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J.H.A. van Konijnenburg-van Cittert, I.M. van Waveren & J.B. Jonkers

Catalogue of the Mesozoic and Cenozoic holotypes
in the collection of plant fossils
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April 2004

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Catalogue of the Mesozoic and Cenozoic holotypes in the collection of plant fossils in the Nationaal Natuurhistorisch Museum, Leiden

J.H.A. van Konijnenburg-van Cittert, I.M. van Waveren & J.B. Jonkers

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J.H.A. van Konijnenburg-van Cittert (konijnenburg@naturalis.nnm.nl), I.M. van Waveren (waveren@naturalis.nnm.nl) and J.B. Jonkers (jonkers@naturalis.nnm.nl), Nationaal Natuurhistorisch Museum, Postbus 9517, NL-2300 RA Leiden The Netherlands.

Key words — Plants, fossils, holotypes, Mesozoic, Cenozoic, Nationaal Natuurhistorisch Museum.

This is an inventory of the Mesozoic and Cenozoic type material in the original palaeobotanical collections of the Nationaal Natuurhistorisch Museum, Leiden, The Netherlands. In total 60 holotypes are documented and one is noted as missing from the collections. One new combination is made (*Cinnamomum javanicum* (Goeppert) nov. comb.) and several species are considered to be conspecific.

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Introduction

Over the last 200 years, the Nationaal Natuurhistorisch Museum, Leiden, has accumulated a large collection of fossil plants. During a recent inventory several holotypes of fossil plants were encountered in the old collections. The majority of these holotypes are Tertiary in age and originate from Indonesia. A large part belongs to the 'Martin Collection,' which mainly consists of Cenozoic molluscs from Java, Indonesia (Hoek Ostende *et al.*, 2002). These plant specimens were mainly collected by Junghuhn and described by Goeppert (1854), or collected and described by Crié (1888). A smaller collection of holotypes is that of von Ettingshausen (1888a, b), from the Tertiary of Austria. The other holotypes are single specimens of diverse origin. All holotypes mentioned above are stored in the old collections of the National Natuurhistorisch Museum at the Raamsteeg.

How to use this catalogue

Each of the records in the list of holotypes, below, starts with the name as currently employed. This is followed by a synonymy list that starts with the basionym. In the discussion, comments made by various authors are given including new combinations or attributions to other taxa. The author's name of a genus is given without the year of publication unless it was described at the same time as the species involved. This inventory is based on literature and collection data, and does not contain systematic revisions of the material although comments are made in aid of future research. We are aware that many of the data are in need of revision, and invite colleagues to provide us with emendations and additions.

The holotypes are ordered first of all stratigraphically, that is, the holotype that is oldest in age is discussed first. Within the same time interval, the holotypes are ordered firstly according to continent and then to country. For each specimen the RGM number is given (RGM refers to the "Rijksmuseum van Geologie en Mineralogie," now included in the Nationaal Natuurhistorisch Museum) and the locality where it has been found. The original authors, of course, figured their holotypes and the reader is referred to these original publications for illustrations. However, one leaf species, *Cylicodaphne lenorae-selenkae* Schuster, 1911, was only figured in a simplified drawing, and only the thin sections were figured of most of the wood holotypes, not the complete wood specimens from which these sections were made. These specimens are figured in this catalogue for the first time.

List of holotypes**Jurassic****Division Cycadophyta**

Genus *Novoguineoxylon* Boureau & Jongmans, 1955
Novoguineoxylon lacunosum Boureau & Jongmans,
 1955

- 1955 *Novoguineoxylon lacunosum* Boureau & Jongmans, p. 721, pls. 50-52, text-figs. 2-21.

Material — RGM 84309, type specimen of *Novoguineoxylon lacunosum* Boureau & Jongmans; the material includes slides made from this wood.

Remarks — The characters of this fossil differ so much from those of other Cycadophyte woods that it is impossible to give a more precise assignment of the genus and species. It could not even be determined whether this wood might belong to the order of the Cycadales or to that of the Cycadeoidales, let alone be attributed to a family.

The exact age of the fossil is also not completely clear. It was found in the so-called Jass Formation, subdivided into the Upper (Albian, based on ammonites) and the Lower Jass Formation. The specimen was found in the latter. Only plant fragments were found in these beds and no marine fossils which would allow a precise age to be determined. Boureau & Jongmans (1955) stated that the fossil must have had a Jurassic age because it resembled some Liassic wood specimens.

Locality — Kamoendan, New Guinea (Irian Djaja), Indonesia.

Cretaceous**Division Rhodophyta****Order Gigartinales****Family Corallinaceae**

Genus *Archaeolithothamnium* Foslíe

Archaeolithothamnium curasavicum (Martin, 1888)
 Howe, 1918

- 1888 *Lithothamnium curasavicum* Martin, p. 26, pl. 2, figs. 22-25.
 1918 *Archaeolithothamnium curasavicum* (Martin); Howe, p. 5.

Material — RGM 17913, holotype (Martin, 1888, pl. 2, fig. 22); RGM 45829, syntype.

Remarks — Martin described the material and discussed why these specimens (found in the so-called 'Rudistenkalk') should belong to the genus *Lithothamnium* and not to the genera *Dania* or *Radiolites*. Howe (1918) transferred the species to the genus *Archaeolithothamnium* and stated that the distinct rows of embedded sporangial cavities are very characteristic.

Locality — Savonet, Curaçao, Netherlands Antilles.

Cenozoic: Miocene**Java, Indonesia****Kingdom Fungi****Division Eumycetes****Genus *Xylomites* Unger**

Xylomites stigmariaeformis Goeppert, 1854

- 1854 *Xylomites stigmariaeformis* Goeppert, p. 34, pl. 4, fig. 27.
 1864 *Xylomites stigmariaeformis* Goeppert; Goeppert, p. 180.
 1874 *Xylomites stigmariaeformis* Goeppert; Heer, p. 10, pl. 3, fig. 11.
 1879 *Xylomites stigmariaeformis* Goeppert; Heer, p. 9.
 1883b *Xylomites stigmariaeformis* Goeppert; von Ettingshausen, p. 374.
 1887 *Xylomites stigmariaeformis* Goeppert; Geyler, p. 480.
 1925 *Xylomites stigmariaeformis* Goeppert; Kräusel, pp. 331, 337.
 1931 *Xylomites stigmariaeformis* Goeppert; Posthumus, p. 486.

Material — RGM 11784, holotype (Goeppert, 1854, pl. 4, fig. 27).

Remarks — This more or less round fungus was originally described by Goeppert (1854, 1864) from the Miocene of Java. Later authors also described and mentioned it from the Tertiary of Sumatra and Borneo (Heer, 1874, 1879; von Ettingshausen, 1883b). Kräusel (1925, p. 331) stated that the specimen did not show the regularity of the characters as described by Goeppert and was, therefore, indeterminable, although he retained the name.

Locality — Near Tandjung, Java.

Kingdom Plantae**Division Magnoliophyta****Class Liliopsida****Order Arecales****Family Palmae (Arecaceae)****Genus *Flabellaria* Sternberg**

Flabellaria licualaefolia Goeppert, 1854

- 1854 *Flabellaria licualaefolia* Goeppert, p. 36, pl. 4, fig. 29.
 1864 *Flabellaria licualaefolia* Goeppert; Goeppert, p. 180.
 1883b *Flabellaria licualaefolia* Goeppert; von Ettingshausen, p. 374.
 1887 *Flabellaria licualaefolia* Goeppert; Geyler, p. 480.
 1925 *Flabellaria licualaefolia* Goeppert; Kräusel, p. 331.
 1931 *Flabellaria licualaefolia* Goeppert; Posthumus, p. 490.

Material — RGM 11791, holotype (Goeppert, 1854, pl. 4, fig. 29).

Remarks — There is only the holotype (Junghuhn collection 301) present in the collection. Goeppert (1854, pl. 4, fig. 30) compared it to the living palm species *Licuala gracilis* which still occurs on Java. Subsequent authors (von Ettingshausen, 1883b; Kräusel, 1925) give

the name in a list, but Kräusel (1925, p. 331) stated that the leaf is an indeterminable palm.

Locality — On the right bank of the River Tji-Séke Karang, where it joins the Tji-Karang, Java.

Genus *Amesoneuron* Goeppert, 1854

***Amesoneuron calyptrocalyx* Goeppert, 1854**

- 1854 *Amesoneuron calyptrocalyx* Goeppert, p. 36, pl. 5, figs. 31-33.
 1864 *Amesoneuron calyptrocalyx* Goeppert; Goeppert, p. 180.
 1883b *Amesoneuron calyptrocalyx* Goeppert; von Ettingshausen, p. 374.
 1887 *Amesoneuron calyptrocalyx* Goeppert; Geyler, p. 480.
 1925 *Amesoneuron calyptrocalyx* Goeppert; Kräusel, pp. 331, 332.
 1931 *Amesoneuron calyptrocalyx* Goeppert; Posthumus, p. 489.

Material — RGM 11786, holotype (Goeppert, 1854, pl. 5, fig. 33).

Remarks — There are three leaf fragments of this species, all stored under RGM 11786 (Junghuhn collection 356), of which the one figured in Goeppert (1854, pl. 5, fig. 33) is the holotype according to the notes in the box. The other two specimens are figured in Goeppert's pl. 5, figs. 31 and 32. Goeppert compared the species to living *Calyptrocalyx* (figuring *Calyptrocalyx spicatus* in his pl. 5, fig. 34), particularly with regard to the venation. Von Ettingshausen (1883b, p. 374) gave the name in a list. Kräusel (1925, p. 332) stated that Goeppert's specimen (1854, pl. 5, fig. 31) is no palm leaf at all, but might belong to *Cannophyllites*, and that figs. 32 and 33 represent palm leaves that might belong to *Pandanus*.

Locality — At the waterfall in the River Gembong near the village Tandjung.

***Amesoneuron sagifolium* Goeppert, 1854**

- 1854 *Amesoneuron sagifolium* Goeppert, p. 37, pl. 5, fig. 38.
 1864 *Amesoneuron sagifolium* Goeppert; Goeppert, p. 180.
 1883b *Amesoneuron sagifolium* Goeppert; von Ettingshausen, p. 374.
 1887 *Amesoneuron sagifolium* Goeppert; Geyler, p. 480.
 1925 *Amesoneuron sagifolium* Goeppert; Kräusel, pp. 331, 332.
 1931 *Amesoneuron sagifolium* Goeppert; Posthumus, p. 489.

Material — RGM 11793, holotype (Goeppert, 1854, pl. 5, fig. 38; Junghuhn collection 355).

Remarks — Goeppert gave as the main distinguishing character the numerous fine veins that are visible between main parallel veins. He also compared *A. sagifolium* with living *Sagis* species, especially *Sagis filaris* Blume that he figured in pl. 5, fig. 39, for comparison. Von Ettingshausen (1883b, p. 374) repeated the name in a list, while Kräusel (1925, p. 332) mentioned that *A. sagifolium* might be conspecific with *A. dracophyllum*.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

***Amesoneuron dracophyllum* Goeppert 1854**

- 1854 *Amesoneuron dracophyllum* Goeppert, p. 37, pl. 5, figs. 35-36.
 1864 *Amesoneuron dracophyllum* Goeppert; Goeppert, p. 180.
 1883b *Amesoneuron dracophyllum* Goeppert; von Ettingshausen, p. 374.
 1887 *Amesoneuron dracophyllum* Goeppert; Geyler, p. 480.
 1925 *Amesoneuron dracophyllum* Goeppert; Kräusel, p. 331.
 1931 *Amesoneuron dracophyllum* Goeppert; Posthumus, p. 489.

