in Malaya and is a typical plantain or cooking banana. It is very similar to the variety "Nendren," so common on the Malabar Coast in India. Fingers may be almost a foot in length and up to 2½ inches in diameter. The flesh when ripe is of an orange hue.

For brief descriptions of other varieties of Malayan bananas, not included in the above, reference should be made to papers by Milsum and Hales in the Bulletin of the Agric. Dept. of the S.S. and F.M.S. (25, 45).

PLATE V.

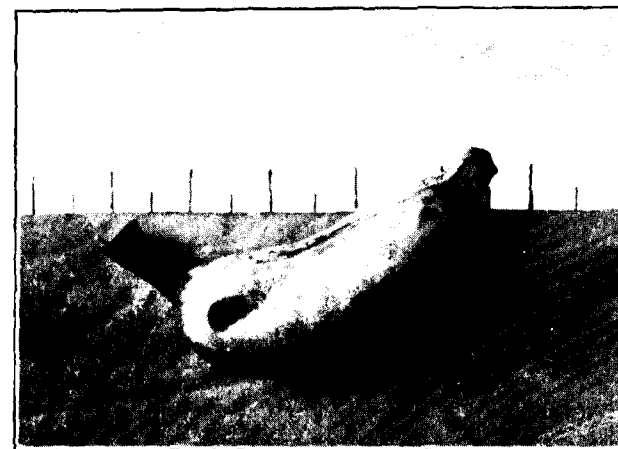


Fig. 3.

Fig. 3. Klui nam wa, Siam.

Scale in inches.

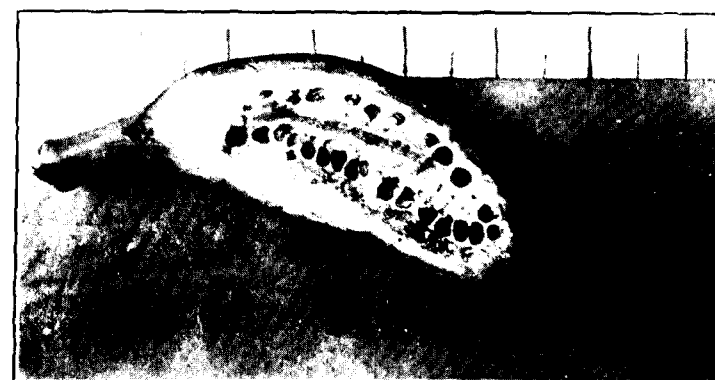


Fig. 2.

Figs. 1 and 2. Klui tani ban, Siam.

Scale in inches.

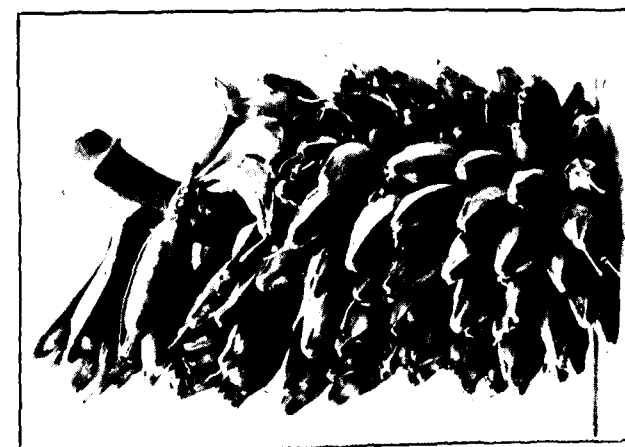


Fig. 1.

PLATE VI.

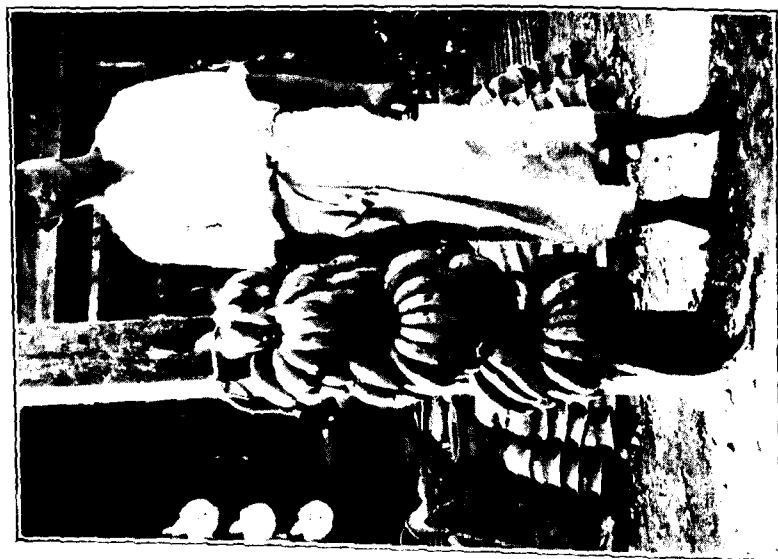


Fig. 2. Wet-ma-lut, Burma.

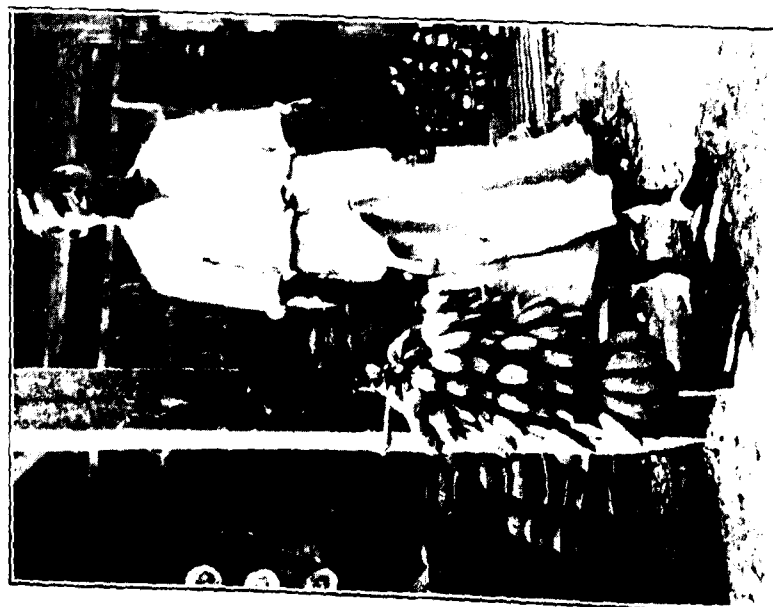


Fig. 1. Yakhine, Burma.

SIAMESE VARIETIES.

"Klui kai."

This variety as the name indicates (klui=banana, kai=egg) is a small, rather plump-fingered type. It is a most popular variety and very delicately flavoured, being without doubt identical with the "Pisang maas" or Golden Banana of Malay. For further information reference should be made to "Pisang maas" under Malayan varieties.

"Klui hom."

Another of the commoner varieties which is marketed a good deal in Bangkok is that known as "Klui hom." This is a large-fingered variety of good quality resembling very much the "Jamaica" or "Gros Michel," and similar to the "Pisang embon" of Malay. It was never found, however, attaining to quite such a large size as the "Pisang embon" of Malay. This might be accounted for by the fact that the time of the year when Bangkok was visited was the middle of the dry season when bananas are less well developed than during the rainy months of the year. "Klui hom" exists in four or perhaps five sub-varieties or forms, the differences between which are very slight. The most distinct of these forms is one which remains a green or yellow-green when ripe and never assumes a yellow colour. This form might be regarded, therefore, as corresponding to the "Pisang masak hijau" of Malay and Java. The following are the forms of "Klui hom" :—

1. "Klui hom tong" (tong=yellow), the ordinary form most commonly met with.
2. "Klui hom kieu" (kieu=green), the form which remains green when ripe. The flesh is softer and regarded by some as inferior to that of "Klui hom tong." Its keeping qualities are said to be inferior also.
3. "Klui hom kom" (kom=short) possesses a shorter but slightly plumper fruit than "Klui hom tong," but is otherwise similar.
4. "Klui hom chan" is a small form of the ordinary "Klui hom tong" with a little longer pedicel. The flesh is slightly more aromatic than the ordinary form. It is suspected that undersized fruit of "Klui hom tong" is sometimes known by this name.

The flavour of the different forms of "Klui hom" is excellent and the flesh of a fine uniform texture. It is in great favour particularly among Europeans as a dessert banana, though some Siamese express preference for other varieties.

"Klui nam wa." (Plate V, fig. 3).

The most universally grown banana in Southern Siam is undoubtedly that known as "Klui nam wa." Of this variety there are two forms, one with a pale cream flesh and the other with the flesh tinged slightly pink. The fruit is rather short and stout—4 to 5

inches in length and $1\frac{1}{2}$ inches in diameter. In colour it is pale yellow or buff. The flesh has a pleasant sweet, though slightly acid, flavour, but is of a rather tough consistency towards the centre. The fruit is inclined to break away at the pedicel when ripe. Should this factor be constant it would militate against its value as a shipping banana.

The preparation of sun-dried bananas was carried on in all the banana areas visited in Southern Siam, and on all the native markets dried bananas were one of the common commodities offered for sale. It is possible banana drying may only be satisfactorily carried out during the dry season. The best variety for drying is "Klui nam wa," and this variety is used almost exclusively. The fruit is peeled, halved longitudinally and allowed to remain in the sun until quite dry and powdery. The reason given for the preference shown for this variety for drying was that "it becomes neither too hard nor too soft when dry as did many of the other varieties."

In the Ban Pong district where bananas are cultivated on an intensive scale, this variety is grown almost exclusively. The conditions here are particularly hot and dry during a period of several months in the year and facilities for irrigating the bananas are absent. It was found that the Chinese cultivators were all of the same opinion regarding the hardness of the "Klui nam wa" variety, and stated that under their conditions it was the only variety that would thrive. Other varieties commanding a higher price, such as "Klui hom" and "Klui kai," had been tried but without success. The price obtained for bananas by cultivators in the Ban Pong area was 3 ticals per hundred hands (1 tical = $1/10\frac{1}{2}$ d).

It is reported by residents in Siam that seeds are frequently met with in this variety. At Sriracha (E. Siam) two apparently normal seeds were found in one fruit by the writer.

"Klui humuk."

This is the variety most commonly used in Siam for cooking. A common sight in some of the streets of Bangkok is to see this banana being cooked at the small Siamese and Chinese food stalls. The usual method is for the fruit to be peeled, and then fried in oil, but frequently whole fruits are placed in the hot coals and "roasted in their jackets." When treated in this manner they invariably split down one side. It is also eaten in the uncooked state, however, and is the variety generally given to children and invalids, the softer rather watery flesh being regarded as more readily digestible than that of any other variety. When an infant reaches the stage of being able to take solid food the "humuk" banana, it is said, is one of the first forms of solid food given. The fingers are large and plump, $6\frac{1}{2}$ inches in length and fully $1\frac{3}{4}$ to 2 inches in diameter in the centre. The fruit is generally angular with five prominent ridges. The most characteristic feature is perhaps the very long thin pedicel (1 inch long). Towards the apex the fruit tapers gradually to a blunt point. The

colour when ripe is a pale yellow with a slight bloom. Pink colorations appear here and there in some cases, particularly where the fingers are in contact with one another on the bunch. The texture of the flesh is rather coarse and the flavour such as is not likely to appeal to the European palate.

"Klui ferong."

This is a well filled plump banana about 4 to 5 inches in length and almost completely cylindrical in shape. The flesh (cream) is soft and buttery and of good flavour: the skin being of medium thickness. The few bunches seen of this variety were small and lacking in compactness, though these may not have been truly representative of the variety. The name given to this variety (ferong = foreign) would seem to indicate that it has been introduced to Siam from elsewhere. It is similar to the variety known as "Ptawbat" or the "butter banana" in Burma.

"Klui naak."

This is the common red or bronze banana of Siam and no doubt corresponds to the "Pisang rajah udang" of Malay and Java, though the impression was received that it is slightly smaller in size. The fruit seen of this variety averaged 4 inches in length and $1\frac{3}{8}$ inches in diameter, and is bluntly rounded at the apex. The flesh is yellow with a pleasant though very distinctive flavour. The belief commonly held by the Malays, that the red banana is responsible for skin complaints, appears to be quite non-existent among the Siamese.

"Klui lep mu nang."

This variety is interesting in that it is very distinctive and quite different from all other varieties seen in any of the other Eastern countries visited. The fruit is red when ripe and very slender. When peeled the fruit is barely the thickness of the little finger. This added to the fact that the flavour is poor no doubt accounts for the small extent to which the variety is grown.

BURMESE VARIETIES.

"Thihmwe."

One of the most noteworthy and widely grown varieties in Southern Burma is that known as "Thihmwe." This variety is equivalent to the "Pisang embon" of Malay and "Klui hom" of Siam. The common form is a greenish yellow when ripe, though a type with a good yellow colour is said to exist. Opportunity of seeing this type did not occur: it is apparently rather rare. "Thihmwe" is grown mostly in Southern Burma and is seldom encountered in the more northern areas where apparently it does not thrive. It does not appear to lend itself well to the rather specialized irrigation conditions prevailing in regions where intensive banana cultivation exists, as for example at Myittha.

Bunches with 8-10 large hands are the rule. The fingers are 7 to 8 inches in length, slightly angled and curved and lie parallel to one another throughout their length, forming a good compact bunch. The skin, which is of a medium thickness, is soft and the flesh a pale cream, almost white, of even soft texture and excellent flavour. The pseudostem is generally of a rather yellowish or mottled hue with dark markings on the leaf sheath below the point of attachment of the petiole. "Thihmwe" is regarded as one of the best of the Burma varieties, but requires a rich soil and sheltered position to thrive. At the Hinawbi Agricultural Station, in the delta area, eighteen months elapse from the time of planting to the production of fruit, but in areas with a more evenly distributed rainfall the period required would no doubt be less.

"Htaw-bat."

This variety, known also as the "butter" banana, is well represented on the Rangoon markets, but like "Thihmwe" is not encountered much in the north. It is known among Tamils in Rangoon as the "Rastali," and is very probably the same variety as the "Rastali" so extensively grown in parts of Southern India. The bunches seen were generally of medium size only, though the fruits were large and well filled—5 to 6 inches in length, and $1\frac{1}{2}$ inches in diameter, with a very short pedicel. The skin is fairly thick and the flesh soft and buttery and of good flavour. According to Sawyer's classification of Burmese bananas this variety is classed as *M. sapientum* L. var. *Champa* Hort.

"Wet-ma-lut." (Plate VI, fig. 2).

"Wet-ma-lut" is one of the Canary forms (*M. Cavendishii*) and is grown a good deal and is in great favour in the Mandalay area. In some localities a superstition exists to the effect that the variety is sacred and that its cultivation by lay folk will bring bad luck, with the result that its cultivation may be more or less restricted to temple grounds. On ripening the fruit retains its green colour and is probably identical with the Cavendish forms "Pisang serandah" and "Pachawara" of the Malay Peninsula and Southern India respectively.

The size of the bunches produced by this variety in Mandalay during the dry season is surprising, bunches up to 4 feet in length being by no means uncommon. The bunches are, however, rather lacking in compactness with large intervals on the fruit stalk between the hands. The keeping qualities of the variety are regarded as poor, but this is compensated for as far as local consumption is concerned by the excellent quality of the fruit.

"Yakhine." (Plate VI, fig. 1).

This variety is largely grown in Burma and is similar to the "Klui-nam-wa" of Siam already described. According to Sawyer's classification this variety is classified as *Musa sapientum* L. var.

arakanensis Ripley. The opinion is held by some that this variety came originally from Arakan on the West Coast of Burma, a postulate which is supported by the Burmese name given to the variety.

An interesting feature about the variety is that it is seedless after first planting, but if the stool is left undisturbed for 3 or 4 years seeds invariably appear in the fruit. A marked difference is noticeable in the shape of the pseudostem according to whether the plants grow in clay or sandy soils. In sandy soils the pseudostems become much bulged at the base but in clay soils there is no bulging whatsoever.

"Hpi-gyan."

This is another common Burmese variety which has its equivalent among Siamese varieties in "Klui humuk." Owing to the rather poor flavour and shape of the fruit it can claim no consideration whatsoever as a shipping banana. This variety is probably cultivated to a greater extent than any other variety in Burma and is used largely for cooking. In the vicinity of Myittha, where banana cultivation is intense, "Hpi-gyan" and "Yakhine" are grown to the exclusion of all other varieties and the cultivators state that other varieties cannot be made to respond profitably under the conditions prevailing at Myittha.

"Nanthabu."

"Nanthabu" is one of the smaller fingered sorts and is characterised by the rather pronounced apex being slightly bent to one side and retaining a green colour after the rest of the fruit has turned yellow and is ripe. The bunches are light with 6 to 7 hands as a rule and the fingers 4 to $4\frac{1}{2}$ inches long. The skin is of a medium thickness and tough and the flesh white with light brown markings throughout. The flavour can only be described as fair, though the keeping qualities are reported to be good.

"Sen-Yan."

This name means literally "the elephant vomits" and may have been given to indicate that the quality and flavour are so poor as to make even an elephant vomit! The fruit is of medium size—4 to 5 inches, and the flesh fibrous and pithy with little or no flavour. It is essentially a cooking banana.

An interesting feature about the variety is the fact that the fruits, except those at the extreme ends of the hands, are all regularly four-angled, and quadrangular, not round, in cross section.

"Shwe-hnet-pyaw."

This is the red banana of Burma. It is not grown to a large extent and is probably to be met with more frequently in the South than in the North. It does not appear to differ in any way from the red banana of Siam and Malay.

PLATE VII.

SOUTHERN INDIAN VARIETIES.

"Rastali." (Plate VII, fig. 2).

"Rastali" is one of the well known varieties of Southern India, but should not be confused with the "Pisang rastali" of Malay and Java, from which it is quite distinct. The fruit is generally 5 to 5½ inches in length and 1½ to 1¾ inches in diameter and is very full when mature. The striations of the thin bright yellow skin of the fruit are coarser than is the general rule. The flesh is soft, fairly dry, of even texture and pleasant flavour. Bunches of 8 to 10 hands were found to be usual at Perugamani (near Trichinopoly) where the variety is largely grown. The hands have generally 16 to 18 fingers per hand and the bunches are compact and of good shape.

The variety has certainly many desirable features and should form a suitable shipping banana. Its carrying properties are undoubtedly good. Along with "Puven" it is packed in closed-in steel railway wagons with no packing material whatsoever, and despatched to various parts of Southern India, the journey taking possibly two or three days, and no protection from the hot sun is given.

"Puven." (Plate VII, fig. 3).

This is probably the most commonly grown banana in Southern India. The fingers are usually 4 to 5 inches long and 1½ to 1¾ inches in diameter, with a rather pronounced apex, and the skin tough but of average thickness. The flesh is white and of fair flavour. Bunches are frequently large with up to 13 hands and 18-20 fingers per hand. They are also compact and appear to have good carrying qualities.

In the vicinity of Trichinopoly and Tanjore this variety may be seen cultivated to perfection and large quantities of the fruit are produced and despatched by rail or bullock cart to other centres in Southern India. The variety is also grown to a large extent on the Malabar coast.

"Pachawara."

This banana (known also as "Nala muti," meaning literally "that which touches the ground," referring to the bunch) is a Cavendish of the type which remains green when ripe, similar to varieties seen in Burma and Malaya. According to information given by an Indian Agricultural Officer of long standing, cultivation of this variety has increased very much in recent years. Its early maturity compared with other varieties in part accounts for this popularity. Bunches of 9 to 10 hands were usual, the bunches being more compact than those of the Burma Cavendish. The "Mauritius Banana" is the term occasionally used by educated classes in Southern India to denote this variety.

On the fruit markets of Madras this variety, along with another known as "Puven," figures more largely than any. It appears to



Fig. 3. Puven, India.



Fig. 2. Rastali, S. India.

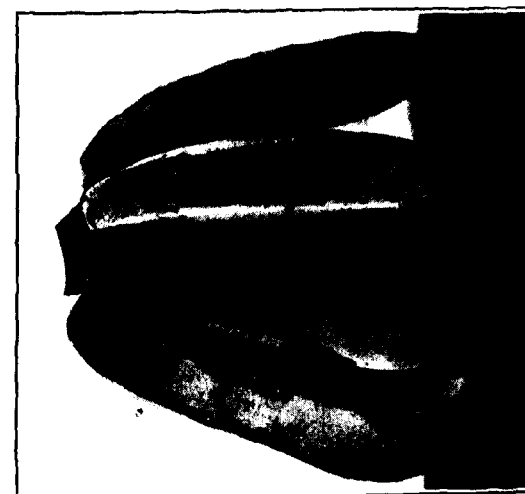


Fig. 1. Pachaladen, India.



Fig. 2. *Musa malaccensis* Ridl., Malay.



Fig. 1. Pisang lilan, Malay.

be conveyed quite considerable distances by rail from where it is grown to Madras. In the banana growing area in the Cauvery River delta the variety is only occasionally to be seen, the varieties "Puven" and "Rastali" predominating.

"Pachaladen." (Plate VII, fig. 1).

The fruit of this variety is like that of "Pachawara" in that it remains green in colour on becoming ripe. It is, however, one of the tall-growing and not one of the dwarf forms. The variety was only seen on the Trichinopoly market and appears to be rather rare. Though of good shape with a fairly thick skin the fruit met with was lacking in flavour.

"Mysore."

The "Mysore" banana is grown a great deal on the Malabar coast. The fingers are usually $3\frac{1}{2}$ inches in length and $1\frac{1}{4}$ inches in diameter and have a pronounced apex. Ripe fruit is pale yellow with a pale yellow flesh, the central portion of which is darker in colour and jelly-like. In texture it is wet and soapy but of fair flavour. Large bunches of this variety were seen in the neighbourhood of Teleparamba. It is used largely for cooking in addition to being an eating banana.

"Sawara."

This is the red-skinned banana of Southern India. It is much relished and commands a high price on the Madras market and elsewhere. It does not appear to differ radically from the red forms recorded from the other countries visited.

"Nendren."

This banana, which is primarily one of the cooking class, is used to a certain extent as an eating banana in Malabar. The fruit may be 10 to 11 inches in length and $2\frac{1}{4}$ inches in diameter, and is bright yellow when ripe. The flesh is coarse and of rather poor flavour, but is said to be at its best only when the fruit is allowed apparently to over-ripen and become black and decayed looking outwardly. The bunches are small and the fingers loosely arranged. This variety is called "the banana" among English speaking Indians in distinction from other cooking or eating varieties, all of which are commonly called "plantains," as is the practice throughout India and Burma. The terms "banana" and "plantain" have here, therefore, the very reverse meanings to those generally attached to them, where banana signifies the finer dessert or eating forms and "plantain" the large coarse forms which require to be cooked before eating.

CEYLON VARIETIES.

"Anamalu."

This is the variety in Ceylon corresponding to the "Jamaican" or "Gros Michel" and is represented in Malaya, Siam and Burma

(see table of synonyms, page 307). As in Siam, it exists in more than one form, the different forms being distinguished among growers by the addition of a descriptive prefix. These forms are known by such names as Gal-anamalu, Hapu-anamalu, Meegon-anamalu, etc. The differences are undoubtedly very slight.

The form "Hapumal-anamalu" or "Hapu-anamalu" remains green when ripe, and is therefore similar to the "Pisang masak hijau" of Malaya. Fruit seen was 7 to 8 inches long and $1\frac{1}{2}$ inches in diameter, well shaped and of even thickness throughout. The quality of the flesh is good.

The fruit of "Gal-anamalu" is similar in shape to the above but of a good yellow colour. Very large hands with up to 21 fingers per hand are seen. Another distinct variety resembling somewhat the "Rastali" of Southern India was also known as "Gal-anamalu" by some cultivators in the neighbourhood of Kandy.

The "Anamalu" forms are regarded as inferior as eating bananas to other Ceylon varieties such as "Koli-kuttu" and "Hondarawala," and the belief exists among the natives that they are inclined to be unwholesome, causing windy complaints and are in consequence not as a rule given to young children.

"Koli-kuttu."

This is one of the favourite eating bananas and one of the most extensively grown. The fruit is well filled, $1\frac{3}{8}$ inches in diameter, $4\frac{1}{2}$ inches in length and bright yellow when ripe. The skin is of medium thickness and the flesh white, very dry and floury and of good flavour.

It is unfortunately one of the most susceptible varieties to "Bunchy Top" disease in Ceylon. One of the most resistant varieties is "Hondarawala," also a common variety in the Kandy district.

"Suwandel."

This is another of the most popular eating varieties and is regarded by some as superior to all others in Ceylon as a dessert banana. Up to 5 inches in length and $1\frac{1}{2}$ inches in diameter, the fruit is characterised by a rather sharp apex. On becoming dead ripe the fruit becomes covered with small reddish brown spots. The skin is very thin, and the pale flesh of buttery consistency with a delicious aromatic sub-acid flavour. In the writer's opinion this is one of the most choice varieties to be encountered in the East.

"Ratembala."

This is the red-skinned banana of Ceylon and is identical no doubt with the red banana of Southern India and elsewhere. Some of the fruit seen was particularly well developed, 8 inches in length and 2 inches in diameter. It is seldom grown in Ceylon and is used mostly for ceremonial purposes, no doubt on account of the attractive and unusual colour.

"Marthamalu."

This variety so closely resembles "Ratembala" in all the characters of the fruit, except that of skin colour, that the possibility of its being a yellow form or bud mutant that has arisen from "Ratembala" is suggested.

"Puwalu."

"Puwalu," which has fingers about $4\frac{1}{2}$ inches long and $1\frac{1}{4}$ inches in diameter, is very similar to, and possibly identical with, the variety known as "Puven" in southern India. The flesh is white with a pleasant sweet flavour.

"Navari."

This is an extremely slender fingered variety and interesting in that it is quite distinct from any other variety seen in the East. The fingers are fairly straight, about $4\frac{1}{2}$ inches long and $\frac{3}{4}$ to $\frac{7}{8}$ inches in diameter. The yellow skin is thick, with the result that when peeled the banana is no thicker than the little finger. The flesh is watery with a peculiar and distinctive though not unpleasant flavour.

In the few fruits opened one or two partly developed seeds were found. It would therefore not be unreasonable to expect that if fruit could be obtained over a wider range, viable seed might be obtained.

"Alu kehel."

This variety has the fruits covered with a thin layer of a white waxy substance and is similar to the "Pisang abu" of Malaya in this respect; in fact from the shape, size and colour of the fruit there can be little doubt but that the two varieties are identical.

Seeding Forms of Musa.

SPECIES OF MUSA INDIGENOUS TO BRITISH MALAY.

Apart from cultivated bananas, four distinct wild species of Musa occur in, and are indigenous to, Malay. Opportunity occurred of seeing two of these species growing in the wild state, one of which appears to be only slightly removed from some of the cultivated forms, as will be shown later.

The four species are—*Musa flava* Ridl., *M. violascens* Ridl., *M. malaccensis* Ridl. and *M. truncata* Ridl. The first mentioned is very rare and has only been recorded from two or three localities. *Musa violascens* Ridl. is rather small and has the inflorescence pointing straight upwards and not bent over as in cultivated forms. It is of no interest from the point of view of breeding work, being too far removed altogether from *M. sapientum* L. *Musa truncata* is stated to be a tall vigorous growing species closely resembling the cultivated banana in appearance and found only at higher altitudes in Malay. Unfortunately opportunity of seeing this species in the wild state did not occur.

Musa malaccensis is the most common of the wild species and is very prevalent in some areas, particularly in jungle clearings and along river banks. It appears to favour the richer granite soils and is one of the pioneer species in new clearings where it is sometimes found completely dominant or as a pure stand. The ripe fruit is subject to the depredations of birds, monkeys and other fruit-eating animals, and it was with some difficulty that a bunch of ripe fruit, or rather the remains of a ripe bunch, could be found. (Plate VIII, fig. 2).

The plant attains to quite a fair height (10–12 feet) in the most-favoured situations and can be picked out at a distance from the cultivated banana around native dwellings by the grey colour of the under surfaces of the leaves. Partially developed bunches of 7 and 8 hands and 17 to 19 fingers per hand were seen. The young fingers situated on the under surface of the bunch have a habit of twisting very much, so that their ends point upwards. The twisting is very pronounced, and is a character or peculiarity shared with the cultivated Malayan banana (seedless) known as "Pisang lilan" (lilan=candle) to which it is very similar. The young bunches of fruit of *M. malaccensis* and of "Pisang lilan" (Plate VIII, fig. 1) are barely distinguishable, and the habit—thin and slender—and general appearance of the two forms is also similar.

The leaf petioles have further this feature in common—they are almost perfectly circular in cross section with the two margins folding in on one another in a convolute fashion. This is a character not possessed by the majority of cultivated forms. These and other affinities which exist between these two types ("Pisang lilan" and *M. malaccensis*) suggest that the two are closely related and point to *Musa malaccensis* being the direct progenitor of "Pisang lilan," the seedless character having been attained gradually, possibly through selection exercised by early cultivators. Allied to "Pisang lilan" are one or two other similar, but by no means commonly grown, varieties, which possibly owe their origin to the same species. Among these are "Pisang klat barot" and "Pisang jarong."

The fruit of *M. malaccensis* is a muddy yellow when ripe and sometimes spotted with brown. In shape the fingers may vary from being almost straight (curved at pedicel only) to being much curved and rather abruptly pointed. The usual length is 4–4½ inches and ¾ to 1 inch in diameter, the fruit being well filled with the ridges barely noticeable. The pulp is cream in colour and sweet; numerous seeds exist throughout the entire length of the fruit. The small black seeds are sharply angled and rather irregular in shape. The skin comes away readily from the flesh when the fruit is thoroughly ripe.

An interesting seeding banana encountered in Johore is a variety known as "Pisang batu," the name meaning literally "stone banana," derived no doubt from the large number of seeds to be found in the fruit. This variety was seen in cultivation—a few

PLATE IX.



Fig. 2. *Musa Rumphiana* var. *paradisiaca*,
Botanic Gardens, Buitenzorg, Java.



Fig. 1. *Musa brachycarpa*,
Botanic Gardens, Buitenzorg, Java.

stools—at one locality in the neighbourhood of the township of Batu Pahat. In Malay fruit is used exclusively in the young stage, before the seeds harden, for cooking purposes. One of the methods whereby the Malays make use of the fruit is to cut it into thin slices and leave it to stand in water for some time, after which it is used as a curry ingredient.

This "Pisang batu" is probably identical with a seeding form known by the same name (Pisang batoe) in Java and described in some detail by Heyne. It was found, however, that this name was also used in parts of Java for a large seedless cooking banana similar to the "Klui humuk" of Siam.

In Java "Pisang batu" is put to a number of uses, some of which are no doubt common practice in Malay also. The stems cut up are used as food for water buffaloes and hogs, and for cattle also in times of scarcity, and the outer leaf sheaths when nearly dry are cut up into strips and used as binding material. The fibre contained in them is claimed to be of a superior, soft, silky nature, but the percentage is too low to warrant commercial extraction. Both in the green and the dry state the leaves are much used as packing materials. The sticky sap from the pseudostem mixed with soot is used for colouring bamboo plait work. According to Heyne it is only among the more primitive peoples of the Archipelago that the fruits of "Pisang batu" are regularly used as food, though they are frequently used medicinally.

SPECIES AT THE BOTANIC GARDENS, BUITENZORG.

At the Botanic Gardens at Buitenzorg several species of *Musa* native to various parts of the East have been established. These exist in the *Musa* plot as—*Musa Rumphiana* var. *paradisiaca*, *M. brachycarpa*, *M. Cliffortiana* var. *seminifera*, *M. Cliffortiana* var. *brachycarpa*, *M. Cliffortiana* var. *seminifera*, *M. Cliffortiana* var. *brachycarpa*, *M. zebrina*, *M. Basjoo*, *M. zebrina* var. *cerifera*, *M. glauca*, *M. sanguinea*, *M. mindanensis* and others. Of these the first four mentioned possess a tall erect habit and resemble most the cultivated banana in appearance. (Plate IX, figs. 1, 2).

The fruit bunch of *Musa Rumphiana* var. *paradisiaca* is rather striking in appearance. The fingers, which are tightly packed, are arranged in many hands extending down the full length of the fruit stalk. Pollen is produced very profusely by this variety.

SEEDING MUSAS IN SIAM.

Two types of banana that regularly form seed were encountered in Siam and are of particular interest on account of the large size of the bunches and fruit. These two types are very similar, so much so in fact that in some areas no differentiation is made by the natives and the name "Klui tani" is applied to both. It is more usual, however, for the two types to be distinguished and the names "Klui tani ban" (ban=compound, yard), and "Klui tani pa" (pa=forest, wild) to be given. (Plate V, figs. 1, 2).

The difference between these two types is not very pronounced. In habit "Klui tani ban" is slightly the larger and grows to a height of fifteen feet. The pseudostem is darker than that of "K. tani pa" and the fruits larger and less tightly packed with seed. Both are cultivated chiefly on account of the leaves, though not to a large extent. The leaves, cut into segments, are in great demand as wrappers for foodstuffs and other articles in bazaars, and are much favoured as holders or wrappers for cooking (boiling) special foods such as certain Siamese sweetmeats. The contention is held that, in contrast to other varieties, neither flavour nor colour are imparted by it to the foodstuff. The leaves are undoubtedly much tougher than those of the ordinary banana plant. The very young leaves dried are used as cigarette wrappers, and the heart or inflorescence bud is used extensively as a vegetable and is to be found for sale on most bazaars. This heart is utilised in much the same way as a cabbage, the inner pale coloured bracts only being eaten. It is quite free from any bitter principle which characterises the "heart cabbage" of most other varieties. The pseudostems are fed to stock, chiefly buffaloes, in some areas.

The fruit is not much utilised, and then only in the green state, the most common use being as a pickle. The young fruits are cut into thin slices and placed in vinegar to which a little salt is added. After standing for some days the pickle is ready for use. Another use for the young fruit is in curries. Care is taken to utilise only partially developed fruit before the seeds harden.

In "Klui tani ban" fingers are 6 to 7 inches long and 2 inches in diameter, and generally rather sharply angled. These angles or ridges are generally separated from one another at the apex of the finger by distinct furrows. The fruit is characterised by an unusually long pedicel, and a noticeable feature is the persistent style and corolla remains which adhere to the fruit right up to the ripening stage. The fruit turns yellow when ripe, but becomes quite soft when still partly green in colour. The pulp is white, watery and sweet, but it is not eaten in the ordinary way on account of the numerous seeds present.

All the fingers examined of this variety were distinctly six-locular and not three-locular as is customary in most species of *Musa*. These interesting seeding forms are regarded under the existing classification of the genus *Musa* as forms of *Musa sapientum* L. However, it should be pointed out that the wild Musas of Siam have not as yet been fully worked out and subsequent classification may lead to isolation of these two types. Be this as it may, it is felt that these forms might be of value in breeding work, possessing as they do suitable characters as regards habit, size of bunch, size of fruit, etc., and probably disease resistance.

SEEDING SPECIES OF MUSA IN BURMA.

In Burma there appears to be no seeding form of banana that is in regular use or cultivated such as the "Klui tani" of Siam. There

are, however, wild species of *Musa* occurring in the jungle in certain localities. Of these *Musa glauca* Roxb. was found to be very common in a forest reserve near Toungoo, where another species was encountered. In habit these two species are smaller and more slender than the cultivated banana, but in the case of the second, bunches of quite fair size may be produced.

Notes on Cultivation, Diseases, etc.

The methods of cultivation adopted in the countries visited were not found to vary as much as might have been expected. Where bananas were grown as a field crop, as opposed to two or three stools only in a compound or back yard, the methods adopted belonged to one of two systems, according to whether a more or less continuous rainfall and growing season prevailed, as in Malay and Ceylon, or whether a hot, dry season existed over a part of the year and irrigation was resorted to, as in parts of Burma and India. In any area where bananas were grown on an intensive scale it was always found that cultivation was limited to one or two varieties only, whereas in those areas where field scale cultivation did not exist a greater number of varieties were always to be met with in compounds and intermixed with other crops.

Five or six miles from Jelibu in the State of Negri Sembilan, Malay, several hundred acres of bananas, cultivated as a pure stand, and Chinese-owned, were in existence. The growth of the plants on the leached hill slopes was very much inferior to that of those on lower-lying alluvial situations and the incidence of disease more marked. "Pisang embon" and "P. maas" were the only varieties cultivated, and the whole of the output was conveyed to the larger centres for consumption. That considerable damage was being done by a vascular disease of some sort there was no doubt, and it was the opinion of the Assistant Mycologist, Agricultural Department, who had been investigating banana diseases in Malay for some months, that the symptoms at Jelibu were suggestive of more than one disease being present. In some cases the pseudostems of infected stools showed a marked red or red-brown discolouration of the vessels, and deep splitting of the pseudostems was occasionally seen, accompanied by premature wilting and breaking down of the leaves. In other cases the brown discolouration was quite absent but the central portion of the pseudostem was of a discoloured grey appearance.

It is interesting to record that in this area "P. embon" only was attacked, "P. maas" being apparently immune to the disease. This observation was confirmed by information obtained from local squatters who stated that "P. maas" was not affected, and that more and more of this variety was therefore being grown by them. The wild banana *Musa malaccensis* Ridl. was common in this disease-infected area along paths and the river bank, but nowhere was there evidence of its being attacked.

The skipper caterpillar (*Erionota (Hidari) thrax*) was very troublesome in parts of Malay and a serious pest to banana cultivation

in some areas. Patches of bananas were frequently met with almost completely defoliated by it; nor did the wild species of *Musa* escape its depredations. Though so common in Malay it was not noticed to any extent in other countries visited.

The common banana beetle borer (*Cosmopolites sordida* Chevr.) was everywhere encountered. In many instances it was difficult to find stools from which to obtain suckers that were not infested. The ramifications of this pest in the East appear to be quite independent of climatic and environmental conditions.

In western Johore, bananas are extensively grown on some of the low-lying flats, the cultivators being in many cases immigrant Javanese. On these flats a heavy black clay soil abounds, and it is only by the efficient upkeep of a most elaborate drainage system that takes the form of a network of canals, that cultivation of any sort can be carried on, the elevation being almost sea level. Given good drainage and good cultural treatment this heavy soil is remarkably productive and excellent yields from bananas were witnessed. The spacing afforded the plants was found to vary a good deal on different holdings. In planting out, large suckers or offsets are selected, and after the leaves have been removed and rootstock trimmed, they are allowed to lie for a day or two, to dry off partly no doubt, before being planted out in prepared holes. In the course of a few weeks leaves appear and all the attention the plants then receive is to have the dead leaves removed and soil round the roots occasionally loosened and kept tolerably free of weeds.

In the eastern portion of the island of Java, at Banjoewangi for instance, bananas are grown for export to Western Australia. The varieties grown are "Pisang embon" and "Pisang hijau" chiefly, though in 1924 success was obtained with a third variety "Pisang songgroito." According to Ochse (Landbouw, Juli 1925, bl. 20, en Jan. 1926, bl. 321) the plants are spaced 4 metres by 5 to allow of the cultivation of subsidiary crops between the rows. In the second year a bunch of fruit is obtained from each stem, and from the second year onwards two bunches are obtained from each stool. After the sixth year replanting is generally effected, young plants being established the year previous between the old rows in order to avoid having a year without fruit. The fruiting period can be regulated to a certain extent, to suit market demands, by regulating the period during which suckers are removed, but it is dependent also upon soil conditions and rainfall. The growing period here is estimated at 14 months, and the bunches are cut when the fruit is fully developed though still green. The export of bananas from Java to Australia during the period 1918/25 is given by Ochse as 90, 114, 104, 125, 130, 119, 138 and 164 thousand bunches. The fruit is said to be packed in wooden crates, the voyage lasting about 6 days.

In Siam bananas are generally grown in mixed cultivation with other crops or interplanted between fruit trees, and in only a very few localities are they grown as a pure stand. Around Bangkok

and along the banks of the Menam chau river in the lower reaches where the ground is very low lying and flat, cultivation of bananas and other fruits is generally carried out on wide ridges or strips of land surrounded on either side by irrigation or drainage canals. Remarkably good crops are in some cases obtained.

Bananas are cultivated as a field crop in the neighbourhood of the railway in parts of southern or peninsular Siam, particularly around Ban Pong and Rajburi, where several hundred acres exist—the fruit being disposed of mainly on the Bangkok markets. One variety, "Klui nam wa," is grown almost exclusively throughout this area and is claimed to withstand the conditions prevailing in the dry season far better than any other variety. The prevailing soil is of a lateritic nature with the appearance of being deficient in humus and liable to rapid drying out. In planting out the suckers are evenly spaced and planted in rows, and appear to receive a fair amount of attention from the resident Chinese owners.

On the whole the banana areas visited in Siam were found to be singularly free from fungoid diseases and insect pests, with the solitary exception of the beetle borer (*Cosmopolites sordida* Chevr.), though it must be remembered that conditions during the dry season only were witnessed. The only sign of serious fungus disease was met with at Bangkok-noi. Here in a rather badly drained area a disease causing a greyish discolouration of the pseudostem and dying back of the outer leaves was prevalent, young suckers up to 2 feet in height being attacked in addition to mature plants.

In Burma the general run of banana cultivation was found to be very much the same as in peninsular Siam, but in a few localities where large areas were cultivated occasional special features were noticed. Near Myittha, where open semi-savannah country prevails, bananas were being grown on a large scale by Burmese cultivators. The ground used was rich, flat paddy land, and irrigation from a neighbouring river was possible, one to three waterings per month being given during the dry season, according to circumstances. At the time of the visit the fields were perfectly clean of weed growth and the soil surface in a good state of tilth. For planting six months old suckers are used, and are planted in rows at about 500 per acre. Fruit is obtained one year after planting, and as soon as the bunches have been reaped the area is replanted. It was stated that no manuring whatsoever was practised in this area, but that after three years rotation with paddy would be effected. The fruit, which is of the varieties "Hpigyan" and "Yakhine," is sold to dealers, who buy in on the spot and forward it to the larger centres, the price paid being usually about R.70 (1 R=1s. 6d.) per 1000 hands. A leaf fungus, *Macrophoma Musae* (Cooke) Berl. & Vogl., was found to be common on the bananas in this area. It did not, however, appear to be the cause of any serious damage and was restricted in all cases to the dead and dying leaves at the base of the crown: in no instance was it found on young leaves. At Myittha the cultivators did not make a practice of

cutting away the dead leaves hanging from the pseudostems as is so often done, and argued that during the dry season these dead leaves are a protection to the stem of the plant.

Farther south in Burma, near Piasca, some ten or twelve miles from Toungoo, a different type of banana cultivation over quite a large area was found to exist. This was practised on the somewhat intersected lower slopes of river valleys on what had not long since been wooded or forest land. The soil was a rich alluvium for the most part and stony. Stools had been established in no regular order, but where situation suited. The plants were all in a thriving condition and good yields obtained. The variety grown was almost entirely the more choice "Thihmwe," a contrast to Myittha, where the two coarser varieties only were grown.

In southern India bananas appear to be grown in all districts with the exception of those at the higher altitudes. In some areas, notably around Trichinopoly and Tanjore and parts of the Malabar coast, large acreages are devoted exclusively to this crop. In these areas cultivation is generally on "wet" lands, and the stools are allowed to remain in the ground three or four years before being removed. In parts of the Cauvery river delta examples of bananas cultivated more or less to perfection were to be seen. The conditions under which the bananas were grown and the attention meted out to them surpassed those seen in any other part of the East. Excellent irrigation facilities prevailed, the soil being a dark deep loam. A large proportion of the fruit produced is despatched by rail or bullock cart to other centres in southern India. Suckers are planted at distances of from 6 to 10 feet, and only one new sucker is allowed to replace the parent one. When the plants reach the bearing stage and the bunches of fruit are developing, each stem is supported by a stout bamboo stake. This is an essential safeguard against wind which sometimes causes much damage, the variety "Puyen" being, it is stated, particularly subject to damage in this way. The practice of removing the aggregation of terminal bracts and male flowers at the end of an inflorescence, or heart, when bunches are half developed, is commonly resorted to by Indian cultivators.

In Malabar a coarse cooking banana "Nendren" is grown all along the coast, and receives rather different cultural treatment from other varieties. Replanting is effected as a rule after each season, as very poor yields are said to accrue from ratoon suckers with this variety. Where irrigation is not possible watering by hand during the dry season is done, two or three waterings per month being given and loose soil heaped up round the base of the pseudostem after each watering. Liberal dressings of manure, mostly pig, are given.

In Ceylon banana cultivation is at present seriously affected by the presence of "Bunchy Top" disease, regarded as being identical with the "Bunchy Top" that has caused such damage to banana growing in Queensland. It occurs more or less throughout the island and is being investigated by the Department of Agriculture in Ceylon.

INDEX OF VARIETAL NAMES.

	PAGE		PAGE
Alu kehel	307, 321	Musa Rumphiana var.	
Anamalu	307, 319	paradisiaca	323
Ash banana	... 312	Musa sanguinea	323
		Musa sapientum var. Champa	316
Burmese varieties	... 315	Musa truncata	321
		Musa violascens	321
Canary banana	306, 311	Musa zebrina	323
Cavendish banana	306, 311	Musa zebrina var. cerifera ...	323
Ceylon varieties	... 319	Mysore banana	319
Gal-anamalu... ..	... 320	Nanthabu	317
Gros Michel	305, 306, 308, 313	Navari	321
		Nendren	319, 328
Hapu-anamalu	... 320	Pachaladen	319
Hapumal-anamalu	307, 320	Pachawara	307, 318
Hondarawala	... 320	Pisang abu	307, 312
Htaw-bat	307, 316	Pisang awak betol	311
Hpi-gyan	307, 317	Pisang batu	307, 322
		Pisang brok bakul	312
Indian varieties	... 318	Pisang bunga	309
		Pisang embon	307, 308, 313
Jamaica banana	305, 306, 313	Pisang hijau	307, 309
		Pisang jarong	322
Koli-kuttu	... 320	Pisang kapas	312
Klui ferong	307, 315	Pisang klat barot	322
Klui kai	307, 313	Pisang kling	311
Klui hom	307, 313	Pisang lilan	322
Klui hom chan	... 313	Pisang maas	307, 309
Klui hom kieu	307, 313	Pisang nangka	312
Klui hom kom	... 313	Pisang rajah	310
Klui hom tong	... 313	Pisang rajah udang	307, 310
Klui humuk	307, 314	Pisang rastali	311, 318
Klui lep mu nang	... 315	Pisang serendah	307, 311
Klui naak	307, 315	Pisang songgroito	326
Klui nam wa	307, 313	Pisang talon	312
Klui tani	307, 323	Puyen	307, 318, 328
Klui tani ban	... 323	Puwalu	321
Klui tani pa	... 323		
		Rastali	307, 318
Malayan varieties	... 308	Ratembala	307, 320
Marthamalu	... 321		
Mauritius banana	... 318	Sarawa	307, 319
Meegon-anamalu	... 320	Seeding forms	321
Musa Basjoo	... 323	Sen-yan	317
Musa brachycarpa	... 323	Shwe-hnget-pyaw	307, 317
Musa Cavendishii	306, 311	Siamese varieties	313
Musa Cliffortiana var.		Southern Indian varieties ...	318
asperima	... 323	Suwandel	320
Musa Cliffortiana var.			
seminifera	... 323	Thihmwe	307, 315, 328
Musa flava	... 321	Wet-ma-lut	307, 316
Musa glauca	... 325		
Musa malaccensis	321, 322	Yakhine	307, 316
Musa mindanensis	... 323		

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XLIX.—CONTRIBUTIONS TO THE FLORA OF BURMA: VI.*

Illicium manipurens Watt [Magnoliaceae].

Known from Manipur.

Naru Bum, hills of the Bhamo district at 7,800 feet, March 1927, *Maung Mya* 5327. "Middle-sized tree. Flowers white scented."

Kayea assamica King et Prain [Guttiferae].

Known from Assam.

Pidaung Reserve, Myitkyina district at 530 feet. Flowers March, *Maung Mya* 5350. "Tree, stem brownish with white patches. Flowers white, anthers yellow."

Gordonia anomala Spreng. [Ternstroemiaceae].

Known from South China.

Spur of Shangtai Bum at about 6500 feet, Bhamo district March, *Maung Mya* 5322 and 5321. "A middle-sized tree, large at times, stem greyish-white. Flowers white."

Sterculia Roxburghii Wall. [Sterculiaceae].

Known from Sikkim, Silhet and Assam.

Malikha, Myitkyina district at 750 and 3100 feet, flowers March; fruit June, *Maung Mya* 5385 and 5461. "Tree. Flowers and fruits red."

Acer laevigatum Wall. [Aceraceae].

Known from the outer Himalaya from Garhwal to Sikkim and the Khasi hills.

Lahpyekha, hills of the Bhamo district at 6500 feet, March 1927, *Maung Mya* 4981.

Acer sikkimense Miq. [Aceraceae].

Known from Sikkim, Bhutan and the Mishmee hills.

Hills of the Bhamo district at about 6000 feet, March 1927, *Maung Mya* 5313 and 5336.

*Continued from K.B. 1928, p. 47.

***Gymnocladus burmanicus* C. E. Parkinson** [Leguminosae-Eucaesalpinieae]; affinis *G. chinensi* Baill., sed foliolis lanceolatis, apice acutis et calyce paene glabro differt.

A deciduous tree attaining 17 m. in height and 1.5 m. in girth; bark brown with transverse lines. *Leaves* equally bipinnate, the rachis about 20 cm. long, shortly and sparsely pubescent to glabrescent, with usually 3 pairs of opposite or sub-opposite pinnae 8-15 cm. long. *Leaflets* alternate, 7-10 pairs on each pinna, 4-6 cm. long, 0.5-1.5 cm. wide, the lower ones ovate lanceolate and unequal-sided at base, the upper ones lanceolate or narrowly so, their bases narrowed, apex (of all leaflets) acute to a point, when young with scattered short adpressed hairs to almost glabrous when mature, midrib prominent, secondary nerves and reticulations less prominent; petiolules 0.2 cm. long with short pointed stipels under them. *Inflorescence* a short terminal raceme, the rachis, pedicels, and calyx very shortly and sparsely pubescent; bracteoles short, filiform and pubescent. *Flowers* reddish-brown, pedicels 1-1.3 cm. long. *Calyx* narrowly funnel-shaped, 0.7 cm deep, the 5 narrow lobes 0.5 cm. long. *Petals* oblong, pale-pubescent, 0.8 cm. long. *Stamens* 10 alternately longer and shorter, the longer ones opposite the calyx lobes and about as long as them, filaments narrowed upwards, anthers ovate. *Ovary* glabrous, with few ovules, style exserted, stigma slightly oblique. *Fruit* about 8 cm. long and 3 cm. wide, oblong, compressed, with a reddish-brown polished pericarp and few (2 or 3) black oblong ovoid seeds.

Ta-ok plateau, Dawna hills of Tenasserim in Lower Burma at 3500 feet, C. E. Parkinson 5229. Leafless about the month of January. Flowers in February with the conspicuous new reddish foliage. The fruits have a strong smell of stale bananas when ripe and are said to be used by Karens for making a hair wash. The seeds are extremely hard. Vernacular name:—*Mya-pe-ler* (Karen).

Nyssa bifida Craib [Nyssaceae].

Known from Siam.

Misty Hollow, Dawna hills of Tenasserim at 2400 feet. Flowers February, C. E. Parkinson 5282. "Tree 50 to 60 feet high. Flowers pale-greenish."

Craibiodendron Henryi W. W. Smith [Ericaceae].

Known from Yunnan.

Lahpye Kha, Hills of the Bhamo district at 6500 feet. Flowers March, *Maung Mya* 4985.

***Styrax polysperma* C. B. Clarke** [Styracaceae in Fl. Brit. Ind. iii. 590; in monographia *Styracacearum* auctore cl. J. Perkins (Das Pflanzenreich) inter Sect. i. *Eustyrax*, Ser. 2 *Imbricatae* prope *S. odoratissimum* ponenda].

C. B. Clarke based this species on the rather incomplete material collected in Khasia by J. D. Hooker and T. Thompson and by Griffith. Miss J. Perkins, owing to the imperfectness of Clarke's material, excluded the species from the *Styracaceae* in her monograph and referred it, as had been previously done (Fl. Brit. Ind. l.c.), to the family *Boraginaceae*. Flowering specimens recently collected in the Myitkyina district of Upper Burma show that C. B. Clarke was right in describing the plant under *Styrax*. An amplified description is herewith given.

A *tree*. Leaves with obscurely crenate margins; venation fine. Flowers white, nearly sessile, in terminal and sub-terminal panicle corymbs 3-6 cm. across, the branches of the inflorescence shortly pale stellate-pubescent in their younger parts. Calyx small, 0.3 cm. long and 0.4 cm. across, cup-shaped, shortly pale-tomentose outside and with a few short straight hairs within, teeth 5, triangular. Corolla 0.8 cm. long, 5-partite, the lobes imbricate, ovate, the tube shorter than the lobes, densely and shortly pale-tomentose outside and rather less so within. Stamens 10 in a ring on the corolla-tube; filaments 2 cm. long, flattened, with short hairs at the base on their inner side; anthers ovate, introrse, 0.2 cm. long, those of the stamens opposite the corolla rather smaller. Ovary glabrous, depressed-globose, 3-celled with about 5 or 6 ovules in each cell; style 0.4 cm. long, obscurely 3-lobed.

Myitkyina District, Lima hills at 4000 feet, *Maung Mya* 5376. "The old leaves turn pinkish-red before falling."

***Alstonia venenata* R. Brown** [Apocynaceae].

I refer the Burmese specimens, which are glabrous, to the older (1911) and geographically more remote species *A. venenata* of S. India. *A. neriifolia* D. Don (1825) from the E. Himalaya and Yunnan hardly appears to be specifically distinct.

Gokteik Gorge, Northern Shan States, 3000 ft. June, C. E. Parkinson 6152.

***Ecdysanthera multiflora* King et Gamble** [Apocynaceae].

Known from the Malay Peninsula.

Tavoy, Nwalabo, 2000 feet, Oct., R. N. Parker 2305.

"Extensive climber with milky juice. Twigs rough with small raised lenticels, flowers white." Vernacular name:—*Sit Kyauk*.

***Beilschmiedia sphaerocarpa* Lecomte** [Lauraceae].

Known from CochinChina.

Mergui, bank of the Little Tenasserim River, Dec., R. N. Parker 2331. "Flowers green." Vernacular name:—*Thwegyo*.

***Scleropyrum Ridleyi* Gamble** [Santalaceae].

Known from the Malay Peninsula.

Mergui, Lepanthaung on the Little Tenasserim River, Dec., R. N. Parker 2334. "Small tree 30 ft. high, 8 in. diam. Flowers

greenish-white with an unpleasant smell. Racemes often from thick leafless branches. Stem with thick spinescent branches." Vernacular name:—*Myetsat*.

***Sapria himalayana* Griff.** [Rafflesiaceae].

Near Mulayit peak, Dawna hills of Tenasserim at 4000 ft. Unopened flowers were obtained in March 1927, open flowers would appear to be available about the month of May. It is known from the Himalayan region in the vicinity of the Mishmee Hills, from Northern Burma (Rec. Bot. Surv. Ind. x, 346) and from Northern Siam. It is possible that this is the plant (*Rafflesia*) referred to in the Botany of the Indian Empire, Imperial Gazetteer of India, i. 203.

***Glochidion obscurum* Bl.** [Euphorbiaceae].

Known from China, the Malay Peninsula and Malayan Islands. Mergui, Chaungnaukpyau, Dec., R. N. Parker 2346. "Small tree 6 m. high. Common in open scrub."

***Galearia pedicellata* R. Br.** [Euphorbiaceae].

Known from the Malay Peninsula. Mergui, Chaungnaukpyau, Dec., R. N. Parker 2348. "Shrub 1.2 m. high in open scrub forest." Vernacular name: *Wuntiche*.

***Endospermum chinense* Benth.** [Euphorbiaceae].

Known from China.

Forests in the vicinity of Pidaung and Mogaung at about 800 feet, Myitkyina District. Flowers May, fruit June, *Maung Mya* 5440, 5469. "Large tree. Stem whitish-brown. Flowers white." Vernacular name:—*Okalaput pun* (Kachin).

***Ficus nemoralis* Wall.** [Moraceae].

Known from the Himalayas from Hazara to Assam and the Khasi hills.

Lahpye Kha, hills of the Bhamo District at 6500 ft., March, *Maung Mya*, 4983

***Hedychium elatum* Rosc.** [Zingiberaceae].

Known from the Eastern Himalayas.

Maymyo Plateau, 3500 ft., Sept., C. E. Parkinson 2094. "Erect, herbaceous, 3-4 ft. high. Flowers white, bases of petals pale-pink, filament pink." Vernacular name:—*Pha-hla*.

***Iris Clarkei* Baker** [Iridaceae].

Known from Sikkim.

Bhamo, North West of Lweje, 3300 ft., March, *Maung Mya* per C. E. Parkinson 5308. "Hygrophyte 1 ft. 2 in. high. Flowers indigo-blue; stem erect, smooth, green, without rootstock. In valley between hillocks."

Crinum Wattii Baker [Amaryllidaceae].

Known from Manipur.

Amherst, Wekwa Chaung, 150 ft., Jan. C. E. Parkinson 5010.
"Water plant 1-2 ft. high. Flowers white, stamens and base of perianth purplish; leaves dark purplish."

L.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies:—MR. H. R. HOSKING, B.Sc., A.R.C.S., Assistant Cotton Botanist, Uganda; MR. A. H. SAVILE and MR. N. V. ROUNCE, Agricultural Officers, Tanganyika Territory; MR. E. R. GUEST, B.Sc., A.R.C.S., Plant Breeder, Iraq.

MR. E. PHILLIPS TURNER.—We record with pleasure the appointment of Mr. E. Phillips Turner as Director of Forestry, New Zealand, in succession to Mr. L. M. Ellis, who recently resigned that office.

Mr. Phillips Turner is an Englishman by birth. In 1886 he was an Assistant on the Survey of the Railway from the Waikato to Rotorua, and made a careful survey on foot of the country the day after the eruption of Mt. Tarawera and Lake Rotomahana. In 1908 he was appointed Inspector of Scenic Reserves for the Dominion. This post enabled him to travel all over New Zealand and he acquired a wide knowledge of the Vegetation and Forests of the Dominion. When the Forestry Department was created as an independent Department, in the year 1919, Mr. Phillips Turner was made the head of it with the title of Secretary of Forestry. The following year the Department was reorganised as the State Forest Service, Mr. Ellis being made Director, with Mr. Phillips Turner as permanent head in charge of the Administrative side as Secretary of Forestry.

He has written valuable reports on the Botany of the higher Waimarino and on the re-vegetation of Tarawera Mountain. His keen botanical interests in addition to his love of scenic beauty should be of great value to the Dominion in his new post.

FRANK J. EVANS.—We record with regret the death of Mr. F. J. Evans in Trinidad. Mr. Evans entered the Royal Botanic Gardens, Kew, in March, 1902, and left in June, 1903, to take up the post of Assistant Superintendent of the Royal Botanic Gardens, Trinidad (*K.B.*, 1903, p. 31). In 1912 he was appointed Assistant Superintendent in the Agricultural Department, Southern Nigeria (*K.B.*, 1912, p. 300). Three years later he was placed in charge of the various Plantations in the Cameroons and carried on his duties with conspicuous efficiency until the Estates were sold a few years ago. He then returned to Trinidad to take over the Perseverance Estate, but he was in poor health and died on August 9th after a long illness.

(273) Wt. 85/18 1m 10/28 S.E.R. Ltd. 8p. 8.

BULLETIN OF MISCELLANEOUS INFORMATION No. 9 1928 ROYAL BOTANIC GARDENS, KEW

LI.—THE CORRECT SPELLING OF CERTAIN GENERIC NAMES—III.* T. A. SPRAGUE.

The interpretation of the International Rules of Nomenclature (ed. 2, 1912), in so far as they concern the spelling of generic names, offers a series of problems which have been solved by different botanists in different ways, with the result that there are hundreds of generic names the correct spelling of which is in dispute. A single illustration may suffice: in Communication no. 7, p. 28 (May 1926) of the International Seed Exchange publications, issued by the Brooklyn Botanic Garden, a list is given of twenty-one very frequently used generic names of cultivated plants,† which are currently spelt by adherents of the International Rules in two (or more) different ways. Adherents of the American Code are faced with similar problems.

As part of the necessary preparatory work in nomenclature for the International Botanical Congress to be held at Cambridge, England, in 1930, an attempt has accordingly been made by the writer to ascertain the precise meaning of the Rules in question, and to determine in accordance therewith the correct spelling of over 120 generic names and homonyms including the twenty-one mentioned above. The number of orthographic variants of these names exceeds 300. For convenience of reference the names are arranged alphabetically. Where one of the names discussed has been applied to two or more genera, the several homonyms are arranged, however, not in strict alphabetical but in chronological sequence, preceded by the figures (1), (2), etc., as in the case of (1) *Bradlea* (2) *Bradlaeia* (3) *Bradleja* (4) *Bradleya*. The correct spelling is indicated by heavy black type, synonyms following in italics.

The principal articles dealing with the spelling of generic names are the following:‡

Art. 7. Scientific names are in Latin for all groups. When taken from another language, a Latin termination is given them, except in cases sanctioned by custom. . . .

* Continued from *K.B.* 1928, p. 296.

† *Annona*, *Borago*, *Euonymus*, *Furcraea*, *Haloragis*, *Jussiaea*, *Maianthemum*, *Mesembryanthemum*, *Osmorhiza*, *Penstemon*, *Pereskia*, *Prunella*, *Pyrula*, *Pyrus*, *Raphanus*, *Stuartia*, *Sweetia*, *Symphoricarpos*, *Thuja*, *Thujopsis*, *Zanthoxylum*.

‡ In case of any doubt as to the meaning of the English and German translations, the French text is to be accepted as authoritative (*Internat. Rules*, ed. 2, p. vi.). A few slight verbal changes are here made in the English text.

Art. 19. Botanical nomenclature begins for the different groups of plants (recent and fossil) at the following dates.

(a) Phanerogamae and Pteridophyta, 1753 (Linné, *Species Plantarum*, ed. 1). . . .

It is agreed to associate genera, the names of which appear in Linné's *Species Plantarum*, ed. 1, with the descriptions given of them in the *Genera Plantarum*, ed. 5 (1754).

Art. 20. However, to avoid disadvantageous changes in the nomenclature of genera by the strict application of the rules of nomenclature, and especially of the principle of priority in starting from the dates given in Art. 19, the rules provide a list of names which must be retained in any case. These names are by preference those which have come into general use in the fifty years following their publication, or which have been used in monographs and important floristic works up to the year 1890.*

Art. 24. Genera receive names, which are substantives (or adjectives used as substantives) in the single number and written with a capital letter, and which may be compared with our surnames. These names may be taken from any source whatever, and may even be composed in an absolutely arbitrary manner.

