# KEY SPECIES IN THE TAXONOMIC HISTORY OF ZINGIBERACEAE

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ABSTRACT. The early history of the classification of Zingiberaceae is analysed through a chronological study of the key species which are concerned in the typification of the main genera, subgenera and sections. This is intended to be complete up to 1830; some selected later entries are also included. Interspersed in the sequence of the 47 key species are notes on the treatment given by selected authors. There is an index of names of genera, subgenera and sections.

In addition to *Amomum* (recently proposed and accepted) it is considered that *Curcuma* and *Geanthus* require conservation in their present senses and that *Albina, Buekia, Martensia* & *Zerumbet* need to be added to the list of nomina rejicienda in favour of *Alpinia* Roxb. nom. cons. The necessary proposals will be submitted.

This study was started with a limited and clearly defined objective: to clear up the taxonomic and nomenclatural confusion surrounding many genera of this family that were described between the time of Linnaeus (1753) and, roughly, that of Roxburgh (1820). The need for this had become apparent in attempting to determine material collected in Sarawak by Burtt & Woods in 1962. We felt that, until this work of clarification was accomplished, no real progress could be made in a modern study of the family: confusion had been created in the libraries and herbaria of Europe and there it had to be resolved. In the event, we have found the family of too great interest to restrict our work on it in this way, but it is that limited study which is the subject of this particular paper.

In tracing the history of any family from 1753 onwards, it is soon apparent that some of the plants described are important only at the species level. Others were proposed as, or later became, the type species of genera or infrageneric groups. It is such species in Zingiberaceae that form our theme and give the paper its title.

We are trying, in effect, to unravel for taxonomic purposes the enormously complicated history of the family by stripping it to the bare essentials. The identification of some obscure species, the correction of the innumerable misuses of generic names and of the misidentifications of species, must await a monographer, if one ever thinks the labour of such work profitable. We are concerned only with effective nomenclatural and classificatory steps. The technique of tracing the story through the key species emphasises our concern, in this phase, with the structure of the type species rather than with the ultimate circumscription of genera and other groups.

Ideally each of the key species would have been illustrated, for the detailed structure of flower and inflorescence is not always ascertainable from the original description. Unfortunately we do not have available good living or preserved material of many of these old species, and flowers of Zingiberaceae are often very difficult to examine from dried herbarium specimens. In the majority of cases we have not been able to illustrate the key species itself but have had to be content with showing another that we are satisfied is closely related; sometimes no relevant illustration at all has been possible. We are still anxious to fill these gaps and appropriate material (herbarium

specimen accompanied by an inflorescence preserved in alcohol) would be greatly appreciated. Knowledge of the fruits and seeds of Zingiberaceae is still in a quite elementary state.

The arrangement of the results of this inquiry has posed some difficulties. The chronological method is fundamental to the plan, but in the early part of the story we cannot immediately separate the species as individual components of it: some general discussion of the contributions of various authors is essential. There are thus two interwoven threads: general comments on the literature headed by the date of the publication or period to which they refer, and the chronological sequence of key species. These latter are numbered serially and are headed by what seems to us the best current name, but their place in the sequence is determined by the date of their original publication. The arrangement is, we think, easier to follow than this explanation might suggest!

The coverage of key species is intended to be complete from 1753 up to 1820. Had we stopped abruptly at the latter date we should have left out of account certain items (e.g. the type species of *Boesenbergia*, clarification of the name *Monolophus*) which can be dealt with by the same method and for which the data had been assembled. Such items have been included. However the technique of following up the key species cannot usefully be pursued up to the present day. One is faced from about 1850 onwards by new genera, subgenera and sections erected with a considerable content of species but without any typification. The choice of lectotypes can only be decided by monographic studies covering all the species. Only for a few of the more important later genera (e.g. *Aframomum* K. Schum., see No. 11, and *Geanthus* Val., see No. 47) have we felt called upon to take any action now.

We have tried, in this phase, to avoid making taxonomic decisions that result in major innovations, but some of the problems we have uncovered have made temporary decisions inevitable. For instance, Holttum (Gard. Bull. Sing. 13: 129, 1950) accepted as independent genera three groups previously included in *Alpinia*. These he called *Alpinia* (based on subgen. *Dieramalpinia* K. Schum.), *Languas* (including *Alpinia galanga*, the conserved type of *Alpinia*) and *Catimbium* (*Alpinia* subgen. *Catimbium* K. Schum.). We have included all these in *Alpinia* for two reasons. First, the extension of these narrower concepts to the whole of *Alpinia*, especially to the species of New Guinea and the Pacific, poses taxonomic problems for whose solution we simply do not yet have adequate material. Secondly, because Holttum's generic nomenclature is untenable. In using *Languas* for *Alpinia* Roxb. non Linn. he was following certain authors (e.g. Small, Merrill and Burkill) who had adopted this course before *Alpinia* Roxb. became *nomen conservandum*. Once *Alpinia* reached that status the use of *Languas*, never correct, became unnecessary and it was certainly not permissible to maintain it and also use *Alpinia* for a different part of the aggregate genus. *Catimbium*, as a generic name, is also untenable. Nearly all the species concerned have names available in *Alpinia* and to re-name these segregate genera without greater confidence in their validity would be irresponsible. Nevertheless we are aware of the inconsistency in abandoning these genera while yet retaining *Cenolophon* and *Geostachys*. In this preliminary phase of work consistency cannot be expected. The maintenance of the generic groups represented by *Catimbium* and *Languas* in Holttum's sense would require nomenclatural

innovations at present unjustified; the maintenance of *Cenelophon* and *Geostachys* requires none.

The genus *Curcuma* L. has also proved intractable (see under No. 4) and we have had to propose its conservation from Roxburgh (1810) in order to provide a firm basis for future work.

Another difficult case concerns *Geanthus*. This is an illegitimately named genus of some 45 species. Whether it really merits distinction from *Achasma* and *Nicolaia* is by no means certain, but the solution of that problem probably lies at least 10 years ahead. Meanwhile we need to have a legitimate system of reference, not merely for the plants already named but for new species now coming to light. Here our decision has been to recommend *Geanthus* for conservation. Both *Achasma* and *Nicolaia* are older names, so the ultimate position will not be effected if any mergers take place: meantime *Geanthus* will become legitimate and we shall avoid the danger of a new name which might itself become unnecessary before long.*

It may avoid confusion in reading the subsequent part of this paper if the situation about conserved names in this family is summarized here.

| *Nomina conservanda* | *Nomina rejicienda* |
|---|---|
| *Zingiber* Boehm. (1760) | *Zinziber* Mill. (1754) |
| Type: *Z. officinale* Roscoe | |
| *Alpinia* Roxb. (1810) | *Alpinia* L. (1753) |
| Type: *A. galanga* (L.) Willd. | |
| *Renealmia* L. f. (1781) | *Renealmia* L. (1753) |
| Type: *R. exaltata* L. f | |
| *Riedelia* Oliv. (1883) | *Riedelia* Cham. (1832) |
| Type: *R. curviflora* Oliv. | *Nyctophylax* Zipp. (1829) |
| *Tapeinochilus* Miq. (1869) | |
| Type: *T. pungens* (Teys. & Binn.) Miq. | |

A further name has been proposed by us and recommended for acceptance by the Committee (Taxon 17: 730, 1964; 19: 293, 1970).

| | |
|---|---|
| *Amomum* Roxb. (1820) | *Amomum* L. (1753) |
| Type: *A. subulatum* Roxb. | *Meistera* Giseke (1792) |
| | *Wurfbainia* Giseke (1792) |
| | *Paludana* Giseke (1792) |
| | *Etlingera* Giseke (1792) |

Simultaneously with this paper we are making three further proposals (Taxon, ined.):

(1) For conservation:

| | |
|---|---|
| (a) *Geanthus* Val. (1914) | *Geanthus* Reinw. (1825) |
| Type: *G. roseus* (Teys. & Binn.) Loes. | *Etlingera* Giseke (1792) |
| (b) *Curcuma* Roxb. (1810) | *Curcuma* L. (1753) |
| Type: *C. angustifolia* Roxb. | *Kua* Medic (1790) |
| | *Erndlia* Giseke (1792) |

* Throughout the explanatory notes which follow each key species references to K. Schumann & R. E. Holttum have been reduced to page nos. The works referred to are: Pflanzenr. 4: (1904)—Schumann, and Gard. Bull. Sing. 13: 1–249 (1950)—Holttum.

(2) Additional names to be rejected:

*Alpinia* Roxb. (1810)
*Albina* Giseke (1792)
*Buekia* Giseke (1792)
*Martensia* Giseke (1792)
*Zerumbet* Wendl. (1798)

## CHRONOLOGICAL SEQUENCE

### 1753

*Linnaeus*, Species Plantarum, and the associated generic descriptions in Genera Plantarum, ed. 5 (1754).

Linnaeus recognized in Monandria Monogynia five genera that are now referred to Zingiberaceae (s.l.): *Amomum*, *Alpinia*, *Curcuma*, *Kaempferia* and *Costus*.

*Amomum* had four species: *A. zingiber* (= *Zingiber officinale*—No. 1 below), *A. zerumbet* (= *Zingiber zerumbet*—No. 2), *A. cardamomum* (= *Elettaria cardamomum*—No. 3), and *A. grana-paradisi*. The last was a name for the Grains of Paradise of commerce, which probably came from several species of *Aframomum*; the application of this name is hopelessly uncertain and it is rightly rejected by Hepper (Kew Bull. 21: 129, 1967). Despite the exclusion of all four original species the generic name has remained in general use. We therefore proposed it for conservation as *Amomum* Roxburgh (see No. 33).

*Alpinia* contained a single species, but this is now referred to *Renealmia* as *R. racemosa* (L.) A. Rich. As in the case of *Amomum*, *Alpinia* has remained in use for a large generic group not containing the original species. This is conserved as *Alpinia* Roxb. (type species *A. galanga*, No. 8).

*Curcuma* contained two species. *C. rotunda* is now referred to *Boesenbergia*, but is the basis of the generic name (see No. 4). *C. longa* is a *Curcuma* as that name is currently used, but its specific identity is doubtful (see No. 5); it can scarcely be accepted as the type of the genus and a proposal is therefore being made to conserve *Curcuma* from Roxburgh (1810).

*Kaempferia* also contained two species, *K. galanga* (No. 6) and *K. rotunda*. The former was well illustrated in Hortus Cliffortianus and belongs to the largest infrageneric group: it has properly been proposed as the lectotype of the genus. The second species belongs to the small subgenus *Protanthium* (Horan.) K. Schum. (with *K. candida* Wall. & *K. fissa* Gagnep.).

*Costus* was based on the single species which Linnaeus unhappily called *Costus arabicus* (No. 6).

**No. 1. Zingiber officinale** Roscoe in Trans. Linn. Soc. 8: 348 (1807) et Monandr. Pl. t. 83 (1824–1829); Horan., Monogr. 27 (1862); K. Schum., Pflanzenr. 170 (1904).

Syn.: *Amomum zingiber* L., Sp. Pl. 1: 1 (1753).

Type: No specimen at LINN or in Herb. Cliff. (BM).

Type of: (i) *Zingiber* Boehm. apud Ludwig, Def. Gen. Pl. 89 (1760)—nomen conservandum.

Syn *Zinziber* Mill., Gard. Dict. Abr. ed. 4 (1754)—nomen rejiciendum.

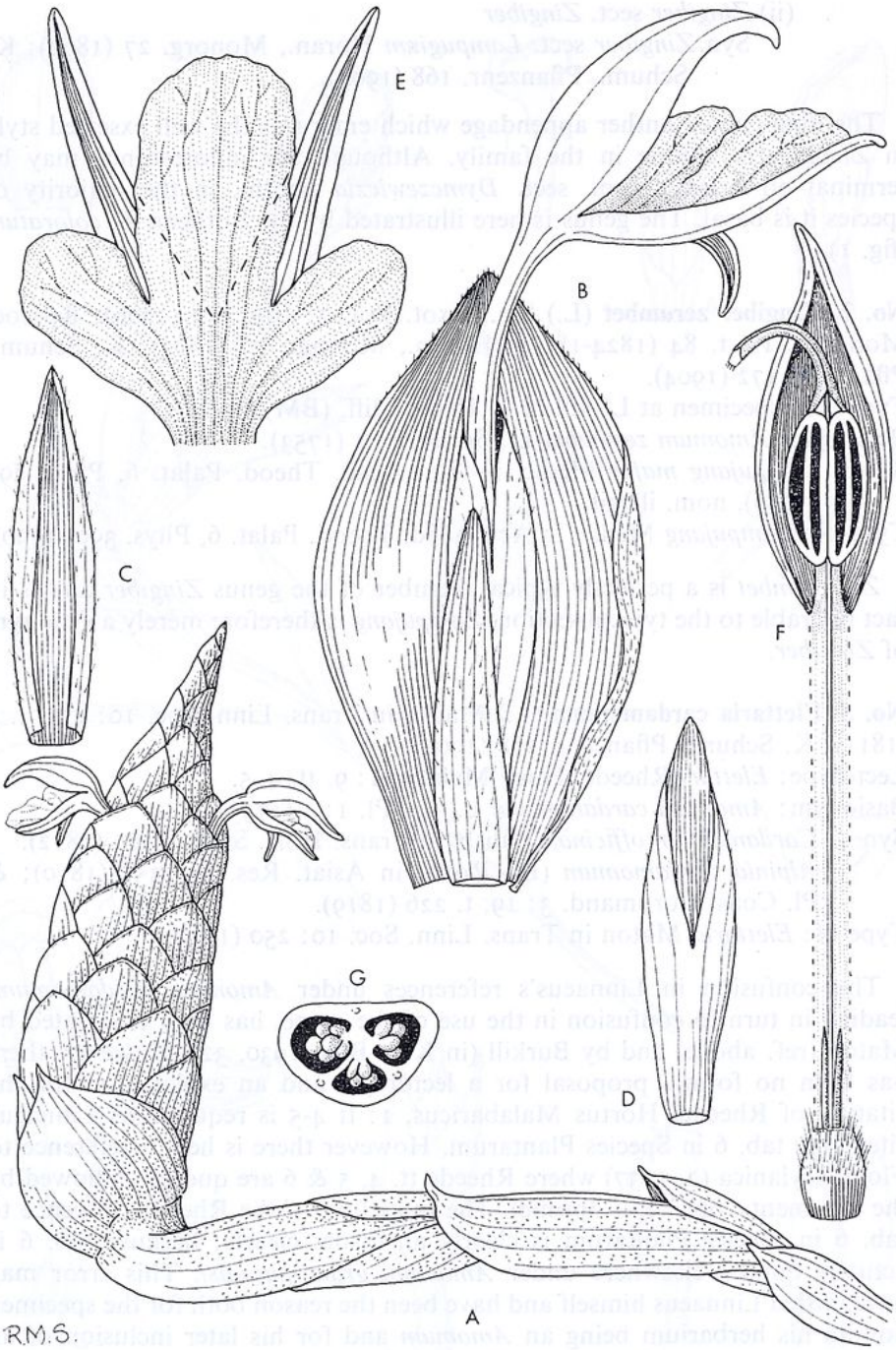


FIG. 1. *Zingiber coloratum* N.E.Br. (Sarawak: Third Division, SE Hose Mts., *Burtt & Martin, B.* 5127): A, habit x $\frac{2}{3}$; B, flower with primary bract and bracteole x 2; C, bracteole x 2; D, calyx x 2; E, lateral petals and labellum x 2; F, corolla tube in L.S. showing dorsal petal anther and epigynous glands x 2; G, ovary in T.S. x 4. (from living material, cult. R.B.G. Edinburgh, *C.* 8005).

(ii) *Zingiber* sect. *Zingiber*
Syn. *Zingiber* sect. *Lampugium* Horan., Monorg. 27 (1862); K. Schum., Pflanzenr. 168 (1904).

The long curved anther appendage which embraces the well exserted style in *Zingiber* is unique in the family. Although the inflorescence may be terminal on a leafy stem, sect. *Dymczewiczia* Benth., in the majority of species it is basal. The genus is here illustrated by the Bornean *Z. coloratum* (fig. 1).

**No. 2. Zingiber zerumbet** (L.) Sm., Exot. Bot. 2: 105, 112 (1806); Roscoe, Monandr. Pl. t. 84 (1824-1829); Horan., Monogr. 27 (1862); K. Schum., Pflanzenr. 172 (1904).
Type: No specimen at LINN or in Herb. Cliff. (BM).
Basionym: *Amomum zerumbet* L., Sp. Pl. 1: 1 (1753).
Syn.: *Lampujang majus* Medic. in Act. Acad. Theod. Palat. 6, Phys. 394 (1790), nom. illegit.
Type of: *Lampujang* Medic. in Act. Acad. Theod. Palat. 6, Phys. 390 (1790).

*Z. zerumbet* is a perfectly typical member of the genus *Zingiber* and is in fact referable to the typical section. *Lampujang* is therefore merely a synonym of *Zingiber*.

**No. 3. Elettaria cardamomum** (L.) Maton in Trans. Linn. Soc. 10: 254, t. 5 (1811); K. Schum., Pflanzenr. 268 (1904).
Lectotype: *Elettari* Rheede, Hort. Malab. 11: 9, tt. 4–5.
Basionym: *Amomum cardamomum* L., Sp. Pl. 1: 1 (1753).
Syn.: *Cardamomum officinale* Salisb. in Trans. Hort. Soc. 1: 282 (1812).
*Alpinia cardamomum* (L.) Roxb. in Asiat. Res. 11: 355 (1810); & Pl. Coast Coromand. 3: 19, t. 226 (1819).
Type of: *Elettaria* Maton in Trans. Linn. Soc. 10: 250 (1811).

The confusion in Linnaeus's references under *Amomum cardamomum*, leading in turn to confusion in the use of the name, has been elucidated by Maton (ref. above) and by Burkill (in Kew Bull. 1930, 32). However, there has been no formal proposal for a lectotype, and an explanation for the citation of Rheede, Hortus Malabaricus, 1: tt 4-5 is required as Linnaeus cites only tab. 6 in Species Plantarum. However there is here a reference to Flora Zeylanica (2, 1737) where Rheede tt. 4, 5 & 6 are quoted, followed by the comment "opt." (= optime). The reduction of the Rheede reference to tab. 6 in species Plantarum is clearly an error: clearly, because tab. 6 is actually quoted elsewhere under *Amomum grana-paradisi*. This error may have misled Linnaeus himself and have been the reason both for the specimen now in his herbarium being an *Amomum* and for his later inclusion of an additional synonym from Rumphius (Herb. Amb. 5: 152, t. 65) which also refers to an *Amomum*. (*A. compactum* [Soland ex] Maton; see Notes R.B.G. Edinb. 31: 309, 1972).

Be that as it may, Rheede tab. 5 and the accompanying text are the only clear description and illustration of the small Cardamom, to which most of the Flora Zeylanica references apply. It is the only satisfactory type for the species.

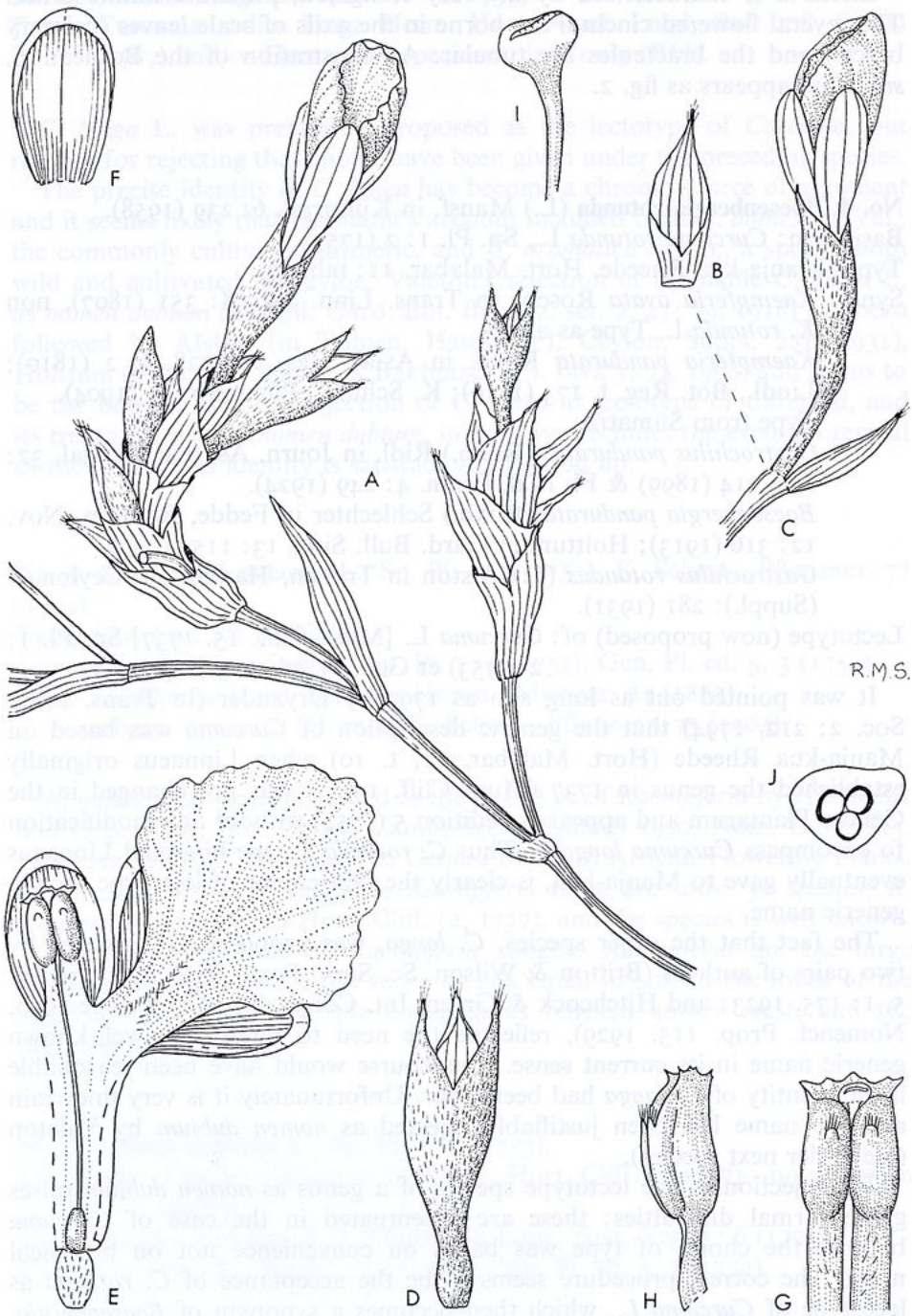


FIG. 2. *Elettaria surculosa* (K. Schum.) Burtt & Smith (Sarawak: Third Division, S. Melinau, *Burtt & Martin, B.* 4773): A, part of inflorescence x 2; B, bracteole x 2; C, flower bracteole removed, showing position of next bracteole x 2; D, calyx x 3; E, flower, dissected x 3; F, dorsal petal x 3; G, H, anther x 6; I, stigma x 12; J, ovary in T.S. x 9. (from spirit material).

