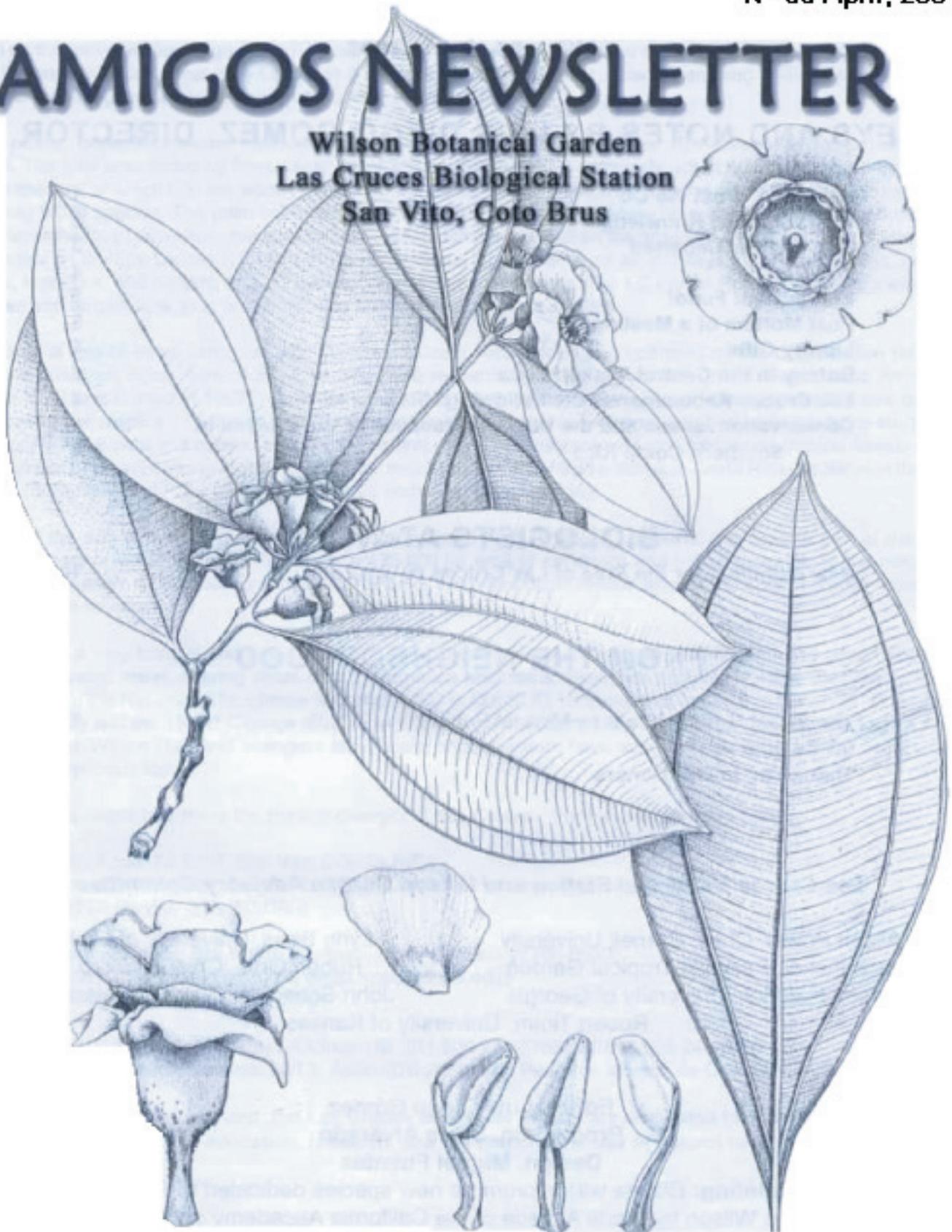


N° 55 April, 2001

AMIGOS NEWSLETTER

Wilson Botanical Garden
Las Cruces Biological Station
San Vito, Coto Brus



Organization for Tropical Studies

AMIGOS NEWSLETTER

NO. 55, April 2001

KEYS AND NOTES BY LUIS DIEGO GOMEZ, DIRECTOR

What It Is, What We Do	1
On Traditional Knowledge	2
Two Friends Departed	3
Why Not?	4
Endowment Fund!	5
Post Mortem of a Meeting	5
Library Gifts	6
Botany in the Central Market: Yuca	6
Las Cruces Recommends the Following URLs	8
Conservation issues and the Hunting Practices of the Guaymí in Southern Costa Rica	9

BIOLOGISTS AT WORK

New sightings for the Area of Las Cruces by Jim Zook	10
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FROM THE NEIGHBORHOOD

The Sweet Smell of Fear by Michael Roberts	12
LC Cuisine	16
Thank You to Our Donors	16

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Cover painting: *Blakea wilsoniorum*, a new species dedicated to Robert & Catherine Wilson by Frank Almeda of the California Academy of Sciences. Reproduced here with permission from NOVON, Missouri Botanical Garden.

Illustrator: Jenny Speckels.

WHAT IS WHAT WE DO

The **Wilson Botanical Garden** (a.k.a. JBW, Jardín Botánico Wilson) is part of the Las Cruces Biological Station (LC), located on the mid-elevation ridge of the Fila Zapote, 287 km south of Costa Rica's capital city of San José. A major attraction in the county of Coto Brus, Las Cruces is a center for public education, scientific training and natural history studies as well as for biological, agroecological, and botanical research.

Aroids, palms, ferns, bromeliads, heliconias and marantas are abundant on the 10 hectares (25 acres) of cultivated grounds. The total area including forest reserves of 266 ha (657 acres) is extremely rich in native plant life—approximately 2,000 species, of which 600 are woody genera. In the Garden area, planted among the native species, are exotic plants numbering 5,028 species. The palm collection alone numbers 700 species. Many plant species from around the tropical world, threatened with extinction, are maintained ex situ in lathhouses and on the grounds. The fauna is abundant with 322 bird species on the Las Cruces (LC) bird list, and numerous mammals, such as monkeys, sloths, armadillos, peccaries, weasels, kinkajous, and olingos, plus 37 species of bats identified to date. The LC Forest Reserve protects a wide variety of reptiles and amphibians, plus an astonishing fauna of moths and butterflies.

Las Cruces is one of three biological field stations in Costa Rica owned and operated by the Organization for Tropical Studies, a non-profit consortium of 58 universities and research institutions from the United States, Latin America and Australia. OTS was formed in 1963 to **provide leadership in education, research and the responsible use of natural resources in the tropics**. To this end, OTS offers intensive field courses for graduate and undergraduate students and professionals in the pure and applied areas of the natural sciences, facilitates research, conserves tropical forests and conducts environmental education programs. OTS also maintains two other field stations in Costa Rica: La Selva in the Atlantic lowlands (Sarapiquí) and Palo Verde in the Pacific northwest (Guanacaste).

Because of the rich collections and proximity to the Amistad Park, UNESCO declared the Garden part of the Amistad Biosphere Reserve in 1983. The Biosphere is a 472,000 ha area of parklands and buffer zones along the mountainous backbone of southern Costa Rica and western Panama. Important opportunities exist in the area of conservation biology and sustainable development.

