

**STUDIES IN SOUTH AMERICAN
MALPIGHIACEAE, LAURACEAE AND
HERNANDIACEAE, ESPECIALLY OF
SURINAM**

BY

A. J. G. H. KOSTERMANS (Utrecht).

INTRODUCTION.

Acknowledgments.

The present investigation has been carried out in the "Botanisch Museum en Herbarium" of the University of Utrecht. I wish to render to Dr. A. Pulle, the Director of the Institute, my most sincere thanks for the facilities afforded to me and for the interest in the progress of this work.

I am also greatly indebted to the Directors of the Berlin-Dahlem, Brussels, Göttingen, Leiden and Paris Herbaria and to the members of their staff for the opportunity of studying in these Institutes the collections entrusted to their care and for their helpful advice. Special words of thanks are due to Dr. O. C. Schmidt (Berlin-Dahlem), Dr. R. Benoist (Paris) and Dr. Exell (South Kensington). To Mr. Wilmott (South Kensington) I am obliged for the information he gave me with regard to the genus *Persea*, and to Dr. Hochreutiner (Geneva) for the loan of the type specimen of *Ocotea vernicosa*. To the Brussels, Berlin-Dahlem, Göttingen, Kew, Leiden and Paris Herbaria I am indebted for the loan of specimens which I needed for the solution of various special problems.

Scope of work.

It are in the first place Surinam species to which in this paper attention has been paid. In various instances however it was found advisable to revise a part of a genus, and then of course species not occurring in Surinam had also to be taken into consideration.

Material studied.

I have done my best to make the enumeration of the specimens collected in Surinam as complete and reliable as possible. For this purpose I have verified all the older determinations. The Surinam collections preserved in the Herbaria of Berlin-Dahlem, Brussels, Göttingen and Leiden are entirely included. It is doubtless true that other herbaria too possess specimens of Surinam plants, but as the greater part of these are merely duplicates of sheets belonging to the herbaria mentioned above, these collections are not of great importance. Those of Daniel Rolander, presumably in the Copenhagen Herbarium, could not be found: this is a great pity, because the study of these plants is absolutely necessary for the solution of several problems of identity. The Surinam material preserved in Utrecht consists for the greater part of collections made by the „Boschwezen” (Forestry Bureau); it was collected mainly in the localities indicated on the map at the end of this paper. In 1924 the numbering of the trees in the forest, a method which up to that date had been applied by the Forestry Bureau with such a great succes, was unfortunately stopped. Especially in a family like the Lauraceae this method is of the utmost importance, as it is practically the only way for establishing the specific identity or non-identity of the various fruiting and flowering branches, which in their vegetative characters are often very similar. A survey of these collections has been given by Pulle in his „Enumeration of the Vascular Plants known from Surinam (1906)” and in a paper published in the „Rec.

d. Trav. Bot. Néerl. 22 (1925), p. 324". The Utrecht Herbarium possesses also a number of jars containing flowers and fruits preserved in alcohol. As they belong to the herbarium specimens collected by the Forestry Bureau they are not mentioned separately. Information with regard to habit and to colour and fragrance of flowers and fruits were taken from the labels supplied by the collectors and from the card catalogue made by the Forestry Bureau. All other particulars were studied on herbarium material.

ABBREVIATIONS.

Herbaria:	Vernacular names:
B Brussels	Ar. Arowaccan (Indian)
D Berlin-Dahlem	Car. Caribbean, Caraibic, Galibi (Indian)
G Göttingen	N.E. Negro English
L Leiden	Sar. Saramaccan (Negro)
K Kew	S.D. Surinam Dutch
P Paris	
U Utrecht	

CHAPTER I.

NEW AND CRITICAL SPECIES.

MALPIGHIACEAE.

Niedenzu in his monograph of the Malpighiaceae includes the diagnostic characters of the varieties in his description of the species. In this paper however the description of the species is based exclusively on the var. *typica*. The presence or absence of glands on the sepals has been used by Niedenzu as a varietal diagnostic and before him even new species had been based on this character. In the course of this study it appeared however that glandular and eglandular sepals may be found even in the flowers of the same tree (see: *Byrsonima coriacea*). Consequently no great taxonomic value can be attached to the presence or absence of these glands and in the enumeration of the specimens I have indicated the two forms therefore merely as: glandless and gland bearing.

Mascagnia anisopetala (Juss.) Griseb. in Fl. Bras. XII, 1(1858), p. 95.

In my opinion *M. macrodisca* (Tr. et Pl.) Niedenzu is a variety only of *M. anisopetala*. The sole difference lies in the tomentum, which is sericeous in *M. macrodisca* and tomentose in *M. anisopetala*. The difference in the form of the leaf, to which Niedenzu draws the attention, viz. leaves usually cuspidate-acuminate in *M. macrodisca*, acuminate or obtuse-apiculate in *M. anisopetala* are of fluctuating nature. Of still

less importance is the diameter of the wings and I have not been able to confirm his statement that the glands of the sepals of *M. macrodisca* are less free than those of *M. anisopetala*. Niedenzu did not see flowers of *M. macrodisca*. A specimen with flower buds from Bolivia (Buchtien n. 1799) shows that the flowers too are exactly the same as those of *M. anisopetala*.

Mascagnia anisopetala* (Juss.) Griseb., var. *macrodisca
(Tr. et Pl.) Kosterm. nov. var.

Frutex scandens. Pubes sericea appressa. Folia ovata apice plerumque cuspidato-acuminata. Samarae ala 6—8 cm diametro.

Mascagnia multiglandulosa* Niedenzu, var. *surinamensis
Kosterm. nov. var.

Ramuli teretes, dense lanuginosi. Folia oblonga vel elliptica basi rotunda vel subcordata margine subrevoluta apice breviter acuminata vel apiculata supra glabrescentia nervis majoribus exceptis subtus dense persistenter lanuginosa. Inflorescentiae floresque ferrugineo-lanuginosi.

Surinamo, Brownsberg (v. Emden s. n., fl. m. Sept.; typus in Herb. Utrecht).

***Tetrapteris mucronata* Cav., Diss. IX (1790), p. 434,**
emend. Kosterm.

I have united the two species *T. mucronata* Cav. and *T. crebriflora* Juss., because they merge into each other. The var. *dubia* Griseb. of *T. crebriflora* can hardly be distinguished from *T. mucronata*. To get a better survey of the different varieties I have divided the species into two subspecies: *eumucronata*, covering *T. mucronata* s.s. and *crebriflora*, consisting of *T. crebriflora*.

Tetrapteris discolor* (G. F. W. Meyer) Niedenzu, var. *brownsbergensis
Kosterm. nov. var.

Folia glabra obovato-oblonga vel oblonga basi acuta apice breviter acuminata obtusa petiolis usque ad 15 mm longis. Inflorescentiae (fructiferae) usque ad 20 cm longae.

Surinamo, Brownsberg (B.W. n. 658, fr. m. Sept.; v. Emden s. n., fr. m. Sept.; typus in Herb. Utrecht).

This variety links *T. discolor* with *T. ovalifolia* Griseb. from which it differs by the thinner and smaller leaves.

Tetrapteris puberula Miq. in Tijdschr. Nat. Gesch. X (1843), p. 84; id. in Linnaea 18 (1844), p. 56.

The type specimen of this species: Focke n. 330, lower Suriname R., is identical with *T. discolor* (G. F. W. Meyer) Niedenzu. The error may be explained by the fact that this specimen consists of an inflorescence only, the inflorescence leaves always being smaller and somewhat different in shape from the normal ones.

Heteropteris nervosa Juss. in St. Hil., Fl. Bras. mer. III (1832), p. 26.

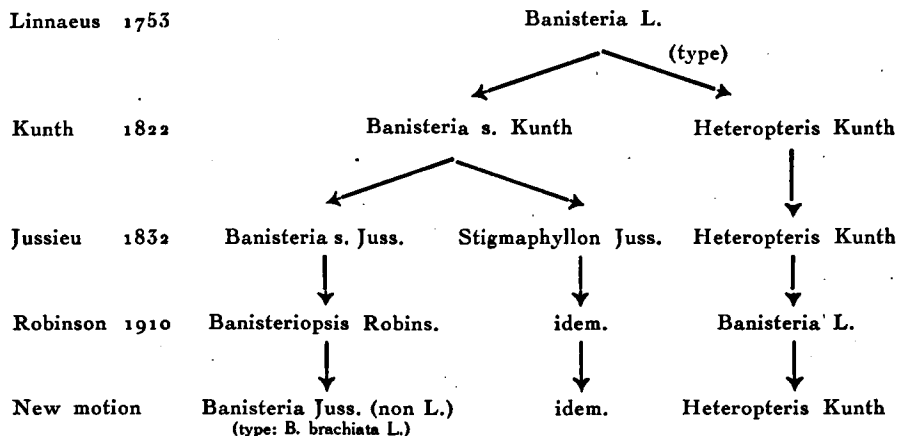
According to Macbride in Field. Mus. Nat. Hist. VIII, 2 (1930), p. 120, this name must supplant: *H. suberosa* (Willd.) Griseb, the name of Willdenow being a nomen nudum. I have combined this species with *H. anoptera* Juss. Neither the length of the inflorescence, nor the thickness of pedicels and peduncles, nor the shape of the top of the styles of *H. anoptera* are sufficiently distinct from those of *H. nervosa*. In the shape and the length of the wings of the samaras there is no difference at all.

Heteropteris multiflora (D. C.) Hochreutiner in Bull. N.-York Bot. Gard. VI, (1910), p. 277.

This species has first been described by Poiret as *Malpighia reticulata* (1816). In Flora Bras. XII, I (1858), p. 71 Grisebach described another species as *Heteropteris reticulata* Griseb. Niedenzu altered the name illegally into *H. Grisebachiana*. The name *H. reticulata* has to be kept for the species described by Grisebach and *M. reticulata* Poir. should be altered into *H. multiflora*, the name of D.C. being the oldest synonym.

Banisteria Juss. (non Linn.).

De Jussieu (St. Hil., Fl. Bras. merid. III, 1832, p. 27) and after him several other authors, including Niedenzu, have employed the name *Banisteria* in another sense than Linnaeus did. As the name: *Heteropteris* Kunth, based on the type specimen of Linnaeus' genus *Banisteria*, belongs to the nomina conservanda and *Banisteria* Linn. has been rejected (Intern. rules, ed. 3, 1935, p. 135), it appears advisable to make *Banisteria* Juss. (non Linn.) a nomen conservandum and *Banisteriopsis* Robinson ex Small (N. Amer. Fl. XXV, 2, 1910, p. 131) a nomen rejiciendum. In this way the renaming of the numerous species mentioned by Niedenzu in his monograph under the name: *Banisteria* sensu Juss. will be avoided. See for the discussion of the generic names: *Heteropteris* Kunth and *Banisteria* L.: Niedenzu in Engl., Pfl. reich IV (1928) p., 386; Fawcett and Rendle, Fl. Jam. IV (1920), p. 232, and the following scheme:

**Banisteria calocarpa** Miq. in *Linnaea* 18 (1844), p. 53.

Niedenzu's monograph merely refers to the diagnosis given by Miquel. Miquel did not describe the flowers. He stated that this species is nearly related to *B. lucida* Rich., but that

it differs from the latter in the shape of the leaves, in the inflorescence and in the flowers. Of this species I have only seen the specimen: Focke n. 329, which bears the determination of Miquel. The same specimen was labeled: *B. lucida* by Niedenzu. It is very incomplete, having samaras only, the latter are not different from those of *B. lucida*, and a few leaves, one of the leaves has a slightly cordate base, the others do not differ in the least from those of *B. lucida*.

Banisteria leptocarpa Benth. in Lond. Journ. Bot. VII (1848), p. 13.

B. elegans Tr. et Pl. is a very polymorphous species. By some of its forms it is connected with *B. leptocarpa*. I have removed the var. *ciliata* Ndz. of *B. elegans* to *B. leptocarpa*. But it is better perhaps to unite the two species. In both the underside of the leaf is provided with glands on either side of the midrib and in both calyx glands occur. Niedenzu points rightly to the following differences: *B. leptocarpa* has pseudo-alternate leaves, differing in shape from those of *B. elegans* and with glands along the margin. The tomentum too of this species differs from that of *B. elegans*.

Banisteria cristata Griseb. in Linnaea 22 (1849), p. 16.

The specimen: Wullschlägel n. 183, mentioned by Niedenzu in Pulle, Enumer. Pl. Surin. was collected in Venezuela.

Brachypterys Juss.

This genus is closely related to *Stigmaphyllon*, but differs so widely in its general habit, its inflorescence and its fruit, that there is no sufficient reason for uniting it with *Stigmaphyllon*, as Niedenzu has done.

Byrsonima crassifolia (L.) Rich. ex A. L. de Jussieu in Ann. Mus. Paris XVIII (1811), p. 481.

A. L. de Jussieu in Ann. Mus. Paris XVIII (1811), p. 481 says: „D'autres . . . (Malpighiacées), telles que les *M. spicata*,

lucida, *crassifolia*, *verbascifolia*, etc....., formeroient un second genre que Mr. Richard nomme *Byrsonima*," As the name *Byrsonima* of Richard is accepted, there is no reason why the names of the species, above mentioned, should not be accepted as valid combinations, though Jussieu himself was not convinced, that they belonged to the genus *Byrsonima*. The combinations of Richard should therefore have the priority above those of Kunth.

Small includes *B. cotinifolia* Kunth also in this species. This may be advocated on the ground of the polymorphy of this species, but the shape of the leaves and their tomentum make it preferable to keep them separated. The forms: *Kunthiana* Niedenzu, *ferruginea* (Kunth) Griseb., and more or less *cubensis* (Juss.) Niedenzu are merging into each other. The differences in the pilosity of ovaries, anthers and leaves are of little value, as this character often changes in the process of maturing.

Byrsonima coriacea (Swartz) Kunth in H.B.K., Nov. gen. V (1821), p. 113 (col. ed.).

Kunth states in a note in H.B.K., Nov. Gen. V (1821), p. 113 (col. ed.): „(Byrsonima Rich.) Hujus generis sunt: *M. crassifolia* Aubl., *M. moureila* Aubl., *M. spicata* Cav., *M. altissima* Aubl., *M. verbascifolia* Aubl., *M. lucida* Swartz, *M. coriacea* Swartz, et *M. rufa* Poir". I consider these names, for so far as they had not yet been published by Richard, as valid combinations made by Kunth. Sandwith (Kew Bull. 5, 1935, p. 312) is of a different opinion. The case is rather dubious, but in my opinion no difficulty can arise as to what was the meaning of Kunth.

Byrsonima Aerugo Sagot in Ann. sc. nat. 6e sér. XII (1881), p. 178.

According to Sandwith (Kew Bull. 5, 1935) this species is identical with *B. altissima* Auct. (not of Aubl.). The name *Malpighia altissima* Aubl. Guia. I (1775), p. 455 is of younger

date than *Malpighia altissima* Jacquin, Observ. Bot. I (1764), p. 40 and must therefore be rejected. I propose for *Malpighia altissima* Aubl. the name **Byrsonima Aubletii** Kosterm. nom. nov.

Byrsonima densa (Poir.) D.C., Prodr. I (1824), p. 580.

