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ATBC PRESIDENTIAL ADDRESS 2007

WE NEED MORE THAN SCIENCE TO CONSERVE NATURE

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Interdependence and the Cause-Effect Principle

Thich Nhat Hanh, a Vietnamese Buddhist monk once nominated for the Nobel Peace Prize, beautifully described a basic yet critical principle affecting the moment-to-moment course of reality. Holding up a blank piece of paper, he asked: *"If you were a poet, what could you see in this piece of paper?"*

Most of us would see a piece of paper, or perhaps the texture, shape or color of the paper but not more… However, Thich Nhat Hanh's response to this simple question is revealing: *"If you were a poet, you would see clouds floating within this piece of paper. Without the clouds the rain will not exist; without rain the trees cannot grow; and without trees we cannot make paper. If we look deeply, we could see the rays of sun feeding the tree, the logger that cut the tree, the wheat that becomes his bread, and the fathers that raised him…. Without all this things, this piece of paper could not exist."*

Here, Thich Nhat Hanh has expressed the principle of *interdependence*, of *cause-effect*, which is basic in science but rarely recognized and often distant, not really meaningful in the daily life of most human beings, especially for those of us inhabiting urban areas.

Vision of the Future

In the early sixties of the past century, when I was a child, there was a popular cartoon TV series called "The Jetsons" that reflected to some extent the vision that the "developed world" had for human life in the XXI century. In that vision, humans enjoyed a fully-developed technological world, where even minor activities, such as brushing one's teeth or taking a shower, were carried out with the help of machines and robots. In the Jetsons' world, living beings other than humans and the dog "Astro" did not exist.

Consequences of Ignoring the Interdependence Principle

Indeed, the Jetsons' vision was pursued in our societies, very much fueled by economic, social, and political forces (such as the Cold War, the race for the conquest of space, and the development of global economic and commercial consortia) and based on an unprecedented growth of scientific knowledge and technological achievements. Since the beginning of the past century, human life has become increasingly dependent on a technological impetus that is mostly supported by oil and charcoal as energy sources. Our generation has benefited from amazing advances in medicine and technology, which have greatly increased human life-expectancies as well as global population growth rates. As a result, human population size has grown, in just one century, from less than two billon to almost seven billon.

In the Jetsons' world there were no negative consequences of technological development on the Earth's environment; the sky was blue and the land and water were clean. But in the real word, where the principle of interdependence operates, the consequences of human population growth have been dramatic and certainly not

positive for the Earth's environment and for life. This frenetic growth has been attained through a tremendous transformation and loss of Earth's ecosystems and biological diversity (which emerged from a complex and unrepeatable evolutionary history over the course of billions of years). It is calculated that more than 25% of the terrestrial surface of the planet has been transformed into agricultural systems, including the fields used to raise the domesticated animals we consume. We have reached unprecedented degradation records: chemical contamination and physical degradation of rivers, lakes, seas and soils, high rates of species extinction, high rates of invasive species, global warming and climate change exhibited with multiple environmental, social, and economic negative effects. Such Earth degradation has been astonishingly fast. In 1967, when human population density reached about three billon, we were consuming half of the Earth's resources. By 1995, five billon humans were consuming all resources of the planet. Presently, more than 80% of the planet's surface is in some degree affected by the human footprint. If we maintain our present demographic growth rate and our habits of resource consumption, by 2050 we will require two planet Earths to sustain a human population estimated at more than nine billon.

WHAT CAN WE DO?

We urgently need to work to change such a depressed and clearly unsustainable scenario. Broadly, it is clear that this development has resulted from a lack of balance among three major dimensions affecting human well-being: environmental, social and economic forces. Economic systems, mostly those related to big consortia, have enormously expanded, with negative effects on the environmental and social dimensions of our world. Humanity as a whole has not received the benefits of such extraordinary economic growth, evidenced by the tremendous wealth disparities among and within societies. In Mexico, for example, economic dynamics have produced the richest man in the world, while at the same time 50% of the population lives in conditions of poverty. It is also well known that there is a socio-economic division between the global North and South, a disparity that produces a vast inequality in the kinds of health, nutritional, educational, technological, and environmental challenges that people confront.

