spring 2001

liana

NEWS FROM THE ORGANIZATION FOR TROPICAL STUDIES

li•a•na \lē-'än-ə, 'an-ə\ n. **1 :** A climbing herbaceous or woody vine especially of tropical rain forests that roots in the ground, **2 :** The bi-annual newsletter published for friends of the Organization for Tropical Studies.

The Organization for Tropical Studies is a nonprofit consortium of 64 universities and research institutions in the U.S., Costa Rica, Perú, Canada, México, South Africa, and Australia. Founded in 1963, OTS is dedicated to providing leadership in education, research and the responsible use of natural resources in the tropics. To this end, OTS offers graduate, undergraduate and professional education, facilitates research, participates in conservation activities, conducts environmental education programs and maintains three biological stations in Costa Rica: La Selva Biological Station in the Atlantic lowland rainforest; Palo Verde Biological Station in the Pacific deciduous dry forest; and Las Cruces Biological Station in the premontane cloud forest near the Panamanian border.

OTS

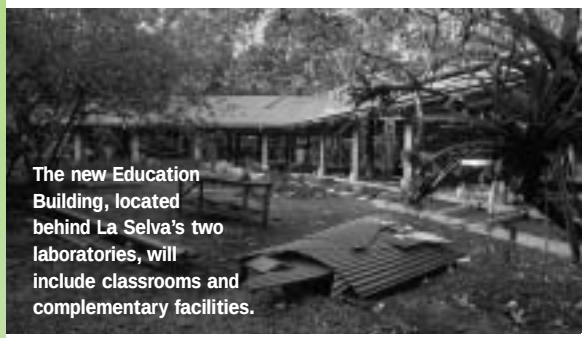
Organization for Tropical Studies

www.ots.duke.edu

Two New Facilities Underway to Meet Academic and Administrative Needs

LA SELVA EDUCATION BUILDING

La Selva Biological Station hosts more than 50 education groups each year, including ten to twelve OTS graduate and undergraduate courses. Education is the largest component of station usage, representing more than 9,800 person-days in 2000 (39% of the total person-days recorded). Currently, students work in the classroom above the "old lab" and share space with researchers in the two labs. According to Academic Director Nora Bynum, "Because of the lack of dedicated space for courses, limited use of the analytical labs, the need for faculty offices, computers and other specialized equipment, we are constructing a building dedicated exclusively to graduate and undergraduate education. This new facility will effectively allow us to serve two concurrent courses at the station, providing enough space for them both to pursue their goals while allowing them to interact for mutual benefit."



The new Education Building, located behind La Selva's two laboratories, will include classrooms and complementary facilities.

PETE CARMICHAEL

The La Selva Education Building, scheduled for completion in May 2001, will include two classrooms outfitted for audiovisual equipment, a temperature-controlled computer room, two dry labs and two wet labs, office space for course faculty, a library and herbarium, storage space for course equipment and a commons area to facilitate student interactions and informal discussions.

LATIN AMERICAN HEADQUARTERS

The OTS Latin American headquarters has been housed in a converted residence for nearly 20 years with numerous expansions to accommodate the Organization's needs. Construction will begin in June on new headquarters, thanks in part to the support of the Richard H. Simons Charitable Trust.

The OTS Simons Center will be an intellectual center where U.S. and Latin American graduate and undergraduate students benefit from contact with the experts concentrated in the capital city of San José, where scientists from throughout the world engage in a dialogue on the natural resource issues facing the tropics, and where politicians, corporate executives, and community leaders in the region participate in an open exchange of ideas. The Center will provide the facility, equipment and locale that will enable OTS to continue to address the needs of education, research and conservation in the tropics. OTS

OTS Chairperson Pedro León "lays the first stone" for the OTS Simons Center on the Universidad de Costa Rica Research Campus.

SILVIA ALVARADO

Offices

North American Office (NAO)
Box 90630
Durham, NC 27708-0630 USA
Phone: (919) 684-5774
Fax: (919) 684-5661
E-mail: nao@duke.edu
www.ots.duke.edu

Costa Rican Office (CRO)
Apartado 676
2050 San Pedro de
Montes de Oca
San José, Costa Rica
Phone : (506) 240-6696
Fax: (506) 240-6783
E-mail: oet@ots.ac.cr
www.ots.ac.cr

La Selva Biological Station
Phone: (506) 766-6565
Fax: (506) 766-6535
E-mail: laselva@sloth.ots.ac.cr

Las Cruces Biological Station
and Wilson Botanical Garden
Apartado 73-8257 San Vito
Coto Brus, Costa Rica
Phone: (506) 773-4004
Fax: (506) 773-3665
E-mail: lcruces@hortus.ots.ac.cr

Palo Verde Biological Station
Phone: (506) 384-6106
Fax: (506) 240-6696
Email: pverde@ots.ac.cr

For a listing of personnel,
visit www.ots.duke.edu

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PETE CARMICHAEL

In this issue of the LIANA, you will read about many new and exciting initiatives. Our Education Program is expanding by offering an innovative graduate course at four Neotropical sites and a pioneering course training early-stage doctoral plant biologists at six research sites worldwide in multi-level perspectives. At the undergraduate level, a Minority Scholarships Committee is being developed to help us reach students from groups traditionally under-represented in the natural sciences and we are exploring a possible expansion of courses to South Africa, thanks to support from the A.W. Mellon Foundation and collaborations with the Universities of the Witwatersrand (Johannesburg) and Cape Town.

The following pages highlight two OTS alumni and give you short updates on other alumni and friends. As I see our alumni grow professionally and take leadership roles in government, academic and research institutions as well as grassroots, regional, national and international environmental organizations, I am reminded of OTS' importance in the world today and the farsighted vision of our founding fathers.

As our programs and activities continue to expand to meet the education, research and conservation needs of the tropics, so does our institutional membership. I am pleased to report that seven new members, including the first institutions from Canada, México and Africa, were approved at the recent meeting of our Assembly of Delegates: University of Texas-Austin, University of California-Santa Cruz, Instituto de Ecología-Xalapa, México, Universidad de San Antonio Abad-Cusco, Perú, University of Alberta, Canada, Iowa State University and University of Cape Town.

Unfortunately, this issue also records other events that have taken us by surprise and sorrow. Four of our close friends died recently: Peyton Fuller, Claude Hope, Bob Ornduff and Agustín López. Each of these individuals had a significant impact on OTS. We are grateful for having the opportunity to share their passions, and we are thankful that they believed so fully in the importance of our work. We will strive to keep their visions alive as we meet the challenges and opportunities before us. OTS

IN REMEMBRANCE

J. Peyton Fuller (1932-2001)

GARY HARTSHORN —
OTS President and CEO

Peyton Fuller, who retired from his position as OTS Vice Chairman for Finance last year, died in January 2001 at the age of 68. Peyton's outstanding academic life and professional accomplishments can take up the better half of a newspaper page. He graduated from Duke University, Summa Cum Laude, was elected to Phi Beta Kappa, was a member of Alpha Kappa Psi and in his senior year he was awarded the "Outstanding Student in Accounting" by the North Carolina CPA Association. After positions with the U.S. Army Audit Agency and General Electric, Peyton returned to Duke University where he started as Assistant University Controller and advanced through numerous positions to Vice President for Planning and Treasurer.