The Garden is a very tranquil and beautiful place. Approximately eight km of trails wind through the gently sloped landscapes in cultivated areas, offering vistas of the Talamanca Mountains. Biologists particularly enjoy the primary forest on the west bank of the Río Java. The climate is cool at 1,100 m (3,630 ft); temperatures average in the 21-26° C range (70s° F) during the day and the 15-21° C range (60s° F) at night. Student accommodations are bunkrooms (with four or six beds per room) in the Wilson Hall, and biologists and natural history visitors have accommodations in private cabins. Guests enjoy simple, delicious food.

We invite you to come and share the tropical diversity of Las Cruces. For more information write:

Las Cruces/JBW, Apdo. 73-8257, San Vito, COSTA RICA.

Fax from US 011 506 773-3665; Tel. 011 506 773-4004; email <lcruces@hortus.ots.ac.cr>

WEB SITE: [HTTP://WWW.OTS.AC.CR](http://www.ots.ac.cr)

OTS North American Office: Box 90630, Durham, North Carolina 27708-0630;

Fax (919) 684-5661; Tel. (919) 684-5774, email <nao@duke.edu>

WEBSITE: [HTTP://WWW.OTS.DUKE.EDU](http://www.ots.duke.edu)

Reservations: (OTS San José office) FAX from US 011 506 240-6783; tel. 011 506 240-6696;

e-mail<reservas@ots.ac.cr>; or write: OTS, Apdo. 676-2050, San Pedro de Montes de Oca, COSTA RICA

The Wilson Botanical Garden and the Las Cruces Biological Station are dedicated to accomplish OTS mission: to provide leadership in education, research, and the responsible use of natural resources in the tropics.

DIRECTOR'S KEYS & NOTES

by Luis Diego Gómez
ldgomez@hortus.ots.ac.cr

ON TRADITIONAL KNOWLEDGE

The operating room is aglow with the high intensity lamps required for surgery. All over the place, blinking machines with circuitry of the highest technology hum. In the middle, surrounded by doctors dressed in sterile greens, the patient's open heart is immobilized to replace a faulty valve. In some other section of the hospital an ophthalmologist is doing a simpler operation on an eye, also immobilized. The two scenes just described have one thing in common: tubocurarine.

Tubocurarine is a refined version of the arrow and dart poison developed by the South American Indians from plant extracts. The time between a Shuar hunter's first use in Ecuador of this potent chemical and its use by Christiaan Barnard's disciples in New York is only some three thousand years.

We have gazed at stars and planets from time immemorial. At first, we saw portents and gods in the firmament, and we used the celestial bodies to foresee and divine, then we saw practical ways of establishing important cycles such as sowing and harvesting and have devised calendars, some of such precision, that the Mayan astronomers could calculate planetary orbits that are just fractions of seconds short of NASA's. Yes, from astrology to space flight is a long jump for the mind, but the former is the essential basis of the latter.

We build dams and canals to irrigate arid landscapes and turn them into agricultural lands. After many millions of dollars we announce in the media the great achievements of the hydrologists and engineers. Few know, however, about the sophisticated waterworks of the Inca Empire still in use! The Spanish conquistadors made an easy entrance into Peru because the Inca had turned the coastal desert into a garden!

Tubocurarine, astronomy and hydraulics are all innovative knowledge of peoples of the past or peoples we used to call "primitive," "savages," "illiterate societies", and now politely refer to as "indigenous cultures", "first nations".



Olmec style jadeite, ca. 2000 BP. The carved holes correspond to the Ursa Major constellation. An early "fixed" sextant to navigate Central American coastlines? Photo: L. D. Gómez collection

In late October 2000, a group of scientists met at White Oak Plantation, Florida, with the idea of discussing the contribution of local knowledge to science, conservation and development. Why? Because we have identified an issue of concern: Science (read Europeanized science, Western science) and many of its actors have invested themselves as sole possessors of the Truth, with the Power of Knowledge, often forgetting the origin of many ideas, technologies and economics that evolved from the non-Cartesian world of the aboriginal populations.

Round the table were anthropologists, ethnobiologists, botanists, rural sociologists, physicians, linguists, and other scholars. Our goal was to devise a strategy that could be discussed in the **7th International Congress of Ethnobiology** we were to attend at the University of Georgia, Athens, after our symposium.

The issue arises from two documents produced by the **World Conference on Science** held in Budapest in June 1999. In the Declaration on Science a paragraph describes traditional and local knowledge systems as “*dynamic expressions of perceiving and understanding the world that can make, and historically have made, a valuable contribution to science and technology*”. The second document, **Science Agenda**, calls on governments to “*formulate national policies that allow a wider use of the applications of traditional forms of learning and knowledge.*”

Now, you and I would not dispute those paragraphs, but in the Cairo meeting (Sept. 99) of the **International Council for Science** (ICSU), there was concern that “traditional knowledge” was insufficiently defined and could open the door to forms of “anti-science” ideas ranging from astrology to creationism. With all due respect to my readers, astrology enjoyed a high status in the White House a few administrations ago, and creationism seems to be an aberration endemic to some parts of the U.S. of A. So, why should that concern be phrased as a —*Hear ye all the world!* — Of course, astrology has no base in reproducible science, and we all know about evolution. But how can one define what makes knowledge “scientific” and different from other forms of knowing?

The question posed above has relevance beyond the philosophical, when scientific data have an impact on the economy, when patents are being applied or when governments insist that environmental remediation and conservation must be based on “scientific facts.”

Have you heard of the system of weirs built in pre-Columbian times in the Bolivian savannas, that allowed a tremendously successful management of river resources and agriculture that must have fed thousands of people? Did you know that recent research suggests that the entire Amazon Basin is not as pristine a forest as we thought, but rather a vast agroscape carefully modelled through eons of indigenous management? Are you aware that slash-and-burn agriculture may not be the Big Bad Wolf of land use we have been advocating but a very ingenious system invented by the “primitives?”

Yes, we have to be careful to separate the grain from the chaff, valuable knowledge from myth. However, we also have to be less arrogant and concede that our view of the world from whatever discipline we profess is not the only perspective possible and, with a lot of respect, recognize that there are other cosmovisions and systems worthy of our recognition, and of incorporation into our growingly global society as part of the human phenomenon. We must bridge the artificial gap between the Humanities and our Science and put an end to the wall that keeps C. P. Snow’s “two cultures” apart.

TWO FRIENDS DEPARTED

In memoriam

Duane Isely and Rupert Barneby

It is never pleasant to write about friends who go wherever people go when they die. And it seems to me that I have had to write too many obituaries this past year or so.

Professor Duane Isely, of Iowa State, died on December 6. He graduated from Cornell and for many years was the U.S. expert on “weedy” species, later angiosperm seeds and finally of legumes for the last fifty years.

We met through our common friend Richard Pohl, the grass expert. Duane was always very helpful while I was Curator of the National Herbarium of Costa Rica and provided not only taxonomic advice but many hard-to-find publications and literature.

