Department of Botany and the U.S. National Herbarium

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Department Profile

Lichenologist Narrows the Generation Gap

By Robert DeFilipps

One of the goals of the Department of Botany is to become an international center for the training of a new generation of botanical systematists, professional botanists and paraprofessionals. At a time when universities are decreasing their systematics programs, it is important that significant educational and outreach components be a part of the department's overall strategy.

Ever since she arrived at the Museum in 1992, Paula DePriest, Curator of Botany, has participated in numerous research projects, which include training of students from around the world. Being a professional lichenologist, and specialist in *Cladina* (Cladoniaceae), DePriest's aim is to enable future generations of students and researchers to develop information about these ascomycete fungal organisms.

To further her goal and that of the department, DePriest and colleagues Samuel Hammer (Boston University) and Teuvo Ahti (University of Helsinki) were awarded a PEET grant in 1997 to conduct monographic studies in the Cladoniaceae. PEET, "Partnerships in Enhancing Expertise in Taxonomy", is a National Science Foundation grant which is designed to translate current expertise into electronic databases and other formats with broad accessibility to the scientific community. The major objective of the project is to produce a synopsis of all species in the Cladoniaceae, which will be accessible through the department's lichen Web site, and prepare revisions of various groups, with the ultimate goal of a worldwide monograph within five years.

The lichen collection of the U.S. National Herbarium, estimated at 250,000 specimens, is one of the ten largest in the world, and is especially rich in Cladoniaceae. Lichens of the genus *Cladonia* are physically of rather small stature, but collectively they dominate the plant cover in some parts of the great northern tundra where reindeer and caribou abound. They are significant along the Atlantic Coastal Plain of the United States, while in South America they carpet the ground at Guyana's spectacular Kaieteur Falls. The cosmopolitan cladonias account for 500 known species, and while ecologically important they are incompletely studied from taxonomic and phylogenetic perspectives as a whole.

Through the PEET grant, a Smithsonian Scholarly Studies Award and a Mellon Fellowship, an international team of students and scientists from universities in Finland and the United States have streamed through the doors of DePriest's office and the Museum's Molecular Systematics Laboratory in Suitland, Maryland. Research is being conducted to acquire new sets of characters for taxonomic discrimination and phylogenetic comparison, including molecular DNA sequence data and morphological features of hyphal growth of the fungus. The integration of these various kinds of evidence to improve classification and phylogenetic inference constitutes a pioneering model for the modernization of lichen systematics. The generational aspect of cladonia work, namely the participation of three generations of people, from students through researchers and advanced senior scientists and professors, is being considered as a model for the planning of other programs in the department.

"We're falling behind in numbers of students in botanical systematics", said DePriest. "The Smithsonian has to be active in turning this around". As Chair-Elect of the Senate of Scientists Council at NMNH, DePriest hopes that the field of botany can become a stimulating beacon to future generations. She feels the current population of botanists should become instrumental in leaving a lineage of students in their wake, almost like a family tree of radiating investigators. To this end, DePriest and other curators in the department will be striving to include training and education components in their research activities.

DePriest is not the only curator in the department who believes training is an important aspect of scientific research. Liz Zimmer has hosted many students in molecular evolution studies; Maria Faust and Jim Norris have sponsored scientists in marine algological and dinoflagellate studies; and Vicki Funk and John Kress have taught plant systematics courses at Duke University. Future issues of *The Plant Press* will feature these and other training projects of botany staff.

New Faces

Lynne Cherry was recently appointed by the chairman to the position of Artist in Residence in the Department of Botany, for a period of one year to June 1999. Cherry is director of the Center for Children's Environmental Literature (Washington, D.C.) and an accomplished illustrator and writer of 30 children's books relating to various environmental concerns. Among her books are *The Shaman's Apprentice: A Tale of the Amazon Rain Forest* and *The Great Kapok Tree*.

She is working on a book on relationships between ecosystems, endangered species and values, with drawings in her vivid yet tasteful style of coloring.

Former (1990-1993) Laboratory of Molecular Systematics (LMS) Post-doctoral Fellow **Youngbae Suh**, now an Associate Professor with the Natural Products Research Institute at Seoul National University, is taking a sabbatical to work on basal angiosperms at the LMS from 8/15/98-1/14/99 and 8/1/99-1/4/2000.

