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Front Cover: *Tillandsia concolor*. Photograph by J. P. Pinzón. Story on page 75



Back Cover: *Billbergia stenopetala*. Photograph courtesy of Marie Selby Botanical Gardens. Story on pg. 6

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President's Message

Jay Thurrott



World Conference Speakers Sponsorship Program

The BSI is an all-volunteer organization. Officers, directors and committee chairs travel to the annual board meetings and world conferences entirely at their own expense, often putting in long hours working to ensure that the BSI is best served and that conferences are the enjoyable events that we have all come to expect. Sometimes we overlook the fact that speakers at world conferences are also among the many unpaid volunteers that make up our organization. Everyone would like to hear from the same authors of articles that you see in the Journal, but for many of these researchers, travel costs are simply prohibitive. Although we would like to be able to help with those costs for speakers coming from countries remote from conference locations, the budget of BSI simply can't support it. That's

why we are asking for your help in a new "World Conference Speakers Sponsorship" program. Your tax deductible donations will be used from this special account solely to help defray some of the travel costs our speakers are faced with and will ensure that world conferences continue to offer speakers programs with the pre-eminent names in the bromeliad community.

The BSI would like to express its gratitude to Nat Deleon for his generous donation to the World Conference Speakers Sponsorship Program. We encourage others to step forward and support this worthy cause. Your donations will help ensure that World Conference will continue to have top quality seminars and speakers by making it possible for the BSI to assist speakers with some of these expenses.

The annual BSI general membership meeting will be held in Dallas Texas on September 7th at the Crown Plaza hotel in Dallas. This is an opportunity for members to share their comments and suggestions with the Board of Directors. The meeting will begin promptly at 9am and will be immediately followed by the annual meeting of the BSI Board of Directors. For more information, contact the president at president@bsi.org.

Conference Corner

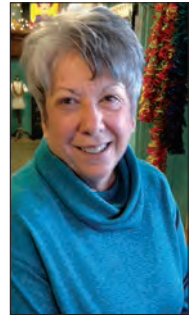
Bonnie Boutwell

Plans for WBC 2014 in Paradise are well underway!

We sincerely hope that both members and affiliates will consider sponsoring conference speakers.

Here is how the program works:

- Donations by both members and affiliates will receive recognition in the conference program.
- Donations should not be earmarked for a specific speaker.
- Donations for WBC 2014 should be mailed to the conference treasurer: Mr. Raleigh Ferdun, 3558 B Woodlawn Dr. Honolulu HI 96822. Please remit by December 31, 2013 so that tentative speakers can plan their schedules and we can complete the seminar schedule for WBC 2014.



We realize that some of you may have questions about transporting plants in & out of Hawaii – most of which can be best answered by your governing authority. However, we want you to know that long-time member and hybridizer Sharon Petersen is diligently working to ensure that plants intended to be entered in the show can be received into the state with minimal effort. Sharon is familiar with the agricultural requirements and procedures in Hawaii and will keep us posted on her progress.

Don't forget to ask your affiliated society to sponsor a conference – the BSI Board will be considering possible locations for WBC 2016 at their meeting in September.

Have you checked the web site lately? The most current updates and information on WBC 2014 can be found at www.bsi.org.

Mahalo, Bonnie



Figure 1. Sharon Peterson in her shade house area at Sharon Peterson, Ltd.

What Bromeliads Can Tell Us About Darwinian Evolution: Part 1

David H. Benzing

A recent poll conducted by the Pew Foundation revealed that among developed nations only Turkey scored below the United States in its public acceptance of evolution. More than half of all US adults remain unconvinced that *Homo sapiens* arose from primitive hominid stock. The fact that every species that ever lived ultimately shares the same ancient ancestry fares no better. Majority denial of the Theory of Evolution persists despite overwhelming evidence to the contrary. Why else, for instance, do flu vaccines require yearly reformulation, and why have so many previously effective antibiotics lost their efficacy? Even more powerful examples involve instances where knowledge of evolution's mechanisms is being used to improve cancer therapy and heighten understanding of who we are and why we behave as we do. It's disheartening to witness such a technically advanced society so stubbornly resistant to the most profound of human revelations about nature.

Bromeliad growers, particularly those who maintain diverse collections, enjoy special opportunity to witness the results of evolution. More than most botanical families, Bromeliaceae includes species adapted to diverse kinds of habitats, no small number of which subject their resident floras to demanding growing conditions. Numerous, even more species-rich groups of the same taxonomic rank such as the grasses (family Poaceae) and the mints (family Lamiaceae) fall well short of Bromeliaceae for possessing capacities to tolerate extreme drought and obtain nutrients from sources as unconventional as ants and tree litter. Being heavily epiphytic explains much of this novelty: only the orchids rival, and in some respects, exceed the bromeliads for adaptive and ecological variety. Darwinian evolution is particularly well demonstrated by many of the bromeliads commonly encountered in culture, but before turning to specific examples let's consider the process as a whole.

Simply put, environmental dynamism renders biological rigidity the enemy of Darwinian fitness. Being immobile, plants experience the unmitigated effects of growing conditions that fluctuate seasonally, daily, and not uncommonly even from minute to minute: their species face change of a more enduring, less cyclic nature. "Phenotypic plasticity" (itself a capacity shaped by natural selection) facilitates mid course corrections during a single organism's lifetime, whereas evolution offers opportunity for adjustment (adaptation) across generations. Genetic accidents (DNA copy errors) that occur when cells divide provide the raw material for heritable improvements, and natural selection winnows the rare winner from the far more numerous losers. If an offspring, by virtue of its mutated genotype, is better equipped to sire progeny than its more parent-like siblings, i.e., if it possesses greater "fitness", then the characteristic responsible for its advantage stands a chance of becoming standard for its species. The more a mutated trait (or more precisely the altered gene responsible for that trait) elevates fitness the more likely its preservation. In essence, evolution operates by error and trial, not the more familiar sequence of trial and error.

Evolution is a complex process that operates within certain environmental and biological constraints and by way of multiple mechanisms. Five of its broadest attributes are listed below, all of which have shaped what can be seen today among the bromeliads.

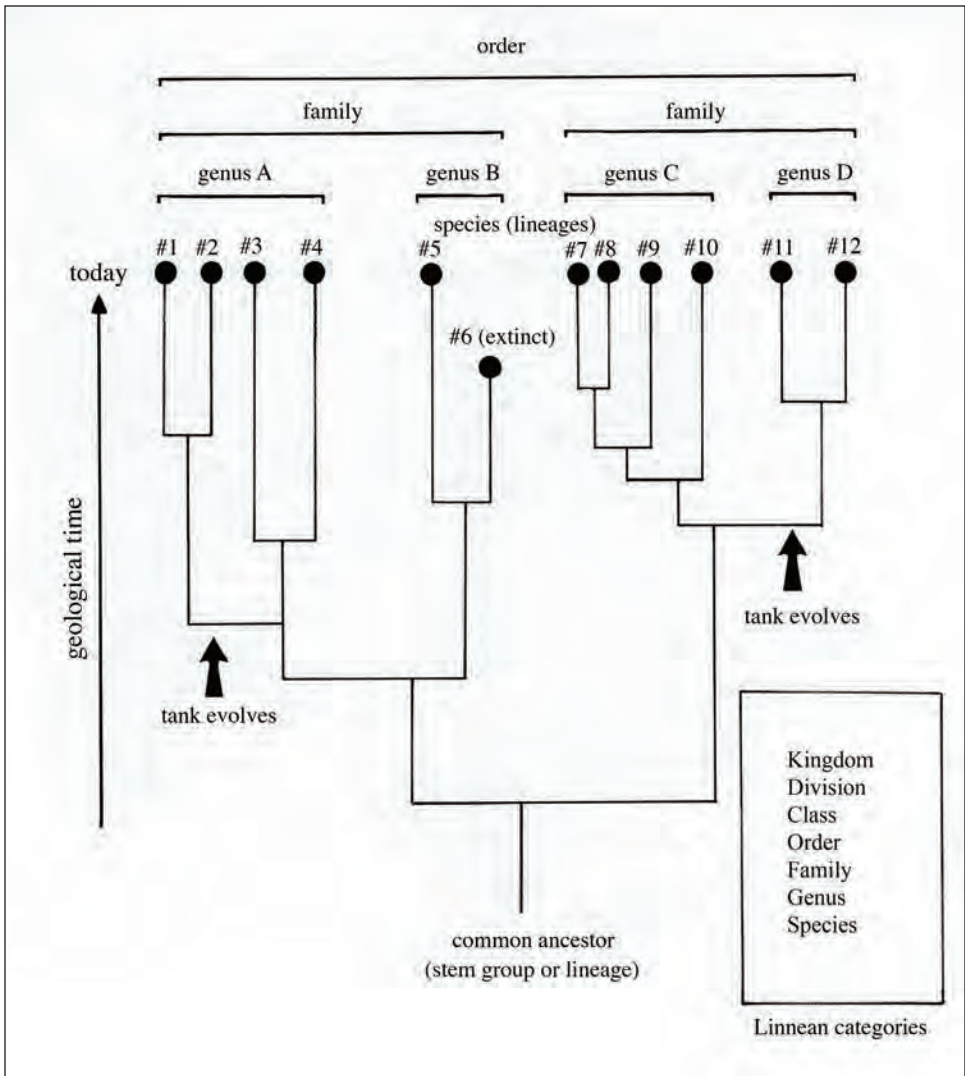


Figure 1. A hypothetical phylogeny comprised of 13 lineages, 12 living and one extinct. This tree also illustrates nested clades, the shape of an adaptive radiation, and how taxonomy parallels phylogenetic relationship. See text on page 8 for details.

1. Evolution is fundamentally divergent in the sense that species descended from common ancestors change in different ways (directions): in other words organisms engage in “adaptive radiations”.

2. Despite the inherent tendency of daughter species to diverge, evolution is often redundant, meaning that the same characteristic can arise more than once.



Figure 2. *Tillandsia brachycaulos*

3. Evolution is governed by many of the same rules that influence whether a factory succeeds or fails.

4. Different plant organs and their characteristics differ in their capacities to respond to natural selection, i.e., to evolve.

5. Adaptation is often accompanied by costly functional trade-offs.

Bromeliaceae has a history, i.e., a family genealogy, or what biologists call a phylogeny. When viewed on a sheet of paper the history of the bromeliads is tree-like, a tree in this instance whose crown is partitioned into eight primary branch systems, one each for its eight subfamilies. These eight trusses in turn consist of secondary and tertiary subsystems, one axis for each genus for the second order division, and for the third, 1 twig for each of the living and extinct species that comprise a particular genus. How densely a family's phylogenetic tree has branched and how broadly its crown has spread indicate how extensively its membership radiated after the stem (ancestral) lineage began to proliferate daughter lineages. Both of these dimensions are extraordinarily robust for Bromeliaceae in accordance with its relatively large size (many species) and exceptional ecological breadth. (A lineage incidentally, is a population considered in its totality, i.e., as it has persisted through multiple, sometimes thousands or more successive generations.)

Figure 1 illustrates the divergent branching that accompanies an adaptive radiation. Note that the vertical axis in this figure represents geological time and the horizontal plane, the magnitude of the group's evolutionary (genetic) divergence. Also note how

this array of one extinct and 12 surviving lineages began with a single ancestral lineage that generated two daughter lineages each of which repeated the same process and so on beyond that. Just one lineage died out while this radiation progressed and its products were adapting (acquiring the appropriate characteristics) to fill the same number of empty niches. Lastly, notice how the taxonomic ranks indicated along the top of the tree segregate the 13 lineages according to their degrees of phylogenetic relationship. Figure one further demonstrates why plant taxonomy is a joint enterprise: nature (specifically evolution) groups species according to their familial relationships and botanists assign hierarchical ranks (genus, family, and so on) to the groups. Needless to say they also assign the Latin designations.

How many lineages comprise a clade, (a clade being all of the daughter lineages derived from a single ancestral lineage, 10 of which occur nested within the 13 member, all inclusive clade illustrated in figure 1), and how far they diverge from their shared ancestry are determined by a host of interacting and shifting environmental and organism-based agencies. Suffice it to say that massive adaptive radiations require ancestors that possess extraordinary potential for engaging in exuberant bouts of speciation (lineage proliferation). No less essential is sufficient empty niche space to accommodate the products of such events. Radiations also require the presence of plant mechanisms and/or environmental circumstances that prevent gene exchange among diverging, still sexually compatible populations (nascent species). All of these conditions clearly prevailed for a number of the lineages that constituted what millions of years ago was a younger and much smaller Bromeliaceae.

Two evolutionary events provided much of the impetus responsible for the sizable number of bromeliad radiations that today account for much of the family's substantial size and its exceptional success in aerial habitats: the acquisitions of the impounding shoot and the absorbing foliar scale or trichome. Both of these exceptionally propitious adaptive breakthroughs opened up vast, underutilized habitat in humid and drier tropical regions respectively. It's no coincidence that tank-forming Bromeliaceae includes genera such as *Aechmea* that account for hundreds of species of epiphytes and lithophytes. The same can be said for parts of *Tillandsia* and several of the other genera that belong to the same subfamily.

The narrative presented above casts Bromeliaceae as a group of some 3300 species that vary by geologic age and degree of evolutionary divergence from the family prototype. Branches represented by just a few relatively primitive lineages such as those that constitute genus *Brocchinia* (the sole genus in subfamily Brocchinioideae) either never underwent extensive radiations or their modern memberships are much diminished by subsequent extinctions. Conversely, some of the family's youngest branches already have become quite large and show signs of on going expansions. Evidence of their youth includes numerous, closely related species that appear little differentiated by tolerances or requirements for particular kinds of substrates, or by shade versus undiminished sunlight, or by arid versus humid climates (e.g., genus *Tillandsia*, subgenus *Tillandsia*). Similarly persuasive are the overlapping geographic ranges of large clusters of some of these same lineages.

Other large bromeliad genera belong to older subfamilies, their memberships apparently having diverged more slowly. Such is the case for terrestrial *Navia* (subfamily



Figure 3. *Tillandsia duratii*



Figure 4. *Tillandsia dodsonii*

Navioideae) where highly dissected topography across the geologically ancient and nutrient-impoverished Guyana Shield confines the majority of its 100+ species to one or a few of the region's signature table topped tepuis. Vicariance (a term used to describe how species arise from isolated segments of formerly continuous parental populations) is also responsible for the 150+ species that make up predominantly bird pollinated *Puya* (subfamily Puyoideae). Radiation in this case is probably more recent being the result of late Pliocene-Pleistocene (most recent three million years) north Andean uplift (orogeny) and fluctuations in global climate that forced montane habitats up and down the flanks of Central and South America's elevated back bone where virtually the entire genus occurs today.

Adoptions of different kinds of pollinators, asynchronous flowering schedules, and several additional phenomena that limit gene exchange as effectively as geographic separation does for *Puya* and *Navia* may explain the overlapping ranges of closely related, ecologically similar bromeliad species in genera such as *Guzmania* and *Tillandsia*. But irrespective of what caused or encouraged a particular bromeliad radiation DNA evidence indicates that much of the family's modern diversity goes back no more than 20 million years, with many of today's lineages being considerably younger, for example, less than 10 million years for entire subfamily Bromelioideae! The same data set identifies Bromeliaceae per se as having emerged around 100 million years ago as a product of the initial monocot radiation. Where the family originated, what its earliest lineages looked like, how they lived, and in what sorts of habitats are all subjects that lie beyond the scope of this short article.

It's popular to envision evolution as nature's way of producing novelty, as more or less

a means to update something of ebbing adaptive value. This assumption is only partially correct: in fact, evolution often repeats itself, and the bromeliads provide striking examples. The two arrows inserted in the hypothetical phylogeny illustrated in figure one identify two points back in geologic time and where during a modest adaptive radiation that the tank “habit” first appeared. We can safely assume that two prerequisites, one environmentally based and the other botanical in character, were met before the dual emergences of this single, highly adaptive innovation could occur. The same selective advantage (enhanced capacity to exploit soil-free habitats) had to be in play in the first instance, and satisfying the second requirement was the existence of a common ancestor, equipped with a shoot bearing a tight rosette of foliage, its individual leaves being readily modifiable into the components of a leafy cistern.

The redundant nature of the bromeliad tank in reality can be demonstrated by superimposing its occurrence over the family’s phylogenetic tree. *Brocchinia*, which used to belong to what now is a much slimmer (many former genera having been reassigned to new subfamilies) subfamily Pitcairnioideae, includes several tank-formers (e.g., *B. reducta*). This same architecture arose repeatedly within subfamily Bromelioideae, whereas its presence in subfamily Tillandsioideae is probably basic (ancestral). The absorbing version of the nearly family-wide, umbrella shaped (peltate) trichome has multiple origins as well, its basic condition being non-absorptive. Most, if not all of the *Brocchinia* species deploy trichomes able to take up moisture and nutrients, but their capacities to prevent overheating and photo damage as well fall short of what the most sophisticated types do for the dry-growing members of Tillandsioideae. Only among the atmospheric tillandsioids does the presence of this pivotal appendage make possible near complete abandonment of roots and extreme stress-tolerance.

