

## INDEX

Callicarpa 86

Geunsia 86

Petraea 86

Premna 86

*Sesuvium* 85  
*Tournefortia* 85  
 mi-iodendron 75-78, 79, 85, 86, 88, 89, 92, 96, 103; sect. Plurifoholatae 75, 78, 80- sect. Unifoliolatae 75, 78, W, 95; ahernianum 75, 77, 79, 84, 86; auri- \* 94; bogoriense ^ 7 J 9, 80, 85, 88, 90, 93; coriaceum 75, 79, 80, 81, 8Z, •83\*; 'glabrum 88-90; hollrungii 75, 77, 79, 95, 99, 103-105; holophyllum 75, 80, 96, 97, 98\*, 99; longifolium 75, 89; mo- no'phyllum 75, 76, 103, 104; novogui- neense 75, 79, 80, 103; pteropodum 75, 77, 79, 92-94; var. auriculatum 75, /», 94- sa'rawakanum 75, 80, 99, 100, 101\*; simplicifolium 75, 79, 95, 96; smilaci- folium 75, 79, 95, 96; spec. 79, 95; sub- spicatum 75, 79, 96, 99, 103, 104.

Vitex 76-79, 86, 96, 100; sect. Agnus- Castus 78; sect. A.-C, Axillares 79, 100; sect. A.-C, Terminates 79, 100; aherniana 77, 84-86; bankae 75, 84, 86-88- bogoriensis 75, 84, 86-88; clar- keana 103, 104; cofassus 104; coriacea 80- curranii 84, 85; flabelhflora 88-90; Urw 75, 76, 97, 99, 103, 104; holo- phylla 75, 97; koordersii 75, 92-94; lon- gifolia 89; merrillii 88; novoguineensis 103, peralata 92; philippinensis 92; pteropoda 77, 92; punctata 104; sara- wajcana 100; simplicifolia Clarke 103; simplicifolia Oliver 103, smdaxfoha 95, 96; subspicata 75, 99, ^ ^ ^ gona 75, 100, 102; venosa 75, 80, 82, 84- unifoliolata 104.  
 Xerocarpa 75, 77, 85, 86; avicenniaefo- liola 75, 76, 84-86.

## THE GENUS VIBURNUM (CAPRIFOLIACEAE) IN MALAYSIA

J. H. KERN \*

## SUMMARY

1. In the following pages an account of the genus *Viburnum* in Malaysia is presented.
2. The distribution of its species is briefly discussed and a map relating to it added.
3. The main part of the present paper consists of keys to the sections and species, followed by a systematic treatment of the 16 species admitted for the region.
4. Three new subsections are proposed, viz. *Viburnum* subsect. *Punctata* Kern, subsect. *Sambucina* Kern, and subsect. *Lutescentia* Kern. *Viburnum* subseries *Coriacea* Maxim, is reduced to the rank of a subsection.
5. Three species and two varieties are described as new, viz. *Viburnum amplifolium* Kern, *V. clemensae* Kern, *V. hispidulum* Kern, *V. coriaceum*, var. *longiflorum* Kern, and *V. sambucinum* var. *subglabrum* Kern.
6. The following species are reduced to the rank of varieties: *Viburnum floribundum* Merr. has become *V. luzonicum* var. *floribundum* (Merr.) Kern, and *V. sinuatum* Merr. has become *V. luzonicum* var. *sinuatum* (Merr.) Kern.
7. The following reductions to synonymy are made: *Viburnum longistamineum* Ridl. to *V. sambucinum*- var. *subglabrum* Kern; *V. sumatranum* Miq., *V. villosum* Ridl., and *V. inopinatum* Craib all to *V. sambucinum* var. *toventosum* Hallier f.; *V. forbesii* Fawc. partly to *V. sambucinum* Bl., partly to *V. coriaceum* Bl.; and *V. zippelii* Miq. to *V. japonicum* (Thunb.) Spr.
8. Emended descriptions of *Viburnum beccarii* Gamble and of *V. junghuhnii* Miq. are given.

## INTRODUCTION

In the present paper I have tried to give a critical survey of the Malaysian material of *Viburnum*, put at my disposal by the Directions of the following herbaria:

- Herbarium of the Arnold Arboretum, Harvard University, Jamaica plain, Mass. (U.S.A.) (A);
- Herbarium Bogoriense, Kebun Raya Indonesia, Bogor (B);
- The Gray Herbarium of Harvard University (G);
- Rijksherbarium (National Herbarium), Leiden (L);
- Herbarium of the Botanic Gardens, Singapore (S);
- Botanisch Museum & Herbarium (Herbarium of the State University), Utrecht (U).

\* Botanist, Herbarium Bogoriense, Kebun Raya Indonesia.

To the Keepers of these Herbaria I am much indebted for their kind assistance.

Soon it was evident, that because of the great polymorphism the delimitations of the taxa would often be very difficult. It would have been desirable to incorporate the species of *Viburnum* of the surrounding regions into this revision, too, especially so as to compare the types of the hence described species with those of the Malaysian ones. In many cases however this has not been tried; therefore I am well aware of the incompleteness and the inaccuracies, adhering undoubtedly to this survey.

Recognised are 16 Malaysian species of *Viburnum* and a small number of varieties. Three species, all originating from Borneo, are published for the first time. On the other hand several previously published species are referred to the synonymy or reduced to varietal rank.

In Ridley's "Flora of the Malay Peninsula" five species are enumerated; two of them however, *Viburnum longistamineum* Ridl. and *V. villosum* Ridl., deserve at best varietal rank. The remaining three species, *V. beccarii* Gamble, *V. lutescens* Bl., and *V. sambucinum* Bl., also occur in the Malay Archipelago.

Merrill's "Enumeration of the Philippine flowering plants" records eight species: *V. cornutidens* Merr., *V. floribundum* Merr., *V. glaberrimum* Merr., *V. luzonicum* Rolfe, *V. odoratissimum* Ker, *V. platyphyllum* Merr. (erroneously as *V. pachyphyllum*), *V. propinquum* Merr., and *V. sinuatum* Merr. Of these, I consider *V. floribundum* and *V. sinuatum* to be not specifically distinct from *V. luzonicum*. Only two of the remaining species, viz. *V. odoratissimum* and *V. luzonicum*, reach Celebes and the Moluccas respectively.

In addition to the species already mentioned above, Koorders & Valetton, Boerlage, Hallier, and others record for the Malay Archipelago: *V. coriaceum* Bl., *V. forbesii* Fawc., *V. hasseltii* Miq., *V. junghuhnii* Miq., *V. punctatum* Ham. ex D. Don, *V. sumatranum* Miq., *V. vernicosum* Gibbs, and *V. zippelii* Miq. Of these, *V. hasseltii* is identical with *V. odoratissimum* and *V. forbesii* partly with *V. sambucinum*, partly with *V. coriaceum*; *V. sumatranum* is a variety of *V. sambucinum*; and *V. zippelii* (= *V. japonicum*) has been wrongly recorded for the area. On the other hand, *V. junghuhnii*, often taken for a synonym of *V. lutescens*, proved to be a well marked species.

As will become apparent from the present treatise, two groups can be distinguished within the Malaysian species of *Viburnum*. The southern group comprises the common *V. sambucinum*, *V. lutescens*, and *V. coria-*

*ceum*, and moreover, the rare *V. punctatum*, *V. beccarii*, and *V. junghuhnii*. With Mount Kinabalu as a centre, Borneo possesses a number of endemics, of which up to the present four are known: *V. amplificatum*, *V. clemensae*, *V. hispidulum*, and *V. vernicosum*. *V. sambucinum* inhabits the largest area, spreading over the Malay Peninsula and almost the whole of the Malay Archipelago, inclusive of the Lesser Sunda Islands and the Moluccas. The area of *V. lutescens* is nearly equal, reaching as far as Borneo and the western Lesser Sunda Islands Bali and Lombok. That of *V. coriaceum* is more restricted; in Malaysia this species occurs only in Sumatra, Java, and the Lesser Sunda Islands. *V. punctatum*, practically confined to the Asiatic continent, possesses an exclave in North Sumatra. *V. beccarii*

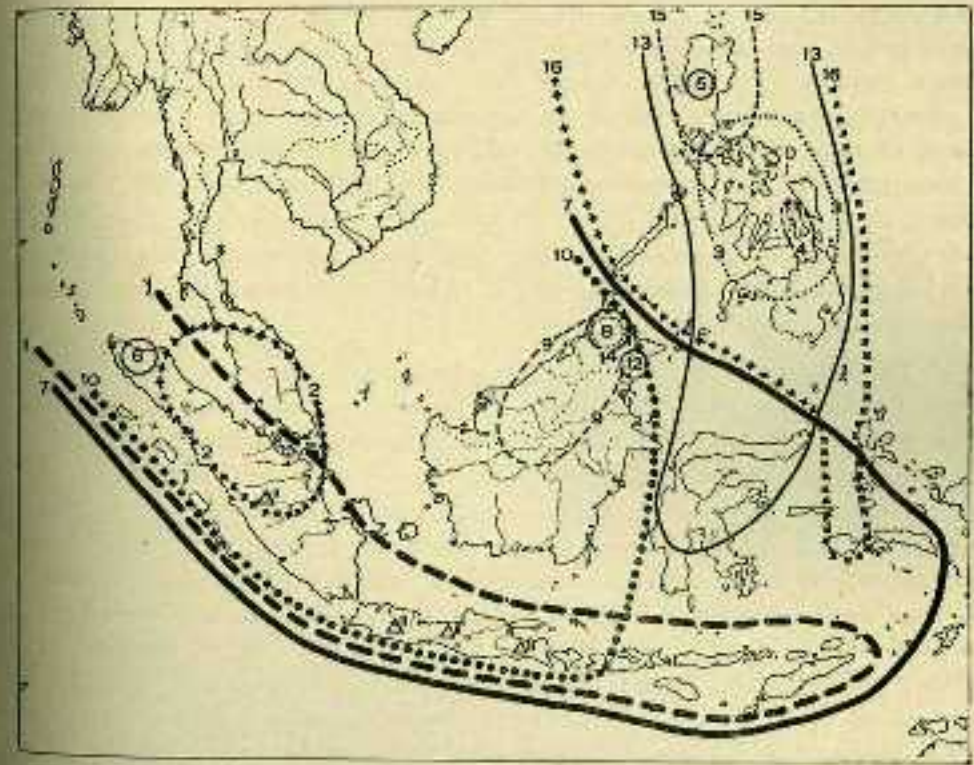


FIG. 1. The distribution of the Malaysian species of *Viburnum*. The numbers are those of the species in this paper.

is only known from the Malay Peninsula and the northern half of Sumatra; *V. junghuhnii* from a few localities in Sumatra and Java. None of these species reaches the Philippines.

The northern group inhabits the Philippines. The three species of the 'glaberrimum'-group (*V. glaberrimum*, *V. platyphyllum*, and *V. cornutidens*) are apparently endemics. Of the other Philippine species of *Viburnum*, which also occur in China, Formosa, etc., *V. odoratissimum* reaches Celebes, and *V. luzonicum*, Buru. It is only in these two islands that the southern and the northern group overlap somewhat. *V. propinquum* has penetrated from the Asiatic continent only as far as Luzon.

About the polymorphy of the genus only a few remarks will be made. The widely distributed species show an astonishing plasticity. All the numerous attempts to divide these agglomerates into smaller units I consider as failures. In my opinion the way out of the difficulties will not be found merely by morphological researches. The polymorphy even goes so far, that the usually widely differing *V. sambucinum* and *V. coriaceum* show a surprising similarity at the boundary of their area in the Lesser Sunda Islands, which at the same time is the boundary of the area of the genus. Especially the shape of the corolla proves to be of comparatively small taxonomical value. The tubular corolla of *V. coriaceum*, in Sumatra often 6 mm long, has here become short; the campanulate corolla of *V. sambucinum* on the other hand has become slightly tubular by lengthening of the tube which is here even distinctly longer than the lobes.

The filaments of the Malaysian species are usually described as inserted at the base of the corolla. As to *V. odoratissimum* and *V. coriaceum*, this is certainly incorrect, while also in *V. junghuhnii* the lower part of the filaments is adnate to the corolla.

Since Oersted's work on the genus much importance has correctly been attached to the shape of the endocarp. Its taxonomical value should indeed not be underestimated, although the number of the grooves cannot always easily be decided. Except with *V. propinquum*, the endocarp is always dorsiventrally compressed in the Malaysian species. Besides, it is either undulate (two dorsal, one or three ventral grooves) or inflexed. In the inflexed endocarp the ventral side becomes internal. The endocarp of *V. junghuhnii* and *V. amplificatum* is both undulate and inflexed and so shows a two-lobed intrusion.

Up till now too little attention has been paid to the presence or absence of pitted glands at the leaves, especially of the deep pits at the base of the blade. With *V. beccarii* and *V. vernicosum* the presence of the glands is very characteristic. Thus, *V. hispidulum* can always be distinguished from *V. vernicosum* by the absence of glandular pits. The margin-

al glands in *V. propinquum*, mentioned nowhere, I have not met with in any other species of *Viburnum*.

As an elaboration of the whole genus is still wanting, the subdivision of the genus is as yet insufficient. Particularly the section *Thyrsosma* is rather heterogeneous and further division would be highly desirable. The scheme of the Malaysian sections given below corresponds mainly to that of Render.

#### VIBURNUM L.

*Viburnum* Linnaeus, Spec. Pl. 267. 1753; D. Don, Prodr. Fl. nepal. 141, 1825; Blume, Bijdr. 13: 655. 1826; De Candolle, Prodr. 4: 323. 1830; Miquel, Fl. Ind. bat. 2: 119. 1856; Hooker f. & Thomson in J. linn. Soc. (Bot.) 2: 174. 1858; Miquel, Fl. Ind. bat., Suppl.: 213, 537. 1860; Oersted in Vid. Meddel. Kjobenh. 1860: 267. 1861 (incl. gen. *Megalotinus*, *Microtinus*, *Oreiotinus*, *Solenotinus*, *Tinus*); Brandis, For. Fl. 257. 1874; Bentham & Hooker, Gen. Plant. 2 (2): 3. 1876; Clarke in Hooker f., Fl. Brit. Ind. 3: 3. 1880; Maximowicz, Mel. biol. 10: 644. 1880; Fritsch in Engler & Prantl, Nat. Pflanzenfam. 4: 4. Abt.: 163. 1891; Boerlage, Handl. Fl. Ned.-Ind. 2 (2): 3. 1891; Trimen, Handb. Fl. Ceyl. 2: 288. 1894; Koorders & Valeton, Bijdr. Booms. Java 5: 36. 1900; Graebner in Bot. Jb. 29: 584. 1901; Gamble in King & Gamble in 3. Asiat. Soc. Bengal 72 (2): 112. 1903; Render in Sargent, Trees and Shrubs 2: —. 1908; Render in Sargent, PL Wils. 1: 106. 1911; Hallier f. in Meded. Rijks-Herb. 14: 35. 1912; Hayata, Ic. PL form. 2: 68. 1912; Koorders, Exkursionsfl. Java 3: 285. 1912; Hayata, Ic. PL form. 4: 12. 1914; Koorders, FL Tjibodas 3 (2): 37. 1918; Hayata, Ic. PL form. 8: 34. 1919; 9: 41. 1920; Merrill, Bibl. Enum. Bornean PL 582. 1921; Nakai in J. Coll. Sci. Univ. Tokyo 42 (2): 14. 1921; Danguy in Lecomte, Fl. gen. Indo-Ch. 3: 4. 1922; Merrill, Enum. Philip, fl. PL 3: 577. 1923; Ridley, Fl. Mai. Pen. 2: 1. 1923; Craib, Fl. Siam. Enum. 2: 1. 1932; Merrill in Contr. Arn. Arb. 8: 164. 1934; Corner, Wayside Trees Mai. 183. 1940.

Evergreen or deciduous, erect or sprawling shrubs or small trees. Leaves opposite, petiolate, simple, entire or serrate-dentate or trifid, pinnately or palmately nerved; stipules on the petiole or (in the Malaysian species) absent. Inflorescence terminal, compound, corymbiform or paniculate, primary rays usually whorled, flowers cymosely arranged; bracts and bracteoles usually small, caducous. Flowers actinomorphic, hermaphrodite, the marginal ones sometimes (not in Malaysia) radiant, neutral. Calyx 5-lobed or 5-partite. Corolla white, creamy or pink, rotate, campanulate, hypocrateriform or tubular; lobes 5, imbricate in bud. Stamens 5, adnate to the corolla, alternate with the corolla-lobes; filaments narrow, attenuate towards the apex; anthers dorsifix, versatile, longitudinally dehiscent. Ovary inferior, 1-celled; ovule anatropous, pendulous from the apex, solitary; style short, conical; stigmas 3, often connate. Fruit a drupe, crowned by the persistent calyx and style, 1-seeded; endocarp horny or stony, in cross-section often undulate or with inflexed edges; albumen often ruminant.

DISTRIBUTION. — Large genus; several hundred, often polymorphous, species in Europe, Asia, and America; 16 species in Malaysia.

USES. — None of the Malaysian species are known to be of importance economically.

CONSPECTUS SECTIONUM ET SUBSECTIONUM MALESIANARUM  
GENERIS VIBURNI

1. Folia integra, dentata vel serrata, nervis primariis anastomosantibus; drupa nigra.
2. Drupa baccata, endocarpio et semine valde compressis; albumen haud vel vix ruminatum.
3. Endocarpium utrimque sulcatum, marginibus haud incurvatis. (Spec. 1—10).  
Sect. *Idealotinus* (Maxim.) Rehd.
4. Corolla tubulosa; filamenta aestivatione implicata. (Spec. 1—5, typus: *V. coriaceum* Blume.) Subject. *Coriacea* (Maxim.) Kern, *subsect. nov.*
4. Corolla rotato-campanulata.
5. Partes juniores dense lepidotulae. Filamenta aestivatione implicata. (Spec. 6, typus: *V. punctatum* Ham. ex D. Don.) Subject. *Punctata* Kern, *subsect. nov.*
5. Planta haud lepidotula.
6. Folia integra; filamenta longa, aestivatione serpentinif ormia. (Spec. 7—9, typus: *V. sambucinum* Bl.) Subject. *Sambucina* Kern, *subsect. nov.*
6. Folia serrata; filamenta brevia, aestivatione implieata. (Spec. 10, typus: *V. lutescens* Bl.) Subject. *Lutescentia* Kern, *subsect. nov.*
3. Endocarpium marginibus incurvatis. (Spec. 11—14.) Sect. *Thyrsoisma* (Raf.) Rehd.
2. Drupa achenoidea, endocarpio et semine ovoideis, haud compressis; albumen valde ruminatum. (Spec. 15.) Subject. *Tinus* Maxim.
1. Folia dentata, nervis primariis in dentes abeuntibus. Drupa rubra, endocarpio compresso obsolete sulcato. (Spec. 16.) Subject. *Odontotinus* Rehd.

KEY TO THE MALAYSIAN SPECIES OF VIBURNUM—I

Chiefly according to the characters of the flowers

The flowers of *V. amplificatum*, *V. cornutidens*, and *V. clernensae* being unknown, these species have been omitted.

1. Leaves triple-nerved. Tube of the corolla hairy within. Philippines. 15. *V. propinquum*
1. Leaves penninerved. Tube of the corolla glabrous within:
2. Corolla squamulose without. All young parts densely covered with minute rusty-coloured, peltate scales. Leaves entire, the under side at first densely covered with minute scales, later on densely punctulate. Sumatra. . . . 6. *V. punctatum*
2. Corolla quite glabrous or pubescent without, sometimes gland-dotted, but not squamulose. Young parts without peltate scales:
3. Corolla pubescent without, rotate, the tube very short, about 0.5 mm long, the lobes 1 mm. Filaments 1.5—2 mm long. Young branchlets ferruginous-pubescent. Philippines and Moluccas. . . . 16. *V. luzonicum*
3. Corolla glabrous or gland-dotted without, the tube at least 1 mm long:
4. Filaments adnate to the throat of the corolla. Corolla shortly salvershaped-campanulate, the limb horizontally spreading, finally reflexed, the tube 2—3 mm

long, the lobes 2 mm. Higher mountain regions of the Philippines and Celebes.

4. Filaments adnate to the base or the tube of the corolla. Shape of the corolla different:
  5. Ovary pubescent. Corolla glabrous, the tube 1—1.5 mm long, the lobes 1—2 mm. Filaments 5—7(—9) mm long. Leaves large, 10—25 by 5—10 cm, coriaceous, entire. Malay Peninsula, Greater and Lesser Sunda Islands, Moluccas. 13. *V. odoratissimum*
  7. *V. sambucinum*
5. Ovary not pubescent:
  6. Corolla distinctly tubular, the tube at least 3 times as long as the lobes, the latter about 1 mm, erect:
    7. Leaves quite entire, the under side with a distinct glandular pit at the base on both sides of the midrib, the apex obtuse or shortly and bluntly acuminate. Filaments inserted at the base of the corolla, 7—8 mm long. Malay Peninsula and Sumatra . . . . . 2. *V. beccarii*
    7. Leaves usually distinctly dentate, sometimes nearly entire, the under side bearded in the nerve-axils, but without glandular pits at the base, the apex mostly gradually long-acuminate. Filaments usually about 4 mm long, if longer, inserted 2—3 mm above the base of the corolla. Greater and Lesser Sunda Islands. . . . . 1. *V. coriaceum*
  6. Corolla not distinctly tubular, the tube less than 3 times as long as the lobes, the latter usually more than 1 mm long:
  8. Inflorescence shortly pyramidal, paniculate. Corolla rotate-campanulate, the tube about 1 mm long. Filaments 2—3 mm long:
  9. Leaves thinly coriaceous. Corolla 2—2.5 mm long, rarely almost 3 mm. Filaments inserted near the base of the corolla. W. Malaysia, between 500 and 1500 m altitude, sometimes up to 2300 m. . . . . 10. *V. lutescens*
  9. Leaves manifestly coriaceous. Corolla 3 mm long. Filaments adnate to the corolla 0.5—1 mm above the base. Without fruits hardly distinguishable from *V. lutescens*. Higher mountain regions of Java and Sumatra (altitude at least 2300 m). . . . . 11. *V. junghuhnii*
  8. Inflorescence corymbiform. Tube of the corolla usually longer than 1 mm. Filaments at least 6 mm long:
  10. Filaments 6(—7) mm long, in bud with inflexed top:
    11. Corolla shortly tubular-turbinate, globular in bud, the tube about 2 mm, the lobes 1.5—2 mm. Leaves gradually long-acuminate. Philippines (Leyte). 4. *V. platyphyllum*
    11. Corolla broad-tubular, obovoid in bud, the tube about 2.5 mm, the lobes about 1.5 mm. Leaves obtuse or shortly and bluntly acuminate. Philippines (Luzon, Mindanao). . . . . 3. *V. glaberrimum*
  10. Filaments (8—)9—10 mm long, serpentine in bud:
    12. Leaves dull, somewhat hispidulous, especially on the midrib and the primary side-nerves at the under side, without glandular pits. Corolla rotate-cupulate, the tube 1(—1.5) mm long, the lobes 2—2.5 mm. Borneo. 8. *V. hispidulum*
    12. Leaves shining, glabrous, with distinct glandular pits at the base. Corolla turbinate, the tube 2.5—3 mm long, the lobes 1.5—2 mm. Borneo. 9. *V. vernicosum*

## KEY TO THE MALAYSIAN SPECIES OF VIBURNUM—II

For fructiferous specimens

(The numbers between brackets refer to Key I)

1. Leaves triple-nerved. Drupe nearly globose, 4—5 mm long, 4 mm wide (1).  
15. *V. propinquum*
1. Leaves penninerved. Drupe not globose, usually compressed, if not, more than 5 mm long:
2. Endocarp with strongly incurved edges, the ventral side deeply intruding, embracing an internal split or cavity:
3. Drupe oblong, 16 mm long, 7 mm wide. Internal cavity of the fruit bilobate in cross-section. Leaves entire, glabrous, elliptic-oblong to slightly obovate, up to 26 cm long, 12—13 cm wide. Borneo. . . . . 12. *V. amplificatuvii*
3. Drupe smaller:
4. Leaves minutely papillose-rugulose on both sides, entire. Ventral side of the endocarp showing a narrow split, the central cavity at most 0.5 mm in diameter. Borneo. . . . . 14. *V. clemensae*
4. Leaves smooth, usually dentate or serrate. Ventral side of the endocarp amplexing a cavity, which is circular or bilobate in cross-section and about 2 mm wide:
5. Fruit ovoid, 6—7 mm long, 4—5 mm wide. Internal cavity of the fruit nearly circular in cross-section. Leaves dentate to nearly entire (4).  
13. *V. odoratissimum*
5. Fruit obovoid, 7—9 mm long, 5—7 mm wide. Internal cavity of the fruit broad, bilobate in cross-section. Leaves closely crenate-dentate (9). 11. *V. junghuhnii*
2. Endocarp undulate in cross-section, *i.e.* with shallow grooves on both sides, but without an internal split or cavity:
6. Leaves quite entire:
7. All young parts densely covered with minute rusty-coloured peltate scales. Under side of the leaves at first densely covered with minute scales, later on densely punctulate. Fruit elliptic to somewhat obovoid, 9—11 by 6—7 mm (2).  
6. *V. punetatum*
7. Young parts without peltate scales:
8. Ripe fruits small, 5—6(—6.5) mm long:
9. Leaves usually ovate-lanceolate, gradually long-acuminate. Fruit ovoid to broad-ellipsoid, 6(—6.5) mm by 5—6 mm (7). . . . . 1. *V. coriaceum*
9. Leaves broader, ovate to obovate, obtuse or shortly and bluntly acuminate. Fruit small, about 5 by 5 mm, ovate to nearly orbicular (11).  
3. *V. glaberrimum*
8. Ripe fruits larger:<sup>1</sup>
10. Nerve-axils and also the leaf-base without glandular pits or spotty glands. Leaves somewhat hispidulous beneath, especially on the midrib and the primary side-nerves. Young branchlets and axes of the infructescence glabrous or sparingly hispidulous. Young fruits glabrous (12). . . . . 8. *V. hispidulum*
10. Nerve-axils and/or leaf-base at the under side glandular pitted or with (sometimes indistinct) spotty glands. Midrib and primary side-nerves on the under side glabrous or stellate-pubescent, not hispidulous:

<sup>1</sup> Without flowers hardly determinable!

