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Nature and botanical gardens in the 21st century Toward a global garden: the Fairchild Tropical Garden, a case study

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"In the end, we will conserve only what we love, we will love only what we understand, we will understand only what we are taught".

Baba Dioum, Senegalese Conservationist

ABSTRACT

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On August 24, 1992 Hurricane Andrew, one of the most damaging and costly storms ever to hit the United States, struck south Florida and the internationally renown Fairchild Tropical Garden in Miami. The recovery of the Garden following the storm is presented as a case study illustrating the contrasting views of nature as wilderness and as tended space — the garden. Classifying, naming and nurturing plants for the purposes of becoming intimate with them and sharing that knowledge is portrayed as the special province of botanical gardens, historically and into the 21st century. And the need is expressed for clearly articulated collections policies to guide garden development in the future. The recently adopted collections policy of the Fairchild Garden is presented as one such model.

In the wake of Hurricane Andrew, the Fairchild Tropical Garden was treated by staff and a devoted corp of volunteers from around the world as metaphor for the destruction taking place in tropical regions throughout the planet. The botanical garden ethic is advanced as the way we should be viewing nature today as our Global Garden.

RÉSUMÉ

KLEIN, W. McK. Jr. (1993). Nature et jardins botaniques au XXI[e] siècle. Vers un jardin global: le Fairchild Tropical Garden, un cas d'étude.
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Le 24 août 1992, l'ouragan Andrew, qui fut l'un des plus violents depuis longtemps aux Etats-Unis et qui causa des dommages extrêmement graves et coûteux, s'abattit sur la Floride et le Fairchild Botanical Garden à Miami. La remise en état du Jardin à la suite de cet ouragan est présentée comme cas d'étude, illustrant les vues contrastées de la nature, selon qu'on la regarde comme espace sauvage ou comme espace ordonné (soit le jardin). La classification, la nomenclature des plantes et les soins prodigués pour leur culture dans le but de mieux les connaître sont exposés en tant que rôle spécifique des jardins botaniques, historiquement et pour le XXI[e] siècle. Des politiques de collection bien définies sont présentées comme une nécessité, constituant un guide pour le développement des jardins dans le futur. Dans cette optique, la politique des collections au Fairchild Botanical Garden, adoptée récemment, est présentée comme modèle.

A la suite de cet ouragan, le Fairchild Botanical Garden a été considéré par son personnel et un corps dévoué de volontaires du monde entier comme une représentation de la destruction qui a lieu dans les régions tropicales de toute la planète. Dès lors, l'éthique du jardin botanique est présentée comme notre manière de voir la nature aujourd'hui, à savoir notre Jardin Global.

On July 10, 1989, a tornado struck New England and left in its wake the desecration of Cathedral Pines, a forest with trees dating back to the 1780s (Photo 1). Managed by The Nature Conservancy, the federal government designated this sacred grove as a National Natural Landmark in 1985. Robbed of its familiar ordered existence this national treasure sparked a wide public debate as to who was going to rebuild this temple to Nature. Preservationists for The Nature Conservancy argued to allow Nature to take her course. After all, this was a Natural Landmark and this was an act of Nature. Neighbors of Cathedral Pines and elected officials of nearby Cornwall were less willing to trust simply natural forces, pointing to the unsightly appearance, fire hazard and loss of a potential timber harvest. The following September the decision was made by The Nature Conservancy. A firebreak was constructed around the most threatened area and Nature was allowed to take her course, wherever that might lead.

POLLAN (1991) describes Cathedral Pines as a means of exploring our attitudes about wilderness and the garden. Although the product of earlier human disturbance, the mystique of wilderness had grown up around Cathedral Pines. It was part of that precious eight percent of the land area of the United States that we fight to preserve. We endow such areas with spaceage systems concepts; ecosystems imply an ordering, balance and the inherent powers to return to a state of equilibrium. But then what did Nature have in mind for Cathedral Pines? Neither side of the debate felt quite comfortable with the answers. Was Cathedral Pines a garden to be tended by man or wilderness to be left to a creator whose purpose we could not know?