Flowers provide additional opportunities to observe evolutionary redundancy among the bromeliads, and they also prove that plant organs vary in their susceptibility to modification by natural selection. Numerous combinations of closely and more distantly related species exhibit flowers adapted to lure specific kinds of pollinators, sometimes to the exclusion of most other potential visitors. The three tillandsias featured in figures 2-4 are illustrative. *Tillandsia brachycaulos* relies on scentless blossoms equipped with, long stout petal tubes featuring exerted male and female parts to encourage birds to help set its seeds. Abundant nectar sequestered at the bottom of the corolla tube rewards foragers able to access it. Foliage that turns bright red at flowering time (anthesis) strengthens this epiphyte’s visual signal. The same set of characteristics prevails in *T. fasciculata*, *T. ionantha*, and dozens more closely related species, in this case, most likely as a consequence of sharing a similarly equipped ancestor.

Tillandsia duratii manipulates day-active insects to exchange pollen among its powerfully fragrant, lavender flowers that lack visual backup by appropriately pigmented foliage or floral bracts. Here the corolla tube is much shorter as befits shorter mouthparts, and its three petals flare toward their tips. *Tillandsia dodsonii* targets night flying moths with larger, nocturnally receptive pure white flowers equipped with even more broadly spreading petals. The accompanying sweet fragrance is most pronounced around sundown, while its small, green inflorescence bracts become nearly invisible after dark. These same three suites of attributes (“pollination syndromes”) plus others that evolution fashioned to co-opt still other kinds of animals, or instead indicate unassisted self-pollination, occur within numerous related genera such as *Alcantarea*, *Guzmania*, and *Vriesea*.



Figure 5. *Billbergia horrida*



Figure 6. *Billbergia roberto-readii*

The three billbergias featured in figures 5, 6 and back cover of this issue demonstrate how some aspects of the floral apparatus change more readily than others when natural selection favors a shift from one to another kind of pollinator. Highly responsive among the billbergias are the size, shape, and color of the inflorescence bracts. This organ does little to help *Billbergia horrida* reproduce, daytime fragrance and nectar secretions being sufficient to assure visitations by day-flying insects. Note the comparably dull color of the petal tube. Much larger, showier bracts help attract birds to substantially more ornamental *B. stenopetala*. Flowers in this case are predictably odorless, long and slender, and they position both stigma and anthers where hover-flying foragers will remove and deposit pollen. *Billbergia Roberto-readii* is bat-pollinated, which is no surprise considering its nocturnal sexual receptivity and accompanying production of a less than pleasant fragrance. Its largely pale grey inflorescence, including the somewhat downsized bracts, reflects enough dim light to remain alluring at night.

Aspects of flowers that resist the kind of rapid adjustment described above owe their evolutionary inertia to being more firmly rooted in the plant's genetically based development program. Features that qualify for this more fundamental status (slow to change) include the number of each kind of appendage per blossom and the order of their insertion on the floral axis (always three petals attached below six stamens, topped by a single three-parted pistil), overall floral symmetry, and ovary position (e.g., inferior in *Billbergia*, superior in *Tillandsia*). You can see why taxonomists employ evolutionarily conservative (fundamental) features to assign species to families while they reserve the more labile traits to differentiate species within genera.

Readers will find additional information about all of the subjects treated above and much more about bromeliad evolution by consulting chapters 4,5,7 in my book titled *Air Plants: Epiphytes and Aerial Gardens*. The final two attributes of bromeliad evolution--the influences of economics and functional trade-offs--will be featured in a coming issue of this journal.

Literature cited:

Benzing, David H. 2012. *Air Plants: Epiphytes and Aerial Gardens*. Comstock Publishing Associates, a division of Cornell University Press

Acknowledgements:

Figures 4-6 and back cover of this issue were provided by the Marie Selby Botanical Gardens

Mulford Foster: A Man Of Many Faces

Diane Racine



Figure 1. Mulford Foster. Photo by Wes Schilling.

Introduction

Mulford Foster, my great grandfather, was born in Elmer, New Jersey in 1888. He devoted his life to the discovery, then introduction of many new species of bromeliads to the United States as well as hybridizing and contributed widely to the knowledge of the plant species. Among his achievements were the publication of numerous articles one of the more noteworthy being his 1950 National Geographic article "Puya, The Pineapple's Andean Ancestor". He published many scientific articles on bromeliads, starting in 1942 with Bromeliads of Brazil in Smithsonian Annual Reports, but mainly in the Bulletin of the Bromeliad Society. Numerous articles of a more popular nature can be found in such journals as *Home Gardening for the South*, *The Bulletin of Garden Club of America*, *National Horticultural Magazine*, *The Gardener's Chronicle* as well as articles in *The New York Times*. He co-authored or co-edited books with his wife Racine including "*Brazil, Orchids of the Tropics*", "*Bromeliads. A Cultural Handbook*", and "*Air Gardens of Brazil*".

His work was recognized by awards that included the 1951 Herbert Medal from the Plant Life Society for the discovery of several new species in the Amarylidaceae and a 1962 award from the American Horticultural Society for his contributions to the knowledge of bromeliads. He served as President of the Bromeliad Society from 1950 through 1959, also serving as editor of the Bulletin for the first 8 of those years. He strove to teach his students, both informally and as a mentor to see the miracle and web of life in all that is around us, even in death. His passing in 1978 at age 89 was mourned not only by his family and close friends but by the entire community of scientists, bromeliad hobbyists and horticulturists whose understanding of bromeliads was greatly broadened by his scientific contributions.

This work is my effort to complete a biography originally started by Racine Foster, Mulford's late second wife who died in 1991. The original manuscript was a handwritten rough draft. Unfortunately Racine only reached the year 1938 with her efforts. Given the fact that she was absent during this part of his life there are aspects that were missing in the telling. However, I have tried to fill in the remaining facets of my great grandfather's illustrious life by studying the information available to me. This required some interpretation in cases where the data is sparse or confusing. I was fortunate to have Racine's existing albeit incomplete text along with copious letters and records.

These accounts of his lifedraw on additional letters written by Mulford himself as well as extensive historical papers in my possession and his actual portfolio of artwork that was handed down to my mother. Other information was obtained from the Michael Spencer collection at the University of Central Florida. I was also fortunate to be able to interview persons knowing him, both family and otherwise. To help understand his impact on others, I have included the many examples of quotations from his memorial service.

Racine took the time to write down his personal explanations of his art work adding depth to our understanding of both the individual pieces and in doing so, the artist. There are also extensive newspaper and magazine articles documenting his career as a lecturer as well as notes and nonfiction books of the various explorations to South America which I used to build a foundation for this piece.

While combining and melding this information I have tried to remain true to Racine's vision of the completed project. Without her deep and tireless devotion to Mulford and the resulting detailed attention to documentation, archiving and preserving the legacy of my great grandfather it is questionable that he would be as well-known as he is. For this I am most thankful and forever indebted.

To try separating Mulford's many parts into distinct topics for the purpose of providing an organizational format was most difficult. He was a man of complexity and private controversy. Yet this work needed at least a manner of surface arrangement so his story could be told in a cohesive fashion. In many ways his life defies standard classification, akin to his beloved plants.

Attempting to come up with the metaphor best able to describe this intricacy of parts was challenging. Depending on who was doing the observing, each would have their own description of Mulford. An onion to be peeled into various layers? A diamond with many facets? A cathedral of many windows each reflecting back something different depending on the viewer? A jigsaw puzzle with many bits making the whole when completed. Yet even this is inadequate for he was more than just the sum of his parts. Finally I settled on a kaleidoscope, that instrument of ever-changing perspectives comprised from a set of fragments forming a pattern, but not locked into place. Changing, melding as he was exposed to new ideas and experiences. The end result containing the exact same small pieces but shaping an entirely new design. His life phases starting with reptile collector to naturalist and lecturer melding to landscape architect joined by artistic leanings first as photographer then painter. Later branching out to become an explorer and plant collector. This didn't end here as he moved forward purchasing his own land, amassing his plant collections and forays into plant hybridization. Sprinkled throughout were his philosophical leanings and his role as a family man by being son, husband, father, grandfather, great-grandfather and uncle. Even these pieces of his life are able to be subdivided further as this biography shall attempt to show. In the end, Mulford's kaleidoscope should be a symbol of hope and evidence that things can change into something beautiful.

For a beginning I felt the following quote from Racine Foster, written on August 28, 1979, the one year anniversary of Mulford's death helps to introduce us to his unique philosophy and sets the stage for understanding who Mulford Foster was as a man.

"It has been a year since the worst day of my life occurred, this date 1978. I must say that I have been trying to learn the meaning of Mulford's departure. Essentially, it is to love more, in a different way, his gentle presence. To fathom the meaning is to love more his great philosophy concerning the continuity of Life. To learn that a change of form is an opportunity for more understanding, for a greater insight into the spiritual essence of all Nature, also known as the controlling Principle, this governs the universe. This Controller asked Mulford to serve in another realm, that of spiritual extensions where other vistas, canvases, other palettes needed an artist to convey a message. Mulford is there in an ethereal realm to paint another kind of picture, to plant another kind of garden

Although he is serving in these other realms, I feel his presence here. His friends in the woods speak to me in various dialects. The cardinal at twilight calling his mate is



Figure 2. Mulford Foster, Scout Naturalist 1912.

a message for sweets (his term for me). The delicate twitterings of the night tree-frogs are messages direct from Mulford which read, "Be gentle", a refrain he always listened to with his very keen hearing ears, along with the staccato of the night crickets which become punctuation marks as the night is closing down. He enjoyed being aware that as the temperature cools the oak seeds respond by dropping to the ground where they will regenerate the species. The leaves loosen and float to earth where they are recycled for the nourishment of the seeds.

His prayer each night was an alert awareness to the night sounds of our forest, for him an ethereal benediction. So, now, for him I give this as a benediction."

Mulford's Early Life

So how did Mulford come to be the person we knew? Perhaps starting at the beginning will provide some clues.

His father, Samuel Preston Foster, was the editor of a small New Jersey town newspaper, the Elmer Times, which remains in the family to this day. The December 26, 1888 issue carried this notice: "Christmas present arrived at the Editor's house." This announcement came as a surprise to Mulford's father for he generally wrote the Happenings column but this year a fellow worker had scooped the news and entered the information without his knowledge. The Christmas present in question was a 6 pound boy named Mulford Bateman Foster named after English ancestors.

He learned later that a December 25th birthday was distinguished. He also learned as he grew up that due to the great activity of preparations for that festival, his birthday was usually forgotten, typically a week or two late.

Mapping out his childhood from letters and family stories reveals multiple influences. Each was perhaps small when taken alone but cumulatively they created an environment ripe for supporting the inquisitive child amidst the natural world. The first event, perhaps indirectly shaping his life, was related to his mother.

During Fannie Foster's pregnancy, an itinerant artist came to the door asking for work. Since there were plenty of small jobs to be done, Fannie found a ready handy-man who needed work. Sometimes at the close of the day, he would take a scrap piece of wood and paint a little flower for the lady who had served him a good lunch. Fannie was completely fascinated with the process of how a flower was painted. Soon she had her own brush into it, forgetting completely the time. Imagine the family's surprise when they came home and found her in the midst of a painting lesson in the wood shed when they expected dinner.

Part of growing up was exploring the woods around his home with his mother who had a green thumb. She frequently collected the native wild ferns with all manner of accompanying treasures. His mother delighted in creating miniature fairy glades for her little son under the wide spreading oaks of their backyard. By no means was it a formal flower garden like the ones their neighbors made in sunlight with their row after row of dazzling colors.



Figure 3. Young Mulford with snake.

No, Fannie wanted a shade garden where it was moist, secluded, shadowy and a little mysterious with curving pathways around moss covered rocks. Besides it was more of a challenge to transfer these specialized plants from the wild than to drop seeds from an envelope bought at the store. Mulford would relay that as a young boy it took a while to realize that the dining room was also a place used for dining. That is the part not filled up with plants.

With his mother's inspiration, Mulford loved making his own diminutive gardens with all sorts of mosses and wild plants that he too had gathered. He recalled the first time he heard the saying "that a rolling stone gathered no moss" with some consternation given his love of mosses and exploration. Fannie didn't know it at the time but she was creating for her son the milieu that would someday become his career, building gardens.

While Fannie's involvement in plants was likely instrumental in directing him into this love of nature there were other forces at work as well. His visits to the Horticulture greenhouses in Fairmont Park, Philadelphia when he was very young may have steered him to his preoccupation with tropical varieties. He was then exposed later on through his friend George Morrison to ornamental and bizarre forms of exotic plant life under glass.

It was his father who gave him direction in the wisdom of the land. Young Mulford was very impressed that his father won a slogan contest. One of the large seed companies wanted a catchy phrase to promote the sale of their vegetable seeds. It was Samuel P. Foster's slogan "They want the earth" that won.

To a child just awakening to the marvels of the earth, this had an impact. Many years later when he planted thousands of seeds (mainly bromeliads-those plants with long stiff and colorful leaves, the epiphytic tropical American plant family Bromeliaceae that included pineapples, Spanish moss and the numerous ornamental plants we find in our homes or yards depending on location or the more recognized self-heading philodendrons) he could be heard quoting this catchphrase.

There would then follow a discourse on the intelligence within the tiny seed. He would expound on how it knew what to do when the moisture and the temperature were just right for sending forth the tiny leaflet that would be controlled by light, moisture and the nutrients at hand. Mulford never ceased to marvel at the miracle embodied in a seed.

His childhood was one filled with curiosity. If it wasn't plants it was animals. He started



Figure 4. Mulford's family at Fortescue, New Jersey.

collecting reptiles at a young age. According to a newsletter from the Bromeliad Society of Broward County he had already made a name for himself as a herpetologist through his knowledge of North American reptiles by the time he was 14 years of age.

Other early experiences shaped his life as well. Going to Fortescue, New Jersey where the family had a summer cottage was always a big event in the summer months. Although it was not the ocean, it was the next best thing to being there. Located on the north end of the Delaware Bay, Fortescue was a sleepy resort town where people came to fish, dig for oysters, boat and swim in the shallow waters.

On one excursion Mulford, not yet able to swim, almost drowned and was rescued by his Uncle Shep who from his boat yelled "That boy isn't fooling, he needs help!"

It was a traumatic experience never quite erased from Mulford's memory. From that time forward he never enjoyed trying to swim. However, going to the shore to search for crabs, shells, starfish and seahorses, now that was a fascinating adventure that never left him. He loved the abundance of seahorses found on the sand, those delicate creatures with their equine heads and grasping tails covered in bony plates. Later, his brother Preston named his Fortescue bungalow "The Seahorse Cottage" using this as the decorative motif throughout.

There was romance in going out to the shore each summer. No fanfare, just the simple middleclass annual trek to the great open spaciousness and peace of the huge Delaware Bay. It was not the fierceness of the pounding Atlantic Ocean, it was a more mellow experience enjoyed here. Sitting on the front porch one could look out over the expansive



Figure 5. Mulford with parents and siblings.

waters and hear the smaller waves lapping at the pilings as the tide moved in and out, drawn by their invisible forces. These pleasant experiences provided a thread of peaceful memories throughout his life.

With these influences, Mulford knew early where his dedications were headed. These remained constant through his life. He knew what he wanted to learn about and where he preferred to be. He viewed a task always in its relation to those activities that he loved. Attending school was seen as a good idea but it kept him from his true love of garden making, ditch riding and hunting for snakes. Still, he managed to stay in school and graduated as salutatorian of his class from Elmer High School in 1905. He knew he wanted to be immersed in some way with the organic world. His father on the other hand was concerned about his son's love of nature. He felt it would be impractical in the line of business.

Acquiescing to his father's urging, he attended and completed a four year



Figure 6. Mulford in contemplation.



Figure 7. Portrait of Mulford by Reginald Marsh.

business college in Philadelphia. After graduating he then worked in two of Philadelphia's largest banks for five years. While there, however, to remain true to his love of nature, he spent every moment on the weekends collecting plants, snakes and animals.

Living in Philadelphia was fortuitous for he met two men, both who would alter his future life in ways he could not have imagined at the time. One was a deaf art student, Reginald Marsh. He was a pleasant fellow whom Mulford escorted to art lectures. Since he was deaf Mulford had to learn to talk by signing with his fingers so as to convey to Reginald the lecture content. This procedure met with an unexpected bonus for Mulford. It required that he listen to, think art and understand it well enough to then be able to relay the ideas being expressed in the classes. This exposure was the equivalent to a Fine Arts college education through audit. It gave a rich quality to his life.



Figure 8. Mulford with Richard Tautenhahn.

The other man who changed his life direction was Richard Tautenhahn. From their first meeting Mulford loved this dignified gentleman who had an affinity for anything natural. Richard had emigrated from Germany in the late 1880's. He was an educated man with many talents. Among his talents, Richard knew how to skin and stuff a squirrel, snake or bird and taught Mulford the secrets of taxidermy. He also taught him the love of the woods in a more robust way than his mother had done. A great rapport developed between them that some felt turned into hero worship.

After five years of banking he decided if he didn't do a bit of rolling himself, he'd gather too much moss. And so, he eventually left Philadelphia. He went back to New Jersey to try being Associate Editor on his father's newspaper. His father wrote in a way he admired and when recounting those days,



Figure 9. Portrait of Mulford.