In such a context, the biggest challenge that humanity faces is finding ways of human development in which social and economic forces could change the route of degradation to that of sustainability. Continuing to encourage the best science, training, and educational activities is important to undertaking this challenge. A great number of discoveries wait to be explored and understood, both in global tropical and non-tropical ecosystems. For example, mysteries about the origin, evolution, and maintenance of biological diversity are starting to be revealed through important advances that have been achieved in the diverse tropical forests and coral reefs. We know little, however, about how life functions in the forest canopies, the ecosystem soils and in the deep seas.

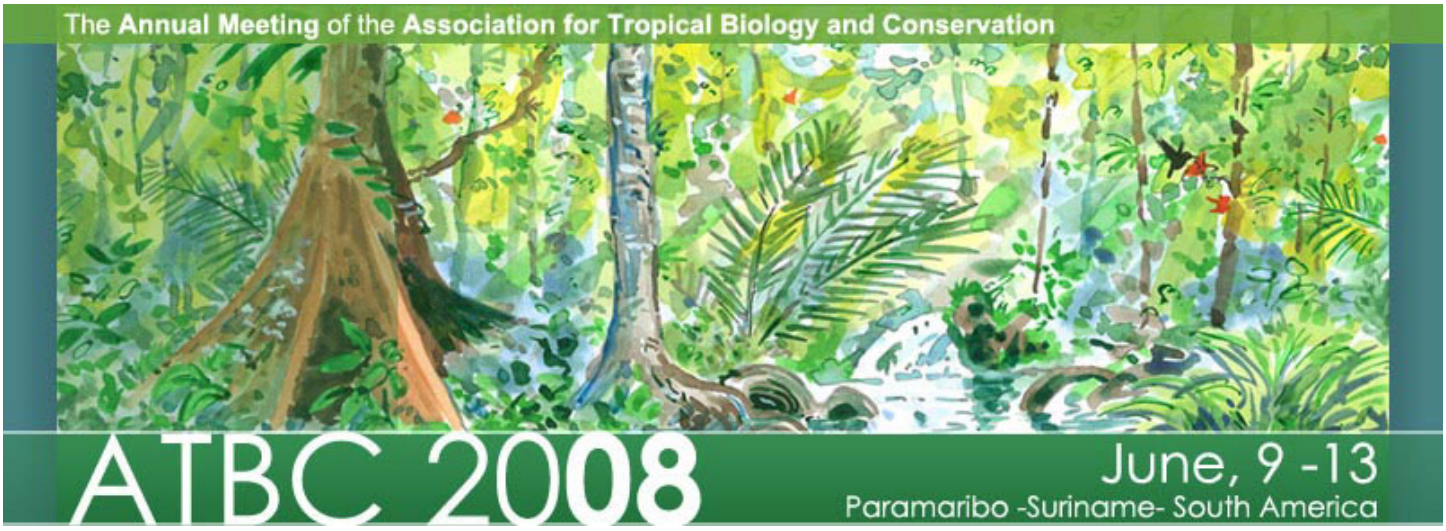
An urgent task is to build interdisciplinary teams of people with expertise in natural, social, and economic sciences looking for principles for sustainable development. How we can achieve the food and energy production needed to sustain human well-being and ensure at the same time the conservation of Earth's ecosystems, including their biodiversity, functions, and services? Most researchers have graduated from disciplinary training programs, which frequently impose strong barriers on collaboration. But to solve these massive problems, we need new training programs (starting from the early childhood stages) which foster collaboration in solving problems for the common good rather than for self-interest. Also, linking social, economic and environmental dimensions in the common goal of sustainable development will require the participation of all social actors and sectors, including users, decision makers, and producers. We need to recognize that there is no more distinction between "nature" and "human impacted" ecosystems. At this moment of the Earth's history, humans are totally integrated as a critical structural and functional component of what has been called "socio-ecosystems".

We have the fortune to live in a beautiful place in the universe, which is very rare to find. Here we have beautiful expressions of life as are found nowhere else in the known universe. From a pessimistic perspective, if we continue our present degradation process of the Earth we will need a Jetsons-like solution to escape to other planets, looking for more resources and possible human habitats. If we travel in a space craft to the closest neighboring plants, however, we will find a very cool, inhospitable home on Mars. If we travel to Venus we will find an inferno, where it is incredibly hard to conceive of any possible form of human development.