[Art. 37. A species or a subdivision of a species, announced in a work with a complete specific or varietal name, but without diagnosis or reference to a former description under another name, is not effectively published. Citation in synonymy or incidental mention of a name is not effective publication, and the same applies to the mention of a name on a ticket issued with a dried plant without printed or autographed diagnosis.]

Plates accompanied with analyses are equivalent to a description; but this applies only to plates published before January 1, 1908.]

Art. 38. A genus . . . named or announced without being characterized conformably to article 37 cannot be regarded as effectively published (*nomen nudum*). The mere indication of species as belonging to a new genus . . . does not allow us to accept the genus . . . in question as characterized and [the generic name as] effectively published. An exception is made of the generic names mentioned by Linné in *Species Plantarum*, ed. 1, 1753, which it is agreed to associate with the descriptions in *Genera Plantarum*, ed. 5, 1754 (see Art. 19).

Art. 39. The date of a name . . . is that of its effective publication.

Art. 40. For the indication of the name . . . of a group to be accurate and complete . . . it is necessary to cite the author who first published the name . . . in question.

Art. 50. No one is authorized to reject, change or modify a name . . . because it is badly chosen or disagreeable or because another is preferable or better known. . . .

*As explained under *Maianthemum* (p. 350), the particular *spelling* used in the list of conserved names is not necessarily conserved, as that list was drawn up directly from Dalla Torre et Harms, *Genera Siphonogamarum*, in which numerous unauthorised "corrections" were made.

Examples.—This rule was broken when *Staphylea* was changed to *Staphylis*, *Tamus* to *Thamnos*, *Mentha* to *Minthe*, *Tillaea* to *Tillia*, *Vincetoxicum* to *Alexitoxicon*.

Art. 57. The original spelling of a name must be retained, except in the case of a typographic or orthographic error. When the difference between two names, especially between two generic names, lies in the termination, these names are to be regarded as distinct, even though they differ by one letter only. [Orthographic variants, however, such as *Columella* and *Columellia*, or *Eschweilera* and *Eschweileria*, are not regarded as distinct names: see footnote to Rec. XXXI.]

Examples of different names. *Rubia* and *Rubus*, *Monochaete* and *Monochaetum*, *Peponia* and *Peponium*, *Iria* and *Iris*.

Rec. XXX. Restraint should be exercised in making orthographic corrections, particularly if the change affects the first syllable, and above all the first letter of a name.*

Rec. XXXI. Many names differ only by a single letter, without any risk of confusion arising (ex. *Durvillea* and *Urvillea*). In cases where a close approach to identity might be a source of error (ex. *Astrostemma* and *Asterostemma* in one and the same family, *Asclepiadaceae*, *Pleuropetalum* and *Pleuropetalum* in *Orchidaceae*), only one of the names (the older) should be retained in accordance with Art. 51, 4°.†

It should be noted that Art. 7, which states that scientific names are in Latin, and that when taken from another language, a Latin termination is given them, is not a "rule" but a "guiding principle." The "rules" are Art. 10-58 (see Art. 2). Reference to Art. 24 shows that generic names may be composed in an *absolutely arbitrary manner*, and Art. 57 states that no one is authorized to change or modify a name because it is badly chosen or because another is preferable. Hence the Rules do *not* allow the replacement of a Greek termination by a Latin one: *Symphoricarpos* must not be altered to *Symphoricarpus*, nor *Phoradendron* to *Phoradendrum*. The generic name *Manihot*, cited as valid under Art. 24, is neither Latin nor latinized, nor is *Quamoclit*. It is evident that Art. 7 is of the nature of a recommendation, not of a rule. Names or forms of nomenclature contrary to a recommendation cannot be rejected (Art. 2).

Disregard of the essential difference between rules and recommendations has led to all kinds of unauthorized orthographic

*The wording, both of the original French text and of the English translation, might suggest that botanists were at liberty to make what orthographic corrections they pleased, whereas it is only in comparatively few cases that such corrections may be made under the Rules (see pp. 339-340).

†This is an application of the general principle that names which might lead to confusion or error must be rejected (Art. 51). Thus of the four generic names dedicated to Richard Bradley (*Bradlea*, *Bradlaeia*, *Bradleja* and *Bradleya*) only one can be retained, namely the earliest, *Bradlea*, since each of them has been spelt both as *Bradleya* and *Bradleia*.

"corrections" of generic names being accepted by botanists. A generic name may not be altered under the Rules on the ground that it is a *nomen hybridum* (e.g. *Rupicapnos*, from *rupes* and *καπνός*) nor because it is badly formed (e.g. *Stigmaphyllon*, which should have been *Stigmatophyllon* or *Stigmatophyllum*), nor because it is a corrupted form of a classical word (e.g. *Tamus* for *Thamnos* or *Tamnus*, an example cited under Art. 50), nor because it is telescoped (e.g. *Penstemon*, which should have been *Pentastemon*) or curtailed (e.g. *Richardia* for *Richardsonia*), or has a wrong connecting vowel (e.g. *Chimaphila* for *Chimophila*), nor because an initial aspirate is omitted in latinizing a Greek word (e.g. *Aplophyllum* for *Haplophyllum*). Many botanists use such forms as *Fourcroya*, *Jussieua*, *Vaillantia*, because these genera were named in honour of Fourcroy, Jussieu and Vaillant respectively. But the original spellings *Furcraea*, *Jussiaea* and *Valantia* must be retained under Art. 24, although they are not in accordance with Rec. IV.

For this misunderstanding the wording of Art. 57 and Rec. XXX. seems to be primarily responsible. The correction of typographic and orthographic errors is permitted under Art. 57, but no definition of an orthographic error is given. The only serious difficulty connected with the correction of *typographic* errors lies in the fact that it is often difficult to prove that an error occurred in printing. In the cases of *Kissenia* and *Saurauia* the spellings *Fissenia* and *Saurauja* may be rejected as containing typographical errors, because these generic names not only commemorate Kissen and Saurau, but were actually written *Kissenia* and *Saurauia* respectively by Robert Brown and Willdenow, who proposed the names in question.

When Art. 57 is read in conjunction with Art. 24 and Art. 50 it seems clear that the *orthographic* corrections permitted do not include such as are based *solely* on *philological* grounds. It is very regrettable that so many badly formed names or corrupt spellings of classical names should have been published for genera, but Art. 50 expressly forbids the changing or modification of such names. The reason for this provision is not far to seek: authorities such as Ascherson, St. Lager, Dalla Torre and Harms, and Post and Kuntze, frequently disagree as to what the philologically "correct" spelling should be—hence it was considered advisable to retain the original spelling in such cases. The only orthographic errors that may be corrected are such as are *unintentional*.

If the views expressed above represent a correct interpretation of the International Rules, it is obvious that the cases in which typographic or orthographic corrections may be made are relatively few. The ten examples given in the following list are: *Acanthephippium*, *Argithamnia*, *Bejaria*, *Beurreria*, (4) *Bradleya*, *Kissenia*, *Malcolmia*, (2) *Matthiola*, *Saurauia*, *Stuartia*. These form about 8 per cent. of the names discussed; and two of them, *Malcolmia* and *Matthiola*, are on the border-line.

It seems desirable to draw special attention to the question whether spellings of generic names published in *Species Plantarum*, ed. 1 (1753) have precedence over different spellings of the same names published in *Genera Plantarum*, ed. 5 (1754). Dr. Hans Schinz and the late Dr. A. Thellung have taken the view that the spellings published in *Sp. Pl.* ed. 1 (1753) must be adopted, owing to the rule (Art. 38) under which such names are accepted as dating from 1753, and are associated with the descriptions published in *Gen. Pl.* ed. 5 (1754). The writer, on the other hand, considers that the generic names common to these two works are treated as published in 1753, but that neither the one work nor the other was intended to have priority as regards the spelling of generic names. This question is discussed at some length under *Euonymus* (p. 294). Since then the case of *Thuja* has been investigated: in this Linné subsequently to 1753-54 appears to have consistently adopted one of the spellings. In the writer's opinion such cases should be settled by the following considerations:

1. If Linné subsequently to 1753-54 consistently adopted one of the spellings, that spelling should be accepted, e.g. *Thuja*.
2. If not, the spelling which is more correct philologically should be adopted, e.g. *Agrostemma*.
3. Of two spellings which are equally correct philologically, the one which is (a) in accordance with the recommendations, or (b) is more commonly used, should be adopted, e.g. *Ludwigia*.

In conclusion, it may be pointed out that it is often very difficult to ascertain what authors first published particular variants of generic names, so that earlier citations may possibly be found for some of the names in the following list. Pfeiffer's *Nomenclator Botanicus* (1873-74) is nearly exhaustive for names published up to the end of the year 1858. For those published since that date the *Index Kewensis* and its Supplements, Dalla Torre and Harms, *Genera Siphonogamarum*, and Post and Kuntze, *Lexicon Generum Phanerogamarum*, may be consulted.

It is hoped that the publication of the present paper may lead to a satisfactory solution of this vexed question, and that the numerous examples discussed may enable other workers to determine the correct spelling of particular generic names with less difficulty than heretofore.

Acanthephippium Endl. *Gen. Pl.* i. 200 (1837); Blume, *Orchid.* i. 156 (1858). *Acanthophippium* Blume, *Bijdr.* 353, 433, *Clav. Gen. Orch. Jav.* fol. 5, t. 47 (1825); Blume, *Orchid.* i. t. 49, fig. 1 (1858).—Since the spelling *Acanthophippium* contains a definite (and apparently *unintentional*) orthographic error, namely, the omission of the initial letter of ehippium (a saddle) and the alteration to *Acanthephippium* involves no risk of confusion or error, the latter spelling should be adopted.

Achillea L. Sp. Pl. ed. 1, 896 (1753); L. Gen. Pl. ed. 5, 382 (1754). *Achillios* St. Lager in Ann. Soc. Bot. Lyon, vii. 82, 118 (1880).—From the point of view of the classical scholar, the form proposed by St. Lager is doubtless preferable, since it corresponds with *αχίλλειος*. Under Art. 50, however, *Achillea* must be retained.

Acokanthera G. Don Gen. Syst. iv. 485 (1837). *Acocanthera* Endl. Gen. ii. 1404 (1841). *Akokanthera* Walp. Rep. iii. 122 (1845).—As it is quite possible that the eccentric spelling *Acokanthera* was deliberately chosen by G. Don, it should be retained.

Aeranthus Lindl. in Bot. Reg. x. t. 817 (1824). *Aeranthus* Spreng. Syst. iii. 718 (1826).—There is no error whatever in the original spelling *Aeranthus*, and Sprengel was not justified in changing it. The adjectival ending -anthus is used in numerous accepted generic names such as *Menyanthes* and *Spilanthes*. The fact that Lindley subsequently (Orch. Gen. et Sp. 243: 1833) accepted Sprengel's alteration of the spelling is immaterial under Art. 50. If Lindley had intended to publish the name in the form *Aeranthus* and it had appeared by accident as *Aeranthus*, the case would have been different. As the name *Aeranthus* was chosen to correspond with *Aerides*, and occurs seven times in the original place of publication, there can be no question of an accidental mis-spelling.

Aerva Forsk. Fl. Aegypt.-Arab. 170 (1775). *Aerua* Juss. Gen. 88 (1789).

Agropyron J. Gaertn. in Nov. Comm. Petrop. xiv. pars 1, 539 (1770). *Agropyrum* Roem. et Schult. Syst. ii. 750 (1817). *Agriopyrum* E. H. L. Krause in Bot. Centralbl. lxxiii. 339 (1898)—vide Schinz et Thell. in Vierteljahrsschr. Nat. Ges. Zürich, liii. 522 (1909).

Agrostemma L. Sp. Pl. ed. 1, 435 (1753). *Agrostema* L. Gen. Pl. ed. 5, 198 (1754).—Of the two spellings used by Linné in 1753-54 *Agrostemma* should be adopted as it is more correct, the second half of the name being *στρέμμα*, a garland.

Ailanthus Desf. in Mém. Acad. Sc. Par. 1786, 265, t. 8 (1788). *Aylantus* Juss. Gen. 373 (1789). *Aylanthus* Vent. Tabl. iii. 450 (1799). *Ailantus* DC. in DC. Prodr. ii. 88 (1825).—vide p. 286.

Aira L. Sp. Pl. ed. 1, 63 (1753); Gen. Pl. ed. 5, 31 (1754). *Aera* Aschers. Fl. Brandenb. 830 (1864).

Alchemilla L. Sp. Pl. ed. 1, 123 (1753); Gen. Pl. ed. 5, 58 (1754).—Ascherson and Graebner (Syn. Mitteleur. Fl. vi. Abt. 1, 385: 1902) adopted the original pre-Linnean spelling *Alchimilla** used by Hieronymus von Braunschwyg, Buoch von distillierung, fol. cxiii, recto (1515), Tragus Comm. ii. 511 (1552), and Tournefort, Élem.

* Restored by Ascherson, Fl. Brandenburg, 935, Berichtig. zu S. 196 (1864).

408, t. 289 (1694). Briquet, Prodr. Fl. Corse, ii. 199 (1913) has pointed out that the Linnean spelling must be retained under Art. 50.

Aldrovanda L. Sp. Pl. ed. 1, 281 (1753); Gen. Pl. ed. 5, 136 (1754). *Aldrovandia* Post et Kuntze, Lexic. Gen. Phan. 17 (1903).—Monti is stated to have published the generic name as *Aldrovandia*, and he used that form in his 'Indices Botanici,' 3 (1753). Aldrovandi's name was, however, latinized "Aldrovandus" in his posthumously published 'Dendrologiae . . . libri duo,' and Linné in 1753-54 adopted the spelling *Aldrovanda* in preference to *Aldrovandia*. His decision cannot be reversed.

Allophylus L. Sp. Pl. ed. 1, 348 (1753); Gen. Pl. ed. 5, 164 (1754). *Allophyllus* Gled. Syst. 82 (1764).—There was no orthographic or typographic error in *Allophylus*. Linné (Phil. Bot. 186: 1751) derived it from "ἀλλόφυλος, alienigenus." The alteration to *Allophyllus* may have been due to a mistaken idea that the second part of the name was from φύλλον, a leaf. This illustrates one of the dangers attending orthographic "corrections."

Amaranthus L. Sp. Pl. ed. 1, 989 (1753); Gen. Pl. ed. 5, 427 (1754). *Amarantus* L. Syst. ed. 10, 1268 (1759)—vide p. 287.

Amethystea L. Sp. Pl. ed. 1, 21 (1753). *Ametystea* L. Gen. Pl. ed. 5, 13, (1754)—vide p. 295.

Ammannia L. Sp. Pl. ed. 1, 119 (1753); Gen. Pl. ed. 5, 55 (1754). *Ammannia* Scop. Introd. 209 (1777); Houtt. in Reliq. Houtt. 4 (1781).—The spelling originally used by Houston and adopted by Scopoli was *Ammannia*, but Linné published it in the form *Ammannia*. The generic name was evidently associated by Linné with Johann Amman (1707-1741), Professor of Botany at St. Petersburg, who was a contributor to the Linnean Herbarium (B. D. Jackson, Index Linn. Herb. 9: 1912). Under *Ammannia latifolia* L. Sp. Pl. ed. 1, 119, is the synonym *Ammannia palustris*, caule quadrangulati, foliis angustis Amm. Herb. 344. That this refers to Johann Amman, who wrote on Ruthenian botany, is evident from the entry in the list of Auctores usitatores: "Amanni [sic] Ruthenica, Herbarium."

Johann Amman spelt his name as "Amman" (Stirp. Rar. Ruthen. Ic. et Descr., dedicatory epistle, and preface), and latinized it as "Ammanus." Linné spelt both Johann Amman and Paul Ammann (1634-1691) as "Amman" (Biblioth. Bot. 146, 207, and Index auctorum: 1751) and latinized Paul Ammann's name as Ammannus. ("Paulus Ammannus," l.c. 109, 116, 123, 175). In 1753 he latinized Johann Amman as "Ammannius" or "Ammannus" (Sp. Pl. ed. 1, 119; "Amannus" in list of Auctores usitatores). Subsequently, however, he had "Ammanus, J." (Sp. Pl. ed. 2, Auctores restauratores).

Haller (Biblioth. Bot. i. 518, ii. 291), like Linné, spelt both Paul and Johann as "Amman," whereas Pritzel (Thes. Lit. Bot., ed. 2, 5), and the British Museum (Nat. Hist.) Library Catalogue have both as "Ammann." In these circumstances the original spelling *Ammannia* should be retained. It seems probable that Linné intentionally doubled the "n" in Amman's name, when he latinized it. In any case he actually used the form *Ammannia* throughout the period 1737-71.

Androsace L. Sp.Pl. ed. 1, 141 (1753); L. Gen. Pl. ed. 5, 69. (1754). *Androsaces* Aschers. Fl. Brandenburg, 555 (1864).—Although the classical *ἀνδρόσακες* should be transliterated *Androsaces*, the name *Androsace* adopted by Linné for a genus of Primulaceae cannot be altered under the Rules.

Angraecum Bory, Voy. i. 359 (1804), in adnot. *Angrecum* Pfitzer in Engl. et Prantl, Nat. Pflanzenfam. ii. Abt. 6, 214 (1889).—*Angraecum* was derived from angrec (angrek, anggrek, anggerik), the Malay name for orchid. Bory doubtless considered that it was a better latinized form of angrec than *Angrecum*. Under the Rules the spelling published by him must stand.

Annona L. Sp. Pl. ed. 1, 536 (1753); Gen. Pl. ed. 5, 241 (1754). *Anona* Boehm. in Ludwig, Def. Gen. Pl. 377 (1760).—The form *Annona* must be retained because it was *deliberately* chosen by Linné to replace *Anona* Comm. (Hort. i. 133, t. 69: 1697) on the ground that the latter was a "barbarous" name, being of native American origin. By the addition of an "n" he turned it into a classical Latin word (Hort. Cliff. 222: 1737; Phil. Bot. 163: 1751). Linné's action in rejecting the euphonious and historic name *Anona* for the inept one *Annona* may be regretted (vide Journ. Bot. 1921, 158), but it cannot be reversed under International Rules, except by conserving the spelling *Anona*. *Annona* has been accepted by Safford (Journ. Wash. Acad. Sc. i. 118: 1911), and by Fawcett and Rendle (Fl. Jam. iii. 194: 1914).

Anthericum L. Sp. ed. 1, 310 (1753); Gen. Pl. ed. 5, 146 (1754). *Anthericus* Aschers. Fl. Brandenb. 727 (1864).

Aplolophium Cham. in Linnaea, vii. 556 (1832). *Haplolophium* Endl. Gen. 712 (1839).—The name of the genus stands as *Aplolophium*. Under Art. 24, 50 and 57, Endlicher was not at liberty to change the spelling.

Aplopappus Cass. in Dict. Sc. Nat. lvi. 168 (1828). *Haplopappus* Endl. Gen. 385 (1837).—Although it is regrettable that Cassini did not adopt the spelling *Haplopappus*, it is not permissible under Art. 24, 50 and 57 to alter the name *Aplopappus* published by him.

The name is included among the nomina generica conservanda as "*Haplopappus* Cass.," which is inaccurate. As in the cases of *Epifagus* (q.v.), *Iochroma* and *Maianthemum* (q.v.) there is no evidence

that it was intended that the "corrected" spellings, namely *Haplopappus*, *Epiphegus*, *Jochroma*, and *Maianthemum*, which were copied directly from Dalla Torre et Harms, Genera Siphonogamarum, should be conserved. It is inconceivable that the beautiful and philologically correct name *Iochroma* should have been conserved under the horrible guise of "*Jochroma*."

Since the philologically preferable spelling *Haplopappus* is widely current, however, and is being adopted in H. M. Hall's 'The genus *Haplopappus*: a phylogenetic study in the Compositae' (Washington, 1928), it seems desirable that it should be definitely conserved. This may be effected by citing the conserved name as "*Haplopappus* Cass. corr. Endl. Gen. 385 (1837)," or by indicating in some other way that Cassini's spelling was corrected by Endlicher.

(1) **Aplophyllum** Cass. in Dict. Sc. Nat. xxxiii. 463, 472 (1824). *Mutisia* sect. *Aplophyllum* Less. in Linnaea, v. 273 (1830). *Mutisia* subgen. *Aplophyllum* Less. Syn. Comp. 107 (1832). *Mutisia* subgen. *Haplophyllum* Endl. Gen. 484 (1838). *Mutisia* sect. *Haplophyllion* Reichb. Nomencl. 88, n. 3436 (1841).—Whether as a genus, a subgenus, or a section this group must retain the name *Aplophyllum*, originally given it by Cassini (as a genus), and subsequently adopted by Lessing (as a sectional or subgeneric name).

(2) **Aplophyllum** A. Juss. in Mém. Mus. Par. xii. 464 (1825). *Haplophyllum* Reichb. Handb. 282 (1837); Reichb. Nomencl. 196, n. 7493 (1841).—The existence of the valid prior homonym *Aplophyllum* Cass. (Compositae) precludes the use of *Aplophyllum* Juss. (Rutaceae) or of its variant *Haplophyllum* Reichb. As the name *Haplophyllum* Reichb. is in common use, however, it may perhaps be considered desirable to conserve it, in view of the fact that *Aplophyllum* Cass. is generally regarded as no more than a section of *Mutisia*.

Archytæa Mart. Nov. Gen. i. 117 (1824). *Architæa* Mart. l.c. 116, t. 73.—The spelling *Archytæa* should be retained, as the name commemorates the Greek philosopher Archytas.

Argithamnia Swartz, Fl. Ind. Occ. i. 335 (1797). *Argythamnia* P. Browne, Jam. 338 (1756); Adans. Fam. ii. 355 (1763). *Argithamnia* Adans. l.c. 520. *Argothamnia* Spreng. Anleit. ed. 2, ii. 369 (1817). *Argyrothamnia* Muell.-Arg. in Linnaea xxxiv. 144 (1865).—There can be little doubt that Patrick Browne intended to give a name meaning "white shrub," and that the spelling *Argythamnia* was an unintentional orthographic error on his part for *Argithamnia*. Adanson, from whom some authors consider that the effective publication of the name dates, spelt it either with a "y" or an "i". Hence the form *Argithamnia* adopted by Swartz (1797) may be accepted as embodying an orthographic correction such as is warranted under Art. 57. It has been adopted by Pax in Engl. Pflanzenreich, IV. 147, vi. 78 (1912).

(1) **Aristotela** Adans. Fam. ii. 125 (1763).—A superfluous name (nomen abortivum) for *Othonna* L. (1753). Hence it does not invalidate *Aristotelia* L'Hérit.

(2) **Aristotelia** L'Hérit. Stirp. ii. 31, t. 16 (1784). *Aristotela* Gmel. Syst. 751 (1791). *Aristotelea* Spreng. Gen. i. 393 (1830).—The original spelling *Aristotelia* stands.

Aspidopterys A. Juss. in Ann. Sc. Nat. sér. 2, xiii. 266 (1840). *Hiraea* sect. *Aspidopteris* Reichb. Nomencl. 206 (1841). *Aspidopteryx* Hassk. Cat. Pl. Hort. Bogor. ed. 2, 223 (1844). *Aspidopteris* Niedenzu in Engl. et Prantl, Nat. Pflanzenfam. iii. Abt. 4, 53 (1890).—A. Jussieu deliberately adopted the termination -ys, as in the cases of *Brachypterys*, *Diplopterys*, *Echinopterys*, *Lophopterys* and *Rysopterys*. Therefore the spelling of these names cannot be changed under the Rules.

Asplenium L. Sp. Pl. ed. 1, 1078 (1753); Gen. Pl. ed. 5, 485 (1754). *Asplenium* Aschers. Fl. Brandenb. 913 (1864).

Aubrieta Adans. Fam. ii. 420, 523 (1763). *Aubrietia* DC. in Mém. Mus. Hist. Nat. Par. vii. 232 (1821). *Aubretia* Dietr. Syn. iii. 629, 637 (1843).

Balduina Nutt. Gen. ii. 175 (1818). *Baldwinia* Torr. et Gray, Fl. N. Am. ii. 388 (1843).—It seems probable that Nuttall latinized Baldwin's name as 'Balduinus' and intentionally published the generic name in the form *Balduina*. If this is agreed, it follows that that spelling must be retained. Nuttall's 'Genera' admittedly contains numerous orthographic or typographic errors such as "*Similax*" (ii. 237) for *Smilax*, "Eratum" for Erratum, "*Vaege-lia*" for *Vogelia*, and "*Bruchmannia*" for *Beckmannia*. The last two are corrected in the "Eratum", and "*Similax*" was correctly indexed as *Smilax*. In spite of the existence of these errors, however, it can hardly be supposed that in publishing a new generic name he could have written, or let pass in proof, *Balduina*, if he had intended to spell it as *Baldwinia* or *Baldwynia*. In a footnote he dedicates the genus to William Baldwin [sic].

Ballota L. Sp. Pl. ed. 1, 582 (1753); Gen. Pl. ed. 5, 253 (1754). *Ballote* Adans. Fam. ii. 192 (1763).—The Greek plant-name βαλλωτή was transcribed *Ballote* by Pliny: "Balloten alio nomine porrum nigrum Graeci vocant." (Nat. Hist. ed. Harduinus, ii. 427, 1. 3). Hence it might have been better if Linné had adopted that form. His choice of *Ballota*, however, is final.

Barbarea R. Br. in Ait. Hort. Kew. ed. 2, iv. 109 (1812). *Barbaraea* Link, Enum. ii. 164 (1822).—The generic name *Barbarea* was taken by Robert Brown without alteration from the Linnean trivial name of his type-species, *Barbarea vulgaris* (*Erysimum Barbarea* L.) The historic origin of the name in its Latin dress was *S[anctae] Barbarae Herba* Fuchs, Hist. 745 (1542), *Herba S. Barbarae* Tragus

Stirp. ed. Kyber 101 (1552); and the philologically correct form is undoubtedly *Barbaraea*, which is also in accordance with Rec. IV a. The spelling *Barbaraea* appeared in Dodoens, Cruydeboek, 668, 669 (1554), but *Barbarea* is given in the 'Index appellationum . . . quibus passim officinae pharmacopolorum et nostri temporis Herbarii utuntur.' In 1583, however, Dodoens (Pempt. 699) accepted the spelling *Barbarea*, with the following remark, "Germani Sant Barberen [sic] kraut nominant, Latine Barbaream idcirco vocavimus," which suggests that *Barbarea* may have been derived from the German 'Barbarenkraut' instead of directly from the Latin name Barbara. The form *Barbarea* was used also by Lobel, Obs. 104 (1576), Gerarde, Herball 188 (1597), C. Bauhin, Pinax. 98 (1623), 104 (1576), Gerarde, Herball 188 (1597), C. Bauhin, Pinax. 98 (1623), 104 (1576), J. Bauhin, Hist. ii. 868 (1651), Tabern. Kraeutter-Buch 843 (1664), Chabr. Sciagr. 278 (1666), Moris. Hist. ii. 230 (1680), Mentzel, Index, 44 (1682), Ray, Hist. i. 809 (1686), Weinmann, Phyt. i. 130 (1737); the form *Barbaraea* on the other hand seems to have fallen into complete disuse until it was revived in 1822 by Link. The generic name *Barbaraea* has been erroneously attributed to Beckmann, Lexicon Botanicum, 33 (1801), but the word as it appears in that work is a specific epithet coupled with the generic names *Erysimum* and *Sisymbrium*.

Under Art 24 and 50, Robert Brown was at liberty to use the Linnean specific epithet, and pre-Linnean generic name, *Barbarea*, for his new genus, and no alteration on philological grounds is permissible.

Bartsia L. Sp. Pl. ed. 1, 602 (1753); Gen. Pl. ed. 5, 262 (1754). *Bartschia* Wettst. in Engl. et Prantl, Nat. Pflanzenfam. iii, Abt. 3 B, 102 (1893)—vide Schinz et Thell. in Bull. Herb. Boiss. sér. 2, vii. 340 (1907).

Bejaria Zea ex Vent. Jard. Cels. sub t. 51 (1800); Zea in Anal. Cienc. Nat. iii. 151 (1801), in nota. *Befaria* Mutis ex L. Mant. ii. 152 (1771).—The genus was named *Bejaria* by Mutis in honour of José Bejar, Professor of Surgery at Cadiz. The spelling *Befaria* contains an unintentional orthographic error, and should therefore be corrected. Had Linné deliberately changed *Bejaria* to *Befaria*, his original spelling could not have been altered under the Rules.

(1) **Beureria** Ehret, Pl. et Papil. depict. t. 13 (1755).—Dedicated by Ehret to Joh. Ambrosius Beurer, a Nuremberg apothecary, and life member of the Acad. Nat. Curiosorum. It is a nomenclatural synonym of the conserved name *Calycanthus* L. (1759), and hence does not invalidate the following name.

(2) **Beurreria** Jacq. Sel. Stirp. Am. Hist. 44 (1763); Obs. Bot. ii. 2 (1767). *Bourreria* P. Br. Jam. 168 (1756); Jacq. Enum. Pl. Carib. 2, 14 (1760). *Beureria* Spreng. Syst. i. 647 (1825).—Patrick Browne called the genus "after Mr. Bourer, an apothecary of Nuremberg, who was a great promoter of natural history." The

actual name of the apothecary, however, was Beurer (see above, under *Beureria*). This seems to have been discovered by Jacquin between 1760 and 1763, for in the latter year he changed the spelling to *Beurreria*. Finally, in 1825, Sprengel discarded an "r," spelling the name *Beureria*, so as to make it correspond more closely with Beurer.

Since *Bourreria* contained an *unintentional* orthographic error the second letter being an "o" instead of an "e", Jacquin was justified in modifying the spelling to *Beurreria*; but since both Patrick Browne and Jacquin deliberately used the double consonant "rr" (in *Bourreria* and *Beurreria*), Sprengel was not justified in further modifying the name to *Beureria*.

Boerhavia L. Sp. Pl. ed. 1, 3 (1753); Gen. Pl. ed. 5, 4 (1754). *Boerhaavia* Mill. Gard. Dict. Abridg. ed. 4 (1754); Boehm. in Ludw. Def. ed. 3, 3 (1760). *Boerrhavia* Neck. Elem. i. 124 (1790). *Boerhaavea* Kuntze, Rev. Gen. ii. 532 (1891).—Linné latinized Boerhaave's name as "Boerhavius" (Sp. Pl. ed. 1, list of 'Auctores usitatiores'), and *deliberately* adopted the spelling *Boerhavia*, doubtless on the ground that the double vowel "aa" was out of place in a Latin name. The case is similar to those of *Swertia* and *Valantia*.

Borago L. Sp. Pl. ed. 1, 137 (1753); Gen. Pl. ed. 5, 67 (1754). *Borrigo* Mill. Gard. Dict. Abridg. ed. 4 (1754)—vide p. 288.

Brachypterys A. Juss.—vide sub *Aspidopterys*.

(1) **Bradlea** Adans. Fam. ii. 324, 527 (1763), sensu *Apios* + *Wisteria*. *Bradleya* Britt. Man. Fl. N. States & Canada, 548 (1901), sensu *Wisteria*. *Bradleya* Post et Kuntze Lexic. Gen. Phan. 78 (1903), sensu *Apios*. *Bradleia* Britt. et Brown, Ill. Fl. ed. 2, ii. 418 (1913), sensu *Apios*.—*Bradlea* is a prior name for *Apios* Moench (1794).

(2) **Bradlaeia** Neck. Elem. 169 (1790). *Bradleia* Wittst. Etym. Handwörterb. ed. 2, 121 (1856). *Bradleya* Post. et Kuntze, Lexic. Gen. Phan. 78 (1903).—*Bradlaeia* is a synonym of *Siler* Crantz (1767).

(3) **Bradleja** Banks ex Gaertn. Fruct. ii. 127, t. 109 (1791). *Bradleia* Cav. Ic. iv. 48, t. 371 (1797). *Bradleya* Post et Kuntze, Lexic. Gen. Phan. 78 (1903).—*Bradleja* is a synonym of *Glochidion* Forst. (1776).

(4) **Bradleya** Kuntze, Rev. Gen. i. 40 (1891). *Braddleya* Vell. Fl. Flum. 93 (1825); ii. t. 140. *Bradleia* Wittst. Etym. Handwörterb. ed. 2, 121 (1856).—*Braddleya* Vell. is a taxonomic servatum (Internat. Rules, ed. 2, 94), which is a nomen conwith two "d"s because he thought that Richard Bradley's name was Braddley (l.c. 94). Hence the spelling *Braddleya* may be corrected to *Bradleya* under Art. 57.

The four preceding generic names, *Bradlea*, *Bradlaeia*, *Bradleja* and *Bradleya* were all commemorative of Richard Bradley, 1675-1732, Professor of Botany at Cambridge. It will be noticed that each of them has been spelt both as *Bradleia* and as *Bradleya*. This case illustrates two important points: (1) not more than one generic name should be formed from the same personal name, otherwise confusion may result; (2) it is generally undesirable to "correct" the original spelling, as different authors may "correct" it in different ways.

Buddleja L. Sp. Pl. ed. 1, 112 (1753); Gen. Pl. ed. 5, 51 (1754). *Budleia* Adans. Fam. ii. 224 (1763). *Budleja* Neck. Elem. ii. 9 (1790). *Budlaea* Swartz, Obs. Bot. 47 (1791). *Buddleia* Willd. Sp. Pl. i. 631 (1797). *Budlea* St. Hil. Expos. i. 272 (1805). *Buddlea* Spreng. Anleit. ed. 2, ii. p. 479 (1817).—The generic name *Buddleja* was originally proposed (in manuscript) by Houston to commemorate the English botanist, Buddle. It was accepted by Linné in Gen. Pl. ed. 1, 26 (1737), Hort. Cliff. 35 (1737), Gen. Pl. ed. 2, 45 (1742), Syst. Nat. ed. 10, 895 (1759), Sp. Pl. ed. 2, 162 (1762) and Gen. Pl. ed. 6, 57 (1764), as well as in 1753-54.

Either *Buddleia* or *Buddlea* would have been preferable, the latter being formed in accordance with Rec. IV a. Under Art. 24, however, the spelling adopted by Linné in 1753-54 must be retained.

Buginvillaea Comm. ex Juss. Gen. 91 (1789). *Bugainvillea* Nees et Mart. in Nov. Act. Nat. Cur. xi. 39 (1823). *Bugenvillea* Endl. Gen. 312 (1837). *Buginvillia* Blanco, Fl. Filip. 307 (1837). *Bougainvillea* Spach Vég. Phan. x. 516 (1841). *Bugainvillaea* Brongn. Énum. genres, 101 (1843).—Jussieu, who published the generic name, was at liberty under the Rules to latinize Bougainville's name as he pleased, hence the name *Buginvillaea* is correct, as has been recognized by Bailey (Manual of Cultivated Plants, 254: 1924). As the genus is so widely known under the spelling *Bougainvillea*, which is moreover formed in accordance with Rec. IV a, it may perhaps be considered desirable to conserve that spelling.

Bulbophyllum Thouars, Hist. Pl. Orch. Isles Afr., 3me Tabl. Espèces, tt. 93-110 (1822). *Bolbophyllum* Spreng. Syst. iii. 732 (1826).—It is a pity that Thouars did not adopt the form *Bolbophyllum*, from *βολβός* and *φύλλον*, instead of compounding the Latin word *bulbus* with the latter. Nevertheless the generic name must stand as published by Thouars (Art. 50).

Calophora Presl, Rel. Haenk. ii. 41, t. 56 (1831)*. *Cajophora* Endl. Gen. 931 (1839).—The form *Cajophora* has been adopted by Urban, Monogr. Loasac. 268 (Nov. Act. Nat. Cur. lxxvi: 1900) and others, but Endlicher was not justified in altering the original spelling.

* The date 1835, given by Urban, and by Dalla Torre et Harms, Gen. Siphonog. 333, is not the original date of publication.

Castilleja *Mutis ex L. f. Suppl.* 47 (1781). *Castileia* Vent. Tabl. ii. 299 (1799). *Castilleia* Spreng. Syst. ii. 774 (1825). *Castileja* Meisn. Gen. ii. 223 (1840). *Castillejoa* Post et Kuntze, Lexic. Gen. Phan. 104 (1903).—The genus was named in honour of Domingo Castillejo, Professor of Botany at Cadiz in the times of Mutis. There was thus no justification, either nomenclatural or philological, for changing the original spelling *Castilleja*.

Chimaphila *Pursh*, Fl. Am. Sept. i. 279, 300 (1814). *Chimophila* Radius, Diss. Pyrol. 7, 33, t. 5, fig. 2 (1821).—The form *Chimophila*, though philologically preferable, is nomenclaturally invalid. The case is similar to that of *Stigmaphyllon*, q. v.

Corallorrhiza *R. Br.* in Ait. Hort. Kew. ed. 2, v. 209 (1813). *Coralliorrhiza* Aschers. Fl. Brandenb. 697 (1864).—The fact that *Coralliorrhiza* is philologically preferable, does not warrant the rejection of the form *Corallorrhiza*, which was adopted by Robert Brown from Gmelin, Fl. Sibir. i. 26 (1747) and Haller, Hist. ii. 159 (1768). The name appeared as *Corallorrhiza* Rupp. in Haller, Enum. 278 (1742). Haller (1768) cited *Corallorrhiza* from "Rupp. I. p. 281" which apparently refers to Ruppius, Flora Jenensis, ed. 1. 284 (1718), which is the only work by Ruppius included in Haller's Catalogus auctorum et editionum (Hist. i. p. xlii. col. 1), three editions being mentioned, the others being those of 1726 and 1744 respectively. The reference is *Orobanche spuria seu corallorrhiza* Rupp. (l.c.). By the use of the epithet *spuria*, Ruppius indicated that the species did not really belong to *Orobanche*. Also he removed it from *Orobanche* (p. 232), and placed it after *Orchis* (p. 284), with the following remark. "Et hujus plantae flos est irregularis hexapetalus, non secus ac totius classis, unde hactenus male modo ad *Orobanchen*, modo ad *Dentariam* relata fuit." In Haller's edition of Ruppius, Fl. Jen. 301 (1745), the generic name *Rhizocorallon* is used for the plant. The name *Corallorrhiza*, however, is used by Haller in an editorial note. I have been unable to trace the citation "*Corallorrhiza* Rupp. Orchid. gen. constit. p. 12" (Haller, Hist. ii. 159). It may possibly refer to one of the "codices Ruppiani manu scripti" mentioned by Haller, Biblioth. Bot. ii. 147 (1772).

Coreopsis *L. Sp. Pl.* ed. 1, 907 (1753); Gen. Pl. ed. 5, 388 (1754). *Coriopsis* Clements in Nebraska Univ. Studies, iii. No. 1, 54 (1902).—The name *Coreopsis* was derived by Linné (Phil. Bot. 178: 1751) from κόρις cimex, and ὄψις, facies. As the genitive of κόρις is either κόριος or κόρεως there was no justification for the so-called correction.

(1) **Corydalis** [Knaut, Meth. Pl. 153 (1716); Dill. Nov. Gen. 129, t. 7 (1719)] Medik. Phil. Bot. i. 96 (1789).—Synonymous with *Cisticapnos* Adans., 1763 (*Cysticapnos* Gaertn., 1791), being based on *Fumaria vesicaria* L. This genus is united by many authors with *Corydalis* Vent.

(2) **Corydalis** Vent. Choix, 19 (1803), quoad syn. *Capnoides* Adans. [excl. *C. fungosa* Vent., quae *Adlumia fungosa* Greene est]. *Corydallis* Aschers. Fl. Brandenb. 28 (1864).—*Corydalis* was a name mentioned by Mattioli, Comment. 566 ll. 16, 19 (1560), Compend. 807 (1571), Epit. ed. Camerarius, 892 (1586), C. Bauhin, Pinax, 143, No. v. (1623), J. Bauhin, Hist. iii. pars 1, 203 (1651), and Ray, Hist. i. 975, l. 12 (1686). It was spelt κορυδαλῖς (*Corydalis*) in Kuhn's edition of Galen's Opera, xii. 361 (1826). Even if Ascherson was right in stating that the correct classical spelling is *Corydallis*, the form *Corydalis* should be retained for botanical purposes: Medikus and Ventenat were at liberty to adopt the customary mediaeval spelling, *Corydalis*, for their genera.

Cypripedium *L. Sp. ed.* 1, 951 (1753); Gen. Pl. ed. 5, 408 (1754). *Cypripedium* Aschers. Fl. Brandenb., 700 (1864). *Cypripedilon* St. Lager in Cariot, Étude des Fleurs, ed. 8, sec. Rouy in Morot, Journ. de Bot. viii. 58 (1894). *Cypridopedium* Aschers. et Graebn. Fl. Nordostdeutsch. Flachl. 204, adnot. 2 (1898). *Cypridopedium* Clements in Nebraska Univ. Studies, iii. 54 (1902).—Under the Rules, the original spelling *Cypripedium*, adopted by Linné in 1735 and consistently employed by him in his subsequent works, must be retained. He used it in Syst. Mat. ed. 1 (1735), Fl. Lapp. 248 (1737), Gen. Pl. ed. 1, 272 (1737), Hort. Cliff. 430 (1737), Gen. Pl. ed. 2, 435 (1742), Fl. Suec. ed. 1, 264 (1745), Phil. Bot. 27, 143, 186 (1751), Fl. Suec. ed. 2, 318 (1754), Syst. Nat. ed. 10, 1245 (1759), Sp. Pl. ed. 2, 1346 (1763), Gen. Pl. ed. 6, 464 (1764), Syst. Nat. ed. 12, 595, errore "*Cyrripedium*" (1767), and Mantissa Altera, 491 (1771), as well as in 1753-54.

In Fl. Lapp. 248, n. 318, adnot. β (1737) Linné explained the meaning of the name. "*Cypripedium*, quasi calceum Veneris, diximus a floris figura et viribus. Calceus est nomen aequivocum." In Philosophia Botanica, 186, he derived *Cypripedium* from κύρις and ποδίον, and gave the meaning as "Veneris calceus" (i.e., Venus's Slipper). The second half of the name should have been *-podium*, but Linné made it *-pedium*, probably from analogy with Lat. *pes*, foot. The Greek word "ποδίον" (correctly ποδεῖον) means a foot-band or sock. The word ποδίον, on the other hand, means a little foot, being a diminutive of πούς, a foot.

Diervilla *Adans. Fam.* ii. 157 (1763). *Diervillea* Bartl. Ord. 214 (1830).—The fact that the genus was named in honour of Dierville, does not warrant the alteration of the original spelling.

Diplopterys *A. Juss.*—vide sub *Aspidopterys*.

Dorycnopsis *Boiss. Voy. Esp.* 163 (1840). *Dorycniopsis* C. Lemaire in d'Orbigny Dict. Hist. Nat. v. 118 (1848); ed. 2, v. 239.—Briquet, Prodr. Fl. Corse, ii. 320 (1913), upholds the original spelling *Dorycnopsis* on the ground that Boissier in compounding δορύκνιον

and *δφνς* was at liberty to omit the "i" in the former, since generic names may be composed in an absolutely arbitrary manner (Art. 24).

Dovyalis E. Meyer ex Arn. in Hook. Journ. Bot. iii. 251 (1841). *Doryalis* Drège, Zwei pflanzengeogr. Docum. 180 (1843).—The name *Dovyalis* is clearly so written on the labels of four specimens of the type-species, *D. zizyphoides* E. Mey., in the Kew Herbarium. The spelling *Doryalis* in the Index to Drège's work may be a mistake—at all events there is nothing to show that Meyer was responsible for it.

Arnott published the name as *Dovyalis*, as it was spelt on the labels, and printed in the main body of Drège's work (p. 124, IV, C, b, 8), and this spelling was accepted by Sonder in Linnaea, xxiii. 12 (1850), Harvey in Harv. et Sond. Fl. Cap. i. 69 (1859-60), and Bentham in Benth. et Hook. f. Gen. Pl. i. 128 (1862). In 1893, however, Warburg adopted the spelling *Doryalis*, stating (1) that the name originated with Drège and (2) that *Dovyalis* was either a misprint or a mistake on the part of Meyer. The only evidence offered by Warburg in support of these statements is the fact that *Doryalis* is spelt with an "r" in the Index to Drège's book, and appears before *Dovea*. In the first place there is nothing to show that Drège either suggested the generic name, or was responsible for it in any way; and secondly, as has been pointed out by Marloth (Flora of South Africa, ii. 194: 1925) "it is quite possible that the indexer was not Drège himself, and that having mis-read the name in the manuscript, he naturally placed it before *Dovea*." The fact that the meaning, if any, of *Dovyalis* is unknown, whereas *Doryalis* might well have been formed from *δόρυ*, a spear, in allusion to the extremely spiny nature of the shrub, lends support to the view that the spelling *Dovyalis* in the distributed sets of Drège's plants was an error for *Doryalis*. In the preface to his Commentar. Pl. Afr. Austr. (1835-37), p. vii. Meyer states that he has endeavoured to construct his new names in correct Greek form: "Nomina nova Graecitati qua potui diligentia accomodare studui."

The name, however, was published as *Dovyalis*, and though it may be shrewdly suspected that it was a mistake for *Doryalis*, in the absence of definite proof the original spelling should be maintained under the Rules.

Echinopterys A. Juss.—vide sub *Aspidopterys*.

Eleocharis R. Br. Prodr. i. 224 (1810). *Heleocharis* Lestib. Ess. Cyperac. 41 (1819).—It is unfortunate that Robert Brown should have omitted the initial aspirate in coining the new generic name *Eleocharis*, but Lestiboudois was not justified under International Rules in modifying the name. The case is comparable with those of *Aplopappus*, *Aplophyllum* and *Aplolophium*.

Elichrysum Mill. Gard. Dict. Abridg. ed. 4 (1754). *Helichrysum* Pers. Syn. ii. 414 (1807).—Briquet (Burnat, Fl. Alp. Marit, vi.

261: 1917) has shown that the original spelling *Elichrysum* Mill. must be retained under the Rules. As the genus, however, is very well known under the name *Helichrysum*, and is of considerable horticultural importance, it is suggested that the form *Helichrysum* should be conserved.

Epifagus Nutt. Gen. ii. 60 (1818). *Epiphegus* Spreng. Neue Entdeck. i. 264 (1820).—This appears in the list of conserved generic names as "*Epiphegus* Nutt. Gen. Am. II. (Mai 1818) 60," which is inaccurate. Nuttall published the name as *Epifagus*, and Sprengel's alteration was unauthorized by the Rules. The name is accepted as *Epifagus* Nutt. in Gray's New Man. 739 (1908), which seems to indicate that Robinson and Fernald did not regard the spelling *Epiphegus* as being conserved. Compare the cases *Aplopappus* and *Maianthemum*.

Euodia J. R. et G. Forst. Char. Gen. Pl. 13, t. 7 (1776). This spelling must be retained under the Rules, as it contains no typographic or orthographic error. The form *Evodia* Scop. Introd. 250, et index, fol. B 2 recto (1770), which has been generally adopted, cannot be maintained unless it is specially conserved. It is not even certain that Scopoli intended to alter the spelling of *Euodia* Forst. The same character "V" was employed in his Introduction to represent both "U" and "V" in generic names, and "I" was used for both "I" and "J". Thus *Usubis* Burmann was printed "VSVBIS" (l.c.), and *Juglans* L. appeared as "IVGLANS." However, the generic name appeared as "*Evodia*" in the Index, which Scopoli probably corrected, even if he did not prepare it; and in the first edition of his Flora Carniolica, 324 (1760), he had previously adopted the spelling of *Euonymus* in preference to *Euonymus*, so that all things considered, the spelling *Evodia* may perhaps be attributed to him.

As *Euodia* is an important tropical Asiatic and Australasian genus, comprising at least 100 species, it may perhaps be considered desirable to conserve the very widely used spelling *Evodia*.

Euonymus L. Gen. Pl. ed. 5, 91 (1754). *Evonymus* L. Sp. Pl. ed. 1, 197 (1753).—This case is discussed at length on pp. 294-296.

Furcraea Vent. in Bull. Soc. Philom. i. 65 (1793). *Furcroya* Rafin. Princ. Somiol. 31 (1814). *Fourcroya* Spreng. Anleit. ed. 2, ii. 238 (1817). *Fourcroea* Haw. Suppl. Pl. Succ. 42 (1819). *Furcroea* Benth. in Benth. et Hook. f. Gen. Pl. iii. 739 (1883).—The case is analogous to that of *Valantia* (q. v.). Ventenat was at liberty to latinize Fourcroy's name as he pleased, and the spelling *Furcraea* chosen by him cannot be altered under the Rules.

Galinsoga Ruiz et Pav. Prodr. 110, t. 24 (1794). *Galinsogea* Willd. Sp. Pl. iii. 2228 (1804). *Gallinsoga* Jaume St. Hil. Expos. i. 417 (1805). *Galinsogaea* Zuccar. in Flora, iv. 612 (1821).—The genus was dedicated to Dr. Mariano Martinez de Galinsoga. The form

Galinsogaea is philologically preferable, and is in accordance with Rec. IVa, but the original spelling cannot be altered under the Rules (Art. 24). The cases of *Maranta* L. and *Aldrovanda* L. are comparable.

Galium L. Sp. Pl. ed. 1, 105 (1753); Gen. Pl. ed. 5, 46 (1754). *Gallium* Boehm. in Ludw. Def. Gen. Pl. ed. 2, 5 (1760). *Galion* St. Lag. in Ann. Soc. Bot. Lyon, vii. 81, 113, 126 (1880).

Gleditsia L. Sp. Pl. ed. 1, 1056 (1753); Gen. Pl. ed. 5, 476 (1754). *Gledisia* All. in Misc. Taur. v. 75 (1773). *Gleditschia* Scop. Introd. 295 (1777). *Gleditzia* Jaume St. Hil. Expos. ii. 202 (1805).—Compare the cases of *Bartsia* and *Valantia*. Linné was at liberty to omit the “ch” in *Gleditsch* in forming the generic name.

Haloragis J. R. et G. Forst. Char. Gen. 61, t. 31 (1776). *Halorrhagis* Petersen in Engl. et Prantl, Nat. Pflanzenfam. iii. Abt. 7, 232 (1893).—The fact that the form *Halorrhagis* is philologically preferable does not warrant the rejection of the name *Haloragis* chosen by J. R. and G. Forster (Art 50).

Hierochloë R. Br. Prodr. 208 (1810), nomen conservatum. *Hierochloa* Beauv. Agrost. 62 (1812).—The spelling *Hierochloa* was adopted by Post et Kuntze, Lexic. Gen. Phan. 280 (1903). Apart from the fact that the name *Hierochloë* is now conserved, that spelling was published previously to *Hierochloa*, and is equally good from a philological point of view.

Hippophaë L. Sp. Pl. ed. 1, 1023 (1753); Gen. Pl. ed. 5, 449 (1754).—*Hippophaës* St. Lager in Ann. Soc. Bot. Lyon, vii. 83, 88 (1880); Aschers. & Graebn. Fl. Nordostdeutsch. Flachl. 503 (1899).—The original spelling *Hippophaë* must be retained under the Rules (Art. 24 and 50).

Jasione L. Sp. Pl. ed. 1, 928 (1753); Gen. Pl. ed. 5, 400 (1754). *Iasione* Moench, Meth. 518 (1794).—The classical *ιασιώνη* Theophr., *Iasione* Plin., was *Calystegia sepium* R. Br. It was described as a wild herb, abounding in latex, and as having a white flower composed of a single “leaf” but so folded that there appear to be several “leaves” (Theophr., Enquiry into Plants, transl. Hort. i. 90; Pliny, Hist. Nat. ed. Harduin. ii. 251, l. 25, 278, l. 21). Linné altered the spelling to *Jasione*, and applied the name so altered to a new genus (Gen. Pl. ed. 1, 266 : 1737), which he afterwards placed in his family *Campanacei*, which included genera now assigned to *Convolvulaceae*, *Polemoniaceae* and *Campanulaceae*, and the genus *Viola*. Under Art. 24, generic names may be taken from any source whatever, and may even be composed in an absolutely arbitrary manner, while under Art. 50, no-one is authorized to change or modify a name because it is badly chosen. Hence *Jasione* must be spelt as published by Linné.

Jateorhiza Miers in Hook. Niger Fl. 212 (1849); Ann. Nat. Hist. sér. 2, vii. 38 (1851); Contrib. Bot. iii. 26 (1871). *Jatrorrhiza* Prantl in Engl. et Prantl, Nat. Pflanzenfam. iii. Abt. 2, 87 (1888). *Jatrorhiza* Post et Kuntze, Lexic. Gen. Phan. 296 (1903).—The name seems to have been compounded by Miers from *ιατέος* (from *ιάουαι*) and *ρίζα*. Hence the so-called corrections by Prantl, and by Post and Kuntze, were unnecessary.

Jatropha L. Sp. Pl. ed. 1, 1006 (1753); Gen. Pl. ed. 5, 437 (1754). *Iatropha* Stokes Bot. Mat. Med. iv. 447 (1812).—Derived from “*ιατρόν*, medicamentum, and *φάγω*, edo” (Linn. Phil. Bot. 184 : 1751). Linné’s action in spelling the name with an initial “J” instead of an “I” cannot be reversed. The case is similar to that of *Jasione*.

Juglans L. Sp. Pl. ed. 1, 997 (1753); Gen. Pl. ed. 5, 431 (1754). *Iuglans* Moench, Meth. 696 (1794).

Jussiaea L. Sp. Pl. ed. 1, 388 (1753); Gen. Pl. ed. 5, 183 (1754). *Jussia* Adans. Fam. ii. 85 (1763). *Jussieuia* Murr. Syst. 335 (1774); Reichard, Gen. Pl. 220 (1778).* *Jussieuia* Thunb. Fl. Jap. 180 (1784).†—The spelling *Jussiaea* chosen by Linné in 1753-54 must be retained under the Rules. The case is similar to that of *Valantia* (q. v.) which has been decided by Briquet.

Kentranthus Necker, Elem. Bot. i. 122 (1790). *Centranthus* DC. Fl. Franç. iv. 238 (1805).—“La graphie *Kentranthus* de Necker a la priorité et doit être conservée. Nous considérons le nom de *Centranthus* comme une variante orthographique et ne changeons pas les citations des auteurs pour des combinaisons de noms spécifiques”—Briquet in Burnat, Fl. Alp. Marit v. 186 (1915).

Kissenia R. Br. ex T. Anders. in Journ. Linn. Soc. v. Suppl. 1, 43 (1860). *Fissenia* R. Br. ex Endl. Gen., Suppl. 2, 76 (1842).—The genus was named by Robert Brown in honour of Kissen, a traveller in Arabia, who collected *K. spathulata*. Brown wrote the name as *Kissenia*. *Fissenia* was an *unintentional* orthographic error on the part of Endlicher—vide Dandy in Kew Bull. 1926, 174.

* Pfeiffer, Nomencl. Bot. i. 1802 (1874) attributed the spelling “*Jussieua*” to Reichard, i.e., apparently not realizing that Reichard used the symbol “V” for both “U” and “V,” and “u” for both “u” and “v.” Thus *Quisqualis* appeared as “QVISQVALIS” on p. 221 and as “*Quisqualis*” on p. 207; *Ulva* appeared as “VLVA” on p. 562 and as “Vlua” in the Index, where all the “U”s and “V”s are in one series. Hence it can only be inferred indirectly in each case which of the two letters Reichard intended to use. As *Jussieua* had been adopted four years previously in Murray’s “Systema” that spelling was probably the one which Reichard intended to use.

† The actual spelling was “IUSSIEUIA.” Since the symbol “I,” however, stood for both “I” and “J,” the spelling intended can only be inferred indirectly, as in the case of Reichard’s ‘Genera.’

Koeleria Pers. Syn. i. 97 (1805). *Köleria* Spreng. Anleit. ed. 2, ii. 164 (1817). *Kölera* Spreng. Syst. i. 332 (1825). *Koelera* St. Lag. in Ann. Soc. Bot. Lyon, viii. 171 (1881).—Although *Koelera* is in accordance with Rec. IV b, and *Koeleria* is not, the latter must be retained because it was the original spelling.

Leonurus L. Sp. Pl. ed. 1, 584 (1753); Gen. Pl. ed. 5, 254 (1754). *Leonuros* St. Lag. in Ann. Soc. Bot. Lyon, vii. 129 (1880). *Leonturus* Aschers. et Graebn. Fl. Nordostdeutsch. Flachl. 606 (1899).—Doubtless *Leonturus* is philologically preferable to *Leonurus*, but the latter, being the original spelling, must stand.

Leptolaena Thou. Hist. Vég. Isles Afr. ed. 2, 41, 46, t. 11 (1805). *Leptochlaena* Spreng. Syst. ii. 330 (1825).—The case is parallel to those of *Sarcolaena* and *Schizolaena*.

Leucojum L. Sp. Pl. ed. 1, 289 (1753); Gen. Pl. ed. 5, 140 (1754). *Leucoium* Willd. Sp. Pl. ii. 30 (1800). *Leucoïum* Aschers. Fl. Brandenb. 706 (1864).—The spelling *Leucoïum* corresponding with λευκοῖον, would have been preferable to *Leucojum*, but the latter was chosen by Linné.

Lophopterys A. Juss.—vide sub *Aspidopterys*.

Ludwigia L. Gen. Pl. ed. 5, 55 (1754). *Ludvigia* L. Sp. Pl. ed. 1, 118 (1753).—The question whether Sp. Pl. ed. 1 enjoys priority over Gen. Pl. ed. 5 is discussed and answered in the negative on pp. 294–296. Of the two spellings *Ludvigia* and *Ludwigia*, the latter is adopted because it is correctly formed according to Rec. IV b.

Luehea Jackson Ind. Kew. ii. 123 (1894). *Lühea* Willd. in Neue Schr. Ges. Naturf. Freunde, Berlin, iii. 409, t. 5 (1801); Sp. Pl. iii. 1434 (1803). *Luhea* DC. in DC. Prodr. i. 517 (1824).—The name *Luehea*, as transcribed by Jackson, in accordance with Rec. IV c, may be attributed to Willdenow. The phrase “Letters which are unknown to botanical Latin must be transcribed, diacritic signs are suppressed” seems intended to have the force of a Rule, though it is inserted as part of a Recommendation.

Maianthemum Wigg. Prim. Fl. Holsat. 14 (1780). *Majanthemum* Gmel. Syst. 266 (1791). *Mayanthemum* DC. Fl. Franç. iii. 177 (1805).—The name *Maianthemum* is conserved (Internat. Rules, ed. 2, 82). It appears in that list under the later spelling *Majanthemum*, but that is merely because the list was drawn up directly from Dalla Torre et Harms, Genera Siphonogamarum, 71, n. 1119, where the name was spelt with a “j”. The original (and at least equally correct) spelling *Maianthemum* should be retained.

Malcolmia Spreng. Anleit. ed. 2, ii. 716 (1818). *Malcomia* R. Br. in Ait. Hort. Kew. ed. 2, iv. 121 (1812).—Briquet, Prodr. Fl. Corse, ii. 51 (1913), considers that the name appeared as “*Malcomia*” by a typographical error, and that the spelling *Malcolmia* may be

attributed to Robert Brown. The generic name is conserved (Internat. Rules, ed. 2, 87), but that does not necessarily mean that the particular *spelling* used in the list (taken from Dalla Torre et Harms, Gen. Siphonog.) is conserved. Compare the case of *Maianthemum*.

Mr. J. Ardagh, of the Department of Botany, British Museum, has kindly informed me that Robert Brown wrote the names of this genus and *Matthiola* as “*Malcomia*” and “*Mathiola*” respectively on the herbarium sheets. Brown may therefore have intended to omit the second (and *mute*) “l” in Malcolm’s name, in order that the Latin generic name might be pronounced like the Scottish surname.

(1) **Matthiola** L. Sp. Pl. ed. 1, 1192 (1753); Gen. Pl. ed. 5, 499 (1754). *Mathiola* Scop. Introd. 143 (1777).—The genus was based on *M. scabra* L., which is at present included under *Guettarda* L. (1753), as the type of sect. *Matthiola* (L.) Benth. et Hook. f. Gen. Pl. ii. 100 (1873); the correct name as a section is, however, sect. *Guettardaria* DC. in DC. Prodr. iv. 455 (1830), according to Art. 49.

There can be no doubt that *Matthiola* L. is a valid name, as defined in Art. 56. Hence under Art. 51, 2°, *Mathiola* R. Br. is invalid, and cannot be retained unless it is specially conserved. The only generic homonyms that may be adopted under Art. 50 are homonyms of *non-valid names*.

(2) **Matthiola** Spreng. Anleit. ed. 2, ii. 714 (1818). *Mathiola* R. Br. in Ait. Hort. Kew. ed. 2, iv. 119 (1812).—Briquet, Prodr. Fl. Corse, ii. 53 (1913), states that the spelling *Mathiola* which appeared in the “Hortus Kewensis” was the result of an orthographic error on the part of Robert Brown. In that case the form *Matthiola* adopted by Sprengel may be attributed to Brown. Since *Matthiola* R. Br. is invalidated by the existence of the prior *Matthiola* L. (q. v.), it is suggested that it should be conserved.

Melandrium Roehl. Deutschl. Fl. ed. 1, 274 (1796); ed. 2, ii. 274 (1812). *Melandryum* Reichb. Handb. 298 (1837). *Melandrum* Blytt, Norges Fl. iii. 1068 (1876). *Lychnis* sect. *Melandryum* Reichb. Fl. German. Excurs. 824 (1832).—When Roehling based a new genus on *Lychnis dioica* L. Sp. Pl. 437, he chose for it the name *Melandrium*, which Linné had cited as a synonym of that species: “*Melandrium Plinii genuinum* Clus. Hist. i. 294, mas.” The actual spelling employed by Clusius, however, was *Melandryum*, and on this account Reichenbach “corrected” Roehling’s generic name *Melandrium* by replacing the “i” with a “y”. This “correction” was accepted by Ascherson (Fl. Brandenb. 89: 1864), Dalla Torre et Harms, Gen. Siphonog. 161 (1901), and others, who apparently overlooked the fact that the spelling *Melandryum* employed by Clusius and in early editions of Pliny’s *Historia Naturalis*, was itself due to an error, the original form of the name being “*malundrum*.” The sentence “*Iocineri autem herba melandryum nascens in segete ac pratis*

flore albo odorata" occurs in the following editions of Pliny's *Historia Naturalis*, lib. xxvi. cap. vii.: ed. Alexander Benedictus, 1507, fol. 196, verso, l. 19; ejusdem, ed. 1513, fol. cxcv, recto, l. 24; ed. Dalecampius, 1615, p. 539, col. 2, l. 54. In a marginal note, however, Dalechamps (l.c.) gave the alternative spelling "malundrum" Ch. [Chiffletianus codex manuscriptus]. The form *Melandryon* was employed by Ruellius, *De Nat. Stirp.* 457, l. 4 (1537) and Ray, *Hist. i.* 709 (1686). *Melandryum*, on the other hand was used by Lobel, *Obs.* 184 (1576) and Clusius, *Hist.* 293, 294 (1601). Caspar Bauhin (1623) had three different spellings: *Melandryon* (Pinax, 163) as a synonym of *Barba caprae* [*Spiraea* L.]; *Melandrium* under *Lychnis sylvestris quae Been album vulgo* [*Silene vulgaris* Garcke]; and *Melandryum* under *Lychnis sylvestris sive aquatica purpurea simplex* [*Lychnis dioica* L.]. Ambrosini, *Phytologia*, 350, referred *Melandryon* to *Barba Caprae floribus oblongis* C. B. P. [*Spiraea Aruncus* L.], and the genuine and false kinds of *Melandryum* respectively to *Ocimoides purpureum* [*Lychnis dioica* L.] and *Been album* [*Silene vulgaris* Garcke].

