ADDITIONAL NOTES ON ALPINIA SECT. MYRIOCRATER

R. M. SMITH

ABSTRACT. *Alpinia* sect. *Myriocrater* (Zingiberaceae), which occurs in SE Asia and Oceania, is reviewed in the light of recently examined material. The need for careful field observations is discussed and special reference made to the now extended distribution of the section. A new key, in which a total of 22 taxa are dealt with, is provided. Three new species are described: *A. edanoi* R. M. Smith (Philippines), *A. regia* R. M. Smith (Moluccas) and *A. biakensis* R. M. Smith (W Irian). Eight others, possibly new but lacking adequate material, are discussed in the enumeration. *A. myriocratera* K. Schum. is placed in synonomy under *A. gigantea* Bl.

INTRODUCTION

In a previous paper on *Alpinia* sect. *Myriocrater* K. Schum. (Burtt & Smith in Notes R.B.G. Edinb. 32:29–43, 1972) ten species were recognised, six of them described as new. Since then a considerable amount of additional material, much of it from Lae (LAE), most of the remainder from the Rijksherbarium, Leiden (L), has become available for study. There are eleven possible new species among these new collections but, because of inadequate material, only three are formally described in this paper. None of the specimens examined alters the circumscription of sect. *Myriocrater*. All exhibit the characteristic monoecism of the section; that is, fruit is produced only by the first, or very rarely, the second flower of the cincinnus. The remainder of the flowers are functionally male, the ovary is completely aborted and the style reduced in length to a few millimetres, often barely exceeding the epigynous glands. Completely male inflorescences may perhaps be produced (*l.c.* 31).

Study of this additional material emphasises that elucidation of these plants must start in the field. Functionally female flowers (the first flower of the cincinnus) are rarely found in herbarium material. This suggests that, in many cases, fruit has formed, and probably fallen, from the first flower before the remainder of the cincinnus develops to any extent. This is borne out by the type collection of *A. gigantea*, material of *A. regia* and *A.* aff. *novae-hiberniae* (no. 9). In all three young, as well as mature, inflorescences have been collected and the young spikes have a very different appearance to those in the later stages of development. This is discussed more fully under *A. regia*. The time lapse between stages may be 'seasonal', and only the field worker can help to elucidate this. Unless the collector studies populations, he may easily fail to realise that he is dealing with two flower types.

The actual collecting of these plants demands special care, as flowers readily become detached and lost. The only safe method is the removal of some flowers and fruits for separate drying inside small envelopes which should be annotated to indicate from which part of a cincinnus the material has come. Good spirit material, such as was made available after the Royal Society Expedition to the Solomons in 1965, represents the ideal, for it was

this material which made the presence of two flower types, and their position within the cincinnus, immediately apparent.

Collection from the leaf frond also presents special problems. Leaf blades of over 2 m in length are known in sect. *Myriocrater* and while to collect the entire frond is obviously impracticable, notes on the constancy of petiole length and careful preservation of ligule, base and apex of lamina, must be made.

Characters

Sect. *Myriocrater* is readily sub-divided into 2 groups: plants in which the cincinni arise all around the axis, and those in which they are produced unilaterally. Beyond this, consistently reliable characters are at a premium.

Leaf indumentum is often variable; in *A. monopleura* (as here defined), the lamina may be quite glabrous, except for the margins, or sparsely pubescent on the lower surface. Similar variation occurs in *A. novae-hiberniae*. In *A.* aff. *novae-hiberniae* (no. 11) and *A.* aff. *monopleura*, the indumentum is denser and conspicuous. Petiole length has been used in the key to some extent, but as many herbarium specimens have but one or two individual leaves, it has rarely been possible to measure a wide range.

Length of cincinnus stalk is a useful character, but not always consistent throughout an inflorescence. However, in *A. conferta*, *A. vulcanica*, *A. edanoi* and *A. unilateralis* the cincinni are more or less sessile; in *A. monopleura*, *A.* aff. *monopleura* and *A. laxisecunda* at least some of the stalks exceed 2 cm. Primary bracts are, in most cases, barely visible, but those of *A. unilateralis*, which are usually 1–4 cm long and more or less persistent, usefully distinguish that species. The bracteoles* have two distinct shapes; for example, in *A. salamonensis* and *A. novae-hiberniae*, they are infundibuliform; more commonly they are cupular, although within a single gathering the shape may vary, but with one kind always predominating. There is often a tendency for the first bracteole of the cincinnus to be funnel-shaped. This can be seen in the young inflorescence of *A. gigantea:* as the inflorescence develops these bracteoles broaden and the succeeding ones are distinctly cup-shaped.

Examination of the flowers has been largely confined to male flowers (often at a very young stage) and, beyond showing that monoecism is consistent throughout the section, no important differences have been observed. Good material may indicate otherwise. Flower colour is usually greenish-white, with the exception of the salmon-bronze or red flowers found in A. *aenea* and *A.* aff. *aenea* (no. 21).

Collector's notes on fruit colour cannot always be relied on because the capsules of *Alpinia* may ripen extremely slowly and are, one suspects, often collected green even though they will eventually turn orange, red or black. Capsule shape, on the other hand, is important. In *A. monopleura* and *A. aenea* it is globose, in *A.* aff. *novae-hiberniae* (no. 11) rather ovoid, while in *A. unilateralis* and *A.* aff. *aenea* (no. 22) it is cylindrical. But all too often fruit has not been collected.