11. Young branchlets densely rusty stellate-pubescent, axes of the infructescence also densely stellate-pubescent, though later on more or less glabrescent. Young fruits thinly stellate-pubescent, soon glabrescent. Under side of the leaves glabrous to softly villous, at the base with a (sometimes indistinct) spotty gland on both sides of the midrib (5). . . . . 7. *V. sambucinum*
11. Young branchlets and axes of the infructescence glabrous to somewhat stellate-pubescent, but not densely pubescent. Young fruits glabrous:
12. Leaves large, up to 22 cm long and 10 cm wide, ovate to oblong-ovate, the apex gradually narrowing into the usually elongated and slender acuminate. Axils of the primary side-nerves and of the coarser secondary nerves with shallowly sunken glands. Infructescence usually large, up to 18 cm across (11). . . . . 4. *V. platyphyllum*
12. Leaves smaller, obtuse or shortly and bluntly acuminate. Under side of the leaves at the base on both sides of the midrib with a deeply intruding glandular pit or a distinct spotty gland:
13. Young axes of the inflorescence brown stellate-pubescent, later on however glabrescent. Young parts of the plant not vernicose. Primary side-nerves at the under side of the leaves little prominent (7). . . . . 2. *V. beecarii*
13. Inflorescence quite glabrous. Young parts of the plant very shining, vernicose. Primary side-nerves at the under side of the leaves prominent (12).  
9. *V. vemicosum*
6. Leaves dentate or serrate (sometimes superficially):
14. Young leaves usually densely pubescent, later on more or less glabrescent, the indument of the midrib however persistent. Leaves chartaceous, rarely subcoriaceous. Drupe ovate, much compressed, 5—7 mm long, 5—6 mm wide, when ripe red (always?) (3). . . . . 16. *V. luzonicum*
14. Leaves more or less coriaceous, glabrous, sometimes bearded in the nerve-axils on the under side. Drupe ripening purplish or bluish black:
15. Leaves thickly coriaceous, beneath with shallowly sunken glands in the nerve-axils, the margins conspicuously corniculate-dentate. Drupe broadly ovate, 8 by 6—7 mm. Philippines (Luzon). . . . . 5. *V. cornutidens*
15. Not combining these characters:
16. Infructescence shortly paniculate. Fruit oblong-elliptic, 7—10 mm long, 4—5 mm wide, sometimes still larger (9). . . . . 10. *V. lutescens*
16. Infructescence corymbiform. Fruit more ovate or ovoid, smaller:
17. Leaves usually ovate-lanceolate, gradually long-acuminate, distinctly dentate. Fruit 6(—6.5) mm long, 5—6 mm wide (7). . . . . 1. *V. coriaceum*
17. Leaves broader, ovate to obovate, obtuse or shortly and bluntly acuminate, nearly entire. Fruit small, 5 by 5 mm (11). . . . . 3. *V. glaberrimum*

## 1. VIBURNUM CORIACEUM BL.

*Viburnum coriaceum* Blume, Bijdr. 13: 656. 1826; De Candolle, Prodr. 4: 329. 1830; Hasskarl in Flora Bot. Ztg. 3: 242. 1845; Miquel, Fl. Ind. bat. 2: 120. 1856; \*pp1: 213. 1860; Hooker f. & Thomson in J. linn. Soc. (Bot.) 2: 179. 1858; Oersted in Vid. Meddel. Kjobenh. 1860: 300 t. 6 f. 5-6. 1861; Brandis, For. Fl. 259. 1874; Clarke in Hooker f., Fl. Brit. Ind. 3: 5. 1880; ?Trimen, Handb. 2: 288. 1894; Koorders & Veleton, Bijdr. Booms. Java 5: 38. 1900; Koorders in Natuurk. Tijdschr. Ned.-Ind. 60: 247. 1900; Koorders, Exkursionsfl. Java 3: 285. 1912; Elbert in Meded. Rijks-Herb. 12: 17.

1912; Hallier f. in Meded. Rijks-Herb. 14: 35. 1912; Koorders, Pl. Tjibodas 3 (2): 37. 1918; Gamble, Fl. Madras 3: 576. 1919; Danguy in Lecomte, Fl. gen. Indo-Ch. 3: 8. 1922; Ridley in J. Mai. Br. roy. As. Soc. 1: 64. 1923; Moore in J. of Bot. 62: Suppl.: 46. 1924; Hochreutiner in Candollea 5: 286. 1934.

*Viburnum eylindricwrn* Hamilton ex D. Don, Prodr. Fl. nep. 142. 1825, *sensu* Rehder in Sargent, Trees and Shrubs 12: 112. 1908; in Sargent, PL Wils. 1: 110. 1911, *pr.p.*; Merrill in Contr. Arn. Arb. 8: 164. 1934.

*Viburnum sp. aut var. V. forbesii* Fawcett in Forbes, Nat. Wand. 507\* 1885.

Evergreen, crooked shrub or small, often branchy tree, up to 15 m. Trunk terete, knotted, without buttresses. Bark greyish or brownish, lenticellate. Crown irregular, rather dense. Young parts thinly stellate-pubescent. Branchlets greyish to reddish-brown, somewhat lenticellate. Petioles channelled above, light green, up to 4 cm long. Leaf-blades more or less coriaceous, somewhat shining, sometimes even as if varnished and viscid, dark green above, pale green beneath, glabrous on the upper side, often bearded in the nerve-axils on the under side, ovate to lanceolate, 10—24 cm long, 4—8 cm wide; apex mostly gradually long-acuminate, base rounded or somewhat acute and slightly decurrent on the petiole, margin superficially dentate to rather densely serrate-dentate, sometimes almost entire, somewhat revolute in dry state: nervation somewhat impressed above, prominent beneath; primary side-nerve 5—7 on each side of the midrib, arcuately ascending, evanescent near the margin and indistinctly anastomosing; reticulation delicate, pellucid. Inflorescence umbellate, corymbiform, 3—4 times compound, up to 10 cm across; axes thinly stellate-pubescent; peduncle short, up to 2.5 cm long; primary rays 5—7, light green; bracteoles small, ovate, soon caducous; flowers somewhat scented. Calyx-limb obscurely toothed, 1.5—2 mm in diameter; teeth triangular, acute. Corolla tubular, ellipsoid-obovoid in bud, creamy white to white, sometimes pink, usually dotted with brown on the outside; tube usually 3—4 mm long (see var. *longiflorum*); lobes erect, rounded triangular, 1 mm. Stamens exerted; filaments ligulate, subulately tapering towards the top, in the flower-bud with inflexed apical part, white, adnate to the tube of the corolla 0.5—1 mm above the base, 4—6(—7) mm long; anthers oblong, purplish, 1—1.5 mm long. Ovary cylindrical, glabrous or lepidote, 1.5—2 mm long; style glabrous, white, short, 0.5—1 mm. Drupe ovoid to broad-ellipsoid or even nearly spherical, *in vivo* only slightly dorsiventrally compressed, bluish black, 6—6.5 mm long, 5—6 mm wide; endocarp undulate in cross-section, 2-grooved on the dorsal side, 3-grooved on the ventral side, the lateral grooves, however, often obsolete.

**ECOLOGY.** — In open primary and secondary forests, especially at their outskirts, sometimes in brushwood or in grassy plains. Only in the higher mountain region, from 1000 (especially 1500) m upward, there often common and one of the pioneers in the natural re-forestation. Flowering and fruiting throughout the year.

**USES.** — Not recorded.

**DISTRIBUTION.** — SE Asia; in Malaysia only in the Greater Sunda Islands Sumatra and Java, and in the Lesser Sunda Islands (Bali, Lom-

bok, Flores, Timor). Not occurring in the Malay Peninsula and in the Philippines.

*Viburnum coriaceum* var. *longiflorum* Kern, *var. nov.*

*Corollae tubus circiter 6 mm longus, lobi 1 mm longi; filamenta usque ad 6 mm longa, 2—3 mm supra basin corollae adnata.*

Tube of the corolla about 6 mm long, lobes 1 mm; filaments up to 6 mm long, adnate to the corolla 2—3 mm above the base.

**DISTRIBUTION.** — Sumatra, East Coast Residency.

**TYPE.** — Yates 1567 (A).

*Viburnum coriaceum* is extremely variable in all its parts, mainly as to the shape of the leaves. Usually these are slenderly acuminate and remotely dentate, but the acumen may also be short or nearly wanting, the margins serrate or nearly entire. The flowers, too, vary in colour and size.

In revising the Malaysian species of *Viburnum* in the Herbarium of the Arnold Arboretum I was struck by the large flowers and the very shining, vernicose leaves of the specimens Yates 1567 and Hamel & Rahmat Si Torus 639, both from North Sumatra. At first I believed they might represent a distinct species. However, neither in the leaf-shape nor in the fruits could I find valid differences. For this reason it seems preferable to regard the large-flowered specimens as a variety, the more so, as Burkill 16312 and Yates 105 with a corolla of 6 mm length may be regarded as intermediate. The small-flowered form also occurs in North Sumatra. However remarkable the viscosity of the leaves may be, it should be remembered that the normal Javanese *V. coriaceum* may also be viscid, as is evident from an annotation on the label of Clason K198 from Mount Kelud. On account of the strikingly shining leaves I presume nevertheless, that the fruiting specimens Yates 976, Bangham 928 & 948, and Hamel 443 may belong to the large-flowered form.

Noteworthy also are the specimens collected in the Lesser Sunda [Islands during the Elbert Expedition of 1909—1910 and the Rensch Expedition of 1927. They greatly resemble the aberrant *V. sambucinum* of those regions. Hallier (*I.e.*) already pointed out this fact: "Von *V. sambucinum* Reinw. sind die Exemplare mit ganzrandigen Slattern leicht zu unterscheiden durch ihre nicht mit bleichen Lenticellen langs gestrichelten jungen Zweige, ihre oberseits harzglänzenden jungen Blätter, ihre kahlen, harzglänzenden Fruchtknoten und ihre in der Knospe nicht kugeligen, sondern länglichen Blumenkronen". However, the discrimination cannot be called easy. In flowering specimens the ovoid flower-bud, the tubular corolla, the inflexed stamens, the lepidote or vernicose ovary point to

*V. coriaceum*; in fruiting specimens the small, young somewhat lepidote or shining vernicose drupes are characteristic. In *V. sambucinum* of the Lesser Sunda Islands, however, the ovary is often but sparingly hairy, the flower-bud more ovoid than in Javanese specimens, and the twisted aestivation of the stamens often indistinct. I agree with Hallier's opinion that Fawcett's *V. forbesii* must be referred to *V. sambucinum*: it is the more or less aberrant form, which occurs in Timor. On the contrary the poor specimens of Forbes 3872 belong in my opinion to *V. coriaceum*. Fawcett regarded them as a new species or a variety of his *V. forbesii*; Hallier identified them as *V. sambucinum*.

The specimen Koorders 1065/? (cf. Koorders & Valetton *op. cit.* 39; is, in my opinion, not a *Viburnum*, but a species of *Maesa*.

As far as I know Hooker f. & Thomson were the first to treat *V. cyndricum* Ham. ex D. Don and *V. coriaceum* Bl. as synonyms. *V. cylindricum* was published in the "Prodromus florae nepalensis" with the following diagnosis:

"foliis ovali-oblongis acuminatis coriaceis integerrimis subtus ramulisque pubescentibus, cymis compositis erectis tomeritosis, corollis oblongis tubulatis: limbo brevissimo 5-dentato". — D. Don (Prodr. Pl. nep. 142. 1825).

I greatly doubt whether the Nepal plant with entire leaves, pubescent beneath, and tomentose cymes can be identical with the Malaysian *Viburnum coriaceum*. Therefore, I prefer for the present to use Blume's unambiguous name.

SPECIMENS EXAMINED. — SUMATRA. Without exact locality: *Korthals s.n.* (L). Atjeh. Above Takengeun, *van Steenis* 5977 (B). East Coast. Berastagi, *Md. Nur* 7274 (B, S), *Burkill* 40 (S), *Yates* 593 (A, B), *Beumée* A810 (B), *Doeters van Leeuwen* 12898 (B), *Symington* 23964 (S); Karo-plateau, near Berastagi, *Lörzing* 5936 (B, L); Siosar, local name longa longa, *Lörzing* 8615 (B); Kabandjaha near Karang-Karang (NE-Sinabun), local name pokok kau buluh, *Roesel* 260 (B); Mt. Singalang, *Lörzing* 8951 (B); Seribudolok, local name ketawu, *Djaduk* 9US (B); Mt. Sibajak, *Lörzing* 5980 (B, L), *Doeters van Leeuwen* 12846 (B); Mt. Pinto, *Lörzing* 8267 (B); Simelungun, local name silanglangrih, *Keers* 86 (B). Tapanuli. Toba, Paranginan, *Ouwehand* 363 (B); Toba-plateau, S of Balige, local name golom-golom-masak, *Huitema* 111 (B, L); near Mt. Tolong, *Ouwehand* 35, 208 (B); Habinsaran-plateau, *Lörzing* 6567 (B, L); Mt. Margu, *Polak* 97, 98 (B). West Coast. Mt. Talakmau, *Biinnemeijer* 882 (B); Mt. Marapi, *Biinnemeijer* 4989 (B); Mt. Korintji, *Biinnemeijer* 9410 (B, L), 9456 (B), 9613 (B, L, S), 10027, 10U5, 10213, 10553 (B). Palembang, Mt. Pesagi, *van Steenis* 3650 (B). — JAVA. Without exact locality: *Blume* (type of *Viburnum coriaceum* BL, L. 899. 69—260), *Horsfield s.n.* (G), *Junghuhn s.n.* (L), *Korthals s.n.* (L), *Zoilinger* 2924 (G). WEST JAVA. Bogor. Summit of Mt. Salak I, *Koorders* 36743 (B); summit of Mt. Salak II, *van Steenis* 2980 (B); Mt. Pangerango, *Kuhl & van Hasselt s.n.* (L),

*de Monchy s.n.* (B, L), *van Steenis* 2021 (B), *Kern* 7798 (B), *van Ooststroom* 13367 (L); Mt. Gede, "Houtsoorten" (= kinds of wood) 501 (L), *van Steenis* 17558 (B); Kandang Badak, *Blume s.n.* (L), *Hallier* 53'4 (B), local name ketumpangRma (Sundanese), *Sapiin s.n.* (B), local name ki kukuran, *Bruggeman* 536 (B); Tjibodas, *Scheffer s.n.* (B), *Bruggeman* 37SO (B), *Lörzing* 2200 (B), local name ketumpang, *Koorders* 1042, 10/3 (B, L), 15616, 20432 (B), 26083, 32113 (B, L), *Baap* 827 (L), *Sapiin* 2461 (U); Lebak Saat, *Hallier* 501 (B); Tjibeureum, local name kiapu (Sundanese), *Burck s.n.* (B). Priangan. Mt. Patuha, *Reinwardt s.n.* (L); near Rantjabali, *Lörzing* 1316, 1370 (B), *van Steenis* 7422 (B); Pengalengan, *Backer* 26100 (B); *van der Pijl* 416 (B); Mt. Malabar, *Forbes* 954 (according to S. Moore in J. Bot. 62: Suppl., 46. 1924, not agreeing with the printed label "SE Java"), (A, G, L), *den Berger* 789 (B); Mt. Papandajan, local name ki kukuran (Sundanese), *Scheffer* C48 (B); Talun Kulon, *Sugandiredja* 132.160 (B, L); between Tegal Bungbrung and Tegal Pandjang, *van Steenis* 4216 (B, L); Mt. Ipis, *van Steenis* 4957 (B); Garut, *Burck s.n.* (B); Mt. Galunggung, *Koorders* 1051 (B). Cheribon. Mt. Tjareme, *Backer* 5129 (B). CENTRAL JAVA. Pekalongan. Mt. Slamet, *Waitz s.n.* (L), *Backer* 509 (B), vern. name temendilan, *Koorders* 1058, 1059 (B); Mt. Perahu, "in sylvis montis Prau Javae", local name pohon plebber, *Junghuhn s.n.* (L), local name bleber, *van der Goot s.n.* (B), *Backer* 21794 (B), *Brinkman* 884c (L); in sylvis circa Dieng, *Junghuhn s.n.* (L, U); Dieng, *Koorders* 11243, 11244 (B, L). Ked u. Mt. Sundoro, near Kledung district Wonosobo, *Koorders* 10904, 11277 (B), local names tementilan and wuru (Javanese), *Lörzing* 462 (B), *Doeters van Leeuwen* 8959 (B); near Kledung, distr. Parokan, local name tementilan (Javanese), *Koorders* 11276 (B); Mt. Merbabu, *Junghuhn s.n.* (L). Jogjakarta. Kaliurang, *Brinkman* 379 (B). EAST JAVA. Madiun. Mt. Lawu, *Junghuhn s.n.* (U); above Sarangan, *Dorgelo* 120, 417 (L), *de Voogd* 678 (L); Djogolarangan, *Elbert* 15, 16, 17, 18 (L); above Djagaraga, *Backer* 6823 (B), *Jacobson s.n.* (B). Kediri. Mt. Wilis, *Backer* 11394 (B); Wanasegara, *Lörzing* 890 (B); Mt. Kelud, *Clason* K90, K102 (B), *Clason-Laarman* K198 (B). Pasuruan. Mt. Welirang, *Backer* 37089 (L), *Backer & Skottsberg* 37314 (L). Malang. Mt. Andjasmoro, *Posthumus* 3963 (B); Mt. Kawi, Tjemara Kandung, *Arena & Wurth s.n.* (B), *Doeters van Leeuwen* 12278 (B); Mt. Panderman, *Groenhardt s.n.* (B); Mt. Ardjuno, *Koorders* 38169, 43733 (B), *Hagedoorn & Jeswiet s.n.* (B), *Bremekamp s.n.* (B), *Backer & Skottsberg* 37313 (L); pass of Mt. Bahal-Kembar S, *van Steenis* 7080 (B); Prigen, *Rant s.n.* (B); Mt. Tengger, Tosari, *Koorders* 37919 (B, L), local name meniran (Javanese), *Pa Munah* Ja2846 (B), *Backer* 37092 (L); Penandjan, local name meniran, *Ja*2853 (A, B, L), *Kobus s.n.* (B); Mt. Kembang, *Koorders* 37360 (B), 37361 (B, L); Kletak-pass, *Mousset* 176 (A, B, L); above Ngepuk, *Harreveld-Lako* 69 (B); near Ranu-Pani, vern. name meniran (Javanese), *de Jong* Ja2657 (B, L); Mt. Iden-Iden, *Kobus* 221 (L); saddle of Tengger-Semeru, local name kaju meniran (Javanese), *Jeswiet* 55 (L); Mt. Semeru, *Jeswiet s.n.* (L). Besuki. Mt. Liang, *Backer* 9651 (B); Tjemara Lantjang, *Backer* 9800 (B, L, S), with fruit-galls, *Koorders* 43473 (B, L), *Clason-Laarman* G49 (B); Mt. Eaung, *Clason-Laarman* 154 (B); Mt. Idjen, *Backer* 37506, 37685 (L), *Clason-Laarman* E72, E76 (B), *Koorders* 1064 (B); Kawah Idjen, *Koorders* 43297 (B). — BALI. Mt. Batukau, local name kaju-njalian, *Sarip* 402 (exp. Maier) (B, L); Mt. Abang, *de Voogd* 2759 (B); Mt. Agung, *de Voogd* 1937, 2197 (B), *van Steenis* 7875 (B). — LOMBOK. Mt. Rindjani, *Elbert* 969, 1008, 1405, 1475, 2165 (L), *Gruendler* 2322 (L). — FLORES. Mt. Mutu, *de Voogd* 2800 (B); Eana Mese, *Rensch* 1300 (B); Seli Mutu, *Rensch* 1509 (B). — TIMOR.

Samoro, Mt. Sobale, *Forbes* 3872 (cf. *Nat. Wand.* 507. 1885) (B, L); Mt. Mutis, *de Voogd* 2303<sup>A</sup>B, L).

a. *Viburnum coriaceum* var. *longiflorum*.

SUMATRA. East Coast: *Yates* 1567 (A, L, S); Deleng Singkut, *Hamel & Rahmat Si Torus* 639 (A). Less typical (corolla about 6 mm long): *Yates* 105 (A); Berastagi, *Burkill* 16312 (B, S), *Hamel* U3 (A). — The following fruiting specimens may belong to the variety, on account of the vegetative characters: Atjeh. Gajolands, Mt. Losir, *van Steenis* 8618 (B). East Coast: *Yates* 976 (A); Siantar-Berastagi, *Banghavi* 9&8 (A); on sides of volcano near Redelong, *Bang ham* 928 (A).

## 2. VIBURNUM BECCARII Gamble. — Fig. 2.

*Viburnum beccarii* Gamble in *J. As. Soc. Bengal* 72 (2): 114. 1903; Hallier in *Meded. Rijks-Herb.* 14: 37. 1912; Ridley in *J. Fed. Mai. St. Mus.* 8: 44. 1917; Ridley, *PL Mai. Pen.* 2: 2. 1923.

*Viburnum* sp. Merrill in *Contr. Arn. Arb.* 8: 164. 1934.

Coarse, sprawling or climbing, evergreen shrub or small tree, up to 8 m. Branches and branchlets brownish, glabrous, warty-lenticellate. Petioles channelled above, glabrous, 1.5–3.5 cm long. Leaf-blades coriaceous, dark green above, bright green beneath, upper side glabrous, under side minutely gland-dotted and with a distinct elliptic glandular pit at the base on both sides of the midrib and often smaller pits in the nerve-axils, elliptic, obovate or ovate, 8–15 cm long, 5–8 cm wide; apex obtuse or shortly and bluntly acuminate, rarely somewhat emarginate, base cuneate to nearly rounded, somewhat decurrent on the petiole, margin entire, revolute in dry state; midrib impressed above, prominent beneath; primary side-nerves much less prominent, 4–8 on each side of the midrib, at an angle of 45–60° to it, ascending, arcuately anastomosing near the margin, veins distinct, reticulate. Inflorescence terminal, corymbiform, 3–4 times umbellately branched, 6–12 cm across, infructescence up to 15 cm; young axes rather densely brown stellate-pubescent, glabrescent; peduncle rather stout, up to 12 cm long; primary rays 5–7(–8), 2–5 cm long, later on up to 6 cm; bracts and bracteoles small, linear-lanceolate, rusty stellate-pubescent, very soon caducous. Calyx-lobes lobed, minutely gland-ciliolate, otherwise glabrous. Corolla tubular, obovoid-ellipsoid in bud, white; tube 3–4 mm long, lobes erect, rounded to rather acute, minutely gland-ciliolate, 1 mm long. Stamens long-exserted; filaments flattened, subulately tapering towards the top, in the flower-bud with inflexed top, inserted at the base of the corolla, glabrous, 7–8 mm long; anthers oblong, purplish, about 2 mm long. Ovary cylindrical, glabrous, about 2 mm long; style conical, glabrous, 1 mm long. Drupe ovate, dorsiventrally compressed, (young) bluish green, 9–10 mm long, 6–7 mm wide, endocarp undulate in cross-section, shallowly 2-grooved on the dorsal side, shallowly 1-grooved on the ventral side.

ECOLOGY. — In forests and thickets in the higher mountain regions.

DISTRIBUTION. — Only known from the Malay Peninsula and Sumatra.



FIG. 2. *Viburnum beccarii* Gamble: a, twig with flower-buds, 0.5 ×; b, part of inflorescence, 0.5 ×; c, fruit, 2 ×; d, cross-section through fruit, 2 ×; e, flower-bud, 2 ×; f, activation of stamen, lateral view, 3 ×; g, same, ventral view; h, flower, not yet fully open, 2 ×; i, ovary, 3 ×; j, part of corolla, inside view, 3 ×; k, stamen, not yet fully developed, 3 ×. — a, after Lüding 7342, b–d, after Lüding 8303, e–g, after Docters van Loerwen, 12813, h–j, after Binnemeyer 9720.

The original description of this species by Gamble was made after an incomplete specimen of Scortechini (no. 375b) from Perak. The characters of *V. beccarii* given in Ridley's "Flora of the Malay Peninsula" are nearly the same as in Gamble's description; new localities have not



been recorded since. The occurrence of the species in Sumatra was already mentioned by Gamble: Mt. Singgalan (Beccari 194 in Herb. Kew; also in Herb. Lugd. Bat.), In the various herbaria I found material from several new localities in Sumatra, some of them bearing flowers and nearly mature fruits.

Van Steenis 9960 differs somewhat from the other specimens by its less stellate-pubescent, more tender axes of the inflorescence, but in my opinion it cannot be referred to another species.

The shape of the corolla and the aestivation of the stamens point to a close relationship between *V. coriaeeum* and *V. beccarii*.

SPECIMENS EXAMINED. — MALAY PENINSULA. Perak: *Seortechini 375b* (type, not seen). Pahang. Fraser Hill, 4000 ft., fl.-buds, Aug. 1923, *Henderson 11484* (B), 4000 ft., fl., Aug. 1923, *Henderson & Md. Nur 11176* (S); 4000—4370 ft., fl., Sept. 1922, *Burkill & Holttum 8631* (S); Gunung Berembun, Cameron Highlands, June 1933, *Symington 31005* (S). — SUMATRA. Without exact locality: *Forbes 2568* (L) (cf. Hallier *I.e.*). Atjeh. Gajo-lands, near the confluence of Kali Kapi and Kali Aunan, flat wooded ridges with cold solfatara fields, 1100—1250 m fl.-buds and young fr., March 1937, *van Steenis 9960* (B). East Coast. Mt. Sibajak, one of the NE ridges, in thicket, scattered, 1800 m, sprawling shrub, fl.-buds, July 1920, *Lorzing 7343* (B); in primary forest on dry ridge, scattered, 1900 m, coarse sprawling shrub, fr., Jan. 1921, *Lorzing 8303* (B, L); Lau Debuk Debuk, in thicket, 1300 m, sprawling shrub, fl.-buds, Oct. 1929, *Docters van Leeuwen 12813* (B); road from East Coast to Tapanuli (NW side of Toba Lake), near Peso Peso, virgin jungle, 4100—4500 ft., vine climbing, fr., Feb. 1932, *Bangham 116U* (A); Huta Gindjang, Toba, common, 1400 m, climbing shrub, fl.-buds, July 1897, *Ouwehand 393* (B); Laukakai, jungle, 1630 m, shrub, June 1939, *Batten Pooll s.n.* (S). West Coast. Mt. Singgalang 1878, *Beccari 191*, 345 (L); Mt. Korintji, edge of swamp, 1800 m, tree, fl., April 1920, *Bunnemeijer 9730* (B, L).

### 3. VIBURNUM GLABERRIMUM Merr.

*Viburnum glaberrimum* Merrill in Philip. J. Sci., Bot. 4: 329. 1909; Enum. Philip, fl. Pl. 3: 577. 1923.

Small, evergreen tree, nearly glabrous. Branchlets dark reddish-brown, lenticellate. Petioles channelled above, glabrous, 2—4 cm long. Leaf-blades coriaceous, shining, glabrous on both sides except for the bearded (or glandular pitted) nerve-axils on the under side, ovate or elliptic, (6—)8—15 cm long, (3—)6—8 cm wide; apex broadly and obtusely acuminate to nearly rounded, base rounded or slightly decurrent-cuneate, margin entire or remotely undulate-dentate; nervation indistinct above, rather prominent beneath; primary side-nerves 6—8 on each side of the midrib, at an angle of about 45° to it, slightly ascending, anastomosing, connected by indistinct transverse veins. Inflorescence terminal, umbellate, corymbiform, 3—4 times branched, 5—10 cm across; axes thinly stellate-pubescent, glabrescent; peduncle stout, 2—4 cm long; primary rays 5—7,

up to 5 cm long; bracteoles very small, caducous before the anthesis. Calyx-limb obscurely lobed. Corolla broad-tubular, obovoid in bud, glabrous; tube about 2.5 mm, lobes erect, rounded, about 1.5 mm long. Stamens exerted; filaments flattened, adnate to the base of the corolla, in the flower-bud inflexed at the top, about 6 mm long; anthers oblong, 1.5—2 mm long. Ovary cylindrical, glabrous, 1 mm long. Drupe (after Ramos & Edaño 39025) ovate to nearly orbicular, dorsiventrally compressed, about 5 by 5 mm; endocarp obscurely undulate in cross-section, with 2 shallow dorsal grooves and 1 shallow ventral groove.

ECOLOGY. — In primary forests; altitude according to Merrill 1909, *I.e.*, 300—450 m, according to Merrill 1923, *I.e.*, 1000—1400 m.

DISTRIBUTION. — Philippines, endemic.

SPECIMENS EXAMINED. — PHILIPPINES; LUZON. Camarines: fl., Dec. 1913, *Ramos* (Merrill, *Phil. PL 1519*) (B, G, L, S); Rizal: fl., Jan. 1913, *Loher 13878* (B), *13904* (A); fl., Dec. 1913, *Loher 14846* (A). MINDANAO. Bukidnon. Mt. Dumalucpihan, fl., fr., June-July 1920, *Ramos & Edaño BS39025* (A, B, G). See p. 125.

### 4. VIBURNUM PLATYPHYLLUM Merr. — Fig. 3.

*Viburnum platyphyllum* Merrill in Philip. J. Sci., Bot. 10: 284. 1915; Enum. Philip, fl. Pl. 3: 577. 1923 ("pachyphyllum").