Harduinus seems to have been the first to point out that the correct spelling of the plant mentioned by Pliny was malundrum, not melandrium. He has "Jocineri autem herba malundrum" with the following footnote: "Sic MSS. omnes, tum hoc loco, tum in Indice: non, ut editi, *melandryum*: quod ineptum est, si flore albo odorata (Pliny *Hist. Nat.* ed. Harduinus, ii. 396, l. 13, adnot.). Lewis and Short, *Latin Dictionary*, 1104 (impr. 1927) accepted malundrum, and did not even mention melandrium as an alternative spelling for the plant in question, though they included the latter with its proper meaning, "a piece of salted tunny-fish" (μελάνδριον).

The case of *Melandrium* is a further illustration of the dangers attending the alteration of names on philological grounds, and without adequate investigation. Fortunately, under Art. 50, the spelling *Melandrium* must be retained, as there was no unintentional error of an orthographic or typographic nature in the original publication by Roehling. The fact that *Melandrium*, like *Melandryum*, is philologically corrupt, is immaterial under the Rules. Otherwise the spelling "malundrum" would have to be adopted.

Mesembryanthemum L. *Sp. Pl.* ed. 1, 480 (1753); *Gen. Pl.* ed. 5, 215 (1754). *Mesembrianthemum* Spreng. *Bot. Gart. Halle*, Erster Nachtr. 28 (1801); Batsch, *Tab.* 38 (1802)—vide p. 115.

Morea Mill. *Fig. Pl.* ii. 159, t. 239 (1758); *Gard. Dict.* ed. 7, Addenda (1759); N. E. Brown in *Journ. Linn. Soc., Bot.* xlviii. 40. *Moraea* L. *Sp. Pl.* ed. 2, 59 (1762).—Miller dedicated the genus *Morea* to Robert More of Shrewsbury. Under Art. 24 and 50, the original spelling must be used. If it is desired to retain the well-known and widely used form *Moraea* L., it will be necessary to place that on the list of conserved names.

Ortegia L. *Gen. Pl.* ed. 5, 21 (1754); Loefl. *Iter* 122. *Ortega* L. *Sp. Pl.* ed. 1, 560 (1753). *Ortegaea* Post et Kuntze, *Lexic. Gen. Phan.* 405 (1903).—As explained on p. 295, the writer takes the view that *Sp. Pl.* ed. 1 and *Gen. Pl.* ed. 5 are treated under the Rules as though they were published at the same time, 1753, and that consequently where the spelling in these works differs, the more correct form should be adopted. Since the genus was named in honour of Ortega, the correct form according to Rec. IV a would have been *Ortegaea*, as proposed by Post and Kuntze. Of the two forms published by Linné, from which the choice should be made, *Ortegia* is preferable.

Osmorhiza Raf. in *Amer. Monthly Mag.* ii. 176 (1818); et in *Journ. de Phys.* lxxxix. 257 (1819). *Osmorrhiza* Reichb. *Handb.* 219 (1837).—Rafinesque was at liberty to compound his new generic name as he pleased, hence there is no justification under the Rules for the additional "r".

The original publication of *Osmorhiza* (1818) appears to be invalid. Rafinesque pointed out that *Chaerophyllum Claytoni* Pers. required a new generic name: "whence several names have been proposed for it, *Washingtonia*, *Osmorhiza*, *Gonatherus*; but these are not yet published; the second is perhaps the best." Later he is said to have formally established the genus under the name *Osmorhiza* (vide *Contrib. U.S. Nat. Herb.* vii. 61). *Washingtonia*, *Osmorhiza* and *Gonatherus* as they appeared in 1818 were merely three names which Rafinesque suggested might be used. It was open to the next worker (Rafinesque himself) to choose any one or none of them, and Rafinesque chose *Osmorhiza*. His choice cannot be reversed under the Rules.

Penstemon Mitchell Diss. 36 (1769). *Penstemon* Soland. in Ait. *Hort. Kew.* iii. 511 (1789); Schreb. *Gen.* ii. 808 (1791). *Pentastemon* Batsch, *Tab.* 193 (1802). *Pentostemon* Raf. in *Atlantic Journ.* 176 (1833). *Pentastemum* Steud. *Nomencl.* ed. 2, ii. 299 (1841).—The original spelling, *Penstemon*, must be retained under Art. 24 and 50.

Pereskia Mill. *Gard. Dict. Abridg.* ed. 4 (1754). *Peirescia* Zucc. in *Abh. Akad. Muench.* ii. 695 (1837). *Perescia* Lem. *Cact. Hort. Monvill.* p. xiv. (1838). *Peireskia* Steud. *Nomencl.* ed. 2, ii. 282 (1841). *Cactus* sect. *Peiresciae* Spreng. *Syst.* ii. 498 (1825).—The fact that the genus was named in honour of Peiresc does not justify the alteration of the original spelling *Pereskia*. Compare the case of *Valantia*.

Prunella L. *Sp. Pl.* ed. 1, 600 (1753); *Gen. Pl.* ed. 6, 301 (1764). *Brunella* L. *Gen. Pl.* ed. 5, 261 (1754)—vide p. 292.

Pyrola L. *Sp. Pl.* ed. 1, 396 (1753); *Gen. Pl.* ed. 5, 188 (1754). *Pirola* Neck. in *Act. Theod. Pal.* ii. 488 (1770).—This case is similar to that of *Pyrus* (q. v.). The name *Pyrola* occurs in Brunfels, *Hist.*

iii. 88 (1536), and was very much commoner than *Pirola* both before and after 1753.

Pyrus L. Sp. Pl. ed. 1, 479 (1753); Gen. Pl. ed. 5, 214 (1754). *Pirus* Haller, Hist. ii. 34 (1768).—From the revival of Botany in the sixteenth century (e.g. Brunfels, Herb. iii. 223) down to 1753 the form *Pyrus* was perhaps more commonly used than the correct classical form *Pirus*. Under Art. 24 Linné was at liberty to adopt the spelling *Pyrus*, and his choice cannot be reversed. Briquet, Prodr. Fl. Corse, 162 (1913), adopted that spelling, without any explanatory note, thus implicitly indicating that there could be no doubt as to the effect of the Rules in that particular case. In various other cases he supplied such notes (in Prodr. Fl. Corse and Fl. Alp. Marit.) e.g. *Alchemilla*, *Dorycnopsis*, *Kentranthus*, *Malcolmia*, *Matthiola*, *Rorippa*, *Wistaria*.

Raphanus L. Sp. Pl. ed. 1, 669 (1753); Gen. Pl. ed. 5, 300 (1754). *Rhaphanus* Gaud. Fl. Helv. iv. 192 (1829). *Rhaphanos* St. Lag. in Ann. Soc. Bot. Lyon, vii. 83, 133 (1880).—The Latin form of ῥάφανος being *Raphanus*, there was not even any philological reason for changing the original spelling to *Rhaphanus*.

Rhodolaena Thou. Hist. Vég. Isles Afr. ed. 2, 47, t. 13 (1805). *Rhodochlaena* Spreng. Syst. ii. 595 (1825).—The case is similar to those of *Sarcolaena* and *Schizolaena*.

(1) **Richardia** L. Sp. Pl. ed. 1, 330 (1753); Gen. Pl. ed. 5, 153 (1754). *Ricardia* Adans. Fam. ii. 158 (1763); Reliq. Houston. 5 (1781). *Richardsonia* Kunth in Mém. Mus. Par. iv. 430 (1818).—Named in honour of Richard Richardson (1663-1741), physician and botanist. Linné deliberately adopted the abbreviated form *Richardia*, although he was aware (Phil. Bot. 173: 1751) that the surname of the man commemorated was Richardson not Richard. Hence the original spelling cannot be altered under the Rules.

(2) **Richardia** Kunth in Mém. Mus. Par. iv. 437 (1818).—Named in honour of L. C. Richard. A synonym of the conserved name, *Zantedeschia* Spreng. (Internat. Rules, ed. 2, 80).

Rorippa Scop. Fl. Carniol. ed. 1, 520 (1760). *Roripa* Adans. Fam. ii. 417 (1763); Scop. Fl. Carniol. ed. 2, ii. 24.—The origin of the name *Rorippa* is doubtful. Scopoli attributed it to Gesner, but Briquet and others have searched Gesner's works without finding it. In these circumstances the original spelling *Rorippa* should be retained in spite of the fact that Scopoli later accepted *Roripa*, vide Briq. Prodr. Fl. Corse, ii. 28 (1913).

Rynchospora Vahl, Enum. ii. fol. 2, verso, n. 113, 229 (1806). *Rhynchospora* Willd. Enum. Pl. Hort. Berol. 71 (1809).—The generic name was derived from ῥύγχος, beak, and σπορά, seed, in allusion to the rostrate achenes, and it would therefore have been better had it been published as *Rhynchospora*. When it is remembered.

however, that ῥάδιξ became radix in Latin, ῥάφανος, raphanus, and ἑλλεβορίνη either elleborine or helleborine, and that in numerous other cases an initial Greek aspirate was dropped when the word passed into the Latin language, the philological arguments for altering *Rynchospora* to *Rhynchospora* will not appear so cogent. In any case *Rynchospora* should be retained under Art. 24 and 50.

Ryssopterys Blume ex A. Juss. in Deless. Ic. Sel. iii. 21, t. 35 (1837). *Rhyssopterys* Wittst. Etym. Handwörterb. ed. 2, 764 (1856). *Rhyssopteryx* Dalla Torre et Harms, Gen. Siphonog. 263 (1901). *Ryssopteris* Post et Kuntze, Lexic. Gen. Phan. 493 (1903).—The original spelling *Ryssopterys* must be retained under Art. 24. For the first half of the name, compare the case of *Rynchospora*, and for the second half, that of *Aspidopterys*.

Sarcolaena Thou. Hist. Vég. Isles Afr. ed. 2, 37, 46, tt. 9, 10 (1805). *Sarcochlaena* Spreng. Syst. ii. 594 (1825).—The derivation given by Du Petit Thouars is as follows: "Nomen: Σαρξ σαρκος; caro, carnosus: χλαίνα; latine, laena, tunica exterior". There is thus no doubt that Thouars deliberately composed *Sarcolaena* from "laena" instead of "chlaena", and Sprengel's alteration of the spelling is contrary to the Rules.

Satureja L. Sp. Pl. ed. 1, 567 (1753); Gen. Pl. ed. 5, 247 (1754). *Satureia* Mill. Gard. Dict. Abridg. (1754).—Linné cited "*Satureja* Riv." and "*Satureja* T." under *Thymus* in Gen. Pl. ed. 1, 168 (1737), and used the spelling *Satureja* in synonymy of species of *Clinopodium*, *Thymus* and *Melissa* in Hort. Cliff. 305, 306, 308 (1737). In 1742, however, when he recognised an independent genus under that name he published it as *Satureia*, ascribing it to Rivinus and Tournefort (Gen. Pl. ed. 2, 266). In 1748 he employed both spellings, *Satureia* as the generic heading, *Satureja* for the species and their synonyms, and in the Index. From 1753 onwards, however, he appears to have consistently employed the form *Satureja*, which occurs in Syst. Nat. ed. 10, 1095 (1759), Sp. Pl. ed. 2, 793 (1763), Gen. Pl. ed. 6, 288 (1764), and Syst. Nat. ed. 12, 389 (1767). Hence that form may be regarded as his deliberate choice.

In most Latin dictionaries (e.g. Lewis and Short (1927), p. 1635), the name appears as *Satureia*, but the spelling *Satureja* was accepted by Ascherson and Graebner (Fl. Nordostdeutsch. Flachl. 592: 1899), who laid great stress on correct classical form.

The generic name appeared as *Satureia* in Tragus, New Kreütter Buoch, fol. x, verso (1539), Comment. i. 44 (1552), Fuchs, Hist. 304 (1542), Dodoens, Cruydeboek, p. cclxii (1554), Pena et Lobel, Stirp. Advers. 182 (1571), C. Bauhin, Pinax, 218 (1623), J. Bauhin, Hist. iii. 272 (1651), Ray, Hist. i. 518 (1686), and Tournefort, Instit. i. 197 (1700).

The spelling *Satureja*, however, was employed by Rivinus, Pl. Fl. Irreg., Monopet. fol. D 2, verso, ll. 22, 23, t. 44 (1690), whose figures are cited by Linné as the basis of the genus *Satureia* (1742).

Satureja was used also by Boerhaave, Ind. Alt. Hort. Lugd.-Bat. i. 161 (1720), and Royen, Fl. Leyd. Prodr. 324 (1740).

It is evident from the preceding account that the spelling *Satureja* contains no orthographic error on the part of Linné, and that it was deliberately chosen by him in 1753-54. Hence it should be accepted under Art. 24.

Saurauia Wittst. Etym. Handwörterb. ed. 2, 787 (1856). *Saurauja* Willd. in Neue Schr. Ges. Naturf. Freunde, Berlin, iii. 407, t. 4 (1801). *Sauravia* Spreng. Anleit. ed. 2, ii. 818 (1818). *Sauraua* Post et Kuntze, Lexic. Gen. Phan. 502 (1903).—According to Wittstein (Etym. Handwörterb. ed. 2, 787: 1856) the genus was named in honour of "Graf Fr. von Saurau," whose name might be latinized as "Sauraius." Gilg (Engl. et Prantl, Nat. Pflanzenfam. iii. Abt. 6, 126, footnote: 1893) states that Willdenow in his herbarium always wrote the name as *Saurauia*. Hence *Saurauja* may be regarded as a typographical error, and the spelling *Saurauia* published by Wittstein may be attributed to Willdenow.

Schizolaena Thou. Hist. Vég. Isles Afr. ed. 2, 43, 46, t. 12 (1805). *Schizochlaena* Spreng. Syst. ii. 595 (1825).—Derived by Thouars from "Σχιζος *lacerus* et *laena*, ab involucro *lacero*." The cases of *Leptolaena*, *Rhodolaena* and *Sarcolaena* fall in the same category.

(1) **Sclerolaena** R. Br. Prodr. 410 (1810).—Name formed from *σκληρός*, hard, and *λαῖνα*, (a variant of *χλαῖνα*), a cloak.

(2) **Scleroolaena** Baill. in Adansonia, x. 236 (1872).—The generic name was apparently formed by Baillon from *σκληρόω*, harden, and *λαῖνα*, a cloak. In order to avoid confusion with *Sclerolaena* R. Br., Baillon replaced *Scleroolaena* by *Xyloolaena* (q. v.).

Stigmaphyllon A. Juss. in St. Hil. Fl. Bras. Merid. iii. 48, tt. 170, 171 (1832). *Stigmatophyllum* Spach, Hist. Veg. Phan. iii. 153 (1834). *Stigmatophyllum* Meissn. Gen. i. 55, ii. 39 (1837). *Stigmatophyllum* D. Dietr. Syn. Pl. ii. 1587 (1840). *Stigmaphyllum* Wittst. Etym.-Bot. Handwörterb. ed. 2, 845 (1856).

Stipa L. Sp. Pl. ed. 1, 78 (1753); Gen. Pl. ed. 5, 34 (1754). *Stupa* Aschers. Fl. Brandenb. 812 (1864).—The accepted spelling of the classical Latin word was *stupa*, less correct forms being *stupa* and *stipa*. Under Art. 24, however, Linné was at liberty to select any one of them, if he so pleased, and his choice of *Stipa* cannot be reversed.

Stuartia L'Hérit. Stirp. 153 (1785). *Stewartia* L. Sp. Pl. ed. 1, 698 (1753); Gen. Pl. ed. 5, 311 (1754).—The generic name was originally published by Linné as *Stewartia* (Act. Ups. 1741, 79, t. 2: 1746), but was altered by Catesby (Carol., App. 13, t. 13: 1743) to *Steuartia*. Linné, however, adhered to the spelling *Stewartia* in Sp. Pl. ed. 1 and 2, Gen. Pl. ed. 5 and 6, Syst. Nat. ed. 10 and 12. Miller, Gard. Dict. ed. 6, App. (1752) at first accepted the spelling

given by Catesby, but in ed. 7 (1759) adopted *Stewartia*. L'Héritier (Stirp. 153; 1785) altered the spelling to *Stuartia* on the ground that the name commemorated John Stuart, third Earl of Bute (1713-1792).

The form *Stuartia* is accepted in Index Kewensis and by Post et Kuntze, Lexic. Gen. Phan. (1903). Dalla Torre et Harms, Gen. Siphonog. 317 (1901), however, adopted *Stewartia*.

There seems to be no doubt that Linné erroneously supposed that the surname of the Earl of Bute was Stewart, not Stuart. The generic name *Stewartia* accordingly contains an *unintentional* orthographic error, which may be corrected under the provisions of Art. 57.

Swertia L. Sp. Pl. ed. 1, 226 (1753); Gen. Pl. ed. 5, 107 (1754). *Svertia* Adans. Fam. ii. 503 (1763). *Sweetia* Koch, Syn. 485 (1837).—The genus was named in honour of Emanuel Sweet, author of "Florilegium amplissimum et selectissimum" (1620), who latinized his own name as *Sweetius*. As the "ee" was not suitable in a Latin word, Linné rendered Sweet's name as *Swertius*, omitting an "e" (Biblioth. Bot. 29: 1751), and published the generic name as *Swertia*. The case is comparable to that of *Valantia* (q. v.).

Symphoricarpos Boehm. in Ludw. Gen. ed. 2, 35 (1760); Adans. Fam. ii. 157 (1763); Juss. Gen. 211 (1789). *Symphoricarpa* Neck. Elem. i. 129 (1790). *Symphoricarpus* H. B. K. Nov. Gen. iii. 424 (1818). *Symphorocarpus* Post et Kuntze, Lexic. Gen. Phan. 545 (1903). *Symphorocarpus* Post et Kuntze, l.c. (sub *Symphoricarpa*).—Boehmer was at liberty to adopt the name *Symphoricarpos* as spelt by Linné (Gen. Pl. ed. 1, 380: 1737). He was not obliged to give it the Latin termination -us, nor to replace the connecting vowel "i" by "o".

Tetrapteris Cav. Diss. ix. 433 (1790). *Tetrapterys* A. Juss. in Ann. Sc. Nat. sér. 2, xiii. 261 (1840). *Tetrapteryx* Dalla Torre et Harms, Gen. Siphonog. 263 (1901)—see the remarks under *Triopteris*.

Thuja L. Sp. Pl. ed. 1, 1002 (1753); Syst. Nat. ed. 10, 1274 (1759); Sp. Pl. ed. 2, 1421 (1763); Gen. Pl. ed. 6, 1078 (1764); Syst. Nat. ed. 12, 633 (1767). *Thuya* L. Gen. Pl. ed. 5, 435 (1754). *Thya* Adans. Fam. ii. 480 (1763). *Thuia* Scop. Introd. 353 (1777). *Thyia* Aschers. Fl. Brandenb. 886 (1864).—The three spellings *Thuia*, *Thuya* and *Thuja* were in use before 1753. For example, *Thuia* was employed by Dalechamps, Hist. i. 59 (1587); *Thuya* was used by C. Bauhin, Pinax, 487 (1623), Tourn. Inst. i. 586 (1700), Boerhaave, Ind. Alt. Pl. Hort. Lugd.-Bat. ii. 180 (1720), Linn. Gen. Pl. ed. 1, 378 (1737), and Royen, Fl. Leyd. Prodr. 87 (1740); *Thuja* was adopted in Linn. Hort. Cliff. 449 (1737), and Hort. Upsal. 289 (1748).

As Linné employed the two forms *Thuja* and *Thuya* in 1753-54, and afterwards consistently adhered to *Thuja*, that spelling may be regarded as his choice and should be retained under Art. 20.

Thujopsis Sieb. et Zucc. ex Endl. Gen., Suppl. 2, 24 (1842); Sieb. et Zucc. Fl. Jap. ii. 32, tt. 119, 120 (1844). *Thuiopsis* Endl. Syn. Conif. 53 (1847). *Thuyopsis* Parl. in DC. Prodr. xvi. pars 2, 460 (1868). *Thyopsis* Aschers. et Graebn. Syn. Mitteleur. Fl. i. 239 adnot. 4 (1897).—The original spelling *Thujopsis* published by Endlicher in 1842 must be retained.

Triopteris L. Sp. Pl. ed. 1, 428 (1753); Gen. Pl. ed. 5, 195 (1754). *Tripteris* Thunb. Pl. Bras. Dec. i. 14 (1817); Post et Kuntze, Lexic. Gen. Phan. 574 (1903). *Triopterys* A. Juss. in Ann. Sc. Nat. sér. 2, xiii. 265 (1840). *Triopteryx* Dalla Torre et Harms, Gen. Siphonog. 263 (1901).—The form *Tripteris* is philologically preferable to *Triopteris*, but its adoption would lead to confusion with a well-known genus of Compositae, *Tripteris* Less. Fortunately, under Art. 50, the original spelling *Triopteris* must be retained. As regards the replacement by Dalla Torre and Harms of the second half of the name -pteris by -pteryx, it may be pointed out that Linné doubtless based *Triopteris* on *πτερόν*, a wing, not on *πτέρυξ*. The correct compound would have been "tripteros" or "tripterus" (analogous with *διπτερος*), not "triopteris," but under Art. 50 no one is authorized to modify a name because it is badly chosen.

Valantia L. Sp. Pl. ed. 1, 1051 (1753); Gen. Pl. ed. 5, 471 (1754). *Vaillantia* Neck. Elem. i. 200 (1790).—This case is discussed in Burnat, Fl. Alp. Marit. v. 171 (1915) by Briquet, who points out that the spelling *Valantia* should be retained under the Rules, as it contains no orthographic error such as might be corrected under Art. 57. Linné was at liberty to latinize Vaillant's name as he pleased.

Wisteria Nutt. Gen. ii. 115 (1818). *Wistaria* Spreng. Syst. iii. 255 (1826).—L. H. Bailey, Manual of Cultivated Plants, 11 (1924) has the following note. "*Wisteria* is written as originally spelled, even though it is made in compliment to Caspar Wistar (a family name sometimes spelled Wister) . . . Nuttall had the right to spell his genus as he chose, and he may have considered *Wisteria* a more conformable and euphonious Latin; at all events he appears to have so spelled the name deliberately". Briquet, Prodr. Fl. Corse, ii. 341, in adnot. (1913), on the other hand, considered that *Wisteria* was a mere typographic error for *Wistaria*. In such cases as *Wisteria*, where opinions differ as to whether a name contains an error or not, the original spelling should be retained. Judging by the example of *Balduina* (q.v.), Nuttall probably intended to use the spelling *Wisteria*.

Xylolaena Baill. Dict. Bot. ii. 2 (1879), in obs.; et l.c. iv. 293 (1892). *Xylolaena* Baill. in Bull. Soc. Linn. Par. i. 410 (1884). *Xylochlaena* Dalla Torre et Harms, Gen. Siphonog. 304 (1901).—Apparently formed on the analogy of *Sclerolaena* from *ξύλω*, lignify, and *λαίνα*, cloak. The latter spellings *Xylolaena* and *Xylochlaena* should be rejected under Art. 50.

Zanthoxylum L. Sp. Pl. ed. 1, 270 (1753); Gen. Pl. ed. 5, 130 (1754). *Zanthoxylon* Walt. Fl. Carol. 52, 243 (1788). *Xanthoxylum* J. F. Gmel. Syst. ii. 509 (1791). *Xanthoxylon* Spreng. Anleit. ed. 2, ii. 655 (1818).—Linné (Hort. Cliff. 487) took the name *Zanthoxylum* from Plukenet and Catesby. It was not an orthographic error on his part for *Xanthoxylum*. Hence the spelling *Zanthoxylum* should be retained under Art. 24.

LII.—NEW SPECIES FROM BRITISH GUIANA.

N. Y. SANDWITH.

During the last few years a good deal of collecting has been done in British Guiana by Mr. L. S. Hohenkerk and other Forest Officers, and by Mr. R. A. Altson, until recently Government Botanist and Mycologist. With the exception of some of the Monocotyledonous families which are being studied by Dr. H. A. Gleason, most of their dried material has now been examined in the Herbarium; and although, as is usual with this area, a certain proportion of the plants cannot be named specifically without a critical investigation of their respective genera, there happen none the less to be a number of very striking new species, belonging either to small or even to hitherto monotypic genera, or else to genera which have been carefully monographed, which should be described without delay. Some of these species were collected long ago by Jenman, and old sheets of them have been found in the Herbarium at Kew at the end of the covers; they were put aside because the material was insufficient or the time was lacking for their description. Others have never been collected before because the areas in which they grow have not been touched by botanists. Thus the discovery of two new species of the interesting little genus *Heterostemon* is due to the comparatively recent opening-out of a new station on the Mazaruni River at Kamakusa.

Mr. Altson's collections are of extraordinary interest both for the excellence and the novelty of the material, and his careful detailed systematic notes and suggested identifications have always been of the greatest value. One of his expeditions was undertaken in August and September, 1925, to the Kurupung River which comes down in a series of falls from the great Pacaraima Range to the Mazaruni at a point some thirty-five miles to the south-east of where that river makes its sharp bend from a northerly to an easterly course toward its mouth. His second excursion was in April and May, 1926, to the unexplored forest area lying south-west of the Kaieteur on the Brazilian frontier, where the ground is not yet mapped with even approximate accuracy. Besides discovering a large number of obviously new species, some of which, particularly in the Rubiaceae and Gesneriaceae, cannot be described without much detailed work, Mr. Altson has added two very rare and little-known genera to the flora of the colony, *Patima* in Rubiaceae described by Aublet from

French Guiana, and the Samydaceous *Euceraea* which has only been recorded hitherto from Amazonian Brazil.

It frequently happens that the nearest affinities of these specimens from British Guiana are species collected by Spruce on the distant Rio Uaupes, but this is not surprising when it is remembered how little collecting has yet been done in the intervening region. Our present knowledge of the distribution of plants in the great forest areas of tropical South America is shown to be hopelessly imperfect by the discovery by Prof. Ducke of Uaupes and other supposed western Amazonian species right at the mouth of the Amazons in the district of Pará. In connexion with the flora of British Guiana, the recent studies of "hylaëa" by Ducke, comprising descriptions of scores of new species and recensions of some of the genera as well as general notes on distribution, deserve constant and careful attention, and the following remark of his is significant: "The least known region of all 'hylaëa' to-day is still without doubt British Guiana, the flora of the central and southern parts of which is one of the most interesting in the world."

Catostemma Altsoni *Sandwith* sp. nov. [Bombacaceae]; a *C. fragrante* Benth. praecipue floribus cum omnibus partibus suis multo majoribus, foliis longioribus differt.

Arbor 12 m. alta; ramuli cortice glabro nigrescente, 7-12 mm. diametro, juniores canaliculati, seniores cicatricibus foliorum delapsorum saepe ad 7 mm. diametro notati. *Folia* versus apicem ramulorum juniorum aggregata magna, elliptico-oblonga, apice rotundata et mucrone ut in *C. fragrante* subtus recurvato, basi rotundata vel majora cuneata, 19-24 cm. longa, 7-9 cm. lata, summa decrescentia, glabra, integra, crasse coriacea, utrinque subnitida, siccitate fusco-olivacea, costa nervisque primariis in utroque latere costae circiter 10 utrinque et praecipue subtus valde prominentibus; petioli glabri, crassi, valde canaliculati, 2-5.5 cm. longi, 2.5-3.5 mm. diametro, versus laminam incrassati; stipulae anguste acuteque triangulares, glabrae, nigricantes, ad 7.5 mm. longae, basi circiter 3 mm. latae. *Flores* in axillis (saepe in ramulis nudis defoliatis) complures; alabastra pyriformia, 8-10 mm. longa, ad 7 mm. lata, pedicellis vulgo 1 cm. longis; pedicelli sub anthesi ad 4.7 cm. longi atque 1.5 mm. diametro, indumento *C. fragrantis* furfuraceo, bracteis bracteolisque squamiformibus similibus. *Calyx* extra ut in *C. fragrante* dense stellato-furfuraceus; tubus 5 mm. longus, 6.5 mm. latus, fissus in segmenta 3 inaequalia, ovata, acuta vel obtusa, 1 cm. longa, 5-8 mm. lata. *Petala* anguste obovato-oblonga, apice cucullata, 2.3 cm. longa, ad 7 mm. lata. *Stamina* filamentis 1.4 cm. longis. *Ovarium* ampullaceum, ovoideum, acuminatum, in stylum paulatim transiens, dense stellato-pilosum, 6-7 mm. longum, 4.5-6 mm. diametro, disco calycino relicto 5 mm. lato insidens; stylus glaber, 1.2 cm. longus; stigmata glabra, ad 6 mm. longa; ovula 1 mm. longa, 0.6 mm. lata. *Fructus* (unus solus immaturus visus) obovato-oblongus, dense minute ferrugineo-furfuraceus, fere 5 cm.

longus atque 2 cm. latus, pedicello crasso 5.5 cm. longo atque 3 mm. diametro.

BRITISH GUIANA: by water, Macreba Falls, Kurupung River, September 1925, *Altson* 391 (type in Herb. Kew.). "Tree 40 feet high. Vernaculars: (1) Ge-ma-na (Acawai Dialect), (2) Cou-yami (Arawak Dialect)."

An excellent addition to this hitherto monotypic genus. Its position in Bombacaceae, next to *Scleronema* Benth., is established by K. Schumann in Engl. and Prantl, Pflanzenfam. Nachtr. ii. 42-43 (1908). Bakhuizen van den Brink does not seem to be justified in uniting *Catostemma* and *Scleronema* (Bull. Jard. Bot. Buitenzorg, 1924, ser. iii. vi. 217-8), and his remarks about the affinities of *C. fragrans* and *S. Spruceanum* suggest that he has not seen material of either species. He makes no mention whatever of the character of the stigmata.

Sterculia guianensis *Sandwith* sp. nov. [Sterculiaceae-Sterculieae]; affinis *S. Ivira* Sw. (*S. pruriens* K. Schum.), foliis longissimis lanceolatis longe acuminatis glabris opacis, inflorescentia magis pauciflora, floribus laxe dispositis longius pedicellatis, gynophoro furfuraceo differt.

Arbor parva, 9-12 m. alta, ramulis summis 6-7 mm. diametro. *Folia* magna longissima, lanceolata, apice vulgo ad 1-1.5 cm. acuminata, basi attenuata rotundata vel fere cuneata, 11-33.5 cm. longa, 3.5-9.5 cm. lata, integerrima, chartacea vel tenuiter coriacea, utrinque satis opaca, supra glabra olivacea, subtus glabra pallidiora fere glaucescentia, costa nervisque primariis in utroque latere costae circiter 12-18 utrinque prominentibus, rete venularum subtilissimo utrinque conspicuo nec ut in *S. Ivira* fere occulto; petiolus teres, laevis, glaber vel parcissime pilosulus, apice basique incrassatus, 1-10.5 cm. longus, ad 2.5 mm. diametro. *Paniculae* apice ramulorum complures aggregatae, laxae, satis pauciflorae, speciosae, ad 18 cm. longae, 5-7.5 cm. latae, passim indumento minuto albo stellato-furfuraceo indutae; rami primarii vulgo 3-flori 3-4 cm. longi; pedicelli sub flore aperto 0.7-1.5 cm. longi; bractee basi inflorescentiarum castaneae, triangulares, saepe longe acuminatae, ad 7 mm. longae, ad 3.5 mm. latae, glabrae, basi apice et nonnunquam marginibus villosis exceptis; bracteolae caducae, 2-3 mm. longae. *Flores* extra minute satis dense stellato-pilosuli, intus etiam basi excepta pilis longis simplicibus adpressis immixtis, 1.2-1.6 cm. longi, applanati ad 2.5 cm. diametro; lobi calycini trinervi inaequales, triangulares vel ovato-lanceolati, acuti, 7-11 mm. longi, basi ad 5 mm. lati. *Flos* ♂ gynophoro curvato, nutante, basi incrassato, furfuraceo-pilosulo, 7 mm. longo; stamina 10, tubo stamineo cupuliformi brevi cum indumento simili, circiter 0.75 mm. longo, 1.5 mm. lato; carpodia rudimentaria pilosula. *Flos* ♀ gynophoro simili; tubus stamineus cupuliformis, furfuraceo-pilosulus, 1-1.5 mm. longus, fere ad 2.5 mm. latus; ovarium globoso-ovoidum, furfuraceo-pilosulum, 1.5 mm. longum ita tubum

stamineum paulo tantum superans, 2 mm. diametro ; stylus deorsum curvatus, furfuraceo-pilosulus, cum stigmatе capitato quinquelobato glabro 3-3.5 mm. longus. *Fructus* non visus.

BRITISH GUIANA. Membaru Trail, on lower slopes of Kurupung Mountains, 600 feet, September 1925, *Altson* 379 (type in Herb. Kew). "A small tree, 30 ft. high. Flowers red and white." Dense upland forest, Tumatumari, June-July 1921, *Gleason* 442 (with leaves evidently belonging to this species, and black seeds about 2 cm. long and 1.2 cm. in diameter).

***Spiranthera guianensis* Sandwith** sp. nov. [Rutaceae-Cusparieae]; a *S. odoratissima* St. Hil. petiolis multo longioribus, foliolis longe petiolulatis plerumque multo majoribus obovatis vel obovato-ellipticis apice fere cuspidatis ad basim acute cuneatam longe attenuatis, cum nervis paucioribus atque magis distantibus, filamentis multo longioribus, praecipue disco omnino dissimili statim distinguitur.

Arbor parva, 6-7 pollices diametro ; ramuli obscure pilosuli, cortice nitidulo purpureo-fusco, sub inflorescentia 4-5 mm. diametro. *Folia* trifoliolata, petiolo cum cortice simili longissimo 10-14 cm. longo, 1.5-2.5 mm. diametro ; foliola obovata, obovato-elliptica vel fere rhomboideo-elliptica, apice satis abrupte acuminata fere cuspidata, basi in petiolulum pubescentem 5-15 mm. longum longe acute attenuata, 9-20 cm. longa, 4.7-9.5 cm. lata, textura atque colore eorum *S. odoratissimae* sed subtus per costam nervosque et praesertim in tota facie sparse sed regulariter minute adpresse pilosula, nervis in utroque latere costae 7-9 in foliolis minoribus 1-1.5 cm. in foliis majoribus saepe 2-3 cm. distantibus. *Inflorescentia* ut in *S. odoratissima* late thyrsoida ramis nigrescentibus pubescentibus, cum bracteis prophyllis indumento formaque alabastrorum simillimis ; pedunculi cymarum inferiores ad 7 cm. longi ; pedicelli nonnunquam ad 1.5 cm. longi. *Calyx* cinereo-puberulus, dentibus 1-2 mm. longis. *Petala* adulta ad 5 cm. longa, ad 3.5 mm. lata, indumento eorum *S. odoratissimae*. *Stamina* filamentis inferne pilosulis adultis saepe fere forma indumentoque ejus *S. odoratissimae* sed saepius angustius, 3-6 mm. altum, apice 2-2.5 mm. diametro ; discus fusco-nigrescens inconspicuus humilis ad 1 mm. altus dentibus calycinis fructiferis brevior vel vix aequilongus integer truncatus et fundo stipitis conspicue exsertus apice dentatus et ovarii stipitem laxе vaginans ; stylus inferne pilosulus, adultus vulgo 4.5-5 cm. longus. *Fructus* non visus.

BRITISH GUIANA : Weri-werai-kuru creek, Essequibo River, October 16th, 1922, *Hohenkerk* 853 (type in Herb. Kew.). "Small tree only 6 or 7 in. in diameter. Petals cream, long and narrow, like those of a waterlily, curved backwards." Demerara River, May 1887, *Jenman* 3929. Vernacular name (fide Jenman) "Whyoa-balli."

A very distinct species, remarkably like *S. odoratissima* in general respects but at once distinguished by the shape of the large leaflets and the long petiole, and especially by the peculiar floral disk which resembles that of the allied genus *Almeidea*. The measurements of the floral parts of *S. odoratissima* which are given by Engler in Mart. Fl. Bras. xii. ii. 88 are very inexact, but an examination of numerous specimens shows that the filaments are always shorter than the style, whereas in *S. guianensis* the very long filaments of the fully-developed flowers usually exceed it.

***Protium Altsoni* Sandwith** sp. nov. [Burseraceae] ; inter species folia 4-6-juga atque ovarium adpresse pilosum ferentes, inflorescentiis brevissimis congesto-thyrsoideis, floribus pedicellatis, ovario minuto in disco pulverulento fere omnino immerso, stylo nullo distinguitur.

Arbor elata, ramulis summis pubescentibus lenticellatisque 3-4 mm. diametro. *Folia* alterna, imparipinnata, 4-6-juga, 20-35 cm. longa ; petiolus supra canaliculatus, dense breviter pubescens, basi incrassatus, 3-5 cm. longus, ad 2 mm. latus ; rhachis similis sed subteres vel leviter angulata, internodiis 2-4 cm. longis ; petioluli supra canaliculati costa folioli per canaliculum decurrente, pubescentes, 6-9 mm. longi ; foliola opposita, oblonga vel rarius elliptica, apice abrupte ad 1.5 cm. acuminata, basi obtusa cuneata obliqua, 6-11.8 cm. longa, 2.4-4 cm. lata, utrinque glaberrima vel costa supra nonnunquam pilosula, integra, chartacea, nervis primariis in utroque latere costae circiter 15 subparallelis versus marginem sursum arcuatis atque anastomosantibus, rete venularum subtus satis prominente. *Inflorescentia* axillaris, brevissima, congesta, thyrsoida, 1-2.5 cm. longa, igitur petiolo multo brevior, dense adpresse pubescens ; bracteolae minutae, ovatae ; pedicelli 1-2 mm. longi. *Calyx* cupularis late acute sed non profunde 5-dentatus, glabrescens vel extra pilosus. *Petala* 5 ovato-lanceolata, ad 2.7 mm. longa, 1.3 mm. lata, utrinque pulverulenta puberula, extra etiam nonnunquam sparse pilosa, marginibus albo-furfuraceis. *Stamina* 10, filamentis glabris 0.75-1 mm. longis ; antherae ad 0.5 mm. longae. *Ovarium* minutum globosum, adpresse pilosum, 1 mm. longum atque diametro, stylo nullo, stigmatе 5-loba coronatum, in disco siccitate pulverulento margine undulato-sinuato fere omnino immersum.

BRITISH GUIANA : in forest bordering savannah, near Paramacutoi Savannah, Ireng District, 2300 ft., May 1926, *Altson* 529 (type in Herb. Kew.). "A tall tree. Calyx green. Corolla green. Anthers brown. Stigma dark-brown, sessile. A Hiawa gum tree."

***Clathrotropis paradoxa* Sandwith** sp. nov. [Papilionaceae-Sophoreae] ; ab omnibus speciebus adhuc repertis filamentis basi leviter sed manifeste connatis differt ; aliter *C. grandiflorae* (Tul.) Harms (cujus legumen ignotum) affinis, inflorescentiis multo longioribus, floribus minoribus, petiolis brevioribus differt ; quoad legumen *C. brachypetalae* (Tul.) Kleinh. evidenter affinis.

Arbor ramulis summis versus apicem glabris laevibus 4-5 mm. diametro; internodia summa 1.5-2 cm. longa. *Folia* alterna, imparipinnata, 2-3-juga, pari summo sub foliolo terminali nonnunquam in stipellas reducto; stipulae subulatae, glabrae, 5-8 mm. longae; petiolus glaber, nigrescens, teres, basi incrassatus, 3.5-6 cm. longus, 2 mm. diametro; rhachis similis, internodiis inferioribus 4-5 cm. longis; petioluli crassi, cortice corrugato, glabri, 7-8 mm. longi, 2-2.5 mm. crassi; foliola evoluta 5-7, opposita, oblonga, obovato-oblonga vel elliptico-ovata, apice satis breviter retuse acuminata, basi saepius attenuata sed demum rotundata, 10-16.7 cm. longa, 4.5-7 cm. lata, glabra, integra, coriacea, supra olivacea satis nitida, subtus pallidiora subglaucescentia, nervis primariis in utroque latere costae 10-12 supra immersis subtus cum costa prominentibus. *Inflorescentia* axillaris paniculata, adulta longissima, folium subtendens aequans vel etiam superans, ad 30 cm. longa, ramis arcuato-adscendentibus multifloris satis laxifloris inferioribus 15-23 cm. longis, tota dense adpresse puberula pubescentia pallide fusca vel juventute purpureo-fusca; flores in ramis racemosi, pedicellis sub flore adulto 2-4 mm. longis; bracteae subulatae, 1-1.5 mm. longae; bracteolae calyci adpressae similes, ad 1.2 mm. longae. *Calyx* indumento simili ad 6.5 mm. longus, tubo ad 5 mm. lato, labio superiore fere rectangulato 3 mm. longo 4 mm. lato apice ad 0.8 mm. lobato, dentibus labii inferioris acute triangularibus 2-2.3 mm. longis ad 2.5 mm. latis. *Corolla* glabra, alba, fauce purpurea, petalis conspicue venosis, 1-1.2 cm. longa; vexillum late obovatum, exauriculatum, cum ungue 2.5 mm. longo ad 1.2 cm. longum, 1.2 cm. latum, apice profunde ad 2 mm. emarginatum; alae obovato-spathulatae, exauriculatae, 9-10 mm. longae, 5 mm. latae; petala carinae obovato-spathulata, exauriculata, dorso leviter adhaerentia et facile sejungentia, 6-6.5 mm. longa, 3 mm. lata. *Stamina* 10, filamentis basi tubi calycis breviter sed manifeste vix ad 1 mm. connatis, glabris, subaequalibus, 5-6 mm. longis, 5 alternis quam 5 longioribus circiter 0.5 mm. brevioribus; antherae ad 0.5 mm. longae. *Ovarium* sessile, dense fusco-villosum, in flore nondum marcescente 3 mm. longum, 1 mm. diametro; stylus sursum glabrescens, apice recurvus, cum stigmate terminali 2.5 mm. longus; ovula 4. *Legumen* late obovato-lanceolatum, crassum, lignosum, planum, dense ferrugineo-tomentosum, 13-15 cm. longum, 4.5-6 cm. latum, valvatim elastice dehiscens; semina 4 valde compressa, oblonga, 2-2.5 cm. longa, ad 1 cm. lata, funiculis conspicuis pendencia.

BRITISH GUIANA: by water, Kamakusa, Mazaruni River, 180 feet, August 1925, *Abraham* 408 (type in Herb. Kew.). "Tree. Flowers white with pink blotches, slightly perfumed. Starch is prepared from the seed and eaten as food. Vernacular, Dakamballi (Arawak Dialect)." By water, Kurupung River, 200 feet, September 1925, *Altson* 402. "Tree. Calyx brown-purple. Corolla white with purple throat. Pod flattened, brown-tomentose. Vernaculars: (1) Tira-ek (Acawai Dialect), (2) Iron Mary (Creole)."

This has the facies, leaves, inflorescence and floral characters of the five other species which have been placed in this genus, differing only in the slightly connate filaments. It agrees very well in many points with the description of *C. grandiflora* (Tul.) Harms, but differs markedly in the points given above. It has the long lax inflorescence of *C. nitida* (Benth.) Harms, but differs from it in the strong indumentum of the ovary—a character shared by all the other species—the larger flowers, and the remarkable long 4-seeded pods. *C. flava* Ducke, which Ducke now makes the type of his new genus *Ormosiopsis*, has a very much shorter inflorescence, larger and yellow flowers and a short 1-2-seeded pod. *C. surinamensis* Kleinh. has more numerous narrower lanceolate leaflets, a much shorter inflorescence, and yellow flowers; the pod is unknown. There remains *C. brachypetala* (Tul.) Kleinh., which has recently been transferred from *Diploptropis* on the evidence of floral and fruiting characters. Though less like *C. paradoxa* in general appearance than all the other species, the pod of *C. brachypetala* provides a striking confirmation of its generic affinity. This, in *Jenman* 4921, is black and glabrescent, but roughly of the same shape and dimensions as that of *C. paradoxa*, being 15-16 cm. long and 5-6 cm. broad, as well as 4-seeded. It is possible that a further definition of the taxonomic relationship of the species of this genus and those of *Diploptropis*, perhaps involving a revised generic division, will prove to be necessary in the future when the fruit of all the species has been collected; in the event of any such division, *C. paradoxa* and *C. brachypetala* will probably stand together in the same genus. For the most recent conception of *Clathrotropis*, and notes on its relationship with *Diploptropis*, see Kleinhoonte in *Rec. Trav. Bot. Néerl.* xxii. 394-398 (1925). Should *Clathrotropis* be restored at some future date to its original position as a section of *Diploptropis*, the present species will have to be named *Diploptropis paradoxa* mihi; if to *Ormosiopsis*, *Ormosiopsis paradoxa* mihi, but as Kleinhoonte has shown, the characters assigned to *Ormosiopsis* are in most instances typical of Harms' original species of *Clathrotropis*.

Dicymbe Altsoni *Sandwith* sp. nov. [Caesalpinaceae-Sclerolobieae]; a *D. corymbosa* Spruce ex Benth. foliolis minoribus 5-6-jugatis, alabastris pedicellisque minoribus tenuioribus statim distinguitur.

Arbor magna, 27 m. alta, ad 15 m. nuda, cortice crasso rubro-fusco, ramulis summis minute adpresse pubescentibus 3-4 mm. diametro; internodia superiora saepe 5-7 cm. longa. *Folia* alterna, paripinnata, 5-6-juga; petiolus adpresse pubescens, basi incrassatus, 1.7-3 cm. longus, 1.5 mm. diametro; rhachis similis, internodiis 1.8-3.3 cm. longis; petiolulus pilosulus, 4-6 mm. longus; foliola opposita, ovato-lanceolata vel lanceolato-elliptica, apice attenuata atque longe ad 2 cm. acuminata, basi plerumque rotundata, 7.5-14 cm. longa, 2.8-4.5 cm. lata, integra, supra glabra olivacea, subtus sub lente minutissime sparse sed regulariter adpresse fulvo-pilosula, coriacea, utrinque costae conspicua sed nervis primariis inconspicuis,

rete tamen venularum intricatissimo subtus manifesto; stipulae delapsae. *Inflorescentia* axillaris atque terminalis, racemosa vel corymboso-paniculata ramis longis cum floribus racemosis, 8-14 cm. longa, tota dense fulvo-pubescent; bracteae delapsae; pedicelli flexuosi, 1-2.5 cm. longi, ad 1.5 mm. tantum diametro; alabastra bracteolis omnino inclusa, ovoidea, acuta, cum pubescentia densa siccitate sericeo-subnitente metallicolori, 1-1.5 cm. longa, ad 1.1 cm. lata; bracteolae sub flore aperto cymbiformes, late ovato-ellipticae, 1.5-1.8 cm. longae, applanatae ad 1.5 cm. latae, extra sericeae, intus margine crasso conspicuo excepto glabrae. *Calyx* tubo crasso discifero brevi 7 mm. lato; sepala 4 flava, obovato-oblonga, 1.9-2 cm. longa, 1-1.2 cm. lata, duo alterna angustiora ad 8 mm. lata, extra dense adpresse sericeo-pilosa, intus glabra. *Petala* 5 flava, extra plus minusve adpresse sericeo-pilosa, intus glabra; in alabastro 4 minora obovato-spathulata in unguem brevem attenuata, 1.7 cm. longa, ad 1.2 cm. lata, quintum majus fere rotundato-quadratum basi latissima ad 1.8 cm. latum; in flore aperto mox lacerata, 4 minora 2.3-2.8 cm. longa, ad 1.6 cm. lata, quintum majus verosimiliter ad 2.5 cm. latum. *Stamina* 10 libera, filamentis basi incrassatis pilosis, versus apicem inflexis, inaequalibus, 0.7-1.7 cm. longis; antherae ad 7 mm. longae. *Ovarium* in fundo calycis dense pilosum, circiter 8 mm. longum, ad 3 mm. diametro; stylus glaber, cum stigmate ad 1.6 cm. longus; ovula in ovario unico dissecto 8. *Fructus* non visus.

BRITISH GUIANA: common in forest on hills in red soil, Ananda-baru, Kopinang River, 2000 ft., April 1926, *Altson* 459 (type in Herb. Kew.). "A large tree, 90 ft. high, 50 ft. up to the first branches. Bark thin, red-brown: sapwood white; heartwood reddish. Flowers borne at the summit. Bracteoles 2, thick, yellow; calyx 4, yellow; petals 5, yellow; stamens free, 10; anthers versatile. Trunk tends to be fluted in old trees; no buttresses. Vernacular name, Atuba (Patamona Dialect)."

Dicymbe has remained a monotypic genus since it was described by Spruce from material collected by him in 1852 near Panuré on the Rio Uaupes, and published by Bentham. The species then described, *D. corymbosa*, has recently been discovered in at least two localities in British Guiana, and the following material has been sent to Kew: *Hohenkerk* 757, collected on the Potaro-Essequibo railway survey; and *Mackay* 896, collected at Camp No. 10, Mazaru-Kuribrong Divide. The presence, therefore, in British Guiana of two very fine and strikingly distinct new species of this genus, though of exceptional interest, is hardly remarkable. The locality in which Mr. Altson discovered his new species—which he correctly identified as a *Dicymbe*—lies some twenty-five miles south-west of the Kaieteur Falls towards the Brazilian frontier, and he reports that it is abundant, if not dominant, there over a considerable area. Meanwhile a third species, collected by Jenman on the Potaro River, has been lying for years unnamed in the Kew Herbarium in

the cover of *Dicymbe*, where it was correctly placed by Mr. J. G. Baker, and is described below. It is noteworthy that whereas *D. Altsoni*, which has more numerous and smaller leaflets than its congeners, is a large tree reaching a height of ninety feet, the other two are comparatively small trees; *D. Jenmani* was noted as only "eight feet high or more," while *D. corymbosa* was said by Spruce to be normally from ten to fifteen feet in height and in rare instances to attain to thirty feet.

***Dicymbe Jenmani Sandwith* sp. nov.** [Caesalpiniaceae-Sclerolobieae]; ab utraque specie adhuc cognita foliis 4-jugis foliolis subtus dense molliter tomentosis, petiolis internodiisque rhacheos dense patule tomentoso-pilosulis, inflorescentia tota dense patule fulvo-pilosa nec adpresse sericea, filamentis multo longioribus facile distinguitur.

Arbor parva ramulis summis 4-5 mm. diametro. *Folium* unicum visum paripinnatum, 4-jugum; petiolus densissime tomentoso-pilosulus, 5.3 cm. longus, 3 mm. diametro; internodia rhacheos indumento simili, fere 5 cm. longa, summum 4 cm. longum; petioluli similes, 5 mm. longi; foliola opposita, ea jugorum 3 inferiorum ovato-oblonga vel ovato-elliptica, jugi summi obovato-oblonga, apice longe acuminata, basi rotundata, in quoque jugo versus jugum summum paulatim crescentia, ea jugi imi 9 cm. longa, 4.6 cm. lata, jugi summi circiter 15 cm. longa, 6.2 cm. lata, integra margine revoluta, supra glabra, subtus molliter adpresse tomentosa, crasse coriacea, utrinque costa nervisque primariis in utroque latere costae ad 15 satis prominentibus, supra etiam reticulatione venularum satis prominente; stipulae delapsae. *Inflorescentia* axillaris, unica visa racemosa, fere 12 cm. longa, tota conspicue patule subnitide fulvo-pilosa; rhachis ad 3.5 mm. diametro; bracteae delapsae; flores apice corymbosi, pedicellis striato-sulcatis ad 3 cm. longis atque 3 mm. diametro; alabastra bracteolis omnino inclusa, ovoidea, acuta, ad 1.5 cm. longa, ad 1.1 cm. diametro; bracteolae sub flore aperto cymbiformes, ad 2.2 cm. longae, circiter 1.4 cm. latae, extra indumento fulvo supra commemorato, intus glabrae margine lato furfuraceo-sericeo excepto. *Calycis* sepala 4, in alabastro ovata 1.3-1.4 cm. longa, 7-9 mm. lata, in flore aperto oblonga vel obovato-oblonga ad 2.5 cm. longa, 0.8-1.2 cm. lata, extra per medium adpresse pilosa, ceterum saepius glabra. *Petala* 5 in alabastro ovata vel obovata 1.1-1.3 cm. longa, 7-8 mm. lata, in flore aperto pro rata angustiora spathulata 2.7-3.1 cm. longa, 8-10 mm. lata, extra margine satis angusto excepto dense satis longe atque laxe pilosa, pilis pallide ferrugineis quam eis sepalorum multo longioribus. *Stamina* 10 libera, filamentis in alabastro recurvatis 1.5 cm. longis, in flore aperto longissimis ad 4.2 cm. longis, dimidio inferiore satis dense longe pilosis, pilis eis petalorum similibus, sursum glabris; antherae 7-8.5 mm. longae. *Ovarium* dense pilosum, pilis eis petalorum similibus, ad 1.5 cm. longum, ad 4 mm. diametro; stylus superne

glaber, cum stigmate ad 2.8 cm. longus; ovula in ovario unico dissecto 10. *Fructus* non visus.

BRITISH GUIANA: Kaieteur Savannah, Potaro River, September-October 1881, *Jenman* 1006 (type in Herb. Kew.). "A small tree, eight or more feet high."

Heterostemon mazarunensis *Sandwith* sp. nov. [Caesalpiniaceae-Amherstieae]; affinis *H. conjugato* Spruce, praesertim floribus duplo saltem minoribus, petalis dimidio superiore satis dense regulariter ciliatis, fructu maturo glabro differt.

Arbor 9 m. alta, ramulis nigrescentibus minute pilosulis versus apicem 2-3 mm. diametro; internodia saepius 5-8 cm. longa. *Folia* paripinnata bijuga sed primo visu unijuga; petiolus crassus cortice corrugato 6-7 mm. longus, 2.5-3.5 mm. diametro; jugum inferius fere suppressum, minutissimum, stipellaceum in petiolo basi jugi superioris insidens, foliolis 2-3 mm. longis, 0.5-1 mm. e petiolo exstantibus; jugi superioris foliola maxima petiolulis 3-5 mm. longis, anguste oblonga vel obovato-oblonga, apice subito acuminata fere cuspidata acumine 0.7-1.5 cm. longo, basi obliqua, latere postico in apicem petioluli attenuata atque cuneata, latere antico ad basim petioluli rotundata, 14-25 cm. longa, 4-6.3 cm. lata, glabra, integra, tenuiter coriacea, utrinque subnitida, supra olivacea, subtus pallidiora, nervis primariis in utroque latere costae circiter 12-15 cum nervis intermediis venulisque supra satis aequaliter conspicuis ac immersis subtus exstantibus reticulatis; stipulae subulatae, pilosulae, ad 8 mm. longae. *Racemi* dense minute pubescentes multiflori, ad 11 cm. longi; pedicelli indumento simili, 2-5 mm. longi; bractee indumento simili, lanceolatae, 4 mm. longae; bracteolae indumento simili, fere in medio connatae, ovatae, 4-7 mm. longae, circiter 3 mm. latae. *Calyx* tubo dense pubescente 1-1.2 cm. longo, vix 2 mm. lato; calycis segmenta 4 extra dense pubescentia, obovato-linearia, obtusa, 1.7-2.4 cm. longa, ad 3.5 mm. lata. *Petala* 3 magna obovata, 2.2-3.2 cm. longa, ad 1.2 cm. lata, vix unguiculata, apice conspicue satis late emarginata, dimidio superiore ciliata; petala 2 rudimentaria minuta, membranacea, ovato-lanceolata, 1-3 mm. longa, ad 1 mm. lata, saepe apice ciliata. *Tubus stamineus* glaber 1.4-2 cm. longus, filamentis 9 exorientibus, trijugis lateralibus, tribus apicalibus, glabris vel pilis longis raris praeditis; antherae 3 majores 2.5-3 mm. longae, 6 minores circiter 1 mm. longae sed cum filamentis eis staminum perfectorum saepe aequilongis vel etiam longioribus. *Ovarium* suturis pubescentibus, faciebus glabrescentibus, 4-6 mm. longum, ad 1.7 mm. latum, stipite pubescente 3-4 mm. longo; stylus glaber, cum stigmate 1.4 cm. longus; ovula 4. *Legumen* fuscum, glabrum, 10-11 cm. longum, ad 3.3 cm. latum, stylo 3-4 mm. longo relicto, stipite circiter 7 mm. longo ad 3 mm. diametro.

BRITISH GUIANA: in forest, Kamakusa, Mazaruni River, August 1925, *Abraham* 400 (type in Herb. Kew.). "A thin-stemmed tree 30 feet high. Flowers white; standard streaked with pink."

Heterostemon ingifolius *Sandwith* sp. nov. [Caesalpiniaceae-Amherstieae]; affinis *H. conjugato* Spruce, forma foliorum perfecte bijugorum jugo inferiore plane evoluto magno conspicuo, rhachide inter juga longa, bracteolis caducis, ovario mox glabrescente differt.

Arbor ramulis nigrescentibus pilosulis versus apicem 2-3 mm. diametro; internodium unicum visum fere 7 cm. longum. *Folia* paripinnata, perfecte bijuga; petiolus crassus cortice corrugato, 5-6 mm. longus, 3-4 mm. diametro; jugum inferius foliolis brevissime petiolulatis late ovatis, apice retusis, basi ut in aliis speciebus obliquis; rhachis inter juga non alata, 4.3-5.3 cm. longa, 1.5-2 mm. diametro; jugum superius foliolis brevissime petiolulatis obovato-ellipticis vel ellipticis, apice acuminatis acumine retuso circiter 1 cm. longo, in basim similiter obliquam attenuatis, 14-15.5 cm. longis, 5.8-6 cm. latis; foliola omnia glabra, integra, chartacea, utrinque subnitida olivacea fere concoloria, utrinque sed praesertim subtus reticulata, nervis primariis foliolorum jugi superioris in utroque latere costae circiter 10-12; stipulae delapsae. *Racemus* unicus visus dense minute pubescens multiflorus, 5 cm. longus; pedicelli indumento simili, 5 mm. longi; bractee basi racemi persistentes minutissime ciliatae, triangulares, acutae, 1.5-2 mm. longae, basi ad 2 mm. latae; bracteolae omnes delapsae. *Calyx* tubo dense pubescente, 2.8-3 cm. longo, apice latiore excepto ad 2.5 mm. lato; calycis segmenta 4 extra minute dense pubescentia, obovato-linearia, obtusa, inaequalia, 3.5-4.2 cm. longa, 0.5-1.1 cm. lata. *Petala* 3 magna obovata, ad 4.5 cm. longa, ad 1.7 cm. lata, unguiculata, apice inconspicue emarginata, dimidio inferiore pilis paucis longis raris ciliata, superiore glabra; petala 2 rudimentaria lanceolata, apice ciliata, 4-5 mm. longa, 1 mm. lata. *Tubus stamineus* glaber, ad 3.2 cm. longus, filamentis 9 exorientibus, trijugis lateralibus, tribus apicalibus, glabris vel pilis longis raris praeditis; antherae 3 majores 4-4.5 mm. longae, minores abortivae brevissimae filamentisque brevissimis. *Ovarium* suturis glabrescentibus, faciebus glabris, 0.6-1 cm. longum, 1-2.5 mm. latum, stipite pubescente 3-5 mm. longo; stylus glaber, cum stigmate 3-4.5 cm. longus; ovula 4. *Legumen* non visum.

BRITISH GUIANA: in forest, Kamakusa, Mazaruni River, August 1925, *Abraham* 410 (type in Herb. Kew.). "Flowers purple and white."

Cassia (Subgen. *Lasiorhagma*, Sect. *Apoucouita*) **pteridophylla** *Sandwith* sp. nov. [Caesalpiniaceae-Cassieae]; affinis *C. adiantifoliae* Benth., foliolis brevioribus vulgo duplo angustioribus apice emarginatis subtus glabrescentibus, racemis pedicellisque brevioribus differt.

Arbor parva, trunco (in *Altson* 548) 10 cm. diametro, ramulis vetustioribus floriferis circiter 6 mm. diametro, hornotinis summis foliiferis alternis aggregatis dense pilosulis, 2-6 cm. longis, 0.75-1.5 mm. diametro; internodia vulgo 3-8 mm. longa. *Folia* in

quoque ramulo alterna 4-10 sed inferiora plerumque delapsa, ad 12 cm. longa, vulgo 2-3 cm. lata, paripinnata, multijuga; stipulae anguste lanceolatae, falcatae, glabrescentes, 2-3 mm. longae, circiter 0.5 mm. latae; petiolus 3-4 mm. longus, dense pilosulus; rhachis multo sparsius pilosula fere glabrescens, fortiter canaliculata, internodiis vulgo 3-4.5 mm. longis, apice ultra jugum summum paulum producta, glandula scutellata in latere superiore sessili sub jugum imum posita; foliola 20-30-juga, opposita, oblonga, apice obtusa semper conspicue emarginata, basi obtusa inaequilatera, 1.2-2 cm. (vulgo ad 1.6 cm.) longa, 2-4.5 mm. (vulgo ad 3 mm.) lata, chartacea, supra nitida fusca glabra, subtus opaca ferruginea laevia glabrescentia sed pilis raris longiusculis sparsa, costa centrali nervisque supra satis prominentibus atque reticulatis. *Racemi* nodis ramulorum vetustiorum conferti, breves, vulgo 2-3 cm. longi, passim dense pilosuli; pedunculus communis vulgo 1 cm. longus; pedicelli 1-2.3 cm. longi; bracteae minutae. *Sepala* extra dense pilosula, ovata subacuta vel saepe obtusa rotundata, 1.5-3.5 mm. longa, 1-2 mm. lata. *Corolla* ad 3 cm. diametro, petalis obovatis, 4 majoribus ad 2 mm. unguiculatis cum ungue ad 1.5 cm. longis, 8-9.5 mm. latis, extra in venis pilosulis, quinto saepe multo minore, circiter 8 mm. longo, 5-6 mm. lato. *Antherae* 10 omnes perfectae filamentis brevissimis, fere aequales, 3.5-4.5 mm. longae, dense adpresse pilosulae. *Ovarium* dense adpresse pilosum, 6-7 mm. longum, 1.2-1.5 mm. latum; stylus curvatus, glabrescens, cum stigmate pilosulo circiter 1 cm. longus; ovula 12. *Fructus* non visus.