Collections

Amorphophallus lambii (Araceae) has flowered in the Department of Botany greenhouses.The 35-inch inflorescence - rare due to its large size- is made up of tiny individual flowers on a tall central spadix encircled by a spathe at the bottom. Native to Borneo, it emits a smell of rotting flesh to attract its pollinators, flies and beetles.

Our material was a gift from Fanny Philipps of Silver Spring, Maryland who germinated it from seeds collected in Kalimantan by M.R. Birdsey of Miami. Dr. Birdsey reports that this is the first flowering from the seeds he collected. Photos will appear on the Botany Web site (http://www.nmnh.si.edu/botany/html).

Red Alert Exhibit

A new temporary exhibition, Red Alert, will open on September 18 in the Museum's Constitution Avenue lobby, highlighting the *IUCN Red List of Threatened Plants* and the Department of Botany's plant collections.

Red Alert will focus on the rapid extinction of plants worldwide as chronicled by the *Red List*, a recent publication that details 34,000 threatened or extinct species of vascular plants (see *The Plant Press* No. 3).

Herbarium specimens of extinct and threatened plants from the U.S. National Herbarium will be displayed, as well as a variety of dried and wet collections. Living plants from the department's research greenhouses will also be featured each month. The exhibit will continue for six months.

Visitors

George Proctor, Department of Natural and Environmental Resources (DNER), San Juan, Puerto Rico; m onocotyledons of Puerto Rico and the Virgin Islands (May 1998-June 1999).

Renato Valencia, Pontifica Univ. Católica del Ecuador (QCA); lowland flora of Ecuador (Aug. 2-6).

Eve Emshwiller, Bailey Hortorium, Cornell Univ. (BH); New World *Oxalis* (Aug. 6-7).

Steve Manchester, Univ. of Florida Museum (FLAS); pteridophytes (Aug. 6-7).

Jose Luis Villaseñor, Univ. Nacional Autónoma de México (MEXU); Asteraceae (Aug. 6-7).

Darren Crayn, Smithsonian Tropical Research Institute (SCZ); Bromeliaceae (Aug. 7).

Martin Nickol, Christian-Albrechts-Universität, Kiel, Germany (KIEL); Plumbaginaceae (Aug. 10-12).

Hermilo Quero Rico, Univ. Nacional Autónoma de México (MEXU); palms of Mexico (Aug. 17-31).

John Clark, Quito, Ecuador; Gesneriaceae (Aug. 21-Sept. 30).

Gerry Moore, Duke Univ. (DUKE); Cyperaceae (Aug. 28).

Sadao Sakamoto, Ryukoku Univ., Japan; Amaranthaceae (Sept. 5-10).

Cristina Roleri, Univ. de La Plata (LP); ferns (Oct. 1-31).

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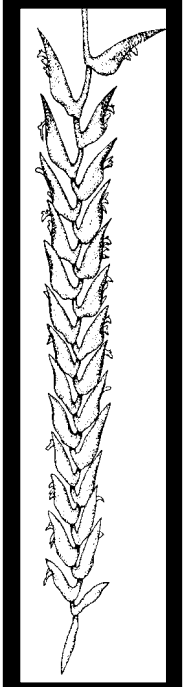
Chair With A View — W. John Kress



Consilience: the "jumping together" of concepts, attitudes, philosophies, and disciplines to formulate exceptional explanations. E. O. Wilson, Professor at the Museum of Comparative Zoology at Harvard, has written a new book introducing his approach to the conceptual integration of knowledge that has received considerable attention not only from the biological community, but from the global intellectual populace as well. When Speaker of the House Gingrich joined us for lunch the other day in the Chairman's Office in Botany, he was quick to point out that Wilson had impressed even him with his manuscript on consilience. Not only has Wilson stimulated discussions among ecologists and evolutionary biologists, his normal population of readers, but he has somehow challenged the mode of operation of politicians, philosophers, economists, and humanists as well.

Over the last few months several of us in the Museum tackled a reading and critique of the ideas Wilson presents in *Consilience-The Unity of Knowledge* published by Alfred A. Knopf, Inc. It is clear that Wilson, who is now more active than ever as Emeritus Professor at Harvard, has expanded his ken beyond ants, the evolution of social behavior, and even the worldwide biodiversity crisis, to tackle a more encompassing approach to the development of knowledge and humanity. His essay attempts to galvanize a new concept of knowledge based on a mega-interdisciplinary approach to understanding the earth and society. We are not simply challenged with the integration of various branches of the biological sciences, such as systematics, ecology, genetics and physiology, nor even the synthesis of the major branches of science including biology, physics, chemistry and mathematics. Wilson advocates in a persuasive way the "jumping together" of science, economics, the arts and religion to provide a new perspective on the evolution of our world, our biotic environment, our social fabric, and ourselves. This is no small challenge.