Tall, nearly glabrous, evergreen tree. Branchlets dark reddish-brown, lenticellate. Petioles glabrous, 4—5 cm long, of the smaller leaves 1—2 cm. Leaf-blades firmly chartaceous to subcoriaceous, somewhat shining, pale olivaceous when dry, glabrous, ovate to oblong-ovate, 9—22 cm long, 4—10 cm wide; apex gradually narrowed to the usually elongated and rather slender acumen, base obtuse to somewhat acute and slightly decurrent on the petiole, margin entire to obscurely undulate; primary side-nerves 6—7 on each side of the midrib, somewhat prominent beneath, ascending, indistinctly anastomosing, axils on the lower surface (often also axils of the coarser secondary nerves) glandular-pitted. Inflorescence large, umbellate, corymbiform (3—)4(—)5 times branched, up to 18 cm across; axes thinly stellate-pubescent, glabrescent; peduncle 4—6 cm long; primary rays about 7, (4—)6—7 cm long. Flowers numerous, fragrant. Calyx-limb with short but distinct triangular teeth. Corolla globular in bud, when open shortly tubular to somewhat turbinate, gradually slightly widening towards the top, white, glabrous; tube 2—2.5 mm, lobes erect, rounded, 1.5—2 mm. Stamens exerted; filaments inserted at the base of the corolla, in the flower-bud with inflexed top, sometimes moreover with a distinct fold in the lower part, 6—7 mm long; anthers oblong, 2 mm long. Ovary cylindrical, glabrous, 1 mm long. Drupe oblong-ovate, dorsiventrally compressed, 8—9 mm long, 6 mm wide; endocarp slightly undulate in cross-section, with 2 shallow dorsal grooves and 1 shallow ventral groove.

ECOLOGY. — According to Merrill in forests, at an altitude of about 500 m.

DISTRIBUTION. — Philippines, endemic.

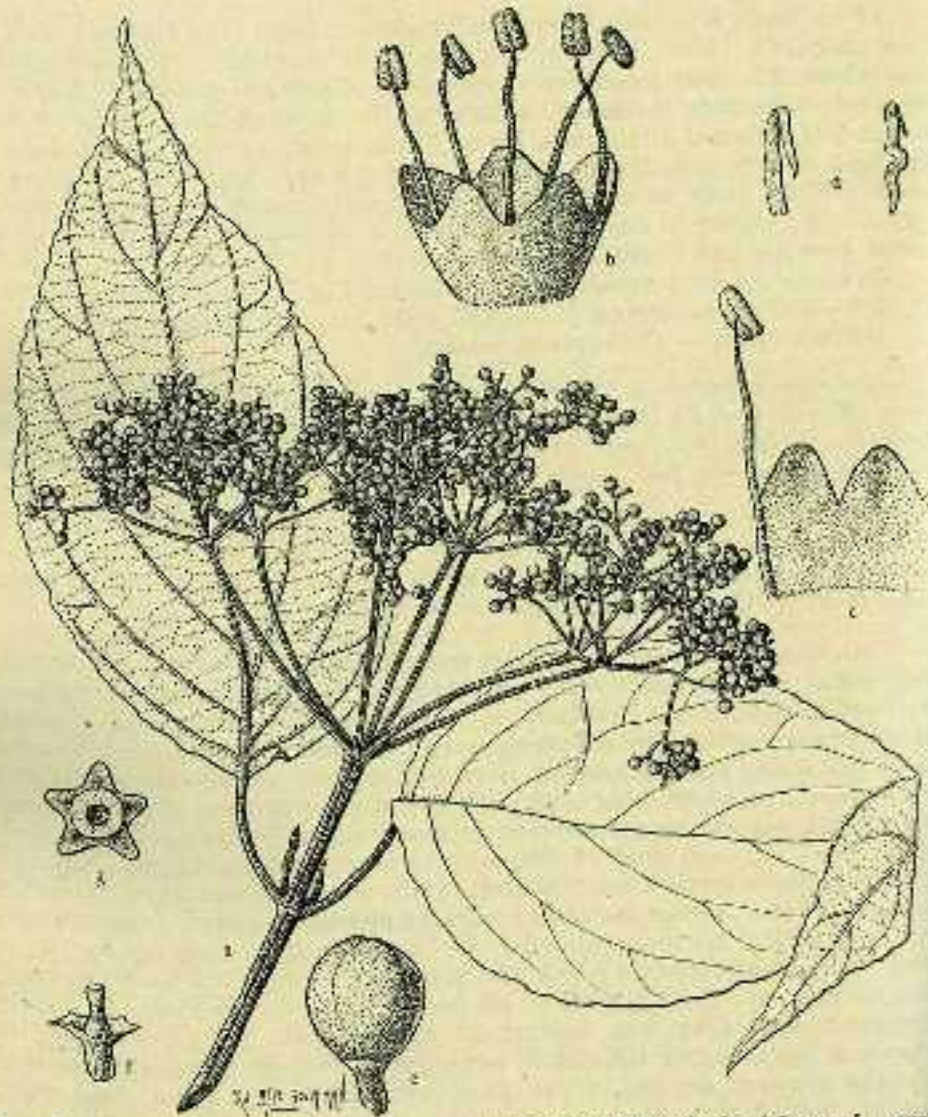


FIG. 3. *Viburnum platyphyllum* Merr.: a, twig with flower-buds, 0.5  $\times$ ; b, corolla, 5  $\times$ ; c, part of corolla, inside view, 5  $\times$ ; d, acclivation of filaments, 5  $\times$ ; e, flower-bud, 5  $\times$ ; f, ovary, 5  $\times$ ; g, calyx-limb, seen from above, 5  $\times$ . — After Wenzel 923.

Note. The height given by Wenzel as 25 m is according to Merrill probably over-estimated.

SPECIMENS EXAMINED. — PHILIPPINES, LEYTE, Buenavista, near Jaro, June 25, 1914, Wenzel 923 (dried type, not seen); II, Aug. 1, 1914, Wenzel 923 (A); Caba-han, fr. Dec. 1922 (f. *foliis minoribus*), Ramos B.S. 41582 (A, B, L); Ramos B.S. 41586 (A). See p. 127.

### 5. *VIBURNUM CORNUTIDENS* Merr.

*Viburnum cornutidens* Merrill in Philip. J. Sci. 26: 491. 1925; Enum. Philip, fl. Pl. 4: 251. 1926.

Small, glabrous, evergreen tree, about 5 m high. Branchlets dark reddish brown, conspicuously lenticellate. Petioles 2—3.5 cm long. Leaf-blades thickly coriaceous, shining, olivaceous or brownish olivaceous, obovate to elliptic, 10—14 cm long, 7—10 cm wide; apex rounded to shortly and obtusely acuminate, base acute and somewhat decurrent on the petiole, margin conspicuously corniculate-dentate; teeth straight, obtuse, 1—2 mm long, chiefly terminating the primary side-nerve, the latter usually 9 on each side of the midrib, nearly straight, once (sometimes twice) forked one-half to two-thirds of the margin, beneath with glandular pits in the axils, connected by indistinct transverse veins. Inflorescence terminal, umbellate, corymbiform, 3—4 times branched, about 15 cm across; peduncle stout, about 5 cm long; primary rays 5—7, up to 7 cm long. Drupe broadly ovate, dorsiventrally compressed, 8 mm long, 6—7 mm wide; endocarp slightly undulate in cross-section, with 2 shallow dorsal grooves and 1 shallow ventral groove.

ECOLOGY. — On forested slopes; altitude about 1800 m.

LOCAL NAME. — Manano (Igorot).

DISTRIBUTION. — Philippines, endemic; only known from the original collection.

SPECIMEN EXAMINED. — PHILIPPINES, LUZON, Benguet, Mt. Baudan, fr., Sept. 1921, Ramos & Edano B.S. iO-309 (A; type).

In order to come to a satisfactory classification of the group of *V. glaberrimum*, occurring in the Philippines (species 3—5), it will be necessary to collect a lot of additional specimens, with both flowers and fruits from the same plant, as the material in the herbaria is insufficient to gain an insight in this difficult question.

*Viburnum glaberrimum* was described in 1909. As Merrill mentions, it is a species manifestly allied to *V. coriaceum* of the Indo-Malayan region, but at the same time very distinct, especially in its vegetative characters. I did not see the type of *V. glaberrimum*, Merritt 15848, but in his "Enumeration" Merrill also mentions Merr. Phil. Pl. 1519, of which I have seen several sheets in the various herbaria. It will be useful to verify the characters given by Merrill. In my opinion *V. glaberrimum* cannot be called "glabrous throughout." Not only the glands of the nerve-axils on the under side of the leaves are often somewhat bearded, but also the axes of the inflorescence are thinly stellately pubescent, though glabrescent. The leaves are rather elliptic or ovate than obovate. The corolla is not 5 mm but 4 mm long, the tube being about 2.5 mm, the lobes about 1.5 mm. The filaments are not 5 mm long but 6 mm. Moreover, I do not

believe that the leaves of *V. glaberrimum* are always entire. In Loher 13878 and 13904, otherwise quite identical with Merrill Phil. PI. 1519, the leaves are distinctly remotely undulate-dentate.

However, *V. glaberrimum* and *V. coriaceum* differ manifestly. Whereas in *V. coriaceum* the leaves are usually ovate-lanceolate, gradually long-acuminate and remotely dentate, they are broader, elliptic to ovate, not or obtusely short-acuminate, entire or somewhat undulate in *V. glaberrimum*. The corolla of *V. coriaceum* is more distinctly tubular than with *V. glaberrimum*, the tube in the former being at least 3 mm, often longer, the teeth 1 mm, in the latter respectively 2.5 and 1.5 mm. The flower-bud of *V. glaberrimum* is obovoid, with *V. coriaceum* more ellipsoid. The stamens of *V. glaberrimum* are inserted at the base of the corolla, those of *V. coriaceum* somewhat adnate to the tube (0.5—1 mm, sometimes, even to 2—3 mm above the base). The filaments are 6 mm long; those of *V. coriaceum* reach this length only in some large-flowered specimens. Obviously the place of *V. coriaceum*, which is wanting in the Philippines, is taken by *V. glaberrimum*, and the differences are presumably sufficient to justify the specific separation from the variable *V. coriaceum*.

Later on Merrill published two further species, viz. *V. platyphyllum* (1915) and *V. cornutidens* (1925); according to their author the former is distinguished by its much larger, distinctly slenderly acuminate leaves, the latter by its conspicuously corniculate-dentate leaves. For the rest no striking differences are given. *V. platyphyllum* is based on Wenzel 923 from Leyte, *V. cornutidens* on Ramos & Edaño 40309 from Luzon. In Merrill's "Enumeration" no supplementary specimens of both species are mentioned.

*Viburnum cornutidens* has been described from a fruiting specimen only. In comparing it with *V. glaberrimum*, Merrill Phil. PI. 1519, I have been unable to find other valid differences but the dentation of the leaf. In my opinion it would be undesirable to segregate it specifically from *V. glaberrimum*, until further collections have furnished more characteristics. For a similar variation of the dentation (entire, undulate, dentate) can be observed in the Philippine *V. odoratissimum*, without this having led to the institution of a separate species. On the other hand it must be admitted, that the thickly coriaceous, broad, dentate leaves are striking. The plant also seems to be characterized by the broadly ovate fruits, which measure about 8 by 6—7 mm, those of *V. glaberrimum* probably being smaller (see below).

We have a similar case in *V. platyphyllum*. The much larger leaves, gradually tapering upward to the distinctly slenderly acuminate apex in the type are indeed remarkable. The inflorescence is larger too and, as far as I can judge from a single specimen, there are also slight differences in the flower. The calyx-teeth seem to be more distinct, the corolla appears to be somewhat widened towards the top, therefore less tubular than in *V. glaberrimum*, and more globular in bud. Unfortunately fruits are absent, both in Merrill Phil. PI. 1519 and in Wenzel 913.

I have met with great difficulties in trying to identify the specimens not mentioned by Merrill. Loher 13904 and 14846, both distributed as *V. glaberrimum*, have been correctly identified in my opinion. Ramos & Edaño 39025, distributed as *V. odoratissimum* Ker, I also take for *V. glaberrimum*. The fruits of this specimen are nearly orbicular, 5 by 5 mm, but probably not full-grown. Ramos 41482 and 41585 on the contrary bear ovate young fruits of 6—7 by 4—5 mm. The leaves, although much smaller than in Wenzel 923, taper more or less gradually into the rather long acumen. For these reasons I can agree with the determination on the label as a small-leaved form of *V. platyphyllum*. But I repeat, the question is very intricate. For the present I must acquiesce in the opinion of Merrill; it is to be hoped that more complete material may offer a solution.

#### 6. VIBURNUM PUNCTATUM Ham. ex D. Don

*Viburnum punctatum* Hamilton ex D. Don, Prodr. Fl. nepal. 142. 1825; De Candolle, Prodr. 4: 324. 1830; Hooker f. & Thomson in J. linn. Soc. (Bot.) 2: 176. 1858; Oersted in Vid. Meddel. Kjøbenh. 1860: 298. 1861; Brandis, For. fl. 260. 1874; C. B. Clarke in Hooker f., Fl. Brit. Ind. 3: 5. 1880; Danguy in Lecomte, Fl. gen. Indo-Ch. 1: 12. 1922; Craib, Fl. Siam. Enum. 2: 3. 1932; Merrill in Contr. Arn. Arb. 8: 164. 1934.

*V. acuminatum* Wallich ex De Gandolle, Prodr. 4: 325. 1830; Wight & Arnott, Prodr. Fl. Pen. Ind. or. 1: 388. 1834; Wight, Icones Pl. Ind. or. 3: (13) t.1021. 1845; Gamble, Flora Madras 3: 575. 1919.

Evergreen shrub or small tree, up to 18 m. Bark greyish; young parts densely covered with minute, rusty-coloured, peltate scales, leaving numerous punctiform scars when they fall off. Branchlets angular, somewhat warty lenticellate. Petioles channelled above, 1—1.5 cm long. Leaf-blades coriaceous, shining dark green above, lighter and somewhat bronzy beneath; upper surface glabrous, under side densely covered with minute scales, neither bearded nor glandular pitted in the nerve-axils, elliptic-lanceolate to lanceolate, 5—13 cm long, 2—4.5 cm wide, bluntly acuminate at the apex (acumen 0.5—1 cm long), tapering towards the base and slightly decurrent on the petiole; margin entire and somewhat revolute in dry state; primary side-nerve 5—7 on each side of the midrib, indistinct

above, rather prominent beneath, arcuately ascending, anastomosing near the margin, connected by delicate veins. Inflorescence terminal, 3(—4) times umbellately branched, corymbiform, 5—10 cm across (the infructescence up to 15 cm); axes densely squamulate; peduncle very short, usually 1—3 cm long; primary rays 3—5, angular, 2—5 cm long; bracteoles very minute, ovate-lanceolate, fimbriate, 1.5 mm long. Flowers fragrant, about 5 mm wide. Calyx-teeth ovate-triangular, obtuse, light-margined, squamulose, about 0.75 mm long. Corolla white, glabrous within, somewhat squamulose without, globular in bud, nearly rotate (only slightly campanulate) when open; tube about 1 mm long, lobes broad-ovate, rounded, somewhat overlapping at the base, about 2 mm long. Stamens somewhat exerted; filaments flattened, subulately tapering towards the top, in the flower-bud with an inflexed tip, inserted near the base of the corolla, 3—4 mm long; anthers elliptic, about 1 mm long. Ovary cylindrical, lepidote, 1.5—2 mm long; style short and thick, conical. Drupe elliptic or slightly obovate, much compressed dorsiventrally, young squamulose, ripening black, 9—11(—12) mm long, 6—7 mm wide; endocarp undulate in cross-section, with 2 dorsal and 3 ventral grooves.

DISTRIBUTION. — SE Asia, from Nepal, Kumaon, and the Deccan to Siam and Indochina. In Malaysia only collected twice at neighbouring localities in North Sumatra. The statement of Hooker f. & Thomson (*I.e.*) : "Java," already doubted by Hallier for phytogeographic reasons, has never been proved by any material.

Don's meagre diagnosis of *V. punetatum* reads: "foliis ovali-oblongis integerrimis mucronulatis utrinque glabris, cymo terminali laevi patente sessili." It is to be found again nearly literally in De Candolle's "Prodromus," only with the addition "foliis ... subtus sub lente punctatis." The description of *V. acuminatum* in the "Prodromus" is also very short and it is impossible to find a clear difference between the two diagnoses. Consequently Hooker f. & Thomson united the two species, treating the name *V. acuminatum* in synonymy. Nearly all later authors followed them, recently Merrill, who expressly stated: "[Bangham 825] very closely matches Wallich's Nepal material and Wight 1523, distributed as *V. acuminatum* Wallich." However, Clarke distinguished the Deccan plant from the Nepal *V. punetatum* as variety *acuminatum* (Wall.) Clarke, characterized by its acuminate leaves, persistent bracts, larger drupes and obscurely grooved seeds, adding: "the berry looks so different that it may indicate a distinct species." The group of *V. punetatum* obviously comprises a number of closely related taxa and great prudence should be exercised in uniting them into a single species. *Viburnum lepidotulum* Merr. & Chun (*in* Sunyatsenia 2: 22 pi. 12. 1934), for instance is undoubtedly a markedly different species, although judging from the description and the plate it seems to differ only from the plant figured in Wight's

tabula 1021, by its larger fruits [in How 72851 (B) they are even 18 mm long!]- The conspecificity of *V. acuminatum* and *V. punetatum* is therefore in my opinion still questionable, but provisionally I follow the majority of the authors. At any rate the Sumatran specimens agree with Clarke's variety *acuminatum* and with Wight's plate. They are identical with the Indian and Siamese specimens I saw [Wight 1263 (L); Nilgiris, Clarke B 10744 (B); Pulney Hills, Sauliere 74, 123 (B); — Pu Tong, Kerr 8874 (S); Chiengmai, Kerr 6222 (S); Krabin, Kerr 9829 (S)].

SPECIMENS, EXAMINED. — SUMATRA. A t j e h. Along road from Takingeun to Bireuen, road to Balek, edges of and in first growth jungle, alt. 3300 ft, fl., Jan. 1932, Bangham 825 (A, S); Enang Enang, N of Lampahan, along road, alt. 800 m, fr., Sept. 1934, van Steenis 6587 (B).

#### 7. VIBURNUM SAMBUCINUM BL.

*Viburnum sambucinum* Blume, Bijdr. 13: 656. 1826; De Candolle, Prodr. 4: 325. 1830; Miquel, Fl. Ind. bat. 2: 120, 1856; Suppl.: 213. 1860; Hasskarl *in* Bonplandia 7: 170. 1859; Oersted *m* Vidensk. Meddel. Kjøbenh.. 1860: 299 t. 7 f. 11-13. 1861; Clarke *in* Hooker f., Fl. Brit. Ind. 3: 5 & 671. 1880; Koorders & Valeton, Bijdr. Booms. Java 5: 40. 1900; Koorders *in* Natuurk. Tijdschr. Ned.-Ind. 62: 216. 1903; Gamble *in* J. Asiat. Soc. Bengal 72: (2): 113. 1903; Koorders *in* Gedenk. Jungh. 192. 1910; Exkursionsfl. Java 3: 285. 1912; Hallier f. *in* Meded. Rijks-Herb. No. 14: 36. 1912; Ridley *in* J. Fed. Mai. St. Mus. 8: 44. 1917; Koorders, Fl. Tjibodas 3 (2): 38. 1918; Merrill *in* J. Str. Br. roy. As. Soc. 86: 582. 1921; Danguy *in* Lecomte, Fl. gen. Indo-Ch. 3: 11. 1922; Ridley, Fl. Mai. Pen. 2: 1. 1923; Burkill & Henderson *in* Gard. Bull., Str. Settl. 3: 380. 1925; Von Malm *in* Fedde Repert. 34: 28. 1934 (*excl.* Rensch 1509); Henderson *in* J. Fed. Mai. St. Mus. 13: 219. 1927; *in* J. Mai. Br. roy. As. Soc. 5: 251. 1927; Corner, Wayside Trees Mai. 183. 1940.

*Viburnum integerrimum* Wallich, Cat. 457; Hooker f. & Thomson *in* J. linn. Soc. (Bot.) 2: 176. 1858.

*Viburnum forbesii* Fawcett *in* Forbes, Nat. Wand. 506. 1885 (*excl. var.*).

Evergreen, branchy shrub or small spreading tree, up to 10(—15) m. Trunk terete, straight, unbuttressed. Bark greyish brown. Crown irregular, rather lax. Branches terete, glabrous, lenticellate; young branchlets densely rusty stellate-pubescent. Petioles channelled above, glabrous or glabrescent, up to 4 cm long. Leaf-blades more or less coriaceous, shining dark green above, paler and less shining beneath, both sides glabrous except for a few hairs on the nerves and the bearded nerve-axils at the under side (see var- *tomentosum*), here with an often indistinct spotty gland at the base on both sides of the midrib, elliptic-oblong to oblong-lanceolate, the larger ones 10—25 cm long, 5—10 cm wide; apex abruptly short-acuminate, base cuneate and somewhat decurrent on the petiole, margin entire, somewhat revolute in dry state; nervation slightly impressed above, rather prominent beneath; primary side-nerves 5—7 on each side of the midrib arcuately ascending, evanescent towards the margin, anastomosing; reticulation close, dark green. Inflorescence densely many-flowered,

umbellate, corymbiform, (3—)4(—5) times branched, up to 15(—18) cm across; axes densely stellate-pubescent, glabrescent; peduncle stout, reddish brown, 4—6 cm long; primary rays 6—8, up to 5 cm long; bracts occasionally leafy, usually like the bracteoles small, linear-lanceolate, stellately pubescent, often semi-persistent. Flowers small, 3—4 mm in diameter, very fragrant (as in *Sambucus*). Calyx-lobes with ovate-triangular, acute, ciliate lobes, 0.75—1 mm long. Corolla rotate or campanulate, globular in bud, white or creamy; tube 1(—1.5) mm, lobes spreading, ovate, rounded (1—)1.5(—2) mm, the tube usually somewhat shorter than the lobes, not rarely the reverse. Stamens long-exserted; filaments almost filiform, somewhat flattened, white, serpentine in bud, inserted at the base of the corolla, (4—)5—7(—9) mm long; anthers elliptic to oblong, 0.75—1 mm long. Ovary cylindrical; usually densely hairy, very rarely subglabrous, 1—1.5 mm long; style short, glabrous, 1 mm long. Drupe ovate, much compressed dorsiventrally, young shining dark green, thinly short-hairy, ripening bluish-black, glabrescent, astringent, (7—)9(—10) mm long, (5—)6(—7) mm wide; endocarp undulate in cross-section, dorsally 2-grooved, ventrally 3-grooved, the lateral ventral grooves often obsolete.

ECOLOGY. — In open primary and secondary forests, in brushwood, particularly at the edges of forests in the lower mountain regions (up to 1800 m), occasionally in swampy places in the lowlands. Flowering and fruiting throughout the year.

USES. — Winckel (648/9) mentions the use of the leaves as a remedy against scabies by the natives; other uses are not recorded.

DISTRIBUTION. — SE Asia: Cambodia; Malaysia, chiefly in the western part, often frequent, from the Malay Peninsula through Sumatra and Java (already rare in the central and eastern part) to the Lesser Sunda Islands; also in Borneo, Celebes, and the Moluccas, but presumably very rare there.

*Viburnum sambucinum* var. *subglabrum* Kern, var. nov.

*Viburnum longistamineum* Ridley in J. Fed. Mai. St. Mus. 6: 151. 1915 (basinym); Fl. Mai. Pen. 2: 2. 1923; Symington in J. Mai. Br. roy. As. Soc. 14(3): 353. 1936.

Inflorescence small, 5—7 cm across; axes of the inflorescence and ovary subglabrous.

DISTRIBUTION. — Malay Peninsula.

*Viburnum sambucinum* var. *TOMENTOSUM* Hallier f.—Fig. 4

*Viburnum sambucinum* var. *tomentosum* Hallier f. in Meded. Rijks-Herb. No. 14: 36. 1912.

*Viburnum sumatranum* Miquel, Fl. Ird. bat., Suppl.: 537. 1860; Moore in J. of Bot. 62: Suppl.: 64. 1924.

*Viburnum villosum* Ridley in J. Str. Br. roy. As. Soc. No. 61: 10. 1912; Fl. Mai. Pen. 2: 2. 1923.

*Viburnum inopinatum* Craib in Kew Bull., 1911: 385; Danguy in Lecomte, Fl. gén. Indo-Ch. 3: 10. 1922.

*Viburnum sambucinum* Blume *sensu* Hosseus in Beih. Bot. CB. 28: 446. 1911.

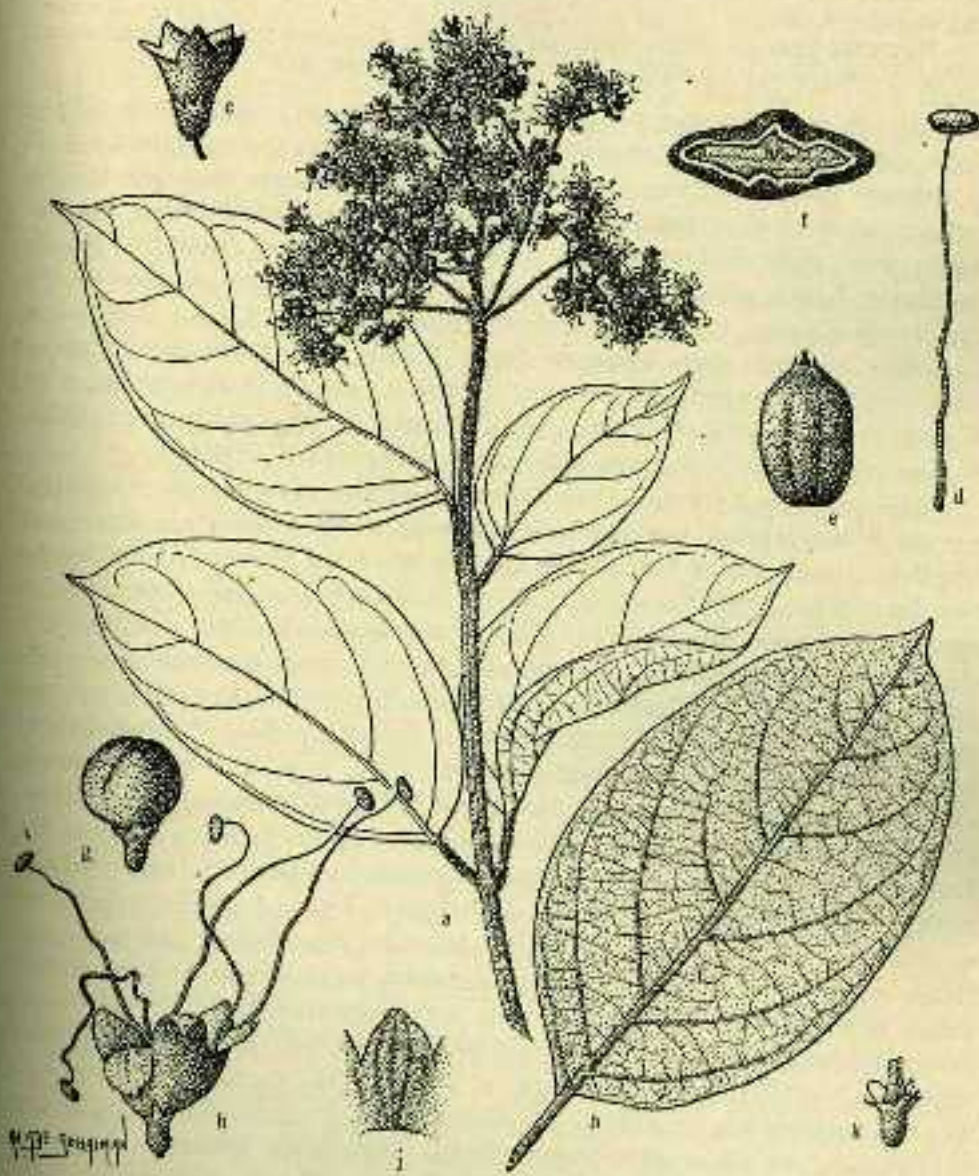


FIG. 4. *Viburnum sambucinum* var. *tomentosum* Hallier f.: a, flowering twig, 0.5 ×; b, leaf, under side, 0.5 ×; c, flower, stamens removed, 5 ×; d, stamen, 6 ×; e, fruit, 2 ×; f, cross-section through fruit, 5 ×; g, flower-bud, 6 ×; h, flower, 6 ×; i, part of corolla, 6 ×; k, ovary 3 ×. — a-d and g-k, after Lörzing 7915, e-f, after Van Steenis 9200.