Peyton provided OTS with 5 years of financial genius that will be felt for many years to come. As anyone who ever attended a Board or Assembly meeting with Peyton can tell you, when he spoke everyone in the room listened and nodded their heads in agreement at his always straightforward and succinct analysis. But perhaps it was Peyton's ability to develop and nurture human potential that made him such an extraordinary person. During his tenure at Duke, he recognized the talents of his staff and cultivated them as they grew personally and professionally. Duke benefited with dozens of "Fullerized" managers. And it was this passion for helping people recognize their potential that inspired Peyton to be involved with OTS, an organization that makes a daily business out of cultivating young minds to achieve their dreams.

Claude Hope (1907-2000)

LUIS DIEGO GÓMEZ —
Las Cruces Biological Station and Wilson Botanical Garden Director

Claude Hope, friend and benefactor of Las Cruces/Wilson Garden, beloved by all who knew him and admired by horticulturists worldwide, died in July 2000.

Claude worked in Costa Rica under Ernest Imle in the establishment of plantations of *Cinchona* trees to provide the U.S. Army with emergency supplies of quinine in the event the major source of that drug (the Philippines) fell to Japanese troops during the Second World War. This effort, together with the planting of thousands of rubber trees around the town of Turrialba, were in fact the first international effort to do *ex situ* conservation of germplasm and certainly the first such program in Costa Rica. Because of his affiliation with the Army, Claude was familiarly referred to as "Captain" Hope, el Capitán. After the cinchona project closed down, Claude remained in the country and established a program for the breeding of various ornamental plants. The best known were the many cultivars of *Impatiens* that turned his effort into the world's largest producer and exporter of *Impatiens* seeds, retailed by his brainchild Panamerican Seed Company.

A personal friend for a very long time, he was always at the ready to support the Wilson Garden and its projects not only during the Wilsons' last years but also especially through my tenure as Director since 1986. Claude was a perpetual source of good advice and inspiration. The Las Cruces Biological Station and the

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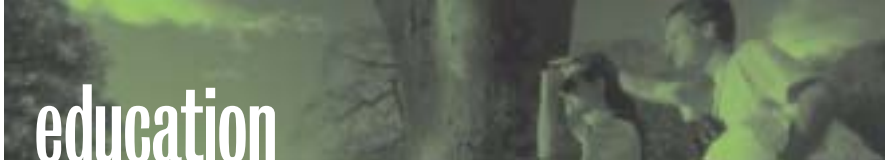

education

looking ahead

OTS Course Application Deadlines

- **ECOLOGÍA DA FLORESTA AMAZONICA 01-12:**
  18 MAY 2001
- **ECOLOGÍA TROPICAL Y CONSERVACIÓN 02-2:**
  15 JUNE 2001
- **UNDERGRADUATE SEMESTER ABROAD PROGRAM SPRING 02:**
  5 OCTOBER 2001

Advisory Committee in Development for Minority Scholarships

OTS is establishing a National Scholarship Advisory Committee that will provide guidance to the undergraduate scholarship program for African American, Native American and Hispanic students. This program seeks to increase the number of minority students in the sciences, particularly in ecology and tropical biology. Representatives from key minority-serving institutions, including Historically Black Colleges and Universities, Tribal Colleges and Universities and Hispanic-Serving Institutions, have been invited to participate. Professors from the following universities have agreed to serve on the committee: Florida International University, Haskel Indian Nations University, Howard University, Morehouse College, North Carolina A&T University, University of Puerto Rico, Spelman College and Tuskegee University. Additional representatives are projected to join the committee, including professors from Costa Rican universities. The first meeting of the committee will be in July 2001.

New Course at Four Premier Neotropical Research Sites

A highly select group of 14 post-doctoral scholars, junior faculty and advanced graduate students have been invited to participate in the first Advanced Comparative Neotropical Ecology course this fall. Coordinated by Gordon Orians (U. Washington emeritus) and offered in collaboration with the Smithsonian Tropical Research Institute (STRI), the course will provide an intensive comparative research experience and will take place at La Selva Biological Station in Costa Rica, Barro Colorado Island Research Station in Panamá, Cocha Cashu Biological Station in Perú and Biological Dynamics of Forest Fragments Project near Manaus, Brazil.

OTS

graduate education

OTS Alumnus Named Leader for Graduate Education

Ben Bergmann, alumnus of Tropical Agroecology 85-04, joined OTS in November as Graduate Program Officer. Previously, Ben served as Director of Graduate Studies and Research Associate Professor in the Department of Forestry at North Carolina State University. In addition, he taught numerous courses, including a course in Agroforestry that included a tropical field component. Ben's recent research has focused on bioremediation systems using rapidly growing hardwood trees; his other interests include temperate and tropical agroforestry systems. Ben did his MS work at University of Minnesota-St. Paul in Plant Physiology and received his Ph.D. in Forestry from North Carolina State University in 1992.

TROPICAL BIOLOGY: AN ECOLOGICAL APPROACH 00-3
Deedra McClearn
Course Coordinator

Co-coordinators Laura Brown (Cornell U., OTS 92-3) and Derek Johnson (U. Miami, OTS 97-1) and I directed 22 students in this course — the first tropical field experience for most. The English language course included students in the early stages of graduate study from Brazil, Mexico, Perú, Argentina, Spain, Finland and the U.S.

Not only did students benefit from long-term resource people, such as Mo Donnelly (Florida International U.) and Bob Timm (U. Kansas), but also from researchers who were conducting research at the sites visited. For example, at Cerro de la Muerte students had the opportunity to see techniques in large mammal research when a melanistic little spotted cat (*Felis tigrina*) was captured and observed. Other unique opportunities included a watershed ecology boat tour of the Puerto Viejo and Sarapiquí Rivers with expert commentary from Beth Anderson (U. Georgia).

In this, the 37th year of Tropical Biology, we were reminded of the impact this course has on students. In the words of one, "This is one of the best academic experiences that I have had — certainly the best graduate experience" and from another, "It is hard to convey how much I have enjoyed and learned from this course. It reminded me of the wonder I felt for the natural world as a child that first led me into science."

AGROECOLOGÍA TROPICAL 00-7
Mickie Swisher
Course Coordinator

This course focused on the ecology of agricultural ecosystems — understanding how these systems work and how they interact with natural ecosystems. The first three weeks of the course involved group projects in which students learned field research methods useful for understanding agroecosystems. The first module examined the relationships between biological and physical factors at the level of the individual field.

Dan Janzen leads the course on the Santa Elena Peninsula, geologically the oldest piece of Costa Rica with rare serpentine soils and species of plants that are not found elsewhere.

DEEDRA MCCLEARN

graduate education

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In the second module, we expanded our scope of inquiry to look at impacts of agroecosystems on components of natural systems — the communities of aquatic invertebrates that occupy streams, for example. The community was the focus of the third module where we conducted a short research project designed to learn why agricultural communities develop as they do. After a short review of statistics and the application of the scientific method, students conducted independent research projects. The 15 participants, including graduate students and professionals in agronomy, ecology and related fields, were influenced greatly by the interaction with peers and professionals in their field, while they worked together to analyze agricultural systems from an ecological perspective.

