Department of Systematic Biology - Botany & U.S. National Herbarium

The Plant Press

Smithsonian
National Museum of Natural History

New Series - Vol. 6 - No. 2 April-June 2003

Special Symposium Issue - see page 11

Botany Profile

The Temperature of Southeast Asian Botany

By Robert DeFilipps

On 28-29 March, an enthusiastic group of scientists convened in the National Museum of Natural History in order to take the temperature and feel the pulse of modern Southeast Asian botany. They found the subject to be in a mostly sustainable and thriving condition, though faced with some problems and desirous of additional international cooperation to fulfill its many goals.

The occasion was the Third Annual Smithsonian Botanical Symposium, and the chosen subject was "Botanical Frontiers in Southeast Asia: from the Discovery of the Earliest Flowering Plants to the Sequencing of the Rice Genome." The speakers from around the world explored numerous new developments in collaborative biodiversity research, which includes facets of paleobotany, floristic composition, ethnobotany, genome technology and tropical forest structure. As noted by W. John Kress, Head of Botany, these studies are operational within an environmental framework that includes huge increases in land clearing, industrial expansion, and surging population growth which often cause casualties in the health of ecosystems. It is now projected that in the future there will remain less than 1 hectare of arable land per person in Southeast Asia (1 hectare = 2.5 acres).

After an opening reception on 28 March at the United States Botanic Garden (one sponsor of the Symposium), the whole day of 29 March was devoted to presentations by teams of speakers. They were preceded by welcoming remarks by Kress who announced the launching of the Smithsonian Botanical Exploration Fund, and by David Evans, Undersecretary for Science, who expressed a hope that the annual symposia will continue for many years. The much-awaited presentation of the José Cuatrecasas Medal for Excellence in Tropical Botany was conducted by Laurence Dorr and the honored recipient of the medal was John Beaman, now working at the Royal Botanic Gardens, Kew. Beaman's prolific research career has spanned the realms of Mexican floristics, taxonomy of the Asteraceae, and most recently the complex plant communities of Mount Kinabalu, Borneo and environs.

Smithsonian Botanical Symposium

The nature of paleobotanical research on the earliest known flowering plants was discussed by David L. Dilcher (University of Florida) and Ge Sun (Jilin University, China). The presentations revolved around the discovery of two species of *Archaefructus*, the earliest known flowering plants (angiosperms), from geological strata where the Jurassic and Cretaceous meet in the Yixian formation of Heilongjiang Province, northeastern China. The plants shared a strange world with feathered dinosaurs such as *Sinosauropteryx*, and were not too far away in time from another plant of the Jurassic which had been named *Problematospermum* due to its puzzling (i.e., "*problematic*") identity.

The closed-carpelled ancient plants named *Archaefructus sinensis* and *A. liangonensis* are believed to have been denizens of aquatic habitats (lots of fish fossils nearby) where they lived from 126-147 million years ago, and are monoecious with a tepaloid perianth, 4-thecous anthers and monosulcate pollen, highly dissected leaves that fork dichotomously at the apex, and hollow stems. Tracing of the morphological characteristics of the plants puts them in a phylogenetic position somewhere between *Ephedra* and *Amborella*. The ancient flowers of the Chinese *Archaefructus* are actinomorphic, and Dilcher explained that zygomorphy only happened 60 million years after the evolution of flowers. He also reminded the audience of the important role of "cooperative evolution" between animals and angiosperms which has benefited human populations, as an intimate part of the feeding of the world.

The next subject to be assayed was the ethnobotany of tropical agrodiversity and forestry management, which was presented by Christine Padoch (New York Botanical Garden), who announced the regrettable absence of team-mate Kuswata Kartawinata of Jakarta, Indonesia. Padoch illuminated the endeavors of local people in the community of Bagak Sawah in Kalimantan, Indonesia, as "ecosystem managers" due to the numerous forms of plant cultivation they have practiced over the years. In the face of much forest conversion, deadly forest

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Travel

Vicki Funk traveled to Mesquite, Nevada (1/4–1/7) to present a paper at the International Biogeography Society; to Pretoria, South Africa (1/7–1/25) to collect Asteraceae specimens in the Free State and Lesotho and to present a talk at the First International Meeting of Deep Achene: The International Compositae Alliance; to the University of Queensland, Brisbane, Australia (2/24–3/13) to work with colleagues on analyzing biodiversity data from the Guianas and to collect Asteraceae with staff from the Queensland Herbarium; and to the University of Hawaii at Manoa (3/12–4/2) to work with colleagues on DNA data from the Asteraceae and to collect weedy Asteraceae.

Paul Peterson and **Robert Soreng** traveled throughout Argentina (1/8–2/15) to collect grass specimens.

Pedro Acevedo traveled to Raleigh, North Carolina (1/10) to attend a graduate committee meeting for Alex Krings; to Cayenne, French Guiana (2/13–3/2) to attend the Flora of the Guianas Advisory Board meeting and to conduct field work; and to Bronx, New York (3/17–3/18) to work on an upcoming book on the vines of Puerto Rico.

W. John Kress traveled to Naples, Florida (2/6–2/9) to speak at the Naples Botanical Garden and to conduct fund raising for Botany; and to Durham, North Carolina (2/21–2/22) to attend the 8th Annual Ph.D. Career Symposium at Duke University.

Robert Faden traveled to London, England (2/8–3/13) to study specimens of Commelinaceae at the Royal Botanical Gardens, Kew, in connection with work on the Flora of Tropical East Africa.

Alain Towaide traveled to Tempe, Arizona (2/13–2/15) to present a paper at the annual conference of the Arizona Center for Medieval and Renaissance Studies; to New York City, New York (2/21) to present a paper at the annual meeting of the College of Arts of America; to Durham, North Carolina (2/22) to present a paper at the Southern Association for the History of Sciences and Medicine; to New York City, New York (3/17–3/21) to chair a panel at the Biennial Meeting of the Society for Textual Scholarship; and to Toronto, Canada (3/29) to chair a session at the annual meeting of the Renaissance Society of America.

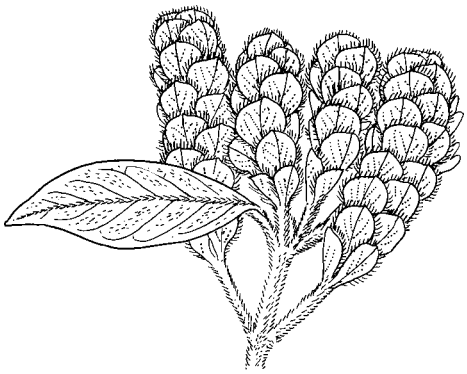
Laurence Skog traveled to Cayenne, French Guiana (2/13–2/25) to attend the Flora of Guianas Advisory Board meeting and to work with colleagues on Gesneriaceae; and to Sarasota, Florida (2/25–3/1) to do research at the Marie Selby Botanical Gardens.

Christian Feuillet traveled to Cayenne, French Guiana (2/13–3/5) to attend the Flora of the Guianas Advisory Board meeting and to conduct field work with members of the Passiflora Society International.

Warren Wagner traveled to Paris, France (2/25–3/5) to attend a meeting for the Species Plantarum Project and to conduct research at the Paris Natural History Museum.

Mark and **Diane Littler** traveled to Panama City, Panama (3/11–3/26) to conduct ongoing research at Bocas del Toro.

Robert DeFilipps traveled to Dominica (3/14–3/22) to attend meetings for preparation of a Dominica National Biodiversity Plan; for future plans of the Springfield Environmental Research Center; and to consult on a planned visitors outpost at Fond Melle.



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Visitors

Victor Albert, Botanical Garden, University of Oslo, Norway; Lamiaceae (1/16-1/17).

Genevieve Kline, Northern Illinois University; *Agrimonia* (Rosaceae) (1/27).

Robert Raguso, University of South Carolina; Onagraceae phylogeny and pollination biology (2/5-2/9).

Patricia Barlow-Irick, University of New Mexico; *Cirsium*, *Carduus*, *Cnicus* (Asteraceae) (2/10-2/14).

Charles Zartman, Duke University; Epiphyllous liverworts (2/10-4/30).

Susanne Renner, University of Missouri, St. Louis; Melastomataceae, Hernandiaceae, Monimiaceae (3/7-3/9).

Philomena Vieira, Museu Nacional, Brazil; *Ficus* (Moraceae) (3/10-5/10).

Francisco Morales, INBio; Apocynaceae (3/15-3/26).

Ihsan Al-Shehbaz, Missouri Botanical Garden, St. Louis; *Arabis* (Brassicaceae), Flora North America (3/24-3/30).

Jun Wen, Field Museum, Chicago; Asian and Pacific Araliaceae (3/24-3/30).

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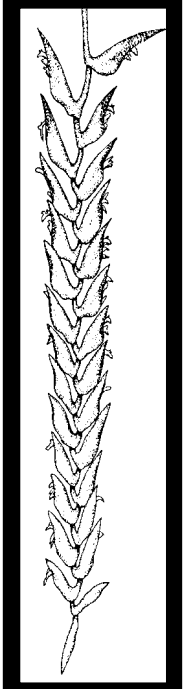
Botanical Frontiers in Southeast Asia

Chair With A View — W. John Kress



The world is currently in a state of conflict and strife. Most immediate is the turmoil in the Middle East, but violence and factionalism are present in many places around the world. The economic and environmental impacts of these conflicts are sometimes obvious and sometimes not. Political diplomacy and interchange, concurrent with this increase in conflict, appear to have reached a significant nadir as well. It is, therefore, important that as scientists and educators we pursue and maintain dialog and discussion among scholars, citizens, and nations. In a time of irrationality, we need rational thought and discourse. In a time of global uncertainty, we need concrete ideas for the future. In a time of confrontation and conflict, we need international collaboration. The 2003 Smith-sonian Botanical Symposium marked the third annual gathering at our Museum of systematists and natural history biologists with the purpose of discussing issues of importance to us as scientists and as members of society.

