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Front Cover: *Pepinia leopoldii photo* by Matthias Asmuss. Story on pg. 100

Back Cover: Navia species on rock wall. Photo by Eloise Beach. Story on pg. 100

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PAGE 113

PAGE 119

PAGE 139

CONTENTS

King Leopold's Silver Treasure

Matthias Asmuss & Eloise Beach

King Leopold must have been a real adventurer to march through this endless and unknown territory near 60 years ago. In a moment of lunacy, we decided to visit a mysterious lake deep within the vertical walls of a crumbling tepui and rediscover a silver treasure named for this valiant king of Belgium. To organize this trip seemed almost as difficult as the trip itself. Eloise Beach was the driving force who pushed her Venezuelan friends, Francisco Oliva and Matthias Asmuss, to arrange the expedition to a remote part of their beautiful country. So we were going exploring to find a plant so rare that few people have seen it in the wild. The super-rich hire a helicopter. We hired Indian guides and walked for days!

Matthias insisted we go in March because one of Francisco Oliva's books noted that the blooming *Pepinia leopoldii** was photographed and collected that month in the year 2000. On March 15, 2010 with overstuffed backpacks in tow, Eloise**, John Irvine, Bob Wright, Francisco, and Matthias took a flight from Caracas south to Puerto Ayacucho, capital of Amazonas state and starting point for many journeys to The Lost World.

Our first night was spent at the Orinoquia Lodge beside the Orinoco, only a stone's throw away from the Colombian border. An impressive clump of *Aechmea bauxilumii,* blooming in a tree, caught our attention right away. Plenty of *Pepinia armata* and *Pepinia pruinosa* flourished in harsh conditions on granite monoliths near the lodge. We were the only guests at that rustic inn with thatch-roofed bungalows but were treated to a wonderful fresh-cooked dinner in an open-air pavilion.

Figure 1. *Aechmea bauxilumii*. Photo by Matthias Asmuss.

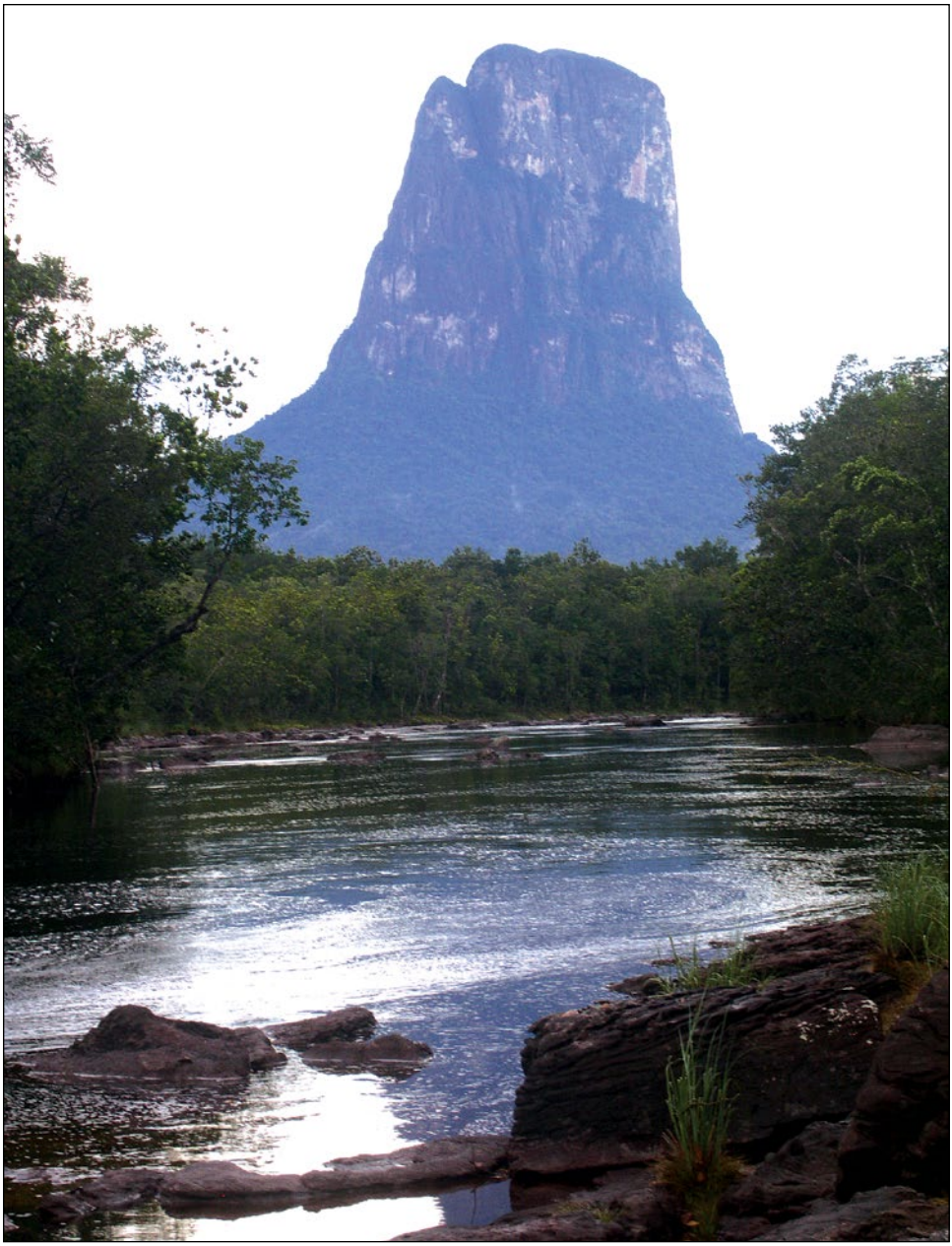

Figure 2. Cerro Autana. Photo by Eloise Beach.

The next morning our travel permits had to be stamped in Puerto Samariapo but due to low water levels, we had to switch ports and board a small boat out of Puerto Venado. Only minutes after shoving off, the boat refused to cooperate, so our trusty captain Elvis, a

Baniwa Indian, headed back to shore. Then more bad news: our newly installed outboard motor was mounted too high on the transom! After an hour alternating between working and drinking, six men with beer bottles in hand managed to lower the motor by notching out the transom with a machete and hammer. Delays are to be expected in this part of the world. We passed the time in the burning sun drinking a fermented beverage the locals call *chicha* and ate yummy banana cake hawked by a smiling guy pushing a beat up and not too sanitary cart with all sorts of questionable food items. Luckily Montezuma was asleep that day and didn't seek any revenge from us later.

"All aboard!" And we climbed back into the boat and headed down the Rio Orinoco, then turned into the Rio Sipapo, where we noticed different water colors as the two rivers flowed together. More guides, Miguel, a Jivi Indian, and Carlos, a Piaroa Indian, waited for us in a larger boat called a bongo, which is better suited for navigating lower water levels. Our boat load represented a true international mix: three Indian languages, English, Spanish, and German. At the Báquiro campsite, on the Autana river, we climbed to an excellent viewpoint overlooking the Amazonas rain forest. Majestic tepuis dotted the horizon. Cerro Autana stood out, 12 kilometers from our goal.