BRITISH GUIANA: bank of small creek, Camp 12, eight-and-a-half miles east of Kaburi River, Mazaruni River, April 20th, 1926, B. R. Wood 877 (type in Herb. Kew.). "Forest tree. Common name, Iriariadan? (Arawak Dialect)". On sandy soil in forest, Kaietuk Plateau, Potaro River, 1300 ft., May 1926, Altson 548. "A slender tree, 40 ft. high. Calyx green. Corolla yellow." Upper Demerara River, September 1887, Jenman 4265.

This is closely allied to *C. adiantifolia* Benth. a species originally collected by Spruce on the Rio Uaupes, and recently recorded by Ducke from various localities at the mouth of the Amazons near Pará.

Macrocentrum vestitum Sandwith sp. nov. [Melastomataceae-Sonerileae]; foliis obovatis pilosis dense foveolatis necnon calycis lobis glanduloso-ciliatis *M. droseroidi* Tr. affinis, sed ab hoc ac ab omnibus speciebus adhuc descriptis habitu facie indumentoque insigniter differt.

Herba humilis, tota pilis ad 2 mm. longis simplicibus ac aliis glanduliferis raris saepe brevioribus immixtis vestita; caulis simplex vel parce ramosus, decumbens vel arcuato-adscendens, 6-12 cm. longus, radice crassa fibrosa 2-3 mm. diametro. *Folia* paribus satis approximatis, obovata, apice rotundata, in utroque pari saepius valde inaequalia, majora 1.5-3 cm. longa, 1-1.6 cm. lata, minora

saepe fere orbicularia 2-7 mm. longa, 2-5 mm. lata, integra, carnosae, utrinque dense foveolata atque pilis supra commemoratis vestita, senectute ferruginea, oculo nudo saepe fortiter uninervia sed verisimiliter semper trinervia; petiolus 0.3-1 cm. longus. *Inflorescentia* axillaris; flores 2-4 in pedunculo communi brevi dispositi; pedicelli striati, 0.8-2 cm. longi, pilis multo rarioribus saepius glanduliferis praediti. *Calyx* campanulatus, 3 mm. longus atque latus, indumento ei pedicelli simili, apice crenato-lobatus, lobis 4 secus marginem glandulis permultis breviter stipitatis instructis, 1.2 mm. longis, 2.5 mm. latis. *Petala* 4 anguste ovato-oblonga, obtusa, 3 mm. longa, 1.5 mm. lata, apice pilo vel seta glandulifera circiter 0.4 mm. longa praedita. *Stamina* 8 circiter 1.2 mm. infra apicem calycis inserta; filamenta uninervia 1.2 mm. longa; anthera ad 1.5 mm. longa, appendice filiformi 1-1.3 mm. longa. *Ovarium* glabrum turbinatum, 1.5 mm. longum, ad 1.3 mm. latum; stylus cum stigmate circiter 2.6 mm. longus. *Calyx fructifer* campanulatus, incrassatus, costis vel striis 8 e pedicello excurrentibus praeditus, 4 mm. longus, apice 5 mm. latus, capsula inclusa paulo brevior; semina glabra, laevia, ovoidea vel saepius pyramidata.

BRITISH GUIANA: Tumatumari Falls, Potaro River, Jenman 7781 (type in Herb. Kew.); common on shady rocks below the Kaieteur, Potaro River, September-October 1881, Jenman 826; on rocks in the open, Macreba Falls, Kurupung River, Mazaruni River, August 1925, Altson 339; *ibid.*, on boulders in shade, August 1925, Altson 340. "Corolla in bud red. Peduncle red. Fruit red. Leaves fleshy, pitted."

This curious species has been lying for many years unnamed in the Herbarium at Kew owing to the absence of flowering material. This has now been supplied by Mr. Altson (no. 340, from which the above description was taken) and proves that the plant, as was suspected, belongs to this interesting little genus. The conspicuous gland-tipped hair or bristle at the apex of each of the petals is a remarkable feature of the corolla. The nearest affinity of this species is evidently *M. droseroides*, which grows with it in the same localities, and exhibits a similar anisophylly, a somewhat similar indumentum on the deeply-pitted leaves, as well as a glandular margin to the calyx-lobes; but the entirely basal foliage and long scapiform inflorescence of *M. droseroides* give it a totally different appearance. These peculiar little plants have never been collected except in the neighbourhood of the bigger falls of British Guiana, and Mr. Altson notes that they always grow within reach of the spray. The Macreba Falls lie at a distance of about eighty-five miles to the north-east of the Kaieteur.

Macrocentrum gesneriaceum Sandwith sp. nov. [Melastomataceae-Sonerileae]; *M. vestito* Sandwith affinis, praesertim foliis acutis margine tantum setoso-pilosis brevius petiolatis, floribus duplo majoribus fere sessilibus, calyce ovarioque angustiore atque longiore, petalis apice nudis insigniter differt.

Herba humilis, decumbens vel arcuato-adscendens, radice fibrosa ad 1.2 mm. diametro; caulis 8-15 cm. longus, 0.5-1 mm. diametro, obscure tetragonus, angulis tuberculis atque pilis sursum arcuatis instructis; internodia 0.5-1.5 cm. longa. *Folia* in paribus valde inaequalia, minora mox delapsa ita ut folia alterna esse videantur, majora persistentia elliptica vel obovato-elliptica, acuta, 1-3 cm. longa, 0.5-1.5 cm. lata, integra, carnosae, dense minute foveolatae, oculo nudo fortiter uninervia sed juniora evidenter trinervia, faciebus glabris, secus marginem pilis densis plerumque simplicibus sursum arcuatis instructa; petiolus brevissimus 2 mm. longus, praesertim versus nodum dense pilosus. *Inflorescentia* axillaris; flores 1-4 de pedunculo communi brevissimo indumento caulis praedito dependentes, brevissime pedicellati vel fere sessiles. *Calyx* fere hypocrateriformis, costis 8 setosis, 5 mm. longus, anguste cylindricus 1 mm. latus, apice subito ad 3 mm. ampliatus, lobato-crenatus, lobis 4 secus marginem glandulis vel tuberculis sessilibus instructis ad 1.2 mm. longis ad 2.5 mm. latis. *Petala* 4 alba, obovato-oblonga, acuta, apice nuda, ad 6.5 mm. longa, ad 3.5 mm. lata. *Stamina* 8 circiter 1 mm. infra apicem calycis inserta; filamenta 2 mm. longa; anthera 2.75 mm. longa, appendice filiformi 1.5 mm. longa. *Ovarium* anguste cylindricum, circiter 3 mm. longum, apice paulo ampliatus ad 1 mm. latus; stylus cum stigmate fere 6.2 mm. longus. *Calyx fructifer* incrassatus, profunde costato-striatus costis setiferis, cylindrico-campanulatus vel obconicus, 8-10 mm. longus, apice 4-6 mm. latus, capsula inclusa paulo brevior; semina laevia, oblique ovoidea, quam eis *M. vestiti* minus pyramidata.

BRITISH GUIANA: Mazaruni River; with *M. droseroides* and *M. vestitum* on the face of sandstone cliffs and on fallen trees, Macreba Falls, Kurupung River, August 1925, *Altson* 358 (type in Herb. Kew). "Corolla white".

The anisophylly of this species, which has never been discovered before and which exhibits several other characters common to *M. droseroides* and *M. vestitum*, is so extreme that the small members of each pair have fallen in the upper parts of the plant, leaving little or no scar, and the leaves appear to be alternate.

Sipanea micrantha *Sandwith* sp. nov. [Rubiaceae-Rondeletieae]; affinis *S. biflorae* L. fil., omnibus partibus minoribus, praesertim floribus minimis corollae tubo brevissimo statim distinguenda.

Herba tenuis nodis radicans et parce ramosa, ad 28 cm. longa, fortasse nonnunquam longior, sed saepe multo brevior atque 6-12 cm. longa; caulis dense adpresse pilosus; internodia in plantis minoribus 1-2.5 cm. longa, in plantis majoribus ad 5 cm. longa. *Folia* parva, ovata, acuta, basi cuneata, 0.5-1.7 cm. longa, 3-9 mm. lata (in planta typica solum ad 1.1 cm. longa ac ad 6.5 mm. lata), glabra vel nervis sparse pilosa; petiolus indumento caulis 2-6 mm. longus; stipulae obsoletae. *Inflorescentia* axillaris biflora, adpresse pilosa, summa axem facile superans, pedunculo communi 1.2-1.8 cm.

longo, pedicello terminali 3-5 mm. longo, laterali brevior; bractaeae subulatae, circiter 1 mm. longae. *Calyx* tubo campanulato brevi, circiter 1 mm. longo atque lato, dense adpresse albo-piloso, apice glandulis rubro-aurantiacis ut in *S. biflora* inter bases dentium instructo; dentes inaequales, lineari-subulati, ad 2.8 mm. longi, glabrescentes. *Corolla* tubo cylindrico brevissimo 2.5-3 mm. longo, extra glabro, intus superne usque ad faucem piloso; limbus ad 4.5 mm. diametro, lobis rotundatis vel obovatis ad 2.3 mm. longis, ad 1.75 mm. latis, intus minute pulverulentis. *Stamina* tubo 1-1.2 mm. supra basim inserta, filamentis brevissimis circiter 0.4 mm. longis; antherae viridescens, 0.75-1 mm. longae. *Ovarium* glabrum, transverse ellipticum, 0.3 mm. longum, 0.8 mm. latum; stylus 2-2.5 mm. longus, ramis ad 0.6 mm. longis. *Fructus* ovoideus, pilosus, ad 2.5 mm. longus atque diametro, calycis dentibus persistentibus.

BRITISH GUIANA: Kamakusa, Mazaruni River, September 1925, *Abraham* 404 (type in Herb. Kew.). Bartica Grove, November 1886, *Jenman* 2416, a more drawn-up form with larger leaves and internodes.

Leiphaimos (§ *Euleiphaimos* Gilg) ***eximia*** *Sandwith* sp. nov. [Gentianaceae-Leiphaimeae]; affinis *L. aphyllae* (Jacq.) Gilg, corollae tubo multo longiore, lobis majoribus speciosis, antheris majoribus connatis, filamentis longioribus differt.

Herba 10-20 cm. alta, caule ut in *L. aphylla* plerumque simpliciter unifloro. *Folia* bractaeaeque squamiformia, 2.5-4 mm. longa, infra medium connata. *Calyx* tubo 4-5 mm. longo, lobis triangulari-subulatis acutis ad 1.75 mm. longis. *Corolla* flavo-aurantiaca, glabra, hypocrateriformis; tubus 4-5 cm. longus, igitur ovario triplo vel quadruplo longior, ad 2 mm. latus, versus limbum ad 4-5 mm. ampliatus; limbus lobis ovato-lanceolatis acutis, 0.9-1.5 cm. longis, 3-5.5 mm. latis. *Stamina* infra os 4-5 mm. filamentis distinctis 0.5-0.75 mm. longis inserta; antherae arcte connatae, loculis obtusis inappendiculatis circiter 1.3 mm. longis. *Ovarium* 5-10 mm. longum, 1.5-2.5 mm. latus, glabrum, eglandulosum; stylus glaber cum stigmate 3-3.8 cm. longus.

BRITISH GUIANA: in damp shady places under boulders on summit of sandstone escarpment, Kurupung Mountains, Pacaraima Range, 1500 ft., August 1925, *Altson* 373 (type in Herb. Kew.). "A saprophyte on leafmould. Flowers orange-yellow." Bushy edge of Kaieteur Savannah, October 1878, *E. F. im Thurn*. In forests near the Kaieteur Savannah, Potaro River, September-October 1881, *Jenman* 1266.

This has been confused with *L. aphylla* from which it is easily distinguished by the large handsome flowers and the characters of the stamens. One of Sir Everard im Thurn's specimens bears two flowers at the apex of the stem.

LIII.—TROPICAL AFRICAN PLANTS: V.*

J. HUTCHINSON AND J. M. DALZIEL.

CHAILLETIACEAE.

Dichapetalum cordifolium Hutch. et J. M. Dalz., sp. nov.; affinis *D. umbellato* Chod., sed foliis petiolatis late oblongo-ellipticis majoribus infra reticulatis differt.

Frutex; ramuli breviter tomentosi. *Folia* late oblongo-elliptica, acuminata, basi cordata, circiter 16 cm. longa et 8–10 cm. lata, infra parce pubescentia et crebre venulosa, nervis lateralibus utrinsecus circiter 8; petioli 1–1.5 cm. longi, molliter tomentosi. *Cymae* pauciflorae, breviter pedunculatae, ubique molliter tomentosae; pedicelli crassi, 0.5 cm. longi. *Sepala* oblonga, 3 mm. longa, extra tomentosa. *Petala* biloba, extra appresse pubescentia.

Nigeria: Southern Provinces; Akure, Foster 192.

Dichapetalum Linderi Hutch. et J. M. Dalz., sp. nov.; affinis *D. subauriculato* Engl., sed ramulis floriferis plus minusve pubescentibus, foliis nervis infra setulosis differt.

Frutex parvus; ramuli purpurascens, mox glabri. *Folia* oblongo-obovata, basi inaequilatere cordata, apice sensim acuminata, 8–15 cm. longa, 3.5–6 cm. lata, nervis lateralibus utrinsecus circiter 5 infra setulosis; petioli 3 mm. longi, tomentelli; stipulae lineares, 8 mm. longae. *Flores* flavescens, glomerati, sessiles, circiter 6 mm. longi. *Sepala* oblonga, dense pubescentia, 2.5 mm. longa. *Petala* biloba, glabra.

Liberia: Suen, Nov., Linder 1407.

Dichapetalum Rowlandii Hutch. et J. M. Dalz., sp. nov.; affinis *D. Thomsonii* Engl., sed costa supra breviter pubescentia, foliis elliptico-obovatis basi cuneatis, floribus subsessilibus differt.—*D. Bocageanum* A. Chev. Explor. Bot. Afr. Occid. Franç. 119, non Engl.

Ramuli breviter tomentosi. *Folia* elliptico-obovata, obtuse acuminata et mucronata, basi cuneata, 10–20 cm. longa, 5–10 cm. lata, infra leviter pubescentia, nervis lateralibus utrinsecus 6; petioli usque ad 0.5 cm. longi, tomentelli. *Flores* axillares, glomerati, subsessiles. *Sepala* anguste oblonga, 1.5 mm. longa, extra tomentosa. *Petala* bilobata, glabra.

Dahomey: Porto Novo, Mar., Chevalier 23332. Nigeria: Southern Provinces; Western Lagos, Rowland (type).

Dichapetalum chrysobalanoides Hutch. et J. M. Dalz., sp. nov.; affinis *D. toxicario* Engl., sed pedunculis inferioribus petiolo adnatis, foliis minoribus differt.

Ramuli flexuosi, glabri. *Folia* oblongo-elliptica, abrupte et breviter acuminata, basi breviter cuneata, 4–8 cm. longa, 2–4 cm.

*Continued from K.B. 1928, p. 301.

lata, glabra, supra nitida, nervis lateralibus utrinsecus circiter 6; petioli usque ad 0.6 cm. longi. *Flores* minimi, laxe cymosi, pedunculo petiolo adnato. *Sepala* extra tomentosa. *Petala* biloba.

Sierra Leone: Magbile, Dec., Thomas 6016, 6019, 6110, 6119, 6125, 6145; without locality, Scott Elliot (type).

CAESALPINIACEAE.

Cynometra leonensis Hutch. et J. M. Dalz., sp. nov.; affinis *C. Hankei* Harms, sed foliolis circiter 6-jugis infra glabris differt.

Arbor magna; ramuli flexuosi, leviter pubescentes. *Folia* circiter 8 cm. longa; foliola circiter 6-juga, oblique-oblonga, apice truncata vel leviter emarginata, 2–3 cm. longa, 1–1.5 cm. lata, glabra. *Flores* breviter paniculati; pedicelli 4–5 mm. longi, puberuli. *Sepala* suborbicularia, 4 mm. longa, glabra. *Petala* obovata, 3.5 mm. longa.

Sierra Leone: Yandahun, Unwin & Smythe 52; Bandama, Mar., Aylmer 576; Kenema, Mar., Aylmer 136 (type).

Cynometra ananta Hutch. et J. M. Dalz., sp. nov.; affinis *C. Vogelii* Hook f., sed foliolis acuminatis late falcatis, floribus breviter cymosis differt.

Arbor magna, ligno duro rubro; ramuli glabri. *Foliola* 1-juga, late falcata, acuminata, 6–10 cm. longa, 2–4 cm. lata, glabra, nervis reticulatis; petioluli 3–4 mm. longi. *Flores* breviter cymosi, conferti; pedicelli brevissimi, fulvo-pubescentes; bractee parvae. *Sepala* obovato-orbicularia, 3–4 mm. longa. *Petala* 5. *Fructus* late oblongus, inaequaliter triangulari-apiculatus, circiter 9 cm. longus et 5 cm. latus, leviter nervosus.

Gold Coast: Ankobra River Basin, Nov., Chipp 11 (type); Dunkwa, Vigne 875.

Hymenostegia Bakerianum Hutch. et J. M. Dalz., sp. nov.; foliolis 8–10-jugis, racemis densifloris alabastro bracteis magnis coriaceis striatis tectis, bracteolis lineari-oblancoelatis magnis, calycis lobis venosis tinctis distincta.

Arbor; ramuli tomentelli. *Folia* usque ad 20 cm. longa; foliola circiter 8–10-juga, oblonga, obtuse acuminata, glabra, nervis lateralibus numerosis reticulatis; rhachis breviter pubescens, subteres. *Racemi* densiflori, 7–8 cm. longi; bractee coriaceae, striatae, usque ad 3 cm. longae; bracteolae lineari-oblancoelatae, circiter 1 cm. longae, extra pilosae. *Calycis lobi* obovati, tincti, venosi, 1 cm. longi, 6–7 mm. lati. *Petala* lineari-oblancoelata. *Stamina* numerosa.

Nigeria: Southern Provinces; Oban, Talbot 1567.

Hymenostegia gracilipes Hutch. et J. M. Dalz., sp. nov.; foliolis 4-jugis, racemis laxifloris, bracteis mox deciduis, bracteolis late oblongis distincta.

Arbor; ramuli flexuosi, glabri. *Folia* circiter 10 cm. longa; foliola 4-juga, jugis subaequalibus, oblique oblongo-oblancoolata, triangulari-acuminata, 4-8 cm. longa, 2-3.5 cm. lata, glabra, nervis lateralibus numerosis; rhachis exalatus. *Racemi* terminales, laxiflori, foliis breviores; axis glaber; pedicelli graciles, 2.5 cm. longi; bracteolae oblongae, tenues, circiter 1 cm. longae, petaloideae. *Calycis lobi* anguste ovati, 6 mm. longi. *Petala* 3, inaequalia, multo reducta. *Stamina* 10, libera.

Gold Coast: Sa, on the Bonsa River, Aug., Vigne 978.

Tessmannia baikieoides Hutch. et J. M. Dalz., sp. nov.; affinis *T. africanae* Harms, sed foliolis longe acuminatis, sepalis extra tomentellis differt.

Arbor; ramuli breviter puberuli. *Foliola* alterna, circiter 3-juga, oblique obovato-oblancoolata, obtuse acuminata, basi cuneata, 5-7 cm. longa, 2-3 cm. lata, costa media puberula excepta glabra, nervis lateralibus numerosis; petioluli brevissimi. *Flores* pauci, alabastro circiter 1.5 cm. longi; pedicelli usque ad 2 cm. longi, tomentelli. *Sepala* oblongo-lanceolata, acuta, tomentella. *Petala* juniora tantum visa, costa hirsuta. *Ovarium* dense villosum, stylo alabastro spiraliter contorto.

Sierra Leone: York Pass, Dec., Lane-Poole 137.

Talbotiella Gentii Hutch. et Greenway, sp. nov.; a *T. eketensi* Bak. f., foliolis circiter 6-jugis majoribus apice rotundatis differt.

Arbor; ramuli minute puberuli. *Foliola* circiter 6-juga, opposita, oblique oblonga, apice rotundata, basi unilateraliter auriculata, circiter 2 cm. longa et 1 cm. lata, glabra, venulosa. *Racemi* axillares, circiter 3 cm. longi, pilosi, basi perulis coriaceis striatis instructi; pedicelli 1 cm. longi, laxe pubescentes. *Sepala* oblongo-elliptica, 6-7 mm. longa, glabra. *Stamina* 8-9. *Ovarium* stipitatum, villosum. *Fructus* planus, late obovatus, leviter rostratus, circiter 4 cm. longus, oblique nervosus.

Gold Coast: North Scarp, Kwahu, Dec., Gent 184 (type); Agogo, damp places, Irvine 957.

Daniellia Oliveri Hutch. et J. M. Dalz., comb. nov. *Paradaniellia Oliveri* Rolfe in Kew Bull. 1912: 96. *Daniellia thurifera* A. Chev. Explor. Bot. Afr. Occid. Franç. 231, non Bennett.

Widely spread from the French Sudan through Northern Nigeria and the Cameroons to the Eastern Sudan.

Daniellia pubescens Hutch. et J. M. Dalz., sp. nov.; rhachi et costa foliorum infra molliter pubescenti, foliolis circiter 5-6-jugis oblongo-ellipticis basi inaequilateralibus et subcordatis apice breviter acuminatis 7-13 cm. longis 3-5 cm. latis nervis lateralibus numerosis subparallelis infra crebre reticulatis, calyce extra glabro lobis late ellipticis 1.3 cm. longis, seminibus complanatis oblongo-ellipticis 3 cm. longis distincta.

Nigeria: Southern Provinces; Lagos Colony, Moloney.

LIV.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies:—Mr. O. J. VOELCKER, B.A., Mr. G. N. K. TURNBULL, Mr. J. H. PALMER, B.A., and Mr. E. W. LEACH, B.Sc., Superintendents, Agricultural Department, Nigeria; Mr. G. COWAN, Superintendent, Agricultural Department, Gold Coast; Mr. H. P. SMART, B.Sc., Agricultural Officer, British Honduras; Mr. E. E. MARTYN, B.A., Botanist and Mycologist, British Guiana; Mr. C. W. J. LINE, Deputy Director of Agriculture, Gambia, to be Assistant Superintendent, Agricultural Department, Gold Coast (K.B. 1924, p. 27).⁶

CHARLES CURTIS.—We regret to record the death, on 16th August, 1928, of Mr. Charles Curtis, who was for many years Superintendent of the Botanic Gardens at Penang. Between 1878 and 1884 Mr. Curtis made several plant-collecting expeditions for Messrs. James Veitch and Sons, the first being to Mauritius and Madagascar. In 1880 he was sent to Borneo, Sumatra, Java, and the Moluccas. The special object of this journey was to collect specimens of *Nepenthes Northiana*, a plant which had been made known through a drawing by Miss North, now in the North Gallery at Kew. In this quest he was successful.

Mr. Curtis sent home large collections of plants, including many new species. Among the latter are *Cypripedium Curtisii*, *Nepenthes Curtisii*, *Medinilla Curtisii*, *Rhododendron multicolor* var. *Curtisii*.

Through his botanical activities Mr. Curtis was brought into close touch with Kew, and it was through the recommendation of Kew that he received the appointment to Penang mentioned above. This was in 1884, and he held the post until his retirement in 1903. While at Penang, under Mr. H. N. Ridley, he assisted in carrying out some of the earliest experiments in the tapping of Para rubber.

HENRY ALEXANDER WICKHAM.—The death of Sir Henry Wickham, on September 28th, brings to an end a career noteworthy in the annals of industry. The part played by Wickham in the foundation of the plantation industry is well known and need not be recounted here. It received public recognition in 1911 when the Rubber Growers' Association of London and the Rubber Planters' Association of Ceylon and Malaya presented him with 1,000 guineas and an annuity, while in 1920 he received the honour of knighthood. Rarely, if ever, can an individual have witnessed, as Wickham did, the results of his early efforts develop within his lifetime into an enterprise of such magnitude as the rubber industry.

On the type specimen of *Viola confusa*.—The description of *Viola confusa* Champ. ex Benth. is to be found in Benth. 's "Florula Hongkongensis" published in Hooker's Kew Journal of Botany iii. pp. 260-261 (1851).

BULLETIN OF MISCELLANEOUS INFORMATION No. 10 1928 ROYAL BOTANIC GARDENS, KEW

LV.—DISCOVERY OF THE GENUS *COOPERIA* IN PERU. T. A. SPRAGUE.

Bulbs of an amaryllidaceous plant received from Mollendo in southern Peru by Major Albert Pam of Wormley Bury, Broxbourne, Herts, were presented by him to the Royal Botanic Gardens in August, 1928. At the time of writing (Sept. 14th) two plants have just flowered and have been identified as belonging to the genus *Cooperia* (Prairie Lily). This has hitherto been supposed to be confined to North America, only three species being known, namely, *C. Drummondii* Herb., found on prairies in Texas and New Mexico and the adjacent parts of Mexico, *C. pedunculata* Herb., a native of Texas, and *C. miradorensis* Kränzlin, from Mexico (Vera Cruz). The last species, however, may possibly, according to Kränzlin, be only a small form of *C. pedunculata*.

As it seemed not improbable that this Peruvian *Cooperia* might have been described as a species of some allied genus, search was made amongst the herbarium specimens and descriptions of *Zephyranthes*, with the result that it was identified with a species from Ylo in southern Peru, described and figured in 1725 by Feuillée under the phrase-name, *Lilio-Narcissus, flore albicante, tubo praelongo* (Journ. Obs. Phys. iii., Hist. Pl. Med. 29, t. 20, fig. sinistra). This description and figure form the sole basis of *Pyrolirion albicans* Herb. (Amaryllidaceae, 184: 1837). Herbert included *P. albicans* doubtfully in *Pyrolirion*, with the following remarks: "This plant, from Ylo in Peru, is only known to us by Feuillet's [sic] description and bad plate, with a whitish tubular flower, and limb reflex at the point; it agrees with no genus but *Pyrolirion*. There is no spathe in the figure. It is impossible to be quite certain that this plant may not be a *Cooperia*; but both the leaves and the reflex points of the limb seem to correspond with those of *Pyrolirion*." Baker, Handb. Amaryllid. 30 (1888), treated *Pyrolirion* as a subgenus of *Zephyranthes*, and gave the name *Zephyranthes albicans* to *P. albicans*.

There can be no question that Major Pam's plants and Feuillée's figure are congeneric. The long slender cylindrical perianth-tube, short filaments, and suberect anthers distinguish them both from *Pyrolirion* and *Zephyranthes*, and are characteristic of *Cooperia*. The fact that they differ from the previously known species of *Cooperia* in having reflexed perianth-lobes does not seem a sufficient reason for excluding them from that genus.

In the writer's opinion the two are also conspecific. The following differences, have however, been observed.
Feuillée: perianth-lobes very acute, 10-12 mm. broad; style considerably exceeding the stamens.

The sheet with the type specimens of this species is preserved in the Kew Herbarium and consists of two flowering plants and three fruiting specimens. The label runs "352 *Viola inconspicua* (Bl.)? Hongkong." Added to this, in another handwriting, is the name "*V. confusa* Champ." It was cited by Hemsley in Index Florae Sinensis as *V. serpens* Wall.

The sheet in question actually, however, consists of two species, namely, *V. inconspicua* Bl. (the three lower fruiting specimens), and two flowering plants (the upper ones). The description of *Viola confusa* is for the most part concerned with the latter, at all events in so far as flowering plants come into consideration.

The following passages in the published description of *V. confusa* refer to the three fruiting individuals of *V. inconspicua*. "In specimenibus flores fertiles apetalos . . . pedunculis petiolis brevioribus." "Capsula elliptico-trigona." But the description as a whole obviously refers to the flowering specimens.

V. confusa Champ. is a species with an eastern Asiatic distribution and which had been described by Hayata under the name *V. stenocentra*. I have also myself published it as *V. philippica* subsp. *malesica*. As *V. philippica* Cav. is an uncertain species the name *V. confusa* Champ. must be given priority.

I would also draw attention to the fact that Bentham's description of *V. confusa* in "Flora Hongkongensis" (1861), p. 20, refers entirely to our plant and excludes *V. inconspicua* Bl.

W. BECKER.

Setaria verticillata as a preventive of rats.—The following interesting note, on the method adopted by the Wasakuma tribe of the Shinyanga District to protect their corn-stores from rats, has been communicated to us by the Director of Agriculture, Tanganyika Territory, who received it from the District Agricultural Officer, Shinyanga.

"The native food stuffs such as millet and maize are stored in large Lindos or circular grain stores made from mtama stalks or long grass, plastered with cow-dung, and built either inside the houses or under a separate roof. The Lindos are raised 2 to 3 ft. from the ground on stones and vary in size according to the wealth in grain of the owner.

Over the top of the grain in the open months of the Lindos, the Wasakuma place the dried spikes of a grass called by them *Makalamatta*, or in Swahili, *Marramatta*. The bristly spikes wrap themselves around the fur of the rats and make themselves so unpleasant to the rats that they do not attempt to get at the grain below."

Specimens of this grass accompanying the above note have been determined as *Setaria verticillata* P. Beauv. It is the reversedly barbed bristles which become rigid at maturity that serve to fix the spikes to the fur of the rats.

Pam: perianth-lobes obtuse with a small apiculus, 15–18 mm. broad; style slightly exceeding the stamens.

The differences in breadth of perianth-lobes and length of style seem to be rather discounted by the fact that a flower from another bulb of the same batch sent by Major Pam to Sir William Lawrence, Bt., of Burford, Dorking, has the perianth lobes only 12–13 mm. broad, and the style considerably exceeding the stamens, in these respects agreeing more closely with Feuillée's figure. On the other hand the flowers of two of the bulbs received direct from Major Pam have anthers about 3 mm. long and easily visible filaments, agreeing in these characteristics with the figure, whereas the flower received from Sir William Lawrence has anthers of two sizes, respectively 6 mm. and 4 mm. long, which at first sight appear to be sessile, as they completely hide the very short filaments.

The precise importance which should be assigned to the various differences noted above cannot be determined until more is known about the limits of variation in the species under consideration. It seems significant, however, that according to Small (Fl. South-eastern United States, ed. 2, 290: 1913), the perianth-lobes of *Cooperia Drummondii* exhibit considerable variation both in shape and size. It is desirable that an attempt should be made to obtain bulbs of *Cooperia* from Feuillée's locality, Ylo, in order that they may be compared with the Mollendo plants. These two localities are, however, not far apart (Ylo 17° 40' S., 71° 22' W.; Mollendo 17° 5' S., 72° 2' W.), and are in the same phytogeographical region.

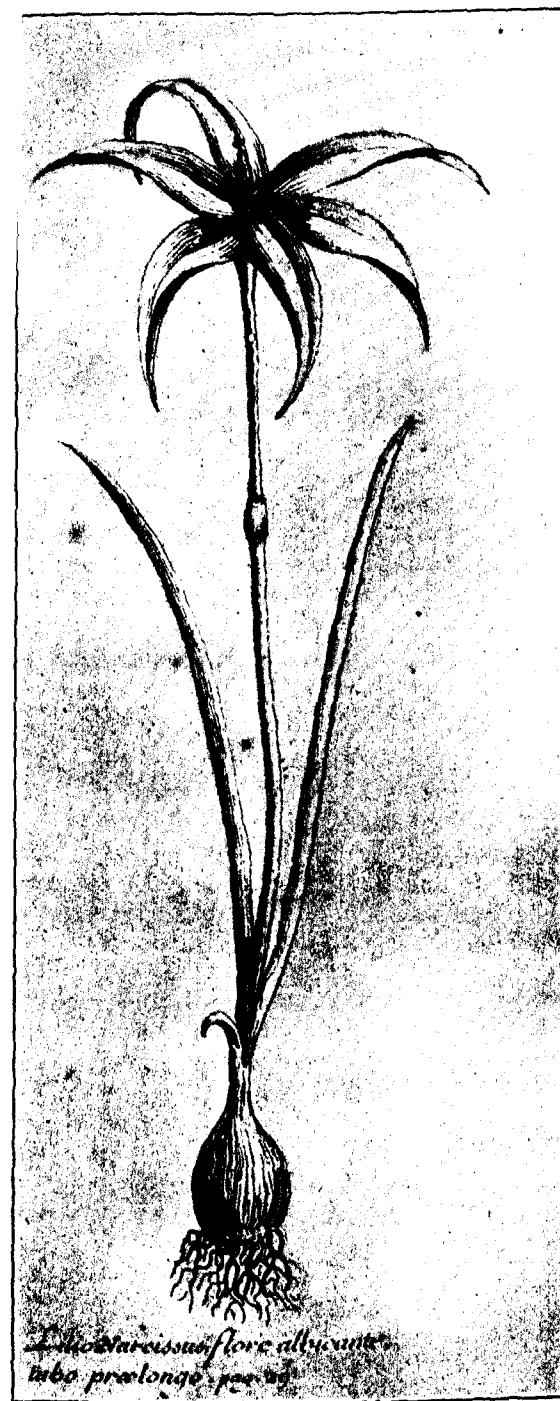
In the meantime, the new name *Cooperia albicans* is proposed for *Pyrolirion albicans* Herb. (*Zephyranthes albicans* Baker), and the bulbs from Mollendo are assigned to that species.

Cooperia albicans (Herb.) Sprague, comb. nov. *Pyrolirion albicans* Herb. Amaryllidac. 184 (1837). *Zephyranthes albicans* Baker, Handb. Amaryllid. 38 (1888). *Lilio-Narcissus, flore albicante, tubo praelongo* Feuillée, Obs. iii., Hist. Pl. Medic. 29, t. 20, fig. sinistra (1725).

Original description:—"Les oignons de cette espece sont de differente grosseur, les moiens ont quinze à seize lignes de longueur, sur dix à douze lignes d'épaisseur; ils renferment une substance gommeuse, fort blanche. La tige est simple, nue, ronde, d'un beau verd, haute de sept à huit pouces, sur environ une ligne et demi d'épaisseur, elle sort d'entre trois ou quatre feuilles de sept à huit pouces de longueur, sur une ligne et demi de largeur, creusées en gouttière, d'un beau verd, et terminées en pointe. La tige soutient une seule fleur blanc de lait, sa partie postérieure est un tuyau long de deux pouces, dont le pavillon s'évase environ quatre pouces, et se découpe en six parties, longues chacune de deux pouces, sur cinq à six lignes de largeur, elles se terminent en pointe, et se courbent en dessous de cette plante.

Je trouvai cette plante dans la vallée d'Ylo, entre deux montagnes, dans un pays extrêmement sec."

PERU. Type-locality, Ylo (Ilo), south of Mollendo.



Cooperia albicans (Herb.) Sprague.

As the original description and figure of *C. albicans* given above are incomplete, it seems desirable to supply a new description drawn up from one of Major Pam's plants which flowered at Kew.

Bulb subglobose, nearly 2 cm. long and over 2 cm. in diameter, pale brown, neck less than 1 cm. long. *Leaves* oblanceolate-linear, subobtuse, 12–20 cm. long, arcuate-subrecurved towards the apex, lower part with margins more or less strongly incurved, and hence only 2.5–4 mm. broad, upper part shallowly concave, 7–8 mm. broad, rather strongly 7-ribbed, especially on the lower surface. *Scape* 7 cm. long, slightly compressed, broader diameter 4.5 mm., narrower diameter 3.5 mm. *Spathe* 4.3 cm. long, very closely investing the ovary and perianth tube, split unilaterally down to 2.7 cm. from base, free tips of its two component bracts about 8 mm. long, shrivelled at the time of flowering. *Flower* sessile in the spathe, very sweet-scented. *Perianth* white; tube cylindric,

about 7 cm. long, slightly broadened into the throat; lobes arcuate-recurved, broadly lanceolate, outer ones 4-4.5 cm. long, 1.7-1.8 cm. broad, inner ones about 4 cm. long and 1.5-1.6 cm. broad; limb when flattened horizontally about 7.5 cm. in diameter. *Filaments* with broadly depressed-deltoid, slightly united basal parts, upper parts oblong, tapered upwards, 1 mm. long, 0.7 mm. broad at the base. *Anthers* (already dehiscent) oblong, about 3 mm. long and 1 mm. broad. *Style* shortly (about 3 mm.) exceeding the anthers; stigmas suborbicular, slightly concave above, margins recurved, outline pyriform if the short style-arms are included; ovary oblong, hardly 1 cm. long, 5 mm. in diameter.

PERU. Hills above Mollendo, in almost pure volcanic sand. Vernacular name: "flor de amancaes."

LVI.—NEW PLANTS FROM THE SEYCHELLES.

V. S. SUMMERHAYES.

In the course of preparing an enumeration of the phanerogams of the Seychelles a new genus and a number of new species have been detected. It has also been found necessary to transfer certain species to other genera. In addition it has seemed advisable to revive an old genus for a rather anomalous species. The descriptions and changes of nomenclature are given in this paper.

Neowormia *Hutchinson et Summerhayes*, genus novum, inter familiam floribus racemosis, carpellis connatis, antherarum marginibus undulatis longitudinaliter dehiscentibus valde distinctum.

Arbor, ligno molli, innovationibus dense sericeo-villosis; folia alterna, petiolata, elliptica, nervis lateralibus numerosis parallelis prominentibus, juniora denticulata et interdum fere glabra, adulta integra et plerumque infra tomentella; petioli lobis lateralibus stipulaeformibus deciduis muniti; inflorescentia oppositifolia, racemosa, ubique molliter villosa; bracteae mox deciduae; sepala ab exterioribus gradatim majora, valde imbricata, extra marginibus exceptis appresse villosa; petala 5, libera, tenuia; stamina numerosissima, libera, antheris marginibus undulatis longitudinaliter dehiscentibus; carpella 10, usque ad apicem connata, stylis subulatis liberis patulis; ovula biseriata.

Neowormia ferruginea *Hutch. et Summerhayes*, comb. nov. *Wormia ferruginea* Baill. *Adansonia*, vi. 268 (1865-66); Baker, Fl. Maur. Seych. 2 (1877).

Known as "Bois rouge" on account of the deep red young leaves, and one of the commonest trees in the islands. The remarkable cupular sheathing base of the leaves of young specimens or of young shoots has been commented on by Percival Wright and by Schimper. Schimper notes that even after several weeks' drought these cupular bases of the leaves were brimful of water. Horne (mss.) states that the leaves of a healthy young plant and of suckers are often 3 ft. long, rough and jagged on the margin.

In attempting to discover the most nearly related species of *Wormia* to *W. ferruginea* Baill. from the Seychelles we were unable to find a close ally. This led us to re-examine the flowers more closely, with the result that the ovary was found to be completely syncarpous, a character which agrees better with the genus *Dillenia* than with *Wormia*. But it differs from *Dillenia* in having a long, racemose, leaf-opposed inflorescence. We therefore propose to make it the type of a new genus, *Neowormia*, in reference to its more advanced gynaecium. The following key summarises the differences between these three genera:—

Carpels free or slightly united at the base; flowers in leaf-opposed or terminal racemes; anthers straight, opening by apical pores *Wormia*

Carpels united; flowers in leaf-opposed [or terminal?] racemes; anthers with undulate margins, opening by longitudinal slits. *Neowormia*

Carpels more or less united; flowers solitary, fasciculate or rarely in very short few-flowered spreading cymes; anthers opening by pores or slits. *Dillenia*

Vateriopsis seychellarum *Heim*. *Vateria seychellarum* Dyer in Baker. Fl. Maur. Seych. 526.

A re-examination of this plant has led me to accept Heim's genus, which is intermediate in character between *Vateria* and *Stemonoporus*. The Seychelles species has the indefinite stamens of *Vateria* and these dehisce by longitudinal slits, but the connective is only produced a short distance above the anthers. However the inflorescence, which is paniculate in *Vateria* and shortly racemose in *Vateriopsis*, and the absence of any scaly indumentum in *Vateriopsis* distinguishes the latter easily from the Indian genus. Indeed, as pointed out by Dyer, the Seychelles species resembles *Stemonoporus Wightii* (*Vateria ceylanica*) extremely closely in appearance, and is probably more closely allied to this plant than to the genus *Vateria*, but differs in the stamens. The absence of a reflexed fruiting calyx in *Vateriopsis* separates it from both genera.

Smythea lanceata *Summerhayes*, comb. nov. *Ventilago lanceata* Tulasne in Ann. Sci. Nat. Sér. 4. viii. 121 (1857). *Smythea Dupontii* Hemsl. in Journ. Bot. liv. suppl. II. 9 (1916). *S. pacifica* Seem. Fl. Vit. 41 (1865).

There seems no doubt from the description that Tulasne's species is identical with the other two species cited, and indeed it would be difficult to imagine what other plant could have been intended by Tulasne.

Allophylus Gardineri *Summerhayes*, sp. nov.; affinis *A. chartaceo* Radlk. et *A. Pervillei* Blume, ab illo foliis multo minoribus, ab hoc foliis chartaceis subcaudatis satis distinguenda.

Arbor fruticosa vel frutex ; ramuli teretes, vel rarius longitudinaliter lateque sulcati, juventute pilis sericeis adpressis flavidis subdense vestiti, demum glabri, lenticellis pallide brunneis notati. *Folia* satis longe petiolata, trifoliolata ; petiolus supra leviter compressus, 1.5–5.5 cm. longus, juventute praesertim superne flavide pubescens, demum fere glaber ; foliola ovata vel rhomboideo-ovata, lateralia interdum obliqua, apice acuta, basi cuneata usque ad rotundata, terminale longiuscule, lateralia breviter vel brevissime, petiolulata, usque ad 15 cm. longa et 8 cm. lata, margine remote acute dentata, juventute utrinque subdense flavido-pilosa, demum fere glabra, axillis nervorum barbata, costa ut nervis supra prominula subtus prominente, nervis lateralibus utrinsecus 6–7 arcuatis reticulatione subtili. *Thyrsi* solitarii, simplices, breviter pedunculati, usque ad 15 cm. longi, ramis brevissimis usque ad 5-floris. *Flores* subglobosi, 1–2 mm. pedicellati. *Sepala* 4, exteriora valde concava, elliptica, interiora orbicularia, latiora, omnia 1.5 mm. longa, ciliolata. *Petala* spathulata, 1–1.5 mm. longa, supra unguem squama bifida longe barbata instructa, intus sparse longiuscule albido-hirsuta, extra fere glabra. *Discus* unilateralis, biglandulosus. *Flores* ♂ ; stamina 8, breviter exserta ; filamenta anguste linearia, 1.5–2 mm. longa ; thecae antherarum ellipticae, 0.5 mm. longae. *Flores* ♀ ; stamina inclusa, filamentis 0.5–0.75 mm. longis ; ovarium bilobum, hirsutum ; stylus 0.8 mm. longus, ut videtur indivisus, stigmatibus duobus divergentibus 0.5 mm. longis. *Fructus* didymus, coccis ellipsoideis 6–7 mm. longis glabris.

Frutex altus vel arbor usque ad 10 m. alta; ramuli teretes, juventute adpresse pilosuli, demum glabri, cortice brunneo vel nigrescenti-brunneo longitudinaliter ruguloso obtecti, saepius cicatricibus foliorum delapsorum notati. *Folia* breviter petiolata, elliptica vel oblongo-elliptica, rarius ovata, apice acuta vel breviter acuminata, basi cuneata, rarissime subrotundata, 5-14 cm. longa, 2.5-7 cm. lata, discoloria, supra glabra, subnitida, subtus praesertim nervis sparsiuscule vel densiuscule adpresse sericeo-pilosa, costa ut nervis supra impressa subtus prominente, nervis lateralibus utrinsecus 5-8 prope marginem arcuatim conjunctis, inter nervos laterales conspicue reticulata; petiolus supra glaber, subtus adpresse pilosus, nigrescens; stipulae elongato-lanceolatae, acutae, extra glabrae. *Flores* polygamo-dioici. *Flores* ♀ solitarii, axillares, longe (1-2 cm.) pedunculati, pedunculo apice bibracteolato; bracteolae triangulares; calyx breviter cupularis, tubo 2 mm. longo, 4-dentatus, utrinque densiuscule adpresse pubescens; corolla breviter campanulata, 4-loba, tubo 4 mm. longo, lobis patentibus oblongo-lanceolatis tubo aequilongis, extra dense adpresse sericeo-pilosa, intus glabra; stamina fauce corollae inserta, filamentis brevibus, antheris oblongo-lanceolatis 2.5 mm. longis; stylus columnaris, 9 mm. longus, adpresse pilosus, superne 5-lobus; ovarium multi-loculare, loculis uniovulatis. *Flores* ♂ in cymis breviter cupularis, breviter vel brevissime pedicellati; calyx 3-11-floris dispositi, breviter vel brevissime pedicellati; calyx breviter cupularis, 4-dentatus, tubo 1-1.5 mm. longo, extra adpresse sericeo-pilosus; corolla tubulosa, 4-loba, tubo 5-8 mm. longo, lobis patentibus triangulari-lanceolatis 2.5-3.5 mm. longis, extra dense adpresse sericeo-pilosa, intus glabra; stamina infra faucem corollae inserta, filamentis brevibus, antheris anguste oblongis 3.5 mm. longis; stylus fere filiformis, 3 mm. longus. *Fructus*

subsphaeroideus, obtusissime 4-angulatus, lignosus, polypyrenus, 7-10 mm. diametro.

SILHOUETTE. Common tree-shrub of glacia, 1908, *Gardiner* 10 (type). MAHÉ. Sept. 1871, *Horne* 263; 3000 ft., 1874, *Horne* 505/1; 1000 ft., 1874, *Horne* 505; Morne Blanc, *Gardiner*; Cascade Estate, common in mountains, flowers orange coloured, *Thomasset* 30. NO DEFINITE ISLAND. *Wright*; *Pervillé* 152. Vernacular Name.—Bois cassant.

Psychotria sechellarum *Summerhayes*, comb. nov. *Psathura sechellarum* Baker, Fl. Maur. Seych. 157.

This plant differs from all the other species of *Psathura* in the large terminal bracteate inflorescence and the bifid stipules. It agrees most closely in general facies with *Psychotria*, from the greater number of species of which it differs in the 5-6 locular ovary. In view of the occurrence of certain American species of *Psychotria* with 3-5-locular ovaries (these have however been included in *Palicourea* by some authorities), and the presence of bifid stipules in some species of *Psychotria*, the Seychelles plant is best placed in that genus as an aberrant form. The creation of a new genus in this tribe of Rubiaceae, previous to a critical monograph of all the genera, would only increase the confusion already present.

Tarenna sechellensis *Summerhayes*, comb. nov. *Webera sechellensis* Baker, Fl. Maur. Seych. 139 (1877). *Tarenna nigrescens* Hemsl. in Journ. Bot. liv., Suppl. II, 17 (1916), quoad specimina sechellensis, non Hiern.

This differs from *T. nigrescens* Hiern in having longer and more caudate leaves while the venation is also somewhat different.

Oldenlandia goreensis *Summerhayes*, comb. nov. *Hedyotis goreensis* DC. Prodr. iv. 421 (1830). *Oldenlandia trinervia* Baker, Fl. Maur. Seych. 139 (1877), non Retz.

This species, which by later authors has been considered to be conspecific with *O. trinervia* Retz., can be easily distinguished from the latter by its more robust habit and its larger and more acute leaves. It is restricted to Africa and the Mascarene Islands, whereas *O. trinervia* is a native of Indo-Malaya.

Conopharyngia coffeoides *Summerhayes*, comb. nov. *Tabernaemontana coffeoides* Bojer ex DC. Prodr. viii. 370 (1844). *T. coffeaeifolia* Bojer ex Baker, Fl. Maur. Seych. 224 (1877).

Coleus subfrutectosus *Summerhayes*, sp. nov.; affinis *C. lanuginoso* Hochst. et *C. cyaneo* Gurke a quibus calycis lobo posteriore aliis sesqui longiore differt.

Herba erecta, basi valde lignosa, caulibus e rhizomate repente simplicibus teretibus pubescentibus. *Folia* triangulari-ovata, subacuta, basi truncato-rotundata vel fere hastata, breviter petiolata, 4-5 cm. longa, 3-3.5 cm. lata, marginibus obtuse serrato-crenatis, utrinque praesertim juniora dense pubescentia. *Inflorescentia*

angustissima, nodis distantibus, floribus ut videtur fasciculatis breviuscule pedicellatis; bracteae late lanceolatae, acuminatae, cito deciduae. *Calyx* breviter tubulosus, extra albedo-pilosus; lobus posterior oblongo-ellipticus, 2-3 mm. longus, acutus; lobi reliqui subulato-lineares, 1.3-2 mm. longi. *Corolla* bilabiata, labio superiore orbiculari trilobo, lobo intermedio retuso, lobis lateralibus minutis, labio inferiore oblongo-spathulato concavo. *Stamina* filamentis basi coalitis. *Fructus* non visus.

MAHÉ. Botanical Station, 10th Feb., 1913, *Dupont* 204 (type). **SILHOUETTE.** Grande Barbe, growing on rocks, and here and there on old cultivation, *Gardiner* 136. Vernacular name.—Gros Baume.

Ficus (§ Bibracteatae) **sechellarum** *Summerhayes*, sp. nov.; affinis *F. rubrae* Vahl a qua foliis majoribus oblongo-ellipticis vel oblongis apice acutatis, et *F. Thonningii* Blume a qua bracteis receptaculi minoribus, floribus masculis pedicellatis differt. *F. rubra* var. *sechellensis* Baker, Fl. Maur. Seych. 285.

Ramuli teretes, leviter longitudinaliter striati, glabri, cicatricibus foliorum et stipularum delapsorum notati. *Folia* oblonga vel oblongo-elliptica, rarius elliptica vel oblongo-oblancheolata, utroque angustata, apice obtuse vel late breviter acuminata, basi cuneata vel leviter rotundata, usque ad 16 cm. longa, usque ad 5.7 cm. lata, chartacea vel subcoriacea, utrinque glabra, costa ut nervis supra prominula subius prominente, nervis lateralibus utrinsecus 8-11 a costa angulo 60° abeuntibus, nervis tertiariis crebris distinctis subquadrato-reticulatis conjunctis; petiolus supra complanatus, leviter canaliculatus, 1-4 cm. longus, glaber; stipulae subpersistentes, lanceolatae, acuminatae, glabrae, ad 2.5 cm. longae. *Receptacula* axillaria, sessilia, hermaphrodita, globosa, 5-10 mm. diametro, glabra, flavida, bracteis basalibus parvulis. *Flores* ♂ pedicellati, perianthii segmentis 3, stamino singulo. *Flores* ♀ sessiles, stylo gracili. *Flores galliferi* subsessiles.

MAHÉ. Sept. 1908, *Gardiner* (type); Mt. Harrison, *Gardiner*; common, sometimes epiphytal, May 1908, *Thomasset* 104. **SILHOUETTE.** *Gardiner*. NO DEFINITE ISLAND. *Wright*; May 1905, *Thomasset* 204.

Wright's specimen (type of *F. rubra* var. *sechellensis*) differs from the other specimens in the shape of the leaves but is almost certainly conspecific. I have changed the name to "sechellarum" in order to be able to cite a more complete and typical specimen as the type of the species.

Eulophia sechellarum *Rolfe* ms. sp. nov., characteribus generalibus *E. panduratae* Rolfe sed foliis longioribus, labello obovato-oblongo trilobato nec pandurato distincta.

Rhizoma repens, radicibus carnosissimis glabris instructum; pseudobulbi teretes, graciles, bifoliati, 4-7 cm. longi, usque ad 4 mm. diametro, juniores vaginis membranaceis cincti, glabri. *Folia*

longiuscule petiolata, lanceolata vel oblongo-lanceolata, acuta, basi in petiolum decurrentia, 9-11 cm. longa, 2-3 cm. lata, petiolo 3-4.5 cm. longo. *Scapus* erectus, gracilis, pauciramosus, usque ad 25 cm. longus, inferne cataphyllis remotis praeditus, apice subaxe 10-20-florus; bractee oblongo-lanceolatae, acuminatae, ovario pedicellato multo breviores, reflexae. *Flores* subpatentes, ovarii pedicellatis 10-12 mm. longis gracilibus. *Sepala* oblonga, vix spathulata, subacuta, 5-6 mm. longa, lateralia leviter falcata. *Petala* sepalis similia sed breviora et paulo latiora. *Labellum* ambitu oblongo-obovatum, superne trilobatum, 5.5 mm. longum, 4-4.5 mm. latum; lobus intermedius brevis, latus, emarginatus vel bilobulatus, calvus; lobi laterales rotundati intermedio bene breviores; calcar obtusum, apice subdilatatum, 2 mm. longum. *Columna* 3 mm. longa, subteres, antice complanata; operculum rotundatum. *Capsula* vix matura, fere 2 cm. longa.

MAHÉ. Cascade Estate, in mountain forest, 900 ft., May 1902, *Thomasset* 38 (type); Cult. Hort. Kew. Jan. 1905.

Sepals and petals yellowish-white. Lip white, with a few light streaks on the disc.

Schoenus xipholepis *Summerhayes*, comb. nov. *Cladium*? *xipholepis* Baker, Fl. Maur. Seych. 424 (1877). *Asterochaete elongata* Baker, l.c. 417, non Kunth. *Schoenus Hornei* C. B. Clarke in Dur. & Schinz, Cons. Fl. Afr. v. 657 (1895).

Examination of the original specimen of *Cladium xipholepis* shows that, in spite of its immature state, it is conspecific with *Schoenus Hornei*. C. B. Clarke has written on a label attached to the sheet "This is the young state of Baker's *Asterochaete elongata* (Fl. Maur. p. 417)", but for some reason or other did not make the correct combination when renaming Baker's plant.

Garnotia sechellensis *Hubbard & Summerhayes*, sp. nov.; affinis *G. tectorum* Hook. f. a qua culmis multinodis geniculato-adscendentibus, foliorum vaginis glabris laminis lanceolato-linearibus latioribus, panicula angustiore, gluma inferiore breviter aristata, anthoecio pallidiore differt.

Gramen perenne, caespitosum, usque ad 1.7 m. altum. *Culmi* geniculato-adscendentes, simplices, graciles usque moderate robusti, usque ad 4 mm. diametro, teretes, glabri, laeves, multinodi, e nodis infimis radicanter, innovationibus intravaginalibus. *Foliorum* vaginae teretes, sublaxae, internodiis saepius longiores, striatae, firme papyraceae, supra nodos pubescentes, apice villosopubescentes, ceterum glabrae; ligulae ad seriem ciliorum reductae, ciliis usque ad 5 mm. longis; laminae late lineares vel lanceolato-lineares, basi angustatae, apice setaceo-acuminatae, usque ad 16-35 cm. longae et 2.2 cm. latae, planae, glabrae, laeves, costa distincta. *Panicula* glabra, striata, superne minute asperula; rami suberecti, usque ad 10 cm. longi, ramosi; pedicelli laterales usque ad 4 mm. longi. *Spiculae* lineari-lanceolatae, acutae, 5-6 mm. longae, callo piloso

instructae; glumae tenuiter chartaceae, trinerviae, nervis scabridulis; gluma inferior lanceolata (explanata), 4-4.5 mm. longa, breviter (ad 2 mm.) aristata, superior oblongo-lanceolata (explanata), acuta, 5 mm. longa; lemma lanceolatum, acutum vel brevissime aristatum, 5-6 mm. longum, firme membranaceum, trinervium; palea hyalina, linearis, 4-4.5 mm. longa, obscure binervis, marginibus ciliatis; antherae 1.5-2 mm. longae.

MAHÉ. Delanos and Pérard, at 600 m., 1912, *Dupont* (type); Morne Blanc, 1908, *Thomasset*.

The discovery in the Seychelles of a species of this otherwise Indo-Malayan and Polynesian genus is a further indication of the marked Indo-Malayan affinity of the Seychelles flora. *G. sechellensis* is most closely related to a species from Ceylon, as is often the case with Seychelles endemics. The description of *Garnotia africana* Janowski, based on a specimen collected by Chevalier near Lake Fittri, east of Lake Chad, suggested to us that it has been placed in the wrong genus. The glumes and lemma are stated to be 5-7-nerved, whereas in all the other species of *Garnotia* hitherto described the nerves vary from one to three. Also, in view of the isolated geographical position of *G. africana* it seemed unlikely to be a true *Garnotia*. Thanks to Dr. Pilger we have been able to examine the type specimen of this species, and there is no doubt that it is merely an immature specimen of a species of *Panicum*, probably *P. anabaptistum* Steud.

LVII.—OREOCNIDE VERSUS VILLEBRUNEA.

T. A. SPRAGUE.

A list of generic names was communicated to the writer in 1927 by Dean Elmer D. Merrill, of the University of California, in order that their claims to conservation might be investigated. Among them were the names of such important genera as *Loranthus* and *Lasianthus*, the conservation of which would doubtless be welcomed by the general body of botanists. The case of the name *Villebrunea* Gaudich. is of especial interest, as its validity or non-validity under International Rules depends on the precise interpretation of Art. 38, about which there appears to be some uncertainty. Hence it seems desirable to discuss it in detail.

The generic name *Villebrunea* appeared in Gaud. Voy. Bonite, Bot., Atlas tt. 91, 92 (*Villebrunea integrifolia* Gaud. and *V. crenulata* Gaud.), the exact date of publication of which is doubtful. According to Weddell (DC. Prodr. xvi. sect. 1, 235²², footnote), however, the botanical plates of the 'Voyage de la Bonite' were published between the years 1839 and 1846, though the title-page was not issued until 1851. No descriptions of the new genera and species of Phanerogams were published by Gaudichaud, though an explanation of the plates was issued by Alleizette in 1866.

Under International Rules, Art. 37, the names of the two species, *Villebrunea integrifolia* Gaud. and *V. crenulata* Gaud. were effectively

published in Voy. Bonite, Bot., Atlas, tt. 91, 92 (1839-46), since these plates were accompanied by analyses, and are therefore equivalent to descriptions of the species.

Under Art. 38 "a genus . . . named or announced without being characterised conformably to Art. 37 cannot be regarded as effectively published," which seems to imply that the name of a genus so characterised is effectively published. Hence the publication of a plate, with analyses, of a *monotypic* new genus and species, such as *Philgamia hibbertioides* Baill. (Grandidier, Madag., Bot. t. 265: 1894), constitutes effective publication not only of the specific but also of the generic name. Similarly the effective publication of the generic name *Lopezia* dates from 1786, when Jacquin issued a plate of *Lopezia mexicana* with highly enlarged figures of two flowers in different stages of development (Jacq. Ic. Pl. Rar. t. 203). The figures of the flowers, though not literally "analyses," nevertheless supply detailed information of the floral structure, and may therefore be accepted as the equivalent of analyses for the purposes of Articles 37 and 38. It is generally held that a combined generic and specific description of a new genus and species validates both the generic and the specific name. Thus Endlicher's description of *Kissenia* ("Fissenia"), validates the binary combination *Kissenia capensis* as well as the generic name *Kissenia* (Endl. Gen., Suppl. 2, 76: 1842).

In the case of a *ditypic* or *polytypic* new genus, of which plates with analyses of two or more species are published together, it does not seem certain that the generic name is effectively published, since the plates are equivalent to descriptions of two or more species, and there may be nothing to show what are the characters of the proposed genus, although those of the constituent species are known. According to Art. 38, "the mere indication of species as belonging to a new genus, does not allow us to accept the genus in question as characterised and [the generic name] as effectively published," notwithstanding the fact that the *species* in question may have been previously described in detail. In 1894 Baillon published two plates of *Didierea madagascariensis*, with analyses and four plates of *D. mirabilis*, also with analyses, thus effectively publishing the names of these two *species* (Grandidier, Madag., Bot. tt. 261-262 D); in the writer's opinion the generic name, *Didierea*, was not effectively published until the appearance of Baillon's generic description in 1895 (Bull. Mus. Hist. Nat. Par. i. 22). Similarly the generic name *Villebrunea* Gaud. was not effectively published until 1854, when a generic description was supplied by Weddell (Ann. Sc. Nat. sér. 4, i. 195).

In the meantime, however, Miquel (Pl. Jungh. i. 39: March, 1851*) published the new genus *Oreocnide*, which was reduced in

*Miquel subsequently (Fl. Ned. Ind. i. Afd. 2, 270: 1859; Ann. Mus. Bot. Lugd.-Bat. iv. 306: 1869) cited the date as 1852, but the first fascicle of *Plantae Junghuhnianae* was published in March 1851, according to Flora, 1851, 302, as has been pointed out by C. B. Robinson.

1856 by Blume (Mus. Bot. Lugd.-Bat. ii. 166-168), to *Villebrunea*. Weddell in 1856 (Monogr. Urtic. 451), also adopted the name *Villebrunea* Gaud. in preference to *Oreocnide* Miq. Miquel, however, contended that the name *Villebrunea* was not effectively published until 1854, when a description was supplied by Weddell, and he accordingly maintained *Oreocnide*, relegating *Villebrunea* to synonymy (Fl. Ned. Ind. i. Afd. 2, 269: 1859; Ann. Mus. Bot. Lugd.-Bat. iv. 306: 1869). Owing, however, to Weddell's adoption of *Villebrunea* in DC. Prodr. xvi. sect. 1, 235²⁰, that name has come into general use, having been accepted in the following floras and lists: Franch. & Savatier, Enum. Pl. Jap. (1875); Hook. f. Fl. Brit. Ind. (1888); Forbes & Hemsley, Index Florae Sinensis (1899); Diels, Fl. Central-China (1900); K. Schum. & Lauterb. Fl. Deutsch. Südsee (1901); Matsum. & Hayata, Enum. Pl. Formosa (1906); Kawakami, List Pl. Formosa (1910); Matsum. Ind. Pl. Jap. (1912); Koord. Exkursionsfl. Java (1912); Ridley, Fl. Mal. Penins. (1924). On the other hand *Oreocnide* has been adopted, in accordance with the International Rules, by C. B. Robinson, Philippine Urticaceae (Philipp. Journ. Sc., Bot. vi. 16: 1911); Merrill, Bibl. Enum. Bornean Pl. (1921), and Enum. Philipp. Fl. Pl. (1923).

In view of the fact that the genus comprises not more than 10-12 species, none of which are of any economic importance, and that its bibliography is comparatively small, no great inconvenience is likely to be caused by the adoption of the name *Oreocnide* Miq., and it is therefore undesirable in the writer's opinion to propose the name *Villebrunea* Gaud. for conservation.

LVIII.—TROPICAL AFRICAN PLANTS: VI.*

J. HUTCHINSON AND J. M. DALZIEL.

CAESALPINIACEAE (continued).