*Elettaria* is characterised by the very elongated, prostrate inflorescence. The several flowered cincinni are borne in the axils of scale leaves (primary bracts) and the bracteoles are tubular. An illustration of the Bornean *E. surculosa* appears as fig. 2.

**No. 4. Boesenbergia rotunda** (L.) Mansf. in Kulturpfl. 6: 239 (1958).
Basionym: *Curcuma rotunda* L., Sp. Pl. 1: 2 (1753).
Type: Manja-kua Rheede, Hort. Malabar. 11: tab. 10.
Syn.: *Kaempferia ovata* Roscoe in Trans. Linn. Soc. 8: 351 (1807), non *K. rotunda* L. Type as above.
*Kaempferia pandurata* Roxb. in Asiat. Res. 11, 328, t. 2 (1810); Lindl., Bot. Reg. t. 173 (1816); K. Schum., Pflanzenr. 82 (1904). Type from Sumatra.
*Gastrochilus panduratus* (Roxb.) Ridl. in Journ. As. Soc. Bengal, 32: 110, 114 (1899) & Fl. Mal. Penin. 4: 249 (1924).
*Boesenbergia pandurata* (Roxb.) Schlechter in Fedde, Rep. Sp. Nov. 12: 316 (1913); Holttum in Gard. Bull. Sing. 13: 115 (1950).
*Gastrochilus rotundus* (L.) Alston in Trimen, Handb. Fl. Ceylon, 6 (Suppl.): 281 (1931).
Lectotype (now proposed) of: *Curcuma* L. [Musa Cliff. 15. 1737] Sp. Pl. 1: 2 (1753) et Gen. Pl. ed. 5, 3 (1754).

It was pointed out as long ago as 1792 by Dryander (in Trans. Linn. Soc. 2: 212, 1794) that the generic description of *Curcuma* was based on Manja-kua Rheede (Hort. Malabar. 11, t. 10) when Linnaeus originally established the genus in 1737 (Musa Cliff. 15). It was not changed in the Genera Plantarum and appears in edition 5 (1754) without any modification to encompass *Curcuma longa* L. Thus *C. rotunda L.*, the binomial Linnaeus eventually gave to Manja-kua, is clearly the best choice of lectotype for the generic name.

The fact that the other species, *C. longa*, was proposed as lectotype by two pairs of authors (Britton & Wilson, Sc. Surv. Porto Rico & Virgin Isl. 5, 1: 175, 1923; and Hitchcock & Green, Int. Congr. Bot. Cambridge 1930, Nomencl. Prop. 115. 1929), reflected the need to retain this well-known generic name in its current sense. This course would have been reasonable if the identity of *C. longa* had been clear. Unfortunately it is very uncertain and the name has been justifiably rejected as *nomen dubium* by Valeton (see under next species).

The rejection of the lectotype species of a genus as *nomen dubium* raises grave formal difficulties: these are accentuated in the case of *Curcuma* because the choice of type was based on convenience not on botanical merit. The correct procedure seems to be the acceptance of *C. rotunda* as lectotype of *Curcuma L.*, which then becomes a synonym of *Boesenbergia*. *Curcuma* in its current sense must obviously be conserved from a later author. The notes on the genus which we give as an appendix (p. 224) show that Roxburgh was the first author to have a valid concept of the genus, to exclude *C. rotunda* and to describe recognizable species. *Curcuma* Roxb. is therefore proposed for conservation and *C. angustifolia* Roxb. is put forward as the type species (see No. 32).

**No. 5. Curcuma longa** L., Sp. Pl. 1: 2 (1753).
Type: Curcuma radice longa Herm. Hort. Acad. Lugd. Bat. 208, f. 209 (1787) and/or Hermann's specimen, infl. only (BM).

*C. longa* L. was previously proposed as the lectotype of *Curcuma*, but reasons for rejecting that choice have been given under the preceding species.

The precise identity of *C. longa* has become a chronic source of argument and it seems likely that Hermann's account included both *C. domestica* Val., the commonly cultivated turmeric, and *C. aromatica* Salisb., a species both wild and cultivated in Ceylon. Valeton's rejection of the name *C. longa* L. as *nomen dubium* (in Bull. Gard. Bot. Buitenz. ser. 2, 27: 79, 1918) has been followed by Alston (in Trimen, Handb. Fl. Ceylon, Suppl. 281. 1931), Holttum (p. 68) and Backer & Bakhuizen (Fl. Java 3: 72, 1968) and seems to be the best course. The rejection of *C. longa* as lectotype of *Curcuma*, and its treatment *now* as *nomen dubium*, in no way precludes the eventual revival of the name if its identity is satisfactorily cleared up.

**No. 6. Kaempferia galanga** L., Sp. Pl. 1: 2 (1753); K. Schum., Pflanzenr. 77 (1904).
Type: Sav. Cat. 8/1 (LINN).
Lectotype of: *Kaempferia* L., Sp. Pl. 1: 2 (1753), Gen. Pl. ed. 5, 3 (1754).
Syn.: *Kaempferia* L. A. *Soncorus* Horan., Monogr. 21 (1862).
subgen. *Soncorus* (Horan.) K. Schum., Pflanzenr. 75 (1904).

*K. galanga* has been proposed as the lectotype of *Kaempferia* by Hitchcock and Green (Int. Bot. Congr. Cambridge (England) 1930, Nom. Prop. 115. 1929) and by E. P. Phillips (The Genera of South African Flowering Plants, ed. 2: 224, 1951). In subgenus *Kaempferia* there are some 30 species, *K. galanga* is illustrated in Hort. Cliff. (2, 1737), and the species is well known.

The salient features of *Kaempferia* subgen. *Kaempferia* are the large lateral staminodes which are more or less equal in size to the lobes of the deeply divided labellum, the conspicuous reflexed anther crest, and the tuber-bearing roots.

**No. 7. Costus arabicus** L., Sp. Pl. 1: 2 (1753).
Lectotype: The description in Linnaeus, Hort. Cliff. 2 (1737)—no specimen known.
Syn.: *Costus glabratus* J. F. Gmelin in Linn., Syst. Veg. 1: 6 (1791).
Type of: *Costus* L., Sp. Pl. 1: 2 (1753), Gen. Pl. ed. 5, 3 (1754).

In Species Plantarum the name *Costus arabicus* is established without any definitive description but simply by reference to previous publications of which the first is Linnaeus's own Hortus Cliffortianus. Here there is a full description and the following synonymy and remarks:—
"Costus officinarum Dal. Pharm. 366. Comm. flor. 23.
Tsiana-Kua Rheed. Mal. XI p. 15, t. 8.

Paco Caatinga brasiliensibus. Marcgr. bras. 48. Pis. bras. 98.
Anonyma Mer. Surin. 36, t. 36.
Crescit in nemoribus Malabariae, Brasiliae, Surinamae.
Judicent alii num istae a Rheedo & Meriana depictae, distinctae sunt inter se species, vel una eademque, ut nobis videtur, planta, qui surinamensem modo habemus."

Now the vital point in those remarks is clearly contained in the last clause which tells us that Linnaeus only had material of the Surinam plant. The description he had given was a detailed one, not such as could have been made up from the other references.

The Hortus Cliffortianus herbarium at the British Museum (Nat. Hist.) does not contain a specimen of *Costus arabicus*. However there is in the library a drawing by Ehret of a *Costus* and Smith (in Trans. Linn. Soc. 1: 249, 1791) writes of this as though it had been made at the time that Linnaeus was describing the plant. Whether this can be demonstrated with sufficient certainty to justify taking it as the type is doubtful. *Costus* was certainly in cultivation at Leyden at this time (van Royen, Fl. Leyd. Prodr. 11, 1740). Ehret's drawing has long since been correctly written up as *Costus glabratus*. The type of *Costus glabratus* J. F. Gmelin is Merian's tab. 36, the Surinam element of Linnaeus's *C. arabicus*. Gmelin was wrong to take this element out as his *C. glabratus* and he must be overruled. *Costus arabicus* must, in the absence of a specimen be typified by Linnaeus's description; it takes its place alongside *Scilla peruviana* as a classic example of the misapplication of a geographical epithet which cannot be corrected. This plant has nothing to do with the Arabian drug costus, which is now thought to have come from the root of *Saussurea lappa* (Compositae). The Asiatic element of *Costus arabicus* is *C. speciosus* (No. 19). The two species are closely related.

**No. 8. Alpinia galanga** (L.) Willd., Sp. Pl. 12 (1797); K. Schum., Pflanzenr. 316 (1904).
Basionym: *Maranta galanga* L., Sp. Pl. ed. 2, 3 (1762).
Type: No specimen at LINN.
Syn.: *Amomum galanga* (L.) Lour., Fl. Coch. 7 (1790).
Type of: *Alpinia* Roxb. in Asiat. Res. 11: 350 (1810)—nomen conservandum.

The generic name *Alpinia* was originally established by Linnaeus (Sp. Pl. 1: 2. 1753) with a single American species *A. racemosa*. In the course of time many species, mostly Asiatic, were added to *Alpinia*: American species tended to be referred to *Renealmia* L. f. The position was more or less finalized by K. Schumann who kept the generic name *Alpinia* for asiatic species although placing *A. racemosa* as *Renealmia racemosa* (L.) A. Rich. Thus *Alpinia* no longer contained its type species; the name was subsequently conserved for the Asiatic species as *Alpinia* Roxb. with *A. galanga* (L.) Willd. as its type.

*A. galanga* belongs to that group of *Alpinia* characterised by rather small flowers which are borne on well developed cincinni. Both primary bracts and bracteoles (which are open to the base) are small and usually soon deciduous (see fig. 3 B). This group was called subgen. *Autalpinia* sect. *Hellenia* by K. Schumann (p. 312) and recognized as a separate genus, *Languas* by Holttum (p. 156). It should of course be *Alpinia* subgen. *Alpinia* sect. *Alpinia*.

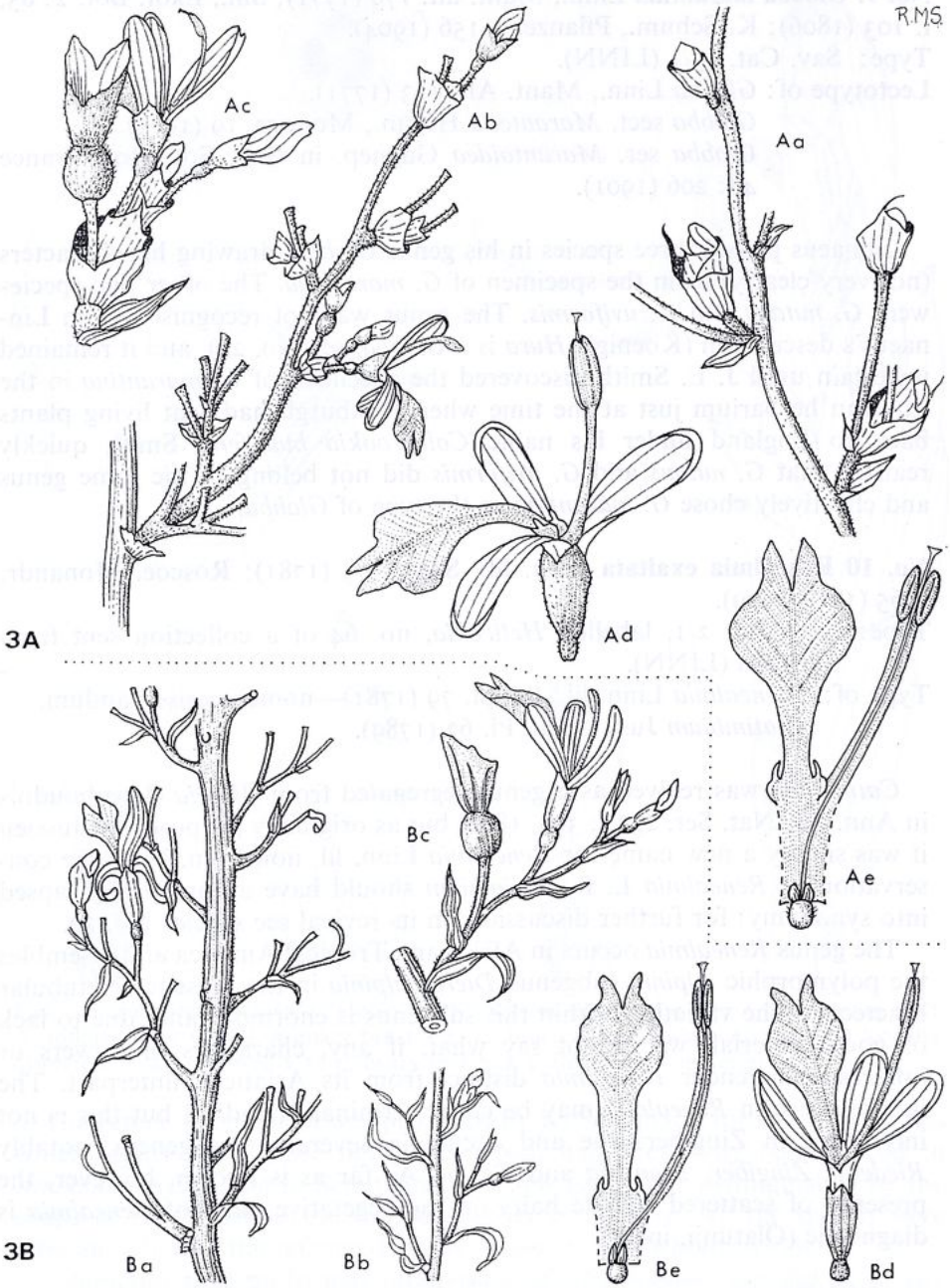


FIG. 3A. *Alpinia allughas* (Retz.) Roscoe (Aa, Bengal: Chittagong, *Cowan* 1342; Ab, Ad, Ae, Burma: Sittaung, *Lace* 4203): Aa, part of young inflorescence x ½; Ab, part of mature inflorescence, bracteoles often no longer complete x ½; Ac, reconstruction of a single cincinnus x ⅔ (approx.); Ad, flower x 1; Ae, L. S. of corolla showing labellum, stamen and epigynous glands x 1. (from dried material).

FIG. 3B. *Alpinia galanga* (L.) Willd. (Burma: S Shan States, *Macgregor* 692): Ba, part of mature inflorescence x ½; Bb, upper part of same inflorescence x ½, Bc, reconstruction of a single cincinnus x ⅔ (approx.); Bd, flower x 1; Be, L.S. of corolla showing labellum, stamen and epigynous glands x 1. (from dried material).

**No. 9. Globba marantina** Linn., Mant. alt. 170 (1771); Sm., Exot. Bot. 2: 85, t. 103 (1806); K. Schum., Pflanzenr. 156 (1904).
Type: Sav. Cat. 45/1 (LINN).
Lectotype of: *Globba* Linn., Mant. Alt. 143 (1771).
*Globba* sect. *Marantella* Horan., Monogr. 19 (1862).
*Globba* ser. *Marantoidea* Gagnep. in Bull. Soc. Bot. France 48: 206 (1901).

Linnaeus placed three species in his genus *Globba*, drawing his characters (not very clearly) from the specimen of *G. marantina*. The other two species were *G. nutans* and *G. uviformis*. The genus was not recognised from Linnaeus's description (Koenig's *Hura* is a *Globba*, see No. 24), and it remained uncertain until J. E. Smith discovered the specimen of *G. marantina* in the Linnean herbarium just at the time when Roxburgh had sent living plants back to England under his name *Colebrookia bulbifera*. Smith quickly realized that *G. nutans* and *G. uviformis* did not belong to the same genus and effectively chose *G. marantina* as the type of *Globba*.

**No. 10 Renealmia exaltata** Linn. fil., Suppl. 79 (1781); Roscoe, Monandr. t. 65 (1824–1829).
Type: Sav. Cat. 2/1, labelled *Heliconia*, no. 64 of a collection sent from Surinam (LINN).
Type of: *Renealmia* Linn. fil., Suppl. 79 (1781)—nomen conservandum.
*Catimbium* Juss., Gen. Pl. 62 (1789).

*Catimbium* was revived as a genus segregated from *Alpinia* (Lestiboudois in Ann. Sci. Nat. Ser. 2, 15: 306, 1841) but as originally proposed by Jussieu it was simply a new name for *Renealmia* Linn. fil. non Linn. With the conservation of *Renealmia* L. f., *Catimbium* should have automatically lapsed into synonymy: for further discussion on its revival see species No. 29.

The genus *Renealmia* occurs in Africa and Tropical America and resembles the polymorphic *Alpinia* subgenus *Dieramalpinia* in the presence of tubular bracteoles. The variation within this subgenus is enormous and, due to lack of good material, we cannot say what, if any, characters of flowers or inflorescence render *Renealmia* distinct from its Asiatic counterpart. The inflorescence in *Renealmia* may be either terminal or radical but this is not infrequent in Zingiberaceae and occurs in several other genera, notably *Riedelia*, *Zingiber*, *Mantisia* and *Costus*. As far as is known, however, the presence of scattered stellate hairs on the vegetative parts of *Renealmia* is diagnostic (Olatunji, ined.).

**No. 11. Aframomum angustifolium** (Sonn.) K. Schum., Pflanzenr. 218 (1904).
Type: Madagascar, *Sonnerat*.
Basionym: *Amomum angustifolium* Sonn., Voy. Ind. 2: 242, t. 137 (1782).
Syn.: *Amomum madagascariense* Lam., Encyc. 1: 133 (1783)—nomen illegitimum.
*Zingiber meleguetta* Gaertn., Fruct 1: 34 (1788)—nomen illegitimum.
*Amomum meleguetta* Giseke in Linn., Prael. Ord. Nat. (1791)—nomen illegitimum.
Lectotype of: *Aframomum* K. Schum., Pflanzenr. 201 (1904).

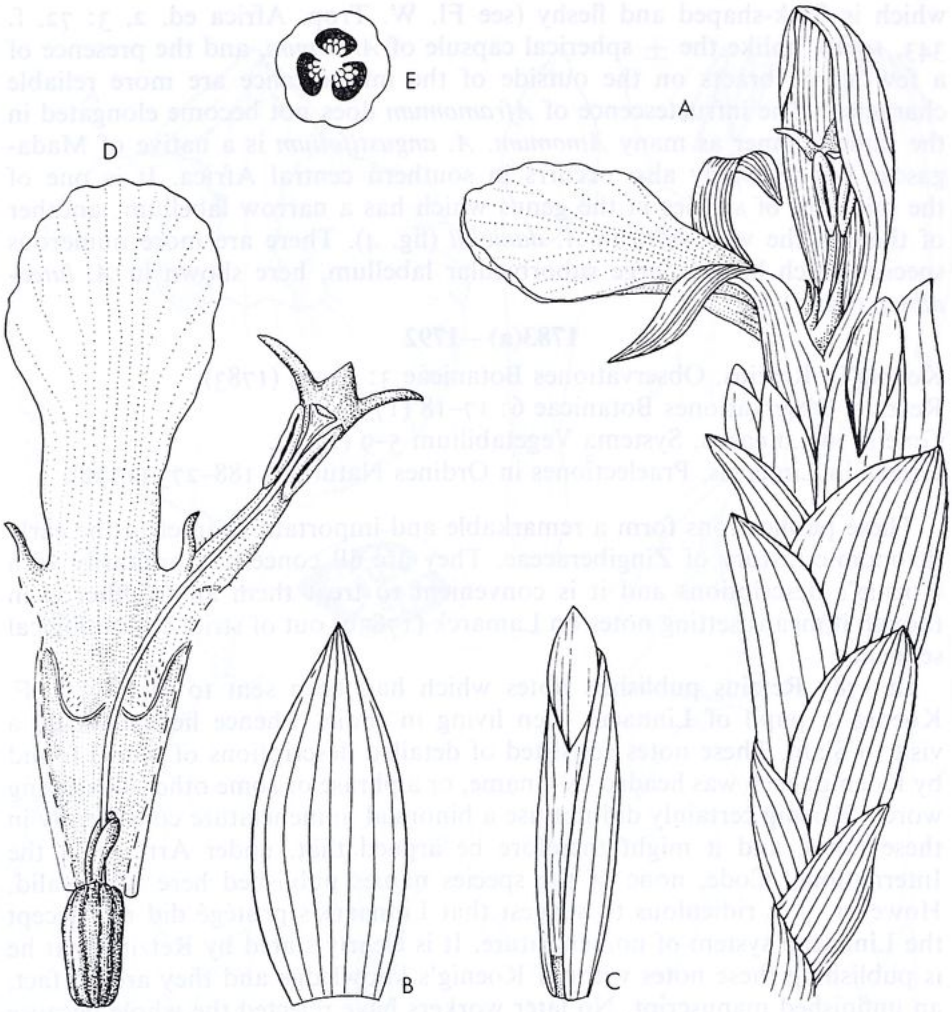


FIG. 4. *Aframomum daniellii* (Hook. f.) K. Schum. (Sierra Leone: *J. K. Morton* s.n.): A, inflorescence x 1; B, primary bract x 1; C, bracteole, enclosing calyx x 1; D, corolla, dissected, petals removed x 1; E, ovary in T.S. x 2. (from spirit material).