Our Symposium this year addressed environmental issues in one of the fastest growing regions of the world: Southeast Asia. Why should we be focusing on botany in Southeast Asia? A few facts and predictions about the present state and future economic, social, and environmental outlook for this region provide ready answers to this question:

1) The population of Southeast Asia was only one third the size of Europe's in 1950 (182 million compared to 547 million in Europe), but **by 2050, the population of Southeast Asia is projected to be 25 percent larger than Europe's** (786 million vs. 628 million).
2) **By the year 2020, ASEAN will be one of the five largest economic powers in the world** after NAFTA, EU, China, and Japan.
3) As a specific example of economic growth, **Thailand by 2005 will be the world's fastest-growing vehicle exporter** producing over 700,000 vehicles per year.
4) **By 2010, Vietnam will have 8.47 million new fixed phones, 1.61 million mobile phone subscribers, and 770,000 local Internet subscribers**, which is an increase over today's number of 473 percent, 375 percent, and 962 percent, respectively, in each of those areas.
5) **Seven of the ten largest cities will be in Asia by the year 2050**.
6) As populations and economies increase, supplies of land, water and firewood are shrinking such that **by 2020 Southeast Asia will have less than one hectare of arable land per person.**

Clearly these major changes in economic structure and social organization will have profound effects on natural environments and biodiversity. In fact in Laos, now less than 40 percent of the country is forested, down from 70 percent in 1940; in Cambodia, over 70 percent of the timber export volume consists of unreported logs; and in Vietnam all substantial forest cover could be lost by 2020 if the current rate of deforestation continues. With respect to marine habitats, it is predicted that as a result of anthropogenic stresses in the form of pollution, sedimentation, and direct physical alteration the complete destruction of Southeast Asian coral reefs will take place by 2030.

All of these predictions suggest that over the next half-century Southeast Asia will experience one of the most significant transformations on Earth in every aspect of society and nature. It is therefore appropriate and imperative that we review and evaluate the state of the biodiversity research is this region. In fact over the last decade significant new biodiversity discoveries and advances have taken place in the plant sciences in the tropical areas of Southeast Asia through the collaborative efforts of local and foreign scientists. Exploration in many remote and poorly surveyed regions in such countries as Laos, Cambodia, and Myanmar is uncovering new taxa of plants and animals and expanding the inventory of biodiversity. At the same time in China, Vietnam, Indonesia, Malaysia, and the Philippines innovative field and laboratory investigations have led to great strides in our understanding of the ecological complexity of habitats as well as the evolutionary history and genetic diversity of plants in this region. Despite these innovations the increasing rate of destruction of pristine environments necessitates rapid conservation action throughout the region.

As you will read in this issue of *The Plant Press* the 2003 Smithsonian Botanical Symposium successfully brought together botanists from around the world for discussion and scientific exchange about the numerous new developments in our knowledge of plant diversity in Southeast Asia. Topics included recent fossil discoveries of the earliest angiosperms, ethnobotanical surveys and agricultural practices, systematics and floristics, forest structure, conservation, and breakthroughs in genome technology. The subjects were diverse, but the results were unequivocal: the increase in scientific knowledge is keeping pace and must continue to accelerate with economic growth and social advancement in this region.

At the end of the day we appreciated that speakers

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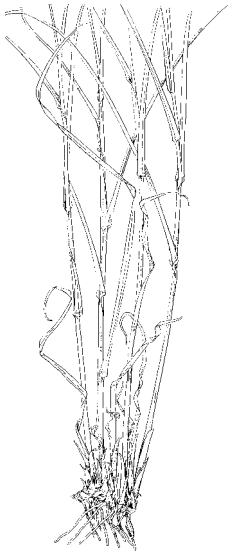
Staff Research

Robert Faden worked at the herbarium of the Royal Botanic Gardens, Kew from 10 February to 12 March. He continued his studies of tropical African Commelinaceae, primarily in connection with the *Flora of Tropical East Africa* and *Flora Zambesiaca*, which collectively cover the area between Ethiopia in the north and South Africa. This is the richest area for Commelinaceae worldwide. On this trip, the research focused on the paleotropical genus *Cyanotis* and cosmopolitan *Commelina*. The highlights of the findings include the discovery that *Cyanotis speciosa*, which ranges from Tanzania to southern South Africa and Madagascar, may consist of five subspecies, three in Africa and two in Madagascar. The northernmost subspecies was found to differ from the others in having a bulbous base and will be described as a new subspecies. The misunderstood *Cyanotis somaliensis*, native to a very small area in northern Somalia but possibly widespread in cultivation, was studied from herbarium specimens and liquid-preserved flowers. Field collected, living material is being sent to the Smithsonian by Kew for further research on the variation in this species. Additionally, a very old problem in *Commelina* was solved. A somewhat mysterious and previously poorly defined *Commelina* that ranges from southern Somalia to northern Mozambique was determined to be a Madagascan species.

Paul Peterson and **Robert Soreng** visited Argentina on 8 January to 15 February to collect grasses in Patagonia. With the help of students Manuel Belgrano (Darwinion) and Nancy Refulio-Rodriguez (Rancho Santa Ana Botanic Garden), Peterson and Soreng traveled to Rio Gallegos (Provincia Santa Cruz) then began collecting north along the Andes through Provincias Chubut, Río Negro, Neuquén, and La Pampa. They collected 486 numbers of grasses, 133 of these in silica for later molecular studies. Many interesting species of *Poa*, *Calamagrostis*, *Bromus*, *Trisetum*, and *Festuca* were found, and two endemics: *Relchela panicoides* Steud. and *Leptophyllochloa micrantha* (E. Desv.) C.E. Calderón were located. Along the way the group visited the large glacier "Perito Moreno," Mount Fitz Roy, Estancia Tucu Tucu, Lago Los Niños, Baños de Queñi, Paseo Pino Hachado, and Rio Nahuéve.



Staff Activities

Robert DeFilipps visited Dominica on 14-22 March. He attended group discussions conducted by Merle Shepard (Clemson University), director of the Springfield/ Archbold Science Center, regarding plans for revitalization of this important biological field research station at Springfield Estate; attended group meetings with Clayton Shillingford, president of the Dominica Academy of Arts and Sciences, concerning preparation of a comprehensive report on a biodiversity capacity development program for the environment of Dominica; and met with Fitz Shillingford, facilities manager of Emerald Pool, regarding the proposed development of a scientific visitors outpost at Fond Melle.

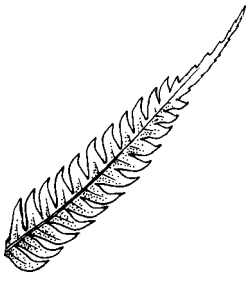
DeFilipps obtained several young containerized specimens of "Pride of Burma" (*Amherstia nobilis*, Caesalpiniaceae), a tree producing racemes up to 3 feet long with brilliant vermilion and yellow flowers, for cultivation at his pandanetum on Rosalie Estate. The parent tree in the Roseau Botanical Garden had apparently been triggered to produce seeds by an unseasonably dry spell in the weather some time ago, a fortuitous event since the plants are said to rarely produce a pod even in their native Myanmar (Burma).

Gradual deforestation in parts of Dominica has recently caused some of the endangered red-necked Amazona parrots to seek food in the orange groves of the island, while normally forest-dwelling agoutis and manicous (opossums) are coming into towns to eat tannias and pineapples.

On 28 February, DeFilipps and Beverly Wolpert (graduate student at George Washington University) presented a lecture on "Medicinal Plants of Haiti" at the US Botanic Garden. Wolpert is investigating the anthelmintic (vermifuge) characteristics of plants used in Haiti to expel intestinal hookworms.

Gary Krupnick presented a seminar entitled "A Test of Southeast Asian Conservation Hotspots and Ecoregions Using Taxonomic Data" to the Plant Conservation Alliance (PCA) in Arlington, Virginia, on 12 March. The PCA is a consortium of ten federal government member agencies and over 145 non-federal cooperators representing various disciplines within the conservation field. PCA works collectively to solve the problems of native plant extinction and native habitat restoration.

On 24 January, museum scientists Conrad Labandeira (Paleobiology), **John Kress** (Botany), Ted Schultz (Entomology) and **Paula DePriest** (Botany) discussed coevolution among a variety of plants and animals, in the program *Coevolution*, at the National Museum of Natural History Film and Lecture Series. DePriest spoke about lichen, a unique mutualism between fungi and algae. Ancient plant-insect interactions were the focus of Labandeira's talk. The tight fight between *Heliconia* plants and their hummingbird pollinators was illustrated in a talk by Kress. Finally, Schultz described how attine ants have mastered the art of cultivation in their interactions with fungi and bacteria. The audience included public visitors, staff, and visiting scientists.

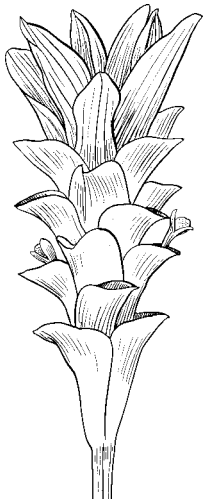


Awards & Grants

Dan Nicolson and visiting botanist **Alain Touwaide** were awarded a grant from the Smithsonian Women's Committee to digitize the text and illustrations from books from the Renaissance (15th and 16th centuries) that deal with plants used for medicinal purposes. The study aims to build a prototype of a computerized data base dealing with a limited number of plants selected on the basis of their historical significance. Texts and illustrations will be digitized, original Latin texts will be translated into English, and the material will be provided with relevant historical data. This program complements Towaide's database on texts and illustrations of plants in ancient Greek manuscripts. The databases will be made available through the Internet and will constitute a unique reference work for further research. Books will come from the SI collections, particularly the Joseph F. Cullman 3rd Library of Natural History and the Dibner Library. Technical support will be provided by the Smithsonian Institution Library Imaging Center.