* The convenient and widely used term 'bracteole' is used throughout to refer to all bracts arising on the cincinnus.

Distribution

Hitherto, sect. *Myriocrater* has been recorded from Celebes, Ternate (Moluccas), New Ireland and the Solomons. The known range is now considerably extended (see fig. 1). In the west it is bounded by Wallace's Line as originally drawn by T. H. Huxley. That is to say the range of the section stops short of the Sunda shelf. It is widely distributed in the archipelago east of Wallace's line, from the Philippines south to Sumbawa and across to the Moluccas and Ceram, but eastward its range is bounded by another recognised line, Lyddekker's line, which is in fact the edge of the Sahul shelf on which New Guinea stands. The distribution of sect. *Myriocrater* completely misses the New Guinea mainland but continues east along the islands of the Old Melanesian Foreland through the Bismarck Archipelago to the Solomon Islands. The species with cylindrical inflorescences are less numerous than those with unilateral ones, and the latter alone are found in the Philippines. With that exception, however, both types are found across the whole range of the section.

The area between the Sahul and Sunda shelves is commonly recognised as an area of transition between the faunas and floras of Australasia and Malesia. *Alpinia* sect. *Myriocrater* is, however, by no means a transitional group and its added extension on the islands North of New Guinea suggests that it is an old SW Pacific entity.

Key to the species of sect. Myriocrater

The following key, although based on that given in the previous paper, is augmented to include all species believed to be new. It is less than satisfactory in many places but will perhaps provide, however imperfectly, a guide to the identification of these plants.

In the succeeding enumeration only the new species are discussed. Those dealt with in 1972 are merely listed, together with reference to the earlier work, and additional material cited without comment unless new observations have been made. The section is divided here into two informal groups: "Inflorescence unilateral", corresponding to the no longer recognised sect. *Monopleura*; and "Inflorescence cylindrical".

1a Cincinni borne on one side of axis 2
1b Cincinni borne all around axis 16
2a Cincinni with stalks (at least some of them) 2 cm or more long, cincinni well-spaced, or dense only at the top of the inflorescence; axis glabrous 3
2b Cincinni sessile, subsessile or stalks rarely more than 1 cm (if up to 1·5 cm then axis pubescent) 6
3a Leaves narrowly lanceolate, under 4 cm wide × 50 cm long, conspicuously pubescent below . . . 2. *A.* aff. *monopleura*
3b Leaves never narrowly lanceolate, at least 14 cm wide (leaf size not known in *A. celebica*), usually much more, if pubescent below then sparsely so 4
4a Leaves sessile or very shortly petiolate; cincinni becoming dense towards top of inflorescence . . . . 3. *A. celebica*
4b Leaves distinctly petiolate; cincinni not noticeably denser towards top of inflorescence 5

5a Cincinni arising 2–3 at more or less the same level; petiole up to 3 cm long; leaves often with sparse pubescence below . 1. *A. monopleura*

5b Cincinni arising 4 at more or less the same level; petiole up to 6 cm long; leaves glabrous . . . . . 4. *A. laxisecunda*

6a Primary bracts lanceolate, occasionally, up to 9 cm long (more usually 2–4 cm); bracteoles densely pubescent; cincinni dense . 5. *A. unilateralis*

6b Primary bracts minute, often not apparent; bracteoles pubescent or glabrous; cincinni dense or not 7

7a Main axis quite glabrous; leaves distinctly petiolate . . 8

7b Main axis pubescent; leaves petiolate or not . . . 10

8a Leaves up to 1 m × 25 cm; ligule pubescent . 7. *A. edanoi*

8b Leaves up to 60 × 20 cm; ligule glabrous 9

9a Cincinni arising up to 2·5 cm apart . . . 6. *A. vulcanica*

9b Cincinni not usually more than 0·5 cm apart . . . 9. *A.* aff. *novae-hiberniae*

10a Bracteoles funnel-shaped, i.e. longer than their width at the top . 11

10b Bracteoles cup-shaped, i.e. shorter than their width at the top . 14

11a Leaves sessile or subsessile, glabrous below or with some pubescence on the midrib 12

11b Leaves petiolate, pubescent below 13

12a Cincinni arising 3–4 at more or less the same level; inflorescence robust; leaves up to 1 m × 20 cm . 8. *A. novae-hiberniae*

12b Cincinni arising in pairs; inflorescence comparatively slender; leaves up to 60 × 12 cm . . . 10. *A.* aff. *novae-hiberniae*

13a Leaves densely pubescent below; petioles to 5 cm . . . 11. *A.* aff. *novae-hiberniae*

13b Leaves lightly pubescent below; petioles under 2 cm . 12. *A. regia*

14a Leaves pubescent below, sessile . . . 15. *A.* aff. *biakensis*

14b Leaves glabrous below, distinctly petiolate 15

15a Leaves up to 1 m × 20 cm; flowering part of inflorescence to at least 60 cm long . . . . . 14. *A. biakensis*

15b Leaves up to 65 × 10 cm; flowering part of inflorescence under 15 cm long . . . . . 13. *A. eremochlamys*

16a Bracteoles 2·5–3·5 cm long, funnel-shaped, conspicuously pubescent throughout 17