Under side of the full-grown leaves softly villous with simple, forked, and stellate hairs.

DISTRIBUTION. — Siam, Malay Peninsula, Sumatra; the typical form probably restricted to higher altitudes (800—1200 m).

Like most Malaysian *Viburna* this species is very variable in all its parts, especially as to the indument. Almost glabrous forms occur as well as densely pubescent ones. This variability more than once led to the distinction of new segregate species. The nearly glabrous plants for instance were described by Ridley as *V. longistamineum* from the Malay Peninsula. I am unable to draw a line between *V. sambucinum*, also occurring in the Malay Peninsula, and *V. longistamineum*. I take this for a somewhat slender, more glabrous form. Ridley named his species after "the very long projecting stamens," but this feature is also peculiar to *V. sambucinum sensu strieto* and the difference is illusory. In my opinion *V. longistamineum* is perhaps not even a well-marked variety.

The pubescent form, on the other hand, also received some specific names. When Miquel described his *V. swmatranum* after a specimen collected by Junghuhn at Sipirok, he did not know the flowers. He added to the description: "Probabiliter prope *V. sambucinum* inserendum, indumento persistente insigne." The description indeed does not preclude the close relationship with *V. sambucinum*; there is even only one character in it, which is not applicable to the common form of this species, viz. the indument of the leaves. The full-grown leaves of typical *V. sambucinum* are almost glabrous on both sides, except for a few hairs on the nerves and the bearded nerve-axils on the under side; the young ones, however, are pubescent beneath, especially on the midrib and the primary side-nerves. In *V. swmatranum* the under side of the full-grown leaves is softly villous with persistent hairs. In the various herbaria I found several specimens of a *Viburnum*, fully agreeing with Miquel's description and the type. Some of them bear flowers, but nevertheless I am unable to find differences from *V. sambucinum* that may be considered specific. Moreover, the hairiness of the leaves is very variable, slight, for instance, in Krukoff 4201 and 4366, and Yates 2544. I agree with Hallier who reduced *V. swmatranum* to a variety of *V. sambucinum*. Presumably the range of this variety (or geographic race) extends from Siam through Malaya to Sumatra. *Viburnum villosum* Ridl. of the Malay Peninsula is quite identical with Miquel's plant. Ridley described the flowers as follows: "Flowers small sessile green . . . Corolla tube short Vio inch long glabrous cylindrical thick lobes rounded ovate, as long as the tube 5. Stamens twice as long as the corolla 5." This description is incorrect. I cannot find any

evident difference with the corolla of *V. sambucinum*. The tube and the lobes are both about 1 mm long, the stamens about 6 mm. Besides, the label-note "flowers green" must probably be due to the fact that only flower-buds are present. King already mentioned a more hairy form from the Malay Peninsula. Obviously he did not know the densely villous plants, which are indeed very striking. However, there are so many intermediate specimens that I cannot maintain it as a species.

For lack of authentic material I cannot quite make up mind, but judging from Craib's description and a specimen in the Rijksherbarium at Leiden (Lugd. Bat. 934.323—409) I am nearly convinced that *V. inopinatum* Craib from Siam in future must also be treated as a synonym. Craib published *V. inopinatum* as a new species in his "Contributions to the flora of Siam." He already saw the close relationship with *V. sambucinum*, for his description begins: "a *V. sambucino*, Reinw., foliis subtus molliter pubescentibus, calycis dentibus minoribus, corolla parum majore, filamentis antherisque longioribus recedit." In the Malaysian specimens, however, the corolla is not larger than in *V. sambucinum*, the tube being about 1 mm, the lobes fully 1 mm long, neither can I find evident differences in the calyx-lobes. The length of the fully developed filaments in *V. sambucinum* is very variable, from 4—7 mm. In Henderson 11555 I even measured filaments of 8—9 mm. In general the specimens of Sumatra and the Malay Peninsula have stamens projecting further than with those of the eastern part of the Archipelago (Celebes, Lesser Sunda Islands).

In comparing the descriptions of *V. inopinatum* and *V. sambucinum* in Danguy's elaboration in Lecomte, "Flore generale de l'Indo-China" one only finds the following differences:

<i>V. inopinatum</i>	<i>V. sambucinum</i>
Limbe glabre en dessus, excepte la nervure médiane, pubescent en dessous.	Limbe glabre sur les 2 faces.
Inflorescence pubescente, rayons a poils surtout étoilés et blanchâtres.	Rayons pubescents, couvert de poils étalés, a la fin glabrescents.
Fleurs blanches.	Fleurs jaunâtres.
Calice a 5 dents courtes, a peine 0,5 mm., pubescentes.	Calice a 5 dents triangulaires, sub-obtuses, glabres, 1 mm a peine.
Tube [de la corolle] 1,5 mm.	Tube très court, 0,5 mm.
Pilet 5—6,5 mm.	Filet 5 mm.

It may be that the Siamese plants differ in all these characters and represent a separate species, but it is clear, that the data on *V. inopinatum* are taken unaltered from Craib's description. So I do not Relieve that the contrast "fleurs blanches — fleurs jaunâtres" really

exists. "Tube tres court, 0,5 mm" in *V.*: *sambucinum* does not at all agree with the numerous specimens of this species examined by me. They all have a corolla-tube of at least 1 mm in length. *Viburnum sambucinum* of Hosseus (*I.e.*) from Siam, Chieng Mai, no 250 (L) is also variety *tomentosum*.

It is remarkable that Clarke (*I.e.*) under *V. sambucinum* mentions: "Leaves in some Javan specimens are hairy beneath." None of the Javanese specimens of that species I examined showed this; on the contrary I did not see quite typical *V. sambucinum* from North Sumatra, whereas but a single specimen of variety *tomentosum* has been collected in South Sumatra.

In the list below the specimens with more or less persistent pubescence have all been reduced to variety *tomentosum*; the typical specimens are marked by an asterisk (\*); the latter probably only occur at higher elevations above sea-level (*ef.* the label-notes).

SPECIMENS EXAMINED. — MALAY PENINSULA. P. Butong, *Berry s.n.* (S). P. Penang: *Maingay 712/2* (G, L), *Md. Nur 2423* (B, S); Government Hill, *Curtis 278, 2453, s.n.* (S), *Ridley 7128, 7928, 9230* (S), *Fox s.n.* (B), *Burkill 387* (B, S), *Corner 31594~(S)*, *Nauen s.n.* (S), 35828 (B); Penara Bukit, *Haniff 278* (S). Perak. Birch's Hill, *Burkill & Haniff 12992* (S). Pahang. Fraser Hill, *Hose 60* (S), *Burkill & Holtum 7779* (S)/*Henderson & Md. Nur 11252* (A, B, S), *Henderson 11555* (B); Cameron's Highlands, *Hancock 1987* (A), *Henderson 17984* (B, S), 23490 (S), 23617 (A, S), *Osman 20846* (S), *Md. Nur 32635* (L, S); Perolak, *Jaamat 27555* (S); Gunong Benom, *F.M.S.-collector s.n.* (S); Sungei Lemoi, *Jaamat 28151* (S); Raub Pahang, *Kalong 20260* (S); Telom wood, *Ridley 13571* (S), *Kiah & Strugnell 23909* (B, S). Selangor. Gunong Mengkuang, *Robinson s.n.* (S). Singapore. *Cantley's collector 2913* (S), *Ridley 2106, 6829, 8036* (S), *Woodford 6335* (S); Bukit Panjang, *Ridley 11840* (A, S), *s.n.* (S), *Burkill & Henderson 6810* (S); Gap, *Symington 20183* (S). — SUMATRA. Without exact locality: *Korthals s.n.* (G). Palembang. Mt. Dempo, between Lematang and Ensikang river, *Huitema 75* (B); Ogan Ulu, local name kaju tai, *Teysmann 3777HB* (B, U); Semindo, *de Voogd 1506* (B, L); Muaradua, *de Voogd 1-4* (B, L). — JAVA. Without exact locality: *Binnendijk s.n.* (B), *Blume s.n.* (B, L), local names ki lakketang, ki mokla, *Junghuhn 283, Pl. ined. 38, 39, 40, 42* (L), *s.n.* (U), *Korthals s.n.* (L), *Kuhl & van Hasselt s.n.* (L), *Reinwardt s.n.* (L), *Steenstra-Toussaint s.n.* (L), *Zollinger 310* (L), 843 (S). WEST JAVA. Banten. Sadjira, *Reinwardt s.n.* (L); between Sadjira and Lebak, *Korthals s.n.* (L); between Muntjang and Sadjira, *Backer 1887* (B); Djasinga, *Backer 9960, 10040, 10404* (B), *van Steenis 1121.3* (B); between Bajah and Langkop, *Backer 1703* (B); Gunong Kantjana, local name ki tai, *Koorders 41289* (B, L); Bondjongmanik, *Koorders 40919* (B, L); Tjiladaheun, (ace. to Moore *I.e.*), *Forbes 4-10* (B); Pasir Orai, Kosala, (ace. to Moore *I.e.*), *Forbes 537a* (B). Djakarta. Tjigelung near Djasinga, *Beumée A362* (B, L, U); Gunong Paniisan, local name ki tarassi (Sundanese), *Bakhuizen van den Brink 6132* (B, L, U), *van Steenis 2289* (B); Tjianten, S of Leuwiliang, *Backer 25730* (B); Gunong Djambu, W of Leuwiliang, *Bakhuizen*

*van den Brink f. 2726* (B, U); Gunong Sembung, *Backer 12213* (B). Bogor. Bogor, *Boerlage s.n.* (L); Nirmala, W of Bogor, *Backer 11130* (B, L, S, U), *de Voogd s.n.* (B); near Tjampea, local name ki tai, *Koorders 30609* (B, L, S); Pasir Karet near Gadog, *Backer s.n.* (B); Batutulis near Bogor, *Hallier s.n.* (B); Maseng, S of Bogor, *Backer 9303* (B); Mt. Salak, local name ramo kekkek, *Junghuhn 37* (L), *Koorders 24167* (B, L), 24177 (B); Pasir Tengah, local name ki kulat, *Arsin 19529* (B); Warungloa, *van Steenis 87* (B); Tjisangku, Nanggung, *Backer 10617* (A, B, L); forest-area Nanggung, *van Steenis 17400* (B); Nanggerang, *Sugandiredja 84* (B); Pasir Datar, slope of Mt. Pangrango, *Bakhuizen van den Brink 2098* (B, L); between Tjiloa and Pasawahan, *Backer 2265* (B); Pasawahan, *Boaters van Leeuwen 2903* (B); Tjitjurug, *Backer 17248* (B); Njalindung near Tjitjurug, *Belle s.n.* (B); Tjibareno, NW of Palabuanratu, local name babatuan (Sundanese), *Winckel 1862* (B, L, U); Palabuanratu, local name ki kujup, *Koorders 1047, 1048, 1049* (B); Tjipetir, *Burck & Be Monchy s.n.* (B); Tjibeber, local name ki sempur (Sundanese), *Winckel 648* (B, L); Tjibodas, *Hallier 42* (B), local name ki kukuran (Sundanese), *Hallier 500a,b* (B, L), *Koorders 31936, 32137* (B), local name ki kukuran, *Koorders 41983* (B), *Boerlage s.n.* (B), *Lorzing 1790* (B), *Kern 7989* (B), *van Ooststroom 13795* (L), local name ki beureum (Sundanese), *Kern 8055* (B), *van Ooststroom 13901* (L), local name katutunkul, "Houtsoorten" (= kinds of wood) 241 (L); Mt. Gede, *van Steenis 6857* (B); Mt. Gede, between Tjibeureum and Lebaksaat, local name ki kukuran, *Hallier 500* (B); Mt. Kantjana, *Backer 23235* (B); Takoka, *Koorders 15368, 25544* (B, L), 15191 (B); Tjadas Malang, local name ki kukuran, *Winckel 180, 1773* (B, L, U), *Bakhuizen van den Brink 2525* (B); Tji Kareo, *Lam 2146* (B). Priangan. Talun Kulon, *Sugandiredja 108* (B); forest-area Tjigenteng, local name ki bangkong, *Koorders 1045* (B, L, U), 1046, 1053 (B), 23168 (B, L); Mt. Malabar, local name beubeunteran, *coll. ind., s.n.* (B, L); in silvis cacuminis supremi montis Malabar, *Junghuhn s.n.* (L, U); near Nagerang, local name djalaprang (Sundanese), *Winantadipura Jal396* (B); Gambling, *Rant s.n.* (B); Pengalengan, *Junghuhn s.n.* (L); Mt. Mandalagiri, *Lam 2257* (B); Telagabodas, *Korthals s.n.* (L); Bandar, *Backer s.n.* (B); forest-area Pangentjongan, *Koorders 1052* (B, L); local names djawer, gedebong, ki bewog, *Koorders 13986, 14053, 14096* (B), 26679, 30149 (B, L); Pasir Ipi near Pangentjongan, local name beunter badak, *Koorders 26538* (B); Tjipaku, *Hallier s.n.* (B); island Nusagede in Pendjalu-lake, *Koorders 44481* (B); Tjipanas, Garut, *van der Pijl 620* (B); Garut, *Burck s.n.* (B), Gunong Guntur, *Koens 423* (B); Tjelaki, (ace. to Moore *I.e.*), *Forbes 865* (G, L, S); Sanggrawa, *Koorders 1067* (B). Pekalongan. Petung Kriana, *Backer 16304* (B); Mt. Perahu, NW slope above Surdjo, local name bleber (Javanese), *Koorders 1060, 1061* (B). Banjumas. Mt. Midangan near Pringombo, *Koorders 1040* (B), local name gambiran (Javanese), *Koorders 33878* (B). Kedu. Mt. Andong, local name kututan (Javanese), *Koorders 36559* (B). Semarang. Selokaton, *Loogen s.n.* (B); Ungaran, *Junghuhn s.n.* (L), *Koorders 1055* (L), 1056 (B); Mt. Telomojo, local name songko (Javanese), *Koorders 9961, 35902, 35904* (B), *Boeters van Leeuwen 1068* (B). EAST JAVA. Pasuruan. Mt. Mangongan, *Mousset 485* (B, L); near Tawangredjo, local name mentjok gunung (Javanese), *Verhoef 23* (B, L, U); above Djunggo, *Altmann 472* (A, B); Mt. Ardjuno, *Koorders 3\*170* (B). — BORNEO. Sarawak. Without exact locality, *Haviland 3019* (S); near Kuching, *Haviland 197* (B), 1054 (S); Bonga, *Haviland »2* (S). West Borneo. mt. Klam, *Hallier 2279* (B, L). — South and East Borneo. Martapura, *Korthals s.n.* (L); Mt. Sakumbang, *Korthals s.n.* (L). — CELEBES. Manado. Mt.

Beang, *Rachmat 1020* (exp. van Vuuren) (L); Palu Subdivision: W slope Mt. Ngilalaki, E of Lindu-lake, local name tumpudolo, *Bloembergen U081, 4005* (B); Waju, local name totoko, *bb.14130* (B). Luwuk Subdivision: between Mt. Lokai and Tambunan, *Eyma 3762* (B). Celebes: Tji Manipi, *Warburg 16361* (A); Bonthain, local name baliodeh, *Teysmann 13982* (B); Biroro near Lombasang, *Biinnemeijer 11647, 11700* (B, L), *11814* (B); Rante Lemo, *Kjellberg 1612b* (B); Liasa, *Kjellberg 2253* (B). Kabaena I. Mt. Sangia-wita, *Gruendler 3455, 3488* (L). — BALI. Tjatur, *de Voogd 1664* (B), *2159* (B, L); Mt. Pala, *Sarip 272* (exp. Maier) (B, L). — SUMBAWA. Mt. Batu Lanteh, N slope, *Gruendler 4176* (L); Pussu, W of Batu Lanteh, *Gruendler 4161* (L). — FLORES. Rana Mese, *Renech 1245* (L); Sita, *Rensch 1368* (B); Doaria, *Gruendler 4306* (L). — SUMBA. Kananggar, local name takumekeweda, *Ibut 521* (L). — TIMOR. Mt. Tahaolat, *Forbes 3587* (type of *Viburnum forbesii* Fawc), *3589, 4089* (L). — CERAM. Without exact locality, *de Vriese & Teysmann s.n.* (L); Manasula, *Kornassi 577* (exp. Rutten) (B).

a. — *V. sambueinum* var. *subglabrum*.

MALAY PENINSULA. Ke Iantan. Mt. Tapis, 4600 ft., *Symington & Kiah 28847* (S). Trengganu. Mt. Padang, 3800 ft., *Moysey & Kiah 31810* (S). Pahang. Padang woods, Mt. Tahan, 5600 ft., *Ridley 16064* (type of *Viburnum longistamineum* Ridl.), *16064A* (S); Mt. Tahan, 6000 ft., *Holtum s.n.* (S).

b. — *V. sambueinum* var. *tomentosum*.

MALAY PENINSULA. Selangor. Bukit Kutu, 3000 ft., *Ridley 7597<sup>d</sup>\** (type of *Viburnum villosum* Ridl. (S)). — SUMATRA. Without exact locality, *Junghuhn 100* (U). Atjeh. Gaju-and Alaslans, Gajuluas, *Pringgo Atmodjo 52\** (exp. van Daalen) (B, L); Go Lembuh, 1200 m, *van Steenis 9200\** (B). East Coast. Asahan: Bandar Pulau, *Yates 2030* (A, B, L); Porsea-Tutupan, Asahan-saddle, 1000—1100 m, *Lb'zing 9917\** (B); vicinity of Parsoburan, 900—1000 m, *Lörzing 7818\**, *7915\** (B, L); Bila, Aekburo, *Lörzing 9582* (B); vicinity of Rantauparapat, *Rahmat Si Torus 1594\**, *1863\**, *2255*, *3126\**, *4237*, *4263* (A); Bilak Pertama, *Rahmat Si Torus 340* (A, S); Marbau, *Rahmat Si Torus 218* (S); Masihi Forest Reserve, *Krukoff 4201* (A, L, S); vicinity of Huta Bagasan, local names kaju isar and kaju mia, *Rahmat Si Torus 6661* (A), *6876* (A, S); Huta Padang, *Krukoff 4366* (A, L, S); vicinity of Tomuan Dolok, local name kaju simur, *Rahmat Si Torus 9145*, *9939* (A); vicinity of Lumbanria, local name kaju marip-marip, *Rahmat Si Torus 7905*, *7956* (A, S), *7867* (S); Damuli, Kualu, *Rahmat Si Torus 1345* (A). Tapanuli. Tapanuli, *Yates 2535\** (A, B); Angkola, Tobing, *Junghuhn s.n.* (L); in regione montana Sipirok, *Junghuhn s.n.\** (type of *Viburnum sumatranum* Miq.) (U), in silvaticis planitie aliae Sipirok, 2700 ped., *Junghuhn s.n.* (type of *Viburnum sambueinum* var. *tomentosum*, Hallier f.) (L); Padangsidempuan, Mt. Manaun, *Rahmat Si Torus 4499*, *4599* (A); Simelungun, 1000 m, local name hatilandon, *Kerling s.n.\** (B); Simelungun, *Yates 1668\** (A, B, L). West Coast. Palembang, Lake Maninjau, 900 m, *Docters van Leeuwen 3948\** (B); Fort de Kock, *Yates 2524\** (A, B); Duku, *Korthals s.n.\** (L); Tandjonggedang, 900 m, *Jacobson 2208\** (B); Alahan Pandjang, 1500 m, *Ultee 118\** (B). Lampung. Near Hudjang, 3300 ft., *Forbes 1909\** (acc. to Moore l.e.).

### 8. *Viburnum hispidulum* Kern, *spec. nov.* — Fig. 5.

Arbor parva sempervirens. Petioli sparsim hispiduli, 2—6 cm longi. Lamina foliorum coriacea, opaca, in pagina superiore glabra vel interdum

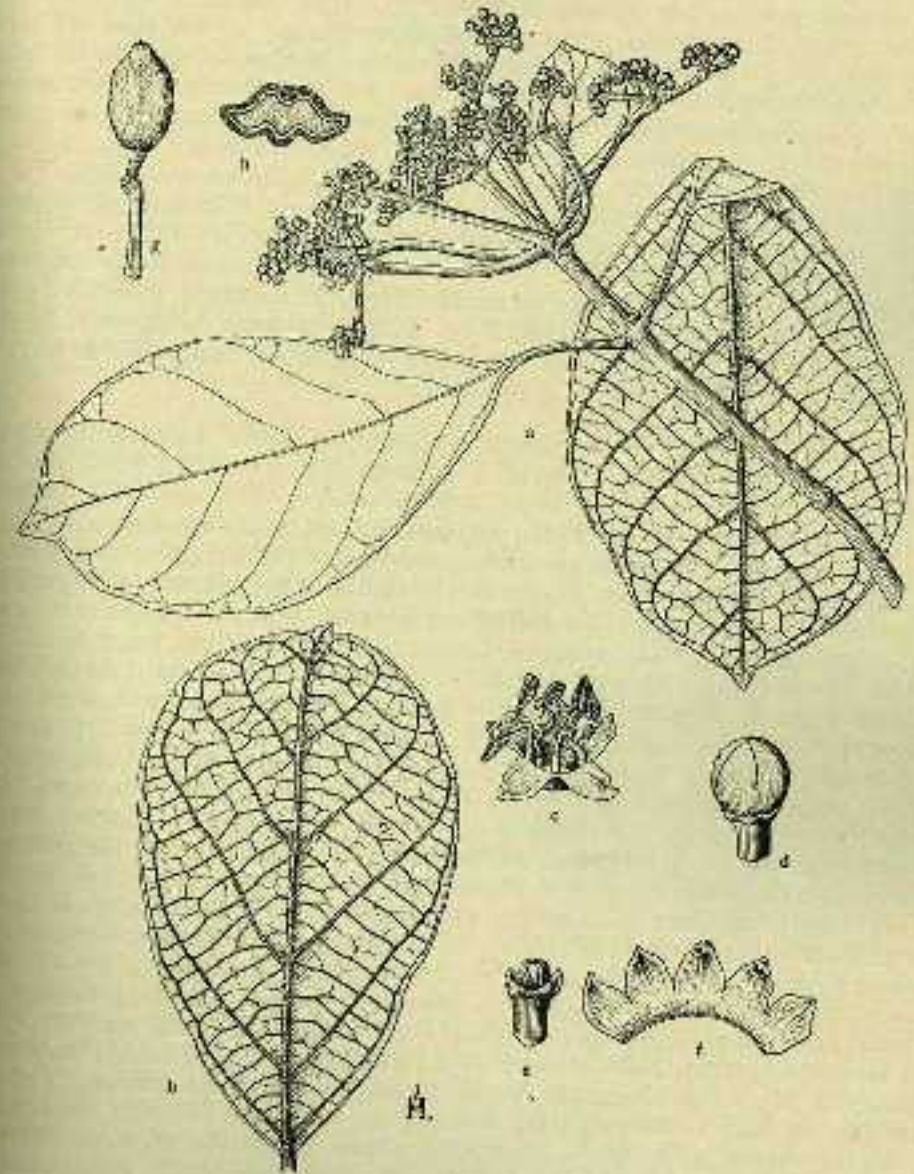


FIG. 5. *Viburnum hispidulum* Kern: a, twig flower-buds, 0.5 ×; b, leaf, under side, 0.5 ×; c, corolla, 8 ×; d, flower-bud, 3 ×; e, ovary, 8 ×; f, corolla displayed, 8 ×; g, fruit, 1.5 ×; h, cross-section through fruit, 2.5 ×. — After Clemens 31902 (1929).



in costa et nervis primariis hispidula, in pagina inferiore dense glanduloso-punctata et praesertim in costa et nervis primariis hispidula, in nervorum axillis glandulis carentia, elliptica, elliptico-oblonga vel obovata, 12—17 cm longa, 8—9 cm lata, apice abrupte breviter obtuseque acuminate, basi cuneata usque ad late cuneata, margine integra, nervis primariis utrimque 5—7, supra, indistinctis infra prominentibus, prope marginem sursum subcurvatis et arcuato-anastomosantibus, venis transversalibus prominentibus. Pedunculi crassi, usque ad 5 cm longi. Inflorescentia umbellato-corymbosa, 10—15 cm diametro. Bracteolae anguste ovatae usque lanceolatae, 4—6 mm longae. Alabastrum globosum. Corolla rotato-cupulata, tubo 1(—1.5) mm longo, lobis 2—2.5 mm longis. Stamina longe\* exserta, filamentis crassis aestivatione serpentiniformibus imo tubo insertis 9—10 mm longis. Drupa oblongo-elliptica vel leviter obovata, compressa, 9—10 (—11) mm longa, 6—7 mm lata, 4 mm crassa; endocarpium a dorso leviter bisulcatum, a ventre leviter trisulcatum.

Small, evergreen tree. Branchlets terete, pithy, warty-lenticellate, dark brown in dry state, nearly glabrous, only sparsely hispidulous at the nodes. Petioles longitudinally grooved above, very sparingly hispidulous, 2—6 cm long. Leaf-blades coriaceous, dull, glabrous above or occasionally somewhat hispidulous on the midrib and the primary side-nerves, hispidulous beneath, especially on the midrib and the primary side-nerves, punctulate, neither glandular pitted nor bearded in the nerve-axils, elliptic to elliptic-oblong or obovate, the larger ones 12—17 cm long, 8—9 cm wide, abruptly shortly and bluntly acuminate at the apex (the acumen up to 5 mm), cuneate to broadly cuneate at the base and somewhat decurrent on the petiole; margin entire; nervation indistinct above, prominent beneath; primary side-nerves 5—7 on each side of the midrib, at an angle of about 45° to it, slightly curved upward towards the margin and arcuately anastomosing near it, connected by distinct transverse veins (in the type-specimen the veins at right angles to the primary nerves, in the other examined specimens the angles more or less acute). Flowering branchlets leafy nearly up to the top, the actual peduncle therefore short or nearly lacking, stout, up to 5 cm long. Inflorescence terminal, with 1—2 small deciduous leaves at the base (always?), 3—4 times branched, umbellate, corymbiform, 10—15 cm across; primary rays 6—7, verticillate, stout, glabrous, (2—)3—6 cm long; bracteoles narrow-ovate to lanceolate, firm, gland-dotted, short-ciliate, 4—6 mm long. Calyx-limb cupulate, glabrous, obscurely lobed, 1 mm long. Corolla (creamy) white, globular in bud, rotate-cupulate when open; tube 1(—1.5) mm long, lobes ovate to oblong, rounded to somewhat acute, incrassate towards the top, 2—2.5 mm long. Stamens much exserted; filaments thick, serpentine in the flower-bud, inserted at the base of the corolla, glabrous, 9—10 mm long; anthers oblong, 2 mm long. Ovary cylindrical, lepidote, 1.5 mm long and thick; style short and thick, glabrous, 1.5 by 1.5 mm; stigma obscurely 3-lobed. Drupe dorsiventrally flattened, oblong-elliptic to slightly obovate, 9—10(—11) mm long, 6—7 mm wide, about 4 mm thick, of unknown

colour; endocarp shallowly 2-grooved on the dorsal side, shallowly 3-grooved on the ventral side.

TYPE. — Clemens 31902. (B).

*Viburnum hispidulum*, manifestly a distinct entity, differs from the following species mainly by its dull hispidulous leaves, the absence of glandular pits at the leaf-base, and the rotate-cupular corolla. See also p. 141—142.

SPECIMENS EXAMINED. — BORNEO. Colony of North Borneo. Mt. Kinabalu: Upper Kinataki R., at 7000 ft. altitude, tree, flowers cream-coloured, fl. and fr., Feb. 25, 1933, *Clemens 31902* (B, type; L); between Lumu and Kamburanga, near the cataract rock shelter, 7400 ft., tree 50 ft. high, diameter of bole breast high 6", flowers white, fl., June 9, 1932, *Clemens 30297* (B, L); "other side of ridge from falls," very steep hillside, 7000 ft., tree 80 ft. high, diameter of bole breast high 8", flowers white, fl. and fr., June 8, 1932, *Clemens 29702* (A, B, L).

#### 9. VIBURNUM VERNICOSUM Gibbs. — Fig. 6.

*Viburnum vernicosum* Gibbs in J. linn. Soc. (Bot.) 42: 86. 1914; Merrill, *Bibl. Enum. Born. PI.* 582. 1921.

