Journal of The Bromeliad Society

VOLUME 43 • NOVEMBER–DECEMBER 1993 • NUMBER 6

Journal of the Bromeliad Society

Vol. 43, No. 6 November–December 1993

Editor: Thomas U. Lineham, Jr., 1508 Lake Shore Drive, Orlando, Florida 32803-1305.

Editorial Advisory Board: David H. Benzing, Gregory K. Brown, Pamela Koide, Harry E. Luther, Robert W. Read, Walter Till.

Cover photographs. Front: *Vriesea nahoumii,* a new species described by E.M.C. Leme on pages 244 and 245. Photo by Luiz Claudio Marigo. Back: *Aechmea recurvata* and monarch butterfly chrysalises. Photo by T.U. Lineham.

CONTENTS

The *Journal,* ISSN 0090-8738, is published bimonthly at Orlando, Florida by the Bromeliad Society, Inc. Articles and photographs are earnestly solicited. Closing date is 60 days before month of issue. Advertising rates are listed in the advertising section. Permission is granted to reprint articles in the *Journal,* in whole or in part, when credit is given to the author and to the Bromeliad Society, Inc. **Please address all correspondence about articles, advertising, or subscriptions to the editor.**

Subscription price (in U.S. $) is included in the 12-month membership dues: single–$20.00, dual (two members at one address receiving one *Journal)*–$25.00, fellowship–$35.00, life–$750.00. Please add $5.00 for international mail, except for life members. For first class or airmail add $7.50.

Please address all membership correspondence to Membership Secretary Linda Harbert, 2488 E. 49th, Tulsa, OK 74105.

Back Issues: All single copies $4.50 1st class postpaid to ZIP addresses, other countries $5.50 airmail postpaid; per volume $20.00 to ZIP addresses, $25.00 to other addresses, 3rd class or surface postpaid. Order back issues from the editor; make checks drawn on U.S. banks, bank drafts, or money orders payable to B.S.I.

Printed by Fidelity Press, Orlando, Florida.

Two New Lithophytic Species from Bahia, Brazil

Elton M.C. Leme

In January 1993, during a photographic expedition to the ecologically dry area of Milagres, State of Bahia, two new, ornamental species were found. The plants were growing in sparse colonies on bare, steep rocks located in the same neighborhood but on different hills in the domain of the shrubby caatinga vegetation. The xerophytic conditions that predominate in that area encourage the occurrence of hundreds of long-spined cactus in addition to many other plant species. These new species are described here:

***Tillandsia milagrensis* Leme sp. nov.** (figure 1)

Subgen. *Anoplophytum* (Beer) Baker

A *T. tenuifolia* Linnaeus, cui affinis, planta insigniter robustior, foliis manifeste cinereo-lepidotis, scapo folia valde superante, filamentis haud distincte plicatis differt.

Type. Brazil. State of Bahia, Milagres. Leg. *P. Nahoum & L.C. Marigo s.n.,* January 1993 (Holotype HB).

Plant lithophytic, clustering, caulescent, flowering ca. 50 cm high, stem ca. 30 cm long. *Leaves* many, densely polystichous along the stem, suberect-arcuate, narrowly triangular, attenuate, densely cinereous lepidote on both sides, channeled, ca. 20 cm long, ca. 1.5 cm wide at base; *sheaths* inconspicuous; *scape* ca. 15 cm long, ca. 0.3 cm in diameter, erect, glabrous, green, distinctly longer than the leaves; *scape bracts* foliaceous, suberect, shorter than the inflorescence, concealing the internodes. *Inflorescence* simple, subcylindric, suberect, ca. 5 cm long, ca. 2 cm in diameter; *rachis* glabrous, green, subangulous, 2–3 mm in diameter, not concealed by bracts; *floral bracts* membranaceous, red, white lepidote and distinctly nerved toward the apex, ecarinate, the basal ones with obovate-elliptic sheaths, ca. 23 mm long, ca. 14 mm wide, distinctly longer than the sepals; *blade* filiform-caudate, the upper ones ovate-elliptic, acute, and apiculate, ca. 13 mm long, ca. 8 mm wide, equaling the sepals. *Flowers* ca. 10, very short pedicellate, suberect, sublaxly and polystichously arranged 20–25 mm long; *sepals* narrowly lanceolate, acute, symmetric, 11–15 mm long, 4–5 mm wide, glabrous, nervate, pale colored, the posterior slightly carinate and connate for 9–11 mm, the anterior free and ecarinate; *petals* sublinear, apex rounded, 14–18 mm long, ca. 3 mm wide, free, white, apex slightly recurved at anthesis; *filaments* ca. 7 mm long, not distinctly plicate, flattened, dilated toward base;

Luiz C. Marigo

Figure 1.
Tillandsia milagrensis in habitat.

anthers ca. 1.5 mm long, oblong, obtuse, fixed near the base; *ovary* obovate, ca. 3 mm long, ca. 2 mm in diameter; *style* ca. 10 mm long.

This new species is very closely related to *Tillandsia tenuifolia* but can be distinguished from it by its incomparably large size, the densely cinereous lepidote leaves, as well as by the longer scape, which exceeds the leaves, and the indistinctly plicate filaments.

***Vriesea nahoumii* Leme sp. nov.** (front cover)

Subgen. *Alcantarea* E. Morren ex Mez

A *V. geniculata* (Wawra) Wawra, cui affinis, foliis brevioribus, inflorescentia 20–30 cm longa, bracteis primariis quam basin sterilem ebracteatam ramulorum aequantibus, bracteis floriferis altitudinem sepalorum aequantibus vel vix brevioribus, sepalis leviter asymmetricis differt.

Type. Brazil. State of Bahia, Milagres. Leg. *Pedro Nahoum & L.C. Marigo s.n.,* January 1993 (Holotype HB).

Plant lithophytic, flowering ca. 100 cm high; *leaves* densely rosulate, suberect, forming a broad funnelform rosette at base; *sheaths* broadly elliptic, ca. 10 cm long, ca. 11 cm wide, densely brown lepidote on both sides, pale; *blades* sublinear, 35 cm long, 7 cm wide, not narrowed at base, apex short acuminate and incurvate, subglabrous and green on both sides. *Scape* ca. 70 cm long, ca.

0.8–1.3 cm in diameter, rigid, erect, sulcate, distinctly longer than the leaves, red, glabrous; *scape bracts* suberect to near spreading, apex distinctly recurvate, red, concealing the scape, the basal ones subfoliaceous, longer than the internodes, the upper ones 3–6 cm long, suborbiculate, apex acuminate or subacute and apiculate, equaling or surpassing the internodes. *Inflorescence* short-paniculate, subdensely bipinnate, 20–30 cm long, 20–30 cm in diameter, erect; *primary bracts* orbiculate, obtuse and short-apiculate, ca. 3 cm long, ca. 3 cm wide, red, equaling the sterile bases of the branches; *branches* ca. 7 cm wide (excluding the petals), subspreading, sometimes slightly secund and decurved, subdensely flowered, the lateral ones 4–11, 10–15 cm long, with 13–16 flowers, peduncle ca. 3 cm long; ca. 0.5 cm diameter, thick, the terminal one ca. 20 cm long; *rachis* geniculate, glabrous sulcate, greenish, 5 mm in diameter; *floral bracts* orbiculate, ca. 3 cm long, apex obtuse, distinctly concave, gibbous near the base, sulcate, subcoriaceous, ecarinate, red, inconspicuously lepidote inside, not imbricate after anthesis, enfolding the sepals and slightly shorter to equaling them. *Flowers* distichous, not secund, near spreading, ca. 3.5 cm long (excluding the petals), pedicels stout, slightly complanate, ca. 6 mm long, ca. 8 mm in diameter; *sepals* slightly asymmetric, obovate, rounded, ca. 30 mm long, ca. 17 mm wide, glabrous, free, ecarinate, yellow; *petals* known only by immature or depauperate segments, apex narrowly obtuse, bearing two obovate, obtuse appendages at base; *stamens* ca. 70 mm long; *anthers* linear, ca. 13 mm long, base and apex obtuse, fixed near the base.

Closely related to *Vriesea geniculata,* from the Organ Mountains of Rio de Janeiro State, this new species presents the following differences: shorter leaves; smaller inflorescence despite the very long scape; branches few in number; primary bracts equaling the sterile bases of the branches; floral bracts almost equaling the sepals; sepals slightly asymmetric, and petals with obtuse appendages.

Vriesea nahoumii was named after one of its collectors, Pedro Ivo Nahoum who has been contributing notably to the preservation of local bromeliads by means of developing many activities related to plant propagation.

A BIOGRAPHICAL NOTE:

Elton Martinez Carvalho Leme has been writing for the JOURNAL since 1981. His work includes plant descriptions, analyses of descriptions, reports of Brazilian bromeliad habitats, and pleas for conservation. His speeches at two international bromeliad conferences have found enthusiastic audiences. He will be the primary speaker at the 1994 world bromeliad conference in San Diego. Sr. Leme is a botanist by avocation and a lawyer by profession.

Figure 2.
Elton M.C. Leme

Elton was born on the 24th of August 1960 in the state of Rio de Janeiro. He received his law degree in 1984, practiced law for three years, became a Public Defender of Rio de Janeiro State in 1988, and was nominated state judge in September 1992. The photograph shows him on the occasion of his nomination wearing toga and capella and looking appropriately serious. Earlier photographs[1] show his appearance on less formal occasions.

Sr. Leme began his study of bromeliads in 1978 at the Rio de Janeiro Botanical Garden where he met Gustavo Martinelli. Soon after that, he began systematic studies in collaboration with Wilhelm Weber and intensive activity under the tutelage of Edmundo Pereira. Those three botanists are known to JOURNAL readers. During the years 1980 to 1986, his main work with bromeliads was with Pereira in the joint authorship of many papers including the first part of the revision of *Canistropsis of Nidularium*. Since Sr. Pereira's death in 1986, Sr. Leme has published a very large number of articles on bromeliads, some in joint authorship and many as sole author.

In addition to all of these scholarly activities, Elton continues to search for new bromeliads. He has recently moved his large collection of native species to his newly acquired property at Teresópolis, in the heart of the Orgãos Mountains. His intention is to organize there the most complete possible collection of Brazilian bromeliads for research purposes.

Elton and his wife Vania have two sons and a daughter, who was born on the 29th of August this year. In addition to caring for his family, attending to his judicial duties, writing and exploring, it is no surprise that Elton has accepted the presidency of the Editorial Advisory Board of the newly formed Sociedade Brasileira de Bromélias.

Would that every country have more of his kind.—TUL

[1] J. Brom. Soc. volume 42, pages 161, 209, 210 (1992).

