

MISCELLANEOUS BOTANICAL NOTES 3*

A. J. G. H. KOSTERMANS **

SUMMARY

1. Lauraceae. New combinations: *Beilschmiedia gitingensis* (*Endiandra gitingensis* Elmer); *B. zapoteoides* (*Endlicheria zapoteoides* Lundell); *Persea sphaerocarpa* (*Beilschmiedia sphaerocarpa* Winkler); *Alseodaphne andersoni* (*Cryptocarya andersoni* King ex Gamble). New species: *Beilschmiedia reticulata* (Borneo), *Litsea palustris* (Borneo), *Ocotea trinidadensis* (Trinidad). Reductions: *Cryptocarya macrophylla* Gamble = *Cr. caloneura* (Scheff.) Kosterm.; *Alseodaphne keenanii* Gamble = *Alseodaphne andersoni* (King ex Gamble) Kosterm.; *Litsea bancana* (Miq.) Boerlage = *Beilschmiedia madang* Bl.

2. Leguminosae — Mimosaceae: *Abarema sumbawaensis*, nov. spec.; *Abarema harmsii* (von Malm) Kosterm., descript. emend.

3. Sterculiaceae: A note on *Heritiera* and *Tarrietia* and on *H. percoriacea* Kosterm.; *Heritiera gigantea*, spec. nov. (Sumbawa); *Firmiana sumbawaensis*, spec. nov.

4. Verbenaceae: *Teijsmanniodendron glabrum* Merrill reinstated.

5. *Septogarcinia sumbawaensis*, nov. gen., nov. spec. (Guttiferae).

6. *Mammea timorensis* Kosterm., descript. emend.

ACKNOWLEDGEMENTS

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Messrs. Sukirno, Damhuri and Anwar prepared the figures.

1. LAURACEAE

ENDIANDRA GITINGENSIS Elmer

Elmer, Leaflets Philip. Bot. 2: 712. 1910; Merrill, Enum. Philip. flow. Pl. 2: 361. 1923 — Sibuyan, *Elmer 12420*.

Merrill, l.c. remarked, that this species might probably not be a representative of the genus *Endiandra*, but as the flowers were unknown, he could not place it. The species belongs in *Beilschmiedia* and consequently

* The first and second part of this series appeared in *Reinwardtia* 5: 233-254, 1960 and 5: 375-411, 1961, respectively.

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should be renamed: **Beilschmiedia gitingensis** (Elmer) Kostermans, *comb. nov.* (basionym: *Endiandra gitingensis* Elmer, l.c.)

BEILSCHMIEDIA SPHAEROCARPA Winkler

Winkler in Fedde, Repert. 7: 108. 1909; Kostermans in Receuil Trav. bot. néerl. 35: 865. 1938. — Bolivia, *Buchtien 1378*.

I had the opportunity to study two iso-type sheets of this species, one in Kew and one in the Smithsonian Institution.

The species belongs in *Persea* and should be renamed: **Persea sphaerocarpa** (Winkler) Kostermans, *comb. nov.* (basionym: *Beilschmiedia sphaerocarpa* Winkler, l.c.).

Beilschmiedia sphaerocarpa Lecomte (1913) is a later homonym.

ENDLICHERIA ZAPOTEOIDES Lundell

Lundell in *Wrightia* 1(2): 145. 1946; Kostermans in *Bolet. tecn. Inst. Agr. Norte, Brasil* 28: 65 (1953) 1955. — Chiapas, *Matuda 153* (U.S.)

I had the opportunity to study an iso-type specimen in the Smithsonian Institution, Washington. The species should be referred to *Beilschmiedia* as **Beilschmiedia zapotecoides** (Lundell) Kostermans, *comb. nov.* (basionym: *Endlicheria zapoteoides* Lundell, l.c.).

Ocotea trinidadensis Kosterm., *spec. nov.* — Fig. 1.

Arbor ramulis glabris griseis, foliis glabris coriaceis obovato-ellipticis prominule reticulatis apice acutis basi cuneatis, supra nitida, nervo mediano lato, vix prominulis, subtus late-prominentibus, costis untrinseque 10, subpatentibus gracilis arcuato-anastomantibus; paniculis sub innovatione congregatis, laxe pilosulis foliis minoribus, floribus tubus profundis, extus parce minutissime pilosis, tepalibus glabris ovalis reflexis, pedicellis parvis, staminibus glabris, filamentis antheris ovalis longioribus; exterioribus introrsis, interioribus extrorso-lateralibus, glandulis basalibus sessilibus minutis; ovario glabro, tubo incluso, stylo conspicuo, stigmatate parvo peltato.

Rather large tree, up to 20 m high and 40 cm in diam.; bark smooth; no buttresses; branchlets grey, smooth, glabrous; buds minutely sericeous. Leaves glabrous, coriaceous, obovate-elliptical (to lanceolate-elliptical), apex acute, tip blunt, base cuneate, slightly decurrent, both surfaces prominently reticulate; above glossy, midrib broad, prominent, nerves faint; below somewhat glossy, midrib broad, prominent, nerves ca 10 pairs, rather patent, near margin arcuately anastomosing. Petiole 3—5 mm.

Panicles congested below the new flush, slightly, minutely pilose, up to 5 cm long, rather few-branched, bracts caducous. Pedicel 1 mm, flower

tube ca 1 mm high, tepals oval, obtuse, ca. 1.5 mm, glabrous, reflexed after anthesis, stamens glabrous; outer filaments 1—1.25 mm, anthers 0.75 mm, ovate or oval, cells introrse; inner filaments somewhat bigger and longer with narrower, thick anthers with extrorse or extrorse-lateral cells; basal glands conspicuous; ovary glabrous, globose, embedded in the tube, style thick, almost 1 mm long with truncate stigma.

HOLOTYPUS. — *Richardson 12667* (TRIN)

The species was wrongly identified as *Aniba megacarpa*. I had the opportunity to see living specimens during a short stay in Trinidad in 1959. The species is not uncommon near the type locality at about mile 9 of the Arima-Blanchicheuse Rd.; the local name is Laurier pulcherro.

Mr. N. Y. Sandwith took the trouble to compare the specimens with the Kew Herbarium material, but failed to match it with a known species. As in none of the numerous herbaria, which I visited, I was able either to match it, I venture to describe it as new.

The para-typus (Brooks 12709) is a fruiting specimen. The cup is semiglobose, about 1 cm high, the aperture is slightly constricted, 8 mm in diam. with thin, entire margin, most of the apiculate fruit is embedded in the cup; the pedicel of 1 mm is hardly thickened.