Material — RGM 11792, holotype (Goeppert, 1854, pl. 5, fig. 35; fig. 36 is a detail of the venation).

Remarks — Goeppert stated that there is only one definite specimen of this species (Junghuhn collection 355), but in his pl. 10, fig. 65e (RGM 11818) he figured an *Amesoneuron* leaf fragment that he provisionally attributed to *A. dracophyllum* without further discussion. Goeppert (1854, p. 37) gave as the main difference between this species and the other two *Amesoneuron* species from Tandjung the venation between the main parallel veins that is finer than in *A. calyptrocalyx* and not as fine as in *C. sagifolium*. He also compared the specimen to the living palm leaf *Damaenorops draco* Blume, figured in his pl. 5, fig. 37. Von Ettingshausen (1883b, p. 374) repeated the name in a list, whilst Kräusel (1925, p. 332) considered *A. sagifolium* to be conspecific with *A. dracophyllum*.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Order Zingiberales

Family Zingiberaceae

Genus *Cannophyllites* Brongniart

***Cannophyllites vrieseanus* Goeppert, 1854**

- 1854 *Cannophyllites vrieseanus* Goeppert, p. 38, pl. 6, figs. 42-43, 45-46.
 1864 *Cannophyllites vrieseanus* Goeppert; Goeppert, p. 180.
 1883a *Cannophyllites vrieseanus* Goeppert; von Ettingshausen, p. 178.
 1883b *Cannophyllites vrieseanus* Goeppert; von Ettingshausen, p. 374.
 1887 *Cannophyllites vrieseanus* Goeppert; Geyler, p. 480.
 1925 *Cannophyllites vrieseanus* Goeppert; Kräusel, pp. 331, 332.
 1931 *Cannophyllites vrieseanus* Goeppert; Posthumus, p. 490.

Material — RGM 11794, holotype (Goeppert, 1854, pl. 6, fig. 42; Junghuhn collection 356).

Remarks — Next to the holotype Goeppert also described RGM 11790 (1854, pl. 6, fig. 43) which shows two leaves of this species. He compared the material with the living species *Alpinia nutans*. In his pl. 6, figs. 45, 46, a stem is illustrated which consists of leaf petioles that are rolled together (sheathlike), a feature typical for this group of plants. Von Ettingshausen (1883a, p. 178; 1883b, p. 374) repeated the name in a list. Kräusel

(1925, p. 332) stated that Goeppert's pl. 6, fig. 43, figures indeterminable leaves and that he was not entirely certain that the stem with leaf petioles figured in figs. 45, 46, belonged to the species. Geyler (1887) agreed with the attribution of the leaves to *Cannophyllites*, but was not sure about the stem.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Family Musaceae

Genus *Musophyllum* Goeppert, 1854

Musophyllum truncatum Goeppert, 1854

- 1854 *Musophyllum truncatum* Goeppert, p. 39, pl. 7, fig. 47.
 1864 *Musophyllum truncatum* Goeppert; Goeppert, p. 180.
 1883a *Musophyllum truncatum* Goeppert; von Ettingshausen, p. 178.
 1883b *Musophyllum truncatum* Goeppert; von Ettingshausen, p. 374.
 1887 *Musophyllum truncatum* Goeppert; Geyler, p. 480.
 1925 *Musophyllum truncatum* Goeppert; Kräusel, pp. 331, 332.
 1931 *Musophyllum truncatum* Goeppert; Posthumus, p. 490.

Material — RGM 11819, holotype (Goeppert, 1854, pl. 7, fig. 47).

Remarks — The holotype (Junghuhn collection 357) demonstrates two apical leaf fragments, which undoubtedly belong together and constituted the apex of a leaf comparable to that of a living *Musa*. The midrib is distinct and thick, the secondary veins have a concentration of about 10 per cm and curve upwards. Von Ettingshausen (1883a, p. 178; 1883b, p. 374) quoted the name in two lists. Geyler (1887, p. 480) doubted Goeppert's attribution to the Musaceae. Kräusel (1925, p. 332) said that the leaf fragment is certainly a dicot leaf that might belong to the genus *Calophyllum*. Schenk (1890, p. 387) stated that fossils resembling *Musa* should be placed in the genus *Musaphyllum* Unger (instead of *Musophyllum* Goeppert).

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Class Magnoliopsida

Order Piperales

Family Piperaceae

Genus *Piperites* Goeppert 1854

Piperites miquelianus Goeppert 1854

- 1854 *Piperites miquelianus* Goeppert, p. 41, pl. 7, figs. 48-49.
 1864 *Piperites miquelianus* Goeppert; Goeppert, p. 180.
 1883b *Piperites miquelianus* Goeppert; von Ettingshausen, p. 374.
 1887 *Piperites miquelianus* Goeppert; Geyler, p. 481.
 1890 *Piperites miquelianus* Goeppert; Schenk, p. 489.
 1925 *Piperites miquelianus* Goeppert; Kräusel, pp. 331, 332.
 1931 *Piperites miquelianus* Goeppert; Posthumus, p. 491.
 1974 *Piperites miquelianus* Goeppert; Kramer, p. 50.

Material — RGM 11789, holotype (Goeppert, 1854, pl. 7, fig. 48).

Remarks — In Junghuhn's collection there are more specimens of this species (nos. 354a, 356, 358) of which one more is figured (Goeppert, 1854, pl. 7, fig. 49; RGM 232535); also, a leaf of the species is present on RGM 11813. Goeppert stated that the shape and venation of the leaves undoubtedly points to an affinity with the Piperaceae and figured a leaf of the living species *Chavica chaba* Miquel (pl. 7, fig. 50) for comparison. Von Ettingshausen (1883b, p. 374) gave the species name in a list. Schenk (1890, p. 489) and Kräusel (1925, p. 332) mentioned that, in their opinion, this was the only *Piperites* species that had been correctly determined by Goeppert (1854).

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Piperites bullatus Goeppert, 1854

- 1854 *Piperites bullatus* Goeppert, p. 41, pl. 7, fig. 51.
 1864 *Piperites bullatus* Goeppert; Goeppert, p. 180.
 1883a *Phyllites bullatus* (Goeppert); von Ettingshausen, p. 191.
 1883b *Phyllites bullatus* (Goeppert); von Ettingshausen, p. 376.
 1887 *Piperites bullatus* Goeppert; Geyler, p. 841.
 1890 *Piperites bullatus* Goeppert; Schenk, p. 489.
 1925 *Piperites bullatus* Goeppert; Kräusel, pp. 331, 332.
 1931 *Piperites bullatus* Goeppert; Posthumus, p. 491.

Material — RGM 11792d, holotype (Goeppert, 1854, pl. 7, fig. 59).

Remarks — Only one specimen of this species is present in Junghuhn's collection (no. 357). The species differs from *P. miquelianus* in the large marginal veins that probably arose from the base of the leaf. Goeppert (1854, pl. 7, fig. 52) compared the species with the living species *Cubeba wallichii* Miquel, and expressed doubt with regard to the attribution to the genus *Piperites* and, indeed, to the family Piperaceae. Von Ettingshausen (1883a) transferred the species to the genus *Phyllites* (a form genus for fossil leaves belonging to the Dicotyledonae, but without any further attribution). Schenk (1890, p. 489) and Kräusel (1925, p. 332) stated that the leaf fragment was so poorly preserved that it should be regarded as indeterminable, but nevertheless retained the name.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Piperites hasskarlianus Goeppert, 1854

- 1854 *Piperites hasskarlianus* Goeppert, p. 40, pl. 3, figs. 20-23.
 1864 *Piperites hasskarlianus* Goeppert; Goeppert, p. 180.
 1883b *Piperites hasskarlianus* Goeppert; von Ettingshausen, p. 374.
 1884 *Piperites hasskarlianus* Goeppert; Hofmann, p. 17.
 1887 *Piperites hasskarlianus* Goeppert; Geyler, p. 481.
 1890 *Piperites hasskarlianus* Goeppert; Schenk, p. 489.
 1925 *Piperites hasskarlianus* Goeppert; Kräusel, pp. 331, 332.
 1931 *Piperites hasskarlianus* Goeppert; Posthumus, p. 491.

Material — RGM 11788, holotype (Goeppert, 1854, pl. 3, fig. 20).

Remarks — This species is only represented by a small piece of wood (Goeppert, 1854, pl. 3, fig. 20) with associated slide preparations (*ibid.*, pl. 3, figs. 21–23). Goeppert (1854) compared it with wood from the living species *Piper unguiculatum* and *Piper nigrum*. He stated that the species agrees with wood of the living *Piper*, and simply attributed it to the genus *Piperites* because the material consisted only of a small specimen and not a whole stem. Schenk (1890, p. 489) mentioned that some typical features of Piperaceae wood had not been preserved, hence his doubts about the attribution of this small piece of wood to this family. Kräusel (1925, p. 332) gave as his opinion that this specimen represents angiosperm wood, but is indeterminable beyond that.

Locality — Along the River Tji-Asahan (G.-Bulut), Java.

Order Fagales

Family Fagaceae

Genus *Quercus* Linné

Quercus subsinuata Goeppert, 1854

- 1854 *Quercus subsinuata* Goeppert, p. 42, pl. 8, fig. 53.
 1864 *Quercus subsinuata* Goeppert; Goeppert, p. 180.
 1883a *Quercus tephrodes* Unger; von Ettingshausen, p. 178, pl. 1, fig. 1, pl. 2, fig. 1.
 1883b *Quercus tephrodes* Unger; von Ettingshausen, p. 374.
 1887 *Quercus subsinuata* Goeppert; Geyler, p. 481.
 1890 *Quercus subsinuata* Goeppert; Schenk, p. 440.
 1925 *Quercus subsinuata* Goeppert; Kräusel, p. 321.
 1931 *Quercus tephrodes* Unger; Posthumus, p. 492.

Material — RGM 11801, holotype (Goeppert, 1854, pl. 8, fig. 53; Junghuhn collection 360).

Remarks — Goeppert (1854) founded the species on the holotype only, mainly based on its venation, and compared it to the living species *Quercus glaberrima* Blume from Java. However, according to von Ettingshausen (1883a, p. 178, pl. 2, fig. 1) the fossil species is so similar to European Tertiary *Quercus tephrodes* Unger (known, for example, from the fossil flora of Radoboj, Croatia; *ibid.*, pl. 1, fig. 1) that he believed them to be conspecific and synonymised *Q. subsinuata* with *Q. tephrodes*. Von Ettingshausen compared the material not only to the extant *Q. glaberrima*, but also to *Q. aquatica* known from the moors of Florida and Texas. Schenk (1890, p. 440) disagreed with von Ettingshausen and stated that the Tandjung taxon was a separate species. Kräusel (1925) also kept the original name *Q. subsinuata*, but stated that the leaf was poorly preserved.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Quercus laurophylla Goeppert, 1854

- 1854 *Quercus laurophylla* Goeppert, p. 42, pl. 8, fig. 54.
 1864 *Quercus laurophylla* Goeppert; Goeppert, p. 180.
 1883a *Quercus laurophylla* Goeppert; von Ettingshausen, p. 187.
 1883b *Quercus laurophylla* Goeppert; von Ettingshausen, p. 374.
 1887 *Quercus laurophylla* Goeppert; Geyler, p. 481.
 1890 *Quercus laurophylla* Goeppert; Schenk, p. 440.
 1925 *Quercus laurophylla* Goeppert; Kräusel, p. 331.
 1931 *Quercus laurophylla* Goeppert; Posthumus, p. 491.