I have united this species with *B. amazonica* Griseb. The differences according to Niedenzu are: Leaves glabrous (or puberulous at the margin) and shining beneath; *B. amazonica*: leaves glabrous, dull beneath but in the latter species the var. *lucidula* (Huber) Niedenzu has a shining lower surface. Poiret (Enc., Suppl. IV, 1797, p. 7) states that the leaves of *B. amazonica* are shining on both surfaces, but less so beneath. The shape of the leaves is in both practically the same. I could not confirm Grisebach's statement, that the lower leaf surface is sparsely covered with black dots: in Grisebach's material the leaves may have been infected by fungi. It is possible, that *B. punctulata* Juss. also should be included in the above mentioned species: the description of Jussieu accords very well with this supposition, there is only a slight difference in the shape of the leaves. Unfortunately I could not find this specimen in the Paris herbarium.

Byrsonima densa var. **emarginata** Kosterm. nov. var.

Folia oblanceolata apice emarginata, apice ramuli brevissime congesta. Internodia 1—5 mm longa.

Surinamo, Dalgerberg (Pulle n. 395, fr. m. Sept.; typus in Herb. Utrecht).

Alcoceratothrix Niedenzu.

In Arb. Inst. Lyc. Braunsb. I (1901), p. 45 Niedenzu founded a new genus: *Alcoceratothrix* on the 2 species: *Byrsonima rugosa* Benth. and *B. stipulacea* Juss. The name of the genus is derived from the antler shaped hairs (the author introduces here the name Elk-horn shaped hairs, probably under the influence of the Elk reserve in the vicinity of his residence;

I did not use this name, as it may give a false impression of the shape of these hairs: the branches of the latter namely are not flattened like those of the antlers of the Elk; usually they are more or less stellate or antler-shaped). Antler shaped hairs however also occur in *Byrsonima Poeppigiana* Juss., *B. nitidissima* Kth. and *B. laurifolia* Kth., where they can even be 6-branched. Other species of *Byrsonima* moreover show hairs differing from the ordinary compassneedle type, e.g. *B. verbascifolia* (L.) Rich. where they appear to be simple, one of the branches being reduced. Therefore not too much significance should be attributed to this character. On the other hand the large deciduous stipules, the sepals already recurved in bud and the rectangular nervation of the leaves also serve to distinguish *Alcoceratobrix* from *Byrsonima*. In the opinion of Sandwith and myself, however, these characters are not so important as to necessitate the separation of the two genera, especially because the general appearance of the various species is very similar. (see also Gleason and Smith in Bull. Tor. Bot. Cl. 60, p. 361 and Sandwith in Kew Bull. 1935, p. 311). Other differences, mentioned by Niedenzu are still more dubious, e.g. the bullate leaves of *Alcoceratobrix* and its climbing habit. More or less bullate leaves also occur in other species of *Byrsonima* and *Alcoceratobrix stipulacea* Juss. is, according to v. Emden (on label), a tree.

I have combined *Byrsonima rugosa* and *B. stipulacea* Juss. The principal difference, according to Niedenzu and already mentioned by Bentham in Lond. Journ. Bot. VII (1848), p. 118, is the presence of glands in *B. rugosa*. As previously remarked, this character has no specific value. Neither could I confirm the presence of a difference in the shape of the hairs, as indicated by Niedenzu, viz. the presence of trimorphous hairs in *B. stipulacea* and of hairs of one kind only in *B. rugosa*, nor that the tertiary nerves are parallel in *B. rugosa* only. The sole difference I could find lies in the stipules, which

in *B. rugosa* are longer and provided with longer hairs; the poor state of the specimens of *B. stipulacea* makes it however very doubtful, whether this difference is of any value.

LAURACEAE.

Persea Mill.

Mr. A. J. Wilmott from the British Museum of Natural History has been very kind in giving me the necessary information with regard to the publication of this genus in Miller's Gardener's Dictionary. The 8th edition of this work follows the Linnean nomenclature, the other editions do not and consequently they figure on the list of works to be rejected according to the proposal of Mr. Wilmott (Kew Bull. 1935). As Mr. Wilmott pointed out to me the genus *Persea* was properly described and the name is therefore valid in the usual sense. It therefore seems necessary to Mr. Wilmott and me to change the name *Persea* Gaertn. to *Persea* Mill. in the list of nomina conservanda. Otherwise we should have the curious fact that the species name: *Persea americana* Mill. is of older date than the genus name: *Persea* Gaertn.

Persea Benthamiana Meissn. in D.C., Prodr. XV, 1 (1864), p. 44.

The leaves of this species are densely sericeous beneath; the adult leaves of *Persea nivea* Mez are nearly glabrous and pruinose beneath, but the young leaves have the same sericeous tomentum as those of *P. Benthamiana*. In my opinion the two species are identical.

Persea coriacea Kosterm. nov. spec.

Arbor 15 m. Ramuli sulcati sparse pilosi glabrescentes. Rami cylindrici laeves glabri. Petioli tenues glabri supra distincte canaliculati usque ad 2 cm longi. Folia alterna coriacea elliptica vel lanceolata basi breviter acuta apice breviter

acuminata vel acuta veteriora rotundata vel emarginata margine recurva (5—)10—12(—13) cm longa, ($1\frac{1}{2}$ —) $3\frac{1}{2}$ — $4\frac{1}{2}$ (—5) cm lata supra glabra nitida dense tenuiter punctiformi-areolata nervo mediano impresso costis vix prominulis infra glabrescentia brunneo-lutescentia sub lente granulata nervo mediano prominente costis utrinque 7—10 patentibus curvatis subprominentibus venis prominulis dense areolatis. Inflorescentiae in axilli foliorum superiorum floribus paucioribus late pyramidales usque ad 10 cm longae pedunculo graciliore sulcato glabro usque ad 6 cm longo incluso ramulis alternis usque ad $1\frac{1}{2}$ cm longis. Floris tubus subnullus attenuatus in pedicellum sulcatum extus dense breviter cinereo-pilosus intus glaber. Perianthii lobi sub-aequales ovato-orbiculares $1\frac{3}{4}$ mm longi concavi carnosi extus dense cinereo-puberuli exteriores intus eodem indumento vestiti interiores intus cinereo-sericei. Stamina exteriora 2 mm longa filamentis extus dense sericeis antheras sub-aequantibus sub-gracilioribus applanatis antheris ellipticis apice rotundatis margine plerumque constrictis cellulis introrsis, seriei tertiae $1\frac{3}{4}$ —2 mm longa filamentis 1— $1\frac{3}{4}$ mm longis extus cinereo-tomentosis intus glabris tertia parte a basi glandulis parvis sessilibus ellipsoideis compressis praeditis antheris ellipticis glabris cellulis extrorsis. Staminodia 1 mm longa extus fere usque ad apicem dense cinereo-sericeo-tomentosa intus glabra apice sagittata incrassata atra. Seriei quintae staminodium singulum saepe adest. Ovarium glabrum cylindricum $1\frac{1}{4}$ mm longum stylo crasso $\frac{3}{4}$ mm longo. Bacca globosa laevis 1 cm diametro cupula subplana parva margine integra 4 mm diametro 2 mm alta. Pedicellus fructifer crassus obconicus 1 cm longus apice 3 mm latus.

Surinamo, Emma Range, Hendrik top; 1080 m. (B.W. n. 5748, fl. m. Mart.; typus in Herb. Utrecht).

Species *Persea lanceolata* (Meissn.) Mez simillima sed magnitudine et forma loborum perianthii ovario glabro aliisque notis differt.

Ocotea Aubl.

O. rubra Mez, *O. Rodiaei* (Rob. Schomb.) Mez and *O. barcellensis* (Meissn.) Mez differ from the other *Ocotea* species in the shape of the outer stamens. But for the position of the anther cells the latter show a striking resemblance with those of many *Nectandra* species. I agree with Mez, that for the separation of the genera *Ocotea* and *Nectandra*, the position of the cells is of primary importance and the shape of the anthers secondary. The cells in the species mentioned above are inserted in two vertical rows and these species are therefore to be reckoned to the genus *Ocotea*.

Ocotea rubra Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 258.

My description of the flowers based on Surinam material shows important deviations from that given by Mez. There can be no doubt however, that the type specimen (Mélidon s. n. in the Paris Herb.) and the specimens from Surinam are conspecific. The flowers of the type specimen are badly preserved and moreover rather young.

Ocotea Rodiaei (Rob. Schomb.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 236.

Bentley and Trimen (Med. pl. III, 1880, p. 219) give a very good drawing of this species. It has repeatedly been mixed up with other species, but can easily be recognised by the elongated-triangular form of the outer stamens with their basal cells. The specimen Schomburgk n. 1004 in the Kew Herb. is the same as Schomburgk n. 1703 in the Brussels and Dahlem Herb., the former bearing in addition the number 1703. It is curious that most flowers of this species are abnormal in possessing an increased number of stamens.

Ocotea barcellensis (Meissn.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 237.

This species was erroneously described by Ducke (Arch.

Rio de Janeiro V, 1930, p. 113) as a *Nectandra*. He was led astray by taking the shape of the outer stamens, instead of the position of the anther cells as a generic criterium. The type specimen of *O. barcellensis* (Spruce n. 1925) has immature fruits, still included in the cupule. But the cupule shows already the same double margin as that of the two specimens of *Nectandra elaiophora* Barb. Rodr.: Ducke n. 23963 [D.] and n. 19936 [U.], which I had an opportunity for studying. The flowers of the latter specimen are abnormally enlarged.

Ocotea glomerata (Nees) Benth. et Hook.f., Gen. III (1880), p. 158.

According to the description of *Gymnobalanus Fendleri* Meissn. from Venezuela, which is given by Mez as a synonym, the berries of this species are 2 cm long and the fruiting pedicel is sub-cylindrical and up to $7\frac{1}{2}$ mm long, and $5\frac{3}{4}$ mm diam. This species can not belong therefore to *O. glomerata*.

Ocotea guianensis Aubl., Pl. Guia. II (1775), p. 781.

Aublet (Guia. II, 1775, p. 781, III t. 310) gives a description and a drawing of a fruit, which do not belong to this species. He mistook the valves of the anther cells for the anthers themselves and described the filaments as bearing four anthers, each of the latter with a cavity underneath. A specimen in the Sprengel Herb. in Berlin, determined as *Laurus surinamensis* Swartz is *Ocotea floribunda* Mez p. p., the rest is not a Lauracea.

Ocotea guianensis Aubl., var. **subsericea** Kosterm. nov. var.

Differt a specie foliis subtus indumento indistinctiore subsericeo vestitis.

Fluv. Surinamo super. prope Goddo (Wilhelmina Exped. n. 105, fl. m. Jan.; spec. femin.; typus in Herb. Utrecht).

Ocotea Wachenheimii R. Benoist in Bull. Mus. Hist. nat. Paris 30 (1924), p. 510.

The rudimentary ovary in the male flower is sometimes

minute, stipitiform and provided with an inconspicuous stigma, but shows all gradations to a quite distinct ovary, provided with a conspicuous style and stigma. The shape of the rudimentary ovary consequently is of no importance as a species character.

Ocotea caudata (Meissn.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 378.

This species shows a great variation in the shape of the leaves, which are sometimes obovate-cuspidate and sometimes oblong-cuspidate. Both forms of leaf occurred on the same plant. *O. urophylla* (Meissn.) Mez is perhaps also a mere variety of this species.

Ocotea Neesiana (Miq.) Kosterm. nov. comb.

This species was first validly published by Miquel as *Nectandra Neesiana* in Linnaea 18 (1844), p. 745; afterwards Miquel himself altered this name into *Oreodaphne fallax* (Stirp. surin. 1850, p. 202), the name adopted by Mez. *O. florulenta* (Meissn.) Mez, of which I could study the type specimen (Spruce n. 812, *Ocotea* n. 1 in the Dahlem Herb.) does not differ from *O. Neesiana*. Mez however confused his *O. florulenta* with other species. *Oreodaphne dispersa* Nees (Syst., 1836, p. 427; Linnaea 21, 1848, p. 520, quoad cit. spec. Sello n. 1361) is *O. Hilariana* Mez. *Oreodaphne confusa* Meissn. in D.C., Prodr. XV, 1 (1864), p. 126 and in Fl. Bras. V, 2 (1866), p. 221, quoad cit. spec. Sello n. 1381, is *O. Hilariana*. It remains doubtful, whether *Gymnobalanus Sprucei* Meissn. belongs to *O. Neesiana* or to *O. Hilariana*. With the aid of the leaves alone they can not be distinguished and I had no opportunity for studying fruiting specimens of *O. Hilariana*. The latter can easily be recognised by the larger flowers which seem to be hermaphrodite and not dioecious, as they are described by Mez: in the so called male flower a well developed ovary, provided with style and stigma is present.

Ocotea puberula Nees, Syst. (1836), p. 472.

This widely distributed species has been described under several names. *O. Martiniana* (Nees) Mez differs from *O. puberula* according to Mez by the filaments. The latter are said to be united with the perianth segments. Pilger (Engl. Jahrb. 30, 1902, p. 153) could not confirm this statement, nor could I.

Ocotea vernicosa Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 331.

Mez mixed a flowering specimen (Mélion n. 555 in the Paris Herb.) of *O. globifera* Mez with the fruiting specimens of *O. vernicosa* (Mélion s. n.). The label of the specimen in the Geneva Herb. bears the words nov. spec. and I therefore consider this specimen as the type of *O. vernicosa*. Neither the cupule, nor the leaves resemble those of an *Ocotea* species. In my opinion it is more probable that this species belongs to the genus *Acrodiclidium*.

Ocotea subglabra R. Benoist in Arch. Bot. T. 3 (Jan. 1929), p. 10 and in Bull. Soc. Bot. France 75 (1928), p. 979, is identical with *Ocotea oblonga* (Meissn.) Mez.

Ocotea Tessmannii O. C. Schmidt in Notizbltt. Berl.-Dahlem X, 93 (1928), p. 233 is identical with *Ocotea cuneifolia* (R. et P.) Mez. I do not agree with Macbride (Field Mus. XI, 1, 1931, p. 18) that the names of the species published in Ruiz et Pavon, Fl. Peruv. IV are invalid. The drawings are very good and they are provided with flower details. Nothing in the rules compels us to consider these species as invalidly published.

Nectandra grandis (Mez) Kosterm. nov. comb., non Nees mscr. ex Klotsch et Karst in syn. in Linnaea 21 (1848), p. 505; — *Endlicheria grandis* Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 124; — *Nectandra praeclara* Sandwith in Kew Bull. 1932, p. 224; — *Nectandra dioica* Mez in Fedde, Rep. 16 (1920), p. 308.

The fruiting type of this species in the Paris and Dahlem Herb. from French Guiana is identical with the flowering type of *N. praeclara* Sandwith. Flowers, collected at various times from the same Surinam tree show a good deal of variability; the tube, at first infundibuliform, increases at the end of the flowering period rapidly in bulk and becomes subglobose with a distinct contraction at the top; in the specimen: B.W. n. 5546 the tube is extremely, in my opinion more or less abnormally, enlarged; the perianth segments vary but little in shape and tomentum. The 6 outer stamens vary between ovate or ovate-rectangular and transversally elliptic, the top of the anthers is as a rule truncate or emarginate and incurved, but an obtuse top is not rare. In young flowers the anthers of the third row of stamens are as broad as the filaments, after the flowering period they give the impression of being narrower.

Nectandra dioica Mez is, according to Sandwith, a distinct species, the principal differences with *Nectandra grandis* being the indumentum of the branches, in *N. dioica* tomentose and not appressed as in *N. grandis*. However Surinam specimens of *N. grandis* show a tendency to become tomentose. The tomentum of the adult leaves shows no difference and the specimens of *N. dioica* have no young leaves. The top of the adult leaves of *N. dioica* varies between mucronate and cuspidate, consequently in this respect there is no difference with *N. grandis*. The flowers of both species are identical; it is sure that the glands of *N. dioica* are as a rule somewhat smaller than those of *N. grandis*, but small glands occur also in the latter species. The ovary rudiment is not pilose, as stated by Mez, but in both species glabrous. The only difference lies in the length of the pedicel, which is very short in *N. dioica*, but it has not been proved, that this character is constant.