TRINIDAD. — Arima-Blanchicheuse Rd., mile 9¼, July, fl., *Richardson Herb. Trinidad 12667* (TRIN); *ibid.*, Dec., fr., *Brooks, Herb. Trinidad 12709* (TRIN).

According to a note of Mr. N. Y. Sandwith the following numbers of the Trinidad Herbarium belong here: 12709, 12674, 12677.

Litsea palustris Kosterm., *spec. nov.* — Fig. 2

Arbor mediocris glabris foliis coriaceis ellipticis vel obovato-ellipticis obtusis basi cuneatis, supra conspicue prominule reticulatis, nervo mediano sulcato, subtus laevibus, nervo mediano prominentibus, petiolis parvis, racemis axillaribus parvis, pedunculis capitulis longis.

Tree up to 30 m high and 25 in diam., glabrous in all its parts. Leaves spirally arranged, coriaceous, elliptical to (usually) obovate-elliptical, 7—9 × 2.5—3.5 cm, obtuse (in flowering branches obscurely, broadly, obtusely acuminate), base tapering; upper surface glossy, conspicuously, prominently reticulate, midrib conspicuously sulcate, lateral nerves slender, prominulous; lower surface smooth, dull, midrib prominent, lateral nerves inconspicuous. Petiole ca 5 mm long.

Racemes axillary, up to 1 cm long; peduncles of flower-heads up to 1 cm long, slender. Buds of male flower-heads globose; bracts concave,

glabrous, ca 4 mm long, flower tube very short; sepals ovate, acute, ca 3 mm long, outside laxly tomentose; filaments slender, laxly tomentose, anthers elliptical, introrse; basal glands sessile, pistillode lacking.

HOLOTYPE. — *Anderson 9197* (BO).

DISTRIBUTION. — Peat swamp forests in *Dacrydium* — *Casuarina* association, Borneo; character species.

VERNAC. NAME. — Madang padang.

The species is characteristic for peat swamp and heath forest areas. The fruiting specimens, enumerated below have obovate-spathulate leaves, which is apparently the common shape. The fruit cup is very shallow, about 4 mm in diam., about 1 mm deep and merges gradually into the obconical, ca 5 mm long pedicel; the fruit is ellipsoid, mucronulate, up to 18 mm long and 12 mm in diam.

BORNEO. — Sarawak, Lawas Distr., Kayangeran For. Res., July, fl., *Anderson 9197* (BO, K, L); Simanggang Distr., Lingga, Jan., fr., *Anderson 9819* (BO, SAR); *ibid.*, peat swamp forest, April, fl. buds, *Mohtar bin Tahip 13502* (A, BO, K, L, NB); Loba Kabang, South P.F., fresh water swamp, Jan., fr., *Anderson S. 0664* (SAR); *ibid.*, Nov., fr., *Anderson S. 0427* (SARF); *ibid.*, ster., *Wyatt-Smith 79335* (SAR); Betong Distr., near Meludan Penis, swamp forest, Aug., fl., young fr., *Haji Bujang 13032* (A, BO, K, L, NB, SING).

Beilschmiedia reticulata Kosterm., *spec. nov.* — Fig. 3.

Arbor; foliis apice ramulorum crassiorum congestis ellipticis vel subobovato-ellipticis glabrescentibus, conspicue laxe prominule reticulatis supra nitidis, petiolis crassis glabrescentibus, infructescentis pilosis parvis, fructus ellipsoideus.

Tree, branches thick with large leafscars, glabrescent; apical bud pilose. Leaves spirally arranged, congested near apex of branchlets, elliptical to subobovate-elliptical, 16—29 by 6—10 cm, shortly acuminate, base contracted into the up to 2.5 cm long glabrescent petiole; midrib level with upper surface or slightly impressed, prominent and finely pilose on lower surface; nerves about 8—10 pairs, slightly arcuate, connected by a prominent, lax reticulation, which is especially conspicuous on the upper leaf surface.

Infructescence axillary, 4 cm long, stout, hardly branched, rusty pilose, bearing the ellipsoid, 3 cm long, 15 mm in diam. fruit on a cylindrical woody pedicel.

TYPUS. — *San A 1815* (SING).

A species particularly characterized by the lax conspicuous reticulation of the leaves. The young leaves are apparently shortly pilose.

NORTH BORNEO. — Diwata R., 10 miles W.S.W. of Lahad Datu, Febr., fr., *Kadir & Japoni San. A. 1815* (SING).

LITSEA BANCANA (Miq.) Boerlage

Litsea bancana Boerlage, *Handl. Fl. Nederl. Ind.* 3: 143. 1900; Boldingh, *Cat. Hort. Bogor* 49. 1914; Merrill in *Philip. J. Sci.* 11: 271. 1916; in *J. Straits Br. Roy. As. Soc.* 85: 197. 1922; in *Univ. Calif. Publ. Bot.* 15: 80. 1929; in *Contr. Arnold Arb.* 4: 62. 1934 — *Tetranthera bancana* Miquel, *Fl. Ind. bat.* 1(1): 950. 1858; *Suppl. Sumatra* 146. 1860; Kurz in *Tijdschr. Natuurk. Vereen. Nederl. Ind.* 27: 172 (reprint 22). 1864 (quoad nomen); Meissner in *DC., Prodr.* 15(1): 198. 1864; Teijsmann & Bianendijk, *Catal. Hort. Bogor* 94. 1866 (quoad nomen); van Eeden, *Houtsoorten Nederl. Oost. Ind.* 72. 1872 (quoad nomen); Kuntze, *Rev.* 2: 572. 1891 (quoad nomen); Boerlage, l.c. (quoad nomen); Merrill, l.c. (quoad nomen). — *Malapoenna bancana* (Miq.) O. Kuntze, *Rev.*, l.c. 572.

This species was based on a specimen collected in Bangka by Horsfield, which I could inspect in the Horsfield Herbarium in Kew (marked: *Apetal.* 9). It represents *Beilschmiedia madang* Bl. The interpretation of this species of Kurz, Teijsmann, van Eeden, Boerlage and Merrill was wrong.

CRYPTOCARYA MACROPHYLLA Gamble.

This species, based on the specimen: *Teijsmann H.B. 7453*, collected in Andai near Manokwari, W. New Guinea and published by Gamble in *Kew Bull.* 1910: p. 147, represents *Cryptocarya caloneura* (Scheffer) Kostermans. The type specimen is deposited in the Calcutta Herbarium, isotypes are in Bogor and Leiden. Gamble's specific epithet is moreover invalid, because of the earlier *Cryptocarya macrophylla* Zippel *ex* Blume (*Mus. Lugd. bat.* 2: 14. 1856); *Cryptocarya macrophylla* Sarlin (*Bois et forêts de la Nouv. Calédonie* 122. 1954) is a later homonym.