Three days into this adventure we continued up the Rio Autana and glided into the narrow Rio Caño Manteco. After a few meters, fallen trees and thick vegetation blocked our way. The guides pulled out machetes and cut away the obstacles like skilled surgeons. On the banks of the river we admired several groups of lush, green pitcairnias. Later a bright red flash caught our eye...a clump of those pitcairnias was flowering! The plant turned out to be a new species. It will be described by Bruce Holst. Lots of blooming *Aechmea politii* grew high in trees close to shore.

Figure 3. *Pitcairnia*, new species. Photo by Matthias Asmuss.

Figure 4. Intriguing *Navia* species. Photo by Eloise Beach.

Figure 5. Aechmea brevicollis. Photo by Matthias Asmuss.

The rapids prevented us from going any farther, signaling the beginning of our walking trip. We landed in a clearing, grabbed our gear, hid the bongo and motor and prepared for what would become the most exhausting part of this arduous journey. Zillions of hungry mosquitos attacked every exposed piece of flesh. They went crazy for the fresh blood because the hungriest ones sliced through the mosquito nets that some of us brought to cover our heads. An annoying rain made hiking through the thick woods difficult and wetted even our bones. Lots of white-centered navias, resembling *Navia lactea*, were thriving on the ground in every direction, and at times it was difficult to avoid stomping on those beauties. Heavy rain eliminated the chance of a photo session.

Our bridge across a dangerous gully with a flowing stream was nothing more than a slippery log. Poles helped keep us from falling. Unfortunately one very expensive camera ended up being an offering to the water gods. Groups of *Brocchinia maguirei* grew nearby, their tall stems visible because old leaves detach cleanly as they die.

The pace was unrelenting but we still didn't cover enough distance the first day. Our fast-moving Indian guides got all the rest waiting for us to catch up! Nightfall forced us to pitch our tents in an uneven, rocky place by the river. To reduce the load in our way-too-heavy backpacks, some of us stuffed "un-necessities" in plastic bags and hid them for pickup on the way back! Impressive clusters of *Brocchinia tatei* grew at the forest edge surrounding our campsite, and a robust clone of *Aechmea brevicollis* formed small clumps on low limbs of scrubby trees. That evening we found out that untreated tannin-stained river water would be the only way to quench our thirst for the remainder of the trip. Now we understood why the Indians gave us several packages of Tang beverage mix in our snack packs. Tang can make even the nastiest water a tasty treat!

In the morning we headed for our first day's unreached destination, Salto El Zorro, a flat campsite at the base of a rocky waterfall. Intermittent heavy rain, dense bramble, and frequent sightings of guzmanias, vrieseas, and brocchinias kept our minds from focusing on our blistering feet and aching legs. The camp was visible through the trees but first we had to endure a horrible slide down a steep, muddy slope and then walk on slippery rocks across a stream with fast-moving water. Our shoes, socks and pants got soaked! And nothing ever dried on this trip! Aggressive horse flies patrolled the area and had to bite all intruders at least twice. Beautiful clumps of *Navia semiserrata*, *serrulata* or possibly *ocellata* covered huge areas of the rock walls. Unfortunately, two members of our group stayed behind to enable the others to reach the lake later that same day.

The challenging climb from the base of the waterfall up to the top of the tepui had some very steep slopes. If anyone got hurt, help was too many days away. After three hours of treacherous hiking over rocky terrain, we reached the top of the ancient tepui and looked down at the mirrored water of Lake Leopold. From our high vantage point, we admired other picturesque tepuis. Surprises were becoming the norm on this expedition. We descended the steep inner wall down a slippery trail populated by thousands of leaf-cutter ants, who let us know we were not welcome on their path. At the bottom, we climbed over huge rocks, then collapsed on a small pink sand beach and celebrated our safe arrival with a Tang and lake water cocktail. Our moment of elation didn't last long because we had to set up the tents on compacted sand that felt like concrete. While we changed our soaked clothes, some pesky bees made us nervous. "Killer bees"…warned our Indian guide. As the sun began to set, we saw colorful macaws and heard Rufous-vented Chachalaca birds (Ortalis ruficauda), as the clouds rolled in from the low side of the tall

Figure 6. *Navia* species by the El Zorro camp. Photo by Eloise Beach.

Figure 7. High rock walls surrounding Lake Leopold. Photo by Matthias Asmuss.

rock walls that surrounded us. Our crackling campfire illuminated this surreal location where few bromeliad enthusiasts have set foot. Still feeling pains from the exhausting trip, we fell asleep to a serenade of frogs.

Early on the fifth day, the hunt for *Pepinia leopoldii* began. The first sighting was confirmed with binoculars...an unreachable clump high on the wall to the right of our camp. The rare plant was here! Our guide, Carlos, suggested that we go the opposite direction and explore the entire lake. Go around the lake? It wasn't that easy. The beach totally disappeared in some spots, replaced by sheer rock walls. So with a minimum of gear, makeshift bathing suits on and cameras in plastic bags, we sometimes had to take a swim or risk slipping on jagged rocks. At one beach, we looked up and something silvery caught our attention. We climbed slippery and loose rock piles and discovered a big group of *P. leopoldii* growing among the rocks and scrubby vegetation at around 100 meters, possibly fallen off the tepui wall above. Brilliant red flowers contrasted with the silver foliage, resembling a *Navia* at first glance. What an astonishing sight! Our difficult trip was a huge success. We found the elusive plant discovered by King Leopold III 58 years before us. This remote lake was named in honor of the king, but the indigenous people from this region refer to it as Lago Paraka-Wachoi.

In another area high above a beach, we found a larger colony growing in the woods, where we took note of various characteristics of these unusual plants. Length and width of leaves varied according to the amount of sun exposure. The most compact, silver plants were in more sunny areas. They grew on soil, rocks and as epiphytes. One of our most surprising observations: some plants propagated by forming long stolons!

Rather than stay another night at Lake Leopold and recover from our tiring half day of exploring, we hastily decided to return to the El Zorro camp to rejoin the other members of our group. The climb out of that steep-sided hole was no picnic. A combination of heavy backpacks and gravity depleted our already low supply of energy, but we had to smile because the ants had taken a different route that day. On the dangerous climb back down the steep slope toward the waterfall, Eloise's "lost" walking stick was found once again just in the nick of time. Our reward that afternoon was sunshine, blue skies, and continuous views of Cerro Autana, Wahari Tepui and an interesting rock formation known as Cara del Indio (Face of the Indian). When we reached El Zorro, the camp was empty. Our friends had already begun their eight hour trek back to the boat. That night we enjoyed spaghetti for dinner with just a spoon since the other group had taken all the forks. We had learned to watch our plates and eat what was not crawling. Around the campfire, Carlos told us about a tree called *caraña* that smells like menthol, heals the pain when the locals get injured, and they use the flammable dry wood to start fires.

The next morning we made decent time, but the exhausting hike took hours. This was now the sixth day and we were anxious to meet up with our friends. After a successful crossing of that scary log bridge, we reached the boat. Bob and Francisco were impatiently waiting in a very small tent, and the two guides that accompanied them used mosquito netting to cover their faces in an attempt to escape those hoards of blood-thirsty mosquitos. We drank Tang and river water, ate a delicious tuna salad, packed our gear into the bongo and fled from the cumulus cloud of mosquitos. Once again trees blocked the narrow river, machetes flew, and we were on our way.