16b Bracteoles not exceeding 2 cm in length, predominately cup-shaped but appearing funnel-shaped in young inflorescence, more or less glabrous or pubescent at base only . . . 18

17a Cincinni sessile, very dense, leaves glabrous . . 16. *A. conferta*

17b Cincinni stalked, laxly arranged, leaves with some pubescence below . . . . . 18. *A. salamonensis*

18a Cincinni sessile 19

18b Cincinni stalked 21

19a Leaves and inflorescence quite glabrous . 17. *A.* aff. *conferta*

19b Leaves and inflorescence with some pubescence . . . 20

20a Fruit elongate, 2 × 1 cm; bracteoles pubescent at base . . 22. *A.* aff. *aenea*
20b Fruit spherical; bracteoles glabrous . . . 21. *A.* aff. *aenea*
21a Flowers bronze, cream and pink; fruit spherical . 20. *A. aenea*
21b Flowers green; fruit oval . . . . . 19. *A. gigantea*

INFLORESCENCE UNILATERAL

1. Alpinia monopleura K. Schum. in Pflanzenr. Zing. 361 (1904); Burtt & Smith in Notes R.B.G. Edinb. 32:39 (1972).
Type. Celebes, *Sarasin* 219 (n.v.).
Syn.: *Alpinia monopleura* var. *minor* K. Schum. in Pflanzenr. Zing. 362 (1904); Burtt & Smith in Notes R.B.G. Edinb. 32:39 (1972).
MOLUCCAS: Ceram, s.l., 1859–1860, *Teysmann* (L); Oeloe Wai Koea, 26 viii 1917, *Kornassi* 40 (L); Honitetoe Biv. Meoete, 29–30 xi 1938, *Eyma* 2697 (L).
CELEBES: s.l., 1859–1860, *Teysmann* (L).

The Teysmann material from Celebes was cited by K. Schumann under var. *minor*; its dimensions are not conspicuously less than those given for the species. No pubescence is present on the leaves and for this reason Valeton, who annotated the sheet, considered it to be nearer *A. gigantea* Bl. but in that species the cincinni arise all around the main axis. The Ceram plants also lack leaf pubescence (save for the margins) but otherwise do not differ from Schumann's description.

2. A. aff. **monopleura**
CELEBES. Mengkoka, Baũla, 0–150 m, 26 ix 1909, *Elbert* 3194 (L).

No fruit remains on this specimen and only small buds (which are functionally male) are to be found at the top of the cincinni. The distinctly stalked cincinni, cupular bracteoles and entirely glabrous inflorescence are as in *A. monopleura*, although the spike is much less robust than in that species. Vegetatively, this plant is quite distinct; it has shortly petiolate unusually narrow leaves up to (probably) 50 cm long and under 4 cm wide. The undersurface of the lamina is sparsely but distinctly strigose, with more or less glabrous margins.

3. A. celebica K. Schum. in Pflanzenr. Zing. 362 (1904); Burtt & Smith in Notes R.B.G. Edinb. 32:40 (1972).
Type. Celebes: Gorontalo, *Riedel* s.n. (n.v.).

4. A. laxisecunda Burtt & Smith in Notes R.B.G. Edinb. 32:39, fig. 1B (1972).
Type. British Solomon Islands Protectorate: San Cristobal, 3 viii 1965, Royal Society Expedition, *Sore* 2316 (K, E).

5. A. unilateralis Burtt & Smith in Notes R.B.G. Edinb. 32:37, fig. 1A (1972).
Type. British Solomon Islands Protectorate: Guadalcanal, 24 x 1965, Royal Society Expedition, *Corner* 106 (K, E).

6. A. vulcanica Elm. in Leafl. Philipp. Bot. 8:2971 (1919); Smith in Notes R.B.G. Edinb. 34:180 (1975).
Type. Philippines: Luzon, Irosin (Mt Bulusan), v 1916, *Elmer* 16168 (n.v.).
PHILIPPINE ISLANDS. Bucas Grande, vi 1919, *Ramos & Pascasio* 35051 (K).

The above collection was verified by Merrill (Enum. Phil. Pl. 1:234, 1922). Elmer placed *A. vulcanica* in sect. *Eubractea* but the species quite clearly belongs to sect. *Myriocrater*. The original description makes reference to a 'dwarfed' ovary and 'style only a few mm long'; apparently no functionally female flowers or fruit remained on the type collection, neither are there any on the Kew sheet.

A. vulcanica has petiolate leaves c. 60 × 8 cm, lightly pubescent in the margins below. The inflorescence, which may be branched at the base, bears more or less sessile cincinni which usually arise in well spaced (up to 2.5 cm apart) groups of 2 or 3 on the main axis. The bracteoles are cupular rather than infundibuliform and the male flowers examined show the crestless anthers to be pubescent at apex and margins; a feature not observed in any other species of this section.

7. Alpinia edanoi R. M. Smith, **species nova** *A. eremochlamydi* cincinnis subsessilibus vel breviter pedicellatis dense congestis similis, **sed foliis** majoribus, ligula dense pubescente et rhachide glabra distincta.