He was a very active conservationist as well and during the last decade was very involved in the protection of the Ames High School Prairie/Richard W. Pohl Preserve.

Rupert C. Barneby, recipient of the Millennium Botany Award during the International Botanical Congress in St. Louis, Missouri, was a true scholar. He was born in England in 1911 and graduated with a B. A. from Cambridge in History and Modern Languages but he was destined to

become one of the most prolific botanists of the century with several thousand pages of published articles and books. He was Mr. Legumes or, better said, Lord of the Leguminosae. The same could be said of his dominion of the moon-seed family, the Menispermaceae.

Barneby was one of the nicest people I have ever met. Generous with his knowledge and finding time for all of us with questions, he was one of the very few botanists in the United States (where he moved in the early 40's) who could write plant descriptions in Latin, as required by the Code of Nomenclature, for publication of new species. And many were the requests for this service which he graciously granted. Of a very literary and artistic inclination, he felt at ease among the literati as he did among scientists. A self-taught botanist who became Curator of the New York Botanical Garden, he was also awarded the Henry A. Gleason Award, and the Asa Gray Award, among other distinctions. Both of them will be missed by the botanical community.

WHY NOT?

Oftentimes some of the visitors ask me if we sell plants. We do not. There are several reasons for this. One is that production costs would be too high for us given the non-existent volume of sale. Do we sell seed? We did, before 1992. Why not after that year? Because of the Convention on Biological Diversity, or the Rio de Janeiro Convention.

Since then, botanical gardens have had to comply with the Convention, in particular with Article 15 (Access to Genetic Resources), especially in connection with the exchange of plant material (plants whole or parts thereof, seeds, tissues) as well as with the Convention on International Trade in Endangered Species (CITES).

Wilson Gardens can only trade materials with other botanical gardens and institutions that comply with the following general principles:

1-The material is intended to serve the common good, particularly scientific study, education and environmental protection.

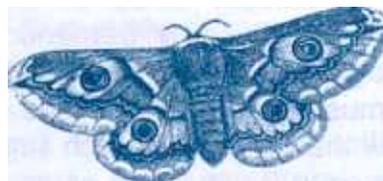
2- Upon accepting plant material from the Garden, the recipient is obliged to document and preserve information relating to the material appropriately.

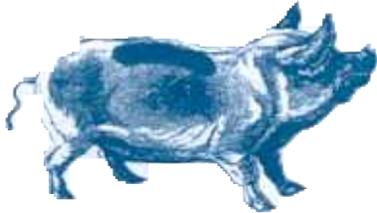
3-In the event of scientific publication on the plant material provided, the origin of the material must be cited and three copies of the publication must be deposited with the provider of the material.

4-Plant material can not have intended commercial use by the recipient, and said use is not covered by these agreements. Commercialization of any kind must be cleared with the country of origin of the plant material, and recipients must share profits with that country through proper channels of authority.

Every time we request seeds of interesting species, we have to sign a document with the above clauses, even when requesting seeds from long-time partners. We never import into the country plant tissues or live plants to avoid the risk of introducing plant diseases not yet established in Costa Rica. We also never import plants that have the potential to become invasive species. Some well-meaning visitors offer to send us cuttings of this and that, and we have to politely refuse.

The exchange of seeds among botanical gardens has been a tradition. The exchange is always for free and serves not only to increase the diversity in the living collections, but also to insure the multiplicity of depositories for the germplasm. "Not placing all your eggs in one basket," as it were.





ENDOWMENT FUND!

We would like to thank Michelle Cloud, a long-standing contributor to the Garden, for her rather unique donation. Michelle gifted her land holdings in Costa Rica to OTS with the stipulation that the proceeds from the sale of her property go to the Las Cruces Endowment. In November the property was sold and we finally have the beginnings of a much-needed endowment in place.

In December AMIGOS Michael and Alison Olivieri added to the endowment with a gift of stock, and that too is gratefully appreciated. Complementing these gifts, we are pleased to report, is a recent grant to OTS from the Andrew W. Mellon Foundation (see upcoming LIANA). This grant will enable OTS to match all endowment gifts on a 1:1 basis. Combined with the Mellon match, the Las Cruces Endowment stands at a hefty \$70,000—a modest amount in which to rest the long-term financial security of the Garden, to be sure, but thousands more than we had a year ago!

If you are interested in contributing to the Las Cruces Endowment or learning more about the Mellon match, please email Jonathan Giles in our North American Office at [HYPERLINK mailto:hgiles@duke.edu](mailto:hgiles@duke.edu) or call him at (919) 684-5774. As Jonathan likes to point out, gifts of land and other property, as well as outright gifts of cash, can provide a nice tax deduction, and gifts of appreciated stock can be deducted at its fair market value without paying capital gains.

POST MORTEM OF A MEETING

On November 3, 2000 the conference room in Wilson Hall served as the stage to a most unusual meeting. The audience was comprised

of directors of the regional hospitals, emergency room physicians, lawyers, detectives, staff from the Justice Department and indigenous people in their traditional costumes.

The topic: Forensic procedures in the determination of causes of death and indigenous cosmology. How to reconcile the practices of law and forensics with the particular perception of death and handling of the dead in the indigenous communities.

All of our Indian tribes are animistic in their view of their everyday life and afterlife. For them, there is an unquestionable organic and cyclical connection between life and death and a connection between our bodies, alive or not, and the Earthmother.

Indigenous groups were having severe problems with the idea that death resulting from any ailment that had not been diagnosed by one of the national system's doctors, meant that a body had to be removed to the Forensic Medicine lab in San Jose for the death certificate. And then, what of the funeral rites that are so important to these Amerindians? And what if the body was returned to them mutilated and, even worse, missing parts?

All that was discussed from many perspectives. Dr. Luis del Valle, Chief Medical Examiner, patiently went over the reasons for autopsies. Many in the medical segment of the participants were remotely aware of the procedures and so were the Civil authorities. However, little did they know how complex the Indian mythology was!

The meeting ended with a very important agreement: Costa Rican authorities will make every effort to limit the necropsies to only those cases where an element of doubt exists and in such cases, the bodies will be expedited back to the mourners for the proper rites.

Needless to say, I was delighted to learn from the indigenous participants all the details about their funeral rites and discover that they have not changed much since the earliest ethno-

graphic accounts of the early twentieth century. I am sure to use the information in the next ethnobiology course.

LIBRARY GIFTS

Las Cruces wishes to thank the following AMIGOS for their donations to the library: Jay Savage, Walter Hodge, Bette Loiselle, Alison & Michael Olivieri, Anthony and Don Ellison, Donald Stone, and Carl Luer.