In our struggle to define our place in Nature every corner of the earth has been touched directly or indirectly by the hand of man. The concept of wilderness which gave American civilization its "identity and meaning" also carried quite different implications for those most closely identified with its definition (NASH, 1982). The writings of that great American naturalist, John Muir, are generously seeded with references to Nature in terms of a garden. With thoughts of Paradise he closes his journal of July 21, 1869, his first summer in the Sierras: "Good-night, friends three — brown bear, rugged boulder of energy in groves and gardens fair as Eden" (MUIR, 1954). And Muir leaves no doubt that his garden is under divine direction: "Nature is doing what she can, replanting, gardening, sweeping away old dams and flumes, leveling gravel and boulder piles, patiently trying to heal every scar" (MUIR, 1954).

Photo 1.

America's first forester, Gifford Pinchot, fully shared Muir's passion for trees and wilderness. But his Eden was clearly tended by Adam, not by God. For Pinchot, trees were a crop to be harvested as one might harvest corn "for the greatest good of the greatest number in the long run" (PINCHOT, 1987). The differences arising over who was to tend Eden inevitably led to a parting of the way between Muir and Pinchot, a divide that can still be seen between preservationists and conservationists.

But where do botanical gardens fit into the picture today, and what must we do to prepare for the 21st century? POLLAN (1991) is raising this question when he asks, "What if now, instead of to the wilderness, we were to look to the garden for the making of a new ethic? [...] For the garden is a place with long experience of questions having to do with man in nature". Pollan's view of who is in charge is clear, his garden is the product of human imagination and labor.

In his recent book on biodiversity WILSON (1992) makes a compelling case for the preservation of wilderness as a means for keeping body and soul together: "The stewardship of environment is a domain on the near side of metaphysics where all reflective persons can surely find common ground [...] An enduring environmental ethic will aim to preserve not only the health and freedom of our species, but access to the world in which the human spirit was born".

The emerging field of Restoration Ecology (WILSON, 1992) sees as ushering in a new era, "the means to end the great extinction spasm", while ex-situ preserves such as botanical and zoological gardens and parks he regards as the last courts of appeal for maintaining biodiversity "when all else fails".

While botanical gardens themselves, that is, their curated collections, may hold little hope for preserving significant fragments of biodiversity, as WILSON (1992) states, nevertheless he clearly invests hopes for the future in the kinds of activities that are at the very root of what our institutions are about: "I am willing to gamble that familiarity will save ecosystems, because bioeconomic and aesthetic values grow as each constituent species is examined in turn — and so will sentiment in favor of preservation. The wise procedure is for law to delay, science to evaluate, and familiarity to preserve. There is an implicit principle of human behavior important to conservation: the better an ecosystem is known, the less likely it will be destroyed".

The case I would make here is that the kind of familiarity that comes uniquely from the botanical garden experience is one that must now be applied on a global scale. It is certainly true that these Noah's Arks that we captain are extremely limited in what they can preserve in their holds, no matter how vast these may be. But it is equally true that what is most lacking is the space in our psyches for an environmental ethic that is adaptive. The psychological and intellectual constructs that compass these bounded and tended spaces are fundamentally and irrevocably associated with naming.

As botanists we know that classification is essential to naming and that naming is essential to identification. Names that portray evolutionary relationships have predictive power and give dominion. But naming is also about intimacy and sharing as ROSENBERG (1993) discovers through his restoration of the "Lost Book of Paradise". Adam and Eve both had the "naming power, which is the god-given sublimation of intimacy, a need to share" (ROSENBERG, 1993). Mistaken identities lead to intimacy and sharing while at the same time they expand the creation.

Restating that eloquent quote from Baba Dioum, "in the end, we will love only what we know, we will know only what we name". It is the nurturing and sharing spirit of botanists, horticulturists, gardeners and cadres of volunteers who work in botanical gardens today that is so rare and so endangered. It is their spirit, their environmental ethic, that is enveloped by a profound sense of loss in the worldwide destruction of biodiversity that must be propagated. In the twilight of the 20th century we must strain to see the world more in terms of a botanic garden, all nature waiting to be named, accessioned, nurtured and shared. And it took a dramatic natural event such as a hurricane to focus a nation's, attention on the role of botanical gardens and our growing sense of impending loss.