Monopetalanthus compactus Hutch. ex Lane-Poole Trees etc. of Sierra Leone 64, nomen; affinis *M. pteridophyllo* Harms, sed foliis minoribus, rhachi foliorum leviter pubescenti, racemis strobiliformibus differt.

Arbor; ramuli mox glabri. *Folia* usque ad 5 cm. longa; foliola circiter 20-juga, lineari-oblonga, unilateraliter auriculata, usque ad 1 cm. longa et 2.5 mm. lata, apice rotundata, supra nitida, infra venosa. *Racemi* strobiliformes, bracteis dense imbricatis striatis ciliatis extra sericeo-tomentosis tecti. *Bracteolae* 3-4 mm. longae, pubescentes. *Petalum* late obovatum, glabrum. *Stamina* 8.

Sierra Leone: Falaba, Apr., Aylmer 30 (type); Giehun, Apr. Aylmer 226.

Monopetalanthus emarginatus Hutch. et J. M. Dalz., sp. nov. imperfecte nota, foliolis apice emarginatis mucronatis circiter 10-11-jugis anguste oblongis 1-1.3 cm. longis 3-4 mm. latis glabris

*Continued from K.B. 1928, p. 382.

supra nitidis costa utrinque prominente, fructibus oblongo-ellipticis breviter stipitatis circiter 6 cm. longis et 3 cm. latis rufo-tomentosis, seminibus planis late ellipticis 1.5 cm. longis distincta.

Sierra Leone: banks of the Morro River, *Unwin & Smythe* 42 (type). Ivory Coast: Lower Sassandra, Soubré, *Chevalier* 19174 bis.

Berlinia splendida A. Chev. Explor. Bot. Afr. Occid. Franç. 230, nomen.

Arbor. *Foliola* 3-juga, superiora majora elongato-oblonga, basi inaequaliter cordata, usque ad 40 cm. longa et 11 cm. lata, inferiora parva, circiter 8 cm. longa et 3.5 cm. lata, nervis lateralibus numerosis a costa sub angulo fere recto abeuntibus; stipulae magnae, lanceolatae, dimidio connatae, 6 cm. longae, appendice basale reniforme usque ad 4 cm. lato nervoso. *Bracteolae* ellipticae, coriaceae, 4-5 cm. longae, 2.5-3 cm. latae, intra glabrae, extra rufo-tomentellae. *Calycis* circiter 2.5 cm. longus, glaber. *Petalum* posterior magnum, orbiculare, circiter 15 cm. latum, breviter unguiculatum, multe striatum. *Fructus* circiter 35 cm. longus et 10-12 cm. latus, brunneo-tomentellus, intra marginem nervis tribus parallelis ornatus.

Ivory Coast: Middle Cavally, Tebo village and neighbourhood, July, *Chevalier* 19387 (type). Gold Coast: Western Province, Namachere, *Chipp* 234; Ajakwa, *Chipp* 206; Cape Coast District, *Vigne* 935.

Vernacular name: "Kotopapa."

Berlinia Hollandii Hutch. et J. M. Dalz., sp. nov.; affinis *B. Craibianae* Bak. f., sed pedicellis brevioribus, bracteolis angustioribus intra breviter pubescentibus differt.

Arbor usque ad 10 m. alta. *Foliola* 3-4-juga, elliptico-lanceolata, longe et sensim acuminata, usque ad 16 cm. longa et 6 cm. lata, laxae reticulata, nervis lateralibus utrinsecus circiter 10; petioluli 6 mm. longi, puberuli. *Flores* laxae racemosi; pedicelli usque ad 6 cm. longi, molliter tomentelli. *Bracteolae* oblanceolatae, circiter 6 cm. longae, intra breviter pubescentes, extra tomentellae. *Calycis lobi* circiter 3 cm. longi, extra appresse pilosi. *Petalum* posterior suborbiculare, circiter 7 cm. latum, ungue 4 cm. longo extra appresse piloso.

Nigeria: Southern Provinces; Calabar, Mar., *Holland* 10 (type), 30.

Berlinia grandiflora Hutch. et J. M. Dalz., comb. nov. *Westia grandiflora* Vahl in Skrivt. Nat. Selsk. 6: 117 (1810); Macbride in Contrib. Gray Herb. 59: 20 (1919). *Berlinia acuminata* Sol. ex Hook. f. et Benth. in Hook. Niger Fl. 36 (1849).

Extends from Sierra Leone to French Cameroons.

Macrolobium Dawei Hutch. et J. M. Dalz., sp. nov.; foliolis 5-jugis utrinque crebre reticulatis, bracteolis extra glabris, stipulis intrapetiolaribus oblongis valde distincta.

Arbor magna; ramuli glabri. *Foliola* circiter 5-juga, lanceolata vel oblongo-elliptica, acute acuminata, 5-10 cm. longa, 2-4 cm. lata, chartacea, utrinque crebre reticulata, supra nitida, glabra; stipulae intrapetiolares, cortice simulantes, 1 cm. longae. *Flores* glomerato-paniculati; bracteae triangulares, 6 mm. longae, extra glabrae, intra tomentosae; pedicelli 1.5-2 cm. longi; bracteolae late oblongo-ellipticae, circiter 3 cm. longae et 1.8 cm. latae, coriaceae, extra glabrae, intra molliter tomentellae. *Calycis lobi* late lanceolati, 1 cm. longi, glabri. *Ovarium* stipitatum, tomentellum. *Fructus* planus, oblongus, circiter 14 cm. longus et 4 cm. latus, crebre verrucosus.

Sierra Leone: Bunkababe, May, *Lane-Poole* 121; without locality, *Dawe* 28 (type); Kennema, June, *Aylmer* 88; without locality, *D. G. Thomas* T 44; *N. W. Thomas* 10484.

Macrolobium bilineatum Hutch. et J. M. Dalz., sp. nov.; affinis *M. obliquo* Stapf., sed foliolis 5-jugis basin versus longe cuneatis, bracteolis tomentellis differt.

Arbor. *Foliola* 5-juga, obovato-oblanceolata, basi longe cuneata, breviter acuminata, usque ad 16 cm. longa et 5 cm. lata, glabra, nervis lateralibus numerosis subobscuris, infra tenuiter reticulata; stipulae persistentes, oblanceolatae, 3 cm. longae, appendice basale reniforme circiter 2.5 cm. lata. *Flores* paniculati; pedicelli 5-10 mm. longi, tomentelli. *Bracteolae* vix 1 cm. longae, molliter tomentellae. *Fructus* oblongus, molliter tomentosus, intra marginem lineis duabus parallelis ornatus.

Sierra Leone: Kahreni, Apr., *Scott Elliot* 5588 (type); between Sellakuri and Yanga, Mar., *Scott Elliot* 5070. Ivory Coast: Attie, *Chevalier* 22662.

Macrolobium Talbotii Hutch. et J. M. Dalz., sp. nov.; affinis *M. Preussii* Harms, sed stipulis plus minusve persistentibus foliaceis, foliolis basi obliquis differt.—*M. demonstrans* var. *Talbotii* Bak. f.

Arbor usque ad 8 m. alta. *Foliola* 3-4-juga, oblonga vel oblongo-oblanceolata, basi obliqua, usque ad 22 cm. longa et 7.5 cm. lata, nervis lateralibus numerosis intra marginem prominenter conjunctis; stipulae lanceolatae, acutae, circiter 2.5 cm. longae, trinerviae, appendice mox deciduae. *Flores* dense paniculati; pedicelli, 1 cm. longi, rufo-tomentosi. *Bracteolae* ellipticae, 1 cm. longae, extra hirsutae.

Nigeria: Southern Provinces, Oban, *Talbot* 1284, 1504 (type).

Macrolobium Aylmeri Hutch. et J. M. Dalz., sp. nov.; affinis *M. Preussii* Harms, sed foliolis 2-jugis, nervis lateralibus paucis differt.

Arbor parva. *Foliola* 2-juga, obovata ad oblanceolata, acuminata, basi inaequilatera, usque ad 17 cm. longa et 7 cm. lata, interdum multo minora, glabra, nervis lateralibus utrinsecus usque ad 9, infra reticulata; stipulae deciduae. *Flores* dense paniculati, pedicelli usque ad 1 cm. longi, rufo-tomentelli. *Bracteolae* ellipticae,

8 mm. longae, tomentellae. *Fructus* circiter 10 cm. longus, glaber, intra marginem linea una ornatus.

Sierra Leone: Freetown, Colonial Reserve, Jan., *King-Church* 8; Commendi, Nov., *Aylmer* 263 (type); Buri Town, on the sea beach, *Unwin & Smythe* 9; York, near mangrove swamp, *Lane-Poole* 80; John Obey, *Lane-Poole* 423.

Macrolobium chrysophylloides *Hutch. et J. M. Dalz.*, sp. nov.; affinis *M. macrophylo* Macbride, sed foliolis apice rotundatis nervis lateralibus numerosioribus differt.

Arbor magna; ramuli rufo-tomentelli. *Foliola* 3-4 juga, elongato-oblongo-obovato, superiora usque ad 25 cm. longa et 9 cm. lata, coriacea, infra breviter tomentella, nervis lateralibus utrinsecus 14-18 infra prominentibus; stipulae deciduae. *Paniculae* circiter 15 cm. longae, ramulis lateralibus brevibus rufo-tomentellis. *Bracteolae* circiter 5 mm. longae, tomentellae.

Sierra Leone: Commendi-Gengaru Road, Nov., *Aylmer* 261 (type). Ivory Coast, Middle Comoe; between Bébou and Mbasso, *Chevalier* 22648.

Cryptosepalum minutifolium *Hutch. et J. M. Dalz.*, comb. nov. *Hymenostegia minutifolia* A. Chev. in Bull. Soc. Bot. Franç. 58, Mém. 8: 165 (1912).

Ivory Coast: Middle Cavally, between Toula and Nikaougnié, July, *Chevalier* 19579.

Bussea occidentalis *Hutch. ex Chipp*, Trees etc. of the Gold Coast 17, nomen; species foliis bipinnatis, foliolis longe acuminatis distincta.

Arbor magna; ramuli ferrugineo-tomentosi. *Folia* bipinnata, pinnis 3-jugis; foliola alterna, circiter 5-juga, oblongo-elliptica, longissime acuminata, basi rotundata, 6-10 cm. longa, 3-4 cm. lata, laxe reticulata, supra nitida, glabra; petioluli 3 mm. longi. *Racemi* spiciformes, simplices vel ramosi, ubique ferrugineo-tomentelli, usque ad 25 cm. longi; pedicelli 5 mm. longi. *Sepala* triangulari-ovata, subacuta, circiter 1 cm. longa. *Petala* rugosa, margine incisa, obovata, circiter 2 cm. longa. *Filamenta* et stylus dense villosus. *Fructus* anguste oblanceolatus, lignosus, valvis recurvis circiter 15 cm. longis et 3.5 cm. latis demum glabrescentibus.

Sierra Leone: Hangha, Aug., *Lane-Poole* 394; *Aylmer* 241. Liberia: Gbanga, Sept., *Linder* 479. Gold Coast: Dunkwa, Aug., *Chipp* 715 (type); Essuasu, May, *Vigne* 170; Obuasi, *Vigne* 920; Kankan, June, *Thompson* 90.

MIMOSACEAE.

Calpocalyx sericeus *Hutch. et J. M. Dalz.*, sp. nov.; pinnis 1-2-jugis foliolis 3-5-jugis infra sericeo-tomentellis paniculis elongatis valde distincta.

Frutex scandens usque ad 10 m. longus; rami conspicue hexagoni, juniores tomentelli, demum glabrescentes et lenticellati.

Folia bipinnata, pinnis 1-2-jugis; foliola 3-5-juga, oblongo-elliptica, subacuta, basi rotundata, 3.5-7 cm. longa, 1.5-3 cm. lata, infra sericeo-tomentella, nervis lateralibus utrinsecus circiter 5. *Paniculae* elongatae, ubique tomentellae; rami laterales graciles, 5-7 cm. longi; bracteae numerosae, subulatae, 2 mm. longae, persistentes; pedicelli 1.5 mm. longi. *Calyx* cupularis, breviter dentatus. *Petala* oblongo-lanceolata. *Ovarium* leviter pubescens, stipitatum.

Liberia: Peáhtah, Oct., *Linder* 478A (type); Gbanga, Sept., *Linder* 478.

Entada flexuosa *Hutch. et J. M. Dalz.*, sp. nov.; affinis *E. Wahlbergii* Harv., sed foliolis numerosioribus et angustioribus calyce minus dentato differt.—*E. Wahlbergii* Oliv. Fl. Trop. Afr. 2: 326, non Harv.

Frutex scandens; ramuli insigniter flexuosi, glabri. *Folia* bipinnata, pinnis 2-jugis; foliola 12-15-juga, linearia, circiter 1.5 cm. longa et 2.5 mm. lata, glabra. *Racemi* circiter 6 cm. longi, glabri; bracteae minutae, deciduae; pedicelli brevissimi. *Calyx* cupularis, triangulari-dentatus. *Petala* late lanceolata, 3 mm. longa. *Fructus* falcatus, usque ad 22 cm. longus, circiter 3.5 cm. latus, uno margine crenatus, segmentis transverse oblongis.

French Sudan: Bama, June, *Chevalier* 943. Ivory Coast: Middle Comoé, Dec., *Chevalier* 22612. Nigeria: Northern Provinces; Nupe, *Barter* 991 (type); Yola, July, *Dalziel* 7. Djur-land: Great Seriba Ghattas, *Schweinfurth* 95, 1868.

Dichrostachys glomerata *Hutch. et J. M. Dalz.*, comb. nov. *Mimosa glomerata* Forsk. Fl. Aegypt.-Arab. 177 (1775). *D. nutans* Benth. in Hook. Journ. Bot. 4: 353 (1842); Bak. in Oliv. Fl. Trop. Afr. 2: 333. *D. platycarpa* Welw. Apont. 576. *D. Lugardae* N. E. Br. Kew Bull. 1909: 106. *Cailliea dichrostachys* Guill. et Perr. Tent. Fl. Seneg. 239 (1883). *C. glomerata* Macbride in Contrib. Gray Herb. n.s. 59: 16 (1919).

Widely distributed over Tropical and parts of South Africa.

Cathormion altissimum *Hutch. et J. E. Dandy*, comb. nov. *Albizzia altissima* Hook. f. Niger Fl. 332 (1849). *Pithecolobium altissimum* Oliv. Fl. Trop. Afr. 2: 364. *Albizzia Passargei* Harms in Engl. Bot. Jahrb. 26: 253 (1899).

Widely distributed from Sierra Leone to the Belgian Congo.

Cathormion Dinklagei *Hutch. et J. E. Dandy*, comb. nov. *Mimosa Dinklagei* Harms in Engl. Bot. Jahrb. 26: 253 (1899). *Albizzia Dinklagei* Harms l.c. 53: 455 (1915).

Extends from French Guinea to Liberia and also in French Cameroons.

Baphia confusa Hutch. et J. M. Dalz., sp. nov.; a *B. spathacea* Hook. f. foliis haud vel leviter acute acuminatis late ellipticis differt.—*B. spathacea* Bak. in Oliv. Fl. Trop. Afr. 2: 250, partim, non Hook. f.

Frutex vel arbor usque ad 8 m. alta, interdum scandens; ramuli leviter flexuosi, breviter pubescentes. *Folia* late elliptica, basi rotundata, apice acute et breviter acuminata, 10–18 cm. longa, 6–8 cm. lata, infra reticulata et minute pubescentia, nervis lateralibus utrinsecus 6–7; petioli 2–3 cm. longi, pubescentes, pulvino 4 mm. longo. *Flores* paniculati; pedicelli vix 1 cm. longi, breviter hirsuti; bracteolae ellipticae, 5 mm. longae. *Calyx* spathaceus, 1.3 cm. longus, extra appresse tomentosus. *Vexillum* suborbiculare, circiter 2 cm. longum. *Fructus* clavatus, curvatus, rostratus, circiter 4 cm. longus, tomentosus. *Semina* nitida, 1.2 cm. longa.

Nigeria: Southern Provinces; Onitsha, *Unwin* 82; Degema, *Talbot* 3729; Uzi, *Thomas* 2336; Calabar, *Holland* 72; Oban, *Talbot* 1209, 1331, 1555; Cameroons River, *Mann* 746 (type), 2219. Fernando Po, *Mann* 216; *Barter* 1613, 2063.

Angylocalyx Talbotii Bak. f. ex Hutch. et J. M. Dalz., sp. nov.; valde affinis *A. oligophylla* Bak. f., sed floribus roseis carmineo tinctis, vexillo recurvato forsitan satis distincta.

Foliola circiter 4-juga, alterna, ovato-elliptica ad oblongo-elliptica, acute acuminata, basi leviter inaequaliter rotundata, 12–25 cm. longa, 5–9 cm. lata, utrinque crebre reticulata, nervis lateralibus utrinsecus 5–7 intra marginem crenulato-ramosis; petioluli fere 1 cm. longi, verrucosi. *Flores* e trunco fasciculati, breviter pedicellati, rosei, carmineo maculati. *Calyx* spathaceus, 1.5 cm. longus, minute papillosus. *Corolla* 2–2.5 cm. longa, vexillo recurvato.

Nigeria: Southern Provinces; Oban, *Talbot* 1205 (type); 239.

Dalbergia Dalzielii Bak. f. ex Hutch. et J. M. Dalz., sp. nov.; foliolis subacutis terminale majore late obovato-elliptico infra costa dense pubescente distincta.

Frutex scandens; ramuli dense molliter tomentosi. *Foliola* circiter 5–6, late obovato-elliptica, usque ad 15 cm. longa et 6.5 cm. lata, infra costa dense pubescentia, nervis lateralibus utrinsecus circiter 8 marginem versus multe ramosis; stipulae late lanceolatae, foliaceae. *Flores* axillares, breviter racemosi, conferti; pedicelli graciles, circiter 5 mm. longi, pubescentes. *Calyx* 3 mm. longus, extra dense pubescens. *Corolla* 8 mm. longa. *Fructus* anguste oblongus, utrinque rotundatus, abrupte stipitatus, 6–9 cm. longus, 1.5–2 cm. latus, glaber et laxo reticulatus, seminibus 1–3.

Nigeria: Southern Provinces; Lagos, Ikoyi Plains, Jan.-Feb., *Dalziel* 1220 (type), 1368; Ebute Metta, Jan., *Millen* 95, 211; Bonny, Feb., *Kalbreyer* 55.

Dalbergia setifera Hutch. et J. M. Dalz., sp. nov.; ramulis junioribus pilis reflexis dense hirsutis, racemis brevissimis distincta.

Ramuli juniores pilis reflexis rufescentibus dense hirsuti. *Foliola* circiter 4-juga, inferiora ovata, superiora oblonga vel oblongo-elliptica, basi rotundata, acute acuminata, usque ad 8 cm. longa et 2.5 cm. lata, infra pilis patulis pubescentia; stipulae lanceolatae, acuminatae, circiter 1 cm. longae. *Racemi* axillares, brevissimi; pedicelli 3–4 mm. longi, pubescentes. *Calyx* 3.5 mm. longus, breviter dentatus, extra laxo pubescens. *Corolla* 8 mm. longa.

Gold coast: without locality, *Evans* 24.

Dalbergia oligophylla Baker ex Hutch. et J. M. Dalz., sp. nov.; affinis *D. Bakeri* Welw., sed foliolis plus minusve oblongis acuminatis differt.

Frutex scandens usque ad 8 m. longus; ramuli glabri. *Foliola* circiter 4-juga, oblonga vel obovata, basi breviter cuneata, usque ad 7 cm. longa et 3 cm. lata, obtuse acuminata, infra leviter pubescentia, nervis lateralibus numerosis; petioluli 4 mm. longi. *Racemi* axillares, brevissimi, ramosi; pedicelli 2–3 mm. longi, apicem versus bracteolis geminatis 1 mm. longis. *Calyx* 5 mm. longus, puberulus, triangulari-dentatus. *Corolla* 1 cm. longa.

Cameroons Mt.: 1600 m., Dec., *Mann* 2172.

Dalbergia albiflora A. Chev. Explor. Bot. Afr. Occid. Franç. 210, nomen; affinis *D. hostili* Benth., sed foliolis circiter 3-jugis late obovato-ellipticis infra pubescentibus floribus confertis differt.

Frutex scandens; ramuli pubescentes. *Foliola* circiter 3-juga, late obovato-elliptica, conspicue apiculata, 3.5–5 cm. longa, 2–3.5 cm. lata, infra pubescentia, nervis lateralibus utrinsecus 6–8; petioluli 2 mm. longi. *Flores* paniculati, dense conferti. *Calyx* 3.5 mm. longus, breviter tomentosus. *Corolla* glabra. *Stamina* monadelphia.

Ivory Coast: Middle Sassandra; between Soubré and Péhiri, June, *Chevalier* 19175.

Ecataphyllum Heudelotii Hutch. et J. M. Dalz., comb. nov. *Dalbergia Heudelotii* Stapf in Journ. Linn. Soc. 37: 95 (1905). *E. monetaria* Baker in Oliv. Fl. Trop. Afr. 2: 236, non Pers.

Extends from French Guinea to the French Cameroons.

Millettia pilosa Hutch. et J. M. Dalz., sp. nov.; affinis *M. Stapfianae* Dunn, sed foliolis infra nervis pilosis abrupte caudato-acuminatis, floribus minoribus differt.

Ramuli ferrugineo-hirsuti, angulares. *Foliola* circiter 4-juga, obovato-elliptica, abrupte caudato-acuminata, basi rotundata, 8–11 cm. longa, 3.5–5 cm. lata, infra nervis patule pilosa, nervis lateralibus utrinsecus circiter 7 prominenter conjunctis; petioluli 3–4 mm. longi; hirsuti. *Racemi* graciles, usque ad 15 cm. longi, ubique molliter tomentelli; bracteae deciduae; pedicelli usque

ad 5 mm. longi. *Calyx* 4 mm. longus, ferrugineo-tomentosus, undulatus. *Corolla* 1.6 cm. longa, vexillo extra sericeo-tomentosa.

Nigeria : Southern Provinces ; Oban, *Talbot* 583, 1308 (type).

Millettia Irvinei *Hutch. et J. M. Dalz.*, nom. nov. *Robinia multiflora* Schumacher. & Thonn. Beskr. Guin. Pl. 350 (1827), non *Millettia multiflora* Coll. et Hemsl.

Gold Coast : Accra Plains *Thonning* (type) : *Irvine* 47, 99, 211.

Tephrosia djalonica *A. Chev.* Explor. Bot. Afr. Occid. Franç. 179, nomen ; valde affinis *T. radicante* Welw., sed stipulis subulatis, foliolis 2-jugis obovatis emarginatis et mucronatis 2-2.5 cm. longis infra fere glabris, floribus paucis breviter racemosis circiter 0.8 cm. longis differt.

French Guinea : Futa Jallon, between Timbo and Ditinn, Sept., *Chevalier* 18447.

Astragalus Vogelii *Hutch. et J. M. Dalz.*, comb. nov. *Phaca Vogelii* Webb in Hook. Nig. Fl. 123, t. 8 (1849).—*Astragalus prolixus* Sieb. ex Bunge, *Astrag.* 1 : 9 (1868) ; 2 : 6.

Occurs from the Cape Verde Islands through the French Sudan to Arabia.

LIX.—MISCELLANEOUS NOTES.

We learn that Mr. W. R. B. OLIVER, F.L.S., has been appointed Director of the Dominion Museum, Wellington, New Zealand.

The following appointments have been made by the Secretary of State for the Colonies :—Mr. R. M. DAVIES, B.Sc. (Agric.), to be Superintendent, Agricultural Department, Nigeria ; Mr. J. D. BROATCH, B.Sc. (Agric.), and Mr. C. L. SKIDMORE, B.Sc. (Agric.), to be Assistant Superintendents of Agriculture, Gold Coast ; Mr. J. E. BRUCE to be District Agricultural Officer, Tanganyika Territory ; Mr. G. G. AUCHINLECK, Deputy Director of Agriculture, to be Director of Agriculture, Gold Coast, in succession to Mr. C. H. Knowles, who retires (*K.B.* 1925, page 346).

DR. L. COCKAYNE.—We note with great pleasure that Dr. L. Cockayne, F.R.S., has been awarded the Darwin medal of the Royal Society for his contributions to Ecological Botany.

The Darwin Medal, which is accompanied by a grant of £100, is given biennially in reward for work of acknowledged distinction (especially in Biology) in the field in which Mr. Darwin himself laboured.

Botanical Magazine.—Part iv. of Vol. clii (1926) of the Botanical Magazine, which was published in October, 1928, contains the following illustrations :—

Tulipa lanata E. Regel (t. 9151), flowers brilliant scarlet-vermilion with a large black blotch of varying size and shape, usually bordered with yellow, at the base of the tepals, native of Bokhara but cultivated in Kashmir from about the sixteenth century on the roofs of mosques ; *Ozothamnus Antennaria* Hook. f. (t. 9152), a Tasmanian shrub which has proved to be one of the hardiest Antipodean plants in cultivation at Kew ; *Berberis Hookeri* Lem. (t. 9153), with greenish-yellow flowers and blackish-purple berries, from Sikkim ; figured in the flowering state only as *B. Wallichiana* on t. 4656 (1852) ; *Solanum laciniatum* Ait. (t. 9154), an Australian species confused in floras with the New Zealand *S. aviculare*, but here considered to be morphologically and geographically distinct ; *Paphiopedilum Robinsonii* Ridley (t. 9155), a Malayan orchid with dull yellowish-green petals with a very broad purple band, and a purple and green lip ; *Rhododendron hippophaeoides* Balf. f. et W. W. Sm. (t. 9153), a dwarf* species from Yunnan with flowers varying in colour from lavender-blue to rose-pink ; *Muscari armeniacum* Baker (t. 9157), the well-known "Heavenly Blue" grape-hyacinth of gardens ; *Cestrum psittacinum* Stapf (t. 9158), a tall climber with racemes of bright orange and green flowers, believed to be of Central American origin ; figured and described from a plant that has been in cultivation at Kew for upwards of 30 years ; *Saxifraga amabilis* Stapf (t. 9159), a supposed natural hybrid between *S. Stribrnyi* and *S. Sempervivum*, described and figured from a plant of unknown origin in cultivation at Kew ; *Hypericum Leschenaultii* Choisy (t. 9160), native of Java and Sumatra, figured from specimens from Glasnevin, where it has been grown for many years, though the plant appears to be still rare in cultivation ; *Guevina avellano* Molina (t. 9161), the guevina, huevina or avellano of Southern Chile, an evergreen shrub or tree with edible seeds, that has proved to be hardy in Ireland and the South-west of England.

Paddy in Ceylon.—In recent numbers of the Tropical Agriculturist† accounts are given by Mr. Lord, Economic Botanist, and others, of investigations that are being carried on in Ceylon with a view to increasing the paddy output of the Colony. It is estimated that Ceylon produces about 13 million bushels of paddy per annum, but has to import over 31 million bushels, either in the form of paddy or rice, from elsewhere. The causes that militate against a possible greatly increased output from Ceylon are clearly outlined by Mr. Lord in his paper on "Some of the Limiting Factors in the Improvement of Paddy Cultivation in Ceylon" (Vol. lxx. no. 6). One of the chief factors is the conditions of tenancy to which the

*By a printer's error the height is given as 1.5 m. instead of 1.5 m.

†The Tropical Agriculturist, Vol. lxx, pp. 207-215, 374-382; Vol. lxxi, No. 1: April, June, July, 1928. The Agricultural Department, Peradeniya, Ceylon.

actual cultivators are subjected; the "half share" system with the landlord being the one commonly in vogue. The evil influence this system has on many other aspects of paddy cultivation is pointed out and it is shown how, under this system, adequate weeding does not pay the cultivator and smaller crops are reaped than might otherwise be the case.

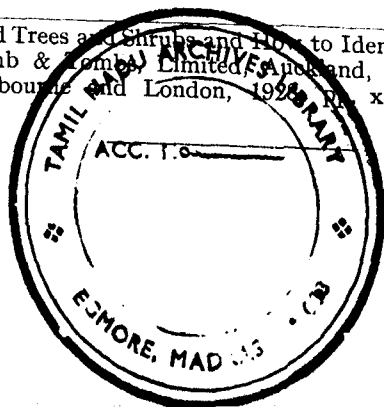
What are regarded as three of the most promising lines along which improvement might be effected are seed and seed supply, cultural methods, and increase in size of holdings. At the Paddy Seed Station at Belunmahara yield trials with several pure line paddies are being carried on. Three of the common cultivators' paddies in Ceylon are said to be "Hatiel," "Murungan," and "Elwi," a hill paddy. The last named is of course grown under dry conditions, and is one of the common crops with the prevalent "shifting cultivation." The seed is invariably found to be contaminated with that of *Paspalum scrobiculatum* L. F. N. H.

New Zealand Trees and Shrubs.*—Dr. H. H. Allan, who is a field botanist and ecologist of considerable experience in New Zealand, realises that for rapid determination of plants in the field a book less bulky and easier to use than Cheeseman's well-known Manual of the New Zealand Flora is required. He also realises the necessity of sometimes having to depend on vegetative parts for identification, and has therefore used the leaves as the basis of classification in his little key to the trees and shrubs of New Zealand. The book is, however, more than a key, since a short description of each species is given together with other biological notes.

There is a short introduction in which, among other subjects, the plant communities of New Zealand, status of forms, growth forms, and characteristics of leaves, are dealt with shortly. The arrangement of the key, etc., is very clear and there is a striking lack of typographical errors. The book is illustrated by excellent photographs showing various species, hybrid series, etc. Since the various wild hybrid swarms known to Dr. Allan are included, while the nomenclature and taxonomy are up to date, the book should be of real value to herbarium botanists as well as to field botanists and gardeners. A key to the genera based on floral characters adds to the value of the book, and, if flowers are available, enables any determinations made on the vegetative parts only to be checked.

Belosynapsis.—In the article "Dalzellia or Belosynapsis," in K.B. no. 6, 1928, the name **Belosynapsis uniflora** C. E. C. Fischer (p. 254) should read **Belosynapsis moluccana** C. E. C. Fischer, comb. nov.

*New Zealand Trees and Shrubs and How to Identify Them, by Dr. H. H. Allan. Whitcomb & Tombs Limited, Auckland, Christchurch, Dunedin, Wellington, Melbourne and London, 1928, pp. x + 188, plates 28, price 6s. 6d.



INDEX.

- A.
Acacia Meeboldii Craib, 66.
Achras Sapota, 302.
Achyranthes Talbotii Hutch. et J. M. Dalz., 29.
Adenia Dinklagei Hutch. et J. M. Dalz., 214.
 — *tenuispira* Hutch. et J. M. Dalz., 214.
Adina nobilis Geddes, 240.
 — *parvula* Geddes, 241.
Aeranthus elegans Rchb. f., 34.
 — *sphenochilus* Kraenzl., 34.
 Africa, genus *Dichapetalum* in (with figs.), 115.
 — South Central, notes on Forest Flora of (with plate and figs.), 193.
 — West Tropical, Flora of, 303.
 African Grasses, notes on, 35, 130.
 — Plants, Tropical, 22, 211, 296, 380, 397.
Afrobrunnichia Hutch. et J. M. Dalz., gen. nov., 28.
 — *africana* Hutch. et J. M. Dalz., 28.
 — *erecta* Hutch. et J. M. Dalz., 28.
Ailanthus (spelling of), 286.
Allophylus Gardineri Summerhayes, 389.
 — *sechellensis* Summerhayes, 390.
Altingia siamensis Craib, 68.
 Altson, R. A., 254.
Amaranthus (spelling of), 287.
Amomum muricatum (with figs.), 105.
Amphiblema grandifolium A. Chev., 221.
Ancistrocladus uncinatus Hutch. et J. M. Dalz., 218.
 Andes, some Violets from the, 133.
 Andes of Argentina, new spp. from, 107.
Angylocalyx Talbotii Bak. f. ex Hutch. et J. M. Dalz., 402.
Anisophyllea purpurascens Hutch. et J. M. Dalz., 226.
Annona (spelling of), 113.
Anplectrum patens Geddes, 72.
 — *stellulatum* Geddes, 236.
 Appointments :—
 Altson, R. A., 254.
 Auchinlech, G. G., 404.
 Bridges, M. C. M., 112.
 Broatch, J. D., 404.
 Bruce, J. E., 404.
 Bruins-Lich, H., 301.
 Cairns, T. C., 254.
 Cowan, G., 383.
 Davies, R. M., 404.
 Dawe, M. T., 254.
 Edwards, A., 301.
 Faull, J. H., 254.
 Gillett, S., 254.
 Greenway, P. J., 156.
 Guest, E. R., 336.
 Handley, C. B. C., 156.
 Harcourt, F. G., 112.
 Hosking, H. R., 336.
 Illingworth, J. L., 156.
 Leach, E. W., 383.
 Line, C. W. J., 383.
 McCarthy, P. M., 47.
 McIntosh, E. S., 78.
 Marsland, H., 156.
 Martyn, E. E., 383.
 Moreau, R. E., 156.
 Musk, H., 112.
 Nauen, J. C., 254.
 Nicholl, Capt. E. M., 156.
 Nutman, F. J., 112.
 Oliver, W. R. B., 404.
 Palmer, J. H., 383.
 Rounce, N. V., 336.
 Savile, A. H., 336.
 Skidmore, C. L., 404.
 Smart, H. P., 383.
 Smith, C. A., 157.
 Squire, I. G. C., 254.
 Storey, H. H., 47.
 Sunman, W. O., 112.
 Svedelius, N. E., 301.
 Tempany, H. A., 301.
 Thorns, F. W., 301.
 Toms, K. E., 78.
 Turnbull, G. N. K., 383.
 Turner, E. Phillips, 336.
 Voelcker, O. J., 383.
 Walford, A. S., 254.
 Wallace, J. W., 112.
 Ward, J. F., 47.
 Williams, T. L., 47.
 Argentine Andes, new spp. from, 107.
Arisaema Monbeigii Gamble, 146.
Aromadendron elegans var. *glaucum* Dandy, 183.
 — *nutans* Dandy, 183.
Arundinaria Gallatlyi Gamble (with figs.), 47.

Asiatic Gentians, new, 49.
Asperula ambleia Shaw et Turrill, 99.
 — *asthenes* Shaw et Turrill, 100.
 — *Charophyton* Shaw et Turrill, 101.
 — *conferta* β abbreviata Shaw et Turrill, 87.
 — *conferta* γ scoparioides Shaw et Turrill, 87.
 — *Cunninghamii* Shaw et Turrill, 97.
 — *euryphylla* Shaw et Turrill, 100.
 — var. *octophylla* Shaw et Turrill, 100.
 — var. *tetraphylla* Shaw et Turrill, 100.
 — *gemella* Shaw et Turrill, 102.
 — *Gunnii* var. *curta* Shaw et Turrill, 90.
 — *lissocarpa* Shaw et Turrill, 95.
 — *scoparia* var. *ulicina* Shaw et Turrill, 89.
 — *subsimplex* forma *aquatica* Shaw et Turrill, 93.
 — *subulifolia* Shaw et Turrill, 98.
 — *wimmerana* Shaw et Turrill, 94.
 — forma *glaberrima* Shaw et Turrill, 94.
Asperulae Australienses, 81.
Astragalus Vogelii Hutch. et J. M. Dalz., 404.
Astrebla or Mitchell Grasses, 257.
 — *squarrosa* C. E. Hubbard, 259.
Auchinlech, G. G., 404.
Avenastrum albinerve Hubbard et Sandwith, 154.
 — *bromoides* Hubbard et Sandwith, 154.
 — *sarracenorum* Hubbard et Sandwith, 154.
 — *sulcatum* Hubbard et Sandwith, 155.

B.

Banana, the, in some Tropical Eastern countries—its forms and variations (with plates), 305.
Baphia confusa Hutch. et J. M. Dalz., 402.
Barringtonia Marcanii Craib, 237.
Bauhinia concreta Craib, 63.
 — *tubicalyx* Craib, 64.
 Becker, W., On some Violets from the Andes, 133.
 — — New Chinese spp. of *Viola*, 247.
Begonia lushaiensis Fischer, 273.
 — *Smithiae* Geddes, 239.
 — *tiomanensis* Ridl., 73.

Belosynapsis or *Dalzellia*, 252, 406.
 — *capitata* C. E. C. Fischer, 254.
 — *moluccana* C. E. C. Fischer, 406.
 — *uniflora* C. E. C. Fischer, 254, 406.
 — *vivipara* C. E. C. Fischer, 254.
Berberis lologensis Sandwith, 108.
Bergia guineensis Hutch. et J. M. Dalz., 27.
Berlinia grandiflora Hutch. et J. M. Dalz., 398.
 — *Hollandii* Hutch. et J. M. Dalz., 398.
 — *splendida* A. Chev., 398.
Blastus stellulatus Geddes, 236.
 Books:—
 Agricultural Journal of British Guiana, 255.
 Beautiful Flowers of Kashmir, 80.
 Botanical Magazine, 112, 159, 404.
 British Garden Flora, A, 78.
 Care of Ornamental Trees, 304.
 Flora of West Tropical Africa, 303.
 Gladiolus, 48.
 Ground-nut cultivation in Central Provinces, India. Bulletin of Department of Agriculture, 160.
 Harvard Botanical Gardens, Cuba, Report of, 160.
 Icones Plantarum Sinicarum, 255.
 Journal of Botanical Society of South Africa, 159.
 New Zealand Trees and Shrubs, and how to identify them, 406.
 Pioneers of Plant Study, 304.
 Plants of Trinidad and Tobago, 48.
 Shrubs, 47.
 Wild Flowers of Kashmir, 80.
Borago (spelling of), 288.
 Botanical Magazine, 112, 159, 404.
 Botanical Society of South Africa, Journal of, 159.
Brachystegia Bournei Greenway (with fig.), 200.
 — *nchangensis* Greenway (with fig.), 201.
 Brazil, *Diacrodon*, a new genus of *Rubiaceae* from, 32.
 Bridges, M. C. M., 112.
 British Guiana, Agricultural Journal of, 255.
 — — new species from, 365.
 Broatch, J. D., 404.
 "Bromus," nomenclature of, 209.
 Bruce, J. E., 404.
 Bruins-Lich, H., 301.
Brunella (spelling of), 292.

Bulbophyllum Frostii Summerhayes, 76.
 Burma, contributions to Flora of (with figs.), 42, 332.
Bussea occidentalis Hutch. ex Chipp, 400.
 Butterworts, Orchid-flowered, 230.

C.

Cairns, T. C., 254.
Calceolaria cymbiflora Sandwith, 111.
Calpocalyx sericeus Hutch. et J. M. Dalz., 400.
Calvoa monticola A. Chev., 221.
Camphorina and *Septina*, 41.
Canthium berberidifolium Geddes, 244.
 — *carinatum* Summerhayes, 391.
 — *sechellense* Summerhayes, 391.
Capparis biloba Hutch. et J. M. Dalz., 25.
Carex leucostachys Ridl., 77.
Carpolobia glabrescens Hutch. et J. M. Dalz., 26.
Casearia bridelioides Mildbr., 213.
 — *inaequalis* Hutch. et J. M. Dalz., 213.
Cassia pteridophylla Sandwith, 375.
Cathormion altissimum Hutch. et J. E. Dandy, 401.
 — *Dinklagei* Hutch. et J. E. Dandy, 401.
Catostemma Altsoni Sandwith, 366.
 Central Provinces, India, Bulletin of Department of Agriculture, 160.
 Ceylon, Paddy in, 405.
Chenolea muricata Hutch. et J. M. Dalz., 29.
 Chile, new spp. of *Nototriche* from, with notes on *Malvastrum* (with figs.), 17.
 China, new *Medicago* from (with figs.), 270.
 Chinese spp. of *Viola*, new, 247.
Chrysanthemum paludosum var. *pinnatifidum* Hubbard et Sandwith, 150.
Clathrotropis paradoxa Sandwith, 369.
Cleistanthus discolor Summerhayes, 144.
 Cockayne, Dr. L., 404.
 Coconuts, cover crops for, 172.
Coelospermum acuminatum Geddes, 244.
 — *luteum* Geddes, 245.
 Coffee, cover crops for, 169.
Cola Johnsonii Hutch. et J. M. Dalz., 297.

Cola lanata Bak. f. ex Hutch. et J. M. Dalz., 298.
Coleus subfrutectosus Summerhayes, 392.
Combretum bauchiense Hutch. et J. M. Dalz., 224.
 — *crotonoides* Hutch. et J. M. Dalz., 224.
 — *Dalzielii* Hutch., 225.
 — *homalioides* Hutch. et J. M. Dalz., 225.
 — *Mildbraedii* Hutch. et J. M. Dalz., 225.
 — *obanense* Hutch. et J. M. Dalz., 226.
 — *platypterum* Hutch. et J. M. Dalz., 224.
 — *procursum* Craib, 69.
 — *relictum* Hutch. et J. M. Dalz., 225.
Commelina Jacobi Fischer, 277.
Conopharyngia coffeoides Summerhayes, 392.
Cooperia, discovery of the genus in Peru (with fig.), 385.
 — *albicans* Sprague (with fig.), 387.
 Cover Crops in tropical plantations, 161.
 Cowan, G., 383.
Croton Collettii Hutch. et J. M. Dalz., 300.
 — *penduliflorus* Hutch., 300.
Cryptosepalum minutifolium Hutch. et J. M. Dalz., 400.
 Cuba, Report of Harvard Botanical Gardens in, 160.
 Curtis, C. H., 78.
 Curtis, Charles (obit.), 383.
Cynoglossum cheirifolium var. *immarginatum* Hubbard et Sandwith, 151.
Cynometra ananta Hutch. et J. M. Dalz., 381.
 — *leonensis* Hutch. et J. M. Dalz., 381.

D.

Dalbergia albiflora A. Chev., 403.
 — *Dalzielii* Bak. f. ex Hutch. et J. M. Dalz., 402.
 — *oligophylla* Baker ex Hutch. et J. M. Dalz., 403.
 — *setifera* Hutch. et J. M. Dalz., 403.
Dalzellia or *Belosynapsis*, 252, 406.
 Dalziel, J. M., and Hutchinson, J., Tropical African Plants, 22, 211, 296, 380, 397.

- Dandy, J. E., Malayan Magnolieae, 183.
 Daniellia Oliveri Hutch. et J. M. Dalz., 382.
 — pubescens Hutch. et J. M. Dalz., 382.
 Dasylepis assinensis A. Chev., 30.
 Davies, R. M., 404.
 Dawe, M. T., 254.
 — Branching in the African Oil Palm (with plate), 21.
 Decades Kewenses, 72, 141, 272.
 Desplatia lutea A. Chev., 229.
 Diacrodon, a new genus of Rubiaceae from Brazil, 32.
 — Sprague, gen. nov., 33.
 — compressus Sprague, 33.
 Dichapetalum, the genus, in East, South Tropical, and Subtropical Africa (with figs.), 115.
 Dichapetalum chrysobalanoides Hutch. et J. M. Dalz., 380.
 — cordifolium Hutch. et J. M. Dalz., 380.
 — Dummeri M. B. Moss, 123.
 — Linderi Hutch. et J. M. Dalz., 380.
 — mossambicense (with figs.), 120.
 — Rowlandii Hutch. et J. M. Dalz., 380.
 — ugandense M. B. Moss, 125.
 — venenatum (with figs.), 126.
 Dichrostachys glomerata Hutch. et J. M. Dalz., 204, 401.
 Dicycme Altsoni Sandwith, 371.
 — Jenmani Sandwith, 373.
 Didymocarpus Parryorum Fischer, 142.
 — Wengeri Fischer, 74.
 Digitaria verrucosa C. E. Hubbard, 40.
 Dioncophyllum Dawei Hutch. et J. M. Dalz., 31.
 — peltatum Hutch. et J. M. Dalz., 31.
 Dissotis Gilgiana Hutch. et J. M. Dalz., 222.
 — Lecomteana Hutch. et J. M. Dalz., 222.
 — leonensis Hutch. et J. M. Dalz., 222.
 — Pobeguini Hutch. et J. M. Dalz., 221.
 — rupicola Hutch. et J. M. Dalz., 221.
 Drypetes Aylmeri Hutch. et J. M. Dalz., 300.
 — ivorensis Hutch. et J. M. Dalz., 299.
- Duboscia viridiflora Hutch. et J. M. Dalz., 229.
- E.
- Ecastaphyllum Heudelotii Hutch. et J. M. Dalz., 403.
 Edwards, A., 301.
 Elaeis guineensis, branching specimen of (with plate), 21.
 Elichrysum (spelling of), 113.
 Elmerillia mollis Dandy, 184.
 — papuana var. adpressa Dandy, 185.
 — — — glaberrima Dandy, 185.
 Entada flexuosa Hutch. et J. M. Dalz., 401.
 Epistephium ellipticum R. O. Williams & Summerhayes, 145.
 Eria Cooperi Summerhayes, 145.
 Eugenia ciliaris Ridl., 74.
 — Collinsae Craib, 237.
 — Dawei Hutch. et J. M. Dalz., 219.
 — nigerina A. Chev., 219.
 — salacioides Laws. ex Hutch. et J. M. Dalz., 219.
 — saxitana Ridl., 74.
 Eulophia seychellarum Rolfe, 393.
 Euonymus (spelling of), 294.
 Evans, F. J. (obit.), 336.
 Evonymus (spelling of), 294.
- F.
- Faulkner, O. T., 78.
 Faull, J. H., 254.
 Ficus sechellarum Summerhayes, 393.
 Fischer, C. E. C., Amomum muricatum (with figs.), 105.
 — — — and Sprague, T. A.; Dalzellia or Belosynapsis, 252, 406.
 Flora, a British Garden, 78.
 Flora of Burma, contributions to (with figs.), 42, 332.
 — — — Madras, notes on, 281.
 — — — Siam, contributions to, 62, 234.
 — — — West Tropical Africa, 303.
 Forest Flora of South Central Africa, notes on (with plate and figs.), 193.
- G.
- Gaertnera lushaiensis Fischer, 141.
 Gagea kashmirensis Turrill, 77.
 Galium petiolatum Geddes, 246.
 Garcinia brevipedicellata Hutch. et J. M. Dalz., 228.
- Garcinia gnetoides Hutch. et J. M. Dalz., 227.
 — golaensis Hutch. et J. M. Dalz., 228.
 — granulata Hutch. et J. M. Dalz., 227.
 — laurifolia Hutch. et J. M. Dalz., 228.
 — tenuifolia Ridl., 72.
 Garden Flora, a British, 78.
 Gardenia fusca Geddes, 242.
 — magnifica Geddes, 243.
 — saxatilis Geddes, 243.
 Garnotia sechellensis Hubbard & Summerhayes, 394.
 Gentians, new Asiatic, 49.
 Gentiana anomala Marquand, 49.
 — burmensis Marquand, 49.
 — chungtienensis Marquand, 50.
 — confertifolia Marquand, 50.
 — damyonensis Marquand, 51.
 — ecaudata Marquand, 51.
 — filistyla Balf. f. et Forrest, 60.
 — Forrestii Marquand, 52.
 — hapalocaula Marquand, 52.
 — helophila Balf. f. et Forrest, 60.
 — muliensis Marquand, 53.
 — nanobella Marquand, 53.
 — praeclara Marquand, 54.
 — pterocalyx var. flavo-viridis Marquand, 54.
 — pubigera Marquand, 59.
 — Purdomi Marquand, 55.
 — rhodantha var. Wilsoni Marquand, 55.
 — saltuum Marquand, 55.
 — setulifolia Marquand, 56.
 — sichitoensis Marquand, 56.
 — sino-ornata var. gloriosa Marquand, 57.
 — stictantha Marquand, 57.
 — stragulata Balf. f. et Forrest, 61.
 — streptopoda Balf. f. et Forrest, 61.
 — suborbisepala Marquand, 58.
 — Trailliana var. minima Marquand, 58.
 — trichotoma var. albescens Marquand, 59.
 — tsarongensis Balf. f. et Forrest, 62.
 — Wilsoni Marquand, 59.
 Geranium brevipes Hutch. et J. M. Dalz., 30.
 Gerrardanthus nigericus Hutch. et J. M. Dalz., 215.
 Gillett, S., 254.
 Gladiolus, 48.
- Glyphaea lateriflora Hutch. et J. M. Dalz., 229.
 Grasses, African, notes on, 35, 130.
 — Mitchell (Astrebla spp.), 257.
 — Uganda, 130.
 Green, M. L., The last issue of the Journal de Botanique, 155.
 Greenway, P. J., 156.
 — Notes on Forest Flora of South Central Africa (with plate and figs.), 193.
 Grewia cissoides Hutch. et J. M. Dalz., 229.
 Ground-nut cultivation in Central Provinces, India, 160.
 Guest, E. R., 336.
 Gymnocladus burmanicus C. E. Parkinson, 333.
- H.
- Handley, C. B. C., 156.
 Harcourt, F. G., 112.
 Harvard Botanical Gardens, Cuba, Report of, 160.
 Hedyotis sessilifolia Geddes, 241.
 — similis Geddes, 241.
 Helichrysum (spelling of), 113.
 Henriques, J. A. (obit.), 301.
 Heterostemon ingifolius Sandwith, 375.
 — mazarunensis Sandwith, 374.
 Hibiscus comoensis A. Chev., 298.
 — Gourmania Hutch. et J. M. Dalz., 298.
 Hill, Dr. A. W., 78, 112.
 — — — A new species of Lilaeopsis from New Zealand (with fig.), 266.
 — — — New spp. of Nototriche from Chile, with notes on Malvastrum (with figs.), 17.
 Hirtella bangweolensis Greenway, 199.
 — eglandulosa Greenway, 199.
 Homalium alnifolium Hutch. et J. M. Dalz., 212.
 — Aylmeri Hutch. et J. M. Dalz., 213.
 — crenulatum Geddes, 238.
 — Dalzielii Hutch., 211.
 — djaloneensis A. Chev., 212.
 — dolichophyllum Gilg, 212.
 — glabrifolium Geddes, 238.
 — Symthei Hutch. et J. M. Dalz., 213.
 — verruculosum Craib, 239.
 Hosking, H. R., 336.

Howes, F. N., The Banana in some Tropical Eastern countries—its forms and variations (with plates), 305.

Hubbard, C. E., The Genus *Astrebula* or Mitchell Grasses, 257.
— and Sandwith, N. Y., New plants from Spain, (with figs.), 150.

Hugonia Chevalieri Hutch. et J. M. Dalz., 29.

Hutchinson, J., and Dalziel, J. M., Tropical African Plants, 22, 211, 296, 380, 397.

Hybanthus thesiifolius Hutch. et J. M. Dalz., 26.

Hydnocarpus calvipetala Craib, 234.

— *dawnensis* Parkinson et Fischer (with figs.), 43.

— *verrucosa* Parkinson et Fischer (with figs.), 42.

Hymenostegia Bakerianum Hutch. et J. M. Dalz., 381.

— *gracilipes* Hutch. et J. M. Dalz., 381.

Hyparrhenia Eylesii C. E. Hubbard, 37.

— *Pilgeriana* C. E. Hubbard, 39.

— *Snowdenii* C. E. Hubbard, 38.

I.

Icones Plantarum Sinicarum, 255.

Illingworth, J. L., 156.

Impatiens Putii Craib, 235.

India, Ground-nut cultivation in Central Provinces, 160.

Irving, W., 301.

Isobserlinia globiflora Hutchinson, 203.

— *paniculata* Hutchinson, 203.

— *tomentosa* Hutchinson, 203.

J.

Journal de Botanique, the last issue of, 155.

Juel, H. O., 301.

Juncus Ellmanii Hubbard, Sandwith et Turrill (with figs.), 153.

K.

Kalanchoe tetramera Geddes, 67.

Kashmir, Beautiful Flowers of, 80.

— Wild Flowers of, 80.

Knowles, C. H., 404.

Kosteletzkyia stellata Hutch. et J. M. Dalz., 299.

Kraenzlin, F., Notes on New Caledonian Orchids, 34.

Lasianthus longisepalus Geddes, 245.

Leach, E. W., 383.

Leiphaimos eximia Sandwith, 379.

Lilaeopsis, a new species of, from New Zealand (with fig.), 266.

— *orbicularis* A. W. Hill (with fig.), 267.

Limonium carthaginense Hubbard et Sandwith, 150.

— *spathulatum* var. *emarginatum* Hubbard et Sandwith, 151.

Line, C. W. J., 383.

Lobelia Eryliae Fischer, 141.

M.

McCarthy, P. M., 47.

McIntosh, E. S., 78.

Macrocentrum gesneriaceum Sandwith, 377.

— *vestitum* Sandwith, 376.

Macrolobium Aylmeri Hutch. et J. M. Dalz., 399.

— *bilineatum* Hutch. et J. M. Dalz., 399.

— *chrysophylloides* Hutch. et J. M. Dalz., 400.

— *Dawei* Hutch. et J. M. Dalz., 398.

— *Talbotii* Hutch. et J. M. Dalz., 399.

Madras, notes on Flora of, 281.

Maesobotrya edulis Hutch. et J. M. Dalz., 299.

Magnolia acquinotialis Dandy, 185.

— *pachyphylla* Dandy, 186.

— *persuaveolens* Dandy, 186.

— *pulgarensis* Dandy, 187.

Magnolieae, Malayan, 183.

Malayan Magnolieae, 183.

Malvastrum coccineum, 21.

— *nubigena*, 20.

Manglietia glauca var. *lanuginosa* Dandy, 187.

— *sumatrana* Dandy, 188.

Marica and Neomarica, 278.

Marquand, C. V. B., New Asiatic Gentians, 49.

Marquesia macroura (with plate), 195.

Marsden-Jones, E. M., and Turrill, W. B., Researches on *Silene maritima* and *S. vulgaris* (with figs.), 1.

Marsland, H., 156.

Martyn, E. E., 383.

Medicago from China, new (with fig.), 270.

— *archiducis-Nicolai* Širjaev (with fig.), 270.

Melochia mollis Hutch. et J. M. Dalz., 297.

Melothria fernandensis Hutch. et J. M. Dalz., 215.

Memecylon Aylmeri Hutch. et J. M. Dalz., 223.

— *Bakerianum* Hutch. et J. M. Dalz., 222.

— *Dinklagei* Gilg ex Hutch. et J. M. Dalz., 223.

— *Fosteri* Hutch. et J. M. Dalz., 223.

— *viride* Hutch. et J. M. Dalz., 223.

Menonvillea Comberi Sandwith, 108.

Mesembryanthemum (spelling of), 113.

Michelia sumatrae Dandy, 188.

Miconia and *Myconia*, 268.

Milletia Irvinei Hutch. et J. M. Dalz., 404.

— *pilosa* Hutch. et J. M. Dalz., 403.

Miscanthidium erectum Stent et Hubbard (with figs.), 36.

Miscellaneous Notes, 47, 78, 112, 156, 254, 301, 336, 383, 404.

Mitchell Grasses, 257.

Mollugo Chevalieri Hutch. et J. M. Dalz., 27.

Momordica bracteata Hutch. et J. M. Dalz., 215.

Monopetalanthus emarginatus Hutch. et J. M. Dalz., 397.

— *compactus* Hutch. ex Lane-Poole, 397.

Moreau, R. E., 156.

Moss, M. B., The Genus *Dichapetalum* in East, South Tropical, and Sub-tropical Africa (with figs.), 115.

Musk, H., 112.

Mussaenda Parryorum Fischer, 274.

— *pentasemia* Fischer, 275.

Mycetia, 253.

Myconella Sprague, nom. nov. 269.

— *Myconis* T. A. Sprague, 269.

Myconia and *Miconia*, 268.

N.

Napoleona leonensis Hutch. et J. M. Dalz., 220.

— *lutea* Bak. f. ex Hutch. et J. M. Dalz., 220.

— *reptans* Bak. f. ex Hutch. et J. M. Dalz., 220.

Nasturtium benuense Hutch. et J. M. Dalz., 26.

Nauen, J. C., 254.

Neomarica and *Marica*, 278.

Neomarica Sprague, nom. nov. 280.

— *brachypus* Sprague, 280.

— *bulbosa* Sprague, 281.

— *caerulea* Sprague, 280.

— *candida* Sprague, 281.

— *glauca* Sprague, 280.

— *gracilis* Sprague, 280.

— *imbricata* Sprague, 281.

— *longifolia* Sprague, 280.

— *lutea* Sprague, 281.

— *Martii* Sprague, 281.

— *Northiana* Sprague, 280.

— var. *undulata* Sprague, 280.

— *occidentalis* Sprague, 281.

— *vittata* Sprague, 281.

— *Warmingii* Sprague, 280.

Neowormia Hutchinson et Summerhayes, gen. nov., 388.

— *ferruginea* Hutch. et Summerhayes, 388.

New Caledonian Orchids, notes on, 34.

New Zealand, new sp. of *Lilaeopsis* from (with fig.), 266.

— Plant Research Institute, 302.

— Trees and Shrubs, 406.

Nicholl, Capt. E. M., 156.

Nomenclature of "Bromus," 209.

Nototriche from Chile, new spp. of (with figs.), 17.

— *nana* A. W. Hill (with fig.), 19.

— *pulvinata* A. W. Hill (with fig.), 18.

— *sarmentosa* A. W. Hill (with fig.), 20.

Nutman, F. J., 112.

O.

Obituary Notices:—

Curtis, Charles, 383.

Evans, F. J., 336.

Henriques, J. A., 301.

Riley, L. A. M., 157.

Rose, J. N., 302.

Wallis, E. J., 254.

Wickham, Sir H. A., 383.

Ochna elegans Hutch. et J. M. Dalz., 216.

— *kibbiensis* Hutch. et J. M. Dalz., 216.

— *Smythi* Hutch. et J. M. Dalz., 216.

Ochthocosmus Chippii Sprague et Hutch., 29.

Oil Palm, African, branching in (with plate), 21.
 — cover crops for, 179.
Oldenlandia goreensis Summerhayes, 392.
 — *rosettifolia* Geddes, 242.
 Oliver, W. R. B., 404.
 Orchids, New Caledonian, notes on, 34.
Oreocnide versus *Villebrunea*, 395.
Osbeckia parva Geddes, 70.
 — *setoso-annulata* Geddes, 71.
Ouratea ambacensis Hutch. et J. M. Dalz., 218.
 — *amplectens* Hutch. et J. M. Dalz., 217.
 — *Barteri* Hutch. et J. M. Dalz., 218.
 — *calophylloides* Hutch. et J. M. Dalz., 218.
 — *Cameronii* Hutch. et J. M. Dalz., 217.
 — *Morsonii* Hutch. et J. M. Dalz., 217.
 — *subcordata* Hutch. et J. M. Dalz., 217.
 — *Turnerae* Hutch. et J. M. Dalz., 217.
Oxalis Comberi R. Knuth, 109.

P.

Paddy in Ceylon, 405.
 Palmer, J. H., 383.
Panicum Cooperi C. E. Hubbard, 147.
 — *Snowdenii* C. E. Hubbard, 132.
Pararistolochia Hutch. et J. M. Dalz., gen. nov., 23.
 — *cereoepigioides* Hutch. et J. M. Dalz., 24.
 — *Flos-avis* Hutch. et J. M. Dalz., 24.
 — *Goldieana* Hutch. et J. M. Dalz., 25.
 — *ju-ju* Hutch. et J. M. Dalz., 23.
 — *leonensis* Hutch. et J. M. Dalz., 24.
 — *Preussii* Hutch. et J. M. Dalz., 24.
 — *Schweinfurthii* Hutch. et J. M. Dalz., 24.
 — *Soyauxiana* Hutch. et J. M. Dalz., 23.
 — *Staudtii* Hutch. et J. M. Dalz., 24.
 — *triactina* Hutch. et J. M. Dalz., 24.
 — *tribrachiata* Hutch. et J. M. Dalz., 24.

Pararistolochia Zenkeri Hutch. et J. M. Dalz., 24.
Paspalum scrobiculatum var. *Deightonii* C. E. Hubbard, 40.
Pelargonium hemicyclum Hutch. et C. A. Smith, 272.
Pennisetum Snowdenii C. E. Hubbard, 133.
 Peru, discovery of the genus *Cooperia* in (with fig.), 385.
Phacelurus caespitosus C. E. Hubbard, 35.
Phaeoneuron gracile Hutch. et J. M. Dalz., 220.
Physedra eglandulosa Hutch. et J. M. Dalz., 216.
 Pioneers of Plant Study, 304.
Pittosporum Dalzielii Hutch., 30.
Polyosma elongata Geddes, 66.
 — *odorans* Geddes, 67.
Protium Altsoni Sandwith, 369.
Prunella (spelling of), 292.
Psorospermum Thompsonii Hutch. et J. M. Dalz., 226.
 — *umbellulatum* Hutch. et J. M. Dalz., 226.
Psychotria sechellarum Summerhayes, 392.

R.

Rats, *Setaria verticillata* as preventive of, 384.
Rhaphidiocystis Caillei Hutch. et J. M. Dalz., 215.
Rhinopteryx Kerstingii Hutch. et J. M. Dalz., 299.
Rhodomyrtus parvifolia Craib, 70.
 Ridley, H. N., presentation of Frank N. Meyer Medal, 158.
 Riley, L. A. M. (obit.), 157.
Rinorea djalensis A. Chev., 26.
Ritchiea obanensis Hutch. et J. M. Dalz., 25.
 Rose, J. N. (obit.), 302.
 Rounce, N. V., 336.
 Rubber, cover crops for, 176.
Ruprechtia exploratricis Sandwith, 143.

S.

Sampson, H. C., Cover crops in tropical plantations, 161.
 Sandwith, N. Y., New spp. from the Andes of Argentina, 107.
 — — — New spp. from British Guiana, 365.
 — — — and Hubbard, C. E., New plants from Spain (with figs.), 150.

Sapodilla Plum, 302.
Saraca Pierreana Craib, 64.
 Savile, A. H., 336.
Scaphopetalum amoenum A. Chev., 296.
Schizoglossum divaricatum N. E. Br., 275.
 — *hirtiflorum* N. E. Br., 276.
Schoenus xipholepis Summerhayes, 394.
 Scott, Dr. D. H., 78.
Scottellia coriacea A. Chev., 31.
Scutia buxifolia Hutch. et M. B. Moss, 272.
Scyttopetalum Tieghemii Hutch. et J. M. Dalz., 228.
Septina and *Camphorina*, 41.
Setaria glauca and *S. lutescens*, 147.
 — *verticillata* as preventive of Rats, 384.
 Seychelles, new plants from, 388.
 Shaw, H. K. A., and Turrill, W. B., *Asperulae Australienses*, 81.
 Shrubs, 47.
 Siam, contributions to Flora of, 62, 234.
Silene maritima and *S. vulgaris*, researches on (with figs.), 1.
Sindora fusca Craib, 65.
Sipanea micrantha Sandwith, 378.
 Sirjaev, G., A new *Medicago* from China (with fig.), 270.
 Sisal, cover crops for, 179.
 Skidmore, C. L., 404.
 Smart, H. P., 383.
 Smith, C. A., 157.
Smythea lanceata Summerhayes, 389.
Solanum Sanitwongsei Craib, 246.
Sonerila gracilis Geddes, 71.
 — *parva* Geddes, 72.
 South Africa, Journal of Botanical Society of, 159.
Soyauxia velutina Hutch. et J. M. Dalz., 214.
 Spain, new plants from (with figs.), 150.
Spatholobus pallidus Craib, 62.
 Spelling of certain generic names, correct, 113, 285, 337.
Spiranthera guianensis Sandwith, 368.
 Sprague, T. A., *Camphorina* and *Septina*, 41.
 — — — Discovery of the genus *Cooperia* in Peru (with fig.), 385.
 — — — *Diacrodon*, a new genus of Rubiaceae from Brazil, 32.