Call for 1994 Nominations for the Office of Director

The Bromeliad Society, Inc. is managed by a Board of Directors elected to represent the members of the 10 regions of the society and by officers elected by the board. The details of the BSI organization and how the business of the society are conducted are explained in the bylaws. Every affiliated society has a copy of the bylaws. If you cannot find a copy, write to the BSI secretary, whose name and address are listed in the inside back cover of every issue of the JOURNAL. Your participation in the conduct of BSI business matters is essential. The matter at hand is the nomination of directors.

THIS IS THE CALL FOR NOMINATIONS FOR THE TERMS 1995–1996 AND 1995–1997:

Regions having vacancies for the 1995–1996 term (nominees to serve the unexpired portion of the normal 1994–1996 term—

Central	1 director	Southern	1 director
International	2 directors	Western	1 director
Northeast	1 director		

Regions having vacancies for the regular three-year term, 1995–1997—

Australia	1 director	Texas	1 director
Florida	1 director		

Who may nominate? Any voting member of the society who resides in a region for which there is an opening may nominate any number of candidates to compete for that opening or openings.

Who may be nominated? A nominee must: (1) be a current, voting member of the society and have been a voting member for the three consecutive years prior to nominations; (2) reside in the region for which nominated; (3) not have served two consecutive terms as a director immediately preceding nomination; (4) agree to being nominated; (5) agree to serve as a director, if elected.

Procedure for nominating: (1) obtain the consent of the prospective nominee and verify compliance with the qualification criteria; (2) airmail nominations to the chairman of the Nominations Committee between 1 January and 18 March 1994 inclusive. Nominations by telephone will be accepted through 15 March but must be confirmed in writing; (3) supply with each nomination the full name, address, and telephone number of the nominee, the region to be represented, the nominee's local society affiliation (if any), and a brief autobiography of the nominee.

Mail nominations to:

T.A. Calamari, Jr., Chairman, BSI Nominations Committee
1016 Rosa Avenue, Metairie, LA 70005 USA
Telephone: 504-831-1764

New Species and a New Combination in the Subfamily Pitcairnioideae (Bromeliaceae) from the Guayana Shield

Bruce K. Holst[1]

Continuing exploration and research of plants collected in the "Lost World" region, or the Guayana Shield, of northern South America have yielded three beautiful new species of Pitcairnioideae and justified the transfer of a fourth species. The *Navia* species described below comes from an area in southern Venezuela that indisputably has the richest concentration of species in that genus. The two *Pitcairnia* species described here are from two high, contiguous, granitic mountain ranges near the center of Guayana Shield: Sierra de Maigualida and Serranía Uasadi. These mountain ranges, which have only recently been explored, are providing many novelties for the Venezuelan flora and for science. In addition, *Puya phelpsiae* from southern Venezuela, is transferred to *Pitcairnia*.

NAVIA

***Navia mosaica* B. Holst, sp. nov.** (figures 3 and 5)

Type. Venezuela. Amazonas: Cerro Duida, 1,000 m, Jan.–Feb. 1969, *Fariñas, Velasquez & Medina 421* (holotype, US 2559502, 2559503; isotype, VEN).

Haec species *Naviae aridae* L.B. Sm. & Steyerm. affinis est, sed squamis aureis aureobrunneisve (vs. albis), foliis 1–2 cm (vs. 2–4 cm) latis, inflorescentiis compositis (vs. simplicibus), sepalis rubellis (vs.luteis) ac petalis albis (vs.luteis aurantiacisve) differt.

Plants medium-sized, caulescent, rosulate; *stem* apparently creeping and possibly rhizomatous, 20–30 cm long, bearing some dead leaves and numerous wiry, blackened roots. *Leaves* 8–25, spreading to strongly reflexed, 25–40 x 1–2 cm; *sheaths* straw-colored, ovate, 1.5–2 x 1.3–1.5 cm, glabrous, margins sparsely spinulose in distal half; *blades* light green on upper surface with a broad pale median stripe, narrowly elliptic to narrowly oblong, thin, upper surface lustrous and glabrous or with a few scales basally, lower surface completely covered with lustrous, gold or gold-brown (upon drying) peltate scales, partially falling with age, the scales circular, with concentric rings of numerous, equal-sized, round cells, blade apex gradually acuminate, the tip pungent, margins laxly to moderately spinulose-serrate, spinules spreading or recurved in basal 1/3 of blade and to 1 mm long, ascending and minute in upper 2/3, base of blade gradually narrowed or not, the inner leaves red basally; *primary bracts* bright red in their basal 2/3 to 1/2, upper surface glabrous, lower surface lepidote. *Scape* lacking. *Inflorescence* sessile, compound, terminal, 2.5–3 cm wide, containing 5 or 6 subequal, sessile heads, these ovoid, ca.1.5 x 1 cm, many-flowered; *floral bracts* erect, red, ovate, 10–13 mm long and equalling or scarcely exceeding the sepals, sparsely lepidote on both surfaces in distal half, apex acuminate, pungent, margins membranous, involute apically, entire or with a few small teeth. *Flower* symmetry not known, buds dorso-ventrally compressed; *sepals* free, imbricate with the two keeled, ovate-lanceolate, conduplicate, posterior ones covering the anterior, reddish at least apically, 10–12 mm long, sparsely lepidote, acuminate; *petals* free, white, spathulate, 14–15 x 4 mm, exceeding the floral bracts, glabrous, rounded to obtuse apically, unappendaged. *Anthers* narrowly oblong, 4 mm long, apparently not exserted; *filaments* ca. 7 mm long. *Ovary* superior, ovoid, glabrous, *style* slender, ca. 8 mm long; *stigma* 3-parted, the branches clavate, ca. 1 mm long, papillose ventrally. *Capsules* partially both septicidally and loculicidally dehiscent. *Seeds* 2 or 3 per locule, semicircular and wedge-shaped or somewhat angled, 1.3–1.5 mm long, the surface with fairly regular rows of bumps and shallow depressions, unappendaged.

Additional specimens examined. Venezuela. Amazonas, Dept. Atabapo: in the saddle between Duida and Marahuaca, near base of Duida, 1,000 m, 3°34'N, 65°32'W, 25 Oct. 1988, *Liesner 25334* (MO, US); 27 Oct. 1988, *Liesner 25486* (MO, US); Dept. Atabapo, banks of the Caño Negro, between Cerro Duida and Cerro Marahuaka, 850 m, 25 Jan. 1992, *Oliva-Esteve 211* (VEN).

Navia mosaica superficially resembles *N. phelpsiae* L.B. Sm. by virtue of the red inflorescence and white flowers, but the dense coating of shiny gold or gold-brown, peltate mosaic-like scales (versus linear or hair-like in *N. phelpsiae* on the lower surface of the blade at once distinguishes it. *Navia mosaica* scales are well formed and strikingly beautiful, especially when viewed under a dissecting microscope. Well-formed peltate scales such as these are relatively rare in the genus—most of the species having linear or hair-like trichomes, poorly formed pletate scales that break apart radially and appear arachnoid, or greatly reduced and undifferentiated flap-like scales. *Navia phelpsiae* also lacks the colored leaf bases that can be seen in the accompanying photograph of *N. mosaica* (figure 3).

A related species, *Navia arida* L.B. Sm. & Steyerm., also has well-formed peltate scales, but differs from *N. mosaica* by having white scales, broader leaf blades 2–4 cm wide, simple inflorescences, yellow sepals, and yellow or orange petals. *Navia mosaica* has gold or gold-brown scales, thinner leaves, 1–2 cm wide, compound inflorescences, reddish sepals, and white petals.

The four known collections come from the moist forests found on the lower slopes of the huge Venezuelan table mountains (commonly called "tepuis") of Cerro Duida and Cerro Marahuaka at 850–1,000 m elevation. These two mountains, and their smaller sister mountain Cerro Huachamacari, slightly to the north, are home to what is the richest concentration of *Navia* species in the entire range of the genus. Of the 20 species that have been found on both the slopes and summits of these three mountains, 17 occur nowhere else.

[1] Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166.

Francisco Oliva-Esteve

Figure 3.
Navia mosaica. Habit.

Otto Huber

Figure 4.
Pitcairnia cana.
Habit.

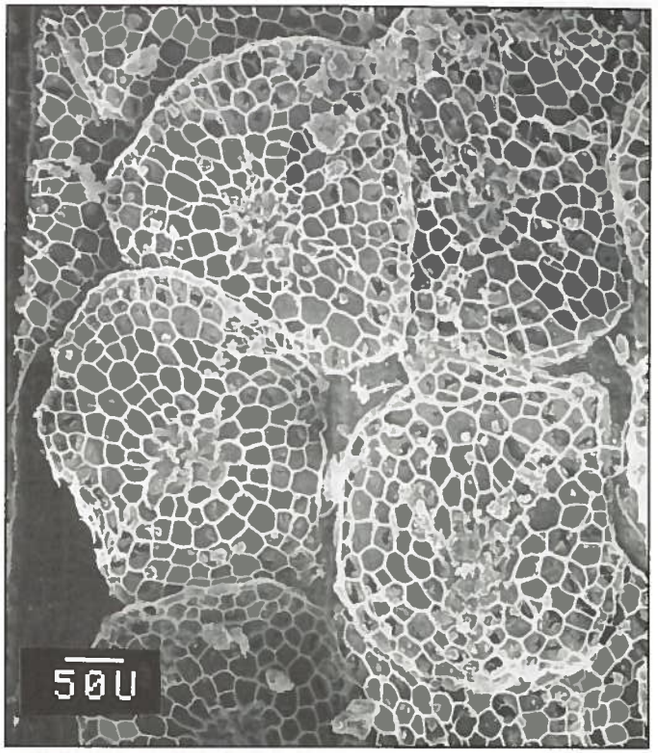


Figure 5.
Navia mosaica.
Scanning electron microscope photograph of the scales on lower leaf surface.
150X.

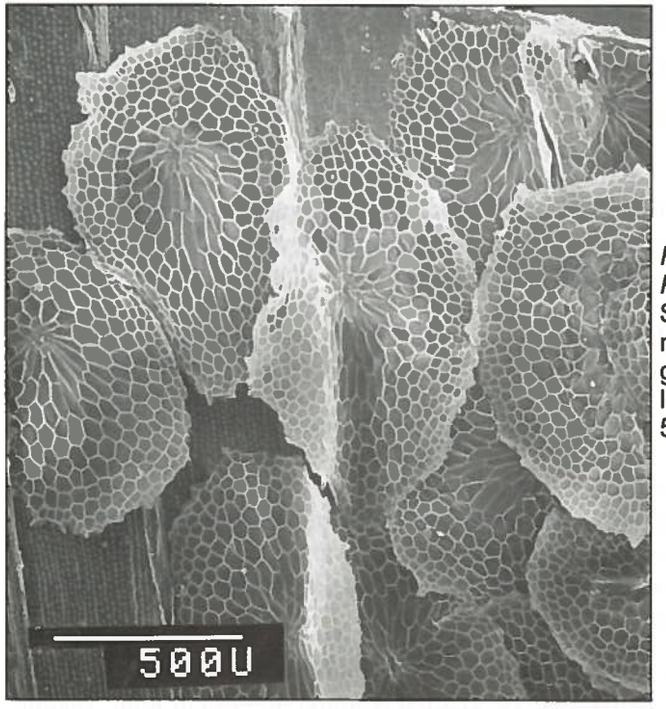


Figure 6.
Pitcairnia cana.
Scanning electron microscope photograph of the scales on lower leaf surface.
50X.