TROPICAL BIODIVERSITY 00-10

Ethel Villalobos
Course Coordinator

With deforestation rampant in many tropical countries, it is critical that students get exposure to the central questions in the biodiversity debate. The three-week *Biodiversity* course focused on four major issues in biodiversity. First, what is biodiversity? How is it defined and quantified? Second, what are the origins of biodiversity? What are the prevailing hypotheses explaining high tropical diversity? Third, what are the threats to biodiversity? What are the main threats in Costa Rica and how do problems here relate to global patterns? Fourth, what can be done? How can ecosystems be managed to preserve and restore biodiversity?

This holistic approach, instead of an encyclopedic listing of species, allowed students to experience the diversity of the flora and fauna of Costa Rica and to integrate facts into a conceptual framework. Students participated in a variety of field activities that included projects with many different taxa (insects, birds, frogs and plants) and incorporated basic science and applied perspectives. One of the more interesting field projects was a survey of aquatic insects at Río Java in the Las Cruces Reserve, a project that illustrated the mechanics of calculating alpha and beta diversity indices and the way in which aquatic insects are used as bioindicators of water quality.

TROPICAL PLANT SYSTEMATICS 00-9

Robbin Moran and Brad Boyle
Course Coordinators

Most courses in plant systematics emphasize either identification of vascular plant families or phylogenetic theory and practice. This course did both. Also, it did so at five locations in Costa Rica that enabled students to see the major habitats of the Central American region. At each site the students heard lectures and studied plants in the field with professional systematists from Costa Rica and the United States. This presented an unparalleled opportunity for students to learn about the systematics of tropical plants.

During the six-week course, the students were taught how to identify families and genera of seed plants, lycopods and ferns, with emphasis on the use of vegetative characteristics. Rapid vegetation transects at each site reinforced identification skills and provided a quantitative understanding of the differences and similarities among tropical forest types. The students learned how to collect and label specimens for the herbarium and how to conduct herbarium research during a two-day stay in San José.

Theoretical aspects covered by the course included cladistic analysis, biogeography, pollination ecology, biogeography and nomenclature. The practical and theoretical aspects of the course were brought together in the main course project: a taxonomic monograph of a small group of species for which the students wrote keys and descriptions, cited specimens and performed a cladistic analysis. OTS

3M Initiative

Plant Ecology Pilot Project to Train New Generation of Scientists

Premier-quality research in plant ecology increasingly involves comparative approaches among sites and interdisciplinary collaborations among researchers. Traditionally, however, young biologists are recruited and trained by a single mentor at a single site. Enhancing Comparative Research Opportunities for Young Scientists in Tropical and Subtropical Plant Ecology, funded by the Andrew W. Mellon Foundation, will augment single-site training, through a suite of modular programs that expose the most exceptional young plant biologists to multi-site and multi-level perspectives early in their scientific careers.

This novel, two-year pilot project will take place at six research sites worldwide and is for early-stage doctoral students. It is called the "3M Initiative" because it is designed to identify and train outstanding young plant ecologists in multi-site, multi-investigator, multi-disciplinary research. Eminent scientists and institutions who have been recognized by the Conservation and Environment Program of the Andrew W. Mellon Foundation for research and training achievements in tropical and subtropical plant ecology are collaborating at the six research sites.

Training through the 3M Initiative will disseminate the work of the Mellon-funded scientists taking place throughout the world to a new generation of scientists at the cutting edge of plant ecology. Each year will include three training modules, led by Mellon-funded senior scientists with research at module sites.

3M Initiative Coordinating Committee and their module sites:

- Peter Vitousek (Stanford U.), Hawai'i
- Robin Chazdon (U. Connecticut), La Selva Biological Station, Costa Rica
- Heraldo Vasconcelos (INPA), The Biological Dynamics of Forest Fragments Project, Brazil
- Kevin Rogers (U. Witwatersrand), Kruger National Park, South Africa
- John Terborgh (Duke U.), Manu National Park, Perú
- Allen Herre (STRI), Barro Colorado Island and Nature Monument, Panamá

undergraduate education

ETHNOBIOLOGY — SUMMER 00

Luis Diego Gómez (Las Cruces Biological Station/Wilson Botanical Garden Director) and Todd Capson (Smithsonian Tropical Research Institute) led the first-ever Ethnobiology undergraduate course. Ten students from seven universities from the U.S. participated, with six receiving scholarships from OTS, thanks to a grant from the National Science Foundation.

This four-week course was a scientific study of the medicinal, ceremonial and subsistence use of plants and animals by human communities in Costa Rica. Throughout the course there was emphasis on the preservation of natural and cultural resources. Students attended lectures on basic linguistics of Costa Rican indigenous languages and studied articulatory linguistics in order to collect vocabularies for the study of folk taxonomies. Because mythology and religious beliefs underlie attitudes toward Nature in all cultures, students were exposed to a series of lectures on mythology of Amerindian groups and syncretisms between those and European religious influences on native peoples. As a preamble to the study of mind altering substances used by indigenous groups, lectures on psychology were programmed into the course syllabus.

During the course several areas were visited to expose the students to both biological and ethnological diversity. An underlying topic was the concept of sustainability and its practical implications for indigenous communities.

TROPICAL ECOLOGY — SUMMER 00

The second offering of this four-week summer course for undergraduates included lectures, field trips, orientation walks, faculty-led projects and independent research projects. At Las Cruces the garden walk provided the students with an overview of plant diversity, and a plant lab exercise introduced them to basic botanical concepts and pollination strategies. Discussions included talks on forest fragmentation and agricultural land use; one faculty-led project focused on the relationship between habitat complexity and species diversity. At Palo Verde the course emphasized conservation, management and forest regeneration. The class project dealt with natural regeneration in dry forests, whereas the group project focused on remnant trees serving as a nucleus for natural regeneration in dry forest habitats. At La Selva students worked on a variety of independent projects, such as nest predation, aposematic coloration in snakes, predation in butterflies, the effect of flower mites on host plants, activity patterns of leaf-cutter ants and leaf drip-tip function.

Students interviewed indigenous people about the use of plants and animals for medicinal, ceremonial and subsistence use.

Students measure bird beaks as part of an independent project.

UNDERGRADUATE SEMESTER ABROAD — FALL 00

Karin Gastreich
Director Undergraduate Programs

Twenty-five students from 17 U.S. universities spent the fall semester in Costa Rica in an intense immersion in tropical biology. The course began with a language institute, during which students worked in small groups studying Spanish and Costa Rican history, literature and environmental issues. Spanish classes were complemented by introductory lectures from the other courses in the program: Tropical Biology, Environmental Science and Policy and Field Research.

As the course traveled the country, students benefited from lectures and field projects from a number of visiting resource people. In addition, students were introduced to tropical plant taxonomy, learned first-hand about the rice, banana, forestry and ecotourism industries, and learned how to conduct research through group and independent projects. The students' independent projects included topics such as advertising and rewards in insect-pollinated flowers, effects of neighboring plants on herbivory in Melastomataceae, allocation to sexual vs. asexual reproduction in *Piper* plants, soil nutrient cycles in secondary vs. primary forest and butterfly diversity in forest fragments.