Nectandra Laurel Klotsch et Karst ex Nees in *Linnaea* 21 (1848), p. 505 and *N. rigida* Nees can easily be distinguished

from *N. reticulata* (R. et P.) Mez by the glabrous inside of the flower tube; in *N. reticulata* the tube is densely sericeous-hirsute inside, a character not mentioned by Mez in his monograph. As the three species are otherwise very much alike, it is comprehensible, that Mez mistook several specimens of *N. reticulata* for specimens of the other two species and vice versa. *N. Laurel* and *N. rigida* are closely allied and it is often difficult to decide to which of these two species a specimen belongs. In both species the shape of the leaf is very variable and the young leaves are moreover different from the adult ones. The following differences could be found: in *N. Laurel* the leaves are as a rule alternate, but now and then, especially at the top of the branches they may become opposite or sub-opposite; in *N. rigida* the leaves are usually opposite, but this holds true only for the upper ones, the lower ones being often sub-opposite. *N. Laurel* has elliptical or ovate leaves with obtuse base; the latter showing the typical „auricle”, i.e. the margins are reflexed; *N. rigida* has lanceolate leaves with acute base, but the older leaves of *N. rigida* are rigidly coriaceous, those of *N. Laurel* coriaceous with distinctly impressed nerves on the upper surface. In the flowers no difference could be found; in both species the size of the flowers and the length of the pedicels vary strongly. The presence of a difference in the length of the style, as mentioned by Mez, I could not confirm.

***Nectandra Kunthiana* (Nees) Kosterm. nov. comb.**

Mez saw a male specimen only of this species. The female ones from Surinam show that this species does not belong to *Ocotea* but to *Nectandra* and that it is closely related to *Nectandra grandis* (Mez) Kosterm.

***Nectandra Pisi* Miq., Stirp. Surin. (1850), p. 199.**

This species was identified by Mez in his monograph as *N. globosa*. Aublet, *Guia*. I (1775), p. 364, gave no description

of his *Laurus globosa*, but referred to Plumier, Gen. 4. According to Urban (Fedde, Repert., Beih. V, 1920, p. 49), Plumier's plant, figured in Descr. pl. Amer. ed. Burm. (1775), p. 50, t. 60, is identical with *Nectandra antillana* Meissn., a species closely related to *N. Pisi*, but known from the West Indian islands only, not from Surinam. The name: *Nectandra globosa* (Aubl.) Mez must be reserved therefore for *N. antillana* Meissn. *Laurus globosa* Lamarck, Dict. III, p. 451, based on a specimen collected by Martin in S. Domingo, may be identical with this species. *Ocotea lineata* H.B.K., Nov. Gen. II (1817), p. 131 is treated by Mez as identical with *N. Pisi*. I could not study the type specimen; the description however does not correspond with that of *N. Pisi*.

The conclusion is that the Surinam species should bear the name: *N. Pisi* Miq. But there remains another unsolved difficulty: *N. sanguinea* Rol. ex Rottb. in Act. Hafn. (1778), p. 279, is based on a specimen of Rolander, collected in Surinam. The type specimen could not be found in the Copenhagen Herb., and Mez apparently did not see it. The locality makes it possible that Rolander's plant may be identical, either with *N. Pisi* Miq. or with *N. guianensis* Meissn. If the first supposition should prove to be true the name *N. sanguinea* Rol. should supplant the name *N. Pisi*. The species, interpreted by Mez as *N. sanguinea*, has not been found in Guiana.

In Stirp. Surin. (1850) Miquel gave a description of *N. leucantha* Nees based, as he remarks, on the description given by Nees, but he recognised already that there were differences between the various specimens described under this name by Nees himself. However he did not draw the conclusion that it was desirable to split the species up, though he mentioned *N. Rodiaei* Schomb. as a possible constituent, but not as a distinct species. According to Miquel the specimens Hostmann n. 235 and Kegel n. 193 (both *N. Pisi* Miq.) connect *N. Rodiaei* with *N. leucantha*. Miquel gave a good drawing of

the specimen Hostmann n. 235 and he stated also that there exists a difference between this specimen and the specimen Schomburgk n. 29 (*N. ambigua* Meissn.); of the latter he gave a short differential diagnosis.

The specimen: Kappler n. 1827 in the Leiden Herb. has much longer, lanceolate leaves with acute base, of the same shape therefore as those of *N. ambigua*. The leaves however are alternate and not opposite as in *N. ambigua*. The type specimen of *N. Pisi*: Focke n. 1305 bears abnormal, gall-like berries; the cupule is badly developed, flattish, irregular instead of hemispheric.

Nectandra ambigua Meissn. in D.C., Prodr. XV, 1 (1864), p. 158.

The specimens: Schomburgk n. 29 in the Leiden en Dahlem Herb. agree with the description given by Mez. Schomburgk n. 29 in the Brussels Herb. is different and belongs to *N. Pisi*.

Nectandra cuspidata Nees, Syst. (1836), p. 330.

The type specimen of *N. Pichurim* (H.B.K.) Mez in the Kunth Herb. in Dahlem is identical with *N. amazonum* Nees. The leaves possess a sericeous tomentum beneath, while those of *N. cuspidata* are puberulous. The many primary nerves and the hemispheric cupule exclude the possibility that *Ocotea Pichurim* H.B.K. should be identical with *N. cuspidata* Nees. *N. amazonum* Nees is only a synonym of *Ocotea Pichurim* = *Nectandra Pichurim* (H.B.K.) Mez (excl. descript.). The young leaves of *N. Pichurim* and the adult ones are very different. A beautiful specimen: Krukoff n. 2077 and also the type specimen of *N. amazonum* of Martius show the young, narrowly lanceolate cuspidate leaves, densely sericeous beneath and puberulous above, whereas the adult leaves are ovate or ovate-lanceolate, shining, and glabrous on both sides. *N. urophylla* Meissn. does not show the slightest difference from this species and must therefore be considered as a synonym. The type

specimen has the young lanceolate leaves only, but it shows the same kind of panicle as *N. Pichurim*.

The leaves and cupules of *N. pallida* Nees of which I could study two fruiting specimens are in my opinion identical with those of *N. urophylla*, except that in *N. pallida* the older, coriaceous leaves remain sericeous beneath and have the same shape as the young leaves of *N. Pichurim* usually have. The type specimen of *N. Pichurim* however has the same kind of leaves. It is questionable whether *N. ambigua* Meissn. should be considered as a distinct species or merely as a variety of *N. Pichurim*. The base of the adult leaves is different, usually acute, but there occur also leaves with rounded bases resembling those of *N. Pichurim*. The cupule and flowers of both species are, the tomentum excepted, nearly the same. The leaves of *N. ambigua* are usually opposite, those of *N. Pichurim* alternate but the latter has sometimes sub-opposite leaves.

Nectandra guianensis Meissn. in D.C., Prodr. XV, 1 (1864), p. 160.

Mez cites as a synonym: *N. Neesiana* Miq. in Linnaea 18, p. 745, teste Nees. This species is based on Hostm. et Kappl. n. 1433, which is *Ocotea Neesiana* (Miq.) Kosterm.

The description of *Nectandra sanguinea* Rol. ex Rottb. shows many controversies, as already pointed out by Nees. The shape of the leaf: oblong and the description of the nerves make it possible that this species is identical with *N. guianensis*. See also under *N. Pisi* Miq.

Nectandra kaburiensis Kosterm. nov. spec.; — *Nectandra surinamensis* Mez in Urban, Symb. II (1900), p. 252, nec alibi; — *Aniba sulcata* R. Benoist, nomen, in Bull. Soc. Bot. France 75 (1928), p. 976.

Arbor usque ad 30 m alta. Ramuli crassissimi angulati sulcati dense fulvo tomentosi vel sericei. Rami cylindrici leaves grisei. Gemmae dense sericeae. Folia alterna rigide coriacea

late elliptica vel oblonga raro oblongo-lanceolata (9—)13—19 (—21) cm longa, (4—)5—6(—8) cm lata basi acuta vel cuneata margine vix recurva apice acuminata acumine usque ad 1 cm longo acuto, juniora interdum lanceolata puberula, adulta supra glabra nitida nervo mediano costis nervisque secundariis impressis infra sparse hirsuta vel puberula nervo mediano valde prominente costis utrinque 10—15 prominentibus rectis adscendentibus margine arcuato-connectis inferioribus exceptis nervis secundariis parallelibus subhorizontalibus 4—5 mm distantibus subprominentibus venis fere inconspicuis, petiolis crassis latis glabrescentibus supra planis 10—15 mm longis. Paniculae multiflorae axillares in ramulis pyramidales dense fulvo-tomentellae usque ad 18 cm longae pedunculis crassis compressis usque ad 7 cm longis ramulis strictodivariatis crassis compressis usque ad $7\frac{1}{2}$ cm longis cymis pluribus floribus pseudo-umbellatis. Bractee lanceolatae acutae 1— $1\frac{1}{2}$ mm longae extus tomentellae intus glabrae deciduae. Pedicelli graciles tomentelli $2\frac{1}{2}$ mm longi. Flores fragrantis albi vel flavescens rotati 5—6 mm diametro tubo $\frac{1}{2}$ mm longo apice paullo constricto extus tomentello vel subglabro intus glabro. Perianthii segmentis ovatis vel oblongis $1\frac{1}{2}$ — $2\frac{1}{2}$ mm longis extus glabrescentibus intus dense lanuginoso-papillois. Stamina seriei exterioris 1 mm longa filamentis brevibus latis tomentellis antheris transverse ellipticis vel suborbicularibus truncatis incurvis interdum subemarginatis $\frac{1}{2}$ mm longis extus dense papillois loculis serie paullo curvata dispositis magnis introrsis exterioribus saepe sublateralibus, stamina seriei tertiae paullo longiora antheris cuneatis apice truncatis gradatim in filamenta lata breviter transeuntibus intus canaliculatis loculis inferioribus extrorsis superioribus lateralibus glandulis basalibus maximis depressis globoso-polygonis magis minus filamenta amplectentibus. Staminodia seriei quartae $\frac{1}{2}$ mm longa subclavata pilosa vel glabra. Ovarium glabrum globosum 1 mm diametro stylo brevi vel vix $\frac{1}{2}$ mm longo stigmatibus discoideo parvo. Bacca globosa

12 mm diametro sublibera. Cupula plana parva 6 mm diametro pedicello crasso obconico 12 mm longo apice 5 mm diametro insidens.

Surinamo, Kaboeri, arbor n. 649 (B.W. n. 4888, ster. m. Oct.; n. 5901, fl. m. July, typus in Herb. Utrecht).

Mez reckoned (Urb. Symb. l. c.) material of this species from Trinidad to *N. surinamensis*, but it can easily be distinguished from the latter species by the broadly elliptic, rigidly coriaceous leaves with their thick, broad petioles.

Aniba sulcata R. Benoist was published as a nomen nudum; there can be no doubt that the type specimen in the Paris Herb. is identical with *N. kaburiensis*.

N. kaburiensis is closely related to *N. myriantha* Mez, from which it differs in the distinctly impressed nerves and the secondary nerves which are prominulous on the lower side. A specimen from Peru (Weberbauer n. 5027) determined by Mez as *N. cissiflora* Nees, is in my opinion *N. myriantha*; the inflorescences however are tomentose.

N. Kuntzeana Mez in O. Ktze. Rev. II, 2 (1898), p. 277 is identical with *N. myriantha*. Not the least difference could be discovered in leaves and flowers.

Aniba Koumaroucapa Kosterm. nov. spec.; — *Aniba salicifolia* (Nees) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 71, p. p., quoad cit. spec. Mélinonis in Herb. Paris; — *Laurus koumaroucapa* L. C. Richard, mscr. in Herb. Paris.

Arbor. Ramulis rectis gracilibus cylindricis subnitidis glabris rubro-brunneis vel cinereis plerumque lenticellis pluribus magnis internodiis usque ad 10 cm longis ramis cinereis gemmis subglabris. Folia sub-verticillata obovato-lanceolata, (6—)10—14 (—20) cm longa, (2—)3½—5 cm lata, basi subcordata vel rotundata apice breviter acuminata vel acuta saepe obtusa margine vix recurvulo supra glabra satis opaca nervo mediano et costis prominulis vel planis venis inconspicuis areolatis

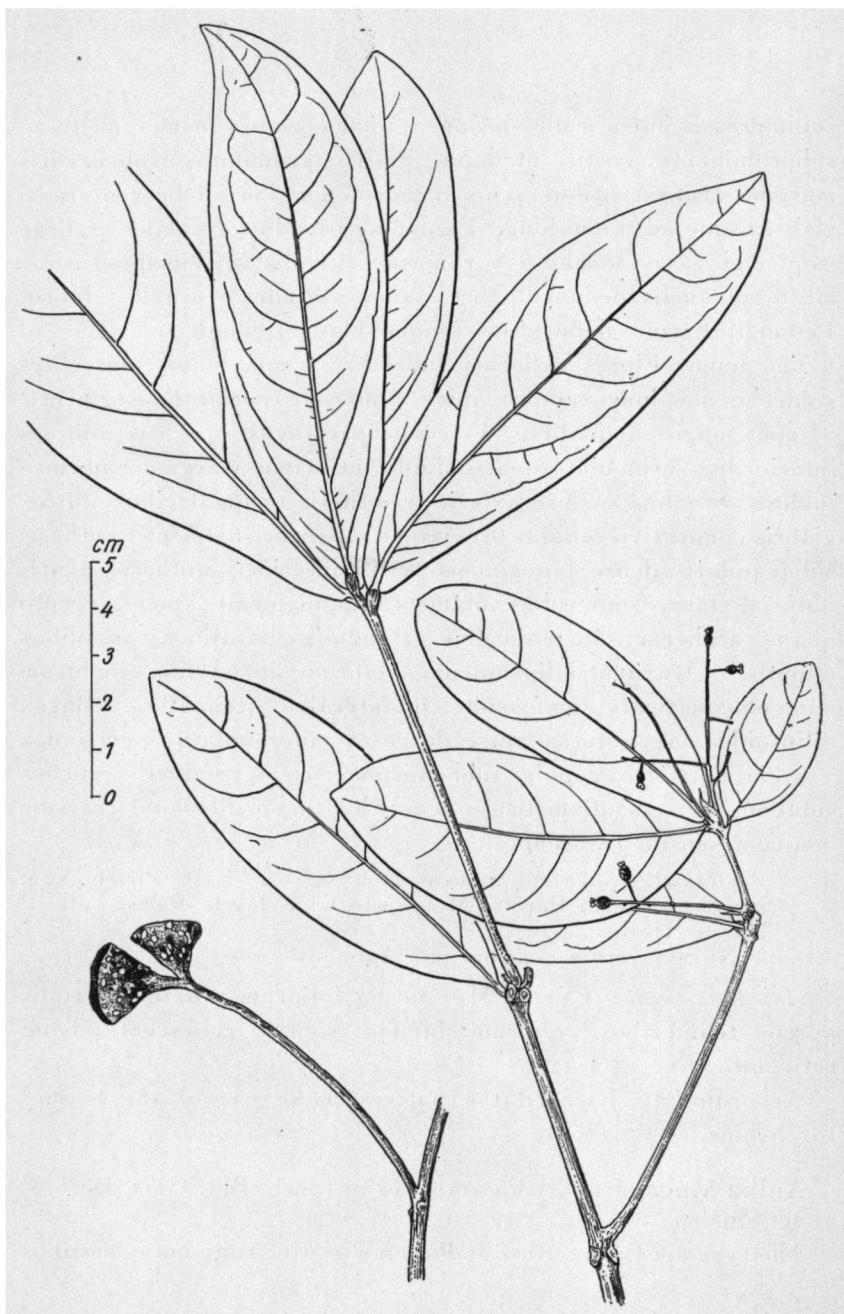


FIG. 1. *Aniba Koumaroucapa* Kosterm.

subimpressis infra rubro-brunnea opaca glabra nervo mediano subprominente costis utrinque 7—10 prominulis subcurvatis margine evanescentibus venis inconspicuis. Petioli breves crassi glabri usque ad 6 mm longi. Paniculae pseudo-terminales glabrae usque ad 4 cm longae vix ramosae ramulis inferioribus usque ad 1 cm longis pedunculo brevissimo cylindrico gracile glabro. Pedicelli florum defloratum tenues glabri cylindrici usque ad 4 mm longi. Flores deflorati subglabri 1 mm longi tubo ellipsoideo 2 mm longo glabro apice constricto perianthii segmentis 1 mm longis aequalibus exterioribus anguste ovatis obtusis interioribus orbiculato-ovatis duplo latioribus margine fimbriato incluso. Stamina inclusa exteriora antheris triangularibus obtusis glabris connectivo cellulas brevissime superante filamentis antheris subaequilatis dense lanuginosis seriei interioris antheris ovatis obtusis glabris minoribus filamentis lanuginosis apice excepto quam antherae angustioribus glandulis basalibus sessilibus minutis. Ovarium ellipsoideum glabrum in stylum inclusum conicum stigmate majusculo sublaterale attenuatum. Bacca ellipsoidea laevis lutea apice depressa mucronulata 3 cm longa $1\frac{1}{2}$ cm diametro cupula subhemisphaerica ferrugineoverrucosa subtenuae $\frac{1}{2}$ cm diametro 1 cm alta in pedicellum crassum conicum sensim transeunte.