The genus *Aframomum* was proposed by K. Schumann for some 40 species which, apart from those newly described, had previously been placed in *Amomum*. According to Schumann, the new genus was distinguished by the shape of the fruit and the trilobed anther connective. All the species were African, whereas the reformed genus *Amomum* was wholly Asiatic.

Schumann gave no formal subdivision of *Aframomum*, nor did he in any way indicate its type species. A lectotype has therefore to be selected. The oldest name concerned is *Amomum grana-paradisi* L. but, as already mentioned, Hepper has rightly discarded this name as it is impossible to decide precisely what species it represents. The next oldest name is *Amomum angustifolium* Sonnerat, a species which was well-illustrated when first published and which conforms to Schumann's generic characters. This species is therefore now proposed as lectotype of the genus.

The trilobed anther-crest of *Aframomum* does not provide a distinction form *Amomum*, many species of which have a similar crest. The fruit, however,

which is flask-shaped and fleshy (see Fl. W. Trop. Africa ed. 2, 3: 72, f. 343, 1968), unlike the ± spherical capsule of *Amomum*, and the presence of a few sterile bracts on the outside of the inflorescence are more reliable characters. The infructescence of *Aframomum* does not become elongated in the same manner as many *Amomum*. *A. angustifolium* is a native of Madagascar but probably also occurrs in southern central Africa. It is one of the minority of species in the genus which has a narrow labellum; another of these is the west African *A. daniellii* (fig. 4). There are more numerous species which have a large suborbicular labellum, here shown in *A. luteoalbum* (fig. 5).

**1783(a)—1792**

Koenig in Retzius, Observationes Botanicae 3: 45–75 (1783).
Retzius, Observationes Botanicae 6: 17–18 (1791).
Gmelin in Linnaeus, Systema Vegetabilium 5–9 (1791).
Giseke in Linnaeus, Praelectiones in Ordines Naturales 188–273 (1792).

These publications form a remarkable and important chapter in the early taxonomic history of Zingiberaceae. They are all concerned primarily with Koenig's descriptions and it is convenient to treat them all together even though it means setting notes on Lamarck (1783b) out of strict chronological sequence.

In 1783 Retzius published notes which had been sent to him by J. F. Koenig, a pupil of Linnaeus then living in India, whence he had made a visit to Siam. These notes consisted of detailed descriptions of plants found by Koenig: each was headed by a name, or a phrase or some other identifying words. Koenig certainly did not use a binomial nomenclature consistently in these notes, and it might therefore be argued that, under Art. 23 of the International Code, none of the species names published here were valid. However, it is ridiculous to suggest that Linnaeus's protégé did not accept the Linnaean system of nomenclature. It is clearly stated by Retzius that he is publishing these notes without Koenig's knowledge and they are, in fact, an unfinished manuscript. No later workers have rejected the whole because part of the work was incomplete and we should not do so now.

The headings used in these notes fall into three categories:

(a) Linnaean names: to be regarded as identifications;

(b) new binomials for plants not identifiable with any then known:

(c) temporary, partial or vernacular names for plants whose final status was still uncertain. The full list of headings used by Koenig is given below, the letter (a), (b) and (c) after an entry indicating to which of the above categories it belongs. There are only two headings of which the category seems doubtful. It may well be asked if "Hura siamensium genus novum" is the proposal of a new scientific name or whether it is a descriptive phrase "Hura of the Siamese, a new genus". There are several arguments in favour of the latter interpretation. Koenig, Linnaeus's pupil, must have known of the genus *Hura* L.; then, when he does have a new genus to name, he does not do it in this form but simply "Hedychium coronarium" without comment; the word "siamensium" has not been treated by later authors as a specific epithet. On balance it seems best to treat this as a descriptive phrase (c), and this is in accord with the view expressed by Rendle (Journ. of Bot. 71: 186, 1933) after consultation of a manuscript at the British Museum.

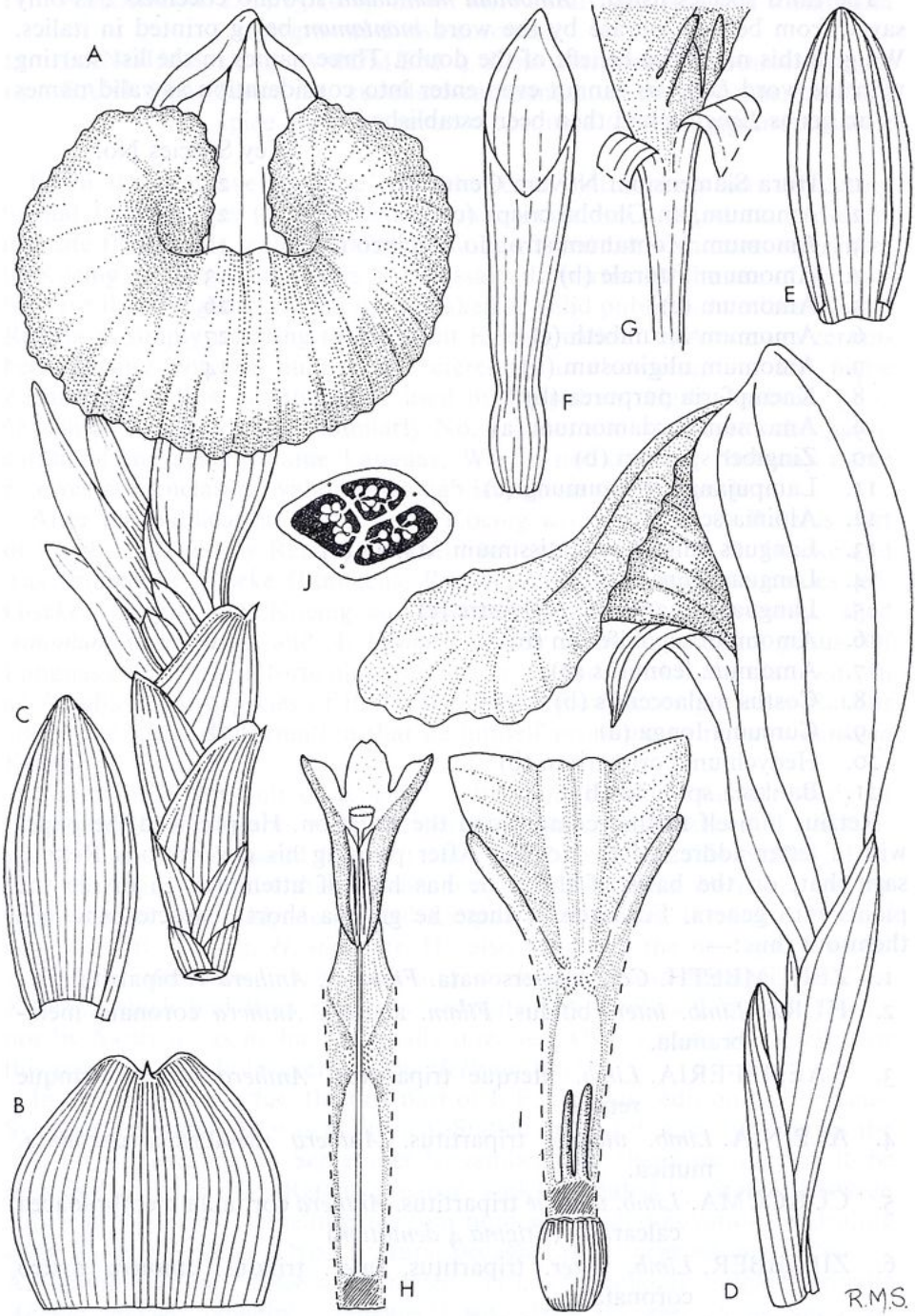


FIG. 5. *Aframomum luteo-album* K. Schum. vel aff. (Malawi: Ruo Gorge, *Burtt & Hilliard, B.* 4634): A, inflorescence x 1; B, sterile bract x 1; C, primary bract x 1; D, flower with bracteole x 1; E, bracteole x 1; F, calyx x 1; G, upper part of corolla tube showing position of petals (dorsal petal arising above laterals) and lateral staminodes x 1; H, corolla tube in L.S. showing anther x 1; I, corolla tube in L.S. showing lateral staminodes and epigynous glands x 1; J, ovary in T.S. x 3. (from living material, cult. R.B.G. Edinburgh, *C.* 8078).

The third species listed, "*Amomum montanum* strobilo coccineo", is only saved from being a phrase by the word *montanum* being printed in italics. We give this name the benefit of the doubt. Three names in the list starting with the word *Languas* cannot even enter into consideration as valid names as no genus *Languas* had then been established.

| | | Key Species No. |
|---|---|---|
| 1. | Hura Siamensium Novum Genus (c) | 24 |
| 2. | Amomum, an Globba crispa (c) | 25 |
| 3. | Amomum Montanum strobilo coccineo (b) | 12 |
| 4. | Amomum littorale (b) | 13 |
| 5. | Amomum (c) | 26 |
| 6. | Amomum zerumbeth (c) | 27 |
| 7. | Amomum uliginosum (b) | 14 |
| 8. | Kaempferia purpurea (b) | |
| 9. | Amomum cardamomum (a) | |
| 10. | Zingiber spurium (b) | 15 |
| 11. | Lampujang vel Thumung (c) | |
| 12. | Alpinia sessilis (b) | |
| 13. | Languas vulgare, usitatissimum Maleys (c) | |
| 14. | Languas chinensis (c) | |
| 15. | Languas aquaticum s. sylvestre (c) | |
| 16. | Amomum scyphiferum (b) | 16 |
| 17. | Amomum leonurus (b) | |
| 18. | Costus malaccensis (b) | 17 |
| 19. | Curcuma longa (a) | 28 |
| 20. | Hedychium coronarium (b) | 18 |
| 21. | Banksea speciosa (b) | 20 |

Retzius himself further complicated the situation. He prefaced the paper with a letter addressed to Koenig. After praising his descriptions Retzius says that, on the basis of these, he has himself attempted to divide the plants into genera. For each of these he gives a short character and sets them out thus:—

1. ZERUMBETH. *Cor.* subpersonata. *Filam.* 2. *Anthera* 1. bipartita.
2. HURA. *Limb. inter.* bifidus. *Filam.* alatum. *Anthera* coronata membranula.
3. KAEMPFERIA. *Limb.* uterque tripartitus. *Anthera* nuda, utrinque retusa.
4. ALPINIA. *Limb. uterque* tripartitus. *Anthera* membrana coronata, mutica.
5. CURCUMA. *Limb. uterque* tripartitus. *Anthera* coronula membranacea calcarata. (*Stigma* 4 *dentatum*)
6. ZINGIBER. *Limb. exter.* tripartitus, *inter.* trifidus. *Anthera* rostro coronata.
7. AMOMUM montanum. *Limb. exter.* tripartitus, *inter.* ovatus, integer. *Anthera* coroniculo coronata.
8. COSTUS. *Limb. exter.* tripartitus, *inter* trilobus. *Anthera* nuda.
9. HEDYCHIUM. *Limb. uterque* tripartitus. *Anthera* nuda basi hastata.
10. AMOMUM 5. *Limb. inter.* trilobus dupliciter cordatus. *Anthera* coronula semilunari.

11. AMOMUM 2.7.9.15.16.17. *Limb. inter.* indivisus. Anthera membrana integra vel divisa coronata.
12. LANGUAS 13.14. AMOMUM 4. *Limb. int.* indivisus. *Anthera* nuda.
13. BANKSEA. *Limb. int.* cucullato-campanulatus dorso sissus. *Anthera* apice filamenti recurvo coronata (*Stigma* biglandulosum).

From the first five of these it might seem that Retzius was allocating formal Latin names to these genera: numbers 7, 10, 11 and 12, however, indicate that this is really nothing but a numbered list with cross references to Koenig's names or numbers as necessary. In particular the use of Zerumbeth for the first genus should not be taken as valid publication of that name. Retzius is simply referring to the plant Koenig called "6, Amomum zerumbeth", using not the number as reference, as elsewhere, but the name Zerumbeth as this was the name used by Rumphius (Herb. Amboin, 5: 5, 68) which Koenig quoted. Similarly No. 12 does not constitute valid publication of the generic name Languas. We do not consider that any name receives nomenclatural validity through its appearance in this list.

After the publication of his notes Koenig wrote a letter to Retzius part of which is quoted by Retzius in one of his own letters to P. D. Giseke and was printed by Giseke (Linnaeus, Praelectiones in Ordines Naturales, ed. Giseke). In this letter Koenig said that the plants he had previously called *Amomum scyphiferum* and *A. leonurus* clearly formed a distinct genus. Of Languas he remarked 'forte nimis siamicum' and added that the plant known as Alughas was a species of it. To the extract from Koenig's letter Retzius added the further information that he himself proposed to rename *Banksea* Koenig as *Swartzia*.

The taxonomic result of Koenig's letter and Retzius's further study of these monandrous plants was a further publication by Retzius (Obs. Bot. 6: 17–18, 1791—it appeared between July and November, fide Stafleu, Tax. Lit. 52: 389, 1967). In this Retzius proposed the genus *Heritiera* for the three species previously designated Languas, and added the fourth species suggested by Koenig, *H. allughas*. He also proposed the new genus *Hornstedtia* for *Amomum scyphiferum* and *A. leonurus*, and replaced *Banksea* Koenig, which had been narrowly antedated by *Banksia* Linn. fil. (1781), not by *Swartzia*, as he had originally intended when writing to Giseke (for this too was already in use), but by *Hellenia* Retz.

In the same year, 1791, the first part of J. F. Gmelin's edition of Linnaeus, Systema Vegetabilium was published. Stafleu (Tax. Lit. 172, 1967) gives the date of appearance as September-November; we therefore suggest it be regarded as later than Retzius's paper, which is dated by Stafleu between July and November. Gmelin made four nomenclatural innovations in dealing with Koenig's plants: No. 1 Hura became *Sphaerocarpos hura*; No. 5, Amomum became *Amomum koenigii*; No. 13 Languas vulgare became *Alpinia languas* (sphalm. "langaus") with Nos. 14 and 15 as unnamed varieties, and No. 21 *Banksea speciosa* became *Tsiana speciosa*.

In 1792 Paul Dietrich Giseke published his study of Scitamineae as part of the additional matter added to his edition of Linnaeus, *Praelectiones in Ordines Naturales Plantarum*. In this he was particularly concerned to assimilate Koenig's plants. Working from descriptions alone he greatly increased the number of genera. None of the fourteen new names he proposed

has passed into general use, but in a full reconsideration of the genera of Zingiberaceae they need careful treatment. It should be made clear that despite Giseke's references to the *temporary* nature of his names there is no doubt that they were, at the time of publication, fully accepted by him and are nomenclaturally valid. They are temporary only in the sense that he realized the inadequacies of his work and knew that changes would become necessary later. Where he was at fault was in persisting with his own manuscript names for the plants that he knew Retzius had named in the previous year. Thus *Planera* (= *Hellenia* Retz.) and *Greenwaya* (= *Hornstedtia* Retz.) are illegitimate.

It will be seen that Koenig's descriptions of these Zingiberaceous plants exerted an enormous effect on the classification and nomenclature of the group between 1783 and 1792. The amazing thing is that many of the names were proposed by botanists who knew the plants only from Koenig's unillustrated descriptions. Retzius records in his letter to Giseke that the corresponding specimens sent to him by Koenig were lost by shipwreck, and C. E. C. Fischer (Kew Bull. 1932: 66) found only three specimens of Zingiberaceae collected by Koenig in the Lund herbarium. Rendle reports (Journ. of Bot. 71: 185, 1933) that he failed to find specimens relating to Koenig's visit to Siam and Malacca in the Banksian herbarium (BM).

**No. 12. Zingiber montanum** (Koenig) [Link ex] Dietrich in Linn., Sp. Pl. ed. 6, 1: 52 (1831).
Basionym: *Amomum montanum* Koenig in Retz. Obs. 3: 51 (1783); J. F. Gmelin in Linn., Syst. Veg. 1: 6 (1791).
Type: Thailand, Phuket, Pullu Jambo, *Koenig*. Specimen lost.
Type of: *Jaegera* Giseke in Linn., Prael. Ord. Nat. 203, 212, 236 (1792).

*Amomum montanum* Koenig has been generally accepted as a synonym of *Zingiber cassumunar* Roxb. (1810), a species for which it would provide the earliest epithet if determination were confirmed.

Giseke made Koenig's species into a new genus, but did not make any binomial for it.

**No. 13. Amomum littorale** Koenig in Retz., Obs. Bot. 3: 52 (1783); J. F. Gmelin in Linn., Syst. Veg. 1: 6 (1791); Baker in Hook. f., Fl. Brit. Ind. 6: 239 (1892); K. Schum., Pflanzenr. 234 (1904).
Type: Thailand, Phuket (olim Young Ceylon), *Koenig*. Specimen lost.
Type of: *Etlingera* Giseke in Linn., Prael. Ord. Nat. 209, 229, 251 (1792).

*Amomum littorale* is still known only from Koenig's description: it has apparently not been re-collected. K. Schumann placed this species in his "sect. Geanthus Blume", which Loesener, following Valeton, has recognised as a genus under the name *Geanthus* Reinw. (see Engl. & Prantl, Nat. Pflanzanfam. 2 Aufl. 15A: 591, 1930). Unfortunately the original species of *Geanthus* have been excluded from this concept of the genus (or section). Airy Shaw (in Willis, Dict. Fl. Pl. ed. 7, 426. 1966) has suggested that *Etlingera* Giseke be adopted, but this would seem to be a very unwise move when it is impossible to verify any of the characteristics of the genus. We

have proposed that *Geanthus* be conserved in Valeton's sense and that *Etlingera* be placed on the list of *nomina rejicienda* so that no disturbance is caused if the species is eventually re-discovered (see further under No. 47 below).

**No. 14. Amomum uliginosum** Koenig in Retz., Obs. Bot. 3: 56 (1783); J. F. Gmelin in Linn., Syst. Veg. 1: 6 (1791); Baker in Hook. f., Fl. Brit. Ind. 6: 241 (1892); Ridl. in Journ. Asiat. Soc. Bengal 1899, 136, et Fl. Mal. Penins. 4: 264 (1924); Holttum in Gard. Bull. Sing. 13: 213, fig. 26 (1950).
Type: Thailand, Phuket, Raput-Nok, 19 May 1779, *Koenig*. Specimen lost.
Syn.: *Wurfbainia uliginosa* (Koenig) Giseke in Linn., Prael. Ord. Nat. 206 (1792).
Type of: *Wurfbainia* Giseke in Linn., Prael. Ord. Nat. 206, 226, 245 (1792).

This plant is currently identified with a common Malayan species and belongs to that group of *Amomum* in which the anther crest is distinctly 3-lobed, Sect. *Amomum* ser. *Lobulatae* K. Schum. (see fig. 6—*A. sp.* Borneo). Notes on the generic characters of *Amomum* will be found under species No. 33.

**No. 15. Zingiber spurium** Koenig in Retz., Obs. Bot. 3: 60 (1783); J. F. Gmelin in Linn., Syst. Veg. 1: 6 (1791).
Type: Malaya, *Koenig*. Specimen lost.
Syn.: *Dieterichia minor* Giseke in Linn., Prael. Ord. Nat. 250 (1792).
Lectotype of: *Dieterichia* Giseke in Linn., Prael. Ord. Nat. 208, 228, 250 (1792).

Giseke's genus was based on two of Koenig's plants: 10. *Zingiber spurium* and 11. *Lampujang* vel *Thumung*, which Koenig thought was the same or perhaps a variety. This second plant Giseke named *Dieterichia major*. We choose the original *Zingiber spurium* (*Dieterichia minor*) as the type of Giseke's genus.

*Z. spurium* is given by K. Schumann (p. 172.) as a synonym of *Zingiber zerumbet* (L.) Sm. If that is correct (and we ourselves would agree that the description fits), then Giseke's generic name is a synonym of *Lampujang* Medic. of which *Z. zerumbet* is the type (see No. 2).

**No. 16. Hornstedtia scyphifera** (Koenig) Steud., Nomencl. 2: 776 (1840); K. Schum., Pflanzenr. 195 (1904); Holttum in Gard. Bull. Sing. 13: 170 (1950).
Basionym: *Amomum scyphiferum* Koenig in Retz., Obs. Bot. 3: 68 (1783); J. F. Gmelin in Linn., Syst. Veg. 1: 6 (1791).
Type: Malaya, *Koenig*. Specimen lost.
Syn.: *Hornstedtia scyphus* Retz., Obs. Bot. 6: 18 (1791)—nomen illegitimum.
*Greenwaya scyphifera* (Koenig) Giseke in Linn., Prael. Ord. Nat. 245 (1792).
Lectotype of: *Hornstedtia* Retz., Obs. Bot. 6: 18 (1791).
*Greenwaya* Giseke in Linn., Prael. Ord. Nat. 206, 226, 245 (1792)—nomen illegitimum.