Shrub or small tree, up to 10 m. Branchlets terete, greyish to reddish brown, lenticellate, glabrous; young parts very shining, vernicose. Petioles channelled along the upper side, glabrous, 1—3 cm long. Leaf-blades coriaceous, shining, eventually turning somewhat dull, glabrous, chiefly on the under side densely punctulate and gland-dotted, beneath with a distinct glandular pit at the base on both sides of the midrib and often smaller ones in the higher nerve-axils, elliptic to slightly obovate, the larger ones 12—18 cm long, 6—11 cm wide; base acute and somewhat decurrent on the petiole, apex shortly and abruptly acuminate (the acumen up to 1 cm long), margin entire; primary side-nerves 5—7 on each side of the midrib, at an angle of about 45° to it, curved upward towards the margin and anastomosing near it, somewhat impressed above, prominent beneath, connected by transverse veins. Flowering branchlets leafy nearly up to the top, the actual peduncle stout, up to 6 cm long. Inflorescence terminal, 3—4 times umbellately branched, corymbiform, up to 11 cm across; primary rays 5—7, up to 7 cm long, the secondary about 2 cm, the tertiary 1 cm; bracteoles oblong to lanceolate, 5—7 mm long, firm with membranous margins, gland-dotted, very soon caducous. Calyx-limb obscurely lobed. Corolla creamy white, gland-dotted on the outside, turbinate, obovoid in bud; tube 2.5—3 mm long, lobes erect, rounded, triangular, incrassate towards the top, 1.5—2 mm long. Stamens much exserted; filaments thick, serpentine in bud, inserted at the base of the corolla, glabrous, (8—)9—10 mm long; anthers oblong, about 2 mm long. Ovary cylindrical or slightly turbinate, lepidote, vernicose, 1—1.5 mm long. Fruit ovate, dorsiventrally compressed, purplish black, 10 mm long, 7—8 mm wide; endocarp undulate in cross-section, (often irregularly) 2-grooved on the dorsal side, 3-grooved on the ventral side, the lateral grooves often nearly absent.

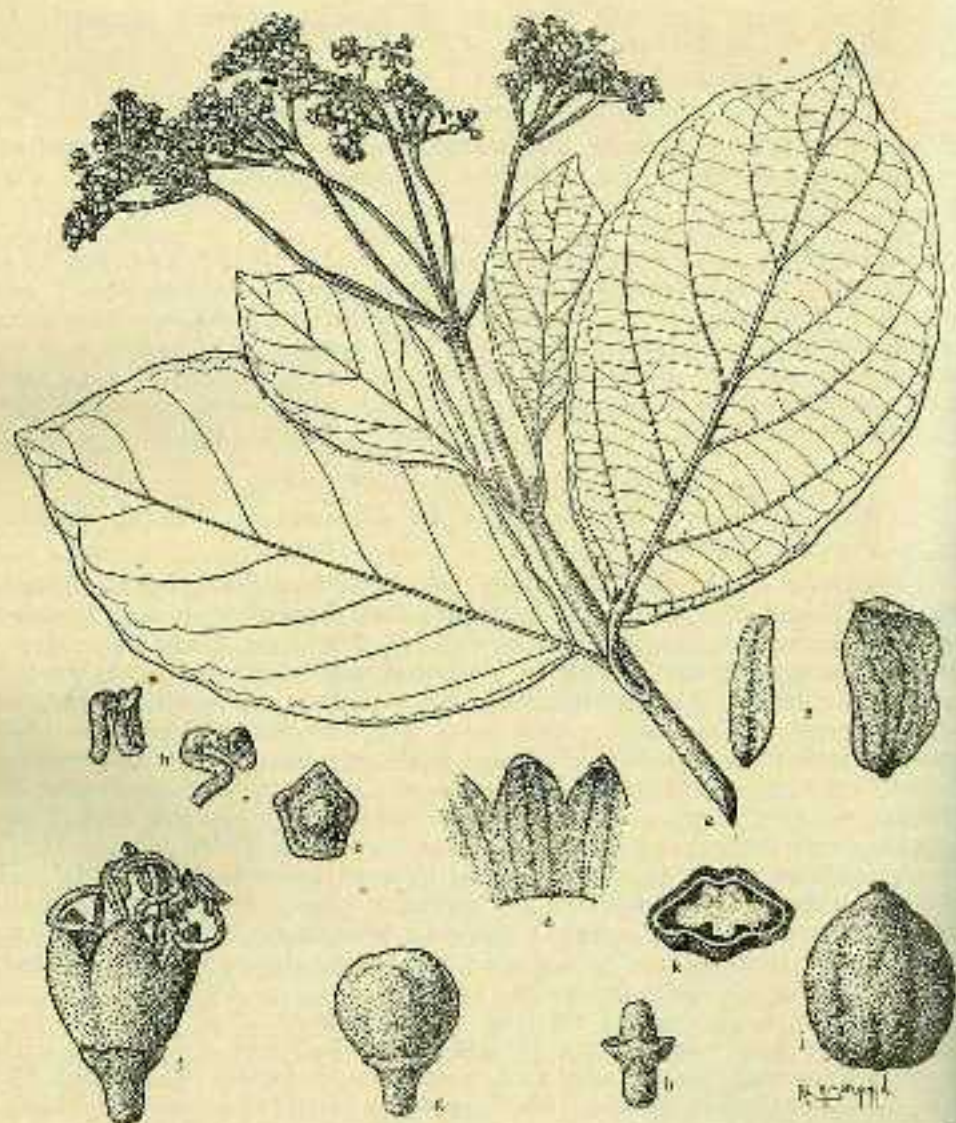


FIG. 6. *Viburnum vernicosum* Gibbs: *a*, flowering twig, 0.5 X; *b*, aestivation filaments, 5 X; *c*, calyx-limb, seen from above, 5 X; *d*, part of corolla, inside view, 5 X; *e*, bracteoles, 5 X; *f*, flower 5 X; *g*, flower-bud, 5 X; *h*, ovary, 5 X; *i*, fruit, 2.5 X; *k*, cross-section through fruit, 2.5 X. — After Clemens 30298.

SPECIMENS EXAMINED. — BORNEO. Colony of North Borneo. Mt. Kinabalu: above Kiau, in secondary forest, 3500 ft., fl. fr., Feb. 1910, *L. S. Gibbs* 3990 (type, in Herb. Brit. Mus., not seen); Dallas, Kinabalu-ridges, 3000 ft., fl. fr., Nov. 1931, *Clemens* 27033 (A, B, L); Tenompok, jungle, 5000 ft., fl. fr., Feb. 1932, *Clemens*

30298 (A, B, L), 5000 ft., fl. fr., Feb.—March 1932, *Clemens* 30298 (A, B, L, S); Penibukan, 4000—5000 ft., margin of landslide, jungle ridge, fr., Jan. 1933, *Clemens* 30767 (A, B, L); same locality and altitude, small tree in canon beyond N ridge, fl. fr., Jan. 1933, *Clemens* 30885 (A, B, L); Marai Parai, low jungle, 5000 ft., tree 25 ft., fr., March 1933, *Clemens* 32225 (B); same locality, ridge E of camp, 5500 ft., shrub 10 ft., fr., Apr. 1933, *Clemens* 32752 (B); Colombon river, 9000 ft., fl. fr., June 1933, *Clemens* 33761 (B, L); Marai Parai, edge of jungle near camp, 5000 ft., shrub 10 ft., fr., May 1933, *Clemens* 40166 (B), the same number in (A) is labelled: Penataran basin, 6000 ft., Aug. 1933). Central Borneo. Amai Ambit, young fr., 1893-1894, *Hallier* f. 3272 (B, L).

The extremely difficult group of Bornean *Viburnum* nos. 8—9 could be but provisionally worked out. The material was gathered mainly by J. & M. S. Clemens during the Kinabalu-expeditions of 1931, 1932, and 1933. A single number with very young fruits was collected by Hallier in 1893—1894. Also Gibbs 3990, the type-specimen of *Viburnum vernicosum*, collected in 1910, belongs to this group. I did not see this specimen. Because Miss Gibbs ascribed filaments of 2 cm in length to it, I at first believed it must be a very deviating species. The photographs, which I received through the kindness of Dr Taylor of the British Museum, however, convinced me, that Hallier 3272 and Clemens 27033, 28263, 30298 are identical with it. The above description was made only after these specimens. On purpose I did not include the other numbers mentioned below, because they constitute some fairly marked groups, which in future may possibly be segregated. For the present I confine myself to stating the differences.

Clemens 30885, 32225, 32752, and 40166 deviate on account of the thickly coriaceous, manifestly obovate, short-acuminate leaves (the acumen at most 3 mm long), but especially on account of the large, elliptic fruits, 12—14 mm long, 7—8 mm wide.

Clemens 30767 possesses broad-elliptic leaves, 14—16 cm long, 9—11 cm wide. Flowers are absent, but the texture of the leaves, the shape of the infructescence, the size of the fruits and the like, point to a close relationship with Clemens 30885, etc. The lower primary nerves arise at an angle of about 60°, the higher ones at an angle of about 45°. The upper surface of the leaves bears scattered, short, white, at the base scale-like dilated hairs; some of the latter along the midrib and the primary side-nerves are black.

Less deviating is Clemens 33761, striking on account of its large ovate fruits, 12 mm long, 10 mm wide.

Whether all these forms can be maintained under the polymorphous *Viburnum vernicosum* requires further scrutiny.

The thick, long projecting stamens of the group are characteristic. The filaments are twisted in the flower-bud; this aestivation points to a relationship with *Viburnum sambucinum*, with which the Bornean plants also rather coincide as to the shape of the leaf, corolla, fruit, etc. *Viburnum sambucinum* is easily distinguished by its pubescent ovary, the stellate-pubescent axes of the inflorescence, and its almost filiform filaments.

*Viburnum beccarii* of the Malay Peninsula and Sumatra also coincides in its habit with the species of this group. It can easily be distinguished by the tubular corolla, the nearly ellipsoid flower-buds, the shorter, not twisted filaments, the somewhat smaller fruits, and by the much less prominent primary side-nerves on the under side of the leaves. The glandular pits at the base of the leaves characterize both *Viburnum*, *beccarii* and *V. vernicosum*; they are absent in *V. hispidulum*; in *V. sambucinum* they are reduced to spotty glands.

#### 10. VIBURNUM LUTESCENS BL.

*Viburnum lutescens* Blume, Bijdr. 13: 655. 1826; De Candolle, Prodr. 4: 325. 1830; ?Hooker f. & Thomson in J. linn. Soc. (Bot.) 2: 176. 1858; Oersted in Vid. Meddel. Kjobenh. 1860: 298. 1861; Maximowicz, Mel. biol. 10: 651. 1880; Forbes & Hemsley in J. linn. Soc. (Bot.) 23: 353. 1888; Gamble in J. Asiat. Soc. Bengal 72: 114. 1903; Koorders, Exkursionsfl. Java 3: 286. 1912; Hallier f. in Meded. Rijks-Herb. No. 1: 15. 1911; No. 14: 37. 1912 (excl. syn. *Viburnum junghuhnii*); Koorders, Fl. Tjibodas 3 (2): 38. 1918; Merrill in J. Str. Br. roy. As. Soc. 86: 582. 1921; Ridley, Fl. Mai. Pen. 2: 2. 1923; Moore in J. of Bot. 62: Suppl.: 46. 1924; Hochreutiner in Candollea 5: 286. 1934; Von Malm in Fedde Repert. 34: 289. 1934; Corner, Wayside Trees Mai. 183. 1940.

*Viburnum monogynum* Blume, Bijdr. 13: 655. 1826.

f*Viburnum elegans* Junghuhn in Nat. Gen. Arch. 2: 36. 1845.

*Viburnum sundaicum* Miq., Fl. Ind. bat. 2: 121. 1858; Suppl.: 213, 537. 1860; Kurz in Natuurk. Tijdschr. Ned.-Ind. 27: 198. 1864; Koorders & Valetton, Bijdr. Booms. Java 5: 43. 1900; Ridley in J. Fed. Mai. St. Mus. 8: 44. 1917.

*Viburnum coriaceum* Blume sensu Koorders in Gedenkb. Junghuhn 191. 1910 pr. p.

*Viburnum colebrookiamim* Wallich sensu Danguy in Lecomte, Fl. gen. Indo-Ch. 3: 9. 1922.

Evergreen, crooked, sometimes sprawling shrub or small, vaguely branched tree, up to 10 m, usually much lower. Trunk terete, unknotted, unbuttressed; bark smooth, greyish; youngest parts thinly stellate-pubescent, glabrescent. Branchlets terete, lenticellate, glabrous. Petioles channelled above, thinly stellate-pubescent, glabrescent, 1—2 cm long. Leaf-blades thinly coriaceous, bright green above, pale green beneath, when dried dark brown above, yellowish brown beneath, glabrous on the upper side, thinly stellate-pubescent to almost glabrous on the under side, very variable in shape, broad-elliptic, ovate or oblong-elliptic, up to 18 cm long and 10

cm wide; apex short-acuminate, base nearly rounded to cuneate and somewhat decurrent on the petiole, margin in the upper 2/3 coarsely crenate-serrate to finely serrate, teeth shortly mucronate, the lower 1/3 entire or supercificially dentate; nervation indistinct above, rather prominent beneath; primary side-nerves 5—8 on each side of the midrib, arcuately ascending, evanescent and indistinctly anastomosing near the margin, connected by delicate veins. Inflorescence terminal (or sometimes spuriously lateral), paniculate, short-pyramidal, 3—4 times paniculately branched, 5—9 cm across, 5—7(—10) cm long, with stellate-pubescent, glabrescent axes; peduncle 4—10 cm long; primary branches 4—7, verticillate; bracts sometimes leafy, bracteoles minute, lanceolate, stellate-pubescent, 1 mm long. Flowers somewhat fragrant, 4—5 mm wide. Calyx-teeth ovate-triangular, glabrous or somewhat pubescent, green, 0.75 mm long. Corolla globular in bud, nearly rotate (only slightly campanulate) when open, creamy white, glabrous; tube 0.75—1 mm long, lobes ovate, rounded, 1.25—1.5 (sometimes almost 2) mm. Stamens somewhat exserted; filaments inserted near the base of the corolla, flattened, subulately tapering towards the top, in bud with inflexed top, white, 2—3 mm long; anthers elliptic, sordidly white, about 1 mm long. Ovary cylindrical, glabrous, 1—1.5 mm long; style short and thick, 1—1.5 mm long. Drupe oblong-ellipsoid, somewhat oblique, slightly compressed, turning from bright green through red to purplish-black, usually 7—10 mm long and 4—5 mm wide; endocarp undulate in cross-section, with 2 dorsal and 1 ventral groove.

**ECOLOGY.** — In primary and secondary forests, in brushwood, often common but scattered, usually between 500 and 1500 m altitude, rarely lower (lowest record 150 m) or higher (one record of 2400 m, from Mt. Patuha). Flowering and fruiting throughout the year.

**USES.** — Sometimes cultivated as a hedge-plant, easily multipliable by cuttings. Other uses not recorded; not fit for timber. The ripe fruits are readily eaten by birds.

**DISTRIBUTION.** — SE Asia. In Malaysia only in the western part, from the Malay Peninsula (here local) through the whole of Sumatra and Java up to Bali and Lombok. Also collected in Borneo a few times.

An extremely variable species, mainly as to the shape of the leaves and the size of the fruits. Authentic specimens of *Viburnum monogynum* Bl. in the Leiden Herbarium prove, that this is merely a form with superficially toothed leaves. Miquel (1856) distinguished three forms of *V. sundaicum*: *a. macrodon* Miq.: folia nisi omnia, saltem in eodem ramo plura grosse serrata, oblonga vel elliptica (*V. lutescens* Bl., s.s.); (*S. latifolia* Miq.: folia pleraque ovato- vel lato-elliptica<sup>1</sup>; *y. microdon* Miq.: folia oblonga vel elliptica, tenuiter serrulata vel superne saltem serrulata aut repanda vel in eodem ramo subintegerrima (*V. monogynum* Bl.)). He himself already stated, as well as Koorders & Valetton later on, that these forms are

<sup>1</sup> = *Viburnum lutescens* var. *latifolium* (Miq.) Hochr. in Candollea 5: 287. 1934.

connected by numerous intermediates. Although it is likely that in future *Viburnum lutescens* will be divided into various races, I do not believe that Miquel's forms are of any systematic value.

Very striking is the variability as to the size of the fruit. In Borneo, Hallier collected a specimen of a *Viburnum*, which I might consider to be *V. lutescens*, deviating however from the Javanese plants by its much larger, more flattened, broader fruits, 11—12 mm long, 7—8 mm wide. These large fruits I also found in some specimens from the Malay Peninsula (Henderson 11496, Henderson & Nur 11202, Ridley 13902), which also otherwise agree with Hallier's plant. The leaves are very minutely denticulate. However, also in Java and Sumatra plants occur with hardly denticulate leaves, but with typical fruits. Moreover, in Van Steenis 5923 from Atjeh I found fruits 11—12 mm in length but only 5 mm wide. Therefore I am not inclined for the present to segregate a variety with large fruits.

The question whether *Viburnum colebrookianum* Wall, from the Himalayan region should be united with the Malaysian *Viburnum lutescens* or not seems to be still open. Hooker f. and Thomson mention the Indian plant as *Viburnum lutescens* Bl., introducing *V. colebrookianum* as a synonym. Maximowicz, however, is of the opinion that *V. colebrookianum* differs from *V. lutescens* "corymbis subaphyllis axillaribus foliis fere a basi grandisue serratis et drupa duplo minore ovata." Clarke distinguished the two species as follows:

*V. colebrookianum*: corymbs on very short axillary branches, drupe ellipsoid, 1/5 by 1/6 in., seed hardly grooved;

*V. lutescens*: inflorescence terminal, berries • 1/3 in. long, narrowly obovoid-oblong, with deeply grooved seed.

Koorders & Valetton also treated *Viburnum colebrookianum* as a separate species: "foliis et inflorescentia valde similis sed ... endocarpium vix sulcatum, albumen aequabile."

I only saw a few incomplete specimens of Himalayan *Viburnum colebrookianum*. I could not find any differences with *V. lutescens* as to the flowers. As the leaves of the latter are very variable, those of the Himalayan plants are not particularly striking. However, the short-stalked pseudaxillary inflorescences are remarkable indeed, although they are not completely lacking in Malaysian *Viburnum lutescens*. The small fruits with their less grooved endocarps are always characteristic and for the time being I take *Viburnum colebrookianum* and *V. lutescens* to be two very closely allied species. Surely the specimens from Kwantung, Hainan, Tonkin and Indochina I saw (Lei 246, How 72981, 73407, Balansa 4422, Squires

184, Tsiang Ying 1940, Pételot 6294), all distributed as *V. colebrookianum* do not differ specifically from *V. lutescens*. It is also clear in my opinion, that the Indochinese plant, described by Danguy in the "Flore générale de l'Indochine" as *V. colebrookianum* is in reality *V. lutescens*. "Inflorescences terminales ... Fruit ovale-aigu, long de 6—8 mm ... noyau présentant un sillon sur la face ventrale, 2 sur la face dorsale", can only refer to this species. By the way it may be noted that the measurements of the flower given by Danguy (tube 1.5 mm, lobes 2.5 mm) and "ovaire légèrement pubescent," do not agree with any of the Indochinese specimens examined.

SPECIMENS EXAMINED. — MALAY PENINSULA. P a h a n g. Telom, Ridley 15902 (S); Ulu Telom, local name lahou, Jaamat 27270 (S); Fraser Hill, Henderson & Md. Nur 11202 (B, S), Henderson 11496 (B), Holttum 21615 (S); Ulu Sungei Lemoi, Jaamat 28114 (S). — SUMATRA. Without exact locality: Korthals s.n. (L). Atjeh. Takingeun, van Steenis 5923 (A, B). East Coast: Yates 1003 (A), 1197 (A, B); Bandarbaru, Lorzing AS66 (B), U7S2 (B, L, U); Sukaradja, Cramer 64, 65 (B). Tapanuli. Upper Angkola, Junghuhn s.n. (B, L); Lubu Radja, Junghuhn s.n. (L, U); near Tobing, vern. name lakkatang, Junghuhn 132 (L). West Coast. Mt. Talakmau, Biinnemeijer 828, 867 (B); Gombok Laras Talang, Biinnemeijer 5686 (B); Padang Pandjang, Schiffner 2624 (L); Mt. Kerintji, Biinnemeijer 8995 (B), 9059 (B, L, S), 9087, 9778 (€, L). Palembang. Mt. Dempo, Forbes 2254, 2530a (L), cf. Moore in J. of Bot. 62, Suppl.: 46. 1924; Lake Ranau, vern. name kaju nassi, de Voogd 9 (B, L), J531 (B, L, S); margin of Lake Ranau, Forbes 2094 (G, L); Mt. Pesagi, van Steenis 364-0 (B, L). Benkulen. Mt. Semingung, van Steenis 3965 (B, L, S). Lampung. W of Mt. Trang, Forbes 1526 (G, L); Penanggungan, Forbes 1629, 1662 (G, L); Hudjung, Forbes 1909 (L), cf. Moore in J. of Bot. 62: 46. 1924). — JAVA. Without exact locality: Blume s.n. (L), vern. name ki randja, Junghuhn 288, pi. ined. 76 (L), Horsfield s.n. (G), Korthals s.n. (L), Reinwardt s.n. (L), Waitz s.n. (L), Zollinger s.n. (G), Forbes 1023 (G). WEST. Without exact locality: Kuhl & Van Hasselt s.n. (L). B a n t e n. Forest-area Gunung Karang near Pandeglang, Koorders 1054 (B, L), Backer 7482 (B). D j a k a r t a. Purwakarta, Bakhuizen van den Brink 4271 (B); Gunung Sembung, Backer 12366 (B); Wanajasa, Backer 14109, 14300 (B), local name ki tahi (Sundanese), Bakhuizen, van den Brink tUS9, 4795, 4802 (B), Wisse 1205, 1226 (L). B o g o r. Bogor, Boerlage s.n. (L), Hallier s.n. (B), Bakhuizen van den Brink f. 1637 (B); Mt. Salak, local name ki laban, Koorders 24176 (B, L), Backer 9336 (B), local name ki apo, Blume s.n. (as *V. monogynum* Bl.) (L); N of Sindanglaja, Backer 21502 (B); Mt. Gede, vern. name ki burrum, "Houtsoorten" (= kinds of wood) 39 (L), local name ki tampang lalakina, "Houtsoorten" 646 (L); Tjibodas, Scheffer s.n. (B), local name ki kukuran, Koorders 1041 (B), 1044, 15579 (B, L), Arsin 19661 (B, L); local name ki kukuran, Kern 8058 (B), van Ooststroom 13905 (L), Bruggeman 586, 769 (B); Mt. Pangerango, Kern 7577 (B), van Ooststroom 12909 (L); Tjisarua, Kern 7543 (B), van Ooststroom 12740 (L); Perbawati, Mt. Gede, Holten s.n. (B); Mt. Beser, Winkel 212, 218 (B, L); Tjibeureum-Tjidadap, Bakhuizen van den Brink f. 2827 (U); Tjidadap, Backer 22953 (B, L), Bakhuizen van den Brink 463 (B), 1508, 1623, (B, L); Tjadasmalang near

Tiidadap *Winkel* 1578 (B, L, U), 1630 (B, L, S), local name ki rantja, *Winkel Hi* (B, L) • Tjampaka Gunung Karang, *Smith* 839 (B); Tjampaka, G. Beser *Buwalda* 3i7S (B) • Tjisoka near Tjidadap, *Winkel* 666, 1673 (B, L); Palabuanratu, *Koorders* 1066 (B) • D - forest-area Takoka near Tjiandjur, local name kibewok, *Koorders* 1037, 25794 (B, L); forest-area Tjigenteng, local names ki rantja, ki bewok, *Koorders* 26273 (B, D - Mt Patuha, *Blume s.n.* (L), *Backer* 12771 (B); Lembang (*coll*) (L). Pri-anga'n Without exact locality: *Junghuhn s.n.* (L), *Reinwardt s.n.* (L), *Warburg* 2988 (A) • Manglajang, "*Houtsoorten*" (= kinds of wood) 288 (U); *Tjimangliet, Bakhuizen van den Brink f.* 3120 (U); Bandung, Dago-fall, *van Steenis* 1625 (B); Dago *Koorders* 44315 (B), *Popta s.n.* (B); Bandung, *Damme s.n.* (B); Bandung, Kendeng Rantja Bolang, *Smith & Rant* 290, 295 (B, L); Riung Guneng, *Smith & Rant* 418 (B) • Gunung Palasari near Bandung, *Wisse* 1039 (L); Pengalengan, *Junghuhn sn* (B, L, U), local name lakkatang, "*Houtsoorten*" (= kinds of wood) 132 (L) *Teysma'n n s.n.* (L); Mt. Malabar, local name keketjehan, *Scheffer s.n.* (B), *Anderson s.n.* (G); Mt. Papandajan, *Korthals s.n.*, (L); from Mt. Papandajan to Mt Djaja Tegal pandjang, *van Steenis* 4885, 12626 (B); Mt. Guntur, *Koens* 76 (B); Garut vern name ki kukuran, *Burck s.n.* (B); Telagabodas, *Korthals s.n.* (L), vern. name'ki bewok, *Reinwardt s.n.* (L), *Hasskarl s.n.* (B), *Boerlage s.n.* (L), *Burck* 110 (B) *Koens* 310 (B), *Schiffner* 2625 (L), *Backer* 33030 (B); forest-area Pangentjongan-Telagabodas vern. name ki bewok (Sundanese), *Koorders* 1038 (B), 1050 (B, L), 13843 14158 (B), 26468 (A, B, L, U), 26818 (B, L, S); Mt. Tjikuraj, near Waspada, *Backer* 5395 (B); Mt. Sawal, above Tjikoneng, *Backer* 8443 (B, L); Lake Pendjalu, forest reservation Nusagede, *Koorders* 47945 (B, L); Mt. Tjikorang above Maleer, vern names mara, ki bewok (Sundanese), *Backer* 86fO (B); Bukit Djarian, *Wisse* 938 (B) Cheribon. Tjiratjas, *Blume s.n.* (L). CENTRE. Tegal. Bumidjawa, local name taj korres, *Koorders* 1039 (B). Banjumas. Mt. Tjendana near Madjenang, *Backer* 18661 (B); Mt. Slamet, near Baturaden, vern. name tjempangan (Javanese), *Backer* 320 (B); N of Purwokerto, *Backer* 133 (B); Sindang Panon estate near Purwokerto, vern. name kitahi, *Estate-manager s.n.* (B); Midangan mountains near Pringombo *Koorders* 1062 (B); Dieng, local name kaju gambir, *Junghuhn* 180 (L). Kedu Bati Kalangan, *Waitz s.n.* (L); Mt. Sundoro, *Koorders* 11278 (B); E Sundoro, local names tementilan, waru watu (Javanese), *honing* 225 (B); Tjandiroto, *Lör-ling* 172 (B) • Temanggung, local name tjere (Javanese), *Sumardjo Ja*2i75 (A, B, n- Ungaran' *Junghuhn s.n.* (L, U), *Koorders* 1057 (B), *Docters van Leeuwen s.n.* (B) • forest-area Telomojo, local name tjere (Javanese), *Koorders* 27669, 35899, 35900, 35901 (B), *van der Goot i* (B); Selapradja — Mt. Telomojo, *Docters van Leeuwen* 173 (B) • Mt Merapi (Andong), local name kutadang, *Junghuhn s.n.* (L), local name tjere, *Koorders* 36622 36642 (B). Semarang. Getasan near Salatiga, *Docters van Leeuwen* 1133 (B) Jogjakarta. Mt. Merapi, local name kututan (Javanese), *Zuidema Ja*2565 (A, B); above Kaliurang, *Brinkman* 428 (B). EAST. Madiun. Mt. Lawu, *Bmnendijk s.n.* (B), *Backer* 6705 (B), local name kututan, *Jacobson s.n..JB*); MI-Wilis, forest-area Ngebel, *Koorders* 23170, 29176 (B, L). Kediri. M. Kam, ffoordew 23874 (B, L). Pasuruan. Above Djunggo, *Altmann* U65 (B); Mt. Wehrang, *IlmZ* 258 (B); Djunggo above Puntan, *van Steenis* 2536 (B); Gebok Klakka, *Zollinaer* 2i96 (B); Mt. Tengger, *Buysman* 151 (U), local name djurang (Javanese), *S* 675 (B); Tosari, Kertanom, *Kobus* 173 (B); Mt. Semeru, Ranu Darungan, *ZzeenisnOS* (B); from Semeruram to Sendura, *van Steenis* 7327 (A, B, L); Mt Widodaren S of Mt. Semeru, *Backer* 360U (B); forest-area *Sumbatkilil, vern.*

name kendal sapi (Javanese), *Koorders* 23574 (B, L); Pudjon, *Ultee* 56 (B); Tokol, *Verhoef* 37 (B, L). Besuki. Ijang-plateau, *van Steenis* 10883 (A, B, S), 11957 (B); Sukasari, *Raap* 585 (L); forest-area Pantjur-Idjen, local name porkuporan, *Koorders* 1063, 12831, 1%407, 14896, 20527 (B), 28524 (B, L), 28525 (B, L, S, U), 32306, 32473 (B). —BORNEO. Without exact locality: *Korthals s.n.* (L). N. Borneo. Tambato, Tambunan, *Puasa Angian* 4019 (S). W. Borneo. Gunung Damus, *Hallier f.* 607 (B, L). — BALI. Mt. Abang, *van Steenis* 8066 (B); Agung, *de Voogd* 2170, (A, B, L), 2198 (B). — LOMBOK. Mt. Rindjani, *Zollinger s.n.* (B), *Elbert* 1620, 1750, 1807, 1853, 2136 (L), *Gruendler* 2261 (L), *de Voogd* 2699, 2710 (B)..