BOTANY IN THE CENTRAL MARKET: YUCA

When you walk into the produce area of the Central Market, or for that matter, any green-grocer's hole-in-the-wall or store, you will see something that is not green but coffee brown, has a somewhat scaly surface, is usually thick but tapers on one end. If you cut it across, under the chaffy brown there will be a circle of pink and then a pure white core. That is a yuca tuber. This plant belongs to the Euphorbiaceae, the spurge family and in the genus *Manihot*, which has over one hundred species found from the southern US to Bolivia. You know it by other names in the English literature: manioc, mandioc, mandiog, cassava. These are words originating in the Guaraní languages of southern Brazil. The Spanish were first acquainted with these plants in the area of first contact: the Caribbean and adopted the *taíno* name for it: yuca. It has nothing to do with the plants known as yuccas elsewhere, such as the Century Plant, in the Agavaceae.



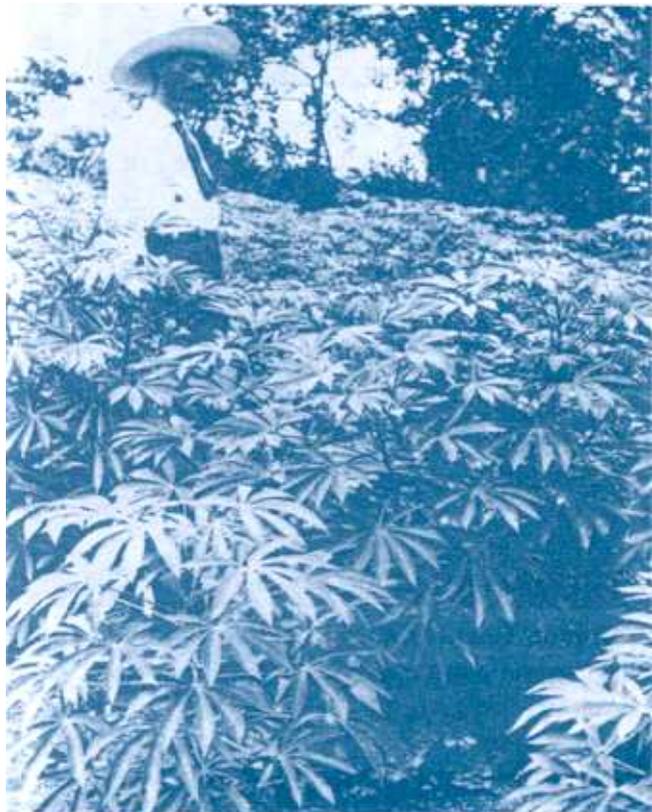
Manihot esculenta. From Piso's *De Indias utriusque Re naturali et Medica*, 1658.

As with many other important food plants that have been taken into cultivation, it is hard to pinpoint the geographical center of origin of yuca. However, there is growing evidence that the edible yucas may have been selected at opposite ends of the American continent: one group of "sweet" varieties in the Mayan area and another in the triangle formed by the rivers Orinoco (Venezuela) Vaupés (Colombia) and the middle Amazon as it is here where one can find the largest number of strains of the so-called "bitter" yuca. They are bitter because of their relatively high content of cyanogenic glycosides, a form of cyanide. The other variety, "sweet" yuca has little or no cyanide in it. This is the more widely cultivated in Central America.

That yuca has been a staple in Middle and South America for a long time (estimated around 4,000 B.P.) is known from pollen remains, as well as by the presence of griddles, graters and other paraphernalia required for its manipulation found in archaeological sites, which differ little from those in use today.

Yuca is propagated by cuttings and yields after about nine months. You dig the entire plant out, cut the fat roots and then chop the stem into

stakes that you put back into the ground. The young leaves, well boiled, are also edible and are rather nice to eat. It grows well almost anywhere from sea level to about 1,000 metres and does not seem to be bothered by the long, tropical wet season. So it is an ideal culture for indigenous peoples.



Yuca plantation in Puerto Rico, 1904.

Photo : L.D. Gómez collection

The bitter varieties take a lot of preparation. You free it from any dirt, peel it and then grate it. If you are an amerindian living in the boonies, there are no food processors, “yucanizers” or “EZ-yuca” machines. You simply make your own. Choose your favorite: the very prickly stilt root of a palm or cut yourself a piece of wood and insert (neatly, please) many chips of quartzite rock. Once that is ready, you grate your yuca to a paste. Drop it in a hollowed tree trunk filled with water and then put it through a squeezing like you never thought possible: a long sleeve of woven palm leaves that you hang from a pole while at the other end you pass a stick to twist it until Hell freezes over and no drop of the poisonous juice is left. Then you make cakes from the paste and dehydrate it on a flat earthenware over a fire. If you leave it in water long enough, say about 5

days, you can obtain a solution of yuca starch and some pellets after squeezing. These pellets you have eaten for sure. Some of us were literally fed to death with these pellets. You may have called them “fish eyes,” I called them *tapioca*.



Garífuna (black carib) woman grating yuca on board studded with pebbles. Author's collection

The starchy fraction is dried over heat and this becomes the main ingredient in that wonderful brazilian fabada: farinha, or yuca flour, which you can use very much like corn-flour. In actuality, some delicious cookies, called “Ñuños” in Perú are made from this. It is a good starch and it starches things like shirt collars, little doilies or macassars. My dear Mom was a great fanatic of yuca starch and she requested every available piece of clothing starched as stiff as cardboard, my shirts, my pants, my sheets, my pajamas, napkins, table-clothes, etc. On changing clothes I walked like a robot for the first hour or so...

The sweet varieties do not require such drastic treatment before cooking. You just peel them and throw them in the pot. The Costa Rican “olla de carne” or potpourri of veggies and beef soup, never lacks hefty chunks of yuca. It has the texture of a slimy potato and may be very white or a bit on the yellow side.

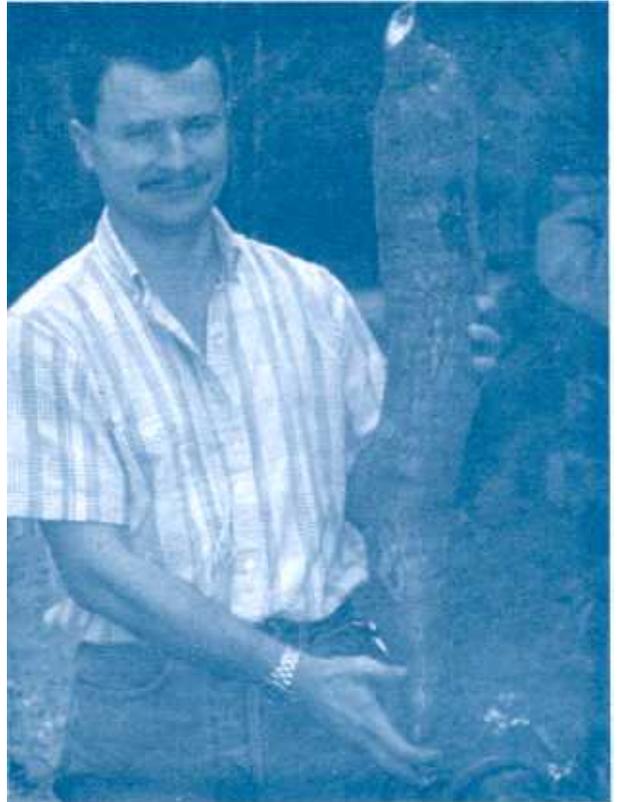
As diet goes yuca is mostly starch, very few proteins, but a good amount of minerals. It is said that boiled yuca leaves can sooth gouty extremities with the added advantage that after applying the poultice you can eat them as you would eat spinach.