In the early morning hours of Monday August 24, 1992, Hurricane Andrew struck south Florida and left in its wake sixty to seventy percent of the Fairchild Tropical Garden severely damaged or destroyed. There was no debate, public or private, as to what needed to be done. The outlines of the recovery operation were set forth in a staff meeting the following Wednesday morning. This was a garden, and the business at hand was to restore it. In the following months the staff, visiting botanists, horticulturists, gardeners and a large corps of volunteers would work to recreate this tropical paradise. The restoration took on a character and direction that distinguishes a botanical garden as a curated collection from parks and preserves. Surrounded by twisted and fallen trees and debris, the Fairchild Tropical Garden became of metaphor for how we might approach the destruction that is taking place in tropical regions throughout the world (Photo 2).

The Fairchild Tropical Garden was founded in 1938 by Colonel Robert H. Montgomery, a successful businessman who had a passion for palms and cycads. The persona and the writings of the famed plant explorer David Fairchild were the inspiration for the Colonel (Photo 3) to found a botanical garden in his honor. David Fairchild provided the Garden with instant name recognition, scientific credibility and assistance with building the early collection. The southern tip of Florida with its sub-tropical climate was the only region in the contiguous forty-eight states where the kind of garden that both Montgomery and Fairchild had in mind could be created.

Photo 2.