Alseodaphne andersonii (King *ex* Hook. f.) Kosterm., *comb. nov.*

Cryptocarya andersoni King *ex* Hooker f., *Fl. Brit. India* 5: 120. 1886 (basionym); Gamble, *Man. Ind. Timb.*, ed. 2: 558. 1902; Burkill in *Records bot. Survey India* 10(2): 50. 1925; Kanjilal et al., *Fl. Assam* 4: 50. 1940; Bor, *Man. Ind. For. Bot.* 50. 1953 — *Jenkins s.n.* (K).

Alseodaphne keenani Gamble in *Kew Bull.* 1914: 188; Calder et al. in *Records bot. Survey India* 11(1): 7. 1926; Liou Ho, *Laur. Chine et Indochine* 43. 1932; Kanjilal, l.c. 62; Bor, l.c. 54. — *Keenan s.n.* (K).

An isotype sheet, *Jenkins s.n.* (BO) and two specimens of the Calcutta Herbarium (*Hock = Prain's collect 416 and 418*) of *Cryptocarya andersoni* were available for examination. These specimens agree perfectly with the type specimen of *Alseodaphne keenani* (K). The species is related to *A. petiolaris* Hook. f.

The distributional range so far known is as follows:

ASSAM, fl., *Jenkins s.n.* (BO, CAL, K); *ibid.*, fl., *Masters s.n.* (BO); Jengali Bam, Nov., fr., *Hock (= Prain's collector) 416 et 418* (CAL); BURMA, Myitkyina Distr., at Chipwikka, alt. 900 m, Sept., fr., *Keenan s.n.* (K); YUNNAN, Mengla, Jenn-Yeh-Hsien, alt. 900 m, Nov., fr., *Wang 80720* (A); Hei-lung-tarn, Fo Hai Hsien, July, fl., *Wang 76299* (A); Fo Hai, July, fl., *Wang 77288* (A); *ibid.* 1320 m., July, fl., *Wang 76137* (A); Szemae, alt. 1500 m, fl., *Henry 12152* (A, NY).

2. LEGUMINOSAE — MIMOSACEAE

Abarema sumbawaensis Kostermans, *spec. nov.* — Fig. 4, 5

Arbor, foliis pilosis bipinnatis, pinnis 2- jugis, glandulis minutis, rachillis 5—6 foliolatis, foliolis alternantibus oblique lanceolatis vel ellipticis. Flores pedicellatis pseudo- umbellati; pseudo- umbellae longe pilosopedunculatae, axillares. Legumen dehiscens, valvulis coriaceis contortis.

Tree, up to 22 m high and 25 cm in diam; bole up to 16 m; bark smooth to slightly cracked and roughish, brown to darkbrown, 2 mm thick; living bark 5 mm, straw- coloured; wood white; buttresses lacking. Branchlets densely shortly, brownish- yellow pilose. Leaves with 2 pairs of rachillae (near inflorescence one pair); petiole (axis) 3—9 cm long, densely pilose, base glandless; distal rachillae up to 11 cm long with up to 10 alternate folioles and a protruding semiglobular small, round gland just below the petiole insertion of the three topmost folioles; proximal rachillae up to 7 cm long with up to 7 alternate folioles. Leaflets chartaceous, obliquely lanceolate to elliptical, the distal ones up to 9 × 3 cm, the proximal ones 3 × 1.5 cm or less, base cuneate, apex obscurely, broadly acuminate or obtuse; upper surface with scattered hairs (especially on the veins), glabrescent, main nerves filiform; lower surface laxly pilose (hairs erect), midrib and rather straight, erect-patent, up to 12 pairs of lateral nerves prominent; reticulation inconspicuous; petiolules slender, 1—2 mm long.

Inflorescences axillary, densely pilose, consisting of a reduced, very short basal branch and 2—3 cm long, and slender- peduncled (up to 7 cm), pseudo- umbels of pedicelled (pedicel filiform, 2—3 mm long) florets. Florest taxly pilose, calyx pale green, funnel-shaped, 2 mm long with inconspicuous, acute teeth; corolla pale green, laxly pilose, funnelshaped,

6 mm long, teeth 1 mm long, acute, reflexed; staminal tube shorter than the corolla tube; filaments exerted 5—6 mm; ovary glabrous.

Legume coriaceous, flat; valves 1 mm thick, redbrown, up to 6 cm long, 1.5 cm wide, seeds orbicular, flattened, 8 mm in diam.

TYPUS. — *Kostermans 18618* (BO)

DISTRIBUTION. — W. Sumbawa, dry evergreen forest at 600—700 m altitude.

The species is allied to *A. syringaeifolia* Kosterm. from which it differs by its glands, pilosity, shape of and size of its pedicellate flowers. As far as could be ascertained it occurred only in evergreen, rather dry forest on slopes of Mt. Samparolat, N. of Mt. Batulanteh, between 600 and 700 m. altitude.

W. SUMBAWA, Mt. Batulante, Mt. Samparolat, N. of village of Batudulang, evergreen, rather dry forest, alt. 600—700 m., May, fl. and old fruit, *Kostermans 18618* (A, BH, BISH, BM, BO, BZF, CANB, L, LAE, LE, K, P, PNH, SING, US); id. *18621* (A, BH, BO, G, K, L, LAE, LE, SING), *paratypus*.

ABAREMA HARMSII (von Malm) Kostermans — Fig. 6.

Of this species, abundant material could be collected during my recent expedition to Sumbawa, which enables me to emendate its description.

The species is restricted to the wettest parts of the Western slopes of Mt. Batulante in W. Sumbawa, at an altitude of about 600—800 m, where it is common in the *Dipterocarpus retusus* forest; it may occur, however, also in other parts, where local humidity conditions are favourable, a single specimen was observed at an altitude of 600 m on the north, dry side of Mt. Batulante in a river gorge.

In drier places (even in the wet season) the leaflets are very concave and somewhat drooping, which gives the tree a sickly appearance. The bole may be up to 45 cm in diameter; buttresses are lacking; the dead bark is pale-brown, paperthin with large lenticels (Richards, the Tropical rainforest, page 5. 1952 contends, that no lenticels are present on the boles of tropical rainforest trees; I am, however, of a different opinion, a large number of tree-species have very large and conspicuous lenticels); the lenticels are in older trees combined to longitudinal fissures; living bark 10 mm, straw-coloured, outside glossy black. The pod is irregularly bent into a semicircle, very thick-leathery, concave, with bulging parts where the seeds are located on one side and often slightly concave on the inner side, up to 12 cm long and 2.5 cm wide, splitting open at one side and at

last completely dehiscent; outside green, partly redbrown, inside redbrown with large, globose-ellipsoid seeds with a soft, leathery, glossy, black seed-coat.