One can make yuca beer or what indige-nous peoples call “chicha” or “masoto.” The recipe is simple enough: Once you go through the steps of grating, squeezing and pan drying, you carve another hollowed tree (or use your canoe) and search for some old women. These ladies will chew the moistened yuca and spit it in the container, add water and then you let it fer-ment for a couple of days or until the concoction reaches the desired alcoholic proof. The trick in the chewing is the enzymes in saliva that break the starch molecules into simpler sugars! You may add other flavoring ingredients, like pineap-ple, banana or who-knows-what. The drink is cer-emonial and is offered you upon arrival to malo-cas (large huts) and you simply MUST NOT dis-appoint the host.

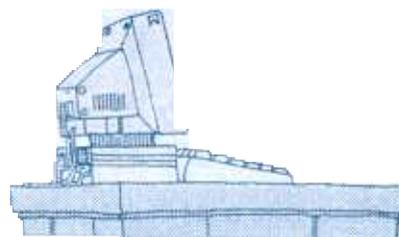
Chicha is sometimes made with corn and even plantains instead of yuca. Those of you planning to attend the Little Devils Feast in Boruca (Costa Rica) will be offered chicha. Will you not be very happy to know the recipe?

There are more innocent uses for cooked yuca. Deep fry raw, thin slices and surprise your guests with a different kind of crisps. You can puree it and make patties or pie crusts with fill-ings of your choice. Here we call them “enyuca-dos,” fried or baked. One of my favourite ways is to boil the peeled yuca in water with a pinch of salt until the chunks show signs of splitting. Remove from heat and drain very well for sever-al hours. In a pan, sautee tonnes of red onion slices and bell pepper strips. Spread a layer of this on a baking dish then distribute wedges of yuca and cover with more onions and peppers. Add a little water, cover with foil and put in pre-heated oven (350 F) until it starts sizzling. Remove foil, add some good vinegar (but not bal-samic), put foil back and heat for another five minutes before serving. This is a variation of something I once ate in Poland using turnips,

which I immensely dislike and which should have gone extinct long ago.



Las Cruces' Charlie Salazar holds a 14 pound yuca. A single plant may produce 4-6 of these!



URLs!!!!

LAS CRUCES RECOMMENDS:

www.cloudforestalive.org and

www.quetzalcam.org to visit the Monteverde Cloud Forest Reserve and see the quetzals.

Mail indknow@u.washington.edu to enter your subscription to Indigenous Knowledge Development Monitor reports.

www.dnr.cornell.edu/edge to see the herpetol-ogy of LAS CRUCES

www.traditionalknowledge.org to know about Traditional Knowledge

CONSERVATION ISSUES AND THE HUNTING PRACTICES OF THE GUAYMI IN SOUTHERN COSTA RICA

The Guaymí, called in their own language Ngöbe, are one of the nine tribes living in Costa Rica who still preserve their traditional culture. The Guaymí live mainly from hunting, some farming and occasionally as hired hands during coffee picking season. Fabricio Carbonell, on the staff of the NGO Meralvis, conducted a study among them in 1998 to determine the relationship between their hunting practices and the size of wildlife populations, particularly of threatened and endangered species.

Carbonell's study resulted in a Master's thesis at the Universidad Nacional. The research was supported by several organizations, among them the WWF and U.S. Fish and Wildlife Service. The title of his thesis is "Fauna use and conservation in an indigenous Ngöbe (Guaymí) community in Punta Burica and its relation to conservation in Costa Rica."

Carbonell described and analyzed the hunting practices in order to determine the rate at which the Guaymí were harvesting the animals. He then determined the size of animal populations. The question he sought to answer was: How can sound plans for managing neotropical wildlife be designed so as to meet the requirements both of government and local communities.

Field work was conducted for seven months between late 1997 and mid-1998. A total of 133 interviews were conducted with 19 hunters and their families (55% of the local population). At the same time, assessments of the wildlife populations were made on the basis of tracks and sightings. Over the seven months, the Guaymí, hunting with rifles, were found to have shot 191 animals (851 kilograms of game). These were used mainly as food (81%), but some (10%) were a matter of pest control. The species most frequently hunted were paca (*Agouti paca*) and the coati (*Nasua narica*). But in terms of weight, three species accounted for

most of the harvest: the paca, the collared peccary (*Pecari tajacu*) and the green turtle (*Chelonia midas*). The tamandua (*Tamandua mexicana*) and the capuchin monkey (*Cebus capucinus*) were the main "pests" hunted.

The Guaymí generally prefer to hunt in primary forests and forests alongside rivers and streams. The sites chosen depend on the time of year. Carbonell found that there seemed to be a trend towards hunting farther and farther away from areas inhabited by white people and where brocket deer (*Mazama americana*) and other larger species can be found in greater numbers. In areas closer to settlements, hunting had imposed much pressure on the paca and the iguana (*Iguana iguana*).



Students of OTS' Ethnobiology course chat with Guaymí mother about their diet. Photo: L.D. Gómez

The study is concluded with several recommendations for management in Guaymí inhabited areas. One of them is that both the indigenous groups and community-based organizations and government agencies should be involved in a dialogue and that the Guaymí harvest rates should be monitored, even when the rates seem to be low, because it is important to consider them along with other factors, such as habitat fragmentation and the local status of the species hunted. Tapirs (*Tapirus bairdii*), white lipped peccary (*Tayassu pecari*) and jaguars (*Panthera onca*) are now extinct in the area of study due to overexploitation and forest destruction. If the same is not to happen to the capuchin monkey, green turtle, the red-faced monkey (*Ateles geo-froyi*), steps must be taken quickly.

The results of Carbonell's study were presented to key people in the local community, and a dialogue was established for the purpose of participatory education in matters of the local community's concern. One result has been the publication and distribution of a bilingual colouring book to local schools and groups: It is titled *Kruá rugaydäghuóre*, which in the Guaymí language means "The jaguar will return." The first edition is now out of print, but funding is being sought to produce it again.

MERALVIS is a virtual NGO of recent creation where biologists, veterinarians, physicians, agronomists and other professionals join efforts to preserve biodiversity and improving rural development. For information contact meralvis@yahoo.com



Sloth slothing his way near Dominical.
Photo: William C. Burger

BIOLOGISTS AT WORK

NEW SIGHTINGS FOR THE AREA OF LAS CRUCES

by Jim Zook

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My first visit to Wilson Gardens was in 1990. I came looking for birds I had not yet seen. Four days after my arrival I had seen 15 dazzling

species new to my list. I still remember nearly stepping on a Marbled Wood-Quail while hiking through the reserve in the pouring rain, and my first glimpse of an elusive Tawny-throated Leaf-tosser that later hopped out onto the trail for me. That was during my first year in Costa Rica, and it was fairly easy then to visit a new area and encounter plenty of unfamiliar birds. Those days have past, and after 12 years living and birding in this country I am lucky to see a few "new" species a year. In that time, I've also had the great luck to come to know the Botanical Gardens and surrounding areas quite well. So it was a pleasant surprise when three of the five new birds that I saw in 2000 turned up while I was working in Las Cruces.