Herba alta, robusta. *Folia* vagina breviter et parce (ad margines densius) pubescente; ligula 1–1·5 cm longa, integra, breviter et dense pubescens; petiolus 3–5 cm longus; lamina usque ad 120 × 25 cm, plus minusve glabra vel subtus ad margines pubescens, basi attenuata et inaequalis, apice breviter acuminata. *Inflorescentia* c. 50 cm longa, rhachide glabra basi c. 1 cm diametro; cincinni unilaterales, densi, inferiores pedunculis ad 4 mm longis, superiores subsessiles, 5–?-flori; bracteae primariae minimae, c. 1–2 mm longae, persistentes, interdum marginibus parce ciliatis; bracteolae (inferiores) 5 mm longae, ore c. 8 mm diametro, cupulares, plus minusve glabrae, truncatae, demum unilateraliter fissae. *Flores* e bracteola prima haud visa sed verosimiliter feminea, et flores intermedii etiam delapsi; alabastra superiora mascula. *Fructus* e bracteola prima globosus, c. 1·5 cm diametro, glaber, polyspermus.
PHILIPPINE ISLANDS: Negros, Mt Malbug, vi 1948, Phil. Nat. Herb., *Edaño* 7132 (holo. L); Mindoro, Mt Halcon, 1 xi 1948, Phil. Nat. Herb., *Edaño* 3345 (L).

It is appropriate to name this species after the late Gregorio Edaño, for many years chief plant collector for the Manila Science Bureau.

A. edanoi is the second species of sect. *Myriocrater* to be recorded from the Philippines. It is a much more robust plant than *A. vulcanica*, differing also in the densely congested cincinni and pubescent ligule. The dense inflorescence and short-stalked to sessile cincinni suggest a possible affinity with *A. eremochlamys* but that species is of much smaller stature and has a pubescent rhachis and glabrous ligule.

The Mindoro plant, which lacks fruit and from which all flowers, except small male buds, have fallen, shows what are probably minor differences from the type: the primary bracts are quite glabrous and the hair on the lamina margin is almost lacking.

8. A. novae-hiberniae Burtt & Smith in Notes R.B.G. Edinb. 32:38 (1972). Type. New Ireland, 14 ii 1970, *Sands* 857 (K, E).
NEW BRITAIN: Pomio subdistr., lower slopes of Mt Lulului, 5° 43′ S, 151° 02′ E, 8 m, flowers green, 6 v 1973, 1465 m, *Stevens & Lelean*, Lae 58284 (LAE, E); Hoskins subdistr., crater rim of North Son, 4° 56′ S, 151° 26′ E, 4 m, flowers green, fruit green, 900 m, 2 vi 1973, *Stevens & Lelean*, Lae 58504 (LAE, E); Talasea subdistr., Mt Tangis, 4° 40′ S, 148° 25′ E, 5 m high, fruit orange, 1100 m, 17 xi 1965, *Frodin* NGF 26301 (LAE).

The occurrence of this New Ireland species in neighbouring New Britain is not surprising. It is a large-leaved strong-growing plant characterised by the cincinni being closely arranged (but not concealing the main axis). The cincinnus stalks are usually under 1 cm, the bracteoles funnel shaped and the capsules globose. The leaves are subsessile or shortly petiolate and the lamina is pubescent on the margin below.

On the collection from Mt Tangis (*NGF* 26301), the cincinnus stalks are up to 1·5 cm long and the inflorescence more conspicuously pubescent. This plant was evidently in fruit for the note states 'fruit orange'; unfortunately no capsules remain on the herbarium material. The type of *A. novae-hiberniae* also lacks fruit.

9. A. aff. **novae-hiberniae**
BOUGAINVILLE: Bougainville distr., Lake Loloru, 6° 30′ S, 155° 38′ E, 2 m high, flowers green, 1600 m, 7 xi 1967, *Lavarack & Ridsdale* NGF 31317 (LAE); ibidem, *Lavarack & Ridsdale* NGF 31315 (LAE).

Although they appear distinct from each other, the above collections, which must have been growing in close proximity, are discussed together for they provide an indication of the variation which occurs within a population. *NGF* 31315 has a simple short glabrous inflorescence (flowering part up to c. 10 cm long) apparently composed of *singly borne* flowers with more or less sessile funnel-shaped bracteoles. On dissection these flowers, which are still in bud, are clearly female; the ovary is well-formed, with parietal placentation, the style held between the thecae and there is a distinct, entire crest. No sign of a cincinnus can be seen but the inflorescence is very young and it is reasonable to assume that one will eventually develop.

NGF 31317 has subsessile cincinni of at least 7 flowers: the thickened pedicels remain with the first bracteoles indicating that fruit has been formed. Buds from the top of the cincinni are male. The bracteoles are funnel-shaped and the inflorescence is very like *A. novae-hiberniae* in general facies but is quite glabrous. Both collections have petiolate, rather light green leaves.

It may be that here are two phases of the same species, *NGF* 31315 representing a plant at the beginning of its flowering, while *NGF* 31317 is the result of many months longer growth. A similar situation has been found in *A. regia* and *A. gigantea*.

