

Journal of The Bromeliad Society



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COVER PHOTOGRAPHS. We are grateful to Harry Luther for supplying these photographs taken by Bob Wands for Selby Botanical Gardens. The brief descriptions are from the Smith & Downs monograph, part 2, Tillandsioideae, pages 851 and 1344, respectively. Front: *Tillandsia cornuta* Mez & Sodiro. This plant, which flowers to a height of about 4 dm, is from Ecuador. It is epiphytic in rainforest, about 600 m in altitude. Back: *Guzmania verecunda* L.B. Smith, is from the Dept. of Valle, Colombia, where it was first collected by J. Cuatrecasas at an altitude of 1500 m.

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Grace M. Goode, Honorary Trustee

Bob D. Whitman



Fig. 1. Grace M. Goode

On the coast of Queensland, in the resort town of Alexandra Headlands, there is a small garden, not more than 60 by 150 feet, called by some "Paradise," by others "Fairyl-land." A more appropriate name might be "Living Tapestry." This tapestry of color has been intricately woven since the late 1960s by Grace Goode.

Her addiction to bromeliads began when she admired her mother's blooming *Billbergia pyramidalis* var. *pyramidalis*. That plant began her collection. A small book, *Indoor Plants*, speeded the collecting fever. Although she acquired a great many plants in her own country, she wanted to import stock from the United States. The Silver Anniversary show of the Bromeliad Society, Inc. in Los Angeles, California, in 1975 provided the incentive to travel. While there, she added many new plants to her supply. A trip in 1980 to the World Bromeliad Conference in Orlando, Florida, resulted in sending many more new plants home.

Even in the early years, imports were costly and the gassing by plant inspectors always took its toll so Grace decided that the only solution to these problems was to hybridize. The bromeliad world has been rewarded by her efforts as shown in Derek Butcher's *The Hybridist's Handbook and Checklist of Bromeliad Hybrids and Cultivars* (Australia, June 1986): 9 aechmeas, 34 billbergias, 109 cryptanthus, 5 dyckias, 129 neoregelias, 1 nidularium, 1 tillandsia, and 8 bigenerics created and named by Grace Goode. She cannot name her favorite bromeliad, but of the genera she proudly admits that the cryptanthus steal her heart, "fallen stars that hug the earth."

"I like to see color in the landscape," explains Grace when you visit her garden, appropriately named "Bromania." You are overcome by bromeliads, in fact, the entire landscape is bromeliads. Great festoons of Spanish moss cascade like waterfalls surrounding the entire property. Great, sweeping beds of neoregelias dominate the garden. The few trees are host to various aechmeas; billbergias find homes up a terraced brick wall. Cryptanthus grow happily along the driveway and beneath a grove of tree ferns like a carpet of fallen stars.

(continued on page 198)

Vriesea ochracea, a New Species from Peru

Werner Rauh and Elvira Gross

Vriesea ochracea Rauh et Gross, spec. nov.

Vriesea unilateralis (Baker) Mez (e Brasilia australi: Santa Catarina et Espírito Santo) similis, sed ab es differt characteribus sequentibus: Laminae non luteo-virides, sed glaucae, in luce transmittenti hieroglyphice depictae. Inflorescentia longior (usque ad 25 cm) et usque ad 25 flora (non 6- vel 20 flora); rhachis crassa, angulata (non gracilis); bracteae florales laete brunneae (non virides) supra lepidotae; pedicelli tantus 4 mm (non 10 mm) longi; sepala usque ad 1.4 cm lata (non anguste elliptica), viridia, violaceo-limbata; petala ochracea, basim versus albescenti-viridia.

Holotypus: B.G.H. 17 442, leg. Dr. A. Lau (Juni 1968), in herb, inst. bot. system. univ. heidelb. (HEID).

Patria et distributio: Epiphytica in sylvis montium, Chanchomayo Valley, Oxapampa (sine indicatione loci natalis), Dptm. Pasco, Peruvia centralis.



Authors

Fig. 2

A flowering plant of *Vriesea ochracea* (70 cm tall). The inflorescence shows the secund-turning flowers; one flower just after anthesis.



Authors

Fig. 3

The flower of *V. ochracea* at full anthesis. Stamens and style have a dorsiventral arrangement (abaxial); this, together with the nightblooming, indicates that the flowers will be pollinated by bats or their relatives.

Vriesesa ochracea Rauh et Gross, spec. nov.

Plant stemless, flowering up to 70 cm in height. *Leaves* numerous, forming a rosette 30 cm high and 60 cm in diameter. *Sheaths* conspicuous, spoonlike, 12 cm high, 7 cm wide, with a hyaline margin, densely brown lepidote on both sides. *Blades* 30–35 cm long, 4 cm wide, ligulate, broadly rounded and apiculate, bluish green, with irregular, transverse lines by transmitted light, lepidote on both sides, but becoming glabrous on the upper side. *Scape* erect, round, 1 cm thick, 40 cm long. *Scape bracts* densely imbricate, erect, the basal ones subfoliate, the upper ones soon drying off, exceeding the internodes, nerved, laxly lepidote on both sides. *Inflorescence* (Fig. 2) erect, simple ± 25 cm long, complanate, with about 25 flowers; these before anthesis erect, distichous, at anthesis all secund and horizontally spreading, after anthesis erect, with a thick, 4-mm long pedicel. *Rachis* straight, somewhat flexuous, thick, green. *Floral bracts* broad-ovate, 3 cm long, 3 cm wide, ecarinate, acute, even, on the upper side brown lepidote, beneath only on the upper half lepidote, shorter than the sepals, soon drying off, not becoming secund. *Sepals* lanceolate-ovate, slightly acute, 2.6 cm long, 1.4 cm wide, rigid, somewhat carnosate at the base, green with violet margins, even, ecarinate (Fig. 3). *Petals* ligulate, broadly rounded, 3.6 cm long, 2 cm wide, of a

yellow-brown (ochre) color, with two, big, acute scales at base. *Stamens* and *style* included. Nightbloomer.

Holotype: B.G.H. 17 442, coll. *Dr. A. Lau*, June 1968 (HEID).

Locality and distribution: Central Peru. Pasco: Oxapampa, Chanchomayo Valley, 1800 m.

Vriesea ochracea seems to be related to *V. unilateralis* (Baker) Mez, which is known only from Santa Catarina and Espírito Santo in Brazil, but it differs from *V. unilateralis* in the following characteristics: blade of the rosette leaves not ochre, but bright bluish green and with irregular lines by transmitted light. Inflorescence up to 25 cm long, with ± 25 (not 6–20) short pedicillated flowers. Rachis thick, not thin, angled, green. Floral bracts light brown (not green), brown lepidote on the upper side. Sepals up to 1.4 cm wide (not narrow-lanceolate), green, violet at the margin. Petals of an ochre color. The flowers are wide open during the night only and probably pollinated by chiropters. Nothing is known about the flowering time of *V. unilateralis*.

*Institute for Systematic Botany and Botanical Garden
of the University of Heidelberg, West Germany*

Grace M. Goode, Honorary Trustee *(continued from page 195)*

Although she compares herself to the woman who lived in a shoe with her many children, the visitor will find Grace at midmorning among the neoregelias and cryptanthus assessing the merits of parent plants for future hybrids capable of adding to the color and beauty we all so desire in our quest as bromeliad collectors.

It is for this devotion that the Board of Directors of the Bromeliad Society, Inc. at its May 1987 meeting recognized Grace M. Goode for her contributions to the Bromeliaceae by unanimously electing her an honorary trustee.

Beaumont, Texas

WE ARE VERY GRATEFUL TO THE OREGON BROMELIAD SOCIETY for its generous gift for color illustrations in the *Journal*. Such gifts are always welcome, especially in view of the sad state of the society's finances as shown in this issue. *Journal* production cost for the fiscal year budget is estimated at \$40,000 and the color work will account for approximately \$5,000 of that. Contributions from all affiliates would greatly help with this major item.

—TUL

The Bromeliads: Genera—Species—Hybrids

Louis Dutrie

Louis Dutrie of Ghent, Belgium was an eminent bromeliad grower whose lifetime of work as a horticulturist and hybridist was destroyed during World War II. Before his death in 1948, he wrote a ten-part series about his work and his friend Charles Chevalier published it in his Bulletin horticole.¹ Of that series, two parts and a biographical sketch of M. Dutrie were reprinted in translation in volume 29 (1979) of the Journal.²

We plan to reprint most of the material³ for several reasons, omitting only routine descriptions. It will tell us directly what M. Dutrie did, what his reactions were, and how the hybrids were received. It will help keep his memory fresh, and it may encourage others to remake some of the hybrids, many of which are still well known.

The series will appear in its original order beginning with M. Charles Chevalier's introduction. —Ed.

Louis Dutrie, whom we have the pleasure of numbering among our collaborators, has consented to write for our readers a series of articles on the bromeliads.

No one is better qualified than our friend to discuss this important subject. Those who have had the good fortune to know him admire him not only as a good grower, but above all and especially as a collector, as one who loves the plants more for the pleasure they bring rather than for any material value they may possess.

The aroids, and especially the bromeliads, have been for a long time his preference. One might even say that as far as the latter are concerned, no one has obtained such happy results, especially in the field of hybridization.

Before him, only the vrieseas and billbergias had been used as a source for those hybrids. Thanks to his discernment and perserverance, he has succeeded in creating interspecific hybrids with the genera Aechmea, Neoregelia, Nidularium, Guzmania, and others. And, he has succeeded in something more rare and difficult: obtaining some extremely interesting bigeneric hybrids.