The first surprise came on the morning of Sept. 2, I was working on a project for Drs. Paul Ehrlich and Gretchen Daily that involved counting birds along a 200 meter transect in the Wilson and Gamboa forest trails. Plodding along down the steep muddy trail I was headed to do the last count of that morning and my mind was typically occupied with the weather. Would it rain soon and would I be able to ford a flooded Rio Java, or would the sun come out and cause buzzing cicadas to drown out all birdsong before I finished? Sudden movement ahead of me brought me to a sliding stop. A big, floppy, dark bird rose off the ground and flew to a low but exposed drooping liana some 20 meters away. My mind had identified it as something strange, but when it came into focus in my binoculars it was a shock. There it was, without any warning, a Pheasant Cuckoo! The bird perched in such a way that I could only see its back, the top of its great tail and the side of its neck and slightly crested head. It seemed calm and hardly moved, except to puff out its throat after I whistled an imitation of its song. The buffy color of its foreneck and throat, and dark brown upperparts with an overall lack of white-tipped feathers indicated that it was a young bird. As Pheasant Cuckoos are brood parasites, I thought its hapless foster parents might be nearby. So, after watching it for 5 minutes I decided to get closer to it. As soon as I took my step, the bird uttered a single, sharp, quetzal-like bark and flew off down the steep side of the ridge and away. This is one of those myth-

ical birds that you know are out there but never expect to see. Staring at the empty, swaying perch, I was left not knowing whether to stand in awe, jump up and down screaming, or fall over backwards. I guess I did a little of all. Who can guess if the bird is still around the reserve but having seen it now makes the forest of Las Cruces seem a bit bigger, wilder and more mysterious.

The next eye-opener appeared on Nov. 30. This time while working for Dr. Catherine Lindell, who had me walking down rural roads and stopping every 200 or 250 meters to count birds for six minutes. I was on the road from Lindavista to Los Angeles, some 2 km from the Gardens. It was a wet and foggy morning and on several of my stops I could see no further than 25 meters away. There had also been many stops where the winged reproductives of termites or ants were swarming from the moist ground and rising up in fluttering clouds, much to the delight of birds. All kinds of species had taken to bug-catching or scurrying about the ground after the juicy morsels. Somehow the word got out to the real professionals and a sizable flock of White-collared Swifts came zipping through the mist. Like most mountain roads in the broken terrain of Coto Brus, this one often passed along the top of steep, bare ridges. Here these robust swifts would suddenly materialize out of the fog, and plowing along a eye-level be almost close enough to touch. One could not expect a more amazing sight for the day. But, at one of the stops, I immediately picked up on some unfamiliar calls coming from somewhere beyond the limit of visibility. Protocol did not allow me to ponder on the mystery songs at the expense of noting the familiar ones, and so I became wrapped up in the count. Then came the swifts blasting out of the haze, but with them were three chortling oropendolas with bone-white bills. They were the source of the strange calls. One large male and two females, as they flew directly overhead I heard a deep “whoosh, whoosh” produced by the male’s wings. The only oropendola in these parts is supposed to be the Chestnut-headed Oropendola, but something was wrong with what I had just seen and heard. The Chesnut’s have similar bills but their fairly small size gives them a more

buoyant flight than the birds I had just observed. A male Chesnut-headed Oropendola wings do not whoosh and, furthermore, the vocalizations were quite new to me. My mind was blank, but as it cleared, I began to smile—Those were Crested Oropendolas! Over the three weeks I saw them at four different sites within a 15 km radius from the Wilson Gardens. Now this is one bird that you won’t find in **A Guide to the Birds of Costa Rica**. They have just come up from Panamá. Stanford University student Cagan Sekercioglu was the first to report seeing “a different kind” of oropendola around Los Angeles earlier in 2000, and talking with some of the local folks it appears that they might have already nested in the area. In the forthcoming months I expect to get some photos, song recordings and also look for colonies in an effort to document this bird’s presence in Costa Rica.

The last species came so close on the heels (or should I say the halix?) of the Crested-Oropendolas that it was almost too much to believe. Again, doing counts for Dr. Lindell, but this time on the road from Cañas Gordas to Campo Tres, about 7 km southwest of Las Cruces. The sixth stop that morning was in an area of yards and gardens of the campesino homes, tall cypress trees, fallows and active agricultural plots bordered by living fences and a big patch of secondary forest along the entire right hand side of the road. Not surprisingly, it was full of birds. After six minutes I had detected 33 species. There was a small flock of noisy Brown Jays— are there ever quiet Brown Jays?—in the forest. But once again, I heard some vocalizations I did not know and spied the large bird that seemed to be producing them. In my binocs I expected to see yet another of the oropendolas... but wait, this one bird has creamy yellow belly, a dark tail with a wide white tip, it is bluish above with a black chest and it does look, indeed, like a big jay. The desire was there to hit my binoculars so they would start making some sense. It was a Black-chested Jay, and then another, and another until there were five of them. Again the field guide failed me. These jays are found in Costa Rica but so far only along the southern Caribbean coast. Now, it appears, they are also in the southern Pacific side!

Like the brown-throated Parakeet, Pearl Kite, and Mouse-colored Tyrannulet, the Black-throated Jay and the Crested Oropendola appear to be part of the most recent wave of open country species that are expanding their ranges northward on the Pacific slope out of Panamá and into Costa Rica. Deforestation has removed the natural barriers to the dispersal of such species. They only lag a few decades behind early pioneers such as the White-tailed Kite, Yellow-headed Caracaras, Smooth-billed Ani, Yellow-crowned Tyrannulet and Red-breasted Blackbirds.

To see three new birds was a joy, but sadly two of these additions to my list are the direct result of deforestation. I would gladly trade my new Crested Oropendola for one of the Crested Eagles that once soared over the forest canopies of yesteryear.



Mayan hummingbird

FROM THE NEIGHBORHOOD

Michael Roberts spent several months in Las Alturas surveying birds and nesting behaviour of birds as part of the research project of Dr. Catherine Lindell (MSU). Mike then wrote the following article published by California Wild (Vol. 53, #3, 2000) and reproduced here by permission from OUTSIDE MAGAZINE where Mike is Assistant Editor of the on-line version of the magazine.

The Sweet Smell of Fear

An apprentice biologist finds his way in the Costa Rican rain forest

by Michael Roberts
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It began under a ceiling of monkeys. Carefully picking my rubber-booted way down the cobbled path formed by one of the streambeds that bisect the 15-acre study plot, I heard the congregation while still a few hundred feet away and smiled. Rough barks and the heavy shaking of branches created an unmistakable canopy ruckus. I gleefully approached the cloud of activity with vision of transcendent inter-primate communication. There's something both alluring and freaky about staring into the face of a creature that stares back. I hoped the capuchins might be interested, too.