10. A. aff. **novae-hiberniae**
NEW BRITAIN: Pomio subdistr., lower slopes of Mt Lulului, 5° 43′ S, 151° 02′ E, 3 m, flowers green, 1065 m, 5 v 1973, *Stevens & Lelean* Lae 58257 (LAE, E); Hoskins subdistr., Mount Lake Summit, 40° 50′ S, 151° 5′ E, 2 m high,

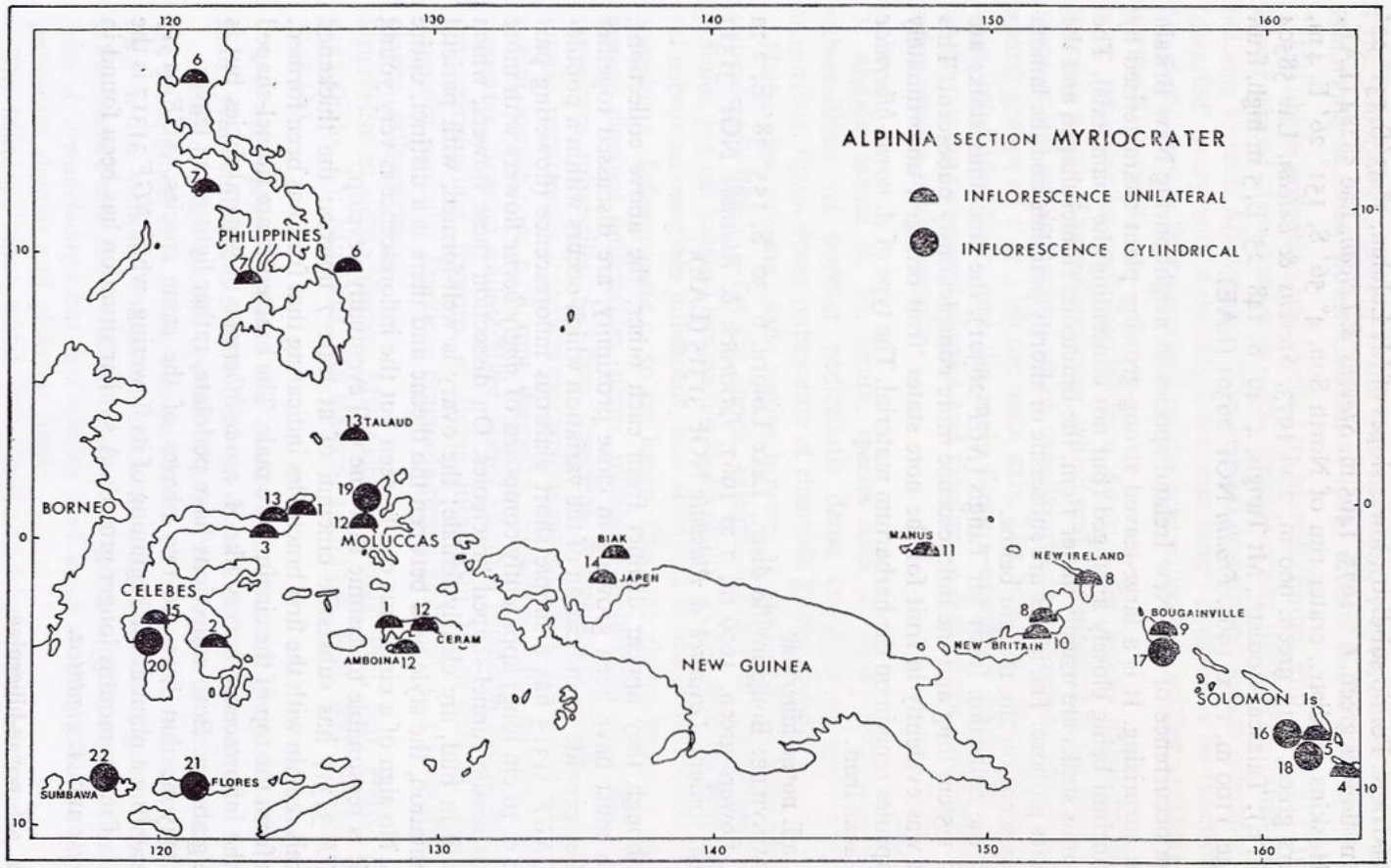

FIG. 1. Distribution of *Alpinia* sect. *Myriocrater*. Species 1–15 have unilateral inflorescences and are represented by half circles; species 16–22 have cylindrical inflorescences and are represented by full circles. The numbers correspond with those used in the enumeration.

flowers white, fruit green, 800 m, 4 vi 1973, *Croft & Katik* NGF 41481 (LAE, L, BRI, CANB, E). Arawe area, along river, 5 miles north of old site of Omoi, 6° 05′ S, 149° 05′ E, height 2 m, fruit yellow-green, 1·6 m, 30 iii 1968, *Frodin* NGF 26520 (LAE).

This is a much less robust plant than *A. novae-hiberniae*. Except for marginal hair and some midrib pubescence on *NGF* 58257 the leaves are quite glabrous and the sessile cincinni are well spaced on the pubescent rhachis. The bracteoles are usually funnel-shaped and therefore like *A. novae-hiberniae*, but our material of *Lae* 58257 has one inflorescence in which the bracteoles are much reduced in size and clearly cup-shaped. (The field note states 'all specimens from different plants'). The most mature fruits are those of *NGF* 26520, noted as yellow-green. They are more or less ovoid, up to 2·5 × 1·8 cm.