MINORITY SCHOLARSHIPS BENEFIT UNDERGRADUATE STUDENTS

Joel Abraham from Howard University was one of eleven students who received funding from OTS' Minority Scholarship Program, funded by the National Science Foundation, to participate in the summer undergraduate programs. Joel participated in the Tropical Ecology course and describes it as "the best time of my life." He explained that this course allowed him to go to Costa Rica with an established organization and framework that enabled him to become totally immersed in his first field course. According to Joel, "In one summer I learned and retained more than in an entire semester of school." One of the highlights of the course was to learn about ecological theories through lectures and then experience them first-hand by exploring

Joel Abraham and ten other undergraduate students received scholarships to study in the tropics.

the forest and conducting independent research projects. "The month in Costa Rica settled my intention of pursuing a Ph.D. in Ecology. I fell in love with Costa Rica, the rainforest, the capuchin monkey and everything else." Joel will start a program in the fall though it is not clear yet where. He hopes it will be at an OTS member school so he can go back to Costa Rica as a participant in a graduate course. OTS

Updates
on OTS Alumni and Friends

Peter Raven (Former OTS President), Director of the Missouri Botanical Garden and Englemann Professor of Botany at Washington University, was honored by President Clinton when he was named to receive the National Medal of Science, the nation's highest scientific honor.

Alan Thornhill (93-1 Tropical Biology Alumnus) recently accepted the position of Director of Learning and Communications for The Conservation Science Division of the Nature Conservancy.

Joan Frazee (90-1 Tropical Biology Alumna) is President of the Washington Native Plant Society.

Richard Primack (74-1 Tropical Biology Alumnus) authored two conservation biology textbooks, Essentials of Conservation Biology and A Primer of Conservation Biology, with translations into six other languages.

Reid Harris (86-1 Tropical Biology Alumnus), professor of biology at James Madison University, was awarded the Madison Scholar prize for his amphibian population biology research activities in 2000.

Clay Corbin (99 Tropical Biology Association course Alumnus) received the John Cody Fellowship at Ohio University for 1999-2000.

Barbara Hoshizaki (67-4 Pteridology Alumna) is President of the American Fern Society and authored The Fern Grower's Manual.

Boyce Drummond (68-1 Tropical Biology Alumnus) recently became the Director of the Colorado Natural Heritage Program, a program with more than 40 professionals engaged in assessing the status of threatened and endangered species and biodiversity hotspots in Colorado.

Dick Smythe (94-8 Decision-Makers Alumnus) retired from the U.S. Forest Service after more than 37 years in positions in Mississippi, Minnesota and most recently in D.C. as the Director of Wildlife, Fish, Water and Atmospheric Science Research.

James Adams (85-1 Tropical Biology Alumnus) with Dalton State College, conducts moth surveys for the U.S. Forest Service and National Park Service in the Great Smoky Mountains National Park and built a website of lepidoptera of Georgia at <<www.daltonstate.edu/galeps>>.

William (Skip) Stiles (88-8 Decision-Makers Alumnus) left Capitol Hill after 22 years, most recently as legislative director of the House Science Committee, and is currently consulting with the Rockefeller and Pew Foundations on biotechnology. He is the Executive Director of the non-profit publishers of Diversity, dedicated to genetic resources conservation and use.

Juan Martín Cruz Campos (99-7 Agroecología Alumnus) is a research professor at the Instituto Tecnológico Agropecuario-México, where he teaches Sustainable Agriculture and Plant Biotechnology.

Sarah Johnson (Fall 99 Undergraduate Semester Abroad Program Alumna) is finishing her undergraduate work at Washington University before beginning a Truman Scholar summer internship in DC and studying philosophy, politics and economics at Oxford University as a Rhodes Scholar.

Leslie Brinson (99 Woodrow Wilson Environmental Science Institute Alumna) was named North Carolina Biology Teacher of the Year last year by the National Association of Biology Teachers.

Thomas Emmel (66-3 Tropical Biology Alumnus) will be the first director of the University of Florida's McGuire Center for Lepidoptera, the world's largest research and education center dedicated to the study of butterflies and moths.

Richard Wassersug (70-1Tropical Biology Alumnus) was awarded the 2000 Ig Nobel Prize for Biology by the Annals of Improbable Research for his first-hand report, "On the Comparative Palatability of Some Dry-Season Tadpoles from Costa Rica." This report was published in the American Midland Naturalist in 1971. In his acceptance speech Wassersug said, "I couldn't have won this award without the immense help of all my fellow graduate students in the jungle biology course that I took in Costa Rica 30 years ago. My compatriots, who willingly chewed up tadpoles for the reward of a few beers, are heroes to me." Wassersug is a professor in the Department of Neurobiology and Anatomy at Dalhousie University, a key advisor to the Canadian Space Agency and NASA and serves as a columnist for the Discovery Channel.

Please send noteworthy information to nao@duke.edu.

Where are they now?

alumni features

Carol Baird Works to Conserve California

While pursing her Ph.D. at the University of California-Berkeley, Carol Baird took part in OTS' 80-3 Tropical Biology course at the suggestion of her major professor, Rob Colwell. According to Carol, it was this experience that "turned her life around."

Carol recalls that the program was "intense and glorious." Working on less than 4 hours of sleep each night, she and her peers were fully immersed in tropical biology and fieldwork. The fieldwork was especially exciting for Carol and thanks to an OTS research fellowship, she spent four seasons after the course at La Selva doing a community ecology nectar-feeding project, work that later became her dissertation. Carol recalls, "I learned more about biology and ecology from fellow researchers, the grad students, the post-docs, the long-time researchers, than I ever could have imagined."

After her course and research, Carol returned to Berkeley where she was a full-time lecturer and then the Director of Education at the UC Botanical Garden. Five years ago Carol founded the California Institute for Biodiversity, a non-profit organization dedicated to educating students and the general public about California's rich biodiversity and the importance of conservation. The institute developed Cal Alive! educational software to educate young people in California about their environment. The curriculum consists of three modules: habitats, experiments (based on current scientific research where students work through hypothesis development, testing and results) and tutorials. Cal Alive! is in 4th through 8th grades in the public and private schools of California and many teachers are using it as an interdisciplinary tool. Cal Alive! is in the works for K-3, middle school and high school. Carol is Executive Director of the Institute and also continues to reach college students with the same message of biodiversity conservation through her California Alive course at UC Berkeley.

Although Carol says she fell in love with Costa Rica during her course in 1980, it is her commitment to her home state of California where she is making the greatest impact today. "I am putting my energies into California — it is one of the top 10 environmental hotspots of the world, given the number of endangered and threatened species, and it is my home." According to Carol, "I believe in OTS. It was the OTS course experience that helped develop my passion for translating science into education for the general public."

Rodolfo Dirzo, First Mexican to Take OTS-02 Course, Trains Young Biologists

Rodolfo Dirzo's career was determined in 1975, when he became

the first Mexican student to take the *Ecología de Poblaciones* course, the course that later became *Ecología Tropical y Conservación*. According to Dirzo, "the OTS course encouraged me to become a tropical ecologist."

The course not only greatly expanded Rodolfo's knowledge of ecology and skills in scientific research, but also exposed him to many great professors, renowned scientists and peers from other parts of Latin America. Rodolfo believes that the OTS course showed him the value of teaching in Latin America. According to

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him, "formal education, like OTS courses, and education targeted to the general public are the most efficient ways to address biological and biodiversity conservation problems in Latin America. It is a long term investment whose rewards can be incredibly valuable."

After the course, Rodolfo returned to México and worked on tropical ecology research projects with José Sarukhán at the National University of México (UNAM). He then studied at Wales University in Great Britain, where he obtained his doctorate in ecology, specializing in the interactions between animals and plants.