Material — RGM 11800, holotype (Goeppert, 1854, pl. 8, fig. 54; Junghuhn collection 360).

Remarks — Goeppert (1854) founded the species on the holotype only, differing from *Q. subsinuata* in possessing a more prominent midrib, slightly falcate secondary veins and a completely entire margin. He compared the specimen with the extant species *Q. daphnoidea* Blume (*ibid.*, pl. 8, fig. 55). According to von Ettingshausen (1883a), the Tertiary species *Q. hookeri* von Ettingshausen from Australia is quite similar, differing in the presence of stronger and weaker secondary veins, while those of *Q. laurophylla* are distinct throughout. Subsequent authors simply listed the species.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Quercus castanoides Goeppert, 1854

- 1854 *Quercus castanoides* Goeppert, p. 42, pl. 7, fig. 56.
 1864 *Quercus castanoides* Goeppert; Goeppert, p. 180.
 1883a *Castanopsis goeppertii* von Ettingshausen, p. 187, pl. 5, fig. 1.
 1883b *Castanopsis goeppertii* von Ettingshausen, p. 374.
 1887 *Castanopsis goeppertii* von Ettingshausen; Geyler, p. 481.
 1890 *Quercus castanoides* Goeppert; Schenk, p. 433.
 1925 *Quercus castanoides* Goeppert; Kräusel, pp. 331, 332.
 1931 *Castanopsis goeppertii* von Ettingshausen; Posthumus, p. 491.

Material — RGM 11798, holotype (Goeppert, 1854, pl. 7, fig. 56).

Remarks — Goeppert (1854) based this species on the holotype only, which is a very incomplete leaf fragment. He attributed it to the genus *Quercus* on the basis of its venation, which is comparable to that of the living species *Q. persica* Jaubert & Spach and *Q. lineata* Blume, but stated that the living *Castanea* species in Java also show a somewhat similar venation. Von Ettingshausen (1883a) transferred this species to the genus *Castanopsis*, but with the new trivial name *goeppertii*, which is illegitimate according to the *International Code of Botanical Nomenclature* (Greuter *et al.*, 2002). Geyler (1887, p. 481) and Schenk (1890, p. 433) commented that von Ettingshausen (1883a) placed *Q. castanoides* in the genus *Castanopsis*, but gave no opinion of their own. Kräusel (1925, p. 332) stated that the specimen is too poorly preserved to make a reasonable attribution.

Locality — Peshawahan (Djampang Kulon), Tjandjur, Preangan, Java.

Order Urticales
Family Moraceae
Genus *Ficus* Tournef
***Ficus flexuosa* Goeppert, 1854**

- 1854 *Ficus flexuosa* Goeppert, p. 43, pl. 8, fig. 57.
 1864 *Ficus flexuosa* Goeppert; Goeppert, p. 180.
 1883a *Ficus flexuosa* Goeppert; von Ettingshausen, p. 189.
 1883b *Ficus flexuosa* Goeppert; von Ettingshausen, p. 375.
 1887 *Ficus flexuosa* Goeppert; Geyler, p. 481.
 1890 *Ficus flexuosa* Goeppert; Schenk, p. 483.
 1925 *Ficus flexuosa* Goeppert; Kräusel, pp. 331, 332.
 1931 *Ficus flexuosa* Goeppert; Posthumus, p. 492.

Material — RGM 11806, holotype (Goeppert, 1854, pl. 8, fig. 57; Junghuhn collection 357).

Remarks — Goeppert (1854) described the species on the basis of the holotype only, which he regarded as showing the characters typical of habitus and venation of a living *Ficus* leaf. For comparison he figured a leaf of the living species *Ficus scaberrima* Miquel (*ibid.*, pl. 8, fig. 58). Von Ettingshausen (1883a) discussed the species, stating that it could better be compared to the European Tertiary *Ficus lanceolata* Heer instead of *F. scaberrima*. However, the difference with *Ficus lanceolata* lies in the much larger lamina and the more upwards curving secondary veins. Kräusel (1925, p. 332) maintained the species, commenting that Goeppert's comparison with *F. scaberrima* was not very adequate, but that the leaf certainly belongs to the genus *Ficus*.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

***Ficus dubia* Goeppert, 1854**

- 1854 *Ficus dubia* Goeppert, p. 43, pl. 7, fig. 59.
 1864 *Ficus dubia* Goeppert; Goeppert, p. 180.
 1883a *Phyllites goeppertianus* von Ettingshausen, p. 192.
 1883b *Phyllites goeppertianus* von Ettingshausen, p. 376.
 1887 *Phyllites goeppertianus* von Ettingshausen; Geyler, p. 481.
 1925 *Ficus dubia* Goeppert; Kräusel, pp. 331, 332.
 1931 *Ficus dubia* Goeppert; Posthumus, p. 492.

Material — RGM 11804, holotype (Goeppert, 1854, pl. 7, fig. 59).

Remarks — Again, Goeppert described the species based only on the holotype and stated that it showed some characters in common with species of *Ficus*, hence his attribution. However, the specimen is too incompletely preserved to be sure about its affinity. Because of its incompleteness, von Ettingshausen (1883a, p. 192) transferred the specimen to the form genus *Phyllites*, albeit with a different trivial name, naming the species

after Goeppert. This is not allowed according to the *International Code of Botanical Nomenclature* (Greuter *et al.*, 2000). Von Ettingshausen (1883a) stated that there are also differences in the venation of this leaf (especially in the basal pair of secondary veins) to comparable living *Ficus* species; von Ettingshausen (1883b) simply gave the name in a list. Geyler (1887, p. 481) considered the species to be rather doubtful and Kräusel (1925, p. 332) considered the specimen indeterminate.

Locality — Near Pesawahan, Java.

Order Laurales
Family Lauraceae
Genus *Cinnamomum* Linné
***Cinnamomum javanica* (Goeppert, 1854) comb. nov.**

- 1854 *Daphnogene javanica* Goeppert, p. 44, pl. 9, fig. 60.
 1864 *Daphnogene javanica* Goeppert; Goeppert, p. 180.
 1883a *Cinnamomum goepperti* von Ettingshausen, p. 189.
 1883b *Cinnamomum goepperti* von Ettingshausen, p. 375.
 1887 *Cinnamomum goepperti* von Ettingshausen; Geyler, p. 482.
 1890 *Daphnogene javanica* Goeppert; Schenk, p. 496.
 1925 *Daphnogene javanica* Goeppert; Kräusel, pp. 331, 332.
 1931 *Cinnamomum goeppertii* von Ettingshausen; Posthumus, p. 494.

Material — RGM 11814, holotype (Goeppert, 1854, pl. 9, fig. 60; Junghuhn collection 354).

Remarks — Goeppert (1854) founded the species on the holotype alone, which is an apical leaf fragment. He compared the specimen with the living species *Cinnamomum culiwawan* and *C. cassia* (*ibid.*, pl. 9, figs. 61, 62, respectively). Von Ettingshausen (1883a) transferred the species with a slightly different diagnosis, but based only on Goeppert's specimen to the genus *Cinnamomum* and created (illegitimately) a new name, *C. goeppertii*. This is not allowed according to the *International Code of Botanical Nomenclature* (Greuter *et al.*, 2000). The combination should have been named *Cinnamomum javanicum*. He compared the species with *C. rosmaessleri* Unger from the European Tertiary, that differs in possessing slightly stronger basal veins and a different pattern of perpendicular veins. Schenk (1890, p. 496) simply mentioned the presence of the species in Java, without commenting on the generic assignment. Kräusel (1925, p. 332) agreed with von Ettingshausen's attribution to the genus *Cinnamomum*, but did not make a new combination. This we do herein.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Genus *Daphnogene* Unger
***Daphnogene intermedia* Goeppert, 1854**

- 1854 *Daphnogene intermedia* Goeppert, p. 44, pl. 9, fig. 63.
 1864 *Daphnogene intermedia* Goeppert; Goeppert, p. 180.

- 1883b *Daphnogene intermedia* Goeppert; von Ettingshausen, p. 375.
 1887 *Daphnogene intermedia* Goeppert; Geyler, p. 482.
 1890 *Daphnogene intermedia* Goeppert; Schenk, p. 496.
 1925 *Daphnogene intermedia* Goeppert; Kräusel, pp. 331, 332.
 1931 *Daphnogene intermedia* Goeppert; Posthumus, p. 495.

Material — RGM 11813a, holotype (Goeppert, 1854, pl. 9, fig. 63; Junghuhn collection 358b).

Remarks — *Daphnogene intermedia* is based on the holotype only, which is a leaf fragment that lacks the apex. An apical leaf fragment is present on the same slab, but it is impossible to say if it belongs to the same species. According to Goeppert (1854, p. 45) the venation is similar to that found in living *Caryodaphne* (comparing with extant *C. densiflora* Blume; *ibid.*, pl. 9, fig. 64), and intermediate between that of the genera *Daphnogene* and *Laurophyllum*. The two basal secondary veins do not continue to the apex as in *Cinnamomum*, but they converge above the middle of the leaf and end in anastomoses. Von Ettingshausen (1883b, p. 375) gave the name in a list, Schenk (1890, p. 496) just mentioned the presence of the species on Java and Kräusel (1925, p. 332) considered the specimen indeterminate.

Locality — At the waterfall in the River Gembong near the village Tandjung, Java.

Genus *Laurophyllum* Goeppert, 1854

Laurophyllum beilschmiedoides Goeppert, 1854

- 1854 *Laurophyllum beilschmiedoides* Goeppert, p. 45, pl. 10, fig. 65a, b, pl. 11, figs. 66, 68.
 1854 *Laurophyllum viburnifolium* Goeppert, p. 45, pl. 10, fig. 65c, pl. 11, fig. 69.
 1864 *Laurophyllum beilschmiedoides* Goeppert; Goeppert, p. 180.
 1864 *Laurophyllum viburnifolium* Goeppert; Goeppert, p. 180.
 1874 *Daphnophyllum beilschmiedoides* Goeppert; Heer, p. 13, pl. 2, figs. 1, 2.
 1883a *Daphnophyllum beilschmiedoides* Goeppert; von Ettingshausen, p. 176.
 1883a *Laurophyllum viburnifolium* Goeppert; von Ettingshausen, p. 176.
 1883b *Daphnophyllum beilschmiedoides* Goeppert; von Ettingshausen, p. 375.
 1887 *Daphnophyllum beilschmiedoides* Goeppert; Geyler, p. 482.
 1887 *Laurophyllum viburnifolium* Goeppert; Geyler, p. 482.
 1890 *Daphnophyllum beilschmiedoides* Heer; Schenk, p. 494.
 1890 *Laurophyllum viburnifolium* Goeppert; Schenk, p. 496.
 1925 *Laurophyllum beilschmiedoides* Goeppert; Kräusel, pp. 331, 332.
 1925 *Laurophyllum viburnifolium* Goeppert; Kräusel, pp. 331, 332.
 1931 *Daphnophyllum beilschmiedoides* von Ettingshausen; Posthumus, p. 495.
 1931 *Laurophyllum viburnifolium* Goeppert; Posthumus, p. 495.