Guiana gallica ad amnem Kourou, leg. L. C. Rich. s. n. (typus in Herb. Paris); Mélinon s. n. in Herb. Paris; collect. ign. in Herb. Paris.

Nomen vernac. caribaeum: Ayououy.

Anibae bracteatae (Nees) Mez forma foliorum proxima petiolis autem tenuioribus foliorum lamina subtus rubescente haud reticulata diversa est.

According to Richard the natives make use of the berries for fishing.

Aniba Muca (Ruiz et Pavon) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 57.

The type specimen: Ruiz et Pavon s. n. (in Andinum nemoribus

ad Pozuzo, Cuchero) in the Dahlem Herb. is a fruiting one. The shape of the leaves induced Mez to place it in the same group as *A. firmula* (Nees et Mart.) Mez. Weberbauer collected a flowering specimen (n. 1919, La Mezzed in Chamayo vale, Dep. Junin) of which the leaves agree very well with those of Ruiz' specimen. The flowers however are quite different from the *A. firmula* type. Here follows the description:

Narrow, small panicles, densely rusty-tomentellous, few-flowered, up to 4 cm long, clustered at the top of the branchlets; peduncle compressed, up to 2½ cm long, branchlets up to 1 cm long. Flower tube nearly cylindrical, 1 mm long, constricted at the top, tomentulous inside. Perianth segments ovate-triangular, slightly acute or obtuse, concave, tomentulous, inner row broader, orbicular-ovate, obtuse, ½ mm long. Outer 6 stamens ½ mm long, filaments hirsute, broader than the anthers; anthers transversally oblong, 3 × broader than long. Inner stamens ¾ mm long, filaments narrower than those of the outer ones, slightly narrower than the anthers, canaliculate, glabrous inside, twice as long as the glabrous, small, depressed-oblong anthers, densely pilose outside; connectives not protruding beyond the cells; glands large, touching each other. Ovary ellipsoid, nearly glabrous, 1 mm long, merging into the slender, conical, glabrous, 1 mm long style, stigma minute. This species differs from *A. firmula* in its minute flowers with their cylindrical tube, in the indumentum of the filaments and in its nearly glabrous ovary.

Aniba Burchellii Kosterm. nov. spec.; — *Aniba firmula* (Nees et Mart.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 58, p. p., quoad cit. spec. Burchell n. 9620.

Arbor. Ramuli angulati, striati, dense ferrugineo-puberuli; ramuli cylindrici laeves cinerei. Folia alterna chartacea oblonga vel elliptica, 13—17(—20) cm longa, 4—5½(—6½) cm lata

basi breviter acuta apice acuminata margine recurvulo supra viridia nitida laevia nervo mediano costis et venis reticulatis plerumque planis, subtus glabra nervo mediano puberulo flavida sub lente papillosa nervo mediano prominente costis prominentibus utrinque 10—14 arcuatis patentioribus margine haud connectis venis prominulis dense reticulatis. Petioli crassi striati 1—1½ cm longi ferrugineo-puberuli. Paniculae axillares et pseudo-terminales pyramidales laxae dense ferrugineo-puberulae usque ad 14 cm longae, pedunculo compresso striato breve, ramulis paucioribus patentibus usque ad 5 cm longis. Flores 2½ mm longi puberuli pedicellis crassis 1 mm longis tubo subcylindrico breve 1 mm longo apice paullo constricto perianthii segmentis aequalibus concavis obovatis apice subtriangularibus margine pilosis extus puberulis 1 mm longis interioribus angustioribus ovato-oblongis subacutis puberulis. Stamina exteriora sex 1 mm longa filamentis gracilioribus ¾ mm longis incurvatis dense hirsuto-lanuginosis antheris parvis subglabris cellulis parvis introrso-apicalibus connectivis cellulas distincte superantibus. Stamina interiora paullo breviora antheris minoribus filamentis latioribus dense lanuginosis cellulis extrorsis connectivis cellulas haud superantibus glandulis basalibus magnis filamentis sub-aequantibus globosis sessilibus. Ovarium ellipsoideum puberulum glabrescens 1 mm longum in stylum gracilem 1 mm longum vix puberulum stigmatem minimo transeans.

Brasilia, Para (Burchell n. 9620, typus in herb. Leiden);
in planitie alta inter flum. Livramento et flum. Ipixuna (Krukoff
n. 7050, fl. m. Nov.).

Aniba firmulae (Nees) Mez affinis sed staminum 6 exteriorum forma differt.

Aniba firmula (Nees et Mart.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 58.

The differences between *A. Panurensis* Mez, *A. firmula* and *A. laevigata* Mez given by Mez in his Monograph are the following:

<i>A. Panurensis</i>	<i>A. firmula</i>	<i>A. laevigata</i>
Petioles up to 15 mm long;	Up to 8 mm long;	Up to 10 mm long;
leaves subcoriaceous; elliptical- or broadly sublanceolate-oblong; top acuminate;	chartaceous-coriaceous; elliptical- or obovate-lanceolate; top shortly acuminate;	chartaceous; elliptical- or oblong-lanceolate; top very shortly and obtusely acuminate;
16—18 cm long; 4—5½ cm wide;	13—17 cm long; 3½—5 cm wide;	10—18 cm long; 2,8—4½ cm wide;
beneath distinctly prominent-reticulate;	minutely, obscurely reticulate;	nearly smooth;
pedicels 3—8 mm long	2—4 mm long	1—2 mm long
Flowers 2—3 mm long;	2½ mm long;	1½ mm long;
glands very large.	small.	very large.
Ovary densely strigose;	sparingly strigose-pilose;	densely strigose;
style rather thick	slender	conical

These characters are hardly sufficient to distinguish the 3 species. Of *A. Panurensis* I could study: Spruce n. 2603 (type), Glaziou n. 7809; of *A. firmula*: Sellow n. 369 (type), Glaziou n. 17193, Moura n. 1001; of *A. laevigata*: Glaziou n. 8104, Pohl s. n., Schwacke n. 6608, III 434. The length of the petioles of *A. firmula* (Sellow n. 369) is up to 12 mm, of *A. laevigata* (Glaziou n. 8104) up to 15 mm. Not the least difference could be found in the thickness of the leaves. The shape and the length of the leaves is so variable that this character has no value at all. The specimen Sellow 369 shows in contradiction with Mez' statement the reticulation of the lower leaf surface better than the type specimen of *A. Panurensis*. The length of the pedicel depends on the stage of development of the flower: in the same specimen lengths varying between 1 and 7 mm may be found. The same holds true for the length of the flower. Flowers with small and with large glands occur in Surinam specimens on the same tree. The ovaries are densely tomentellous in youth, but in the end they become glabrous. *A. Gardneri* Mez is also a synonym only of this species, though the distinct reticulation of the lower leaf surface seems a rather characteristic feature, but it also occurs in *A. firmula*

(Glaziou n. 1793). I have studied the specimens Glaziou n. 12118, Schwacke n. 6654, Gardner n. 5156 (type), Mexia n. 5163, Jelski n. 203, 192; Raimond n. 3764, 4055. According to Mez the difference lies in the length of the leaves, the latter being shorter and more distinctly elliptic than those of *A. firmula*; however the specimen Jelski n. 203 shows among short leaves also some reaching up to 18 cm long and 6 cm wide. Another difference should lie in the broader filaments, but I could not confirm this, as among very broad filaments there are also narrow ones, even in the same flower. *A. fragrans* Ducke (specimens studied: Ducke n. 18349 and 19978) differs from *A. firmula* in the denser tomentum of branchlets, lower leaf surface and flowers. A specimen of *A. laevigata* (Pohl s. n.) has the same tomentum, whereas the specimen Glaziou n. 12118 (*A. Gardneri*) is intermediate between the more glabrous and the tomentose type. The type specimen of *A. firmula* (Sellow n. 369) too has a denser tomentum. The shape of the leaves and of the flowers is the same as in *A. firmula*.

Aniba Canelilla (H.B.K.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 53.

The stamens of the third row are fertile and not sterile as stated by Mez. The shape of the flower changes very markedly when the fruit begins to develop: the tube becomes constricted at the top, the ovary, at first ellipsoid, pilose and gradually merging into the style becomes globose-ellipsoid, glabrous and distinct from the style. *A. elliptica* A. C. Smith differs only in the shape of the leaves, the latter are more distinctly elliptical.

Aniba mas Kosterm. nov. spec.

Arbor. Ramuli paulo angulati ferrugineo-tomentelli. Rami cylindrici brunnei glabri. Gemmae ferrugineo-tomentosae. Folia alterna tenuiter chartacea obovato-elliptica vel elliptica, (11—)14—18(—22) cm longa, (4—)5—6(—8½) cm lata, basi cuneata vel acuta apice acuminata acumine lato obtuso usque

ad $1\frac{1}{2}$ cm longo supra glabra subnitida nervo mediano subprominulo vel plano costis vix prominulis venis oblitteratis, subtus flavido-viridia glabrescentia nervo mediano valde prominente tenuiter tomentello costis utrinque 10—13 prominentibus patentibus quodam spatio a margine curvatis connectis venis reticulatis prominulis vel indistinctis. Petioli supra valde canaliculati dense ferrugineo-tomentelli glabrescentes, $1-1\frac{1}{2}$ cm longi. Paniculae permultiflorae, ferrugineo- vel cinereo-tomentellae apice ramulorum congestae pyramidales usque ad 9 cm longae pedunculo subcompresso sulcato gracile usque ad 3 cm longo ramulis patentioribus compressis usque ad 3 cm longis bracteis ovatis carinatis usque ad 3 mm longis, deciduis. Pedicelli 1—3 mm longi sulcati dense cinereo-tomentelli. Flores cinereo- vel ferrugineo-tomentelli, $1\frac{1}{2}-2$ mm longi; perianthii segmentis ovatis vel ovato-orbicularibus, 1 mm longis margine paullo ciliatis apice obtusis. Stamina inclusa, 6 exteriora antheris glabris ovatis vel depresso-ovatis filamentis villosis quorum tria seriei primae filamentis dilatatis tria seriei secundae filamentis antheris aequilatis praedita sunt. Stamina seriei tertiae antheris aequilatis basi tantum hirsutis. Ovarium ellipsoideum praeter basin tomentellum in stylum conicum praeter apicem tomentellum stigmatem minimo transeuns. Fructus ignotus.

Surinamo, Brownsberg, arbor n. 1024 (B.W. n. 6337, fl. m. Nov., typus in herb. Utrecht).

Anibae firmulae (Nees) Mez valde affinis sed foliorum magnitudine crassitudine et forma filamentis angustioribus diversa.

Aniba Gonggrijpii Kosterm. nov. spec.

Arbor. Ramuli angulati crassi dense ferrugineo-tomentosi. Rami cylindrici laeves cinerei. Folia alterna chartaceo-coriacea elliptica vel magis minus obovato-elliptica, (7—12(—15) cm longa, 3—5(—7) cm lata basi breviter acuta apice breviter acuminata margine recurvulo supra glabra laevia venis vix conspicuis subtus flavida sub lente papillosa glabra praeter

nervum medianum prominentem, costis utrinque 6—10 prominentibus patentioribus superioribus arcuato-connectis quodam spatio a

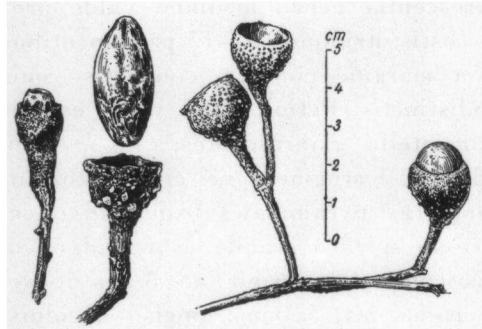


FIG. 2. Left: Young and mature fruit of *Aniba rosaeodora* Ducke; right: young fruit and cupules of *Aniba Gonggrijpii* Kosterm.

margine distantibus venis vix prominulis dense reticulatis. Petioli dense ferrugineo-puberuli supra distincte canaliculati, 1—1½ cm longi. Flores ignoti. Paniculae fructiferae axillares usque ad 10 cm longae. Bacca ellipsoideo-ovoidea flava laevis mucronulata usque ad 2 cm longa 1½ cm diametro. Cupula crassa ferrugineo-verrucosa maculis albidis

irregularibus verrucosis, hemispherica, 15 mm alta, 17 mm diametro margine integro sub-tenuo in pedicellum fructiferum crassissimum obconicum verrucosum sensim transeuns.

Surinamo, fluv. Suriname sup., Parwa-Kreek, prope Wane-Kreek (B.W. n. 369, fr. m. Oct.; typus in herb. Utrecht).

Anibae rosaeodora Ducke affinis sed foliis et cupulis tenuioribus diversa.

