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BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 1.]

[1909.

I.—ON SOME SPECIES OF *IMPATIENS* FROM INDO-CHINA AND THE MALAYAN PENINSULA.

J. D. HOOKER.

When examining the contents of a rich collection of Chinese *Balsamineae*, liberally loaned to me by the authorities of the Paris Museum of Natural History for the purpose of collating the species with those in the Kew Herbarium, I found amongst them a considerable number that had been collected in the French possessions of Indo-China. These were of special interest as being the only ones known to me as natives of that country.* There were about 16 of them, and they appeared to me to differ so greatly from those of China proper, not only specifically but in sectional and in other characters as to suggest Indo-China being, in respect of *Balsamineae*, a different phyto-geographical area from that to the north of it. Further, a study of the *Balsamineae* of the Malayan Archipelago from Sumatra eastwards to Borneo, Celebes, the Moluccas, New Guinea, and the Philippines, proved that these did not harmonise with those of Indo-China. Two more Indo-Chinese have subsequently been received from the Herbarium of the Fribourg Museum, making 18 species to be discussed here.

To determine the relationship of the Indo-Chinese and Malayan Peninsula species of *Impatiens*, it is necessary to take into consideration those of the adjacent areas of China, Burma (including Assam), and the Malayan Archipelago. Siam should be included were its Balsams known, but only six species have been collected in that kingdom (by Dr. C. C. Hosseus); one of them is also a native of Yunnan, and the others are of Burmese type.

The Balsams of the Himalaya differ so greatly from those of other Indian areas that their inclusion would be valueless. Except

* Loureiro's "Flora Cochinchinensis," published in 1790, when probably the term Cochinchina was not that now understood, contains five species of *Impatiens*, all apparently either Canton or garden plants. Two of these *I. Balsamina*, L., and *I. cornuta*, L., are forms of one. The others are too incompletely described for identification. None now exist in the British Museum, where Loureiro's herbarium is deposited.

the ubiquitous *I. Balsamina*, not a dozen of the 80 or 90 Himalayan species have been collected elsewhere.

Japan, too, is of no account in this study; it presents the unexplained anomaly of containing only two species known to me, namely, *I. nolitangere*, which extends throughout N. Asia and Europe to the Atlantic, and *I. Textori*, Miq., which is also a native of N. China. An explanation may be found in its insect fauna.

The materials from which the following data have been obtained are contained in the herbaria of Kew, the British Museum, Paris, Berlin, Vienna, St. Petersburg, Holland, Edinburgh, New York, the Philippine Islands, Fribourg, and Le Mans, which have all been liberally placed in my hands for study. I may add that, with the exception perhaps of the Malayan Peninsula, each of the included areas may, in my opinion, be expected to contain perhaps twice as many species as have hitherto been collected in it. The number known to me in each is approximately as follows:—

China, 180; Indo-China, 18; Burma, including Assam, 70; the Malayan Peninsula, 12; the Malayan Archipelago, 50.

The following are the characters selected for the differentiation of the areas:—

1. INFLORESCENCE—pedicellate, when consisting of simple axillary pedicels, ebracteate or bracteate at the very base only; in contrast with peduncled—the peduncles bearing one or more flowers with bracteate pedicels.
2. The absence of a BRACT at the base of the lowest pedicel of a two- or more-flowered peduncle (*I. nolitangere* is a species in which the lowest pedicel is ebracteate).
3. FLOWERS—the lateral sepals being four in number.
4. The distal lobes of the two WINGS being coherent or connate.
5. The ANTHERS being acute or acuminate.
6. FOLIAGE—the leaves being opposite or whorled (not alternate).

Other very important characters would be afforded by the staminal column, a comparatively minute structure, so contracted and deformed in herbarium specimens as to be in most species very difficult of analysis. The raphides, which abound in the leaves and often in the flowers of most species, are no doubt available for description, but many months of anatomical research would be necessary to utilize them for systematic work. So, too, with the nervation of the floral envelopes: this could be rendered available only by photographic representation through transmitted light. The anatomy of the leaves offers a rich field for research: it presents many various phases.

I have not included in the differentiation the remarkable character peculiar to a well-marked section of upwards of 20 Western Chinese balsams, which consists in the basal and often also the distal lobes of the wings being terminated by a very long flexuous filament of extreme tenuity, so fragile as to have been overlooked in descriptions of species belonging to the group.