Material — RGM 11818a, b, holotype (Goeppert, 1854, pl. 10, fig. 65a, b) (Junghuhn collection 357, 358). RGM 11813b (*ibid.*, pl. XI, fig. 66) also belongs to this species, RGM 11819a (*ibid.*, pl. 11, fig. 68) possibly does so (according to Goeppert) and RGM 232377 (Junghuhn

collection 358) may represent the same taxon, but is rather fragmentary.

Remarks — The holotype, RGM 11818, contains two incomplete leaves of this species, the holotype of the synonymous *L. viburnifolium* Goeppert and a fragment of *L. haasioides* Goeppert (see below). Goeppert (1854, p. 45, pl. 11, fig. 67) compared *L. beilschmiedoides* with extant *Beilschmiedia javanica* Miquel. Heer (1874, p. 13) considered that *Laurophyllum* was a 'vox hybrida' and changed the name into *Daphnophyllum beilschmiedoides* Goeppert; von Ettingshausen (1883a, b) mentioned *Daphnophyllum beilschmiedoides* Goeppert without comment, and considered *L. viburnifolium* and *L. haasioides* to be conspecific with it. Schenk (1890, p. 494) used the name *Daphnophyllum beilschmiedoides*, but with Heer as author. The correct name should, of course, be *Daphnophyllum beilschmiedoides* (Goeppert) Heer. Kräusel (1925, p. 332) retained *Laurophyllum beilschmiedoides*, considered *L. viburnifolium* conspecific and the *L. haasioides* remains as indeterminate.

RGM 11818c was the holotype of *L. viburnifolium* Goeppert, 1854, pl. 10, fig. 65c. The specimen figured by Goeppert in pl. 11, fig. 69, has not been found in the present study. Both Von Ettingshausen (1883a) and Kräusel (1925) considered *L. viburnifolium* to be conspecific with *L. beilschmiedoides*, a decision with which the present authors concur.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

cf. *Laurophyllum* sp.

- 1854 *Laurophyllum haasioides* Goeppert, p. 46, pl. 10, fig. 65d, pl. 11, fig. 70.
 1864 *Laurophyllum haasioides* Goeppert; Goeppert, p. 180.
 1883a *Laurophyllum haasioides* Goeppert; von Ettingshausen, p. 176.
 1887 *Laurophyllum haasioides* Goeppert; Geyler, p. 482.
 1890 *Laurophyllum haasioides* Goeppert; Schenk, p. 496.
 1925 *Laurophyllum haasioides* Goeppert; Kräusel, pp. 331, 332.
 1931 *Laurophyllum haasioides* Goeppert; Posthumus, p. 495.

Material — RGM 11820a, holotype (Goeppert, 1854, pl. 11, fig. 70) (Junghuhn collection 360a).

Remarks — The holotype shows two leaf fragments that probably belong to the same species and possibly even to the same leaf, according to Goeppert (1854, p. 46). RGM 11818 also demonstrates a small leaf fragment of the same species (*ibid.*, pl. 10, fig. 65a). Goeppert compared with the living species *Haasia microcarpa* Blume (*ibid.*, pl. 11, fig. 71). Von Ettingshausen (1883a, p. 176) considered *L. haasioides*, just as *L. viburnifolium*, to be conspecific with *Daphnophyllum beilschmiedoides*. Kräusel (1925, p. 332) considered the material indeterminate, a determination with which we agree and name the specimen cf. *Laurophyllum* sp.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

Order Ebenales
Family Ebenaceae
Genus *Diospyros* L.
***Diospyros dubia* Goeppert, 1854**

- 1854 *Diospyros dubia* Goeppert, p. 47, pl. 12, fig. 72.
 1864 *Diospyros dubia* Goeppert; Goeppert, p. 181.
 1883b *Diospyros dubia* Goeppert; von Ettingshausen, p. 375.
 1887 *Diospyros dubia* Goeppert; Geyler, p. 483.
 1890 *Diospyros dubia* Goeppert; Schenk, p. 749.
 1925 *Diospyros dubia* Goeppert; Kräusel, pp. 331, 333.
 1931 *Diospyros dubia* Goeppert; Posthumus, p. 503.

Material — RGM 11840, holotype (Goeppert, 1854, pl. 12, fig. 72; Junghuhn collection 353).

Remarks — Goeppert (1854) described *D. dubia* based on the holotype only, but the secondary venation is so typical that he was certain that he was dealing with a species of *Diospyros*. He compared his new species with extant *D. virginiana* L. and the fossil species *D. pannonica* von Ettingshausen from the Tertiary of Austria. Kräusel (1925, p. 333) confirmed that although the venation of RGM 11840 (which he reexamined) was slightly different from Goeppert's figure (*ibid.*, pl. 12, fig. 73), the identification was correct.

Locality — Pesawahan, Java.

Order Gentianales
Family Apocynaceae
Genus *Apocynophyllum* Juss
***Apocynophyllum reinwardtianum* Goeppert, 1854**

- 1854 *Apocynophyllum reinwardtianum* Goeppert, p. 48, pl. 12, figs. 74-75.
 1864 *Apocynophyllum reinwardtianum* Goeppert; Goeppert, p. 180.
 1883a *Apocynophyllum reinwardtianum* Goeppert; von Ettingshausen, pp. 178, 190.
 1883b *Apocynophyllum reinwardtianum* Goeppert; von Ettingshausen, p. 375.
 1887 *Apocynophyllum reinwardtianum* Goeppert; Geyler, p. 483.
 1890 *Apocynophyllum reinwardtianum* Goeppert; Schenk, p. 768.
 1925 *Apocynophyllum reinwardtianum* Goeppert; Kräusel, pp. 331, 333.
 1931 *Apocynophyllum reinwardtianum* Goeppert; Posthumus, p. 503.

Material — RGM 11843, holotype (Goeppert, 1854, pl. 12, figs. 74-75) (Junghuhn collection 355).

Remarks — Apart from the holotype that shows a middle part of a leaf (Goeppert, 1854, pl. 12, fig. 74; fig. 75 gives a detail of the venation), there is RGM 232387 (labelled *Apocynophyllum reinwardtianum*) from an unknown locality in Java (Junghuhn collection) that has two leaf apices showing the typical net venation of *Apocynophyllum* leaves. However, it is by no means cer-

tain that they belonged to this particular species. *Apocynophyllum reinwardtianum* resembles, according to Goeppert (1854, p. 48), many living Apocynaceae (e.g., *Melodinus scandens*; *ibid.*, pl. 12, fig. 76), and other fossil forms such as *Apocynophyllum rigidum* Goeppert (*ibid.*, pl. 12, fig. 77) from the Tertiary of Germany. Von Ettingshausen (1883a, p. 190) agreed with this comparison and also compared *A. reinwardtianum* with *A. etheridgei* from the Tertiary of New South Wales, Australia. Kräusel (1925, p. 333) agreed with Goeppert's attribution of this species to the genus *Apocynophyllum*.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

***Apocynophyllum nervosissimum* Goeppert, 1854**

- 1854 *Apocynophyllum nervosissimum* Goeppert, p. 49, pl. 12, fig. 78.
 1864 *Apocynophyllum nervosissimum* Goeppert; Goeppert, p. 180.
 1883b *Apocynophyllum nervosissimum* Goeppert; von Ettingshausen, p. 175.
 1887 *Apocynophyllum nervosissimum* Goeppert; Geyler, p. 483.
 1890 *Apocynophyllum nervosissimum* Goeppert; Schenk, p. 768.
 1925 *Apocynophyllum nervosissimum* Goeppert; Kräusel, pp. 331, 333.
 1931 *Apocynophyllum nervosissimum* Goeppert; Posthumus, p. 503.

Material — RGM 11842, holotype (Goeppert, 1854, pl. 12, fig. 78; Junghuhn collection 357).

Remarks — *Apocynophyllum nervosissimum* closely resembles *A. reinwardtianum*, differing only in its larger size and larger meshes in the net venation. Goeppert (1854, p. 49) stated that the difference in venation might have been caused by the size difference, but still made another species for the leaf. Kräusel (1925, p. 333) regarded the two species as conspecific. The collection at the Nationaal Natuurhistorisch Museum is also comprised of RGM 232385, labelled *A. nervosissimum*, from an unknown locality in Java (Junghuhn collection). The specimen can be attributed to the same species as RGM 11842. Moreover, RGM 232389 (Junghuhn collection 359) shows a leaf fragment that also may be conspecific.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

Order Coriales
Family Cornaceae
Genus *Cornus* Linné
***Cornus benthamioides* Goeppert, 1854**

- 1854 *Cornus benthamioides* Goeppert, p. 50, pl. 13, fig. 79.
 1864 *Cornus benthamioides* Goeppert; Goeppert, p. 186.
 1883b *Cornus benthamioides* Goeppert; von Ettingshausen, p. 375.
 1887 *Cornus benthamioides* Goeppert; Geyler, p. 483.
 1890 *Cornus benthamioides* Goeppert; Schenk, p. 614.
 1925 *Cornus benthamioides* Goeppert; Kräusel, pp. 331, 333.
 1931 *Cornus benthamioides* Goeppert; Posthumus, p. 502.

Material — RGM 11839, holotype (Goeppert, 1854, pl. 13, fig. 79).

Remarks — The species was based on the holotype only, an almost complete leaf. Goeppert compared this with the living genera *Myristica* and *Erioglossum* that grow on Java, but especially with the subtropical species *Benthamia fragifera* Lindl. (*ibid.*, pl. 13, fig. 80). According to Schenk (1890, p. 614) the species could just as well be attributed to *Benthamia* as to *Cornus*. Kräusel (1925, p. 333) stated that the specimen was indeterminate.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

Order Magnoliales

Family Magnoliaceae

Genus *Magnoliastrum* Goeppert, 1854

Magnoliastrum michelioides Goeppert, 1854

- 1854 *Magnoliastrum michelioides* Goeppert, p. 50, pl. 13, fig. 81.
 1864 *Magnoliastrum michelioides* Goeppert; Goeppert, p. 180.
 1883b *Magnoliastrum michelioides* Goeppert; von Ettingshausen, p. 375.
 1887 *Magnoliastrum michelioides* Goeppert; Geyler, p. 483.
 1890 *Magnoliastrum michelioides* Goeppert; Schenk, p. 504.
 1925 *Magnoliastrum michelioides* Goeppert; Kräusel, pp. 331, 333.
 1931 *Magnoliastrum michelioides* Goeppert; Posthumus, p. 493.

Material — RGM 11792c, holotype (Goeppert, 1854, pl. 13, fig. 81) (Junghuhn collection 358).

Remarks — Goeppert (1854) described the species based on the holotype only, stating that it certainly belonged to the Magnoliaceae and probably most closely resembled the living genus *Michelia*, hence the epithet. He drew particular attention to similarities with *Michelia pubinervia* Blume that grows on Java; Kräusel (1925, p. 333) agreed with this opinion.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

Magnoliastrum arcinerve Goeppert, 1854

- 1854 *Magnoliastrum arcinerve* Goeppert, p. 51, pl. 13, fig. 82.
 1864 *Magnoliastrum arcinerve* Goeppert; Goeppert, p. 180.
 1883b *Magnoliastrum arcinerve* Goeppert; von Ettingshausen, p. 375.
 1887 *Magnoliastrum arcinerve* Goeppert; Geyler, p. 483.
 1890 *Magnoliastrum arcinerve* Goeppert; Schenk, p. 504.
 1925 *Magnoliastrum arcinerve* Goeppert; Kräusel, pp. 331, 333.
 1931 *Magnoliastrum arcinerve* Goeppert; Posthumus, p. 493.