#### 11. VIBURNUM JUNGHUHNII Miq. — Fig. 7. "

*Viburnum junghuhnii* Miquel, Fl. Ind. bat. 2: 123. 1856; *Koorders & Valeton, Bijdr. Booms. Java* 5: 47. 1900; *Koorders, Exkursionsfl. Java* 3: 286. 1912.

*Viburnum lutescens* Blume *sensu* Hallier f. in *Med. Rijks-Herb. No.* 1: 15. 1911,

Subarborescent shrub or small, freely branching, crooked tree, up to 18 m. Bark greyish brown, lenticellate. Branchlets angular, glabrous. Petioles brown to reddish-brown, channelled above, somewhat stellately pubescent, glabrescent, 1.5—2.5(—4) cm long. Leaf-blades coriaceous, broad-elliptic, obovate-elliptic to nearly lanceolate, rounded or short-acuminate at the apex, more or less attenuate toward the base, slightly decurrent on the petiole, often somewhat inequilateral, somewhat revolute. in dry state, closely crenate-dentate with apiculate teeth, at first brownish, later on shining green above, paler beneath, glabrous, (4)—8—12.5 cm long, 3—8 cm wide; nervation impressed above, very prominent beneath; primary side-nerves 5—7 on each side of the midrib, arcuately ascending, anastomosing, connected by distinct transverse veins. Inflorescence terminal or pseudolateral on short 2-leaved branchlets, paniculate, short-pyramidal, up to 5 cm long and 8 cm wide; lower ramifications 3—5-nately whorled, upper ones alternate; peduncle 3—6 cm long, bracteoles small, lanceolate to ovate, up to 4 mm long, caducous. Flowers fully 5 mm wide, fragrant. Calyx-limb about 1 mm long, distinctly toothed; teeth ovate-triangular. Corolla creamy white, globular in bud, rotate-campanulate when open, glabrous; tube short, fully 1 mm long, lobes up to 2 mm, ovate, rounded. Stamens hardly exerted; filaments short and thick, flattened, in bud with inflexed top, the inferior part adnate to the corolla 0.5—1 mm, the free part 1.5—2 mm long; anthers elliptic, 1 mm long. Ovary cylindrical, glabrous, about 2 mm long. Drupe obovoid, 7—9 by 5—6 mm, compressed; endocarp slightly undulate in cross-section and with strongly incurved edges, the ventral side therefore deeply intruding, embracing a broad, bilobate cavity.

ECOLOGY. — In forests, obviously restricted to the higher mountain regions, from 2300 m upward.

The description of Miquel runs as follows:—

"Arboreum, ramuli tetragoni, (an juniores etiam?) glabri, petioli 1—fere 1% pollicares antice canaliculati, folia obverse oblonga usque lato-elliptica brevi-acuminata

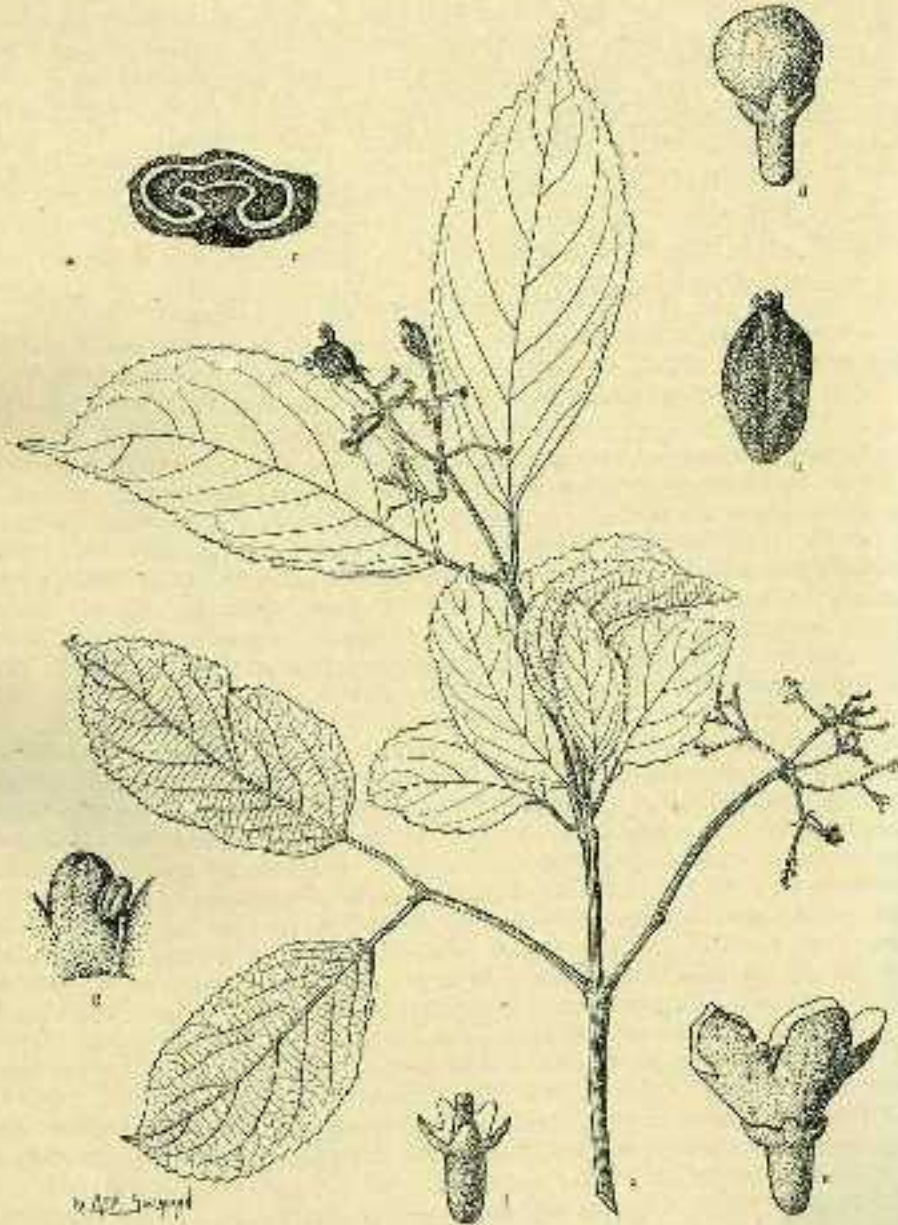


FIG. 7. *Viburnum junghuhnii* Miq.: a, fruiting twig, 0.5 ×; b, fruit, 2 ×; c, cross-section through fruit, 1 ×; d, flower-bud, 5 ×; e, flower 5 ×; f, ovary, 5 ×; g, ovary, 5 ×; h, part of corolla, inside view, 5 ×. — a-a, after Sugandiredja 115. d-g, after Lörzing 609.

vel obtusa, supra basin acutam vel subacutam vulgo inaequalem dense aequaliter grossiuscule serrata, coriacea, supra nitida, subtus pallida nunc glaberrima ad lentem minute verruculosa, costulis 6—7 adscendentibus demum transverse venosis pertensa, 4—1% poll, longa, thyrsi ramulos terminantes, ramis primariis 5—7 verticillatis superne subpaniculato-ramulosis, bracteae bracteolaeque lanceolatae, flores in ramulis ultimis sessiles subconferti, baccae obovoideae vel ellipticae angulato-compressae, dentibus calycis 5 ovatis concavis brevibus stigmatique subsessili coronatae".—Miquel (PL Ind. bat. 2: 123. 1856).

This description is rather insufficient for the identification of the plant. Up to the present little is known about *Viburnum junghuhnii*, undoubtedly a well-marked species. Koorders & Valetton in their "Bijdragen tot de kennis der boomsoorten op Java" (Contributions to the knowledge of the trees in Java) cite Miquel's description. They add that neither in the description nor in the authentic specimen of Junghuhn, in which flowers and fruits were said to be absent, could they find an essential difference with *Viburnum sundaicum* Miq. (= *V. lutescens* Bl.); only the leaves were small and the inflorescence quite glabrous; Junghuhn's plant originating from Mt. Dieng in Central Java had not yet been traced again in that locality. They suppose that it is not out of the question, that a few sterile specimens of *Viburnum*, collected in Central Java, may belong to this species ("or variety"). From what they say it is clear, that *Viburnum junghuhnii* must greatly resemble *Viburnum lutescens*. Miss G. J. A. Amshoff in her elaboration of the genus *Viburnum* in Backer's "Beknopte Flora van Java," (Nooduitgave, fam. 175: 4. 1945) has contributed much to the solution of the question. She has found a *Viburnum*, originating from West-Java, which might easily be confounded with *V. lutescens*. She takes it for *V. junghuhnii*, and I can wholly agree with her. She did not see the flowers, but in the fruits she has found a difference with *V. lutescens*, described as follows: "Endocarp nearly plane on the dorsal side, on the ventral side with a deep, in cross-section bilobate groove." Among the material of *Viburnum lutescens* in Herbarium Bogoriense I found some further specimens, fully answering to this description. Comparison with Junghuhn's type-specimen which does bear fruits, has convinced me of the correctness of Miss Amshoff's interpretation. The specimen Lörzing 609 bears one rather young inflorescence; as far as I can judge from the few flowers I could examine they also resemble those of *Viburnum lutescens*. They are somewhat larger than is usual in the latter, the ovary being about 2 mm long, the corolla 3 mm. The filaments are somewhat stouter, the anthers larger. Whereas in *Viburnum lutescens* the filaments are inserted near the base of the corolla, in *V. junghuhnii* they are distinctly adnate to the tube in the

lower 0.5—1 mm. The shape of the fruit is undoubtedly different from that of *V. luteseans*, not oblong, but shorter, obovate. Notwithstanding the different cross-section of the endocarp, *Viburnum junghuhnii* may be allied to *V. luteseans*, but on the other hand the affinity to the *Viburnum*s with incurved endocarp cannot be denied. The endocarp of *V. junghuhnii* is both undulate and incurved. The insertion of the filaments also seems to point to the latter relationship. The leaves of *Viburnum junghuhnii* are more coriaceous than those of *V. luteseans*, but this cannot easily be judged from dried material. The primary nerves are generally more prominent than in *V. luteseans*. The inflorescence is not quite glabrous; the axes are more or less stellate-pubescent, at least in a young stage.

Lorzing evidently saw the differences with *V. luteseans*. To his specimen 472 of *V. luteseans* he added: "Under no. 472 a branchlet, which is similar to this species. The find-spot has escaped my memory, although I am nearly sure, that it originates from more than 1700 m altitude, quite possibly from N Sundoro, about 2600 m. Vide no 609." Both 472<sup>a</sup> and 609 are indeed *V. junghuhnii*.

SPECIMENS EXAMINED. — SUMATRA. West Coast. Mt. Korintji, cloud forest, 2700 m, shrub, fruits red, fr., Aug. 1931, *Frey Wyssling 108* (B). — JAVA. WEST JAVA. Priangan. Talun Kulon, fr., April 1909, *Sugandiredja 118* (B, L). CENTRAL JAVA. Dieng, in silvis, 50—60 ped., nom. vern. per kottot, fr., Martio, *Junghuhn s.n.*, type (U, dupl. in L 899. 69. — 333); Dieng, *Vorderman s.n.* (B) (? , specimen very defect); Mt. Perahu, SE part of Perahu-ridge, in open forest, rather frequent, 2500 m, moist soil rich in humus, subarborescent shrub or small, much branched, crooked tree, about 5 m high, free flowering and fruiting, flowers fragrant (as in *Sambucis*), corolla rotate, cream-coloured; petioles and peduncles brown to reddish-brown, young leaves quite or partly brownish, local name wuru-watu (Javanese), fl. fr., Aug. 1912, *Lorzing 609* (B); Mt. Sundoro, 2600 m, fr., June 1912, *Lorzing U72a* (B) (see above). EAST JAVA. Kraksaan, Ijang reservation, near Tamankering, 2500—2600 m, fr., Sept. 1934, *Ja2993* (B, L); Lumajang, Mt. Tengger, near Ranu Pani, 2300 m, local name kidangan (Javanese), fr., Sept. 1933, *de Jong Ja2662* (B).

## 12. *Viburnum amplificatum* Kern, *spec. nov.* — Fig. 8.

*Viburnum* sp. Merrill in Univ. Cal. Publ. Bot. 15: 297. 1929.

Arbor humilis. Petioli glabri, 2—4 cm longi. Lamina foliorum subcoriacea, utrimque glabra, opaca, in sicco supra olivacea infra brunea, elliptico-oblonga vel leviter obovata, usque ad 26 cm longa, 12—14 cm lata, integra, basi cuneata vel subrotundata, apice abrupte breviter acuminata, in pagina inferiore in axillis nervorum glandulis carentia, nervis primariis utrimque 5—7 sursum curvatis supra indistinctis infra prominentibus, venis transversalibus distinctis. Infructescentia umbellata, corymbosa, plus minusve 13 cm diametro, radiis primariis 7—8 usque ad 4 cm longis. Drupa oblonga, valde compressa, utrimque distincte sul-

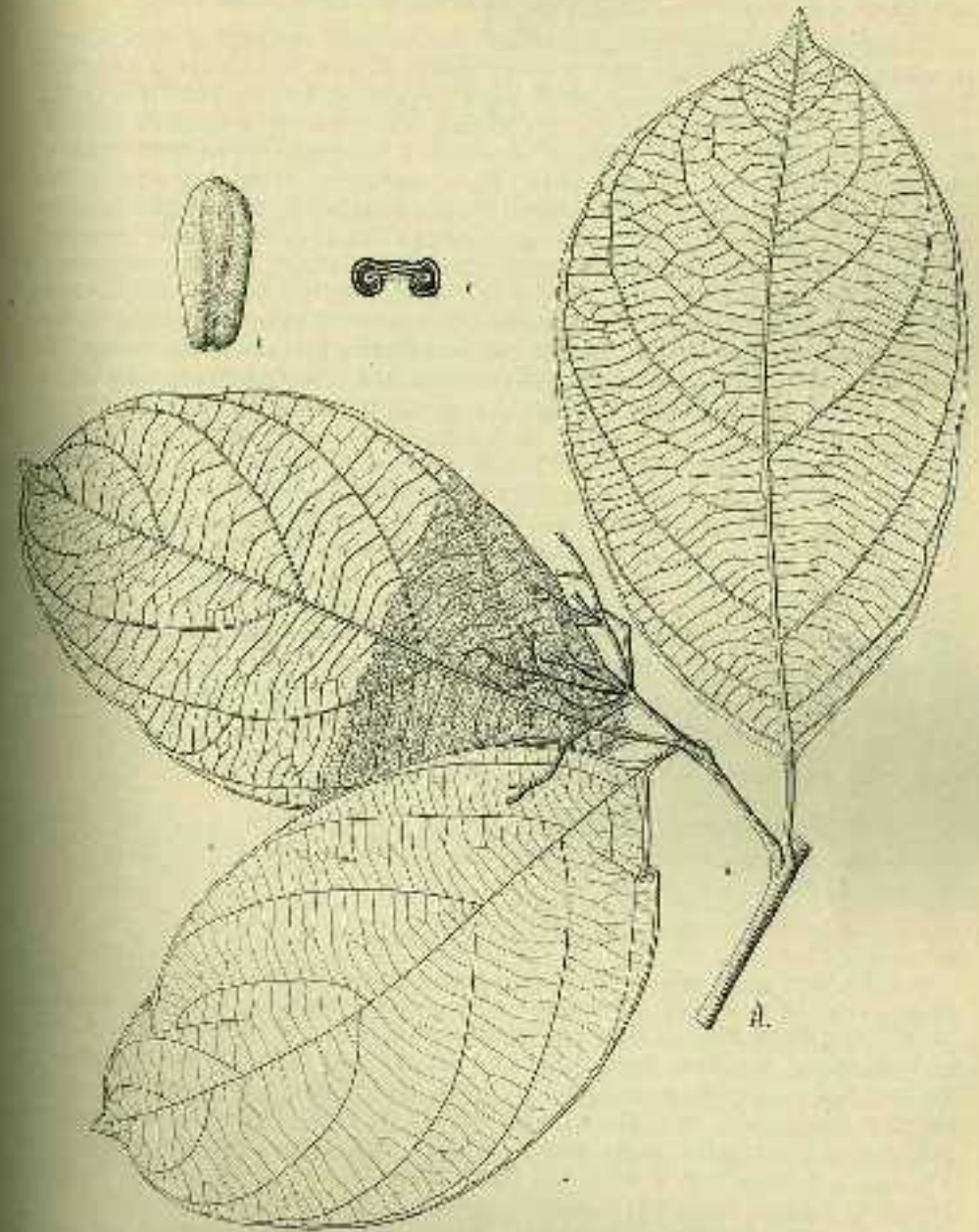


Fig. 8. *Viburnum amplificatum* Kern: a, twig, 0.5 X; b, fruit, 1.5 X; c, cross-section through fruit, 1.5 X. — After Elmer 21741 (type).

cata nigra 16 mm longa 7 mm lata; endocarpium incurvatum, a dorso late-sulcatum, a ventresulco lato profundo bilobato praeditum.

Coarse shrub-like tree. Branches horizontally spreading and mostly in whorls, branchlets greyish brown, nearly terete, lenticellate, glabrous. Leaf-blades thinly coriaceous, dull, dark olivaceous above, brown beneath, glabrous on both sides, neither glandular pitted at the base nor bearded in the nerve-axns, elliptic-oblong to slightly obovate, the larger ones up to 26 cm long 12-14 cm wide; apex abruptly short-acuminate (the acumen 0.5-1 cm long, rather blunt), base cuneate to somewhat rounded and slightly decurrent on the petiole, margin entire, sometimes remotely and obscurely undulate; nervation rather indistinct above, prominent beneath, primary side-nerves 5-7 on each side of the midrib, arising at an angle of 45-60° to it, curved upward toward the margin and anastomosing close by it, connected by distinct transverse veins. Inflorescence 3-4 times umbellately branched, corymbiform, about 13 cm in diameter, with nearly glabrous axes; peduncle stout, about 7 cm long, primary rays 7-8, up to 4 cm long. Drupe oblong, very slightly curved upwards, dorsiventrally much flattened, with a distinct groove on both sides, black, 16 mm long, 7 mm wide; endocarp with a broad shallow longitudinal groove on the dorsal side, the incurved edges forming a deep broad in cross-section bilobate furrow on the ventral side.

TYPE. — Elmer 21741 (G).

As there are only fruiting twigs available, the description must remain incomplete for the time being. The new species is readily recognizable by its large leaves and fruits and by the cross-section of the endocarp, reminding one of *Viburnum junghuhnii*. This type of endocarp I have not yet met with in other Bornean species of *Viburnum*.

#### SPECIES EXAM

Elphinstone province  
(G. type; L. S).

#### 13. VIBURNUM ODORATISSIMUM Ker

*Viburnum odoratissimum* Ker, Bot. Reg. 6: t. 456. 1820; De Candoles, Proc. 4: 320. 1830; Huetter & Thomson in J. Linn. Soc. (Bot.) 2: 172. 1858; Benthams, Fl. Hongkong 113. 1861; Miquel in Ann. Mus. Bot. Lugd. Bat. 2: 268. 1866; K. Koch in Wochenschr. Ver. Bot. Gartenb. Preuss. St. 10: 109. 1887; Clarke in Hooker in Fl. Brit. Ind. 3: 7. 1830; Maximowicz, Mém. biol. 10: 645, 649. 1880; Reiche in J. of Bot. 23: 213. 1885; Vidal, Rev. Plant. vascul. Filip. 147. 1886; Forbes & Hemsley in J. Linn. Soc. (Bot.) 23: 354. 1888; Koorders, Versl. bot. dienstr. Nederlandsch. 492. 1898; Matsumura & Hayata in J. Coll. Sci. Univ. Tokyo 22: 180. 1906; Merrill in Philip. J. Sci. 1, Suppl. 192. 1906; Bolander in Sargent, Trees and Shrubs 2: 107. 1908; Merrill in Philip. J. Sci. 5, Bot. 391. 1910; Hayata, Ic. Pl. Form. 2: 71. 1912; Haller in Medd. Rijks-Herb. No. 1: 15. 1911; No. 14: 37. 1912; Nakai in J. Coll. Sci. Univ. Tokyo 42: 55. 1921; Hancey in Linn. Soc. Fl. gén. Indo-Ch. 3: 5. 1822

Merrill, Enum. Philip. fl. Pl. 3: 577. 1923; Merrill in Lingnan Sci. J. 9: 44. 1930.—*Microtinus odoratissimus* (Ker) Oersted in Vid. Meddel. Kjobenh. 1860: 294. 1861.

*Viburnum hasseltii* Miquel, PL Ind. bat. 2: 123. 1856; Koorders & Valetton, Bijdr. Booms. Java 5: 46. 1900; Koorders, Exkursionsfl. Java 3: 286. 1912.

*Viburnum arboricolum* Hayata, Ic. PL form. 4: 12 t.l. 1914.

*Viburnum Uukiense* Nakai in 3. Coll. Sci. Univ. Tokyo 42: 22. 1921.

*Viburnum zambalense* Elmer, Leaf. Philip. Bot. 9: 3181. 1934.

Evergreen, crooked shrub or small tree, sometimes up to 20 m (Koorders). Branches and branchlets terete, greyish, densely warty-lenticellate, glabrous, only the youngest parts with a few stellate hairs. Petioles short, (0.5—) 1—2 cm, channelled above. Leaf-blades more or less coriaceous, dull or somewhat shining green above, paler beneath, smooth, upper side glabrous, under side also glabrous or with a few scattered stellate hairs and somewhat bearded in the nerve-axils, elliptic-oblong to oblong-lanceolate or obovate, 8—15 cm long, 3—7 cm wide; apex shortly and bluntly acuminate, rarely rounded or even emarginate, base gradually tapering into the petiole, margin in the upper half obsolete and widely, sometimes distinctly toothed or nearly entire, cartilaginous, somewhat revolute in dry state; nervation slightly impressed above, prominent beneath; primary side-nerves 5—7 on each side of the midrib, at an angle of about 60° to it, arcuately ascending, evanescent and indistinctly anastomosing near the margin, connected by delicate transverse veins. Inflorescence terminal, paniculate, more or less elongated pyramidal, 3 times paniculately branched, up to 10 cm long and wide, many-flowered, with slightly stellate-pubescent, glabrescent axes; peduncle 2—5 cm long; primary branches verticillate, divaricate, bracteoles linear-lanceolate, ciliate, 1—3 mm long. Flowers fragrant, 5—6 mm wide. Calyx-limb cupular, 1 mm long, with broad-triangular acute teeth, glabrous or sparsely ciliate. Corolla obovoid to ellipsoid-obovoid in bud, shortly funnelshaped-campanulate when open, creamy white, glabrous or sometimes with some stellate hairs on the outside, tube gradually widened towards the top, 2—3 mm long; limb horizontally spreading, finally reflexed, with broad-ovate, rounded, somewhat overlapping lobes, 2 mm long. Stamens exerted; filaments adnate to the throat of the corolla, flattened, in bud inflexed at the top, 2—3 mm long; anthers oblong, 1.5—1.75 mm long. Ovary at first cylindrical, later on somewhat fusiform, glabrous, 1.5—2 mm long. Fruit ovoid, 6—7 mm long, 4—5 mm wide, turning from green through red to purplish-black; endocarp dorsiventrally compressed and strongly incurved, in outline orbicular or angular in cross-section, the edges nearly touching, the ventral side strongly concave, embracing a cavity of 1.5—2 cm diameter. Seed strongly dorsiventrally compressed, falcate in cross-section, 1 mm thick.

ECOLOGY. — In primary forests, ravines, thickets, etc. Only in the higher mountain regions, from 1000 to 2000 m upwards. Flowering and fruiting throughout the year.

USE. — Not recorded.



DISTRIBUTION. — From Eastern India to Indo-China, Eastern China and Formosa, northward to Japan; in Malaysia in the Philippines (Luzon, Mindoro, Panay, Negros, Leyte, Mindanao) and in Celebes.

The above description only refers to the Malaysian material. In studying the specimens of *Viburnum odoratissimum* in Herbarium Bogoriense I was much surprised to see that the descriptions of most of the authors are not quite applicable to the Malaysian form. The main differences concern the shape and the dimensions of the corolla. Some of those descriptions I may cite here.

*Viburnum odoratissimum* has been described as a new species by Ker-Gawler, in 1820. According to him the corolla is rather fleshy, turbinate-rotate, white, caducous, turning yellow or buff as it fades, tube three times the length of the calyx or more, with an open dilated orifice, limb rather longer than the tube, revolutely reflexed in the end, segments rounded convex, the filaments adnate to the tube, divaricate, equal to

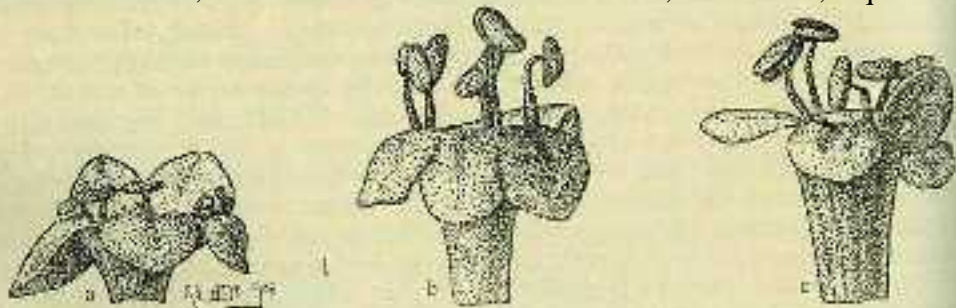


FIG. 9. *Viburnum odoratissimum* Ker-Gawl.: a, corolla of Chun 5216 (Hongkong); b, same of Elmer 16965 (Philippines); c, same of Maximowicz s.n. (Yokohama).

the limb, subulate, white, stiff, permanent. In De Candolle's "Prodromus" *Viburnum odoratissimum* is found under the heading "corollae rotatae aut vix subcampaniformis." Hooker f. & Thomson also say: "corolla parva, rotata." Oersted divided the genus *Viburnum* into five genera; concerning the corolla of his genus *Microtinus*, to which *Viburnum odoratissimum* is referred, he says: "corolla parva, rotata, quinquefido, lobis obtusis." I also draw attention to his description of the stamens: "stamina quinque immo tubo inserta." Danguy described the corolla as "blanche, rotacee, sub-campanulee, glabre, tube de 1,5 mm, lobes de 2,5 mm, obtus, etaes" and the filament as "long de 3—4 mm, inséré vers le milieu du tube de la corolle."