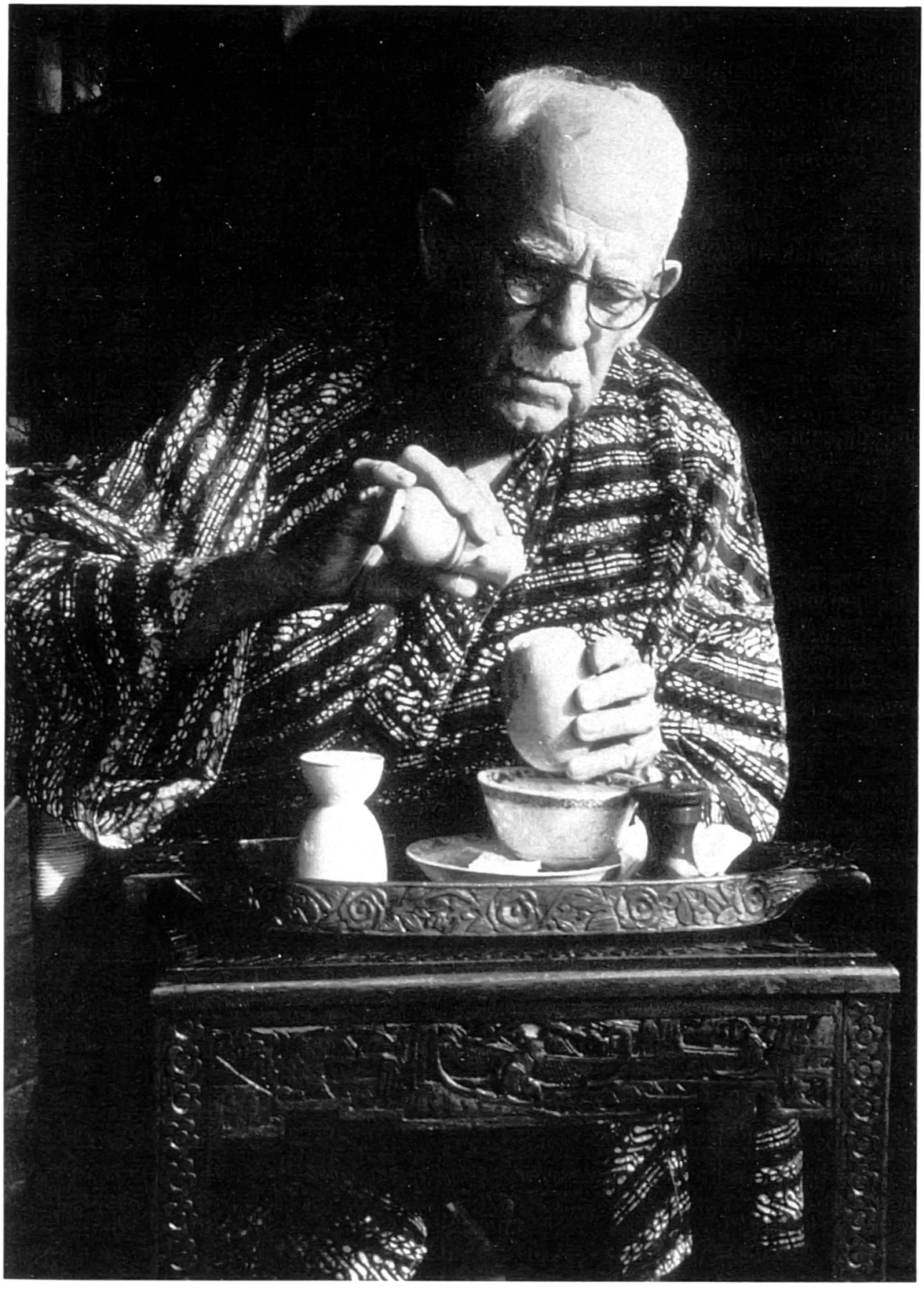

Photo 3.

Colonel Montgomery was also exceedingly fortunate in his choice of landscape architect, William Lyman Phillips. Harvard educated, Phillips had worked in the distinguished firm of Frederick Law Olmsted before taking on the assignment of designing public parks in south Florida during the Depression. Designing a botanical garden, however, would be a new experience for him. To give form and structure for his new garden Phillips would draw from his wide experience in park design. The overall design is informal, the English style of landscape gardening that we have come to associate with Olmsted parks. Subtle changes in elevation in an ancient escarpment running in a north/south direction at almost right angles to the long axis of the property he [William Lymon Phillips] would perceive as the "Genius of the Site" (Photo 4). The escarpment would serve as a hinge linking the lowlands that he had sculpted into a series of irregularly shaped lagoons, with the uplands, where he located the Montgomery Palmetum and Flowering Tree section. Classical architectural elements in the forms of an allee, rock walls of native stone, terrace and balustrade he employed to link the several landforms into a masterwork of landscape design.

In creating a public botanical garden with the implied curated collection, Phillips was confronted with the problem of trying to provide form and structure for ordered growth of the collection, of trying to accommodate for the abundance and lushness of a tropical collection while at the same time giving a unity to the design and allowing an ordered progression through the space. He accomplishes this by overlaying on his plan two hundred irregularly shaped and spaced plots, to contain the families of plants. Plants were going to arrive in, God only knew, what sequence and order. Phillips describes the situation in this very revealing way: "Except in the early years of the Garden, when a systematic search was made for species of the various genera planned for, and except for certain features and formal layouts (Amphitheatre, Palmglade, Moos Memorial), planting has been generally a matter of disposing of accessions as they came to hand; and the accessions are somewhat haphazard". He goes on to observe: "[...] they seem to have been collections of what at the moment was collectable and thought to be of interest, they were distributed by this or that agency, or were gifts, and so on. They had to be disposed of, and the obvious thing, in the planting I did, was to put them in the appropriate Family plot, and, if salt-demanding or thought to be salt-tolerant, to try them on the lake shores" (PHILLIPS, 1961).

In a recent review of the Fairchild Tropical Garden's collection policy, Roger Sanders states: "Fairchild Tropical Garden was developed and has been maintained without the benefit of a clearly articulated, focused accession policy" (SANDERS, 1993). The approach to collections was either passive or at best opportunistic as indicated in a document dated April 1975 and titled: "Criteria for making plant accessions, essentially perennial ornamental and botanical species, at The Fairchild Tropical Garden." These include:

1. Does the species (taxon) come from a locality or environment indicating that it may be grown and established at the Garden or in the area?
2. Does the species have some general or special recognized merit?
3. Is the species a new addition to the Garden or to the area?
4. Is the species of some particular interest to a staff member at the Garden or to a cooperating institution, or desired for some specific reason such as study, addition to plantings or distribution to members?
5. Is the species without a known objectionable characteristic?