Rodolfo is currently the director of the Ecology Graduate Program at UNAM, as well as a researcher at the Ecology Institute. He has been a resource person for 13 offerings of *Ecología Tropical* and several *Tropical Biology* and *Ecosistemas Amazónicos* courses. Rodolfo used his experiences with OTS, both as a student and as a resource person, to develop courses for the ecology doctorate students in UNAM. Today he is one of the most outstanding conservation biologists, leading many graduate students at UNAM to follow careers in tropical biology and to study the southern tropical and subtropical regions of México. In addition, he inspires students in the OTS courses in the same way he was inspired by the professionals involved in his course 25 years ago. OTS

Alumni...We Need You!

OTS is conducting a comprehensive review of its Graduate Education Program, 1963-2001. Please help us evaluate our program and chart our course for the future by completing the alumni survey found on the OTS website: **<<www.ots.duke.edu>>**

professional education

Training Program Reaches National Park Managers

Although many Latin American countries have established protected wildlands, protection continues to be hindered by weak institutional and regulatory structures, colonization pressures, poor management programs, poverty in surrounding communities, shrinking budgets and limited knowledge of existing resources. Many Latin American wildlands, estimated to harbor as much as 70% of the species found on Earth, are not being adequately protected.

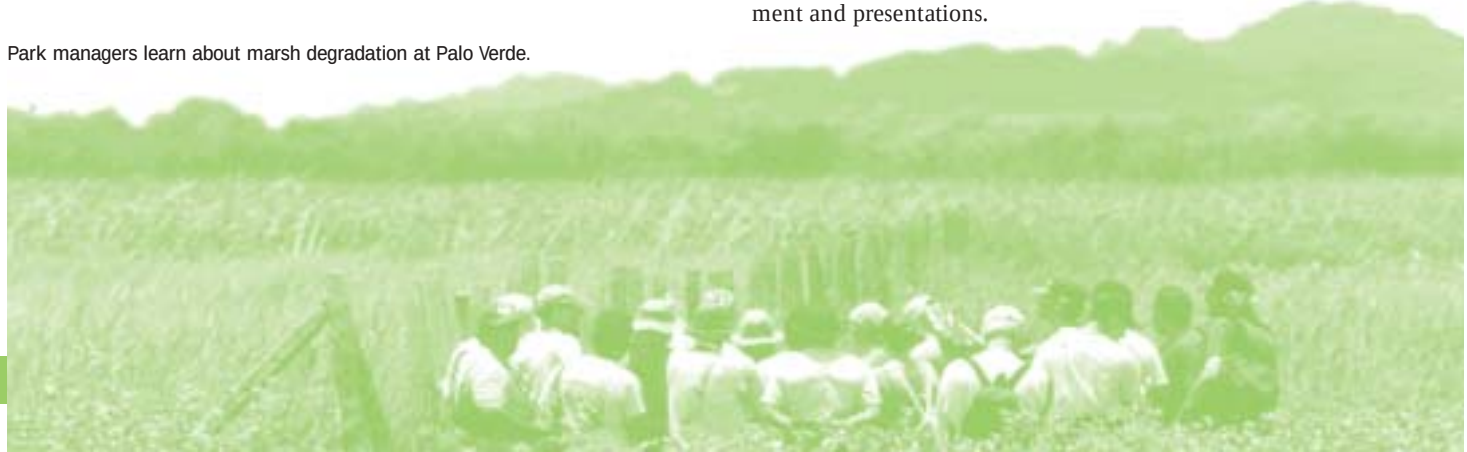
In conjunction with the U.S. Fish & Wildlife Service, OTS designed the course Wildlands Management in the Tropics to significantly improve the capacity of managers to better administer and conserve ecologically important wildlands in the region. The second offering of the course took place in September and included 25 wildland managers from nine Latin American countries. The course included lectures, group discussions and intensive, hands-on, field-oriented projects. A variety of topics were addressed, including wildlands conservation systems, biodiversity conservation, development and conservation, participatory decision making and environmental interpretation. The course trained Latin American managers in strategic and practical approaches to wildlands management, with a vision toward promoting the sustainable use and conservation of wildlife, natural resources and important habitats in the region. Particular efforts were made to ensure that the topics were examined within Latin America's socioeconomic, political and environmental context, while at the same time respecting each participant country's idiosyncrasies.

U.S. Science Teachers Learn by Doing

The *2000 Environmental Science Institute*, funded by the National Science Foundation and administered by The Woodrow Wilson National Fellowship Foundation Leadership Program (WWNFF) for Teachers, was conducted for the second year in a row in conjunction with OTS. The course focused on global environmental change and its impact on the tropics and inquiry-based approaches to field projects in environmental science. Fifty-two middle and high school science teachers, representing all regions of the U.S., and coordinators Tom Langen, Philippe Hensel, Evan Notman, James Cole (WWNFF), Carol Zucca (WWNFF), David Silverberg (WWNFF) and John-Fred Crane (WWNFF) participated. Activities at the OTS biological stations included site orientations and walks, discussions, group projects, web page development and presentations.

Field projects were developed to familiarize participants with some of the issues related to global environmental change that can be addressed at a site and to learn some techniques that may be applied to investigate them. For example, at Las Cruces participants examined water quality in the Río Java from its headwaters to the town of San Vito, while in La Selva they measured abiotic and biotic indicators of edge effects. Participants produced four final products: (1) a personal web page to disseminate what they learned about inquiry-based teaching and global environmental change to their colleagues, (2) an abstract of each of the two large group projects, (3) an edited report of each of the eight small-group projects and (4) a group diary. Information on the program participants, itineraries and projects can be found at the course web page: <<www.woodrow.org/teachers/esi/2000/cr2000/cr2000main.htm>>. OTS

Park managers learn about marsh degradation at Palo Verde.



research

research

AT OTS BIOLOGICAL STATIONS

For a listing of current research taking place at the OTS Biological Stations in Costa Rica, visit www.ots.duke.edu. The complete list of research is also included in the Organization's Annual Report.

fellowships

OTS

OTS fellowships are open to U.S. and Latin American graduate students enrolled in degree programs at OTS member institutions and to OTS course alumni. Proposals are reviewed twice a year. Deadlines for receipt of English language proposals are January 30 and September 15 and for receipt of Spanish language proposals are March 15 and September 30. Awards are intended to assist thesis research in tropical biology and related fields and are available in amounts up to $3,000. Pilot awards for exploratory research are available in amounts up to $1,000. Proposals for research at OTS biological stations are encouraged and will receive priority. However, outstanding proposals for research at other locations will be considered. For more information, visit www.ots.duke.edu or call (919) 684-5774.

OTHER

Ford Foundation launched an International Fellowships Program (IFP) that will provide $280 million over the next 10 years to support post-baccalaureate study for Fellows from Africa, the Middle East, Asia, Latin America and Russia. The IFP will award 350 new graduate fellowships annually that will support up to three years of master's or doctoral study at universities anywhere in the world. For more information visit <<www.fordfound.org/>>.

library

Please help us keep our library complete, send copies of publications of work done at the OTS stations to our Costa Rican office, OET, Apdo. 676-2050 San Pedro, Costa Rica or e-mail beatriz@ots.ac.cr.