From the point of view of the commercial horticulturist, M. Louis Dutrie has shown that it is possible to make some bromeliads suitable for extensive cultivation since their abundant production of seeds enables their large-scale reproduction.

The war, unfortunately, destroyed his magnificent establishment at Meirelbeke and with it numerous choice specimens upon which he had built great hopes. There still remains to him the distinction of being the innovator of a method of culture which has proved its worth. Thanks to his valuable hybridizations, M. Louis Dutrie has provided the means of exciting and keeping the interest of plant lovers.

C.C.

I

The bromeliads all have features in common which permit them to be recognized at first glance. Nevertheless, few plant families offer so much diversity. The height of certain cryptanthus and tillandsias does not exceed 4 or 5 centimeters; *Puya gigas* André can attain a height of 10 meters. The color of the leaves is quite variable, as well as the form of the inflorescences in which one will find the gamut of rich coloring.

They are monocotyledonous, generally acaulescent, usually epiphytic, sometimes rupicolous, rarely terrestrial. Leaves in a rosette, more or less dense, canaliculous, more or less rigid and tough, rounded like a gutter, spiny, armed on the margins (species with inferior ovaries), or unarmed (species with superior ovaries), sometimes farinaceous, dotted, stippled, spotted, blotched, lined, streaked, cross-lined, or striped in white, brown, or black.

Flowers hermaphroditic, calice in three sepals, corolla of three petals, the axil of the bracts often colored, in spike, cluster, or panicle, sometimes single, sometimes compound. Fruit capsulated, trilocular in the species with superior ovary, berry-bearing in those with inferior ovary.⁴

Botanists have classified more than 40 genera. Almost all have originated in tropical America.

All of the species are interesting to the collector and many of them attract the amateur. The horticulturist keeps only a few, indeed too few. As an amateur, I have, although lacking certain genera such as the *Puya* and *Pitcairnia*, assembled a collection of more than 300 species. I understand perfectly well that the bromeliad grower busies himself first with the revenue-producing species, but I would like to see him reserve a corner of his greenhouse, or at least one end of the bench, for a few, choice specimens which he would never feel embarrassed to sell if he felt like doing so. "There are no more amateurs," is a complaint often heard. The truth is that it is the horticulturist who lacks enthusiasm, grows rusty, and has nothing new to offer his clientele weary with the same old thing. Offer something new, and you will see amateurs again.

We shall mention along with species already known as commercial plants those which could become the source of more vigorous and more beautiful hybrids.

We shall then make a selection among the following genera: *Aechmea*, *Ananas*, *Billbergia*, *Cryptanthus*, *Neoregelia*, and *Nidularium*, with inferior ovaries; *Guzmania*, *Tillandsia*, and *Vriesea*, with superior ovaries.

THE AECHMEAS (Ruiz & Pavon)⁵

Aechmea fasciata (Lindley) Baker

A. chantinii (Carrière) Baker.

A. fulgens Brongniart.

A. fulgens var. *discolor* (C. Morren) Brong. ex Baker

(*A. fulgens discolor* Beer)

"*A. fulgens Thibauti* Hort. Leod." [Quotation marks added. A variety grown at the Liège botanical gardens.]

Lymania corallina (Brong. ex Beer) R.W. Read

(*A. corallina* (Beer) Brong. ex Baker)

A. miniata (Beer) hortus ex Baker

A. miniata var. *discolor* (Beer) Beer ex Baker

(*A. miniata discolor* hort.)

A. weilbachii Didrichsen.

A. weilbachii f. *leodiensis* André

(*A. weilbachii leodiensis* hort. Leod.)

A. wittmackiana (Regal) Mez

A. recurvata var. *ortgiesii* (Baker) Reitz

(*A. ortgiesii* Baker)

A. recurvata var. *recurvata*

(*A. Legrelleana* Baker)

A. drakeana André

A. calyculata (E. Morren) Baker

A. lindenii (E. Morren) Baker

(*A. Lindenii* Koch)

A. lindenii var. *makoyana* [?] Mez

(*A. Lindenii foliis variegatis* hort.)

A. caudata var. *variegata* M.B. Foster

(*A. Forgeti foliis variegatis* hort.)⁶

A. lamarchei Mez

A. lueddemanniana (K. Koch) Mez

(*A. coerulescens* Baker)

A. ramosa Martius ex Schultes filius

A. candida E. Morren ex Baker

A. leucocarpa André

A. veitchii Baker

"*A. fasciata foliis variegatis*" [Quotation marks added. This plant may well be what is today called *A. fasciata* var. *variegata*.]^{7 8}

"*A. coerulescens foliis albo-marginatus* hort. Flandria." [Quotation marks added. Probably *A. coelestis* (K. Koch) E. Morren var. *albo-marginata* M.B. Foster. H.E.L.]

Close neighbors of the aechmeas are:

Quesnelia testudo Lindman

(? *Quesnelia skinneri* E. Morren ex Harms)

Androlepis skinneri Brong. ex Houillet.

II

AECHMEA HYBRIDS

It is strange that the genus *Aechmea*, numerous, rich, and varied as it is, has been cultivated for such a long time without any attempt at hybridization between the species, while other genera, such as the *Billbergia*, much less interesting from a commercial point of view, have been the object of numerous crossings.

Must this abstention be attributed to the difficulty of obtaining seeds of species such as *Aechmea fulgens* and *A. fulgens* var. *discolor*? So difficult that several growers have given up trying to pollinate them after many failures? The few, rare, fertile *A. chantinii* seeds that were obtained by MM. Sander, at Bruges, and Declercq van Ghyseghem, at Ledeberg, never produced, in fact, an adult plant possessing any characteristics that resembled, even from a distance, those of the mother plant.

On the other hand, *Aechmea fasciata* produces seed in profusion, *A. candida* and *A. lueddemanniana* produce them without even the aid of artificial pollination, and from many other species one can reap a harvest without much difficulty.

It is, moreover, not surprising that among plants propagated for many generations by offsets fertility is reduced and that they eventually become sterile.

Be that as it may, I decided to attempt with aechmeas what others had done with billbergias, nidulariums, and especially, vrieseas. I have not regretted my initiative.

Here is the almost complete list of the crosses that I have made among the aechmeas.⁹

| | |
|---|---|
| <i>A. candida</i> | × <i>A. fulgens</i> |
| <i>A. chantinii</i> | × <i>A. fasciata</i> |
| | × <i>A. fulgens</i> var. <i>discolor</i> |
| <i>A. lueddemanniana</i> | × <i>A. calyculata</i> |
| | × <i>A. fulgens</i> var. <i>discolor</i> |
| | × <i>A. lindenii</i> |
| <i>A. fasciata</i> | × <i>A. chantinii</i> |
| | × <i>A. caudata</i> |
| | × <i>A. fulgens</i> |
| | × <i>A. fulgens</i> var. <i>discolor</i> |
| <i>A. fulgens</i> | × <i>A. chantinii</i> |
| | × <i>A. fasciata</i> |
| <i>A. fulgens</i> var. <i>discolor</i> | × <i>A. calyculata</i> |
| | × <i>A. chantinii</i> |
| | × <i>A. fasciata</i> |
| | × <i>A. fulgens</i> |
| | × <i>A. lamarchei</i> |
| | × <i>A. ramosa</i> |
| <i>A. recurvata</i> var. <i>ortgiesii</i> | × <i>A. weilbachii</i> f. <i>leodiensis</i> |
| <i>A. ramosa</i> | × <i>A. fulgens</i> var. <i>discolor</i> |
| <i>A. recurvata</i> var. <i>recurvata</i> | × <i>A. fulgens</i> |
| " <i>A. × Ortgiesioides</i> hort." | × <i>A. recurvata</i> var. <i>ortgiesii</i> |
| [Quotation marks added] | × <i>A. calyculata</i> |
| | × <i>A. fasciata</i> |
| | × <i>A. fulgens</i> var. <i>discolor</i> |

The first hybrids to flower were the *Aechmea fulgens* × *A. fulgens* var. *discolor*. Let us note in passing that the two parents were of distinct species and not varieties of the same species. Indeed, the seed of the *A. fulgens* were almost double, if not triple, the volume of those of *A. fulgens* var. *discolor*. They were also whiter and of a different shape.

The plants were green here, brown there, darker on the underside, more or less, sometimes very pruinose, vigorous, often more robust than the parents. Some of the spikes measured 50 cm in height, very strong, well branched, the

panicle attaining a height of 25 cm and more than 15 cm in breadth, with more than 100 bright red berries. Some of the specimens had berries tinged with black at the top, but with none was the stain shown so plainly as with *Aechmea fulgens*.

These newcomers produced nothing sensational, nothing earth-shaking, but they produced seeds freely and some specimens showed exceptional vigor and inflorescences that were remarkably developed. One might depend on future specimens grown from these seeds being decidedly superior to the original types. I have not differentiated between the following named plants to note which was the seed-bearer.

Presented at the meeting at Ghent in June 1939, under the name of *Aechmea* × *fulgida*, the novel hybrid won a Certificate of Merit by acclamation.