PITCAIRNIA

The new species of *Pitcairnia* described here are known only from flowering collections and do not have mature seeds, the shape of which is a useful character in placing *Pitcairnia* species quickly in one of the two existing subgenera. However, since these new species do not have caudate ovules (which equates to subgenus *Pitcairnia),* and the fact that their closest relatives belong in subgenus *Pepinia,* it is likely that the new species also belong in this subgenus. Recently, subgenus *Pepinia* has been reelevated to genus level after many years of subgeneric status (Varadarajan & Gilmartin 1988a), but I hesitate to recognize subgenus *Pepinia* at the genus level for a variety of reasons.

As far as I can tell, the seed form and shape is the only consistent character that distinguishes subgenus *Pepinia* (with about 45 species) from subgenus *Pitcairnia.* The subgenus *Pepinia* seed type is basically triangular or falcate and has a broad wing that runs around all or part of it, or the wing is absent; in subgenus *Pitcairnia,* the seeds are ellipsoid and always have two long, narrow, hair-like appendages, one at each end of the seed. The *Pepinia* seed type, however, is not unique to subgenus *Pepinia.* It occurs also in what may prove to be closely related species in the genus *Puya.* All of the other characters that Varadarajan & Gilmartin used to help distinguish subgenus *Pepinia* from *Pitcairnia* in the restricted sense can be found in either subgenus.

The species in subgenus *Pepinia* are disconcertingly variable with regard to habit (terrestrial, on rocks, or epiphytic), foliar morphology (from leaves thin, grass-like, drooping and unarmed, to succulent, erect and painfully armed), flower color and shape (from scarlet-red and with strongly bilateral symmetry, to greenish and symmetric), inflorescence type (simple and flowers pedicellate, to compact and spike-like), and petal scales (present or lacking). It is even possible that the typical winged seed described above may have evolved more than once, and the species that we are including in subgenus *Pepinia* (or genus *Pepinia*) are not all closely related. However, until additional work can be done to help clear up the differences between *Pitcairnia* (and its subgenera) and *Puya*, I prefer to follow the traditional classification system.

***Pitcairnia cana* B. Holst, sp. nov.** (figures 4 and 6)

Type. Venezuela. Amazonas: Sierra de Maigualida, northwest sector, headwaters of Río Iguana, affluent of the Río Asita, 1,720 m, 5°43'N, 65°19'W, 25 Mar. 1988, *O. Huber 12706* (holotype, VEN; isotype, MO).

Haec species *Pitcairniae phelpsiae* L.B. Sm. affinis est, sed foliis longioribus 40–46 cm longis (vs. ca. 13 cm longis) supra dense griseolepidotis (vs. glabris), sepalis longioribus 14–18 mm longis (vs. ca. 11 mm), petalis longioribus ca. 20 mm longis (vs. 14 mm longis) ac inflorescentiae ramis longioribus 3–6 cm longis (vs. 1 cm minusve) differt.

Plants terrestrial, colony-forming, canescent-lepidote, to 80 cm tall in flower, stem unknown. *Leaves* ca. 10, erect-spreading, 40–46 cm long; *sheaths*

dark brown when dry, incomplete on only collection known, ca. 2 x 3–4 cm, glabrescent, margins entire; *blades* narrowly triangular, 38–44 cm long, ca. 3 cm wide basally, parallel veins equally prominent, both surfaces densely covered with light gray peltate scales, the scales are elliptic or round and with 7–8 concentric rings of pentagonal or hexagonal cells, blade apex flexible, the tip pungent, margins glabrescent, laxly spinose with brown-black antrorse spines 2–3 mm long, these borne 5–10 mm apart; *interior leaves* well developed. *Scape* terminal, erect, exceeding the leaves, wine-red and sparsely to densely lepidote with light gray furfuraceous scales, 15–39 x 0.4–0.5 cm; *lower scape bracts* leaf-like, to 25 cm long, the upper ones reduced with the sheath-like portion elliptic, thin, apex abruptly or gradually acuminate, the tip 0.5–15 cm long, margins lepidote, spinose. *Inflorescence* once-branched, 11–41 x 3–4 cm, narrowly elliptic or ovoid, many-flowered, longer branches 3–6 cm long; *primary rachis* 4–5 mm wide near the base, slightly zig-zag, gray-surfy lepidote; *lower primary bracts* (2–) 7–12 cm long, ovate to narrowly triangular, densely gray-lepidote on both surfaces, apex abruptly acuminate or gradually narrowed to a pungent tip; *floral bracts* elliptic, 7–10 mm long, glabrous or with a few scattered gray scales; *pedicels* 2–5 mm long, sparsely furfuraceous-lepidote. *Flowers* scarlet red; *sepals* free, convolute, lanceolate, 14–18 mm long, glabrous, apex slightly recurved, the margins very thin and membranous, entire; *petals* free, elliptic, unappendaged, 20 x 7 mm, acute at apex, margins crenulate-toothed. *Stamens* ca. 15 mm long; *anthers* narrowly oblong, 4–5 mm long; *filaments* slender, 10–11 mm long. *Ovary* ca. 1/4 inferior, the superior portion ovoid, glabrous; *ovules* oblong to globose, not obviously appendaged; *style* slender, ca. 13 mm long; *stigma* 3-parted, the branches 1–2 mm long, twisted, papillate ventrally. *Capsule* and *seeds* not known.

The wide range of dimensions of the scape, inflorescence, and primary bract length in the description results from differences between the holotype and isotype specimens. The holotype (VEN) is an apparently well-developed individual with an elongate scape and mature leaves, where the isotype (MO) may be only a young, flowering individual with greatly reduced scape, primary bracts and inflorescence. There is no question, however, that these two specimens belong to the same species. Indeed, they were even collected from the same colony. Intermediates between these are to be expected when further collections become available.

Pitcairnia cana is most closely related to *P. phelpsiae,* a species that grows on neighboring sandstone mountains. It differs from that species by having longer leaves, 40–46 cm long, densely gray lepidote on the upper surface (vs. ca. 13 cm long and glabrous on the upper surface), longer sepals 14–18 mm long (vs. 11 mm), longer petals ca. 20 mm long (vs. 14 mm long), and longer branches of the inflorescence 3–6 cm long (vs. 1 cm or less).

Pitcairnia cana grows among granitic outcrops and in shrub thickets where it can form large colonies. It is known only from the type collection. The specific

Figure 7.
Pitcairnia graniticola.
Habit.

Photos by Otto Huber

Figure 8.
Pitcairnia graniticola.
Close-up of inflorescence.

epithet refers to the gray scales that cover all parts of the plant except the flowers.

***Pitcairnia graniticola* B. Holst, sp. nov.** (figures 7 and 8)

Type. Venezuela. Bolívar: Dist. Cedeño, Serranía Uasadi, NW sector, headwaters of Río Chajura, W. affluent of Río Erebato, 1,850–1,900 m, 5°24'N, 65°07'W, 4 May 1990, *Huber 13095* (holotype, VEN).

Haec species *Pitcairniae kunhardtianae* L.B. Sm. affinis est, sed foliis longioribus anguste ellipticis usque ad 51 cm longis (vs. linearibus usque ad 140 cm longis), scapi bracteis ovatis (vs. late ellipticis) apice abrupte acuminato ca. 1 cm longo quam basi expansa perbreviore (vs. longe lanceolato 5.5–9.6 cm longo quam basi expansa longiore), inflorescentiae ramis elongatis laxifloris plerumque 10–14 cm longis (vs. brevibus densifloris 5–6 cm longis) ac pedicellis elongatis ca. 15 mm longis (vs. 3 mm longis) differt.

Plants forming clumps, terrestrial, rosulate, caulescent, to 1.5 m tall in flower; *stem* with leaf base remnants ca. 6 cm wide, covered with the persistent leaf bases. *Leaves* 6–12, spreading-arching, 22–51 cm long, outer leaves greatly reduced; *sheaths* castaneous apically, 3–4 cm wide, very thick, glabrous, margins spinose apically; *blades* narrowly elliptic, 19–48 x 2–5 cm, coriaceous, parallel veins equally prominent, upper surface densely light gray-lepidote in proximal $^1/_3$, lower surface mostly glabrous or with scattered scales near sheath, scales peltate with the cells of the concentric rings elliptic or multi-angled, blade apex gradually acuminate, pungent, margins spinose and lepidote, the spines to 5 mm long near the base, base constricted. *Scape* terminal, erect, stout, wine-red basally, covered with gray, flocculose scales, ca. 37 x 1 cm; *bracts* appressed, reddish, ovate, 4.5–5.5 cm long, both surfaces gray-flocculose, apex abruptly acuminate with the tip ca. 1 cm long, margins lepidote, lacking spines. *Inflorescence* once-branched, 39 x 8 cm, ellipsoid, many-flowered; *primary rachis* 7 mm wide, sparsely gray-flocculose; *primary bracts* as in scape bracts, but smaller, the lower ones 2.5–3 cm long, equal to or exceeding the internodes; *branches* few, racemose, erect, mostly 10–14 cm long, sparsely gray-flocculose; *floral bracts* appressed to the pedicel and partially enclosing it, green in basal half, red apically, ovate, 9–11 mm long, obtuse and apiculate, the margins entire, membranous; *pedicels* ca. 1.5 cm long, spreading or nodding, sparsely arachnoid-lepidote. *Flowers* apparently actinomorphic; *sepals* free, imbricate, equal, scarlet-red, oblong, thickened basally, 13–14 x 4 mm, glabrous or with a few scattered scales, aprex rounded and apiculate, the margins thin; *petals* free, unappendaged, dark purple-red, spathulate, 21–23 mm long, glabrous, rounded apically. *Anthers* included, oblong, ca. 4 mm long, apiculate; *filaments* ca. 15 mm long. *Ovary* ca. $^1/_3$ inferior, the superior portion ovoid, glabrous, ovules oblong to globose, not obviously appendaged; *style* 11 mm long; *stigma* 3-parted, the branches 1.0–1.3 mm long, twisted together, slightly unequal. *Capsules* and *seeds* unknown.