"Consilience" has generated both positive and some negative acclaim from the intellectual community at large. I suggest that anyone interested in the ideas presented in his book concentrate on the first few chapters where he reviews the development of intellectual thought through the ages and presents his basic ideas on integration. I am still pondering the more speculative interpretations he presents in the later chapters on explanations for the evolution of the mind, human culture, and the arts. As a biologist, I believe he is on the right track. However, Wilson is still at only the early stage of developing this approach to understanding the intrinsic unity of knowledge.

Does consilience translate to monographic research, or investigations of plant molecular systematics, or even the new compactorization of our collections? At the risk of misinterpreting Wilson's higher level concepts of the integration of knowledge, I think it does. We can approach all that we do as natural historians in understanding the diversity of the earth, documenting the biological world, and deciphering the evolutionary process by accepting a broader perspective on how all universal information and knowledge fit together. We can broaden our perspective on the uses and importance of our collections, taxonomic data, and botanical results to understand not only the biological world, but the disciplines of economics, humanities, and the arts. Consilience does not have to be only a reconciliation of the more esoteric concepts of multidisciplines, but in the long run is better served by the jumping together at all levels of integration. We can indeed better understand the nature of our botanical collections by considering their evolutionary history, their physiological basis, their economic value, and their aesthetic appeal. In turn, an understanding of the natural world can lead us to a deeper understanding of our current communities, the history of our societies, and the future of the planet. And perhaps most immediate, consilience challenges us as a natural history museum to bring together for the public a clear explanation of the natural world based on good science linked with a thoughtful understanding of its cultural context and presented in an artistically exhilarating atmosphere.

Postdoctoral Fellow Publishes in Science Magazine

Postdoctoral Fellow **Preston Aldrich** and co-author James Hamrick (University of Georgia, Botany Department) had an article published in the July 3 issue of *Science* on the effects of forest fragmentation on the population biology of the tree *Symphonia globulifera* (Clusiaceae). They applied hyper-variable genetic markers to trace patterns of parentage on a Costa Rican population, showing that most of the numerous seedlings in remnant forest had been produced by adults in adjacent pasture. The patterns of parentage indicated that the number of donors to the gene pool had been reduced by deforestation but also through foraging responses of the animal pollinators (hummingbirds) and seed dispersers (bats). These results indicate that substantial changes in population and community dynamics can result from tropical forest fragmentation, yet remain undetected by one-time surveys of community composition.

Staff Research

Alice Tangerini attended the Guild of Natural Science Illustrators' annual meeting in Ames, Iowa at Iowa State University (ISU) June 20-26. The meeting featured traditional and electronic media, with discussions on combining the two methods. Tangerini attended classes in Abode Photoshop and gave a workshop on botanical illustration as part of the "Technique Boutique", a popular hands-on session of illustrators' specialties.

Illustrations of gingers (Zingiberaceae) by Tangerini were displayed at the Heliconia Society International Conference held in Singapore on July 22-26. The 12 drawings are examples of plates which will appear in John Kress' proposed book, *Genera Zingiberarum*, and represent genera in Zingiberaceae, Marantaceae, Costaceae, Musaceae, and Strelitziaceae. Several of the drawings were made in Hawaii at the Lyon Arboretum. The exhibit was so successful that there were offers to buy the illustrations and offers of future commissions for Tangerini.

Tangerini painted watercolors of *Romulea sulphurea* Bég. and *Rubus odoratus* L. for the Red Alert exhibition (see page 2). *Romulea sulphurea* is an extinct species known only from the 1897 type collection made in Cape Province, South Africa. The type specimen is deposited at the U.S. National Herbarium (see illustration, page 6).

Dan Nicolson was in Europe July 10-25 to study Forster materials of the 2nd Cook Expedition. The first weekend involved a meeting of IAPT officers in Berlin; Nicolson is President of IAPT. The next week was spent with Stefan Dressler at the herbarium of the Senckenberg Research Institute in Frankfurt where almost 90 Forster specimens were found and the provenance sketched. Two specimens are believed to be in original papers used by the Forsters with a distinctive tree-of-life watermark.