Sprague, T. A., *Marica* and *Neomarica*, 278.
 — — — The Generic names *Miconia* and *Myconia*, 268.
 — — — The Orchid-flowered Butterworts, 230.
 — — — *Oreocnide* versus *Villebrunea*, 395.
 — — — The correct spelling of certain generic names, 113, 285, 337.
 — — — and Fischer, C. E. C., *Dalzellia* or *Belosynapsis*, 252, 406.
 Squire, I. G. C., 254.
 Stapf, O., Nomenclature of "Bromus," 209.
 — — — *Setaria glauca* and *S. lutescens*, 147.
Sterculia elegantiflora Hutch. et J. M. Dalz., 297.
 — *guianensis* Sandwith, 367.
 — *Thompsonii* Hutch. et J. M. Dalz., 297.
 Storey, H. H., 47.
Strobilanthes Parryorum Fischer, 142.
 Summerhayes, V. S., New plants from the Seychelles, 388.
 Sunman, W. O., 112.
 Svedelius, N. E., 301.
Symphonia gabonensis var. *macrantha* Hutch. et J. M. Dalz., 227.
Syzygium mumbwaense Greenway, 196.
 T.
Talauma athliantha Dandy, 189.
 — *gitingensis* var. *glabra* Dandy, 189.
 — — — *rotundata* Dandy, 190.
 — *gracilior* Dandy, 190.
 — *intonsa* Dandy, 191.
 — *levissima* Dandy, 191.
 — *peninsularis* Dandy, 192.
 — *soembensis* Dandy, 193.
Talbotiella Gentii Hutch. et Greenway, 382.
Tarenna sechellensis Summerhayes, 392.
 Tea, cover crops for, 165.
 Tempany, H. A., 301.
Tephrosia djalensis A. Chev., 404.
Terminalia glaucifolia Craib, 68.
 — *oryztorum* Craib, 69.
 Terniola, 253.
Tessmannia baikieoides Hutch. et J. M. Dalz., 382.

Tetracarpidium conophorum *Hutch. et J. M. Dalz.*, 300.
Teucrium almeriense *Hubbard et Sandwith*, 152.
 — *Ellmanii* *Hubbard et Sandwith*, 151.
 Thorns, F. W., 301.
Timonius sechellensis *Summerhayes*, 391.
 Toms, K. E., 78.
 Trees, Ornamental, care of, 304.
 — and Shrubs, New Zealand, 406.
Trigonostemon arboreus *Ridl.*, 75.
 Trinidad and Tobago, Plants of, 48.
Trisepalum lineicapsa *Fischer* (with figs.), 276.
Triumfetta longicornuta *Hutch. et M. B. Moss*, 272.
 Turnbull, G. N. K., 383.
 Turner, E. Phillips, 336.
 Turrill, W. B., and Marsden-Jones, E. M., Researches on *Silene maritima* and *S. vulgaris* (with figs.), 1.
 — and Shaw, H. K. A., *Asperulae Australienses*, 81.
 U.
 Uganda Grasses, 130.
Uncaria quadrangularis *Geddes*, 240.
 V.
Valeriana chionophila *Sandwith*, 110.
Venidium fastuosum, 112.
Villebrunea or *Oreocnide*, 395.
Viola, new Chinese spp. of, 247.
 — *Comberi* *W. Bckr.*, 136.
 — *confusa*, on the type specimen of, 383.

Viola coronifera *W. Bckr.*, 137.
 — var. *minoriflora* *W. Bckr.*, 137.
 — *Cotyledon* subsp. *lologensis* *W. Bckr.*, 135.
 — *dasyphylla* *W. Bckr.*, 135.
 — *diffusa* var. *brevisepala* *W. Bckr.*, 251.
 — *Duclouxii* *W. Bckr.*, 249.
 — *escondidaensis* *W. Bckr.*, 138.
 — *gan-chouenensis* *W. Bckr.*, 251.
 — *grandisepala* *W. Bckr.*, 250.
 — *Hancockii* *W. Bckr.*, 249.
 — *Hillii* *W. Bckr.*, 134.
 — *lucens* *W. Bckr.*, 250.
 — *Monbeigii* *W. Bckr.*, 248.
 — *petraea* f. *albida* *W. Bckr.*, 136.
 — *Pricei* *W. Bckr.*, 252.
 — *pulla* *W. Bckr.*, 250.
 — *rupestris* subsp. *Licentii* *W. Bckr.*, 248.
 — *serrula* *W. Bckr.*, 247.
 — *squamulosa* *W. Bckr.*, 138.
 — *tectiflora* *W. Bckr.*, 139.
 — *Wilsonii* *W. Bckr.*, 251.
 — *yunnanfuensis* *W. Bckr.*, 248.
 Violets from the Andes, 133.
Vismia leonensis var. *macrophylla* *Hutch. et J. M. Dalz.*, 227.
 Voelcker, O. J., 383.
 W.
 Walford, A. S., 254.
 Wallace, J. W., 112.
 Wallis, E. J. (obit.), 254.
 Ward, J. F., 47.
 Wickham, Sir H. A. (obit.), 383.
 Williams, T. L., 47.
 Z.
Zeuxine Blatteri *Fischer*, 76.

BULLETIN OF MISCELLANEOUS INFORMATION Appendix I 1928 ROYAL BOTANIC GARDENS, KEW

REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1927.

General.

STAFF.—During 1927 the following appointments were made :—
 Mr. H. C. Sampson, C.I.E., B.Sc., as Economic Botanist ; Miss
 M. B. Moss, B.Sc., as Temporary Botanist in the Herbarium, in
 succession to Mr. J. E. Dandy, B.A., appointed an Assistant in the
 Department of Botany, British Museum (Natural History).

Miss I. C. Verdoorn, of the Division of Botany, Department of
 Agriculture, Pretoria, who has acted as Assistant for South Africa
 in the Herbarium during the past two years, returned to South
 Africa in December, on termination of her period of duty at Kew.

Dr. J. M. Dalziel was absent the first four months of the year on
 special leave, accompanying Dr. D. Fairchild, Chief of the Foreign
 Seed and Plant Introduction Office of the U.S. Department of
 Agriculture, with the Allison V. Armour Expedition, 1926-27, to
 West Tropical Africa.

EMPIRE MARKETING BOARD.—During the past year Kew has
 been brought into intimate relation with the Empire Marketing
 Board. At first sight it may appear that there can be little in
 common between botanical research and commercial enterprise.
 The policy of the Board has, however, been conceived on broad lines,
 and a leading feature of that policy is the scientific and economic
 investigation of the resources of the Empire. In this investigation,
 so far as plant products are concerned, Kew has been continuously
 occupied for upwards of three-quarters of a century.

The following extracts from a Report dated June, 1927, "A
 Year's Progress," define the policy of the Board in this particular
 aspect :—

"The best service that can be done to the Empire producer is to
 place freely at his disposal the resources of science and economic
 investigation."

"The Board has made no attempt itself to engage directly in
 scientific research. Its proper part was seen clearly from the outset
 to be that of fortifying existing scientific institutions in such measures
 as would enable them to intensify or develop their work and of
 making possible the establishment of new institutions to meet new
 and proven needs."

In its well-advised decision to avail itself of the assistance of existing institutions qualified by tradition, experience and equipment to further the ends in view, the Empire Marketing Board has naturally enlisted the services of Kew, and has made, through the Ministry of Agriculture and Fisheries, a grant of £4,000.

The particular purposes to be subserved by this grant are set out in the further extract from the Report already quoted :—

“The grant has been devoted partly to the employment of an Economic Botanist at Kew, who will be available either to visit the Dominions and Colonies from time to time or to set free a superior officer of the Kew staff to undertake oversea missions. It will also be used in part for sending botanical collectors to various parts of the world to study and bring home plants of economic importance for cultivation at Kew, and distribution to the Dominions and Colonies.

“The close liaison which exists between Kew and the agricultural and botanical departments of the world has proved of inestimable benefit to the Dominions and Colonies in the introduction of new staples and the development of the natural vegetable resources of the Empire. With the progressive opening up of new territories and the continual expansion of agricultural enterprise in the Dominions and Colonies the need has arisen for a closer co-operation and a more direct service, and these the grant from the Empire Marketing Fund is designed to afford.”

OFFICIAL VISITS.—Arising out of the grant from the Empire Marketing Board the following official visits were undertaken during the year.

On the invitation of the Commonwealth Council for Scientific and Industrial Research, Melbourne, the Director left England in November to visit Australia. The object of his visit is to study the various botanical and allied institutions in the different States, on behalf of the Commonwealth Council. It is intended that he will attend the Australian Association for the Advancement of Science at their meeting in Hobart in January, and then, on the invitation of the Dominion Government he will visit New Zealand. His return journey will be through Java, Malay, and Ceylon to enable him to visit the botanical centres of those countries.

Mr. H. C. Sampson, the Economic Botanist newly appointed to the Kew Staff, left England on June 11th on a mission to British Guiana for the purpose of studying the local conditions in that country and of suggesting steps necessary for improving the agricultural prospects of that Colony. He availed himself of the opportunity of this tour to visit Trinidad, Barbados and the Leeward and Windward Islands, with a view to acquainting himself with the agricultural developments which have taken place there. He returned to this country on October 3rd, and the reports on his tour have been submitted to the Secretary of State for the Colonies.

Mr. W. Dallimore, Keeper of the Museums, visited Majorca early in September to procure grafts of several of the best varieties of Almonds. Owing to the large and growing demand for Almonds for culinary and dessert purposes it has for some time been felt that the cultivation of Almonds in certain parts of the Empire might advantageously be increased. In order to raise a stock of the best kinds for distribution, it was decided to procure grafts of the premier varieties grown in Majorca, an island famous for its Almonds.

The grafts obtained were brought to England, where they were immediately worked upon specially prepared stocks. From these grafts it is hoped that upwards of a hundred plants will be available in 1928 for despatch to suitable destinations.

Mr. F. N. Howes, Assistant, Museums, left in December on a visit to the East to study and collect Bananas to be sent to Kew in the first instance, and ultimately to Trinidad, for the purpose of raising strains of Bananas immune to Panama disease. Mr. Howes will first visit the Malay Peninsula and later Java, Siam, Burma, Madras and Ceylon.

Mr. W. Taylor, Assistant Curator, Tropical Department, also left in December on a visit to the East to bring back collections of useful and interesting plants for distribution and to enrich the collections at Kew, and also to study tropical plants in their native homes and under local conditions. Mr. Taylor will visit the Botanic Gardens at Penang, Singapore, Buitenzorg, and Peradeniya.

Apart from those visits already mentioned as having been arranged in connection with the grant from the Empire Marketing Board, the following visits were undertaken by members of the staff during the year.

The Keeper of the Herbarium visited the herbaria of Berlin and Vienna in order to study organisation and confer with the heads of these departments with regard to the work of specialists engaged in monographic and floristic research. He also visited the Pflanzen-physiologisches Institut and the Biologisches Reichsanstalt für Land und Forstwirtschaft at Berlin in connection with mycology and plant pathology. At Vienna, he spent some days at the National Herbarium in the Naturhistorisches Museum, and at the Botanic Institute of the University, which also possesses a large and valuable herbarium. In the Naturhistorisches Museum he was successful in tracing the Sonder herbarium. Sonder's plants were found in the Reichenbach herbarium, which was formerly kept apart but is now incorporated in the general collection. The whereabouts of this herbarium, exceedingly valuable on account of the many old types quoted in *Flora Capensis*, has long been a mystery at Kew. After Vienna the Keeper spent ten days in Czechoslovakia, seeing something of the principal botanical and agricultural institutions in Bohemia and Moravia. He also took the opportunity when passing through Germany of visiting the Botanic Gardens at Dresden, Darmstadt and Frankfurt.

In connection with the work on the Flora of West Tropical Africa Mr. J. Hutchinson paid two visits to Paris of about ten days' duration each, to examine Dr. Chevalier's collections in the Muséum d'Histoire Naturelle. He also visited the University of Lyons with the object of examining African material.

In connection with her monograph of *Crotalaria* Miss I. C. Verdoorn, the Assistant for South Africa, spent some days at Brussels examining the herbarium specimens of this genus.

The Keeper of the Museums attended the Annual Meeting of the Museums Association held in the Isle of Man early in July.

The Curator visited the Scilly Isles in April, chiefly to study the wonderful collection of trees and shrubs grown in the open air at Tresco Abbey by Major Dorrien Smith. Many of the species are natives of Australia, Tasmania, New Zealand and the smaller Australasian islands; others come from South Africa and the Canary Isles. Tresco is the only place in the British Isles where so many of these Australasian species can be seen growing out-of-doors.

The annual exhibition held at Truro, chiefly of the products of Cornish gardens, was visited on the return journey.

Mr. J. Coutts, Assistant Curator, served on the Grand Jury at the International Horticultural Exhibition held at Brussels during August. He took advantage of being in Belgium to visit the Botanic Gardens, Brussels, as well as several of the well-known commercial horticultural establishments at Ghent and Bruges.

ADVISORY WORK.—During the year the Director was appointed a representative of the Ministry of Agriculture and Fisheries on the Council of the John Innes Horticultural Institution, Merton, Surrey. He was also appointed a delegate to represent the Ministry of Agriculture and Fisheries at the Imperial Agricultural Research Conference, 1927.

Mr. H. C. Sampson was appointed a member of an Empire Marketing Board Advisory Committee on Infestation of Stored Products. He also represents the Director, during the latter's absence overseas, on the Colonial Agricultural Research Organisation Committee, the Colonial Fruit Grants Committee of the Empire Marketing Board, and Imperial Institute Advisory Committees.

The Keeper of the Herbarium visited Worthing at the request of the Fisheries Department of the Ministry, to investigate the reported accumulation of seaweed on the foreshore.

PUBLICATIONS.—Ten numbers of the *Kew Bulletin* were published, and three Appendices. Appendix I was the Review of the Work of Kew for 1926. Appendix II, List of Staffs, was issued in a new style and considerably more information was incorporated. Appendix III contained the List of Seeds available for exchange.

The pamphlet entitled "Hints for Collectors," which had been reprinted from the Article appearing in *Kew Bulletin*, 1914, pp. 97-116, was revised and issued as a separate publication.

The Bentham Trustees issued Part I of volume ii of the Fifth Series of Hooker's *Icones Plantarum*, which had been prepared by the staff at Kew.

A new edition of the Illustrated Guide was published, and a new edition of the Popular Official Guide has been prepared and will be on sale shortly. This latter Guide has been extensively revised, and contains new features, such as an enlarged index and page headings, by which its usefulness will be increased. A number of new postcards have been placed on sale. These include pictures in natural colours of the Iris Garden, *Cornus Nuttallii*, *Prunus Lannesiana*, *Dendrobium thyrsiflorum*, *Angraecum sesquipedale* and Grape Hyacinths. There is also a set of six cards in colour representing some of the ornamental ducks which are to be found on the Pond by Museum I, and a set of seven black-and-white cards of geese, swans, etc., including a picture of "Joey," the Stanley Crane.

Other publications are mentioned on p. 19, and pp. 22-33.

PARKS REGULATION ACTS, 1872 and 1926.—The Regulations prescribed in the First Schedule to the Parks Regulation Act, 1872 (35 & 36 Vict. c. 15), having been repealed by the Parks Regulation (Amendment) Act, 1926 (16 & 17 Geo. 5, c. 33), as from 15th December, 1927, the 'Rules for Kew Gardens and Pleasure Grounds' in connection therewith ceased to have effect as from the date mentioned. They have been replaced by 'The Royal Botanic Gardens, Kew, Regulations, 1927, dated the fifteenth day of December, 1927, made by the Minister of Agriculture and Fisheries under the powers vested in him by the Parks Regulation Acts, 1872 and 1926.'

IMPERIAL AGRICULTURAL RESEARCH CONFERENCE.—The Delegates to the Imperial Agricultural Research Conference visited Kew on 31st October. In the morning they visited the Herbarium and Library where the work of the Department was explained by the Keeper, Mr. Cotton, and special exhibits of interest were inspected. After lunch, under guidance of members of the staff, they toured the Gardens and Museums and saw the work of these departments in relation to the Empire generally.

BOARD OF EDUCATION.—By arrangement with the Board of Education, a short course of instruction for Teachers in Secondary Schools was again held at Kew. The course, which was organised by Dr. Harold Wager, F.R.S., was attended by 41 teachers and lasted from July 29th to August 11th; it included lectures and practical botanical work, for which accommodation was provided in the Lecture Rooms adjoining the Jodrell Laboratory, demonstrations in the Gardens and Museums, and visits to the Herbarium and Library. The Director and several members of the Staff were invited to lecture to the class on special subjects. The last course of a similar nature was held in 1925.

BRITISH ECOLOGICAL SOCIETY.—On the 11th June the British Ecological Society visited Kew and were shown the special work

undertaken in the Experimental Ground. In the Herbarium a series of exhibits was arranged. Specimens illustrating the Sclerophyllous Brushwood Communities from various parts of the world were specially shown. The Gardens were also visited under guidance of members of the staff and various plant types and subjects of ecological interest were demonstrated.

COURSES OF INSTRUCTION.—During 1927, as in previous years, special courses were arranged, at the request of the Secretary of State for the Colonies, for Probationers and Officers of Scientific Departments in the Colonies. The subjects included taxonomy, ecology, genetics, mycology, economic botany and general horticulture.

NATIONAL PINETUM AT BEDGEBURY.—Many of the young trees began to grow very early in the spring. By the middle of April some had formed new shoots 1–2 in. long. Then two very cold nights occurred when 8° and 11° (Fahrenheit) of frost were registered. All the young shoots were killed, and, as the frosts were followed by several weeks of dry weather with cold winds, the plants were slow in recovering. The wet summer was favourable for the plants on the whole but many of those most seriously injured by frost remained stationary throughout the summer. Pine weevils were again troublesome and certain pines were injured. Some 10,000 pine weevils were trapped. *Aphis abietina* again appeared on some of the Spruces, and *Chermes* sp. on *Abies* spp., but constant spraying with insecticides kept these pests in check. Numerous old Rhododendrons were cleared out, and trees felled to make room for the remainder of the *Taxaceae* and *Cupressus* which it is hoped will be planted next March. The heavy snowstorm of December 25–26 did not seriously injure the trees at Bedgely.

Although there have been many difficulties to contend with, the majority of the young plants are growing well, particularly Larches, Junipers, Cedars, Douglas Firs, N. American Firs, Cypressess, Thuyas and Hemlocks. Spruces that were unaffected by Aphis, and that were not injured by frost, are growing well, but those injured are not in a very satisfactory condition. Many of the Asiatic Firs suffered badly from frost and numerous Pines were damaged through weevil attacks. Given a favourable growing time next spring some of the badly injured trees will probably recover, but there are others that must be replaced. The abnormally wet summer and autumn added very considerably to the labour and expense of keeping the young trees clear of coarse weeds.

The Gardens.

VISITORS.—The number of visitors to the Gardens in 1927 was 1,078,088. This was a decrease of 84,459 on the figures for the preceding year. This decrease took place in the first five months of the year, and for the remaining months the numbers were generally

higher, especially in December when an increase of nearly 5,000 was recorded. The month of May with 227,063 was the greatest monthly record in the year, December with 9,937 was the lowest. The largest daily attendance was 60,104 on Easter Monday, April 18th, and the smallest 6 on November 29th. On Students' Days (Tuesdays and Fridays), when an admission fee of 6d. is charged, the attendance went up from 62,285 to 74,417. The absence of bright sunny weather, the greater rainfall and its general distribution through the year, and a particularly sunless and foggy autumn tended adversely to affect the attendance of visitors.

PLANT HOUSES.—A new span-roofed house for the cultivation of bananas was erected in the private yard near the Curator's Office. The object of this house is to provide isolated accommodation for the cultivation of this very important class of plants, so that new varieties obtained by Kew for transmission to the banana-growing colonies may be put in quarantine until they can be certified free from insect or fungus disease. At the same time it will afford means of propagating desirable varieties. The interior dimensions of the house are :—Height 16 feet, length 34 feet, width 20 feet. A depth of two feet of rich loam has been provided for the plants. Such a house, of course, is not big enough to allow the larger-growing banana plants space for full development—but it will, it is hoped, serve the purpose desired. The cost of its erection was met by a grant from the Empire Marketing Board.

The overhauling of the roof of the Temperate House referred to in last year's Review (p. 4), which consists chiefly in re-bedding the panes of glass with fresh putty, was continued during the summer and autumn. The trouble and annoyance caused by drip during rainy weather has been greatly reduced in consequence.

The interior of the *Victoria regia* House (No. 10) was repainted, and considerable repairs were done to the woodwork, much of which had decayed. It is intended during 1928 to provide increased accommodation for the collection of insectivorous plants, a group in which the general public is keenly interested. For this purpose the Annex attached to the *Victoria regia* House in which they have hitherto been grown has been pulled down and the gabled portion of the main building brought down to the common slope of the roof. The new Annex for insectivorous plants, which will be considerably larger than the old one, is being built on the same site.

FLOWER GARDEN.—During the War the parterre between the Palm House and the Pond was dug up and given over to the cultivation of vegetables for a few years. When restored to its position as the chief site in Kew for spring and summer bedding, a design of flower beds different from that previously existing was adopted. As the original design is considered preferable in affording opportunities for the display of a more varied set of plants, it was restored last autumn in time for the reception of bulbs and other spring-flowering plants.

SERVICE ROAD.—In last year's Review (p. 6) it was noted that the section of this road which extends from the Kew Palace Dépôt to the Stable Yard had, during 1926, been re-made. The remaining portions, one reaching from the Stable Yard to the Oxenhouse Gate which opens on to the Old Deer Park, the other connecting the Stable Yard with the Queen's Cottage Grounds, have been similarly treated.

HERBACEOUS GROUND.—The systematic overhauling of the Natural Family Beds in the Herbaceous Department has been in progress, and the section west of the gravel walk that bisects this area has been completed. The beds have been trenched two feet deep, and the poorer soil replaced with new loam, about 250 loads of which have so far been used. Bone meal has also been incorporated as the work proceeded.

CHINESE RHODODENDRONS.—A further plantation of these shrubs has been made in the wood between the Cedar Vista and the collection of cypresses and yews. Mr. J. C. Williams, in his wonderful collection at Caerhays, was the first to show that the ideal place for rhododendrons was on sites where the overhead growth of large trees afforded them a certain amount of shade. His lead is now being generally followed. One important thing, however, is that the trees with which they are associated shall be of the right kind. Experience seems to prove that of our native trees the oak is the best, perhaps the only one that associates happily with rhododendrons, chiefly because its roots are comparatively few and go deep into the soil. Unfortunately the dominant tree at Kew is the beech, than which no worse a tree could be found to associate with rhododendrons. Its roots are far-spreading and keep so close to the surface that moisture-loving plants like rhododendrons stand no chance in competition with them. The site above-mentioned happens to be one where a group of oaks only was planted, so it is probably as suitable a place for rhododendrons as can be found in Kew.

It is, however, becoming only too apparent that the great bulk of the new Chinese rhododendrons are not going to add much to the beauty of gardens with a situation and climate like that of Kew. This applies more to the larger, broader-leaved ones than to the smaller scaly-leaved ones. Late-starting and late-flowering species such as *R. discolor* succeed very well indeed, but unfortunately the great majority are early-flowering and early-growing and consequently at the mercy of every late frost. The condition of the Chinese rhododendrons at Kew after the frosts of last April made one glad that there were old-fashioned garden hybrids to fall back on, in spite of the fact that there is an inclination nowadays to belittle them. It is fairly evident by now that except in specially favoured places the really successful cultivation of the majority of the large-leaved rhododendrons will have to be confined to western and southern maritime counties.

TREE AND SHRUB COLLECTIONS.—In the Review for 1926 (p. 5) the re-arrangement of the collections of shrubby *Rosaceae* and *Saxifragaceae* was alluded to. Owing considerably, no doubt, to the cool wet summer the transplanted shrubs succeeded remarkably well, and scarcely a plant was lost even amongst the old rose plants which had been undisturbed for at least three decades.

During the past autumn and early winter the collections in the Berberis Dell and surrounding area have been overhauled. The early families (in the Bentham and Hooker conception) are planted here, and besides the *Berberidaceae* there are also the *Magnoliaceae*, *Ranunculaceae*, *Tiliaceae*, *Cistaceae*, *Malvaceae*, *Rutaceae*, *Hypericaceae* and smaller allied families. The work involved is of a somewhat routine nature, consisting chiefly of spacing out plants that have become crowded, the removal of duplicates, and the addition of new species and varieties from the nurseries. Advantage is also taken of the opportunity to supply the plants with manure and new soil of a richer nature than that of Kew. The twentieth century exploration of China has nearly doubled the number of species of barbery in cultivation, and the problem of finding room for them becomes yearly more pressing.

ITEMS OF SPECIAL INTEREST.—Special exhibitions were again arranged throughout the year in House 14 c. They included an exhibit of Citrus fruits from the gardens of Mr. Cecil Hanbury at La Mortola; examples of *Phyllodes* and *Cladodes*; a selection of economic plants, and a Wardian Case; examples of parallel development shown by plants belonging to widely different Natural Families; *Pelargoniums* and the derived modern garden "Geraniums"; Sensitive Plants; Cacti from the deserts of Southern Arizona; *Begonia* species and the derived winter-flowering and tuberous-rooted *Begonias*; *Cyclamen indicum* and its modern derivatives; *Petunia* species and recent horticultural forms; *Calceolaria* species, hybrids and varieties; new and rare plants.

Agaves in Flower.—The following species of *Agave* flowered during the past year:—*A. Ellemeeiana* (2 plants), *A. filifera*, *A. Hookeri*, *A. Kerchovei*, *A. rigida* var. and *A. potatorum*. The blossoming of Agaves in our collection is naturally of great interest to botanists, and the tall, handsome spikes add greatly to the interest of the Succulent House (No. 5) during the long period they continue to develop flowers. But it is not altogether a matter for congratulation. All the plants mentioned above were exceptionally fine examples of their respective species and their flowering and consequent death has involved a noticeable loss to the collection.

Pita Fibre Plant.—The production of flowers, for the first time under cultivation in this country, by the Pita Fibre plant, *Bromelia Magdalenae*, should not pass unnoticed. Several consignments of leaves of this plant, which is thriving well in the Palm House, have been sent to people interested in fibre production.

Amorphophallus Titanum.—A plant of the Giant Aroid flowered during September in the Water-lily House (No. 15). Although not quite so large as the one produced by the plant which flowered in 1926 (see *K.B.* 1926, p. 374), the spathe was a very fine one of good colour and perfect shape. Owing probably to the cool, dull weather, it remained in good condition several days longer than did the spathe of the one which flowered in the previous year. Notes about its flowering in the popular press resulted in its being inspected by a great number of visitors.

Virgilia capensis.—Introduced from the Cape of Good Hope in 1767 and figured in the Botanical Magazine as long ago as 1813, this beautiful small tree has been almost lost sight of for a long time. For several weeks in the late summer a plant, some seven or eight feet high, growing in the Temperate House, continued to produce its racemes of pink, pea-shaped flowers which associate charmingly with beautiful silvery, linear-lanceolate, pubescent leaflets, each 1 to 1½ inches long.

East Indian Rhododendrons.—A number of rhododendrons of the Javan, or East Indian, section were kindly presented by the executors of the late Sir George Holford from the fine collection at Westonbirt. The collection at Kew has, during recent years, been grown in the Mexican House, but this structure is apparently somewhat too warm for them. A trial is being made with some of the Westonbirt plants in the borders of the Conservatory (No. 4) where the conditions are cooler.

Californian Cacti.—A valuable and very interesting collection of cactuses from California, mostly new to our collection, was presented by Mr. W. T. Swingle, U.S. Date Garden, Indio, California, amongst them a plant of *Echinocactus acanthodes* weighing 2 cwt. This has been planted in the Succulent House. We have to acknowledge the courtesy of the Royal Mail Steam Packet Co., Ltd., in bringing the plants from Los Angeles to London on one of their ships free of charge.

Reference was made in *K. B.* Appendix I, 1927, p. 8, to the despatch of a number of trees to the Sydney Botanic Garden, to be planted at Canberra by the Duke and Duchess of York and other notable personages on the occasion of the opening of the new Parliament Buildings. The Curator of the Botanic Gardens, Sydney, reported that they arrived in excellent condition as fresh as if they had been sent from a local nursery only a few miles away. The roots and wood of the trees were sound and the buds plump and firm. The actual ceremony of planting the trees at Canberra by the Duke and Duchess of York took place on the morning of May 10th. On the same day the Governor-General of the Commonwealth and the Prime Minister planted some of the trees at the Royal Military College, Canberra.

Snowstorm.—During the night of December 25th and the morning of the 26th there occurred the heaviest fall of snow that has taken place at Kew for many years. Although only about four inches fell, it was of so wet and adhesive a nature that it clung to the branches of the trees and shrubs, both deciduous and evergreen, in an extraordinary way. Even on quite thin, leafless branches the snow piled into narrow lath-like ridges one inch or more high. On evergreens it lay as a solid carpet three inches thick. The consequent breaking down of branches, varying in size from limbs over a foot in diameter to comparatively small twigs, was such as has not been witnessed at Kew for more than forty years. The damage done to evergreens, especially to conifers of the cypress group, evergreen oaks, and arbutuses, is deplorable. Nor have deciduous things escaped, the broom tribe particularly having suffered much injury. Even when not broken, many trees and shrubs were borne to the ground by the weight of snow and partially uprooted. Besides clearing away the wreckage, a great amount of work has been entailed in trimming up wounds and antiseptically treating them with gas tar. The fine old Stone pine (*Pinus Pinea*) near the Director's Office, which has been so well known and striking a feature of Kew for many years, had a large branch snapped off which has rather impaired its symmetry, but perhaps with such a heavy-topped, densely foliated tree it is a matter for congratulation that no worse damage has occurred to it. Considering how susceptible to breakage by snow large cedars of Lebanon are, it is fortunate that ours escaped much injury. As a matter of fact small specimens suffered much more. The fine group of *Ceanothus thyrsiflorus* near the Broad Walk, which has made so charming a display of its pale blue flowers in June for many years past, has been much broken about. One of the most lamentable results of the snowfall was the breakage suffered by numerous Holm Oaks (*Quercus Ilex*). These trees undoubtedly provide the noblest evergreen effects in the winter landscape at Kew, and we of the present day have much reason to bear in grateful remembrance the foresight of men of earlier times who recognised their merits and planted them so freely. One tree near the Service road was found on the morning of December 26th absolutely bereft of every limb, leaving merely a naked stump a few feet high. One of the fine trees near the Ruined Arch lost a large limb as did also another near the Pond. As regards smaller trees it was very noticeable how those of erect habit were injured much more severely than those with a more spreading graceful shape. The bulk of the rhododendrons escaped although a few old plants were ruined; hollies and yews were almost entirely uninjured.

CONTRIBUTIONS TO GARDENS, 1927.—Amongst the donors of plants and seeds to Kew during 1927 special mention has to be made of Mr. Lionel de Rothschild, who presented altogether 283 packets of seeds, which included a set of those collected by Mr. Comber during his travels in Chile and others collected by Capt. Kingdon Ward.

Mr. de Rothschild also supplied some plants of rare species of *Rhododendron*. To Mr. J. C. Williams, of Caerhays Castle, acknowledgment has to be expressed for the continuation of his generosity to Kew which has lasted over so many years.

We have received through the agency of Mr. T. Hay, the Superintendent of Hyde Park, seeds of many very interesting species of plants. The new *Fremontia mexicana* raised from his seeds flowered during several weeks of the late summer.

Advantage was taken of the dispersal of the collection of crocuses, made by the late Mr. Dykes, to purchase a complete set of corms.

The number of separate consignments of living plants, seeds, etc., was 850, an increase of 61 on that for 1926. The most important contributions apart from those mentioned above were the following :—

Public Institutions :—

Home.

- Cambridge, Botanic Garden.—Plants, cuttings, bulbs and seeds.
- Chelsea, Physic Garden.—Plants of *Nepenthes albomarginata* and *Lycopodium phyllanthoides*.
- Edinburgh, Royal Botanic Garden.—Plants and seeds (157 packets).
- Glasnevin, Dublin, Botanic Garden.—Plants.
- John Innes Horticultural Institution, Merton.—Seeds, plants and cuttings.
- London County Council (Parks Department).—Collection of trees and shrubs, etc.
- Wisley, Royal Horticultural Society's Gardens.—Seeds and plants.

Abroad.

- Arnold Arboretum, Jamaica Plain, Mass., U.S.A.—Seeds, plants and grafts of trees and shrubs, including species collected by J. F. Rock in China.
- Brisbane, Queensland, Australia, Botanic Garden.—Plants (Australian).
- British Columbia, University of (per Prof. J. Davidson).—Seeds.
- Brooklyn Botanic Garden, New York, U.S.A.—Tubers : *Nelumbium speciosum*.
- California, U.S.A., Golden Gate Park.—Plants : species of *Ceanothus*, *Escallonia*.
- Dahlem, Botanic Garden.—Seeds : 59 packets.
- Dehra Dun, U.P., India, Forest Research Institute and College.—Seeds.
- Dunedin, New Zealand, Botanic Garden.—Seeds.
- Jamaica, Department of Science and Agriculture.—Filmy ferns.
- Kirstenbosch, South Africa, Botanic Gardens.—Seeds : *Watsonia*, *Erica*, *Protea* spp., etc.
- Leningrad, U.S.S.R., Botanic Garden.—Seeds : 60 packets.
- Lyons, France, Botanic Garden.—Seeds : 57 packets.

Madagascar, Station Agricole.—Plants (including *Didiera mirabilis*) and seeds.

Moscow, U.S.S.R., Botanic Gardens.—Seeds.

Moscow, U.S.S.R., Institute of Applied Botany.—Seeds : 42 packets of Decorative Mongolian Poppies.

Missouri Botanic Garden, St. Louis, Mo., U.S.A.—Plants of *Peristeria elata*.

Ottawa, Canada, Department of Agriculture (Central Experimental Farm).—Seeds.

Peradeniya, Ceylon, Royal Botanic Garden.—Collection of plants.

Sarajevo, Jugo-Slavia, Botanic Garden.—Seeds : 51 packets.

Seychelles, Department of Agriculture.—Fruits of "Coco-de-Mer" (*Lodoicea sechellarum*).

Tashkent, Turkestan, University Botanic Garden.—Seeds : 50 packets.

Tiflis, Georgia, Botanic Garden.—Seeds : 49 packets.

Trinidad, Royal Botanic Gardens.—Stove plants.

Washington, United States Department of Agriculture.—Plants.

Private Donors :—

- H.M. King Boris of Bulgaria.—Bulbs of *Lilium Jankae*.
- Mr. B. C. Aston, Wellington, New Zealand.—24 packets of seeds of New Zealand plants including *Dactylanthus Taylora*.
- Mr. S. C. Atchley, British Legation, Athens.—Seeds and bulbs.
- Mr. Lloyd Austin, Eddy Tree Breeding Station, Inc., Placerville, California, U.S.A.—Seeds.
- Mr. F. R. S. Balfour, Dawyck, Stobo, Peeblesshire.—Seeds.
- Colonel F. Bird, Melbourne, Victoria, Australia.—Seeds.
- Mr. S. F. Blake, Washington, U.S.A.—149 packets of seeds.
- Rev. A. T. Boscawen, Long Rock, Cornwall.—Seedlings of *Telopea speciosissima*, etc.
- Mr. N. E. Brown, Kew.—Plants and seeds including *Huernia* and *Odontophorus* spp., etc.
- Mr. W. S. Chamberlain, Twickenham.—Seeds, including *Ranunculus Lyallii*.
- Messrs. Dobbie & Co., Ltd., Edinburgh.—Plants of 12 named varieties of collarette Dahlias.
- Major A. A. Dorrien Smith, Tresco Abbey, Isles of Scilly.—Plants and seeds.
- Mrs. Earnshaw, Cranley Gardens, London, S.W.—A collection of orchids.
- Senor Don Agustin Edwards, Chile.—Seeds of *Nothofagus obliqua*.
- Major R. Emmet, Moreton Paddox, Warwickshire.—Seeds and plants.
- Hon. Vicary Gibbs, Aldenham.—Trees, shrubs and herbaceous plants.

Mr. Cecil Hanbury, La Mortola, Ventimiglia, Italy.—Plants, bulbs and seeds.

Miss Agnes Hill, Groendoorn, S.W. Africa.—Plants, bulbs, tubers and seeds.

Mr. G. Lindley Hinde, Kamrup, Assam.—Collections of orchids.

The Executors of the late Sir George Holford, Westonbirt.—A collection of *Clivias* and Javanese rhododendrons.

Mr. Louis Van Houtte, père, La Pinte-lez-Gand, Belgium.—Stove and greenhouse plants.

Captain C. Ingram, Benenden, Kent.—Plants and seeds, including 41 packets of seeds collected in South Africa.

Hon. Robert James, St. Nicholas, Richmond, Yorks.—Plants and cuttings.

Mr. G. H. Johnstone, Trewithen, Cornwall.—Plant of *Rhododendron eriogynum* and of a blue-flowered *Fabiana*.

Dr. A. F. G. Kerr, Siam.—Seeds, including *Gossypium arboreum*.

Mr. C. H. Lankester, Cartago, Costa Rica.—Plants, including species of *Coryanthes*, *Clusia* and *Cryptophoranthus*.

Mr. A. E. Lawrance, Lago Petroleum Corporation, Venezuela.—Seeds, bulbs and plants, including orchids collected in Venezuela.

The late Professor Anstruther Lawson, University of Sydney, Australia.—A collection of ground orchids.

Dr. F. Lemperg, Hatzendorf, Steiermark, Austria.—Plants, corms and 51 packets of seeds.

His Excellency Sir John Loader Maffey, Governor General of the Sudan.—Plants, bulbs, roots and tubers, collected in the South Sudan, Imatong Hills, etc.

H.H. The Prince of Monaco, Monte Carlo.—Plants and cuttings of succulents, including *Echinocactus Grusonii*.

Lt.-Colonel L. Messel, Nymans, Handcross.—Plants and bulbs.

Mr. C. T. Musgrave, Hascombe Place, Godalming.—Plants and seeds.

Dr. H. Perrier de la Bathie, Madagascar.—Plants: *Kalanchoe* spp.

Mr. Amos Perry, Enfield, Middlesex.—Seeds, plants and bulbs, including *Brunsvigia Josephinae*.

Sir John Ramsden, Bt., Bulstrode.—Plants introduced by Captain Kingdon Ward, amongst others.

Mr. G. Reuthe, Fox Hill Plant Nurseries, Keston, Kent.—Collection of plants.

Dr. F. W. Stansfield, Reading.—A collection of hardy ferns.

Mr. H. Steedman, Victoria Park, Western Australia.—169 packets of seeds.

Major F. Stern, Highdown, Goring by Sea.—Plants and cuttings.

Mr. T. P. Stokoe, Cape Town, South Africa.—Seeds of *Erica* spp.

Messrs. Sutton & Sons, Reading.—Seedling primulas in variety.

Lt.-Colonel E. E. Todd, 14, Dryden Chambers, W.I.—Plants and seeds of *Viola* spp.

Mr. J. C. Watt, Aberdeen.—Seeds of Himalayan rhododendrons.

Mr. F. A. Weinthal, Sydney, New South Wales.—Orchids.

Mr. W. I. Whitaker, Pylewell Park.—Plant of *Crotalaria agatiflora*.

Mr. P. D. Williams, Cornwall.—Plants.

Miss M. Wilman, McGregor Museum, Kimberley, South Africa.—Plants: Cape succulents.

Mr. K. Yashiroda, Kagawaken, Japan.—Seeds.

DISTRIBUTION OF PLANTS AND SEEDS. There were 192 recipients of seeds sent out from Kew, the total number of packets distributed being 12,966—hardy trees and shrubs, 4,521, herbaceous plants, 8,445; an increase of 2,908 packets compared with the 1926 distribution.

The most important seeds specially distributed were:—*Heteromeles arbutifolia*, *Melia Azedarach* var. *umbraculiformis*, *Ranunculus Lyallii*, *Cinnamomum Camphora*, *Arachis hypogaea* (Basse variety), *Rhopalostylis sapida*, *Corynocarpus laevigatus*, *Caesalpinia brevifolia* (Algarobilla).

Wardian cases of plants were despatched to the Botanic Gardens, Buitenzorg (Java), Cameroons, Peradeniya and Singapore, also to H.E. the Governor, Nigeria; the Division of Botany, Pretoria; the Department of Agriculture, Dar es Salaam, Tanganyika; and the Department of Agriculture, Port of Spain, Trinidad. Other overseas consignments of a fairly bulky nature were sent to Accra, Gold Coast (Achimota College); the Commissioner of Lands and Forests, Freetown, Sierra Leone; the Department of Science and Agriculture, Kingston, Jamaica; the Government Gardens, Nilgiris, Madras; and the Imperial College of Tropical Agriculture and the Department of Agriculture, Trinidad.

Other recipients of plants, etc., from Kew, included the following:—Arnold Arboretum, Mass., U.S.A.—Seeds and cuttings of trees and shrubs.

Beirut, American University.—Plants of *Elodea canadensis*.

Bermuda, Department of Agriculture.—Bulbs of *Eucharis grandiflora*.

Mr. F. W. Black, for Tristan da Cunha.—Seeds of trees and shrubs.

Rev. A. F. Boscawen, Long Rock, Cornwall.—Tender plants.

Bristol University.—Plant: *Hevea brasiliensis*.

Burroughs, Wellcome & Co., London.—Roots of *Ephedra* species.

Canada, Department of Agriculture.—Plants and cuttings of poplars, etc.

Cambridge Botanic Garden.—Greenhouse and stove plants.

Cambridge, Corpus Christi College.—Plant: *Halesia carolina*.

Chelsea Physic Garden, London.—Greenhouse plants.

H.E. the Colombian Minister, London.—Plants of *Hydnocarpus Wightiana* and *H. anthelmintica*.

Cracow, Poland, University Botanic Garden.—Cuttings of *Prunus*, *Pyrus*, *Quercus* and other hardy trees.
 Demerara, Department of Science and Agriculture.—Roots of Cannas.
 Edinburgh, Royal Botanic Garden.—Greenhouse and stove plants.
 Egypt, Department of Agriculture.—Seeds and fern spores.
 Falkland Islands, H.E. the Governor, Port Stanley.—Plants and seeds.
 Mr. G. B. Foote, Puwakpitiya, Ceylon.—Orchids.
 Forestry Commission, Whitehall, S.W.—Hardy conifers.
 Mr. R. C. Bruce Gardner, Conington Hall, near Cambridge.—Plants: *Quercus* spp., etc.
 Hon. Vicary Gibbs, Aldenham.—Collection of plants.
 Glasnevin, Dublin, Botanic Garden.—Plants and cuttings.
 Mr. C. Hanbury, La Mortola, Ventimiglia, Italy.—Plants, bulbs and seeds.
 Messrs. Hillier & Sons, Winchester.—Trees and shrubs.
 Mr. G. Lindley Hinde, Kamrup, Assam.—Orchids.
 Sir Henry Hoare, Bt., Stourhead, Wiltshire.—Cuttings of poplar spp.
 Hyde Park.—Plants and seeds.
 Captain C. Ingram, Benenden, Kent.—Trees and shrubs.
 Jamaica, Department of Science and Agriculture.—*Hippeastrum*. bulbs.
 John Innes Horticultural Institution, Merton.—Plants, seeds and cuttings.
 London County Council (Parks Department).—Collection of trees and shrubs.
 Manchester Corporation (Parks Department).—Plants of *Melocactus Broadwayi*.
 Hon. H. D. McLaren, Bodnant, North Wales.—Plants of *Rhododendron*, *Meconopsis*, etc.
 Lt.-Colonel L. Messel, Nymans, Handcross. — *Rhododendron* seedlings, etc.
 H.H. The Prince of Monaco.—Collection of succulents.
 Mr. C. T. Musgrave, Hascombe Place, Godalming.—Plants and seeds.
 Oxford, Botanic Garden.—Plants of *Melocactus Broadwayi*.
 Oxford, Imperial Forestry Institute.—Collection of plants for exhibition purposes, also seeds.
 Rev. Robert Pooley, for Tristan da Cunha.—Cuttings of willows and poplars.
 Mr. Charles O. L. Power, Madeira.—Collection of plants.
 Mr. L. de Rothschild, Exbury House.—Tubers of *Nymphaea* spp.
 Major F. Stern, Highdown, Goring-by-Sea.—Plants and seeds.
 Sierra Leone, Freetown, Commissioner of Lands and Forests.—plants.
 Swansea, Parks Department.—Collection of economic plants.

H.H. The Raja of Tehri-Garhwal State.—Seeds of *Victoria regia*.
 Trinidad, Department of Agriculture.—Seeds, *Hippeastrum* bulbs and banana stools.
 Sir Oscar Warburg, Boidier, Headley, Epsom, Surrey.—Plants of *Magnolia* and *Quercus* spp.
 Mr. F. A. Weinthal, Sydney, New South Wales.—Orchids.
 Mr. P. D. Williams, Cornwall.—Shrubs and seeds.
 Zoological Society of London.—Collection of plants for reptile house.

The usual distribution of surplus trees, shrubs and herbaceous plants to educational and public institutions was made in February.

RAINFALL RECORD.

Rainfall recorded at the Royal Botanic Gardens, Kew, during 1927.

		Inches.				Inches.
January	...	1.75	July	...	...	3.07
February	...	3.31	August	...	...	4.26
March	...	2.63	September	...	...	4.61
April	...	2.26	October	...	...	1.39
May	...	1.07	November	...	...	2.70
June	...	3.13	December	...	...	3.03
Total 33.21 inches.						

The total for 1926 was 24.96 inches.

The Museums.

GENERAL.—The reorganisation of the Museums, which began in 1926, was continued in 1927. Owing to the buildings being so scattered the general scheme could not be carried as far as could have been wished from the point of view of convenience and economy of management. Moreover, the restrictions of space and the necessity for maintaining a large collection of specimens, some of which are of scientific rather than commercial interest, do not permit such effective displays of certain plant products to be made as their importance demands. Again, there are numerous specimens of historic value, and others complementary to the specimens in the Herbarium collection, which must be kept where they are easily available when required for study, although they may be of little interest to the general public.

A little space was gained by removing two large cases from the top floor of Museum I to the porch of the North Gallery, where they are now used for the display of Japanese and Burmese lacquer ware. In order to make room for a series of special exhibits of popular interest in Museum I, cases containing large-sized models of an Indian Indigo Factory and an Indian Lac Factory were removed from the ground floor to Museum III, where room had to be made by

the removal to Store of three stands of botanical drawings and photographs of plants.

Certain exhibits which had deteriorated or had become out of date were replaced by the courtesy of Messrs. John K. King & Sons, Ltd., of Coggeshall, Essex, who supplied a very good selection of seeds of fodder grasses and food grains, and Messrs. J. T. Healey & Co., Ltd., of the Borough Granaries, London, who sent a collection of pulses and grains with some of their milled commercial preparations.

A long-felt want has been supplied by the erection of an electrically driven circular saw in the Preparer's Shop.

During the absence of Mr. F. N. Howes (*see* p. 3), temporary assistance has been obtained for general work.

Numerous visits have been paid to Commercial Sale Rooms and City Offices by members of the staff in connection with questions relating to economic plant products.

ROUTINE WORK.—There has been a very material increase in correspondence during 1927. Enquiries of the usual miscellaneous character have had reference to agriculture, horticulture, silviculture, plant products generally, and the identification of specimens. This correspondence has emanated from all parts of the Empire as well as from numerous foreign countries.

About 150 visitors requiring special information called at the Museums during the year, and in addition members of the staff have, from time to time, accompanied visitors round the collections.

Re-labelling has occupied a good deal of time, and, in order to reduce constant renewal of labels, experiments are being carried out with varnished labels.

SPECIAL WORK.—Investigations into various questions concerning camphor begun in 1926 have been continued, and an Assistant has devoted a portion of his time to work on timber anatomy.

A Subject Index, in card form, of economic products of plants, is in course of preparation, and a large number of photographs of economic plants, views of Botanic Gardens in various parts of the Empire, and types of vegetation are being assembled, mounted and made available for reference. An alphabetical list of common names of plants and their botanical equivalents is also being prepared.

During the year special exhibits have been made of Cinchona, Dyes, Tanning Substances, Straws and Fibres suitable for hats, sports requisites, Portraits of Botanists with specimens of plants named in their honour, and the Effect of Smoke on Leaves of Evergreens.

The Keeper has continued to act as Executive Officer for the new Pinetum at Bedgebury.

PUBLICATIONS.—A new Guide has been published to the Timber Collections in Museum III, and a new edition of the Guide to Museum II is in course of preparation.

The Keeper acted as Convener of a Committee of the Empire Forestry Association formed for the purpose of preparing a Tentative List of Trade Names for Empire Timbers. This list has been printed and circulated throughout the Empire for the criticism of Forest Officers and the trade. It is intended that it shall receive special consideration at the Empire Forestry Conference which is to meet this year in Australia.

Publications by members of the Museum staff include "Variability of the Camphor Tree in Formosa" (*K.B.*, 1927, p. 157); "Agriculture and Horticulture in Majorca" (*K.B.* 1927, p. 369); "Minor Forest Products," read before the Forestry Sub-section of the British Association at Leeds, and published in the *Empire Forestry Journal*, vol. 6, p. 228.

MAINTENANCE WORK.—H.M. Office of Works have provided facilities during the current year for heating water for cleaning purposes in each of the Museums. Water has also been laid on in Museum III. In the past all water had to be carried at great inconvenience from outside.

The whole of the skylights in Museums II and III have been reglazed. For a number of years these skylights have been a source of trouble during every heavy shower. Although a good deal of scaffolding was needed it was possible to keep the buildings open during the time the work was in progress. The sanitary arrangements in Museum IV have been brought up-to-date.

Following the rearrangement of the specimens in Museum II a beginning has been made in the very necessary repainting and repair of the interior of the cases. It is fifty years or more since these cases were painted and the paint has become dirty and discoloured, and a considerable shrinkage has occurred in the woodwork.

PRESENTATIONS TO MUSEUMS.—The following are the principal donations received during 1927:—

Mr. R. E. Holttum, Botanic Gardens, Singapore.—Nineteen specimens of timbers.

Messrs. Burroughs, Wellcome & Co., London.—Forty-eight samples of Drugs and Essential Oils.

Messrs. John K. King & Sons, Ltd., Coggeshall, Essex.—Ears and seeds of varieties of Wheat, Oats and Barley, and seeds of numerous Fodder Grasses, Clovers, etc.

Mr. I. H. Burkill, Kew.—Roots of *Dioscorea hispida*, prepared for eating.

The California Box Company, Oakland, California.—Redwood slats, and box made entirely by machinery.

Prof. René Maire, Université d'Alger.—Specimens of *Ephedra altissima* and *E. fragilis*.

Mr. J. B. Cassels, H.M. Government Trade Commissioner, British Guiana.—Samples of the Cattle Foods, Copraline and Molascuit.

Dr. Kanehira, Director of Forests, Formosa.—Specimens of 54 Formosan Woods.

Mr. W. E. Broadway, Trinidad.—Specimens of Woods.

Mr. M. T. Dawe, O.B.E., Lands and Forests Department, Sierra Leone.—Roots of a *Melastomad* used by the Temnes as a substitute for sugar.

Mrs. Grieve, Chalfont St. Peter, Bucks.—Pamphlets on Herbs.

The Agricultural Branch, Education Department, Victoria, B.C.—Sets of Photographs of Trees and Forestry Subjects in British Columbia.

Messrs. J. T. Healey & Co., Ltd., London.—Collection of Pulses, Grains, and commercial preparations.

Director-General, Commercial Intelligence and Statistics Bureau, Calcutta.—Samples of Chaulmoogra Seeds, Chaulmoogra Oils, Ointments and Soaps. Also Oil and Seeds of *Hydnocarpus Wightiana*.

Messrs. Carter, Page & Co., Ltd., London.—Collection of *Banksia* fruits from Western Australia.

The Chief, Division of Botany, Pretoria.—Logs of Camphor Wood for Distillation.

The Curator, Auckland Institute and Museum, New Zealand.—Fossil nuts of *Cocos zealandica*.

Mr. A. J. Large, Barbados.—Fruit and seeds of *Swietenia Mahagoni*.

Director, Forest Research Institute, Dehra Dun.—Paper made from Bamboo.

The Curator, Botanic Gardens, Dominica.—Twenty-five specimens of Dominica Timbers.

The Secretary, Egypt Exploration Society.—Specimens of Plant Products found in Ancient Egyptian Tombs.

Mr. H. Clinton-Baker, Bayfordbury, Herts.—Plank of *Abies magnifica*.

The Gas Light and Coke Company, London.—Section of Trunk of *Ginkgo biloba* from a tree grown in Brentford.

Dr. A. Kerr, Bangkok.—Citrus Fruit, variety called "Som Mu."

Sir George Watt, C.I.E., Lockerbie.—Collection of specimens illustrating the Lac Industry.

Specimens have been distributed to the following individuals and institutions:—The Avon Electricity Meter Co., Ltd., Kilburn; Mr. J. Gordon Dalgliesh, Hove; Director, Horticultural Section, El Giza, Cairo, Egypt; Mr. W. T. Summers, Grantham; Squadron-Leader E. R. Hillman Gray, R.A.F.M.S., Uxbridge; Public Museums, Liverpool; Sir David Prain; Prof. Pieraerts, Service Chimique et Onialogique, Belgium; Mr. D. Bliss, Swansea; Dr. Burt Davy, Oxford; Messrs. Rose Downs & Thompson,

Westminster; Messrs. J. Bibby & Sons, Liverpool; University of Stellenbosch, South Africa; Mr. A. van Vollenhoven, Sumatra; Central School, Richmond, Surrey; Belmont Boys' School, Chiswick; Technical Instructor, Hogarth Senior Boys' School, Chiswick; Birmingham Central Technical College; Mr. E. Moe, Universitetets botaniske Have, Oslo.

Jodrell Laboratory.

A large number of specimens of different kinds, chiefly samples of woods, barks, fibres, roots, etc., were examined microscopically, and identified, as far as possible, by means of their anatomical structure. A study of different stages of the ovule of an Aroid (*Typhonodorum Lindleyanum*), begun some years ago, was carried further by the examination of fresh material collected from the plant grown at Kew.

Mr. L. E. Campbell made a microscopic examination of the pollen of species of *Citrus* and of some other plants.

Miss K. E. Ritson was engaged in further work in continuation of her investigation into the morphology, anatomy and physiology of reproduction in the Ground-nut, *Arachis hypogaea* L.

Mr. W. C. Worsdell continued his comparative study of the anatomy of fasciated and of normal plants of *Campanula carpatica*, on behalf of the John Innes Horticultural Institution, Merton, where the plants were grown.

Cultures of various Fungi were made by members of the Herbarium Staff, either for purposes of identification, or, in the case of *Rhizoctonia* and *Vermicularia*, in connection with researches on species of these genera (see p. 30).

A considerable amount of pollen of Alder and Poplar was supplied from Kew for experimental purposes, the removal of bud-scales, anthers, etc., which are present in some quantity among the pollen as ordinarily collected, being carried out in the Jodrell Laboratory.

A microscopic examination of samples of West Indian Arrowroot was made in connection with a statement, forwarded to Kew, that the starch-grains of Bermuda Arrowroot show a certain microscopic character not seen in St. Vincent Arrowroot, but no confirmation of such a difference was obtained.

Herbarium.

The end of 1927 saw the completion of the first part of the cabinet extension programme, namely, the provision of two additional cabinets in each cabinet-block, the extra space being provided by the removal of the old 4in. water pipes and the screwing together of the existing cabinets. A commencement was, moreover, made with the postponed part of the programme, namely, the insertion of extra cabinets on the top of existing blocks on the ground and first floors. As soon as the new cabinets had been placed in position the specimens

were spaced out so that the accumulation of mounted material from the Store could be incorporated. As a result it was possible to "lay in" during 1927 a total of 68,057 sheets, about two-thirds of this total representing Store material.

With regard to publications reference should be made to the Flora of West Tropical Africa, of which Part i of Vol. i appeared during the year (*see* p. 26). The taxonomic work published by members of the staff and visiting botanists is alluded to below under the respective geographical headings, but mention may be made here of other publications not assignable to any particular area. "The Morphology and Taxonomic Position of the Adoxaceae" (*Journ. Linn. Soc.* 47, p. 471), "The Genera of Magnolieae" (*K.B.* 1927, p. 257), "Contributions towards a Phylogenetic Classification of Flowering Plants: vi" (*K.B.* 1927, p. 100), and "Decades Kewenses" Nos. cxvi-cxviii, were contributed by members of the staff. The Director published "The genus *Lilaeopsis*: a Study in Geographical Distribution" (*Journ. Linn. Soc.* 47, p. 525), and Sir George Watt furnished a paper on "*Gossypium*" consisting of notes on certain specimens of cultivated and wild cottons preserved in the Herbaria of the Royal Botanic Gardens of Kew and Edinburgh (*K.B.* 1927, p. 321). A lecture delivered by Miss M. L. Green, on "The History of Plant Nomenclature," in connection with the Board of Education's Short Course in Botany for Teachers in Secondary Schools held at Kew, was also published in a slightly modified form (*K.B.* 1927, p. 403).

EUROPE AND THE ORIENT.—*Routine*.—Approximately 10,000 sheets of newly mounted material have been incorporated, about 7,000 of which were from the Store. Numerous genera have been written up according to recent monographs or standard floras; those dealt with this year include *Scabiosa* and allied genera, *Dianthus*, *Viola*, *Cirsium*, *Carduus*, *Alyssum*, *Chrysanthemum*, *Achillea*, *Anthemis* and *Hyoscyamus*.

Amongst collections which have been named mention must be made of Mr. B. Gilliat-Smith's North Persian plants (1927) and Mr. J. Gladstone's specimens collected on the St. Kilda Islands in July, 1927. An account of Mr. Gilliat-Smith's fine Persian collections is in preparation. Further material from the Balkan Peninsula has been received from various botanists, and a collection of plants from Greece (Bornmüller's *Iter Graecum*) has been purchased. The Rev. E. Ellman invited Mr. E. Nemes to join him on a botanical collecting tour in Spain and the resultant collection, presented to Kew, supplements those made in previous years. Valuable critical material of the British flora has been contributed by Mr. Edgar Thurston and other British botanists, also by several members of the Herbarium staff, including 800 grasses by Mr. C. E. Hubbard. Some 500 sheets were prepared and laid in from specimens grown in the Experimental Ground. Mr. E. M. Marsden-Jones and Mr. W. B. Turrill have

presented 430 specimens of *Centaurea* and *Silene* in connection with their intensive work which is designed to throw light on critical taxonomic problems confronting the botanist dealing with the flora of Europe. These include representative pedigree material illustrating their genetical studies, and also specimens showing the distribution of wild varieties. Especially valuable are the series of varieties of *Silene maritima* from the south coast of England, *S. vulgaris* from the Balkan Peninsula, and *Centaurea* spp., varieties, and hybrids, from the Midland and Northern counties of England and from Scotland.

Research and Publications.—The following notes and papers have been published:—

"On the Flora of the Nearer East: iii" (*K.B.* 1927, p. 3). "The Forests of the Balkan Peninsula" (*The Timber Trades Journal*, September, 1927, p. 855).

ASIA: INDO-MALAYAN REGION.—*Routine*.—Mounting of specimens in the Store proceeded satisfactorily during the year. Practically all the Indian material has been mounted, though some 25,000 sheets of Malay Islands and Philippine Islands plants still remain. A large amount of "laying-in" has been achieved, though on account of the shortage of cabinets some 2,000 mounted specimens are temporarily sorted and still in the Store. The material incorporated included a large number of sheets from Siam with many type specimens named by Professor Craib, about 150 Siamese grasses, and most of the current collections mentioned below. A considerable number of duplicates, mostly Indian, were made available for distribution. About 19,000 sheets of the late Mr. J. S. Gamble's Herbarium were incorporated.

The restoration of the valuable Wallich Herbarium progressed steadily, but on account of the existence of many sheets under one number, the amount of labour involved proved greater than had been estimated. It is now approaching completion and the specimens have been made safe for a long period.

Contributions to the Herbarium were received from Mrs. A. D. Parry (Lushai Hills of Assam), Mr. C. E. Parkinson, Forest Botanist, Burma (mainly from South Tenasserim), Mr. R. N. Parker, Imperial Forest Botanist, Dehra Dun, and Mr. A. H. G. Alston, Systematic Botanist, Ceylon. Most of these have been named and incorporated. Mrs. Parry's and Mr. Parkinson's collections are of special interest, since they come from little-known regions, and the latter especially contained many new species. The South Indian collections have been enriched by about 300 sheets presented by the Royal Botanic Gardens, Calcutta, and about 150 sheets by the Madras Herbarium, all of which were laid in. Minor contributions were received from several other sources.

The Bourne Collection of South Indian plants is being used for the preparation of the Madras Flora. It is of great value in this

connection, and several species find a place in that Flora solely on the evidence of specimens collected by the donors, Sir Alfred and Lady Bourne. The sheets are being added to the general herbarium as the work of the Flora proceeds.

Research and Publications.—Work on the preparation of the Flora of the Presidency of Madras was continued, and nearly two-thirds of Part viii was set up in type by the end of the year.

The following papers were published :—

"Contributions to the Flora of Burma," Part ii (*K.B.* 1927, p. 81), Part iii (p. 203), Part iv (p. 310), by the Assistant for India, containing in all descriptions of 25 new species and 2 new varieties.

"Contributions to the Flora of Siam," Additamentum xx (*Leguminosae*) by Prof. W. G. Craib (*K.B.* 1927, p. 56); Additamentum xxi (*Rubiaceae*) by Miss E. T. Geddes (*K.B.* 1927, p. 164); Additamentum xxii (*Orchidaceae*) by Dr. A. F. G. Kerr (*K.B.* 1927, p. 212); Additamentum xxiii (*Connaraceae*) by Prof. Schellenberg, and (*Leguminosae*) by Prof. W. G. Craib (*K.B.* 1927, p. 374); containing in all descriptions of two new genera, 80 new species and three new varieties.