Paul Peterson and **Susan Pennington** (contractor) were awarded a grant from the Smithsonian Women's Committee to prepare an on-line exhibit and archive exploring the life and work of botanist Mary Agnes Chase through the natural history of the grasses closely associated with her, introducing the public to a pioneering woman scientist and assembling a collection of material that would be of significant interest to teachers, students, scientists, and historians. Renowned botanist, illustrator and author, Mary Agnes Chase (1869-1963) devoted 70 years to studying grasses, the family of plants that provides everything from the putting greens on our golf courses to the bread on our tables, whether it is wheat toast, tortillas, or rice cakes. The exhibit will answer the question of why she spent her life studying these important plants, and why this "living" collection of dried plant specimens at the Smithsonian is still important in the twenty-first century. A traveling panel exhibit through the Smithsonian Institution's Traveling Exhibition Services and book are also planned.

Elizabeth Zimmer has been awarded a small grant from the Magnolia Society. The proposal for the grant was entitled "Linking Cultural History with Natural History: Population Genetic Surveys of *Magnolia virginiana* (Sweet Bay Magnolia)."



Yellow Rose Commemorates the Space Shuttle Columbia

In the week following the Space Shuttle Columbia accident in February, visitors to the National Air and Space Museum left many floral bouquets near the space shuttle exhibit in tribute to the seven astronauts (Colonel Rick Husband; Lt. Colonel Michael Anderson; Commander Laurel Clark; Captain David Brown; Commander William McCool; Dr. Kalpana Chawla; and Ilan Ramon, a Colonel in the Israeli Air Force). Several bouquets featured yellow roses, symbolic of the astronauts' home base in Texas. To preserve one of these roses, Valerie Neal, curator of space history, looked for expertise elsewhere in the Smithsonian, and found it in the Botany section of the National Museum of Natural History. The rose was carefully pressed by **Deborah Bell** and mounted by volunteer Mary Ellen Wiser. The specimen will now be part of the permanent collection of artifacts, joining a white rose that was preserved after the 1986 Space Shuttle Challenger accident.

Botany volunteer Mary Ellen Wiser holds the commemorative rose specimen. (Photo by Deborah Bell)

Unifying the Botany and Horticulture Libraries

By Robert DeFilipps

In March 2003, the Smithsonian Horticulture Library (ca. 7,000 volumes, established in the 1980s) was moved across the National Mall from its location in the Arts and Industries Building, and was reassembled in the Botany Branch Library (ca. 52,000 volumes, established 1964-1965) in the National Museum of Natural History. The result is a new, strengthened entity, the Botany/Horticulture Library. Having these combined resources under one roof will benefit the staff members of both Botany and Horticulture, as well as visiting researchers.

Botany (the science of plants) and horticulture (the science of growing plants) are so closely related in some aspects, that any presupposed distinctions between the two fields tend to become blurred under close examination. Professional research interests of botanists often include plant families having ornamental or economic species that have been brought into cultivation, while the avocations of many botanists reside in gardening, and many horticulturists rely on straight botany in the conduct of their work.

The range of subject matter in the field of horticulture is enormous. The library's holdings on gardening, for example, include books about rock, bulb, kitchen, herb, bird, healing (hortitherapy), wildflower, tropical, water (aquascaping), English, cutting, and greenhouse gardening. Books devoted to fruits, vegetables, gardens from Alcatraz to the White House and around the world, special flowers (daffodils, daylilies, hosta, chrysanthemums, etc.), public and private botanical gardens and arboreta, floriculture, house plants, fountains and ornaments, flower arranging including ikebana, insect pests and diseases, and plant propagation are extensively covered in the newly created joint library.

True to the concept that a civilized house is not a "home" unless it is properly and attractively landscaped with a garden, the Botany/Horticulture Library includes an ample representation of journals such as *"House and Garden"* and *"Landscape Architecture."* Additionally, there are dozens of VHS videotapes on a multitude of horticultural subjects. Two study carrels with chairs are provided for the comfort of patrons in the new Horticulture area.

Those interested in botanical history will not be disappointed, for in the Horticulture section of the library there are journals whose contents often bestride the twin disciplines of botany and horticulture. Examples of such convergence are articles in *"Garden History,"* a British journal, that encompass intriguing topics like the gardens of the Empress Josephine, whose dedication to horticulture enabled her to be instrumental in plant exchanges (plant introductions) from across the world, destined for her incredible gardens at Malmaison, even during the Napoleonic Wars (5(3): 40-46. 1977); and, historical ethnobotany as evidenced in an article on the concept of the garden in pre-Hispanic Mexico, depicting a Mayan clay sculpture from Campeche of a homunculus-like deity arising from the spathe of a *Philodendron* (29(2): 185-213. 2001).

The two huge collections, Botany and Horticulture, are being kept separately for the time being, but are shelved seamlessly adjacent to each other, with the A.S. Hitchcock collection of grass books forming an interface, almost suggesting an ecotone, between them. In the future the Botany and Horticulture collections are hoped to be merged according to call numbers designated in Botany, when sufficient finances become available. Rare Books in Horticulture are kept in the same place as those of Botany, namely in the Cullman Library, situated on the ground floor of the new East Court Building, National Museum of Natural History.

Plummers Island Plant List Posted on the Web

For nearly a hundred years, scientists of the National Museum of Natural History and other agencies of the Washington, DC, area have collaborated under the aegis of the Washington Biologists' Field Club to study the natural history of Plummers Island, Maryland, located in the Potomac River just inside the Capital Beltway (I-495) in Montgomery County. The latest contribution is the *Checklist of the Vascular Plants of Plummers Island* prepared by **Stanwyn Shetler**, **Sylvia Stone Orli**, and Marcie Beyersdorfer, a former volunteer. The *Checklist* has just been posted on the Botany Web site at <http://www.nmnh.si.edu/botany/projects/dcflora>. It is a complete listing, with relevant annotations, of all the ferns and fern allies, gymnosperms, and flowering plants ever recorded growing in the wild on the island or adjacent mainland. The list represents the first updating and revision of this flora in 50 years. The total number of species recorded is 872, including 49 not previously reported. The *Checklist* can be searched or downloaded at the Web site.

The checklist includes plants such as this *Geranium carolinianum*. This picture was taken in 1906 by an unknown photographer.

Report from the First International TICA Meeting

By Vicki Funk

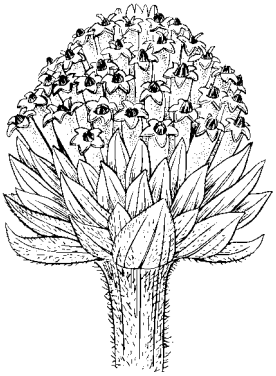
The first international meeting of The International Compositae Alliance (TICA), Deep Achene, took place 9-10 January, 2003, and was hosted by the National Herbarium, NBI Pretoria, South Africa. A total of 30 synantherologists from around the world attended. The first day and the morning of the second were devoted to presentations and posters. The paper sessions and the business meeting were open to all interested persons. The papers were organized in a phylogenetic fashion beginning with the base of the cladogram. The tribe with the most talks was the Anthemideae followed by the Gnaphalieae. A very good discussion on the phylogeny of the family followed the presentations.

After the meeting 14 people participated in a field trip (11-17 January) to Golden Gate National Park, Lesotho, Royal Natal National Park and points in between. Collecting was allowed in most places. Many new and interesting plants were seen and a good time was had by all.

Abstracts were distributed at the meeting but they will also be in the *Compositae Newsletter*. The next international meeting will be held in Barcelona in June of 2006 and will be sponsored by Alfonso Susanna and Nuria Garcia-Jacas with assistance from their colleagues Santiago Ortiz, Aixa Rivero-Guerra, Joan Valles, and others. The purpose of the 2006 meeting will be to produce a new version of the Heywood *et al.* volume (1977). The upcoming treatment in *The Families and Genera of Vascular Plants* (Kubitzki, ed.) will provide an excellent basis for the development of a more theoretical volume. Most people expressed a desire for a format similar to the Heywood *et al.* volume in that each major clade would be covered with a chapter on morphology and a chapter on the results of the molecular analyses. It would also include cross cutting chapters on pollen, chromosome numbers, etc. The meeting will be followed by field trip(s) to the Pyrenees Mountains. The group agreed that we should have local TICA meetings whenever possible and in conjunction with other national and international meetings.

The International Compositae Alliance would like to thank Dr. Marinda Koekemoer and her staff for their hard work, and the National Botanical Institute for hosting our meeting in their lovely new Education Centre.

Anyone interested in being placed on the E-mail list should contact Vicki Funk (funk.vicki@nmnh.si.edu) and anyone wishing to receive the *Compositae Newsletter* should contact Bertil Nordenstam (The Swedish Museum of Natural History, Department of Phanerogamic Botany, P.O. Box 50007, SE-104 05, Stockholm SWEDEN).



Rare African Aroid Discovered among Collection

On a recent visit to the Botany greenhouse, **Dan Nicolson** delivered a dormant corm of *Amorphophallus titanum* donated by Ted Bayer (Invertebrate Zoology). **Mike Bordelon** showed him several interesting aroids, including an unknown collected in Gabon in March 2001 by **Deborah Bell** and **Steve Smith**. Nicolson recognized that the plant was of the subfamily Lasioideae. He was reasonably certain that it was, in fact, *Pseudohydrosme*. This is interesting because this genus of two species was hitherto known only from three collections. *Pseudohydrosme buettneri* Engl., was known only from its original September 1884 collection, now lost, and a drawing. *Pseudohydrosme gabunensis* Engl., is known only from the original (flowering) collection of October 1881, a drawing, and a second collection by Josef Bogner (October 1973). That collection led to an important discussion of the species, including the first description (with photographs) of its leaves (*Aroideana* 4: 31-37. 1981). Bogner kindly shared material of his collection of the spectacular inflorescence with the US National Herbarium. Bell's recent collection, apparently the fourth ever of the genus, being alive, means more work can be done on this poorly known taxon.