11. A. aff. **novae-hiberniae**

MANUS IS. Derimbat, 2° 10′ S, 147° E, 6 m, leaves dark green, densely pubescent beneath, flowers white, fruit green, 180 m, 2 vii 1973, *Foreman* Lae 52400 (LAE, E).

This strong-growing plant has funnel-shaped bracteoles similar to those of *A. novae-hiberniae*. It has, however, densely pubescent leaf undersurfaces and a similar pubescence clothes the rhachis and bracteoles. The leaves are petiolate (c. 6 cm) .The fruit is almost globose but slightly longer than broad and, as expected, formed by the first flower of the cincinnus. No female flowers remain and buds from the 4th or 5th flowers of the cincinnus are functionally male.

12. Alpinia regia R. M. Smith, **species nova** [*A. regia* K. Heyne, Nutt. Pl. Ned. Ind. 1:531 (1922)—nomen] *A. novae-hiberniae* bracteolis infundibuliformibus et inflorescentia unilaterali similis, sed foliis subtus pubescentibus et multo majoribus differt.

Herba ad 8 m alta. *Folia* vagina breviter pubescente; ligula c. 2 cm longa, integra, pubescens; lamina fortasse sessilis vel plus minusve alata (basibus fractis), usque ad 2·35 m × 0·45 m (fide collectoris), subtus pubescens praecipue in costa et ad margines, apice breviter acuminata. *Inflorescentia* verosimiliter basi ramis 2–3 robustis praedita; rhachis breviter pubescens; cincinni unilaterales in pedunculis ad 1·5 cm longis, fortasse 2–3 in gregem orientes, gregibus inter se c. 2–2·5 cm distantibus, 13-vel pluri-flori; bracteae primariae haudvisae; bracteolae primae 1·5 cm longae et ore 1 cm diametro infundibuliformes, plus minusve glabrae, demum unilateraliter fissae, superiores decrescentes et bicarinatae (inferiores haud carinatae). *Flores* e bracteola prima haud visa. *Flores masculi* breviter pedicellati; calyx I cm longus, glaber, obscure lobatus; corolla alba, tubo 1 cm longo, lobis c. 1 × 0.6 cm dorsali paulo latiore et breviter cucullato; labellum 2 × 0·8 cm, oblongum, verosimiliter inferne concavum, superne marginibus crispatis; staminodia lateralia c. 1 mm longa, truncata; filamentum 1 × 0.5 cm; anthera 0.6 cm connectivo in crista minuta 1 mm longa producto; glandulae epigynae c. 2–3 mm longae; stylo abortivo 1·5 cm longo.

MOLUCCAS. Ternate, 8 m high, 18 xii 1920, *Beguin* 1234 (holo. L).

The infundibuliform bracteoles and pubescent rhachis of *A. regia* indicate a close alliance with *A. novae-hiberniae* and it is difficult to distinguish the two satisfactorily, other than on size. Leaf blades measuring 1 m in length are commonplace in sect. *Myriocrater* but here we have a plant in which they may measure over 2 metres. This is according to the collector's note and a portion of such a blade is preserved. Unfortunately there are no undamaged leaf bases on the material and the description is therefore incomplete. Unlike *A. novae-hiberniae* the leaves are lightly pubescent over the entire lower surface. Only parts of the inflorescence are preserved (mostly in spirit at Leiden) but there is every indication that this is an outstandingly large species and Valeton's proposed epithet, found on the herbarium sheet (which was taken up by Heyne), seems particularly appropriate.

Tentatively placed with *A. regia* are the following collections:
MOLUCCAS. Ceram, Honitetoe-Wal Torba, 4 ii 1938, *Eyma* 2783 (L); AMBOINA: Hoetoemoeri rd, 6 m tall, fls white, "geloba gardamu", 250 m, 30 ix 1913, *Robinson* 141 (W); Soja, 8 m tall, 375 m, 24 x 1913, *Robinson* 143 (W).

The indumentum of leaf and rhachis on these plants is denser than that of *A. regia* and extends to at least the lower part of the bracteoles. The cincinni are smaller and more closely clustered together but much of the material is incomplete. In *Eyma* 2783 only part of what has clearly been a very large leaf is preserved; this collection also includes the base of an inflorescence showing 3 strong lateral branches arising from a c. 2 cm thick main axis. *Robinson* 141 consists of a fragment of inflorescence, probably from near the apex and a single leaf c. 1 m long. The other Amboina specimen, *Robinson* 143, is of great interest and underlines yet again the extent to which a young inflorescence may differ from a mature one. The rather slender, c. 40 cm long, pubescent spike bears fully developed female flowers and in some cases fruit is forming. Valeton (in Merrill, Interpretation of Rumphius Herbarium Amboinense, 153, 1917) called this a "pistillate" inflorescence, but dissection reveals that within each first bracteole there is a very young cincinnus. Even at this early stage 2 or 3 buds can be distinguished; as expected, these are male. Here then, is strong evidence to support the view that, in some cases at least, the cincinnus in sect. *Myriocrater* does not develop until fruit has been formed by the first flower.

13. A. eremochlamys K. Schum. in Pflanzenr. Zing. 362, f. 40, o (1904); Burtt & Smith in Notes R.B.G. Edinb. 32:37 (1972).
Syntypes: Celebes, *Sarasin* 412 (n.v.); Tondano, *Meyer* s.n. (n.v.).