Pitcairnia graniticola is related to *Pitcairnia kunhardtiana* L.B. Sm.,[1] but differs by having longer, narrowly elliptic leaves to 51 cm long (vs. linear and to 140 cm long), ovate scape bracts with an abruptly acuminate tip, the tip ca. 1 cm long and much shorter than the expanded base (vs. broadly elliptic with a long-lanceolate tip, the tip ca. 5.5–9.6 cm long and longer than the expanded base), inflorescence branches elongated and laxly flowered, mostly 10–14 cm long (vs. short and densely flowered, 5–6 cm long), and elongated pedicels ca. 15 mm long (vs. 3 mm long).

Pitcairnia graniticola forms small colonies in the cracks of large granitic boulders. It is known only from the type collection.

TRANSFER OF SPECIES

***Pitcairnia phelpsiae* (L.B. Sm.) B. Holst & L.B. Sm., comb. nov. Basionym: *Puya phelpsiae* L.B. Sm., Brittonia 7:78. 1950.**

Type. Venezuela. Amazonas: Cerro Yaví, summit, 2,200 m, 1–3 Mar. 1947, *K. Phelps & Hitchcock 68* (holotype, NY, fragment of type, US).

Lyman Smith originally published this species in *Puya* even though he noted it more resembles other Venezuelan *Pitcairnia* species than those of *Puya.* He chose not to place it in *Pitcairnia,* however, because it had a superior ovary and winged seeds, a combination of characters that was apparently unknown in the genus at that time. Examination of a fragment of the type (US), and a recent collection from the type locality (*Huber 11915,* VEN), shows that the ovary is actually about 1/4 inferior. Also, as mentioned above, the alate seeds are the defining character of *Pitcairnia* subgenus *Pepinia.* Finally, its closest relatives are other Guayana Shield *Pitcairnia* species such as *P. cana* and *P. ctenophylla* L.B. Sm.

Pitcairnia phelpsiae is known only from Amazonas State of Venezuela at 2,100–2,300 meters elevation on two sandstone table mountains, Cerro Yaví where the type is from, and Cerro Parú 150 kilometers to the south.

ACKNOWLEDGMENTS:

I am grateful to Otto Huber and Francisco Oliva-Esteve for providing fine collections of the species described here, along with very helpful color slides. Mary Merello helped with the preparation of the SEM plates. I thank Ivón Ramírez, Germán Carnevali, and Paul Berry for their comments on the manuscript, and Roy Gereau for preparing the Latin diagnoses.

LITERATURE CITED:

Varadarajan, G.S.; Gilmartin, A.J. 1988a. Taxonomic realignments within the subfamily Pitcairnioideae (Bromeliaceae). Syst. Bot.: 13:294–299.

Varadarajan, G.S.; Gilmartin, A.J. 1988b. Seed morphology of the subfamily Pitcairnioideae (Bromeliaceae) and its systematic implications. Amer. J. Bot. 75(6):808–818.

[1] *This species appears in the Luther and Sieff* ALPHABETICAL LIST OF BROMELIAD BINOMIALS, *3rd ed., 1992, under* Pepinia.

San Diego World Bromeliad Conference, 1994 – *Bromeliads In Paradise,* Update #4

Jack Percival

Conference chair Joyce Brehm and her southern California bromworkers continue to tackle the myriad details of the June 1994 World Bromeliad Conference. As a happy result, all of the pieces are falling into place to assure a banner, world-class bromeliad conference.

In Update #2 of the July–August JOURNAL, we described several short trips that could add to your enjoyment of the conference activities and persuade you to extend your vacation time in our area. One-day trips such as the following are worth considering:

• **The desert** can be reached easily by leaving the San Diego beach early, driving east up through the Laguna Mountains with a maximum elevation of 5,400 feet and then descending abruptly to the floor of the desert at, or below, sea level, all in one day.

A visit to Borrego Springs in the Anza Borrego State Park is a treat for those who want to see the beauty of the desert. This park is the largest in the United States Park Service. It is excellent for hiking and roving to observe the wild animal and plant life.

• **North San Diego County.** The San Diego Wild Animal Park is about a 30-minute drive from the Hanalei Hotel. In addition to the animals, the park has many exciting plant exhibits. The California Condor Project is being conducted there. On the way to or from the park you may visit a fine and fairly new shopping mall known as North County Fair.

• **Quail Gardens** is about 25 minutes up the coast from the Hanalei Hotel. It is a botanical garden of semitropical plants especially those that live comfortably in the San Diego climate.

• **California Wine Country** is a 60- to 90-minute drive through typical coastal California scenery. Eleven wineries are in one area. Temecula is the center of the area. The wineries serve excellent food at a wide range of prices.

• **Mexico.** Baja California is about 30 minutes away by the San Diego Trolley or by taxi. If you take the trolley you can grab a cab at the border and head for Avenida Revolucion for the tourist center. Tijuana has a population of about 1.5 million. It has a Space Theater in the main shopping center, known as Rio Plaza. A new attraction is the Mexitlan, a display in miniature of the most interesting products of Mexico.

Ensenada, a tourist city, is a major fishing-seaport located 68 miles south of Tijuana. The road is excellent with many Pacific Ocean overlooks. Along the road are fine restaurants noted for their generous portions of California lobster. You need neither a passport or tourist permit to visit Ensenada but Mexican automobile insurance, available at the border is strongly suggested.

We could go on and on extolling the sights and things to do in and around San Diego that make this 11th World Bromeliad Conference a COME EARLY AND STAY LATE adventure.

A reminder: register now for the conference. June 1994 is just around the corner.

San Diego, California

Bromeliad Enthusiasts

Odean Head

Are you a bromeliad enthusiast? Do you want to instigate enthusiasm among your fellow hobbyists and stimulate new growers' interest in bromeliads? Most of us would give an enthusiastic yes to both of those questions. However, our actions quite often do not reflect this enthusiasm.

How frequently we over-commit ourselves with bulging collections and society activities. Even though we may savor our position, we are inclined to make statements to our long-time grower friends similar to the following: "I've got to get rid of a lot of this junk." I could go on with similar negative remarks that you have heard. To make it worse, the friend will quite often agree and add some negative remarks of his own.

Now, we know that either or both will grab the first opportunity to take off for wherever a show and sale is scheduled to be held and return home with a van load of new bromeliads. Both would probably be disappointed if not asked to assume some society responsibility in the coming year and once again will be competing for the top awards.

The biggest damage that may occur from these negative conversations is when they are overheard by or repeated to some of the very growers you have been trying to get more involved. That sort of expressed attitude would certainly slow them down and could turn them off completely.

This brings me to the purpose of writing this article. We all have our down times when our routine becomes boring. It can be contagious and if allowed to continue will adversely affect others around us. So let's think of some possible cures for the doldrums and do some positive things.

- How about changing our display area? I know some women who can lift their spirits by just moving furniture around (or having their husbands do it). Build some new shelves, put some poles in the ground (or hang them), and create new displays by rearranging plants. Find some interesting driftwood and make some unique mountings. These could be either hanging to help fill in the display or larger ones to serve as focal points.

Agree to have your garden on tour and set a target date. You will be amazed how motivated you can become when you know that you will be sharing your accomplishments with others. Invite some nonbromeliad growers from groups that you are associated with. Maybe you can infect some new people with the bromeliad bug.

- Encourage others to get involved with society activities by agreeing to work with them in areas where help is needed. Usually those who work the hardest receive the most benefit.
- Some good, positive thinking might allow you to regain your enthusiasm without taking drastic measures. Try grooming some of your special plants for show and tell. Just finding some time to work with your plants will probably do it.

Bromeliads are enthusiasm.

7818 Braes Meadow, Houston, TX 77071

Reaction of Three Bromeliads to High Humidity During Storage[1]

R.T. Poole and C.A. Conover[2]

Bromeliads are relatively easy to grow specimen plants that provide a long period of effective display when placed in interior environments. Central Florida producers think bromeliads could command a bigger share of the foliage plant market if certain shipping problems were eliminated. During shipping, healthy leaf tissue sometimes develops necrosis on some or all plants within a shipment. Necrosis most often occurs at structurally weak points such as the arched area of the leaf.

Several experiments have been conducted over the past few years in an effort to discover the production or shipping conditions that lead to this damage. In most experiments damage was not produced under test conditions. In the following two experiments, damage was produced on one of three bromeliads tested from the genus *Aechmea*.

Experiment 1 was a 2 x 2 factorial test with 2 replications per treatment initiated on July 12, 1992. Two local growers supplied a number of excellent quality ready-for-sale *Aechmea* 'Friederike' and *Aechmea fasciata* 'Morgana' to CFREC-Apopka. Excellent quality ready-for-sale *Aechmea fasciata* was obtained from two other local sources. Plants were placed in a greenhouse where maximum light intensity at plant level was 2000 ft-c and air temperatures ranged from 70 to 90° F.

On July 16, 1992, plants were sleeved, boxed, and moved to dark air-tight coolers where air temperature was 65° F and relative humidity (RH) was either 90 ± 10%. Plants were watered either three hours or three days before storage. Center vases and foliage of bromeliads watered three days before storage treatments began had dried when plants were placed in coolers. Vases of bromeliads watered three hours before storage were emptied when plants were sleeved and boxed although foliage was still wet. Leaves were checked for signs of developing necrosis after two hours, one day, and three days in storage coolers.

Experiment 2, a 2 x 2 factorial test with 3 replications per treatment, was initiated on July 30, 1992. Locally grown ready-for-sale *Aechmea* 'Friederike' and *Aechmea fasciata* 'Morgana' were given the same greenhouse, irrigation, and cooler treatments as plants used in experiment 1. Plants were sleeved, boxed,

[1] CFREC-Apopka Research Report RH-92-26.

[2] Professor, Plant Physiology and Professor, Environmental Horticulture and Center Director, Central Florida Research and Education Center, 2807 Binion Road, Apopka, FL 32703, respectively.

and placed in 65° F coolers on August 3 and moved back to the greenhouse on August 6, 1992. As in experiment 1, number of necrotic leaves was counted two hours, one day, and three days after storage began.

Results of the two experiments were similar. *Aechmea fasciata* 'Morgana' and *Aechmea fasciata* were not affected by test treatments of pre-storage irrigation or storage humidity. High RH (90 ± 10%) during 65° F dark storage damaged leaves of *Aechmea* 'Friederike' (Table 1). In experiment 1, few necrotic leaves are detected after two hours of storage. *Aechmea* 'Friederike' plants with more necrotic leaves after three days in coolers were those in high humidity or watered three hours before storage.

In experiment 2, necrotic areas were detected on foliage within two hours of placement in coolers. When number of necrotic leaves were determined again after three days of storage, numbers had increased only slightly from when first counted.

Growers report that locally shipped plants in transit for two hours or less sometimes develop the same type of necrosis as produced in these experiments. A combination of wet plants or high air temperature and inadequate ventilation around plants in transit could quickly create a very humid environment. Results of these experiments indicate lower humidity during shipping could be beneficial for *Aechmea* 'Friederike'.