Our last night at the Autana river camp gave us time to clean up, relax, and laugh about

what we did or didn't do on this trip full of firsts. Lots of odd bugs and mosquitos joined us for dinner but like pros, we avoided eating anything crunchy. People from the city do not realize how many stars are in the sky on a dark night. We were far enough away from light pollution to enjoy a spectacular view. Then we crawled into our little tents for the last time.

After a hot breakfast of local delicacies, we retraced our route along the scenic rivers of Autana, Sipapo and Orinoco. At the port, we hired a vehicle to drive us back through the military checkpoints to the Puerto Ayacucho airport. In the late afternoon we boarded the flight back to Maiquetia, Caracas.

Pain was our constant companion on this life-changing experience that some might call a death march. More than a few times, Eloise had the feeling that we'd never return to civilization. This was no Eco tour for the weak, but none of us realized the physical challenges that we would face on our gratifying adventure to rediscover that silver treasure, *Pepinia leopoldii*, in the wilds of remote Venezuela.

**Pepinia leopoldii* according to *An Alphabetical List of Bromeliad Binomials* compiled by Harry Luther, Twelfth Edition, June 2010. Other pepinias mentioned in this article are also referenced in the same *Bromeliad Binomials*.

**Eloise Beach, Apopka, Florida
John Irvine, Lake Worth, Florida
Robert (Bob) Wright, Arcadia, California
Francisco Oliva, Caracas, Venezuela
Matthias Asmuss, Caracas, Venezuela

Figure 8. *Pepinia leopoldii* on the forest floor. Photo by Matthias Asmuss.

Figure 9. *Pepinia leopoldii* in the forest. Photo by Matthias Asmuss.

Figure 10. *P. leopoldii* in bright light conditions. Photo by Eloise Beach.

Specialties in the Dense Rainforest of the National Park Henri Pittier, Aragua State, Venezuela

*Matthias Asmuss**

Figure 1. *Guzmania sanguinea* between *Tillandsia anceps* and *Vriesea platynema*. Photo by Matthias Asmuss.

Two main roads wind through this National Park, heading to beautiful beaches. My wife Gabriela Keller and I often do not get to taste the salt water, because once we see an inflorescence we have to pull the car to the side to catch the view. The records of several books tell us that there are about 50 to 60 different bromeliads growing in this region and we are trying to see them all. By now, we believe we have enjoyed 39 different species, but three of them are not previously reported for the state of Aragua.

The road is very narrow and often just one vehicle is able to make its way through. You hear the buses driving in an aggressive manner and they use their horns in every curve. Nonetheless , in August 2007 we stepped on the brakes to look at a specimen with red leaves. We could not believe it, but it was a ***Guzmania sanguinea*** *(Andre) Andre ex Mez, DC. Monogr. Phan. 9: 901. 1896* showing it's beauty, unfortunately quite far above our heads. Matthias decided to climb on top of the roof of the Jeep but it was not enough. Just fixing the camera to a monopod, using the timer and still having to stretch helped to get some shots, though the buses were still making noise with their brakes and horns. The best photo we could get from this situation is one where you get an idea of the density of bromeliads: the ***Guzmania sanguinea*** grows between ***Tillandsia anceps*** and ***Vriesea platynema***. Until now, for Venezuela, there has just been one established herbarium voucher for the state of DISTRITO FEDERAL: Naiguata, 15 Aug 1970, *Steyermark*

* Matthias Asmuss, member of the SVCN (Sociedad Venezolana de Ciencias Naturals), Caracas, Venezuela. Email - masmuss62@gmail.com

Figure 2. Camera mounted on monopod held by Matthias on top of the car. Photo by Gabriela Keller.

Figure 3. *Vriesea splendens var chlorostachya.* Photo by Matthias Asmuss

103734 (VEN) and it also has been seen in the state of Miranda. Since it is a rare plant we decided to leave this specimen alone!

A few months earlier, on another trip through this rainforest, we discovered that ***Vriesea splendens var chlorostachya*** is not endemic as thought. The type specimen is from the state of Yaracuy, Cerro La Chapa (Nirgua), 1200 m. s. n. m., leg. *E Oliva-Esteve 304* VEN 303182, holotypus). We found it close to the top at an altitude of 1200 m and it flowered in May. A living specimen was surrendered to the Fundación Instituto Botánico de Venezuela in 2011 to make use of it in the herbarium or the bromeliarium.

The next bromeliad pictured is only reported as being in some islands such as Bahamas, Cuba, Dominican Republic and the mainland USA, and now we know it also grows in the North of the southern continent. The same journey brought us to a place where we tried to find out whether we were dealing with a *Tillandsia rhomboidea* or a *Tillandsia fasciculata*, but it was really too high in the trees to tell. Then we turned around to look at the other trees and noticed something shining with green pale bracts and white sepals. We got out the binoculars, and identified a ***Guzmania monostachia var alba*** *Ariza- Julia, Bromel. Soc. Bull 9: 38, fig. 1959*. About two years later, we discovered that ***Guzmania monostachia var alba*** also grows along the other main road going through this National Park, so it is more widespread than expected. In 2009 a living specimen was donated to the Fundación Instituto Botánico de Venezuela to cultivate or press the plant.

We are looking forward to informing you about other mysteries of this locality in the future and other news from Venezuela.

Figure 3. *Guzmania monostachia var alba.* Photo by Matthias Asmuss

The Bromeliads of Marcel Lecoufle

Marcel Lecoufle

Figure 1. Marcel Lecoufle with his wife Suzanne in 1990

Editor's Note: Congratulations to Marcel Lecoufle! This article is honoring him as a 50 year member of the BSI.

I was born in 1913, in a nursery established by my grandfather, Henri Vacherot, in 1886. My father was killed in the first month of the World War 1. During my school years, the greenhouses were kept by my mother and my grandfather. After 1920 my uncle, Maurice Vacherot, was the manager of the nursery and had mostly orchids and carnations in cultivation. In 1890, the catalogue of H. Vacherot offered some bromeliads for sale: ***Aechmea discolor, A. miniata, A. fulgens, A. fasciata, Vriesea splendens.*** During the same period, Chantrier's nursery, also near Paris, offered 70 bromeliad species. After my studies concluded, I worked in our orchid nursery, now known as Vacherot & Lecoufle, aside from military service in 1933 and a period working at Wisley Gardens in England.

In 1938 I married Suzanne Deveugle, whose father was a builder of greenhouses, and became a partner in the Vacherot & Lecoufle nursery. My wife and I, with the help of her family, decided to buy a property with the intention of building greenhouses for our own nursery, taking as a model Chantrier's nursery in which many kinds of exotic plants, including bromeliads, had been grown since 1810. In 1941, we bought one of the most important properties in Boissy-Saint-Léger, from Mrs Alphonse Révillon. I continued working in orchids at Vacherot & Lecoufle during the 1940 –1945 World War II period. In 1946 we built a first group of 10 greenhouses covering a surface of 1000 square meters. My share of orchids from Vacherot & Lecoufle took up part of these greenhouses, and I bought many other kinds of plants for our cultivations. Bromeliads, Araceas (aroids), foliage plants, Gesneriaceas (gesneriads), carnivorous plants and so on were grown, in order to offer a collection of plants different from that of Vacherot & Lecoufle.