Figure 10. Mulford and Fridel wedding.

he described his own as a “babbling brook style” of writing. This endeavor didn't last long however. He soon found himself back in Pennsylvania.

Mulford Becomes a Naturalist and Landscape Architect

It was speculated that Mulford's love of the father, Richard Tautenhahn led to the love of the daughter, Fridel whom Mulford married in November 1911 in Philadelphia. They purchased land north of Harrisburg, Pennsylvania at Cold Springs and their lives initially flourished. This was a naturalist's haven. It was a huge tract of land, the side of a mountain where the secrets of the world became a fascinating mystery to unfold. Here Mulford was living his dreams of Thoreau's Walden, touching base with John Muir's wilderness. Contemplating the great symbiotic oneness of all living creatures, the very essence of Nature was the fiber of his everyday experience.



Figure 11. Mulford and Fridel on the beach.



Figure 12. Fridel and Mulford Foster behind Fridel's parents, Ida and Richard Tautenhahn.



Figure 13. Fridel, Mulford and Fridel's sister, Hannah.



Figure 14. Mulford and Fridel's Cold Spring's house.



Figure 15. Mulford holding fowl.



Figure 16. Mulford with snakes wrapped around him.

Mulford and Fridel lived in a three story home with the basement and an outbuilding devoted to his snakes. It was remote, connected to services only by a train with a depot near their house and walking path only eventually allowing the passage of vehicles. He had plans of refurbishing one of the old farmhouses on the property although this never transpired. According to historians the farmhouse likely burned down sometime in 1919 and the family left Cold Springs shortly after this time, perhaps a culmination of disappointments and financial realities. Additional information has been collected on the Cold Springs inhabitants of the early 1900's including the Fosters and can be found in Cold Spring Hotel Site (Logan, 2005).

During his years at Cold Springs Mulford kept busy on the property developing the former hotel grounds, growing an orchard, raising fruits and vegetables, his reptiles and squab as well. It is also known that the family was involved in some fashion with the bottling and selling of the spring water that can still be found bubbling to the surface on their former property. In Mulford's time, the collected spring water and squab would eventually find their way to tables as far away as Harrisburg and Philadelphia.

If one explores this area now only the foundations of Mulford and Fridel's house and outbuildings remain, the actual buildings having been demolished by the State of Pennsylvania. Holding early 1900-era pictures of the family and buildings one is transported back almost a hundred years to a simpler time. Still visible in some areas is the complicated duct work for moving the water to the houses. While the springs brought visitors to the baths during the early 1900's when a hotel stood on the site, they no longer



Figure 17. Mulford and boys at camp.



Figure 18. Mulford reading in tent.

hold water. The lake is no longer there as the dam was washed out with a hurricane.

The now aging orchard planted by Mulford those many years ago is still there. Indeed, if one is quietly listening to the rustling leaves, overlooking the vast expanses of silent and lush Pennsylvania countryside, it's possible to almost feel Mulford and Fridel Foster's presence. Certainly it is easy to understand why they had been drawn to this beautiful setting.

While Cold Springs most certainly would have kept the young couple busy, Mulford also worked elsewhere for extra money. He worked as a camp Naturalist and instructor for Camp Kenebec in Maine where he would go in mid-summer. This experience of teaching boys to love nature in all its forms would return joy to him many times. In the winter he lectured to schools, colleges and Boy Scout groups as well as the YMCA. He was already renowned as a lecturer. The New Jersey State Board of Agriculture realized the value of his work. They arranged to send him on a lecture tour around the state to discuss the value of snakes, lizards and turtles at the Farmer's Institutes held at the various counties during the winter shortly after his marriage.

He was known to many as the "Snake Man" having specialized in the reptiles and for that matter all forms of nature for many years by now. He was a charismatic speaker and always pleased his audiences with his enthusiasm and accentuation of humorous and interesting facts. Newspaper articles of the time stated he had in his possession the largest private collection of living reptiles in the state.

Between the years of 1908-1918 he enjoyed the great influence of Elbert Hubbard. Hubbard, a writer and publisher of east Aurora, N.Y. had established a philosophical society that harmonized with Mulford's own developing philosophy. He was invited to lecture there on his favorite topic (at that time), snakes.

The presentation earned him favorable publicity with the live snakes on stage with him. They coiled around his neck, hid in his pockets or inside his shirt against his warm body. It was not too difficult to handle the non-poisonous snakes. His motive was to teach the audience not to be afraid of this traditionally viewed "evil creature". The all black and

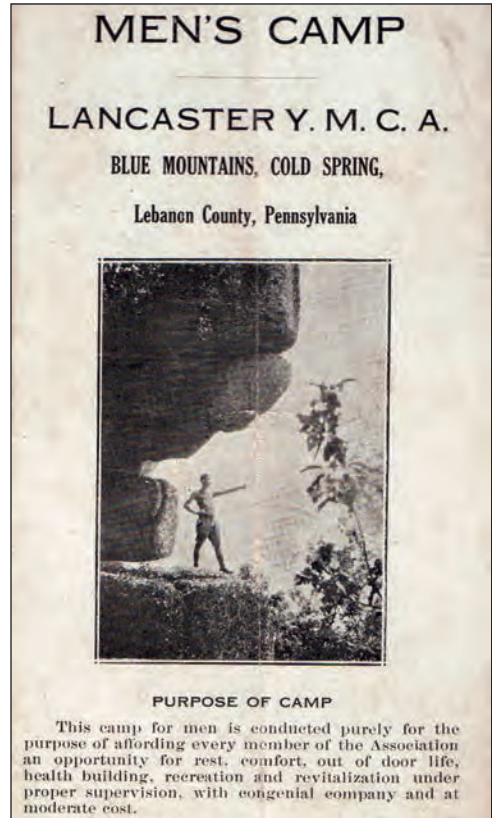


Figure 19. YMCA Men's Camp at Cold Springs.

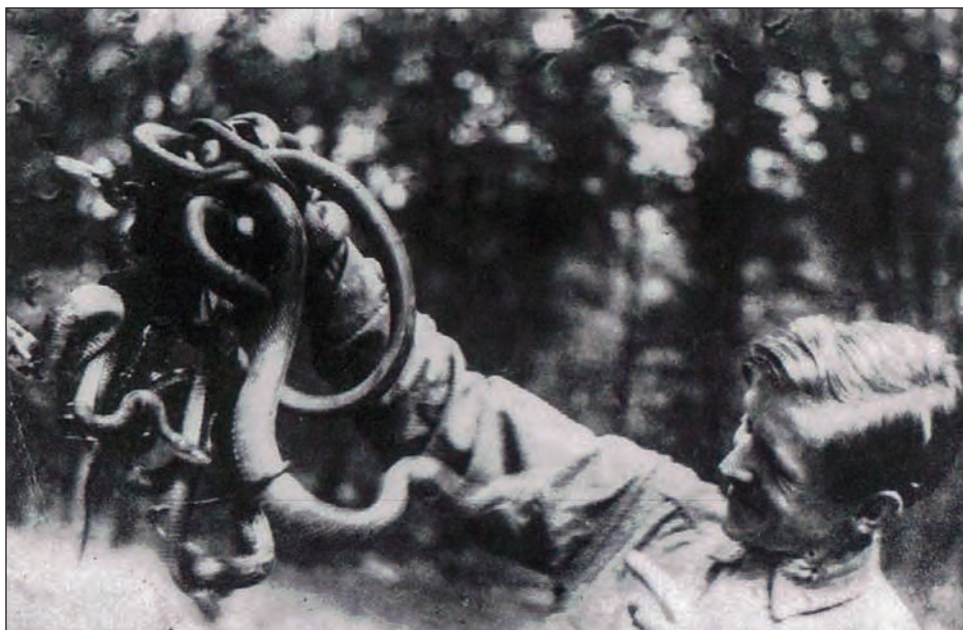


Figure 20. Mulford handling snakes in 1917.



Figure 21. Mulford displaying the rattle of a rattlesnake.



Figure 22. Mulford giving a live demonstration during one of his lectures.

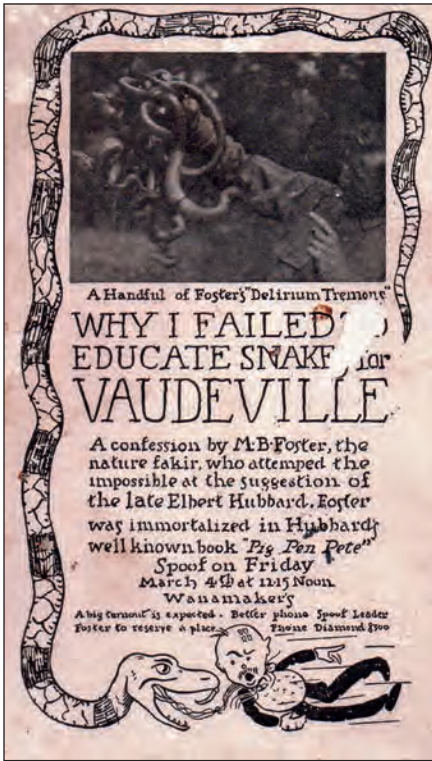


Figure 23. "Why I Failed To Educate Snakes in Vaudeville."

letters are once again found after Mulford had married Racine.

Conrad once wrote "If anyone has a unique paradise of his own on earth, that one is Mulford Foster, Master of one of the prettiest and wildest valleys in Pennsylvania, he has on his immense primeval estate a limpid lake where wood creatures come down to drink, a magic winding little river for his silent canoe, a collection of almost every variety of domestic animal and bird, pet skunks, several dozen kinds of tamed snakes, wild flowers, trees and shrubs and a million wild creatures that have flocked to his place from the mountains about because they know that no harm can come to them here, and Foster attired in brown flannel and stealing noiselessly

highly colored relative in the King snake group soon made friends in the audience.

Mulford was pleased when the participants lost their fears as he'd hoped. On the other hand, with poisonous rattlers, Mulford was very cautious, never allowing anyone to get near them. He demonstrated milking the fangs into a cup and then swallowing the poison, toxic only if it enters the bloodstream.

Elbert Hubbard encouraged him to lecture in many eastern cities. He promoted him in several ways, even writing about him in the chapter called "Just Snakes" in one of his books called *So Here Then Cometh Pig-pen Pete; Or, Some Chums of Mine* (Hubbard, 1914).

While living in Cold Springs he maintained a friendship with another writer Conrad Richter. Conrad and his wife lived in Pine Grove, PA which was a nearby town. Letters between the two as well as pictures reflect a close camaraderie until a falling out which has been speculated to be a result of a conflict between the Richter's and Fridel. The relationship appears to have been rekindled years later in Florida in the 1960's when



Figure 24. Mulford in Library.

through the woods with the light foot and deftness of a Mohican, is all day long and often at evening out among them."

Thirteen months after his marriage to Fridel, his first daughter Gerda was born December 31, 1912. According to a letter from Mulford she was born in Philadelphia although the family was still living in Cold Springs at the time. Perhaps Fridel felt that Cold Springs was too isolated for giving birth during the winter months. It is said that Mulford assisted at her birth, with only an Amish midwife present.

Pennsylvania was in the heartland of the Amish. They were wonderful farmers from Palatine, in Germany. Here they spoke a variety of Platt Deutsch or Pennsylvania Dutch as it became known. Mulford's wife spoke German so she could translate the strange mixture of the German-English of the Amish people. This gave Mulford a passable understanding of the German



Figure 25. Muford, Fridel and Gerda Foster tinted.



Figure 26. Muford and Gerda in corn field.

language which he needed in later life while collecting plants in Parana, South Brazil and corresponding with German bromeliad collectors.

Mulford and Fridel's second child, their son Bert was born in 1919 with a second daughter Miriam born in 1920 and twins born in 1922 with only one

daughter, Jeanne Eunice surviving. From accounts, existence at Cold Springs was becoming increasingly difficult. Mulford and Fridel found that they could not easily survive on his dreams. Life was pressing him to be a realist and he was again restless.

Toying yet again with the rolling stone and moss idea, he made his first trip to Florida and the Deep South looking for snakes in 1912. He returned to Pennsylvania with "sand and Spanish



Figure 27. Mulford working as a tree surgeon for Davy Tree Company.

moss in his hair and shoes". After his initial visit to that state he knew it was the land of promise for him. The lush growth along the St. John's River, the stately cabbage palms, the soft climate, became the magnetic pull that put Florida into his future horizon.

Although Mulford was enjoying the diversity of his employment at Cold Springs it was not adequate to meet the needs of a growing family. An opportunity presented itself that intrigued him with a training course offered by the Davy Tree Expert company in Kent, Ohio in 1918.

Since he already had an empathy with trees it was a simple step to learn how to sell tree service to the people who had large estates in the area of Baltimore, Washington and Virginia. He remained the Davy company representative of these three states during the years 1918-1923, serving with great pleasure. It kept him outdoors, involved with nature and he had a steady income. But it also meant driving many miles across these states as well as being away from home most of the time.

By a certain amount of osmosis he was also learning to make plans. Having a natural artistic inclination plus a connection with plants combined with the background of making gardens in his developing years, he felt he was ready for a change in profession. The next area to pique his interest was landscape architecture. He bought the finest books then currently available on the subject and began to voraciously read and study them. The thought of being independent and on his own recurred again and again but where to start in a new and young profession?

Where else indeed but the state of Florida, a very young, developing state in the mid-twenties? The idea of being in a place without snow had a profound bewitching pull.

Thus it followed that Mulford and his family landed in Palm Beach where he became a landscape architect. It was a happy blending of dreams. He was in a frost-free warm climate. He was working with marvelous new plants. Many of them belonged to familiar plant families. And he loved the ever present Cabbage palms which became his new lodestone plant. The great arching oaks had been that for him in the north, such gallant matchless monarchs. He found their similar unrivaled qualities of nobility and tolerance



Figure 28. Mulford in front of Tropical Arts Studio.

of extremism to wind, drought or flood fascinating when viewed in contrast to their quite different growth patterns and form.

The incomparable cabbage palm native to Florida would turn into a lifelong love affair. He used this palm form in many of his paintings and built the Latch String Tearoom with uprights of the cabbage palm trunks.

There was an understanding with this palm similar as well to the magnetism that he felt as he stretched out below the redwoods of Northern California. Lying on his back with arms spread out in worshipful symbiotic atonement. He always considered himself fortunate that he'd been asked to help drive friends to California and other western states. It had been a wonderful experience in many respects but what could not be surpassed was his "feeling those redwoods", coming into their field of vibration. It was truly an awe inspiring experience for him.

With an ever-expanding number of activities holding his interest, Mulford became good at performing multiple tasks. He maintained a landscaping business while lecturing, trying photography and painting. His native wit was always an attention getter for his lectures. His enthusiasm for plants and gardening made his audience rivet their eyes and ears on him. Garden Clubs eagerly gave him bookings where he not only spoke but sold plants, gave demonstrations on dish gardens and tried to educate the audience on the wisdom of making a landscape plan for a new or old house.

During these landscaping talks he would advise that for a new home, it was often a simple plan for the present focusing on the installation of major large pivotal palms or trees which serve as the framework for the future garden to be developed in segments. This was especially true if the owner himself wanted to do some of the plantings for the sheer joy of it.



Figure 29. Tropical Arts Studio interior.



Figure 30. Tropical Arts Studio Exterior.

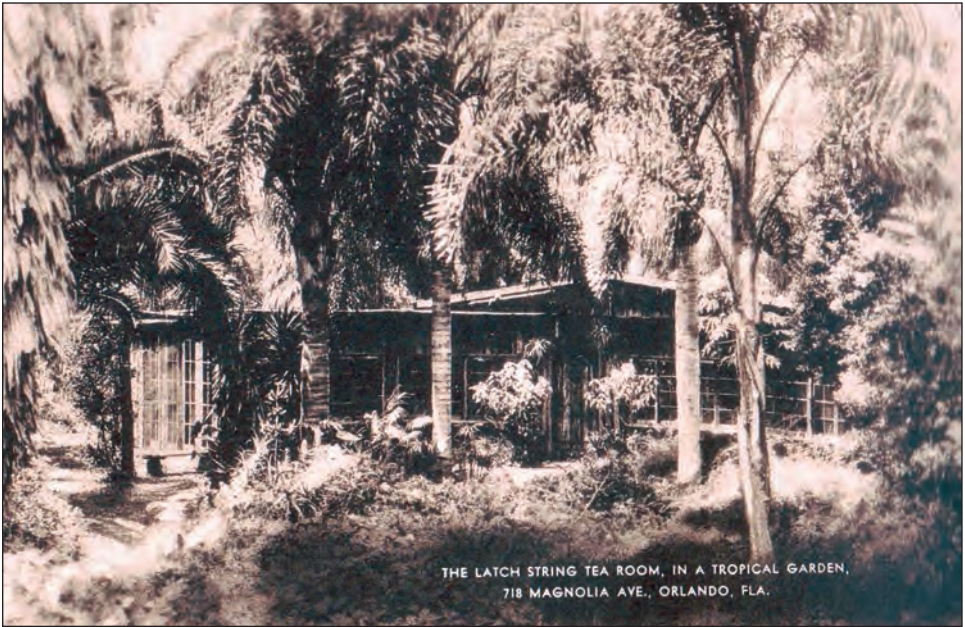


Figure 31. Latch String Tea Room exterior.