Material — RGM 11820b, holotype (Goeppert, 1854, pl. 13, fig. 82; in the caption to this figure the species was named *Magnoliastrum arcinervium*) (Junghuhn collection 360b).

Remarks — Apart from the holotype there is an additional specimen, RGM 232386, from an unknown local-

ity on Java. Goeppert (1854) stated that *M. arcinerve* differed from *M. michelioides* in the secondary veins, which have a more pronounced upward curvature, and thus resemble more the living genus *Magnolia*. Kräusel (1925, p. 333) agreed with this opinion.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

Magnoliastrum taulamoides Goeppert, 1854

- 1854 *Magnoliastrum taulamoides* Goeppert, p. 51, pl. 13, fig. 83.
 1864 *Magnoliastrum taulamoides* Goeppert; Goeppert, p. 180.
 1883b *Magnoliastrum taulamoides* Goeppert; von Ettingshausen, p. 375.
 1887 *Magnoliastrum taulamoides* Goeppert; Geyler, p. 483.
 1890 *Magnoliastrum taulamoides* Goeppert; Schenk, p. 504.
 1925 *Magnoliastrum taulamoides* Goeppert; Kräusel, pp. 331, 333.
 1931 *Magnoliastrum taulamoides* Goeppert; Posthumus, p. 493.

Remarks — The holotype is apparently missing from the collections of the Nationaal Natuurhistorisch Museum.

Order Malpighiales

Family Malpighiaceae

Genus *Malpighiastrum* Unger

Malpighiastrum junghuhnianum Goeppert, 1854

- 1854 *Malpighiastrum junghuhnianum* Goeppert, p. 51, pl. 13, fig. 84.
 1864 *Malpighiastrum junghuhnianum* Goeppert; Goeppert, p. 180.
 1883b *Malpighiastrum junghuhnianum* Goeppert; von Ettingshausen, p. 180.
 1890 *Malpighiastrum junghuhnianum* Goeppert; Schenk, p. 571.
 1925 *Malpighiastrum junghuhnianum* Goeppert; Kräusel, pp. 331, 333.
 1931 *Malpighiastrum junghuhnianum* Goeppert; Posthumus, p. 497.

Material — RGM 11824, holotype (Goeppert, 1854, pl. 13, fig. 84; Junghuhn collection 360).

Remarks — Goeppert (1854) described the species based on the holotype only, an almost complete leaf that he compared to the extant South American species *Heteropteris chrysophylla* H.B. (*ibid.*, pl. 13, fig. 85) as he could not find a living relative on Java. Schenk (1890, p. 571) and Kräusel (1925, p. 333) agreed with the assignment of this fossil to the genus *Malpighiastrum*.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

Order Rhamnales

Family Rhamnaceae

Genus *Ceanothus* Linné

Ceanothus javanica Goeppert, 1854

- 1854 *Ceanothus javanica* Goeppert, p. 51, pl. 14, fig. 86a.
 1864 *Ceanothus javanica* Goeppert; Goeppert, p. 181.
 1883b *Ceanothus javanica* Goeppert; von Ettingshausen, p. 376.

- 1890 *Ceanothus javanica* Goeppert; Schenk, p. 588.
 1925 *Ceanothus javanica* Goeppert; Kräusel, pp. 331, 333.
 1931 *Ceanothus javanica* Goeppert; Posthumus, p. 497.

Material — RGM 11828a, holotype (Goeppert, 1854, pl. 14, fig. 86a; Junghuhn collection 353).

Remarks — Goeppert based this species on the holotype only, which is an incomplete leaf fragment associated with another Rhamnaceae-type leaf fragment that was too incomplete to determine. Goeppert (1854, p. 52) compared it with the living species *Ceanothus americanus* Mill. (*ibid.*, pl. 14, fig. 87). Von Ettingshausen (1883) and Schenk (1890) just mentioned the presence of the species on Java. Kräusel (1925, p. 333) stated that the specimen was too badly preserved to be identified, but retained the name.

Locality — Pesawahan, Java.

Genus *Rhamnus* Linné

Rhamnus dilatatus Goeppert, 1854

- 1854 *Rhamnus dilatatus* Goeppert, p. 52, pl. 14, fig. 88.
 1864 *Rhamnus dilatatus* Goeppert; Goeppert, p. 181.
 1883b *Rhamnus dilatatus* Goeppert; von Ettingshausen, p. 376.
 1890 *Rhamnus dilatatus* Goeppert; Schenk, p. 589.
 1925 *Rhamnus dilatatus* Goeppert; Kräusel, pp. 331, 333.
 1931 *Rhamnus dilatatus* Goeppert; Posthumus, p. 498.

Material — RGM 11835, holotype (Goeppert, 1854, pl. 14, fig. 88; Junghuhn collection 351a).

Remarks — Goeppert (1854) introduced this species on the basis of the incomplete (apex missing) holotype only; he considered that the specimen could be attributed to the genus *Rhamnus* based on its gross morphology and venation. Von Ettingshausen (1883b) and Schenk (1890) mentioned the presence of the species in the Miocene flora of Java. Kräusel (1925, p. 333) considered the specimen to be indeterminable because only the beginning of the secondary veins was visible.

Locality — At the waterfall in the River Gembong near the village of Tandjung, Java.

Order Rhamnales

Family Celastraceae

Genus *Celastrphyllum* Goeppert

Celastrphyllum attenuatum Goeppert, 1854

- 1854 *Celastrphyllum attenuatum* Goeppert, p. 52, pl. 14, fig. 89.
 1854 *Celastrphyllum majus* Goeppert, p. 52, pl. 14, fig. 90.
 1864 *Celastrphyllum attenuatum* Goeppert; Goeppert, p. 181.
 1864 *Celastrphyllum majus* Goeppert; Goeppert, p. 181.
 1883b *Celastrphyllum attenuatum* Goeppert; von Ettingshausen, p. 376.
 1925 *Celastrphyllum attenuatum* Goeppert; Kräusel, pp. 331, 333.
 1925 *Celastrphyllum attenuatum* forma *majus* Goeppert; Kräusel, pp. 331, 333.
 1931 *Celastrphyllum attenuatum* Goeppert; Posthumus, p. 498.

Material — RGM 11830, holotype (Goeppert, 1854, pl. 14, fig. 89; Junghuhn collection 353).

Remarks — Goeppert based the species on the incomplete holotype (apex missing) and described also *Celastrphyllum majus* (see below) from the same beds (just as the other three *Celastrphyllum* species mentioned below), stating that the size difference was enough to create a different species. Kräusel (1925, p. 333) was of the opinion that all *Celastrphyllum* species from this locality are conspecific, a determination with which the present authors disagree (we consider that we are dealing with at least two species). The size difference clearly falls within the natural range of variability of the species.

RGM 11831 was the holotype (Junghuhn collection 352) of *Celastrphyllum majus* Goeppert, conspecific with *C. attenuatum* from the same locality. Kräusel (1925, p. 331) noted it as a form of *C. attenuatum* in his list of fossil plant species from Java. Von Ettingshausen (1883b), Schenk (1890) and Posthumus (1931) did not specifically mention the species, but Schenk (1890, p. 581) stated that all the *Celastrphyllum* leaves described by Goeppert belong to the Celastraceae and were probably rightly attributed.

Locality — Pesawahan, Java.

Celastrphyllum oleaefolium Goeppert, 1854

- 1854 *Celastrphyllum oleaefolium* Goeppert, p. 53, pl. 14, figs. 92, 93a.
 1854 *Celastrphyllum andromedaefolium* Goeppert, p. 52, pl. 14, fig. 91.
 1854 *Celastrphyllum myricoides* Goeppert, p. 53, pl. 14, fig. 93b.
 1864 *Celastrphyllum oleaefolium* Goeppert; Goeppert, p. 181.
 1864 *Celastrphyllum andromedaefolium* Goeppert; Goeppert, p. 181.
 1864 *Celastrphyllum myricoides* Goeppert; Goeppert, p. 181.
 1883a *Pterocelastrus oleaefolius* (Goeppert); von Ettingshausen, p. 190.
 1883a *Rhamnus myricoides* (Goeppert); von Ettingshausen, p. 191.
 1883b *Pterocelastrus oleaefolius* (Goeppert); von Ettingshausen, p. 376.
 1883b *Celastrphyllum andromedaefolium* Goeppert; von Ettingshausen, p. 376.
 1883b *Rhamnus myricoides* (Goeppert); von Ettingshausen, p. 376.
 1890 *Celastrphyllum oleaefolium* Goeppert; Schenk, p. 581.
 1925 *Celastrphyllum oleaefolium* Goeppert; Kräusel, pp. 331, 333.
 1925 *Celastrphyllum andromedaefolium* Goeppert; Kräusel, pp. 331, 333.
 1925 *Celastrphyllum oleaefolium* Goeppert; Kräusel, pp. 331, 333.
 1931 *Pterocelastrus oleaefolius* (Goeppert); Posthumus, p. 498.
 1931 *Celastrphyllum andromedaefolium* Goeppert; Posthumus, p. 498.
 1931 *Rhamnus myricoides* (Goeppert); Posthumus, p. 498.

Material — RGM 11832, holotype (Goeppert, 1854, pl. 14, fig. 92) (Junghuhn collection 351).

Remarks — Apart from the holotype, a second leaf of *C. oleaefolium* occurs on the same slab as the holotype of *C. myricoides* (registered as RGM 11833a). Goeppert (1854, p. 53) stated that the difference with other species of *Celastrphyllum* lies in the more gradually tapering of

both the base and apex of the leaves. Von Ettingshausen (1883a, p. 190) transferred *C. oleaefolium* to the genus *Pterocelastrus*. Schenk (1890, p. 581) and Kräusel (1925, p. 333) stated that the leaves did not yield enough information to make this attribution, and that they were more appropriately assigned to *Celastrorphyllum*. Kräusel (1925, p. 333) thought the species was conspecific with both *C. andromedaefolium* and *C. myricoides*, and that all this material should be named *C. oleaefolium* since this is the best known species, and because all the material was described at the same time. Moreover, the leaves might be conspecific with *C. attenuatum* as well, even though the latter species has slightly larger leaves.

RGM 11829 was the holotype (Goeppert, 1854, pl. 14, fig. 91; Junghuhn collection 351b) of *C. andromedaefolium*. Like most other *Celastrorphyllum* species from Pesawahan, the species was based on the holotype only. This specimen is certainly smaller than that of *Celastrorphyllum attenuatum* and the secondary veins arise at a slightly smaller angle.

RGM 11832 was the holotype (*ibid.*, pl. 14, fig. 93b; Junghuhn collection 351d) of *C. myricoides*. The holotype is on the same specimen as a leaf of *C. oleaefolium* and, as stated above, Kräusel (1925, p. 333) considered them to be conspecific, an assignment with which we agree. According to Goeppert (1854), the difference between *C. myricoides* and *C. oleaefolium* lies only in a slightly denser venation. Von Ettingshausen (1883a, p. 191) transferred the species to the genus *Rhamnus*, but Kräusel (1925, p. 333) did not agree with this and kept the species in *Celastrorphyllum*.