						Total species in area.
i. Flowers simply pedicelled—						
Indo-China	...	...	...	16	...	18
Malayan Peninsula	...	...	...	7	...	12
China proper	...	...	...	14	...	180
Burma	...	...	...	23	...	70
Malayan Archipelago	...	...	...	30	...	50
ii. Lowest pedicel ebracteate—						
Indo-China	...	...	...	0	...	18
Malayan Peninsula	..	...	...	0	...	12
China proper	...	...	...	34	...	180
Burma	...	...	...	0	...	70
Malayan Archipelago	...	...	...	0	...	50
iii. Lateral sepals 4—						
Indo-China	...	...	...	3	...	18
Malayan Peninsula	...	...	...	1	...	12
China proper	...	...	...	25	...	180
Burma	...	...	...	7	...	70
Malayan Archipelago	...	...	...	0	...	50
iv. Connate distal lobes of wings—						
Indo-China	...	...	...	7	...	18
Malayan Peninsula	...	...	...	4	...	12
China proper	...	...	...	1	...	180
Burma	...	...	...	3	...	70
Malayan Archipelago	...	...	...	1	...	50
v. Anthers acute—						
Indo-China	...	...	...	0	...	18
Malayan Peninsula	...	...	...	0	...	12
China proper	...	...	...	40	...	180
Burma	...	...	...	1	...	70
Malayan Archipelago	...	...	...	1	...	50
vi. Leaves opposite and whorled—						
Indo-China	...	...	...	1	...	18
Malayan Peninsula	...	...	...	4	...	12
China proper	...	...	...	40	...	180
Burma	...	...	...	1	...	70
Malayan Archipelago	...	...	...	1	...	50

This table appears to indicate—

1. That the *Balsamineae* of Indo-China and the Malayan Peninsula conform, as regards the great preponderance of species with a simply pedicellate inflorescence; this is also the case in Burma and the Malayan Archipelago.
2. An absence of species having no bract at the base of the lowest pedicel of a peduncled inflorescence; this is also the case in Burma and the Malayan Archipelago.
3. The presence of species with four lateral sepals; as is the case in Burma and China, but not in the Malayan Archipelago.
4. The presence of a considerable number of species with coherent or connate distal lobes of the wings; as in three of Burma and one each of China and the Malayan Archipelago.

5. An absence of species with acute anthers, as in Burma and the Malayan Archipelago, in each of which only one has been collected out of 70 and 50 species respectively; in China proper, on the other hand, nearly one-fourth of the known species have acute anthers.
6. The solitary species with opposite or whorled leaves in Indo-China conforms to the condition of the genus in Burma and the Malayan Archipelago, in each of which areas only one of a large number of species shows this character; on the other hand, of the twelve Malayan Peninsular species four have opposite or whorled leaves, conforming with the Chinese area where species with this character are as numerous as those with acute anthers.

To conclude, the species of the Malayan Peninsula conform with those of Indo-China in all but one character, the sixth, and partly with that, and may be regarded as together indicating one and the same area, most nearly allied to the Burmese and very different from the Chinese.

How far these conclusions will prove aught but crude indications remains to be seen when fuller materials for their scrutiny shall be forthcoming.

CLAVIS SPECIERUM.

- A. Inflorescentia simpliciter pedicellata (pedunculo communi 0);
pedicelli ebracteati v. ima basi tantum bracteati :—
- Folia opposita v. verticillata :—
- Folia et sepala linearia :—
- Folia basi rotundata v. cordata 1. *I. chinensis*, L.
Folia basi longe angustata
2. *I. Griffithii*, Hk. f. & Thoms.
- Folia et sepala ovata :—
- Folia membranacea, vexillum obcordatum
3. *I. Curtisii*, Hk. f.
Folia firma, vexillum orbiculare
4. *I. Wrayi*, Hk. f.
- Folia alterna; sepala saepissime 2 :—
- Alarum lobi distales liberi :—
- Calcar elongatum :—
- Alarum lobi dissimiles, sepala minima
5. *I. Balsamina*, L.
- Alarum lobi consimiles apice obcordati :—
- Alarum lobi sinu terminale mutici :—
- Sepala 1-2 mm. longa 6. *I. Aureliana*, Hk. f.
Sepala 5 mm. longa 7. *I. diffusa*, Hk. f.
- Alarum lobi sinu terminale aristati :—
- Folia crenulata, sepala 3-4 mm. longa
8. *I. semounensis*, Hk. f.
Folia serrata, sepala 7 mm. longa
9. *I. attopeuensis*, Hk. f.