Secondary Forest Regeneration Projects Present Results

During the last 50 years much of the world's lowland tropics has been converted from nearly continuous forest to a fragmented landscape of degraded forest patches, agricultural land and growing urban centers. The Sarapiquí region of La Selva Biological Station has followed a similar trend toward deforestation and conversion of forest to cattle pasture and other forms of agriculture. In some areas secondary forests are now regenerating in former cattle pastures that were abandoned during the 1970s and 1980s. Project BOSQUES began in 1997 to establish baseline studies of secondary forest succession and to develop criteria for long-term monitoring of woody regeneration in tropical second-growth forests in and around La Selva Biological Station. The project is funded by the Andrew W. Mellon Foundation and has three principal investigators: Robin Chazdon (U. Connecticut), Deborah Lawrence (U. Virginia), and Braulio Vílchez (Instituto Tecnológico de Costa Rica). Project manager Alvaro Redondo Brenes, Forestry Engineer, conducts the intensive monitoring research in four 1-ha plots and supervises three full-time, local field assistants (Marcos Molina, Jeanette Paniagua and Juan Romero). The forests under study are now 16 to 29 years old. The project is in its second phase of funding and research has expanded to include studies of ecosystem processes, forest structure, tree reproductive biology, environmental variation and detailed demographic studies of 10 focal tree species. The project hopes to increase our knowledge of the potential for secondary forest regeneration, the consequences for ecosystem processes and the use of secondary forests for forestry and conservation.

SILVIA ALVARADO

Project Manager Alvaro Redondo measures the diameter of trees as part of the Bosques Project.

Results of two studies integral to the long-term BOSQUES project were presented at the Central American Forestry Congress, held in November in Nicaragua. Co-P.I. Braulio Vílchez Alvarado presented his research on "Reproductive phenology of forestry species in the tropical secondary forest," an analysis of reproductive behavior of five forestry species: *Pentaclethra macroloba* (Mimosaceae), *Xylopia sericophylla* (Annonaceae), *Goethalsia meiantha* (Tiliaceae), *Simarouba amara* (Simaroubaceae) and *Vochysia ferruginea* (Vochysiaceae). Between April 1998 and November 1999, a monthly record of the amount of flowers and fruits produced by these species was kept. Although all species flowered and bore fruits during the research period, all individual trees did not flower or bear fruits. Only 9.8% of each species flowered and only 10.8% bore fruit, demonstrating that the vast majority of these trees do not reproduce. There was a correlation between precipitation and the production of flowers and fruits. Rainfall favored a rise in the quantity of flowers of *Pentaclethra* and *Xylopia*, while *Goethalsia* produced the most fruits during the rainiest months. *Pentaclethra* produced fruits regularly throughout the year and its reproduction was the most constant and independent from weather. The conclusions help define how these species reproduce, adding to our knowledge of reforestation and natural regeneration processes.

Forestry Engineer Alvaro Redondo Brenes, Project Manager, gave the second presentation entitled, "The secondary forests in the Huetár norte region in Costa Rica, Sarapiquí, Heredia: A natural reforestation option." This study analyzed the potential of secondary forests to regenerate in abandoned pasture areas. The secondary forests that were evaluated showed vast floristic diversity, with an average of 1200 individuals/ha and up to 123 species/ha for individuals above 5 cm in diameter. The average diameter of the trees studied increased between 1 and 3 mm per

continued on page 10

year. Those trees with diameters larger than 5 cm grew between 2.5 and 5.4 mm per year. The younger forests showed the highest increase in growth, doubling the tree growth in the oldest forests. The diameter of commercial species, like *Dendropanax arboreus* (Araliaceae), *Protium* species (Burseraceae), *Laetia procera* (Flacourtiaceae), *Minquartia guianensis* (Olacaceae) and *Virola koschnyi* (Myristicaceae), increased between 3.5 and 9.1 mm per year. In addition, the basal area (i.e., the area occupied by the trees) ranged between 19.62 in the youngest stand to 31.56 m^2 per hectare in the oldest stand; exceeding some of the known data for primary forests in the region. These results highlight the importance of secondary forests in terms of ecological value and forestry potential. It is especially important information for Costa Rica, given that secondary forests cover approximately twice as much area as primary forests (400,000 ha vs. 200,000 ha). OTS

Considering Research in the Tropics?

SERVICES MAKE OTS BIOLOGICAL STATIONS WORLD CLASS CENTERS FOR RESEARCH

The OTS Biological Stations in Costa Rica are some of the premier research sites in the New World tropics, as evidenced by the more than 400 researchers who conducted work there last year. The stations continue to be popular with researchers not only because of the unique and diverse biodiversity of each station, but because of the excellent facilities and vital research support. The stations have resources such as laboratory equipment, computers, shade houses, GIS services and libraries. Perhaps the most important OTS contribution to research is the personnel devoted to research support. The station staff helps with data analysis, GIS, natural history and a myriad of other researcher needs. The OTS staff in the San José office provides help with reservations and logistics (at OTS sites as well as for non-OTS sites in Costa Rica), processing permits and export papers, procuring equipment and identifying potential collaborators. OTS also offers research fellowships (see page 9). For more details on research at OTS stations, visit <<www.ots.duke.edu/en/research>>. OTS

biological station

las cruces

New Bird Species Reported for Costa Rica

On November 30, 2000, Jim Zook discovered Crested Oropendolas (*Psarocolius decumanus*) in southwestern Costa Rica. During the following two weeks, he had a total of five sightings of both small groups of oropendolas and single birds. Several sightings were within a few kilometers of Las Cruces Biological Station and the others about some 20 km away. This species inhabits forest borders, second growth, and clearings with scattered trees; the range was previously thought to only include western Panamá south to Bolivia.

Las Cruces Forest Gets Paid for Sequestering Carbon

Las Cruces recently obtained admission to the Carbon Sequestration Initiative managed by the Costa Rican Ministry for the Environment (MINAE). One hundred hectares of the forest reserve will be "selling" oxygen to the industrialized governments that set up the Global Environment Facility (GEF) funding, while capturing carbon that remains on site. In exchange for the ecosystem service, Las Cruces will receive enough money for the next five years to cover the wages of the reforestation workers in Melissa's Meadow (now more appropriately referred to as Melissa's Tacotal, the Spanish word for high brush growth, with many treelets already growing in it). While LC is an active member in this program of forest incentives, MINAE will provide periodic supervision of the site to guarantee that the forest reserve's management plan is adhered to.

Las Cruces now has a Geographic Information System, a microcomputer workstation loaded with ArcView and ArcInfo, for researcher and student use.

Volunteer Opportunity

WEED AND SEED — AUGUST 15 - 31, 2001

We are currently accepting volunteers to weed and fertilize the saplings, sow seeds, measure treelet grown in Melissa's Meadow; repot and weed plants in the greenhouse and label plants on the spectacular grounds at the Las Cruces Biological Station and Wilson Botanical Garden. August is a beautiful time of year to experience the premontane rainforest and to reap the benefits of volunteering. The special rate for volunteers is $30 per day and includes lodging and three meals a day (this represents a 58% savings from the normal rates). Come and join the fun and support the Las Cruces Biological Station and Wilson Botanical Garden.