It is possible that all the material of *Celastrorphyllum* from Peshawan belongs to one species, in which case it should be named *C. attenuatum*, but the size difference is considerable. We therefore retain two species, *C. attenuatum* and *C. oleaefolium*, as did Kräusel (1925).

Locality — Pesawahan, Java.

**Dicotyledonous wood of unknown affinity,
possibly Dipterocarpaceae**

**Genus *Junghuhnites* Goeppert, 1854
Junghuhnites javanicus Goeppert, 1854**

- 1854 *Junghuhnites javanicus* Goeppert, pp. 22, 54, pl. 2, figs. 11-16.
- 1864 *Junghuhnites javanicus* Goeppert; Goeppert, p. 183.
- 1884 *Junghuhnites javanicus* Goeppert; Hofmann, p. 179.
- 1922 *Junghuhnites javanicus* Goeppert; Kräusel, p. 14.
- 1925 *Junghuhnites javanicus* Goeppert; Kräusel, pp. 331, 333.
- 1926 *Junghuhnites javanicus* Goeppert; Kräusel, p. 1.
- 1931 *Junghuhnites javanicus* Goeppert; Posthumus, p. 505.
- 1974 *Junghuhnites javanicus* Goeppert; Kramer, p. 50.

Material — RGM 11845, holotype (Goeppert, 1854, pl. 2, figs. 11-16; fig. 11, holotype; figs. 12-16 represent various sections from the holotype) (Junghuhn collection 347).

Remarks — Goeppert (1854, pp. 22, 54) created *Junghuhnites javanicus* for a lithified piece of fossil dico-

tyledonous wood which he could not attribute to any living family. Hofmann (1884) and Posthumus (1931) just mentioned the species. Kräusel (1925, p. 333) stated that it should be attributed to the Dipterocarpaceae and resembled *Dipterocarpoxyylon javanense* Kräusel, 1922. In 1926 Kräusel (pp. 1, 5) stated that the original specimen was lost and it was impossible to determine from Goeppert's figures alone to which family the wood might be attributed. However, the original specimen is still present in the collections of the Nationaal Natuurhistorisch Museum, although the sections are missing. Kräusel must have overlooked the specimen when he studied the material in 1926.

Locality — From the left bank of the Tji-Wulan, near Sukapura tua, district of Pasiredan, Preanger, Java.

**Genus *Shoreoxylon* den Berger
Shoreoxylon moroides (Goeppert, 1854) den Berger,
1927**

- 1854 *Bredaea moroides* Goeppert, p. 56, pl. 1, figs. 3-5.
- 1864 *Bredaea moroides* Goeppert; Goeppert, p. 183.
- 1884 *Bredaea moroides* Goeppert; Hofmann, p. 182.
- 1925 *Bredaea moroides* Goeppert; Kräusel, pp. 331, 333.
- 1926 *Dipterocarpoxyylon moroides* (Goeppert); Kräusel, p. 4, pl. 1, fig. 2, pl. 2, figs. 3-4.
- 1927 *Shoreoxylon moroides* (Goeppert); den Berger, p. 498.
- 1931 *Shoreoxylon moroides* (Goeppert); Posthumus, p. 501.
- 1958 *Dipterocarpoxyylon moroides* (Goeppert); Schweitzer, p. 9.
- 1974 *Shoreoxylon moroides* (Goeppert); Kramer, p. 47.

Material — RGM 11803, holotype (Goeppert, 1854, pl. 1, fig. 3, holotype; figs. 4-5 are sections made from the holotype and numbered RGM 375932, 375933; those made later from the holotype by Kräusel are numbered RGM 375927, 375929-375931) (Junghuhn collection 349a).

Remarks — Goeppert (1854, p. 56) created *Bredaea moroides* for a silicified piece of fossil dicotyledonous wood which he could not attribute to any living family. Hofmann (1884, p. 182) stated that his new species *Hippocrateoxylon javanicum* resembled in some aspects *Bredaea moroides*. Kräusel (1925, p. 333) stated that *Bredaea moroides* should be attributed to the Dipterocarpaceae and that it resembled *Dipterocarpoxyylon javanense* Kräusel, 1922. Accordingly, Kräusel (1926, p. 4) transferred the species to *Dipterocarpoxyylon* and gave good photos of thin sections. Den Berger (1927, p. 498) transferred it to *Shoreoxylon*, also a genus of fossil dipterocarpaceous wood. Kräusel (1926, p. 2) mentioned this already in his general discussion of the genus *Dipterocarpoxyylon* and stated that he did not agree with this transfer. Kramer (1974, p. 47) just mentioned that den Berger transferred the species to *Shoreoxylon* without giving an opinion. Schweitzer (1958, p. 9) stated that the specimen could not be found and that, therefore, its assignment was uncertain.

Locality — In many stream beds in Bantam, Java.

Genus *Miquelites* Goeppert, 1854

***Miquelites elegans* Goeppert, 1854**

- 1854 *Miquelites elegans* Goeppert, p. 56, pl. 1, figs. 6, 7, 7a.
 1864 *Miquelites elegans* Goeppert; Goeppert, p. 183.
 1884 *Miquelites elegans* Goeppert; Hofmann, p. 177.
 1925 *Miquelites elegans* Goeppert; Kräusel, pp. 331, 333.
 1926 *Miquelites elegans* Goeppert; Kräusel, pp. 1, 5.
 1931 *Miquelites elegans* Goeppert; Posthumus, p. 505.
 1974 *Miquelites elegans* Goeppert; Kramer, p. 50.

Material — RGM 375934, holotype (Goeppert, 1854, pl. 1, fig. 6; figs. 7, 7a are sections made from the holotype, numbered RGM 375872-375875 and RGM 375924-375926) (Jungluhn collection 349b).

Remarks — According to Goeppert (1854, p. 56) specimens attributable to this species could be found in many streams in Bantam, but he described only the holotype, which consists of one large and one smaller piece of wood (and the sections prepared from it). Hofmann (1884) just mentioned the material. Kräusel (1925, p. 333) considered that *Miquelites elegans* should be attributed to the Dipterocarpaceae and that it resembled *Dipterocarpoxydon javanense* Kräusel, 1922. However, Kräusel (1926, pp. 1, 5) said that the material was too badly preserved to make a reliable attribution.

Locality — In many stream beds in Bantam, Java.

Flora from Leoben, Austria

Division Cycadophyta

Class Cycadopsida

Order Cycadales

Family Zamiaceae

Genus *Ceratozamia* Brongniart

***Ceratozamia hofmannii* von Ettingshausen, 1888a**

- 1888a *Ceratozamia hofmannii* von Ettingshausen, p. 12, pl. 3, fig. 10.
 2002 *Ceratozamia hofmannii* von Ettingshausen; Kvaček, p. 309.

Material — THDB 6809 (old collection from Technical University Delft, now acquired by the Nationaal Natuurhistorisch Museum), holotype, from the Hofmann collection.

Remarks — Von Ettingshausen (1888a) figured one leaf of this cycadalean species, stating that the epidermal stomata and perpendicular striations (pl. 3, fig. 10a, b, respectively) can be seen under higher magnification. He also recorded the species from Parschlug.

Kvaček (2002, p. 309) stated that *C. hofmannii* might be a monocotyledonous plant. However, recent cuticular research has shown that the specimen indeed

belongs to *Ceratozamia* and resembles *C. floersheimensis* from Floersheim in gross morphology (differing in the narrower and not expanded base) and cuticle anatomy (Kvaček, 2002, in press).

Locality — Münzenberg, near Leoben, Austria.

Division Magnoliophyta

Class Magnoliopsida

Order Proteales

Family Proteaceae

Genus *Dryandroides* Unger

***Dryandroides grevilleaefolia* von Ettingshausen, 1888a**

- 1888a *Dryandroides grevilleaefolia* von Ettingshausen, p. 57, pl. 4, fig. 15, 15a.

Material — THDB 6757 (ex-Technical University, Delft), holotype (von Ettingshausen, 1888a, pl. 4, fig. 15), from the Hofmann collection.

Remarks — Von Ettingshausen (1888a) described and figured one almost complete leaf. He compared it to the fossil species *D. hakeaefolia* Unger and *D. grandis* Unger from the flora of Sotzka from which *D. grevilleaefolia* differs only in its more narrow leaf. The venation (*ibid.*, pl. 4, fig. 15a) is typical for the Proteaceae.

Locality — Münzenberg, near Leoben, Austria.

Order Fabales

Family Fabaceae

Genus *Cytisus* Linné

***Cytisus palaeo-laburnum* von Ettingshausen, 1888b**

- 1888b *Cytisus palaeo-laburnum* von Ettingshausen, p. 361, pl. 9, fig. 27, 27a.

Material — THDB 6799 (ex-Technical University Delft), holotype (von Ettingshausen, 1888b, pl. 9, fig. 27), from the Hofmann collection.

Remarks — Von Ettingshausen (1888b) described and figured a compound leaf consisting of three leaflets and a petiole 12 mm long. He compared with the extant species *Cytisus laburnum* Linné and *C. alpinus* Linné. The venation was enlarged in *ibid.* (pl. 9, fig. 27a). Prof. Z. Kvaček (pers. comm., 2002) studied the specimen and considers it to be a leaf of *Platinus fraxinifolia* (Johnson) Walther.

Locality — Münzenberg, near Leoben, Austria.

Pliocene Flora from Java, Indonesia**Class Liliopsida****Order Cyperales****Family Poaceae****Genus *Poacites* Brongniart*****Poacites cyperoides* Crié, 1888**

- 1888 *Poacites cyperoides* Crié, p. 5, pl. 1, fig. 1a.
 1888 *Poacites arundinacea* Crié, p. 6, pl. I, fig. 1b.
 1925 *Poacites cyperoides* Crié; Kräusel, p. 333.
 1925 *Poacites arundinacea* Crié; Kräusel, p. 333.
 1931 *Poacites cyperoides* Crié; Posthumus, p. 489.
 1931 *Poacites arundinacea* Crié; Posthumus, p. 489.

Material — RGM 11785a, holotype (Crié, 1888, pl. 1, fig. 1a).

Remarks — RGM 11785 shows three fragments of linear leaves (c. 5 mm wide) with at least an indication of a midrib in one of them. The remainder of the veins are parallel to this midrib with interstitial veins in between. It is possible that the midrib is real, but it may be a preservational artifact. Crié compared the specimens mainly with the living genus *Cyperus* Linné. On the same specimen two fragments are present of a similar leaf which are slightly larger (9 and 10 mm wide) and do not demonstrate a clear midrib. Crié made these two fragments into another species (*P. arundinacea*), based mainly on the absence of a clear midrib. Kräusel (1925, p. 333) stated that these two species cannot be separated and the present authors agree that they are probably conspecific. Careful examination of Crié (1888, pl. 1, fig. 1) revealed that at least in one of the broader leaves (*P. arundinacea*) there is a faint indication of a midrib, while in one of the narrower leaves (*P. cyperoides*) there is no midrib visible. All these leaf fragments occur on one single slab.