Reprinted by permission of Dr. C.A. Conover.

Table 1. Irrigation treatment and humidity during storage influence number of necrotic leaves on *Aechmea* 'Friederike' grown at two local nurseries, then stored in 65°F dark coolers for three days.[z]

Treatments[y]		Time in Coolers: 2 hours		3 days	
%RH	Irrigation	Grower A	Grower B	Grower A	Grower B
		Experiment #1			
50	3 days	0.5	0	0.5	1.5
50	3 hours	0	0	0	3.5
95	3 days	1.5	0	2.0	3.5
95	3 hours	0	0	1.5	5.5
		Experiment #2			
50	3 days	0	0	0	1
50	3 hours	0.3	1.3	0.3	1.3
95	3 days	6.7	1.3	8.4	2.0
95	3 hours	4.0	4.3	4.7	5.0

[z]Bromeliads were stored from July 16 until July 20, 1992 during experiment 1 and from August 3 until August 6, 1992 during experiment 2.

[y]Plants were watered 3 days before or 3 hours before being moved to 65°F dark coolers where relative humidity (RH) was 50 ± 10% or 90 ± 10%.

Olof Ole Bromell, Whose Name Became Bromeliad

Jason R. Grant

In order to understand better and appreciate the plants one grows or studies, it is often useful to determine where their names came from and what they mean. The name "bromeliad" can be traced directly to a Swede who likely never saw a living plant of the family that bears his name.

Bild-Archiv der Österreichischen Nationalbibliothek, Vienna

Figure 9.
Olof Ole Bromell. An undated, India ink drawing (94 x 98 mm) by an unknown hand.

In 1703, Charles Plumier (1646–1704), French missionary, botanist, and renowned explorer of the West Indies, proposed the name *Bromelia* in his NOVA PLANTARUM AMERICANARUM GENERA in honor of his contemporary, the prominent Swedish medical doctor and botanist, Olof Ole Bromell. The names that Plumier published, including *Bromelia,* became invalid when the International Botanical Congress fixed 1753, the publication date of Linnaeus's SPECIES PLANTARUM, as the starting point of binomial nomenclature. The result was that Linnaeus is credited with the naming of *Bromelia* instead of Plumier.

Bromell was born in Örebro, Sweden, on the 24th of May 1639. He died in Göteborg on the 5th of February 1705. He studied theology and medicine at the University of Uppsala in 1657, was appointed a medical practitioner in Stockholm in 1667, received his medical degree in Leiden in 1673, and became the chief medical officer in the district of Göteborg in 1691. His son, Magnus von Bromell (1679–1731) was also a famous medical doctor, but he is known primarily for his papers on the classification of minerals and descriptions of Swedish plant and animal fossils.

Olof Bromell is known for two botanical works. In 1687, he published the first edition of LUPOLOGIA, a short gardening manual for the countryman. It was

revised in 1740. He is best known, however, for his CHLORIS GOTHICA (1694), the first published local flora of Göteborg.

There are five different spellings or combinations of Bromell's name. During his time, since Latin continued to serve as the international language of scholars, intellectuals, the clergy, and royalty, it was common practice for authors to Latinize their names and that's what he did also. While Carl von Linné is known only as Carolus Linnaeus, there are four forms of Olof Ole Bromell to be found in the literature. For example, Th. O.B.N. Krok in his SWEDISH BOTANICAL LITERATURE cites him as Olaus Olai Bromelius and adds in a footnote another spelling used at the University of Uppsala: Olavus Olavi Bromelius. His medical certificate says Olaum Bromelium. A fourth spelling is shown in the accompanying portrait: Olaus Bromel.

We don't know who first coined the world "Bromeliad," but as L.B. Smith has noted, "it was probably some fairly recent botanist or horticulturist who was tired of having to use the phrase "species of Bromeliaceae...." Whatever the case, we can thank Olaus Bromel for the use of his name.

Dept. of Botany, Univ. of Maryland
College Park, MD 20742-5815

We are indeed sorry to report that **Shirley Grubb**, wife of past President of the Bromeliad Society Jack Burton Grubb, died on 19 September 1993 after a long illness.

Shirley was a leader in the Greater New Orleans Bromeliad Society and editor of their newsletter POTPOURRI for many years. We have quoted frequently from her material, even as recently as in the September–October issue of this year.

We offer our deepest sympathy to Jack.—TUL

The Brazilian Bromeliads; Dr. Wawra's Trip to Brazil In 1879

[a translation by T.U. Lineham, concluded]

PART III

In which the travellers, with various companions, take a special train to Mount Itatiaia, the highest mountain in Brazil (2000–2994 m), scale the highest peak, and after many adventures complete their trip (9–14 July) and return to Europe. To this report are added Dr. Wawra's short discussion of the bromeliads that he collected and a list giving current names.

On the ninth of July, we left for the expedition to Itatiaia. The highest elevation had not until then been explored by any botanist; "las Aiguillas," a group of granite needles that crown the summit were reputed to be inaccessible. We decided to scale them. We went by special train to the town of Itatiaia and spent the next night in the residence of a Brazilian baron who annually harvests 10,000 arrobes (600,000 kgs) of coffee and holds 2,000 slaves. He provided the means of transporting the necessities for putting our bold project into execution; 15 horses (or mules) and 10 porters were added to the five persons composing our little troop. The next day, in the first hours of the morning, the caravan set out under the leadership of an old negro for whom the neighboring country held no secrets; a Brazilian tourist joined our retinue.

First, we crossed fields of coffee and of sugar cane up to the foot of the mountain, which we climbed after passing through forests with large and numerous clearings. Not without difficulties we reached the summit, some 2,000 m. high, about three o'clock in the afternoon (figures 10 and 11). It is an extensive plateau strewn with slightly raised little hills and covered with a thin turf or, in spots, with dwarf melastomaceous trees, all shrivelled and stunted. Small dry and thick clumps of trees grow among the hills. The trees are short and bear truly minuscule crowns on their relatively thick trunks. *Vriesea itatiaiae* (figure 12), the only epiphyte that reaches this altitude, grows on their stems; the last orchids remained well below. All of the trees have an appearance clearly indigenous to Brazil, while the grasses and bushes that carpet the ground are very much like our subalpine vegetation. There is a granite ridge in the middle of the plateau, which at its lower level is parted into "needles;" at its base the grass is very tall and almost impassible in places. The trunks of *Lomaria tabularis* half a meter thick rise from the ground, topped with tiny leaves, and are typical of the flora of this area.

We made as our headquarters a wooden hut that we came upon on the plateau. It was used by stable-boys who climbed the mountain at regular intervals to round up some horses that were allowed to graze freely by themselves during most of the year.

Luiz Claudio Marigo

Figure 10.
The summit of Mount Itatiaia showing the grassy plateau with hillocks and shrubby growth.

Luiz Claudio Marigo

Figure 11.
A general view of the summit showing gigantic boulders tossed about and, in the distance, the needles.

Journal of the Bromeliad Society Index
Volume 43, 1993

Covers (unnumbered pages) are listed as if numbered. Page numbers in *italics* indicate black and white illustrations; those in **bold face** indicate color photographs. New species or those with status changes are shown in both *italics* and **bold face.**

On the 11th of July, by earliest daylight, we—the two princes, two servants, the guide, the Brazilian tourist, and I—began the ascent of the peak. Before getting into the specific details of the climb, I shall try to point out that the route we took describes an ellipse: we took the east flank and bearing little by little towards the south and then towards the west, we reached the top. We then climbed back down on the north side while following a direction slanting strongly toward the east in such manner as to reach the plateau not far from where we had started.

At the base of the crest, and rising sometimes all the way up to the lower third of it there are, especially toward the south, gigantic boulders tossed about and piled up one on top of the other in a confused manner, completely devoid of vegetation (on the southeast side), covered here and there by overhanging bushes (on the east side), or separated by empty spaces filled with brambles and bushes covered over with thick moss (on the north and northeast sides) in such manner as to make passage perilous, if not impossible. Given no other choice, we had to slide down into hollows that seemed less obstructed and in laborious fashion work out a path in the midst of talus.

The climb began from the mass of bald rocks on the southeast side. By jumping cat-like from one block to another we reached a mound formed of accumulated debris. We had to climb it because it was out of the question to go around the deep ravine that bordered it on each side. It was fortunate that the surrounding, rocky surface was extremely rugged making a misstep next to impossible; that could have had the most serious consequences. There we were on top of the hillock when my climbing staff—we had cut a half-dozen the evening before—suddenly slipped from my hands and slid through a crevice in the rocks and stopped just at a moderate depth. Willing or unwilling, I had to go after it because without the staff it would have been folly to think of proceeding.

Barefoot and having shed all unnecessary clothing, I proceeded to make the perilous descent and reached the desired object. But I was scarcely easy in my mind in this deep and dark precipice. The thought of hideous snakes with which this country abounds and of all kinds of devilish creatures ran through my head. It was with a sigh of relief that I set foot again on the rock where my companions awaited me. Once clear of that accursed, shaky lump we reached the western flank by which we were going to attempt to scale the mountain, but first we sat down near a spring to catch our breath and to have a bite. Meanwhile, our guide went off to look for a way that could lead to the base of the granite pinnacles, which seemed inaccessible. He came back after two long hours announcing that he had found the path. I estimate that the vertical distance between our camp, which was at 2300 meters, and the tops of the pinnacles was about 400 meters.

These pinnacles, or needles, rest on a granite pyramid about 250 m. high, with precipitous sides, bare for the greater part of their expanse. Their surface on the east side is creased with large and deep abysses (figure 11). On the west, on

the other hand, it is only slightly cut by humus-filled grooves that divide it into large holes where *Ruckia itatiaiae*[12] grows, the bromeliad that reaches the highest altitude (figure 13). It was by means of these grooves, and where they were lacking, by means of the smooth surface of the rock, that we had to reach the summit. We clung to the rugged rock like flies to a window pane, crept on all fours, frightened from time to time by the sight of a snake sleeping in the sun; a silly scare, moreover, because the animal moved off in all haste and we had only to wait until the way was clear. Just imagine from this picture what the descent must be like along those pointed rocks. We did it in a squatting position with awkward movements, just like a great bug on its back and waving its legs in desperation and unable to get its balance. At times, whether we wanted to or not, we had to take up a faster pace; that is how one of us happened to fall head over heels and make a dive of some twenty meters.

At last, there we were at the base of the pinnacles. They rise almost vertically to a height of 150 meters. They are joined at the bottom where they form a compact, rocky block. That base becomes divided up higher into a number of prisms of unequal length, pressed one against the other. The outer ones—half a dozen on our side—are more spaced and taller than those in the center. The latter with their mossy tops form a kind of flat space that the outer needles surround like a picket fence. The climb from this plateau presented immense difficulties, which the lack of any kind of climbing equipment made almost insurmountable.