The plants resulting from *Aechmea fasciata* × *A. fulgens* var. *discolor* were, in general, as strong and vigorous and of the same appearance as *A. fasciata*, with thick leaves, light green on both sides, or lightly banded with white on the underside, or brown, with violet-brown on the reverse, brilliant, rarely and lightly pruinose. The spike was strong, carried well above the foliage with a compact head, joining together the white of the ovaries, the blue of the flowers, and the rose of the bracts. This coloration suggested to M. Chevalier the name of "tricolor" for this plant. One could have selected a dozen varieties. Three among them, quite distinct, were presented for judging: two, the 4th of June 1939, under the names of *A. × fulgo-fasciata* var. *amaena* and *A. × fulgo-fasciata* var. *amaena discolor*; the third on the 2nd of July, as *amaena robusta*. This last, as its name indicates, was particularly vigorous. Its leaves, very broad, were brilliant green above, dark brown on the underside. To each was awarded a Certificate of Merit, First Class.

These hybrids turned out to be sterile. It is probable, however, that some would be found fertile. Besides, the hybridization is easy to do again.

Several hybrids flowered during my stay in France from 1940 to March 1942. There were, among others, *Aechmea fulgens* var. *discolor* crossed by *A. lindenii*, and by *A. calyculata*, and those for which *A. lueddemanniana* had been chosen as the seed-bearer.

In the case of *Aechmea fasciata* × *A. fulgens* var. *discolor* I was indeed sorry not to have been able to see it in flower for the plants at the beginning of 1940 made a fine appearance having a less rigid, but smaller, appearance of *A. fasciata* with, however, the leaves being a little less zoned in white. The change in personnel following in the course of my absence deprived me, unfortunately, of all information concerning these hybrids.

Aechmea chantinii, from which I had been unable to obtain anything by self-pollination, had given, when pollinated by *A. fulgens* var. *discolor*, quite a series

of plants that were really remarkable, with leaves of all shades of olive green to red-brown, and thick and leathery. The plant is of the size of *A. fasciata*, of elegant appearance though giving the impression of great robustness. The head on a solid stem stands well above the foliage, is densely flowered and is more voluminous than that of *Aechmea fasciata*, and they present quite a range of warm and lively coloring, from canary yellow to coral red through orange and salmon. As many as were the plants, so were there as many distinct varieties.

I had presented at the meetings of April 9, 1939 some of the *Aechmea* × *fulgo-chantinii luteo-rubens* with yellow and red flowers and was awarded a Certificate of Merit, First Class, by acclamation. The same honor was given on the 4th of June to *A. × fulgo-chantinii formosa discolor* with brown leaves, while the same variety with green leaves had to be content with a Certificate, First Class, without applause.

On July 2nd, again a Certificate, First Class to *Aechmea fulgo-chantinii fulva*, with red flowers and dark brown leaves. Its beautiful salmon tint recalling that of *A. chantinii* won for the *A. fulgo-chantinii salmonea*, on the 6th of August, the fifth Certificate, First Class of the series.

Finally, on October 1st, two plain Certificates of Merit were awarded to *Aechmea chantinii aurantiaca* and to *fulgo-chantinii corallina* which, in my judgment, were at least as meritorious as the preceding varieties which won the Certificates, First Class. *Aurantiaca* was of a rich orange color recalling the slightly more pale color of the flowers of *Scutellaria mociniana*. *Corallina*, as its name suggests, was of a beautiful bright coral red. But then, what can you expect? *Errare humanum est*. The jury had, without doubt, seen enough from April to October, and then again, war was brewing on our frontiers.

Aechmea fasciata pollinated by *A. lindenii* produced plants noticeably stronger than *A. fasciata* and of the same appearance, but with leaves less rigid and less boldly marked. The floral stem carried above the leaves a large, conical panicle with bracts of a brighter rose than those of *A. fasciata*. The flower was very beautiful but, unfortunately, not as lasting as that of the mother plant, greatly reducing its interest from a commercial viewpoint. The plant flowered in 1942 and was not presented for judging by the jury where I did not appear between October 1939 and 1943, and even after that only rarely.

By pollinating *Aechmea candida* by *A. fulgens* I tried to obtain a plant intermediate between these two species, whether it might be with rose-colored flowers or with the appearance of *candida* with the flower of *fulgens*, in short, something new. I obtained only the pure *candida*. However, from the 300 young plants resulting from this crossing, I noticed among those of the first year two specimens which were much more vigorous than the others. After five years of culture (*A. candida* is a stout plant, but of slow growth, and the lack of coal permitted only a minimum temperature in the greenhouse) the plants flowered, and my two pets

which were twice the size of their brothers, produced, like them, white flowers, but in a much larger panicle and with pure white berries that were much more voluminous. Briefly put, it was a good acquisition that formed an intermediate between *A. candida* and *A. leucocarpa*, closer, however, to the former. I believe that if one wanted to recreate the species, or something approaching it, it could be done more easily by crossing one with the other, using both *candida* and *leucocarpa*, for I believe that the pollinization by *fulgens* was useless in the case of the gigantism presented by the *A. candida major* that has, unhappily, disappeared.

Aechmea fulgens discolor by *A. weilbachii*, and *weilbachii* f. *leodiensis*, as with *A. lamarchei*, produced nothing outstanding, nor even equal in merit to the parents.

In contrast, *Aechmea fulgens*, pollinated by *A. ramosa* var. *ramosa*, alias *Reukartiana* produced hybrids stronger than the mother plant, with green leaves in some and brown in others, with large upright, abundantly branched flower panicles, followed by orange-yellow berries of the size of a small pea, and very long lasting. The two varieties were displayed at the meeting of August 6, 1939, under the names of *A. × fulgo-ramosa* and *fulgo ramosa discolor*. Each one was awarded a Certificate, First Class.

The inverse crossing, *Aechmea ramosa* being the seed carrier, produced very strong plants with short leaves, but broader than those of *A. ramosa*, and with a panicle much less voluminous. Since it did not demonstrate any progress, I did not display it at the meeting.

Aechmea recurvata var. *recurvata* × *A. fulgens discolor* gave me small plants with green leaves tinged with brown, narrow, more or less long, as with the parents. Those of one recalled *Tillandsia lindenii*, but with fine spines. Of a beautiful, brilliant, clear green, delicately but clearly edged with brown, they were brown on the underside. The inflorescence, less developed and less brilliant, added nothing to its decorative value. It was, nonetheless, a handsome plant, excellent for baskets or logs. I designated it as *A. × Ortgiesioides*, a name under which it obtained a Certificate of Merit as a foliage plant.

This same *Aechmea* × *Ortgiesioides* was in its turn pollinated by *A. calyculata*, by *A. fulgens* var. *discolor*, and by *A. fasciata*. The result of these crossings was a series of plants of small size, well proportioned, some with narrow leaves, most having a width of 3–4 cm, stiff, some green, others brownish or brown, more or less fasciated, chiefly on the reverse side. The floral stem was, in most of them, shorter than the leaves; with others the heads stood above the foliage, the ovaries, generally, were yellow, infrequently rose, with red bracts, as with *A. calyculata*. As for the petals, they appeared in all shades: lemon yellow, soft rose, bright rose, orange, sky blue, lavender-blue, dark blue, violet, and even a curious aqua green. Among them were some extremely pretty minatures. I

could have easily selected fifty varieties, all distinctly different, but I kept, for propagation purposes, only a dozen, quite varied and distinct.

The plants had flowered in 1943; I had pollinated some, for many were fertile.

But, of all that I produced, the most remarkable were, indubitably, those from the crossing of *Aechmea chantinii* with *A. fasciata*. The plant was noticeably stronger and more robust than *fasciata*, of which it had the appearance, with leaves from 50 to 60 cm long, and 8 cm, or more, wide, solid, without stiffness, farinose, and ribboned with white on the upper side, giving the impression of having great vigor. The floral stem was very solid and upright, elevated well above the leaves, and bearing a large, conical panicle, wide at the base (more than 20 cm) with long bracts of a beautiful salmon-red, recalling the beautiful bracts of *A. chantinii*.

The only plant that I had an opportunity to see in flower in the autumn of 1942 remained beautiful until the summer of 1943. All of the others like it that I had possessed perished in 1944. A photograph was taken of it, which I hope to find again. The color will be found reproduced in a watercolor made by Prof. T'Sjoen of l'Ecole d'Horticulture de L'Etat at Melle. It was a plant of great beauty so it is greatly to be desired that its pollinization may be tried again.

This *Aechmea chantinii* × *fasciata* was not displayed.

BIGENERIC HYBRIDS

Androlepis skinneri crossed with *Aechmea fasciata* and with *A. fulgens* var. *discolor* gave to the plants a special effect, to some green leaves, to others a bronze foliage, the first probably from the pollen of *fasciata*, the others from that of *fulgens* var. *discolor*. Because of their bigeneric origin, I gave these newcomers the name of × *Androlaechmea* which unites those of the two parents.

One of them, particularly vigorous, of 40 cm height, with an almost equal breadth, had green leaves, lightly farinose and striped, having a width of 8 cm, leathery, upright, and compressed into a tube for two-thirds of their length, then curved downward, simulating thus a large vase from which comes the specific name of *crateriformis* which I gave to it. The inflorescence is very close to that of *Aechmea fasciata*, but of a darker rose that glows brightly, standing clear of the foliage on a stout, rigid stem.

The general aspect of the plant was so special that I left my temporary seclusion in order to exhibit it at the Meeting of July 4, 1943, where, under the name × *Androlaechmea crateriformis*, it was awarded a Certificate of Merit, First Class.