RGM 11785b (*ibid.*, pl. 1, fig. 1b) was the holotype of *Poacites arundinacea* Crié. As stated above, the two leaf fragments for which Crié created this species occur on the same specimen as *P. cyperoides* and might very well be conspecific, an opinion shared by Kräusel (1925, p. 333). Therefore, we include them in *P. cyperoides*.

Locality — Goenoeng Kendang, Java.

Order Arecales**Family Arecaceae****Genus *Palmacites* Brongniart*****Palmacites flabellata* Crié, 1888**

- 1888 *Palmacites flabellata* Crié, p. 7, pl. 2, fig. 1.
 1925 *Palmacites flabellata* Crié; Kräusel, p. 333.
 1931 *Palmacites flabellata* Crié; Posthumus, p. 490.

Material — RGM 11787, holotype (Crié, 1888, pl. 2, fig. 1).

Remarks — The holotype is a very incomplete palm leaf; neither its base nor its apex has been preserved. Therefore, Crié attributed the specimen to the general form genus for palm-like leaves, *Palmacites*. The preserved fragment has a folded appearance, characteristic for palm leaves, and demonstrates parallel venation with perpendicular interstitial veins. Crié compared the venation with that of the living genera *Licuala*, *Livistona* and *Sabal* (Crié, 1888, pl. 2, figs. 4, 3, 2, respectively), and stated that the latter agreed best. Kräusel (1925, p. 333) stated that the specimen represented a badly preserved palm leaf.

Locality — Goenoeng Kendang, Java.

Class Magnoliopsida**Order Urticales****Family Moraceae****Genus *Artocarpidium* Unger*****Artocarpidium (Ficus) martinianum* Crié, 1888**

- 1888 *Artocarpidium (Ficus) martinianum* Crié, p. 9, pl. 3, fig. 1.
 1925 *Artocarpidium (Ficus) martinianum* Crié; Kräusel, p. 333.
 1931 *Artocarpidium (Ficus) martinianum* Crié; Posthumus, p. 492.

Material — RGM 11802, holotype (Crié, 1888, pl. 3, fig. 1).

Remarks — The holotype is an incomplete leaf with an uneven base and a distinct straight midrib. Secondary veins arise (sub)oppositely and curve upwards; tertiary veins appear to be perpendicular to the secondary veins and dichotomise, forming irregular veins meshes between the secondary veins. Crié (1888, p. 10) compared *A. martinianum* with the living *Ficus leucantoma* Poir (*ibid.*, pl. 3, fig. 2) from Java, which he considered to be rather similar. He also compared *A. martinianum* with two leaf fragments from the Tertiary of Labuan (North Borneo, Malaysia), described by Geyler (1887, p. 492, pl. 34, figs. 4-5) as *Moreophyllum* sp., and *Artocarpidium gregoryi* Goeppert from the Tertiary of Australia. Kräusel (1925, p. 333) re-examined the holotype and stated that the venation was less clear than illustrated in Crié's figure and that he did not consider the specimen to be a *Ficus* leaf.

Locality — Goenoeng Kendang, Java.

Order Laurales**Family Lauraceae****Genus *Actinodaphne* Nees*****Actinodaphne martiniana* Crié, 1888**

- 1888 *Actinodaphne martiniana* Crié, p. 11, pl. 4, figs. 1-3.
 1925 *Actinodaphne martiniana* Crié; Kräusel, p. 333.
 1931 *Actinodaphne martiniana* Crié; Posthumus, p. 494.

Material — RGM 11811, holotype (Crié, 1888, pl. 4, fig. 1).

Remarks — Crié (1888, p. 11, pl. 4, fig. 2) gives the histology of the midrib according to Crié, but it is not clear if this drawing has been made from the holotype. *Ibid.* (pl. 4, fig. 3) shows the leaf base which has been preserved at the back side of the holotype. The holotype is an almost complete leaf (only the base is missing, but this is present in the specimen illustrated on *ibid.*, pl. 4, fig. 3) that Crié compared with the living *Actinodaphne* from Java (pl. 4, fig. 4). Kräusel (1925, p. 333) agreed with the attribution of the specimen.

Locality — Goenoeng Kendang, Java.

Genus *Cylicodaphne* Blume
***Cylicodaphne lenorae-selenkae* Schuster, 1911**
Fig. 1.

1911 *Cylicodaphne lenorae-selenkae* Schuster, p. 21, text-fig.

Material — RGM 11812, holotype (Schuster, 1911, text-fig. on p. 21; re-figured herein as Fig. 1).

Remarks — Schuster (1911, p. 21) described this fossil from the Pliocene of Java in his monograph on the flora from the *Pithecanthropus* beds. It closely resembles *Cylicodaphne fusca* Blume and *C. cuneata* Blume from Sumatra. Schuster mentioned that in the same layers *Cinnamomum* and *Ficus* leaves were found, together with a fossil freshwater fish (*Barbus*). *Cylicodaphne lenorae-selenkae* is figured photographically for the first time herein.

Locality — Mandalasari, near Buitenzorg, Java.

Family Dipterocarpaceae
Genus *Phyllites* Sternberg
***Phyllites dipterocarpoides* Crié, 1888**

1888 *Phyllites dipterocarpoides* Crié, p. 14, pl. 5, fig. 1.
 1925 *Phyllites dipterocarpoides* Crié; Kräusel, p. 333.
 1931 *Phyllites dipterocarpoides* Crié; Posthumus, p. 501.

Material — RGM 11838, holotype (Crié, 1888, pl. 5, fig. 1).

Remarks — Crié (1888, p. 14) based this species on the holotype only, an incomplete leaf missing the apex that, however, clearly possesses characters of the Dipterocarpaceae, and he compared it with the extant *Dipterocarpus baudii* Korth. (*ibid.*, pl. 5, fig. 2) from Sumatra (Indonesia), especially in venation. Kräusel (1925, p. 333) agreed with the assignment.

Locality — Goenoeng Kendang, Java.

Genus *Dryobalanoxylon* den Berger, 1927
***Dryobalanoxylon spectabile* (Crié, 1888) den Berger, 1927**

1888 *Naucleoxylon spectabile* Crié, p. 19, pl. 8, figs. 1-2.
 1925 *Naucleoxylon spectabile* Crié; Kräusel, p. 333.
 1926 *Dipterocarpoxyton spectabile* (Crié); Kräusel p. 2, pl. 1, fig. 1, pl. 2, figs. 1-2.
 1927 *Dryobalanoxylon spectabile* (Crié); den Berger, p. 498.
 1931 *Dryobalanoxylon spectabile* (Crié); Posthumus, p. 501.
 1958 *Dryobalanoxylon spectabile* (Crié); Schweitzer, p. 9.
 1974 *Dryobalanoxylon spectabile* (Crié); Kramer, p. 48.
 2001 *Dryobalanoxylon spectabile* (Crié); Srivastava & Kagemori, p. 399.

Material — RGM 232704, holotype (Crié, 1888, pl. 8, figs. 1-2). The sections made from the holotype are numbered RGM 375870-375871, 375876-375879.

Remarks — Crié (1888, p. 19) created the genus *Naucleoxylon*, with the type species *N. spectabile*, for a piece of wood that he compared with the living genus *Nauclea* from Java (*ibid.*, pl. 8, figs. 3-4). Kräusel (1925, p. 333) considered it to be a dipterocarpaceous wood, but in 1926 (p. 2) he transferred it to the genus *Dipterocarpoxyton* because of its characteristic resin ducts. Den Berger (1927, p. 498) agreed with the attribution to the Dipterocarpaceae and transferred the species from the more general wood genus *Dipterocarpoxyton* to the genus *Dryobalanoxylon*.

Locality — Goenoeng Kendang, Java.

Genus *Dipterocarpoxyton* Kräusel
***Dipterocarpoxyton goepperti* Kräusel, 1926**
Fig. 2.

1926 *Dipterocarpoxyton goepperti* Kräusel, p. 4, pl. 1 figs. 3-4, pl. 2, figs. 5-6.
 1927 *Dipterocarpoxyton goepperti* Kräusel; den Berger, p. 4.
 1931 *Dipterocarpoxyton goepperti* Kräusel; Posthumus, p. 500.
 1958 *Dipterocarpoxyton goepperti* Kräusel; Schweitzer, p. 10.

Material — RGM 375935, holotype (Kräusel, 1926, pl. 1, figs. 3-4, pl. 2, figs. 5-6; the sections made from the holotype have been numbered RGM 375922, 375923 and 375928).

Remarks — The holotype is a large specimen from which sections have been made. As Kräusel only figured the sections, we figure the holotype for the first time herein (Fig. 2). According to Kräusel (1926, p. 5) the wood belongs to the Dipterocarpaceae, but cannot be identified with any other living or fossil species. Berger (1927, p. 4) agreed with him, but considered this wood to be closest to the genus *Anisoptera*.

Locality — No precise locality known; surroundings of Nangoeng, district of Jasinga, Buitenzorg, Java.

Family Rhamnaceae**Genus *Rhamnus* L.*****Rhamnus ventilagoides* Crié, 1888**

- 1888 *Rhamnus ventilagoides* Crié, p. 15, pl. 6, fig. 1.
 1925 *Rhamnus ventilagoides* Crié; Kräusel, p. 333.
 1931 *Rhamnus ventilagoides* Crié; Posthumus, p. 498.

Material — RGM 11834, holotype (Crié, 1888, pl. 6, fig. 1).

Remarks — Crié (1888, p. 15) based the species on the holotype only, a leaf with the base missing. Its venation differs from that of most *Rhamnus* species in that the tertiary veins are transversal and not oblique. In this respect the leaf resembles more *Ceanothus*, and Crié (1888, p. 16, pl. 6, fig. 2) compared it with *Rhamnus* (*Ceanothus*) *colubrinus* L. from the Antilles and with *Ventilago maderaspatana* Gaert (*ibid.*, pl. 6, fig. 3) from Java. Kräusel (1925, p. 333) agreed with Crié's assignment.

Locality — Goenoeng Kendang, Java.

Family Sapotaceae**Genus *Sapotacites* von Ettingshausen*****Sapotacites delpratii* Crié, 1888**

- 1888 *Sapotacites delpratii* Crié, p. 18, pl. 7, fig. 1.
 1925 *Sapotacites delpratii* Crié; Kräusel, p. 333.
 1931 *Sapotacites delpratii* Crié; Posthumus, p. 502.

Material — RGM 11841, holotype (Crié, 1888, pl. 7, fig. 1).

Remarks — The single specimen of this species is an incomplete leaf from which the apex is missing. Crié (1888, p. 18) stated that the general leaf shape and morphology resembled that of certain plants in the families Myrtaceae, Apocynaceae and Artocarpaceae, but mostly the Sapotaceae, and he compared it with the living *Payenia latifolia* Burck from Indonesia (*ibid.*, pl. 7, fig. 2). Kräusel (1925, p. 333) was not confident with this attribution as he considered the venation to be poorly preserved.

Locality — Goenoeng Kendang, Java.

Flora from Burma**Family Ebenaceae****Genus *Ebenoxylon* Felix*****Ebenoxylon burmense* Du, 1988a**

Fig. 3.

- 1988a *Ebenoxylon burmense* Du, p. 217, pls 1-3.

Material — RGM 43178, holotype (specimen with 14 sections; Du, 1988a, pls 1-3).