- Calcar limbo labelli vix longius; folia serrulata, sepala minuta ... 10. *I. indo-chinensis*, Hk. f.
- Alarum lobi distales cohaerentes v. connati :—
- Sepala ad medium v. altius connata :—
- Folia lanceolata subserrulata, labelli limbus cymbiformis ... 11. *I. Harmandi*, Hk. f.
- Folia ovata integerrima, labelli limbus hemisphaericus ... 12. *I. zygosepala*, Hk. f.
- Sepala libera :—
- Caulis simplex plus minusve columnaris et cicatricatus :—
- Folia ovata, crenata, utrinque 3-5-nervia; sepala 10-12 mm. longa, labelli calcar brevissimum inflatum ... 13. *I. Boni*, Hk. f.
- Folia ovata, crenata, utrinque 8-12-nervia; sepala 12-14 mm. longa, labelli calcar modice elongatum ... 14. *I. Musyana*, Hk. f.
- Folia orbicularia, subcrenata, utrinque 4-5-nervia; sepala 6-9 mm. longa, labelli calcar brevissimum inflatum ... 15. *I. pygmaea*, Hk. f.
- Folia ovata, serrulata, utrinque 5-6-nervia, basi biglandulosa; sepala 10-12 mm. longa, labelli calcar brevissimum 2-lobum 16. *I. verrucifer*, Hk. f.
- Caulis ramosus :—
- Folia utrinque 4-5-nervia :—
- Folia late ovata, membranacea, crenulata; sepala 6-7 mm. longa, labelli calcar breve incurvum... 17. *I. Ridleyi*, Hk. f.
- Folia ovato-lanceolata, nervis obscuris; sepala 7 mm. longa, cuspidata, labelli calcar breve incurvum... 18. *I. cryptoneura*, Hk. f.
- Folia utrinque 8-13-nervia :—
- Folia lanceolata, membranacea, serrulata; sepala orbicularia, 10 mm. diam., labelli calcar brevissimum bifidum 19. *I. Lanessani*, Hk. f.
- Folia lanceolata, crassiuscula, subserrulata; sepala ovata, 10 mm. longa, labelli calcar limbum aequans incurvum bifidum 20. *I. Spireana*, Hk. f.
- Folia ovato-lanceolata, membranacea, subcrenata; sepala 10 mm. diam., labelli calcar 2-lobum lobis limbo scaphiforme semi-immersis ... 21. *I. macrosepala*, Hk. f.
- B. Inflorescentia pedunculata; pedunculi 2-∞ flori :—
- Sepala 2 :—
- Perennis, caulis obesus, folia decidua 10-20 cm. longa, alarum lobi distales leviter cohaerentes 22. *I. mirabilis*, Hk. f.
- Herba ramosa, folia 2-5 cm. longa, utrinque 3-6-nervia, pedunculi 2-4 flori, sepala ovata 3 mm. longa 23. *I. Capusii*, Hk. f.
- Herba caule simplice, folia 10-12 cm. longa, utrinque 8-10-nervia, pedunculi 3-5-flori, sepala oblonga 9 mm. longa 24. *I. oncidiodides*, Ridley MSS.

Sepala 4 :—

Folia 12–16 cm. longa, nervis utrinque 8–14, pedunculi pauciflori	25. <i>I. Scortechinii</i> , Hk. f.
Folia 10–15 cm. longa, nervis utrinque 5–6, pedunculi multiflori	26. <i>I. claviger</i> , Hk. f.
Folia 10–16 cm. longa, nervis utrinque 9–12, pedunculi multiflori	27. <i>I. Balansae</i> , Hk. f.

SPECIERUM HABITATIONES, &c.*

1. *I. chinensis*, Linn. *Sp. Pl.* 937.

INDO-CHINA ; Tonkin, *Sergent Moulet* in Herb. Mus. Paris.

2. *I. Griffithii*, Hk. f. et Thoms in *Journ. Linn. Soc. Bot.* iv. 320.

PENINSULA MALAYANA ; Johor, Mont. Ophir, rupibus graniticis, alt. 1520 m., *Griffith, Cuming, Ridley* in Herb. Kew.

3. *I. Curtisii*, Hk. f. in *Rec. Bot. Surv. Ind.* iv. (1906) 55.

Herba annua, glabra, ramulis gracilibus foliisque novellis supra hirtellis. *Folia* 6–10 cm. longa, opposita et alterna, suprema saepe 3–5-natim verticillata, petiolata, membranacea, ovata, acuta v. acuminata, minute denticulata v. crenulata setis minutis interjectis, supra laete viridia, subtus glaucescentia, basi cuneata interdum setis glanduliferis ciliata, petiolo 3–7 cm. longo gracillimo, nervis utrinque 10–12 ; glandulae infra-petiolares 0. *Pedicelli* solitarii, 3–5 cm. longi, gracillimi, ebracteati, fructiferi elongati. *Flores* 2–2.5 cm. expansi, pallide rosei. *Sepala* 2, 3–4 mm. longa, ovata v. ovato-lanceolata, acuminata, 3-nervia. *Vexillum* amplum, cuneatim obcordatum, costa gracile sinu mucronata. *Alae* ad 10 mm. longae, sessiles, profunde bilobae ; lobus basalis late obovatus, apice truncatus retusus, sinu mucronatus ; auricula dorsalis obscura. *Labelli* limbus scaphiformis, late ovatus, 2.5–3 mm. longus, acuminatus : calcar gracillimum, pendulum, 2–2.5 cm. longum. *Filamenta* brevissima, late linearia ; antherae late didymae, obtusae. *Ovarium* ovoideum, rectum, acutum. *Capsulae* ad 1.5 cm. longae, gibbosae, fusiformes v. ellipsoideae, utrinque attenuatae, obtusae, polyspermae. *Semina* immatura 2 mm. longa, obovoidea, compressa, minute papillosa, pallide brunnea.