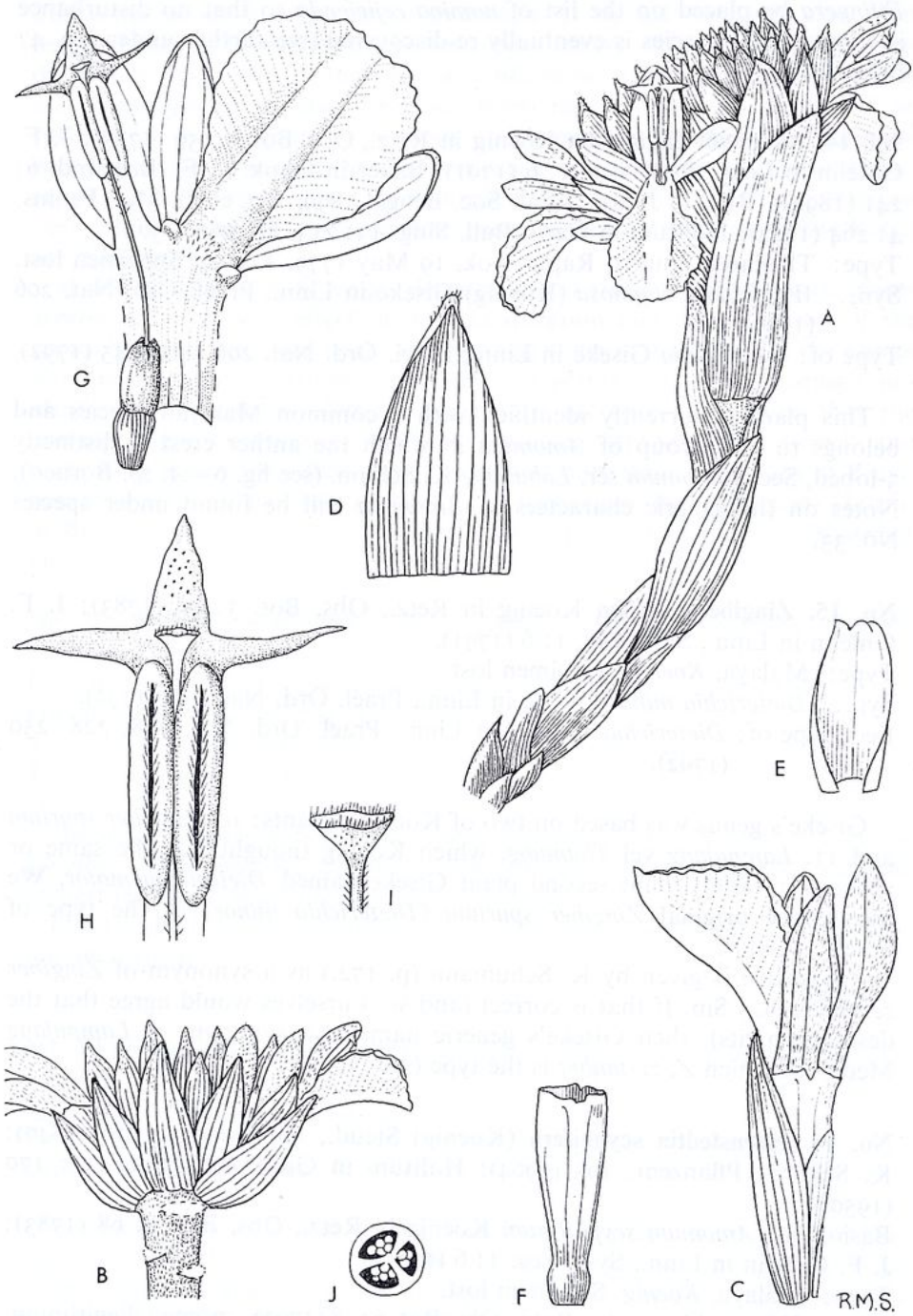


FIG. 6. *Amomum* sp. sect. *Amomum* series *Lobulatae* (Sarawak: Mount Murud, W of Camp IV, *Burtt & Martin*, *B.* 5283): A, inflorescence x 1; B, inflorescence, uppermost peduncle sheaths removed x 1; C, flower x 2; D, primary bract x 2; E, bracteole, x 2; F, calyx x 2; G, flower, dissected x 2; H, anther x 4; I, stigma x 9; J, ovary in T.S. x 4. (from spirit material).

*H. scyphifera* is common throughout Malaya and also occurs in Borneo and Sumatra. The genus is readily distinguished by the more or less fusiform basal inflorescence, all but the tips of the flowers being enclosed by an involucre of stiff sterile bracts. The long-tubed flowers are borne singly in the axils of the primary bracts (an exception is *H. leonurus* which has 2 flowers per bract) and the bracteoles, when present (see sp. No. 37), are open to the base, again with the exception of the anomalous *H. leonurus* which has tubular bracteoles. The *Hornstedtia* labellum is always rather short, usually no longer than the petals; in some species (*H. scyphifera* and *H. pininga* for example: fig. 7) it is thin in texture with distinct side lobes which are held behind the anther in the opened flower while in others (*H. lycostoma*, *H. tomentosa*, fig. 13) it is fleshy and entire. The anther which may or may not extend into a crest is frequently fertile in the upper half only. Many *Hornstedtia* are notable in that stilt shoots carry the rhizome a foot or so above the ground. Such roots are also found in *Geostachys* and *Scaphochlamys*.

**No. 17. Alpinia** (**Costus malaccensis** Koenig in Retz., Obs. Bot. 3: 71 (1783)—non *Alpinia malaccensis* (Burm. f.) Roscoe).
Type: Malaya, *Koenig*. Specimen lost.
Syn.: ? *A. javanica* Bl., Enum. Pl. Jav. 59 (1830).
Type of: *Buekia* Giseke in Linn., Prael. Ord. Nat. 204, 216, 239 (1792).

Giseke proposed no binomial under his genus *Buekia*. K. Schumann (pp. 335, 359) quotes Koenig's plant both under *Alpinia malaccensis* (Burm. f.) Roscoe and under *Alpinia javanica* Bl.; the former reference is probably an error that slipped in because of the specific epithet. Under *A. javanica* Koenig's plant "non Maranta malaccensis Burm. f." is clearly quoted. Holttum (p. 145) also places this plant under *A. javanica* Bl.

The importance of this determination is that Holttum has split *Alpinia* into *Languas*, *Alpinia* and *Catimbium*. The generic nomenclature is untenable, for the part called *Languas* by Holttum is the true *Alpinia* as fixed by its conserved type *A. galanga*. Holttum's concepts brought up to date nomenclaturally would leave *Buekia* Giseke as the earliest generic name for *Alpinia* sensu Holttum, but *Albina* Giseke (see No. 19 below) would also have to be considered. *A. javanica* belongs to that group of *Alpinia* with tubular or funnel-shaped bracteoles and small, often quickly deciduous, primary bracts. K. Schumann places it as a monotypic section, *Javana*, under subgen. *Dieramalpinia*.

**No. 18. Hedychium coronarium** Koenig in Retz., Obs. Bot. 3: 73 (1783); K. Schum., Pflanzenr. 44 (1904); Holttum in Gard. Bull. Sing. 13: 72 (1950).
Type: Malaya, *Koenig*. Specimen lost.
Type species of: *Hedychium* Koenig in Retz., Obs. Bot. 3: 73 (1783).
*Hedychium* sect. *Gandasulium* Horan., Monogr. 24 (1862).

Unquestionably the best known genus of Zingiberaceae, the important features of *Hedychium* are the many-flowered terminal inflorescence, each bract with usually 2–3 bracteolate flowers, well developed strap-shaped or ovate lateral staminodes and the deeply bilobed lip. An illustration of a

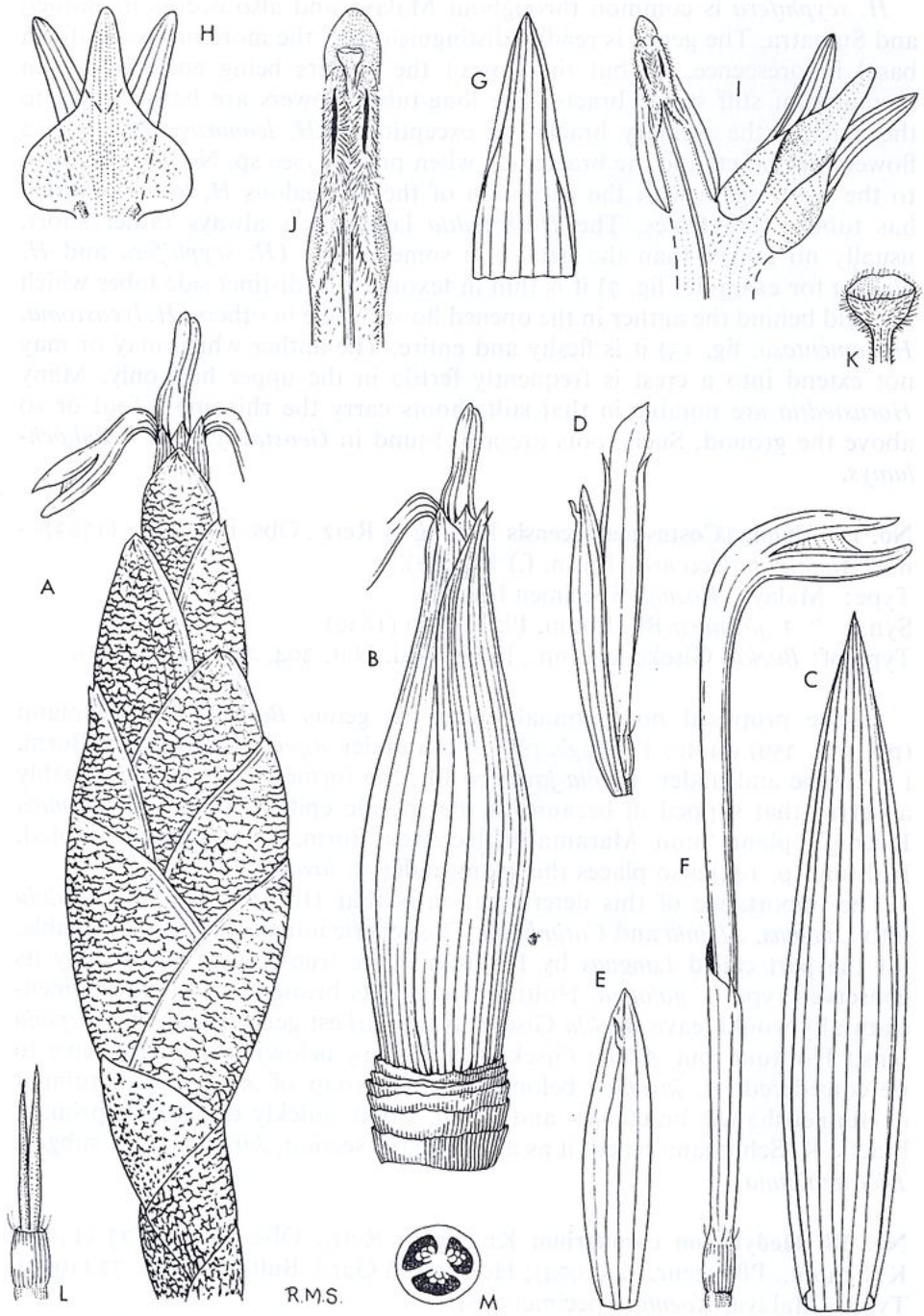


FIG. 7. *Hornstedtia pininga* (Bl.) Val. (Sarawak: First Division, Mt. Matang, 'rhizome aerial on stilt roots', *Burtt & Martin, B.* 5152): A, inflorescence x $\frac{2}{3}$; B, inflorescence with sterile bracts removed showing primary bracts x $\frac{2}{3}$; C, primary bract x 1; D, bracteole and calyx x 1; E, bracteole x 1; F, flower x 1; G, dorsal petal x 2; H, labellum and lateral petals x 2; I, upper parts of flower, dissected x 1; J, anther x 2; K, stigma x 4; L, epigynous glands x 1; M, ovary in T.S. x 2. (from spirit material).

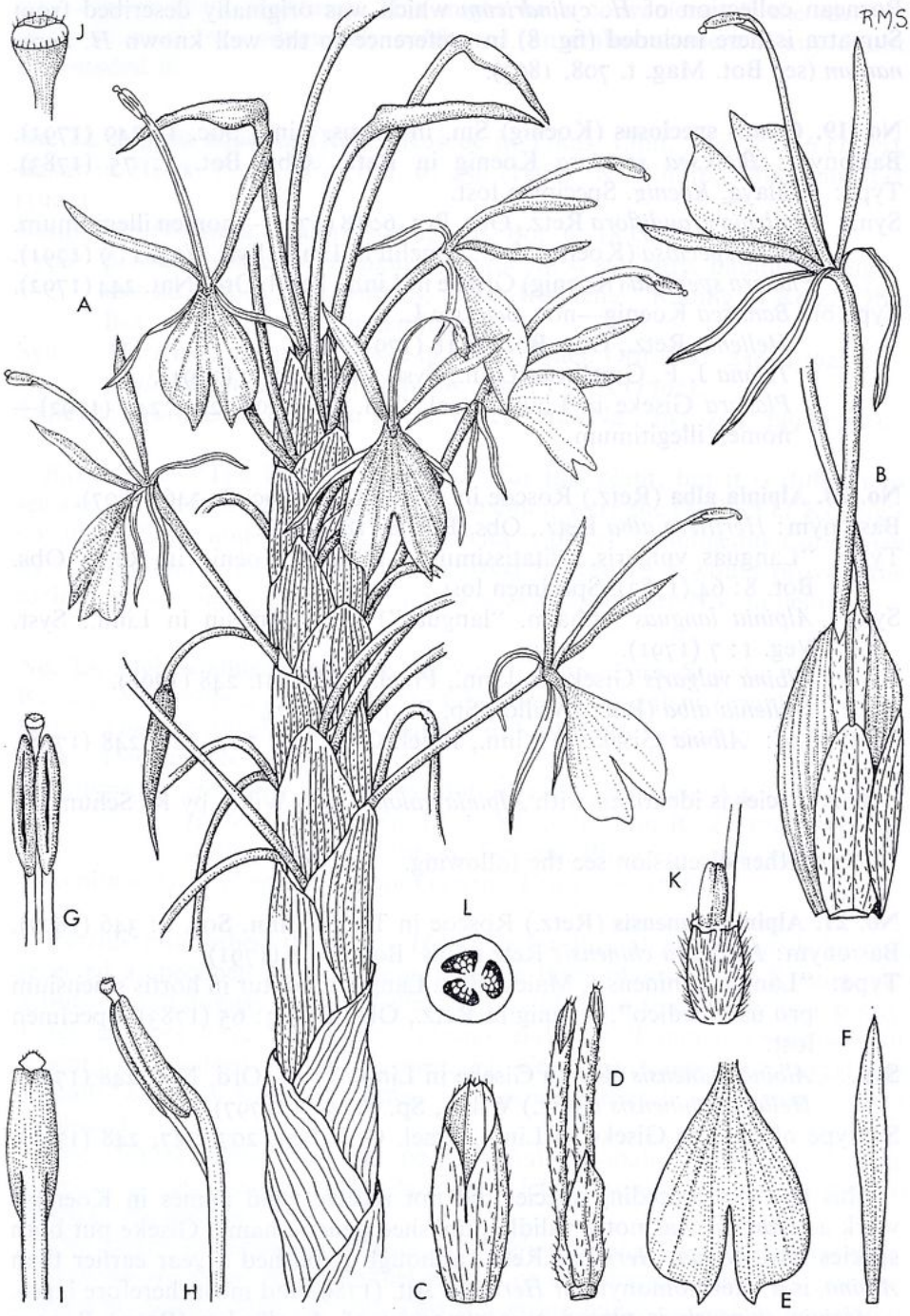


FIG. 8. *Hedychium cylindricum* Ridl. (Sarawak: Fourth Division, Gunong Murud, *Burtt & Martin, B.* 5382): A, inflorescence x $\frac{2}{3}$; B, primary bract enclosing 2-flowered cincinnus x 1; C, bracteole x 1; D, first bracteole removed showing second bracteole surrounding calyx of second flower x 1; E, labellum x 1; F, lateral staminodes x 1, G, H, I, anther x 3; J, stigma x 6; K, epigynous glands x 2; L, ovary in T.S. x 3. (from living material, cult. R.B.G. Edinburgh, *C.* 8002).

Bornean collection of *H. cylindricum* which was originally described from Sumatra is here included (fig. 8) in preference to the well known *H. coronarium* (see Bot. Mag. t. 708, 1803).

**No. 19. Costus speciosus** (Koenig) Sm. in Trans. Linn. Soc. 1: 249 (1791).
Basionym: *Banksea speciosa* Koenig in Retz., Obs. Bot. 3: 75 (1783).
Type: Malaya, *Koenig*. Specimen lost.
Syn.: *Hellenia grandiflora* Retz., Obs. Bot. 6: 18 (1791)—nomen illegitimum.
*Tsiana speciosa* (Koenig) J. F. Gmelin in Linn., Syst. Veg. 1: 9 (1791).
*Planera speciosa* (Koenig) Giseke in Linn., Prael. Ord. Nat. 244 (1792).
Type of: *Banksea* Koenig—non *Banksia* L.
*Hellenia* Retz., Obs. Bot. 6: 18 (1791).
*Tsiana* J. F. Gmelin in Linn., Syst. Veg. 1: 1, 9 (1791).
*Planera* Giseke in Linn., Prael. Ord. Nat. 205, 225, 244 (1792)—nomen illegitimum.

**No. 20. Alpinia alba** (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807).
Basionym: *Heritiera alba* Retz., Obs. Bot. 6: 18 (1791).
Type: "Languas vulgaris, usitatissimum Maleys", Koenig in Retz., Obs. Bot. 8: 64 (1783). Specimen lost.
Syn.: *Alpinia languas* (sphalm. "languas") J. F. Gmelin in Linn., Syst. Veg. 1: 7 (1791).
*Albina vulgaris* Giseke in Linn., Prael. Ord. Nat. 248 (1792).
*Hellenia alba* (Retz.) Willd., Sp. Pl. 1: 5 (1797).
Syntype of: *Albina* Giseke in Linn., Prael. Ord. Nat. 207, 227, 248 (1798).

This species is identified with *Alpinia galanga* (L.) Willd. by K. Schumann (p. 316.).

For further discussion see the following.

**No. 21. Alpinia chinensis** (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807).
Basionym: *Heritiera chinensis* Retz., Obs. Bot. 6: 18 (1791).
Type: "Languas chinensis, Maleys Sina Languas, colitur in hortis sinensium pro usu medico", Koenig in Retz., Obs. Bot. 3: 65 (1783). Specimen lost.
Syn.: *Albina chinensis* (Retz.) Giseke in Linn., Prael. Ord. Nat. 248 (1792).
*Hellenia chinensis* (Retz.) Willd., Sp. Pl. 1: 5 (1797).
Syntype of: *Albina* Giseke in Linn., Prael. Ord. Nat. 207, 227, 248 (1792).

This and the preceding species did not receive valid names in Koenig's work as *Languas* was not a validly published generic name. Giseke put both species into *Albina*. *Heritiera* Retz., although published a year earlier than *Albina*, is a later homonym of *Heritiera* Ait. (1789) and must therefore lapse.

*Alpinia chinensis* is placed as a synonym of *A. allughas* (Retz.) Roscoe by K. Schumann (p. 344.).

We are not at present prepared to recommend which species be taken as the lectotype of *Albina* Giseke. If *A. alba* is chosen, and its determination as *A. galanga* is correct, *Albina* becomes a synonym of *Alpinia* Roxb. however that genus is circumscribed. If *A. chinensis* is chosen, *Albina* would seem to provide a valid generic name for the species to be associated with *A. allughas*

(i.e. *Alpinia* sensu Holttum). This might be a convenience if the identity of *A. chinensis* was adequately confirmed, an embarrassment if any doubt surrounded it.

**No. 22. Alpinia aquatica** (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807), Baker in Hook. f., Fl. Brit. Ind. 6: 256 (1892); K. Schum., Pflanzenr. 341 (1904).
Basionym: *Heritiera aquatica* Retz., Obs. Bot. 6: 18 (1791).
Type: probably Malaya "Languas aquaticum s. sylvestre, habitat in uliginosis ad rivulos inter frutices, minus frequens". Keonig in Retz., Obs. Bot. 3: 67 1783. Specimen lost.
Syn.: *Martensia aquatica* Giseke in Linn., Prael. Ord. Nat. 249 (1792).
*Hellenia aquatica* (Retz.) Willd., Sp. Pl. 1: 5 (1792).
Type of: *Martensia* Giseke in Linn., Prael. Ord. Nat. 207, 229, 249 (1792).

Baker gives "The Deccan Peninsula" for this plant, but it is difficult to see any reason: the other plants in this memoir were the product of Koenig's voyage to Siam and Malacca. The species is placed in subgenus *Catimbium* by K. Schumann, and if this is the correct treatment, it would provide the earliest generic name for this group (cf. discussion under No. 30 below).

**No. 23. Alpinia allughas** (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807).
Basionym: *Heritiera allughas* Retz., Obs. Bot. 6: 17, tab. 1 (1791).
Syn.: *Languas allughas* (Retz.) Burkill in Kew Bull. 1935; 317.
Type: Ceylon, *Koenig* (LU).
Lectotype of: *Heritiera* Retz., Obs. Bot. 6: 17 (1791)—non Ait. (1789).
*Hellenia* Willd., Sp. Pl. 1: 4 (1797)—non Retz. (1791).
*Alpinia* sect. *Allughas* K. Schum., Pflanzenr. 344 (1904).
Taxonomic syn.: *Zingiber nigrum* Gaertn., Fruct. 35 (1788)?

Retzius established the genus *Heritiera* for this plant, of which he had received a specimen from Koenig, and the three plants which Koenig had grouped as 'Languas' without effectively publishing that name as a genus. Later authors have united this species and the "Languas chinensis" of Koenig and indeed Alston (Trimen, Fl. Ceylon 6 Suppl. 282, 1931) has actually adopted Koenig's name, not realising that it was never validly published.

The earliest epithet for the species should probably be provided from *Zingiber nigrum* Gaertn. (1788) but this is left meantime for a more critical study of the species.

The group of *Alpinia* to which *A. allughas* belongs is that in which the bracteoles are more or less funnel-shaped or cup-shaped, subgenus *Dieramalpinia* K. Schum. (see fig. 3A). This is a group badly in need of taxonomic revision.

**No. 24. Globba hura** (J. F. Gmelin) Roxb. in Asiat. Res. 11: 359 (1810).
Basionym: *Sphaerocarpos hura* J. F. Gmelin in Linn., Syst. Veg. 1: 9 (1791).
Type: "Hura siamensium genus novum" Koenig in Retz., Obs. Bot. 3: 49 (1783). Specimen lost.

Syn.: *Manitia aurea* Giseke in Linn., Prael. Ord. Nat. 251 (1792)—*nomen illegitimum*.
*Globba versicolor* Sm., Exot. Bot. 116 t. 117 a, b, c (1804) p.p.—*nomen illegitimum*: Horan., Monogr, 20 (1860); Baker in Hook. f., Fl. Brit. Ind. 6: 205 (1890).
Type of: *Sphaerocarpos* J. F. Gmelin in Linn., Syst. Veg. 1: 9 (1791).
*Manitia* Giseke in Linn., Prael. Ord. Nat. 251 (1792).