Aniba opaca A. C. Smith (type: Krukoff n. 1730) is identical with *A. affinis* (Meissn.) Mez (type: Spruce n. 3769). Both specimens show a remarkable resemblance to *A. Trinitatis* Mez (type: Crueger n. 69). In the shape and nervature of the leaves no difference could be found. The same may be said of the flowers, except that the ovary is densely tomentellous in *A. opaca*, tomentellous in *A. affinis* and nearly glabrous in *A. Trinitatis*. This may be due however to the circumstance that the latter are older. *A. Trinitatis* has very slender panicles, but its peduncles and branchlets have the same tomentum and

the same compressed form as those of *A. opaca* and *A. affinis*. As the type specimen of *A. Trinitatis* gives the impression of being very poorly developed, I doubt whether these differences are of any value. The three species may easily be recognised from other *Aniba* species by the very thick and large, truncate anthers of the stamens of the third row, with minute cells and by the strongly protruding connectives in the large anthers of the outer six stamens with their distinct, narrow filaments. The label of the type specimen of *A. affinis* (Spruce n. 3769) in the Brussels Herb. bears the name: *Goepertia Sprucei* Meissn.; this is an error: the description of *Goepertia Sprucei* refers to Spruce n. 2769. It is strange however that Meissner in Fl. Bras. V, 2, p. 182 cites the number of Spruce n. 3769 as p. p.; probably a mistake has been made in the numbering of Spruce's specimens.

Aiouea densiflora Nees in Linnaea 21 (1848), p. 268 and 513.

The cells of the outer anthers are introrse and not extrorse as Mez erroneously states. This can best be seen before the cells open: after dehiscence the thick cells give the impression of being more or less lateral. But for the climbing habit, *A. scandens* Ducke looks almost exactly like *A. densiflora*. The petioles of *A. scandens* are somewhat longer, the staminodes of the fourth row are longer, but not broader than those of *A. densiflora*: the anthers and the staminodes of the third row are of identical form.

Aiouea guianensis Aubl., Pl. Guia. I (1775), p. 311.

The cells of the outer anthers are extrorse and not introrse as Mez erroneously states. This applies also to the type specimen of Aublet in the Paris Herb.; the description of Aublet is right therefore. But for the size of all its parts *A. rubra* A. C. Smith (Phytologia I, 3, 1935, p. 115) does not differ from *A. guianensis*. The filaments are not glabrous, but sparingly puberulous. As it is very difficult to distinguish the closely allied *Aiouea*

Schomburgkii Meissn., *A. brasiliensis* Meissn., *A. guianensis* Aubl., and *A. densiflora* Nees, I will give here a key.

1. *a.* Anther cells introrse 2
- b.* Anther cells extrorse 3
2. *a.* Staminodes of the 4th row triangular, sessile, not divided at the top. Filaments long. Staminodes of the 3rd row long, but not so long as the style, truncate at the top ***A. brasiliensis*** Meissn.
- b.* Staminodes of the 4th row ovate, sub-stipitate; top incised. Filaments of the fertile stamens very short. Staminodes of the 3rd row long and as long as the style; top clavate... ***A. densiflora*** Nees.
3. *a.* Filaments of the fertile stamens short (in youth). Staminodes of the 3rd row 2 × as long as the glands, somewhat clavate at the top ***A. Schomburgkii*** Meissn.
- b.* Filaments of the fertile stamens long. Staminodes of the 3rd row very short, hardly longer than the glands ***A. guianensis*** Nees.

Acroclidium Canella (Meissn.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 90.

Mez stated erroneously in his monograph that the fertile anthers had extrorse cells; in the abundant material I could study the cells however were introrse. The cupules of the fruiting specimen from Surinam (B.W. n. 4961) agree with those of the fruiting specimen of *Aniba megacarpa* Hemsl. (Bot. Gard. Herb. Trinid. n. 6786). The cupules of the Surinam specimen are somewhat smaller, probably owing to their youth. A fruiting specimen from Brit. Guiana (Forest Dep. n. 2299) has as large cupules as Hemsley's specimen. Leaves and flowers of *A. megacarpa* are identical with those of *A. Canella*, the small size of the outer staminodes made it difficult for Hemsley to decide whether they were sterile or not.

Acroclidium Aubletii Kosterm. nov. spec.; — *Licaria guianensis* Aubl. Guia. I (1775), p. 313, III, t. 121;

Lamarck, Enc. 3 (1789), p. 470; Nees, Syst. (1836), p. 344 et 658; Meissn. in D.C., Prodr. XV, 1 (1864), p. 259; id. in Fl. Bras. V, 2 (1866), p. 281 in adn.; Baillon, Hist. II (1870), p. 466; Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 220 et 378; Hallier in Meded. Herb. Leiden 35 (1918), p. 20; Gonggrijp in de Indische Mercur 23 Apr. 1920; Benoist in Bull. Soc. Bot. France 75 (1928), p. 979; Ducke in Arch. Jard. Rio de Janeiro V (1930), p. 108.

Arbor. Ramuli graciles, subcylindrici, dense ferrugineo-tomentelli. Rami glabri cinerei. Petioli graciles ferrugineo-tomentelli glabrescentes supra canaliculati 1 cm longi. Folia alterna chartacea elliptica vel lanceolata breviter acuta apice caudato-acuminata acumine usque ad $1\frac{1}{2}$ cm longo basi 5 mm lato margine recurvula, (5—)7—9(—13) cm longa, (2—)2 $\frac{1}{2}$ —3 (—4) cm lata, juvenilia supra dense areolata infra sericea adulta supra glabra nitida medio canaliculata nervo mediano prominulo costis impressis nervis secundariis subimpressis infra brunescencia sericeo-tomentella glabrescentia nervo mediano prominente costis utrinque 3—4 prominentibus arcuatis adscendentibus distincte connectis quodam spatio a margine separatis nervis secundariis prominulis laxe reticulatis venis inconspicuis. Paniculae pyramidales in axillis foliorum vel bractearum usque ad 8 cm longae dense ferrugineo- vel rubro-tomentellae pedunculis gracilibus cylindricis usque ad 3 cm longis ramis sparsis patentibus usque ad $1\frac{1}{2}$ cm longis. Pedicelli graciles tomentelli 3 mm longi. Flores 2 mm longi tubo conico apice constricto tomentello 1— $1\frac{1}{2}$ mm longo perianthii segmentis extus tomentellis intus glabris crassis concavis depresso-obovatis apice acutis. Staminiibus serierum 2 exteriorum sterilibus glabris perianthio brevioribus foliaceis ovatis acutis seriei secundae basi paulo constrictis perianthio brevioribus seriei tertiae fertilibus vix $\frac{1}{2}$ mm longis antheris obtusis cellulis terminalibus filamentis pilosis antheras sub-aequantibus et iis subaequilatis glandulis basalibus parvis foliaceis seriei quartae nullis. Ovarium pilosum

ellipsoideum vix $\frac{1}{2}$ mm longum in stylum angustum dimidio breviorum attenuatum stigmatum indistincto. Bacca ellipsoidea laevis 15 mm longa 9 mm diametro apice depressa tertia partem a cupula hemisphaerica subcylindrica tenue sparse ferrugineo-verrucosa margine integra tecta. Pedicellus fructifer obconicus apice 2 mm crassus.

Surinamo: Zandery I, arbor n. 156 (B.W. n. 4365, fl. m. July, typus in Herb. Utrecht; n. 1524, ster. m. Dec.); Zandery I (B.W. n. 6424, fr.; Samuels n. 536, fl. m. July [L.]); Watramiri, arbor n. 1653 (B.W. n. 1923 fl. m. Juny; n. 4706, fl. m. July).

Guiana gallica: Aubl. s. n. (in Herb. Juss. Paris).

A *Acrodiclidio guianense* Nees cui valde affinis foliorum forma et nervatura floribus minoribus differt.

The identity of *Licaria guianensis* Aubl. was difficult to establish. Nees (1836) reckoned it to *Dicypellium caryophyllatum* Nees, but mentioned it also under his species incertae sedis (Syst., p. 658). In the latter publication he suggested that it might belong to *Mespilodaphne*. Meissner (1848) does not accept *L. guianensis* as a synonym of *Dicypellium caryophyllatum* and puts it under the dubious species: Gonggrijp (De Indische Mercur l. c.), who studied the rose wood species from a technical point of view, comes as a result of an anatomical investigation to the conclusion that the real rose wood belongs to the genus *Aniba* and that *Licaria*, which according to Aublet is also called rose wood, is not the real one. It is strange that he says that the leaves of *Licaria* are glabrous beneath; he must have based this opinion on a description because I do not believe that he saw the type specimen of Aublet. Mez in his monograph concludes, after studying the Aublet specimen in Paris, that *Licaria* is identical with *Ocotea caudata*. Hallier in Meded. Rijks Herb. Leiden 31, 1918, p. 20 reviews all the different opinions with regard to the identity of *Licaria guianensis*. R. Benoist (Bull. Soc. Bot. France l. c.) states rightly that the tomentum of Aublet's specimen differs from that of *Ocotea caudata* and remarks that *Licaria* belongs to a

hitherto undescribed species. The abundant Surinam material of *A. Aubletii* of which the leaves look exactly like those of Aublet's type in the Jussieu Herb. in Paris proves that it is this *Acrodiclidium* species which is identical with *Licaria guianensis*.

In comparing the drawing of the leaves one may see that there exists a certain resemblance between the *Licaria* leaves

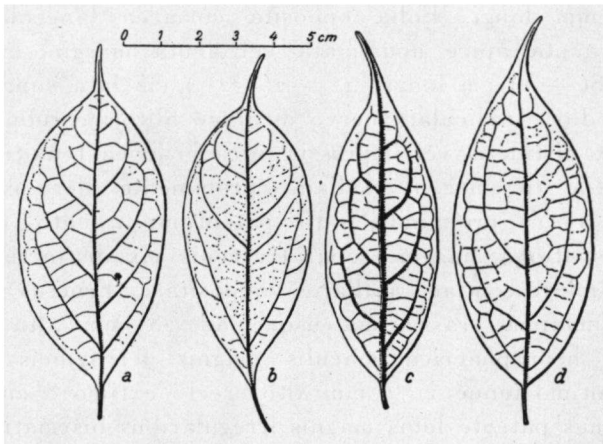


FIG. 3. *a.* Leaf of *Licaria guianensis* Aubl. (type specimen); *b.* leaf of *Ocotea caudata* Mez; *c.*, and *d.* respect, older and young leaf of *Acrodiclidium Aubletii* Kosterm. The lower surface of the leaves is drawn.

and those of *Ocotea caudata*: the base of the leaves however is different. The leaves of *Licaria* and of *A. Aubletii* are sparingly puberulous beneath, while those of *Ocotea caudata* are glabrous.

As the genus name *Licaria* has not been used for 150 years and the renaming of the about 30 species of *Acrodiclidium* would cause much confusion, I propose that the name *Licaria* Aublet, as this genus is moreover based on sterile material only, should be rejected and the name *Acrodiclidium* Nees should be retained.

Acrodiclidium rigidum Kosterm. nov. spec.; — *Acrodiclidium guianense* Auct., non Nees, Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 97, p. p., quoad cit. spec. Mélinonis n. 601 in Herb. Paris.

Arbor, 60 cm diametro (teste Gonggrijp). Ramuli graciles subangulares dense cinereo- vel ferrugineo-tomentelli. Rami cylindrici glabri cinerei. Gemmae dense cinereo-sericeae. Petioli tenues tenuiter pubescentes glabrescentes supra canaliculata 6(—11) mm longi. Folia opposita coriacea lanceolata basi breviter acuta apice acuminata vel acuta margine recurvula (5—)6—8(—11) cm longa, $1\frac{1}{2}$ —2(— $2\frac{1}{2}$) cm lata supra glabra nitida medio canaliculata nervo mediano filiforme subprominulo costis vix distinctis vel impressis infra brunnea tenuiter sparse pubescentia (in nervo mediano prominente densius) costis utrinque 5—10 prominulis satis patentibus arcuato- connectis quodam spatio a margine separatis venis vix distinctis. Flores ignoti. Inflorescentiae axillares oppositae. Fructus ignotae. Cupula maxima crassissima usque ad 28 mm alta 35 mm diametro hemisphaerica maculis magnis ferrugineis margine triplice intimo tenue 1—2 mm alto erecto extimo 8 mm crasso magis minus patente lobis magnis irregularibus biseriatis verosimiliter e perianthii segmentis valde auctis ortis.

Surinamo, Sectie O, arbor n. 852 (B.W. n. 4682, fr. m. Maio, typus in Herb. Utrecht; n. 4259, ster. m. Febr.; n. 4249, ster. m. Febr.). Guiana gallica: Mélinon n. 601 in Herb. Paris.

Foliis oppositis ad *Acrodiclidium Meissneri* Mez et *A. debile* Mez accedens sed ab utraque specie foliorum forma et crassitudine diversa. Habitu *A. sericei* Griseb. quae species cupula simplicimarginata et foliis sparsis a nostra differt.

Mezilaurus O. Ktze. ex Taubert.

The name *Silvia* was first published by Vellozo, Fl. fl. (1825), p. 55, t. 149 (1827). The only species *S. curialis* Vell. is universally reduced to a species of *Escobedia* Ruiz et Pav. (*Scrophulariaceae*). *Silvia* Benth. in D.C., Prodr. XV, 1 (1846),

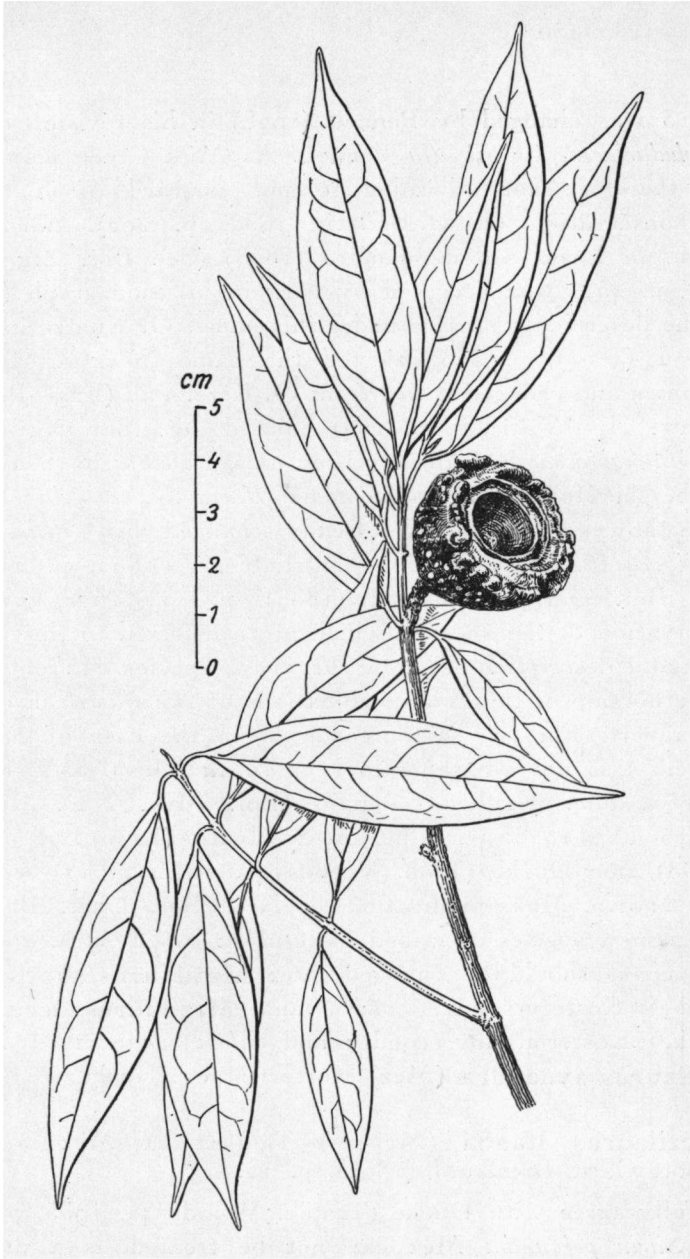


FIG. 4. *Acrodiclidium rigidum* Kosterm.

p. 513 was changed by Pennell (1928) in his revision of the *Scrophulariaceae* to *Silviella* Pennell. As Miss Green points out it is therefore not advisable to put forward *Silvia* Benth. for conservation (Kew Bulletin 1935, p. 492). *Silvia* Fr. Allem. in Diss. Rio de Janeiro (1848) (See Bot. Ztg. XII, 1854, p. 454) was accepted by Mez in his monograph (1889) and he described 6 species under this name. O. Kuntze in Rev. Gen. I (1891), p. 573 rejected the name *Silvia* as a later homonym and changed it to *Mezia* O. Ktze. Pax (Engl.-Prantl., Nachtr. II—IV, 1897, p. 174) pointed out, that a genus of the *Malpighiaceae* had already been named *Mezia* by Schwacke and he therefore changed the name *Mezia* to *Neosilvia*. Meanwhile however Mez had already changed his *Mezia* into *Mezilaurus* (Taubert in Bot. Cntrlbltt. 50, 1892, p. 21). In Arb. Bot. Gart. Breslau I (1892), p. 112 Mez gave an enumeration of the species, which he transferred to this genus, adding the description of a new *Mezilaurus* species. He renounced his authorship of the new combinations of *Mezilaurus* in favour of Taubert. For the same reason as in the case of *Silviella* Pennell it is not advisable to keep *Silvia* Allem. as a nomen conservandum. Neither Sampaio (Bol. Mus. Nac. Rio de Janeiro IV, 1928, p. 39), nor Sandwith (Kew Bull. 1933, p. 338), nor Ducke (Trop. Woods 42, 1935, p. 18) seem to have known Mez' publication in Arb. Bot. Gart. Breslau. The 2 new species described by Ducke: *Silvia subcordata* and *S. decurrens* should be changed into: **Mezilaurus subcordata** (Ducke) Kosterm. nov. comb., and **Mezilaurus decurrens** (Ducke) Kosterm. nov. comb.; and *Silvia synandra* Mez into **Mezilaurus synandra** (Mez) Kosterm. nov. comb.