(continued on page 224)

The Bromeliad Society, Inc. Conservation Goals and Code of Conduct For Growers and Collectors

Introduction

The Bromeliad Society, Inc. conservation code was modeled after those of the American Orchid Society, Inc., and the Cactus and Succulent Society, Inc. The only significant difference between this and the other two codes is in the matter of commercial collecting. In general, the desirable species of bromeliads are much more abundant than the desirable orchids or succulents, so there appears to be no need for a general ethic against commercial-scale collecting at this time. The Society recognizes, however, that this situation is likely to change because of increasing bromeliad popularity and decreasing habitat. Therefore, the code contains recommendations that dealers begin to emphasize nursery propagation.

The Society realizes that there are probably some rare species in this large family, but that there is very little information available. The Conservation Committee is conducting studies to determine which species may be threatened. The committee will cooperate with other conservation-oriented organizations to provide appropriate protection, if needed.

Conservation Goals

1. Conservation of bromeliads.

Objective: To ensure the survival and maintenance of genetic diversity of all bromeliads throughout the world, both in the wild and in cultivation.

2. Data collection.

Objectives:

- a) To establish checklists of bromeliad species occurring in the wild for all countries and to determine the degree of threat facing each species from either habitat destruction, or collection, or both.
- b) To prepare a record of important areas that already are protected legally, e.g. national parks and protected areas, and lists of the bromeliad species that are, in theory, safe within them.
- c) To establish lists of areas of great species diversity or high endemism that should be protected by conservation organizations, governmental, or by other means.
- d) To prepare a record of bromeliad species already in cultivation in botanical gardens, or in private or commercial collections.
- e) To prepare a record of those species already being propagated and grown successfully in cultivation.
- f) To establish lists of species that should be propagated
 - (1) Those which are of value in any sense.
 - (2) Those which could take the pressure off wild populations.
 - (3) Those which could be used to increase the world populations where these are small.

3. Research.

Objective: To promote and support much more basic research on the Bromeliaceae than is currently being undertaken. Such research should include basic taxonomy, and ecological, horticultural, and physiological studies.

4. *Public awareness of the need for conservation.*

Objective: To develop an awareness of plant species and habitat conservation through published books, scientific and popular articles, films and other visual media, and symposiums and meetings and their published proceedings.

5. *Development and promotion of conservation strategies and special projects.*

Objectives:

a) To promote the conservation of areas of great species diversity or high endemism.

b) To prepare and circulate as widely as possible a "Code of Conduct for Bromeliad Growers and Collectors," the main aim of which will be the further protection of species in their wild habitats.

c) To review the operation of the Convention on International Trade in Endangered Species (CITES) with respect to the international trade in bromeliad species and to recommend changes that would make its implementation more successful and more effective for conservation.

d) To encourage the artificial propagation of bromeliad species, especially among commercial growers and in the countries of origin of the wild species, in order to protect those plants remaining in the wild.

e) To promote other, more specific, projects that may be brought to the attention of the committee through its wide membership, and by others.

CODE OF CONDUCT FOR BROMELIAD COLLECTORS AND GROWERS

I. Collection of wild plants.

A. General conduct. Obey international, national, and local regulations including the following:

1. The Convention on International Trade in Endangered Species of Fauna and Flora (CITES).
2. The United States Endangered Species Act of 1973.
3. Other regional laws pertaining to particular parcels of land or species.
4. Local customs of land and plant ownership.

B. Professional courtesies:

1. Obtain all necessary permits (collecting, export, and import).
2. Contact local organizations, institutions, and/or professionals. Your intentions are likely to be of interest to them, and they can be helpful to you.

C. Responsibilities in the field:

1. Never jeopardize natural populations. Collect only a small percentage of the plants present. If the site shows signs of previous heavy collections, seek another locality.
2. When possible, collect seeds or offsets rather than entire plants. When collecting whole plants, choose small ones and leave the large ones for seed production.
3. Make careful field notes. Include precise locality, elevation, host plants or rock (if epiphytic), plant association, date, and your field number. If possible, assess population density and range. Take photographs of the habitat.
4. Make herbarium specimens whenever possible, especially when collecting in remote locations or when you find something unusual (it is not necessary to know the identity of your specimens). Collect at least two specimens: one for the national herbarium of the host country (often this is a condition for obtaining a collecting permit), and one for the M.B. Foster Bromeliad Identification Center at the Marie Selby Botanical Gardens.

5. Do not collect more plants than you can care for, either during the field trip or when you return home. Do not collect plants that you will not be able to grow under the conditions you can provide for them (e.g. do not collect in a cloud forest if you cannot cool your growing facility).

6. If you encounter a population or species which appears to be endangered, or if you come across information regarding its possible preservation or destruction, please report it to the Conservation Committee chairperson.

II. Maintenance of collections (private, public, and commercial)

A. Propagate rare and documented plants and contribute to their survival by distributing them to other enthusiasts. Remember the proverb: To keep a plant, give it away.

B. Keep rare and scientifically valuable plants clearly and correctly labelled. Also keep records of their performance under your conditions of cultivation.

C. Share your knowledge with others, but DO NOT casually disclose specific locations of rare and desirable plants. Not every enthusiast is a scrupulous collector.

D. Ensure that your valuable plants will survive you. A botanical garden is often an excellent beneficiary, as is your local bromeliad society.

E. Buy plants from reputable nurserymen. Do not patronize a supplier who trades in illegally obtained plants or who knowingly imports or exports very rare, collected plants in large quantities.

III. Recommendations for bromeliad societies and clubs.

A. Endorse the precepts of this Code of Conduct as a guide for responsible and conscientious behavior.

B. Discourage the advertising of wild-collected plants of rare species for sale in your publications.

C. Publicize national and international regulations on the export, import, and sale of wild plants.

D. Sponsor or support measures to protect the habitats of rare or threatened species.

E. Assist your members in making arrangements for the continued survival of their plants when they lose interest or can no longer care for them.

IV. Recommendations for show committees and judges.

A. Include in the show schedule some classes for species raised from seed by the exhibitor.

B. Include in the schedule some recognition for rare or undescribed species. Rare plants must not be collected in such a way as to jeopardize the population. This practice is necessarily a matter of honor with the collector.

C. Include good cultivation in judging criteria.

D. Restrict competition to plants that have been grown in cultivation for at least one year.

Mark A. Dimmitt, Chairman
The Arizona-Sonora Desert Museum
2021 N. Kinney Road, Tucson, Arizona 85743

Committee members:

David H. Benzing, Dept. of Biology, Oberlin College, Oberlin, OH

Sue Gardner, Corpus Christi Botanical Garden, Corpus Christi, TX

Paul T. Isley III, Rainforest Flora, Inc., Gardena, CA

John F. Utley, Dept. of Biological Sciences, University of New Orleans, New Orleans, LA

Harold W. Wiedman, Dept. of Biological Sciences, California State University, Sacramento, Sacramento, CA

[The foregoing statement of conservation goals and code of conduct was presented to the Board of Directors at the May 1987 meeting. The Board voted to endorse this statement and to authorize its publication in the Journal. — Ed.]

Morren's Paintings, 9: *Aechmea recurvata* Lyman B. Smith



Photograph by the author of a painting
by C.J.E. Morren.

Fig. 4. *Aechmea recurvata*, illustrated by Morren as *Orgiesia paleolata*.

This species was described from cultivation in 1856, which means that it must have been collected still earlier. It consists of three varieties of which the typical one ranges from southern Brazil to Paraguay and Argentina. Its inflorescence extends above the leaves while it is concealed by them in the other two varieties.

Smithsonian Institution, Washington, D.C.

A Bromeliad Mobile Edward L. Sard

Several years ago, my uncle Nathaniel E. Hess built a house amid three acres of his favorite rhododendrons and azaleas at Sands Point, Long Island, New York. Aside from being one of the leading growers of those plants, Nat Hess is also a landscaper and horticulturist, so he designed the house with a silo-shaped stairwell, approximately 30 feet in height from the basement to the skylight, with the thought of installing a bromeliad tree in that space.

Such a tree was assembled with about 75 bromeliads mounted on the base of an apple tree and its branches, and with both ceiling and wall spotlights for illumination. It was almost as impressive as the bromeliad tree one can see in many botanical gardens. The problem of maintenance, however, forced the decision to replace the tree with a less demanding display. As a result, the tree was replaced with a mobile which both simplified maintenance and gave an improved artistic effect.



Author

Fig. 5

A bromeliad mobile eight feet high and six wide, with black walnut base, an art form worth considering, perhaps on a smaller scale. The suspension cables can be seen.

(continued on page 223)

Two New Pitcairnia from Northwestern Panama

Harry E. Luther

During a short, exploratory trip to Panama in the summer of 1986, several new taxa of Bromeliaceae were collected. Among them was *Pitcairnia lymansmithiana*, an interesting and attractive species, which we respectfully dedicate to Dr. Lyman B. Smith, botanist emeritus at the Smithsonian Institution. It superficially resembles *Pitcairnia bakeri* (André) André ex Mez from Colombia and Ecuador with its simple, cylindric inflorescence, dark, soon disintegrating floral bracts and orange corolla. It can, however, be easily distinguished from *P. bakeri* by its much narrower leaf blades, erect flowers that do not reflect after anthesis, and much narrower, thin sepals.

Pitcairnia lymansmithiana Luther, sp. nov.