The corolla in at least the greater part of the Malaysian specimens, however, cannot be called rotate and hardly subcampanulate. The tube

being about 3 mm, somewhat widened upward, the lobes about 2 mm, spreading horizontally in full flower, finally reflexed, it is shortly salver-shaped rather than rotate-subcampanulate. The filaments are about 2 mm long, adnate to the throat of the corolla.

K. Koch distinguished two related species, *Viburnum odoratissimum* s.s. and *V. awabuki* K. Koch, the latter with "rundlichen, flach ausgebreiteten Abschnitten kiirzer als die Blumenröhre, während sie bei dem nahestehenden *V. odoratissimum* länger erscheinen." In spite of the assertions of Maximowicz and Rehder I was at first inclined to believe that the Malaysian plants are not conspecific with Ker's *Viburnum odoratissimum*, but that they might belong to *V. awabuki*. Maximowicz in his enumeration of the *Viburnum*-species of Eastern Asia, discussing the taxonomic value of the different organs, asserts: "Nee magis ad sectiones stabiliendas valet corollae forma, dum adsunt species flore absente nequaquam distinguendae, dum adest imo una (*V. odoratissimum*) ubi corolla variat subrotata et tubulosa." (*op. cit.*, p. 644). On page 50 he argues that the two species, distinguished by Koch, cannot be maintained, as the plant of Kiusiu seen by him is intermediate between the Nippon specimen with the tube twice as long as the limb, and the Lutschu specimen with the tube shorter than the limb. Rehder, in Sargent's "Trees and Shrubs," also ascribes to *Viburnum odoratissimum* a rotate or campanulate corolla. According to him the northern form, in which the tube of the corolla is longer than the limb, distinguished by K. Koch as *Viburnum awabuki*, is hardly well marked enough to deserve varietal rank.

No more than with actual *V. odoratissimum* do the Malaysian specimens agree with the Japanese plants, in which the tube of the corolla is still longer.

In Nakai's "Tentamen systematis Caprifoliacearum japonicarum," 1921, *Viburnum odoratissimum* s.l. is divided into three species, the new *V. liukiense* being intermediate between *V. odoratissimum* s.s. and *V. awabuki*. The differences given between *V. odoratissimum* and *V. liukiense* did not convince me that the latter should deserve specific rank. It is said to differ in its evanescent pith, the more persistent bracteoles, the more shining leaves, and the reddish branchlets and petioles; like *V. odoratissimum* it has a depressed conical inflorescence and a short tube of the corolla. I must confess my inability to decide whether the Malaysian plants are identical with *V. liukiense* or not. In my opinion even the leaves of the Chinese specimens I examined are more shining than those of the Malaysian ones. These seem to agree completely with *Viburnum arboricolum* Hayata. The flower represented in "Icones plantarum for-

mosanarum" (4: *t. 1 fig. 2.* 1914), is identical with that of the common Malaysian form; the description, too, could have been prepared after a Malaysian specimen: "corolla cylindrico-campanulata utraque glabra 5 mm longa, tubo 3 mm longo totiusque lato, lobis late cordato-rotundatis 2 mm longis totiusque latis apice rotundatis basi cordatis, partibus cordatis imbricatis margine integris vel obscure crenulatis." In comparing *V. arboricolum* with *V. odoratissimum* Hayata mentions only the darker green lusterless leaves. It is curious that Nakai, on the contrary, ascribes dull leaves to *V. odoratissimum*. Indeed he cites *V. arboricolum* as a synonym of *V. odoratissimum*, this, however, in spite of the fact that the tube of the corolla is longer than the limb. On his "Tabula distributionis" (*op. cit.*, p. 121), the Philippine plant is also considered by Nakai as *Viburnum odoratissimum*.

Elmer described his number 22336 from Mt. Pinatubo, Luzon, as a new species, *Viburnum zambalense*. It is not clear whether he regards all Philippine 'odoratissimum' as belonging to his new species or only those with entire leaves. At any rate it is impossible to separate Elmer 22336 specifically from the other Philippine specimens. His description of the flower is correct, probably except for the statement "up to 8 mm in length," for I never saw such large flowers in any Philippine specimen and the flowers of Elmer's type-specimen do not deviate from the common form. The shape of the leaves is extremely variable. Instructive in this respect is for instance Ramos & Edano 40460, with clearly toothed and entire, long- and short-acuminate, rounded and somewhat emarginate, obovate and elliptic-lanceolate leaves in one specimen.

Chinese *Viburnum odoratissimum* has indeed a more rotate-campanulate corolla, the tube being about 1.5 mm, the spreading lobes about 2 mm long. Yet the difference with the Malaysian and Formosan plants in this respect is not so great as it seems to be, for there are Philippine specimens, although rare, with the tube equal to the limb. In the Chinese form too the filaments are adnate to the throat of the corolla.

Summarizing I am of opinion that the separation of *Viburnum liukiuense*, *V. arboricolum*, and *V. zambalense* has not contributed to the solution of the difficulties in this group. For the present I regard them as belonging to the polymorphous species *Viburnum odoratissimum*. The continental plants can perhaps be segregated on account of the length of the tube of the corolla and the indument, but then the insular ones undoubtedly still contain several races, which may be recognized only by a comparative study of extensive material from the whole area.

SPECIMENS EXAMINED. — JAVA. WEST JAVA. Mt. Pangerango<sup>1</sup>, Kuhl & Van Hasselt s.n. (type of *Viburnum hasseltii* Miq.) (L). — CELEBES. Porema, Kjellberg 2673 (B). Manado. Mt. Klabat, local name makijau, Koorders 16358, 16359, 16360 (B), 16361, 16363, 16364, 16365 (B, L), Steup bbl8094 (B), bbl8101 (B, L); from Kakaskassen to summit of Mt. Lokon, local name kupai dano, Koorders 16357 (B); summit of Mt. Lokon, local name pakawai kokkok randang, Koorders 16362 (B, L); Soputau-mountains, local name makanden intjuntung, Koorders 16356 (B, L). Celebes. Enrekang, valley S of Masimbollong, Eyma 997 (B). — PHILIPPINES. LUZON. Ifugao. Mt. Polis, McGregor B.S. 19854 (A, B, G, S). Cagayan. Mt. Dos Cuernos, Ramos B.S.77042 (S). Abra: Darling F.B.14602 (L); Massiasat, Mt. Portoc, Alcasid 1595 (B). Lepanto: Com. fl. for. Fil. 1491 (L); Mt. Sinapsapan, Ramos & Edano B.S. 40460, 40465 (A). Bontoe: Vanoverbergh 191 (G, L); Bauco, Vanoverbergh B.S.3993 (A); Mt. Caua, Ramos & Edano B.S.37991 (A, B), 38024 (A, G), 38053 (A, L). Benguet: Barnes F.B.933, 938 (B, S), Darling 14441 (B, L), Curran, F.B.I 08 41 (B), Leano F.B.21837 (G); Rio Trinidad, Ramos B.S.15558 (B); Baguio, Elmer 5879, 5920 (B), 8415, 8696 (A, B, L), Merritt F.B.J4151 (B), Sandkuhl B-S.61 (A), Mearns B.S.2520 (S), Williams 1042 (G); Mt. Tonglon, Merritt F.B.14169 (L); Mt. Pulog, Curran-Merritt-Zschokke F.B.18205 (L); Pauai, Mearns B.S.4410 (L), Clemens B.S.9153 (A), Santos B.S.31772 (S); Sablang, Fenix B.S.469 (IT). Nueva Vizcaya. Vicinity of Dupax, McGregor B.S.11194 (L). Nueva Eeija: Alvarez F.B.22440 (L). Pampanga. Camp Stotsenburg (Mt. Pinatubo), Elmer 22195 (B, G, L, S), 22336 (type of *Viburnum zambalense* Elm.) (B, G, L, S). Batan. Lamao River, Mt. Mariveles, Ahern's collector, F.B.1512 (B, S). Rizal: Loher B.S.14209 (B), Ramos B.S.1957 (B, G, L, S); Balacbac, Loher B.S.13023 (B), 13041 (A); Bantol, Loher B.S.14145 (A); Bosoboso, Ramos B.S.2097 (B); Mt. Canumay, Ramos B.S.13771 (L); Mt. Lumutan, Ramos B.S. 42145 (S); Montalban, Loher B.S.12961, 13177 (A). Laguna: Sulit students F.B.31083, 31422 (S); Mt. Banajao, Ocampo B.S.27941 (S). Tayabas-Lucban, Elmer 7898, 9201, 9231 (A, B, L). Camarines: Ramos B.S.1559 (B, L, S); Mt. Bagacay, Ramos & Edano B.S.33856 (S). Sorsogon: Ramos B.S. 23409 (A, B, G, L), 23433 (A, B, G, L, S); Irosin (Mt. Bulusan), Elmer 14371, 16965 (A, B, G, L, U). — MINDORO. Mt. Calavite, Ramos B.S.39489 (A); Pinamala-yan, Ramos B.S.41007 (A, B, S). — PANAY. Mt. Macosolon, Ramos & Edano B.S.30786 (S). — NEGROS. Du. maguete (Cuernos Mts.), Elmer 9968 (A, B, L). — LEYTE: Wenzel 620 (A, G); Mt. Abucayan, Edano B.S.41772 (A, B, L, S), 41802 (A). — MINDANAO. Suidnon. Mahilucot River, Ramos & Edano B.S.38662 (A, S); Mt. Candoon, Ramos & Edano B.S.S8902 (A, S). Davao. Todayo (Mt. Apo), Elmer 11441 (A, B, (?), L,

#### 14. *Viburnum clemensae* Kern, *spec. nov.* — Fig. 10.

Arbor humilis sempervirens. Petioli glabri, 1—2.5 cm longi. Lamina foliorum coriacea, opaca, in sicco supra olivacea, infra luteo- vel bruneo-viridia, utrimque glabra, sub lente minute papilloso-rugulosa, in axillis nervorum primariis secundariisque glandulas gerentia, elliptica, oblongo-elliptica vel leviter obovata, 9—11.5 cm longa, 3.5—5.5 cm lata, apice abrupte breviter acuminata usque subcaudata interdum rotundata, basi

Presumably a misstatement. The plant has never been traced again in West Java. See Amshoff (Caprifoliaceae, p. 3 in Backer, Bekn. flora Java, Nooduitg.) and also Hallier (*in Med. Rijks-Herb. No. 1: 15. 1911; No. 12: 37. 1912.*)



FIG. 10

cuneata, margine integra, nervis primariis utrimque 4—5 supra indistinctis infra prominentibus arcuato-ascendentibus prope marginem evanescentibus et anastomosantibus, venis indistinctis. Infructescentia subsessilis 4—8 cm longa, paniculata, bis terve ramosa. Drupa ellipsoidea vel oblongo-obovoidea, haud compressa, 1 cm longa 6—7 mm diametro, nitida, calycis dentibus triangularibus 0.75 mm longis et stylo late conico 1 mm longo coronata; endocarpium valde incurvatum, dorso sectione transversa orbiculato, marginibus inter se attingentibus, ventre cristam internam longitudinalem 2—2.5 mm latam superne vix dilatam formante.

Small, evergreen tree. Branchlets crooked, terete, hardly lenticellate, glabrous, with greyish brown, cracking bark. Petioles channelled above, glabrous, 1—2.5 cm long. Leaf-blades coriaceous, dull, in dry state olivaceous above, yellowish or brownish green beneath, glabrous on both sides, minutely papillose-rugulose all over (under a magnifying glass), glandular-pitted at the under side both in the axils of the primary and secondary side-nerves, elliptic to oblong-lanceolate or slightly obovate, 9—11.5 cm long, 3.5—5.5 cm wide, often inequilateral and somewhat falcate; apex abruptly short-acuminate to nearly caudate, rarely rounded, base cuneate and slightly decurrent on the petiole, margin entire, cartilaginous, somewhat revolute in dry state; midrib and primary side-nerves rather indistinct above, prominent beneath, the latter ones arcuately ascending, evanescent and arcuately anastomosing near the margin, 4—5 on each side of the midrib; veins indistinct. Inflorescence terminal, nearly sessile, small, 4(—8) cm long, paniculate, 2—3 times paniculately branched, the lowest branches ternately whorled, the middle ones opposite, the upper ones alternate; bracteoles minute, lanceolate, caducous, leaving ciliate scars. Flowers unknown. Drupe ellipsoid or oblong-obovoid, not compressed, 1 cm long, 6—7 mm across, shining, the persistent calyx-teeth triangular, 0.75 mm long, the persistent style thickly conical, 1 mm, with 3-lobed stigma; mesocarp thin, scanty fleshy; endocarp strongly incurved, the dorsal side orbicular in cross-section, the edges touching, the ventral side folded to an internal longitudinal crest, which is usually 2—2.5 mm broad and slightly widened at the upper margin, here embracing a cavity of about 0.5 mm diameter. Seed dorsiventrally compressed, reniform in cross-section, 2 mm thick.

TYPE.—Clemens 29978 (A).

Although the flowers are wanting in the available specimens, it seems to be clear that the species is related to *Viburnum odoratissimum*, from which it is easily distinguishable by the minutely rugulose leaves, the indistinct venation of the leaves, the smaller number of primary side-

## EXPLANATION OF FIGURE 10

FIG. 10. *Viburnum clemensae* Kern: a, twig, 0.5 X; b, leaf, under side, 0.5 X; c, part of same, showing glandular pits; d, leaf, 0.5 X; e, fruit, somewhat enlarged; f, cross-section through fruit, 1.5 X. — a, e, f, after Clemens 29978, b, c, after Clemens 29466, d, after Clemens 31500.

nerves, but mainly by the size of the fruit and the quite different cross-section of the endocarp.

SPECIMENS EXAMINED. — BORNEO. Colony of North Borneo. Mt. Kina-baluh: tree, fruit red, August 3, 1937, J. A. Grisooold Jr. 96; Tenompok, 5000 ft., flower-buds green, fruit light green, May 2, 1932, *Clemens* 29466; same locality, fruit pink, turning red, May 3, 1932, *Clemens* 30356; same locality, fruit red, June 9, 1932, *Clemens* 29978; Penibukan, 4000—5000 ft., ridge W of camp, flower-buds creamy, tree 25 ft., Feb. 7, 1933, *Clemens* 31500 (all A).

#### 15. VIBURNUM PROPINQUUM Hemsl.

*Viburnum propinquum* Hemsley in J. linn. Soc. (Bot.) 23: 355. 1888; Rehder in Sargent, Trees and Shrubs 2: 33, 133 pi. 115. 1908; Rehder in PL Wils. 2: 111. 1911; Hayata, Ic. Plant, form. 4: 14 pi. 3. 1914; Nakai in J. Coll. Sci. Univ. Tokyo 42 (2): 48. 1921; Merrill, Enum. Philip, fl. Pl. 3: 578. 1923.

*Viburnum valerianicum* Elmer, Leaf. Philip. Bot. 7: 2578. 1915. — *Viburnum foetidum* Elmer in sched., non Wallich.

Evergreen shrub. Branchlets curved, terete, greyish to reddish brown, strongly lenticellate. Petioles channelled above, glabrous, 1—2 cm long. Leaf-blades thinly coriaceous, shining green above, paler beneath, drying dull brown, glabrous on both sides except for the bearded axils of the primary side-nerves at the under side, ovate to ovate-lanceolate, often somewhat falcate, 6—8(—11) cm long, 2.5—4(—5.5) cm wide; apex acute to long-acuminate, base cuneate to broadly cuneate, margin on both sides 1/2 -1 (—2) cm above the base with an impressed small gland (sometimes 2 marginal glands on one side), usually nearly entire, only minutely and remotely serrulate, the teeth reduced to mucros hardly 0.5 mm long; nervation impressed above, prominent beneath, basal primary side-nerves arising somewhat above the base of the blade at an angle of about 30° to the midrib, arcuately ascending, evanescent at 1/2 — 2/3 of the length of the blade, nearly as prominent as the midrib (leaves therefore triple-nerved), the more apical 2—3 pairs of primary side-nerves less prominent, at an angle of 45—60°; all side-nerves anastomosing near the margin; veins subparallel, nearly rectangulate to the midrib, delicate, connected by a wide reticulate venulation. Inflorescence terminal, corymbiform, 3 times umbellately branched, (3—)5—7 cm across, the axes glabrous; peduncle short, 2(—5) cm long, angular, glabrous; primary rays  $b^{\wedge}i$ , 1—2 cm long; bracts and bracteoles minute, ovate, ciliate, caducous. Calyx-limb about 1 mm long, obscurely lobed, lobes ovate, obtuse, glabrous, about 0.5 mm. Corolla whitish oder yellowish green, 4 mm wide, campanulate-rotate, globular in bud; tube broad, scarcely 1 mm long, hairy within, lobes ovate to oblong, rounded, recurved in anthesis, about 1.5 mm long. Stamens exserted; filaments adnate near the base of the corolla flattened, gradually tapering toward the apex, in bud inflexed at the top 2—2.5 mm long; anthers broadly elliptic, 0.75 by 0.5 mm. ovary 0.75—1 mm long and wide, glabrous; style very short, broadly conical, stigma obscurely 3-lobed. Drupe globose-ovoid, bluish black, 4—5 mm

long, 4 mm wide; mesocarp thin, scanty fleshy; endocarp thin, nearly orbicular in cross-section, ventrally slightly 1-grooved. Seed ovoid, shallowly 1-grooved on the ventral side; albumen deeply ruminant.

ECOLOGY. — According to Merrill in mossy forest, at an altitude of 2200 to 2450 m.

DISTRIBUTION. — China (Hupeh), Formosa. In Malaysia only in the Philippines (Luzon).

The triple-nerved leaf with marginal glands (reminding one of those in *Facmimm*-species), the hairy tube of the corolla, the achenoid drupe and the peculiar cross-section of the endocarp characterize this species and separate it from the other Malaysian species of *Viburnum*. Elmer mentions in connection with his *Viburnum valerianicum* that the strong odour, especially in cured specimens, is that of *Valeriana*. The same fact was already stated by Hallier in dried specimens of *Viburnum sambucinum*, *V. coriaceum* and *V. lutescens*. Van Ittalie ascertained the presence of valerianic acid in *Viburnum sambucinum*. On this ground Hallier supposed the close relationship of *Viburnum* with the *Valerianaceae* (see Hallier in Med. Rijks-Herb. No. 14: 36. 1912; No. 37: 92. 1918).

SPECIMENS EXAMINED. — PHILIPPINES. LUZON. Benguet. Baguio, fl., March 1907, *Elmer* 8591, 8811 (A, B, L); fl., March 1913, *Elmer* 14264 (A, B, G, L, U) (type of *Viburnum valerianicum* Elm.); Mancayan to Baguio, fr., Oct. 1921, *Ramos & Edaño* B.S.40499 (A, B, L); Pauai, fl., Apr.-June 1918, *Santos* B.S.31908 (A, B, L); B.S.31973 (A). Rizal. Mt. Angilog, young fr., Apr. 1922 *Ramos* B.S.40788 (A); Mt. Irig, fl., Apr. 1923, *Ramos* B.S.42195 (B, S).

#### 16. VIBURNUM LUZONICUM Rolfe

*Viburnum luzonicum* Rolfe in J. linn. Soc. (Bot.) 21: 310. 1884; Vidal, Phan. Cum. Philip. 117, 1885; Rev. pi. vase. Filip. 147. 1886; Rehder in Sargent, Trees and Shrubs 2: 97 pi. 14-6. 1908; Merrill in Philip. J. Sci. 5, Bot.: 391. 1910; Hayata, Ic. Plant, form. 2: 70. 1912; Danguy in Lecomte, Fl. gén. Indo-Ch. 3: 13. 1922; Merrill, Enum. Phil. fl. Pl. 3: 577. 1923.

*Viburnum laxum* Elmer, Leaf. Philip. Bot. 7: 2576. 1915.

*Viburnum formosanum* Hayata, Ic. Plant, form. 2: 69. 1912; Nakai in J. Coll. Univ. Tokyo 42 (2): 49. 1921.

*Viburnum morrisonense* Hayata, Ic. Plant, form. 2: 70. 1912; 9: 43 / . 21. 1920.

*Viburnum mushaense* Hayata, Ic. Plant, form. 8: 34. 1919.

*Viburnum subglabrum* Hayata, Ic. Plant. Form. 8: 35. 1919.

*Viburnum tadhasense* Hayata, Ic. Plant- form. 9: 45 / . 22. 1920.

Shrub, slenderly branched from below the middle upward, 3—6 m high. Stem 6—8 cm thick. Bark smooth and shining or somewhat rough, greyish or brownish. Branchlets terete, sparingly lenticellate, the ultimate ramifications more or less (often densely) ferruginous-pubescent. Petioles thin and short, slightly channelled above, densely pubescent, 0.5—1 cm long. Leaf-blades extremely variable, chartaceous to subcoriaceous,

dark yellowish green above, paler beneath, the young 'ones usually densely pubescent with simple antrorse and stellate hairs most abundant on the nerves, later on more or less glabrescent to glabrous except for the persistent pubescence of the midrib and the cilia of the margin, 3—8(—13) cm long, 2—5 cm wide, ovate to lanceolate; apex acute to gradually long acuminate (the acumen often falcate); base broadly cuneate to rounded or even slightly cordate and often inequilateral; margin nearly entire to coarsely sinuate-dentate in the upper part; nervation impressed above, prominent beneath, often hidden by the indument; primary side-nerves 5—7 on each side of the midrib, very obliquely ascending, usually terminating in the teeth, lower ones (in the nearly entire leaves almost all) however anastomosing; venation evident if not hidden by the indument. Inflorescences terminal, not rarely also spuriously lateral on short 2-leaved branchlets, umbellate, corymbiform to semi-globose, 2—3 times branched, 3—5 cm across, the axes densely ferruginous pubescent; peduncle very short, up to 2 cm long; primary rays 3—8, slender, 1(—1.5) cm long; bracts sometimes leafy, up to 2 cm long, usually like the bracteoles small, lanceolate, pubescent and ciliate, 1—2 mm long. Flowers slightly odorous, 3—5 mm wide. Calyx hardly 1 mm long, deeply lobed, the lobes ovate-lanceolate, pubescent. Corolla rotate, globular in bud, creamy white or somewhat pink, more or less strigose and stellate-pubescent without, especially toward the base, glabrous within; tube very short, about 0.5 mm long, lobes elliptic-oblong, rounded, 1.5—2 mm long. Stamens exerted, but shorter than the corolla-lobes; filaments subterete, slightly dilated toward the base, adnate to the base of the corolla, 1.5 to nearly 2 mm long, glabrous; anthers broadly elliptic, yellow, 0.5—0.75 mm long. Ovary cylindrical, densely pubescent, about 1 mm long.; style very short, glabrous, with obscurely 3-lobed stigma. Drupe ovate, dorsiventrally much compressed, red (or ripening black?), (5—)6—7 mm long, 5—6 mm wide, young with scattered stellate hairs; endocarp slightly undulate in cross-section, the 2 dorsal and 3 ventral grooves often obsolete.

ECOLOGY. — In thickets and forests, at medium and higher altitudes, from 800 to 2200 m. Flowering and fruiting throughout the year.

DISTRIBUTION. — From Western China and Indo-China through Formosa and the Philippines to the Moluccas.

LOCAL NAMES. — In Luzon according to Merrill: atalba, tilba (Ig.); atiba (Bon.); bangas-bangas (Bag.); bagiroro (Bik.); putud (Gad.).

*Viburnum luzonicum* var. APOENSE Elmer.

*Viburnum luzonicum* var. *apoense* Elmer, Leafl. Philip. Bot. 7: 2577. 1915; Merrill, Enum, Philip, fl. Pl. 3: 577. 1923.

Leaves subcoriaceous, nearly glabrous except for the midrib on both sides, narrow, ovate-lanceolate, the apex long-acuminate, the acumen often falcate, the margin nearly entire, only obscurely dentate; primary side-nerves often anastomosing.

DISTRIBUTION. — Luzon?, Mindanao.

LOCAL NAMES. — According to Merrill: angganasi (Buk.), atadatud (Buk.), bangas-bangas (Bag.).

*Viburnum luzonicum* var. *floribundum* (Merr.) Kern, *comb. nov.*

*Viburnum floribundum* Merrill in Philip. J. Sci., Bot. 4: 328. 1909; Enum. Philip, fl. Pl. 3: 577. 1923 (basinym).

Leaves chartaceous, nearly glabrous except for the midrib and the primary side-nerves, ovate, the apex acute to shortly acuminate, the margin rather strongly dentate, especially in the upper half, the primary nerves for the greater part terminating in the teeth.

DISTRIBUTION. — Luzon.

*Viburnum luzonicum* var. *sinuatum* (Merr.) Kern, *comb. nov.*

*Viburnum sinuatum*, Merrill in Gov. Lab. Publ. 35: 65- 1906; in Philip. J. Sci. 1, Suppl.: 137. 1906; Enum. Philip, fl. Pl. 3: 578. 1923 (basinym).

Leaves oblong-ovate, the apex slenderly acuminate, the acumen usually falcate, the margin coarsely sinuate-dentate; otherwise as in var. *floribundum*.

DISTRIBUTION. — Moluccas (Buru); Philippines (Luzon, Negros).

LOCAL NAME. — According to Merrill: taringongog (Neg.).

The variability of *Viburnum luzonicum* has led to the distinction of several segregate taxa, viz. *Viburnum sinuatum* Merr., *V. laxum* Elmer, *V. floribundum* Merr., *V. luzonicum* var. *apoense* Elmer, and moreover a few species and varieties from Formosa. They are all based on the shape of the leaf and the density of the indument only. As Merrill already did in his Enumeration, I think *Viburnum laxum* differs too little from typical *V. luzonicum* to constitute a marked variety even. According to Elmer the leaves are more or less tapering at the base with the greatest width across the middle, not below the middle as in Cuming 1345, the specimen upon which Rolfe founded his *Viburnum luzonicum*.

*Viburnum floribundum* is said to be distinguishable by its nearly glabrous leaves, which are less acuminate, more strongly toothed, rounded and inequilateral at the base, as well as by its dense inflorescence. Although the leaves of Ramos & Edaiio 38087 are indeed much more glabrous than in the type of *Viburnum luzonicum*, I cannot agree that the midrib is only slightly puberulent and the inflorescence strikingly dense. Inequilateral leaves occur in all forms of *Viburnum luzonicum* in the present sense.

*Viburnum sinuatum* agrees almost completely with *Viburnum floribundum*, except for the shape of the leaves, which are long-acuminate and still-more strongly toothed. I could not find clear differences either in the flower or in the fruit.

*Viburnum luzonicum* var. *apoense* on the contrary has narrower, hardly toothed leaves. Those of most of the specimens collected in Mindanao are rather striking. They are subcoriaceous; whereas in *Viburnum floribundum* and in *V. sinuatum* the primary nerves are nearly straight and end in the teeth, those of the variety *apoense* from Mindanao are strongly curved upward near the margin and rather distinctly anastomosing, but this is completely due to the absence of the toothing of the leaves. Several specimens have both nerves reaching the margin and nerves distinctly anastomosing. The specimens collected in Luzon which are identified by Elmer as var. *apoense*, do indeed possess almost entire leaves, but they are not subcoriaceous and the nerves end in the small teeth. Though in doubt I have therefore referred them to this variety. On the other hand I might refer Ramos & Edaio 38921, mentioned in the Enumeration under var. *apoense*, to var. *sinuatum* on account of the strongly toothed leaves.

At the utmost I might regard '*apoense*,' '*floribundum*,' and '*sinuatum*' as varieties, but they are far from being well marked and after deducting of these varieties the remaining specimens show still a great polymorphism. Some of them might just as well have been reduced to one of the varieties.

As to how far the several forms of *Viburnum formosanum* distinguished by Nakai and the species of Hayata correspond with the above-mentioned varieties must await further investigation.