The following is placed with *A. eremochlamys*: '*Alpinia pectinata*' Ridl.; Holth. in Blumea 5:168 (1942)—*nomen nudum*.
TALAUD IS. Karakelong, 25 iv 1926, inflorescence stiffly curved downwards, flowers white, fruit pink, *Lam* 2584 (L, K).

Holthuis comments, "These specimens (*Lam* 2808, n.v. and the above) were not seen by us. The identification was made at Buitenzorg but the name *A. pectinata* is not to be found in *Index Kewensis*. Yet the species is mentioned since it is one of the most frequent plants in secondary vegetation".

The island of Talaud lies midway between the Moluccas and the Philippines (fig. 1). *A. eremochlamys* was described from NE Celebes and '*A.*

pectinata' does not differ seriously from it. Small buds from the top of the cincinni show the typically male flowers of sect. *Myriocrater*.

14. Alpinia biakensis R. M. Smith, **species nova** *A. edanoi* inflorescentia unilaterali, bracteolis cupuliformibus et foliis (marginibus exceptis) glabris similis, sed rhachide pubescente, petiolis longioribus et valde alatis differt.

Herba ad 5 m alta. *Folia* vagina glabra vel ad margines leviter pubescente; ligula ad 2 cm, integra, dense pubescens; lamina verosimiliter ad 1 × 0·2 m, subtus marginibus pubescentibus, apice ignota, basi in petiolum alatum pubescentem ad 6 cm longum contracta. *Inflorescentia* usque ad 60 cm longa, ut videtur haud ramosa; rhachis breviter pubescens; cincinni unilaterales, in pedunculis pubescentibus ad 1 cm longis, 3 in grege orientes, gregibus inter se c. 1·5 cm distantibus, 6 -vel pluri-flori; bracteae primariae minutae vix 1 mm; bracteolae ad 1 cm longae, ore 1·5 cm diametro, cupulares, plerumque pilis parcis praeditae, demum unilateraliter fissae, ad apicem cincinni decrescentes et bicarinatae. *Flores* e bracteola prima haud visa. *Flores masculi* breviter pedicellati; calyx 6–8 mm longus, plus minusve glaber, obscure lobatus; corolla alba, tubo c. 6–8 mm, lobis lateralibus 6 × 4 mm oblongis, dorsali latiore et breviter cucullato; labellum viride, c. 1 × 0·5 cm, oblongum, concavum, apice crispato; staminodia lateralia carnosa, truncata, c. 1·5 mm longa; filamentum c. 6 × 2 mm; anthera 5 mm, connectivo in crista minuta prolongato; glandulae epigynae circum stylum abortivum brevissimum connatae. *Fructus* (e flore primo cincinni) plus minusve globosus c. 2 × 1·8 cm, subglaber.

W IRIAN. Biak Is: 4 m high, fls white, 50 m, 9 ix 1966, *Kostermans & Soegang* 882 (holo. L); *Kostermans & Soegang* 987 (L); 5 m high, fls white, lip light green, 60 m, 4 vii 1961, *Vink* 12056 (L, K). Japen Is: 22 ix 1939, L. J. van Dyk Ex., *Tdjan* 869 (L).

The islands of Biak & Japen lie just outside Geelvink Bay in W Irian and *A. biakensis* thus forms a link between species of sect. *Myriocrater* from Celebes and the Moluccas and those of Manus Is and the Bismarck Archipelago. It is a strong growing plant, with leaves up to 1 m long, characterised by c. 6 cm long, conspicuously winged, pubescent petioles. The pubescent inflorescence bears shortly stalked, well-spaced cincinni and the bracteoles are cup-shaped. Although lacking female flowers, the type material is much above average quality; fully opened male flowers are present and in most cases fruit has formed from the first flower of the cincinnus. *A. biakensis* is perhaps most closely allied to *A. edanoi* which it resembles in the unilateral inflorescence, shortish cincinnus stalks with cup-shaped bracteoles and distinctly petiolate leaves. In *A. edanoi*, however, the petioles are not winged and the inflorescence axis is glabrous.

15. A. aff. **biakensis**

CELEBES. Todjamboe, Palopo, c. 700 m, 21 vi 1937, *van Steenis* 10356 (L).

This may represent yet another new species. Only young buds remain on the material; the cincinni, which are rather densely borne on the pubescent rhachis, have cup-shaped bracteoles and are shortly stalked (to almost 1 cm). The leaves, however, are quite dissimilar to those of that species for they are sessile and pubescent on the lower leaf surface.

INFLORESCENCE CYLINDRICAL

16. A. conferta Burtt & Smith in Notes R.B.G. Edinb. 32:40 fig. 2A (1972).
Type. British Solomon Island Protectorate: Guadalcanal, 24 x 1965, Royal Society Expedition, *Corner* 107 (K, E).

17. A. aff. **conferta**
BOUGAINVILLE. Pavairi, 6° 15′ S, 15° 30′ E, 2 m high, flowers yellow green, 1000 m, 15 i 1967, *Ridsdale & Lavarack* NGF 30544 (LAE, L).

This plant resembles *A. conferta* in the entirely glabrous, sessile leaves and in the densely borne sessile cincinni. Here, however, the bracteoles are c. 1·5 cm long and more or less cup-shaped and the inflorescence glabrous. Only unopened male flowers remain at the top of the 3–4 (?)-flowered cincinni and fruit was not collected.