WEST SUMBAWA, Mt. Batulante, N. West slope near Pusu, alt. 700 m, April, fl., *Kostermans 18540* (A, BH, BO, CANB, G, K, L, LAE, LE, P, PNH, SING, US); id., Nov., fl., *Kostermans 19171* (A, BO, K, L); Northern slope, road from Batudulang to Punik, alt. 600 m, rivergorge, Nov., fl., *Kostermans 19182* (A, BO, K, L).

3. STERCULIACEAE

A new species of *Heritiera* from the island of Sumbawa

Van Steenis (Flora Malesiana Bulletin 15: 772. 1960), doubted whether *Tarrietia* and *Heritiera* should be combined. He states that *Tarrietia* (in its former scope) should have never triplinerved leaves and always scales, whereas *Heritiera* should have always triplinerved leaves and stellate scales.

Apparently he failed to go through my monograph, as: 1. the former *Tarrietia simplicifolia* has no triplinerved leaves; 2. the former *Tarrietia argyrodendron* has scales, 3. the former *Tarrietia actinophylla* has completely glabrous leaves.

As has been stressed by me, the only difference between *Tarrietia* and *Heritiera* was the presence of albumen in the fruit. The character of stellate hairs (which van Steenis calls stellate scales) and scales cannot be used for generic (former) segregation, as in practically all species of (former) *Tarrietia* and *Heritiera* both occur on one or other part of the same plant and all intermediate stages between stellate hairs, stellate scales, fimbriate scales and more or less entire scales are found in the same plant in almost all species.

The character of palmate and simple leaves can neither be used, as in *H. borneensis* both types are found in the same plant and in *H. simplicifolia* the leaves of some branches of a single specimen may be palmate of other branches entire. It is remarkable that in *Sterculia* with simple leaves, a few (*S. foetida*) have palmately compound leaves, of which the leaflets are not triplinerved but nobody so far has suggested to segregate *Sterculia foetida* as a genus from *Sterculia*.

The character of subtriplinerved leaves (several are certainly hardly subtriplinerved) can neither be used, as (the former) *Tarrietia simplicifolia* should be moved to *Heritiera*. Moreover I think this hardly a character on the generic level. In flower and fruit characters there is not the slightest difference between the former *Tarrietia* and *Heritiera*.

HERITIERA PERCORIACEA Kosterm.

Of this species I found a full grown specimen during a recent expedition at the foot of Mt. Hondje (limestone) near the village of Taman Djaja in S. W. Banten (W. Java); the tree was 55 m. high and had a diameter of 110 cm; the buttresses were up to 2 m high and 3 m. out.; the bark in this old specimen was scaly and fissured.

Heritiera gigantea Kostermans, *spec. nov.* — Fig. 7.

Heritiera species nova 2, Kostermans in Public. 1, Council for Sciences Indonesia 2. Apr. 1959; in *Reinwardtia* 4: 535. 1959.

Arbor magna ramulis crassis lepidotis, squamulis fimbriatis, foliis alternantibus rigide coriaceis lanceolatis vel ellipticis basi rotundatis, apice obtusis, supra glabris nerviis principalibus vix prominentibus, subtus perdense adpresse aureo-lepidotis squamulis fimbriatis, foliis alternantibus rigide coriaceis lanceolatis vel ellipticis, basi rotundatis, apice obtusis, supra glabris nerviis principalibus vix prominentibus, subtus perdense adpresse aureo-lepidotis squamulis minutis fimbriatis, nervo mediano valde prominentibus, costis utrinque 9—10, distantibus, vix prominentibus, saepe irregularibus, basalibus subadscedentibus, nerviis secundariis gracilis vix conspicuus.

Paniculis axillaribus sub inovationibus foliis minoribus perdense aureo-lepidotis, floribus pedicellatis parvis dense lepidotis, lobis calycibus subaequantibus vel majoribus, androgynophorus floribus masculinis parvis glabris, antheris in annulum dispositis, ovario in floribus feminis subsessilis, lepidotis, stigmatis recurvis, antheris sterilibus parvis per paria basalibus; fructus ellipsoideus compressus lepidotus, aliis magnis lateralibus.

Large tree, up to 50 m tall and 90 cm diameter, buttresses up to 1.5 m high, out 1 m, rather thin, concave. Bark yellowish to rusty, roughish, peeling off in 3—4 cm wide, 0.5—1 mm thick strips, inside pale yellow; living bark 15 mm thick, red. Branchlets patent, stiff, sulcate, covered with a dense layer of minute aureous scales. Leaves rigid-coriaceous, lanceolate to elliptical, 7—11 × 2—4 cm (in young sapling trees up to 20 × 8 cm), base contracted into the slender, 1.5—2 cm long, densely aureo-lepidote petiole, which is slightly thickened at base and apex; apex obtuse; upper surface glossy dark green, smooth, the main nerves level to the surface, lower surface densely adpressed aureo-lepidote; the minute scales fimbriate, midrib prominent, the 8—10 pairs of (sometimes irregular) erect-patent, lateral nerves prominulous, straight, nervation obscure; basal nerves slightly ascendant. Panicles below the leafbud, axillary, up to 5 cm long, densely

minutely aureo-lepidote, main peduncle stout, 1—2 cm long, branches rather erect, up to 2 cm long; bracteoles caducous (not seen); pedicel 1—2 mm long. Flowers urceolate or cupshaped, 3—4 mm high, tube shorter than the acute (usually 4) lobes. Female flower 4 mm long, urceolate, densely lepidote (scales fimbriate), ovary lepidote, almost sessile, 2 mm with short recurved stigmas; base with 5 groups of 2 sessile anther-cells; male flower urceolate, more campanulate, with short (1 mm) androgynophore and anthers in a ring.

The aureo-lepidote samara consisting of an ellipsoid, somewhat compressed seedpart, up to 2 cm long and 1.5 cm wide, contiguous with a large butterfly like wing, up to 7 cm long and 3.5 cm wide in its widest part.

TYPUS. — *Kostermans 18128* (BO).

DISTRIBUTION: Sumbawa, probably Lombok and Flores.