PENINSULA MALAYANA ; Perak, Mont. Thaiping, rupibus graniticis, alt. 900–1250 m., *Curtis, Scortechini, Ridley* ; Larut, *Hort. Bot. Calc. mercenarii* in Herb. Kew.

4. *I. Wrayi*, Hk. f. in *Rec. Bot. Surv. Ind.* iv. (1906) 55.

Herba annua, glabra v. ramulis foliisque novellis hirtellis ; caule 30 cm. alto gracile ramoso. *Folia* 5–8 cm. longa, opposita v. superiora ternatim verticillata, petiolata, crassiuscula, ovata v. oblongo-lanceolata, acuminata, integerrima v. spinuloso-serrulata, subtus glauca, basi in petiolum 2–2.5 cm. longum angustata, costa subtus crassa, pilosa, nervis utrinque 8–10 ; glandulae infra-petiolares et-sitpulares 0. *Pedicelli* 3–5 cm. longi, solitarii, ebracteati, fructiferi elongati. *Flores* ad 2.5 cm. expansi, rosei, disco coccinei. *Sepala* 2.5 mm. longa, late ovata, longe cuspidata, crassiuscula, 3–5-nervia. *Vexillum* orbiculare v. oblate obovatum, costa dorso medio rostrata apice cuspidata. *Alae* ad 2 cm. longae, sessiles, 2-lobae ; lobus

* In the following pages only such species are described in detail as have not been so treated previously. Two of the 12 Malayan Peninsula species (p. 3), having been made known only after this article was in type, shall be described in a future issue.

basalis oblongus, decurvus, obtusus; distalis ter longior, obcordatus; auricula dorsalis obtusa. *Labelli* limbus scaphiformis, 1.5 cm. longus, ore aristulato; calcar 3 cm. longum, gracillimum, rectum. *Filamenta* brevissima, linearia; antherae connatae, obtusae. *Capsulae* 2 cm. longae, ellipsoidae, utrinque breviter attenuatae, apice obtusae, polyspermae. *Semina* 3-4 mm. longa, ovoidea, compressa, pilis articulatis operta.

PENINSULA MALAYANA; Perak, Batang Padang, rupibus calcareis, alt. 600 m., *L. Wray* in Herb. Kew.

The specimens are in poor condition: Mr. Wray notes that the flowers are pink with a crimson centre.

5. *I. Balsamina*, *Linn. Sp. Pl.* 938 forma hortensis.

INDO-CHINA; Laos, *M. Maffie* in Herb. Mus. Paris.

The indigenous state of this plant, which is frequent throughout the warmer parts of India under various forms, has very recently been found in Sumatra.

6. *I. Aureliana*, *Hk. f.* in *Hook. Ic. Pl.* t. 2851.

INDO-CHINA; *Pr. Henri d'Orleans* in Herb. Mus. Paris.

This dwarf species was collected in the Prince's adventurous journey from Indo-China to Burma, but in what locality is not recorded.

7. *I. diffusa*, *Hk. f.*, sp. nov.

Herba 2-3 cm. alta, glaberrima, flaccida, parviflora, caule succulento basi diffuse ramoso, ramis ramulisque gracilibus. *Folia* 0.5-12 cm. longa, alterna, petiolata, carnosula?, exsiccata membranacea, ovata v. oblonga, acuta v. acuminata, indistincte crenata setulis interjectis, basi cuneata marginibus nudis v. ciliatis, in petiolum 2-3 cm. longum gracilem angustata, nervis utrinque 5-7 gracillimis. *Pedicelli* ebracteati, florentes folio breviores, fructiferi elongati. *Flores* ad 1 cm. expansi; raphides 0. *Sepala* 2, ovata v. ovato-rotundata, 5 mm. lata, mucronata, nervis laxo reticulatis. *Ve.villum* trigonum, angulis rotundatis, 6-8 mm. latum, costa dorso alata apice mucronata. *Alae* sessiles, 8 mm. longae, alte bilobae, lobis erectis obcordatis sinibus muticis; auricula dorsalis parva, basin versus alae. *Labelli* limbus scaphiformis, ovatus, 7 mm. longus, in calcar gracile rectum 2 cm. longum attenuatus, ore ascendente apice rotundato mucronato. *Filamenta* brevia; antherae minutae, didymae, obtusae. *Ovarium* oblongum, obtusum. *Capsulae* fusiformes, 10-15 mm. longae, rectae v. gibbosim falcatae, medio tumidae, obtusae, polyspermae. *Semina* oblonga, 3 mm. longa, laevia, pallide castanea.

INDO-CHINA; Sing Fung, *Dr. Harmand*, 89, in Herb. Mus. Paris.