Figure 32. Latch String Tea Room interior.

It happened that one of these talks was a Press Club luncheon attended by Billy Glenn, editor at the time of the Orlando-Sentinel Star. He was captivated by the Show and Tell presentation of landscape plans. Among many words of praise after the luncheon, he said to Mulford "We need a man like you in Orlando. There is no landscape architect in our town."

So it was that Mulford took a look at Central Florida, the subtropical region that differed from the tropical area of Palm Beach. He felt the people there were different. They were self-made people with a deep love of do-it-yourself gardening in their blood. In Central Florida many plants intrigued him including the winter blooming azaleas and camellias. He never ceased in his wonderment that these humble shrubs produced flowers in such a profuse array of multitudinous colors. Although certain plants would not survive the colder winters in Central Florida he made the decision to move. The area needed his services.

It wasn't long before he had settled his family in Orlando in the year 1923. He organized Superior Landscaping service. His architectural business prospered over the next decade. Ultimately he began the Tropical Arts Nursery in 1927 which he maintained until 1943 located at 718 N. Magnolia, on the corner of Magnolia and Colonial Drive along with the Latch String tearoom and his art studio.

The Latch String tearoom was originally built for one of Mulford's sister and operated between 1930 and the late 1950's. After its closure it was converted to an apartment for one of his daughters.

During its heyday, the tearoom was nestled among a canopy of trees with Spanish moss hanging from the branches, lush tropical plants lined the paths that wound their way to the doors. Inside, patrons dined in a rustic open-beam room with bamboo supports and wood boards. They sat on rough hewn chairs and matching tables. Here they could be found sipping a cup of tea or eating a delightful meal overlooking the lush landscape holding 200+ species of plants that had been discovered by Mulford in his travels around the world.

The menu from the tearoom, now one of many historical objects in possession of the UCF reveals wide ranging choices from fillet mignon with mushrooms to lamb with green mint. Desserts and drinks are among the many other choices ranging in price between 75 cents and \$1.50. Drinks were served in hand- made Mexican pottery or European Quimper ware all brought back from travels both to South America and Europe. Artifacts adorned the walls with plants strategically placed inside. The handmade Mexican pottery and woven fabrics fit perfectly into the bucolic structure of the famous tearoom which became a place of great charm.

Unfortunately today these memorable grounds have been replaced by an icon quite different than any Mulford would have chosen to be associated with his beliefs. The wild natural grounds are now covered in asphalt and the eatery has been replaced by a 7-Eleven store. Sadly, only memories of those who were fortunate to have visited, a few surviving tokens from the enchanting tearoom and photographs still exist to remind us of this place and time.

Meanwhile, while Mulford's creative and professional life was flourishing throughout



Figure 33. Mulford with Bert and Miriam.



Figure 34. A greenhouse devoted to cactus and succulents.



Figure 35. Mulford in his greenhouse.

the late 1920's and early 1930's, his married life was not. Mulford was a free spirit and eccentric in ways that Fridel could not tolerate. She was also inclined to want nice things having been raised in this fashion and more than could be provided on Mulford's salary. Perhaps it could be speculated that she wanted him to be an 8-5 kind of husband, like the banker she had known him to be in Philadelphia when they met. But this was not the real Mulford and this had likely caused additional conflict as well. Fridel recognized early that Mulford's personality was much more bohemian than she was or could ever be and he was accepting of far more things than she was.

The combination of dissatisfactions made it difficult to endure and she was left alone with the children for long periods of time. It is impossible to know for certain at this point if his frequent absences contributed to or were the result of rising restlessness and strife in his married life. The final result is that Mulford and Fridel divorced in 1933. The family remained in close contact through the years, the children being raised nearby with Fridel. Based on letters between Fridel and Mulford, it seems they remained on friendly terms throughout their adult lives.

Mulford remained extraordinarily busy with his multiple projects. He had a client, Louise Bovington who he had done work for since the late 1920's. He took on a 3 year contract for landscaping the grounds immediately around her large house. Doing this much work over a three year span of time, meant they spent a good deal of time together and as a result they became friends. Intellectually they shared a similar philosophy. There were ongoing conversations about plants in the garden, the care, pruning, feeding and problems that presented themselves on a recurring basis. Louise loved plants.

Mulford continued with his obsession for knowing and painting plants and working long hours in his greenhouses. It was in his two greenhouses that Racine, his second wife met him. Her employer was the same Louise, who thought she might enjoy seeing all the curious plants while at the same time meeting the remarkable man who owned them. The man proved to be very interesting indeed.

However, Racine tells the story that she first fell in love with the fat droplets of bluish water, like a blob of mercury, still intact on the very succulent leaves of the *Escheverias*. A shimmering hall of transparent water at attention on the fat smooth and thick leaves. These gave her more visual pleasure than a pearl. She fell in love with the man a year later, while he was still married to Fridel although the marriage was all but over and heading for divorce.

Soon after their first encounter, Mulford began painting a large tree design up the spiral staircase of the tower at Castle Hill where Racine was the tutor to Louise's children. In this way she came to know him. She became more involved in his life, matching his passion for nature. It seemed they were the perfect blend to each other.

The connection grew stronger as time passed. Soon, this feeling was so intense that after Mulford's first trip to Mexico in 1935 he had the urgent desire to return to that country with Racine to show her the fascinating country south of the border. They married shortly after his homecoming in the First Unitarian Church's Unity Chapel at Rosalind and Central in the late afternoon of September 16, 1935. It was the same day that Racine's parents had been married. She felt it completed a family cycle.

Having a formal wedding or religious ceremony was the last thing either of them wanted. The determining factor that put them in a church was the pipe organ so that Racine could play her own wedding march as she was an accomplished pianist. She played a fifteen minute recital as a prelude to the little ceremony.

It was a complete surprise to the few friends who gathered behind them as they pronounced the vows in front of the lower embankment of palms and decorative foliage plants. They had been so anxious to have a beautiful setting that they had forgot all about a bride's bouquet so at the last moment at the church, Mulford improvised a bouquet from the decorations. Racine thought nothing could be lovelier or have been devised at a florist shop. They then had dinner at a lovely tearoom.

Their honeymoon was as untraditional as their wedding as they spent it in the ditches of Florida. Their mission at the time of the planned celebration was to collect aquatic plants for Louise who was building a large frog pond. They were busy collecting spiderworts, pipeworts, bladderworts and sedge. This led them to many backwater hamlets around Central and South Florida. It was a good way to get acquainted with the pulse of early Florida. The pattern of their lives was set during that celebratory hiatus. From that day forward Racine would help Mulford collect plants.

They had talked about going to Mexico for an extended honeymoon but before those thoughts had crystallized, Mulford's third daughter, Jeanne Eunice was involved in a car accident. Her neck was injured, serious enough for a neck and shoulder cast. Jeanne Eunice lived with her mother who had also sustained injuries. Mulford and Racine both felt that he needed to be in town to take care of any unexpected needs Jeanne Eunice might have. The Mexico trip together was postponed.

An Artist Develops

Early artistic leanings

Mulford recalled that his first paintings were done on frosted windowpanes in New Jersey (Johnson, 1975). Then in his early twenties he started experimenting with photography. This led directly into his early formal painting. He had a Graflex camera which became his constant companion on field trips exploring for snakes, the primary subject on his film in those early days. While looking for snakes inevitably he saw the wildflowers in fields and forests. The trees became personal friends as he identified and photographed each one.

He began absorbing the laws of the natural world. He experienced the light and shadow of the open and sheltered places. He became aware that simply experiencing the form of trees, the color and shape of flowers gave him total satisfaction. Could he capture what he saw and felt on film? He tried but the answer was always no. As his life progressed he found the answer in painting. It wasn't an instant cut and dried process of producing some canvasses. It was a strange evolution via the camera.

It was after the move to Palm Beach when his painting evolved and found the needed nourishment. This sustenance came through photography like it had in New Jersey. For extra income he took photos of large estates including their grounds, their gardens, their specimen plants, the vistas as seen through their gates. Although the owners were very

pleased with the handsome snapshots he produced in black and white or sepia they often voiced the thought that they wished they could be in color.

In the days before the modern marvel of color film, let alone digital cameras, this comment gave Mulford the impetus to hand-color the photos. With cotton twisted on a toothpick he successfully tinted many photos and sold them at a good price. In order to achieve realistic colors he had to get acquainted with artist oils. He noticed the intricate details of leaves and bark. He saw the natural arrangements of branches and trunks. Each observation made him think about structure. It wasn't long before he had made the step from shading photographs to actual painting.

His first painting was a canvas of a garden scene containing a wall and large vases. It was hung in a Baltimore showing. From that piece forward he made time to paint. In the beginning it was realistic work and always of plants. Early paintings in 1923 were categorized as photographic. From there he began painting his series labeled "*Realistic*" from 1925-1928. An unknown artist friend looked at one of his early efforts and made the comment that he didn't have to paint every leaf. Taking the feedback to heart Mulford did attempt less features thereafter. The period of details however survived until 1928 when the technique became stylized under the tutelage of Leopold Stokowski.

Mulford goes to Europe

When Leopold Stokowski, a long-time friend of Mrs. Bovington said he was looking for someone to accompany the family to Europe, she immediately recommended Mulford who accepted eagerly. Stokowski took him to Switzerland, France and Italy where they spent most of the summer of 1928 in the Alps. Stokowski was eager to see Europe through Mulford's eyes. He viewed life in a way different than Stokowski had ever experienced before. It was Mulford's great pleasure to explain plant life from his philosophical point of view, all of it a revelation to Stokowski.

On the other hand, Stokowski was the disciplinarian-teacher for Mulford. When Mulford painted realistic scenery, Stokowski would ask him, "Where is your camera? Use that for your scenery but use your imagination for the painting".

He also required a daily painting from him. Mulford created over forty impressions of his experience that summer, the major portions being the French Alps in and around Haute Savoie. Stokowski's insistence on painting helped bring these to fruition. Always sensitive to Nature and her richness Mulford painted mostly impressions of the countryside in a style new to him, "*Impressionistic*". These paintings were compiled in a book "Stokowski Sees" that was privately printed but not published and the book is currently held by Michael Spencer who is still deciding on its future.

The exhilarating scenery in the mountainous country side of rural Switzerland, France and Italy was stimulus enough for a lifetime, but there was more. He met and talked with famous people such as Maurice Ravel, Igor Stravinsky and others.

However, his most stimulating conversations were with Stokowski himself who was a teacher in the Socratic Method always asking questions to rouse the dormant thought of his opponent. These periods of questioning usually ended with "What have you painted today?"

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IN LOCAL GALLERIES

PAINTINGS of plants, mostly tropical, by M. B. Foster, were placed on view last week at the gallery of Theodore A. Kohn & Son, jewelers, 608 Fifth Avenue, where they will be shown until Sept. 15. About a month ago this artist held a large exhibition of his work

Playhouse is Thomas Eldred, a Michigan artist, whose first New York one-man show will continue until the end of the month. He is exhibiting both oils and lithographs, and achieves the more persuasive results, one may feel, in the lithographic medium. Mr. Eldred studied at the Chicago Art Institute, where, as likewise at the Little Gallery of Chicago, his work has previously been shown. He also studied at the Art Students League in this city.

Comment last Sunday on the mural work promoted by the College Art Association under the CWA should have contained mention of the fact that the murals by youthful members of the Boys' Club of New York, one of which was reproduced, were painted under the supervision of Antonio Salemme.

"Apples," by Henry Matts
Curren

The New York Times Aug 26, 1934

ENGLISH CRITIC ASKS.

Figure 36. Announcement of an art show featuring paintings by Mulford in New York.



Figure 37. Upper Nyack Studio and Gardens.



Figure 38. Upper Nyack Studio and Gardens Interior.

On his return from France, he stopped briefly in England. While there he went for a visit to Kew Gardens (also known as the Royal Botanic Gardens). He was enthralled by the vast collection of plants from around the world. He brought many things back from France including special art paper, the best cadmium tubes of paint as well as importing a large trunk of Quimper ware for use in his tearoom.

After returning he continued painting with his new found outlook and skills. Between the years 1928-1932 he painted the series called “Stylized” which had started while in Europe. Using familiar motifs, his “Orange Grove” painting used a highly stylized rendition of orange groves found everywhere at the time in Florida. The round form of the orange tree was mimicked by the round oranges themselves broken up by the lines of palm fronds, fences and crates. The lake is repeating the line of the arched trunk hanging over it. The grouping of leaves each is repeating cleverly the whole form of the lake.

The ornamental form of Euphorbias was a persistent stimulus which produced three important paintings. In one, the Euphorbia expressed a freer flowing style with its long undulating branches waving as a Bali dancer would, leading to the creation of “The Dancers”. The Bali mask in the painting suggests a comparison. The very young Bali girls perform their ceremonial dances by undulating motion of the arms rather than of the feet or body. It takes ten years for the plant to do the same thing the Bali dancer can do in ten minutes. The motion of the plant is solidified by the duration of many years, while the dance of the little girl is observed in but a fleeting glimpse of each movement.



Figure 39. Painting by Mulford.

It is a unity of life's expressions with each form finding its happiness in expressing its rhythm within the limits of its timing.

Another painting, "Polynesian" took as its pivot the five points of a talkative Stapelia whose form symbolizes heaven and sun. The pattern of the plant was echoed in the Polynesian tapa cloth which was the inspiration for the painting and is seen in the background. The angular Padilanthus was used as well to compose a symphony of harmonious form. The idea of the painting was to build a symphonic interpretation of these motifs from their original primitive representations, reappearing again in living form. The few simple designs are found repeated in each object with a natural simplicity which the artist has caught and tried to reproduce.

Between the years 1930 and 1935 Mulford's paintings took on a combination of stylized and decorative style. The "Philosophical" series was started between 1932 and 1936. In

"Self Defense", every living thing has its own protection beginning with the flowering date palm and its maze of a thousand spikes or thorns pointing in every direction, each guarding reproduction from conception to maturing of egg cells that we call seeds or fruit. Mulford made a frame to hold it but immediately the border seemed to defeat the purpose of the expression he was trying to illustrate. The palm was confined. This led to painting the fronds on the frame, extending them up and out of the picture itself.

Next he helped develop the Nyack Country Club in New York between the years 1932-1934. He used elephants to move and plow the dirt. Being the astute man that he was he observed that each animal had its



Figure 40. Painting by Mulford titled Araceae or Aroid Family (Oil on Canvas).



Figure 41. Painting by Mulford titled Cactaceae or Cactus Family (Oil on Canvas).

own personality, this being reflected in their eyes. His elephant painting replicates this insight.

In “Mimicry” the artist sympathetically depicts the parallel relationship between one of the lizard’s mannerisms and that of the Anthurium. The little tendrils and feet of the lowest white leaved vine compared to the little feet of the lizard. The leaves and flower in the painting represents the Aracae family, of which the calla lily is a member. They are among the earliest and simplest forms of plants. The lizard as well is a very early and simple form of the reptiles. Multiple and subtle repetitions with colors suggested a deep primeval forest with its many hidden forms.



Figure 42. Mulford photographing in South America.

He described the motivation behind the “Climbers” as being a huge, old, gnarled vine growing outside his studio at Tropical Arts. The vine in his painting climbs up the tree trunk for light and air. A small tendril is the intelligence part of the vine, its guide for stimulus. Likewise the small tender tongue of the snake is the sensitive ear and nose which guide the snake to quiet resting places. The parallel means of motivation of these two forms create the similar shape of their bodies and a similar type of intelligence. The vine and snake are both elemental and early forms of life, assembled in harmonious composition in this painting.

His series “Impressions of Mexico” was completed between 1936 and 1938. By 1936 he was almost entirely painting on wood with such a flat application of oil paint that even artists asked him if he painted in tempera. He had painted previously on canvas but with the painting of his plant subjects he felt closer to the earth if he worked on wood.

One medium that he used skillfully was painting in oil on rice pith. This is very thin, tissue-like paper although not paper at all. Rather it is the pith of the rice plant cut under water by the Japanese. So deft was his use of oil on this transparent, lighter than air substance that there were often accusations that it surely could not be done with oil. The Japanese frequently used tempera on rice pith so everyone assumed he was using it as well.

During the decades of the 1950’s and 1960’s while much of Mulford’s time was spent exploring, collecting, writing, cultivating, and designing yards he managed to paint as well. His final series was called “Synthesis” and was completed over the years 1950-1966. While he continued to do sketches and smaller works, the Palm Family, Orchid Family and Cactus Family were his last serious paintings. It is this last series that prompted the name “passionate plant lover”.

He ultimately held a showing at the Art Center of Maitland in September of 1975 exhibiting all his paintings including all the series from the Photographic to the Synthesis, later the paintings were shown in New York and Pennsylvania. The later, abstract paintings are at the Harry P. Leu Gardens on permanent display.

When discussing his artistic career at age 86 he reminisced that he never intended to be an artist. Racine reported to the newspaper interviewer that “it just welled up out of

him". At the time with his body frail and the stroke having left one arm useless, he continued to sketch with the good hand as he strove to convey those vital life forces that were so a part of him (Johnson, 1975).

Ambitious Explorer

Mulford adored finding both new and old species of plants to be used as either indoor decorations or landscape material. At first these explorations were limited to his home states, then Europe. Soon his sights were set on South America.