A. *P. bakeri* (André) André ex Mez similis sed foliis laminis angustioribus et sepalis angustioribus tenuisque differt.

Plant caulescent, often hemiepiphytic, 2–4 m long, stem to 6 cm in diameter. *Leaves* polymorphic; some reduced to bladeless triangular sheaths, others petiolate with distinct blades. *Sheaths* broadly ovate, 5 cm wide, dark castaneous toward the base, densely brown lepidote, even toward the base, nerved above. *Petioles* to 50 cm long, 1 cm wide, channeled, nerved, serrate with antrorse spines 1–3 mm long. *Blades* linear lanceolate, 60–80 cm long, 2–5 cm wide, entire, channeled, inconspicuously appressed lepidote, dark green, slightly paler beneath. *Scape* erect, to 50 cm long, 1 cm in diameter, appressed brown lepidote. *Scape bracts* erect, densely imbricate, narrowly triangular, serrate with dark, straight or antrorse spines. *Inflorescence* simple, cylindric, densely flowered, to 30 cm long, 3 cm in diameter. *Floral bracts* strict, imbricate, triangular, acute, ca. 45 mm long, very thin, brown lepidote, soon disintegrating into fibers, very dark brown. *Flowers* subsessile, erect both before and after anthesis. *Sepals* narrowly triangular, attenuate, ca. 33 mm long, 5 mm wide, carinate, nerved, thin, their apex soon disintegrating, brown flocculose at the base and apex. *Corolla* zygomorphic. *Petals* to 55 mm long, 10 mm wide with a single 4-mm long appendage at the base, brilliant orange. *Anthers* ca. 13 mm long. *Ovary* about ½ superior.

Type: PANAMA. Chiriqui: montane forests above Fortuna Dam, elev. ca. 1100 m. Luther, Besse, Halton & Kress 1099, June 1986 (holotype, SEL; isotype US).

Pitcairnia lymansmithiana is locally abundant along streams in the dense montane forests surrounding the Fortuna hydroelectric project. Its brilliant orange flowers are especially conspicuous against the dark floral bracts and surrounding vegetation.

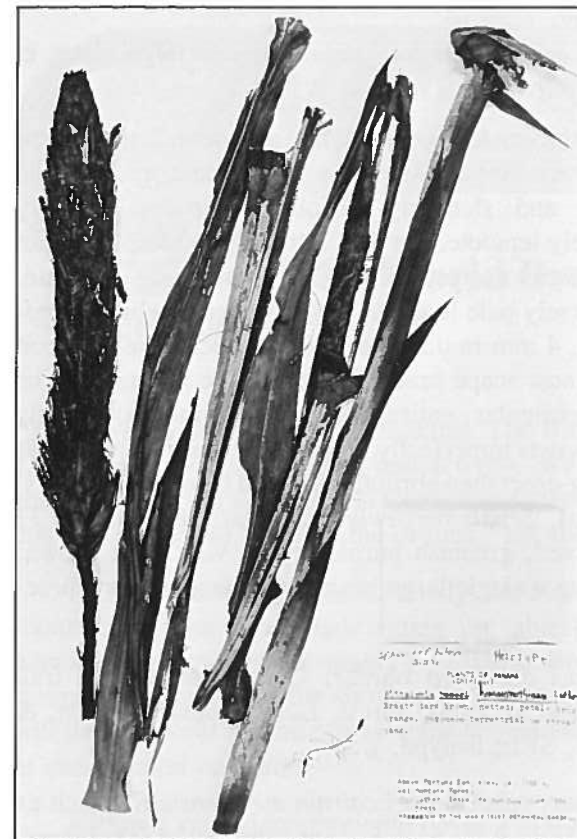


Fig. 6
Herbarium specimen of *Pitcairnia lymansmithiana*, a new species from northwestern Panama named for and dedicated to Dr. Lyman B. Smith, botanist emeritus at the Smithsonian Institution.

Photographs by
Bob Wands for Selby Gardens

Fig. 7
Pitcairnia kressii herbarium specimen, collected in June 1986 in northwest Panama.



Pitcairnia kressii Luther, sp. nov.

A. *P. meridense* Klotzsch ex Mez affinis sed caulis perlongioribus et pedicellis longioribus erectisque differt.

Plant known only from fruiting material, epiphytic, scandent, long caulescent. *Leaves* persistent, trifarious, entire, polymorphic; some reduced to bladeless sheaths, others long and slenderly petiolate. *Sheaths* narrowly triangular, keeled, brown, sparsely lepidote, nerved. *Petioles* slender, to 30 cm long, keeled, sparsely lepidote. *Blades* narrowly linear lanceolate, long attenuate, to 65 cm long, 17 mm wide, sparsely pale lepidote, bright green or slightly reddish. *Scape* erect, to 40 cm long, 4 mm in diameter, brown flocculose but soon glabrous, purple-red. The lowermost scape bracts exceeding the internodes, the upper much reduced, narrowly triangular, entire. *Inflorescence* racemose, laxly flowered, to 35 cm long. *Floral bracts* imperfectly known, very narrow. *Pedicels* slender, to 38 mm long, spreading-erect then abruptly reflexed below the flowers, slightly lepidote but soon glabrous. *Sepals* narrowly triangular, attenuate, to 33 mm long, ecarinate, slightly nerved, greenish purple drying very dark brown. *Petals* imperfectly known, bearing a single large basal appendage. *Ovary* three-fourths superior. *Seeds* bicaudate.

Type: PANAMA. Chiriqui-Bocas del Toro border; Continental Divide trail above Fortuna Dam, elev. ca. 1200 m. Cloud forest. *Luther, Besse, Halton, & Kress 1131*, June 1986 (holotype, SEL; isotype, US).

This species seems most closely related to *Pitcairnia meridensis* Klotzsch ex Mez from Venezuela but differs from it by a caulescent habit, trifarious leaves, longer and erect pedicels and flowers that are pendant, at least in fruit. It is ecologically distinguished also: *P. meridensis* is a terrestrial in dwarf forests and paramos, *P. kressii* is a scandent epiphyte in dense cloud forests. This new species is now well established in cultivation in the research collection of the Marie Selby Botanical Gardens.

M.B. Foster Bromeliad Identification Center
Marie Selby Botanical Gardens
Sarasota, Florida



1988 World Bromeliad Conference

Connie Johnson

There's enchantment in the making. The Bromeliad Society of South Florida is abuzz with excitement and activity. We're using all the wizardry at our command to bring you a World Conference that will bewitch and beguile you, one that will transcend not only the ordinary but the extraordinary as well.

This conference will be distinctly DIFFERENT. Instead of walking into a room filled with bromeliads sitting on tables, you will enter a lush tropical paradise that typifies the magic of Miami. Bromeliads, including those in the competitive portion of the show, will be viewed in many different settings. We will live up to our promise to have the largest assemblage of bromeliads ever seen in one place at one time.

Adding a special international flavor to our show will be an exhibit by the Bak Nursery of Assendelft, Holland. They are growers of seedlings to the trade. They are also one of the world's leading hybridizers of flowering bromeliads. Having seen several of their spectacular exhibits in Europe, we look forward to their contribution.

Hotel Inter-Continental will be the hub of all functions during the conference. You'll want to stay there so you won't miss a moment of the exciting activities. To tempt you further, all registrants who stay at the hotel will be presented with at least two rare bromeliad seedlings, and will have a chance at other inducements as well. Considering what you would have to pay if you could buy these seedlings, that's like getting one night at the hotel free. At \$80.00 per night, single or double occupancy, this is already a bargain for such spacious and luxurious accommodations overlooking Biscayne Bay.

For shopping, or variety in eating, you may want to try the newly opened Bayside, a complex of some 150 shops and restaurants just a short walk from the hotel and also located right on Biscayne Bay.

We are immensely pleased to announce that our featured seminar speaker will be Prof. Dr. Werner Rauh of Heidelberg, West Germany, one of the world's

leading authorities on bromeliads. His talk at Corpus Christi was the highlight of that conference. Another coup will be the first-time conference appearance of Elton Leme of Brazil. Sr. Leme is a very personable young man who has written as well as collaborated on articles for the *Journal*. He is one of Brazil's most active collectors and his seminar talk will be most interesting and informative. All seminars will be down to earth and easily understood by the hobbyist grower.

Mention the Florida Everglades and the name conjures up all sorts of special visions. Now, you will be able to see this part of the magic of Florida firsthand. On Thursday, May 19, before the conference officially opens, you can board a magic carpet (bus) that will whisk you away to a part of this Florida wonderland. See bromeliads growing in their native habitat. Noted naturalist Roger Hammer will lead this preconference, all-day tour. Further details on this at a later date.

How many have ever heard of *Disteganthus basi-lateralis*, let alone seen one? You can own one of only three of these plants in cultivation by being the high bidder at the Rare Plant Auction, thanks to Harry Luther and Selby Gardens. Other extremely rare Brazilian species will send bidders into a state of delicious delirium.

Want a good reason to drive to Miami? So you can enjoy the post-conference tours, of course. If you have never seen Selby Gardens, or even if you have, you'll want to take advantage of this opportunity. Not only will you see the magical displays of tropical plants, but Harry Luther promises to take you behind the scenes, on a tour through the several glasshouses where special bromeliads are grown; bromeliads collected from many areas awaiting flowering, identification, or further research. As an added attraction, the Gardens will have on display an exhibit of Margaret Mee's paintings of Brazilian bromeliads.¹ Some of her works have appeared in the *Journal* over the years. Your conference badge will be your free ticket. Other interesting post-conference tours to private and commercial collections are being arranged.