We quote *Globba hura* in this form as both Gmelin and Roxburgh based their names wholly on Koenig's description; but Roxburgh did not quote Gmelin. Giseke's names are illegitimate as he quoted Gmelin. We have not accepted *Hura* and *siamensium* in Koenig's notes as being valid generic name or specific epithet (see above p. 190).

Sir J. E. Smith based his name *Globba versicolor* on two elements: (a) the sketch made at Java by Parkinson on Cook's second voyage; (b) Koenig's description. It is clear that the sketch was the more important element as it provided his illustration and the specific epithet. Nevertheless the inclusion of Koenig's description means that Smith should, under our retroactive Code, have taken up Gmelin's epithet *hura* and his epithet *versicolor* is illegitimate.

**No. 25. Amomum globba** J. F. Gmelin in Linn., Syst. Nat. 1: 5 (1791).
Type: Thailand? Malaya? "Amomum, an Globba crispa" Koenig in Retz., Obs. 3: 50 (1782). Specimen lost.
Syn.: *Amomum echinatum* Willd., Sp. Pl. 1: 9 (1797); K. Schum., Pflanzenr. 238 (1904).
Type of: *Paludana* Giseke in Linn., Prael. Ord. Nat. 207, 227, 248 (1792).

Giseke gave no specific name under *Paludana*, which is based solely on Koenig's description. Willdenow's name covers both Koenig's plant and *Globba crispa viridis* Rumph. (Herb. Amboin. 6: 137, t. 61, f. 1). Valeton (in Merr., Interpr. Rumph. Herb. Amb. 160. 1917) points differences between the two elements and restricts Willdenow's name to Koenig's plant; indeed K. Schumann had expressed the same view. Neither, however, was aware that this part of the species had an earlier name, *A. globba* J. F. Gmelin.

**No. 26. Amomum koenigii** J. F. Gmelin in Linn., Syst. Nat. ed. 13, 6 (1791); Baker in Hook. f., Fl. Brit. Ind. 6: 237 (1892)*
Type: Thailand, Phuket (olim Young Ceylon), "5. Amomum", Koenig in Retz. Obs. Bot. 3: 54 (1783). Specimen lost.
Type of: *Meistera* Giseke in Linn., Prael. Ord. Nat. 205, 225, 244 (1792).
New material: Thailand, Phuket, hill near Thalang, E. of road to Phuket, 8 v 1968, *Beusekom & Phengkhlai* 649 (E, AAR).

This recent gathering fits Koenig's lengthy description reasonably well. No spirit collection was available but an illustration prepared from the dried material is here included (fig. 9). *A. koenigii* belongs to section *Amomum* series *Integrae* K. Schum., as does *A. subulatum* Roxb., the conserved type of the genus.

* Proposed independently as a new species by Baker but based solely on the Koenig description.

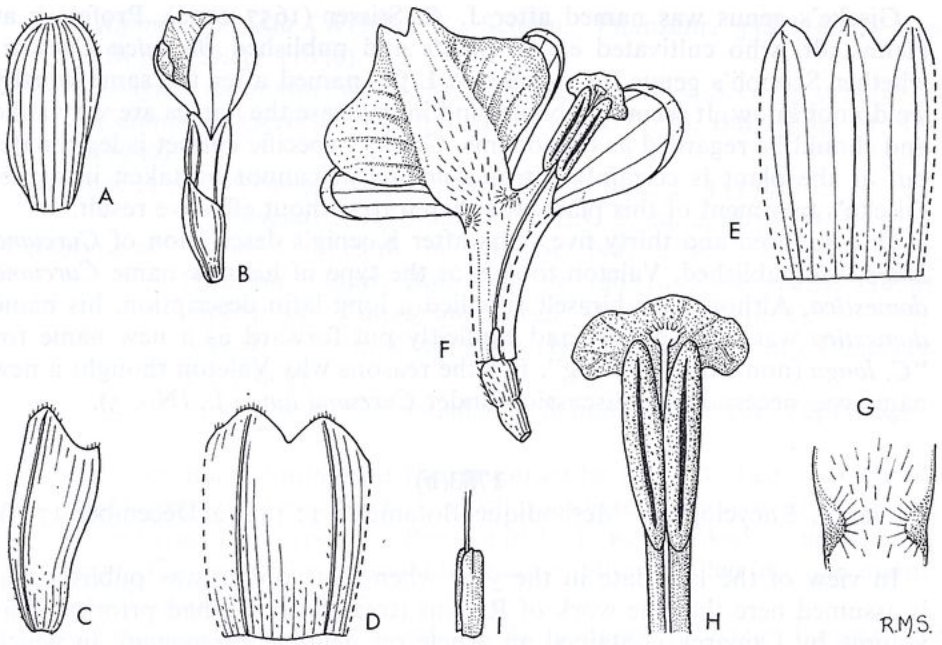


FIG. 9. *Amomum koenigii* J. F. Gmelin (Thailand: Phuket, *Beusekom & Phengkhlai* 649): A, primary bract x 1; B, flower with bracteole x 1; C, bracteole x 2; D, bracteole spread out x 2; E, calyx, spread out x 2; F, flower, dissected x 2; G, lateral staminodes (represented by fleshy swellings) x 2; H, anther x 4; I, epigynous glands x 4. (from dried material).

**No. 27. Curcuma (Erndlia subpersonata** Giseke in Linn., Prael. Ord. Nat. 252, 1792)

Sype: Thailand?, Malaya?, *Amomum zerumbeth* Koenig in Retz., Obs. Bot. 3: 55 (1783) nomen illegitimum—non *A. zerumbet* Linn. (1753). Specimen lost.

Syn.: *Curcuma zerumbeth* Roxb. in Asiat. Res. 11: 333 (1810)—nomen illegitimum.

Type of: *Erndlia* Giseke in Linn., Prael. Ord. Nat. 209, 229, 252 (1792).

*C. zerumbeth* Roxb. included Koenig's *Amomum zerumbeth* (non Linn.) and Roxburgh should, therefore, have taken up Giseke's epithet *subpersonata*. However, Roxburgh was working largely with plants that he knew alive. The citation of *C. zerumbeth* Roxb. as a nomenclatural synonym does not necessarily mean that the epithet *subpersonata* would be correct for plants now known as *C. zerumbeth* Roxb. The epithet should not be adopted until the identity of the plant has been critically determined (see p. 225).

**No. 28. Curcuma domestica** Valeton in Bull. Jard. Bot. Buitenzorg, 2 ser. 27: 31 (1918).

Type: Malaya, "in hortis Sinensium, copiosissime Malaccae", *Koenig*. Specimen lost: flowers in alcohol (BM—fide Dryander, 1794).

Syn.: *Stissera curcuma* Giseke in Linn., Prael. Ord. Nat. 249 (1792).
*Curcuma longa* auct.; Koenig in Retz., Obs. Bot. 3: 72 (1783), non L.

Type of: *Stissera* Giseke in Linn., Prael. Ord. Nat. 207, 228, 249 (1792)—non *Stisseria* Scop. (1777).

Giseke's genus was named after J. A. Stisser (1657–1700), Professor at Helmstadt, who cultivated exotic plants and published *Botanica Curiosa*; whether Scopoli's genus (= *Mimusops* L.) is named after the same worthy we do not know. It seems probable, and in any case the names are very alike and should be regarded as homonyms. Giseke's specific epithet is legitimate, but as the plant is certainly a true *Curcuma* it cannot be taken into use. Giseke's treatment of this plant was therefore without effective result.

One hundred and thirty five years after Koenig's description of *Curcuma longa* was published, Valeton took it as the type of his new name *Curcuma domestica*. Although he himself supplied a long latin description, his name *domestica* was quite clearly and explicitly put forward as a new name for "*C. longa* (non Linn.) Koenig". For the reasons why Valeton thought a new name was necessary see discussion under *Curcuma longa* L. (No. 5).

**1783(b)**

Lamarck, Encyclopédie Méthodique Botanique 1: 132 (2 December 1783).

In view of the late date in the year when this volume was published, it is assumed here that the work of Retzius (treated above) had priority. This volume by Lamarck contained an article on Amome (*Amomum*), in which he included both *Alpinia* L. and *Costus* L. Following Linnaeus, Lamarck placed the gingers in *Amomum* and he added a new species *A. latifolium* which was, in fact, a species of *Curcuma* (see Appendix, p. 225).

**1797**

Willdenow, Species Plantarum 1: 1–15.

The overall position recognized for Zingiberaceae by Willdenow may be summarised as follows

*Hellenia* Willd. (= *Heritiera* Retz. non Ait.): 4 spp.
*Renealmia* L. f.: 1 sp.
*Amomum* L.: 11 spp.
*Hornstedtia* Retz.: 2 spp.
*Hedychium* Koen.: 1 sp.
*Costus* L.: 3 spp.
*Alpinia* L.: 4 spp.
*Curcuma* L.: 2 spp.
*Kaempferia* L.: 2 spp.

Willdenow's innovations were to return Retzius's genus *Hellenia* to *Costus* (this was botanically correct); to abandon the generic name *Heritiera* Retz. (this was nomenclaturally correct as it is a later homonym of *Heritiera* Ait.) and to replace it by *Hellenia*, the name already given by Retzius to a species of *Costus*; (this was nomenclaturally incorrect: *Hellenia* Willd. is merely a later homonym of *Hellenia* Retz.)

**No. 29. Alpinia zerumbet** (Pers.) Burtt & Smith, **comb. nov.**
Basionym: *Costus zerumbet* Pers., Syn. 1: 3 (1805).
Syn.: *Zerumbet speciosum* Wendl., Sert. Hann. fasc. 4: 3, t. 19 (1798).

*Alpinia speciosa* (Wendl.) K. Schum., Pflanzenr. 334 (1904)—non (Bl.) D. Dietr. (1839).
*Languas speciosum* (Wendl.) J. K. Small, Fl. S.E.U.S. ed. 2, 307 (1913.)
*Catimbium speciosum* (Wendl.) Holttum in Gard. Bull. Sing. 13: 152 (1950).

Type species of: *Zerumbet* Wendl., Sert. Hann. fasc. 4: 3 (1798).
*Languas* J. K. Small, Fl. S.E.U.S. ed. 2, 307 (1913).

Lectotype of: *Catimbium* Lestib. in Ann. Sc. Nat. 2, ser. 15: 346 (1841); Holttum in Gard. Bull. Sing. 13: 149 (1950)—non Juss. (1789).
*Alpinia* sect. *Catimbium* Horan. Monogr. 34 (1862).
*Alpinia* subgen. *Catimbium* (Horan.) K. Schum., Pflanzenr. 332 (1904).
*Alpinia* sect. *Flos-paradisi* K. Schum., Pflanzenr. 334 (1904).

The generic name *Catimbium* was proposed by A. L. de Jussieu (Gen. Pl. 62: 1789) to replace *Renealmia* L. f. which was a later homonym of *Renealmia* L. (Bromeliaceae). As soon as *Renealmia* L. f. was ranked as *nomen conservandum*, *Catimbium* Juss. should have automatically fallen into synonymy. The actual history is different.

The first confusion was caused by the younger Linnaeus himself. He described the genus *Renealmia* and the species *R. exaltata* from a Surinam specimen, but under *R. exaltata* he included a reference to the Asiatic *Globba sylvestris* Rumph. (Herb. Amboin. 6: 140, t. 62, 63. 1750). This same reference had been given by Linnaeus under his *Globba nutans* (Mant. alt. 170. 1771). Roscoe (Sm., Ex. Bot. 2: 93, t. 106. 1805), recognized this plant as an *Alpinia* and made the name *Alpinia nutans* (L.) Roscoe; at the same time he cited *Zerumbet speciosum* Wendl. as a synonym. The plant he illustrated was *Zerumbet speciosum* not *Alpinia nutans*. This was the beginning of the second confusion.

The two errors were combined by Lestiboudois (in Ann. Sci. Nat. 2 Ser. 15: 305–349, 1841). He worked particularly with a plant which he referred to as *Globba nutans* L., but which clearly was *Zerumbet speciosum* Wendl. He decided this plant, together with another that he referred to as *Globba erecta*, deserved generic rank. Lestiboudois was clearly aware that the *Rumphius's Globba sylvestris* had been quoted under both *Globba nutans* and *Renealmia*, and that *Catimbium* had been proposed by Jussieu as a replacement for *Renealmia*. He therefore adopted the name *Catimbium* for the distinct genus which he thought should contain the plant he had been calling *Globba nutans*. Though he did not use the name *Catimbium* in the text of the article the genus is clearly keyed out in the table at the end. *Catimbium* Lestib. must be regarded as a later homonym of *Catimbium* Juss. (= *Renealmia* L. f.) and its type is a plant we identify as *Zerumbet speciosum* Wendl. (= *Alpinia zerumbet* above).

K. Schumann was apparently the first to realize that "*Alpinia nutans*" was being misidentified (see also Valeton in Merrill, Interpr. Rumph. Herb. Amb. 154, 1917). Unfortunately Schumann took up the epithet from Wendland's *Zerumbet speciosum*, not realizing that there already existed *Alpinia speciosa* (Bl.) D. Dietr. (= *Nicolaia elatior*, No. 35 below).

We have felt it necessary to provide this well-known and widely cultivated plant with a legitimate name in *Alpinia*. For some reason Persoon transferred

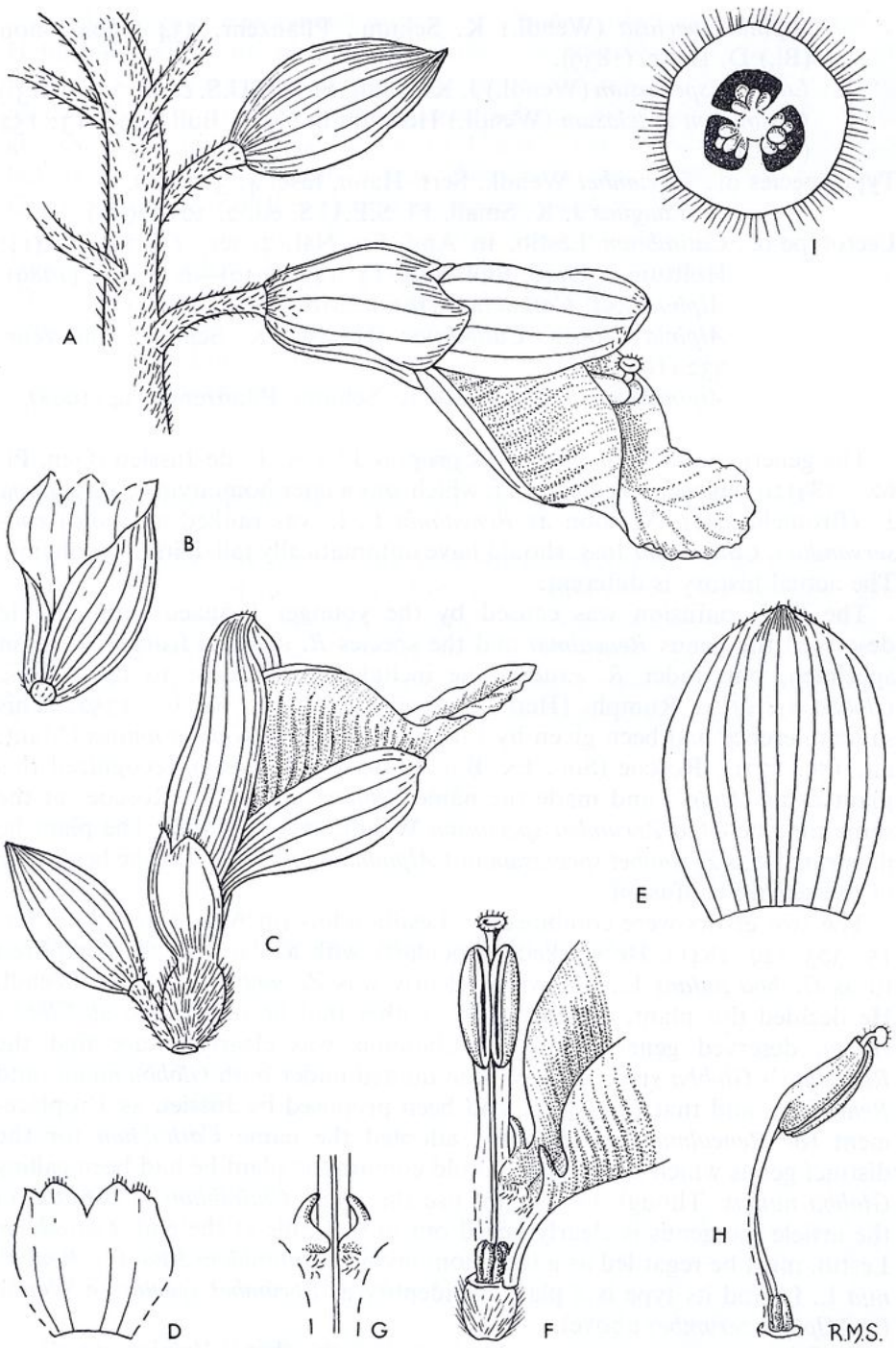


FIG. 10. *Alpinia zerumbet* (Pers.) Burtt & Smith: A, part of inflorescence showing newly opened first flower of a 2-flowered cincinnus x 1; B, bracteole x 1; C, first flower with bracteole removed showing second bracteole x 1; D, calyx spread out x 1; E, dorsal petal x 1; F, corolla tube dissected showing stamen, staminodes and epigynous glands x 1; G, lateral staminodes x 1; H, stamen & epigynous glands x 1; I, ovary in T.S. x 3. (from living materal, precise wild origin unknown, cult. R.B.G. Edinburgh, *C.* 4959).

*Zerumbet speciosum* to *Costus*, and, as the epithet *speciosus* was already in use, he called it *Costus zerumbet*. This provides the earliest epithet available for use in *Alpinia*. If the separate genus is eventually accepted the earliest name definitely applicable to it is *Zerumbet* Wendl., but the problematical *Martensia* Giseke (see No. 22 above) is earlier and will have to be considered.

In *Alpinia* subgen. or sect. *Catimbium* (the name is legitimate in these ranks) primary bracts are usually small or entirely absent. The bracteoles are non-tubular but remain wrapped round the unopened flower. The cincinni are normally 1–3 flowered and the flowers are the largest and most showy found in *Alpinia*. (See fig. 10).

**No. 30. Roscoea purpurea** Sm., Exot. Bot. 2: 97, t. 108 (1806); Horan., Monogr. 20 (1862); K. Schum., Pflanzenr. 119 (1904).
Type: Upper Nepal, *Buchanan-Hamilton*.
Type of: *Roscoea* Sm., Exot. Bot. 2: 97, t. 108 (1806).

*Roscoea*, and the closely allied *Cautleya* (see below No. 44) are well known genera of some horticultural importance. Both bear the inflorescence at the top of leafy stems and the ebracteolate flowers are borne singly in the axils of primary bracts. The petaloid lateral staminodes are held erect behind the truly versatile spurred anther and the labellum is conspicuously bilobed. In *Roscoea* the ovary and tardily dehiscent capsule are elongated whilst in *Cautleya* both are short and the capsule early dehiscent. The prevailing flower colour of *Roscoea* is white or purple and the inflorescence is few-flowered, whereas in *Cautleya* the usually many-flowered inflorescences are yellow. (see figs. 11 and 15).

**1807**

Roscoe, W. A new arrangement of the plants of the Monandrian Class usually called Scitamineae. Trans. Linn. Soc. London, 8: 330–357 (1807).

William Roscoe studied a large number of Scitamineae at the Liverpool Botanic Garden, of which he was one of the founders. One hundred and twelve plants were beautifully illustrated by coloured folio plates in his *Monandrian plants of the order Scitamineae* which was published in parts between 1824 and 1829. He did much to advance the study of Zingiberaceae, and was the first to emphasise the characters to be drawn from the anthers. Although his illustrations include a number of new species, his arrangement of the genera did not involve any major changes that had a lasting classification or nomenclatural effect. His work requires no special consideration here.

**1810**

Roxburgh, W. Descriptions of several of the monandrous plants of India, belonging to the natural order called Scitamineae by Linnaeus, Cannae by Jussieu and Drimyrhizae by Ventenat. Asiatic Researches 11: 318–362. (Calcutta, 1810: reimp. London 1812).