To make your reservation visit: *http://www.ots.duke.edu/en/get-involved/volunteers.shtml* and click on the Reservations button below and enter "Weed and Seed" under the Promotional Code, or call Helen at (919) 668-1686. OTS

CORRECTION

The species Cariniana micrantha was misspelled in page 10 of the fall 2000 issue of Liana. It was written as Cariantha micrantha, which is not correct.

Satellite Image Updates Land Use Map

Last year a satellite from a private company called Space Imaging, Inc., took a photo of Costa Rica with a resolution of 1 meter, which allows researchers to identify and differentiate objects located on the ground (like tree crowns, cars and buildings).

Osvaldo Corella (undergraduate forestry student at Instituto Tecnológico de Costa Rica), funded by an OTS fellowship, developed his bachelor's thesis based on the new satellite image. His work included the creation of historic maps using old aerial photos from 1966, 1971, 1976, 1983 and 1988. In addition, he mapped La Selva according to land-use category. He found that nearly 47% of La Selva is old-growth forests, 21% is secondary growth forests and 9% is selectively logged forests.

This satellite image, the first of its kind taken of Costa Rica, was also used by Osvaldo to update the Geographic Information System's (GIS) La Selva land-use map. The GIS lab at La Selva was established in 1989 and provides not only equipment for performing spatial analyses, but also databases of geographical information about La Selva and the surrounding region. These GIS databases, or coverages, can be used in conjunction with data that investigators collect either in the field or remotely (via aerial photographs or satellite images) to carry out a wide range of projects with spatial or geographic components.

Several projects have used GIS to analyze home ranges of animals. One project examined movements of troops of spider monkeys, while another plotted the home ranges of collared peccary herds. Plant ecologists have used GIS to examine the distribution of palms at La Selva. In addition, GIS helps the organization keep track of long-term plots allocated to specific projects, as well as produce trail maps for visitors and visual material for environmental education activities.

The La Selva GIS consists of computer equipment and a grid of marker posts in the 1,515 hectare reserve. The posts are located at the intersections of 50 x 100 meter grid system, the coordinates of which appear on all La Selva maps. Researchers can reference field measurements to these posts and then input the data into the GIS in the lab.

Conservation Program Reaches 500 Children near La Selva

La Selva Biological Station's environmental education program reached 500 students in the communities near La Selva this year. The Program, initiated in 1999, includes fourth, fifth and sixth grade students in ten county schools.

The 4th grade curriculum focuses on natural history, 5th grade on ecological processes, and 6th grade on interactions between humans and the environment. In addition, students visit La Selva twice during the school year to review concepts learned in the classroom. They experience first-hand the four main topics — birds, trees, energy in the ecosystem and pollination, dispersion and food chains in the tropical wet forest.

The students also develop conservation projects in their own communities. For example, students, teachers and parents of La Trinidad School planted trees and cleaned a portion of land to make a school park. Students from the OTS Undergraduate Semester Abroad Program helped in this project by cutting grass, removing garbage and planting native trees. Cristo Rey School planted trees and other plants to attract birds and picked up garbage in the community and in the Sarapiquí River's watershed, an important recreation destination for the students.

The La Selva environmental education program also reached area high school students. Material and basic lab equipment were donated to the Colegio Técnico Profesional de Puerto Viejo to continue water-monitoring projects in the nearby streams. In addition, the Station also worked with the local high school and the Thompson River Project Group from Colorado to monitor activities in the Quebrada Grande de Sarapiquí.

Six New Bird Species Found

The 2000 La Selva Christmas Bird Count had the highest species total since the count was initiated at La Selva in 1985. A total of 344 species and 8,351 individuals were observed for a 16-year cumulative species count of 473. Six new species were added to the count list this year: *Anas americana* (American Wigeon), *Morphnus guianensis* (Crested Eagle), *Columba livia* (Rock Dove), *Geotrygon lawrencii* (Purplish-backed Quail-Dove), *Panterpe insignis* (Fiery-throated Hummingbird) and *Dendroica striata* (Blackpoll Warbler).

Orlando Vargas, La Selva Station Naturalist, coordinated the 71 participants, representing several institutions and amateur birders, organizing them into 22 parties. Fourteen parties walked the La Selva trails and boated the Sarapiquí and Puerto Viejo rivers. Eight groups surveyed the Braulio Carrillo Corridor (500 m, El Ceibo and 1070 m transect trail shelter sites), the Tirimbina Rainforest Center, the town of Chilamate, Terra Folia, Rara Avis Lodge and roads in the open country. The total effort included 221 person-hours of observation and 159 miles covered. Compliers were James Zook (La Selva Researcher) and Joel Alvarado (La Selva Station Naturalist). OTS

Arson Affects More Than 750 Hectares of Park Land

EUGENIO GONZÁLEZ
PALO VERDE DIRECTOR

On February 9, 2001, a fire was detected in the Poza Azul sector of Palo Verde National Park, 12 kilometers southeast of the Biological Station. Suspected to be intentionally set, the fire extended over wetlands, destroying grasses, cattails and woody species. Although a formal evaluation has not been completed yet, a reconnaissance trip through the site provided evidence of damage to a semi-flooded palm forest (a very rare habitat in the Tempisque), mangrove forests and various forms of wildlife.

Forty members of the Park staff immediately responded to fight the fire, but controlling the fire was difficult given that the site is semi-flooded, access is difficult and the winds were strong. It took 4 days to get the fire under control, requiring the mobilization and participation of more than 200 people.

New Phone and Fax Numbers

In October 2000, the phone rang for the very first time in Palo Verde. There are four phone lines: (506) 661-4717. There is also a fax line: (506) 661-4712. An Internet connection is coming soon.

Research Publications Compiled for Tempisque River Basin

GILBERT FUENTES
BINABITROP PROJECT

The Lower Tempisque River Basin is a convergence of highly intensive agricultural systems and protected wildlands. Although a number of technical and scientific studies have been completed to help create conservation and management policies, the information is often difficult to find. With financial support from Costa Rica/U.S.A. Foundation (CRUSA), OTS is rescuing, cataloging and making public all publications based on research conducted in the region.

This document compilation and classification is presented as a digital database that is part of a larger national Costa Rican project, coordinated by OTS since 1996, known as the National Bibliography on Tropical Biology (BINABITROP). The objective is to make available the technical and scientific information to the general public through the Internet at <<www.ots.ac.cr/binabitrop>>.

The database, including publications on the Tempisque, Guanacaste and Arenal-Tilarán conservation areas, currently contains 2,660 documents. The majority of these documents have been published in the United States (45%), with 36% published in Costa Rica and the remaining 19% in 35 other countries. The majority of the publications are in journals (1,783), but they also include graduate theses, book chapters, books, symposia presentations, cassettes and CD-ROMs.

OTS Staff named to National Park's Advisory Committee

Jorge Jiménez (Director in Costa Rica) and Eugenio González (Palo Verde Station Director) were named to the Palo Verde National Park's Advisory Committee. These appointments represent the important role that the Organization has played and continues to play in the management and conservation of the Park.

Wells Drilled for Research

Forty-eight wells were drilled in the Tempisque River Basin with 25 located in the Lower Basin in Palo Verde National Park. OTS is collaborating with the Japanese International Cooperation Agency (JICA), National Service of Underground Water, Irrigation and Drainage (SENARA) and the National Wetland Program to monitor the water table in the ground (phreatic level) and underground water. Experts at the University of Costa Rica will analyze water quality. The data will provide new information on the Tempisque River Basin's hydrologic conditions. OTS will use these data to promote and coordinate additional research.