SPECIMENS EXAMINED. — PHILIPPINES. LUZON. Bontoc: *Vanoverbergh* 154 (G, L). Benguet: *Barnes* F.B.942 (B, S), *Ramos* B.S.5829 (L), *Merrill* 742 (U), *Merrill* B.S.1753 (B, G, L, S), *Quisumbing & Sulit* B.S.82510 (A); Baguio, *Curran* F-B.4938 (S), F.B.5082 (B), *Elmer* 5831 (B), 8655 (A, B, L), 14283 {type of *Viburnum laxum* Elmer} (A, B, G, L, U), *Santos* B.S.24 (A); Mt. Pulog, *Curran-Merritt-Zschokke* F.B.18164 (B, L); Daklan to Kabayan, *Merrill* B.S.M08 (B, L). Rizal: *Loher* B.S.14353, B.S.14837 (A). Camarines. Mt. Iriga, *Com. Fl. For. Fil.* 504 (L). Albay. Without exact locality: *Cuming* 1345 (type-collection; L); Mayon Volcano, *Ramos & Edaio* B.S.75734 (S). PALAWAN. Mt. Mantalingajan, *Edaio* B.S.77527 (S).

a. *V. luzonicum* var. *apoense*.

PHILIPPINES. LUZON. Pampanga. Camp Stotsenburg (Mt. Pinatubo), *Elmer* 21974 (B, G, L, S). Camarines. Mt. Iriga, *Ramos* B.S.22182 (B, L, S). MINDANAO. Camp Keithley, Lake Lando, *Clemens* 89, s.n. (B). Lanao. Vicinity of Dansalan, bank of Agus river, *Lynn Zwickey* 65 (A); Mt. Makaturing, local name langanassi (Lan.), *Lynn Zwickey* 517 (A). Bukidnon. Vicinity of Tanculan, *Fenix* B.S.26084 (A) f Mt. Dumalucpihan, *Ramos & Edaio* B.S.38963 (A). Cotabato. Buayan, *Ramos & Edaio* B.S.85161 (A); Mt. Matutum, *Ramos & Edaio* B.S.85035 (A). Davao. Todaya (Mt. Apo), *Elmer* 10791 (type) (A, B, G, L).

b. *V. luzonicum* var. *floribundum*.

PHILIPPINES. LUZON. Bontoc. Mt. Caua, *Ramos & Edaio* B.S.38087 (A). Benguet. Pauai, *Santos* B.S.31705 (A, B, G). Pampanga. Camp Stotsenburg (Mt. Pinatubo), *Elmer* 21949 (B, G, L, S); Mt. Afayat, *Merrill* 3837 (L).

The type-specimen *Ramos* B.S.7074 from Luzon, prov. Abra, Mt. Paraga, Feb. 1909 not seen.

c. *V. luzonicum* var. *sinuatum*.

MOLUCCAS. BURU. Fakal, *Toxopeus* 467 (B, L). PHILIPPINES. LUZON. Ilocos Norte. Mt. Nagapatan, *Ramos* B.S.33191 (A). Nueva Ecija. ? Mt. Umingan, *Ramos & Edaio* B.S.26454 (A). Batan. Mt. Mariveles, *Meyer* F.B.2618 (B), *Merrill* 789 (U), 3946 (L), NEGROS. Dumaguete (Cuernos Mts.), *Elmer* 9538, 10363 (A, B, L). MINDANAO. Bukidnon. Mt. Candon, *Ramos & Edaio* B.S.38921 (A, L).

#### SPECIES WRONGLY RECORDED FOR THE AREA

##### *Viburnum zippelii* Miq.

In his "Flora Indiae batavae" (2: 122. 1856) Miquel described a species of *Viburnum* under the name of *V. zippelii*. As locality he indicated "Nieuw-Guinea? (Herb. Zippel)." The description was made after a fruiting specimen: "Plores non vidi. Affine videtur *Vib. acuminato* Wall, nee a *V. sambucino* longe distat, sed illius folia integerrima, hujus inflorescentia basi bifoliata, foliaque multo minus coriacea, nee punctata." The type is in the Rijksherbarium at Leiden (no. 899.69—594). Obviously Miquel compared his new species with *V. acuminatum* on account of the densely punctulate under side of the leaves, the resemblance apart from that not being great. Even slighter is the similarity to *V. sambucinum*. For a long time I was unable to place it among the other Malayan species of the genus and I was inclined to agree with Hallier who remarked, (*in* Med- Rijks-Herb. No. 14: 36. 1912), that it was a strongly characterized species and for that reason possibly a representative of the genus in New Guinea, whence for the rest *Viburnum* is unknown. Possibly, for the accompanying label is not written in Zippelius's own hand, but it is a printed one and Blume already placed a ? after "Nieuw-Guinea." Zippelius participated in an expedition to the coasts of SW New Guinea in 1828. He died on the way back and his valuable collections have been worked out by others. Later on *V. zippelii* has never been collected in Malaysia (*cf.* also Scheffer *in* Ann. Jard. bot. Buitenz. 1: 28. 1876).

I was much astonished when I accidentally came across a specimen of a Japanese *Viburnum* in Herbarium Bogoriense, collected as a species of *Cornus* by Em. Weiss (no. 50) near Nagasaki, Japan. The plant was

identified in 1943 by Hatusima as *V. japonicum* (Thunb.) Spr. and is evidently identical with Miquel's *V. zippelii*. Although I have no further specimens of *V. japonicum* at my disposal I am convinced that the determination of Hatusima is right, in testing it with the description of Nakai {in J. Coll. Sci. Imp. Univ. Tokyo 42: (2) : 30. 1921) and others. The identity will be already evident from the comparison of Miquel's description with that of Nakai. The spotty glands at the base of the under side of the leaves, mentioned by Miquel, also occur in the examined specimen of *T. japonicum*.

*Viburnum japonicum* is only known from Kiusiu and Hondo and it is quite improbable, if not impossible, that Zippelius's plant originates from New Guinea. In my opinion it must be a Japanese specimen or it must have been gathered in the Bogor Botanic Gardens, where Zippelius was employed since 1825 as Assistant Curator. It is very likely that the species was cultivated at Bogor, although I could not find it mentioned in the catalogues of the Gardens. In "Annales d'horticulture et de botanique" (2: 97. 1859), Van Hall described a "*Viburnum m. acrophyllum* Thunb.," obviously belonging to *V. japonicum*, "reçu par l'intermédiaire de M. Teysman, le célèbre jardinier en chef du jardin botanique de Buitenzorg." It is curious that Miquel in "Prolusio florae japonicae" {in Ann. Mus. Lugd. Bat. 2: 268. 1868) published this plant as *V. buergeri* Miq.!

In reading the diagnosis of *Cornus japonica* in Thunberg's "Flora japonica" (63. 1784) one is struck by the following passages: "Filamenta 4... Germen superum." Sprengel (Systema 1: 934. 1825) nevertheless referred it to *Viburnum*, whereas De Candolle (Prodr. 4: 273. 1830) still treated it as a "*Cornus*?" I base the identity of Thunberg's *Cornus japonica* with the plant in question only on Maximowicz's assertion in "Mélanges biologiques" (10: 664. 1880): "Genus ex sola descriptione optime enucleavit d. Sprengel."

#### EXCLUDED SPECIES

##### *Viburnum alternifolium* Zoll. & Mor.

*Viburnum alternifolium* Zoll. & Mor., Syst. Verz. 59. 1845—1846 = *Ilex alternifolia* (Zoll. et Mor.) Loesener in Nov. Acta Leop. Car. 78: 81. 1901.

This is according to Koorders (Exkursionsfl. Java 2: 521. 1912) and Backer (Bekn. Flora Java, Nooduitg. 6, fam. 132: 3. 1948) a form of the polymorphous *Ilex cymosa* Bl.

#### INDEX OF COLLECTOR NUMBERS

Referring to the species by means of their number

Names beginning with De or Van have been entered under the prefix, compound names under the first part.

Ahern's collector 1512=13; Alcasid 1595=13; Altmann 258, 465=10; 472=7; Alvarez 22440=13; Anderson s.n.=10; Arens & Wurth s.n.=1; Arsin 19529=7; 19661=10.

Backer 133, 320 = 10; 509 = 1; 1703, 1887, 2265 = 7; 3604 = 10; 5129=1; 5395, 6705 = 10; 6823 = 1; 7482, 8443, 8670 = 10; 9303 = 7; 9336=10; 9651, 9800=1; 9960, 10040, 10404, 10617, 11130 = 7; 11394 = 1; 12213 = 7; 12366, 12771, 14109, 14300 = 10; 16304, 17248=7; 18661, 21502=10; 21794 = 1; 22953 = 10; 23235, 25730 = 7; 26100=1; 33030 = 10; 37089, 37092, 37506, 37685 = 1; s.n.=7; Backer & Skottsberg 37313, 37314 = 1; Bakhuisen van den Brink 463, 1508, 1623=10; 2098, 2525=7; 4271, 4639, 4795, 4802=10; 6132=7; Bakhuisen van den Brink fil. 1637=10; 2726=7; 2827, 3120 = 10; Balansa 4422=10 (p. 144) ; Bangham 825=6; 928, 948=1a; 1164 = 2; Barnes 933, 938=13; 942 = 16; Batten Pool s.n.=2; bb. numbers, see Forest Research Institute; Beccari 194, 345 = 2; Belle s.n. = 7; Beumee A362 = 7; A810 = 1; Binnendijk s.n.=7, 10; Bloembergen 4081, 4095=7; Blume s.n.=1, 7, 10; Boerlage s.n.=7, 10; Bosbouwproef station = Forest Research Institute; Bremekamp s.n.=1; Brinkman 379 = 1; 428=10; 884c=1; Bruggeman 536 = 1; 586, 769=10; 3730=1; Bunnemeijer 828, 867 = 10; 882, 4989=1; 5686, 8995, 9059, 9087 = 10; 9410, 9456, 9613=1; 9730=2; 9778=10; 10027, 10145, 10213, 10553 = 1; 11647, 11700, 11814 = 7; Burck 110 = 10; s.n.=1, 7, 10; Burck & De Monchy s.n. = 7; Burkill 40=1; 387 = 7; 16312 = 1a; Burkill & Haniff 12992=7; Burkill & Henderson 6810 = 7; Burkill & Holtum 7779 = 7; 8631 = 2; Buwalda 3473 = 10; Buysman 151 = 10.

Cantley's collector 2913=7; Clason K90, K102=1; Clason-Laarrnan 154, E72, E76, G49, K198 = 1; Clemens 89=16a; 3153 = 13; 27033, 28263 = 9; 29466=14; 29702 = 8; 29978 = 14; 30297=8; 30298=9; 30356=14; 30767, 30885=9; 31500=14; 31902 = 8; 32225, 32752, 33761, 40166=9; s.n.=16a; Com. Fl. For. Fil. 504=16; 1491=13; Corner 31594=7; Cramer 64, 65 = 10; Cuming 1345=16; Curran 4938, 5082=16; 10841=13; Curran-Merritt-Zschokke 18164=16; 18205=13; Curtis 278, 2453, s.n.=7.

Damme s.n.=10; Darling 14441, 14602 = 13; De Jong, see For. Res. Inst., Ja2657, 2662; De Monchy s.n.=1; see also Burck & De Monchy; Den Berger 789=1; Derry s.n. = 7; De Voogd 9 = 10; 14 = 7; 678 = 1; 1506=7; 1531 = 10; 1664=7; 1937=1; 2159 = 7; 2170 = 10; 2197=1; 2198 = 10; 2303=1; 2699, 2710 = 10; 2759, 2800 = 1; s.n.=7; De Vriese & Teysmann s.n.=7; Djaduk 943=1; Docters van Leeuwen 173=10; 1068 = 7; 1133 = 10; 2903=7; 3948 = 7b; 8959, 12278 = 1; 12813=2; 12846, 12898 = 1; s.n.=10; Dorgelo 120, 417=1.

Edafio 41772, 41802=13; 77527=16; see also Ramos & Edafio; Flbert 15, 16, IV, 18, 969, 1008, 1405, 1475=1; 1620, 1750, 1807, 1853, 2136=10; 2165 = 1; see also Gründler; Elmer 5831 = 16; 5879, 5920, 7898, 8415=13; 8591=15; 8655=16; 8B96 = 13; 8811=15; 9201, 9231=13; 9538=16c; 9968=13; 10363 = 16c; 10791=16a; 11441 = 13; 14284 = 15; 14283=16; 14371, 16965=13; 21741 = 12; 21949 = 16bj 21974=16a; 22195, 22336=13; Estate-manager Sindang Panon s.n. = 10; Eyma 997=13; 3762=7.

Fenix 469=13; 26084=16a; Field Museum collector s.n.=7; Forbes 410, 537a, 865=7; 954=1; 1023, 1526, 1629, 1662, 1662a, 1909 = 10; 1909a=7b; 2094, 2254, 2530a

=10; 2568=2; 3587, 3589=7; 3872=1; 4089=7; Forest Research Inst. bbl4130=7; bb 18094, bbl8101=13; Ja1396=7; Ja2475, Ja2565=10; Ja2657=1; Ja2662=11; Ja2846, Ja2853=1; Ja2993=11; s.n.=7, 10; Fox s.n.=7; Frey Wyssling 108=11.

Gibbs 3990=9; Griswold 96=14; Groenhart 3=1; Gruendler (Elbert exp.) 2261 =10; 2322=1; 3455, 3488, 4161, 4176, 4306=7.

Hagedoorn & Jeswiet s.n.=1; Hallier 42, 500, 500a, 500b=7; 501, 534=1; 607=10; 2279=7; 3272=9; s.n.=7, 10; Hamel 443=1a; Hamel & Rahmat Si Torus 639=1a; Hancock 1987=7; Haniff 278=7; see also Burkill & Haniff; Harreveld-Lako 69=1; Hasskarl s.n.=10; Haviland 82, 197, 1054, 3019=7; Henderson 11484=2; 11496=10; 11555, 17984, 23490, 23617=7; see also Burkill & Henderson; Henderson & Nur 11176=2; 11202=10; 11252=7; Holten s.n.=10; Holtum 21615=10; s.n.=7a; see also Burkill & Holtum; Horsfield s.n.=1, 10; Hose 60=7; Hosseus 250=7b (p. 134); "Houtsoorten" (=kinds of wood) 39, 132=10; 241=7; 288=10; 501=1; 646=10; How 72981, 73407=10 (p. 144); Huitema 75=7; 111=1.

Ibut 521=7.

Ja- numbers, see Forest Research Institute; Jaamat 27270=10; 27555=7; 28114 =10; 28151=7; Jacobson 2208=7b; s.n.=1, 10; Jeswiet 55=1; s.n.=1; see also Hagedoorn & Jeswiet; Junghuhn pi. ined. 37, 38, 39, 40, 42=7; 43=1; 76=10; 100=7b; 132, 180=10; 283=7; 288=10; s.n.=1, 7, 7b, 10, 11.

Kalong 20260=7; Keers 86=1; Kerling s.n.=7b; Kern 7543, 7577=10; 7798=1; 7989=7; 8056=10; 8085=7; 8312, 8319=1; Kerr 6222, 8874, 9829=6 (p. 129); Kiah, see Moysey & Kiah and Symington & Kiah; Kiah & Strugnell 23909=7; Kjellberg 1612b, 2253=7; 2673=13; Kobus 173=10; 221=1; s.n.=1; Koens 76, 310=10; 423=7; Koorders (all /i-numbers) 1037, 1038, 1039=10; 1040=7; 1041=10; 1042, 1043=1; 1044=10; 1045, 1046, 1047, 1048, 1049=7; 1050=10; 1051=1; 1052, 1053=7; 1054=10; 1055, 1056=7; 1057=10; 1058, 1059=1; 1060, 1061=7; 1062/1063=10; 1064=1; 1066=10; 1067, 9961=7; 10904, 11243, 11244, 11276, 11277=1; 11278, 12831, 13843 =10; 13986, 14053, 14096=7; 14158, 14407, 14896=10; 15191, 15368=7; 15579=10; 15616 =1; 16356, 16357, 16358, 16359, 16360, 16361, 16362, 16363, 16364, 16365=13; 20432=1; 20527=10; 23168=7; 23170, 23574, 23874=10; 24167=7; 24176=10; 24177, 25544 =7; 25794=10; 26083=1; 26273, 26468=10; 26538, 26679=7; 26818, 27669, 28524, 28525, 29176=10; 30149, 30609, 31936=7; 32113=1; 32137=7; 32306, 3247,3=10; 33878=7; 35899, 35900, 35901=10; 35902, 35904, 36559=7; 36622, 36642=10; 36743, 37360, 37361, 37919, 38169=1; 38170, 40919, 41289, 41983=7; 43297, 43473, 43733=1; 44315=10; 44481=7; 47945=10; s.n.=10; Kornassi, see Rutten exp.; Korthals s.n.=1, 7, 7b, 10; Krukoff 4201, 4366=7b; Kuhl & Van Hasselt s.n.=1, 7, 10, 13.

Lam 2146, 2257=7; Leano 21837=13; Lei 246=10 (p. 144); Loher 12961, 13023, 13041, 13177=13; 13878, 13904=3; 14145, 14209=13; 14353, 14837=16; 14846=3; Loogen s.n.=7; Lörzing 225=10; 462=1; 472=10; 472a, 609=11; 890, 1316, 1370=1; 1790=7; 2200=1; 4366, 4782=10; 5936, 5980, 6567=1; 7343=2; 7817, 7915=7b; 8267=1; 8303=2; 8615, 8951=1; 9582, 9917=7b; Lynn Zwickey 65, 517=16a.

MacGregor 11194, 19854=13, Maier exp. 272=7; 402=1; Maingay 712/2=7; Md. Nur, see Nur; Mearns 2520, 4410=13; Merrill 742=16; 789=16c; 1753=16; 3837=16b; 3946=16c; 4408=16; Merritt 14151, 14169=13; see also Curran-Merritt-Zschocke; Meyer 2618=16c; Mousset 143=10; 176=1; 485=7; 675=10; Moysey & Kiah 31810=7a.

Native collector 19, s.n.=7; Nauen 35828, s.n.=7; Nur 2423=7; 7274=1; 11252, 32635=7; see also Henderson & Nur.

Ocampo 27941=13; Osman 20846=7; Ouwehand 35, 208, 363=1; 393=2.

Pa Munah, see For. Res. Inst. Ja2846; Petelot 6294=10 (p. 145); Polak 97, 98=1; Popta s.n.=10; Posthumus 3963=1; Pringgo Atmodjo, see Van Daalen exp.; Proefstation voor het Boschwezen, see Forest Research Institute; Puasa Angian 4019=10. Quisumbing' & Sulit 82510=16.

Raap 585=10; 827=1; Rachmat, see Van Vuuren exp.; Rahmat Si Buea=Rahmat Si Torus; Rahmat Si Torus 218, 340, 1345, 1594, 1863, 2255, 3126, 4237, 4263, 4499, 4599, 6661, 6876, 7867, 7905, 7956, 9145, 9939=7b; see also Hamel & Rahmat Si Torus; Ramos 1519=3; 1559, 1957, 2097=13; 5829=16; 7074=16b; 13771, 15558=13; 22182 =16a; 23409, 23433=13; 33191=16c; 39489=13; 40788=15; 41007=13; 41482, 41585=4; 42145=13; 42195=15; 77042=13; Ramos & Edafio 26454=16; 30786, 33856, 37991, 38024, 38053=13; 38087=16b; 38662, 38902=13; 38921=16c; 38963=16a; 39025=3; 40309=5; 40460, 40465=13; 40499=15; 75734=16; 85035, 85161=16a; Rant s.n.=1, 7; see also Smith & Rant; Reinwardt s.n.=1, 7, 10; Rensch 1245=7; 1300=1; 1368=7; 1509=1; Ridley 2106, 6829, 7128=7; 7597=7b; 7928, 8036, 9230, 11840, 13571=7; 13902=10; 16064, 16064A=7a^ s.n.=7; Robinson s.n.=7; Roesel 260=1; Rutten exp. 577=7.

Sandkuhl 61=13; Santos 24=16; 31705=16b; 31772=13; 31098, 31973=15; Sapiin 2461=1; s.n.=1; Sarip, see Maier exp.; Sauliere 74, 123=6 (p. 129); Scheffer C48=1; s.n.=1; Schiffner 2624, 2625=10; Scortechini 375b=2; Skottsberg, see Backer & Skottsberg; Smith 839=10; Smith & Rant 290, 295, 418=10; Squires 184=10 (p. 144); Steenstra-Toussaint s.n.=7; Steup, see For. Res. Inst. bbl8094, bbl8101; Strugnell, see Kiah & Strugnell; Sugandiredja 84,-108=7; 118=11; 132, 160=1; Sulit 31083, 31422 =13; see also Quisumbing & Sulit; Sumardjo see For. Res. Inst. Ja2475; Symington 20183=7; 23964=1; 31005=2; Symington & Kiah 28847=7a.

Teysmann 3777HB, 13982=7; s.n.=10; see also De Vriese & Teysmann; Toxopeus 467=16c; Tsiang Ying 1940=10 (p. 145).

Ultee 56=10; 118=7b.

Van Daalen exp. 52=7b; Van der Goot 4=10; s.n.=1; Van der Pijl 416=1; 620=7; Van Hasselt, see Kuhl & Van Hasselt; Van Ooststroom 12740, 12909=10; 13367=1; 13795, 13901=7; 13905=10; Vanoverbergh 154=16; 191, 3993=13; Van Steenis 87=7; 1625=10; 2021=1; 2289=7; 2536=10; 2980=1; 3640=10; 3650=1; 3665=10; 4216=1; 4885=10; 4957=1; 5923=10; 5977=1; 6587=6; 6857=7; 7080=1; 7327, 7408=10; 7422, 7875=1; 8066=10; 8618=1a; 9200=7b; 9960=2; 10883=10; 11213=7; 11957, 12626=10; 17400=7; 17558=1; Van Vuuren exp. 1020=7; Verhoef \$3=7; 37=10; Vorderman s.n.=11.

Waitz s.n.=1, 10; Warburg 2988=10; 16361=7; Wenzel 620=13; 923=4; Wight 1263=6 (p. 129); Williams 1042=13; Winatadipura, see For. Res. Inst. Ja1396; Winckel (all /^-numbers) 114=10; 180=7; 212, 218=10; 648=7; 666, 1578, 1630, 1673=10; 1773, 1862=7; Wisse 938, 1039, 1205, 1226=10; Woodford 6335=7; Wurth, see Arens & Wurth.

Yates 105=1a; 593=1; 976=1a; 1003, 1197=10; 1567=1a; 1668, 2030, 2524, 2535=7b.

Zippel s.n., p. 165; Zollinger 310, 843=7; 2496=10; 2924=1; s.n.=10; Zschocke, see Curran-Merritt-Zschocke; Zuidema see For. Res. Inst. Ja2565.



## INDEX OF SCIENTIFIC NAMES

*Cornus japonica* 166.  
*Ilex alternifolia* 166.  
*Ilex cymosa* 166.  
*Maesa* 118, *Megalotinus* 111; *Mierottnus* 111, 154; *odoratissimus* 153.  
*Oreiotinus* 111.  
*Solenotinus* 111.  
Twins III-  
*Viburnum* 107-166; sect. *Megalotinus* 112; sect. *Odontotinus* 112; sect. *Thyrsoisma* 111' 112; s<sup>ect</sup>-*Tinus* 112, > subsect -  
*Coriacea* 112; subsect. *Lutescentia* 112; subsect. *Punctata* 112; subsect. *Sambucina* 112; *acuminatum* 127, 128, 165; *alternifolium* 166; *amplificatum* 109, 110 150, 151\*! *arboricolum* 153, 155, 156'. *aw'abuki* 155; *beccarii* 108, 109, 120' 121\*, 122, 142; *buengeri* 166; *clemensae* 109, 157, 158\*; *colebrookianum* 142 144, 145; *coriaceum* 108, 109, 110, 115' 117, 118, 122, 126, 142, 161; var. **longiflorum** 117, 120; *cornutidens* 108, 110, 125, 126; *cylindricum* 116, 118; *elegans* 142; *floribundum* 108, 163, 164; *foetidum* 160; *forbesii* 108, 118, 129; var 116; *formosanum* 161, 164; *glaberrimum* 108, 110, 122, 125, 126, 127; *hasseltii* 108, 153, 157; **hispidulum** 109, 136 137\*, 139> 142; *inopinatum* 130, 133'; *integerrimum* 129; *japonicum* 165,

166; *junghuhnii* 108, 109, 110, 142, 147, 148\*, 149, 150, 152; *laxum* 161, 163, 164; *lepidotulum* 128; *liukiuense* 153, 155, 156; *longistamineum* 108, 130, 132, 136; *lutescens* 108, 109, 142, 144, 145, 147, 149, 150, 161; var. *latifolium* 143; *luzonicum* 108, 110, 161, 163; var. *apoense* 162, 163, 164; var. *floribundum* 163, 164, 165; var. *sinuatum* 163, 164, 165; *macrophyllum* 166; *monogynum* 142, 143, 145; *morrisonense* 161; *mushaense* 161; *odoratissimum* 108, 110, 126, 127, 152, 154\*, 155, 156, 159; *pachyphyllum* 108, 123; *platyphyllum* 108, 110, 123, 124\*, 126, 127; *propinquum* 108, 110, 111, 160; *punctatum* 108, 109, 127, 128; var. *acuminatum* 128, 129; *sambucinum* 108, 109, 110, 117, 118, 129, 132, 133, 134, 142, 165; var. *subglabrum* 130, 136; var. *tomentosum* 130, 131\*, 132, 134, 136, 161; *sinuatum* 108, 163, 164; *subglabrum* 161; *sumatranum* 108, 130, 132; *sundaicum* 142, 149; var. *latifolium* 143; var. *macrodon* 143; var. *microdon* 143; *taihasense* 161; *valerianicum* 160, 161; *vernicosum* 108, 109, 139, 140\*, 141, 142; *villosum* 108, 130, 132, 136; *zambalense* 153, 156, 157; *zippelii* 108, 165.

## THE FERN-GENUS PLEOCNEMIA PRESL

R. E. HOLTUM\*

## SUMMARY

1. The genus *Pleocnemia* Presl is redefined and differentiated from *Tectaria* Cav. and *Arcypteris* Underw., the latter genus being very closely related to *Pleocnemia*.

2. The configuration of the perispore proved to be of importance for the characterisation of the species. In this regard three types are distinguished, perispore forming<sup>1</sup> crisped anastomosing wings, perispore consisting of many slender spines, and, an intermediate type, perispore forming many small separate wings.

3. Tentatively 15 species are recognized. Of these, *Pleocnemia winitii* Holttum, *P. acuminata* Holttum, *P. pleiotricha* Holttum, *P. presliana* Holttum, *P. dimidiolobata* Holttum, *P. tripinnata* Holttum, and *P. seranensis* Holttum are described as new, as well as one variety, *P. conjugata* var. *elatio* Holttum.

4. The following new combinations are made: *P. hemiteliiformis* (Racib.) Holttum (basinym: *Pleocnemia leuzeana* var. *hemiteliaeformis* Racib.), *P. olivacea* (Copel.) Holttum (basinym: *Tectaria olivacea* Copel.), *P. kingii* (Copel.) Holttum (basinym: *Tectaria kingii* Copel.), and *P. chrysotricha* (Bak.) Holttum (basinym: *Nephrodium chrysotrichum* Bak.).

5. Reductions to synonymy are: *Pleocnemia javanica* Presl to *P. conjugata* (Bl.) Presl, and *Dictyopteris compitalis* v. A. v. R. to *P. hemiteliiformis* (Racib.) Holttum.

This genus, as originally published in 1836, included only one species, *Pleocnemia leuzeana*, based on *Polypodium leuzeanum* Gaudichaud (1827), the type of which was collected in the Moluccas. Presl placed *Pleocnemia* among the Polypodioid ferns (without indusia), and his figure clearly shows a naked sorus. But when he examined Cuming's Philippine collections, he found that some were indusiate, and in his "Epimeliae" (p. 50) he placed the genus next after *Nephrodium*, describing two more species. It is not however clear whether Presl recognized that some species of *Pleocnemia* could be indusiate and some not. Fee, in his "Genera Filicum," speculated on this point. He remarked on the confusion in the labelling of Cuming's specimens (specimens distributed under the same number not always agreeing together), but he evidently considered that indusiate and exindusiate specimens could represent the same species, though perhaps they did not grow on the same plant.

\*Professor of Botany, University of Malaya, Singapore.