In enumerating the species already in my monograph on *Heritiera*, but the sterile material did not warrant description. After having been able to collect the tree in Sumbawa, it is evident, that the sterile material (nos. 14048 and 21400) was not collected from a mature tree, but from saplings. The species has certainly not larger leaves than those of *H. sylvatica*, its closest ally. The species was found scattered on the Northern slopes of Mt. Batulante in W. Sumbawa in a type of evergreen, but not very wet forest from 700—900 m. altitude. It does not occur in the wetter *Dipterocarpus retusus* forest on the N. W. and Western slopes of that mountain. The tree has been cut out for building purposes and has become rather scarce in most places. Fully grown trees are certainly very scarce. The tree is the highest one in this type of forest. Material with very young fruit was collected from a tree on the trail from the village of Batudulang (not Bukit dulang, as wrongly cited in my monograph) to Pusu; old flowers were collected. A search below the tree resulted in finding some mature fruit, which made it possible to place the species. In the same year I was able to visit the same tree (after 6 months), some submature fruit were found, but apparently most of the fruitsetting had failed. The tree is locally well-known as kaju lanang (the name perek majung as cited in the List of vernacular names of the Forest Research Institute, Bogor, is wrong: it refers to *Dipterocarpus retusus*).

The species is close to *Heritiera sylvatica*. It differs by its thicker leaves, which are aureous-lepidote, the shorter and stouter inflorescences, the much larger fruit and the short male androgynophore with the regular ring of anthers. The sterile stamens at the base of ovary are in pairs of 2, each one-celled.

W. SUMBAWA. Mt. Batulante, trail from village Batudulang to Pusu, April, young fruit, *Kostermans 18276* (A, BH, BISH, BM, BO, BRI, CAL, CANB, G, K, KEP, L, LAE, LE, NY, P, PNH, SING, US); *ibid* sapling and fallen fruit, April, *Kostermans 18128 (typus)* (A, BO, K, L).

Firmiana sumbawaensis Kostermans, *spec. nov.* — Fig. 8, 9

Arbor ramulis crassiusculis minute sparseque stellato-pilosis, foliis coriaceis late ovatis, cordatis, apice acutis, supra glabris subtus perdense minutissime adpresse stellato-lepidotis, petiolis longis, paniculis axillaribus perdense stellato pilosis, floribus pedicellatis, lobis lanceolatis reflexis intus dense lanuginoso-pilosis, androgynophorus longe exsertus glabris, antheris in phalangis brevis irregulariter dispositis.

Tree, up to 35 m tall and 60 cm in diameter with large thin concave buttresses; bole smooth, glossy, grey-green with longitudinal rows of large lenticels, which later form longitudinal cracks; living bark 10 mm, very fibrous; wood white, soft. Branchlets stout, laxly, minutely stellate-pilose. Leaves crowded near apex of branchlets, deciduous in the dry season, coriaceous, broadly ovate, 10—20 × 9—16 cm, cordate, apex acute; upper surface glabrous, glossy, venation level with surface, lower surface with a dense, adpressed layer of tiny scale-like stellate hairs, the main nerves glabrescent; main nerves 7, starting from the petiole insertion, prominent; secondary nerves lax, parallel, prominent; petiole glabrescent, 5—10 cm long, rather slender, somewhat swollen at base.

Panicles axillary up to 15 cm long, appearing with the new flush, densely, adpressed white (after drying straw), stellate-pilose; main, bare peduncle up to 6 cm long; branches lax. Pedicel 2—4 mm, bracts caducous. Calyx tube 1—2 mm, densely pilose; lobes lanceolate, reflexed, 5—7 mm long, pale purple, inside with a dense layer of long, yellow hairs (especially in the tube the hairs very long sub-strigose); androgynophore slender, glabrous, pale purple, up to 7 mm long; in male flowers the top slightly enlarged and bearing 20 irregularly placed large anthers, in 5 groups on short very thick "filaments"; anthers after dehiscence completely explanate. Female flower not seen.

TYPUS. — *Kostermans 18572* (BO)

DISTRIBUTION. — Thus far only known from the slopes of Batulante Mt. in W. Sumbawa and surrounding mountains, where it follows the river gorges from 500—700 m altitude. It was also found on the ridges where water conditions were favourable.

The species was discovered during the Sumbawa-expedition, sponsored by the Council for Sciences in 1961. I mistook it for *Hildegardia sunaica* (the specimens have been distributed under that name), a poorly known species of W. Sumbawa. A second expedition to Sumbawa, gave me the opportunity to collect the fruit, which proved that the species belongs in *Firmiana*. It is closely related to *F. papuana* Mildbr., from which it differs by the pilosity of the coriaceous leaves, the peculiar male androgynophore and the pilosity of the flower.

The fruit is pale green (fresh), the 2—3 seeds are attached to the margins.

The species is locally rather common and may grow into huge trees. The vernacular name near Batudulang was: belinat. Of young pole-like trees the bark is stripped and yields a very good fibre which is used for all the ropes, necessary in this country of horses. Living specimens were brought to the Botanic Garden in Bogor.

On the northern slopes of Mt. Batulante the species prefers the moister rivergorges in a type of forest, which is not deciduous, but drier than the forest above 800 m altitude of Mt. Batulante, where the species does not occur.

On the Western slopes, which are wet, the species could not be found, but here the forest has completely disappeared below 700 m altitude.

W. SUMBAWA. Mt. Batulante, near Batudulang, ridge between Batudulang and Mt. Samparolat, alt. 700 m, April, fl., *Kostermans 18572* (A, BH, BISH, BM, BO, BRI, CAL, CANB, G, K, KEP, L, LAE, LE, NY, P, PNH, SING, US); margin of river-gorge near Batudulang, alt. 600 m, Oct., fr., *Kostermans 19110* (A, BH, BO, BRI, C, CAL, CANB, G, K, L, LAE, LE, NY, P, PNH, SING, US); *Kostermans 18572*, sapling (A, BO, K, L); the leaves of saplings are 5-lobed with scattered scale-like hairs on the lower surface.

4. VERBENACEAE

TEIJSMANNIODENDRON GLABRUM Merrill — Fig. 10

This species, described by Merrill (*in Univ. Calif. Publ. Bot.* 15: 263. 1929) was reduced to varietal rank of *T. bogoriensis* by Bakhuizen Sr. (cf. *Kostermans in Reinwardtia* 1: 89. 1951).

Because of the scanty material, I accepted Bakhuizen's conception, but since, more material came to my attention, which induces me to reinstate it as a proper species.

It may be differentiated from *T. bogoriensis* by the smoother leaves (smooth to the touch) and also by the wing-like appendages at the petiole base, which are attached only at the base and ligulate in outline. These

were overlooked by Merrill and by me, who stated that the petioles were not winged.