Come join us. Embark on a mystical, captivating bromeliad adventure in magical Miami, May 20-22, 1988. Remember, the early registration rate ends November 1st. Registration and other fees are listed in our *Journal* ad, May-June 1987, page 137.

Registrar: Elaine Mills, 9735 SW 138 Street, Miami, FL 33176, (305) 235-3036.

Hotel reservations: Hotel Inter-Continental, 100 Chopin Plaza, Miami, FL 33131, (305) 577-1000. Out of state toll free: 1-800-327-3005, Florida toll free: 1-800-332-4246.

For other information: Bromeliad Society of South Florida, 13075 SW 60 Avenue, Miami, FL 33156, (305) 667-7890.

¹ "The Englishwoman who paints our flowers," J. Brom. Soc. 30:253-255; 1980.

Two Locally Endemic Brazilian Tillandsias

Elton M.C. Leme

On the coast, contrasting with the blue-green ocean, there are solid walls of stony hills up to 400 meters high. Here and there, they break the monotony of the scenery and block the way to the sandy plains. The vegetation is typical of the sand dunes. Dense and continuous, it varies between the shrubby and the arboreous. At points it is so dense that it nearly eliminates bromeliads. *Billbergia iridifolia* (Nees & Martius) Lindley, an epiphyte growing just above the ground is the only exception. But where the sunlight pierces the lower stratum of the vegetation, large formations of *Cryptanthus* spp., *Nidularium atalaiaensis* Pereira & Leme, as well as other species, can be seen growing on the ground or on rocks. Sometimes, because they are so big, specimens of *Bromelia antiacantha* Bertoloni and *Streptocalyx floribundus* (Martius ex Schultes filius) Mez can be seen growing as terrestrials and surpassing the height of the woody vegetation.

On the granitic walls where most species of plant life cannot grow, cactus columns appear in the middle of thickets of *Neoregelia cruenta* (R. Graham) L.B. Smith (Fig. 8), *Quesnelia quesneliana* (Brongniart) L.B. Smith, *Billbergia tweedieana* Baker, and conspicuous formations of *Tillandsia neglecta* E. Pereira. The sun and wind are merciless.

There are rocky islands near the shore cut off from the mainland by the wave action of centuries. These islands are inhabited by the same animal and plant species found on the mainland. We have one particular island in mind. It is the only place, to our knowledge, where *Tillandsia gardneri* Lindley var. *rupicola* E. Pereira grows.^{1 2} It is Cabo Island, also known as Farol Island.

All of this scenery was created by the forces of nature in the vicinity of Arraial de Cabo, State of Rio de Janeiro, about 160 km east of the city of Rio de Janeiro by highway.

The village of Arraial de Cabo, formerly a district of the County of Cabo Frio, was recently given a higher status, thus becoming politically and administratively autonomous. In spite of the destructive actions of men begun in this region in the 16th century, the natural areas of this new county are still reasonably well kept. The largest one is the Massambaba, a narrow sand barrier between the sea and the Araruama Lagoon. This sandy plain with its rolling lands has sparse vegetation, low growing and adapted to these dry and hot conditions. The plants very often form islands surrounded by winding rows of sand (Fig. 9). The edges of the islands are the habitat of terrestrial sun-lovers such as *Aechmea pineliana* (Brongniart ex Planchon) Baker, *Neoregelia cruenta* N. eltonia W. Weber, *Portea petropolitana* (Wawra) Mez and *Vriesea neoglutinosa* Mez.



Fig. 8

Formations of *Tillandsia neglecta* growing in spite of intense sunlight and wind on the granitic cliffs of Cabo Frio, east of Rio de Janeiro.



Fig. 9

Islands of vegetation including *Neoregelia cruenta* grow on a barrier island called Massambaba off the coast of Cabo Frio.



Fig. 10

Tillandsia neglecta. The author discusses various synonyms of this plant in the text.

Photos by Luiz Claudio Marigo



Fig. 11

Tillandsia gardneri var. *rupicola* was first described in 1981 as a variant of the species collected by G. Gardner and described by Lindley in 1842. This variety has been found only on the rocky walls of Cabo Island.

Bromeliad Arrangement, 17: *Aechmea ramosa* & Indonesian Ginger (*Tapeinochilus ananassae*)

May A. Moir



Jim Delatorre, Honolulu Academy of Arts

Fig. 12

Mrs. Moir combined *Aechmea ramosa*, the pineapple-shaped Indonesian ginger, and tall pieces of dry bark to form this arrangement.

For this large, rectangular copper container it was necessary to use two very large kenzans (needle holders) to accommodate this amount of plant material. The tall pieces of dry bark were used to give height and good background, and were held erect with stems of heliconia. Heliconia was also used to brace the slender stems of the *ramosa*. The Indonesian ginger (*Tapeinochilus ananassae*), the species name meaning that it resembles a pineapple, is very heavy and prickery,

thus hard to handle. An arrangement of this sort has to be well constructed as we expect it to look good for a full week.

Honolulu, Hawaii



A Bromeliad Mobile (continued from page 211)

The root of an ancient black walnut tree that had been found on the premises was judged to be perfect for inaugurating this new art form—a bromeliad mobile. It is a perfect host, on the acid side, and it looks as if it could last another century or two. It weighs about a thousand pounds and took four husky men to move it into the stairwell. Five men, using the latest machinery, then installed it. The mobile (about eight feet high and six feet wide) is suspended midway from the top by three steel cables.

There is virtually no limit to the artistic display of bromeliads, or the changes that can be made from time to time. Watering and temperature control are no problem. At present, the 18 bromeliads mounted on the mobile include seven in bloom including *Guzmania* Amaranth, Grand Prix, and Orangeade; *Tillandsia leiboldiana*; *Neoregelia carolinae*; *Nidularium citrinum*; and a *Vriesea poelmannii* hybrid. In addition, there are tillandsias and billbergias. The display can, of course, be changed as needed. Major redecorating is done usually twice a year.

Surely, this kind of display is unusual because of its size and the variety of bromeliads displayed, but it should commend itself to interior decorators, botanical garden and art museum curators. At the same time, imaginative hobbyists lacking the space for the thousand pound model can create their own bromeliad mobiles in proportions suitable to themselves.

New York, New York

The Bromeliads: Genera—Species—Hybrids (cont. from page 206)

Some specimens of it still exist at the l'Ecole d'Horticulture at Melle. One could name those with green leaves *Androlaechmea subcrateriformis*; those with bronze leaves *Androlaechmea oenea*.

Aechmea fulgens var. *discolor* × *Quesnelia lateralis* Wawra (*Q. enderi*) did not have time to flower. [To be continued]

NOTES:

1. *Bulletin horticole* (Liège, Belgium) new series vol. 1:39-42, 60-62, 94-96, 118-121, 156-160; vol. 2:52-53, 118-120, 176-177, 217-218; vol. 3:18-21; 1946-1948.

2. *J. Brom. Soc.* 29:12, 13-16; 80-82.

3. A photocopy of the original text is in the Society library. Nat De Leon of Miami, Florida, contributed a copy of the translation. The translator is not identified.

4. More recent research provides many exceptions in Pitcairnioideae according to H.E. Luther.

5. There is no apparent order to this list. Names and authors have been changed to agree with the Smith and Downs monograph, parts 2 and 3, *Flora Neotropica*, number 14. The earlier names follow in parentheses. We have omitted the author's descriptions except those in note 8 to conserve space. Of the 28 aechmeas named, 14 appear in the list of hybrid parents and some members of that group were crossed several times. We can conjecture that the list was his inventory.

6. *Brom. Soc. Bull.* 3:47. Also listed as *Billbergia forgetii* according to this source.

7. *Brom. Soc. Bull.* 3:40-41; 7:84, etc.

8. In these three cases of variegated plants, the text states: "*A. fasciata foliis variegatis*, obtained by M. Declercq van Ghyseghe de Gentbrugge. The leaves are marked with longitudinal bands or lines quite variable in width and position, now in the center of the leaf, now on one side, now on the other. This irregularity often causes a twisting of the leaf in which the edges tend to come together. These deformations reduce much of the plant's interest.

"M. Ch. Spae, of Melle, found among his seedlings a type that was more regularly striped than the preceding *A. fasciata*. Here, the longitudinal white bands are of more regular width and better spaced on the width of the leaves. These make a striking display and the appearance of the plant is very good. If, as is quite probable, the variegation is transmitted faithfully to the offsets, this novelty will make a very interesting acquisition.

"*A. coerulescens foliis albo-marginatis* Hort. Flandria. A band of pure white, very regular in width (5 or 6 mm), clearly and sharply drawn, contrasting well with the grayish green background, encircles the leaves and gives the plant a very special quality which distinguishes it at first glance from all the others, for this kind of variegation does not exist, as far as I know, in any other bromeliad. It is a very beautiful plant either by itself or in a group."

9. Current names, authors' names omitted. For earlier names refer to page 203.

CORRECTION:

"Pitcairnia hammelii, A New Pitcairnia from Panama," by Harry E. Luther as printed in volume 37 (May-June 1987), pages 128-129 is corrected to read as follows:

paragraph 2, lines 11-13: *Petals* ligulate, rounded, to 5.5 cm long, appendaged with one 3-mm long fimbriate scale at the base, bright orange. *Anthers* to 3 mm long, yellowish orange (! Hammel). *Ovary* ca. 3/5 inferior. *Seeds* narrowly winged.

paragraph 3, line 1: **Type:** PANAMA. Cerro Brewster at the border of Colon, Panama, and San Blas. . . .