With such guidelines the horticulturists and botanists of the Fairchild Tropical Garden in collaboration with various plant societies set about the business of assembling a collection of tropical plants. Prior to Hurricane Andrew there were approximately 16,000 plants in the collection

Photo 4.

representing 6068 accessions and almost 3000 taxa. Because of the early interest of the founder, the emphasis would remain on palms and cycads. Of the approximately 2700 taxa of palms and 200 taxa of cycads world-wide, 732 palms and 185 cycads were represented in the living collection. Because of the way the collection had been assembled, the value of the plants varies widely both from a scientific as well as an aesthetic point of view. Nevertheless, the Fairchild Tropical Garden remains, even after the devastation of Hurricane Andrew, one of the outstanding collections of tropical plants in the world.

With the arrival of a new administration and leadership on the Board of Trustees, in March of 1991 initiatives were launched to undertake a critical review of the collection and develop a comprehensive system of standards for its maintenance and interpretation, and policies that would govern its growth. The curators and scientists were eager to move the Garden from the more passive approach that had led to the development of the collection in the past to a more active, directed approach that would enhance the scientific as well as the educational and display values of the collection (WALTERS & HUBBUCH, 1993). The development of special collections of rare and endangered species in cooperation with the Center for Plant Conservation headquartered at the Missouri Botanical Garden in St. Louis, Missouri and the Tropical Fruit collection emphasized the need to think more broadly in terms of conservation issues and germplasm collections.

Mr. Charles Hubbuch, Curator of Palms and Cycads, assembled collection policies for eleven sister institutions and initiated a review of the literature. One of the most helpful studies on the subject was that of Lucy Jones. In a survey of botanic gardens and arboreta that appeared in 1986 she reported that only thirty-five percent of the institutions associated with the American Association of Botanic Gardens and Arboreta "[...] have anything even resembling a collections

management policy" (JONES, 1986). She also pointed out the fallacy that exists in many of our institutions, including the Fairchild Tropical Garden until recently, where the accessions policy masquerades under the banner of a collections policy. The "components" of an effective collections policy, according to Jones, includes considerations of purpose, acquisitioning, accessioning, plant records, evaluation, maintenance, deaccessioning, inventory, disposal, access and use. These general areas were all covered in the report of WALTERS & HUBBUCH (1993) cited above along with a section titled: "Responsibilities and ethics for the collector: guidelines for the collector and code of ethics for research in the third world".

The Fairchild Tropical Garden, as with many of our gardens, is the product of the art of landscape design overlayed with a scientific collection. The challenges of building and maintaining a multiple purpose collection in such institutions are reported by KOLLER (1986) using the Arnold Arboretum as the case study. The plantings of the Arnold were originally laid out according to the system of Bentham and Hooker, and such systematic arrangements are rarely the most pleasing visually. Neither does it allow sufficient latitude for selecting the best site for a given plant. In deciding on position in the landscape, KOLLER (1986) recommends: "[...] one individual should be a specimen plant, but the additional plants could be massed or grouped [...]". As to the question of how many collections from different locales should be sought, KOLLER (1986) suggests: "[...] three accessions collected in the wild from different geographical sites and from different age groups". And cultivars are reviewed periodically and treated as "temporary collections".

The special challenges and opportunities of a botanical garden as both art form and botanical collection came home on August 24 when Hurricane Andrew struck. The message went out to the staff and volunteers: this was not a cleanup operation. The curators established a system of triage on a scale unimagined before. The immediate priority was given to the palms (Photo 5). Three hundred and twenty-six palms were placed back upright, watered and drenched with fungicides and as of March we are reporting losses of 1176 or 20% of the collection. The cycads proved their durability. As of March we are reporting 115 losses, or about 9% of the collection. The flowering trees section in the uplands also sustained heavy damage, and although more than 200 were heavily pruned and set back upright, the jury is still out on how many of these will survive. The specimen value and position in the landscape of these plants now require reassessment and in many instances cuttings have been taken to preserve the accession.