I have been able to receive (or exchange) plants and seeds from growers around the World, including Lee Moore in Peru, Alvim Seidel in Brazil, A.B. Graf in New Jersey and many other individuals and botanical gardens. We participated in numerous shows, both in France and abroad, including Martinique, Réunion, Mauritius, Durban,

Figure 2. Marcel Lecoufle working in his library

Figure 3. Marcel Lecoufle photographing orchids May 1996

Figure 4. Mass production of ornamental Ananas in the Lecoufle greenhouses

Figure 5. Overview of the Lecoufle greenhouses in 1983

Medellin, London, Frankfurt, Bangkok and Tokyo. I received one of the top prizes in the "Floralies de Paris" in 1959 and the top prize (Best in Show) at the same Floralies in 1964 (See the American Orchid Society bulletin, 1964, p. 780, with photos). We employed 25 persons in these years. I have done nearly 30,000 hybridizations of orchids, but just a few in bromeliads. Our nursery has been increased with constructions of additional greenhouses, mostly in 1957 and 1959, with a total of 5000 square meters. I have been in Ivory Coast (Africa), with Guy Muratelle, inspecting the production of pineapple fruits and their export to France and elsewhere. *Ananas comosus* (variegated) and other kinds of plants were also being produced for export.

I started taking photos in 1928 with the old wooden camera belonging to my father. Negatives were made on 13x18 cm glass plates. I was also able to take 2 frames, 9x12 cm each, on a single glass plate. I had my dark room for development of the plates and making prints on paper. I used both black & white and colored Autochrome negatives, developing both types in my darkroom. I switched to plastic negatives with the purchase of a new camera towards 1938 and continued to develop these new negatives (both black and white and Autochrome) myself. Some of my Autochrome orchid photos have been published in 'L'Illustration' in September 1941.

In 1935 I bought a camera to use the current 35 mm format slides (24x36 mm). I also bought two 3D cameras: one using 6x13 cm film and the other 24x30 mm film. These cameras were capable of taking both ordinary and 3D photos. I have also taken moving pictures on 8 mm film up to 1950, and 16 mm film afterwards. My 3D photos of the Liberation of Paris in 1944 have been published in France and in the U.S.A. (see Stereo World, Sept. 2005). I have also given the library of the Bromeliad Society International many copies my bromeliad slides. I have written some articles in the Bulletin of the Bromeliad Society illustrated with my black & white photos. More photos were used by Miss Victoria Padilla in her publications. In 1966, I visited the following collections of bromeliads, of which I have kept photo slides: Mulford and Racine Foster, Ralph Davis, Ervin Wurthmann, David Barry, Paul Brecht, Julian Nally, and various orchid growers. I participated with my son-in-law, Hubert Bert, in the first World Bromeliad Conference in May 1972.

I received many botanical and orchid books from my father and family and have been able to gather many others along my life. My large botanical library may be one of the most important in Europe.

I made a selection of my bromeliad slides four years ago, adding descriptions of each species with the intent to prepare a book about bromeliads. I have followed this task in collaboration with 2 co-authors: Albert Roguenant, who published the book 'Tillandsia and Racinaea' (Belin) ten years ago and Mrs Aline Raynal Roques from the Museum of Paris. This book will be published in Paris by Belin and is projected to be available in the first months of 2013. A translation in English will be published at the same time. Many photos will be included, as well as more than 100 engravings and drawings from old works. Descriptions of all known genera will be included. My best thanks to Harry Luther who helped me with the identifications of my slides for the bromeliad book.

In the last 10 years, I have published a number of other books on plants. Three books on orchids for the general reader: 'Traite´ des orchidées' (published by Artémis in

Figure 6. Tillandsias and orchids in the Lecoufle greenhouses

Figure 7. Cryptanthus by the ton

2004), 'Fabuleuses orchidées' (Artémis, 2006) and 'Orchidées' (Artémis, 2005). A book on carnivorous plants: 'Plantes carnivores' (Artémis, 2006) and, with Jean Bosser, a scientific book on the orchids of Madagascar: 'Les orchidées de Madagascar' (Biotope, 2011).

My cultivations have been managed by my daughter, Geneviève Lecoufle, all her adult life, with help from her daughter, Isabelle Incandela, during the past 25 years. Unfortunately Geneviève, who was also much interested in bromeliads, died last year. Isabelle decided not to keep the nursery and we ceased our operations at the end of December 2011. The nursery is closed and the greenhouses will be replaced by buildings.

My titles are as follows:

Chevalier (knight) in the National order of Merit

Commandeur (commander) in the Horticultural Merit

Correspondent of the National Museum of Natural History of Paris

Honorary President of the SFO (French Orchid Society)

Honorary Trustee of the BSI

Figure 8. Vriesea splendens in mass production

Cross-banded Leaves

Alan Herndon

Figure 1. *Aechmea orlandiana* with cross-banding formed in the same way as in Vriesea splendens. Dark bands of color formed by the concentration of dark pigments in some cells of the leaf blade.

Variations in color on the surface of a leaf enhance the interest of any plant. Among bromeliads, some of the most desirable species have a particular form of color variation where the leaves feature cross-bands of contrasting color. In addition to their inherent beauty, a closer look reveals some interesting, and unexpected, details.

There are three distinctly different forms of cross-banding seen in the cultivated bromeliads. The most common form is that seen in *Aechmea chantinii*. The white bands on this species are formed by the heads of tightly packed peltate trichomes. The band-forming trichomes have a cap composed of rings of empty cells. In *Aechmea chantinii*, these empty cells stick above the leaf surface, but this is not the case in some other species. Walls of the empty cells scatter light very efficiently in all wavelengths, especially when dry, so they appear white. Contrasting bands are formed by areas of the leaf where the trichomes are widely separated from each other, allowing the color of the leaf blade to show.

There is an apparently unlimited number of banding patterns among the cultivated forms of *Aechmea chantinii*. In almost all cases, the bands stretch across the entire width of the leaf or nearly so but these bands may be straight or jagged in appearance. They may be present on both sides of the leaf, or only on the underside of the leaf. The white bands do not necessarily have the same width. In cultivated clones there is a tendency to select plants with even band widths, but in other clones, especially among the earlier clones collected in the wild, it was very common to have bands of greatly different width next to each other. In other wild collected types, for example, *Aechmea chantinii* 'Tarapoto' from Tropiflora, the white bands are considerably wider than the green bands of normal leaf color. There are also great variations in the contrast between the color of the white bands and the bands of normal leaf color. When the light-scattering trichomes are densely packed, the bands completely obscure the color of the underlying leaf. When they are less tightly packed, the leaf color shows through to a greater or lesser extent.