I do not find the locality given for this species in any available atlas.

8. *I. semounensis*, *Hk. f.* in *Hook. Ic. Pl.* t. 2852.

INDO-CHINA; sinu Semoun, muris templi ripis flum. Seng-treng, *Dr. Harmand*, 89 in Herb. Mus. Paris.

9. *I. attopeuensis*, *Hk. f.* in *Hook. Ic. Pl.* t. 2853.

INDO-CHINA; Laos, sinu Attopeu, montibus 600 m. altis, *Dr. Harmand* in Herb. Mus. Paris.

10. *I. indo-chinensis*, *Hk. f.* in *Hook. Ic. Pl.* t. 2854.

INDO-CHINA; Otacamund (Cambodia?) alt. 1830–2130 m., *Pierre* in Herb. Mus. Paris.

11. *I. Harmandi*, *Hk. f.* in *Hook. Ic. Pl.* t. 2858.

INDO-CHINA; *Spire* in Voyage de *Dr. Harmand*, 346 in Herb. Mus. Paris.

12. *I. zygosepala*, *Hk. f.* in *Hook. Ic. Pl.* t. 2857.

INDO-CHINA; Cambodia, Kampoh, rupibus calcareis, *Geoffray* in Herb. Mus. Paris.

13. *I. Boni*, *Hk. f.* in *Hook. Ic. Pl.* t. 2860.

INDO-CHINA; Tonkin, Thongsan et Kienkhe, *Bon*, 286, et *Dick Long*, monte *Soi*, *Bon*, 2879 in Herb. Mus. Paris; *Dong Harn* inter rupis, *Bon*, 2086 in Herb. Mus. Fribourg.

14. *I. Musyana*, *Hk. f.*, sp. nov.

Herba humilis, succulenta, glaberrima, caule 5–6 cm. longo simplice robusto cicatricato inferne nudo. *Folia* 5–10 cm. longa, alterna, petiolata, crassiuscula, ovata, acuta v. obtusa, crenato-serrata, basi acuta, petiolo 1–4 cm. longo raro apice biglanduloso, nervis utrinque 8–12. *Inflorescentia* simpliciter pedicellata; pedicelli solitarii, 3–4 cm. longi, basi ebracteati. *Flores* 3–5 cm. expansi, roseo-violacei, intus flavi. *Sepala* 4; 2 exteriora ovata v. ovato-rotundata, cuspidata, 12–14 mm. longa, firma, opaca, multinervia, nervis reticulatis; 2 interiora minima, vix 1 mm. longa, oblonga, cuspidata, firma. *Vexillum* obovato-oblongum v. obcordatum, apice bilobum, 15–18 mm. longum, galeatum, recurvum, costa firma dorso infra medium alte carinata apice sinu rostellata. *Alae* amplae; lobi basales 1.5–2.5 cm. longi, late falcatis obovati, incurvi; distales in laminam amplam orbicularem 2–2.5 cm. diam. integram connatae; auriculae dorsales parvae, arcte cohaerentes. *Labelli* limbus cupularis v. alte cymbiformis, ore oblongo acuto 2–2.5 cm. longo horizontale; calcar breve, robustum v. subinflatum, 8–10 mm. longum, rectum v. incurvum. *Filamenta* linearia; antherae in capitulum globosum inclinatum connatae. *Ovarium* leviter curvum, acummatum.

INDO-CHINA; Tonkin, Mont. *Soi*, *Deitslong*, *Bon*, Herb. Miss. Tonquini occident., 2879 in Herb. Mus. Fribourg.

The flowers of the specimens of this species, kindly loaned by Prof. Musy, of Fribourg, at the request of the Director of Kew, are in a dilapidated state. They are remarkable for the great size of the wings, of which the distal lobes are connate, forming an orbicular lamina sometimes one and a quarter inch broad; and adding to these the basal lobes which are produced upwards for one-third the length of the united distal, the whole breadth of the wings is nearly 2 inches. On the accompanying ticket indited "Herbarium Missionis Tonquini occidentalis" Father *Bon* adds "Planta carnosa, stricta; flores roseo-violacei et flavi," and gives as the native name "Cay-cay-nin = Planta Candelabrum."

15. *I. pygmaea*, *Hk. f.*, sp. nov.