18. A. salamonensis Burtt & Smith in Notes R.B.G. Edinb. 32:41 fig. 2B (1972).
Type. British Solomon Island Protectorate: Guadalcanal, 30 x 1965, Royal Society Expedition, *Corner* 143 (K, E).

19. A. gigantea Bl., Enum. Pl. Java 59 (1827)—excl. Rumph. t. 62; Smith in Notes R.B.G. Edinb. 34:160, 180 (1975).
Type. Moluccas: Ternate, *Reinwardt* s.n. (L).
Syn.: *A. myriocratera* K. Schum. in Bot. Jahrb. 27:290 (1899) and Pflanzenr. Zing. 356 (1904). Type. Moluccas: Ternate, Aqui Cornora, xi 1874, *Beccari* (n.v.).
MOLUCCAS: Ternate, 6 m high, fls light green, fruit yellow-green, 1350 m, 9 iii 1921, *Beguin* 1489 (L); x 1874, *Moseley* s.n. (K).

Blume's incorrect inclusion of *Globba sylvestris major* (Rumphius, Herb. Amb. 6:140, t. 62) in his description of *A. gigantea* has been discussed in an earlier paper (Smith in Notes R.B.G. Edinb. 34:180, 1975) and reference made to Valeton's excellent account of the confusion (in Merrill, Interpretation of Rumphius Herbarium Amboinense, 154, 1917).

The type specimen of *A. gigantea* lacks foliage although the leaves are described, presumably from Reinwardt's observations. The sheet has been annotated by Valeton and has 2 separate inflorescences. One consists of more or less laxly arranged stalked cincinni, the lowermost flowers of which are lacking; Valeton noted that the remaining flowers were male. There is no fruit. The bracteoles are longer than wide at the base of the spike but become shorter and distinctly cup-shaped upwards. The other inflorescence is a 'young female infl.' (Valeton). Here, as has been observed in *A. regia*, the female flowers appear to be singly borne; but dissection reveals very young cincinni within the funnel-shaped bracteoles.

The Beguin collection was determined by Valeton as *A. gigantea*. The dried material is of foliage only; the inflorescence, which includes fruit, is preserved in spirit at Leiden. As expected, fruit arises from the first bracteole of the cincinnus and the remaining flowers are male. There are no single-flowered inflorescences. Blume's description states that the leaves are pubescent below; in Beguin's material pubescence is restricted to the margins. Although the type of *A. myriocratera* has not been seen, the Moseley collection cited above was verified by Schumann. The mature inflorescence matches that of the type of *A. gigantea* precisely and the leaves are entirely glabrous except for the margins.

20. A. aenea Burtt & Smith in Notes R.B.G. Edinb. 32:42 (1972).
Type. Celebes: Enrekang Distr., Latimojong Mts, 1500 m, 26 xi 1969, *Sands* 595 (K, E).

21. A. aff. **aenea**
LESSER SUNDAS. Flores, 7 iii 1965, *Verheijen* 2339 (L).

In cincinnus size and fruit shape, this collection resembles *A. aenea*. The cincinni are however subsessile, densely arranged towards the top of the inflorescence (as in *A. aenea*), and the rhachis pubescent. The colour of the flowers is not given. The leaves are pubescent on either side of the midrib below (rather more so than in *A. aenea*) and the ligule is densely pubescent.

A further collection from Flores [along rd Bea Laing-Rana nesse, 4 m, fls pink, 5 v 1965, *Kostermans & Wirawan* 784 (L)] has a much more pronounced ligule and sheath pubescence and a c. 28 × 4 cm more or less completely cylindrical inflorescence of closely packed sessile cincinni. The material is too poor for useful dissection and no fruit remain, but the field observation 'fls red' is of interest and indicates that in this, the most south westerly area of distribution yet known for sect. *Myriocrater* (*A. aenea* is from S Celebes), deviation in flower colour from the expected green and white may be the rule.

22. A. aff. **aenea**
LESSER SUNDAS. Sumbawa Is: Mt Batulante, nr Brangbossang, fruit red, 800–1000 m, iv 1961, *Kostermans* 18817 (K).

Sumbawa lies west of Flores but this plant is probably distinct from the collections discussed above. The tightly congested inflorescence bears no flowers or even buds which can be dissected but several capsules remain at the base of the sessile cincinni. These capsules are red, which is unusual, but, as already remarked, in some Zingiberaceae fruit may take many months to ripen fully. What is fundamental is the shape of these capsules; they are elongated, the largest 2 cm long × 1 cm in diameter. There is also a bracteole difference from the Flores plants and from *A. aenea* for, although practically

glabrous in the upper half, the bracteoles of *K.* 18817 have conspicuous tufts of hair at the base which may extend rather more sparsely upwards on one side. The leaves have some hair on either side of the midrib and the main axis and ligule are pubescent.

Acknowledgments

The author is indebted to the Directors and Curators of the following Institutions for the loan of herbarium material: K, BM, L, LAE, W. Thanks are also due to Mr B. L. Burtt for the paragraphs dealing with the distribution of sect. *Myriocrater*, for the Latin descriptions, and for general guidance throughout the preparation of this work.