Many other species are found scattered through out the Bromeliaceae with white bands formed in the same way. Among the *Aechmea* species we have: *Aechmea zebrina*, a very close

Figure 2. *Aechmea chantinii* with bands of normal green leaf color alternating with white bands created by light reflecting off empty cells in tightly packed peltate trichomes.

relative of *Aechmea chantinii*. Three closely related species: *Aechmea fasciata*, *Aechmea flavorosea* and *Aechmea caesia*, have bands formed the same way, but the bands are not so regular in appearance and usually do not span the entire width of the leaf blade. The most widely grown cultivars of *Aechmea fasciata* in the current market favor uniformly silver leaf surfaces rather than banding even though European cultivars in the past, especially those in Germany, emphasized banding (see Bromeliad Society Bulletin 7(6): 83-84. 1957.) The red leaf form of *Aechmea maculata* also falls within this group although there is a smaller crown of empty cells topping the trichomes. Also, even though these empty cells scatter light, the trichomes are embedded in deep furrows running along the length so they are separated into narrow lines. The net effect is that the underlying color of the leaf blade is lightened, so the bands are never fully white.

Some clones of *Aechmea nudicaulis*, for instance, *Aechmea nudicaulis* 'Silver Streak'

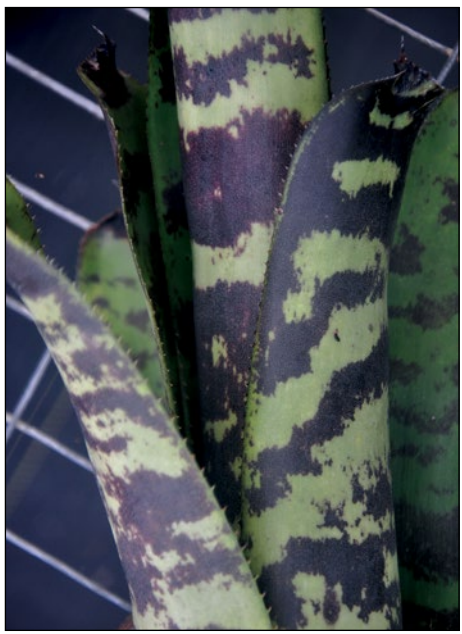

Figure 3. *Aechmea fosteriana* from collection of Elton Leme. This clone has dark cross-bands (of *Vriesea splendens* type) that are much straighter than other clones in cultivation.

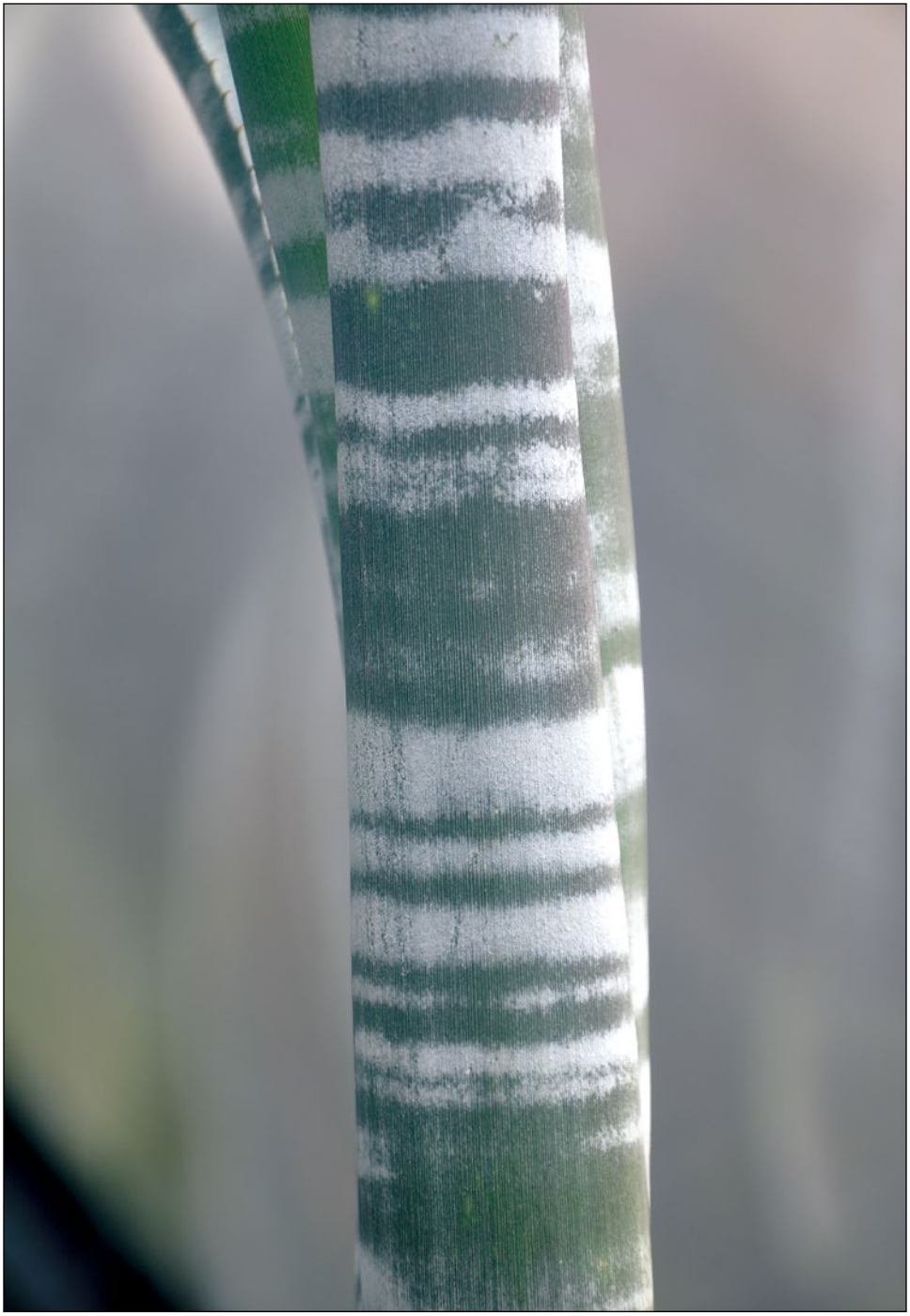

Figure 4. *Billbergia brasiliensis* with cross-banding of the *Aechmea chantinii* type.

Figure 5. *Neoregelia ampullacea* clone with prominent cross-banding.of the *Vriesia splendens* type.

have a leaf dominated by narrow, straight, closely spaced white bands. A clone with much wider, well separated white bands was recently offered at an orchid show in the Miami area. If these plants adapt to our growing conditions (never a given with plants brought in from South America), they will be a welcome addition to the varieties of banding found in our collections.

We can quickly add several species of *Billbergia* (including, but hardly limited to, *Billbergia vittata* and *Billbergia rosea*), *Cryptanthus fosterianus* and *Cryptanthus zonatus*, *Hohenbergia correia-araujoi*, some clones of *Neoregelia cruenta, Orthophytum gurkenii*, *Quesnelia arvensis*, *Neoglaziovia variegata*, *Tillandsia flexuosa* and *Tillandsia hildae* to the list of plants with banding of this type. A number of other species, could undoubtedly be added.

In a few cases, white cross-banding may result from a different mechanism than seen above. In some *Alcantarea* species and species such as *Neoregelia pauciflora*, the 'bands' may be created by waxy deposits on the surface of the leaves. At least, the crude optical instruments at my disposal do not reveal any trichomes that could explain the banding. In these cases, I must defer judgement until someone can make more accurate observations.