"The genus *Dioscorea* in Siam," by Sir D. Prain and Mr. I. H. Burkill (*K.B.* 1927, p. 225).

"The identity of *Talauma Villariana*," by Mr. J. E. Dandy (*K.B.* 1927, p. 419).

"*Hydnocarpus*, *Taraktogenos* and *Asteriastigma* from Burma," by the Assistant for India (*K.B.* 1927, p. 97).

"*Santalum album* in India" (*K.B.* 1927, p. 200).

CHINA.—Routine.—With the exception of a portion of a set of plants collected by Mr. H. H. Chung of the University of Amoy, all the Chinese and Japanese collections in the Store have been mounted. The increased cabinet accommodation provided during 1927 has enabled practically the whole of the 8000 specimens referred to last year as temporarily arranged, to be laid in the Herbarium. Some 4400 others have also been incorporated, and 6800, about half of which have been temporarily sorted, have had to be held over for lack of cabinet accommodation. Apart from the naming of the large collections referred to below the routine work has been mainly concerned with the identifying of numerous garden specimens, and naming of smaller Chinese and Japanese collections in the Store.

Of the larger collections considerable time was spent over Père Licent's contributions from Northern China and Mongolia, and four further lists of identifications have been dispatched. A portion of Captain F. Kingdon Ward's last collection, made on his expedition to the frontiers of Burma and Tibet in 1926, has been named.

Research and Publications.—A complete enumeration, including descriptions of 54 new species and many new varieties, of the collection made by Captain Kingdon Ward in his Tibetan Expedition of 1924 and 1925 has been completed, and will shortly be published.

Work on the revision of the Asiatic species of the genus *Buddleia* has been continued, for which many of the types have been received on loan. In connection with the proposed monograph of the Asiatic species of *Gentiana*, the descriptions of 23 new species and 5 new varieties will shortly appear in the *Kew Bulletin*.

AFRICA.—Routine.—Very satisfactory progress was made in clearing the African section of the Store and practically all the old collections have now been mounted. Some 14,000 specimens, both old and recent, have been laid out and mounted during the year, of which about 5000 have been incorporated in the Herbarium. The remainder are housed in the Store. With regard to naming, the material needed for the Flora of West Tropical Africa was given preference.

In addition to the rearrangement of covers carried out as a matter of routine during the progress of the Flora of West Tropical Africa, the species of some of the larger genera have been divided up into the five regions of the proposed Regional Floras of Tropical Africa. This subdivision, when fully carried out, will greatly facilitate the naming and laying in of Tropical African plants. In this connection it might be mentioned that the whole of South West Africa and of Bechuanaland is now included in the South African covers.

About 4500 specimens were received for identification during the year, chiefly from Tanganyika Territory and the West African Colonies, but also from Kenya, Uganda and South Africa. As they were received in comparatively small consignments the naming involved a considerable expenditure of time, especially as a large number required very critical examination. The Assistant for South Africa was able to deal fairly promptly with the material sent from various parts of the Union of South Africa.

With regard to grasses, 800 sheets have been named and laid in, including a collection of 253 made by Messrs. T. D. Maitland and J. D. Snowden in Uganda, which forms a valuable addition to material from that Protectorate. The African species of *Sporobolus* were arranged after Miss S. Stent's revision in "*Bothalia*."

Work has also been continued on African orchids, especially on a collection from Katanga.

Research and Publications.—Research was concentrated on the Flora of West Tropical Africa, and the second Part of Volume i, which completes the *Archichlamydeae*, is now ready for the press. This Part includes several families of great economic importance, which were much in need of revision. Amongst these may be mentioned *Caesalpiniaceae*, *Mimosaceae*, *Papilionaceae*, *Meliaceae*, *Simarubaceae*, *Anacardiaceae*, and *Sapindaceae*.

The Assistant for South Africa completed her revision of *Crotalaria* from South and South Tropical Africa, in connection

with which a large number of specimens were received on loan from continental herbaria.

An enumeration of the Flora of the Seychelles Archipelago is being prepared. This necessitates the revision of two large collections made by J. Horne (in 1873-5) and Prof. J. Stanley Gardiner (Sealark Expedition, 1908), and of many small collections subsequently made by Mr. R. Dupont and M. H. P. Thomasset.

Work on the Grasses for Part 5 of Volume ix of the Flora of Tropical Africa has proceeded steadily during the year.

With regard to publications, the first Part of Volume i of "The Flora of West Tropical Africa," containing the families *Cycadaceae-Tiliaceae*, was issued in March, 1927.

Other publications included a Memoir by the Assistant Director entitled "The Gold Coast Forest: a study in Synecology," (*Oxford Forestry Memoirs* No. 7); a second part of "East African Pasture Plants," containing descriptions and figures of 30 East African Grasses, obtainable from the Crown Agents for the Colonies; and the following papers:—"Notes on African Grasses: iv" and "v" (*K.B.* 1927, p. 72 and p. 264), "Tropical African Plants: i" (*K.B.* 1927, p. 150), "African Orchids: i" (*K.B.* 1927, p. 415).

AMERICA.—*Routine*.—Substantial progress was made with the Store work, nearly 18,000 sheets being mounted, and about 11,800 laid in. The task of naming and incorporating the large South American collections proceeded satisfactorily, the most valuable body of material made available for study being, perhaps, the extensive set of Hassler's Paraguay plants, which, as originally received, was largely unnamed. This collection possesses special importance since it is by far the largest hitherto made in Paraguay, and forms the basis of much of our knowledge of the flora of that country. Many of the specimens are type-numbers of new species described in the *Bulletin de l'Herbier Boissier* and elsewhere. Satisfactory progress was also made with Lehmann's Andine collection, over 1000 sheets being named, and about the same number of duplicates being prepared for distribution. The fine set of plants of the Argentine Andes brought back by Mr. H. F. Comber received special study.

In connection with the preparation of a Flora of Trinidad various parcels of critical plants from Trinidad and Tobago were determined. Collections from British Guiana, Brazil, Uruguay and Patagonia were among those named in the course of ordinary routine. In addition to several thousand sheets of Hassler's Paraguay plants, named provisionally with a view to rapid incorporation in the Herbarium, over 2000 specimens from other countries were determined.

The work of writing up the larger American genera in the Herbarium according to the most recent floras and monographs was continued; among the genera dealt with were *Solanum*, *Viguiera*,

Lisianthus, *Quercus*, *Ribes*, various members of the *Aristolochiaceae*, *Asclepiadaceae*, *Ranunculaceae*, *Anonaceae*, and *Menispermaceae*.

Research and Publications.—The receipt of a set of species of *Strychnos*, known in British Guiana as "Devil-doer" on account of their poisonous properties, led to a revision of the material in the herbarium, and the description of a number of hitherto unknown species. The results were incorporated in a paper "New Species of *Strychnos* from Tropical America" (*K.B.* 1927, p. 127). Some of the more outstanding novelties of Mr. Comber's Argentine collection mentioned above were described in "New Species from the Andes of Argentina" (*K.B.* 1927, p. 174).

A paper by Mr. L. A. M. Riley, describing various interesting new plants gathered by himself and others during the "St. George" Pacific Expedition, was published under the title "New Species from Panama, Coiba, and Cocos Islands" (*K.B.* 1927, p. 119).

AUSTRALIA.—*Routine*.—A considerable amount of time has again been spent in writing up Australian material already in the Herbarium, according to the recent floras or monographs. The families from *Ranunculaceae* to *Compositae* were completed in this respect.

The increase in the number of queries mentioned last year has been maintained, and has given rise to points requiring a considerable amount of critical investigation, though at the same time much valuable material has been acquired for the Herbarium. Mr. C. T. White sent a collection of duplicate material of *Ficus* in spirit from Papua, collected by Mr. L. J. Brass, which will be worked out and named as soon as possible. A number of grasses was also forwarded, including 45 sheets of *Stipa* from South Australia and 35 sheets of *Astrelba* from Queensland. A collection of 212 specimens (chiefly from Western Australia) was received for determination from the Hon. Lady Evelyn Cecil. The general work of naming Australian specimens progressed satisfactorily and some 1900 sheets have been mounted and laid in. A number of mixed duplicates was presented from various sources, particularly from Mr. C. T. White, Dr. F. A. Rodway and Mr. F. J. Rae.

Research and Publications.—A revision of the Australian genus *Astrelba* is being prepared for publication and a manuscript copy of the revised descriptions was forwarded to the Government Botanist for Queensland for immediate use. The work of revising the Australian species of *Frankenia* has been completed and will shortly be submitted for publication. A considerable number of alterations of generally accepted views of the species of the genus has been necessary, and some twenty novelties have been described.

The following paper was published during the year:—"Santalum, Eucarya and Mida" (*K.B.* 1927, p. 193).

NEW ZEALAND.—*Routine*.—The work in the New Zealand Section during 1927 consisted of routine correspondence, the naming of a small collection made by the Hon. Lady Evelyn Cecil, and the rearranging and writing up according to recent works of the whole of the New Zealand material in the Herbarium from *Ranunculaceae* to *Compositae*.

Research and Publications.—The following paper was published :—"The type of *Veronica Traversii*" (*K.B.* 1927, p. 395).

POLYNESIA.—*Routine*.—The Polynesian material from *Ranunculaceae* to *Compositae* has been written up and rearranged. A collection made by Mr. J. P. Mead was named, and a certain amount of work was carried out on Mr. W. Greenwood's plants from Fiji.

Research and Publications.—A paper entitled "The Grasses of the Fiji Islands," which includes a key, short descriptions, and notes, was published (*K.B.* 1927, p. 18.)

FERNS, MOSSES AND LIVERWORTS.—During 1927 about 3000 sheets of ferns have been laid in. The writing up of specimens according to Dr. C. Christensen's Index Filicum has been continued. While this has been done at various points to facilitate the naming of the more frequently occurring species, most progress has been made with *Eudryopteris* (*Lastrea*).

Collections, such as those from China by W. Hancock and J. Cavalerie, and from Colombia by E. André, of which duplicates were distributed under provisional names a few years ago, are being re-examined and several lists of revised determinations have been distributed. This work is still proceeding, as is also the naming of other large collections made in Siam by Dr. A. F. G. Kerr, and in Mongolia and Northern China by Père E. Licent. The ferns of the following collections have been named :—Mrs. A. D. Parry, Lushai Hills, Assam; Captain F. Kingdon Ward, Tibet, etc.; Mr. W. R. Price, Formosa; Mr. F. R. Irvine, Gold Coast; Mr. F. C. Deighton, Sierra Leone; Mr. K. E. Toms, Zanzibar; Mr. R. A. Altson, British Guiana; and, from the Store, Dr. A. W. Hill, Andes; Mr. W. R. Price, Formosa.

A few specimens of Mosses and Liverworts have been named and laid in.

ALGAE AND LICHENS.—Several miscellaneous collections of Marine Algae were received for identification, the most noteworthy being specimens from the Gulf of Suez, collected by Mr. N. Douglas Simpson, and from the Sind Coast by Mr. Y. V. Paul, and a selection of interesting and critical specimens from New Zealand forwarded by Mr. R. M. Laing. In addition to these, there were the usual enquiries regarding smaller collections of Marine and Freshwater Algae. A number of sheets of *Rhodophyceae* from Bombay and Karachi were

sent on loan to Dr. F. Börgesen, who has accepted an invitation from the University of Bombay to visit Bombay and study the algae of that coast.

The Biological Department of Dalhousie University, Halifax, Nova Scotia, having decided to specialize in Marine Algae, and being desirous of co-operating with other institutions, presented, through Prof. I. H. Ball, the first instalment of a collection of Marine Algae from the Nova Scotian coasts. The donation will form a very valuable addition to the Herbarium.

Kew is again indebted to Mr. R. Paulson, who on the occasion of his weekly visits has given voluntary assistance in the naming of many lichens, especially collections from the Bahamas sent by Mr. L. J. K. Brace, from Abyssinia by Mr. J. Omer Cooper, and various critical specimens. Several collections of Lichens, including E. André's South American series, have been incorporated.

FUNGI.—The routine work of miscellaneous enquiries, and requests for determinations and for specimens on loan, continues to be heavy. In matters of taxonomy and nomenclature assistance has been given to officers of the Ministry of Agriculture and Fisheries at Advisory Centres; and also to authors of papers both at home and abroad.

Among collections named during the year have been fungi from South Africa (P. A. van der Bijl), India (S. R. Bose), Uganda (C. G. Hansford), Dunk Island, North Queensland (W. Cottrell-Dormer), and North America (E. M. Wakefield). Several large collections, however, still await determination.

In addition to those mentioned above, a number of fungi have been laid in, including Philippine material (Elmer), Mycotheca Carpatica (Petrak), Fungi Exotici (Sydow, 4 fascicles), and some 130 British specimens.

Considerable time has been spent in ascertaining the exact nomenclature of pathogenic fungi for a list of British plant-diseases, which is in preparation by the sub-committee for Plant Pathology of the British Mycological Society. The need of the list was pointed out by the officers of the Ministry of Agriculture and Fisheries, and by the Director of the Imperial Bureau of Mycology, and its preparation has been recognised by the Imperial Agricultural Research Conference, 1927.

A card catalogue, already in use in the Herbarium, of fungi parasitic on ornamental or forest trees in Western Europe, has been considerably extended as a result of an enquiry by the Forestry Commission, and the possibility of its publication is being considered.

In connection with the outbreak of the new Douglas Fir disease, caused by the fungus *Rhabdocline pseudotsugae*, a visit was paid by the Keeper to Dawyck (Peeblesshire), where the original outbreak occurred, and subsequently to Kemsing (Kent), and Oxford, where the disease was discovered for the first time this season.

Research and Publications.—The work on the genera *Vermicularia* and *Colletotrichum* was concluded and the manuscript has been sent to the press.

The following papers were published during the year :—" Studies of *Rhizoctonia Crocorum* (Pers.) DC. and *Helicobasidium purpureum* (Tul.) Pat." (Trans. Brit. Myc. Soc. xii, p. 116). "The genus *Cystopus* in South Africa" (*Bothalia* ii, p. 242).

STOREHOUSE.—The allocation of the Store staff was the same as in 1926, though there were several changes in the personnel. In spite of this the rate of laying-out and mounting was more rapid than in any previous year.

In the Asiatic Room almost all the Chinese and Indian material has been mounted and in the African Room all the Tropical African and South African material. Practically all the Australian material has also been dealt with. Very large collections in the European and American Rooms still remain to be mounted, and in the Asiatic Room material from the Malay Islands and Philippine Islands. In the Cryptogamic Section many collections of ferns, lichens, mosses and hepaticae remain practically untouched. The figures in the table below include work accomplished by the Store staff; other references to the Store work will be found under the respective geographical headings.

SUMMARY OF ROUTINE.—The following table summarises the routine work, apart from naming, accomplished by the regular staff and by the special Store staff during 1927, excluding the lower cryptogams.

Mounted	100,630
Incorporated	68,057
Duplicates distributed	3,790
Specimens received on loan	5,552
Specimens sent out on loan	3,132

SEEDS AND CARPOLOGICAL COLLECTIONS.—About 250 boxes of seeds have been added to the Seed Collection from various sources. These included a valuable set from Ceylon presented by Mr. A. H. G. Alston.

The provision of a new table case in the West Wing of the Herbarium has allowed 150 boxes of somewhat bulky fruits and seeds to be incorporated in the Carpological Collection. The specimens are mainly Monocotyledons.

COLLECTION OF DRAWINGS AND PHOTOGRAPHS.—Between three hundred and four hundred drawings were laid in. These consisted mostly of current material, but a certain amount of progress was made with arrears. Of collections received during the year mention may be made of a fine set of orchid drawings by the late Edward

Smith, of Fir Vale, Sheffield, presented by the Representatives of the late Richard Ford Smith, who had received them from Miss Margaret Harker Smith; a set of enlarged photographs of Argentine Andes plants and vegetation purchased from Mr. H. F. Comber, illustrative of his second Expedition (1926) to that region; and a collection of photographs taken by Dr. D. Fairchild on the Allison V. Armour Expedition (1926-7) to West Africa, presented by the National Geographical Society of the U.S.A. Flowers and foliage are very well represented in the Herbarium collection of illustrations, but the extension of this collection by the addition of photographs of entire plants and plant societies is of great importance. A valuable series of photographs of old type specimens preserved in various herbaria throughout the world was presented by the U.S. National Museum, Washington.

NOMENCLATURE.—Preparations for the International Botanical Congress, to be held in England in 1930, were continued during the year. During the last decade there has been an increasing body of public opinion in favour of such modification of the International Rules (ed. 2, 1910) as would lead to greater certainty and uniformity in their application. The subject has been discussed in botanical journals, and was debated at the Imperial Botanical Conference (London, 1924), and the International Congress of Plant Sciences (Ithaca, 1926). At the latter Congress an International Committee was appointed to consider proposals for emending the Rules, and to make recommendations to the International Congress to be held in 1930. A large amount of preparatory work necessary in this connection is being undertaken at Kew, amongst other problems the typification of generic names, and the preparation of a list of additional *Nomina Generica Conservanda*.

As a result of discussion at Ithaca and of subsequent correspondence, it was decided, on the proposal of Professor Hitchcock of the United States Department of Agriculture, to attempt to secure the agreed typification of Linnean generic names of *Phanerogamia* published in *Sp. Pl.* ed. 1, and *Gen. Pl.* ed. 5. An extensively annotated list of suggested standard-species for the names in question has accordingly been prepared, the first 500 genera having been worked out by Professor Hitchcock, and the remaining 555 by Miss M. L. Green. The joint list will be published and distributed for suggestions and criticisms to all botanists interested before being brought before the International Committee on Nomenclature.

As mentioned last year, a schedule containing thirty-one suggested new *Nomina Generica Conservanda* (with the reasons for their conservation) was sent to the members of the International Committee and to other botanists. Judging from the replies received, the schedule as a whole appears to have met with approval.

As illustrating the importance and urgency of work of this nature, the discovery that the name *Epidendrum* as now used was

found to be technically inapplicable may be cited. The placing of this name on the Nomina Conservanda list will save unnecessary name-changes in a genus of about 750 species. An annotated list of twenty additional names has been received from Dr. Elmer D. Merrill, including those of such large and important genera as *Loranthus*, *Lasianthus* and *Gardenia*.

A certain amount of time has been given to correspondence with regard to technical difficulties on points of bibliography, nomenclature, and searching for plant names not easily traced. Enquiries were also received from botanists as to the correct names under International Rules of numerous genera, and some of the results of the investigations undertaken in this connection were embodied in the following papers:—

"*Atylosia* or *Cantharospermum*" (K.B. 1927, p. 134); "*Paphiopedilum* and *Phragmopedilum*" (K.B. 1927, p. 306); "*Aplostellis* and *Corymbis*" (K.B. 1927, p. 363); "*Cerefolium* Haller" (Journ. Bot. 1927, p. 15); "*Alibertia* or *Cordia*" (Journ. Bot. 1927, p. 16); "*Tunica* Mert. et Koch" (Journ. Bot. 1927, p. 225).

INDEX KEWENSIS.—During the past year the compilation of the Seventh Supplement (1921-25) of the Index Kewensis has been proceeding steadily, and between 9000 and 10,000 entries have been added to the card catalogue. The reduction in the number of entries, as compared with last year's, was chiefly owing to the fact that the most important books and periodicals and also those containing the greatest number of new names are on the whole examined first and the new names extracted in order that they may be available for consultation. During the past year works have been examined which contain a smaller number of new names, and the search for the obscure few often entails a vast amount of time. All the Russian works concerned have been dealt with in 1927. Apart from the current literature several older works containing names omitted from the Index Kewensis have been examined, one of which, Lavallée, Arboretum Segrezianum, 1877, was found to contain some 350 new names. It is expected that Supplement VII will be ready for the press by the autumn of 1928.

EXPERIMENTAL GROUND.—The existing plot having proved its value, an extra piece of ground on the south side has been dug up and incorporated. Investigations were continued on *Silene* varieties and on *Epilobium angustifolium*. Critical material of *Silene*, *Centaurea*, *Inula*, *Hieracium*, *Cistus*, *Agropyron*, and species of *Verbascum* (some not previously represented at Kew) were studied and sheets prepared for the Herbarium.

Work was commenced on propagating pure lines of material of *Silene*, *Centaurea* and *Plantago* for the Transplant Committee of the British Ecological Society. The purpose of this Committee, which was formed at the instigation of the Director, is to direct and

superintend experiments with material of pure lines grown in various localities possessing different conditions of soil and climate. The preliminary experiments are being made at Potterne by the courtesy of Mr. E. M. Marsden-Jones, with control experiments at Kew, and as the research proceeds a selection of specimens will be dried and kept at the Herbarium so that a complete record may be preserved. The experiments are planned to last ten years in the first instance, and are likely to be of a very comprehensive nature.

VISITORS.—About 4712 visits have been made to the Herbarium during the year. The work carried out by visitors covered as usual a very wide field, as is indicated in the outline given below.

Dr. O. Stapf and the staff working under him on the Botanical Magazine, and on the new edition of Pritzel's Index Iconum, were again accommodated in the Library. The latter work, which will bear the title "Iconum Botanicarum Index Londinensis," is now nearing completion, and a note as to its scope and the principles adopted in connection with the revision has been published (K.B. 1927, p. 366). Kew is indebted to Dr. Stapf for help received with regard to various questions, particularly in connection with the genus *Ephedra*.

Various members of the staff of the Botanical Department of the British Museum (Natural History) visited the Herbarium repeatedly in connection with their work, as did Mr. E. W. Mason and other workers from the Imperial Bureau of Mycology. Mr. E. D. Darlington, of the John Innes Horticultural Institution, paid visits in connection with investigations on *Prunus* species, and British botanists were chiefly represented by Messrs. C. E. Salmon, J. Fraser, E. Thurston and E. M. Marsden-Jones. On the cryptogamic side Prof. F. O. Bower was at Kew on several occasions studying ferns, and Mr. H. N. Dixon and Mr. R. Paulson paid frequent visits in connection with their work on Mosses and Lichens respectively, whilst Mr. W. B. Grove spent about a fortnight at Kew in September studying fungi.

India was represented by Mr. C. E. Parkinson, Forest Botanist, Burma, who spent the last four months of the year at Kew working at the flora of Burma, especially forest plants; and by Dr. S. K. Mukerji, Lecturer at Lucknow University, who had been engaged in ecological research at University College, London, for two years, and who paid many visits to the Herbarium in connection with his studies on the genus *Mercurialis* and on the flora of Kashmir. Captain F. Kingdon Ward was a frequent visitor and assisted in naming the plants collected during his 1926 expedition to Burma and Tibet.

Mr. H. F. Macmillan, of the Anglo-Persian Oil Company, visited Kew repeatedly with reference to plants collected by him in S. W. Persia.

Considerable attention was again paid to the flora of the Malay region; Mr. R. E. Holttum, Director of the Botanic Gardens, Straits Settlements, spent part of his leave at the Herbarium studying Malayan ferns. Mr. H. N. Ridley was at Kew most of the year continuing his work on Malay plants and the problems of seed distribution. Mr. I. H. Burkill, also a regular visitor, continued his work on a "Dictionary of Economic Plants of the Malay Peninsula," in which he was again assisted by Dr. D. Hooper, late Curator of the India Museum, Calcutta. Thanks are due both to Mr. Ridley and Mr. Burkill for assistance rendered in connection with questions on Malayan plants. Miss E. T. Geddes spent the second year of her tenure of the Senior Kilgour Scholarship at Kew, as approved by the authorities of the University of Aberdeen, and continued work until the middle of July on the flora of Siam. During this period most of her time was spent on the families *Melastomaceae* to *Rubiaceae*.

Professor Schellenberg, of the University of Göttingen, spent nearly two months in England, being engaged on his revision of the *Connaraceae*.

Professor G. Koidzumi, of Kyoto, spent some time in the Herbarium working at the native flora of Japan, and Dr. T. Tanaka paid another visit to Kew in connection with his work on *Citrus*. Mr. W. R. Price visited the Herbarium on several occasions in continuation of his work on his collection of plants from Formosa.

Professor C. E. Moss, of the University of the Witwatersrand, Johannesburg, was at Kew the first month of the year working out South African species of *Compositae* and *Chenopodiaceae*. Miss D. M. Cory, of Grahamstown, also spent some time at Kew working on South African plants. Throughout the year Mr. N. E. Brown was a visitor at the Herbarium and was engaged chiefly on work on the genus *Mesembryanthemum* and on South African *Iridaceae*. Miss M. A. Pocock, of Cape Town, visited the Herbarium in connection with plants collected by her in Angola. Mr. R. E. Vaughan, of the Royal College, Mauritius, during his year of study in England, spent many weeks in the Herbarium naming his collection of Mauritian plants; and Mr. E. F. S. Shepherd, Botanist and Mycologist to the Department of Agriculture, Mauritius, worked at Kew in the autumn, especially in connection with the literature of tropical mycology. Mr. K. E. Toms worked at the Herbarium for several weeks identifying his Zanzibar collections. Mr. T. D. Maitland, Superintendent of the Botanic Gardens, Victoria, Cameroons, paid frequent visits, working chiefly at Grasses collected by him in Uganda. Mr. P. J. Greenway, of the Imperial Forestry Institute, Oxford, paid repeated visits to Kew, chiefly in connection with the forest flora of West Africa.

Professor A. H. R. Buller, of the University of Manitoba, Winnipeg, was at Kew for about two months in the summer, and was engaged in bibliographical work.

Mr. H. F. Comber paid several visits in connection with the working out of his collection from the Argentine Andes, and Mr. L. A. M. Riley spent several weeks at Kew preparing his paper on "New Species from Panama, Coiba and Cocos Islands."

The United States of America were represented by a number of visitors. Prof. B. L. Robinson, Curator of the Gray Herbarium, Harvard University, visited Kew for a short period in July, studying especially the genus *Eupatorium*. Mr. and Mrs. Carl Epling, of the University of California, Berkeley, arrived in August and worked on the American *Labiatae* until the end of the year. Prof. W. Trelease, late of the University of Urbana, Illinois, paid two visits during 1927, and continued his study of South American *Piperaceae*. Dr. Ivan Johnston, of the Gray Herbarium, was at Kew during September, working at the flora of Chile and the *Boraginaceae* of South America; and Dr. H. Castle, of Yale University, who is in Europe studying type specimens of Hepaticae, was at Kew for two or three weeks in September. Dr. W. A. Cannon, of the Carnegie Institution of Washington, Tucson, Arizona, spent several weeks in the Library in connection with the ecology of the Mediterranean flora.

Mrs. Clement Reid and Miss M. E. J. Chandler continued their studies on Oligocene and Eocene fruits and seeds, and made several stays at Kew during the year.

Mr. G. M. Sprague visited the Herbarium in November and December, being engaged on work on the botany of Otto Brunfels' Herbal and Caspar Bauhin's Pinax. Mention must also be made of Miss Muriel Whiting, who again generously gave her services for several months of the year in connection with the rearrangement and working out of Malayan material.

ADDITIONS TO HERBARIUM.—The total number of specimens received during 1927 was about 26,750, of which 2346 were purchased. The chief sources from which they were obtained were as follows:—

EUROPE.—*Presented*: Great Britain, by Messrs. J. Gladstone, C. E. Hubbard, E. M. Marsden-Jones, V. S. Summerhayes, E. Thurston, W. B. Turrill and The Watson Exchange Club (per Mr. D. G. Catchside); Spain, (coll. the Rev. E. Ellman and Mr. E. Nelmes) by the Rev. E. Ellman, and (coll. Don Carlos Pau) by Mr. N. Y. Sandwith; Sweden, by Dr. G. Samuelsson and Mr. Carl G. Alm; Czechoslovakia, (coll. Dr. J. Podpera) by Brno University; Roumania, *Florae Roumaniae Exsiccatae*, Cent. 7, by Prof. A. Borza; Russia, by Prof. B. Fedtschenko, Mrs. E. M. Reid (seeds); Poland, Warsaw University (fungi); Latvia, Riga University (algae); European *Artemisias*, by Prof. R. Pampanini.

Purchased: Mr. D. McArdle, Irish Mosses; Dr. F. Petrak, *Mycotheca Carpatica* fasc. 17-19 (Nos. 401-475); Messrs. A.

Fiori and A. Béguinot, *Flora Italica Exsiccata*, Cent. 29-30 ; Mr. T. O. Weigel, Bornmüller, *Iter Graecum* : Mr. G. V. Keintz, Crimean plants.

ORIENT.—*Presented* : Palestine, (coll. Mr. F. J. Tear) by Department of Agriculture, Palestine ; Persia, by Capt. B. Stuart Horner and Mr. B. Gilliat-Smith ; Cyprus, by Mr. A. Huddle.

NORTH ASIA.—*Presented* : Siberia, by Tomsk University ; Turkestan, by the Central Asia University, Taschkent.

CHINA.—*Presented* : (coll. Mr. G. Forrest) by the Royal Botanic Garden, Edinburgh, Prof. H. Handel-Mazzetti, (coll. Mr. R. C. Ching) by Dr. H. H. Hu, the Abbé E. Lecomte, Dr. J. C. Lui ; Western China, by Capt. F. Kingdon Ward and the Natural History Museum, Vienna.

INDIA AND CEYLON.—*Presented* : Assam, by Mrs. A. D. Parry ; Burma, by Mr. C. E. Parkinson ; Burmese orchids, by the late Mr. R. C. J. Swinhoe ; Karakoram, (coll. Mr. R. C. Clifford) by Major K. Mason ; various, by Mr. R. N. Parker and the Rev. E. Blatter ; Ceylon, (coll. Mr. A. H. G. Alston) by the Department of Agriculture, Peradeniya.

Purchased : Mr. G. O. Allen, Indian Charophyta.

MALAY PENINSULA.—*Presented* : Various, by the Director, Botanic Garden Department, Straits Settlements.

INDO-CHINA.—*Presented* : Siam, by Mrs. D. J. Collins, Mr. H. B. G. Garrett, (coll. Dr. A. F. G. Kerr and Nai Put) by Dr. A. F. G. Kerr, (coll. Phra Winit Wanadorn) by the Siam Forestry Service, and Dr. Eryl Smith.

MALAY ISLANDS.—*Presented* : Java, by the Director, Botanic Garden, Buitenzorg.

Purchased : Borneo, Mr. A. D. E. Elmer.

NEW GUINEA.—*Presented* : (coll. Mr. L. J. Brass) by Mr. C. T. White.

Purchased : (coll. D. R. Schlechter) the Director, Botanic Gardens, Berlin.

POLYNESIA.—*Presented* : Fiji, by Mr. W. Greenwood.

AUSTRALIA.—*Presented* : New South Wales, by Dr. F. A. Rodway ; Queensland, by Mr. C. T. White ; Victoria, by the National Herbarium of Victoria ; Western Australia, (coll. Dr. C. H. Ostenfeld) by the Universitetets botaniske Museum, Copenhagen ; various, by the Hon. Lady Evelyn Cecil and Mr. C. T. White.

TROPICAL AFRICA.—*Presented* : Abyssinia, by Dr. Hugh Scott and Mr. J. Omer Cooper ; Gold Coast, by Mr. F. R. Irvine, Sir A. Kitson ; Kenya, (coll. Mr. H. M. Gardiner) by the Department of Agriculture ; Liberia, (coll. Mr. J. Linder) by the Arnold Arboretum ; Nigeria, by the Forestry Department ; Nyasaland,

(coll. Mr. A. Stolz) by the Bentham Trustees ; Rhodesia, (coll. Mr. F. Eyles) by the Department of Agriculture ; Sierra Leone, (coll. Mr. F. C. Deighton) by the Department of Agriculture ; Tanganyika, (coll. Messrs. D. K. S. Grant, A. E. Haarer and T. H. Marshall) by the Department of Agriculture, and (coll. Mr. B. D. Burt) by the British Museum (Natural History) ; Zanzibar, by Mr. K. E. Toms ; Uganda, (coll. Messrs. T. D. Maitland and J. D. Snowden) by the Department of Agriculture ; West Coast, (coll. Dr. J. M. Dalziel) by Mr. Allison V. Armour.

MASCARENE ISLANDS.—*Presented* : Mauritius, by Mr. R. E. Vaughan.

SOUTH AFRICA.—*Presented* : Cape Province, by Mrs. M. R. Levyns ; various, by Dr. J. Burt Davy and the Division of Botany, Pretoria.

Purchased : Various South African Plants, Mr. N. S. Pillans.

NORTH AMERICA.—*Presented* : United States, by the University of California, U.S. Department of Agriculture, the Gray Herbarium, the U.S. National Museum, (coll. Mr. Kirk Whited) by Dr. L. H. Pammel, and (coll. Mr. J. A. Kusche) by Miss A. Eastwood ; Canada, by Miss C. Rogers and Miss G. Dorrien Smith ; Alaska, by Miss C. Rogers and Miss G. Dorrien Smith, and (coll. Mr. H. L. Mason and Mr. G. Halsey) by Miss A. Eastwood ; British Columbia, by the Royal Horticultural Society ; various, by the U.S. National Museum.

Purchased : Mr. B. F. Bush, U.S.A. plants.

CENTRAL AMERICA.—*Presented* : Mexico, Mosses (coll. the Rev. L. Arsène) by the U.S. National Museum.

WEST INDIES.—*Presented* : Trinidad, by the Forestry Department, Mr. L. A. M. Riley, and (coll. Mr. R. O. Williams) by the Department of Agriculture.

EAST TROPICAL SOUTH AMERICA.—*Presented* : British Guiana, (coll. Mr. R. A. Altson) by the Department of Science and Agriculture ; Brazil, by Mr. C. L. Collenette, Miss G. Dorrien Smith, Mr. B. G. C. Bolland, and (coll. Dr. P. Dusén and Dr. G. Samuelsson) by the Rijks Museum, Stockholm.

WEST TROPICAL SOUTH AMERICA.—*Presented* : Costa Rica, (coll. Dr. P. C. Standley) by the U.S. National Museum ; Peru, by Dr. Francis W. Pennell.

Purchased : Bolivia, (coll. Dr. J. Steinbach) Botanic Gardens, Berlin.

TEMPERATE SOUTH AMERICA.—*Presented* : Argentina, (coll. Dr. J. A. Schafer) by the New York Botanical Garden ; Chile, by Dr. Francis W. Pennell ; Uruguay, by Dr. F. Felippone.

Purchased : Chile, (coll. Dr. E. Werdermann) Botanic Gardens, Berlin.

DISTRIBUTION OF DUPLICATES.—The following were the principal institutions to which duplicates were distributed :—

Great Britain and Ireland.—Aberdeen, Cruickshank Botanic Gardens; Cambridge University, the Botany School; Dublin, Trinity College, Botany Department; Edinburgh, Royal Botanic Garden; London, British Museum (Natural History); Manchester, the University, Botanical Department; Oxford, Imperial Forestry Institute.

Europe.—Berlin, Botanic Gardens and Museums; Brno, Masaryk University; Copenhagen, Botanic Institute; Leningrad, Principal Botanic Garden; Paris, École des Hautes Études; Sofia, the University, Botanical Department; Stockholm, Riksmuseet; Zürich, Botanic Garden and Museum.

Africa.—Cape Town, South African Museum; Bolus Herbarium.

Australia.—Melbourne, National Herbarium of Victoria.

America.—University of California; Gray Herbarium, Harvard University; Philadelphia, Academy of Natural Sciences; Washington, D.C., U.S. National Museum.

The Library.

The following remarks refer to the more important presentations made to the Library.

Several periodicals in continuation have been presented as formerly by the Bentham Trustees; also a copy of *Japanese Cherries*, by M. Miyoshi (1923?); this consists of 118 coloured figures in two oblong folio volumes, and an octavo volume of text in Japanese.

The Secretary of State for India has presented another volume of Sir William Foster's great work *The English factories in India*. The latest volume, which covers the years 1668 and 1669, is the thirteenth of the series. From the High Commissioner for India has been received a copy of the *Journal of Francis Buchanan kept during the survey of the district of Shahabad in 1812-1813*. This has been edited by C. E. A. W. Oldham, and was published at Patna in 1926.

From the Crown Agents for the Colonies :—6 copies of the first part of the *Flora of West Tropical Africa*, by J. Hutchinson and J. M. Dalziel; a second part of *East African Grasses*, the text by C. E. Hubbard; *Bulletin of the Geological Survey of Nigeria*, nos. 10 and 11; and an *Illustrated Guide to the Botanic Gardens, Singapore*, by I. H. Burkill.

The *Natural History Magazine*, now being issued by the British Museum (Natural History), of which four numbers have appeared, has been presented by the Trustees.

From the Council of the Royal Horticultural Society :—*Catalogue of the Lindley Library*, new edition, and the *Report of the Tulip Nomenclature Committee, 1914-15*.

The Carnegie Institution of Washington, through the kind offices of Dr. W. A. Cannon, has presented nos. 354 and 368 of its

Publications, these being Dr. Cannon's works: *General and physiological features of the vegetation of the more arid portions of Southern Africa*, 1924, and *Physiological features of roots with especial reference to the relation of roots to aeration of the soil*, 1925.

An Atlas of 41 large folio plates, with a quarto volume of text, illustrating and describing the dunes near Kootwijk, Holland, and their vegetation, has been published under the title: *De zandverstuivingen bij Kootwijk in woord en beeld*, by the State Forest Administration, Utrecht, from which a copy has been received.

The set of the *Perfumery and Essential Oil Record* in the library, which was deficient in the first three volumes and all issued after October, 1924, as well as in several numbers of other volumes, has been practically completed up to April, 1927, by Mr. Herbert C. Wright, whose valuable assistance was obtained through the kind offices of Mr. E. M. Holmes. The early volumes and many numbers of later volumes of this periodical are now out of print.

From Lieut.-Col. Sir David Prain :—The continuation of several periodicals including the *Berichte der Deutschen Botanischen Gesellschaft*, the *Bulletin de la Société Botanique de France*, and the *Proceedings of the American Philosophical Society*; also the *Year-book of Pharmacy* . . . and *Transactions of the British Pharmaceutical Conference*, 1926.

Mr. I. H. Burkill has presented 22 volumes which include F. A. Buhse, *Die Flora des Alburs und der kaspischen Südküste*, 1899; F. Darwin and J. C. Willis, *Lecture notes on the natural history of plants*, [1892]; G. J. Radde, *Berichte über die biologisch-geographischen Untersuchungen in den Kaukasusländern*, 1866, several elementary textbooks of botany, and 30 maps, mostly of India.

An anonymous little volume entitled *The natural history of remarkable trees, shrubs and plants*, published in Dublin in 1819, has been presented by Mr. Arthur Osborn. There is some connection between it and Joseph Taylor's *Arbores mirabiles* (London, 1812), the remarks concerning several of the plants being exactly the same.

Books received from the Editor of *Nature* :—A. C. Beal, *The Gladiolus and its culture*; A. W. Darnell, *Winter blossoms from the outdoor garden*; R. R. Gates, *A botanist in the Amazon Valley*; R. W. Kolbe, *Die Kieselalgen des Sperenberger Salzgebiets* (Pflanzenforschung, herausg. von R. Kolkwitz, Heft. 7); R. Morse, *British wild fruits and how to identify them*; A. I. Perold, *A treatise on viticulture*; H. Ross, *Die Pflanzengallen (Cecidien) Mittel- und Nordeuropas*, etc., zweite Auflage; J. C. Wister, *The Iris: a treatise . . . for the amateur gardener*.

Books received from their publishers for review in the *Kew Bulletin*. From Messrs. Arnold :—A. T. Johnson, *A garden in Wales*. From Messrs. Baillière, Tindall & Cox :—S. A. Waksman, *Principles of soil microbiology*; S. A. Waksman and W. C. Davison, *Enzymes: properties, distribution, methods and applications*. From

The following are independent works or in some cases separates from periodicals or other publications which have been presented by their authors unless otherwise stated:—J. R. Anderson, *Trees and shrubs, food, medicinal, and poisonous plants of British Columbia*, 1925; E. B. Babcock and R. E. Clausen, *Genetics in relation to agriculture*, ed. 2 (from Prof. Babcock); G. Beck, *Flora Bosnae Hercegovinae et regionis Novipazar*, final part of the Choripetalae (from Director, Botanic Garden, Belgrad); L. Beille, *Précis de botanique pharmaceutique*, tome i, ed. 2, 1925 (from Dr. Otto Stapf); Elsdon Best, (1) *The Pa Maori*; (2) *Maori agriculture*, 1925 (*Bulletin, Dominion Museum, New Zealand*, nos. 6 and 9, from Director); W. Bisiker, *Across Iceland*, 1902 (from Dr. A. W. Hill); F. Börgesen, *Marine Algae from the Canary Islands*, iii, pt. 1; J. Borg, *Descriptive flora of the Maltese Islands*; L. Buscalioni and G. Muscatello, (1) *Studio Monografico sulle specie Americane del gen. Saurauia*; (2) *Studio anatomo-biologico sul gen. Saurauia*, 1918 (both from Malpighia); M. E. J. Chandler, *The upper eocene flora of Hordle, Hants*, pt. ii, 1926; P. Choux, (1) *Le genre Secamone à Madagascar*, 1926; (2) *Les Sapindacées de Madagascar* (both *Mémoires de l'Acad. Malgache*); S. R. de Boer, *Respiration of Phycomyces*; E. de Wildeman, *Plantae Bequaertianae*, vol. iii, fasc. 4 and vol. iv, fasc. 1-2, 1926-27; C. van Dillewijn, *Die Lichtwachstumsreaktionen von Avena*; H. N. Dixon, (1) *Studies in the Bryology of New Zealand*, pt. iv (*Bull. New Zeal. Inst.* no. 3, pt. iv), 1926; (2) *Fossilium catalogus, plantae*, ed. W. Jongmans, pt. 13, *Muscineae*; B. A. Fedtschenko and E. J. Bobrov, *Flora of the Cherepovets Government*, pt. 1 (in Russian); *Rhododendrons collected by G. Forrest* (1) in 1924, (2) in 1925 (from Mr. Reginald Cory); L. Gibbs, *Common Hongkong ferns*; *Letters of Sir Thomas Hanbury* (selected and arranged by Lady Hanbury), 1913 (from Mr. Cecil Hanbury); H. Handel-Mazzetti, *Systematische Monographie der Gattung Leontopodium* (from *Beih. zum Bot. Centralbl.*); A. Heintze, *Cormofyternas fylogeni*; F. L. Herrera, *Chloris Cuzcoensis*, 1926; G. Herter, *Estudios botánicos en la región Uruguaya (Index familiarum plantarum Montevidensis)*; K. Heyne, *De nuttige planten van Nederlandsch Indië*, 2e druk, 3 vols. (from Department of Agriculture, Buitenzorg); E. Hultén, *Flora of Kamchatka and the*

41

Sander); V. V. Sapozhnikov, *L'Altai Mongolien aux sources de l'Irtych et du Kobdo*, 1911 (in Russian); V. V. Sapozhnikov and B. K. Shishkin, *Vegetation of the Zaisan District*, 1918 (in Russian); C. G. G. J. van Steenis, *Malayan Bignoniaceae: their taxonomy, origin and geographical distribution*; B. Stefanov, (1) *Monographie der Gattung Colchicum*, 1926; (2) *Herkunft und Entwicklung der Vegetationstypen in den Rhodopen*; T. R. Sim, *Tree planting in South Africa*, etc.; W. N. Suksdorf, *Werdenda: Beiträge zur Pflanzenkunde*, Bd. i, nos. 1-4, 1923-27; E. Teixeira, *Oleos vegetaes Brasileiros*, ed. 2; B. C. Tharp, *Structure of Texas vegetation east of the 98th meridian*, 1926 (*Bull. Univ. Texas*, no. 2606); *Field notes on Rhododendrons collected by Kingdon Ward in 1926* (also *Field notes on other plants collected by him in 1926*, both volumes from Mr. Lionel de Rothschild); C. W. Wardlaw, *Lanarkshire Strawberry disease*, 1926 (from Major T. F. Chipp); J. H. L. Waterhouse, *A Roviana phrase book*, 1926; F. W. Went, *Wuchsstoff und Wachstum*; Y. Yamamoto, *Supplementa Iconum plantarum Formosanarum*, pt. iii (from Department of Botany, Government Research Institute, Formosa). The year of publication when not stated is 1927.

The periodical and serial publications presented during the year include the following, which have been received from their editors or from the societies or institutions issuing them, unless otherwise stated:—*Acta Horti Botanici Universitatis Latviensis*, vol. i, no. 3, and vol. ii, no. 1; *Acta Instituti et Horti Botanici Tartuensis (Dorpatensis)*, vol. i, fasc. 2-3; *Acta Phytochimica* (Tokyo), vol. ii, no. 4, and vol. iii, nos. 1-2; Angola, Fomento Geral (Fogearang), *Publicações diversas*, vi-ix (2 copies); Australasian Association for the Advancement of Science, Adelaide, 1924, *Report*; Bernice P. Bishop Museum, Honolulu, *Report*, 1926; *Bothalia*, vol. ii, pts. 1a and 1b; Boyce Thompson Institute for Plant Research, Yonkers, New York, *Contributions*, vol. i, no. 4; *Professional Papers*, nos. 3-6; British Association for the Advancement of Science, Oxford Meeting, 1926, and Leeds Meeting, 1927, *Reports* (Miss E. M. Wakefield); Leeds Meeting, *General Handbook*, with maps (Mr. W. B. Turrill); British Bryological Society, *Reports*, 1923-27; Brooklyn Botanic Garden, *Record and Leaflets*; *Bulletin de l'Institut de Pédologie et de Géobotanique de l'Université de l'Asie Centrale*, Tashkent, livr. 1-2; *Bulletin du Jardin Botanique de Kieff*, livr. 5-6; *Bulletin of the Polytechnical Institute of Tiflis*, vol. i-ii; *Bulletin of the Rubber Growers' Association*, vol. ix; *Bulletin de la Société Botanique de Genève*, 2me série, vol. xviii, fasc. 2 and vol. xix, fasc. 1; *Bulletin de la Société Linnéenne de Lyon* (from Dr. A. W. Hill); Canal Zone Plant Introduction Gardens, Panama, *Report*, 1925-26; *Contributions from the Henry Shaw School of Botany*, St. Louis, Missouri, complete set, bound (from Prof. W. Trelease); *Contributions du Laboratoire de Botanique de l'Université de Montréal*, nos. 6-8; Danske Arktiske Station paa Disko, *Arbejder*, nos. 11-12; East Mallang Research Station, *Annual Report* (13th year), Supplement; *Empire Cotton Growing Review*, vol. iv;

Erdészeti Kísérletek (Forest Researches), Sopron, Hungary, vol. xxviii, pts. 1-4, and vol. xxix, pts. 1-2; *Folia Cryptogamica*, Szeged, Hungary, vol. i, no. 4; *Forestry: the Journal of the Society of Foresters of Great Britain*, vol. i, no. 1; *Indian Forester*, 1927; Indian Tea Association, Scientific Department, *Quarterly Journal*, 1926, pt. 4, and 1927, pts. 1-3; *Japanese Journal of Botany*, vol. iii, no. 3; *Journal of the Department of Agriculture of Porto Rico*, vol. xi (from Miss E. M. Wakefield); *Journal of the Federated Malay States Museums*, vol. xiii, pt. 4; *Journal of the Gold Coast Agricultural and Commercial Society*, vol. v, nos. 2-3, and vol. vi, no. 1; Long Ashton, Bristol, Agricultural and Horticultural Research Station, *Annual Report*, 1926; *Malayan Forest Records*, nos. 3-4; Marlborough College Natural History Society, *Report*, no. 75; *Mededeelingen uit het Phytopathologisch Laboratorium "Willie Commelin Scholten"*, Baarn, x-xi; *Mémoires de l'Institut de Génétique de l'École Supérieure d'Agriculture à Varsovie*, livr. 1-2; Milwaukee Public Museum, *Year Book*, 1925 and 1926 (from Mr. T. A. Sprague); Moss Exchange Club, *Reports*, 1903, 1904, 1908-19, 1921-22 (Mr. W. R. Sherrin); *Nederlandsche Dendrologische Vereeniging, Jaarboek*, 1926; *Nederlandsch Kruidkundig Archief*, 1926; *Notulae systematicae*, *Herbier du Museum*, Paris, tome iv, no. 3; *Nova Acta Regiae Societatis Scientiarum Upsaliensis*, ser. 4, extra volume, 1927; *Orchid Review*, 1927; *Quarterly Journal of Forestry*, vol. xxi and General Index to vols. xi-xx; *Recueil des Travaux Botaniques Néerlandais*, vol. xxiii, livr. 3-4, and vol. xxiv, livr. 1-3; *I Rocznik Polskiego Towarzystwa Dendrologicznego (Annuaire de la Société Dendrologique de Pologne)*, 1926; Tohoku (Imperial University, Sendai, Japan, *Science Reports*, ser. 4 (Biology), vol. ii, nos. 2-3; *Transactions of the Royal Society of Canada*, sect. v, ser. 3, vol. xx; *Transactions of Tomsk State University*, vol. 77, fasc. 1-4; *Travaux des Laboratoires de Matière Médicale . . . de la Faculté de Pharmacie de Paris*, tome xvii; *Tropical Woods* (Yale School of Forestry), nos. 9-12; Ukraine Agricultural Scientific Committee, Botanical Section, *Journal of Agricultural Botany*, vol. i, pts. 1-3; Union of South Africa, Department of Agriculture, Veterinary Education and Research, *Reports* 11 and 12, in 2 parts; Forest Department, *Report*, 1925-26, and *Bulletins*, 17-19; Watson Botanical Exchange Club, *Annual Report*, 1926-27; *Welsh Journal of Agriculture*, vol. iii; Welsh Plant Breeding Station, *Bulletin*, ser. H, no. 5; Zionist Organisation Institute of Agriculture and Natural History, Tel-Aviv, Palestine, Agricultural Experiment Station, *First Report*, 1921-26.

Pamphlets, usually reprints from periodicals, include contributions from Dr. H. H. Allan, Mrs. Frank Bolus, Prof. V. F. Brotherus, Dr. P. Bugnon, Mr. B. F. Bush, Miss A. Camus, Mr. C. Cedercreutz, Mr. A. Chaston Chapman, Major T. F. Chipp, Dr. P. Choux, Dr. G. H. Cunningham, Prof. O. V. Darbishire, Prof. L. Diels, Mr. H. N. Dixon, Mr. Paul Dop, Mrs. E. Ekman, Mr. L. O. Gaiser, Prof. L. Hauman,

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The library is indebted to many societies, academies and other institutions in addition to those already mentioned for liberal contributions of their well-known publications and especially to the Royal Swedish Academy of Sciences, Stockholm; Botanic Garden and Academy of Sciences, Leningrad; Botanical Museum of the University of Zurich; Ministry of Agriculture, Egypt; Bureaux of Science, Agriculture and Forestry, Philippine Islands; Departments of Agriculture, Queensland, New South Wales and Victoria; New York Botanical Garden; Gray Herbarium and Arnold Arboretum of Harvard University; Missouri Botanical Garden; United States Department of Agriculture; Smithsonian Institution; California Academy of Sciences; and the University of California, including the College of Agriculture.

Mr. H. C. Sampson has presented the manuscript (98 ff., fol.) of a *Sketch of the botany of Kwangtung*, written by his uncle, the late Mr. Theophilus Sampson, who collected plants in China, many of which are now in the Kew Herbarium. Several original letters have been received from Mr. A. E. T. Long, of Richmond. These include three from Francis Buchanan to Dawson Turner (1806), Sir. W. J. Hooker (1820), and N. Wallich (1826), one from George Sinclair to Sir J. E. Smith (1818), and one from James Macfadyen to Sir W. J. Hooker (1838).

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Professors of Botany—A. H. R. Buller, D.Sc., Ph.D., LL.D.,
H. F. Roberts.

Manitoba Agricultural College.—

Professors.—*Botany and Biology*—V. W. Jackson, B.A., M.Sc.

Horticulture and Forestry—F. W. Brodrick, B.S.A. *Plant*

Pathology—G. R. Bisby, B.S., Ph.D.

British Columbia.—

Department of Agriculture, Victoria.—

Deputy Minister—D. Warnock, O.B.E., M.R.C.V.S. *Provincial*

Plant Pathologist—J. W. Eastham, B.Sc. (*Vancouver*). *Pro-*

vincial Horticulturist—W. H. Robertson, B.S.A. (*Victoria*).

Department of Lands, Victoria.—

Forest Service.—

Chief Forester—P. Z. Caverhill, B.Sc.F., M.Sc.F.

University of British Columbia, Vancouver.—

Professor of Botany—A. H. Hutchinson, Ph.D. *Associate Professor*

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University of Saskatchewan.—

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 R. A. Dyer, M.Sc. (*Grahamstown*). *Agrostologist*—Miss S. M.
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Department of Forests, Pretoria.—

Chief Conservator—C. E. Legat, B.Sc.

University of South Africa, Bloemfontein (Grey University College).

Professor of Botany—G. Potts, B.Sc., Ph.D.

Grahamstown.—

Professor of Botany—N. J. G. Smith, B.Sc., Ph.D.

Pietermaritzburg, Natal University College.—

Professor of Botany—J. W. Bews, M.A., D.Sc., F.L.S.

Pretoria.—

Professor of Botany—C. E. B. Bremekamp, Ph.D.

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South African Museum, Herbarium.—

Assistant-in-Charge—Miss S. Garabedian, B.A.

Bolus Herbarium.—

Curator—Mrs. F. Bolus, B.A. *Assistants*—N. S. Pillans, Miss
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Municipal Gardens.—

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Stellenbosch.—**University of Stellenbosch.—**

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 and Mycology*—P. A. van der Bijl, M.A., D.Sc.

Grahamstown.—**Albany Museum.—**

Hon. Curator of Herbarium—R. A. Dyer, M.Sc.

Municipal Gardens and Plantations.—

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Port Elizabeth.—**Parks Department.—**

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Province of Natal.—**Cedara School of Agriculture.—**

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Transvaal Province.—**Pretoria.—**

Transvaal Museum.—

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Professor of Botany—C. E. Moss, M.A., D.Sc., F.L.S.

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Forest Department.—

Inspector-General and President, Forest Research Institute and
*College, Dehra Dun—*A. Rodger, O.B.E., F.L.S. *Botanist—*
R. N. Parker.

† Officers of the various Departments will be found under the Provinces and Administrations to which they are attached.

INDIA AND BURMA.—contd.**Government of India.—contd.—**

Department of Agriculture.—

Agricultural Research Institute, Pusa.—
Agricultural Adviser to Government of India and Director—
D. Clouston, C.I.E., M.A., D.Sc. *Economic Botanist—*
F. J. F. Shaw, D.Sc., A.R.C.S., F.L.S. *Mycologist—*W. McRae,
M.A., D.Sc., F.L.S.

Bengal.—

Forest Department, Darjeeling.—

*Conservator—*E. O. Shebbeare.

Department of Agriculture, Dacca.—

*Director—*R. S. Finlow, B.Sc. *Economic Botanist—*G. P. Hector,
M.A., B.Sc.

Royal Botanic Gardens, Calcutta.—

*Superintendent and Curator of Herbarium—*C. C. Calder, B.Sc.,
B.Sc.(Agric.), F.L.S. *Curator of Herbarium—*K. P. Biswas, M.A.
*Curator of Garden—*N. Mitra. *Assistant Curator—*M. Jones.

*Assistant Curator, Calcutta Gardens—*S. N. Basu.

Agri-Horticultural Society of India, Calcutta.—

*Secretary—*S. P. Lancaster, F.L.S.

Lloyd Botanic Garden, Darjeeling.—

*Superintendent—*C. C. Calder, B.Sc., B.Sc.(Agric.), F.L.S. *Curator*
*—*J. E. Leslie*.

Cinchona.—

*Superintendent of Cinchona Cultivation—*C. C. Calder, B.Sc.,
B.Sc.(Agric.), F.L.S. *Managers—(Mungpoo) P. V. Osborne*,*
(Munsong) H. Thomas. Assistant Managers—(Mungpoo)*
G. Holl, (Munsong) L. G. Richards, P. W. Cresswell.

Madras.—

Forest Department, Madras.—

*Chief Conservator—*R. D. Richmond.

Department of Agriculture, Madras.—

*Director—*R. D. Anstead, C.I.E., M.A. *Economic Botanists—*
R. O. Iliffe, M.A. (Paddy), G. R. Hilson, B.Sc. (Cotton), G. N.
Rangaswami Ayyangar, B.A. (Millets). *Government Mycologist*
*—*S. Sundararaman, M.A. *Systematic Botanist—*C. Tadulinga
Mudaliyar, F.L.S.

Government Botanic Gardens and Parks, Ootacamund.—

*Curator—*F. H. Butcher*.

Agri-Horticultural Society, Madras City.—

*Superintendent—*G. W. Thompson.

Cinchona Department.—

*Deputy Director—*A. Wilson, B.Sc. *Superintendents—(Dodabetta)*
—————, (Nedivattam and Hooker) W. H. P. Collins,
(Valparai Anamallais) D. M. Gall.

Bombay.—

Forest Department, Poona.—

*Chief Conservator—*E. M. Hodgson.

Agricultural Department, Poona.—

*Director—*T. F. Main, B.Sc., O.B.E. *Econom.c Botanist—*
W. Burns, D.Sc.

Municipal Gardens, Bombay City.—

*Superintendent—*D. S. Laud.

INDIA AND BURMA.—*contd.***Bombay.**—*contd.*—

Empress Botanical Garden, Poona.—
Superintendent—N. M. Bhagawat.
 Government Gardens, Poona.—
Superintendent—E. Little*.

United Provinces of Agra and Oudh.—

Forest Department, Naini Tal.—
Chief Conservator—F. R. Channer, O.B.E.
 Department of Agriculture, Lucknow.—
Director—G. Clarke, C.I.E. *Economic Botanists*—R. L. Sethi,
 M.Sc., B. Ram Parshad, T. S. Sabnis, M.Sc. *Plant Pathologist*—
 P. K. Dey, M.Sc. *Deputy Director of Gardens, Saharanpur*—
 A. E. P. Griessen*. *Superintendents of Gardens*; Agra—V. E.
 Morgan (offg.), Allahabad—W. S. Smith, M.C. (offg.), Saharanpur
 —J. G. Burns (offg.), Kumaon—R. D. Fordham, Lucknow—
 L. F. Ruse*.

Punjab.—

Forest Department, Lahore.—
Chief Conservator—W. Mayes.
 Department of Agriculture, Lahore.—
Director—D. Milne, C.I.E. *Associate Professor, Agricultural*
College, Lyallpur—Rai Sahib L. Jai Chand Luthra.

Delhi.—

Superintendent, Historic and other Gardens—R. H. Locke*.
Superintendent, Arboricultural Operations, New Delhi—W. R.
 Mustoe*.
 Lahore, Government Gardens.—
Superintendent—A. Hardie*.
 Simla and Delhi, Viceregal Estate Gardens.—
Superintendent—E. Long*.

Bihar and Orissa.—

Forest Department, Ranchi.—
Conservator—A. J. Gibson, F.L.S.
 Agricultural Department, Sabour.—
Director—B. C. Burt, B.Sc., M.B.E.

Burma.—

Forest Department, Rangoon.—
Chief Conservator—H. W. A. Watson. *Forest Botanist*—C. E.
 Parkinson.
 Agricultural Department, Rangoon.—
Director—A. McKerral. *Economic Botanist*—M. McGibbon, B.Sc.
Mycologist—D. Rhind, B.Sc.
 Government Botanic Garden, Maymyo.—
Superintendent—C. Bogg.
 Agri-Horticultural Society.—
Superintendent—C. A. Giffening.
 Cinchona.—
Superintendent, Cinchona Cultivation, Burma—P. T. Russell*.

INDIA AND BURMA.—*contd.***Central Provinces.**—

Forest Department, Pachmarhi.—
Chief Conservator—A. St. V. Beechey.
 Department of Agriculture, Nagpur.—
Director—F. J. Plymen. *Economic Botanist for Cotton*—W.
 Youngman, B.Sc., Ph.D. *Mycologist*—J. F. Dastur, M.Sc.,
 D.I.C. *Second Economic Botanist*—D. N. Mahta, B.A., F.L.S.
 Nagpur Public Gardens.—
Officer-in-Charge—D. N. Mahta, B.A., F.L.S.

Assam.—

Forest Department, Shillong.—
Conservator—W. R. Le G. Jacob.
 • *Director of Agriculture and Industries and Registrar of Co-operative*
Societies—Rai Bahadur Kanak Lal Barua.
 Shillong, Government Gardens.—
Superintendent—R. Badgery*.

North West Frontier Province.—

Deputy Conservator of Forests—G. R. Henniker-Gotley, D.S.O., B.A.
Agricultural Officer—W. Robertson Brown*.

Port Blair and Nicobars, Port Blair.—

Chief Forest Officer—L. Mason, O.B.E., M.C.

Indian States.—

Mysore, Bangalore.—
Director of Agriculture—L. C. Coleman, M.A., Ph.D. *Superin-*
tendent of Government Gardens—H. C. Javaraya, F.L.S.
 Forest Department, Bangalore.—
Chief Conservator—B. V. Ramaiengar.

Baroda.

State Gardens.—
Superintendent—T. R. Kothavala.

Kashmir and Jammu.—

Forest Department.—
Chief Conservator—H. L. Wright, B.A.

Gwalior.—

State Gardens.—
Director—C. M. Tembe, F.L.S.

Central India and Rajputana.—

Indore, Institute of Plant Industry.—
Director—A. Howard, C.I.E., M.A.
 Udaipur.—
Superintendent of Gardens—T. H. Storey.

Madras.—

Travancore, Trivandrum.—
Director of Agriculture and Fisheries—N. Kunjan Pillai, M.A.,
 B.Sc., Ph.D. *Superintendent, Museum and Public Gardens*—
 A. N. Nair, M.A.

BULLETIN OF MISCELLANEOUS
INFORMATION Appendix III 1928
ROYAL BOTANIC GARDENS, KEW

LIST OF SEEDS OF HARDY HERBACEOUS
PLANTS AND OF TREES AND SHRUBS.

The following is a select list of seeds of Hardy Herbaceous Plants and of Hardy Trees and Shrubs, which for the most part, have ripened at Kew during the year 1928. These seeds are available only for exchange with Botanic Gardens, as well as with regular correspondents of Kew.

HERBACEOUS PLANTS.

Acaena adscendens. argentea. glabra. laevigata. macrostemon. myriophylla. myriophylla x Sanguisorbae. novae-zelandiae. ovalifolia. Sanguisorbae. — var. sarmentosa.	Achillea— <i>cont.</i> conjuncta. filipendulina. Gerberi. Grisebachii. impunctata. Jaborneggii. Kellereri. lingulata. — var. buglosis. macedonica. moschata. nana. odorata. rupestris. serbica. tomentosa. umbellata. Wilczekii.
Acantholimon glumaceum. venustum.	
Acanthus longifolius. Schottii.	
Aceras anthropophora.	
Achillea ageratifolia. — var. tomentosa. argentea. chrysocoma. Clavennae.	Aconitum Anthora. columbianum. Forrestii. Lycoctonum. — var. septentrionale. Napellus.