Questions & Answers

Conducted by Bob Heer and Tom Montgomery

All readers are invited to send their questions and observations about growing bromeliads as a hobby to the editor. Answers will be sent directly to you and some questions will be published.

Q. What is the best method of applying liquid fertilizer? Do you advocate spraying or should the potting medium be saturated?

A. Liquid fertilizer may be applied through your watering hose or sprinkler [or with a clean pressure spray, or a trigger-pump spray bottle]. It is better to feed oftener with a great dilution than directions on spray material suggest. It can be sprayed on both the plant and potting medium (MFB) 4/6:94

Q. At the last World Bromeliad Conference I overheard a group discussing something called "Cam Metabolism." I couldn't understand at all. Will you explain?

A. As a layman I can only touch on a complex and complicated evolutionary metabolic device. First, C.A.M. stands for crassulacean acid metabolism. It deals with photosynthesis as an adaption of the metabolism of certain dry-growing plants, and was first studied in the Brassulaceae, the botanical name of the Orpine family.

Most of us plant lovers learned at an early age that green plants use the energy of light during the day to combine, through something called photosynthesis, carbon dioxide (CO₂) and water H₂O) to form carbohydrates (CH₂O) and release oxygen (O₂) to refresh the air. Most of us did not know that some plants utilize one of two other methods of chemical manufacturing to arrive at a similar result. One of these we are not concerned with, but the C.A.M. metabolism is utilized by *Dyckia* in the Pitcairnioideae subfamily, some *Guzmania* and *Tillandsia* in the Tillandsioideae subfamily and most, if not all, of the Bromelioideae subfamily.

Oversimplification of C.A.M. deals with an attempt by the plant to conserve moisture. Closing the stoma cells (pores) during the day reduces transpiration (water loss) to a minimum; this process also interferes with gas exchange. By opening the stoma at night when atmospheric water vapor pressure demand is lower, CO₂ diffuses into the leaves and forms the organic malic acid that requires far less energy consumption than photosynthesis that produces (CH₂O). When daylight comes, the stoma close and when light becomes intense enough, the malic acid releases the CO₂ internally in the leaf and provides enough CO₂ for true photosynthesis to occur. A sharp differential between day and night temperatures seems beneficial to this process. For

more accurate and detailed information please refer to *The Biology of Bromeliads* by David H. Benzing, "Photosynthesis," p. 103-128.¹ The only reference in the *Cumulative Index to the Bulletin and Journal of the Bromeliad Society* under the listing "Photosynthesis" appears to be several articles dealing with chemical induction of flowering.

Q. When confronted with a young seedling that develops a pup at the base, what should I do?

- A. If you have a whole flat of seedlings, discard that one. If you only have a few, or just one, you can probably save the plant. Something has most likely damaged the terminal tip of the seedling, or at least it has been severely stressed causing the extremely premature pup. Try clipping the seedling back one-third, then after the pup has shown good growth, clip another third off the original seedling. When it comes time to pot up, center the now well grown pup straight up in the pot. This should allow you to bury the remains of the original seedling that the pup no longer needs for strength and preserve all of the root structure.

Q. Are bromeliads truly air plants or do they need fertilizer?

- A. Is there such a thing as a true air plant? I think not. Plants that grow in nature on trees (epiphytic, not parasitic) or on rocks (saxicolous) receive many nutrients via the atmosphere. They also obtain organic material that collects on, in, or around them; also, insect and animal droppings or carcasses may add nutrients. Many insects, reptiles and even crustaceans live in symbiotic harmony with plants, especially bromeliads. It seems doubtful that a plant given proper lighting, distilled water, and placed in a scrubbed atmosphere (such as the atmosphere supplied to the famed "Bubble Boy" at Baylor College of Medicine) would long survive. Bromeliads do need more than atmospheric H₂O, CO₂, O₂, and N. They may be grown out of doors in mild climates, yet it seems that they respond to additional nutrients with greater vigor and bloom size. Yes, most bromeliads need at least some fertilizer (nutrient), either natural or artificial.

Q. When potting my pups, what size pot should I use? Is there a recommended plant/pot ratio, as in African violet culture?

- A. In the bromeliad world there is no industry-wide acceptance of plant/pot ratio, probably because the different genera have such different soil/mix/pot size requirements.

Eventual plant size usually has some influence on the pot chosen. Constant tipping of the pot can be a nuisance and can damage the plant. Falling off the bench may require an unplanned potting job. Next you may want to

consider the appearance. Even if the plant is not to be entered in a show, it is more pleasing to the eye if some relationship in size exists between the plant and the pot.

Terrestrials, in most cases, respond well to overpotting, even to the point where the pot is bigger than the plant. *Cryptanthus* roots in nature are shallow but widespread in the top layer of humus on the forest floor. *Dyckia*, *Puya*, and *Hechtia* frequently exist in places where long, deep roots try to search out moisture and nutrients. Most healthy *Dyckia* plants, after only a few months of being potted, will circle the pot with a mass of roots. This requires some caution if the sun shines too brightly on the side of the pot. The roots may be killed in clay pots by heat and dehydration, and most at risk are dark green plastic pots which can become too hot to touch comfortably with your fingers.

Epiphytic plants can be grown successfully in very small pots. Neoregelias, eighteen to twenty-four inches in diameter, have been produced in three- to four-inch pots that had been stabilized in some manner. This is not necessarily an endorsement of growing in this manner, yet it can lead to a very beautiful, compact plant. Stabilization of the plant and pot are the first order of importance.

Here's an interesting note regarding pot size. Some very experienced growers upon receiving an expensive or rare offset will grossly overpot, that is, use a pot up to eight to twelve inches in diameter. This seems to encourage root growth, although the grower must be careful not to over water. Any pot that is not full of roots is usually slow to dry out. This is obviously not to be a show plant but an attempt to obtain numerous offsets.

For show purposes, a plant grown in one size pot may need to be repotted before being exhibited. The 1982 B.S.I. *Handbook for Judges and Exhibitors* states on page 25, "the judge should deduct points . . . if there is not a pleasing proportion between the plant and the pot, as well as compatibility of color and texture." Some inexperienced judges and some who are concerned primarily with epiphytic plants: e.g. *Neoregelia*, *Nidularium*, *Guzmania*, *Vriesea*, or *Tillandsia* may interpret this too literally. The *Handbook*, on page 103 under subfamily Pitcairnioideae, states, "These plants are grown as terrestrial under pot culture and are definitely show subjects. Since these plants appreciate adequate room for their roots, large, adequate pots should be a plus factor in their judging."

In summation, let us say that pot size must be influenced by growing conditions, genera, even species, the intention of repotting or not, and/or the purpose intended for the mature plant.

¹ Eureka, CA: Mad River Press, 1980.

DIGEST OF THE MINUTES OF THE ANNUAL MEETING OF THE BROMELIAD SOCIETY, INC.
BOARD OF DIRECTORS
Dallas, Texas, 23 May 1987

Officers and directors present:

| | |
|------------------------|---------------------------|
| George H. Anderson | Thomas J. Montgomery, Jr. |
| B. Dean Fairchild | Stan Oleson |
| William E. Frazel | Herbert Plevier |
| David Gardner | Gerald A. Raack |
| Jack B. Grubb | Gregory A. Reid |
| Wayne B. Guthrie | Ronald Schoenau |
| Linda Harbert | Edgar L. Smith |
| Carol M. Johnson | Valerie L. Steckler |
| Thomas U. Lineham, Jr. | |

Minutes: The minutes of the last annual meeting were approved as corrected to show that the amount approved for membership promotion was \$1,200 and not \$2,400.

Reports were accepted from all of the officers and chairmen of standing and special committees except that there were no reports from the vice-president, the recording secretary, and the chairmen of the Awarded Cultivars and Finance and Audit Committees.

Election results: (The president and vice-president are elected for three-year terms; all other officers and committee chairmen to one-year terms.)

Officers:

Corresponding Secretary, Danita Rafalovich-Smith; Editor, Thomas U. Lineham, Jr.; Membership Secretary, Linda Harbert; Recording Secretary, Jack B. Grubb; Treasurer, David Gardner.

Chairman of Standing Committees:

Affiliate Shows, Charlien Rose; Affiliated Societies, Stan Oleson; Awarded Cultivars, Thomas J. Montgomery, Jr.; Conservation, Mark A. Dimmitt; Finance and Audit, Gregory A. Reid; Hybrid Registration, Brian E. Smith; Judges Certification, William E. Frazel; Nominations, Clyde Jackson; Publications, Annie A. Navetta; World Bromeliad Conference, Thomas J. Montgomery.

Chairman of Special Committees:

Bylaws Revision, Wayne Guthrie; Bromeliad Research Grant, David H. Benzing; Mulford B. Foster Bromeliad Identification Center, Harry E. Luther; Seed Fund, Harvey C. Beltz; Slide Library, Mary E. Massey.

Treasurer: 1. The financial report for 1986 and the approved budget appear in addenda 1 and 2.

2. It is especially important to note that the Society sustained a net loss of \$3,628.03 during calendar year 1986 and that the FY 1988 approved budget requires the transfer of \$4,200 from reserve funds.

3. A motion was passed that the money received as a result of the rare plant auction at future World Conferences be divided between the Bromeliad Identification Center and the Bromeliad Society, Inc.