Another form of cross-banding is exemplified by the widely grown *Vriesea splendens*. Here the leaf blade has alternating light and dark zones created by differential expression of pigments within the leaf. Cultivated forms of *Vriesea splendens* are selected for uniform bands that stretch straight across the entire width of the leaf blade. Those of us in southern Florida are unable to fully enjoy this species because only a single clone, *Vriesea* 'Splenreit', can be consistently grown with attractive cross-banding in our climate. Even with this clone, the banding tends to fade into a irregular collection of dark patches and spots with successive generations when grown under our conditions. *Vriesea glutinosa*, on

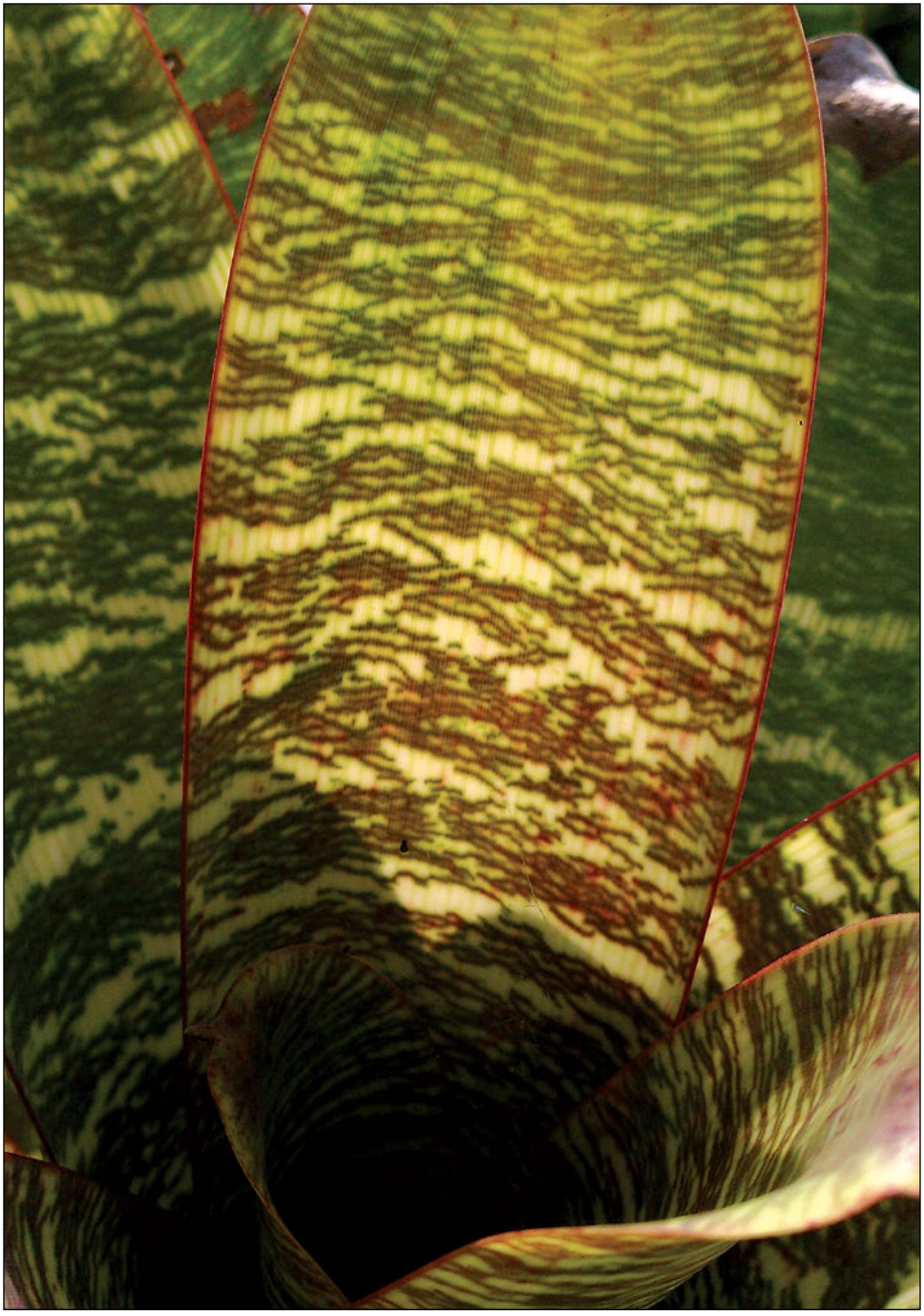

Figure 6. *Vriesea fosteriana, a* clone with small dark lines clumped enough to give an impression of cross-banding.