Visitors

Continued from page 2

Rogier de Kok, Royal Botanic Gardens, Kew; *Vitex* (Verbenaceae) (3/26-3/28).

Jennifer Dropkin, private individual; Collections management (3/27).

Martin Terry, Texas A&M University; *Lophophora* (Cactaceae) (3/27).

Alan Prather, Michigan State University; Lamiaceae, Polemoniaceae (3/27-3/28).

Tom Wendt, University of Texas; Piperaceae, Polygalaceae (3/27-3/28).

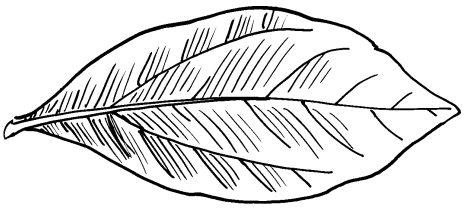
John Beaman, Royal Botanic Gardens, Kew; Flora of Mt. Kinabalu (3/28).

Andrew Henderson, New York Botanical Garden, Bronx; Arecaceae (3/28).

Carolyn Antonion, private individual; Native plant conservation, Western herbal medicine (3/30).

Jinshaung Ma, Brooklyn Botanic Garden; Historical correspondence between Chinese and American scientists (3/30).

Yiu-Man Chan, Chinese University of Hong Kong; Stemonaceae (3/30-4/1).



DePriest Appointed as Advisory Staff Scientist

Paula DePriest has been appointed as a scientist advisor in the Office of the Under Secretary for Science. The Smithsonian Science Commission recommended establishing this rotating position in their report to the Board of Regents. As scientific advisor, DePriest will be responsible for helping to assess scientific progress and identifying scientific highlights in the scientific units; organizing seminars and meetings; coordinating educational and outreach programs; serving as liaison to the Congress of Scholars and other advisory groups; and providing advice, guidance and information on sources of science content for exhibit planning. DePriest's appointment is for one year. DePriest joins Robert Craddock, a geologist at the Center for Earth and Planetary Studies at the National Air and Space Museum, as the two special scientific advisors for the year.

Botany Assists in Examining Crime Evidence

On 26 March, Botany was visited by two officers of the Bureau of Alcohol, Tobacco, Firearms and Explosives with tiny bits of plant materials found on a crime scene and on a suspect to determine if there was a connection. **Stanwyn Shetler** and **Dan Nicolson** were asked by **John Kress** to examine the material. It was quickly determined that the two samples of small thorns were almost certainly from a blackberry, probably *Rubus pensilvanicus*. The other, which they thought might be a grass, meant that **Paul Peterson** was needed. Peterson took a look and said that it was not a grass. Suddenly it was realized that these tiny bits (less than 1 cm long), were from red cedar (*Juniperus virginiana*). All involved were delighted.

Guide Book to South Pacific Reef Plants Published

Identifying marine plants in the South Pacific is now easier thanks to a new book *South Pacific Reef Plants: A Divers' Guide to the Plant Life of South Pacific Coral Reefs*, written by **Diane S. Littler** and **Mark M. Littler** (2003; OffShore Graphics, Inc., Washington, D.C.).

The purpose of this guide is to make marine plant identification possible for both the sport diving community and professional marine scientists who venture into the fascinating undersea realm of South Pacific reefs. Depicted are the major species found during more than 2,200 SCUBA dives over a 10-year period throughout Tahiti, Cook Islands, Samoa, Fiji, Solomon Islands, Papua New Guinea and the Great Barrier Reef. More than 370 stunning underwater photographs showcase the major seaweeds. Over 70 additional images depict "ecological phenomena" in photographic sidebars.

South Pacific Reef Plants features underwater color photographs of each plant on the right facing pages, with a list of key characters to the left of each photo. The location and depth of every photograph is given at the bottom left corner. The descriptions, habitat information, distributions and notes of interest appear directly across on the left facing page to facilitate identification. The photographs were selected to emphasize the characters that enhance visual identification. A specimen can thus be "picture-keyed" initially, then positively identified by using the dichotomous keys in conjunction with the key characters. The book is available at <http://www.erols.com/offshoregraphics>.

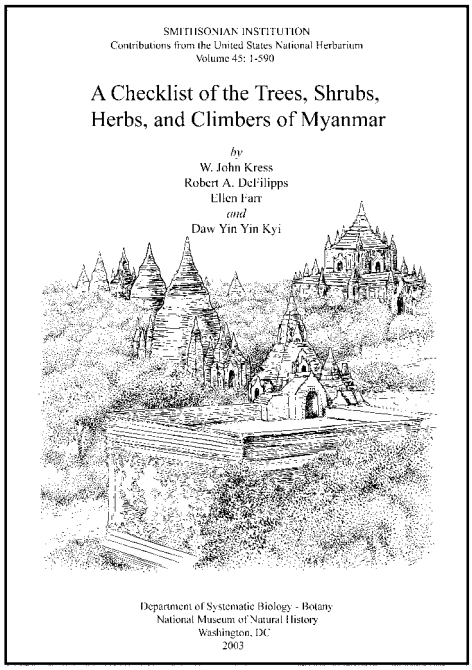
Checklist of Myanmar (Burma) Plants Published

By Robert DeFilipps

W. John Kress, **Robert DeFilipps**, **Ellen Farr** and Daw Yin Yin Kyi have published "A Checklist of the Trees, Shrubs, Herbs, and Climbers of Myanmar" (2003, *Contributions from the United States National Herbarium* 45: 1-590). A thoroughly revised and expanded edition, built upon a foundation laid principally by H.G. Hundley and U Chit Ko Ko in four previous versions (1912-1987), the Checklist increases the combined known gymnosperm and angiosperm flora by approximately 67 percent above the latest previous estimate. In the Checklist are 273 families, 2,371 genera and over 11,800 species. Notes on the habit, distribution and common names are provided for each species.

Included are a brief review of the geology, climate, and vegetation of Myanmar by **Shirley Maina**; 25 color photographs of representative vegetation types and selected plant species by Kress; and a vegetation map presented in crisp color through the skills of **Ida Lopez**. Numerous members of Botany assisted variously with inventorying specimens in the US and Myanmar herbaria; computerization of records; and curatorial review of plant families in areas of their research specialization. Many reviewers of families from around the world also participated, and cooperators in Myanmar extended the benefit of their local expertise, particularly of the forest flora.

Myanmar is perhaps most well known to the public as the home of the "Rangoon creeper" (*Combretum indicum*, Combretaceae); of the commercially important teak trees (*Tectona grandis*, Verbenaceae); and of the leguminous tree known as "Queen of Flowering Trees" and "Pride of Burma," *Amherstia nobilis*, now cultivated in many tropical countries as a breathtaking ornamental. The country was, in past decades, the destination of some of the most intrepid plant collectors in history, who returned to the West with many previously unknown or rare plants of economic potential. Myanmar was the stomping grounds of Joseph F. Rock in the 1920s as he searched for seeds of the chaulmoogra tree (*Hydnocarpus kurzii*, Flacourtiaceae), whose constituent seed-oil acids are an efficacious cure for leprosy; seeding trees were finally found at Kyokta in northwest Burma and formed the germplasm for chaulmoogra plantations in Hawaii. Rock described his exciting search in a 1922 article in the *National Geographic* 41(3): 242-276. Even more famed are the many expeditions of Frank Kingdon-Ward in Myanmar intermittently between 1914 and 1956, searching for plants of horticultural interest, and described in the book *Frank Kingdon-Ward: The Last of the Great Plant Hunters*, by Charles Lyte (1989; John Murray, London).



The sheer magnitude of biodiversity of the flora of Myanmar, and its potential for taxonomic research, conservation-based management, and horticultural investigations, may be glimpsed in the Checklist through such examples as the 118 species of *Dendrobium* orchids; 194 species of *Rhododendron*; 46 species of *Impatiens*; 47 species of *Begonia*; 57 species of primroses (*Primula*), and 48 species of jasmine (*Jasminum*, Oleaceae). There are also 91 species of figs (*Ficus*), and 51 species representing the clove genus *Syzygium* (Myrtaceae). Phytogeographically interesting is a center of diversity of the Acanthaceae in Southeast Asia, which is indicated for Myanmar by the presence, for example, of 70 species of *Strobilanthes* alone; Kress and DeFilipps make 3 new combinations in the genus in an Appendix to the Checklist. Remarkably, there is no recently published flora of Myanmar; a forest flora (excluding herbs) was issued in the 1800s. It is hoped that the Checklist will stimulate further cooperative research on plants of this emerging nation. Extensive plant collecting trips have recently been undertaken by Kress and **Mike Bordelon**.

At a 1997 botanical workshop, a team of Smithsonian staff and Burmese students collect plants on Mt. Popa, Myanmar. (Photo by W. J. Kress)

Samper Named NMNH Director

Cristián Samper has been appointed director of the Smithsonian's National Museum of Natural History (NMNH). He has been the deputy director and staff scientist at the Smithsonian Tropical Research Institute (STRI) in Panama since 2001. Born in San Jose, Costa Rica, Samper, 37, grew up in Colombia, and holds dual citizenship from the United States and Colombia. He is known for his work in the ecology of the Andean cloud forests, conservation biology and environmental policy. He studied biology at the Universidad de Los Andes in Bogota and obtained his master's degree and doctorate at Harvard University, both in biology.

"I see this as a great challenge and opportunity," Samper says. "The Smithsonian's Natural History Museum is one of the great museums of the world, and I look forward to helping make it even better in the coming years. I will move ahead to implement the recommendations from the Science Commission and strengthen collaboration with other units within the Smithsonian and around the world."

From 1992 to 1995, Samper served as director of the environment division of the Foundation for Higher Education in Colombia, and was also adjunct professor of biology at the Universidad del Valle in Cali, Colombia. He was a moving force behind the establishment of a network of more than 200 nature reserves throughout Colombia. In 1995, Samper was founder and first director of the Alexander von Humboldt Institute, the national biodiversity research institute of Colombia. He was in charge of coordinating the biodiversity inventory of Colombia and promoting research in taxonomy and systematics, conservation biology, ethnobiology and environmental economics.