For three months now, I had been living and working on the edge of La Amistad International Park at a remote field station in Costa Rica. No hot water, a World War I-era generator that shook thunderously just to power a couple of light bulbs, and, for 90 percent of the time, only one other human to talk to.

Despite these conditions, securing my position as a field assistant had been more difficult than I expected. For months I had fruitlessly submitted my résumé to biologists studying birds in the tropics, hoping that enthusiasm, years of recreational birding, and a background as a naturalist would prove that, despite my lack of formal training, I had the skills to collect field data.

A call from Michigan changed everything. Catherine Lindell, a landscape ecologist at Michigan State University, had an opening. I would be investigating both the effects of evolving landscape on avian ecology, and one of the looming questions in ornithology: Why do tropical birds lay fewer eggs but have longer nesting periods than their temperate counterparts?

I knew I would miss my girlfriend tremendously, and my bicycle even more, but the chance to work as a field biologist was too tempting to turn down a paid ride to the largest track of forest left in all of Central America! Suddenly I was on a flight to San José, Costa Rica, then a

bus ride to San Vito, and a jeep ride up to Las Alturas.

My instructions were simple: Look and listen for birds. See what they're up to, and, if possible, follow them. Look for any hints of nesting. Find the nests and record their location. Check nests regularly for activity and record the findings. Before me lay six months of wandering around the cloud forest looking for bird nests and talking to myself.

So far, my searching for bird nests had proved as much a matter of luck as of any scientific skills. No system was more successful than any other. In the walls of hanging green, saucer-like clumps of moss and dark cavities tucked between the twisting buttresses of strangler figs were hidden bugs, spiders, furtive lizards, and a few nests. If I was lucky I might find last year's abandoned nest, dried brown with age and spattered with powdery fecal sacs—a sure sign of abandonment. Over the course of my assignment I would discover only six active nests. This left me a great deal of time to worry.

Having traveled in tropical forests previously, I felt sure I had packed appropriately. I had my machete and mosquito netting from Ecuador, one hundred-percent polyester pants purchased second-hand from Thriftown (especially useful when the famed "discomovil" made a visit to a nearby town), my Leatherman multi-purpose tool, and a high-powered bike light that I had modified to use when searching for owls, kinkajous, and other creatures of the night. But during my first morning in the forest I realized how unprepared I actually was. With growing unease, I watched as a resident biologist stepped into his U.S. Forest Service-issue snake chaps. He unrolled the cuffs meticulously, making certain no folds or creases prohibited the chaps from reaching all the way to his ankles.

"You always wear those?"

"Yup, especially when walking off-trail. My wife made me get them after I got bitten."

"Bitten?"

"Yeah, and the truth is these things wouldn't have helped anyway. It was an eyelash viper that I must have brushed against. It hit me in the shoulder. Spent six days in the hospital. Probably the worst experience of my life."

Last year, just off one of the trails that

crosses one of my study plots, some botanists saw a bushmaster. Nasty snake: up to twelve feet long and very venomous. My worst nightmare was of this scaled demon clamped onto my calf, its dual syringes in a binding vise grip penetrating right through my rubber boot. What the hell to do then? Touch it?!? Reach down and pry it off my oozing muscle as toxin surges towards my heart? It would be a rough walk back to the station dragging it along the muddy trails. Danny Holley, my co-worker and sole companion at Las Alturas, would be rather dismayed to return to the humble confines of our field station to find me splayed out on the porch, wrestling free of my new appendage with the aid of a Leatherman.

Danny claimed that he and his brothers always smelled snakes before they saw them. "It's that musky terrarium smell. All snakes have it." Having spent his boy-hood on the Caribbean side of Costa Rica and in the Arizona desert, he had owned, chased, and trapped snakes of all persuasions. Danny had no fear at all. His favorite response every time I confessed my nightmares was to shout, "Snakes? I don't believe in snakes!"

I do. I have no idea what snakes smell like though, despite Danny's efforts to explain. Tromping through the tall undergrowth of ferns, saplings, and the multitude of perplexing underbrush became an exercise in how to think of anything but snakes. My attempts to sniff out snakes only made the nomadic searches for bird nests more intense. The smells of a tropical forest alternate between herb garden and compost bin with almost every step. Every new smell might be a coiled serpent.

My ears served me no better. By the end of my stint at the field station I could identify over 75 birds by their calls and songs. I could pick out the banter of monkeys and say whether they were white-faced capuchin or spider from a mile away. I could also turn a falling leaf into a lunging cat. When a friend visited me at the station after almost four months, the most intriguing reaction I had was a hyperawareness of the sounds he made. Hundreds of hours alone in the lair of jaguars, pumas, and deadly snakes had made me extraordinarily sensitive to vibrations that suggested the presence of life. Having someone else making noises made me that much more

jumpy.

No expert senses were needed on this particular day to pick up the activity of a randy group of white-faced capuchins. Unappreciative of interspecies contact—in fact, frenzied by my approach—the outlying members of the posse began howling, baring fangs, and hurling branches. I narrowly sidestepped a golden shower of acrid, ammonia-tinted monkey piss. The humid air quickly bleached with sour, salty excretions.

Something had drawn this group into the lower end of the canopy. I'd never been closer to their snarls, leaps, hand gestures, and other antics. Careful never to be directly under their active genitals, I tried to get a sense of the size of the group and what they were after. Professor Lindell had warned me to be wary of monkeys and other animals when checking or watching active bird nests. Observant predators can home in on a researcher's activity and in one minute destroy hours of earnest investigation, let alone a season's reproductive efforts for the nest's owners. Perhaps these monkeys were raiding a nest of its high-protein contents. I shifted my attention from one capuchin to another, looking for hints.

Things soon got out of hand. Stirred by my attention, the capuchins hurled increasingly larger branches in my direction. The breeze from a baseball-bat-sized projectile tickled my neck, signaling that it was time to move on. Disguising my sense of rejection, I gave a respectful nod toward my hairy arboreal cousins and moved past the fringes of the assembly. A black dart of motion caught the corner of my eye. I looked up to the frozen figure of a perched male slatey antwren, one of the more common birds in the lower levels of the forest near Las Alturas. Like other members of the antbird family (Formicariidae), slatey antwrens are appropriately drab and blend in the shadows of the understory. Roughly the size of a smaller wood warbler, adult males are a dark slatey-gray, with white-tipped wing coverts. Close-up inspection reveals a small white shoulder patch. Females are a plain buffy-brown, slightly darker above and paler below. I would see and hear these active and acrobatic birds during every walk in the forest. I had memorized their nest description, certain that I would find one eventually.

And perhaps I had. Staring at the rigid individual in front of me, I noticed a collection of moss drooping from his bill. Caught red-handed in the chore of nest building, he stared at me like a cat burglar carrying a TV set through a crosswalk, realizing mid-stride that the headlights illuminating his figure belonged to a siren-topped black and white. A sticky pause passed between us.