The final week was spent at the Paris National Museum of Natural History where Nicolson annotated most of the 220 Forster specimens presented by G. Forster to Buffon on 1778 as a numbered set. Most of the time was spent in the Central Library studying the three-volume J.R. Forster manuscript with more than 300 full descriptions of plant species compiled during the trip. This new Forster information has been incorporated in a book-sized manuscript on the botany of the 2nd Cook Expedition (1772-1775) now in final stages of preparation.

Liz Zimmer and **Warren Wagner** have become research associates of the Pacific Biosystematics Research Centre at the University of Waikato in Hamilton, New Zealand, which has been started by former NMNH postdoc Chrissen Gemmill.

First Marine Expedition to Navassa Island, U.S.A.

On June16, Dr. Michael Smith, a senior scientist with the Center for Marine Conservation (CMC), contacted **Mark** and **Diane Litttler** and **Barrett Brooks** regarding a proposed expedition to Navassa Island, one of America's most isolated and hostile island habitats, located in the precise geographical center of the Caribbean, 200 miles from the continental United States. The deserted rock island is approximately two square miles in area and was claimed by the U.S. in 1857 under a law that asserted ownership over any uninhabited island that contained guano, a valuable source of phosphate fertilizer. The island is administered by the Department of the Interior, which forbids unauthorized visits because of the dangers posed by the harsh vertical cliffs and heavy surf.

Smith initially proposed that the marine team join a land-based group of eight scientists that would be camping near the center of the island. After considerable convincing, Smith eventually was able to put together an exciting ship-based expedition (funded by CMC and the Department of the Interior) through his colleague Dr. Carlos Rodriguez, director of the Museo Nacional de Historia Natural in Santo Domingo, Dominican Republic. Dr. Rodriguez arranged for the charter of the ship R V/Mago de Mar, and the first marine expedition to Navassa Island was launched. Nina Young (a scientist from CMC), Ian Griffith (a remote operated vehicle (ROV) pilot), Llena Sang (a fish specialist from the Dominican Republic) and a crew of four were also aboard.

Overall, the July 23-August 6 cruise was highly successful with a total of 78 dives [SCUBA (to 35 m)] at 13 collection sites, resulting in the collection of numerous algal materials: 318 individual wet specimens, 34 mixed bulk collections and 65 samples for molecular analysis. Additionally, the Littlers and Brooks characterized six deepwater ROV transects (on videotape) and took 1,620 underwater photographs (color transparencies), documenting Navassa Island's invertebrates, fishes and marine plant life.

Spectacularly colorful, mixed communities of sponges, coralline algae, tunicates, bryozoans, hydroids and low-growing iridescent algae were prominent along the undercut terrestrial cliffs that plunge subtidally to 22-29 m in depth all around the island. According to the Littlers, these overhanging ledge and cave dive sites rank among the most impressive of U.S. tropical continental and insular coastal habitats that they have encountered during their more than 30 years of SCUBA surveys.

Travel

Joan Nowicke (6/12-6/26) traveled to Red Bay, Ontario and Johnson, Vermont to participate in the Virginia Native Plant Society annual field trip and to participate in the Joint Annual Field Meeting of the NE Section of the Botanical Society of America (BSA).

Liz Zimmer (6/17-6/23) attended the SMBE and SSB/ASN meetings in Vancouver, Canada, and also the council meeting of SSB with incoming president **Vicki Funk**, and an editorial meeting for the journal *Molecular Phylogenetics and Evolution*. She also attended (8/2-8/5) AIBS meetings in Baltimore with **Hyigyung Kim**.

John Boggan (6/18-6/21) traveled to Morris, New Jersey and New York City to give a lecture on the genus *Christa* (Gesneriaceae) to chapters of the American Gloxinia and Gesneriad Society. He also traveled (6/29-7/5) to Chicago to attend the 42nd Annual Meeting of the American Gloxinia and Gesneriad Society.

Stanwyn Shetler (6/19-6/28) traveled to Albany, New York and Johnson, Vermont to attend the 1998 Joint Botanical Field Meeting of the BSA and assist in leading the field trip.