Additional material. — BORNEO. North Borneo, Tawao, fr., *Elmer 21616* (BO), type; *ibid.*, mile 12½, Apas Road., alt. 30 m, June, fl., *San 19226* (BO); Kabili-Sepilok For. Reserve, alt. 30 m, May, fl., *B.N.B.F.D. 7122* (BO); *id.*, June, fr., *B.N.B.F.D. A 810* (BO); *id.*, June, fl. fr., *San 21419* (BO); Sarawak, near Long Kapa, Mt. Dulit (Ulu Tinjar), IV th Division, Febr., fl., *Richards 2570* (BO).

5. GUTTIFERAE

Septogarcinia Kostermans, *gen. nov.*

Arbor dioecis foliis et floribus ut in Garcinia; staminibus in phalangium unum quadrangulatum dispositis; fructus costatis, dehiscentibus, valvulis carnosis caducis, seminis placentarum centralam adhaerens, pulpis paucis suffultis, cum calycem ad ramulorum persistentibus.

Septogarcinia sumbawaensis Kostermans, *spec. nov.* — Fig. 11, 12

Arbor mediocris glabris foliis oppositis chartaceo-coriaceis petiolatis costis lateralibus pluribus paralellis; floribus sessilibus; sepalibus 4, per paria opposita, exterioribus interioribus inferioribus, obovatis; petalis 4, sublinearibus albis carnosis; staminibus in phalangium unum quadrangulatis coalitis, antheris sessilibus; floribus femineis ovarium magno; antheris sterilibus in 4 phalangibus dispositis. Fructus subconicus, costatis, carnosus, stigmatate peltate-stellatis, planis, sessilis; fructus maturus dehiscentibus, septis 6—8, carnosus, loculis basalibus uniseminatus; seminis placenta centralum adnatus, pulpam paucis suffultis, cum calycibus ad ramulorum persistentibus.

TYPUS. — *Kostermans 18767* (BO)

Tree, glabrous in all its parts, up to 25 m tall and 30 cm in diam., bole often forked, the ramifications erect; branches divaricate, regular, bark smooth, grey to brownish-grey, sometimes fissured, 1 mm thick; living bark 5 mm, with yellow, very sticky latex; wood straw, rather soft. Leaves coriaceous without visible veins when alive (papyraceous when dried), elliptical to subobovate-elliptical, 7—13 × 5—6.5 cm, base tapering into the 1.5—2 cm long petiole, apex obscurely acuminate, midrib level with the upper surface, prominent on lower one, lateral veins slender, prominulous on both surfaces, numerous, (up to more than 30 pairs), parallel, spaced about 2—3 mm, erect-patent, near margin arcuate; basal ears conspicuous; glandular canals not present in the leaves, nor glands.

Inflorescences in the axils of fallen leaves on an inconspicuous reduced branch, consisting of a cluster of 1—4 sessile flowers. Male flower with lightgreen calyx, sepals 4, pairwise opposite, persistent, obovate to rotundate, the lower ones 3—4 mm long, attached much lower than the 8 mm long upper ones; petals 4, almost linear or slightly widened towards apex, white, fleshy, 5×14 mm, obtuse; stamens grown together into one quadrangular phalange, about 5 mm in diam., 3—4 mm high with about 40 sessile anthers; some flowers with a sterile but distinct pistillode, with a large peltate stigma protruding through the centre of the staminal body. Female flower same shape and size as male one, ovary large, sessile, topped by the enormous cone shaped stigma; sterile stamens in 4 phalanges; each phalange of 2—4 anthers, filaments distinct or grown together.

Fruit subglobular to subconical, up to 5 cm long, sessile, strongly ribbed (the ribs in pairs), the ribs green, the sunken parts in between a dirty light red brown, consisting of 6—8, mostly 7 fleshy segments; each segment at the margin with two marginal ribs; inside at base a cavity containing a single seed. Seeds basal, attached to a central placenta, surrounded by a thin deteriorated layer of rather acid, dirty orange pulp. The fruit dehisces when still attached to the branch, starting from the base; the seeds do not drop with the segments, but remain attached to the placenta and the calyx. The segments detach completely (the stigma divides neatly in as many parts as the corresponding segments); on the branch is only left the calyx and the loosely attached seeds in their orange pulp. Seed ellipsoid, slightly reniform, up to 10 mm long, dark.

DISTRIBUTION — So far known only from West Sumbawa, where it occurs in the wettest parts of Mt. Batulante at about 700 m altitude.

VERNACULAR NAME — Near Pusuh at the N.W. side of Mt. Batulante it is known as Djirak.

At first sight the species is exactly like *Garcinia*, but *Garcinia* has non-dehiscent fruit, whereas our species has completely dehiscent fruit like *Tovomita* and *Rheedia*, but the latter two genera have free stamens and glandular strands in their leaves.

There is a possibility that *Garcinia septata* from Celebes belongs also in this genus.

Birds and monkeys discard the acid fruit valves, but eat the seeds and the scanty, loose pulp. It was practically impossible to find already open fruit still containing seeds; they were all finished by animals.

W. SUMBAWA. Mt. Batulante, N.W. slope, alt. 700 m, very moist forest, May, fl., fr., *Kostermans 18767* (A, B, BISH, BH, BM, BO, BR, BRI, BZF, CAL, CANB,

G, K, KEP, L, LAE, LE, NSW, NY, P, PNH, SING, US); idem, Nov., fr., *Kostermans 19125* (same Herbaria); rivergorge near Batudulang, alt. 700 m, May, fl., *Kostermans 18789* (A, BH, BO, BRI, G, K, L, LE), paratypus, male.

MAMMEA TIMORENSIS Kosterm. — Fig. 13

Material, recently collected by Mr. Muchtar on my instigation on the island of Komodo, enables me to emendate the description.

Tree 20 m high, 30 cm in diam., growing along a rivulet at about sea level (as I failed to discover the species on the Batulante Mt. in W. Sumbawa, I assume, that it is a lowland species).

Male flowers attached to the bare branchlets, behind the leafy part on very tiny burr-like reduced inflorescences with many bracts.

Pedice! 18—23 mm long, slender, with 2 tiny acute bracts at base; the parts of the calyx fleshy, concave, ovate-elliptical, 7 mm long; petals somewhat longer, fleshy, broadly spatulate; stamens numerous, 5 mm long, including the linear-oblong, 1.5—2 mm long anthers; pistilode lacking.

The species resembles strongly *M. suriga* of India.

ISLAND OF KOMODO (W. Flores), sealevel, along rivulet, Oct., fl., *Muchtar 33* (A, BH, BISH, BM, BO, BRI, CAL, CANB. G, K, KEP, L, LAE, NY, P, PNH, SAN, SAR, SING, SYD).