Samper served as head of Colombia's delegation to the United Nations Convention on Biological Diversity (1995-2001), and was chairman of its Subsidiary Body of Scientific, Technical and Technological Advice from 1999 to 2001. In this role, he helped develop a global strategy for plant conservation.

The announcement of a new director comes several weeks after a final report from the Smithsonian Science Commission which called the museum's collection a "vital and unique national resource" that requires long-term leadership from a director who is an outstanding scientist with an expertise in fund raising and in managing large scientific organizations.

Chair

Continued from page 3

from six different countries with five different native tongues had successfully communicated about science and society in a common language. We were astonished that our presentations had covered a broad array of disciplines encompassing taxonomy, paleontology, ecology, agriculture, ethnobotany, conservation, and genomics. And we concluded with the recognition that we all have a common concern with the present and future of society and the environment. This common concern brought us together and ensures our success.

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Smithsonian
Botanical Symposium

John Beaman Receives Third Cuatrecasas Medal

John Beaman of the Royal Botanic Gardens, Kew, received the Cuatrecasas Medal at the 3rd Annual Smithsonian Botanical Symposium. The medal is in honor of José Cuatrecasas, a pioneering botanist and taxonomist who spent nearly a half-century working in Botany at the Smithsonian Institution. Cuatrecasas' research, especially in the flowering plant family Asteraceae, was devoted to the classification, biogeography, exploration, and ecology of plants of the páramo and subpáramo regions of Andean South America. Out of enduring respect and admiration, the José Cuatrecasas Medal for Excellence in Tropical Botany was established. This medal is presented annually to a botanist and scholar of international stature who has contributed significantly to advancing the field of tropical botany. The award serves to keep vibrant the accomplishments and memory of this outstanding scientist. The presentation of the medal at this year's symposium was particularly poignant since 2003 marks the centenary of Cuatrecasas' birth.

The recipient of the Cuatrecasas Medal is selected by a committee of botanists on the staff at the National Museum of Natural History, in consultation with other local plant scientists in the Washington area. This year the Committee was composed of **Laurence Dorr** (Chair), **Pedro Acevedo**, Alan Whittemore, and Pat Herendeen. Nominations for the Medal are accepted from all scientists in Botany at the Museum. The award consists of a bronze medal bearing an image of José Cuatrecasas on the front with the recipient's name and date of presentation on the reverse.

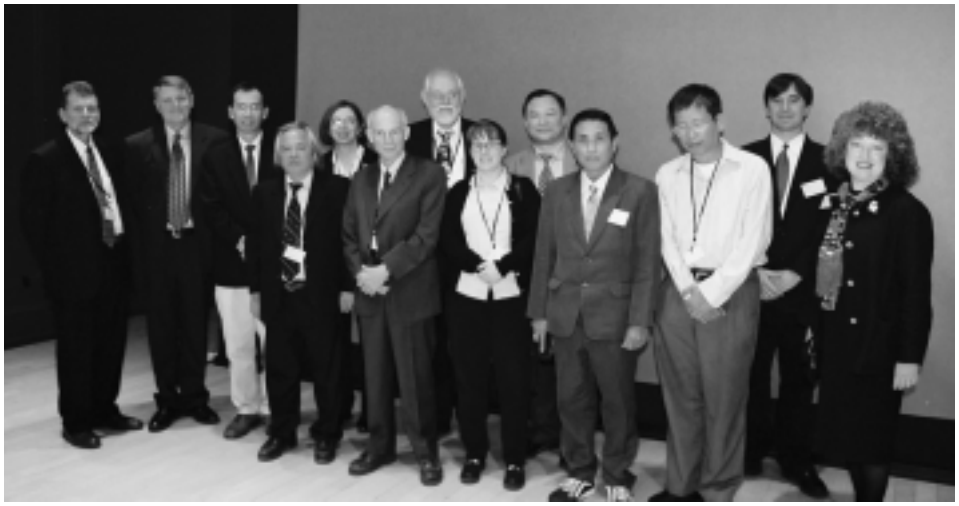
The selection committee was impressed by the many important contributions that Beaman has made to tropical botany over his long and distinguished career. Beaman received his bachelor's degree in Forestry from North Carolina State University in 1951, his master's degree in Botany from Washington State University in 1953, and his Ph.D. from Harvard University in 1957. He was hired in 1956 as an assistant curator of the Michigan State University (MSU) Herbarium. His early floristic work was centered in Mexico, and he provided many contributions to the taxonomy of Asteraceae. Beaman's studies of the flora of northern Borneo began in 1983, culminating with the recent publication of *Plants of Mount Kinabalu*. Initially, Beaman thought the flora of Mount Kinabalu, the highest peak in Borneo, included about 4,000 species of vascular plants. A few years later that figure was revised to about 4,500 species, and now he believes the total could rise to 5,000 species or even more. This extraordinary diversity occurs in an area of only 1,600 km^2.

Beaman's other accomplishments include serving as the program director for systematic biology at the National Science Foundation from 1979-1981; receiving a Fulbright Fellowship for work at the National University of Malaysia, Sabah Campus from 1983-1984; and receiving the Distinguished Faculty Award at MSU in 1989. In 1993, Beaman retired as the curator of the MSU Herbarium, a position he had held for 37 years. In 1994, Beaman became the founding Director of the Institute of Biodiversity and Environment Conservation (IBEC) at the Universiti Malaysia Sarawak. Beaman is now based at the Royal Botanic Gardens, Kew.

John Beaman (middle), recipient of the José Cuatrecasas Medal for Excellence in Tropical Botany, receives his award from Laurence Dorr (left) and W. John Kress. (Photo by Leslie Brothers)

Abstracts from the Speakers of the Smithsonian Botanical Symposium

The third annual Smithsonian Botanical Symposium was held 28-29 March 2003. The symposium, "Botanical Frontiers in Southeast Asia: from the Discovery of the Earliest Flowering Plants to the Sequencing of the Rice Genome," explored the numerous new developments in our knowledge of plant diversity in Southeast Asia. Below are the speakers' abstracts from the papers that were presented.



The speakers at the Smithsonian Botanical Symposium. From left, W. John Kress (Head of Botany), Christen Wemmer, Hei Leung, Nguyen Tien Hiep, Christine Padoch, John Beaman, David Dilcher, Robin Buell, Ge Sun, U San Lwin, Leonardo Co, Stuart Davies, and Paula DePriest. (Photo by Leslie Brothers)

David Dilcher
Florida Museum of Natural History
Ge Sun
Jilin University

"Searching Out the Nature of the Ancient Angiosperms: The Early Flowers and Their Evolution"

Fossils from the Yixian Formation in China (125—144 million years old) and the Vale de Aqua fossil assemblage in Portugal (115—125 million years old) have yielded some useful and interesting characters of early flowering plants. Reports of fossil angiosperms from the Lower Cretaceous of China and Spain, perhaps Hauterivian/ Barremian in age provide additional characters useful for determining the early radiation of the group. Fossils from Aptian and Albian age sediments in Brazil, Australia, and North America provide further diversity of angiosperm remains. Most of these fossils are leaves and only a few are reproductive. It is now possible to begin to list the characters of these early angiosperm remains and then assess to what extant taxa these characters have similarities and to what quantitative extent they are similar. We suggest that this type of evaluation be used and clearly presented in published work, so that we can begin to establish a data bank of characters for fossils reported to be early angiosperms or to have angiospermous affinities. It is clear that many of the characters now known for Lower Cretaceous angiosperms are typical of aquatic angiosperms today. Nymphaeales has been reported, as has Ceratophyllales from 115—120 million years ago. Both of these are aquatic and the Nymphaeales is part of the ANITA basal angiosperm groups known from molecular data. When we combined fossil and modern morphological characters with modern molecular data in a matrix, then *Archaefructus* replaced *Amborella* as basal in the flowering plants. The persistence of the Nymphaeales and Ceratophyllales, as well developed and broadly dispersed Lower Cretaceous clades, suggests that aquatic plants occurred very early in flowering plant evolution and that aquatic environments should have played a role in the evolution of the group.

Christine Padoch
New York Botanical Garden
Kuswata Kartawinata
Center for International Forestry Research, Indonesia

"Tropical Agrodiversity and Forest Management"

The last decade has been a period of upheaval for the people and environments of Indonesia. The monetary crisis, the fall of Suharto, the decentralization of administration and natural resource management, devastating droughts and fires, and civil violence on a scale unknown for many decades have had profound effects on forests and communities. During this period the country—and particularly several provinces of Kalimantan—experienced massive logging and conversion of forests and swidden-fallows to industrial plantations.

These shifts have been radical and overwhelming; we do not want to trivialize their importance. But change rather than stasis has long characterized Kalimantan's communities and environments. Fragmented, altered, and managed forests are not new features, although the processes creating them have changed greatly in scope, rate and impact. Forests, fallows, and agroforests created and managed on community and household scales have been important in Southeast Asia for centuries. We review recent work on this issue and present several examples of technologies and associated social arrangements that create and maintain managed forests in Kalimantan and Sumatra. These practices alter the structure and composition of forests to varying degrees, but many sustain surprisingly high levels of floral diversity and complex forest structures. Many of these multifunctional woodlands also supply incomes for families and exports for local economies, incorporate local peoples' knowledge, and build upon local variations, distinctions, and opportunities. Such anthropogenic forests range from casually managed stands that provide a broad range of household subsistence products, to commercial agroforestry ventures that feature exotics for export, such as the

"jungle rubber" plantings recently investigated by ICRAF scientists and others.