Roxburgh took an especial interest in these plants, appreciating that they could only be studied satisfactorily when alive. He had already published

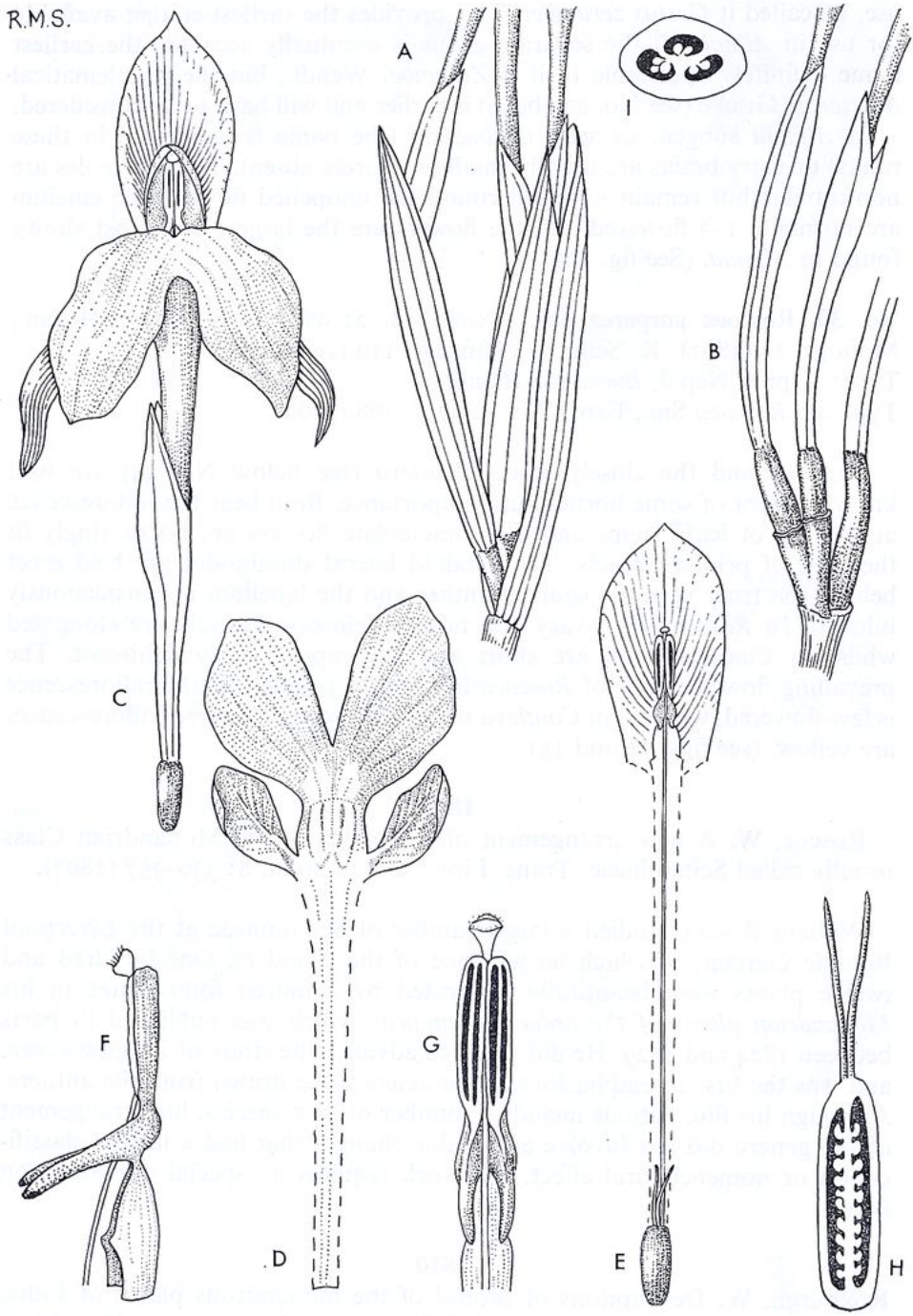


FIG. 11. *Roscoea purpurea* Sm.: A, basal part of inflorescence, with bracts x 1; B, same, bracts removed x 1; C, flower x 1; D, labellum and lateral staminodes x 1; E, dorsal petal, anther and corolla tube in L.S. x 1; F, G, anther x 3; H, ovary in L.S. x 6. (from living material, precise wild origin unknown, cult. R.B.G. Edinburgh, *C.* 8080).

two illustrations in Plants of the Coromandel Coast 2: *Amomum* (= *Zingiber*) *roseum* Roxb. (tab. 126, 1800) and *Curcuma montana* Roxb. (tab. 151, 1802). In this paper of 1810 the modern concepts of the genera begin to emerge and we now retain both *Amomum* and *Alpinia* as names officially conserved in Roxburgh's sense, and we are now proposing the same treatment for *Curcuma*. He described 47 species of Zingiberaceae in 8 genera: almost all these are illustrated in the collection of paintings by Roxburgh's Indian artists: these are now at Kew (see J. R. Sealy, The Roxburgh Flora Indica drawings at Kew, in Kew. Bull. 1956, 297–399).

Although Roxburgh's Flora Indica was only published posthumously in 1820, the Mss was finished before he left India in 1813. The genera in the Flora Indica are the same as those in the paper of 1810, but some 19 additional species were added.

**No. 31. Mantisia saltatoria** Sims in Bot. Mag. t. 1320 (Sept. 1810); Horan. Monogr. 19 (1862); K. Schum., Pflanzenr. 161 (1904).

Type: Cult. "E. Indies (Roxburgh)", but presumably from Chittagong.

Syn.: *Globba radicalis* Roxb. in Asiat. Res. 11: 359 (1810). Type from Chittagong.
*Globba purpurea* Andr., Rep. 10: 615 (Aug. 1810).
*Globba saltatoria* (Sims) Roscoe, Monandr. t. 112 (1828).
*Globba subulata* Roxb., Hort. Beng. 2 (1814).

Type of: *Mantisia* Sims in Bot. Mag. t. 1320 (1810).

This plant was described three times within the same year: until the precise date of publication of *Globba radicalis* Roxb. is known we prefer to maintain Sim's epithet, which is in general use, rather than the slightly earlier *Globba purpurea* Andr.

As we have previously remarked (Burtt & Smith in Notes R.B.G. Edinb. 28: 287, fig. 1, 1968) *Mantisia* exhibits but one clear distinction from *Globba*; the position and form of the lateral staminodes. In *Globba* they arise at approximately the same level as, and are similar in form to, the corolla lobes; in *Mantisia* they are either linear-acuminate or spathulate processes arising at about the same level as the apex of the erect dorsal petal.

**No. 32. Curcuma angustifolia** Roxb. in Asiat. Res. 11: 338, tab. 5, (1810); Baker in Hook. f., Fl. Brit. Ind. 6: 210 (1890); Haines, Bot. Bihar & Orissa, 6: 1131 (1924).

Type: Cult. Bot. Gard. Calcutta, coll. *Colebrooke*, R. Sone to Nagpur. No specimen known.

Lectotype of: *Curcuma* Roxb. in Asiat. Res. 11: 329 (1810), nomen ad conservandum propositum.

The reasons for conserving *Curcuma* from Roxburgh's treatment of the genus are detailed under No. 4 above. *C. angustifolia* seems a good lectotype for the genus: it is a very distinctive species, but is quite typical of the genus in essential characters: it was well illustrated by Roxburgh: its wild origin was clearly stated: it is not mixed up with any of the complicated pre-Linnaean synonymy.

*C. angustifolia* is one of the species in which the inflorescence arises laterally to the leafy shoot. It is characterized by its unbranched stem-tubers, root tubers, green floral bracts, yellow flowers and red coma.

**No. 33. Amomum subulatum** Roxb., Pl. Coromandel 3: 75, t. 277 (1820) et Fl. Ind. 1: 43 (1820); Baker in Hook. f., Fl. Brit. Ind. 6: 240 (1892); K. Schum., Pflanzenr. 253 (1904).
Type: Bengal, *Roxburgh*
Type of: *Amomum* Roxb., Fl. Ind. 1: 317 (1820), nomen conservandum*—non L.

*Amomum* may be recognized by the basal inflorescence which tends to elongate after flowering and lacks an involucre of sterile bracts, such as is found in *Hornstedtia*, *Achasma*, *Nicolaia* and, to some degree, in *Geanthus*. The flowers are borne singly in the axils of the primary bracts and, in the majority of species, possess tubular bracteoles. Most *Amomum* have well developed anther crests, they may be distinctly lobed or entire, but crestless species are not unknown (A. *dictyocoleum* K. Schum. for example).

## 1812

Salisbury, R. A. The cultivation of rare plants. Trans. Hort. Soc. London, 1: 261–366 (1812—Zingiberaceae pp. 279–287).

Salisbury's views on nomenclature led him to change a large number of names in common use. In this paper he introduced no less than seven new generic names (*Galanga*, *Ethanium*, *Gethyra*, *Cardamomum*, *Marogna*, *Torymenes* and *Alexis*). No descriptions were given and none of these names was validly published according to the International Code. The names can therefore be ignored and they are not further cited in this paper.

**No. 34. Caulokaempferia linearis** (Wall.) K. Larsen in Bot. Tidsskr. 60: 170 (1964).
Basionym: *Kaempferia linearis* Wall. in Roxb., Fl. Ind. 1: 20 (1820) et Pl. As. Rar. 1: 24 (1830); Baker in Hook f., Fl. Brit. Ind. 6: 223 (1890); K. Schum., Pflanzenr. 73 (1904).
Type: "mountains of north-east Bengal". (Presumably Wall. Cat. no. 6592, Sillet Mts. W.G.—K).
Syn.: *Monolophus linearis* (Wall.) Horan., Monogr. 22 (1862).
Type of: *Caulokaempferia* K. Larsen in Bot. Tidsskr. 60: 166 (1964).

For detailed notes on the taxonomy of *Caulokaempferia* see Larsen & Smith in Notes R.B.G. Edinb. 31: 287, 1972. The application of the name *Monolophus* is elucidated under *Kaempferia elegans* (No. 42).

**No. 35. Nicolaia elatior** (Jack) Horan., Monogr. 32 (1862); Merrill in Journ. Arn. Arb. 33: 215 (1952).
Basionym: *Alpinia elatior* Jack, Mal. Misc. 2, 7: 2 (1822), reimp. in Hook., Journ. Bot. 1: 359 (1834).
Type: W coast Sumatra, Pulo Nias and Ayer Bangy, *Jack* (lost?).

* Proposed for conservation in Taxon 17, 6: 730 (1968); recommended by Committee in Taxon 19, 2: 293 (1970).

Taxonomic syn. 1: *Elettaria speciosa* Bl., Enum. Pl. Jav. 51 (1827).
*Alpinia speciosa* (Bl.) D. Dietr., Syn. 1: 13 (1839).
*Nicolaia speciosa* (Bl.) Horan., Mongr. 32 (1862); Valeton in Bull. Jard. Bot. Buit. 3 ser., 3: 138 (1921).
*Phaeomeria speciosa* (Bl.) Merr., Enum. Phil. Pl. 1: 241 (1922); Holttum in Gard. Bull. Sing. 13: 181 (1950).
2: *Alpinia magnifica* Roscoe, Monandr. Pl. t. 75 (1824-1829); Bot. Mag. t. 3192 (1834).
*Nicolaia imperialis* Horan., Monogr. 32 (1862).
*Phaeomeria magnifica* (Roscoe) K. Schum., Pflanzenr. 262 (1904).

Type (tax. syn. 2) of: *Nicolaia* Horan., Monogr. 32 (1862).
*Phaeomeria* [Lindl., Nat. Syst. Bot. ed. 2, 446, 1836. nom. inval. ex] K. Schum., Pflanzenr. 261 (1904).
*Hornstedtia* sect. *Phaeomeria* Ridl. in Journ. As. Soc. Bengal 1899; 139.

The synonymy of this species has been set out in some detail, though it is the second taxonomic synonym which is important for our present purpose. This is the type of the genus *Nicolaia* Horan. which, as pointed out by various authors, must replace the name *Phaeomeria* Lindl. This did not receive valid publication as a genus till used by K. Schumann in 1904: by which time it was illegitimate, as *Nicolaia* Horan. had the same type species.

*Nicolaia* is recognized by the showy involucre of sterile bracts which surrounds the long peduncled inflorescence. It is closely related to *Achasma* and *Geanthus* in floral details (see fig. 17B) and this relationship is discussed below under No. 47.

Bakhuizen (Back. & Bakh. f., Fl. Java 3: 64, 1968) states that *Diracodes javanica* Bl., Enum. Pl. Jav. 1: 55 (1827), the type species of the monotypic genus *Diracodes* Bl., is a virescent form of *Nicolaia elatior*. Although Blume's genus antedates *Nicolaia* it must be considered invalid, as it is based on a monstrosity (Int. Code, Art. 71, 1966).

## 1823–1827

Blume, C. L. Cat. Gewass. Buitenzorg, 29–30 (1823).
Enum. Pl. Javae, 39–63 (1827).

Blume's publications on Zingiberaceae were largely based on Reinwardt's manuscripts, although he did not hesitate to change the status of a plant: for instance *Cenolophon* Bl. is based on a plant described in Reinwardt's manuscript as an *Alpinia*. The catalogue of 1823 recorded 8 genera and 20 species as being cultivated at Buitenzorg. The Enumeratio of 1827 recorded 12 genera and 57 species from Java (cf Backer & Bakh. f., Fl. Java, 3: 196—14 genera and 47 species). Blume (Enum. Pl. Jav. 41) made the first attempt to subdivide the family into natural groups, and these formed the basis of Meisner's tribes.

**No. 36. Cenolophon rubrum** Bl., Enum. Pl. Jav. 61 (1827).
Type: Celebes, in sylvis, *Reinwardt* (lost?).
Type of: *Cenolophon* Bl., Enum. Pl. Jav. 60 (1827); Horan., Monogr. 36 (1862); Holttum in Gard. Bull. Sing. 13: 132 (1950).
*Amomum* subgen. *Cenolophon* (Bl.) Baker in Hook. f., Fl. Brit. Ind. 6: 242 (1892).
*Alpinia* sect. *Cenolophon* (Bl.) K. Schum., Pflanzenr. 320; Loes., Pflanzenfam. 614 (1930).
Syn.: *Hellenia rubra* (Bl.) Miq., Fl. Ind. Bat. 3: 604 (1859).

Although Blume took the description from Reinwardt's manuscript, and may have seen no specimen himself, the name appears to be entirely his; Reinwardt placed the plant in *Alpinia*.

Horaninow (Monogr. 38: 1862) added *C. vitellinum* (Lindl.) Horan., based on *Amomum vitellinum* Lindl., to the genus and this has gradually usurped the place of *C. rubrum* as the "type species".

In fact both the group names under *Amomum* and *Alpinia* are based by their respective authors on "*Cenolophon* Horan." although Horaninow merely adopted Blume's genus and there is no justification for attributing *Cenolophon* to him. K. Schumann (p. 321) said he could find no specimen of *C. rubrum* and abandoned the species. Holttum (p. 133.) retains *Cenolophon* as a genus and considered that the crested anther and racemose inflorescence given in the original description justify the use of the name for *C. vitellinum* and other species he associates with it. The situation is clearly unsatisfactory but until *C. rubrum* is re-discovered in the Celebes we recommend that the current association of the name *Cenolophon* with this group be retained. The characters of the group, flowers borne singly on the main axis, primary bracts small (or absent), and the usually conspicuously crested anther are illustrated in fig. 12 which is taken from material of a new Bornean species, *C. argenteum*.

**No. 37. Hornstedtia paludosa** (Bl.) K. Schum. in Pflanzenr. 200 (1904); Backer & Bakh. f., Fl. Jav. 3: 62 (1968).
Basionym: *Donacodes paludosa* Bl., Enum. Pl. Jav. 54 (1827).
Type: W Java, in sylvis altioribus, *Reinwardt*.
Syn.: *Elettaria paludosa* (Bl.) Miq., Fl. Ind. Bat. 3: 604 (1859).
*Amomum paludosum* (Bl.) K. Schum. in Bot. Jahrb. 27: 305 (1899).
Lectotype of: *Donacodes* Bl., Enum. Pl. Jav. 54 (1827).

No lectotype of *Donacodes* has been proposed as yet. The genus is wholly synonymous with *Hornstedtia* Retz.; we have therefore selected this, as the best known species, to stand for the generic name.

*H. paludosa* is one of a very few *Hornstedtia* in which bracteoles are absent. This absence has also been noted in *H. tomentosa* (see fig. 13).

**No. 38. Achasma (Elettaria coccinea** Bl.).
Basionym: *Elettaria coccinea* Bl., Enum. Pl. Jav. 53 (1827).
Type: Java, *Reinwardt*?

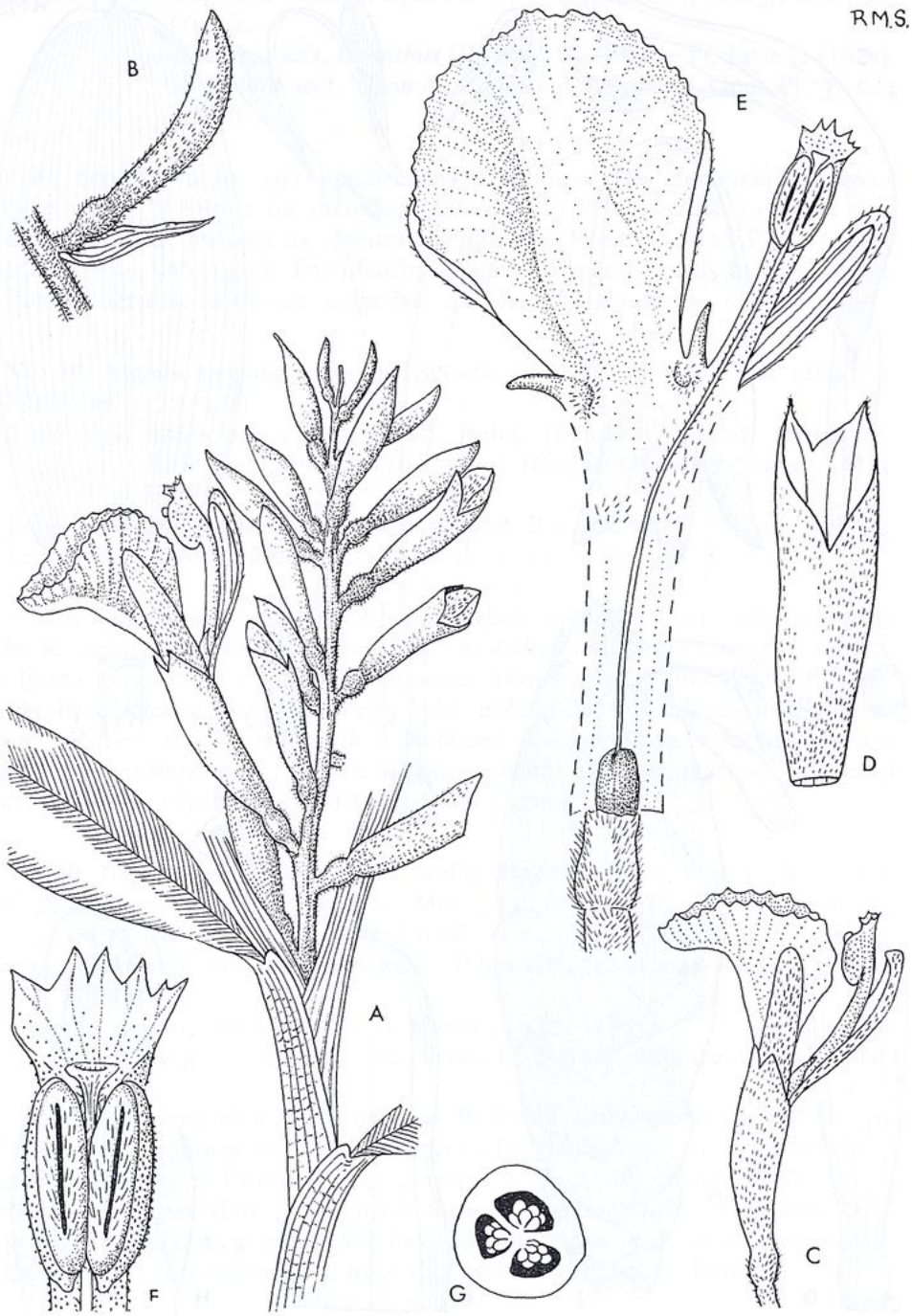


FIG. 12. *Cenolophon argenteum* Burtt & Smith (Sarawak: Fifth Division Bakelan to Gunong Murud, *Burtt & Martin, B.* 5166): A, part of inflorescence x 1; B, young bud with rarely seen primary bract x 2; C, flower x 1; D, calyx x 2; E, flower, dissected x 2; F, anther x 4; G, ovary in T.S. x 4. (from spirit material).

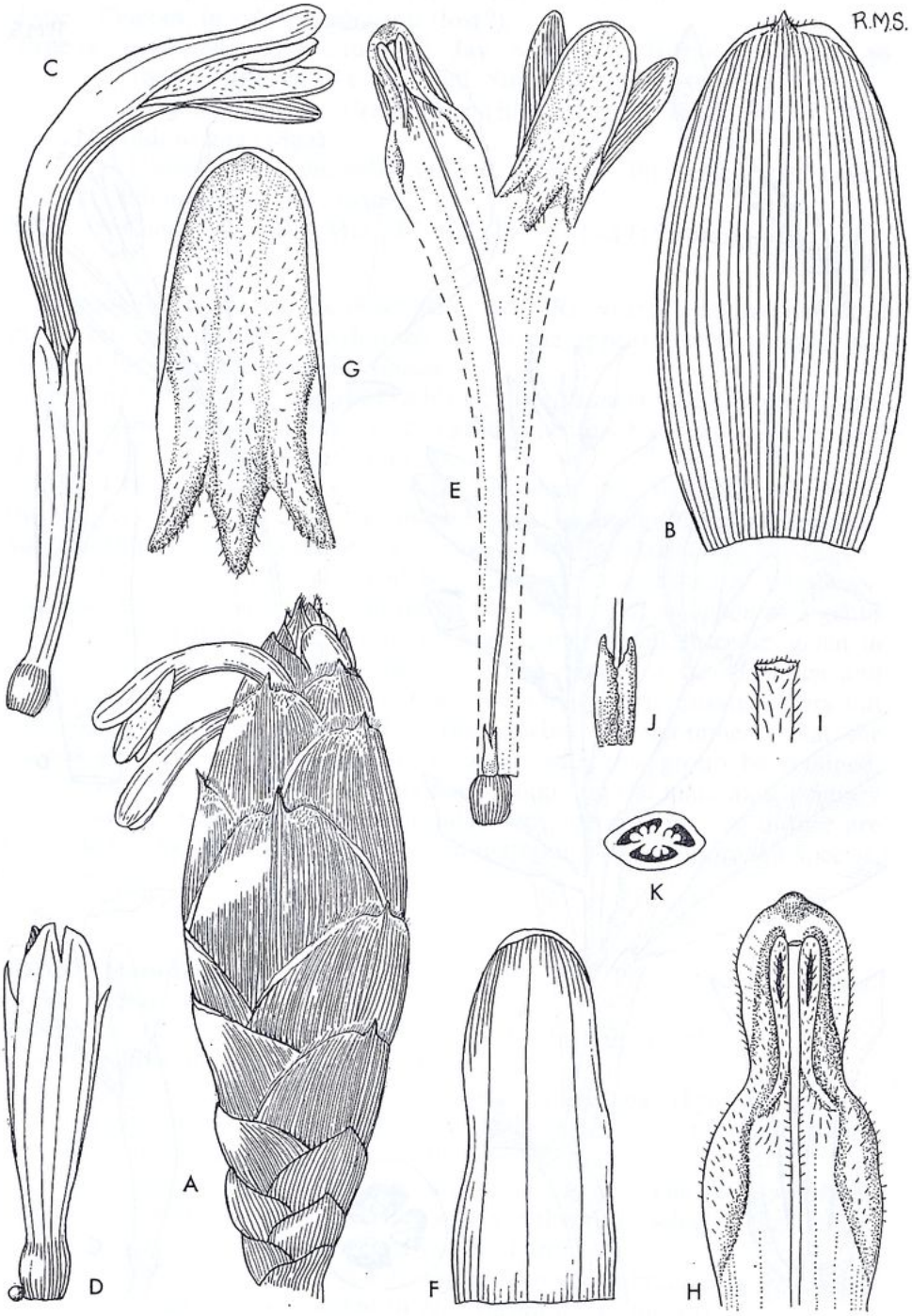


FIG. 13. *Hornstedtia tomentosa* (Bl.) Bakh. f. (Sarawak: First Division, Mt. Matang, *Burtt & Martin, B.* 5151): A, inflorescence x 1; B, primary bract x 1; C, flower x 1; D, calyx plus rudimentary bracteole? x 1; E, flower, dissected x 1; F, dorsal petal x 2; G, labellum x 2; H, anther x 2; I, stigma x 4; J, epigynous glands x 2; K, ovary in T.S. x 2. (from spirit material).