Fig. 1. *Ocotea trinidadensis* Kost., typus



Fig. 2. *Litsea palustris* Kosterm. — Flowering branch (type), leaf and fruit of paratype.



Fig. 3. *Beilschmiedia reticulata* Kosterm.

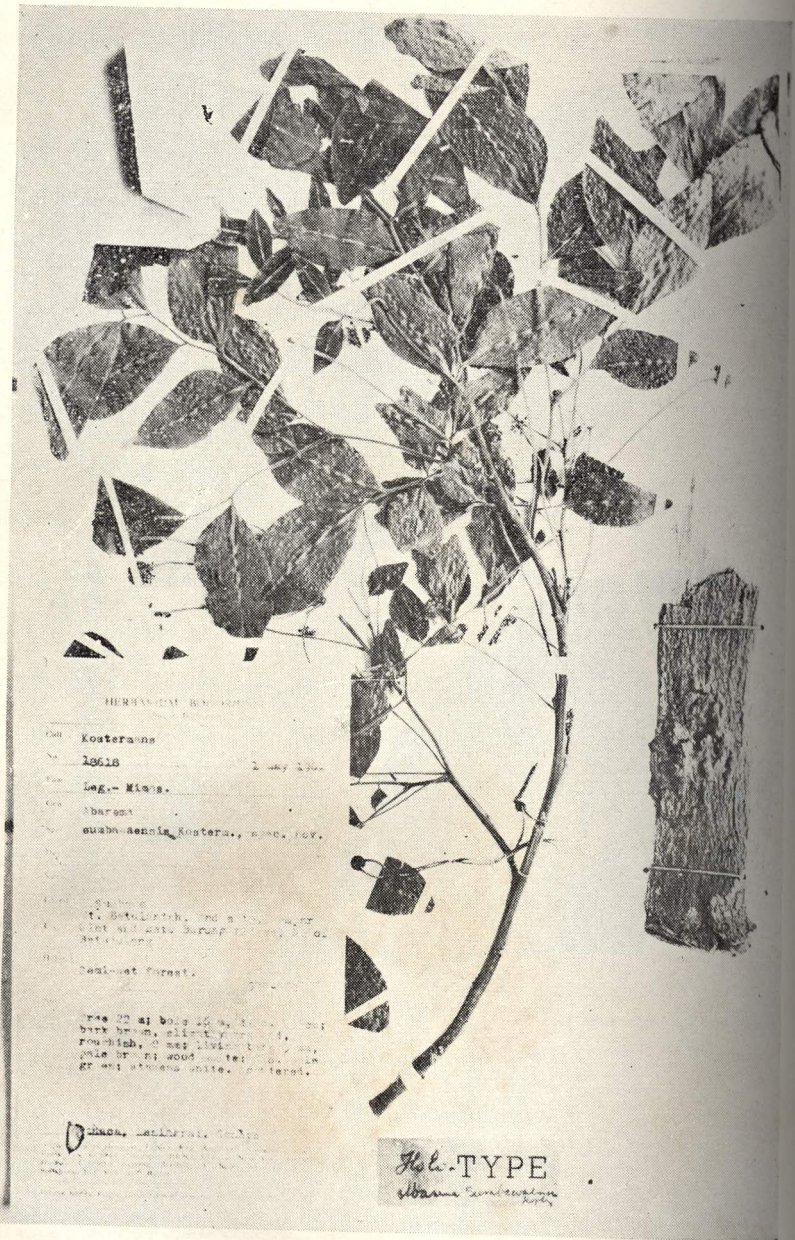


Fig. 4. *Abarema sumbawaensis* Kosterm.

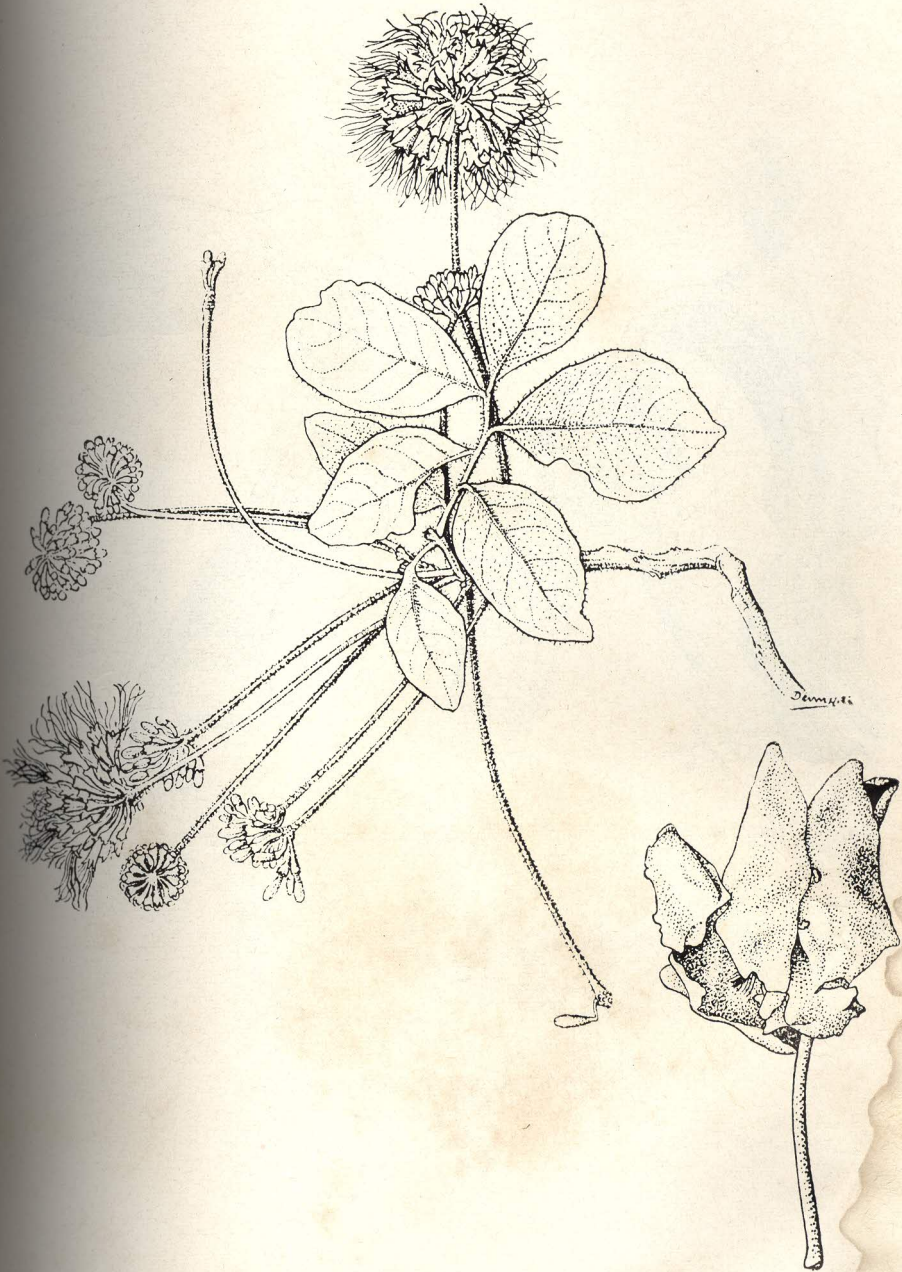


Fig. 5. *Abarema sumbawaensis* Kosterm.