Stuart Davies
Smithsonian Tropical Research Institute and the Arnold Arboretum
Leonardo L. Co
University of the Philippines
Daniel A. Lagunzad
University of the Philippines

"The Natural History of Seven Tropical Forests in Asia"

The Center for Tropical Forest Science of the Smithsonian Tropical Research Institute is a global initiative in long-term tropical forest research. The broad objectives of this research program are: (1) to develop a general theory of tropical forest diversity and dynamics, providing explanations of the relative importance of biotic and abiotic factors in controlling species distributions and the regulation of population and community dynamics, and (2) to develop models incorporating ecological and economic analyses for predicting human impacts on and optimizing sustainable utilization of tropical Asian forests. These and many other fundamental ecological questions concerning tropical forests are best addressed by a comparative approach involving long-term, individual-based, mapped, permanent forest plots. The consortium of researchers and institutions collaborating with CTFS has established a pantropical network of 17 large-scale (50 ha) permanent plots in 14 countries representing the diversity of tropical forests.

The CTFS-Arnold Arboretum Asia Program includes seven core sites, each with a large-scale research plot. The sites were chosen to represent the major biogeographical areas of Southeast and South Asia. The plots are found across a gradient of climates, soil types, and natural disturbance regimes. Current CTFS-AA core sites are in Malaysia, Thailand, India, Sri Lanka, Philippines and Singapore. CTFS-AA also collaborates in associate sites in Taiwan and Thailand. In this talk, we discuss the comparative ecology of the forests in which the seven plots have been established. Forest stand structure, diversity, and species composition are analyzed with respect to climatic and biogeographical gradients.

The Symposium panel (including, from left, Robin Buell, Hei Leung, Stuart Davies, and Christine Padoch). (Photo by Leslie Brothers)

C. Robin Buell
The Institute for Genomic Research
Hei Leung
International Rice Research Institute

"Rice Genomics: Helping Rice Science and Agriculture"

Half of the world's population depends daily on rice for its caloric requirements. Throughout the last 10,000 years, rice has been domesticated and bred for use in diverse environmental conditions around the world. The Green Revolution started more than four decades ago in response to the food crisis in many parts of the developing world. As a result of concentrated efforts devoted to improving rice germplasm and agronomy, a dramatic and steady increase in rice productivity has occurred across Asia. Rice yield in irrigated areas nearly doubled from 1960 and 1980. This has resulted in a lower rice price that benefits consumers. The yield increase, however, is low in unfavorable environments where the water supply is unreliable and the soil is often infertile or problematic for rice production. A new level of scientific input will be required in the coming years to meet the growing needs of an expanding world population. One tool to help develop new adaptive strains of rice will be the application of structural and functional genomics.

The rice genome, encoding 430 megabases of DNA, is small relative to other species in the grass family containing the important cereals such as maize, sorghum, millets, wheat, and barley. The complete sequence of the rice genome is now available in the public domain through the efforts of the International Rice Genome Sequencing Project (IRGSP). The rice genome is relatively compact with the largest number of genes of any organism sequenced to date. It is predicted to contain as many as 62,000 genes, and that one would find a gene in every 5 to 7 kb of DNA. The rice genome also contains a large amount of repetitive DNA that is associated with the heterochromatic regions of the chromosomes. Initial

Continued on page 14

Sponsors of the 3rd Smithsonian Botanical Symposium

- Cuatrecasas Family Foundation
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- International Association for Plant Taxonomy
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Abstracts

Continued from page 13

identification of genes and gene families has revealed that rice is very similar to *Arabidopsis thaliana* yet contains unique genes not found in *Arabidopsis*. The conservation of gene sequence, and possibly functions, across plant species will expand the usefulness of the rice genome information to many important crop plants.

With a genetic blueprint in place, we see new opportunities to understand gene functions and design efficient approaches to find genes of agronomic importance. We will highlight the resources available and being developed to accelerate gene discovery and speculate on the future adoption of new knowledge and tools in plant improvement. We will emphasize the important roles developing countries can play in rice functional genomics as they are rich in genetic resources and agronomic knowledge of the rice crop. Successful application of rice genomics to enhance rice production and agriculture will rest upon the goodwill and determination of the research community to broaden access to the new science and technologies by the developing world.

Chris Wemmer
Smithsonian Institution

"Conservation in Myanmar: A Tale of Taxonomy in the Golden Land"

What is the easiest way to win friends and influence people in the outposts of the developing world? (a) Engage the friendlies at the tea-shop in a heart-to-heart discussion about the benefits of American foreign policy. (b) Take pictures of the folks with your digicam and show them their images. (c) Give the local school a new volley ball and net. (d) Don your collecting gear and demonstrate the collection and preservation of biological specimens with an air of rapt concentration. Answer: all work except for (a).

Every biological collector (read: taxonomist) knows that collecting specimens is one of the easiest ways to make friends and influence people who live close to the land. Villagers in the outposts of the developing world have a natural affinity with nature, and therefore have a great deal in common with taxonomists who visit their country. My presentation is based on Janzen's supposition that the developing world offers the most fertile soil to plant the seeds of taxonomy, and that the renaissance of taxonomy will be lead by a mixed army of practitioners from the North and South. The joint venture will nurture the professional capacity of young devotees (the propagules), and lay the foundation for science-based protected area management and eco-tourism (in a multi-cropped garden).

Beginning in 1992, the Smithsonian Institution began several science initiatives in Myanmar, which continue today. In response to the country's request for biodiversity inventories, ecological studies of flagship species, and in-service training, we developed several inter-related projects. The experience has been rewarding in a number of ways, and has also taught us several lessons, which may be of help to other taxonomists interested in working in similar countries. These themes will be developed with examples from our personal experience. In the interest of generalization, we welcome the thoughts of our colleagues who have had similar or different experiences.

Wade Davis, delivering his keynote address, "Light at the Edge of the World: A Journey through the Realm of Vanishing Cultures" at the Smithsonian Botanical Symposium. (Photo by Leslie Brothers)

U San Lwin
Institute of Forestry, Myanmar

"Current Development of Biodiversity Conservation in Myanmar"

Myanmar, a tropical country in continental Southeast Asia, still remains comparatively well-endowed with forests and vegetative cover. Due to its diverse forest ecosystems, eight primary forest types are subdivided into 48 ecological classifications on the basis of their floristics and other ecological attributes.

Though Myanmar has managed its forest resources systematically and scientifically since 1856, the exploitation of forest products never exceeds the annual allowable cut prescribed based on its potential capacity. Safeguarding the forests and their ecosystems has always been given top priority as they play a vital role in buffering the deleterious environmental impacts of development.

During the last decade, more emphasis was given on environmental values in line with the international movement regarding forestry and environmental issues. Some of the major accomplishments include

Acknowledgments

The success of the Symposium was due to the significant time and efforts of the following people:

Organizers
- Paula DePriest, Co-Convener
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- Ida Lopez
- Linda Moreland
- Sue Lutz

Core Collections Management Staff

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- Holly Shimizu and the United States Botanic Garden

Photographer
- Leslie Brothers

Plant material
- Nancy Bechtol, Barbara Faust, and the Horticulture Services Division at the Smithsonian Institution

And many others who had helped in a myriad number of ways.

formulation of Myanmar Forest Policy in 1993, giving highest priority on protection of soil, water, wildlife, biodiversity and environment to ensure ecological balance and environmental stability, replacing the old Wildlife Protection Act of 1936 by the new Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law in 1994, highlighting habitat maintenance and restoration, protection of endangered and rare species of both flora and fauna, and establishment of new parks and naturally protected areas.

In 1997, a new department entitled 'Dry Zone Greening Department' was instituted to bear specific responsibility for reforestation of degraded forest lands and restoration of the environment in the dry zone of Central Myanmar. Community Forestry Instructions were issued in 1995 and since then local community participation has been accelerated in managing forests not only in utilization of their basic needs but also for environmental conservation of their surroundings.

Forest Department (FD) has been actively participating in international conventions relevant to biodiversity conservation, combating desertification and trade in endangered species. FD has also launched environmentally sustainable projects, some of which are being implemented with international and regional cooperation. In the field of conserving and managing wildlife and wild plants, FD has cooperation with international organizations including the Smithsonian Institution, Wildlife Conservation Society, Washington Park Zoo-Oregon, Global Tiger Forum (GTF), Asian Elephant Specialist Group (AESG), South-East Asian Zoos Association (SEAZA), and the Wildlife and National Park of Peninsular Malaysia (DWNP).

Jacinto C. Regalado, Jr.
Missouri Botanical Garden
Nguyen Tien Hiep
National Center for Science and Technology, Vietnam

"Botanical Diversity in Vietnam: New Discoveries and Challenges in Conservation"

Vietnam is ranked as the 16th most biologically diverse country in the world and is widely recognized to have a globally significant proportion of rare and endemic species of plants and animals. An estimated 12,000 vascular plant species, of which 10,000 have been identified, occur in Vietnam, and nearly 20% of known plants are endemic. A high degree of environmental heterogeneity for climate regime, soil, landscape and topography is certainly responsible for this high level of biodiversity in Vietnam.

Over the past ten years, Vietnamese botanists have actively collaborated with their colleagues abroad in the study of Vietnam's flora. These collaborative efforts have resulted in numerous and exciting plant discoveries. Over two hundred taxa, including thirteen new genera of vascular plants, have been described since 1992. At least a hundred new records of plants have been similarly documented. These findings account for a remarkable 3% increase in the flora. The most spectacular discoveries are the new genera and species of conifer (*Xanthocyparis vietnamensis*) and fern (*Caobangia squamata*). The Vietnam Golden Cypress is the fourth new conifer described since 1948 while *Caobangia* is one of two fern genera recently described; the last new fern genera were described in the late 1960s.

These exciting new discoveries are sobered by the present level of biodiversity protection in Vietnam. The country now supports only 10-12% cover of closed tropical forests; less than 1% is in a pristine state, restricted mainly to isolated mountain regions that are poorly studied but undoubtedly high in biodiversity and endemism. Many of Vietnam's native plants and animals are threatened or endangered by one of the world's fastest rates of deforestation and associated population growth. These stresses, together with the country's rapid opening of an international market economy, bring particular urgency to the need for up-to-date biological information, training, and conservation to protect Vietnam's unique biodiversity.