Mulford's first trip to Mexico was with Tibor Pataky, an artist friend who was going with him to paint impressions of Mexican life and to have constant contact with Mulford in order to become fluent in English. Mulford's purpose was to see where and how plants grew in their native habitat. Some Mexican plants already grew in his Florida garden. It was like meeting old friends when he saw them growing wild. It was with exceptional ecstasy that he collected many new plants for the gardens of Florida although this predated his bromeliad collections.

They drove one of the first Florida cars into Mexico in March of 1935, driving a Chevrolet Sedan with a small two wheel baggage trailer rolling behind. The front seat of the car was cut so that it could drop down and join the rear seat forming a commodious bed for the two of them. This of course saved money as they were on a low budget.

This excursion turned out to be an exciting and wonderful plant collecting and painting expedition. Their joint goals of sketching, painting, photographing, and collecting plants were achieved by the end of July and the exhilarated but tired travelers were happy to be home. The details of that trip were included in the book *Adventures in Mexico* (Foster, 1935). Needless to say the plants Mulford brought home from Mexico have spread far and wide in Florida. He also did a number of paintings and drawings, notably the series of *Tillandsia* as well as many small ones not yet framed.

Mulford and Racine made their first trip together in 1936. There was so much to see, do and feel that their six weeks was tantalizingly brief. Racine found it amusing to hear

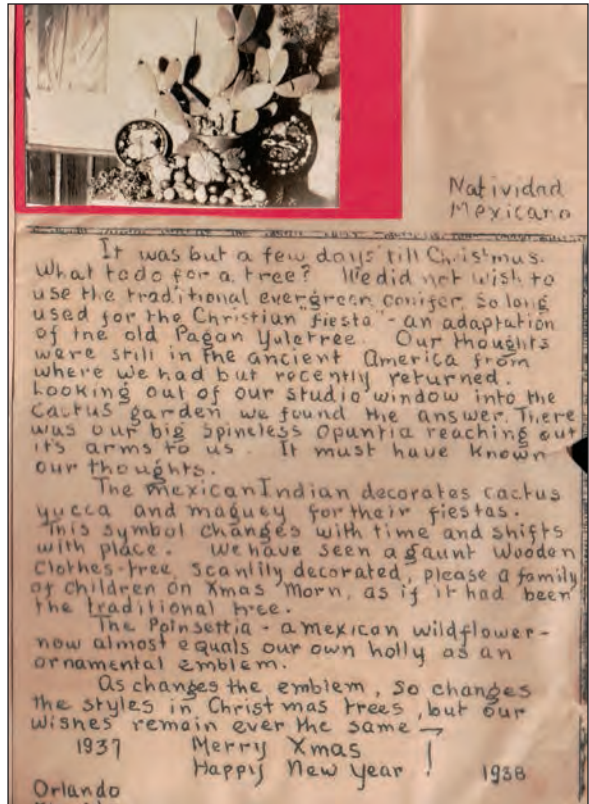


Figure 43. – Holiday greeting designed by Mulford and sent to family and friends in 1937.

Orlandoans Home With Famous Flowers



Mr. and Mrs. M. B. Foster with one of the colorful bromeliads they collected on a recent five months' botanical expedition in Brazil. Among the 2,000 plants

collected were 12 unidentified species, one to be named for Mrs. Foster. The couple are pictured in the greenhouse on Magnolia Avenue.

Orlando Couple Discovers New Plants On Trip Thru Wilds of South America

By ELAINE KLEPPER

M. B. Foster, returning to his Or-

lando, has been given a permit by the United States Government to be in Indian villages and going on day-long excursions. From Sao Paulo,

has been given a permit by the United States Government to be

Figure 44. Orlando Couple Discovers New Plants.

of people flying in to Mexico and staying at a modern hotel for ten days, taking a few tours and then returning home under the illusion that they had “done” Mexico.

She felt that the mixture of the ancient culture, with the old Spanish and modern idiom create a certain mystique not easily absorbed on first impact, even in a “brief” six week tour. Mulford and Racine had the advantage of a panel-body Chevrolet which served much of the time as their sleeping headquarters. It was a great convenience when collecting far from a town. Besides a good selection of plants, they returned with artifacts to be used and sold in the Latch String Tearoom.

Their first trip to Mexico only whetted their appetite for more travel. They were mesmerized by the stoic Indians and their native crafts in pottery, ceramics and the blue glassware, the woven fabrics with skillfully matched colors. There were many places yet to explore for collecting plants, so the summer of 1937 saw them off again trekking as Racine would say “like gypsies” to Mexico. This time they explored the areas in and around Oaxaca. They were in the process of building fine museums there and had just opened the Mixteco wall to tourists so their enthusiasm for all things Mexican was being stimulated in a new way every day.

In 1938 Mulford made a Cuban expedition and from this trip he introduced *Agave caribbea* to Florida. Around this same time Mulford met Lyman Smith who was working at Harvard’s Gray Herbarium, being referred to him by sources in the Smithsonian. Lyman ultimately would be of help with the identification and classification of the bromeliads that Mulford would be collecting. It is Lyman Smith who directed him to Brazil as he had himself been there and collected specimens. Mulford had initially expressed an interest in exploring Dutch Guiana.

Mulford’s expeditions were as Lyman expressed beyond their wildest dreams in the scope of the discovery of the bromeliads. Mulford’s and Racine’s book *Brazil. Orchid of the Tropics* (Foster, 1945), long out of print but available through used sources was a well told story of their 1940 trip to Brazil. Interviews with Lyman indicate that the publisher insisted on using orchids in the title since he thought it would sell better. The book was a success and its completion brought the artful teamwork that was to mark the relationship between Racine and Mulford. His keen vision, liveliness and resourcefulness balanced with her devotion and help in caring for all of the plants and helping organize his materials, keeping fastidious notes of her own were replicated many times over the years with many projects.

The following excerpts of passages written by Mulford come from this now out of print book.

“A multitude of people dream of paradise as a place where there is nothing to do, where there is no effort expended, no strife, no bills to pay. If they could suddenly be placed in the center of a great jungle (without any of the inconveniences of getting there) they would look about and see plants growing everywhere quietly and to all appearances serenely poised on the tree, limb and rock or swinging lightly from a branch. “This is paradise!”, they would exclaim.

Yes, this is paradise, not because there is nothing to do, however, but because each living thing has worked out its own life cycle through the centuries and although outwardly

tranquil, inwardly there is much work going on. The happiness they show is because they have been continually on the alert, have had constant strife in growth and have never rested on their achievements. And when, like the plants, we find ourselves alert, striving to grow, never resting on laurels, we need not search for paradise, we are already there."

"The Brazilian's call the hummingbird Beija-flor, the flower kisser or as we like to say kiss of the flower. There seems to be some affinity between the bromeliads and little beija-flores. They grew up together, possibly each formed for the benefit of the other. The hummers prefer brilliant reds and yellows in selection of flowers and the bromeliads are indebted to them for pollinization (*sic*)."

In 1939 Mulford set off to Brazil for six months, covering many well explored areas. Mulford was again able to find new species in places that were supposedly already previously explored and declared exhausted by prior collectors over the previous one hundred and fifty years. Mulford rediscovered a number of "lost" species during his trips to Brazil. He introduced the brilliant yellow flowering tree, *Tabebuia umbellata* to North America. This tree is now famous in Orlando, Florida.

In 1940 he made his second six month expedition to Brazil and Trinidad this time specializing on bromeliads, orchids and philodendrons. From this trip he introduced many new bromeliads and the now famous self-heading philodendrons.

World War II put a stop to further expeditions for some years. Mulford turned his

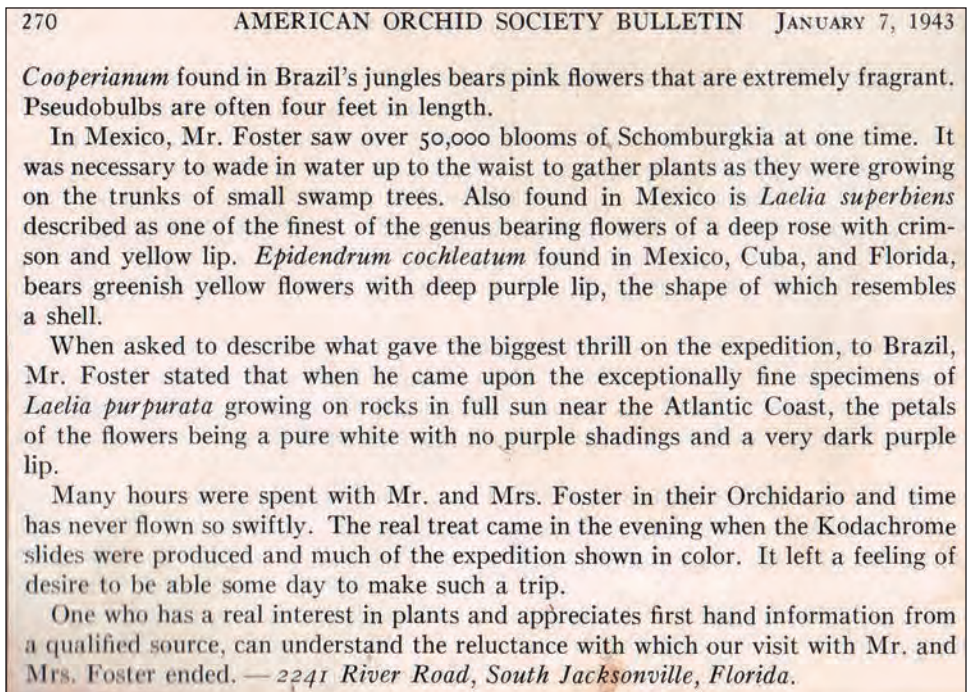


Figure 45. American Orchid Society Bulletin 1943.

attention to cultivating and popularizing the bromeliads. He continued to work with Lyman Smith who described and illustrated the bromeliads that had been brought back from Brazil in the preceding years.

Lyman reported that Mulford's love of art was intertwined with his love of plants. His ability to record the living plants with flowers accurately after his keen observation was invaluable to the man who was responsible for classifying and identifying each of the plants brought to him, often in dried condition. Mulford's passion for color and art however also acted to create barriers between the men at times. According to papers in possession of the family, Lyman reported that he found color "a weak and unreliable character" in distinguishing species whereas Mulford found this feature all important.

More than once Mulford, exasperated, ended a debate with the comment that "There's nothing about them that's alike".

Lyman Smith in a memorial speech after Mulford's death reflected on his ability to hold an audience of one or a hundred with stories and humor, of conveying his own enthusiasm.

Lyman fondly recalled a conversation with Mulford where he was asked, tongue in cheek "Where would you have been without me?" To which Lyman answered, "Without your help, my work would have been finished much sooner- and also very much poorer".

In 1946 Mulford resumed his expeditions. He and Racine traveled to Columbia. This trip followed the earlier trail of the famous Edouard Andre to confirm and add to his discoveries 75 years before. This was considered one of the most important bromeliad areas of Latin America. In 1948 he made a plant expedition around South America collecting in Dutch Guiana, Brazil, Bolivia, Peru, Ecuador, Colombia Costa Rica, Cuba, Puerto Rico and Trinidad.

Several years later in 1951 he would leave on a Venezuelan plant expedition. This was followed in 1954 to Jamaica with his final plant collecting trip made to Mexico in 1957. During these trips Mulford not only collected thousands of herbarium specimens for the Gray Herbarium of Harvard University and the Smithsonian Institution of Washington, DC where all of the scientific data is now on file but he also collected thousands of seeds and live plants to enrich the variety for Florida gardens.

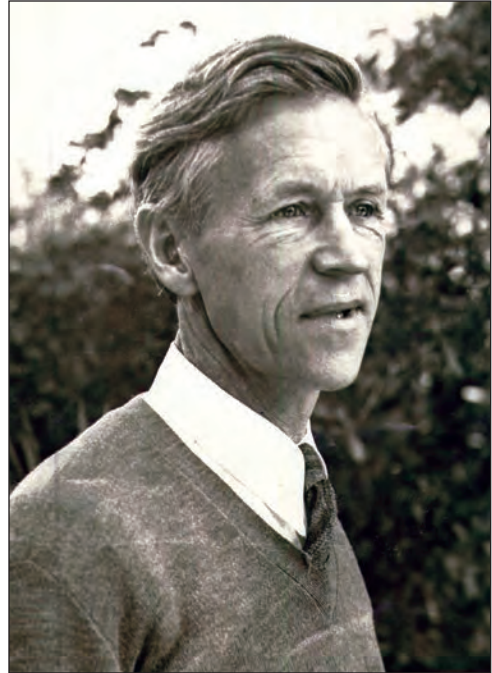



Figure 46. Mulford Foster from the Michael Spencer Bromeliad Research Collection, University of Central Florida.

THIS IS 'MONKEYBUSINESS'



Flowers weren't the only interesting subject when the Mulford B. Fosters toured the interior of Brazil in search of unusual plant life. This gracious little monkey, whose cousin is touring city streets in affiliation with an organ grinder, provided plenty of comedy relief as the Foster motion pictures will show during tomorrow's lecture.

Expect Big Crowd At Foster Lecture

A large crowd is expected to pack the Florida Theater at 11 a. m. tomorrow when Mulford B. Foster appears in Ft. Lauderdale to give an interesting talk on flowers and rare plants. Motion pictures accompanying the lecture will encompass the perils of a safari into the Brazilian jungles and will highlight many interesting events that happened to the Fosters during their travels.

Recognized as an authority on the orchid, an outstanding botanist, plant collector, painter of plants, landscapist, explorer and lecturer, Foster's talk is expected to be the most interesting ever presented in the city.

The program is sponsored by the Ft. Lauderdale Garden Club and all proceeds will be turned over to the canteen at the Service Men's Center. Cost of bringing Foster to the city has been donated with the result that there will be no expenses involved. His descriptions of the countries and jungles he has visited are unparalleled.

On his last trip to Brazil the government furnished him with an official railroad car in which he lived between the periodic forays into the depths of the country in search of rare and important plant life.

Through his entire South American trips, Mulford kept detailed diaries but would intentionally secretly code his locations to keep them undisclosed. They remain locked and waiting to be deciphered.

Horticulturist and Hybridizer Extraordinaire

The chance to own his own piece of paradise became possible for Mulford about a year after moving to Orlando. It was the perfect piece of property for an office and a nursery. He had informed the real estate agent that he wanted a piece of property that had rich soil, was away from downtown and cheap. All these requirements were met in Leuter's Hole, a magnolia-covered property that was a prior lake bottom on the north edge of town.

He bought two lots and his brother bought the adjoining two lots which Mulford used. A rather sizeable landfill job had to be done first, simultaneously with a proper drainage system. Many young palms, trees, bamboos and shrubbery were planted in the following months. One of the great joys of his life was to carry in his arms the ten small cabbage palms planted on each side of the entrance steps. Thirty years later these were the plant-children that he hated most to leave. By this time they had put on twenty feet of growth with wonderful full round heads, so typical of the Florida scene.

Figure 47. Expect big crowd at Foster lecture.

Author-Artist at Work



Flower-Hunting Trip Told By Orlandoan in Geographic

National Geographic, in its October issue just on the stands, carries the complete story with 18 illustrations of a trip to Bolivia in search of the flowering bromeliad *Puya raimondii*, made by Mulford B. Foster, Orlando orchidist.

Foster is the discoverer of 200 species of bromeliads, amaryllids, orchids and cacti. The world's largest collection of living bromeliads grows in his Tropical Arts nursery at 718 Magnolia Ave., where, in a sometime muck sink he has built one of the show places of the botanical world.

AN ARTIST BOTH OF THE paint brush and of the camera, Foster's kodachromes in National Geographic illustrate the success of his trip, and show in full color the giant *Puya* he found growing in the Andes at 14,550 foot altitude — the plant that blooms only once in its 150 year lifetime, and that dies once it has bloomed.

Foster's sketches, too, are filled by hundreds with the National Herbarium at the Smithsonian Institution, where his discoveries are hand-illustrated in magnificent color plates. At home, his own abstractions of the same plants illustrate the relationship of man and plant, and decorate the walls of his rooms.

Major discovery of the trip was the giant *Puya* in full bloom which measured 30 feet overall — 10 feet in the plant itself, and 20 feet in the towering flowered stalk that had a diameter of eight feet.

BENEATH ONE OF HIS own abstract paintings of the jungle, Mulford B. Foster, Orlando orchidist, author and artist whose pictures and story are carried in this month's National Geographic Magazine, works on an exact scientific drawing of the minute seed of a new species of bromeliad he has discovered. Foster's scientific drawings are published by the Smithsonian; his abstractions of plant life, illustrating their paternity to human life and the similarity of traits between the two families, have been exhibited in New York, Winter Park, Miami and elsewhere. [Staff photo: Tucker].

Figure 48. Orlando Evening Star article, Sept. 1950.

Gradually, a subtropical garden took shape. The sloping ground down from the street level made wonderful rock gardens when properly banked with Florida's natural limestone rock. One does not just lay rock on the sloping ground. One must build pockets and ledges where the roots of plants can find moisture retaining niches. One of the best tests of a successful rock garden is that it shows no hand of men. It must be as natural as possible, an arrangement of rock for the convenience of plants, not to show a formal preplanned design.