Herba humilis, glaberrima, carnosa, caule simplice 3–4 cm. alto crasso erecto inferne nudo cicatricato. *Folia* 2–4 cm. longa, alterna, longe petiolata, crassa, late ovata v. ovato-rotundata, petiolo 3–5 cm. longo, nervis utrinque 4–5. *Inflorescentia* simpliciter pedicellata; pedicelli foliis breviores, basi ebracteati. *Flores* ad 2–5 cm. expansi, albi, apice violacei. *Sepala* 4: 2 exteriora late ovata, acuminata,

6-9 mm. longa, tenuiter membranacea, 6-7-nervia; 2 interiora microscopica, ovata, membranacea. *Vexillum* oblongo-obovatum, 13 mm. longum, apice bilobum, costa dorso infra medium gibbo obtuso instructa apice sinu minute rostellata. *Alae* 2 cm. longae; lobi basales falcatis obovati, incurvi, basi acuti; distales in laminam suborbicularem 12-15 mm. latam ad medium bifidam connati, lobulis simplicibus v. sinu excisis; auriculae dorsales minutae. *Labelli* limbus late cymbiformis, obtusus, 14 mm. longus, ore horizontale; calcar brevissimum, inflatum, incurvum v. simplex v. bilobum. *Filamenta* brevia, linearia; antherae in capitulum incurvum connatae. *Ovarium* lineare.

INDO-CHINA; Hao Nho, juxta rivulos umbrosos vallis Thong-san, Bon, Herb. Miss. Tonquini occident., 1399 in Herb. Mus. Fribourg.

As in *I. Musyana* the microscopic inner sepals all but escape observation; if present I have failed to find them in *I. Boni* to which *I. pygmaea* is most nearly allied, differing, however, greatly in the foliage, spur of the lip and size of all parts. Father Bon describes the leaves as "crassa" and flowers as above.

16. *I. verrucifer*, *Hk. f.* in *Hook. Ic. Pl.* t. 2856.

INDO-CHINA; Tonkin, Tan Kaun, convalle de Lankok, (sylvia Mont. Bavi) *Balansa*, 3880 in Herb. Mus. Paris et Kew.

17. *I. Ridleyi*, *Hk. f.* in *Rec. Bot. Surv. Ind.* iv. (1906) 56.

Fruticulus glaber, 3-6 dm. altus; caule erecto v. ascendente lignoso inferne ramoso, ramis gracilibus foliosis. *Folia* 3-6 cm. longa, alterna, petiolata, membranacea, ovata, acuta v. acuminata, crenulata setulis passim interjectis, basi cuneata, saepe biglandulosa, petiolo 1.5-2.5 cm. longo gracillimo, costa gracile, nervis utrinque 4-5; glandulae infrapetiolares 0. *Pedicelli* solitarii v. bini, 2.5-4 cm. longi; capillares, ima basi bracteati. *Flores* ad 2 cm. expansi, albi, fusco maculati. *Sepala* 2, ovato-rotundata v. orbicularia, cuspidatim acuminata, 6-7 mm. longa, 5-7-nervia. *Vexillum* cuneatim obovatum, retusum, costa dorso incrassata, basi ala crassa brevi aucta, apice mucronata. *Alae* 2.5 cm. longae; lobi basales longe stipitati, ovato-oblongi, acuti, recurvi; distales duplo majores, oblongae, connatae; auricula dorsalis minuta. *Labeltum* hemisphericum v. cupulare, ore obtuso mucronato; calcar limbo brevius, robustum, incurvum. *Filamenta* subelongata, linearia; antherae parvae, obtusae. *Ovarium* fusiforme, obtusum. *Capsulae* parvae, ellipsoideae, 8-10 mm. longae, substipitatae, apice rostratae, polyspermae. *Semina* minuta, 1.5-2 mm longa, obovoidea, compressa, minute granulata v. tuberculata, castanea.

PENINSULA MALAYANA; Perak, speluncis calcareis Gua Batu, *C. Curtis, Ridley*, 8278 in Herb. Kew., *Dr. Franz Kehding*.

I am indebted to Mr. Ridley for a good drawing of this species, by Mr. Hussain.

18. *I. cryptoneura*, *Hk. f.*, sp. nov.

Fruticulus glaberrimus, ramosus, ramis teretibus lignosis. *Folia* 5-10 cm. longa, alterna, petiolata, crassiuscula, ovato-lanceolata, acuminata, subserrulata, basi acuta nuda v. biglandulosa, in petiolum gracilem 2-7 cm. longum angustata, nervis utrinque 4-5 gracillimis aegre distinguendis; glandulae stipulares 0. *Pedicelli* solitarii, foliis multo breviores, ebracteati. *Flores* subglobosi,

ad 2 cm. expansi. *Sepala* 2, ovato-rotundata, cuspidata, ad 7 mm. longa, viridia, nervis reticulatis. *Vexillum* obovatum, 8 mm. longum, recurvum, costa crassa dorso basi gibbo instructa, apice cuspidata. *Alae* 1.5 cm. longae, stipitatae, ope loborum distalium connatae; lobus basalis falcatis incurvus; distalis brevior oblongus; auricula dorsalis parva, inflexa. *Labellum* breviter saccatum, basi calcare brevi incurvo instructum, ore 10 mm. diam., apice acuto. *Filamenta* brevissima, subulata; antherae parvae. *Ovarium* breve, ovoideum, acutum.