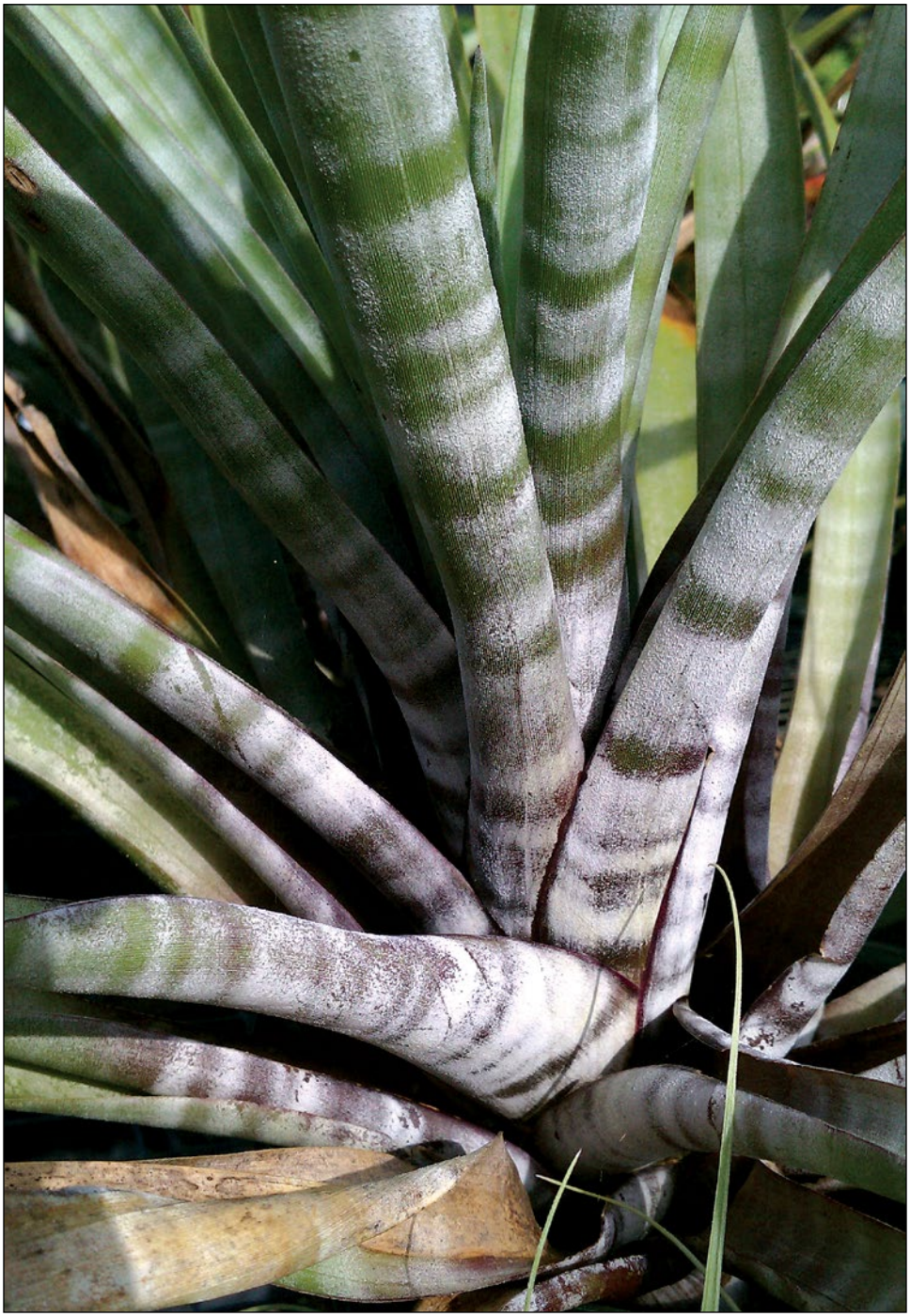

Figure 7. *Tillandsia hildae* with cross-bands formed in the same way as in *Aechmea chantinii.*

Figure 8. *Vriesea* 'Splendide' is the only *Vriesea* that retains the *Vriesea splendens* type cross-banding well under southern Florida conditions.

Figure 10. *Aechmea maculata*, the clone with red leaves. Broad white bands are formed as in *Aechmea chantinii*, but the trichomes are not so densely packed in this species, so the color of the leaf shows

Figure 11. *Vriesea* 'Splenriet' still showing reasonably good banding. This plant has not been growing in southern Florida for very long.

the other hand, does quite well in our climate. It also has cross-banded leaves, but the cross-bands are not as prominent as seen in the cultivated forms of *Vriesea splendens*. Fortunately, the cross between these two species, *Vriesea* 'Splendide' grows well for us and maintains good banding over long periods.

Figure 12. *Billbergia rosea* with a mixture of cross-bands and spots of the *Aechmea chantiniii* type.

Other plants with cross-banding of the same type include several members of the *Aechmea orlandiana* complex. In these plants, the bands are often highly irregular in shape and usually fail to cover the entire width of the leaf. I have, however, a clone of *Aechmea fosteriana* where the bands are straighter. We should also mention *Canistrum seidelii* and *Canistrum fosterianum* with banding patterns that are much like those of *Aechmea orlandiana*. Some members of the *Neoregelia ampullacea* complex display prominent bands, although many plants within the group would more readily be considered spotted. Likewise, some clones of *Neoregelia crispata* have cross-banded leaves while other clones show no trace of any variation in the color of the leaf blade. *Neoregelia carcharodon* 'Tiger' has bold lines formed in the same manner, but these lines are generally less than half of the width of the leaf, and only appear to create cross-bands on selected plants.

Vriesea fosteriana is another well known species that sometimes features cross-banding. In this case, the cross-bands are made up of many short, narrow lines of darker color than the surrounding leaf tissue. These lines are much too small by themselves to be considered bands, but, in some clones of *Vriesea fosteriana*, these lines are concentrated into bands that stretch in a straight line across the entire leaf width and are separated from each other by bands of unlined leaf. In other clones, the dark lines are spread more evenly throughout the leaf and do not give rise to the impression of banding. Most cultivated clones feature the cross-bands. Other bromeliads with this form of cross-banding are *Guzmania lindenii*, *Guzmania musaica* and *Guzmania vittata*. Unfortunately, none of these *Guzmanias* will live for long in southern Florida under the conditions available to the average grower, so we know them mostly from pictures and memories.

In the wild, unbanded plants of several cross-banded species are also found. Plants of *Aechmea chantinii* lacking cross-bars are so common and widespread, they are given the name *Aechmea chantinii* forma *amazonica*. This particular name indicates the lack of barring has no taxonomic significance because you can expect to frequently find

Figure 13. A commercial European clone of *Vriesea fosteriana* with the short, dark lines concentrated at intervals along the leaf to give a prominent cross-banding pattern.

individual plants lacking cross-bands coexisting with cross-banded plants in wild populations. Most cultivated clones of *Aechmea nudicaulis* also lack any distinct banding. *Aechmea orlandiana belloi* lacks any of the dark banding characteristic of *Aechmea orlandiana orlandiana*. *Aechmea fosteriana* var. *rupicola* is likewise is an unbanded form of *Aechmea fosteriana fosteriana*. *Vriesea splendens formosana* is identical to the commonly cultivated *Vriesea splendens* except in lacking cross-bands. Finally, *Guzmania musaica* var. *concolor* lacks any cross-banding. There may be many more examples, but there is a natural human tendency to leave the plants without cross-bands back in the jungle.

I have access to perhaps 1/5 of the described bromeliad species, and usually just a single clone of each species. Different forms of cross-banding may still be awaiting discovery. This sounds like an invitation to look over your own plants more closely. Sometimes, they will surprise you.

Figure 14. *Cryptanthus zonatus fuscus* with *Aechmea chantinii* type cross-bands.

Figure 15. *Cryptanthus fosterianus* with characteristically wavy cross-bands.

Figure 16. *Vriesea fosteriana* (Selby 1999-198) with short lines spread more uniformly across the leaf surface.

Figure 17. *Neoregelia cruenta* (red leaf clone formerly sold as *Neoregelia hatschbachii)* with a distinctive form of cross-banding based on the *Aechmea chantinii* model. The gradation in color is due to a progressive change in trichome density as you move from the base of a band to the top.

Figure 18. *Aechmea nudicaulis* 'Silver Streak' with closely set, narrow white bands.