And so it was only after two hours of work, as difficult as it was dangerous, that we reached the highest point of the Brazilian empire. Since we were the first to venture this perilous feat, according to the information we were able to gather, I really believe that I should mention for posterity the names of those who took part: the princes *August* and *Ferdinand* of Saxe-Coburg, Dr. *Wawra,* the valets *Herrmann* and *Strobl,* and our guide. As for the Brazilian tourist, weariness chained him to the base of the needles.

Having reached the summit, we determined that the plateau is formed of two parts of equal height, one to the east and the other to the west, sloping one toward the other and separated by a deep chasm. The first one is completely sterile, a condition that makes it seem both rugged and cracked. The other, on which we found ourselves, is covered with relatively abundant vegetation. The exterior pilasters, three meters thick, exceed the interior ones by four to eight meters. The former are of a slightly more equal height and so close together that one can jump across the gaps separating them without looking and it is in this way possible to travel around a large part of the plateau. The greatest caution is, however, necessary because the deep, open cracks between the rocks are frequently hidden under thickets and mosses, and the slightest misstep would have the gravest consequences.

[12] *Fernseea itatiaia* (Wawra) Baker. Wawra named this "Bromelia? (Ruckia) Itatiaiae." H.E.L. adds: "This combination [Ruckia] seems to have been overlooked by all subsequent authors as well as INDEX KEWENSIS."

Once on the plateau, we rested for a while and gave ourselves up to contemplating the colossal perspective spread before our gaze. To the east, we could observe and recognize, one by one, in the distance of many miles, the towns and settlements through which we had passed since leaving Rio. The town of Itatiaia itself rested at our feet in lilliputian grandeur. Everywhere else, all is forest, shade, and quiet. From the heart of this immense area, Itacolumi rose quite near us, but its summit was much below ours. Over its top we made out the great plain and innumerable peaks that are scattered about it.

The critical phases of the descent have already been described. It will be enough for me to add that the obvious indications of a thunderstorm appeared toward evening. The weather clouded over while we were going through the maze of debris and rocks and we would have come to harm had we been overtaken by night or by a storm. We had to get out of that area at any price and climb back down to the high plain, where we arrived at twilight without mishap.

On the 12th of July before dawn we were ready to resume our way but black clouds had gathered over the countryside during the night and there could be no question of travelling the broken and rough road that would lead us to the plain in the wan moonlight. We just had to wait until day.

At about six o'clock we got under way. We were still just beginning the perilous descent in the middle of the virgin forest when the storm struck. We had to dismount and lead our horses by the bridle. Soon the tempest was as its peak. We were in the midst of the storm. Lightning lit up the area in front of and all around us; it seemed to come from the ground rather than from the clouds and the continuous rolling of the thunder set off frightful reports causing the surrounding gigantic rock masses to shake. It was a real tropical hurricane and we experienced it at first hand. Men and horses slipped and fell on the slick ground. The constant stumbling of the horses created a dangerous situation for the horseman who was in front.

At last, after four hours of march—if it is possible to give that name to an uninterrupted series of tumbles and leaps—we reached the flat plain. There, the sun was smiling as if nothing had happened and gaily illuminating the sorry condition of our persons. All of these misadventures did not prevent me from botanizing and filling our containers with the most beautiful and interesting specimens of the plant kingdom. The afternoon was greatly advanced when we left for Rio. The time allotted for our stay in Brazil had, however, slipped away.

On the 14th of July, their highnesses granted us our going-away audience and deigned to sit with us at an intimate dinner in Prince August's palace. On the 15th, we embarked on the *Orinoco,* a vessel much like the *Niger,* and his imperial majesty accompanied the princes all the way to the embarkation point. The *Orinoco* retraced our earlier route and we took final leave of each other in Paris (5–9 August).

Figure 12.
Vriesea itatiaia.
In Dr. Wawra's words, "the only epiphyte that reaches this altitude (2,000 m) growing on the stems of the shrubby growth." Plate number 31 (double). ITINERA PRINCIPUM S. COBURGII (see p. 206, preceding issue).

Photographs by Marcel Lecoufle

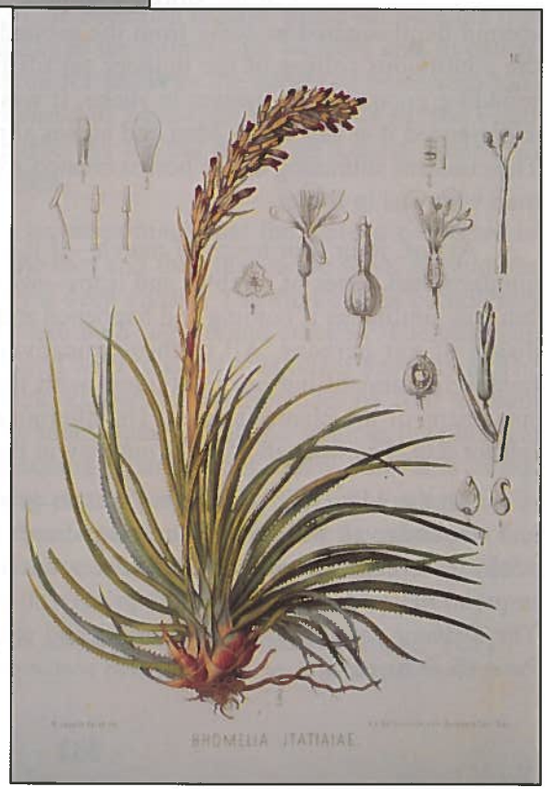


Figure 13.
Fernseea itatiaia.
The bromeliad that reaches the highest altitudes lacks the beauty of *Vriesea itatiaia* but it is protected because of its rarity. These bromeliads of Itatiaia were described in JOURNAL 1985, pages 243–245 and 250. This is plate 19 of the ITINERA.

CONCERNING THE BROMELIADS COLLECTED DURING THE TRIP MADE BY THE PRINCES AUGUSTE AND FERDINAND OF SAXE-COBURG TO BRAZIL IN 1879

BY DR. HEINRICH WAWRA

During this trip, our attention was directed especially toward bromeliads with the result that in spite of the short duration of our stay in Brazil—scarcely six weeks—and at an unfavorable time of year, we collected not fewer than 45 species of these pleasing plants.

Close examination caused me to recognize, to my surprise, a goodly number of these species as new, but since this family enjoys special vogue among amateur gardeners, and most of the species have been based on cultivated specimens, it could well be that numbers of these plants have lost their original appearance under the influence of the artificial growing conditions thus leading to new species. On the other hand, it is possible that a plant collected in its habitat could be considered specifically distinct from its sisters [which have been] altered by cultivation and become the origin of a new species. I must, however, make the observation on this point that, in their native land, bromeliads belong to the least variable of vegetable classes: each species has well-determined characters; the very dimensions stay nearly constant among various specimens of a single species.

The greatest care was then required. Before giving thought to describing our plants we had to commit ourselves to considerable preliminary work, to submit the entire family to a thorough examination with the help of undigested and confused literature. I visited, moreover, all of the important gardens of Vienna to see the greatest number of the types on which new genera were based. The quantity of genera has grown since Endlicher's time from 16 to almost 80 and, remarkably enough, the former basic genus *Bromelia* has become completely lost in this huge partitioning.

I have believed it preferable in my work to hold to the more relatively senior classifications especially to those published by Lindley in the twelfth volume of the BOTANICAL REGISTER. There, only when required by the increased understanding relating to this group of plants, have I had recourse to one of the new names indicating in parentheses the recently created genus to which the species being described might belong. More than once I have had to compose the diagnosis of a genus.

In conclusion, this classification must be considered provisional and valid only until the day when a qualified pen shall subject this much tormented family to a rational and methodical examination.

In spite of the author's efforts to describe and identify these collections, there seems to be little point in continuing the translation when two-thirds of the names have been changed in some way and the descriptions are available in the Smith and Downs monograph, Bromeliaceae, (Flora Neotropica, *number 14, parts 1–3; 1974–1979). Instead, the following table lists the plants by their current names and Dr. Wawra's collection numbers.*

Current name	Wawra's Collection No.
Aechmea fasciata (Lindley) Baker	59
A. nudicaulis (Linnaeus) Griesebach	438
A. organensis Wawra	317
A. purpureorosea (Hooker) Wawra	239
A. ramosa Martius ex Schultes f.	131
Billbergia reichardtii Wawra	197
Fernseea itatiaiae (Wawra) Baker	442
Neoregelia cyanea (Beer) L.B. Smith	140
N. tristis (Beer) L. B. Smith	357
Nidularium antoineanum Wawra	321a,b
N. fernando-coburgii Wawra	101, 370
N. fulgens Lemaire	359
Pitcairnia albiflos Herbert	203, 380
Portea petropolitana Wawra	63
Portea petropolitana var. *noettigii* (Wawra) L.B. Smith	108
Quesnelia augusto-coburgii Wawra	185, 196
Quesnelia blanda (Schott ex Beer) Mez	273
Q. lateralis Wawra	315
Q. liboniana (DeJonghe) Mez	221
Tillandsia geminiflora var. *incana* (Wawra) Mez	508
T. globosa Wawra	142
T. linearis Vellozo	223
T. stricta Solander	439, 516
T. tenuifolia Linnaeus	142a
T. tenuifolia var. *vaginata* (Wawra) L.B. Smith	212
Vriesea bituminosa Wawra	25
V. carinata Wawra	no coll. #
V. corcovadensis (Britten) Mez	224
V. ensiformis (Vellozo) Beer	126a, 166b
V. geniculata (Wawra) Wawra	3, 212
V. incurvata Gaudichaud	86, 95
V. inflata (Wawra) Wawra	219
V. itatiaiae Wawra	36c
V. jonghei (K. Koch) E. Morren	328, 339
V. morrenii Wawra	72, 350
V. paraibica Wawra	184
V. philippo-coburgii Wawra	1
V. procera (Martius ex Schultes f.) Wittmack	202, 515
V. psittacina (Hooker) Lindley	2, 216
V. psittacina var. *decolor* Wawra	266
Wittrockia superba Lindman	233

Regional Reflections

They Don't Always Follow Our Rules

When growing our plants we like to be "horticulturally correct," and there is a large body of bromel lore about the "right" cultural needs of different genera and species. This lore has developed from deductions made after observation of the plants in their native habitats as well as from the experiences of individual growers.

However, some plant delinquents just refuse to respect the rules we try to make for them. Here are a few instances where experience with one plant or genus contradicts the cultural generalization.