Lectotype of: *Geanthus* Reinw., Syll. Pl. Nov. Ratisb. 2: 5 (1825), non Val. (1914).
*Elettaria* sect. *Geanthus* (Reinw.) Bl., Enum. Pl. Java 51 (1827).
*Amomum* sect. *Geanthus* (Reinw.) Benth. in Gen. Pl. 3: 644 (1880).

K. Schumann (p. 197) makes this a synonym of *Hornstedtia punicea* (Roxb.) K. Schum.; he included *Achasma* in *Hornstedtia*. Loesener has transferred *H. punicea* as *Achasma puniceum* (Roxb.) Loes. (Pflanzenfam. 2 Aufl, 15a: 596, 1930). The identity of the two species needs to be checked. For further discussion see under No. 47, *Geanthus roseus*.

**No. 39. Alpinia elegans** (Presl) K. Schum. in Bot. Jahrb. 27: 288 (1899) et Pflanzenr. 352 (1904).
Basionym: *Kolowratia elegans* Presl, Reliq. Haenk. 1: 113, t. 20 (1827); Ridl. in Philipp. Journ. Sci. 4: 181 (1909); Merr., Enum. Phil. Fl. Pl. 235 (1923).
Type: Philippine Islands, Luzon, Sorzogon Bay, *Haenke*.
Type of: *Kolowratia* Presl, Reliq. Haenk. 1: 113 (1827).

This species is referred to *Alpinia* subgen. *Dieramalpinia* sect. *Eubractea* by K. Schumann. The inflorescence is branched and bears numerous linear-oblong primary bracts each containing about 4 or 5 bracteolate flowers. The bracteoles are winged, deeply split unilaterally but tubular in the lower half. Ridley and Merrill both maintained *Kolowratia* as a separate genus but it is perhaps better left in *Alpinia* subgen. *Diermalpinia*, at least until critical study can be made of this complex group.

**No. 40. Leptosolena haenkei** Presl, Reliq. Haenk. 1: 111, t. 18 (1827); Ridl. in Phil. Journ. Sci. 4: 180 (1909); Merr., Enum. Phil. Fl. Pl. 1: 236 (1923).
Type: Philippine Island, Luzon, *Haenke* (lost, fide K. Schum.).
Syn.: *Alpinia leptosolena* K. Schum., Pflanzenr. 312 (1904)—*non A. haenkei* Presl.
Type of: *Leptosolena* Presl, Reliq. Haenk. 1: 111 (1827).
*Alpinia* sect. *Leptosolena* (Presl) K. Schum., Pflanzenr. 312 (1904).

*Leptosolena haenkei*, as figured in Reliquae Haenkeanae, is unlike any *Alpinia*. The inflorescence lacks bracts or bracteoles, and the corolla tube is extremely long and narrow. It is perhaps more closely related to *Burbidgea* and we suggest that *Leptosolena* should be maintained at generic level pending more critical study. We have seen no material. K. Schumann writes *Leptosolenia* throughout; we have retained the original spelling.

**No. 41. Boesenbergia pulcherrima** (Wall.) O. Kuntze, Rev. Gen. 2: 685 (1891).
Basionym: *Gastrochilus pulcherrimus* Wall., Pl. As. Rar. 1: 22, t. 24 (1829).
Type: Burma, *Wallich*.
Lectotype of: *Gastrochilus* Wall., Pl. As. Rar. 1: 22 (1829)—non D. Don (1825).
*Boesenbergia* O. Kuntze, Rev. Gen. 2: 685 (1891).

There were two species originally placed in *Gastrochilus* by Wallich, *G. pulcherrimus* and *G. longiflorus*. Both were well illustrated and they are still thought to be congeneric. The illustration of *G. pulcherrimus* shows with special clarity the two-ranked arrangement of the bracts of the inflorescence now regarded as a most important character of the genus. It was selected as lectotype by Holttum (p. 107) and this choice is endorsed.

The characters of *B. pulcherrima* are discussed by Larsen & Smith in Notes R.B.G. Edinb. 31: 288 (1972). The great majority of *Boesenbergia* are very much shorter stemmed than the type species but are similar in the distichous arrangement of the primary bracts, saccate labellum and the unusual mode of flowering in which the flowers at the top of the inflorescence open first.

**No. 42. Kaempferia elegans** Wall., Pl. As. Rar. 1: 24, tab. 27 (1830); Baker in Hook. f., Fl. Brit. Ind. 6: 222 (1890); K. Schum., Pflanzenr. 82 (1904).
Type: Burma, Tenasserim, *Wallich* 6593.
Syn.: *Monolophus elegans* (Wall.) Horan., Monogr. 22 (1862).
Type of: *Monolophus* [Wall. ex] Endl., Gen. Pl. 225, n. 1636 (1837).
*Kaempferia* subgen. *Monolophus* (Endl.) Baker in Hook. f., Fl. Brit. Ind. 6: 222 (1890).

Authors have consistently attributed the genus *Monolophus* to Wallich, but it was never validly established by him. All Wallich did was to suggest, in a note to *Kaempferia elegans*, that this species, together with *K. linearis* and *K. secunda*, should perhaps be made into a distinct genus under the name *Monolophus*. It is even more incredible that these last two species are attributed to *Monolophus* by Index Kewensis, with reference to Roxburgh's Flora Indica of 1820: ten years before the word *Monolophus* even appeared in print.

When *Monolophus* was eventually published by Endlicher only the species *Kaempferia elegans* was mentioned, and this is accordingly the type of the genus and of *Kaempferia* subgen. *Monolophus* (Endl.) Baker. K. Schumann's use of the subgeneric name (to include *K. linearis*, *K. secunda* and other species) is wrong, because *K. elegans* is placed by him in subgen. *Soncorus* Horan. (= subgen. *Kaempferia*, cf. under No. 6, *K. galanga*). Botanically this is correct and subgen. *Monolophus* is a taxonomic synonym of subgen. *Kaempferia*. *K. elegans* is illustrated in fig. 14.

ENTRIES BEYOND THIS POINT ARE SELECTIVE ONLY (SEE P. 178)

**No. 43. Hitchenia glauca** Wall. in Trans. Med. Phys. Soc. Calcutta, 7: 215 (1834); Baker in Hook. f., Fl. Brit. Ind. 6: 224 (1890); K. Schum., Pflanzenr. 96 (1904).
Type: Burma, *Wallich*.
Type of: *Hitchenia* Wall. in Trans. Med. Phys. Soc. Calcutta 7: 215 (1834).

In general facies *Hitchenia* resembles *Curcuma* but the primary bracts are quite free from one another. We have seen no good material of this genus.

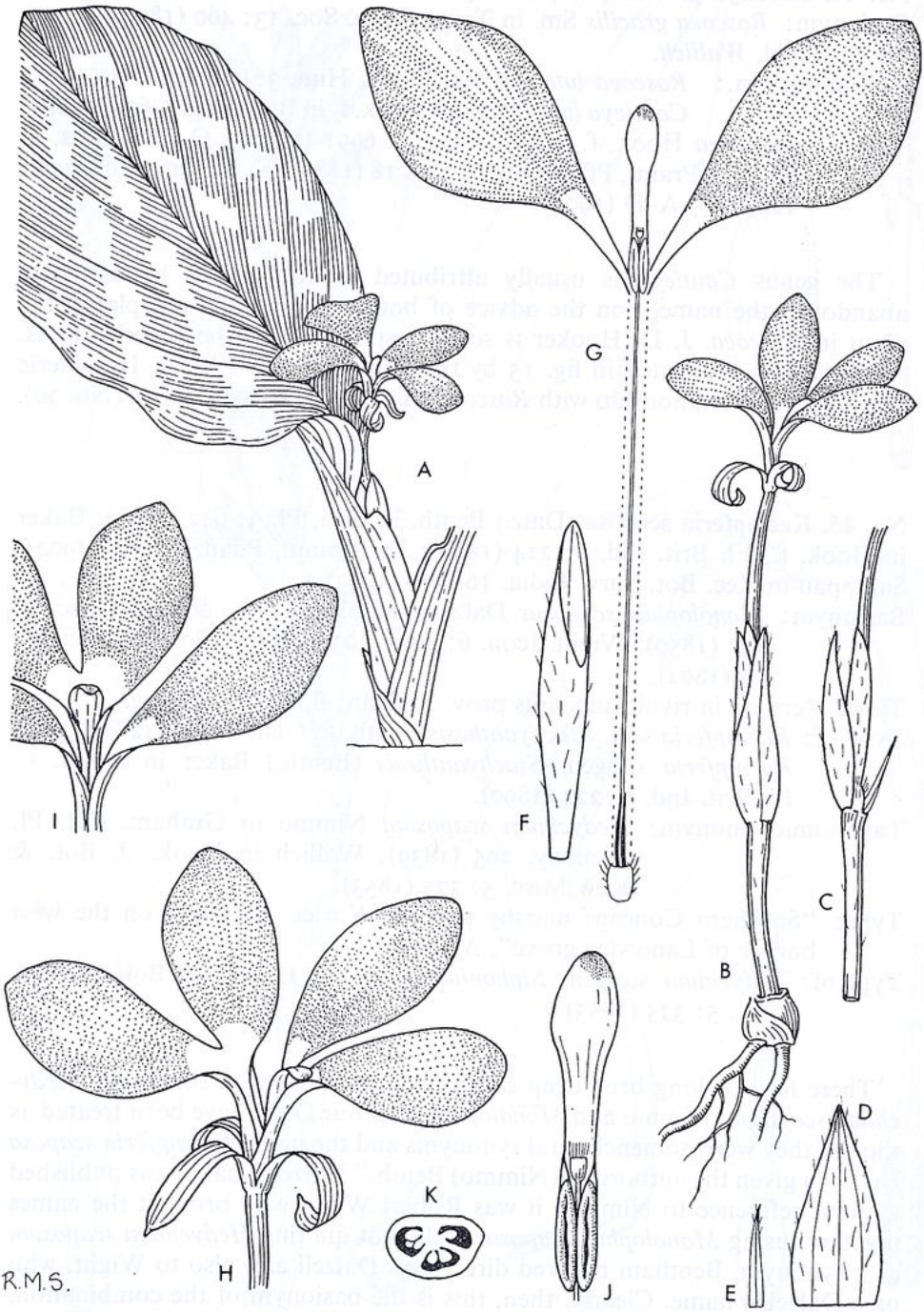


FIG. 14. *Kaempferia elegans* Wall. (Malaya: Langkawi Is., *Burtt & Woods, B.* 1771): A, habit x $\frac{2}{3}$; B, inflorescence removed from leaf sheath x 1; C, base of inflorescence, first primary bract removed x 1; D, primary bract x 1; E, bracteole x 1; F, calyx x 2; G, L.S. of corolla tube showing lateral staminodes and epigynous glands x 2; H, flower, slightly spread out x 2; I, flower, petals removed, showing basal part of labellum embracing anther x 2; J, anther x 4; K, ovary in T.S. x 4. (from living material, cult. R.B.G. Edinburgh, *C.* 3926).

**No. 44. Cautleya gracilis** (Sm.) Dandy in Journ. Bot. 70: 328 (1932).
Basionym: *Roscoea gracilis* Sm. in Trans. Linn. Soc. 13: 460 (1822).
Type: Nepal, *Wallich.*
Taxonomic syn.: *Roscoea lutea* Royle, Ill. Pl. Him. 361, t. 89, f. 2 (1839).
*Cautleya lutea* (Royle) Hook. f. in Bot. Mag. t. 6991 (1888)
Type of: *Cautleya* Hook. f. in Bot. Mag. t. 6991 (1888).; O. G. Peters. in Engl. & Prantl, Pflanzenfam. 2, 6: 18 (1889); K. Schum., Pflanzenr. 122, f. 17 A–D (1904).

The genus *Cautleya* is usually attributed to Royle, but he definitely abandoned the name, "on the advice of botanical friends" and placed the plant in *Roscoea.* J. D. Hooker is solely responsible for the generic status.

*Cautleya* is illustrated in fig. 15 by the Himalayan *C. spicata.* Its generic characters and relationship with *Roscoea* have been discussed above (No. 30).

**No. 45. Kaempferia scaposa** (Dalz.) Benth. in Gen. Pl. 3: 642 (1883); Baker in Hook. f., Fl. Brit. Ind. 6: 224 (1890); K. Schum., Pflanzenr. 72 (1904); Santapau in Rec. Bot. Surv. India. 16: 310 (1953).
Basionym: *Monolophus scaposus* Dalz. in Hook., J. Bot. & Kew Misc. 2: 143 (1850); Wight, Icon. 6: 20. t. 2030 (1853); Horan., Monogr. 22 (1862).
Type: "crescit in rivulorum ripis prov. Malvan; fl. Julio"; *Dalzell.*
Type of: *Kaempferia* sect. *Stachyanthesis* Benth. in Gen. Pl. 3: 642 (1883).
*Kaempferia* subgen. *Stachyanthesis* (Benth.) Baker in Hook. f., Fl. Brit. Ind. 6: 224 (1890).
Taxonomic synonym: *Hedychium scaposum* Nimmo in Graham, Cat. Pl. Bombay, 205 (1839); Wallich in Hook., J. Bot. & Kew Misc. 5: 375 (1853).
Type: "Southern Concan: marshy parts of Karlee plain and on the west border of Lanowlee grove", *Nimmo.*
Type of: *Hedychium* subgen. *Siphonium* Wall. in Hook., J. Bot. & Kew Misc. 5: 375 (1853).

There has for long been deep confusion in dealing with this plant. *Hedychium scaposum* Nimmo and *Monolophus scaposus* Dalz. have been treated as though they were nomenclatural synonyms and the name *Kaempferia scaposa* has been given the authority "(Nimmo) Benth." Dalzell's name was published without reference to Nimmo: it was Robert Wight who brought the names together, using *Monolophus scaposus* Dalz. but quoting *Hedychium scaposum* as a synonym. Bentham referred directly to Dalzell and also to Wight, who uses Dalzell's name. Clearly, then, this is the basionym of the combination. The type localities are sufficiently far apart to emphasise that the names are nomenclaturally independent whatever unpublished link there may have been.

A point to be noted is that in the rank of subgenus Wallich's epithet *Siphonium* has priority, although Bentham's *Stachyanthesis* is correct at sectional level.

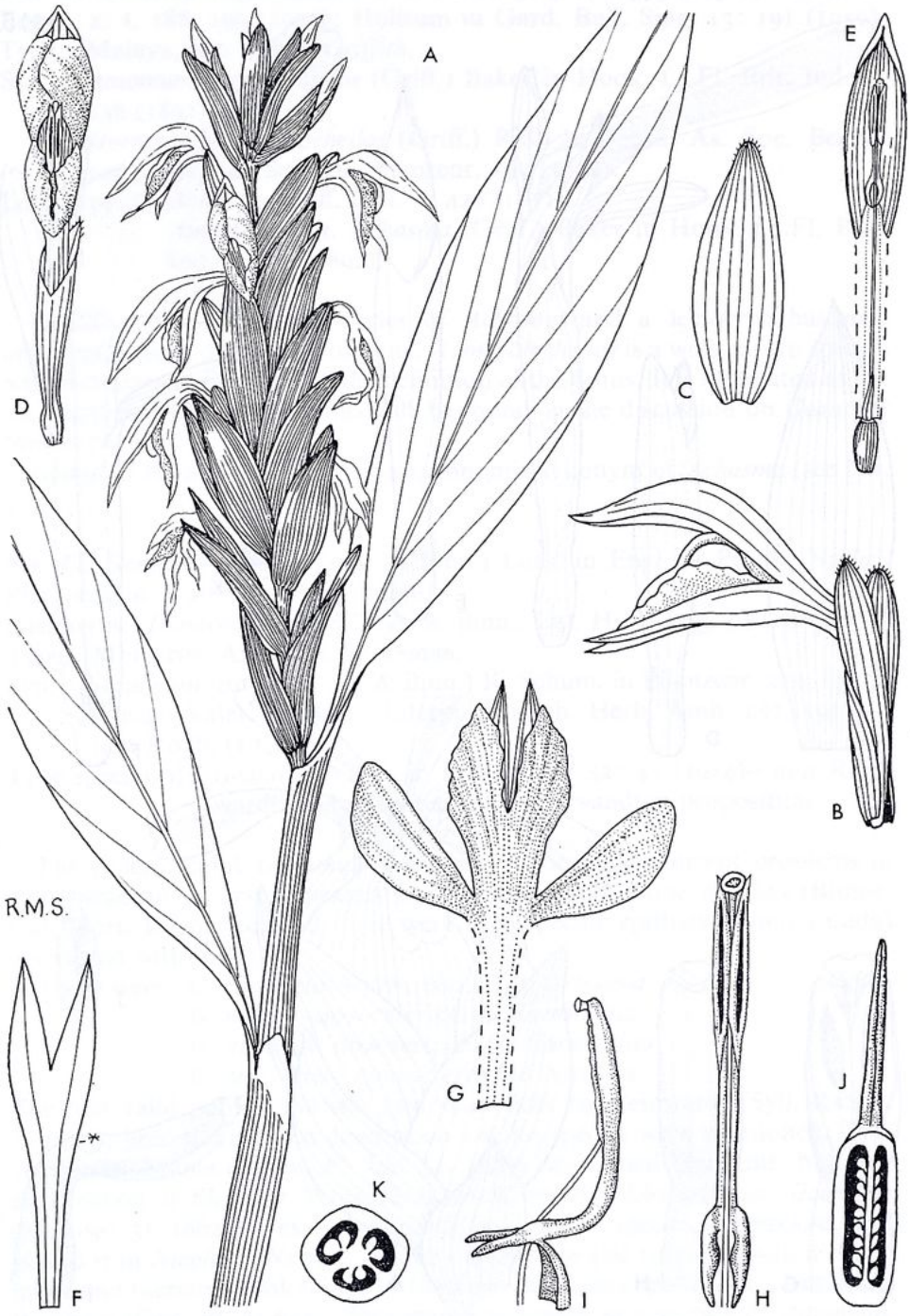


FIG. 15. *Cautleya spicata* (Sm.) Bak.: A, habit x $\frac{2}{3}$; B, flower with bract x 1; C, bract x 1; D, flower x 1; E, corolla in L.S. showing dorsal petal, anther and tube x 1; F, lateral petals,* indicating position of lateral staminodes x 1; G, labellum and lateral staminodes x 1; H, I, anther x 2; J, ovary in L.S. and epigynous glands x 4; K, ovary in T.S. x 4. (from living material, precise wild origin unknown, cult. R.B.G. Edinburgh, *C.* 2125).

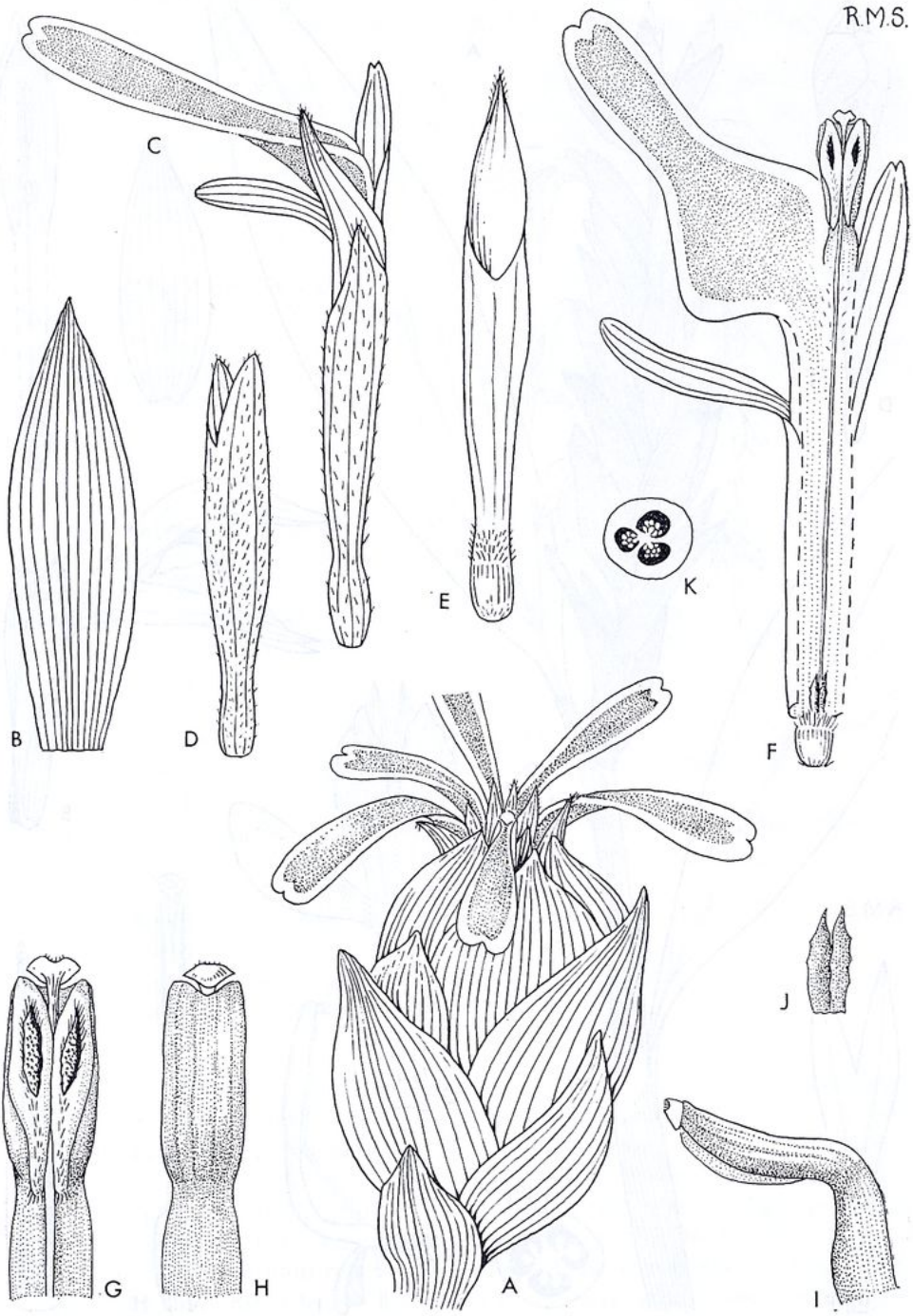


FIG. 16. *Achasma megalocheilos* Griff. (Malaya: Selangor, Ulu Gombak, *Burtt & Woods, B.* 1618): A, inflorescence x $\frac{2}{3}$; B, primary bract x 1; C, flower x 1; D, bracteole x 1; E, calyx x 1; F, flower, dissected x 1; G, H, I, anther x 2; J, epigynous glands x 2; K, ovary in T.S. x 2. (from spirit material).