The study of birds has a particular hold on my attention. I've angered more than a few friends and family members by toting binoculars to weddings and other high-profile social events. At the bottom of many lonely hours during my time in Costa Rica, my spirits were lifted by sighting an especially rare or beautiful bird, or even a not-so-special bird feeding its young, defending territory, or performing an aerial display. For me, birds are windows to the ecology of an area, opening up a view to key, hidden features. Hummingbirds lead to flowers, flycatchers point out beehives and insect colonies, and raptors reveal otherwise invisible currents of air. Despite thousands of diligent hours spent recording data on bird activity, I never grew bored with my assigned duties in Costa Rica. The days became long only after work was over.

I flinched first. As my binoculars rose just out of step with the beat of the moment, the slatey antwren opened his wings with a dramatic "op," flashed, and disappeared through the dark maze of forrest alleyways. No use trying to pick up its trail. The best strategy was to sit and wait in a potentially well-used corridor. He might return, he might not. Either way, I had justification to sit for an hour with the possible reward of more clues to the location of a rarely uncovered nest.

I unrolled the section of thinsulate pad that was perpetually strapped to my pack, sat down, and waited. Wearing my worn outfit of forest friendly green-and-black, thinking shape-changer thoughts, I did my best imitation of a shrub and stretched out my senses. Fifteen evenly spaced minutes passed. The chorus of the forest remained quiet, broken only by the monotonous chanting of wandering black faced antthrushes and the screeching of mile-high parakeets. A few interested but cowardly mosquitoes buzzed just out of reach.

Then a waft of something different tickled my nostrils and receded like a wave sliding back from the beach. I leaned forward and inhaled deeply. The deep funk of sweating meat filled my head and lungs. It was rancid but not dead, as if the forest had an open, festering wound. About 40 feet ahead, palm leaves and other small plants bounced and rebounded from contact. A heavy walker approached. I took a bead on the movement and lifted my glasses: a hairy ear followed by plump shoulders.

A pig.

During my first few weeks at the field station I would stare regularly at a dusty skull that lived on top of a bookshelf. Bared of flesh and hair and endowed with impressive tusks, I found it menacing. "It's a peccary," I was told. "Sort of like a rainforest wild boar."

There were at least six of them. I would have thought my own smell would have given me away, but now, only 30 feet of charging distance from my position, they had yet to express any notice.

I raised myself with the authority of a healthy, 150-pound bipedal primate, expecting to witness the abrupt about-face and squiggly tails of retreating swine. No dice. A husky "whuff" belled by one of the gang sounded like the application of air brakes by a fully loaded 18-wheeler. They continued a slow approach, snorting and grunting among themselves. Apparently I was parked on a cache of their finest slop.

Confrontation was imminent. I sensed a wave of trouble welling up, the steep face of fear taking form as the distance between us closed. Time to get to high ground. With little grace, I hopped onto the trunk of a young tree just wider than my arm. I shimmied clumsily upward in hope of escaping the range of tearing tusks and grinding molars. Still they approached. Taking my cues from the capuchins I voiced a primal "uuuh!" and shook a small branch just above my head.

My actions provoked a couple of intriguing reactions in the surrounding wildlife. On the ground below, and now only ten feet away, one of the peccaries doubled in size. Pointed hairs stood erect like teeth on a comb. A lone monkey, perhaps an outcast from the nearby troop, decided to vent his exclusion on my vulnerable form.

Scurrying to the over-hanging branch of an emergent Cedro tree, it began flinging houseplant-sized epiphytes my way, complete with desintegrating dirt clods that formed a chalky rain by the time they reached my head.



Something had to give. I began to fumble for the handle of the machete strapped to my belt when the smallest peccary in the group, a mere runt, crossed the final few steps to where I was treed, delicately extended its snout, and sniffed the toe of my dangling boot. Wilbur's young cousin, I suppose, inhaling deeply the smell of fear.

To be attacked by wild animals is one thing; to be shamed by small pigs is another. I'd had enough. My machete gave a metallic hiss as I drew it from the stiff leather scabbard. I banged it with great vigor on the exposed trunk below me. Forged steel did the trick as the peccaries scrambled into the bush and the renegade capuchin above headed into the upper reaches of the canopy. It was over.

My deep thump back to earth inspired a wince of humiliation. I had been unable to stand my ground against a ragged band of pigs. They couldn't have weighed more than 50 pounds each. Too many hours in the forest had been spent sharpening my awareness of potential dangers—too few dedicated to building my confidence to deal with them. I headed off to my study plot and onto the trail home. With drooping shoulders and a hanging head I swore that no creature would drive me up a tree again.

The standards I had kept to insure my return trip from the wild forests of Costa Rica had turned me into a coward. As I walked back

towards the station I cruised briskly over fallen trees that I had sworn to always inspect before crossing. There were less than two months remaining until I would once again comfortably walk the streets of San Francisco, oblivious to their lurking dangers that I knew too well to notice. To come all this way, live in such intense circumstances, and feel like I hadn't conquered the forest demons would be a grave disappointment. I was committed to a new attitude.

Emerging from the forest into the open air, I once again picked up the scent of pig. This time it was sweet: Danny was cooking bacon sandwiches for lunch!



One of our readers from Austria enjoyed the piece on coffee so much that he sent a picture of a statue honoring Franz Georg Kolschitzky on the street by that name in Vienna. Thank you, Prof. Barth!

Chef Roger's Famous Fish.

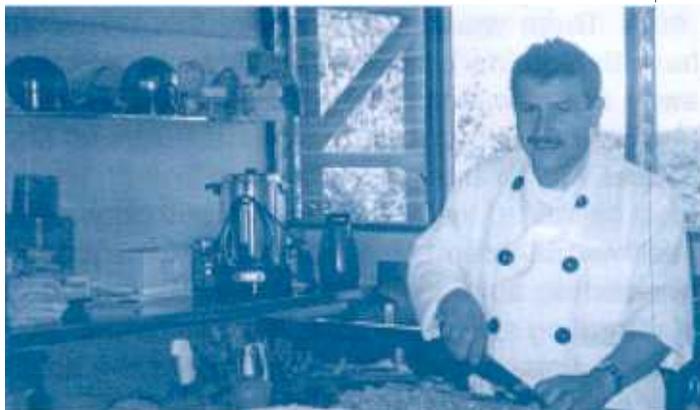
INGREDIENTS

12 filets of fish, about 5 oz. each. I recommend snapper or snook. Clean and sprinkle with fresh white pepper and a tad of finely chopped garlic. Flour them lightly
1 liter of fish stock
1/2 teaspoonful of powdered ginger

1/2 tbs. of cayenne or paprika
1 tbs. of sweet oregano
1 tbs. of finely chopped lemon grass
2 tbs. sliced olives
2 tbs. chopped capers
4 tbs. chopped leek
1 tbs chopped onion
1/2 tbs finely chopped red bell pepper

PREPARATION

In a wide pan, melt half a bar of butter. When hot, put the fish in and let it get golden, Do one side first and then the other. In a bowl, mix the fish stock with all the other ingredients. Add the mix to the pan and gently stir it on, under and around the filets. You may transfer to a baking dish to keep them hot. !Buen provecho!



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THANK YOU!!

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