Editor: A motion was passed that the FY 1988 budget item for the *Journal* be not less than \$40,000 in view of probable cost increases.

Bylaws Revision Committee: The proposed revisions were not received within the prescribed 60 days before the annual meeting, consequently no action was taken.

Conservation Committee: 1. The Board voted to endorse the proposed "Conservation Goals and Code of Conduct for Growers and Collectors," and to authorize the publication of that statement in the *Journal*.

2. A motion was passed authorizing the Committee to offer its services and information about bromeliad conservation to conservation-related agencies.

Directory Committee: A motion was passed to publish 2,100 copies of a membership directory. The directory will include members' telephone numbers currently listed in the membership secretary's records.

Judges Certification Committee: A motion that the Society "get out of the show business" failed.

Publications Committee: A motion was passed that the consignment period for publications be extended to a year.

World Conference Committee: 1. A motion was passed to accept the offer of the Houston Bromeliad Society to host the 1990 World Bromeliad Conference.

2. A motion "that Miami not be bound by the Handbook in the 1988 World Conference show" passed.

Other business: 1. The Victoria Padilla Memorial Bromeliad Research Fund was created. This fund is to be administered by the Research Grant Committee.

2. Grace M. Goode of Australia was elected honorary trustee.

3. A motion was passed that the officers of the society be constituted a committee to receive future nominations for honorary trusteeships and that the committee report its recommendations annually to the Board.

4. The Board authorized the publication of 500 copies of the revised *Handbook for Judges and Exhibitors* to be sold for \$17.50 each, postpaid.

ADDENDUM #1A: FINANCIAL STATEMENT AS OF DECEMBER 31, 1986

ASSETS

CURRENT ASSETS

| | | | |
|---|----|-----------|-------------|
| Cash in Bank - Texas Commerce Bank #09-601908 | \$ | 1,420.17 | |
| First Commerce Bank #02-0072-7 | \$ | 1,863.39 | \$ 3,283.56 |
| Dean Witter - Bromeliad Identification Account #015893649 | \$ | 7,297.08 | |
| General Account #015860686 | | 68,975.23 | |
| Life Membership Account #015893630 | | 5,713.77 | 81,986.08 |
| Advances - Corresponding Secretary: | \$ | 200.00 | |
| Editor | | 500.00 | |
| Judges Certification | | 200.00 | |
| Membership Promotion | | 100.00 | |
| Slide Library | | 375.00 | |
| Affiliates Newsletter | | 100.00 | |
| Publications | | 100.00 | |
| Seed Fund | | 200.00 | 1,775.00 |

FIXED ASSETS

| | Cost | Reserve For Depr. | Book Value | |
|----------------|-------------|----------------------|---------------|----------|
| Apple Computer | \$ 1,706.97 | \$ 375.53 | \$ 1,331.44 | |
| Library | 1,657.80 | 336.05 | 1,321.75 | |
| Typewriter | 814.62 | 364.54 | 450.08 | |
| File Cabinet | 169.00 | 37.18 | 131.82 | |
| | \$ 4,348.39 | \$ 1,113.30 | \$ 3,235.09 | 3,235.09 |

| | |
|----------------------------------|-----------|
| Inventory | 57,443.22 |
| Stock - 2 Shares Burroughs Corp. | 200.00 |

TOTAL ASSETS \$ 147,922.95

LIABILITIES

CURRENT LIABILITIES

\$ -0-

NET WORTH

\$ 147,922.95

TOTAL LIABILITIES AND NET WORTH

\$ 147,922.95

ADDENDUM #1B: PROFIT AND LOSS STATEMENT FOR
TWELVE MONTH PERIOD ENDING DECEMBER 31, 1986

GROSS RECEIPTS

| | |
|-------------------------------------|-------------|
| Advertising | \$ 4,123.62 |
| Back Issues | 1,192.21 |
| Books, Binders & Other Publications | 2,725.54 |
| Bromeliad Identification Center | 11,565.00 |
| Color Plates and Separations | 167.00 |

| | | |
|---------------------|-----------|--------------|
| Cultural Flyers | 684.43 | |
| Dividends | 5.20 | |
| Interest | 6,099.11 | |
| Medallions/Trophies | 1,281.78 | |
| Membership | 33,784.39 | |
| Postage | 55.64 | |
| Seed Fund | 501.36 | \$ 62,185.28 |

EXPENSES

| | | |
|---|-------------|-----------|
| Advance - Owana Jo Myers | \$ 200.00 | |
| Advertising | (175.56) | |
| Affiliates Newsletter | 395.76 | |
| Back Issues of Journal | 953.77 | |
| Bank Handling Charges (Foreign Checks) | 119.50 | |
| Books, Binders & Other Publications | 938.63 | |
| Bromeliad Identification Center | 4,328.00 | |
| Bromeliad Identification Center Auction | 1,580.00 | |
| Depreciation | 517.95 | |
| Director/BSI Meetings | 558.02 | |
| Dues - Council of Garden Clubs | 15.00 | |
| Editor Journal - General | \$ 3,003.87 | |
| Vehicle | 2,700.00 | 5,703.87 |
| Grant | | 500.00 |
| Journal (7 Issues) | | 38,253.47 |
| Judges Chairman | | 655.56 |
| Judges Handbook | | 3,100.47 |
| Medallions/Trophies | | 964.81 |
| Membership - Contract Labor | \$ 2,700.00 | |
| General | 1,807.58 | 4,507.58 |
| Parliamentarian | | 1,032.50 |
| President | | 127.97 |
| Secretarial | | 512.40 |
| Seed Fund | | 573.61 |
| Slide Chairman | | -0- |
| Storage Rental | | 440.00 |
| Taxes - Franchise Tax | | 10.00 |

NET LOSS FOR TWELVE MONTH PERIOD ENDING DECEMBER 31, 1986 \$ (3,628.03)

ADDENDUM #2: APPROVED BUDGET FOR TWELVE MONTH PERIOD ENDING JUNE 30, 1988

PROJECTED RECEIPTS

| | | |
|-------------------------------------|-------------|--------------|
| Advertising | \$ 4,800.00 | |
| Back Issues | 900.00 | |
| Books, Binders & Other Publications | 3,044.80 | |
| Cultural Flyers | 250.00 | |
| Dividends | 5.20 | |
| Interest | 6,000.00 | |
| Judges Handbook | 6,800.00 | |
| Medallions/Trophies/Entry Tags | 1,200.00 | |
| Membership | 33,500.00 | |
| Seed Fund | 600.00 | |
| Slide Library | 200.00 | |
| Video Tapes | 450.00 | |
| World Conference Auction | 5,000.00 | \$ 62,750.00 |
| Transfer from Reserve Funds | \$ 5,000.00 | \$ 67,750.00 |

PROJECTED EXPENSES

| | |
|-----------------------|--------|
| Affiliates Newsletter | 250.00 |
| Bylaws Committee | 100.00 |

| | | |
|---|-------------|-----------|
| Conservation Committee | \$ 100.00 | |
| Cultural Flyers | -0- | |
| Directors Annual Meeting | 500.00 | |
| Directory | 2,400.00 | |
| Editor Journal - General | \$ 2,000.00 | |
| Allowance | 1,800.00 | 3,800.00 |
| Insurance | | 180.00 |
| Journal | | 40,000.00 |
| Judges Certification Committee | | 250.00 |
| Judges Handbook | | 6,800.00 |
| Medallions | | -0- |
| Membership - General & Postage | \$ 1,800.00 | |
| Labor | 5,400.00 | 7,200.00 |
| Mulford Foster Trophies | | -0- |
| Office Supplies & Stationery | | 600.00 |
| Parliamentarian Retainage | | 1,200.00 |
| Postage | | 100.00 |
| President | | 100.00 |
| Secretarial | | 135.00 |
| Seed Fund | | 600.00 |
| Slide Library | | 225.00 |
| Storage Rental | | 240.00 |
| Video Tape | | 350.00 |
| Victoria Padilla Memorial Research Fund | | 2,500.00 |
| Miscellaneous | | 120.00 |

\$ 67,750.00



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| " irridifolia var. concolor | 4.00 | " giganteum | 15.00 |
| " irridifolia var. irridifolia | 6.00 | " leopardinum | 12.00 |
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| " morelii | 5.00 | CATOPSIS berteroniana | 5.00 |
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| " nutans | 2.00 | " acaulis var. ruber (small var.) | 2.00 |
| " nutans var. lineata | 10.00 | " acaulis var. ruber (large var.) | 4.00 |
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- October 9-11** SW Bromeliad Guild 16th Annual Show & Sale, "Bromeliads Cultivate Friends Around the World." Host: Golden Triangle Bromeliad Society, Beaumont Hilton Hotel, Beaumont, Texas. Bob Whitman (409) 835-0644. First All Cryptanthus Show to be held in conjunction with this show.
- November 6-8** Florida Council of Bromeliad Societies State Show hosted by the Caloosahatchee Bromeliad Society. "A Harvest of Bromeliads." Lee Co. Garden & Activities Center, Cleveland Ave. in front of Lee Memorial Hospital, Fort Myers, FL. Saturday, 9:00 a.m. to 6:00 p.m.; Sunday, 10:00 a.m. to 4:00 p.m. Plant sales, art display and sales, rare plant auction. Eleanor Kinzie (813) 332-0210.
- May 1988** World Bromeliad Conference, "Miami Magic." Host: The Bromeliad Society of South Florida.