PENINSULA MALAYANA; Perak, prope Ipoh, rupibus calcareis, *C. Curtis*, 3172, in Herb. Kew.

The specimens which I have seen of this are in a very bad state, but I have been aided in the description by a drawing lent me by Mr. Curtis, late Superintendent of the Botanic Gardens, Penang, of a specimen which flowered in that garden in June, 1896. The leaves are of a remarkably soft texture, apparently not succulent, in which the very delicate nerves are with difficulty detected. This peculiarity, so obvious in dried specimens, is well seen in Mr. Curtis' drawing of the living plant.

19. *I. Lanessani*, *Hk. f.* in *Hook. Ic. Pl.* t. 2855.

INDO-CHINA; Cochinchina inferior; Pulo Condor, *Lanessan* in Herb. Mus. Paris.

20. *I. Spireana*, *Hk. f.* in *Hook. Ic. Pl.* t. 2859.

INDO-CHINA; Tonkin, regione Laos, *Spire*, 246 in Herb. Mus. Paris.

21. *I. macrosepala*, *Hk. f.* in *Rec. Bot. Surv. Ind.* iv. (1906) 56.

Annua? fere glabra, caule erecto 6-7 dm. alto gracile basi simplice superne ramoso, ramis suberectis. *Folia* 5-10 cm. longa, alterna, longe petiolata, tenuiter membranacea, ovato-lanceolata, subcaudatim acuminata, obscure crenata setulis interjectis, juniora supra sparsim ciliolata, basi cuneata v. in petiolum gracillimum 2.5-4 cm. longum apice biglandulosum angustata, nervis utrinque 10-12. *Pedicelli* solitarii, filiformes, breves, basi nudi v. minute bracteati. *Flores* ad 2-5 cm. expansi. *Sepala* 2, orbicularia v. ovato-rotundata, ad 10 mm. diam., membranacea, labellum ocludentia. *Vexillum* parvum, erectum, obovato-oblongum, costa dorso medio incrassata, apice mucronata. *Alae* ad 2 cm. longae; lobi basales stipitati, rotundati, stipite arcuato; distales ovato-oblongae, in laminam bifidam connatae. *Labelli* limbus parvus, scaphiformis, acutus, subtus mamillis 2 acutis parallelis auctus. *Filamenta* elongata, linearia; antherae didymae. *Ovarium* gracile, rectum, acuminatum. *Capsulae* fusiformes, 1.5-2 cm. longae, longe stipitatae et acute rostratae, oligospermae. *Semina* 3-4 mm. longa, minute granulata, fusco-atra.

PENINSULA MALAYANA; Perak, rupibus calcareis prope Ipoh, *C. Curtis*, 3217. SIAM AUSTRALIS; Kasum, *Ridley in litt.* in Herb. Kew.

The above description is drawn up upon very imperfect materials. The large orbicular sepals, and didymous mamillae representing the spur of the lip distinguish it. No. 3217 represents elliptic-lanceolate leaves with petioles 10 cm. long.

22. *I. mirabilis*, *Hk. f.* in *Bot. Mag.* t. 7195.

PENINSULA MALAYANA; Kedah, rupibus calcareis ins. Lankawi, *C. Curtis*, 1678; *W. Fox* in Herb. Kew.

23. *I. Capusii*, *Hk. f.* in *Hook. Ic. Pl.* t. 2864.

INDO-CHINA; Sangir dak (? Songka ad ostia flum. Red river), *Capus* 2° *Voy.* in Herb. Mus. Paris.

24. *I. oncioides*, *Ridley MSS.*

Herba fere glabra, caule simplice apicem versus folioso. *Folia* 10–12 cm. longa, alterna, submembrancea, petiolata, ovato- v. elliptico-lanceolata, acuminata, subserrulata, exsiccata subtus cuprea, basi in petiolum 2–3 cm. longum nudum v. pauciglandulosum angustata, nervis utrinque 8–10 gracillimis; glandulae stipulares 0. *Pedunculi* 6–10 cm. longi, 3–5-flori, pedicellique pubescentes v. glabrati; pedicelli 2–4 cm. longi, fructiferi elongati; bractae 6–8 mm. longae, lineari-oblongae, acutae v. acuminatae, basin pedicellorum amplectentes, deciduae. *Alabastra* subglobosa, calcar limbo labelli brevius, incurvum. *Sepala* 2, oblonga, 9 mm. longa, mucronata, chartacea. *Filamenta* linearia, brevia; antherae connatae, obtusae. *Capsulae* 14 mm. longae, medio ellipsoideae, utrinque attenuatae, acute rostratae, polyspermae. *Semina* minuta, orbicularia, compressa, 2 mm. diam., atro-castanea, nitida.

PENINSULA MALAYANA; Perak, Batang Padang, *L. Wray*, alt. 1,500 m., 1491 in Herb. Kew.