Researchers Seeking Palo Verde Photos

In trying to unravel the history of cattle use, wildlife abundance and vegetation, especially cattails, in the marsh at Palo Verde, researchers Bob Timm, Deedra McClearn and Gordon Frankie are seeking photographs and/or slides from the 1960s and 1970s (and older for the marsh). Please contact Bob at <btimm@falcon.cc.ukans.edu>.

OTS

From the Archives

The more things change the more things stay the same.

Dan Janzen, alumnus of the first OTS course, 63-2, taught on many of the courses in the 60's and 70's. Dan still serves as a visiting resource person today, as shown on page 4.

development news

BY JONATHAN GILES, Director of Development

RECENT GRANTS & CONTRACTS

■ The William and Flora Hewlett Foundation awarded $300,000 to expand environmental policy workshops in Latin America.

■ The Richard H. Simons Charitable Trust funded the OTS Center on the Universidad de Costa Rica Research Campus in San José, Costa Rica with $350,000 over 10 years.

■ The Andrew W. Mellon Foundation awarded a $2,500,000 challenge grant for the OTS endowments.

■ Christiana and Christophe Tyson designated OTS as one of three beneficiary organizations for their charitable remainder trust.

SPECIAL WAYS TO GIVE

■ OTS is eligible for corporate matching gifts through Duke University. If your company has a matching gifts program, please make your check out to "OTS/Duke" and include the matching gift form with your check.

■ Gifts of stock are welcomed and can be transferred through OTS' First Union Securities account. Contact the OTS Development office for details.

■ Planned giving is critical to the growth of OTS' endowments. Consider OTS in your will or in establishing a charitable trust or gift annuity. Broadly defined as the present commitment of a future interest in gift property, planned giving is an increasingly popular means of providing significant support for charitable institutions along with tax benefits.

■ OTS can make your donations automatic by charging your credit card for a specified amount on a specified schedule. Already several donors are taking advantage of this opportunity by having their credit card charged every month, allowing the donors to spread out payments while optimizing the amount of funds provided to OTS. Simply let us know the payment plan you prefer and provide your credit card information on the donor card. OTS

continued from page 3

Wilson Botanical Garden will forever cherish the memory of this great man and friend par excellence.

Robert Ornduff (1932-2000)

WILLIAM LOUIS CULBERSON — Professor Emeritus of Botany, Duke University

Robert Ornduff, one of this country's most distinguished botanists, died last year at the age of 68. Bob was a remarkable field botanist, penetratingly observant, a trait that he showed in early childhood. He first discovered the diversity of life, alone as an only child, in the woodlands, fields, and gardens around his home in Portland avidly learning all that he could about the plants and animals that he found.

He later attended Reed College, and spent a year in New Zealand as a Fulbright Scholar. He received a master's degree at the University of Washington and Ph.D. at the University of California, Berkeley. At Berkeley he developed research interests in the flora of California but these soon broadened to other floras that had evolved under similar mediterranean-type climatic regimes. He was always interested in the evolution of breeding systems in flowering plants and particularly in heterostyly, a mechanism that has arisen in many unrelated genera and that promotes outcrossing rather than selfing in flowers with both stamens and pistils.

Although Bob worked primarily on evolutionary questions, his keen powers of observation also led him to the incidental discovery of new species in some of the best-botanized regions of the world. Bob taught briefly at Reed College and Duke University before returning to Berkeley where he spent the rest of his life. Among the many positions that he held there were director of the University Herbarium, chairman of the Department of Botany, and director of the University of California Botanical Garden.

For most of the last decade of his life, Bob was also grants director of the Stanley Smith Horticultural Trust, and in this role significantly facilitated the rebuilding of the OTS station at Las Cruces after the fire of 1994. He quietly helped hundreds of people in many ways, professionally and otherwise, enriching the lives of everyone lucky enough to have known him.

Agustín López (1946-2000)

ROBERT MATLOCK — La Selva Scientific Director

Agustín López, La Selva Biological Station Administrative Director, died during his sleep at La Selva on January 10, 2001. Agustín graduated from the Universidad Privada Autonoma of Managua, Nicaragua with a degree in accounting. Following university, he worked as a consultant, entrepreneur and in various administrative posts at CATIE.

Agustín joined La Selva in October 1999 as Administrative Director. During his tenure at La Selva, Agustín helped the station make great strides in employee relations, physical infrastructure and management. Agustín was an excellent administrator in whom we could always trust that things would get done.

Agustín and I frequently had long conversations about La Selva in which we strategized about the station's future. He was a man of strong character and integrity, with sound judgement and much wisdom derived from his long experience as an administrator. He was also my friend, and I think that I speak for us all when I say that we miss him, both now and in the future. OTS

Thank You

A special thanks to the following individuals, foundations, corporations and government agencies for their support of OTS between July 2000 and December 2000. It is only through this support that OTS can continue to provide leadership in education, research and the responsible use of natural resources in the tropics.

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Spring 2001

explore the tropical world with OTS

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OTS Biological Stations in Costa Rica are outstanding sites for natural history visitors who are interested in learning and experiencing the wonders of tropical ecosystems. Come join us for a half or full day guided walk.

For information and reservations, contact OTS in Costa Rica at:
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SCIENCE IN THE TROPICS:
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Take a behind the scenes tour of Costa Rica with Gary Hartshorn, OTS President and CEO, in this annual tour. The itinerary will include OTS' La Selva, Palo Verde and Las Cruces Biological Stations and its world renowned botanical garden, and many exciting stops along the way, including the Aerial Tram and Monteverde Cloud Forest Reserve. This trip promises to be a great opportunity to experience the delicate balance of tropical life and learn about the exciting research taking place at OTS field sites.

ENCHANTING PRIVATE AND PUBLIC GARDENS OF COSTA RICA:
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This annual tour will visit a number of exceptional gardens whose owners have created their own versions of tropical paradise. This is a very special opportunity to visit Costa Rica's native orchid expert's country estate, the public Lankester Garden near Cartago, and OTS' Robert & Catherine Wilson Botanical Garden. In addition there are visits to a high elevation river valley (with Resplendent Quetzals), as well one of the world's premier sites for tropical research, La Selva Biological Station.

Tour Groups

The following tour groups regularly bring visitors to the OTS biological stations as part of their tours. Please feel free to contact them directly to book a tour with them or to have the tour group customize a trip for your group.

- Holbrook Travel:
  1-800-451-7111 or
  www.holbrook travel.com
- Horizontes Nature Tours:
  1-506-222-2022 or
  www.horizontes.com
- Preferred Adventures:
  1-800-840-8687 or
  www.preferredadventures.com

Educational Visits

OTS is proud to host many educational institutions that bring their students to our stations for a biological or environmental science experience in Costa Rica. Some recent groups include: Ursinus College (PA), Penn State University, Dartmouth College (NH), University of Wisconsin at Madison, Cabrillo College (CA), Alfred State University (NY), Indiana University, Sierra Nevada College (NV), State University of New York College of Arts and Sciences (SUNY) at Geneseo, Manchester College (IN), Bridgewater College (VA), Wellesley College (MA) and Lehigh University (PA). To bring your educational group to OTS' biological stations, e-mail hbristow @duke.edu or call (919) 668-1686. OTS

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