Approximately 14% of the total collection is being reported lost, or 2223 of the 15,858 individual plants. The built-in redundancy in the collection mitigated against even greater losses and also pointed out the need to diversify plantings and increase efforts to network information systems and collections with sister gardens throughout the Caribbean basin. Moving quickly to restore the collection has also proven to be an effective measure in saving many of the trees and greatly accelerated the recovery process.

Specimens were taken from trees and shrubs that could not be saved to become incorporated into morphological and anatomical studies and also for testing for pharmaceutical activity. A milling operation was set up with a portable band saw and a valuable collection of tropical logs was saved. A jury was appointed to select twenty artists to receive their choice of a special selection of wood from the collection, and through the generosity of a local bank a stipend was awarded to produce a work of art that will become a part of the Garden's permanent collection. In October, an exhibition titled "Harvesting a Wind Called Andrew" will open at the Miami Art Center.

We saw the collection as though it were a great library in which we had declared an open stacks policy for a few weeks before the priceless manuscripts would be lost. The call went out to our colleagues throughout the botanical garden and horticulture community. They answered the call with alacrity and sent researchers to gather specimens. Almost 300 bulk samples were gathered by

Photo 5.

a team from the New York Botanical Garden and dispatched to the National Cancer Institute to be processed and run through screens designed to test for anti-cancer and HIV virus activity (Photo 6). The Missouri Botanical Garden sent researchers to gather samples for storage in a DNA/Banknet, part of an international effort to save germplasm of endangered species. The Royal Botanic Garden at Kew sent a wood anatomist to gather samples, and a team of arborists came in March to assist with corrective pruning to help save the collection. These were just a few of the dozen or more institutions and two dozen scientists who participated in what became one of the largest deaccessioning operations ever to be undertaken by a botanical garden. It was admirably headed by Dr. Jack Fisher, a plant anatomist, who also managed to retrieve the apical meristems of about 85 palms, many of which had been off limits to him before the storm.

Plans to restore and renew the Phillip's design developed prior to August 24 proved to be invaluable after the storm and greatly accelerated the entire recovery operation. The Administration and Board of Trustees had moved quickly to implement a national public relations and fund raising campaign to restore the Garden. A Staff Relief Fund provided assistance for staff who had their homes battered by Andrew. Eleven of the thirty-five member staff had their homes severely damaged or destroyed and were trying to put their lives back together while they were trying to save the Garden.

Expanding volunteer operations was a critical factor in the recovery, and on September 26 a Volunteer Recognition Day complete with BBQ and a photo in the Bailey Palm Glade marked the occasion. The challenge of Hurricane Andrew, one of the most devastating and costly storms ever

Photo 6.

to hit the United States, was met with the indominable spirit of the Garden, more than 1000 volunteers were involved in the operations, and on October 3 the Fairchild Tropical Garden reopened its gates to the public.

In closing I would offer an observation about gardens provided by the late A. Bartlett Giamatti, distinguished Renaissance scholar, President of Yale University and at one time America's baseball commissioner. In his masterful exploration of the garden as it appears in its diverse forms in the Renaissance epic he states: "The garden teaches us that all deception is largely a matter of self-deception and that no matter how strenuously we try to disagree, the final illusion is to think life would be at all bearable without illusion" (GIAMATTI, 1966) (Photo 7).

What we learn in our botanical institutions through naming, tending and sharing information about plants is critical today and will become more in demand as the years advance. On May 19, 1993 the Board of Trustees of the Fairchild Tropical Garden adopted the following collection policy as our most recent effort to keep up the illusion that we may one day find Paradise:

— To display the widest possible diversity of tropical plant life in an attractive landscape setting designed to appeal to Garden visitors.

— To interpret and display biological relationships in the Garden's collections in support of educational and scientific programs.

— To document and record accessioned plants in support of the Garden's research and plant conservation programs according to accepted botanical standards.

— To use the collections to promote the conservation of biodiversity through education and germplasm collection in cooperation with other botanical institutions.

Photo 7.

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