Numerous organizations have given support to Vietnam in the area of biodiversity conservation, but none has been more active in the field of botany than the Vietnam Botanical Conservation Program, which was established in 1994 by the Missouri Botanical Garden (MBG) in collaboration with the Institute of Ecology and Biological Resources (IEBR) of Vietnam's National Center for Natural Science and Technology. The goal of MBG's program in Vietnam is to revitalize study of the flora and strengthen the capacity of Vietnamese institutions, scientists, students, and park and forest protection officers to manage the country's botanical resources in a sustainable manner. Highlights of the program's activities over the past ten years will be presented.

The Symposium panel (including, from left, Nguyen Tien Hiep, Jack Regalado, David Dilcher, and Ge Sun). (Photo by Leslie Brothers)

On Exhibit: A Passion for Plants

By Gene Rosenberg

A branch of *Magnolia grandiflora*, suspended in space, with water droplets glistening on its waxy leaves and a single luscious, cream-colored inflorescence serves as the iconic invitation to an exhibit of 100 paintings by contemporary botanical artists that will be on display at the Smithsonian's National Museum of Natural History until 2 September 2003. This image of a magnolia blossom was painted in acrylic on paper by Australian artist Paul Jones and is part of "A Passion for Plants: Contemporary Art from the Shirley Sherwood Collection." The exhibit includes paintings of plants executed in watercolor, gouache, pen and ink, pencil, and lithography. Apart from the beauty of the paintings themselves, plants are infrequently the focus of Museum exhibits, so for Smithsonian botanists, the exhibit is cause for special celebration.

The paintings were selected from the collection of Shirley Sherwood, which at almost 500 works comprises the finest private collection of contemporary botanical art in the world, representing 191 artists from 27 countries. In a 28 March lecture in the Museum's Baird Auditorium that inaugurated the exhibit, Sherwood recounted that, although she graduated from Oxford University with a degree in Botany, her special interest in botanical art was stimulated by a lecture on botanical illustration and by exhibitions of botanical artworks that were organized at the Kew Gardens Gallery in England from the end of the 1980s. **W. John Kress** observes, "Botanical art has entered a new golden age, a renaissance. Shirley Sherwood's collection has raised the profile of botanical illustration as both an art form and an appreciation of nature."

The glorious diversity of plant shapes, sizes, and colors has fascinated botanists and artists alike. "A Passion for Plants" brings together two passions: the passion of the artist and the passion of the scientist. The passion of the scientist is expressed in careful botanical studies underpinned by the labor of specialists in different plant groups since the time of Linnaeus. The passion of the artist is also supremely disciplined. Although the painted plant images may feature imaginative compositions, rich colors, and varied textures, the illustrations must also be detailed and technically accurate. This strict artistic discipline is what distinguishes the paintings featured in "A Passion for Plants" and the more impressionistic images of flowers by a van Gogh or an O'Keeffe. In a practical sense, for the viewer, these botanical paintings are best approached by first standing back a few paces to appreciate the overall composition, and then going in really close to admire the details.

Botanical art is not simply a time-consuming substitute for photography. Compared to a photograph, the paintings of plants can show multiple perspectives, life stages, and microscopic or dissected anatomical details that cannot be captured by a camera lens. **Alice Tangerini**, botanical illustrator in the Department, recalls occasions when she has noted morphological features that escaped the eyes of the professional botanists! In the exhibit, the different views of the botanist and the botanical artist are underscored by examples of paintings displayed next to pressed herbarium specimens of the same or closely related species. Special panels highlight the history of botanical illustration, illustrations of the same species (magnolia) by different artists, fly-pollinated and parasitic plants, and other botanical curiosities.

Kress notes: "This is an exhibit of art, but we're a science museum. So we want to give visitors a different perspective than they would get at the National Gallery." In keeping with this mission, the exhibit is arranged in an evolutionary framework covering over 500 million years of plant evolution, from fungi (mushrooms), to spore-producing ferns and seed-bearing gymnosperms, to the first flowering angiosperms, to the monocots, and finally the dicots. Graphic icons are used to group the plants shown in the paintings into these five categories and, in addition to common names, the plants are identified to order and species.

In the midst of the exhibit, it is a delightful surprise to encounter "Botany at Work," a diorama of the U.S. National Herbarium that was created using botanical "props," including herbarium cabinets, a drawing table, a plant press, wet and dry herbarium specimens and life-size, cut-out cardboard photographs of some of the Museum's own Botany staff. The diorama brings behind-the-scenes museum research to the public by showcasing botanists at work in maintaining collections, collecting in the field, conducting research, and illustrating plant specimens. A continuous computer slide show takes

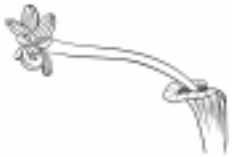
Richard Lindinsky (left), Shirley Sherwood, and Symposium speaker David Dilcher, attend the opening of the exhibit "A Passion for Plants" at the National Museum of Natural History. (Photo by Leslie Brothers)

The exhibit "A Passion for Plants" includes a combination of artwork and herbarium collections in an artistic and scientific setting, as enjoyed here by Ann Juneau, the director of the Natural History branch library. (Photo by Leslie Brothers)

visitors from exotic locales around the world where plants are collected, to the Museum laboratories where specimens are mounted, DNA is sequenced, and results are analyzed.

Planning for the exhibit began in September 2002 when Kress and Tangerini met with Joe Madeira and Tom Thill of the Museum's Exhibits Department. Sharon Barry joined the team as the script writer. Sherwood's view of botanical art as "the meeting place between the arts and the sciences" guided development of the exhibit from the beginning. In early November, Kress, Tangerini and Madeira traveled to the Denver Art Museum in Colorado, where they selected 100 paintings (from among 160 in a temporary exhibit) to tell the story of the evolution of plant life. The concept of the diorama was conceived only three weeks prior to opening. According to Tangerini, the idea to use life-size, cardboard cut-outs of Botany staff started as a fantasy, but soon took on a life of its own. Herbarium staff members Rusty Russell, Deborah Bell, and Linda Hollenberg worked rapidly to take the diorama from a concept to the final installation.

An almost ethereal watercolor of the cycad *Encephalartos woodii*, by U.S. artist Leslie Berge, is one of the paintings that catch the visitor's eye near the beginning of the exhibit. The male plant has strobili that cluster at the base of a mass of fronds that glow like golden pineapples; the fronds stretch upward until they disappear in the soft light. This cycad, growing in a botanical garden in South Africa, is also the last of its species; there is no female. In a foreword to one of Sherwood's books about contemporary botanical art, R. Strong wrote, "Earlier artists took up their brushes to record what had not been seen before. So often now it is a case of recording what may never be seen again." Whether their subjects are rare species on the verge of extinction or common garden vegetables seen in a new light, these paintings exude the breath of life and offer a marvelous, studied view of nature.



Supplementary Symposium Links on the Web

The Web site to the 3rd Annual Smithsonian Botanical Symposium <http://persoon.si.edu/sbsarchives/sbs2003/> has many links and documents related to the conference. Included on the Web site is a full list of the participants, abstracts of the talks and posters, selected images from the various events, and links to the associated exhibits. Additional items related to the symposium can be added to the list of links and documents by sending an E-mail to sbs@nmnh.si.edu.

The Saturday reception at the Smithsonian Botanical Symposium took place among the exhibit "A Passion for Plants." Symposium speaker Nguyen Tien Hiep (second from right) and his son (far right) enjoy a conversation with His Excellency, the Ambassador of Vietnam, Mr. Nguyen Tam Chien and his wife. (Photo by Leslie Brothers)

Symposium

Continued from page 1

fires, deleterious market systems, bans on rubber growing (now being somewhat overcome by "jungle rubber" cultivation), and illegal logging, there is still much biodiversity to be seen in the man-made forests of Indonesia where shifting cultivation is the principal management system.

Many forests that were once believed to be natural have a long history of interaction with people. Several management techniques involve manipulating swiddens (shifting cultivation, slash-and-burn agriculture), conserving and managing plants and landscapes, and creating or building forests. Noxious weeds such as *Imperata* grass and the composite *Austroeupatorium inulaefolium* invade continually as the people work their systems. Somehow a measure of benefit is derived from certain weeds, when, for example, the composite weed shades out the *Imperata* grass and makes much biomass while seemingly producing a chemical that kills parasitic soil nematode worms. Altogether Padoch and her colleagues have identified 115 different types, and modifications, of fallow ground observable in the Asia-Pacific region. Thus the forest-managing peoples of Kalimantan, Indonesia, are adapting to economic problems, while facing the inevitable increases of population density and forest fragmentation in the offing.

Stuart Davies (Harvard University and the Smithsonian Institution) and Leonardo Co (University of the Philippines, Quezon City) discussed biodiversity in forest ecosystems from the perspective of large scale (to 52 hectare) study plots set up by the Smithsonian Tropical Research Institute in India, Sri Lanka, Thailand, Malaysia, Philippines and Singapore. Forest dynamics such as the causative factors of patterns of plant community structure and composition are being compared and contrasted in their studies. They have found that forest structure and canopy height are linked to wind and cyclones, while the short dry season of 2-3 months makes a strong signal to induce flowering behavior, an understandable linkage to water availability. Co's study plot is in the Sierra Madre mountain range in Northern Sierra Madre National Park, an "everwet" forest in northeastern Luzon, Philippines where dipterocarps prevail.

> *"It is a dream come true to speak at this museum."*
> *- Hei Leung*

The team of Robin Buell (Institute for Genomic Research, Rockville, Maryland) and Hei Leung (International Rice Research Institute, Manila, Philippines) lucidly explained the complexities of rice genomics and genetics, by means of which the full rice genome was recently sequenced by several different organizations. Rice is now being used as a platform to decipher the gene sequence of other cereal grains. An international public project used *Oryza sativa* subsp. *japonica* 'Nipponbare,' often grown in temperate zones, as the experimental organism, while a Chinese group worked on the genome of *Oryza sativa* subsp. *indica*, the tropical-zone rice used by 80 percent of the world's rice consumers. Incredibly, the rice plant has more than 62,000 genes (including its transposable element related genes). Working with these, the sequencing of the first complete plant centromere, from the pachytene stage in rice, was also recently accomplished.