David Lellinger (6/26-6/27) traveled to Stuarts Draft, Virginia to collect a rare species of *Isoetes* in order to bring it into cultivation for chromosome and isozyme studies. He also traveled (7/31-8/4) to Baltimore to attend the AIBS conference and fern field trips.

Leslie Brothers (6/30-7/5)) traveled to Chicago to attend the 42nd Annual Meeting of the American Gloxinia and Gesneriad Society.

Dan Nicolson (7/9-7/25) traveled to Berlin, Hanover and Frankfurt, Germany and Paris, France to preside at the officer's meeting of the International Association for Plant Taxonomy, search for Forster specimens at the Senckenberg Research Institute, and study three volumes of Forster manuscript plant descriptions.

Barrett Brooks (7/21-8/7) traveled to Guantanamo Bay, Cuba for research and marine plant collecting around Navassa Island (US).

Laurence Skog (7/22-7/28) traveled to St. Louis, Missouri to conduct research at the Missouri Botanical Garden.

Dieter Wasshausen (7/24-8/14) traveled to La Paz, Bolivia to undertake collaborative botanical fieldwork in the Yungas region.

Preston Aldrich (8/1-8/5) traveled to Baltimore to chair the annual meeting of the Association for Tropical Biology.

Robert DeFilipps (8/1-8/10) traveled to Dominica, and on Rosalie Estate planted specimens of *Pandanus pacificus* in a small coconut field recently acquired for diversification into an ornamental pandanetum. Long-established plantings of *Strelitzia nicolai* at his original Mero garden were also visited.

Robert Faden (8/2-8/6) traveled to Baltimore to attend the annual AIBS, BSA, ASPT and AFS meetings and the ASPT council meeting. He also traveled to London (8/16-9/11) to study Commelinaceae at the Royal Botanic Gardens, Kew for the *Flora of Tropical East Africa* and *Flora Zambesiaca*. He will travel (9/25-10/4) to Sydney, Australia to attend the Monocots II conference and deliver a paper.

John Kress (8/2-8/5) traveled to Baltimore to attend the AIBS conference. He will travel (9/24-10/4) to Sydney, Australia to attend the 2nd International Conference on the Comparative Biology of Monocotyledons.

Paul Peterson (8/3-8/6) traveled to Baltimore to attend the AIBS conference. He will also travel (9/25-11/1) with **Rob Soreng** to Sydney and Perth, Australia to attend the Grass Symposium and collect specimens.

Pedro Acevedo (9/5-9/25) traveled to Paris and Munich for study of types, historical and non-circulating collections of Sapindaceae.

Vicki Funk (9/13-9/26) will travel with **Hyigyung Kim** to Brazil to collect Asteraceae tribe Mutisieae.

Departures

Ken Karol, biological technician with **Liz Zimmer**, has left to begin graduate studies with Chuck Delwiche at the University of Maryland.

With this issue, it comes time for the department to bid adieu to **Jane Villa-Lobos**, co-editor of this publication since the inception of the new series, and editor of the internationally recognized *Biological Conservation Newsletter*, which also emanates from the department.

Villa-Lobos arrived in the department in 1980, and soon became instrumental in botanical conservation, particularly endangered and threatened plant species of Mexico, Central and South America. Her work as director of the department's Latin American Plants Program over the years resulted in jointly authoring and editing numerous basic, and soon classic, reference books such as *Plants in Danger: What Do We Know?* (1985); *Centres of Plant Diversity: The Americas, Volume 3* (1997); and providing many significant contributions to major vehicles, such as the new *IUCN Red List of Threatened Plants* (1998) and the *Endangered Species UPDATE*.

Villa-Lobos will soon be migrating to Palm Coast, Florida with her husband, and will continue her strong interest and involvement in plant conservation as the manager of the Americas for *Plant Talk* magazine.

She has also kindly offered to continue editing the *The Plant Press*. Her extraordinary skills in the organization, electronic preparation, and dissemination of information are surpassed only by her radiant personality, and will be missed by us all. Her often-demonstrated willingness to voluntarily do more than her share of work will also be missed. *[by Robert DeFilipps]*

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Art by Alice Tangerini

This illustration depicts the extinct plant, *Romulea sulphurea* Beg., (Iridaceae) which was collected amid rocks in 1897 in Cape Province, South Africa. It has not been seen since. The type is part of the holdings of the U.S. National Herbarium.

This is a life-size drawing of the watercolor featured in the Red Alert exhibition.

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