Aconitum—*cont.*

Napellus var. *carneum*.
— var. *giganteum*.
— var. *tauricum*.
orientale.
paniculatum.
rostratum.
— var. *judenbergense*.
uncinatum.
variegatum.
volubile.
vulparia.

Actaea alba.
spicata.
— var. *arguta*.

Actinella scaposa.

Actinomeris squarrosa.

Adenophora Bulleyana.
diplostonta.
latifolia.

Adenostyles glabra.

Adlumia cirrhosa.

Adonis amurensis.
annuus.
vernalis.
wolgensis.

Aethionema amoenum.
armenum.
grandiflorum.
pulchellum.
schistosum.

Agrimonia Eupatoria.
leucantha.
odorata.

Agropyron acutum.
cristatum.
intermedium.
prostratum.
repens.
tenerum.

Agrostis alba.

— var. *stolonifera*.
canina.
capillaris.
nebulosa.
pulchella.

Aira caryophylla.

Ajuga genevensis.
reptans.
— var. *alba*.
— var. *atropurpurea*.

Alchemilla acutiloba.
alpina.
Hoppeana.
pentaphylla.

Allium acuminatum.
angulosum.
atropurpureum.
Babingtonii.
Beesianum.
Bidwilliae.
coeruleum.
carinatum.
cyaneum.
Farreri.
fistulosum.
giganteum.
grande.
hymenorrhizum.
kansuense.
karataviense.
macranthum.
Moly.
neapolitanum.
odorum.
Ostrowskianum.
oviflorum.
paradoxum.
pendulinum.
Rosenbachianum.
roseum.
Schoenoprasum.
scorzonerifolium.

Allium—*cont.*

senescens.
— var. *giganteum*.
sikkimense.
sphaerocephalum.
stellatum.
subangulatum.
subhirsutum.
tanguticum.
Tubergenii.
ursinum.
Victorialis.
vineale.
yunnanense.
zebdanense.

Alonsoa Warscewiczii.

Alopecurus arundinaceus.
myosuroides.
pratensis.

Alstroemeria aurantiaca.
haemantha.
— var. *rosea*.

Althaea armeniaca.
cannabina.
ficifolia.
hirsuta.
pallida.
rosea.
Sibthorpii.
taurinensis.

Alyssum argenteum.
creticum.
Moellendorffianum.
orientale.
saxatile.
spinosum.

Amarantus caudatus.
chlorostachys.
hypochondriacus.
polygamus.
retroflexus.

Ambrosia trifida.

Ammobium alatum.

Ammophila arenaria.

Amphoricarpus elegans.

Anacyclus officinarum.

Anagallis arvensis.
— var. *coerulea*.
grandiflora.
— var. *coccinea*.

Anaphalis margaritacea.

Anchusa italica.
myosotidiflora.
officinalis.

Andropogon halepensis.

Androsace Henryi.
lactea.
occidentalis.
primuloides.
sarmentosa.
sarmentosa x villosa.
villosa.

Andryala Agardhii.

Anemone albana.
altaica.
blanda.
— var. *atrocaerulea*.
Hepatica.
magellanica.
montana var. *rubra*.
multifida.
nemorosa.
— var. *bosniaca*.
— var. *Robinsoniana*.
patens.
pratensis var. *montana*.
Pulsatilla.
— var. *amoena*.
Regeliana.

Anemone—*cont.*
 rivularis.
 sylvestris.
 — var. *grandiflora.*
 virginiana.
 vitifolia.

Angelica ampla.

Anoda cristata.
 hastata.

Antennaria alpina.
 dioica.
 — var. *tomentosa.*

Anthemis arvensis.
 carpathica.
 Cupaniana.
 Kotschyana.
 tinctoria.

Anthericum Halleri.
 Liliago.
 — var. *algeriense.*
 ramosum var. *Dorsetii.*

Anthoxanthum odoratum.

Anthyllis montana.
 Vulneraria var. *Dillenii.*

Antirrhinum Asarina.
 glutinosum.
 majus.
 Orontium.

Apera Spica-venti.

Aplopappus coronopifolius.
 pectinatus.

Aquilegia alpina.
 chrysantha.
 coerulea.
 flabellata.
 — var. *nana.*
 formosa.
 glandulosa.

Aquilegia—*cont.*
 glauca.
 Moorcroftiana.
 — var. *alba.*
 nevadensis.
 pyrenaica.
 Stuartii.
 truncata.
 vulgaris var. *stellata.*

Arabis albida.
 — var. *rosea.*
 — var. *variegata.*
 Allionii.
 arenosa.
 aubrietiioides.
 bellidifolia.
 — var. *variegata.*
 glabra.
 hirsuta.
 incana.
 muralis.
 — var. *rosea.*
 scopoliana.
 Sturii.

Aralia cordata.

Archangelica officinalis.

Arctium Lappa.
 nemorosum.

Arctotis stoechadifolia.

Arenaria aretioides.
 austriaca.
 balearica.
 Bertolonii.
 festucoides.
 foliosa.
 gothica.
 grandiflora.
 gypsophiloides.
 Koriniana.
 laricifolia.
 maritima.
 montana.

Arenaria—*cont.*
 pinifolia.
 purpurascens.
 sajanensis.
 saxatilis.
 tetraquetra.
 verna.
 Villarsii.

Argemone alba.
 mexicana.
 — var. *ochroleuca.*
 platyceras.

Arisaema amurense.

Armeria alpina.
 caespitosa.
 canescens.
 chilensis.
 elongata.
 juncea.
 leucocephala.
 majellensis.
 maritima.
 — var. *alba.*
 — var. *laucheana.*
 plantaginea.
 Welwitschii.

Arnica amplexicaulis.
 Chamissonis.
 foliosa.
 longifolia.
 montana.
 sachalinensis.

Arrhenatherum elatius var.
 bulbosum.

Artemisia integrifolia.
 Ludoviciana.
 rupestris.
 vulgaris.

Asarum caudatum.
 grandiflorum.

Asclepias syriaca.

Asperella Hystrix.

Asperula arcadiensis.
 azurea.
 cynanchica.
 galioides.

Asphodeline liburnica.
 lutea.

Asphodelus albus.

Aster acuminatus.
 alpinus.
 Amellus.
 brachytrichus.
 carolinianus.
 Curtisii.
 Douglasii.
 Farreri.
 foliaceus.
 Forrestii.
 furcatus.
 gayanus.
 glaucus.
 Glehnii.
 Herveyi.
 heterochaetus.
 himalaicus.
 laevis.
 lateriflorus.
 likiangensis.
 Lipskyi.
 macrophyllus.
 multiflorus.
 multiradiatus.
 oreophilus.
 puniceus.
 Purdomii.
 pyrenaicus.
 Radula.
 sagittifolius.
 sibiricus.
 spectabilis.
 staticifolius.
 stellaris.
 subcoeruleus.
 Thomsonii.
 tibeticus.
 tricephalus.
 Tripolium.

Aster—*cont.*
 umbellatus.
 Vahl.ii.
 vestitus.
 yunannensis.

Astilbe chinensis.
 Thunbergii.

Astragalus alopecuroides.
 aristatus.
 boeticus.
 chinensis.
 chlorostachys.
 danicus var. albus.
 frigidus.
 Glyciphyllus.
 hamosus.
 Onobrychis.
 pentaglottis.
 sulcatus.
 vaginatus.
 Wulfenii.
 Zingeri.

Astrantia Biebersteinii.
 helleborifolia.
 major.

Athamanta Haynaldii.
 Matthioli.

Atriplex hortense.
 littorale.
 nitens.
 sibiricum.

Avena campestris.
 fatua.

Baeria coronaria.

Ballota acetabulosa.
 macedonica.
 pseudo-dictamnus.

Baptisia australis.
 — var. minor.
 leucantha.
 perfoliata.

Barbarea verna.
 vulgaris.

Beckmannia eruciformis.

Bellium bellidioides.
 minutum.

Bellis mexicana.
 silvestris.

Berkheya Aclamii.

Berteroa incana.

Beta maritima.
 trigyna.
 vulgaris.

Bidens dahlioides.
 ferulaefolia.
 pilosa.
 tripartita.

Biscutella auriculata.
 didyma.
 laevigata.

Biserrula Pelecinus.

Blumenbachia insignis.
 multifida.

Boltonia asteroides.
 — var. decurrens.

Bouteloua racemosa.

Brachycome iberidifolia.

Brachypodium pinnatum.
 sylvaticum.

Brassica alba.
 balearica.
 campestris.
 Erucastrum.
 laevigata.
 napus var. dichotoma.
 nigra.

Brickellia grandiflora.

Briza maxima.
 minor.

Brodiaea aurea.
 Bridgesii.
 Hendersonii.
 hyacinthina.
 ixioides.

Bromus ciliatus.
 erectus.
 madritensis.
 maximus.
 rubens.
 tectorum.
 unioides.

Bryonia alba.

Bulbine annua.

Bulbinella Hookeri.

Bulbocodium vernum.

Bupththalmum salicifolium.
 speciosum.

Bupleurum stellatum.

Caccinia glauca.

Cakile maritima.

Calamagrostis Epigeios.
 lanceolata.
 pseudo-phragmites.
 varia.
 villosa.

Calamintha acinos.
 alpina.
 grandiflora.
 Nepeta.

Calandrinia grandiflora.
 Menziesii.
 umbellata.

Calceolaria biflora.
 mexicana.
 polyrhiza.

Calendula arvensis.
 officinalis.

Callirrhoe digitata.
 involucreta.

Callistephus hortensis.

Calochortus albus.
 Bentharii.
 Maweanus.

Caltha biflora.
 palustris.
 — var. alba.
 polypetala.
 radicans.

Calystegia sepium.
 silvestris.

Camassia Cusickii.
 esculenta.
 Leichtlinii.
 montana.

Camelina foetida.
 sativa.

Campanula alliariaefolia.
 Allionii.
 arvatica var. turbinata.
 barbata.
 bononensis.
 carpatia.
 cochlearifolia.
 — var. alba.
 — var. pallida.
 collina.
 drabaefolia.
 excisa.
 gargarica.
 glomerata.
 Grosseckii.
 haylodgensis.

Campanula—*cont.*
 imeretina.
 lactiflora.
 latifolia.
 — var. *macrantha*.
 — var. *versicolor*.
 latiloba.
 linifolia.
 — var. *Berkeleyana*.
 — var. *valdensis*.
 longestyla.
 macrorrhiza.
 Marchesettii.
 patula.
 persicifolia.
 Portenschlagiana.
 — var. *major*.
 pulla.
 punctata.
 ramosissima.
 Rapunculus.
 rhomboidalis.
 sarmatica.
 spicata.
 Spruneri.
 Stansfieldii.
 thyrsoides.
 Trachelium.
 Tymonsii.
 versicolor.
 Waldsteiniana.

Capsella grandiflora.

Cardamine amara
 chenopodifolia.
 pinnata.

Carduncellus coeruleus.

Carduus arctioides.
 crispus.
 Kernerii.
 tenuiflorus.

Carex acuta.
 alopecoidea.
 axillaris.
 baldensis.

Carex—*cont.*
 binervis.
 brunnea.
 canescens.
 crinita.
 distans.
 flava.
 Fraseri.
 fusca.
 hordeistichos.
 laevigata.
 leporina.
 montana.
 paludosa.
 paniculata.
 pendula.
 pulicaris.
 tomentosa.

Carlina acanthifolia.
 acaulis.

Carthamus leucocaulos.
 tinctorius.

Celmisia coriacea.
 discolor.
 longifolia.

Celsia Barnardesii.

Cenchrus echinatus.
 tribuloides.

Cenia turbinata.

Centaurea americana.
 aspera.
 axillaris.
 Calcitrapa.
 Cyanus.
 cynaroides.
 dealbata.
 glastifolia.
 hypoleuca.
 Jacea.
 macrocephala.
 montana.
 nigra.

Centaurea—*cont.*
 nigrescens.
 phrygia.
 pulchra.
 ruthenica.
 Sadleriana.
 Scabiosa var. *alba*.
 Urvillei.

Cephalaria alpina.
 tatarica.
 transylvanica.

Cerastium alpinum.
 arvense.
 Biebersteinii.
 Boissieri.
 grandiflorum.
 ovatum.
 perfoliatum.
 purpurascens.
 tomentosum.

Cerinthe aspera.
 minor.

Chaerophyllum aromaticum.
 nodosum.
 roseum.

Chaeturus fasciculatus.

Chamaelirium luteum.

Charieis heterophylla.

Chelidonium Franchetianum.
 majus.

Chelone glabra.
 Lyonii.
 obliqua.

Chenopodium album.
 Bonus-Henricus.
 hybridum.
 urbicum.

Chevreulia stolonifera.

Chlorogalum pomeridianum.

Chorispora tenella.

Chrysanthemum alpinum.
 anserinaefolium.
 arcticum.
 Aucherianum.
 Balsamita.
 carinatum.
 caucasicum.
 ceratophylloides.
 cinerariaefolium.
 coccineum.
 coronarium.
 corymbosum.
 densum.
 Gayanum.
 lacustre.
 macrophyllum.
 maximum.
 Myconis.
 pallens.
 rotundifolium.
 viscosum.
 Zawadskii.

Chrysogonum virginianum.

Chrysopogon Gryllus.

Cicer pinnatifidum.

Cimicifuga dahurica.
 foetida.
 japonica.
 racemosa.

Cirsium acaule.
 afrom.
 arachnoideum.
 lanceolatum.
 monspessulanum.
 x ochroleucum.
 oleraceum.

Cladium Mariscus.

Clarkia elegans.
pulchella.

Claytonia sibirica.

Cleome violacea.
pungens.

Clintonia borealis.
umbellata.

Clypeola Jonthlaspii.

Cochlearia glastifolia.
officinalis.

Codonopsis ovata.
tubulosa.

Colchicum Bivonae.
speciosum.

Collinsia bicolor.

Collomia coccinea.
gilioides.
grandiflora.

Commelina coelestis.

Conringia orientalis.

Convallaria majalis.

Convolvulus sículus.
tricolor.
undulatus.

Coreopsis coronata.
grandiflora.
lanceolata.

Corispermum hyssopifolium.

Coronilla cappadocica.
elegans.
montana.
scorpioides.

Cortusa Matthioli.

Corydalis capnoides.
cheilanthifolia.
glauc.
tomentella.
tuberosa.
vesicaria.
Wilsonii.

Corynephorus canescens.

Cosmidium burridgeanum.

Cosmos bipinnatus.
diversifolius.

Cotula coronopifolia.

Cotyledon amoena.
chrysantha.
libanotica.

Crambe maritima.
pinnatifida.

Crepis biennis.
blattarioides.
conyzifolia.
foetida.
incana.
rubra.
setosa.
sibirica.

Crocus aerius.
asturicus.
Balansae.
banaticus.
biflorus.
chrysanthus.
Clusii.
dalmaticus.
etruscus.
hadriaticus.
Imperati.
iridiflorus.
Karduchorum.
laevigatus.

Crocus—cont.
longiflorus.
medius.
nudiflorus.
reticulatus var. micranthus.
Salzmannii.
Sieberi.
speciosus.
Tommasinianus.
zonatus.

Crupina vulgaris.

Cucubalus baccifer.

Cuphea lanceolata.
miniata.

Cynara Cardunculus.
Scolymus.

Cynoglossum nervosum.
pictum.
Wallichii.

Cynosurus cristatus.
echinatus.

Cypripedium spectabile.

Dactylis glomerata.

Dahlia coccinea.
Merckii.
variabilis.

Datura inermis.
Metel.
Stramonium.
Tatula.

Delphinium alatum.
atropurpureum.
Brunonianum.
caucasicum.
decorum.
dyctiocarpum.
elatum.
formosum.

Delphinium—cont.
Gayanum.
grandiflorum.
nudicaule.
speciosum.
sulphureum.
tatsienense.
variegatum.
vestitum.

Deschampsia caespitosa.
— var. vivipara.
flexuosa.

Desmazeria sicula.

Desmodium canescens.

Dianthus alpinus.
anatolicus.
arenarius.
Armeria.
arvernensis.
banaticus.
caesius.
callizonus.
capitatus.
carthusianorum.
Caryophyllus.
chinensis.
cruentus.
deltoides.
fragrans.
furcatus.
gallicus.
giganteus.
Hawkeanus.
hirtus.
integrifolius.
Knappii.
leptopetalus.
lusitanicus.
moesiacus.
Noeanus.
pallens.
petraeus var. spiculifolius.
pinifolius.
plumarius.
pubescens.

Dianthus—*cont.*
pungens.
Requienii.
squarrosus.
strictus.
subacaulis.
superbus.
sylvestris.
tenuiflorus.
tenuis.
Waldsteinii.

Dictamnus albus.
— *var. caucasicus.*

Digitalis dubia.
ferruginea.
flava.
lutea.

Dimorphotheca aurantiaca.
hybrida.
pluvialis.

Diplachne fusca.
serotina.

Diplotaxis muralis.

Dipsacus asper.
fullonum.
inermis.
laciniatus.

Disporum oreganum.
trachycarpum.

Dodecatheon Clevelandii.
Jeffreyi.
Lemoinei.
Meadia.
radicatum.

Doronicum Pardalianches.
plantagineum.

Downingia elegans.

Draba aizoides.
Aizoon.
Athoa.
Bertolonii.
hirta.
incana.
— *var. Adamsii.*
muralis.
olympica.
rigida.
scabra.
siliquosa.
stellata.
tomentosa.

Dracocephalum Isabellae.
peregrinum.
speciosum.
tanguticum.

Dryas Drummondii.
octopetala.
— *var. lanata.*
Sundermanni.

Ecballium Elaterium.

Echinacea purpurea.

Echinaria capitata.

Echinops dahuricus.
exaltatus.
niveus.
sphaerocephalus.

Elymus arenarius.
canadensis.
condensatus.
europaeus.
sabulosus.
uralensis.
virginicus.

Emilia flammea.

Epilobium alpinum.
Dodonaei.
hirsutum.
Lamyi.
latifolium.
melanocaulon.
montanum.
nummularifolium.
rosmarinifolium.
sericeum.

Epimedium Musschianum.

Epipactis palustris.

Eragrostis pilosa.

Eranthis cilicica.
hyemalis.

Eremurus altaicus.
Bungei.
himalaicus.
robustus.
spectabilis.

Erianthus Hostii.

Erigeron aurantiacus.
bellidifolius.
glabellus.
glaucus.
Howellii.
leiomerus.
macranthus.
multiradiatus.
philadelphicus.
pulchellus.
uniflorus.

Erinus alpinus.

Eriogonum subalpinum.
umbellatum.

Eriophorum Scheuchzeri.
vaginatum.

Erodium Botrys.
carvifolium.
cheilanthifolium.
chrysanthum.
corsicum.
gruinum.
hymenodes.
macradenum.
malacoides.
Manescavii.
petraeum.
Salzmanni.
supracanum.
supradenum x.

Erophila vulgaris.

Eruca sativa.

Eryngium alpinum.
Bourgatii.
giganteum.
Oliverianum.

Erysimum cheiranthoides.
dubium.
hieracifolium.
linifolium.
Perofskianum.
rupestre.
thyrsoides var. alpinum.

Erythraea Centaurium.*
grandiflora.

Erythronium Hendersonii.
revolutum.

Eschscholzia caespitosa.
californica.
Douglasii.

Eucharidium concinnum.

Euphorbia epithymoides.
Esula.
Lathyris.
Peplus.
salicifolia.

Ferula communis var. *brevifolia*.
orientalis.
sulcata.
sylvatica.

Festuca arundinacea.
duriuscula.
elatior.
Halleri.
heterophylla.
ingrata.
montana var. *altissima*.
Myuros.
ovina var. *tenuifolia*.
rubra.
uniglumis.
vaginata.

Filipendula hexapetala.
Ulmaria.

Fragaria indica.
virginiana.
viridis.

Fritillaria acmopetala.
latifolia.
meleagris.
Olivieri.
persica.
pyrenaica.
tenella.

Fumaria officinalis.
parviflora.
spicata.
Vaillantii.

Funkia Fortunei.
longipes.
ovata.
Sieboldiana.

Gaillardia amblyodon.
lanceolata.
spathulata.

Galanthus Elwesii.
Ikariae.

Galega officinalis.
orientalis.
patula.

Galeopsis dubia.
pyrenaica.
speciosa.
Tetralit.

Gentiana asclepiadea.
 — var. *alba*.
Cruciata.
dahurica.
decumbens.
Fetisowii.
Freyniana.
frigida.
gelida.
Grombezewskii.
lagodechiana.
macrophylla.
Pneumonanthe.
Saponaria.
septemfida.
straminea.
tibetica.
verna.

Geranium albanum.
albiflorum.
angulatum.
armenum.
Bergianum.
cinereum var. *album*.
collinum.
dahuricum.
dissectum.
Endressii.
eriostemon.
Farreri.
gracile.
grandiflorum.
Grevilleanum.
ibericum.
incisum.
macrorrhizum.
maculatum.
molle.
nepalense.
nodosum.

Geranium—cont.
palustre.
phaeum var. *lividum*.
pratense.
 — var. *album*.
Pylzowianum.
refractum.
Richardsonii.
rivulare.
Robertianum var. *album*.
rotundifolium.
sanguineum.
sessiliflorum.
silvaticum.
striatum.
subcaulescens.
Wallichianum.
Wilfordii.
yedoense.

Gerbera Anandria.

Geum album.
Boissieri.
bulgaricum.
chiloense.
coccineum.
elatum.
Heldreichii.
intermedium.
Jankae.
japonicum.
parviflorum.
Purdomii.
radiatum.
reptans.
rhaeticum.
rivale.
Rossii.
speciosum.
triflorum.
urbanum.
vernum.

Gilia abrotanifolia.
achilleaefolia.
capitata.
Daveyi.
densiflora.

Gilia—cont.
liniflora.
micrantha.
multicaulis.
tricolor.
 — var. *alba*.

Gillenia trifoliata.

Glaucium corniculatum.

Glyceria maritima.
nervata.

Glycine Soja.

Glycyrrhiza glabra.
lepidota.

Grindelia robusta.
speciosa.
squarrosa.

Gunnera chilensis.
manicata.

Gypsophila cerastioides.
elegans.
muralis.
prostrata.
repens.

Haberlea Ferdinandi-Coburgi.
rhodopensis var. *alba*.

Hablitzia tamnoides.

Hebenstretia comosa.

Hedysarum coronarium.
esculentum.
flavescens.
obscurum.

Helenium Bigelovii.
Bolanderi.
Hoopesii.

Helianthella quinquenervis.

Helianthemum alpestre.
guttatum.
pulverulentum.
Tuberaria.

Helianthus coloradensis.
debilis.
decapetalus.
mollis.
Nuttallii.
occidentalis.
parviflorus.
rigidus.

Helichrysum bellidioides.
bracteatum.
frigidum.
siculum.
Stoechas.

Heliopsis scabra.

Helipterum Humboldtianum.
Manglesii.
roseum.

Hemerocallis aurantiaca.
citrina.
flava.
Forrestii.
Middendorffii.
nana.
Thunbergii.

Heracleum candicans.
flavescens.
granatense.
villosum.

Herniaria hirsuta.

Heuchera Drummondii.
glabra.
hispida.
micrantha.
pilosissima.

Hibiscus Trionum.

Hieracium amplexicaule.
anglicum.
aurantiacum.
bombycinum.
bupleuroides.
cappadocicum.
corymbosum.
gymnocephalum.
Heldreichii.
humile.
Jankae.
lanatum.
maculatum.
pallidum.
pannosum.
rupestre.
scorzoneraefolium.
tridentatum.
umbellatum.
villosum.

Horminum pyrenaicum.

Hyacinthus azureus.
hispidus.
orientalis.
romanus.

Hyoscyamus niger var. biennis.

Hypecoum procumbens.

Hypericum delphicum.
Desetangsii.
dubium.
elegans.
elodioides.
fragile.
hirsutum.
montanum.
nummularium.
olympicum.
orientale.
polyphyllum.
pulchrum.
quadrangulum.
rhodopeum.
rumelicum.

Hystrix patula.

Iberis amara.
Jordanii.
pinnata.
sempervirens.
umbellata.

Impatiens Roylei.
scabrida.

Incarvillea Delavayi.
grandiflora.

Inula bifrons.
Britannica.
cordata.
ensifolia.
grandiflora.
Helenium.
hirta.
magnifica.
montana.
orientalis.
salicina.
spiraeifolia.
squarrosa.

Ionopsidium acaule.

Iris bucharica.
Bulleyana.
chrysographes.
Clarkei.
Delavayi.
dichotoma.
Douglasiana.
foetidissima.
— var. citrina.
Forrestii.
graminea.
Kaempferi.
laevigata.
longipetala.
Milesii.
missouriensis.
pumila.
Reichenbachii.
reticulata var. histrioides.

Iris—cont.
sibirica.
stolonifera.
variegata.
versicolor.
Wilsonii.
Xiphium.

Isatis glauca.
tinctoria.

Isopyrum fumarioides.

Iva xanthifolia.

Ixiolirion montanum.

Jasione perennis.

Juncus alpinus.
bufonius.
Chamissonis.
glaucus.
squarrosus.

Jurinea alata.
cyanoides.

Kentranthus Calcitrapa.

Kniphofia breviflora.
Nelsonii.
Thomsoni.

Kochia trichophila.

Koeleria albescens.
cristata.
phleoides.

Lactuca alpina.
Bourgaei.
hastata.
macrantha.
perennis.
Plumieri.
virosa.

Lagurus ovatus.
 Lallelantia canescens.
 peltata.
 Lamium album.
 Galeobdolon.
 maculatum.
 Orvala.
 Lapeyrousia cruenta.
 Lapsana communis.
 Laserpitium gallicum.
 latifolium.
 Siler.
 Lasthenia glabrata.
 Lathyrus angulatus.
 Aphaca.
 articulatus.
 cirrhosus.
 clymenum.
 hirsutus.
 latifolus.
 lusitanicus.
 luteus.
 maritimus.
 montanus.
 niger.
 Nissolia.
 odoratus.
 palustris.
 pisiformis.
 rotundifolius.
 rotundifolius x tuberosus.
 sativus.
 setifolius.
 sphaericus.
 sylvestris.
 tingitanus.
 tuberosus.
 undulatus.
 unijugus.
 variegatus.
 varius.
 venosus.

Lathyrus—cont.
 vernus var. flaccidus.
 violaceus.
 Laurentia Michellii.
 Lavatera arborea var. alba.
 cachemiriana.
 Olbia.
 thuringiaca.
 trimestris.
 Layia elegans.
 Leontodon hastilis.
 hirtus.
 hispidus.
 Leontopodium alpinum.
 Leonurus Cardiaca.
 sibiricus.
 Lepachys columnaris.
 pinnata.
 Lepidium Draba.
 Menziesii.
 sativum.
 Leptosyne Bigelovii.
 Douglasii.
 maritima.
 Stillmannii.
 Leucojum aestivum.
 vernum.
 Levisticum officinale.
 Liatris pycnostachya.
 scariosa.
 Libertia formosa.
 grandiflora.
 Lilium Farreri.
 pardalinum.
 pyrenaicum.
 tenuifolium.

Limnanthes alba.
 Douglasii.
 Linaria alpina.
 bipartita.
 Capraria.
 Hendersonii.
 heterophylla.
 maroccana.
 origanifolia.
 repens.
 reticulata.
 saxatilis.
 supina var. pyrenaica.
 triphylla.
 tristis.
 viscida.
 Lindelofia longifolia.
 Linum alpinum.
 arborescens.
 austriacum.
 capitatum.
 catharticum.
 flavum.
 grandiflorum.
 monogynum.
 narbonense.
 perenne.
 usitatissimum.
 Lithospermum intermedium.
 officinale.
 Loasa triphylla.
 Lobelia Erinus.
 sessilifolia.
 syphilitica.
 tenuior.
 Lolium perenne.
 temulentum.
 Lotus corniculatus.
 ornithopodioides.
 Requienii.
 siliquosus.
 Tetragonolobus.

Lupinus Barkeri.
 densiflorus.
 Douglasii.
 Hartwegii.
 micranthus.
 mutabilis.
 nanus.
 nootkatensis.
 Paynei.
 perennis.
 pilosus.
 Luzula campestris.
 Fosteri.
 Hostii.
 nemorosa.
 sylvatica.
 nivea.
 Lychnis alpina.
 chalcedonica.
 Coeli-rosa.
 Flos-jovis.
 fulgens.
 Githago.
 Preslii.
 pyreniaca.
 Sartori.
 Sermo.
 Viscaria.
 Lycopersicum esculentum.
 Lygeum Spartum.
 Lysichitum camtschaticum.
 Lysimachia barystachys.
 davurica.
 Lythrum alatum.
 Salicaria.
 Madia dissitiflora.
 elegans.
 Malope trifida.

Malva crispa.
 moschata.
 parviflora.
 rotundifolia.
 silvestris.

Malvastrum campanulatum.
 limense.

Mandragora officinarum.

Marrubium candidissimum.
 vulgare.

Matthiola incana.
 sinuata var. *glabra.*
 tricuspidata.

Matricaria Tchihatchewii.

Meconopsis Baileyana.
 cambrica.
 grandis.
 integrifolia var. *Baileyi.*
 Prattii.
 rudis.
 Wallichii.

Medicago ciliaris.
 disciformis.
 falcata.
 hispida var. *pentacycla.*
 lupulina.
 Murex.
 orbicularis.
 rigidula.
 sativa.
 scutellata.
 tuberculata.

Melanthium virginicum.

Melica altissima.
 — var. *atropurpurea.*
 ciliata.
 nutans.
 uniflora.

Melilotus indicus.
 officinalis.

Melissa officinalis.

Mentha gentilis.
 pratensis.
 sylvestris.

Merendera Bulbocodium.

Mertensia echioides.
 paniculata.
 sibirica.

Mesembryanthemum
 pyropeum.

Meum athamanticum.

Micromeria graeca.

Microseris Lindleyi.

Milium effusum.

Mimulus Lewisii.
 luteus.
 nasutus.
 primuloides.
 ringens.

Mirabilis divaricata.
 Froebelii.
 Jalapa.

Miscanthus japonicus var.
 variegatus.

Mitella diphylla.
 nuda.
 pentandra.

Modiola multifida.

Molinia coerulea var.
 variegata.

Molopospermum peloponnesi-
 acum.

Monarda didyma.
 fistulosa.
 — var. *mollis.*

Monardella odoratissima.

Monolepis trifida.

Moricandia arvensis.

Morina betonicoides.
 longifolia.

Muscari armeniacum.
 botryoides.
 commutatum.
 comosum.
 compactum.
 conicum.
 neglectum.
 paradoxum.
 polyanthum.
 racemosum.
 Szovitsianum.

Myosotis palustris.
 Stabiana.
 versicolor.

Myosurus minimus.

Myrrhis odorata.

Narcissus Bulbocodium.
 cernuus.
 cyclamineus.
 triandrus.

Nardostachys grandiflora.

Nardus stricta.

Nemesia strumosa.
 versicolor.

Nemophila insignis.
 maculata.
 Menziesii.

Nepeta granatensis.
 longiflora.
 Mussinii.
 ucranica.

Nicandra physaloides.
 violacea.

Nicotiana alata.
 Langsdorffii.
 paniculata.
 rustica.
 Sanderae.
 Tabacum.

Nigella arvensis.
 damascena.
 hispanica.
 orientalis.
 sativa.

Oenothera acaulis.
 amoena.
 Berteriana.
 biennis var. *grandiflora.*
 densiflora.
 fruticosa.
 glauc.
 Hookeri.
 lepida.
 missouriensis.
 odorata.
 pumila.
 rosea.
 sinuata.
 speciosa.
 tenella.
 triloba.
 Whitneyi.

Omphalodes linifolia.

Onobrychis Cristagalli.

Ononis alopecuroides.
 biflora.
 reclinata.
 spinosa.

Onopordon Acanthium.
 illyricum.
 Salteri.

Onosma albo-roseum.
 corsicum.
 echioides.
 stellulatum.
Opoponax Chironium.
Origanum hirtum.
 hybridum.
 Onites.
 pulchrum.
 vulgare.
Ourisia macrocarpa.
Oxalis enneaphylla.
 magellanica.
Oxyria digyna.
Oxytropis argentea.
 baicalensis.
 campestris.
 lapponica.
 strobilacea.
 sulphurea.
Paeonia anomala.
 arietina.
 lutea.
 Mlokozewitchii.
 tenuifolia.
 triternata.
 Veitchiana.
 Woodwardii.
Palaua dissecta.
Panicum capillare.
 Crus-galli.
 miliaceum.
 Teneriffae.
Papaver alpinum.
 apulum.
 arenarium.
 Argemone.
 commutatum.
 dubium.

Papaver—cont.
 glaucum.
 hybridum.
 lateritium.
 nudicaule.
 orientale.
 — var. *bracteatum.*
 pavoninum.
 pilosum.
 Rhoeas var. *latifolium.*
 rupifragum.
 somniferum.
Paracaryum glochidiatum.
Paradisea Liliastrium.
Parietaria officinalis.
Parnassia fimbriata.
 nubicola.
 palustris.
Paspalum dilatatum.
Patrinia gibbosa.
 palmata.
Peltaria turkmena.
Pennisetum macrourum.
Pentstemon arizonicus.
 caeruleus.
 campanulatus.
 confertus.
 diffusus.
 gentianoides.
 glaber var. *cyananthus.*
 hirsutus.
 humilis.
 laevigatus.
 ovatus.
 Roezlii.
 Scouleri.
Perezia multiflora.

Petunia axillaris.
Peucedanum coriaceum.
 hispanicum.
 officinale.
Ostruthium.
 sativum.
Phacelia congesta.
 tanacetifolia.
 viscida.
 Whitlavia. , ,
Phaegasium lapsanoides.
Phalaris canariensis.
 tuberosa.
Phaseolus multiflorus.
 tuberosus.
 vulgaris.
Phlomis armeniaca.
 cashmiriana.
 pratensis.
 tuberosa.
 umbrosa.
 viscosa.
Phlox divaricata var. *cana-*
 densis.
 — var. *Laphamii.*
 ovata var. *carolina.*
 paniculata.
 pilosa.
Physalis peruviana.
Physochlaina orientalis.
Physostegia virginiana.
Phyteuma canescens.
 Halleri.
 humile.
 limonifolium.
 lobelioides var. *austriacum.*
 nigrum.
 orbiculare.

Phyteuma—cont.
 Scheuchzeri.
 Sieberi.
 spicatum.
 Vagneri.
Phytolacca acinosa.
 clavigera.
 decandra.
Picridium tingitanum.
Pilularia globulifera.
Pinguicula grandiflora.
Pisum arvense.
 elatius.
 sativum.
 — var. *umbellatum.*
Plantago alpina.
 argentea.
 Coronopus.
 Cynops.
 Lagopus.
 lanceolata.
 maritima.
 media.
 nivalis.
Platycodon grandiflorum.
 — var. *Mariesii.*
Platystemon californicus.
Pleurospermum Golaka.
Poa abyssinica.
 caesia.
 caespitosa.
 Chaixii.
 compressa.
 flexuosa.
 nemoralis.
 pratensis.
 sylvatica.
 trivialis.
 violacea.

Podolepis acuminata.
Podophyllum Emodii.
 peltatum.
Polemonium coeruleum.
 mexicanum.
 pauciflorum.
 reptans.
 sibiricum.
Polygonum affine.
 alpinum.
 amphibium.
 Bistorta.
 capitatum.
 divaricatum.
 Laxmannii.
 lichiangensis.
 orientale.
 viviparum.
 Weyrichii.
Polylepis ivesioides.
Polypogon littoralis.
 monspeliensis.
Portulaca grandiflora.
Potentilla alchemilloides.
 ambigua.
 alpestris var. *pyrenaica*.
 argentea var. *calabra*.
 arguta.
 argyrophylla.
 — var. *atrosanguinea*.
 — var. *leucochroa*.
 chrysantha.
 crinita.
 Cryptotaeniae.
 dealbata.
 Delavayi.
 depauperata.
 Detommassii.
 eriocarpa.
 fragarioides.
 fragiformis.
 fulgens.

Potentilla—cont.
 gelida.
 Gordonii.
 gracilis.
 Griffithii.
 Hippiana.
 hirta.
 Hopwoodiana.
 Kotschyana.
 leuconota.
 libanotica.
 Macnabiana.
 Meyeri.
 montenegrina.
 multifida.
 nepalensis var. *minor*.
 nevadensis.
 norvegica.
 pennsylvanica.
 recta.
 — var. *macrantha*.
 — var. *palmata*.
 rivalis.
 rupestris var. *pygmaea*.
 sericea.
 Sibbaldii.
 speciosa.
 splendens.
 supina.
 tanacetifolia.
 tridentata.
 villosa.
Poterium alpinum.
 canadense.
 obtusum.
 officinale.
 Sanguisorba.
 sitchense.
Pratia arenaria.
 repens.
Prenanthes purpurea.
Primula aurantiaca.
 Beesiana x *Bulleyana*.
 Bulleyana.

Primula—cont.
 Burmanica.
 capitata.
 denticulata.
 — var. *cashmiriana*.
 farinosa.
 Forrestii.
 Fortunei.
 frondosa.
 helodoxa.
 involucrata var. *caerulea*.
 japonica.
 luteola.
 marginata.
 modesta.
 obovata.
 officinalis.
 pubescens.
 pulverulenta.
 sikkimensis.
 sino-Listeri.
 Smithiana.
 Veitchii.
 vittata.
 Wardii.
Prunella grandiflora.
 laciniata.
 vulgaris.
Psoralea macrostachys.
Puschkinia scilloides.
 — var. *compacta*.
Ramondia pyrenaica.
Ranunculus aconitifolius.
 acris.
 alpestris.
 amplexicaulis.
 asiaticus.
 auricomus.
 brutius.
 crenatus.
 cymbalaria.
 falcatus.
 Flammula.
 Gouanii.

Ranunculus—cont.
 lanuginosus.
 Lenormandii.
 Lingua.
 millefoliatus.
 monspeliacus.
 muricatus.
 ophioglossifolius.
 parnassifolius.
 parviflorus.
 platanifolius.
 repens.
Raoulia subsericea.
Reseda alba.
 lutea.
Rhagadiolus edulis.
Rheum acuminatum.
 palmatum.
 Pichonii.
 Rhaponticum.
 spiciforme.
 tataricum.
 undulatum.
Rodgersia aesculifolia.
 pinnata.
 Purdomii.
Roemeria hybrida.
Romulea cruciata.
 ligustica.
Rudbeckia ampla.
 amplexicaulis.
 lacinata.
 maxima.
Rumex flexuosus.
 maritimus.
 maximus.
 obtusifolius.
 palustris.
 Patientia.
 pulcher.
 salicifolius.

Salvia argentea.
Bertolonii.
candidissima.
clandestina.
glutinosa.
hierosolymitana.
Horminum.
lyrata.
nemorosa.
pratensis var. *Baumgartenii*.
Schiedeana.
Sclarea.
tiliaefolia.
Verbenaca.
verticillata.
virgata.
viscosa.

Sanicula europaea.

Santolina pinnata.

Saponaria caespitosa.
calabrica.
cerastioides.
lutea.
ocymoides.
officinalis.
Vaccaria.

Satureia montana.

Saussurea albescens.
denticulata.
eriolepis.
hypoleuca.
pectinata.
salicifolia.

Saxifraga bronchialis.
Burseriana.
calabrica.
canaliculata.
cartilaginea.
x Clarkei.
cochlearis.
 — var. *minor*.
conifera.

Saxifraga—cont.
corymbosa.
Cotyledon.
cuneifolia.
decipiens.
Delavayi.
diapensioides.
 — var. *sponhemica*.
x Gaudinii.
Geum var. *crenata*.
 — var. *dentata*.
granulata.
Grisebachii.
hirsuta.
x Kyrillii.
lingulata.
 — var. *Albertii*.
 — var. *lantoscana*.
longifolia.
Macnabiana.
mutata.
pedemontana.
x Petraschii.
rotundifolia.
Sibthorpii.
Stracheyi.
Timbalii.
Wallacei.
Zimmereri.

Scabiosa anthemifolia var.
rosea.

caucasica.
Columbaria.
crenata.
daucoides.
Fischeri.
graminifolia.
Kitaibelii.
longifolia.
maritima.
ochroleuca.
prolifera.
Pterocephala.
sylvatica.
vestina.

Schizanthus pinnatus.
retusus.

Scolymus hispanicus.
maculatus.

Scorpiurus vermiculata.

Scorzonera hispanica.

Scrophularia aquatica.
nodosa.
orientalis.
Scorodonia.

Securigera Coronilla.

Sedum acre.
album.
Cepaea.
Ellacombianum.
Ewersii.
heterodontum.
kamtschaticum.
Kirilowii.
Middendorffianum.
Nevii.
reflexum.
roseum.
rupestre.
Semenovii.
spathulifolium.
stoloniferum.

Selinum vaginatum.

Sempervivum assimile.
Bakeri.
Doellianum.
Fauconnetii.
Funkii.
Gaudinii.
Mettenianum.
Schottii.
triste.

Senecio abrotanifolius.
adonidifolius.
alpinus.
clivorum.
diversifolius.

Senecio—cont.

Doria.
Doronicum.
elegans.
erucifolius.
incanus.
Jacobaea.
japonicus.
Ledebourii.
Ligularia.
nemorensis.
Przewalskii.
saracenicus.
stenocephalus.
tirolensis.
Veitchianus.
Wilsonianus.

Serratula coronata.
heterophylla.
quinquefolia.
tinctoria.

Seseli Libanotis.

Sesleria argentea.
autumnalis.
coerulea.

Setaria ambigua.
glauca.
italica.
verticillata.

Sidalcea candida.
neomexicana.
spicata.

Sideritis scordioides.

Silene acaulis var. *pedunculata*.
alpestris.
Armeria.
Asterias.
auriculata.
ciliata.
colorata.
compacta.
conica.

Silene—cont.

conoidea.
cordifolia.
cretica.
Cucubalus.
echinata.
elegans.
Elizabethae.
fimbriata.
gallica.
italica.
linicola.
Muscipula.
noctiflora.
Otites.
paradoxa.
pendula.
pumilio.
quadrifida.
Reichenbachii.
saxatilis.
Saxifraga.
squamigera.
tatarica.
Zawadzkii.

Siler trilobum.

Silphium terebinthinaceum.
trifoliatum.

Silybum Marianum.

Sisymbrium Assoanum.
Irio.
polyceratum.
strictissimum.
Thalianum.

Sisyrinchium angustifolium.
californicum.
striatum.

Smilacina racemosa.

Smyrnum perfoliatum.

Sorghum vulgare.

Spartina alterniflora.
Townsendii.

Sphaeralcea Fendleri.

Spiraea Aruncus.
palmata.
pectinata.
vestita.

Stachys citrina.
graeca.
recta.
setifera.

Steironema ciliatum.

Stevia ovata.
purpurea.

Stokesia cyanea.

Stipa Calamagrostis.
papposa.
pennata.

Streptopus distortus.

Swertia Kingii.
longifolia.
perennis.

Symphyandra pendula.
Wanneri.

Symphytum officinale.
peregrinum.

Tanacetum argenteum.

Tellima grandiflora.

Teucrium Botrys.
Chamaedrys.
flavum.
lucidum.
montanum.
pyrenaicum.

Thalictrum angustifolium.
aquilegifolium.
corynellum.
cultratum.
dioicum.
dipterocarpum.
Fendleri.
flavum.
foetidum.
glaucum.
minus.
squarrosup.*

Thermopsis fabacea.
montana.

Thymus odoratissimus.

Tiarella cordifolia.

Tofieldia calyculata.
palustris.

Tolmiea Menziesii.

Tragopogon major.
orientalis.

Trautvetteria palmata.

Tricyrtis latifolia.
macropoda.

Trifolium alpestre.
elegans.
fragiferum.
glomeratum.
hybridum.
incarnatum.
Lupinaster.
medium.
montanum.
ochroleucum.
pannonicum.
pratense.
rubens.
stellatum.
subterraneum.

Trigonella coerulea.
corniculata.
cretica.
foenum-graecum.
polycerata.
radiata.

Trillum grandiflorum.
undulatum.

Tripsacum dactyloides.

Trollius altaicus.
asiaticus.
chinensis.
dschungaricus.
Ledebourii.
patulus.
pumilus.
— var. yunnanensis.
sinensis.

Troximon laciniatum.

Tulipa australis.
Clusiana.
Kaufmanniana.
Sprengeri.
sylvestris.

Tunica Saxifraga.

Urospermum picroides.

Ursinia anthemoides.
pulchra.

Urtica cannabina.
dioica.
pilulifera.

Uvularia grandiflora.
perfoliata.

Valeriana baltica.
montana.
officinalis.
Phu.
pyrenaica.
sambucifolia.

Valeriana coronata.
 echinata.
 eriocarpa.
 olitoria.
 vesicaria.

Veratrum album.
 californicum.
 nigrum.
 viride.

Verbascum Blattaria.
 Chaixii.
 longifolium.
 nigrum.
 phoeniceum.
 Thapsus.

Verbena bonariensis.
 hispida.
 prostrata.

Verbesina helianthoides.
 Purpusii.

Veronica Allionii.
 austriaca.
 Beccabunga.
 Bidwillii.
 filifolia.
 fruticulosa.
 gentianoides.
 grandis.
 guthriana.
 Haastii.
 incana.
 longifolia.
 Lyallii.
 morrisonicola.
 orientalis.
 pectinata.
 peduncularis.

Veronica—cont.
 pinguifolia.
 prostrata.
 saxatilis.
 spicata.
 thracica.
 Tournefortii.
 virginica.

Vicia angustifolia.
 atropurpurea.
 calcarata.
 grandiflora.
 lutea.
 melanops.
 narbonensis.
 Orobus.
 pyrenaica.
 sativa.
 sepium.
 striata.
 sylvatica.
 villosa.

Vincetoxicum fuscatum.
 officinale.

Viola arenaria.
 canadensis.
 declinata.
 elatior.
 lutea.
 persicifolia.
 stagnina.
 tricolor var. nigra.

Volutarella muricata.

Zephyranthes candida.

Zygadenus elegans.

TREES AND SHRUBS.

Those marked with an asterisk were not grown at Kew.

Acanthopanax divaricatus.
 Henryi.
 lasiogyne.
 sessiliflorus.
 setchuenensis.

Acer circinatum.
 Heldreichii var. macropterum.
 lutea.
 hyrcanum.
 insigne.
 Lobelii.
 macrophyllum.
 monspessulanum.
 neglectum.
 nikoense.

Aesculus californica.
 indica.

Akebia lobata.

Alnus cordata.
 elliptica.
 firma.
 glutinosa.
 hirsuta.
 incana.
 japonica.
 nitida.
 oregona.
 orientalis.
 serrulata.
 sinuata.
 tenuifolia.
 viridis.
 — var. mollis.

Amelanchier asiatica.
 canadensis.
 florida.
 laevis.

Andrachne colchica.
 phyllanthoides.

Andromeda polifolia.

Anthyllis Barba-Jovis.

Aralia chinensis.
 — var. glabrescens.

Arbutus Menziesii.

Arctostaphylos Manzanita.
 tomentosa.

Baccharis patagonica.

Berberis actinacantha.
 aggregata.
 — var. Prattii.

angulosa.
 aristata.
 atrocarpa.
 Beaniana.
 brachypoda.
 buxifolia.
 canadensis.
 Chitria.
 concinna.
 consimilis.
 Darwinii.
 diaphana.
 dictyophylla.
 — var. albicaulis.
 dubia.
 Edgeworthiana.
 Francisci-Ferdinandii.
 Gagnepainii.
 Hookeri.
 Julianae.
 koreana.
 Lecomtei.
 Leichtlinii.
 Lycium.
 orthobotrys.
 polyantha.
 pruinosa.

Berberis—*cont.*
rubrostilla.
sinensis.
Soulieana.
Stapfiana.
subcaulialata.
thibetica.
Thunbergii.
Tischleri.
Veitchii.
Vernae.
verruculosa.
virescens.
Wilsonae.
yunnanensis.

Betula corylifolia.
davurica.
Delavayi var. *Forrestii.*
Ermanii.
 — var. *nipponica.*
fruticosa.
humilis.
 — var. *kamtschatica.*
Jacquemontii.
japonica.
 — var. *mandshurica.*
lenta.
lutea.
Medwediewii.
papyrifera.
 — var. *occidentalis.*
populifolia.
pumila.
utilis.

Bruckenthalia spiculifolia.

Buddleia albiflora.
alternifolia.
Fallowiana.
nivea.
stenostachya.
variabilis.
 — var. *amplissima.*
 — var. *magnifica.*
 — var. *nanhoensis.*
 — var. *Veitchiana.*

Bupleurum fruticosum.

Buxus sempervirens.

Callicarpa Giraldiviana.
japonica.

Caragana ambigua.
arborescens.
 — var. *Redowskii.*
aurantiaca.

Carmichaelia australis.
flagelliformis.

Carpinus caroliniana.
orientalis.
Turczaninowii.

Caryopteris Mastacanthus.
tangutica.

Cassandra calyculata.

Cassinia fulvida.
Vauvilliersii.

**Ceanothus americanus.*
thyrsiflorus.

Cedrus atlantica.
Libani.

Celastrus articulatus.
rugosus.
scandens.

Celtis glabrata.
gracilis.
occidentalis.

Cephalotaxus drupacea.
Fortunei.
pedunculata.

Cercis Siliquastrum.

Chionanthus virginica.

Cistus canescens.
corbariensis.
cyprius.
hirsutus.
laurifolius.
monspeliensis.
populifolius.
villosus.

Clematis aethusifolia var.
latisecta.
campaniflora.
connata.
 — var. *velutina.*
Douglasii var. *Scottii.*
Fargesii.
Flammula.
fusca.
glauca var. *akebioides.*
Gouriana.
intermedia.
macropetala.
montana.
 — var. *rubens.*
orientalis.
Pseudo-flammula.
Rehderiana.
serratifolia.
Spooneri.
tangutica.
 — var. *obtusiuscula.*
vedrariensis.
Veitchiana.
virginiana.
Vitalba.
Viticella.

Clerodendron Fargesii.

Clethra acuminata.
alnifolia.
 — var. *Michauxii.*
 — var. *paniculata.*
barbinervis.
tomentosa.
Wilsonii.

Cneorum tricoccum.

Cocculus trilobus.

Colutea arborescens var.
bullata.
media.
orientalis.

Corema album.

Coriaria japonica.
terminalis.

Cornus alba.
Amomum.
asperifolia.
Baileyi.
Bretschneideri.
Hemsleyi.
macrophylla.
Nuttallii.
pubescens.
sanguinea.
stolonifera.

Corokia virgata.

Cotoneaster acutifolia.
affinis.
ambigua.
amoena.
apiculata.
bacillaris.
 — var. *obtusa.*
bullata.
buxifolia.
congesta.
Dammeri.
Dielsiana.
divaricata.
Franchetii.
frigida.
glaucophylla.
Harroviana.
hebeophylla.
Henryana.
horizontalis.
hupehensis.
lactea.
Lindleyi.

Cotoneaster—*cont.*

lucida.
melanocarpa.
— var. laxiflora.
microphylla.
— var. cochleata.
— var. thymifolia.
moupinensis.
multiflora.
— var. calocarpa.
nitens.
obscura.
pannosa.
prostrata.
racemiflora.
rotundifolia.
rubens.
salicifolia.
— var. rugosa.
serotina.
Simonsii.
turbinata.
uniflora.
Wardii.
Zabelii.

Crataegus acutiloba.

ambigua.
arkansana.
asperifolia.
austromontana.
Beckwithae.
berberifolia.
Boyntonii.
Buckleyi.
canadensis.
Carrierei.
Chapmanii.
chlorosarca.
coccinea.
cordata.
cuneata.
densiflora.
dilatata.
Dippeliana.
durobrivensis.
Egglestonii.
Ellwangeriana.
elongata.

Crataegus—*cont.*

ferentaria.
filipes.
Fisheri.
Forbesae.
Gaultii.
gloriosa.
infera.
integriloba.
intricata.
Jackii.
Jonesae.
Lambertiana.
Laurentiana.
lenta.
Macauleyae.
Macounii.
missouriensis.
modesta.
mollis.
neo-Canbyi.
orientalis.
populnea.
praecox.
pruinosa.
prunifolia.
punctata.
rivularis.
semi-orbiculata.
sera.
sinaica.
stipulosa.
succulenta.
tanacetifolia.
verecunda.
Wattiana.

Cupressus Lawsoniana.

macrocarpa.
nootkatensis.
thyoides.

Cydonia cathayensis.

Maulei.

Cytisus albus var. durus.

austriacus.
— var. Heuffelii.
grandiflorus.

Cytisus—*cont.*

nigricans.
praecox.
purgans.
purpureus.
ratisbonensis.
scoparius.
— var. Andreanus.
— var. sulphureus.
Spachianus.
supinus.

Daboëcia polifolia.

Danaea racemosa.

Daphne Mezereum.

Deutzia corymbosa.

gracilis.
longifolia.
macrocephala.
mollis.
scabra.
Schneideriana var.
laxiflora.
Sieboldiana.

Diervilla floribunda.

florida.
japonica.
Lonicera.
sessilifolia.
venosa.

Dipelta floribunda.

Dorycnium hirsutum.

Eccremocarpus scaber.

Elaeagnus multiflora.

umbellata.

Empetrum nigrum.

— var. scoticum.

Enkianthus campanulatus.

cernuus.
perulatus.

Erica arborea.
australis.
ciliaris.
cinerea.
scoparia.
stricta.
Tetralix.
Veitchii.

Eucryphia pinnatifolia.

Euonymus Bungeanus.

latifolius.
Maackii.
oxyphyllus.
phellomaria.
planipes.
radicans.
Sieboldianus.
yedoensis.
— var. Koehneana.

Evodia hupehensis.

Exochorda macrantha.

Fontanesia Fortunei.

phillyraeoides.

Forsythia europaea.

Fraxinus lanceolata.

numidica.
obliqua.
oregona.
Ornus.
parvifolia.

Garrya elliptica.

Gaultheria hispida.

procumbens.
pyrolloides.
Shallon.

Gaylussacia dumosa.

frondosa.

Genista aetnensis.
 hispanica.
 lydia.
 pilosa.
 radiata.
 sagittalis.
 tinctoria.
 — var. *elatior*.
 virgata.

Hamamelis japonica.
 — var. *Zuccariniana*.
 vernalis.
 virginiana.

Helianthemum alpestre.
 alpinum.
 alyssoides.
 appeninum.
 formosum.
 halimifolium.
 hymettum.
 pilosum.
 vulgare.
 — var. *rhodanthum*.

Hibiscus syriacus.
Hoheria Lyallii.
Hydrangea Bretschneideri.
 paniculata.
 petiolaris.
 radiata.
 — var. *glabrescens*.
 — var. *setchuenensis*.
 — var. *Wilsonii*.

Hypericum Androsaemum.
 aureum.
 dubium.
 elatum.
 galioides.
 hircinum.
 Hookerianum.
 inodorum.
 Kalmianum.
 patulum.
 — var. *Henryi*.
 uralum.
 Webbii.

Ilex decidua.
 integra.
 opaca.
 verticillata.

Indigofera Gerardiana.

Jamesia americana.

Jasminum Beesianum.
 humile.
 Wallichianum.

Juglans cathayensis.
 nigra.

Kalmia angustifolia.
 cuneata.
 glauca.
 latifolia.

Koelreuteria apiculata.

Laburnum alpinum.
 vulgare.

Ledum latifolium.
 palustre.

Leiophyllum buxifolium.

Leptospermum Liversidgei.
 pubescens.
 scoparium.

Leucothoë Catesbaei.
 racemosa.

Leycesteria formosa.

Ligustrum acuminatum var.
 macrocarpum.
 compactum.
 confusum.
 Delavayanum.
 Ibota.
 insulare.
 ionandrum.
 japonicum.
 yunnanense.

Lonicera alpigena.
 chaetocarpa.
 chrysantha.
 — var. *turkestanica*.
 deflexicalyx.
 floribunda.
 Henryi.
 hispida.
 iberica.
 involucrata.
 japonica.
 lanceolata.
 Ledebourii.
 longa.
 Maackii.
 minutiflora.
 Morrowii.
 müendeniensis.
 nigra.
 obovata.
 orientalis.
 — var. *longifolia*.
 prostrata.
 quinelocularis var.
 translucens.
 Ruprechtiana.
 segreziensis.
 similis var. *Delavayi*.
 Sullivantii var. *hirsuta*.
 syringantha.
 tatarica.
 — var. *micrantha*.
 trichosantha.
 Xylosteum.

Lupinus arboreus.

Lyonia ligustrina.

Maackia amurensis.

Magnolia hypoleuca.
 Lennei.
 Soulangeana.
 tripetala.

Mahonia nervosa.

Menispermum canadense.

Menziesia pilosa.

Microglossa albescens.

Muehlenbeckia axillaris.

Myricaria germanica.

Myrtus communis.
 Luma.

Neillia amurensis.
 capitata.
 opulifolia.
 Torreyi.

Notospartium Carmichaeliae.

Nuttallia cerasiformis.

Olearia albida.
 furfuracea.
 Haastii.
 ilicifolia.

Ononis fruticosa.

Osmanthus Delavayi.

Osteomeles Schwerinae.

Oxycoccus macrocarpus.

Oxydendrum arboreum.

Paeonia Delavayi.
 lutea.

Paliurus Spina-Christi.

Pernettya mucronata.

Pertya sinensis.

Petteria ramentacea.

Phellodendron chinense.
 sachalinense.

Philadelphus argyrocalyx.
brachybotrys.
 — var. *purpurascens*.
californicus.
coronarius.
Delavayi.
Falconeri.
incanus.
latifolius.
Lewisii.
pekinensis.
pendulifolius.
pubescens.
Satumanus.
sericanthus.
speciosissimus.
tomentosus.
verrucosus.
Wilsonii.

Phillyrea angustifolia.

Pieris floribunda.
formosa.
japonica.
mariana.
taiwanensis.

Pinus Armandii.
parviflora.

Piptanthus concolor.

Platanus acerifolia.
orientalis.

Potentilla davurica.
fruticosa.

Prunus acida.
australis.
Avium.
cerasifera var. *divaricata*.
emarginata.
hortulana.
incana.
incisa.
japonica.
Lannesiana.

Prunus—cont.
Mahaleb.
serrulata.
tomentosa.

Ptelea isophylla.
trifoliata.

Pterostyrax hispida.

Pyracantha angustifolia.
coccinea.
crenulata.
Gibbsii.
 — var. *yunnanensis*.
Rogersiana.

Pyrus alnifolia.
alpina var. *superaria*.
americana.
 — var. *nana*.
arbutifolia.
Aucuparia var. *Backhou*.
 — var. *moravica*.
crataegifolia.
decurrens.
floribunda.
Folgneri.
Halliana.
Hostii.
Matsumurana.
Meinichii.
melanocarpa.
minima.
pekinensis.
pinnatifida.
pohuashanensis.
prunifolia.
rotundifolia.
Sargentii.
scalaris.
Scheideckeri.
sikkimensis.
sorbifolia.
Sorbus.
theifera.
Toringo.
 — var. *major*.
toringoides.

Pyrus—cont.
Tormalis.
Tschonoskii.
Vilmorinii.
yunnanensis var. *Veitchii*.
Zahlbruckneri.
Zumi.

Quercus agrifolia.
Ballota.
coccifera.
conferta.
lanuginosa.
pontica.
rubra.

Raphiolepis japonica.

Rhamnus cathartica.
crocea.
davurica.
Erythroxylon.
fallax.
Frangula.
imeretina.
petiolaris.
Purshiana.
spatulifolia.
utilis.

Rhododendron aechmophyllum
amaurophyllum.
ambiguum.
brachycarpum.
californicum.
cinnabarinum.
concinnum.
Cuthbertii.
Davidsonianum.
decorum.
discolor.
ferrugineum.
Fortunei.
halense.
Hanceanum.
hippophaeoides.
hylotheptum.
hypolepidotum.
impeditum.

Rhododendron—cont.
maximum.
micranthum.
oreotrephes.
orthocladum.
polylepis.
praeteritum.
punctatum.
racemosum.
rubiginosum.
scintillans.
Shweliense.
Smirnowii.
telmateum.
Tschonoskii.
Vaseyi.
virgatum.
yanthinum.
yunnanense.

Rhodotypos kerrioides.

Rhus Potaninii.
verniciiflua.

Ribes alpinum.
aureum.
divaricatum.
futurum.
glutinosum.
holosericeum.
Koehneanum.
rotundifolium.
stenocarpum.
Warscewiczii.

Rosa acicularis.
alba.
baicalensis.
blanda.
caudata.
cinnamomea.
corymbulosa.
Davidii.
elegantula.
Fargesii.
glutinosa.
gymnocarpa.
Helenae.

Rosa—cont.

Hugonis.
humilis.
macrophylla.
mollis.
Moyesii.
multibracteata.
nutkana.
omeiensis.
— var. atrosanguinea.
— var. polyphylla.
— var. pteracantha.
pendulina.
— var. pyrenaica.
pisocarpa.
poterifolia.
pyrifera.
rugosa.
saturata.
Seraphinii.
sericea.
sertata.
setipoda.
Soulieana.
stylosa var. evanida.
Sweginzowii.
virginiana.
Webbiana.
Willmottiae.
Woodsii var. Fendleri.

Rubus biflorus.
— var. quinqueflorus.
deliciosus.
flosculosus.
Giraldianus.
inopertus.
lasiostylus.
nigro-baccus.
occidentalis.
parvifolius var.
Fraserianus.
phoenicolasius.
pubescens.
xanthocarpus.

Ruscus aculeatus.

Ruta graveolens.

102

Sciadopitys verticillata.

Securinega fluggeoides.
ramiflora.

Senecio compactus.
laxifolius.

Skimmia japonica.

Smilax excelsa.
rotundifolia.
scobinicaulis.

Sophora viciifolia.

Spartium junceum.

Spiraea Aitchisonii.
arborea.
— var. glabrata.
betulifolia.
bracteata.
canescens.
discolor.
Lindleyana.
salicifolia.
sorbifolia var. stellij
Veitchii.
Wilsonii.

Staphylea colchica.
Coulombieri.
pinnata.

Stranvaesia Davidiana.
— var. undulata.
salicifolia.

Styrax americanus.
japonicus.
Wilsonii.

Thalictrum
thalicarpus Heyeri.
mollis.
occidentalis.
racemosus.
rotundifolius.