Knowledge of the rice genome, as Leung observed, is being used in breeding programs for developing disease resistance. Rice has a unique role in agriculture and the developing world, especially since many people now must live in marginal areas with problem (comparatively infertile) soils, and either too much or too little water availability. Thus, rice is being studied from the standpoint of raising its yields in fragile ecosystems. From the gene pool, the creation of adaptive varieties having novel gene combinations can be used for overcoming some of the most intractable food problems of Southeast Asia. Drought-resistant and early flowering mutants (plants with deleted genes) are especially favored in this type of research, as are rice strains having disease defense-related genes. It was knowledge of the gene controlling the gibberellic acid metabolic pathway that enabled semi-dwarf rice to be developed for the Green Revolution of past decades, and currently it is hoped that by the year 2010, the function of 60 percent of agronomically important rice genes will have been researched.

The focus next turned to work in the Union of Myanmar (formerly Burma). Led by U San Win (Institute of Forestry, Yezin, Myanmar) and Chris Wemmer (Smithsonian Institution, Front Royal, Virginia), the conservation status of Myanmar biota was evaluated. Myanmar, home of the teak plant (*Tectona grandis*, Verbenaceae) and over 800 species of orchids, comprises eight major ecosystems from mountains to mangroves. Of these ecosystems, 34 percent is "moist, upper, mixed, evergreen forest," being the largest percentage of forest area. Currently 2.3 percent of the

The opening reception at the United States Botanic Garden included an opportunity to see the exhibit "Traditions in Elegance: 100 Teapots from the Norwich Castle Museum" sponsored by R. Twinings and Company Limited. (Photo by Leslie Brothers)

A dancer with Gamelan Mitra Kusuma performing for the particpants of the Smithsonian Botanical Symposium. (Photo by Lelsie Brothers).

total land area of Myanmar is in the Protected Areas System (PAS) of the nation, but it is hoped that figure will reach 10 percent by the year 2017. A massive program of "Dry Zone Greening in Central Myanmar" was started in 1997 to form plantations, and conserve natural forests and watersheds. Some concerns in the country are the expansion of agricultural land, deforestation, poaching, and cattle grazing causing loss of biodiversity and habitats in the forests.

Wemmer disclosed the underlying assumptions of collaboration and the requirements of joint planning and realistic common goals, wherein taxonomists need to build professional capacities for conservation, and compelling cases are needed to appeal to international donor agencies. Unanticipated needs arising from zoological work in Myanmar have included the requirements of infrastructure (building a museum, prep labs, etc.), rice allowance for staff support, transportation (boats, Jeep vehicle), and communications (grave need for computers and e-mail access). Among the beneficial policy results of Smithsonian collaboration in Myanmar is the designation, in Sagaing, of the Maha Myaing Wildlife Sanctuary for Eld's deer.

From Myanmar, the topics went eastward to a consideration of flora and plant conservation in Vietnam, in the capable hands of Nguyen Tien Hiep (National Center for Science and Technology, Hanoi) and Jack Regalado (Vietnam Botanical Conservation Program, Missouri Botanical Garden, St. Louis). Vietnam has a flora of 12,000 species of higher plants, of which 10 percent of the species and 3 percent of the genera are endemic. The largest family is Orchidaceae represented by 897 species, followed by the legume and grass families. One of the numerous factors contributing to high biodiversity in Vietnam is karst limestone soils: 17 of the 24 species of cycad in Vietnam occur on karst. Among recent noteworthy finds are a new genus and species of conifer, *Xanthocyparis vietnamensis* (Cupressaceae); 2 new orchid genera in 2003 (*Vietorchis, Zeuxinella*); and a new country record for *Taiwania cryptomerioides*, an aromatic gymnosperm tree formerly known only from Taiwan and mainland China.

However, the great floristic biodiversity of Vietnam is being eroded by a deforestation rate of 1.6 percent per year, which Regalado said is one of the highest percentages of deforestation in the world. In this environment, at the mercy of a burgeoning population of 82.2 million people, and instances of unsustainable use of forest resources while alien invasive species such as *Mimosa pigra* are inexorably replacing the native vegetation, there exist 339 plant species presently threatened with extinction. A major hope for the future is the excellent work of the Vietnam Botanical Conservation Program associated with the Missouri Botanical Garden, begun in 1994 and headquartered in Hanoi, in cooperation with the National Center for Science and Technology (Vietnam), which will be extending its services to Central and Southern Vietnam.

After a delightful Asian dinner in the museum Rotunda, attended by His Excellency the Ambassador of Myanmar and his wife, His Excellency the Ambassador of Vietnam and his wife, and the Agricultural Attaché of the Philippines, the participants reassembled in the auditorium to behold a special treat, the Gamelan Mitra Kusuma ensemble performing Balinese music and dance. The unusual sounds of the orchestra seemed to exert a curiously hypnotic influence on many Westerners in the audience, some of whom were moved to tears.

The gamelan group was followed by the Keynote Speaker, Wade Davis. An Explorer-in-Residence at the National Geographic Society (Washington, D.C.), with three degrees from Harvard University in anthropology and ethnobotany, Davis' illustrated address was entitled "Light at the Edge of the World: A Journey through the Realm of Vanishing Cultures."

As a tropical biologist working in, and experiencing the cultural diversity, of societies in the Amazon, Borneo, Haiti, Peru, Venezuelan Orinoco, East Africa, Tibet, Arctic Canada, and even Timbuctoo in central Mali, Davis described his ventures into the worlds of spiritual as well as material values of people whose lives are arranged much differently than our own. This intellectual and social web of life, comprising all cultures together, he calls the "ethnosphere." And from this sphere, many languages and extraordinary layers of knowledge of forest plants by indigenous peoples are rapidly disappearing. Davis maintained that every fortnight an old language speaker dies, while conversely, the English language "is like a cultural nerve gas spreading over the planet." In an example of ethnobotanical diversity, he noted that the Kofan Amerindians of Ecuador recognize 17 different forms of the hallucinogenic plant *Banisteriopsis caapi* (Malpighiaceae); when ingested together at the same time, the Kofan say that "each form sings to you in a different key."

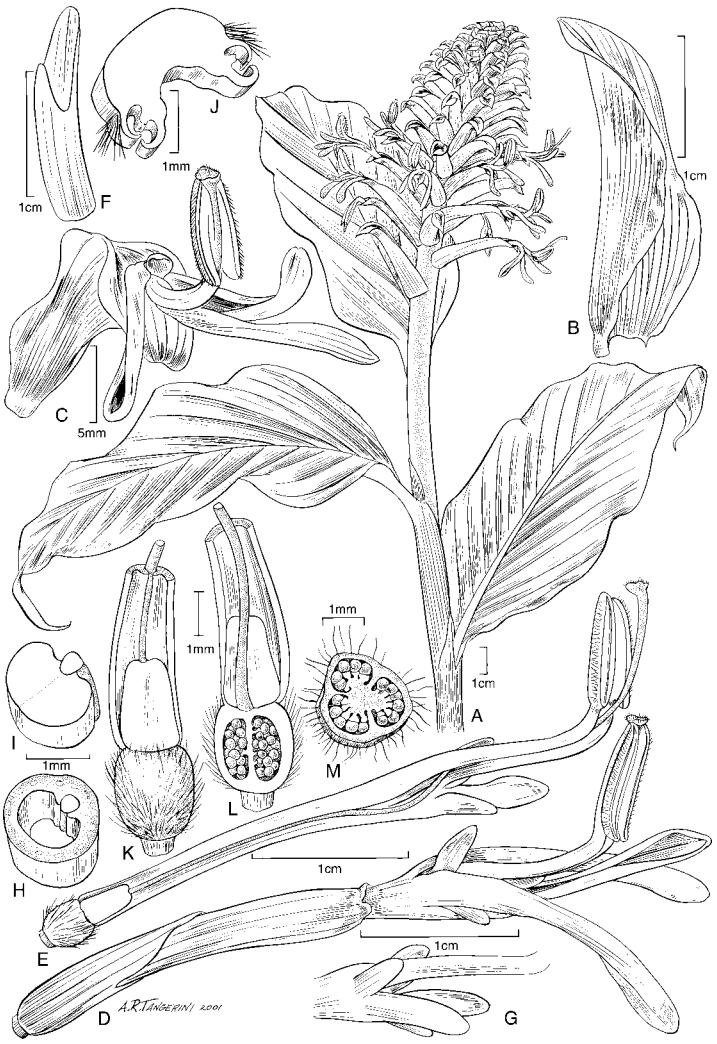
Change, Davis continued, is no threat to culture: power and domination are the threats; *viz.* disease coming to the Yanomami Indians in the wake of the gold miners, and egregious lumbering and deforestation threatening the Panang people of Sarawak. Davis suggested that we are drifting towards a "blandly amorphous world culture," and that the values of the forest and village people of the world, who have "forged a traditional mystique with the earth" must now be appreciated as the "symbols of the naked geography of hope."

The Third Smithsonian Botanical Symposium presented a unique vision with the languages, cultures, biodiversity, and environmental challenges of an increasingly important area of the world: Southeast Asia.

Art by Alice Tangerini

Hedychium bordelonianum W. J. Kress & K. J. Williams

Hedychium bordelonianum W. J. Kress & K. J. Williams is endemic to Western Myanmar where it has only been collected in the mountainous regions bordering Rakhine State and Magwe Division. Although clearly a member of the genus *Hedychium*, this epiphytic species is unusual in the bright red bracts and flowers as well as the much reduced labellum and lateral staminodes. It is named after Mike Bordelon, Manager of the Botany Research Greenhouses and active member of the Myanmar expedition team.



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