In this capacity Mulford was very successful. All his rock gardens, hand laid by him seemed to be just as nature had placed them in a practical way to serve the needs of the plants. A row of giant bamboo was planted along the rear line of the property which in due time became a show feature of the property. No one else had a row of Asian bamboo two hundred feet long and forty feet high. It was spectacular by all accounts. It was also noisy. Racine described it as the wind moved the stalks from side to side hitting the neighboring hollow wooden tubes, creating a clacking noise that some people enjoyed and others not.

Eventually two greenhouses 20 X 30 built side by side took shape, much of the work done by Mulford himself after hours. He enjoyed carpentry work which became a recreational activity when the day's business was done. In these houses he started a



Figure 49. An early photograph of the house at Bromel-La, before the grounds were taken over by bromeliads and other exotics took over all space under the oaks.

collection of succulents and cacti, a long time hobby that became, in self defense, a small side business. However, he did not part with these beauties easily. This is one of the reasons he did not make money selling plants. He could not grow them in commercial quantities. It was against his sensitive grain to push the production of these marvelous creatures. Each one was a favorite.

He had a private line of communication with them, a pure symbiotic relationship expressed in realistic paintings of them. A *Crassula*, and an *Echeveria* on the same rocky knoll, a *Stapelia grandiflora* with its foul smelling but handsome star shaped flowers. It was incongruous to be pleasantly attracted to the lovely shell-pink, rather fleshy petals sprinkled with maroon hairs but be repelled by their unpleasant odor which lured the seeking ant to the putrid center of deep maroon cavity. An insect eating plant! No headlines, it was just a natural phenomena.

And for the next thirty years he and Racine lived their busy lives in this natural garden within the city of Orlando. But the next project was the purchase in 1953 and subsequent development of Bromel-La, a piece of property "in the country". It was a 12 acre forested piece of land with 250 century-old oak trees. It took 6 years to move all the plants, having brought many of the species from their town property after raising seedlings.

A house was finally built for them and they moved to the new property in 1959. It



Figure 50. Mulford (2nd from right) on a trip to Missouri Botanical Gardens.

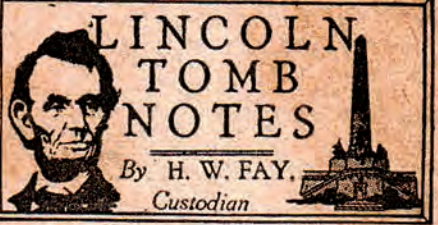
would be a showcase and sanctuary of plants that had been both collected as well as his hybrid bromeliads. The home was a large comfortable “U” shaped building opening to an unobstructed view of the courtyard with a screened patio. He painted an outdoor garden scene on the concrete wall of the back porch. Under the painted wall was a bench. It was perfect.

There was the living room with its fireplace surrounded by book shelves lining the wall, calling for private reflection with a picture window overlooking Lake Alpharetta. Attached to the house by a breezeway was a hobby room. Mulford’s paintings adorned the walls of the house. Artifacts from their trips were placed throughout the rooms. The den contained a desk that ultimately was piled high with correspondence. Racine was forever trying to keep up with this in the days and years to come.

The roof of the house was flat and Mulford had a ladder so people could climb up on the roof and look at his acres of bromeliads. One of his granddaughters remembers a time when they climbed to the roof together. It was just the two of them. It made her feel special that he wanted to share his retreat with her.

The business of growing and cultivating his plants took hours of his time. Two new greenhouses were built each 30 X 60 feet with attached slat houses at the new property. They needed tending which included keeping fires going on cold nights to protect tropical plants, weeding and pollinating flowers.

In a letter to family Racine wrote in 1955 that Mulford had been on a campaign for the prior five years of pollinating flowers and cleaning seeds, mostly at night. He had the reputation of being the first hybridizer of the great self-heading philodendrons and had extensive demands to maintain. They rarely saw each other through the commotion of running a business.



LINCOLN TOMB NOTES

By H. W. FAY,
Custodian

There were about 150 callers at Lincoln's tomb Monday.

Mr. and Mrs. Paul Young and son, Billy, of O'Fallon, were late guests Sunday.

Mrs. Guy E. Bonney, program chairman of the Nature league, brought out Mulford B. Foster of Orlando, Fla., who has a national reputation as growers of orchids. He got his original plants from Brazil. He placed a wreath upon Mr. Lincoln, the first that has featured all orchids all these years. He was accompanied to the national shrine by former Congressman James M. Graham, a former president of the Nature league, and his daughter, Helen K., and by Roy Ide, the present president; Mrs. T. J. Knudsen, the president of the Lincoln garden at Lake Springfield. The distinguished guest was given a Lincoln souvenir.

Mrs. Louis Rehwald of R. R. 2, Springfield, brought out Ruth Richardson of Columbus, Ky., and her brother, Vontress Moss, a private, stationed at Camp Maxey, Tex.

Mrs. Miles Gray of this city was an afternoon guest bringing out her sister from Minnesota.



Figure 51-54. Lincoln's Tomb Notes and photos of Mulford's visit to Lincoln's Tomb.



Figure 55. Spring flower show exhibit 1947.

LAKE COUNTY SHOPPER • Thursday, July 30, 1953



TROPICAL AIR plants, which grow in profusion at Floating Islands, Florida's new major attraction, are being admired by J. T. Claiborne, President of Floating Islands Corp., M. B. Foster, Landscape Architect and noted plant explorer, and Carl Byoir, Director of Floating Islands Corp.

Figure 56. Mulford showing bromeliads at Floating Islands.



Figure 57. Biggest Palm tree ever moved.



Figure 58. Mulford and Racine Foster at Brome-La from the Michael A. Spencer Bromeliad Research Collection, Special Collections and University Archives, University of Central Florida, Orlando, Florida.



Figure 59. Mulford in 1966 with Tillandsias.

Guests were always welcome there. Once there, a visitor would likely find themselves immersed in Mulford's artistic sensibilities via a vis his plants, his many paintings, some of his notes, writings, even poetry and if they were lucky, meeting the man himself if he were home at the time.

Bromel-La represented many things to Mulford. He was proud of his plants and it gave him great joy to share his love and knowledge with others. When family came to visit, he was anxious to show off the greenhouses and his specimens.

In a letter answering one of his nine-year- old great grand-daughters inquiries about orchids, he addressed it to "his great grand orchid daughter". He told her he wished he could have taken her into the greenhouse to show her the beautiful orchids that were in bloom now. He was sure they would like to know her.

His explanations included examples whereby her favorite vanilla ice cream came from the vanilla orchid. He made it clear that you could put a thousand orchid seeds on his thumbnail. Next came a description of blowing out a candle and with that he'd watch the seeds disappear like dust. He went on to describe their colors and shapes, dancing ladies and men, butterflies and moths and one that looked like a lovely white dove. He hoped someday she could come visit him and his orchids. His enthusiasm jumps off the paper even now as one reads the letter. The delight in receiving it is easily imagined.

One could further imagine his mother, Fannie, talking just like that to him when he was a child. He loved telling stories to the children. One he told often was the story of how Spanish moss originated. The story goes that a monkey was swinging through the trees when his beard got tangled up in the branches and was pulled off. As a result of this mishap, we have Spanish moss in Florida.



Figure 60. Mulford comic strip by Dunnigan, a popular comic strip artist in Orlando, Mulford's neighbor next to Bromel-La.

I visited Bromel-La in the mid 1960's. There were the twisted branches from the ancient oak trees, a framework of arching palms and bromeliads below. The Spanish moss hanging mysteriously from the trees, the musty smells of the greenhouses brimming with exotic flowering and pungently fragrant plants, the moisture in the air with its high humidity left the sheets moist and damp with only fans for cooling. I came from California, where the plant life was very different and a much dryer climate. It was certainly a new experience. I can understand now why it gave a peace to visitors not easily found elsewhere.

Mulford always had a rapport with trees. He felt they were otherworldly companions. Visitors who came to Bromel-La after his death would tell Racine they could feel his spirit there among the trees. They were everywhere. Unfortunately, I was a teenager at the time of my visit and could not fully appreciate the Mecca he had created. I often wish I could visit him, with my adult maturity. And yet, in some ways I am getting to know him better now.

It had been almost twenty years of hard work when Mulford died. Racine had sincerely hoped that Bromel-La would remain a treasured landmark after his death, a bromeliad sanctuary. Unfortunately, she needed to sell the property to achieve other goals and settled on a smaller piece of land on the same lane. In the years after his death she continued to hope that monies could be raised to donate Bromel-La to a foundation for safe keeping but this did not transpire. The property was sold and Bromel-La exists no longer. It, like the Latch String tearoom only exists in pictures, in descriptions and in those memories of those who visited its welcoming borders.

Mulford as Writer

“To know, feel, and see the great beauty that lives forever in the growing leaf is to realize the everlasting immortality that nature expresses” (Foster)

Mulford was a prolific writer and story teller in addition to his other talents. His earliest writings came in the form of letters which were abundant even at an early age. Some were simple postcards, acknowledgements of his thoughts and yet now treasured glimpses into his inner self and outward activities.

From the simple exclamation of a child born, to the reporting of harvest, keeping contact with his parents and family was important for him. His letters were often either quite humorous or poetic prose although he also wrote poetry



Figure 61. Holiday card designed by Mulford and sent to family and friends in 1952.



Figure 62. Holiday card designed by Mulford and sent to family and friends in 1953.

which he would use occasionally to adorn Christmas cards and the like. In the later years, after his move to Florida it was typical that you could find them scribbled on his Tropical Arts letterhead paper.

When his oldest daughter, Gerda died from liver cancer in 1970 he sent Fridel, by then his ex-wife a touching letter. In it he wrote “I will never forget that night in Philadelphia when Gerda first saw the light of day. Last week I saw her shortly before she saw her last light of day. Days are short and long but always go on forever.”

Besides his short lived job as editor of the Elmer Times in 1910 he likely wrote out his notes for his extensive lecture series. It appears that he began writing a few articles in the mid 1930's although none apparently were published or if they were, have not been recovered. Most likely any articles and his lectures would

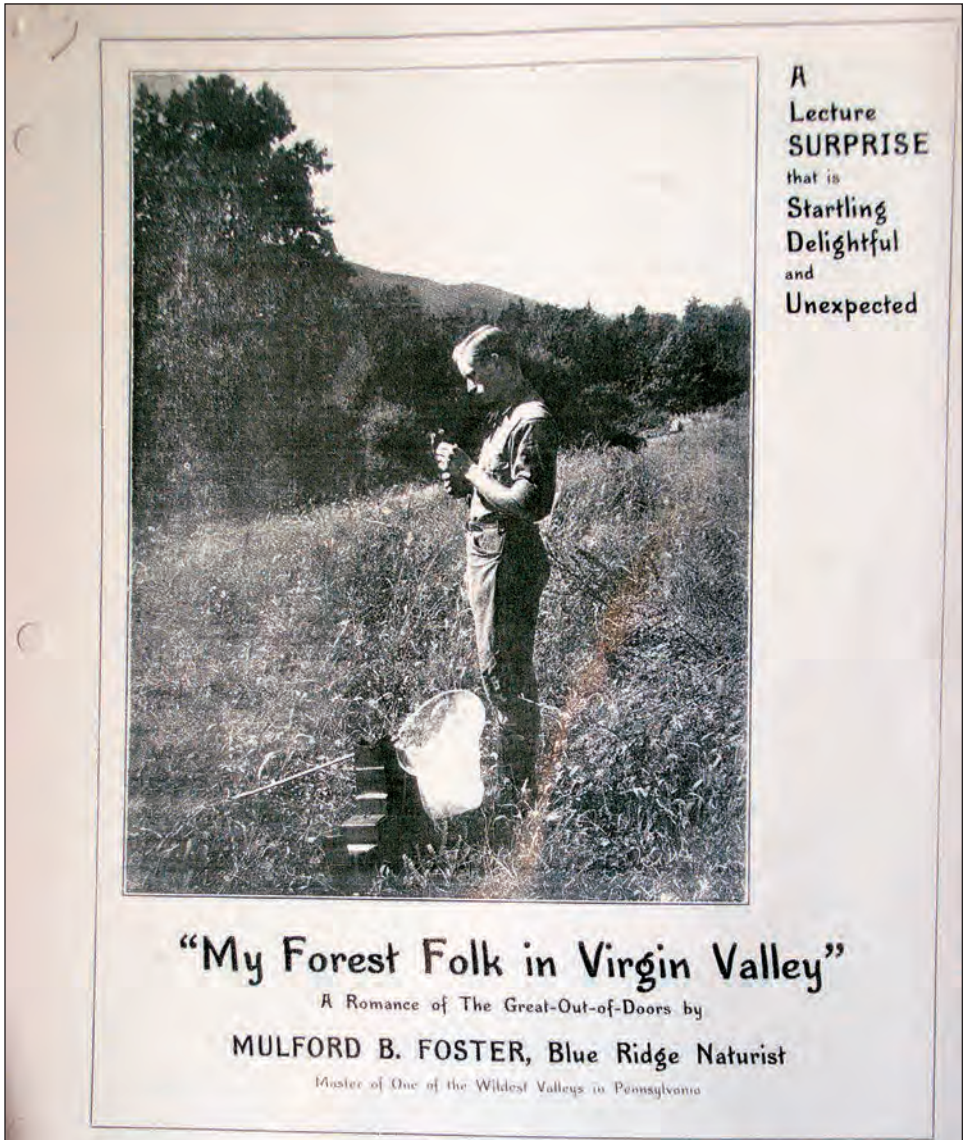


Figure 63. Cover page of a 4 page pamphlet designed to advertise a series of lectures given around 1912 (original in the possession of the Foster family).

be about snakes and reptiles, his first area of expertise, then on to the other subjects of interest. Each decade saw an ever expanding depth of knowledge from which to write about in his personal letters.

Beginning in the 1940's Mulford with Racine began publishing their ever-expanding bromeliad knowledge in a wide variety of garden and horticultural publications. These ranged from well known venues such as The New York Times and House Beautiful to trade

journals such as the National Horticultural Magazine and Cactus and Succulent Journal to name just a few. A special article called “Puya, the Pineapple’s Andean Ancestor” was published in the October 1950 National Geographic Magazine along with color photos.

It was also during this time that they began writing their collaborative books based on travels to South America including Brazil, *Orchid of the Tropics* (Foster M. a., 1945).

Robert Bloch reviewed the “Brazil, Orchid of the Tropics” book and poetically states “The eye rests with pleasure on drawings by Mulford B Foster”. (Bloch, 1946)

Mulford also became a founder of the Bromeliad Society around 1950 and with his editorship of the Bulletin his audience became worldwide. He maintained this responsibility for nearly a decade with Racine acting a copy editor for years. Both were heavily committed to this publication at the beginning, often using their own monies to help publish the journal in the early years.

The Final Chapter

Mulford’s rich and fulfilling life changed dramatically on April 5, 1974, when he suffered a devastating stroke and landed in the hospital. The previously active, fiercely independent 85 year old would be suddenly relegated to a dependent role and confined to a wheel chair most of the time. He suffered a series of small strokes over the next four years before finally succumbing to death.

As a seed planted by the father-mother earth, so Mulford B. Foster saw his span of time among people. Racine described his end as being like the beginning- a matter of breathing. For Mulford Foster it was almost ninety years. Four months shy of that esteemed age. Being paralyzed on the left side for 4 ½ years meant limited action of the body and, of course, the respiratory system, so at the last moment these same lungs could not work hard enough to resist the fluid that filled them.

His last day began as they usually did by then, with Racine close at hand. There was no inkling that it would be his last. He had eaten a very normal light supper. All was well. Then very suddenly he was breathing very hard. The bed held him in his usual sitting position so that it was easy to give his right arm range of motion above his head. Soon he stopped trying to get his breath and leaned back.

Racine lowered the back rest slightly and she later described that at that moment there came a vision of a double helix spiral of air emanating from him. “How strange” Racine said to herself as she was on her way to get him a cool drink of water.

By the time she got to the refrigerator she had a strange feeling about that helix and returned to him quickly. At that moment of return she discovered he was not breathing. She believed that she had seen his spirit leaving his body with the curling spiral, a rare experience she was convinced. That is why she felt “He had never really left me”. For the rest of her life she would see that vision of a helix dancing before her eyes. It is a part of the air that she would breathe.

Philosophically, this process, his last breath on earth mixing with the ether of the universe typified Mulford’s universal viewpoint of all is one. The great oneness of all nature was a guiding direction in Mulford’s life. He saw in Nature the multiple forms or

MULFORD BATEMAN FOSTER
December 25, 1888 - August 28, 1978

*While exploring an open
rock-covered forest in Eastern
Brazil, Mulford Foster came
upon a radiant *Cryptanthus*
species shimmering through the
morning haze. Captivated by the
enchanting difference of it all,
he exclaimed, "They must
surely be Earth Stars."*

*A true legend in his time and for
always, Mulford Foster, as a
collector, grower, and hybrid-
izer, has educated zealously in
all areas of the Bromeliaceae.
In appreciation of his genius,
which has reached so many
plant enthusiasts, we the
Bromeliad Society of South
Florida, respectfully and grate-
fully, dedicate this exhibit
in his honor.*

Figure 64. Mulford Foster's Bromeliad Society memorial plaque.

expressions of God.