**No. 46. Achasma megalocheilos** Griff., Not. 3: 426, t. 355 (1851); Valet., Ic. Bogor. 2: t. 188, 199 (1903); Holttum in Gard. Bull. Sing. 13: 191 (1950).
Type: Malaya, Mt. Ophir, *Griffith.*
Syn.: *Amomum megalocheilos* (Griff.) Baker in Hook. f., Fl. Brit. Ind. 6: 236 (1892).
*Hornstedtia megalocheilos* (Griff.) Ridl. in Journ. As. Soc. Bengal 146 (1899); K. Schum., Pflanzenr. 199 (1904).
Lectotype of: *Achasma* Griff. Not. 3: 426 (1851).
*Amomum* sect. *Achasma* (Griff.) Baker in Hook. f., Fl. Brit. Ind. 6: 234 (1892).

Griffith proposed three species of *Achasma* and a lectotype has not, apparently, been designated till now. *A. megalocheilos* is a well-known species whose characters fit well with the definition of the genus. It is illustrated at fig. 16. Further notes on the genus will be found in the discussion on *Geanthus* (under No. 47).

*Geanthus* Reinw. non Valet. is a taxonomic synonym of *Achasma* (see No. 47).

**No. 47. Geanthus roseus** (Teys. & Binn.) Loes. in Engl. & Prantl, Natürl. Pflanzenfam. 2 aufl. 15a: 593 (1930).
Basionym: *Donacodes roseus* Teys. & Binn., Cat. Hort. Bog. 58 (1866).
Type: Moluccas, Amboina, *Teysmann.*
Syn.: *Amomum roseum* (Teys. & Binn.) K. Schum. in Pflanzenr. 229, fig. 29 (1904); Valet. in Merr., Interpr. Rumph. Herb. Amb. 157 (1917)—non Roxb. (1798).
Type species of: *Geanthus* Valet. in Bot. Jahrb. 52: 43 (1914)—non Reinwardt (1825): nomen ad conservandum propositum.

The generic name *Geanthus* poses one of the major current problems in Zingiberaceae. It first appeared in print as a mere name in 1823 (Blume, Cat. Hort. Bogor. 29) and there were four specific epithets (nomina nuda) associated with it.

These were: *G. coccineus*—now referred to *Achasma.*
*G. minor*—now referred to *Hornstedtia.*
*G. pininga*—now referred to *Hornstedtia.*
*G. speciosus*—now referred to *Nicolaia.*

The first valid publication was two years later by Reinwardt (Syll. Ratisb. 5, 1825): here there was a description but no species were mentioned. Two years later Blume (Enum. Pl. Jav. 51, 1827) again used the name, but now as a section of *Elettaria.* When Horaninow retained *Elettaria* sect. *Geanthus* (Monogr. 31, 1862) he excluded one of the original species, *E. speciosa*, and placed it in *Nicolaia.* We take this as a deliberate and valid restriction of the name and therefore look to one of the three remaining species for a lectotype. Bentham (Gen. Pl. 3: 644, 1880) placed *Geanthus* as a section of *Amomum*, the only one of the original species that he mentioned by name was *Elettaria coccinea* Bl. However it must be deemed significant that he referred *Achasma* to sect. *Geanthus* but *Hornstedtia* to sect. [Eu] *Amomum.*

Reverting to Reinwardt's original publication, we find that there are two significant points. Firstly, he writes after the name "Amomi spec. Roxb."

Now this is clearly an error for "Alpiniae spec Roxb.", but allowing that, we find that the species meant are clearly *A. linguiformis* and *A. punicea*: both these are now referred to *Achasma*. Turning to Reinwardt's description he says that of the labellum that it is *oblongum cucullatum integrum*. The labellum of *Hornstedtia pininga* is shown in fig. 7 and that of *H. minor* is similar. They do not fit Reinwardt's description. That of *Achasma* (fig. 16) is much more appropriate. Furthermore, Reinwardt says the anther is *emarginate, nude*. In *Achasma* this is true (fig. 16): in *Hornstedtia* there is a small entire crest (fig. 7). There are good reasons for taking *Elettaria coccinea* Bl. as lectotype of *Geanthus* Reinw. (see above No. 38). Up to this stage the name *Geanthus*, at whatever rank it was used, may properly be linked to Reinwardt's genus.

When K. Schumann gave a world-wide revision of Zingiberaceae we again find "*Amomum* sect. *Geanthus*" (p. 223). But the position has now changed: *Nicolaia* (as *Phaeomeria*) and *Hornstedtia* (incl. *Achasma*) are recognised as separate genera and the original four species of *Geanthus* are correctly referred to one or the other. *Amomum* sect. *Geanthus* K. Schum. excludes all the original species and is simply a later homonym of *Amomum* sect. *Geanthus* (Reinw.) Benth. The only continuity between Schumann's section and Reinwardt's genus is structural: the name is still applied to species that lack an anther-appendage.

The next author to pay attention to this group was T. Valeton (in Bot. Jahrb. 52: 43–44, 1914). He states quite clearly that all the original species of Reinwardt and Blume are now excluded, but he precisely reconstitutes a genus *Geanthus*, giving a good and complete latin diagnosis. Into this he introduces a new character: the basal parts of the labellum and filament are fused to form an internal tube. The only species he mentions here is in describing the fruit "in *Geantho roseo* Val. (= *Amomum truncatum* Gagnep.)". Writing almost at the same time he has (Nova Guinea 8 pt. 2, 930, 1913) under the heading *Geanthus* Reinw. "Typus *Elettaria rosea* T. & B." It is quite clear that, nomenclaturally, he is writing about a genus *Geanthus* Valeton—non Reinw. (cf. Art. 48). There is no reason not to take the species he indicates, *Elettaria rosea*, as its type.

*Geanthus* in Valeton's sense was retained by Loesener (Pflanzenfam. 2 Aufl. 15a: 591, 1930), and many specific transfers were made. Some 42 binomials are now available in the genus in this sense and many of the species concerned have no names in any other.

Although *Geanthus* has been extracted historically from *Amomum*, Valeton has shown very convincingly that it is not in this separation that the taxonomic difficulty lies. The three genera that are very closely related are *Geanthus*, *Nicolaia* and *Achasma*. Valeton also points out that *Geanthus* is the one that shows greatest diversity, both *Nicolaia* and *Achasma* representing more restricted groups, possibly derived from *Geanthus*. Of these three names *Achasma* (see No. 46) is the oldest, followed by *Nicolaia* (see No. 33) leaving "*Geanthus* Valet." as the youngest. It would however be quite wrong to try to prejudge the issue whether these genera are to be retained or united. Much more botanical study is needed and the difficulty of obtaining material will make this work slow. The interim period must be covered and work should be enabled to proceed under some legitimate form of nomenclature. The best way to ensure this is to conserve *Geanthus* Valet. against *Geanthus* Reinw. and this is therefore being proposed.

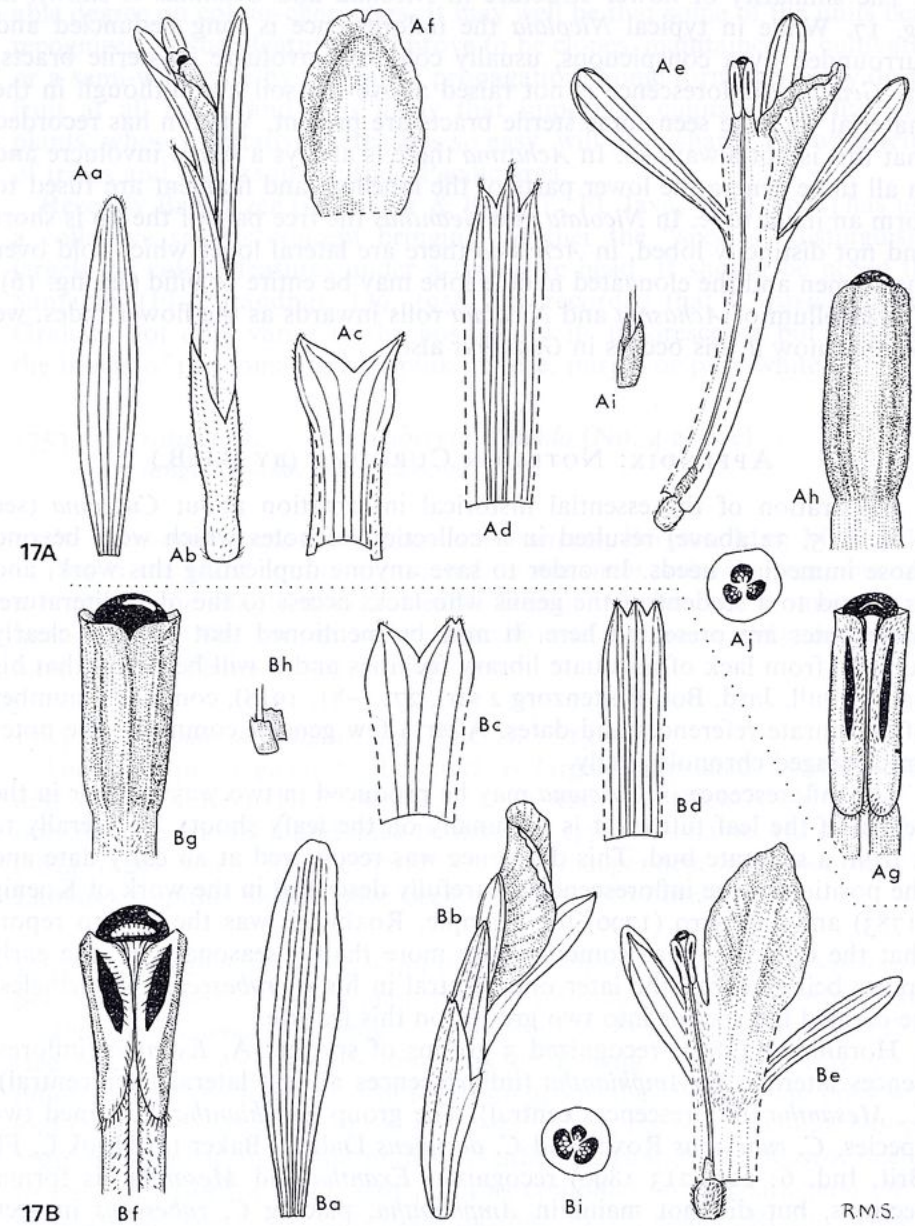


FIG. 17A. *Geanthus pubescens* Burtt & Smith (Sarawak: Fifth Division, route from Bakelalan to Gunong Murud, *Burtt & Martin*, *B.* 5366): Aa, primary bract x 1; Ab, flower with bracteole x 1; Ac, bracteole spread out x 1; Ad, calyx spread out x 1; Ae, flower, dissected x 1; Af, labellum x 1; Ag, Ah, anther x 3; Ai, epigynous glands x 2; Aj, ovary in T.S. x 3. (from spirit material).

FIG. 17B. *Nicolaia elatior* Jack (Sarawak: Third Division, S Melinau, *Burtt & Martin*, *B.* 5141): Ba, primary bract x 1; Bb, flower with bracteole x 1; Bc, bracteole spread out x 1; Bd, calyx spread out x 1; Be, corolla, dissected x 1; Bf, Bg, anther x 3; Bh, epigynous glands x 2; Bi, ovary in T.S. x 2. (from spirit material).

The similarity of flower structure in *Nicolaia* and *Geanthus* is shown in fig. 17. While in typical *Nicolaia* the inflorescence is long peduncled and surrounded by a conspicuous, usually coloured involucre of sterile bracts, the *Geanthus* inflorescence is not raised above the soil and although in the material we have seen some sterile bracts are present, Valeton has recorded that this is not always so. In *Achasma* there is always a sterile involucre and in all three genera the lower parts of the labellum and filament are fused to form an inner tube. In *Nicolaia* and *Geanthus* the free part of the lip is short and not distinctly lobed, in *Achasma* there are lateral lobes which fold over the stamen and the elongated middle lobe may be entire or bifid (see fig. 16). The labellum of *Achasma* and *Nicolaia* rolls inwards as the flower fades, we do not know if this occurs in *Geanthus* also.

## Appendix: Notes on Curcuma (by B.L.B.)

Preparation of the essential historical information about *Curcuma* (see Nos. 4, 5, 32 above) resulted in a collection of notes which went beyond those immediate needs. In order to save anyone duplicating this work, and as an aid to a student of the genus who lacks access to the older literature, these notes are presented here. It may be mentioned that Valeton clearly suffered from lack of adequate library facilities and it will be found that his paper (Bull. Jard. Bot. Buitenzorg 2 ser., 27: 1–81, 1918), contains a number of inaccurate references and dates. After a few general comments the notes are arranged chronologically.

The inflorescence in *Curcuma* may be produced in two ways: either in the centre of the leaf tuft (that is terminally on the leafy shoot), or laterally to it from a separate bud. This difference was recognized at an early date and the position of the inflorescence is carefully described in the work of Koenig (1783) and Loureiro (1790) for example. Roxburgh was the first to report that the difference was sometimes no more than a seasonal one, the early spikes being lateral, the later ones central in his *C. rubescens*. Nevertheless he divided the species into two groups on this feature.

Horaninow (1862) recognized 3 groups of species: A, *Exantha* (inflorescences lateral); B, *Amphiantha* (inflorescences at first lateral later central); C, *Mesantha* (inflorescences central). The group *Amphiantha* contained two species, *C. rubescens* Roxb. and *C. decipiens* Dalzell. Baker (in Hook.f., Fl. Brit. Ind. 6: 209, 213 1890) recognized *Exantha* and *Mesantha* as formal sections, but did not maintain *Amphiantha*, placing *C. rubescens* in sect. *Exantha* and *C. decipiens* in sect. *Mesantha*. More recently Santapau has given data showing that *C. pseudomontana* Graham and *C. inodora* Blatter can also produce both early lateral and late central inflorescences (Journ. Bombay Nat. Hist. Soc. 45, 618–624 (1945) & 51: 135–139 (1952), & Fl. Purandhar, 128–129, 1958).

At present it is probably more practical to key out these *Amphiantha*-type species under both *Mesantha* and *Exantha*, rather than to have an independent group which can only be recognized by round-the-season observation. It is clear that further observations of seasonal behaviour in other species are needed.

Three of the botanists who have studied *Curcuma* most closely, Roxburgh,

Roscoe, Valeton, admit that the recognition of species depends to a considerable degree on colour-characters. It may well be that some of the units being recognized by such features will prove to be clones, maintained in cultivation or a semi-wild state by vegetative propagation. Some forms certainly do not fruit at all freely and it is likely that important culinary and medicinal plants, whose vegetative increase is so easy, will have shared the wanderings of tribes and traders in the Indo-Pacific area.

Recently Bakhuizen (in Backer & Bakh. f., Fl. Java, 3: 69, 1968) has used a collective species concept bringing together the "species" distinguished largely by colour features under a collective head. It should be noted that Santapau (Fl. Purandhar, 129, 1958) has recorded that *C. pseudomontana* Graham not only varies in the position of its inflorescence but may have the bracts of the coma "green, pink or rose, purple or pure white".

1753 *C. rotunda* L. = *Boesenbergia rotunda* (No. 4 above)
*C. longa* L.—see No. 5 above

1778 *Amomum scapo nudo, spica laxa truncata*, Bergius, Mat. Med. 4

This is the plant commonly quoted as *Amomum zedoaria* Berg., but such a binary name simply does not exist. Herein lies the root of much of the later trouble. The earliest valid publication of *Amomum zedoaria* seems to have been by Plenck (1789—see below).

1783 *Amomum latifolium* Lam., Encycl. 1: 134.

The description given by Lamarck is largely translated from Rheede's description of Kua (Hort. Malab. 11: 13, tab. 7), which is quoted as the only definite synonym and must be taken to typify the name. Up to the time (1824–1829) when Roscoe published an independent *Curcuma latifolia*, Lamarck's epithet should have been transferred to *Curcuma*.

1783 *C. longa* auct.; Koenig, non Linn.? The type of *C. domestica* Val. (1918). See No. 28 above. This is a plant with central inflorescence and white coma.

*Amomum zerumbeth* Koenig (—non Linn.) = *Erndlia subpersonata* Giseke (see No. 17 above). This is described by Koenig as a plant with central inflorescence; the lowermost bracts were green, the intermediate ones white and the uppermost purplish rose; flowers yellow; the leaves had an elongate red-purple patch along the midrib. Neither Roxburgh nor Roscoe seemed to have described a plant with just this combination of characters. Of the early-known species it is perhaps nearest to *C. amada* Roxb., while in Valeton's account it is close to *C. euchroma* Val. *Erndlia subpersonata* will, if it can be satisfactorily identified, provide the earliest epithet for a species with central inflorescence.

1789 *Amomum zedoaria* Plenck, Ic. Pl. Med. 2: 12, t. 111.

There is a brief descriptive phrase and an illustration, which is copied from that of Kua in Rheede's Hortus Malabaricus (11, tab. 7). *Amomum zedoaria* was validly published for the first time by Plenck, but since Rheede's Kua already typified *Amomum latifolium* Lam., *A. zedoaria* must be judged illegitimate under our retroactive Code.

1790 Loureiro, Flora cochinchinensis, 8.

Loureiro described two species of true *Curcuma*; for one he used the name *C. longa* L., the other was new, *C. pallida* Lour. Both these had a lateral inflorescence (*scapus externus*). *C. pallida* had the bracts of the coma reddish. Merrill (Comm. Lour. Fl. Coch. 119, 1935) identified *C. pallida* Lour. as "C. zedoaria (Berg.) Rosc.". If that determination is confirmed, then *C. pallida* will be the earliest available name for Kua of Rheede (= *Amomum latifolium* Lam., *A. zedoaria* Plenck, *Curcuma zedoaria* Roscoe). *C. longa* sens. Loureiro is quoted with a query by Valeton under his *C. domestica*; when doing so he must have momentarily forgotten that it is described with a lateral scape. Valeton regarded this character as a primary one.

1797 Willdenow, Species Plantarum, 1: 7.

*Amomum zedoaria* is often attributed to Willdenow. His use of the name was based on the nomenclaturally non-existent *A. zedoaria* Berg. (see above); as a new name it was illegitimate as a homonym of *A. zedoaria* Plenck and because it included *A. latifolium* Lam.

1802 *Curcuma montana* Roxb., Pl. Coast Corom. 2: 28, t. 151.

This was a clearly described and figured new species: central inflorescence, with white bracts, the coma tinged pink.

1807 *Curcuma aromatica* Salisb., Parad. Lond. in t. 96.

Described from a cultivated plant which had lateral inflorescence and pink coma.

1807 *Curcuma zedoaria* Roscoe in Trans. Linn. Soc. 8: 354. This name cannot be regarded as a new combination based on the cited *Amomum zedoaria* Willd., because that name is illegitimate. *C. zedoaria* Roscoe is still illegitimate if treated as a new name, since the citation of *A. zedoaria* Willd. must be assumed to cover the whole content of that name, including *A. latifolium* Lam. Roscoe should have adopted this epithet.

The above notes take us to the publication of Roxburgh's first major paper (Asiatic Res. 11: 329–342, 1810) and are easily summarized. To this date the only epithets legitimate in *Curcuma*, or now available for transfer to it, were:

*C. longa* L.—nomen dubium.
*C. rotunda* L. = *Boesenbergia rotunda*.
*C. pallida* Lour.—lateral inflorescence.
*C.* (*Erndlia subpersonata* Giseke)—central inflorescence.
*C. montana* Roxb.—central inflorescence.
*C. aromatica* Salisb.—lateral inflorescence.

Finally it may be noted that the plant cultivated as turmeric in tropical Africa is a species with a lateral inflorescence, whereas Valeton established that the common turmeric of Ceylon, Malaya and Java was a species, *C. domestica* Val., with a central spike. Hermann's original figure of *C. longa* (Hort. Acad. Lugd. Bot. 208, f. 209: 1787) had a lateral inflorescence, but that does not necessarily mean that the African plants are correctly called *C. longa*. For the moment it is, perhaps, best to be cautious. The following references may be useful: *C. longa* auctt. (Linn.?); Hutch & Dalz., Fl. W.

Trop. Afr. 2: 334 (1936); Koechlin in Fl. Gabon (ed Aubréville), 9: 19 (1964) et Fl. Cameroun (ed. Aubréville), 4: 22 (1965). Inflorescence lateral: bracts greenish white, recurved at tips.

## Index of names of genera, subgenera and sections

(The references are to the number of the species under which there is information on typification.)