Remarks — Du (1988a, p. 217) described this large piece of wood (original length 30 cm) as ebenaceous. After comparing it with various species of *Diospyros* and *Maba*, he concluded that it most closely resembled wood from these two genera which is usually assigned to the organ genus *Ebenoxylon*. The holotype itself was never figured by Du, only the sections; therefore, the specimen is figured here in Figure 3a. Figure 3b shows the small bits that Du cut from the holotype and from which he prepared the sections. Stratigraphical details of the specimen are unknown, other than Irrawaddy Series, Pliocene.

Locality — East flank of the Yenangyaung dome, Yenangyaung Oilfield, Burma.

Family Fabaceae**Genus *Saracoxylon* Du, 1988a*****Saracoxylon irrawaddiense* Du, 1988a**

Fig. 4.

- 1988a *Saracoxylon irrawaddiense* Du, p. 227, pls. 4, 5.

Material — RGM 43164, holotype (specimen with 12 sections; Du, 1988a, pls. 4, 5).

Remarks — Du (1988a, p. 227) described this piece of wood as belonging to his new genus *Saracoxylon* (Fabaceae, formerly Leguminosae), and stated that it resembled the wood from the living species *Saraca indica* Linné and *Saraca thaipengensis* Cantley. Because fossil wood identifiable with *Saraca* was unknown up to that time, he created the new genus for it with the type species *Saracoxylon irrawaddiense*. As with the previous species, the holotype was not figured until now (Fig. 4a, b). Figure 4c shows the small bits that Du cut from the holotype and from which he prepared the sections. From the Irrawaddy Series (Pliocene).

Locality — Two-three miles from Magwe at the east side of the Irrawaddy River, Burma.

Tertiary(?) of The Netherlands**Class Liliopsida****Order Arecales****Family Palmae (Arecaceae)****Genus *Palmoxylon* Schenk*****Palmoxylon pachyoxylon* van der Burgh et Meulenkaamp, 1966**

Fig. 5.

- 1966 *Palmoxylon pachyoxylon* van der Burgh et Meulenkaamp, p. 278, pl. 2.

Material — RGM 62321, holotype (Fig. 5a herein, whole specimen; Fig. 5b illustrates the side from which the sections were taken). The figured sections (van der

Burgh & Meulenkaamp, 1966, pl. 2) are stored at the Laboratory of Palaeobotany and Palynology, University of Utrecht.

Remarks — Van der Burgh & Meulenkaamp (1966) described this single piece of palm wood from the eastern part of The Netherlands. The geological age of the material is not completely clear as this specimen was found in isolation and was probably transported by glacial ice during the Pleistocene. However, this type of palm wood was quite common during the Tertiary in Europe. It is the only specimen of the species.

Locality — Sibculo, The Netherlands.

Genus *Rhizopalmoxylon* Gothan
***Rhizopalmoxylon pilosum* van der Burgh et**
Meulenkaamp, 1966

Fig. 6.

1966 *Rhizopalmoxylon pilosum* van der Burgh et Meulenkaamp, p. 281, pls. 6, 7.

Material — RGM 34586, holotype (Fig. 6a, whole specimen; Fig. 6b, side from which sections were taken). The figured sections (van der Burgh & Meulenkaamp, 1966, pls. 6, 7) are stored at the Laboratory of Palaeobotany and Palynology, University of Utrecht.

Remarks — This species is not a palm trunk, but a silicified bunch of palm roots. The anatomy of the roots has been preserved and this allows the attribution to the fossil palm root genus *Rhizopalmoxylon*. The specimen is again a single piece, but several more specimens have been found in the eastern part of The Netherlands, probably transported there by glacial ice.

Locality — Borne, Twente, The Netherlands.

Quaternary of Indonesia

Class Magnoliopsida
Family Dipterocarpaceae
Genus *Shoreoxylon* den Berger
***Shoreoxylon sumatraense* Du, 1988b**

Fig. 7.

1988b *Shoreoxylon sumatraense* Du, p. 342, pls. 1, 2, pl. 5, fig. 4.

Material — RGM 383446, holotype (specimen with seven sections).

Remarks — Du (1988b, p. 342) described this old specimen (originally registered as RGM B) as a new species of *Shoreoxylon*, mainly comparing it to the living species *Shorea negrosensis* Foxworthy, and all the fossil

Shoreoxylon species known from Indonesia and adjacent areas. The holotype itself was not figured in Du (1988b), and it is shown herein in three views (Fig. 7). No stratigraphical details are known for this specimen, probably collected in the 19th century.

Locality — Djambi district, South Sumatra, Indonesia.

Family Lythraceae
Genus *Lagerstroemioxylon* Mädlar
***Lagerstroemioxylon benkoelense* Du, 1988b**

Fig. 8.

1988b *Lagerstroemioxylon benkoelense* Du, p. 349, pls. 3, 4, pl. 5, figs. 1-3.

Material — RGM 383447, holotype (specimen with four sections).

Remarks — Du (1988b, p. 347) described this piece of fossil wood (originally registered as RGM D) and found it closely comparable to wood from the extant species *Lagerstroemia collettii* Craib known from southeast Asia. He also compared it with all fossil species of *Lagerstroemioxylon*, mainly recorded from southeast Asia and India. The holotype itself was not figured in Du (1988b); two views are figured herein (Fig. 8). Stratigraphical details of the specimen are unknown, other than Quaternary.

Locality — At the roadside from Benkoelen to Lais, Benkoelen District, Sumatra, Indonesia.

Quaternary of The Netherlands

Division Coniferophyta
Class Coniferopsida
Order Pinales
Family Pinaceae
Genus *Picea* A. Dietr.
***Picea florschuetzii* van der Hammen, 1951**

1951 *Picea florschuetzii* van der Hammen, p. 246, fig. 2.

Material — RGM 38971, holotype.

Remarks — Van der Hammen described this female conifer cone based on the holotype only. He also described a cone which he assigned to *Picea* sp., because the scales are slightly smaller than those of *P. florschuetzii* and more lozenge-shaped. He did not compare his material to any living or fossil species.

Locality — Tegelen (clay pit Russel-Tiglia), The Netherlands.

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Fig. 1. *Cylicodaphne lenorae-selenkae* Schuster, 1911, holotype, RGM 11812. Scale in mm and cm.



Fig. 2. *Dipterocarpxylon goepperti* Kräusel, 1926, holotype, RGM 375935. (a) Holotype seen from above with the original label. (b) Side view. Scales in mm and cm.

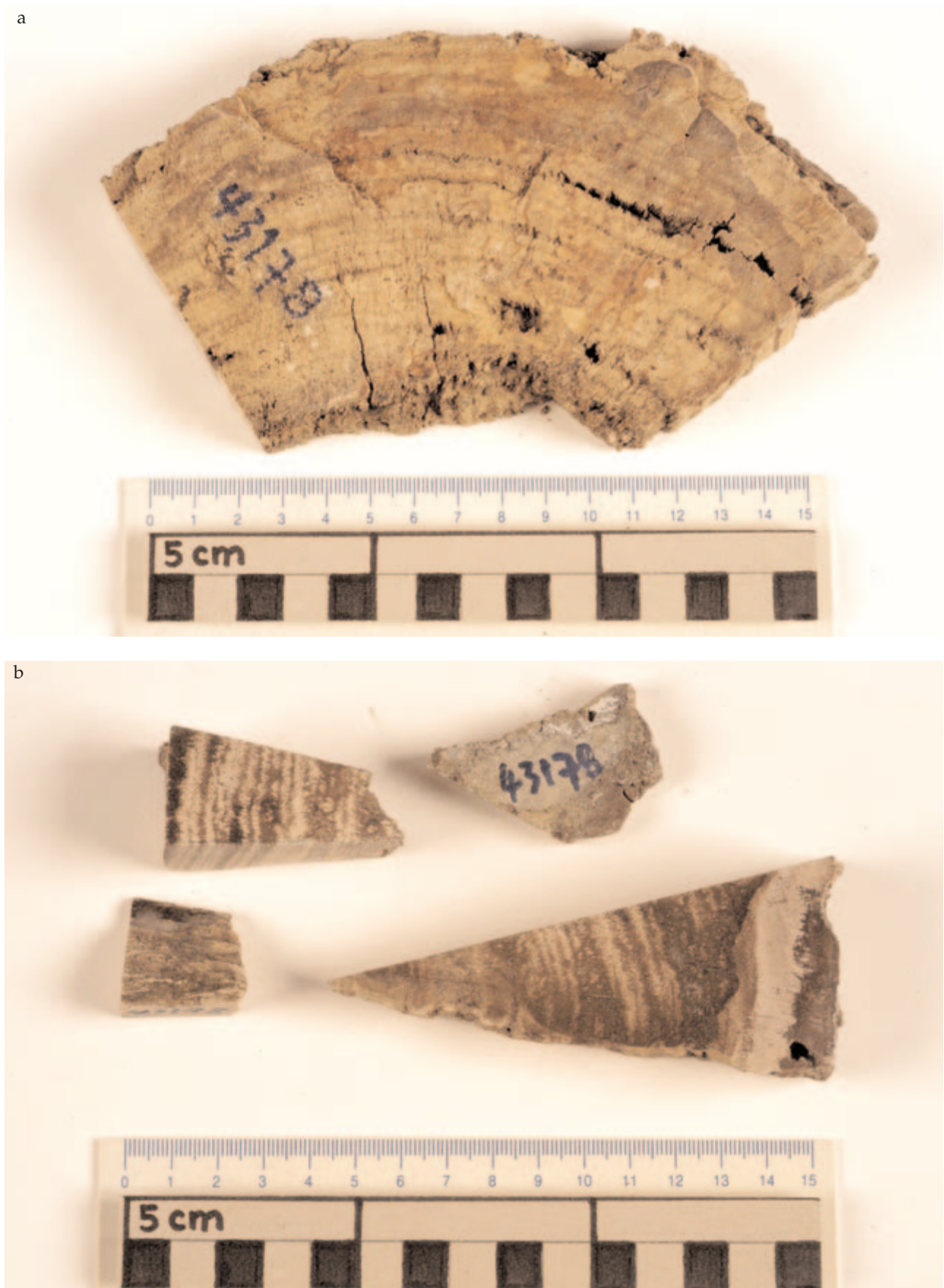


Fig. 3. *Ebenoxylon burmense* Du, 1988a, holotype, RGM 43178. (a) Holotype. (b) Pieces cut from the holotype that were used for preparing the thin sections. Scales in mm and cm.



Fig. 4. *Saracoxylon irrawaddiense* Du, 1988a, holotype, RGM 43164. (a) Side view. (b) View from below. (c) Cut pieces that were used for preparing the thin sections. Scales in mm and cm.



Fig. 5. *Palmoxydon pachyoxylon* van der Burgh & Meulenkaamp, 1966, holotype, RGM 62321. (a) Holotype. (b) The side from which a thin section was cut. Scales in mm and cm.



Fig. 6. *Rhizopalmoxylon pilosum* van der Burgh & Meulenkaamp, 1966, holotype, RGM 34586. (a) Holotype. (b) The side from which a thin section was cut. Scales in mm and cm.



Fig. 7. *Shoreoxylon sumatraense* Du, 1988b, holotype, RGM 383446. (a) Holotype from above. (b) Lateral view. (c) View from below with the original label. Scales in mm and cm.



Fig. 8. *Lagerstroemioxylon benkoelense* Du, 1988b, holotype, RGM 383447. (a) The two parts that originally formed one specimen together. (b) Same, but separated. Scales in mm and cm.