Mulford made an impression on many people during his 89 years and his death touched countless lives. There were numerous memorials printed in newspapers, newsletters and journals across the country. They portrayed him as a man with the ability to spread infectious love, humor and a universal philosophy of plants in everyday conversation. He was described as a man of diverse gifts as horticulturist, artist, philosopher, writer, lecturer, landscape architect, explorer and botanist. Most importantly to some was his art, to others his contribution to bromeliad knowledge.

One acquaintance remembered his risqué stories and his philosophy. He had a love affair with the world from the age of five. He believed life originated and ended here on earth. He believed that his ancestors were green algae and that when he died, he was going right back to the earth.

Such a full and dedicated life cried out for a tribute in death. He had devoted most of his life, without profit to establish bromeliads to their rightful place in the plant kingdom and in the lives of people all over the world. To honor Mulford's life and his contributions to the bromeliad world, a memorial fund was established and entrusted to the Marie Selby Botanical Gardens in Sarasota, Florida. They in turn formed the Mulford Foster Bromeliad Identification Center which exists to this date.

The memorial service of March 4, 1979 strove to honor him and his philosophy. There was a wide attendance of family and friends at the adored Bromel-La. His ashes were scattered over these same gardens, among his beloved bromeliads. In honor of Mulford, palms were planted in 1978, representing victory of Life that both Mulford and the palms expressed.

The service began with a bird song prelude and this music was interspersed with favorite poems and readings. All had guided Mulford's life in some way.

His son, Bert reflected, "Dad loved the earth and life which were the same in his mind." Bert, himself a respected landscape architect also shared that "the world had lost the best bromeliad of all".

One of Mulford's favorite quotations was a saying by Stephen Girard. "If I knew that I would die tomorrow, I would plant a tree today."

Mulford's piece titled "Life in Death" was displayed during his memorial as a representation of his personal philosophy. That is, he thought of death in terms of life wherein he depicted the eternal fact that life is always present even in forms that appear to be dead. He had painted this piece after a discussion in the Wisconsin woods with a group of friends about Life and Death. As a naturalist he led his friends to an old rotten log which was, to all appearances, what we would normally term, dead, simply because it has no further use as a standing tree of the forest.

By explanation and with the aid of a microscope he took great pains to show his audience that in the midst of apparent death in one form, in another form was the greatest activity. Beautiful lichens, fungi and mosses. It represented the living in Death. There is no Death, if we enlarge our scope of thinking to encompass the things unseen.

During the memorial gathering, Racine told Mulford's version of the Story of Primitive Origin.

"In the beginning Father-Heavens and Mother-Earth dwelled together as one. But there came a time when they lived apart. Soon Father-Heavens regretted his distance and wanted to tell Mother-Earth that he still loved her; so he sent her his tears---- the blessed rains to mingle with the earth."

To honor this story and its personal meaning, Mulford's epitaph was engraved on a plaque that read:

"Let the rain be your tears."

Further Information:

Additional information on Mulford Foster can be found on Wikipedia at: http://en.wikipedia.org/wiki/Mulford_B._Foster

A large archive of material relating to Mulford is housed in the Michael A. Spencer Bromeliad Research Collection, Special Collections and University Archives, University of Central Florida, Orlando, Florida.

Indexes to the material found therein may be found at:

<http://library.ucf.edu/SpecialCollections/FindingAids/Spencer.xml> and

<http://www.library.ucf.edu/SpecialCollections/Exhibits/Foster/default.asp>

Donations to the UCF library are always welcome and needed to help in the archiving of the various collections.

The link to his Bromeliad Identification Center:

<http://www.selby.org/index.php?src=gendocs&link=BromeliadIdentificationCenter>

Information on the type specimens collected by Mulford and Racine may be found at Harvard University (http://kiki.huh.harvard.edu/databases/specimen_index.html) for earlier collections and the United States National Herbarium at the Smithsonian Institution for the later collections. (<http://collections.mnh.si.edu/search/botany/>)

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http://www.sil.si.edu/smithsoniancontributions/Botany/pdf_hi/sctb-0070.pdf

Other resources:

Resources in the possession of members of the Foster family were used liberally in this biography. These include the Foster Family Bible, a listing of magazine articles and books written and published from 1938 to 1945 prepared by Racine Foster, numerous newspaper clippings from 1911 to 1912 (newspaper names unknown), notes on personal interviews with Foster family members and facts taken from personal diaries of Mulford and Racine Foster which includes interpretations of all art work, dates of travel to Europe and South America, memories of historical events.

Public records were consulted in Pennsylvania for the marriage of Fridel Tautenhahn and Mulford Foster in 1911. Public records in Florida were consulted for information on the divorce of Fridel Tautenhahn and Mulford Foster in 1933 as well as the marriage of Racine Sarasy and Mulford Foster in 1935.

Photographs: (Used with permission from the following institutions):

Harry P. Leu Gardens

Marie Selby Botanical Garden

Foster Family members

Phylogeny and Evolution of *Tillandsia* subg. *Tillandsia*: A Preliminary Project

Juan P. Pinzon¹, Michael H. J. Barfuss², I. Ramirez-Morillo, G. Carnevali³ and Walter Till²



Figure 1. *Tillandsia minutiflora*, one of the smallest species of *Tillandsia* with stems measuring 1.5–6 × 0.3 cm. Photograph by W. Till.

Introduction

Tillandsia L. is the largest genus of Bromeliaceae with more than 620 species in six subgenera (Luther 2012) ranging from Southeastern United States of America to subtropical Argentina and Chile (Smith and Downs 1977, Smith and Till 1998). The genus inhabits a variety of habitats from tropical rainforests to deserts and from the lowlands to the highlands (Benzing 2000).

As it is shown in this journal regularly, the genus as currently circumscribed is morphologically very variable, including species like the tiny, atmospheric *T. minutiflora* S. Donadio (Figure 1) or the huge tank bromeliad *T. grandis* Schltdl. (Figure 2).

The subgeneric classification of *Tillandsia* in Smith and Till (1998), which was in turn based on that of Smith and Downs (1977) (except for *Racinaea* M.A. Spencer & L.B. Sm.), has been the most accepted scheme (Table 1). Nevertheless, according to molecular based

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Figure 2. *Tillandsia grandis*, one of the largest species of *Tillandsia*, which can reach more than 3 m high. Photograph by J. P. Pinzón.

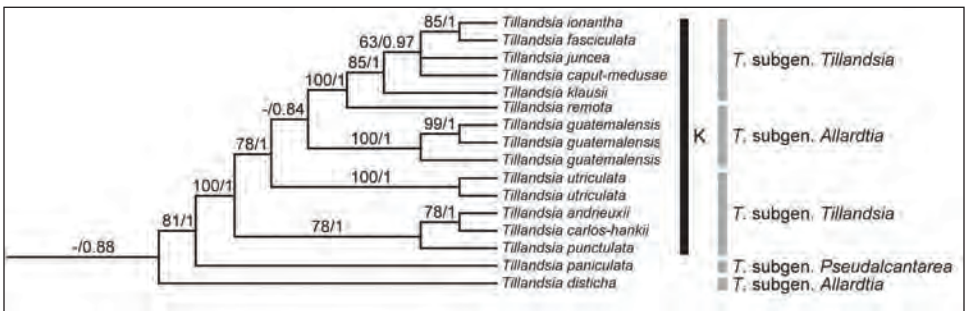


Figure 3. Phylogenetic tree where most of the species of *Tillandsia* subg. *Tillandsia* sampled are grouped, according to the bayesian majority rule tree from Barfuss et al. (2005). Support values (bootstrap/posterior probability) are given above the branches.

phylogenies, this classification does not reflect monophyletic units (i.e. a taxonomic group should evolve from an exclusive common ancestor). From the results of Barfuss et al. (2005) based on sequence data of seven plastid DNA markers, it can be inferred that all six subgenera of that classification are polyphyletic (i.e. species complexes within each subgenus have evolved from different common ancestors). This also shows that the morphological characters currently used to define the subgenera are not appropriate. However, most, although not all, of the species of the subgenus *Tillandsia* sampled by

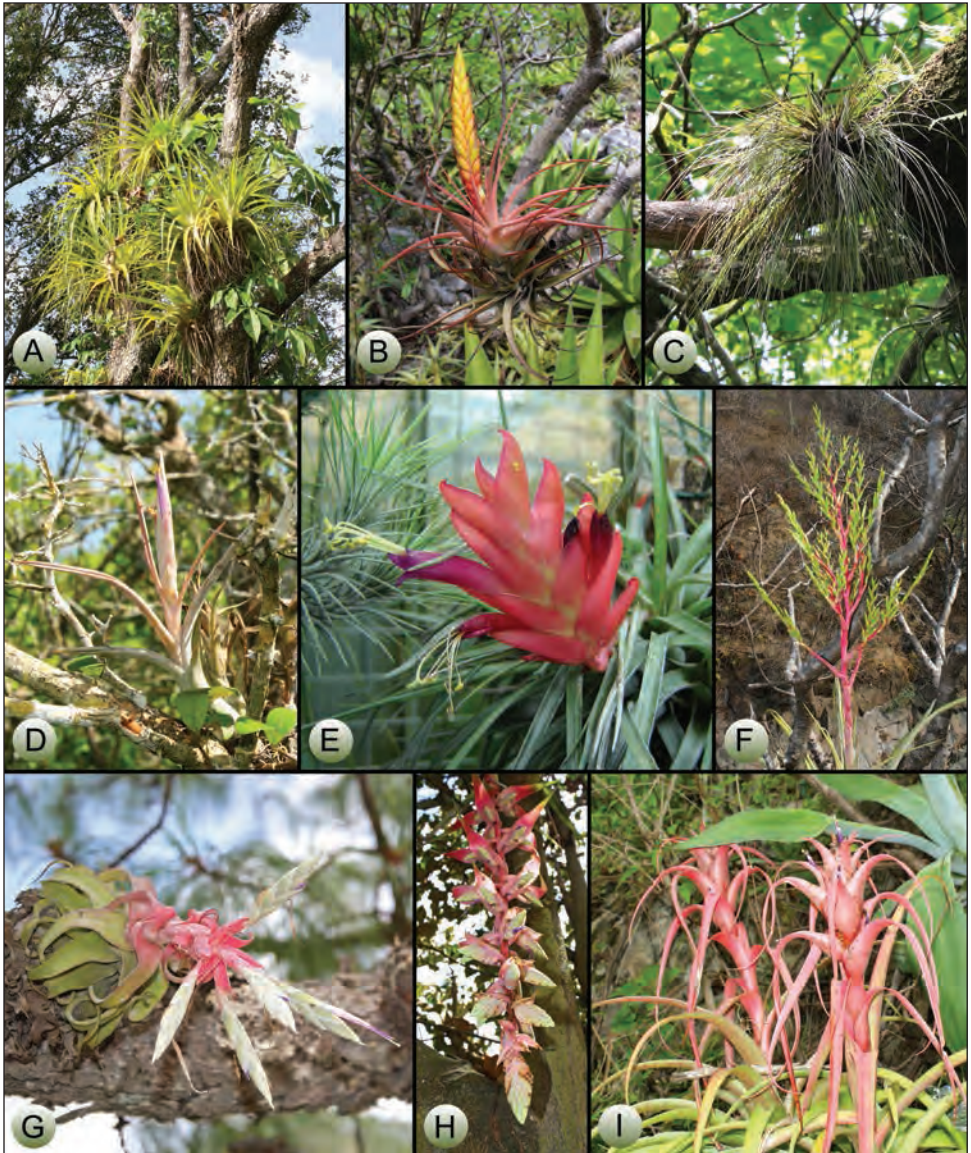


Figure 4. Examples of morphological variation within subgenus *Tillandsia*: A. *Tillandsia utriculata*, B. *T. concolor*, C. *T. pseudosetacea*, D. *T. paucifolia*, E. *T. kegeliana*, F. *T. cucaensis*, G. *T. streptophylla*, H. *T. eizii*, I. *T. rhodocephala*. Photographs by J. P. Pinzón.

Barfuss et al. (2005) and later by Pinzón (2012) are grouped in one well supported clade together with certain species of other subgenera (Figure 3).

The subgenus *Tillandsia* is characterized, according to Smith and Downs (1977), by having the stamens and style exserted from the corolla, and its members exhibit great morphological variation similar to that seen in the whole genus (Figure 4). The species

that share these features are principally distributed in Mexico, Central America, the Antilles, and northern South America, being responsible for the majority of bromeliad diversity in the first two regions mentioned (Utley and Burt-Utley 1994, Espejo et al. 2004).

Gardner (1982) criticized the subgeneric classification of *Tillandsia* of Smith and Downs (1977), because it is based on a few or even single characters. This, according to her view, does not permit the recognition of “taxa with predictive value”. Later, Gardner (1986) proposed a preliminary classification of *Tillandsia* subg. *Tillandsia*, including some species of subg. *Allardtia*, based on a meticulous study of floral characters (Table 2) from a synthetic point of view, as opposed to the analytical approach of Smith and Downs (1977).

The classification of Gardner (1986) has not been tested from a phylogenetic perspective, due to the limited sampling of species in the analyses published so far. On the other hand, the phylogenetic relationships at species level of *Tillandsia* subg. *Tillandsia* have been studied with a species-complex approach for the *T. macdougallii* L.B. Sm. complex (Granados 2008), the bulbous species of *Tillandsia* subg. *Tillandsia* (Chew et al. 2010), and the *Tillandsia utriculata* complex (Pinzón 2012). However, the whole picture of relationships is not known, since only certain species have been studied in detail and taxa selection is not evenly distributed over species complexes of the whole subgenus.

Objectives and expected outcomes

Our principal aims are to elucidate (1) which species belong to *Tillandsia* subg. *Tillandsia*, and (2) what are the phylogenetic relationships of taxa within the subgenus. This will allow us to propose a scenario of the evolution of the subgenus *Tillandsia* and to understand its radiation, especially in Mexico, Central America and the Antilles. In addition, we will be able to test the hypotheses of Gardner (1986) and the results of other studies (Barfuss et al. 2005, Granados 2008, Chew et al. 2010, Pinzón 2012, Barfuss 2012).

One of the main taxonomic issues of the subgenus *Tillandsia* is that the species boundaries are not clear in many cases, especially in some species complexes, such as those surrounding *T. bourgaei* Baker, *T. capitata* Griseb., *T. fasciculata* Sw., *T. juncea* (Ruiz & Pav.) Poir., *T. polystachia* (L.) L., among others. With our results, it should be possible to address taxonomic problems for future investigations at the species and population level with more sensitive genetic methodologies by restricting the study to individual clades within subg. *Tillandsia*, leaving out of the discussion phenetically similar but unrelated species. In this way, time and resources will be saved and different projects could be developed simultaneously by several groups of researchers. Hence, the other objective of this project is to identify and delineate species complexes within the subgenus *Tillandsia*.

The use of evolutionary information for the definition of groups permits classifications that have more predictive power than those based on arbitrarily chosen single or few characters (e.g. the insertion of stamens, petal appendages, bract imbrication). This means that the members of a group defined using evolutionary information are more likely to share features of all nature (morphological, anatomical, physiological) because they have inherited them from a common ancestor.

This can have practical applications for *Tillandsia* cultivation. If a species grows in a cool, humid, mountainous region but it is a member of a group from hot lowlands, it

is possible that plants of the former could be successfully grown in lowlands too. Also, members of some groups could be frost-resistant or drought tolerant. Of course, this is not a rule, but it could give hints to collectors to set the correct conditions for cultivation of rare species, based on their experience growing better-known related species.

Methods

To achieve these aims it is necessary to have a broad sampling of the taxa involved. We consider that the sampling should be at least 80% of the ca. 250 species that are now classified under the subgenus *Tillandsia*. The methodology to infer the phylogenetic relationships will be the comparison of DNA sequences from the plastid (inheritance from maternal side) and nucleus (which includes information from both parents). DNA analysis will be performed following standard procedures of Barfuss et al. (2005) and Barfuss (2012).

In order to understand the evolution and biogeography of *Tillandsia* subg. *Tillandsia*, selected characters and geographical areas will be mapped on the phylogenetic trees to reconstruct their evolutionary history, following the methods applied by Givnish et al. (2011).

What do we already have?

Currently we have samples of 145 species, representing about 58% of all species of the subgenus. To achieve our objective we still need to sample at least 55 additional species, but it might be desirable to include even more in our analysis^{1*}.

Regarding the molecular work, we have assessed the variation and information contained within eight plastid DNA markers (maternal inheritance) for a small sample of the taxa to evaluate their possible utility for the complete data set, and we have selected four of them. We are currently working on the selection of nuclear DNA markers (biparental inheritance). A final report will be published also in this journal after the studies are completed.

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^{1*} People who would like to contribute additional plant material for this project should contact the first author for detailed information on missing taxa. Money donations can still be made to the bank account of the project (please contact Walter Till at walter.till@univie.ac.at).

Renate Ehlers, Barry Genn, Brad Gillis, Ian Hook, Paul Isley III, Maurice Kellett, Chris Larson, Justin Lee, Ross Little, Kerry McBurnie, Steve Morgan, G. and J. Newell, George Nieuwenhoven, John Olsen, Grant Paterson, Bob Reilly, Dave Sheumack, Mark Supple, Peter Tristram, Paul Turvey, Shane Weston, and Dawn Williams.