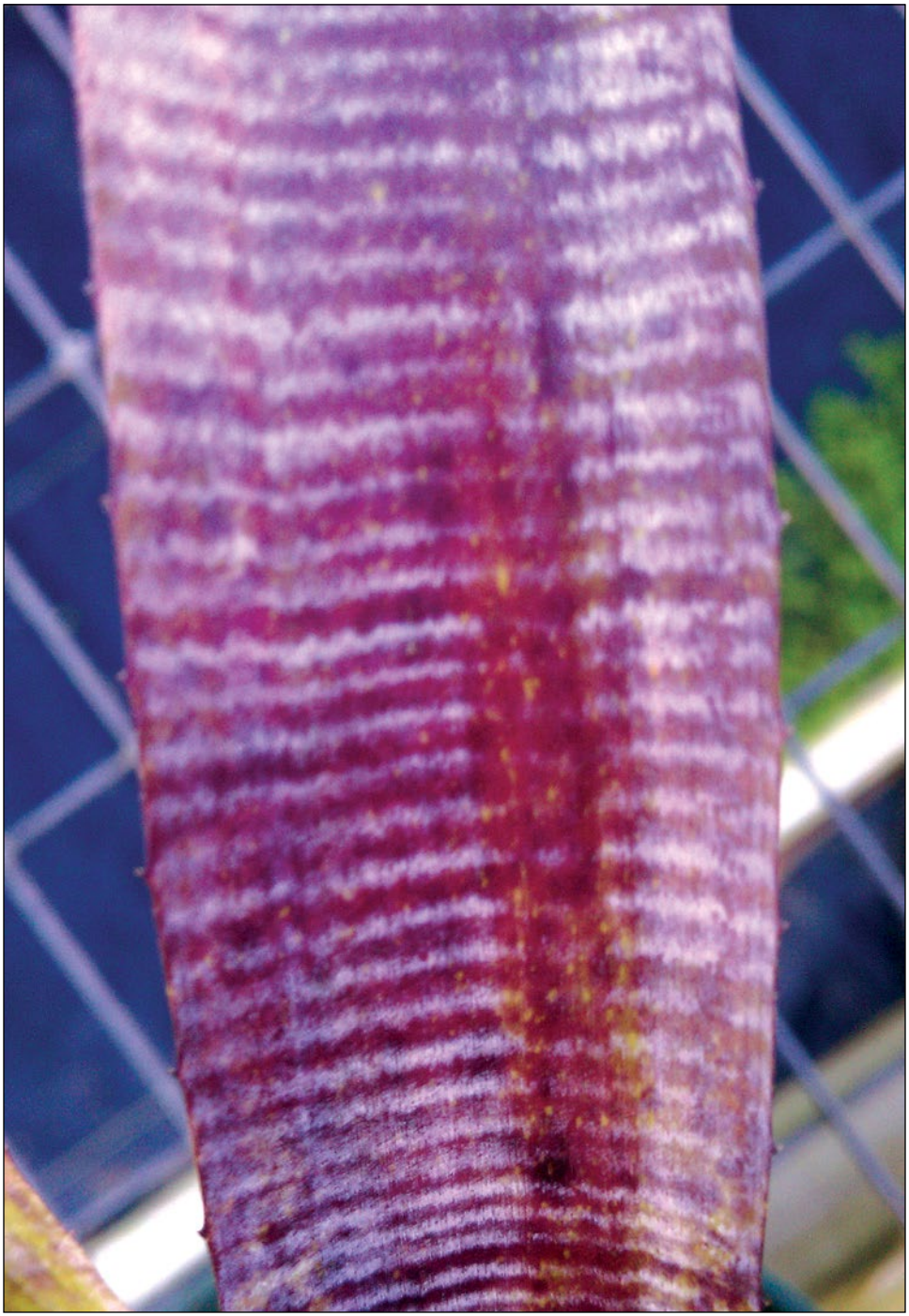

Figure 19. *Neoregelia pauciflora* with narrow white bands of uncertain origin.

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Aechmea 'Macfoster'

Ross Little, Pinegrove Nursery, New South Wales, Australia

Figure 1. *Aechmea* 'Macfoster', photo by Ross Little

Plants grown in Australia with either *Aechmea macrochlamys* or *Portea fosteriana* or *Streptocalyx poeppigii* on the label are quite often sold as *A. macrochlamys*. A plant which closely resembles the recently-named A. 'Macfoster' was imported into Australia from California in 1982 as A. 'Purple Globe' . This 'Purple Globe' has been dealt with by Derek

Butcher, Harry Luther and Elton Leme and was considered to be an abnormal form of *A. macrochlamys*.

The plant we are now referring to as 'Macfoster' came to Pinegrove Nursery in 1984 via Forest Drive Nursery as *Streptocalyx poeppigii*. Peter Tristram in turn had obtained his plant from Grace Goode. Now for a further twist because Grace must have been growing the 'true' *Streptocalyx poeppigii* as well, because Derek Butcher took its photo while visiting Grace in 1979. Therefore 'Macfoster' was either imported by Grace or someone else from presumably the USA as *Streptocalyx poeppigii*. There is also a possibility that Alvim Seidel was involved either with plants sent to the USA or direct to Australia. In his 1976 catalogue Alvim was offering both *Portea fosteriana* and *Streptocalyx poeppigii* but not *Aechmea macrochlamys*. Now might be the time to mention that *Streptocalyx poeppigii* became *Aechmea beeriana* and is now classified as *Aechmea vallerandii*.

Back to Pinegrove Nursery where, at a later date, this plant had its name changed to *A. macrochlamys* by person unknown. In circa 1990 Peter Franklin of Raymond Terrace, N.S.W. received a plant from Pinegrove as *Streptocalyx poeppigii*. Peter could see something was amiss with the description in Smith & Downs Monograph and his plant, but he was never comfortable at all with it being suggested it was *A. macrochlamys*. He thought it worth a look at *A. beeriana*, but it was not a match there either. In 1993 Elton Leme published his book "Bromeliads in the Brazilian Wilderness" and even though Peter had retained the name of *S. poeppigii* for ages, he saw a photo of *Portea fosteriana* on page 48 of Leme's book and felt this was his plant, then changed his label accordingly. Did others do the same ?

Over the years many discussions have been made regarding the taxonomic discrepancies in Smith & Downs Monograph of *A. macrochlamys* and *P. fosteriana* and our 'Macfoster' just doesn't fit comfortably within either description. To my mind there appears to be an overlap in the two descriptions compared to the plant we now refer to as 'Macfoster'. *A. macrochlamys* and *P. fosteriana* were both collected in July 1939 by Mulford and Racine Foster in approximately the same area only 12 days apart. Foster's herbarium specimen of *P. fosteriana* is also tagged *P. silveirae* Mez and does appear close to *P. silveirae*. Photos of this plant on FCBS.org website for the species concerned do look different to 'Macfoster' although there are similarities to the photo by Carol Johnson, late of Pineapple Place nursery of *A. macrochlamys*. Could Florida be the source of this plant which found its way to Australia?

When one asks what separates *Aechmea* from *Portea* the general answer is that "*Portea* has pedicels a minimum of 5-6 mm long". The plant we had tagged as *A. macrochlamys* now 'Macfoster' has pedicels which are 80 – 90% NIL with few to 5 mm. long which indicates a closer affinity to *Aechmea* than *Portea*.

A few differences we noted with 'Macfoster' compared to *P. fosteriana* in Smith & Downs Monograph are:

1. Macfoster's scape is 17 mm not 10 mm thick.
2. Inflorescence not tripinnate.
3. Upper primary bracts half the length of the branch -- not barely exceeds the base of the branch.
4. Floral bracts minute, almost absent -- not shorter than the pedicel (5 - 6 mm)
5. Branches spreading, flowers mostly sessile -- not 5 - 6 mm pedicel.

At the Darwin Bromeliad Conference 2011, I discussed with Harry Luther an anomaly we noted within the floral structure of 'Macfoster'. I had noticed an absence of nectar scales at the base of the petals, whereas the nectar scales in flowers that my colleague Don Beard was checking were quite visible. We checked more flowers to find this wasn't just an irregularity to the one flower. Harry had observed this irregularity also, but could offer no definitive answer.

There are too many discrepancies plus many people agree that this particular plant doesn't fit the botanical descriptions. Therefore we feel it is best resolved by giving it a cultivar name by part-joining the two together as A. 'Macfoster'.

Thanks to: Don Beard, Derek Butcher, Peter Franklin and Peter Tristram for their assistance.

Figure 2. *Aechmea* 'Macfoster' inflorescence. Photo by Ross Little

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The BSI Seed Fund has found a new chairman! Many thanks to Bryan Windham of Kenner, Louisiana for taking on this responsibility.

More information to follow soon!

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