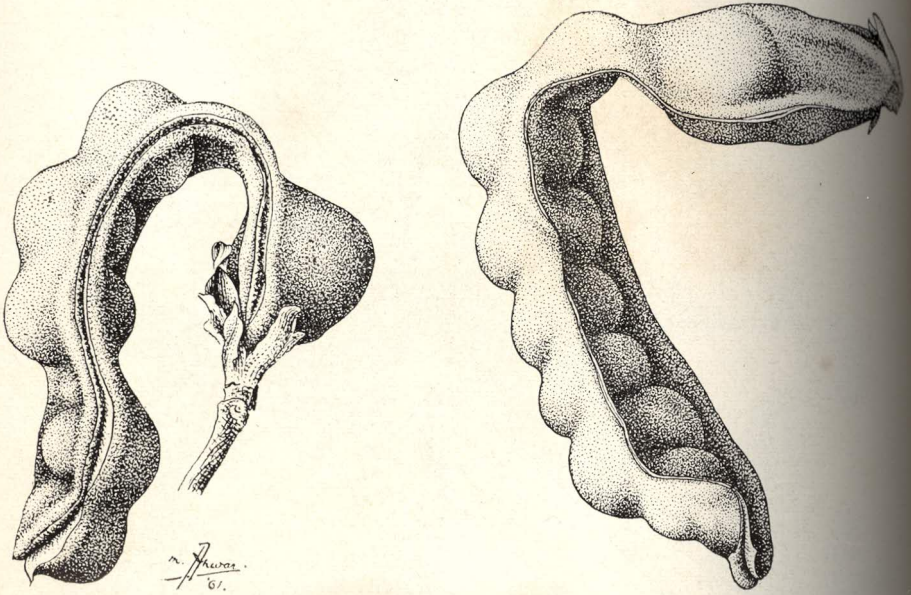


Fig. 6. *Abarema harmsii* (von Malm) Kosterm.; *Kostermans 18540*, W. Sumbawa



Fig. 7. *Heritiera gigantea* Kosterm.



Fig. 8. *Firmiana sunbawaensis* Kosterm.



Fig. 9. *Firmiana sumbawaensis* Kosterm., fruit.



Fig. 10. *Teymanniodendron glabrum* Merr.



Fig. 11. *Septogarcinia sumbawaensis* Kosterm.



Fig. 12. *Septogarcinia sumbawaensis* Kosterm.

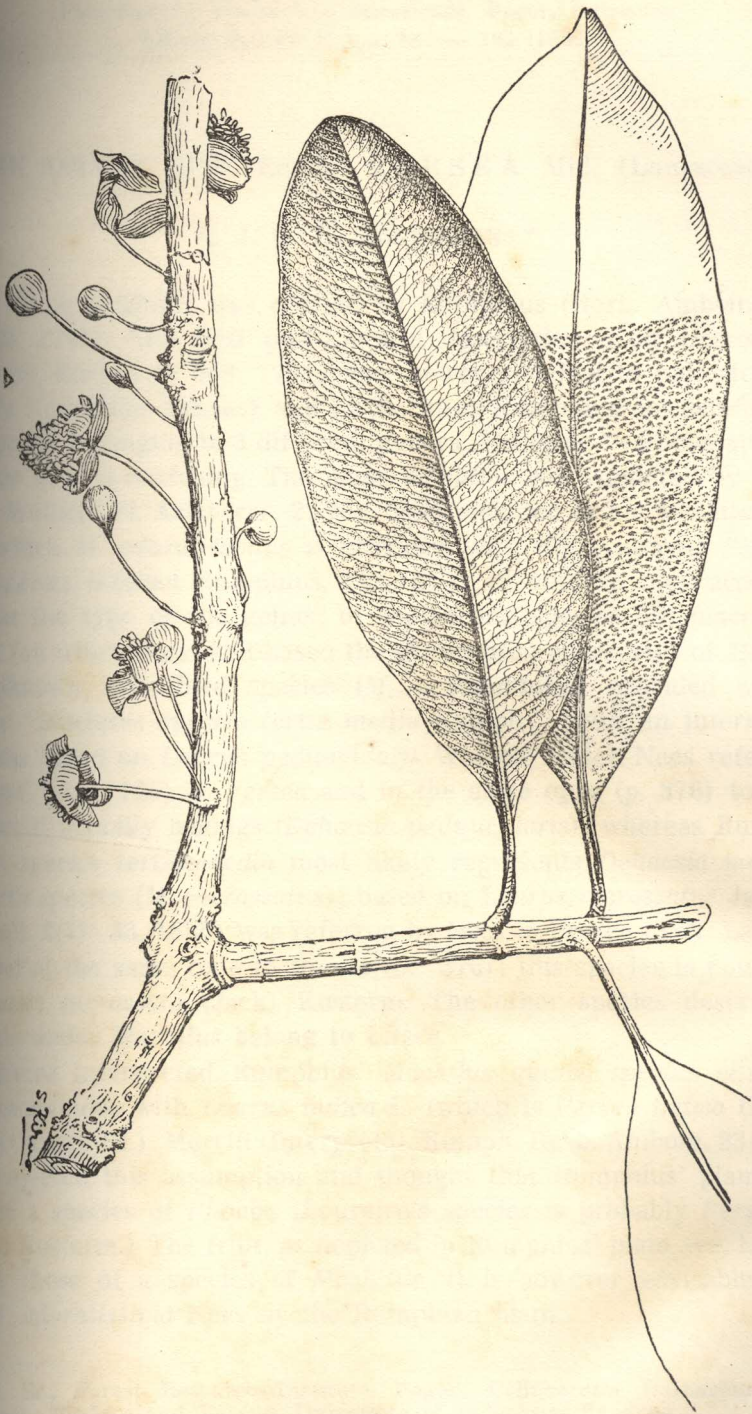


Fig. 13. *Mammea timorensis* Kosterm.