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TABLES

Table 1. Subgeneric classification of *Tillandsia* of Smith and Till (1998) based on the characters used by Smith and Downs (1977). Some characters were not explicitly expressed in Smith and Downs (1977) and are completed here [in brackets] according to our observations.

	<i>Allardtia</i>	<i>Anoplophytum</i>	<i>Phytarrhiza</i>	<i>Diaphoranthema</i>	<i>Tillandsia</i>	<i>Pseudalcantarea</i>
Relative length of stamens/corolla	Included or equal	Included	Included	Included	Exserted	Exserted
Plication of stamens	None/[Present]	Present	[None]	[None]	[None]	[None]
Relative length of stamens/petal claw	Longer	Equal	Shorter	Shorter	Longer	Longer
Relative length of style/ovary	Longer	Longer	Shorter	Shorter	Longer	Longer
Petal blade width	[Narrow]	[Narrow]	Broad	Narrow	Narrow	Narrow
Petal posture	[Erect]	[Erect/subspreading]	[Salverform]	[Spreading to recurved]	Erect	Spreading [to recurved]

Table 2. Infresubgeneric classification of *Tillandsia* subg. *Tillandsia* plus some subg. *Allardtia* species according to Gardner (1986).

	Group I	Group II	Group III	Group IV	Group V
Relative length of filaments	Unequal	Unequal	Equal	Equal	Equal
Shape of filament cross section at upper third	Flat	Round	Round	Round	Flat
Relative width of filaments near apex	Broader	Equal	Equal	Equal	Equal
Anthers fixation	Versatile	Versatile	Subbasifixed	Versatile	Subbasifixed
Corolla throat	Closed	Open	Open/closed	Open	Open

A Longer Story Than Expected: Seeds Of Several Species (Tillandsioideae) Remain Viable For Up To Two Years

Gerhard Zotz^{1, 2}

It is common knowledge that bromeliad seeds lose their viability very quickly. For example, an article by John Atlee on the homepage of the Bromeliad Society gives 4 - 6 weeks for seeds of members of the Tillandsioideae (http://www.bsi.org/brom_info/growing/seed-ja.html), slightly more, up to three months, for members of other subfamilies. Similar figures are found in other sources such as Vasak (1969: "few longer than half a year") or Williams (1990: generally not viable when "older than three months after maturation").

A few years ago we began a large screening program of germination responses of seeds of a large number of bromeliad species in an effort to understand current distributional limits and to predict possible consequences of global climate change. First results have been reported in two recent publications (Bader et al. 2009, Wester and Zotz 2011). Usually, we keep seeds frozen between collection and experimental tests to prolong viability, but when seeds of *Tillandsia fasciculata* were discovered in a paper bag in the office about a year after collection we put them in wet petri dishes out of scientific curiosity, actually expecting from the literature that they would not germinate. We got 100% germination success! This stimulated the study we report upon in the following.

Materials and methods

Mature seeds of *Guzmania lingulata*, *Guzmania monostachia*, *Tillandsia fasciculata*, *Tillandsia flexuosa*, *Vriesea gladioliflora*, *Vriesea sanguinolenta* and *Vriesea viridifolia* were collected from natural populations in Panama. Note that species names follow The Plant List (<http://www.theplantlist.org/>), which treats *Werauhia* as described by Grant (1995) merely as synonyms of *Vriesea*. Most species were from seasonal lowland forest (Panama Province), one (*V. viridifolia*) from the lower montane rain forest of the Fortuna region. One month after collection seeds were either dried in a dessicator and then stored in sealed plastic bags at -20 °C or left in paper bags in the office (Temperature circa 22 °C, relative humidity circa 50%). In regular intervals over 26 months, seeds were sown on filter paper (Sartorius 5H/N) in disposable 15 mm Petri dishes in climate cabinets (Economic Delux, Snijders Scientific, Tilburg, The Netherlands) with 12/12 h light/dark cycles at 25 °C. The light intensity was 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$, which approximates conditions in the inner canopy of forest trees. For each species and each treatment we used three Petri dishes containing 20 seeds each. Germination, defined as the rupture of the testa and the appearance of the swollen hypocotyl, which appears green and is therefore easily recognized, was recorded every other day for 4 weeks. Error terms represent standard deviations.

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Results

The majority of the seven species showed no reduction in germination response after one year of storage (Fig. 1). Even in *V. sanguinolenta*, the species showing the greatest decline in germination rate after storage, an estimated 50% of all seeds successfully germinated after one year. After 26 months few seeds remained viable, although in *V. viridifolia* and *T. fasciculata* germination success was still, respectively, $25 \pm 7\%$ and $14 \pm 12\%$. In contrast, seeds that had been kept at $-20\text{ }^{\circ}\text{C}$ had lost hardly any viability. Their average germination success after 26 months was 93% (range: from 74% in *V. gladioliflora* to 100% in *V. viridifolia*). We estimated the time it took seeds from each species to lose 50% viability by noting where the curve drawn through the observed mean germination rates over time for that species crossed the dashed horizontal line in Fig 1 representing 50%, yielding values between 12 and 22 months (Table 1). Lack of seed material did not allow us to study germination success of *T. flexuosa* after 26 months, but after 20 months it was still $89 \pm 6\%$.

Discussion

Three decades ago, Benzing noted that “information on the longevity of bromeliad seeds is sketchy at best” (Benzing 1980). This situation has not really changed since then. Although the “very limited” longevity of bromeliad seeds is consistently mentioned as a fact in the literature, very few reports present actual data to back up this claim. For example, Fernandez et al. (1989) report complete loss of viability of *T. recurvata* seeds within 6 months when stored at $20\text{ }^{\circ}\text{C}$. In contrast, Goode & Allen (2009) studied seed germination in *Aechmea bracteata* after 1 and 2 years of storage at room temperature. Germination, which was 100% with fresh material, still reached 75% after 1 year, but seeds completely failed to germinate after 2 years. A few other recent studies systematically assessed the effects of low temperatures and desiccation on seed longevity for a number of bromeliad species (Tarré et al. 2007, Pereira et al. 2010a, 2010b), but unfortunately present no data that would allow a comparison with the effects of storage at room temperature.

What is the reason for the large discrepancy between the prevalent view of seed longevity in bromeliads and my findings? I cannot really offer a satisfying explanation. It seems unlikely that the seven haphazardly chosen species are exceptional. They represent the three largest genera of the subfamily Tillandsioideae, growing in a seasonal lowland forest and a wet montane forest. Thus, there is no immediately apparent ecological or phylogenetic bias. Moreover, my data concur with the results of Goode and Allen (2009) for a species from a different subfamily. Both studies consistently indicate that there is relatively little loss in seed viability within a year. On the other hand, there are species with very short-lived seeds (Fernandez et al. 1989) – with more than 3000 species of bromeliads and very few data any *new* generalization seems premature. More data are clearly needed to settle this issue but for the moment my findings cast doubt on the generality of the prevalent notion of a very limited longevity of bromeliad seeds.

Acknowledgements

I thank both Silvia Kempen and Stefan Wester for technical assistance and the Republic of Panama for making their natural resources available for study.

Legend Figure 1:

Temporal changes in viability in three bromeliad species. Data are means \pm SD, n = 3 x 20 seeds. Filled symbols indicate storage at room temperature, open symbols indicate storage at -20 °C.

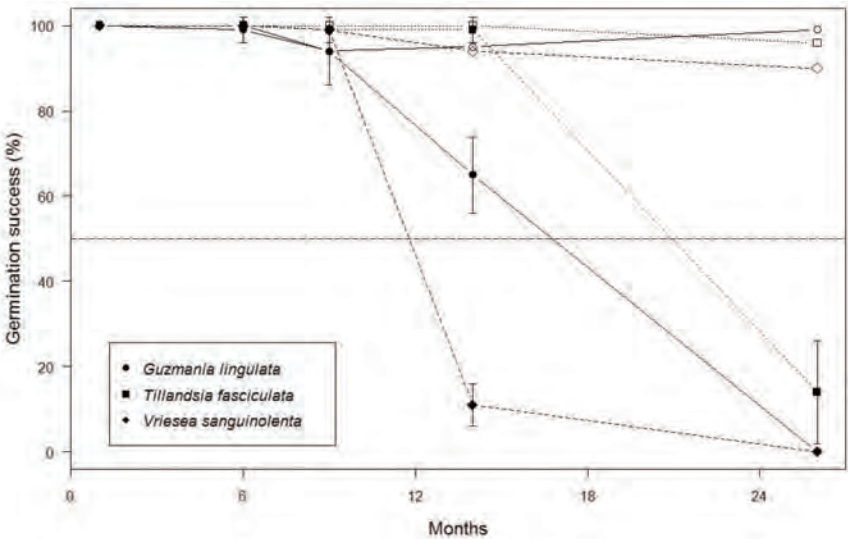


Table 1:

Time to lose 50% viability after storage at room temperature.

Species	Months to 50% viability loss
<i>G. lingulata</i>	17
<i>G. monostachia</i>	13
<i>T. fasciculata</i>	21
<i>T. flexuosa</i>	> 20
<i>V. viridifolia</i>	22
<i>V. gladioliflora</i>	20
<i>V. sanguinolenta</i>	12

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x Neophytum 'Supernova'

Geoff Lawn, BSI Cultivar Registrar



Figure 1. *x Neophytum* 'Supernova'. Photo by Lisa Vinzant.

Since the first x *Neophytum* ('Lymanii') was bred in 1957 by Mulford Foster, only 20 other cultivars in this bigeneric genus have been recorded to date in the BCR . (<http://registry.bsi.org/>) . Most show the strong influence of *Orthophytum navioides* used in about half the crosses, resulting in flattish, narrow-leaved, open star-like rosettes flushed red centrally and with a recessed pincushion-shaped inflorescence.

In 2001 Hawaiian breeder Lisa Vinzant of Olomana Tropicals nursery in Waimanalo, Oahu made this cross, recently registered as x *Neophytum* 'Supernova' (name originally suggested by Chanin Thorut).

Seed parent: *Neoregelia* ('Lambert's Pride x 'Painted Lady') x (*macwilliamsii* x 'Painted Lady').

Pollen parent: *Orthophytum navioides*

A resultant small seed batch was sown and seedlings grew slowly. Fairly early on, only one seedling showed real promise so the rest of the siblings were culled. Over the next 4 years through juvenile and near-mature stages, this lone specimen showed no signs of ever blooming or even pupping. The main attraction was the rather striking foliage markings of vibrant vermilion / golden green crossbands and red-flushed inner leaves (Figure 1). By 2006 this individual rosette "bloomed" but no photo was taken probably because emerging flowers were expected up from the central cluster of scarlet leaf bracts, which didn't eventuate--an anti-climax. The matured rosette gradually declined after that effort and by August, 2007 was looking pretty bad with lots of leaf dieback.

Jubilation came in November, 2007 when a single basal pup emerged from the old parental stem, only for it to be chewed by slugs in January, 2008. By this time the parent plant appeared to be nearly dead with little leaf chlorophyll tissue left. Then there was one more offset growth bud showing, but could it survive on the decimated parent? Normally Lisa would have dumped the whole plant into the trash by this time. However, she knew this was something special, so tried heavily fertilising the pot with slow release pellets and hoped for the best.

Fortunately, the parent plant still had a few breaths of life left and nearly a year later (December, 2008) three basal pups emerged which looked like they may actually make it. Later Lisa separated and potted the pups individually, keeping up the feeding regime. At this stage Lisa was less interested in maintaining the leaf markings than just keeping the pups alive and growing (Figure 2). By 2011 two of the three matured pups had come into "bloom", of sorts. The rosy lavender petals still didn't open up fully, but one rosette produced one offset (Figure 3) This offset didn't appear super-strong but with regular feeding hopefully will become a better parent than the previous generation. The latest update (February, 2013) is that all three rosettes have flowered and are offsetting. A mature rosette can reach 40-60cms. diameter if fed regularly and grown in strong light.

As a breeder of bigenerics Lisa finds that the dominant *Orthophytum navioides* as a pollen parent needs to be crossed with a strongly-marked seed parent (or vice versa) for the foliage pattern to show through at all. This "back from the dead" experience demonstrates the persistence breeders need sometimes to see the final fruits of their labour. General release of x *Neophytum* 'Supernova' into the market may be still some time off, after 12 years in development. and stock propagation .



Figure 2. *x Neophytum 'Supernova'*. Photo by Lisa Vinzant.



Figure 3. *x Neophytum 'Supernova'*. Photo by Lisa Vinzant.

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Celebrating over 50 years with the BSI - Nat DeLeon

Monya Prince



Fig 1. Nat with one of his spectacular hybrids at the 2003 Bromeliad Society of South Florida Show.

Nat DeLeon joined the BSI in 1956, 56 years of BSI membership - what an achievement! He has been intricately involved with both the BSI and the Bromeliad Society of South Florida (as a founding member) longer than many of us have been alive.

Nat's enthusiasm for bromeliads was born some years before his involvement with the BSI and the BSSF, when he took over the landscaping of Parrot Jungle in Miami. He realized he had to learn about the tropical plants he was working with, among them bromeliads, and he became friends with the early giants of the bromeliad world in Florida - Mulford Foster, Ralph Davis, Bob and Catherine Wilson and Alex Hawkes among others. Nat was president of the Temporary Board of BSSF in 1959, and subsequently president three times, the most important time being 1986-1987 when he spearheaded arrangements for the highly successful and stunningly beautiful 1988 Miami WBC.

In addition to his positions on the BSSF board, he has been a constant presence at society meetings where he runs the Show & Tell Table, usually enhanced with his own Vrieseas and Guzmanias. At the annual shows Nat is in charge of Classification, and his knowledge, experience and encouragement to newcomers have been instrumental in persuading new growers to enter their plants, and maybe win a blue ribbon.

Nat's interest in bromeliads progressed to developing cultivars which would do well in landscaping in south Florida. He created large massed plantings of the same cultivar which had a huge impact on visitors to Parrot Jungle. He was always on the lookout for new plants with special characteristics, such as spineless Aechmeas, and plants that were cold-hardy when Miami's temperatures dropped. Parrot Jungle became so famous for its gardens that it was renamed "Parrot Jungle and Gardens" as a tribute to Nat's contributions. Families in the area became members just so they could enjoy the tranquil peace and beauty of the landscaping and become inspired to use these fabulous plants in their own gardens at home. Now, wherever you drive in Miami, you will see beautiful bromeliads used in both business and home landscapes.

Early on Nat became acquainted with growers in Europe and Latin America and went on collecting trips to Colombia, Costa Rica, Venezuela, Panama and Ecuador. Several new species have been named in his honor. He has been a major booster of the BSI, the Bromeliad Identification Center and the Florida Council of Bromeliad Societies. Nat joined the BSI early on and became acquainted with California growers like Victoria Padilla, David Barry and Bill Peylan. He became BSI president and eventually he was named an Honorary Trustee, a lifetime position.

Nat's achievements and service to the world of Bromeliaceae are too numerous to list them all here. We in the Bromeliad Society of South Florida are proud to call this towering figure, Nat DeLeon, our own.

For more information, go to fcbs.org, then click on 'bromeliad information' (menu on the left) - bromeliad people - Nat DeLeon

Announcing the Harry E. Luther BSI Scholar Program

Bruce Holst & Jay Thurrot

During his tenure at Selby Gardens as Director of the Bromeliad Identification Center and Curator of Living Collections, Harry Luther had a profound influence on the world's understanding and knowledge of bromeliads. In fact, Harry was an Honorary Trustee of the Bromeliad Society International and recipient of the Society's highest award, the Wally Berg Award of Excellence.

Harry played a significant role in fostering the longstanding history of partnership and collaboration between Marie Selby Botanical Gardens (MSBG) and the Bromeliad Society International (BSI). In honor of Harry's memory and scientific contributions, BSI will launch a new research initiative in July, the Harry E. Luther BSI Scholar Program. Professional and higher-level student scientists will conduct bromeliad research to advance the mutual goals of BSI and MSBG. The program is expected to bolster the education and research dimensions of both BSI and MSBG, help maintain the high quality of the living collection, and further the conservation of bromeliads. The Mulford B. Foster Bromeliad Research Center (BRC) at Selby Gardens will become the home base for the program.

Upon the announcement, Selby Gardens CEO Tom Buchter commented, "We are pleased to have this opportunity to collaborate once again with our colleagues at the Bromeliad Society International in support of bromeliad research. The discoveries and scientific advances that will result from the Harry E. Luther BSI Scholar Program will undoubtedly lead to greater understanding and appreciation of these important plants."

In addition to research and conservation efforts, the program will document bromeliad diversity in nature, conserve rare bromeliad species in cultivation, publish articles about bromeliads for scientific and lay periodicals, and provide public lectures.

The BSI will manage the scholarship program finances and accept donations to the fund. To contribute, send a check made to the BSI-Harry E. Luther Scholar Program to Annette Dominguez, Membership Secretary, 8117 Shenandoah Drive, Austin TX 78753-5734, USA. Further information for applicants to the Scholar Program will be made available in the coming months.

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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!

The Bromeliad Society International

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.

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