• **Fertilizing tillandsias.** Tillandsias are generally considered to be nutrition-starved in nature, and growers have assumed that in cultivation they need minimal or no fertilizer. But our trial and error testing over the past few years shows that tillandsias do best given lots of fertilizer.I soak my tillandsias in the bathtub for 45–60 minutes every 7 to 14 days and add 6 tbsp. of 20-10-20 fertilizer plus 1 tbsp. of Epsom salts (magnesium sulfate) to the water. The overflow is only $9\frac{1}{2}$" high and the bathtub holds about 35 gallons of water. The tillandsias grow like weeds and they flower and multiple-pup quicker than ever before, without a sign of leaf burn or discoloration. I plan to increase the fertilizer to 8 tbsp. in the spring and slowly increase that strength until I see signs of fertilizer damage.

• **Fertilizing potted plants.** Growers have always been advised to go light on fertilizer because of the fear that too strong a concentration might burn the center cup or might wash out leaf markings. Over the past 2 years I have fertilized my plants every 10 to 14 days with the same 20-10-20 at a strength of $\frac{3}{4}$ tsp. to 2 quarts of water and $\frac{1}{8}$ tsp. Epsom salts. I fertilize even in the winter, although less often, usually every $2\frac{1}{2}$ to 3 weeks.

The plants are now all wick-watered. Except on neoregelias, cryptanthus, and dyckias the fertilizer is poured directly into the cups and is allowed to remain about 40 minutes. I then fill the plant with fresh water to flush out the fertilizer, as it appears the plants absorb nutrients for only about 25 minutes. I don't fertilize neos and I foliar feed the crypts and dyckias. I also use slow release pellets in the mix of those three genera and some individual aechmeas and vrieseas.

I have never had such strong growth and quick blooming as I have had the last year. The high-strength fertilizer regimen seems to have been particularly

effective in producing multiple-branched inflorescences in vrieseas such as *V.* Asahi, *V.* Charlotte, *V.* Christine, and *V.* x *poelmannii*, which used to put up only single or a few spikes.

• **Tank vrieseas.** Bromel lore has it that vrieseas such as *V. fenestralis, V. hieroglyphica, V. gigantea,* and *V. fosteriana* need to be grown dry. Their leaf axils hold an enormous amount of water, and the water in the lower axils tends to grow stale and foul and to host algae, fungus, molds, and slimes. The implication is that we should not keep water in the leaf axils. Bromel lore further holds that these plants do not like to have their feet kept wet and prefer a drier mix.

However, I have been growing these plants wick-watered in bright light. Because I flush out the fertilizer I apply every 10 to 14 days, the leaf axils have lots of fresh water. These plants with constantly moist "feet" have been growing splendidly.

• ***Orthophytum navioides.*** In the December 1991 issue of BROMELIANA we reprinted an article from the Houston Bromeliad Society Bulletin by Tony Novak extolling the virtues of *Orthophytum navioides.* Indeed, it is a very attractive plant that turns rosy red when it sends up fragrant white flowers. Tony indicated that this native of Bahia, Brazil, grows on rocks and while "slightly more tender than other family members, it requires bright light as a prime culture factor." He quoted Dr. Werner Rauh's description of it as extremely xerophytic, meaning very dry in moisture needs, and opined that it "is an adaptable plant for home growing needs...."

At the foot of that article I noted that contrary to that rosy expectation, we in New York had great difficulty in keeping *O. navioides* alive. Our plants kept dying back from the tips with brittle brown leaves until they succumbed despite bright light and adequate humidity. I stated: "I am beginning to suspect that the plant's xerophytic reputation is an over-simplification," and indicated the need to find more plants to test to clear up the mystery.

Orthophytum navioides is not readily available, but last spring I got one from Carol Johnson of Pineapple Place. At her suggestion, it was shipped in a pot, had flowered and was showing a tiny basal pup. Carol recommended not removing the pup and allowing it to grow on attached to the parent.

I potted the plant in my regular friable bromel mix with a nylon wick and placed it on a wick tray in an unobstructed east window that received 2–3 hours of morning sun. I am pleased to report that this *O. navioides* has evidently lost its xerophytic memory and has been happily growing in an evenly moist, wick-watered medium. There are now 3 strong pups growing basally attached to the parent. I cut the parent's leaves almost back to the center to give maximum light

to the pups. I fertilize these offsets with a foliar spray of my regular strength fertilizer.

•**Nidulariums.** This genus has a reputation of tolerating only low to moderate light levels although it is a member of subfamily Bromelioideae and all of its species have leaves with spines. Indeed, *Nidularium innocentii* var. *lineatum,* one of my favorite bromeliads, seems to grow best and develop the strongest white lines under Vita Lite fluorescent tubes. (My light setup certainly provides moderate light or better since it has 6 tubes with silver mylar reflectors.)

However, at least 3 species contradict the low-light generalization: *Nidularium fulgens, N. regelioides,* and *N. billbergioides.* Grown under low or even moderate light, *N. fulgens* develops dark green, long, arched-over leaves and it is difficult to see its leaf spotting. When it is grown in a full-sun, unobstructed south window, however, this plant grows compactly with stiff, broad, yellow-green leaves that are covered with brown and dark green splotches. To a lesser extent the same can be said of *N. regelioides.*

For a number of years we have purchased *Nidularium billbergioides* in bloom with a yellow inflorescence. (The plant was called var. *citrinum,* but that varietal name is no longer recognized.) Most of us have had a lot of difficulty in establishing pups from these plants. The purchased plants had all been forced to bloom and usually were not fully mature or strong.

I finally managed to establish a pup of *N. billbergioides* on a capillary mat set back from an east window, shaded by plants in front of it. Its leaves were narrow and dark green. Then I came across a brochure from the Bak Nursery in Holland, which has been exporting the plant. The brochure contained simplified cultural information about pot size, maximum light requirements, etc., and I was surprised to note that Bak recommended the plant be grown in strong light.

I promptly moved my *N. billbergioides* to a wick tray in a south window and it has responded with vigorous growth. *N. fulgens* and *N. regelioides* have prominent spines whereas *N. billbergioides* leaves are inconspicuously serrate. Nevertheless, the plant likes strong light despite its reputation to the contrary.

Herb Plever
Reprinted from the New York Bromeliad Society newsletter
Bromeliana, *March 1993 by permission.*

Roots

Bromeliad growers seldom get together to talk about roots. Mostly, the subjects are color, size, or bloom. Perhaps, like me, the whole subject is somewhat of a mystery. Bromeliads are mainly epiphytic plants, yet we have given their root systems a whole new function. Since it is possible to foliar feed nearly all bromeliads, then the potting process is merely for the convenience of the grower. Right? Well, not really. The plants we grow in pots and soil are a far cry from what are collected in natural habitats. With soil and fertilizer (in judicious proportion) it is possible to get large, healthy, as well as beautiful specimen plants. At any rate, we all strive to get our offsets to root and that process is the purpose of this article. Let's start making roots...

• **Rooting in perlite.** The Florida Federation of Garden Clubs held its State Flower Show in Orlando earlier this year and I was asked to classify the bromeliad entries. Among the entries were two baskets of *Neoregelia* 'Fireball'. One basket had nice, red-leafed plants. The other basket contained well grown, healthy, green plants and the entry tag said: "Neo. fireball, green form." There is only one *Neoregelia* 'Fireball' and it is red or green according to the treatment of the roots plus good light, of course. Good, red, neo fireball offsets, rooted for about a month in a tray of moist perlite will seldom lose the red color in the process, whereas putting them directly into soil nearly always makes the plants turn green and often produces excessive growth. Hint: When potting from perlite, do not shake all the perlite off the new roots. Offsets rooted in perlite prior to potting will usually maintain foliage color and this is important especially for the small neoregelias because many of them lose color through at least one blooming when potted directly into regular mix.

• **Bottleneck rooting.** Often, a parent plant is almost gone and there is one small offset remaining. The offset is getting no help from the host and will surely die. There is a way to save it. Fill a small-necked glass bottle (a 6-oz. Coke bottle is ideal, but scarce nowadays) about $^{2}/_{3}$ full of water—just water. Put the offset into the neck of the bottle above the water, not in the water. If the offset falls through, the bottleneck is too big. The stub end of the pup reaches for the moisture and in the process forms roots. It works. Sometimes very, very well. I once had to break the bottle to get the roots free. Results are best with Bromelioideae species, but try it with *Vriesea* and *Guzmania* species also.

• **Empty pot.** It is possible to grow perfectly beautiful bromeliads in an empty pot. Why not? That is the way Mother Nature designed them. For many years I have grown *Vriesea* 'Red Chestnut' plants upright in empty pots. Vrieseas have very poor root systems and during our hot, very humid Florida summers it becomes a losing battle: root prune and repot, pull off dead lower

leaves and repot. Seedling *V.* 'Red Chestnut' plants seem to be OK in soil, but when the base gets big and solid it is time for the empty pot. No leaf drop, very little root development, but the plants do grow and bloom. It is best to use heavy, clay pots for the big plants. *Vriesea guttata* does well in soil through the winter months, but unless I bare-root them and grow them through the summer in empty pots, the plants are just barely alive come fall. Some neoregelias of the concentrica type do very well in empty pots. Roots of *Canistrum lindenii* regularly push out onto the soil surface and the plants do very well in empty pots.

•**Rooting season.** Many years of observation have convinced me that all plants respond to lengthening and shortening days. This has been proven in the production of other plants, but no real study has been made of the bromeliad family. Some growers are convinced that bromeliads have an inherent blooming instinct. For example, a vriesea native to Brazil, which blooms there in September (spring) will bloom in Florida in September also. Actually, nearly all of my vrieseas from south of the equator begin the bloom cycle in February (lengthening days) and are through before summer. But, we are discussing roots. It is a real temptation during our warm October and November days in Florida to take and pot offsets from those plants that have finished blooming and are busily reproducing. This past winter was a good example. But, very few of the offsets taken and potted during that time made any appreciable growth until the lengthening days of February and March. Plants dependent on strong light, such as neoregelias, were the slowest to respond. What I am really trying to say, simply, is do not expect offsets to root well during short days.

•**Root pruning.** Lower leaves of many bromeliads regularly go bad and drop off (or must be pulled off), leaving a gradually growing trunk-like stem. *Neoregelia* species such as *carolinae, concentrica,* and *carcharodon* are good examples. Generally, the shy bloomers. I once judged a *Neoregelia carolina* f. *tricolor* that was deliberately grown with an 8-inch bare trunk. It was attractive and our judging panel was put to the test. We finally gave the plant a red ribbon with a notation that we did "not want to encourage this type of exhibit."[1] Such plants can be cut off anywhere along the stem, repotted, and they will produce new roots. The plant usually alters its growing habit after such repotting, so many growers simply cut off most of the roots and repot in a deeper or bigger pot.