Mezilaurus Itauba (Meissn.) Taubert ex Mez in Arb. Bot. Gart. Breslau I (1892), p. 12.

I fully agree with Ducke (Tropic. Woods 42, 1935, p. 18), that *Silvia polyantha* Mez can not be treated as a distinct

species; the only difference lies in the larger inflorescences and pedicels. I had no opportunity to study the type specimen of *Silvia Rondonii* Mez, but according to Ducke this species too is identical with *Mezilaurus Itauba*.

Concerning the dehiscence of the anther cells in the genus *Mezilaurus* I should like to add the following remarks: The normal Lauraceous type of dehiscence, viz. from base to top is found in *M. oppositifolia* (Nees) Taubert and *M. Sprucei* (Meissn.) Taubert. However the cells are in these species not oblong, but more ovate, moreover they are not parallel, but convergent: the cells are not vertical, but more or less horizontal. In *M. crassiramea* (Meissn.) Taubert and *M. synandra* (Mez) Kosterm. the cells are minute and nearly orbicular: the valves dehiscing horizontally in the direction of the centre; if we might consider the cells as horizontal, there would be no difference with the normal type of dehiscence. In *M. Itauba* the dehiscence begins in the upper and outer corners and proceeds from there towards a point somewhat below the centre, which gives the impression of a dehiscence from top to base.

Silvia Duckei A. Sampaio (*Misanteca Duckei* A. Sampaio in Comm. Linh. Telegr. Matto Grosso Amaz. 56, Ann. 5, 1917, p. 15) of which I could study the specimens Ducke n. 17593 and Ule n. 7578 does not differ from *Mezilaurus Lindaviana* Schwacke et Mez of which I have seen the type specimen (Schwacke n. 19798) in the Dahlem Herb. Apparently Ducke did not know the description of this Brazilian species in Bot. Gart. Breslau I (1892), p. 112. There is some discrepancy in the description with regard to the indumentum of the ovary. According to Mez the latter is glabrous; the type specimen however has very young buds only and consequently the pubescence of the ovary could not safely be judged.

Endlicheria Nees has been published in *Linnaea* 8 (1833), p. 37 with 2 species *E. birsuta* Nees and *E. sericea* Nees.

Nees himself altered this name into *Goepertia* (Syst. 1836, p. 365), when he discovered the publication of Presl in Symb. Bot. I (1832), p. 73, where the latter described a Rubiaceous genus *Endlichera* Presl. The name *Goepertia* however had already been published as a genus (genus spurium) of the *Scitamineae* by Nees in Linnaea 6 (1831), p. 337 (see also Nees, Syst., p. 365 in adn.). In: Lindley, Introd. Nat. Syst., 2nd ed. (1836), p. 202 in adn., Nees suggested that, if *Endlichera* Presl. (Rubiaceae) was to be retained, the name of the Lauraceous genus should be altered into: *Schauera* Nees. Supposing that this conditionally given name should be valid, *Schauera* Nees should be kept for the Lauraceous genus. The consequence will be, that the name *Schaueria* Nees (*Acanthaceae*) in Linnaea 13 (1839), Lit. Ber., p. 119, must be rejected.

Endlichera Presl (Rubiaceae) has an older synonym: *Emeorhiza* Pohl in Flora 8 (1835), though a nomen nudum (Mez in his monograph erroneously quotes the name *Endlichera* Presl as a nomen nudum). *Endlichera* Presl (Rubiaceae) has one species only, whereas *Endlicheria* Nees (Lauraceae) is a large genus and includes already about 30 species. Therefore it seems advisable to keep the name *Endlicheria* Nees (Lauraceae) with *E. hirsuta* Nees as type specimen and to reject: *Schauera* Nees (Lauraceae); consequently *Emeorhiza* Pohl (Rubiaceae) should be kept (type specimen: *E. brasiliensis* (Presl) Walp.) and *Endlichera* Presl (Rubiaceae) rejected. A motion in this sense has been put forward at the VIth Bot. Congress (Prelim. opinions etc., p. 25).

Endlicheria pyriformis (Nees) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 116.

The specimen: Triana n. 1059 from Colombia differs in its cupule and in the nervation of the leaves from *E. pyriformis* and does not belong to this species.

Endlicheria multiflora (Miq.) Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 130.

The type specimen (Hostmann n. 1163) is a male one. The female plant is rather different from the male one in the form of its panicles. The latter are more or less spicate and rather short. The type specimen of *Endlicheria villosa* Mez should be in the Göttingen Herbarium, but I could not find it there; a few leaves and flowers however were available from the Mez Herb. in Dahlem. This specimen shows that the only difference lies in the narrowly lanceolate leaves, but a Surinam specimen of *E. multiflora* (Voltz s. n.) and specimens from French Guiana have the same narrow leaves. The locality of *E. villosa* is doubtful. The species has hitherto never again been found in Jamaica, the locality indicated on the label; I suppose that the specimen was a Guiana one, but as the collector of this specimen: March has never collected on the continent, it must erroneously have been inserted by Grisebach among specimens of March.

Endlicheria endlicheriopsis (Mez) Kosterm. nov. comb.;
— *Ocotea endlicheriopsis* Mez in Jahrb. Bot. Gart. Berl. V (1889), p. 300; Benoist in Arch. Bot. V (1931), p. 73.

The female type specimen: Mélinon n. 605 in the Paris Herb. is rather defective and consists of a few flowers and some leaves only. The abundant material of male specimens does not leave the slightest doubt that Mélinon's plant is an *Endlicheria*. The rudimentary, sterile state of the anthers in the female flowers made it difficult for Mez to decide to which genus it ought to be reckoned.

Cassytha filiformis L. (non Thunberg), Spec. pl. I (1753), p. 35; — *Volutella aphylla* Forsk., Fl. Aeg. Arab. (1775), p. 84; — *Cassytha zeylanica* Gaertn. Fruct. I (1788), p. 134; — *Calodium cochinchinense* Lour. in Fl. Cochinch. I (1790), p. 247; — *Cassytha aphylla* Raeusch., Nomencl. ed. 3 (1797), p. 116; — *Cassytha paniculata* R. Br., Prodr. (1810), p. 404; — *Cassytha guineensis* Schum. et Thonn., Beskr. Gui. Pl. (1827), n. 1, p. 219; — *Cassytha americana*

Nees, Syst. (1836), p. 644; — *Cassytha brasiliensis* Mart. ex Nees, Syst. l. c., p. 648; — *Spironema aphylla* Raf., Fl. Tell. IV (1836), p. 92; — *Cassytha remotiflora* F. Muell. ex Meissn. in D.C., Prodr. XV, 1 (1864), p. 256; — *Cassytha capillaris* F. Vill. (non Meissn.), Nov. App. (1880), p. 182 ex Merr., Enum. 2 (1923), p. 204; — *Cassytha timoriensis* Gandoger in Bull. Soc. Bot. France 40 (1913), p. 419.

Cassytha pondoensis Engl. in Engl. Jahrb. 26 (1899), p. 392 is identical with *C. rubiginosa* E. Mey. in Drège, Zwei Pfl. Doc., p. 171 and with *C. pubescens* E. Mey. (non R. Br., non Schlechtend). This species differs only from *C. filiformis* by the rusty tomentum of the peduncles, the outer perianth segments and the base of the inner ones; I consider it therefore as a variety only of *C. filiformis*: var. *pondoensis* (Engl.) Kosterm. nov. comb. *Cassytha capillaris* Meissn. in D.C. l. c., p. 252 differs from *C. filiformis* by its very thin stems and capitate flowers. A specimen of *C. filiformis* from Flores shows the same slender stems, but the spikes are the same as those of *C. filiformis*. *Cassytha capillaris* also may prove after all to be a mere variety. *Cassytha paniculata* R. Br. l. c. differs from *C. filiformis* by the clustered spikes, but these occur now and then also in *C. filiformis*; Bentham in Fl. Austr. V (1870), p. 311 already pointed out that the two species are probably identical.

HERNANDIACEAE.

Sparattanthelium wonotoboensis Kosterm. nov. spec.

Liana. Ramuli crassi striati cylindrici sparse puberuli. Rami glabri laeves striati. Folia alterna subtriplinervia chartacea ovata, (4—)5—6(—8) cm longa, (2—)2½—3(—4) cm lata basi subcordata vel rotunda margine recurvulo apice breviter acuminata supra glabra nervis primariis et secundariis tomentellis planiusculis subtus sparse tomentosis nervo mediano subprominente nervis primariis binis lateralibus ad dimidium vel

duas partes folii adscendentibus costis utrinque 3—4 subprominentibus superioribus arcuato-connectis nervis secundariis prominulis laxe reticulatis. Petioli graciles glabrescentes usque ad $1\frac{1}{2}$ cm longi. Paniculae densae permultiflorae corymbiformes axillares usque ad 10 cm longae pedunculo cylindrico usque ad 4 cm longo ramulis usque ad 4 cm longis cinereo-tomentosis. Pedicelli graciles cinereo-tomentosi usque ad 1 cm longi. Flores rubescentes 4 mm longi tubo cylindrico-ovoideo puberulo $1\frac{1}{2}$ mm longo perianthii segmentis 4 oblongo-linearibus obtusis extus tomentellis intus glabris. Stamina 4 filamentis $\frac{1}{2}$ mm longis glabris filiformibus contortis antheris oblongo-linearibus 1 mm longis glabris connectivis cellulas paullo superantibus. Stylus crassiusculus puberulus stigmatibus capitellato. Paniculae fructiferae divaricato-dichotomae albae ramulis gracilibus nodis incrassatis. Pedicellus fructiferus usque ad 6 cm longus gracilis. Fructus ovoideo-ellipsoideus acutus 15 mm longus 7 mm diametro dehiscens.

Surinamo, fluv. Corantijne in saxis prope catar. Wonotobo (B.W. n. 3120, fl., fr., m. Oct.; typus in herb. Utrecht).

S. Botocudorum Mart. valde affinis sed foliorum forma tomento nervatura et pedicellis fructiferis longis gracilibus diversa.

Hernandia sonora L.

I will give here a survey of the literature:

Hernandia sonora L., Spec. pl. II (1753), p. 981; — *Hernandia, foliis peltatis* Hort. Cliff. (1737), p. 485, t. 33; — *Hernandia amplo hederæ folio umbilicato* Plum. Gen. 6 (1737), p. 374, t. 40; — *Nux vesicaria oleosa, foliis umbilicatis ex insula barbadosi* Pluk. Almag. (1696), p. 266, t. 208 f. 1; — *Nux zeylanica umbilicatis foliis* Kigg., Hort. Beaumont. (1690), p. 31; Burm., Thes. Zeyl. (1737), p. 171; Linn. Fl. zeyl. (1748), p. 199; — *Arbuscula exotica foliis umbilicatis* etc. Breyn. Prodr. 2 (1689), p. 20?; — *Hernandia arborea foliis cordato-peltatis* etc. Browne, Jam. p. 373; — *Hernandia sonora* L., Jacq. Stirp. Amer. (1763), p. 245 et Pict. (1780), p. 120; Buchoz Hist. Regn. Veg. IX, Dec. X (1775),

t. 9; Aubl. Guia. II (1775), p. 852; Gaertn. Fruct. I (1788), p. 194; Lam. Dict. 3 (1789), p. 123, excl. syn. Arbor regis Rumph.; Willd., Spec. IV, 1 (1805), p. 327; Descourt., Fl. Pitt. et Med. Ant. 2 (1822), p. 143; Blume, Bydr. 2 (1825), p. 551; Blanco, Fl. Filip. ed. 1 (1837), p. 689; ed. 2 (1845), p. 478; Twaith, Enum. Zeyl., p. 258; Hassk., Pl. Jav. rar. (1848), p. 217; Wight, Ic. V (1852), t. 1855; Miq., Fl. Ind. bat. I (1855), p. 887, excl. Arbor regis Rumph.; Meissn. in D.C., Prodr. XV, 1 (1864), p. 263; id. in Fl. Bras. V, 2 (1866), p. 300; Baillon, Hist. II (1870), p. 449, 450; — *Hernandia ovigera* L., Stickman in Am. Acad. IV (1759), p. 125; Arbor ovigera Rumph. Amb. III (1743), p. 193, t. 123; Lam., Dict. 3 (1789), p. 123; Willd., Spec. IV, 1 (1805), p. 327; Poir., Enc. Suppl. 3 (1813), p. 45, Pl. t. 755 f. 2; Roxburgh, Fl. Ind. III (1832), p. 577; Schnizlein, Ic. I (1850—1856), t. 109; Meissn. in D.C. l. c., p. 262; id. in Fl. Bras. l. c., p. 299; Baker, Fl. Maurit. (1877), p. 293; Greshoff, Nutt. pl. (1896), t. 21; Koorders en Valet., Booms. VII (1900), p. 110; id. Atl. IV (1913), t. 185; Koorders, Exkurs. Fl. 2 (1912), p. 281; Merrill, Enum. Phil. pl. 2 (1923), p. 206, id. in Phil. Journ. Sc. (1926), p. 370; Heyne, Nutt. pl. I (1927), p. 674; Alston in Trim., Fl. Ceyl. VI (1931), p. 248; — *Hernandia guianensis* Aubl. Guia. II (1775), p. 849, III t. 329; Willd., Spec. l. c., p. 328; Poir., Enc. Suppl. l. c., p. 46; Pl. IV, t. 755 f. 1; Meissn. in D.C. l. c., p. 262; id. in Fl. Bras. l. c., p. 299; Pulle, Enum. pl. surin. (1906), p. 187; Benoist in Arch. Bot. V (1931), p. 76; Standley in U. S. A. Herb. 23,2 (1922), p. 298; id. in Field. Mus. X (1931), p. 202; — *Hernandia peltata* Meissn. in D.C., Prodr. l. c., p. 263; Kurz, For. Fl. Br. Burma II, p. 309; Beddome, Fl. sylv. (1873), t. 300; Benth., Fl. Austr. V (1870), p. 314; Seem., Fl. Vit. (1865—73), p. 205, t. 52; Baker, Fl. Maurit. l. c., p. 293; Vidal, Intr. Fl. Filip. (1883), Atl. t. 78 f. G.; Hook., Fl. Brit. Ind. V (1890), p. 188; Schimper, Bot. Mitt. III (1891), t. 7; Greshoff, l. c., t. 21; Reinecke in Engl. Jahrb. 25 (1898), p. 366; Engl., Pfl. Ost-Afr. C, p. 183; Koorders et Valet. l. c., p. 106; id. Exkurs. Fl. l. c., p. 281; id. Atl., t. 184; v. Eeden, Houts. Ned. O. Ind. (1905), p. 43; Bailey, Compr. Cat. Queensl. pl. (1909), p. 439, t. 13; Sprague in Fl. Trop.