The specimens are in so imperfect a state that I long hesitated to describe and name them, but the species is so handsome and so well marked as the only peninsular one except *I. mirabilis* with peduncled inflorescence, that it cannot fail to be recognised. The leaves in a dried state are of a curious dull coppery-red colour beneath. Flowering specimens from Mr. Ridley have been received at Kew, but too late for description in this article.

25. *I. Scortechinii*, *Hk. f.* in *Rec. Bot. Surv. Ind.* iv. (1906) 56.

Herba glaberrima, succulenta, 2–3 dm. alta, caule erecto simplice robusto longe nudo laeve v. cicatricato, nunc inferne 2–3 cm. diam. *Folia* apicem versus caulis conferta, 12–16 cm. longa, alterna, longe petiolata, ovato-oblonga v. subrotundata, acuminata, serrata v. serrulata, basi cuneata, petiolo 1–2 cm. longo gracile, costa subtus robusta, nervis utrinque 8–14; glandulae stipulares 0. *Pedicelli* solitarii v. plures, pedunculo abbreviato sessiles, petiolis breviores, graciles, floriferi elongati. *Flores* ampli, albi, intus rubri. *Sepala* 4, 2 exteriora 10 mm. longa, late oblonga v. orbicularia, obtusa v. cuspidata, membranacea, viridia; interiora parva, ovato-lanceolata, acuminata. *Vexillum* obovato-oblongum v. cuneiforme, 2 cm. longum, apice rotundatum v. truncatum, costa dorso infra medium incrassata, apiculata. *Alae* 2.5–3 cm. longae; lobi basales ampli, rotundati, stipitati, stipite arcuato; distales oblongi in laminam latam bifidam connati. *Labelli* limbus late infundibularis, ore cuspidato, inferne in calcar breve robustum incurvum apice bifidum attenuatus. *Filamenta* 4–5 mm. longa, linearia; antherae majusculae, oblongae. *Ovarium* gracile, falcatum, longe rostratum. *Capsulae* 2–5 cm. longae, medio cylindratae, longe stipitatae et graciliter rostratae, subtorulosae, oligospermae. *Semina* oblonga v. obovato-oblonga, 5 mm. longa, laevia, pallide fusca.

PENINSULA MALAYANA: Perak, Sungit Siput, rupibus calcareis *C. Curtis*, 3115; Kwala Dipang, *Scortechini*, 1582, 1883, *Kingii mercenarii*, 7057 in Herb. Kew.

26. *I. claviger*, *Hk. f.* in *Hook. Ic. Pl.* t. 2863.

INDO-CHINA; Tonkin, sylvis Mont. Bavi, convalle Lankok, *Balansa*, 3881 in Herb. Mus. Paris et Kew.

27. *I. Balansae*, *Hk. f.* in *Hook. Ic. Pl.* t. 2862.

INDO-CHINA; Tonkin, sylvis Mont. Bavi, convalle Lankok, *Balansa*, 3880 in Herb. Mus. Paris et Kew.

II.—AUSTRALIAN PASTURE HERBS.

The following article on the economic value of Australian pasture herbs as stock feed was contributed by Mr. Fred. Turner, F.L.S., to the *Sydney Morning Herald* and was published in the issue of July 11th, 1907. As the article is of more than local interest and value it is reprinted here by kind permission of the proprietors of the *Herald*.

THE ECONOMIC VALUE OF THE AUSTRALIAN PASTURE HERBS.

Observant persons who have travelled much on the Australian continent cannot have failed to notice the large number of herbs, other than grasses and saltbushes, growing over immense tracts of country, and forming a good percentage of the indigenous herbage on many sheep and cattle stations. Owing to their varied character—for there are representatives of many different families of plants—these nutritious fodder herbs are a most important factor in making Australian native pastures rich feeding grounds for all kinds of stock. Moreover, the succulent stems and leaves of many of these plants assuage the thirst of the animals that eat them. Many of these herbs have long, strong roots, which penetrate deeply into the earth, and enable the plants to withstand a long period of dry weather, without any appreciable check to their growth. When not too closely fed over, they produce an abundance of seed which germinates readily under ordinary conditions, therefore they are fairly plentiful in many parts of the country. Most of them are herbaceous plants, and many are of upright habit, growing about one foot high, while several have prostrate stems, which lengthen considerably in good seasons.

Darling Clover (*Trigonella suavissima*).—This plant is sometimes called “Menindie clover,” and “sweet-scented clover,” but to the aborigines of the Darling country it is known as “Calomba.” This clover-like plant, with fragrant stems and foliage, occurs in more or less abundance over an immense area in the interior. In favourable situations it is of perennial duration, and produces succulent stems three feet long or more. When growing on rich black soils that are subject to periodical inundations it produces a large amount of nutritious herbage, of which stock are particularly fond, and on which they fatten. Though this plant gives the greater yield of herbage on fertile land, it often grows on stony rises and on inferior country, and in such situations it is a valuable addition to the