• **Pot size.** Those of you who grow bromeliads from seed know that the more often you step up a seedling, the faster it will grow. That is why seedling bromeliads seldom have good form until the second generation. It takes that long to get rid of the baby fat (extra roots). The usual rule is, underpot to control size (fewer roots), overpot and feed for maximum size (abundance of roots).

[1] *Did anyone ever claim that bromeliad judging was an exact and objective process?*—Ed.

• **Mounted plants**. Plants bare-rooted for shipping or mounting, which have been grown in pots, may as well have their roots trimmed way back. The new habitat requires new roots and new growth habits.

Plants communicate well. If you are doing something wrong, you may be certain that they will tell you so.

Carol Johnson
Reprinted with permission from Florida Council of Bromeliad Societies, Inc. Newsletter, *June 1993.*

Carol Johnson has contributed frequently to the JOURNAL *and a note about her qualifications may interest readers who don't know her. Her interest in bromeliads began with a specimen of* Billbergia pyramidalis *probably in the late summer of 1968. Since then she has been general chairman of the 1980 World Bromeliad Conference (Orlando), a founder of the Florida Council of Bromeliad Societies, and organizer of the Seminole Bromeliad Society. She owns "Pineapple Place," where she cultivates some 1200 different kinds of bromeliads and edits the Council Newsletter. This editor has great respect for Carol's opinions.*—TUL

WE ARE VERY GRATEFUL TO THE MEMBERS who have contributed to the Color Fund, or who made undesginated gifts to the society, since our acknowledgment of gifts in the March–April 1993 issue. We appreciate the thoughtful generosity of:

Marie Besselieu
Catherine Buckley
Steve Daly
E. Josephine Deville
Ed Doherty
John Donald
Susan Ewalt
Jeanne Gayler
Jeffrey Jilg
Carolyn Johnson
Eleanor Kinzie
Bess Littleton
George & Marilyn Long
Whit Merrin
Kay Natscher
Geoff Nicholson
Danielle Okin
A.M. Oshag and Ann Stucky
Atsushi Shirai
Lloyd Van Epps
Ernest Vosila
Neal White
K. Woods

Decisions Made at the May 1993 BSI Meetings

These notes are a digest of the minutes of the 1993 annual general and the Board of Directors' meetings held in Houston, Texas, on 8 May 1993. The minutes have been distributed to the members of the board and are subject to approval at the next annual meeting.

1. The annual general meeting was convened on 8 May 1993 and then adjourned for lack of business items.

2. The annual Board of Directors' meeting was convened immediately following the general meeting. All members were present except Enrique Graf, Maurice Kellett, and Jacqui A. Watts (international directors) and Frank Messina, Jerrold A. Robinson, and Thelma Mean whose absences were excused.

3. Tributes were paid to the memory of former director Harvey R. Bullis, Jr., who died 15 November 1992, and to the memory of Mrs. Albert Hodes, wife of Director Albert Hodes.

4. Changes in board composition.

a) New directors were welcomed by the president:
1993–1995—*California*, Pamela Koide; *Florida*, Geoffrey Johnson (reelected); *Louisiana*–Fred Ross; *Texas*–Don Garrison.
1994–1996—*California*, Lloyd Kiff, Roger Lane; *Florida*, Hattie Lou Smith.

b) Continued in office since no replacements were elected: *Central*—Thelma Mean; *International*—Enrique Graf, Jacqui A. Watts; *Northeast*—Albert Hodes; *Southern*—Sharon Garcia; *Western*—Mark Dimmitt.

5. Officer and committee reports:

a) Vice-president (World Conference Committee chairman). Will prepare written guidelines to assist host societies to prepare for future world conferences.

b) Editor. The proposed illustrated glossary revision authorized in 1992 has been cancelled.

c) Membership secretary.

1) The new membership roster is being prepared.

2) The treasurer and membership secretary determined that a VISA account is not feasible.

d) Treasurer. Standing Rule 10 concerning the Victoria Padilla Memorial Bromeliad Research Fund was restated and will be published in the next revision of the bylaws.

6. New business.

a) Terms of office. Officers other than the president and vice-president shall serve at the pleasure of the board instead of being elected annually (with certain restrictions and qualifications). The bylaws change will be published.

b) Succession of officers. (The current bylaws do not specify the succession). If the presidency is vacated, the vice-president shall complete the unexpired term and if he is unable to assume those duties, they shall devolve on the most senior officer or director, as determined by the membership secretary and the secretary, subject to confirmation by the board at the earliest possible date. The bylaws change will be published.

c) Editor. With respect to specified back issues of the JOURNAL, authorized to set special sale prices, to dispose of excessive quantities at salvage value, and to rent storage facilities.

d) Membership. Recommendation to make membership dues not refundable. Approved.

e) Treasurer.

1) Action to establish a new fund to receive memorial and other gifts was approved. (To be stated in the revised bylaws.)

2) The annual financial report and recommended budgets for 1993 and 1994 were approved for publication in the September–October 1993 issue of the JOURNAL.

f) Affiliated Societies.

1) The affiliation of the North County Bromeliad Society (California) was approved.

2) The chairman was directed to cease publishing a newsletter but to solicit information from affiliates about their activities, and to forward edited reports to the editor.

g) Conservation. The proposal to reimburse Pamela Koide for expenses incurred in surveying the range of *Tillandsia mauryana* was approved for funding as a research project.

h) Publication sales. The request by the chairman for compensation was denied.

i) World Bromeliad Conference Committee. The proposal to fund the preparation of a poster for the 1994 WBC was tabled.

j) Writing contest. The recommendation by the vice-president for a BSI-sponsored essay contest was approved. The president will appoint a committee to organize and supervise the contest, and judge the entries, which will be published in the JOURNAL.

k) Editor Search Committee. The president appointed himself chairman of a committee consisting of Tim Calamari, Albert Hodes, Thelma O'Reilly, Jerrold Robinson, and Tom Wolfe.

Election of officers and committee chairmen. There being no slate proposed, the board as nominating committee proposed the incumbents with two exceptions: *Cultivar Registration Committee*–Ellen Baskerville, vice Don Beadle, resigned. *Finance & Audit Committee*–Don Garrison vice Odean Head, resigned. The board then approved the nominations.

11TH - WORLD BROMELIAD CONFERENCE

San Diego, California
June 15-19, 1993

LOOKING FOR THE BEST AIR FARE FOR YOUR TRIP?

CALL SUNDANCE TRAVEL INC. AND ASK FOR THE GROUP DEPARTMENT
(714) 752-5456 • (800) 424-3434 • EXTENSION 195
MONDAY THROUGH FRIDAY 8:00 A.M. TO 6:00 P.M. PST
FAX YOUR REQUEST TO (714) 474-1572

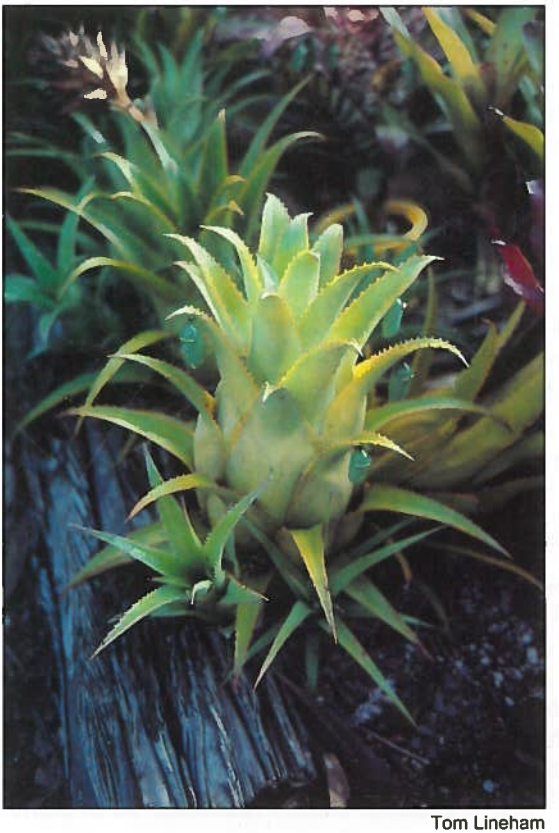
Special air fares have been negotiated with United Airlines (United Airlines Meeting ID #541CA). 10% DISCOUNT off any full coach fare and 5% DISCOUNT off the lowest applicable air fare.

Reservations by Fax
Please Fill Out The Following Information

PASSENGER INFORMATION		
Meeting Participant Name:		
Companion Name:		
Mailing Address:		
City:	State:	Zip:
Bus. Phone:	Home Phone:	Fax:
AIR RESERVATIONS		
Departure Date:	Departure Time:	
Return Date:	Return Time:	
Nearest Commercial Airport:		
Aircraft Seating: Window: ☐ Aisle: ☐ (request for a window or aisle cannot be guaranteed)		
Special Meal Requests:		
Preferred Airline:	Frequent Flyer Number:	
CREDIT CARD		
Credit Card Name:	Card Number:	
Signature:	Expiration Date:	

The Bromeliad Society, Inc.

The purpose of this nonprofit corporation is to promote and maintain public and scientific interest in the research, development, preservation, and distribution of bromeliads, both natural and hybrid, throughout the world. You are invited to join.



Tom Lineham

Monarch butterfly caterpillars often like bromeliads as their final resting place and I have found many hanging under aechmea and billbergia leaves. Some are there now. I wonder if the spiny aechmea leaves help to keep predators at bay? I still think of Ernie Healey's garden one year when his large clumps of *Aechmea recurvata* were host to literally dozens of green chrysalises. *Laurie Dephoff*

From Bromeliad Society of New Zealand Bulletin, *May 1990. With our thanks to Laurie, Bea Hanson, and Harry Martin for their help in finding this paragraph. The picture shows four chrysalises hanging like Christmas ornaments from a large* Aechmea recurvata *var.* recurvata *in Ernie's garden just as Laurie remembered them. The date was April 1989.—TUL*

Calendar

13–14 November	Caloosahatchee Bromeliad Society presents "Treasures of the Rain Forest," a standard show and sale. Lee County Garden Council and Activity Center, Fort Myers, FL (located directly in front of Lee Memorial Hospital on U.S. 41 (Cleveland Ave.) about 1 mile south of the Caloosahatchee River bridge. Saturday 9 a.m. to 5 p.m.; Sunday 10 a.m. to 4 p.m. Hattie Lou and Sam Smith 813-694-1135.
15–19 June	San Diego World Bromeliad Conference. 1994, "Bromeliads in Paradise." Hanalei Hotel, 2270 Hotel Circle North, San Diego, California 92108. Please see pages 257 and 280 for activities and advertising. Joyce Brehm, 5080 Dawne St., San Diego, CA 92117, 619-277-1030.

The deadline for articles, ads, calendar, and other notices for the March–April 1994 issue of the JOURNAL is 1 January 1994.