Afr. IV, 1 (1913), p. 191; Lecomte, Fl. Indo-Chine V, 2 (1914), p. 159, f. 14; Hattori in Journ. Coll. Sc. Tokyo 23, X, p. 13; Gamble, Journ. As. Soc. Beng. 75, 1, p. 204; Ridley, Fl. Malay Pen. III (1924), p. 138; Heyne l. c., p. 675; — *Hernandia peltata* Sessé et Moc., Fl. Mex. 2na ed. (1894), p. 213; — *Hernandia peltata*, var. *subcordata* Hochr. in Candollea II (1925), p. 365; — *Hernandid catalpifolia* Britton et Harris in Torreyia II (1911), p. 174; Fawcett and Rendle, Fl. Jam. III, 1 (1914), p. 221 f. 90.

Linnaeus enumerated under this name specimens from Asia and from America. The type specimen being the American plant the name *H. sonora* was exclusively used for this species.

Stickman in Am. Ac. l. c. described the closely related Asian *H. ovigera*, whereas Meissner distinguished a *H. peltata*. Merrill, Enum. l. c. discovered in studying numerous plants that the supposed differences between *H. ovigera* and *H. peltata* break down absolutely.

H. guianensis, belonging to the same group as *H. peltata* is fully identical with it: Surinam and Brazilian specimens show that peltate and not peltate leaves occur on the same plant.

H. sonora differs according to Meissner by the male flowers being 3—4-merous and having one gland only at the base of each filament. In studying the abundant material from America and Asia I came to the conclusion that neither of these differences holds true. The specimens of Meissner which I could study had 3-merous male flowers. The number of the glands is a character of no value. On the same (American) plant I have found flowers in which the filaments bore 3 glands and flowers in which one of the filaments bore two basal glands. In the Asian specimens I have found flowers with up to 9 glands. The glands are often only partially divided and the conclusion may be drawn that the variability in the number of the glands is due to union and to division of the normal 6 ones. The shape of the flowers and other characters too of the American plants are the same as those of the Asiatic ones.

H. sonora, as already suggested by Hooker, is a pantropical species. The species has not been found hitherto on the West coast of Africa; the species found there: *H. beninensis* Welw. however is, according to Sprague, l. c., very closely allied to *H. sonora* and may prove one day identical with this species.

Hernandia Kunstleri King ex Heyne, Nuttige Ind. Pl. I (1927), p. 674 is no *Hernandia*. Judging from the vernacular name the plant might be a *Podocarpus*.

CHAPTER II.

GEOBOTANICAL REMARKS.

MALPIGHIACEAE.

The geographic distribution of the Malpighiaceae shows but few interesting points. By means of their flying apparatus they are easily transported by the wind and consequently the species cover as a rule very large areas. Of the 42 species occurring in Surinam one only: *Dolichopterys surinamensis* Kosterm. is endemic; 4 species: *Hiraea affinis* Miq., *Tetrapteris fimbripetala* Juss., *Diplopterys rosea* (Miq.) Ndz. and *Byrsonima Aerugo* Sagot occur in the Guianas only.

Malpighia coccigera L. is endemic in the Antilles: the Surinam specimen is most probably a cultivated one. Outside Surinam *Mascagnia multiglandulosa* Ndz. has been found hitherto in Paraguay only but there is every reason to suppose that this species will be found one day in the Amazonian district too. The remaining 35 species, that is 83 %, occupy extensive areas, often reaching from Central America to Argentine.

Heteropteris africana Juss. is the only species of this genus occurring in Western Africa. The explanation given by Niedenzu, namely that its samaras must have been transported either by wind or sea to Africa, after the latter's separation from America, though a simple one, is not convincing: it is, for instance, curious that a species like *Brachypterys ovata* (Cav.) Small, a plant living on the coast, should not have wandered to Africa in the same way. The supposition that the migration

of this species to Africa will have taken place in the Eocene period, when there existed according to Wegener (Die Entstehung der Kontinente und Ozeane) a narrow connection between Guiana and Guinea, is more satisfactory.

LAURACEAE AND HERNANDIACEAE.

The representatives of the Lauraceae are usually very large trees with minute flowers and they are therefore difficult to collect. As this family therefore is rather badly known and as I will restrict myself to a small area: Surinam, the following remarks should be regarded as preliminary. The distribution of the species was, with the exception of a few ones, verified by myself.

Of the 57 species of these two families we need not discuss the cultivated ones: *Persea americana* Mill., *Cinnamomum zeylanicum* Breyn. and *Laurus nobilis* L. Only the first one is a real American plant, *Cinnamomum* has its representatives mostly in Asia, though it has been recorded as growing wild in the Amazone area; *Laurus nobilis* has its native country in Minor Asia and the Mediterranean. Of the remaining species, two are pantropic: *Hernandia sonora* L. and *Cassytha filiformis* L. It is remarkable that both species seem to have been distributed from about the same centre, viz. Australia and Polynesia, as both genera have the greatest number of representatives in those regions. *Cassytha filiformis* is in Guiana a typical savanna plant, climbing on and over minor shrubs and herbs. *Hernandia sonora* is a coast plant, though it has often been found farther inland. Its wide distribution may be due to the circumstance that the seed is protected against the influence of sea-water by several layers; moreover the cupule will give it some buoyancy. That the wood is used for ship-building purposes may also be one of the reasons of its wide distribution. The remaining 52 species are divided into 10 genera as follows:

Persea 2	Aiouea 2
Ocotea 14	Acrodiclidium 7
Nectandra 9	Mezilaurus 1
Aniba 10	Endlicheria 4
Systemonodaphne 1	Sparattanthelium 2

One may see that the genera are all, more or less in accordance of their size, well represented in Surinam.

Of the other genera, occurring in South America, it is curious that not a single species of *Phoebe* has been found hitherto in Surinam. This genus has its largest distribution in Central America; its area extends eastwards over the West Indian islands as far as Trinidad, where a few species have been found; southwards it reaches over the Andes region to Southern Brazil; the Hylaea and the Guianas however are avoided. The area of the genus *Persea* reaches its limit in the Guianas, the greater part of the species occur in the Andes region, Mexico and the Campos of Southern Brazil; its distribution, though somewhat more extensive, is consequently more or less the same as that of the closely related genus *Phoebe*. *Cryptocarya* has been found in French Guiana only (two species) but in view of the similarity of the flora of this country with that of Surinam, we may expect it in Dutch Guiana too. The genus *Hufelandia* reaches its limit in British Guiana, where one species is found; its area covers Central America and the West Indies. The genus *Litsea* does not occur in the Guianas; a few species are known from Central and Southern Brazil, the others occurring chiefly in Mexico; the centre of this genus is found in tropical Asia. The distribution in America is similar to that of *Phoebe*, though not so evident.

Of the 52 Surinam species of the Lauraceae and the Hernandiaceae, 6 are endemic:

Aniba Kappleri Mez
Aniba Hostmanniana (Nees) Mez

SPECIES.

(X denotes, that the species occurs in the region).

	West Indian Islands.	Central America.	Eastern Venezuela, Colombia, Peru.	Brit. Guiana.	French Guiana.	Hylaea.	Trinidad.	Andes.	Southern & Eastern Brazil.	Paraguay, Argentina.
1. Persea Benthamiana Meissn.	—	—	—	x	x	x	—	—	—	—
2. Ocotea rubra Mez.	—	—	—	x	x	x	—	—	—	—
3. Ocotea Rodiaei (Rob. Schomb.) Mez.	—	—	—	x	x	x	—	—	—	—
4. Ocotea barcellensis (Meissn.) Mez.	—	—	—	—	—	x	—	—	—	—
5. Ocotea canaliculata (Rich.) Mez.	—	—	—	x	x	—	—	—	—	—
6. Ocotea glomerata (Nees) Benth. et Hook. f. ...	—	—	x	x	x	—	x	—	x	—
7. Ocotea guianensis Aubl.	—	—	x	x	x	x	—	—	—	—
8. Ocotea Wachenheimii R. Ben.	—	—	—	—	—	—	x	—	—	—
9. Ocotea globifera Mez.	—	—	—	—	x	—	—	—	—	—
10. Ocotea splendens (Meissn.) Mez.	—	—	—	—	x	—	—	—	—	—
11. Ocotea caudata (Meissn.) Mez.	—	—	x	x	x	x	—	—	—	—
12. Ocotea Neesiana (Miq.) Kosterm.	—	—	—	—	x	x	—	—	—	—
13. Ocotea puberula Nees	—	x	x	x	x	x	—	—	x	x
14. Ocotea Schomburgkiana (Nees) Benth. et Hook. f. ...	—	—	—	x	—	—	—	—	—	—
15. Ocotea Petalanthra (Meissn.) Mez.	—	—	x	—	—	—	—	—	—	—
16. Ocotea oblonga (Meissn.) Mez.	—	—	—	x	x	—	—	—	—	—
17. Ocotea punctulata Mez.	—	—	—	x	x	—	—	—	—	—
18. Nectandra grandis (Mez.) Kosterm.	—	—	—	x	x	—	—	—	—	—
19. Nectandra Kunthiana (Nees) Kosterm.	—	—	—	x	x	—	—	—	—	—
20. Nectandra Laurel Kl. et Karst.	—	x	x	—	—	—	—	x	—	—
21. Nectandra Pisi Miq.	—	—	—	x	x	x	—	—	—	—
22. Nectandra ambigua Meissn.	—	—	—	x	x	—	—	—	—	—
23. Nectandra cuspidata Nees.	—	x	x	x	—	x	—	—	x	x
24. Nectandra guianensis Meissn.	—	—	—	x	—	—	—	—	—	—
25. Nectandra surinamensis Mez.	—	—	—	x	x	—	—	—	—	—
26. Nectandra kaburiensis Kosterm.	—	—	—	—	—	—	x	—	—	—
27. Aniba rosaeodora Ducke	—	—	—	—	x	x	—	—	—	—
28. Aniba firmula (Nees et Mart.) Mez.	—	—	—	x	x	x	—	—	—	—
29. Aniba Canelilla (H.B.K.) Mez.	—	—	x	—	—	—	—	—	x	—
30. Aniba Taubertiana Mez.	—	—	—	—	x	—	—	—	—	—
31. Aniba riparia (Nees) Mez.	—	—	—	x	x	x	—	—	—	—
32. Aniba Jenmani Mez.	—	—	—	x	—	—	—	—	—	—
33. Systemonodaphne geminiflora Mez.	—	—	—	—	x	—	—	—	—	—
34. Aiouea densiflora Nees	—	—	—	x	x	x	x	—	—	—
35. Aiouea guianensis Aubl.	—	—	x	x	x	x	—	—	—	—
36. Acroclidium cayennense (Meissn.) Mez.	—	—	—	—	x	x	—	—	—	—
37. Acroclidium Canella (Meissn.) Mez.	—	—	—	—	x	x	x	—	—	—
38. Acroclidium debile Mez.	—	—	—	—	x	x	—	—	—	—
39. Acroclidium Martinianum Mez.	—	—	—	—	x	x	—	—	—	—
40. Acroclidium guianense Nees	—	—	—	x	x	x	—	—	—	—
41. Acroclidium Aubletii Kosterm.	—	—	—	—	x	—	—	—	—	—
42. Acroclidium rigidum Kosterm.	—	—	—	—	x	x	—	—	—	—
43. Mezilaurus Itauba (Meissn.) Taubert.	—	—	—	x	x	x	—	—	—	—
44. Endlicheria pyriformis (Nees) Mez.	—	—	—	—	x	—	—	—	—	—
45. Endlicheria sericea Nees	x	—	—	x	x	—	x	—	—	—
46. Endlicheria multiflora (Miq.) Mez.	—	—	—	x	—	—	—	—	—	—
47. Endlicheria endlicheriopsis (Mez) Kosterm.	—	—	—	—	x	—	—	—	—	—
48. Sparattanthelium Botocodorum Mart.	—	—	—	x	x	x	—	—	—	—

Aniba mas Kosterm.
 Aniba Gonggrijpii Kosterm.
 Persea coriacea Kosterm.
 Sparattanthelium wonotoboensis Kosterm.

The remarkable fact, that most of them belong to the genus *Aniba*, may be explained by assuming, that this genus has its centre of distribution here; it is unfortunately one of the worst known genera.

The distribution of the other species is given in the table page 52. As *Ocotea punctulata* Mez and *Ocotea oblonga* (Meissn.) Mez occur both in French and in British Guiana, these species may be expected in Surinam too: for this reason they are inserted in the table.

The number and percentage of the species occurring in the different regions runs as follows.

Region	Number	%
West Indies	1	2
Central America	3	6
Eastern Venezuela, Colombia, Peru	10	21
British Guiana	31	65
French Guiana	34	71
Hylaea	19	40
Trinidad	8	17
Andes	1(?)	2(?)
Southern & Eastern Brazil	6	13
Paraguay, Argentina	2	4

Surinam has of course most species in common with French and British Guiana, but there exists also a relation between Dutch Guiana and the Amazonian district. It is a curious fact, that only one Surinam species occurs also on the West Indian Islands; according to Mez' monograph there were several other species in common with West India, but they

all proved to be different though closely related species. With the Andes region Surinam shows but little similarity. It is rather dubious whether the specimen of *Nectandra Laurel* Kl. et Karst. really belongs to this species. With Trinidad, as was to be expected Surinam has several species in common.

Ocotea.

It is curious that among the 14 Surinam species of this genus three belong to the group, which by the shape of the outer 6 stamens, link the genera *Nectandra* and *Ocotea*. Mez described 6 species only of this group, of which 3 occur in Central America and one on the West Indian Islands; the 3 Surinam species have their area restricted to Guiana or to Guiana and the Amazone district. In view of this distribution and with regard to the different character of the anthers it is probably advisable to separate this group from both *Nectandra* and *Ocotea*. Of the Surinam *Ocotea* species: *O. puberula* Nees has the widest distribution: its area extending from Mexico to Argentina. In view of the localities where it has been found, we must assume that it prefers the drier and higher regions. A few species of *Ocotea* occur in Eastern and Southern Asia and on the Mascarenes, they differ from the American species by the large staminodes.

Nectandra.

Nectandra Pisi Miq., described by Mez as *N. globosa* Aubl., is not so widely distributed as Mez supposed. The species has hitherto been found only in the Guianas and in the Amazone district. Other specimens from Southern and Central America described by Mez belong probably to the closely related: *N. lucida* Nees; in the West Indies it is supplanted by: *N. antillana* Meissn. (= *N. globosa* Aubl.).

Nectandra ambigua Meissn. This species has been found in British Guiana only and its area seems to reach its limit in Western Surinam, the plant has not been found eastward of

the Nickerie river; in the Amazone district it is replaced by the closely related *N. Picburim* (H.B.K.) Mez.

Nectandra cuspidata Nees has a very extensive area, reaching from Mexico to Argentina.

Aniba.

The centre of the area of this genus seems to lie in the Guianas and the Hylaea. Of the about 40 species, 17 occur in the Guianas and about 10 in the Amazone district.

Acrodiclidium.

The same may be said of this genus. Of the about 30 species: 11 are Guianean, 5 Amazonian.

Mezilaurus.

This genus has its centre of distribution in the Amazone district. A few species extend however as far as Eastern Venezuela and Guiana and southward a few are found in Central and Eastern Brazil. *Mezilaurus Itauba* (Meissn.) Taubert has a large area, it seems to prefer dry, rising ground and does not grow in marshes.

CHAPTER III.

USEFUL PLANTS.

On the following pages is given a brief survey of the useful plants. As the literature on this subject is very scattered, the list does not claim to be in any way complete. Everybody is warned against applying any of the medicaments mentioned here without medical advice.

A list of the principal works from where the data have been taken, is given at the end of this chapter; all authors moreover are mentioned between brackets.

MALPIGHIACEAE.

Malpighia puniceifolia L.

In the West Indies the fruit is much eaten, either raw or it is used for jellies and tarts; it has a sour flavour. The bark is reported to yield a red dye (Standley). The fruit is used against obstipation and inflammatory and adynamic diseases; the sap is purgative and diluted in water it is used in case of scorbut as a refreshment (Descourtilz).

Bunchosia glandulifera (Jacq.) Kunth.

An incision of the bark furnishes an in water soluble gum, named: „Ciruela gum” in Caracas, it is employed against diseases of the respiratory organs and against catarrh of the bladder (Hartwich).

Byrsonima crassifolia (L.) Rich.

The fruit is eaten mostly by children and birds although occasionally in Central America it is offered for sale in the markets. It is used for preparing a kind of lemonade; in some localities it has been fermented to produce an alcoholic drink (Standley). The bark is used for tanning leather and for painting paddles, arrowpoints, etc. (Bentham). It is said to yield a strong fibre (Guzman). The plant is astringent and various parts have been used in domestic medicine for fevers, colds, diarrhoea and snake-bites (Standley, Poiret, Schomburgk). The wood is rather heavy and dense and has a dark red-brown colour (Wiessner); it is used for charcoal and burning purposes, now and then for building.

Byrsonima coriacea (Sw.) Kunth.

The wood is said to be used for tanning leather (Poiret).

Byrsonima verbascifolia (L.) Rich.

A decoction of wood and roots is used as vulneral, detersive and astringent. It gives a red dye (Poiret). The trunk furnishes timber (Niedenzu).

Byrsonima densa (Poir). D.C.; *B. stipulacea* Juss.

These large trees furnish timber for building purposes.

LAURACEAE.

Laurus nobilis L.

Leaves and berries possess aromatic and stimulant properties and have been reported narcotic. The leaves are also said to be diaphoretic and in larger doses emetic. Both leaves and fruits were employed formerly in flatulent colic, hysteria, amenorrhoea and other affections but they are rarely or never used internally at the present time either in Europe or elsewhere. The berries, commonly called Bay-berries, yield a green or yellow-green oil, extracted by boiling, though in minute quan-

tities. Externally this commercial oil of bays is sometimes employed as an external stimulant and application in sprains, bruises, etc., sometimes against hemorrhoids or against vermin. But its principal use is in the veterinary medicine. Now and then it has been used for making soap. The leaves are frequently used by the cook and the confectioner as a flavouring agent. The volatile oil is also sometimes employed in perfumery. The plant itself is cultivated for ornamental purposes.

Persea americana Mill.

Two principal horticultural forms of *Persea americana* are recognised: the West Indian type with smooth fruit and leathery skin and the Guatemalan type also called the Mexican or highland avocado (*P. americana*, var. *drymifolia*) with rough and warty fruit and membranous skin, the leaves when crushed dissipating an anise-like odour. There is great variation in size and shape of the fruit (Standley, Popenoe). In Surinam two forms are cultivated: one with pink and one with whitish pulp, the skin of the fruit being reddish or green (Sack). It is commonly used as a table fruit and eaten raw; it is so rich and mild that most people make use of some spice or pungent substance to give it a poignancy and for this purpose some make use of wine, of sugar or of lime-juice, but most people add pepper and salt and the berry is eaten as a salad (Browne); in the Dutch East Indies usually brandy or coffee is added; it is used further in soups or spread on bread. The seed is used for marking linen: one method being to hold the cloth over the fresh stone and pricking through into the seed with a needle, the milky juice becomes dark-red and is practically indelible. A large number of therapeutic uses are reported. The pulp is credited with hastening the suppuration of wounds and is reputed to have aphrodisiac and emmenagogue properties (Duss, Standley). The seed contains an astringent milky juice reputed against diarrhoea and dysentery (Bocq.-Limousin).

Ground and mixed with cheese, meal, etc. the seeds are used to poison rats and mice (Standley). An ointment of the pulverized seeds is sometimes employed as a rubefacient and a decoction of them or a piece of the seed, put in the cavity of a tooth is believed to cure tooth-ache (Standley). According to Sahagun, the powdered seeds are employed as a remedy for dandruff; they should have a soothing influence in case of intercostal neuralgia (Hartwich). The seeds are also used for manufacturing various trinkets (Standley). The rind is used to expel intestinal parasites (Standley, Peckholt). Hernandez states that by pressure oil was obtained from the seeds and used in curing eruptions of the skin. According to Britton the valuable oil contained in the seeds is used for burning and for making soap. The leaves and bark are employed in domestic medicine because of the pectoral, stomachic, emmenagogue, resolute, antiperiodic, antihysterical, antidyenteric, anthelmintic properties ascribed to them. These properties are probably due to the presence of a large quantity of tannin (Duss, Standley). On the West Indian Islands the leaves are used as pectoral, balsamic and carminative (Bocq.-Limousin). According to Bisschop Grevelink the buds are employed in the Dutch East Indies against contusions and against syphilis. A decoction of flower and leaf buds is used as aperitive. An infusion of leaves and seeds is administered for diarrhoea and chronic catarrh. For building purposes the wood has little or no value.

Cinnamomum zeylanicum Breyn.

Cinnamon bark has generally the properties of the spices, being aromatic, carminative and stimulant. It is also somewhat astringent. It is rarely prescribed alone but chiefly as an addition to other medicines to improve their flavour or to check their griping qualities. As a cordial, stimulant and tonic it is indicated in all cases characterised by feebleness and atony. As astringent it is employed in diarrhoea, usually in combination

with chalk, the vegetable infusions or opium. As a cordial and stimulant it is exhibited in the latter stages of low fever, In flatulent colic, flatulence, in spasmodic affections of the bowels and gastric irritation it often proves a very efficient carminative and antispasmodic. It checks nausea and vomiting. It has also been used in uterine haemorrhage as a stimulant of the uterine muscular fibre and in tedious labour depending upon insufficiency of uterine contractions. The oil of cinnamon possesses the cordial and carminative properties of the bark without its astringency and is a good deal used as an adjunct to other medicines and also as a powerful local stimulant in paralysis of the tongue, cramp of the stomach, to relieve headache etc. An oil of clove-like odour and taste is also distilled from the leaves of the plant in Ceylon and occasionally exported as „clove oil”; it resembles in medicinal properties and uses closely the oil of cloves. A substance called cinnamon suet is also expressed in Ceylon from the ripe fruit (Lindley). From the root is extracted a yellow oil which has a strongly camphoraceous flavour (Watt).

Ocotea rubra Mez.

Furnishes one of the best and mostly widely distributed timber woods of Guiana. The wood is rather light, rather soft, coarse and somewhat splintery but does not burst as a rule, yellowish-brown, useful for indoor constructions, furniture and light cabinet work. It is said not to be attacked by worm (Pfeiffer, Sack, Stone and Freeman). This species furnishes the so called: „suikerkisten-hout” (sugarbox wood) according to v. d. Speck Obreen.

Ocotea Rodiaei (Rob. Schomb.) Mez.

Dr. Rodie prepared from the Bibiru (Bebeeru) bark a solution of the sulphate of its alkali, which he has administered with success in intermittent fevers. Maclagan succeeded in procuring two vegetable alkaline bodies: bibirine and sipirine (according

to other investigators identical with the already known buxine; see Wiessner, Rohst, p. 38). Bebeeru, though not so effective as quinine, is used as a substantive for it as antiperiodical, but it never causes nausea, head-ache or other unpleasant effects, which so frequently follow the use of quinine (Bentl. and Trimen). According to Merrill it is used in various uterine diseases as dysmenorrhoea, menorrhagia, leucorrhoea, also useful in affections of the kidneys and bladder and in blenorrhoeal discharges (Bentl. and Trimen). Bocquillon states that it may be used in case of periodical neuralgia. Externally it is employed against inflammation of the eyes (Dragendorff). There is 54 % starch in the fruit and the aborigines use it in times of scarcity as a substitute for bread. The seeds are grated for that purpose and immersed in water, when a white starch precipitates itself which is repeatedly washed to deprive it of its bitterness. It is afterwards mixed with decayed wood, chiefly that of *Eperua falcata* Aubl. and baked into cakes. The Indians are sometimes obliged to live on it for months (Schomburgk, Martius). The hard, heavy, coarse-grained wood of a more or less pronounced green or greenish-brown colour with prominent light-green pores (Stone and Freeman) is much esteemed for luxurious furniture, constructions of ships and docks, especially for keelsons, beams, engine bearers, planking, dock and lock gates, piers and piling (Record), but in Europe only it proved to be resistant against the attack of marine borers; for Central and South America this reputation is wholly lost: constructions for which it has been used in Panama, San Francisco and Surinam were destructed within a year by a species of *Teredo* (Pfeiffer). The wood tends to check and splitter in drying and requires great care in seasoning and in working (Record). An excellent charcoal is made of it (Wiessner).

Ocotea barcellensis (Meissn.) Mez.

The wood is used for building purposes and for corjales.

When the tree is cut down or when an incision is made in the stem, several litres of a terpentine-like fluid run out of the wound; it is used by the Alukuja Indians for burning (Snijders).

Ocotea guianensis Aubl.

The leaves are used as a cataplasm in order to obtain the suppuration of tumours and bubos (Aublet). The plant furnishes a resin (Dragendorff).

Ocotea canaliculata (Rich.) Mez.

Furnishes a timber for indoor work (Freeman and Williams).

Ocotea puberula Nees.

The yellow, peppery wood is common in carpenter shops and used for tables, shelving and all kinds of joinery (Record).

Ocotea Schomburgkiana (Nees) Mez.

The branchlets are used for basket work, the wood as timber.

Nectandra Pisi Miq.

The yellowish-brown, hard wood, easily to work on, is employed for indoor work and furnishes a durable timber for ship-building and constructions in water (Stone). It needs brass nails, as iron is rapidly attacked (Lauessan).

Nectandra cuspidata Nees.

Furnishes a very light and durable timber used for building purposes (Miquel, Krukoff).

Aniba rosaeodora Ducke.

In 1875 the Frenchman Samain succeeded in distilling out of the wood an oil: „Huile de linalois ou huile d'aloès”, afterwards called: „Essence de bois de rose”. A narrowly related product: „Linaloë mexique” is provided by: *Bursera Delpechiana* Poiss. and *B. Aloëxylon* Engl. The oil contains 90 % of linalol. The wood was shipped chiefly to France for the extraction of the oil, but owing to the loss of essence in transportation, it

was found best to manufacture it in Cayenne itself. The oil is used in the perfumery industry. At the beginning of 1918 this *Aniba* species, named in French Guiana: „Bois de rose femelle” was found by Snijders on the Gonini river. (See: Pulle in Rec. Tr. Bot. Néerl. 22, 1915). Afterwards it has been found elsewhere too, though it seems to be very rare in Surinam. Another species, so closely related, that the collectors could only distinguish it by the terpine smell of the wood, is called: “Bois de rose male”.

Aniba riparia (Nees) Mez.

Furnishes timber wood (Peckholt).

Aniba Canelilla (H.B.K.) Mez.

The bark, with the taste and smell of cinnamon, though fainter is sold on the smaller markets in the Amazonian inland; it is used in the shape of powder for perfuming linen and sometimes for making a stimulating tea (Ducke).

Acroclidium Canella (Meissn.) Mez.

Furnishes a very hard, heavy, dark-brown wood with a faint cinnamon smell. It is durable, but very brittle and difficult to work (Pfeiffer). A decoction of the wood is said to be anti-rheumatic (Corrêa).

Acroclidium guianense Nees.

Furnishes useful timber wood (Peckholt).

Acroclidium Aubletii Kosterm.

According to Aublet this plant should furnish the: „Bois de rose de Cayenne”. It has been proved now that the real rose wood is furnished by *Aniba rosaeodora*. Several *Acroclidium* species have a more or less pungent rose smell. As producers of rose wood plants belonging to various families are mentioned e.g. *Protium altissimum* March, *Amyris* and *Fagara* species, etc.

Mezilaurus Itauba (Meissn.) Taubert.

Furnishes one of the most useful and durable timbers of Brazil and Guiana; the wood is yellowish-green, very sound and strong and especially suited for ship-building (Ducke). The fruit is edible, but it has a strong resinous flavour; from the pulp a wine is made (Spruce). The bark is astringent (Dragendorff).

Cassytha filiformis L.

The aborigines use the stems rubbed with chalk to pitch their vessels (Rumphius). The crushed stems are employed to expel intestinal parasites (Hasskarl) and a watery decoction is said to be a remedy against the coming out of hair (Greshoff). Pulverized and mixed with nutmeg it is said to cure diseases of the abdomen and stomach; the powder mixed with ginger and butter is used as an ointment on tumours. In Southern India the Brahmans use the plant for giving skimmed milk a more agreeable flavour (Greshoff). The powder or viscous juice of the stems is used against vermin (Dragendorff), mixed with sesam oil it preserves the hair, mixed with sugar it is a remedy against sore eyes and head-ache (Rheede). In China it is used as depurative and antivenereal (Baillon, Bot. méd.).

HERNANDIACEAE.

Hernandia sonora L.

The wood is used for canoe-building and indoor work; it is very light and porous, and when dried it can be used as tinder (Lamarck). In the Dutch East Indies swimmers for fishing nets are made of it (Greshoff). The bark should cure inflamed wounds (Dragendorff). An alcoholic extract of the pink sap wood is employed as aphrodisiac; a decoction of the bark should cure wounds, caused by poisoned arrow points (Hartwich). The fruit yields an oil for burning in lamps; in the Dutch East Indies the aborigines make a sort of candle

sticks of it. The oil, extracted out of the stamped and boiled seeds should be narcotic (Hasskarl). On the isle of Réunion a liqueur is made of the fragrant cupule of the fruit (Greshoff); on the Antilles it is used as a drastic. The belief that the plant should have depilating properties is due to the fact that Rumphius' *Arbor regis* was for a long time taken for *Hernandia*, it is however a plant belonging to the *Euphorbiaceae*. The boiled fruit is used against chronic diarrhoea; it is a strong purgative. An ointment made of the fruits is employed against scrofulous affections (Descourtilz).

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