One of the immediate actions we can take to help slow Earth's degradation is to be aware of our own resource consumption habits. Returning to the poem of Thich Naht Hanh, we can, for example, ask: "What do you see in a soda-can?" If you follow the way in which such a can is produced and the process by which it ends up in a human hand, you will see things like: several liters of water used for every manufactured can, rainforest transformation into sugar cane fields, rivers contaminated with agrochemicals, air pollution produced in transportation, and the generation of enormous amounts of trash. Negative health consequences of consuming sodas are another additional issue. Ask the same question for any item you use in your daily life and analyze the consequences from an economic, social, and environmental perspective and be aware of the consequences in using such resources.

Most of our daily life is centered in satisfying our requirements: I need this, I need that, I will go there, or I will get that, most of the time without thinking through the consequences of these actions. If we were fully aware of our actions in terms of the consequences of resource consumption, we could attempt to change our self-centered life to a more communal one, translating the word "I" into "We". This awareness is a cultural attribute which is strongly linked to an ethical behavior, and I think this a major leap than can help to change the route of degradation to sustainability. We need to add to our species attributes an awareness component so that we can convert ourselves from *Homo sapiens sapiens* to *H. sapiens sapiens awarensis*, hopefully within this century. We can start with ourselves, and spread this awareness behavior to those in our family, our friends, students (or teachers), and neighbors.

Let me end by citing another beautiful Thich Nhat Hanh poem. *"People usually consider walking on water or in thin air a miracle. But I think the real miracle is not to walk either on water or in thin air, but to walk on earth. Every day we are engaged in a miracle which we don't even recognize: a blue sky, white clouds, green leaves, and the black, curious eyes of a child — our own two eyes. All is a miracle."*



The Annual Meeting of the Association for Tropical Biology and Conservation will convene in Suriname in June of 2008, the second annual ATBC meeting to be held in South America. The meeting, organized by the ATBC and the Society for Tropical Ecology (GTOE), is hosted by the Anton de Kom University of Suriname, in concert with the Center for Agricultural Research in Suriname (CELOS). Optional pre- and post-meeting field trips will bracket the five-day conference, which will be held in the Torarica Conference Center in Paramaribo. In addition, there will be a day of field trips on June 11, during the conference, to allow all participants to have the chance to experience the landscape and diversity of this Guiana Shield country.

With the theme "Past and Present History of Tropical Ecosystems: Cross-Continental Comparisons and Lessons for the Future," the meeting will bring together researchers working in tropical settings world-wide to share research results, explore future collaborations, and appreciate the unique characteristics of Suriname. As a result of its low population density, Suriname is home to one of the most intact rainforests on earth, the Central Suriname Nature Reserve, a UNESCO World Heritage site. Several international institutions and NGOs, including Conservation International, Tropenbos International and the World Wildlife Fund, are actively engaged in promoting the conservation of the ecosystems of the Guiana Shield region. However, there is a need for more effective interaction between the regional scientists and their European and North American counterparts.

One of the goals of the ATBC 2008 meeting will thus be to facilitate contacts and exchanges of views between scientists from within the Guiana Shield region and from other countries worldwide. The organizers hope that this international conference on tropical biology will promote exchange, improve within-region scientific capacity and facilitate studies that improve the critical knowledge and conservation of natural habitats. Scientists from the region have largely worked without the benefit of an organization capable of actively linking them. Most research projects have been carried out in relative isolation from other regional initiatives, despite the globally unique, but regionally shared, combination of ancient geology, high rainfall, poor soils, vast forests and few people. There is no greater current need than to bring scientists and conservationists from all continents together to the Guiana Shield to share their knowledge and their common interests in the long-term study, protection and sustainable use of tropical ecosystems. This process will, we hope, be initiated under the umbrella of the annual ATBC meeting in 2008, and continued in future meetings.

In addition, the ATBC meeting in Suriname will also lead to an exchange of ideas between institutions and researchers from all parts of the world that have a common interest in research on and conservation of Guianan ecosystems. A major outcome we expect to arise from this conference is the promotion of more effective collaborations within the Guiana Shield for the conservation of the tropical ecosystems at the regional level.

Regular registration for the meeting closes on April 14, 2008. Those planning to attend should consult the conference web pages, at http://www.atbc2008.org/ for details about symposia, participants, and other details. The website includes information on registration, travel, visas, and conference program. The article on page 4, by Paul Ouboter and David Hammond, provides a more detailed look at Suriname, its biology, history, and science, as a prelude to what should be a fascinating ATBC annual meeting.

Biological and Environmental Research in Suriname

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At the heart of the Guiana Shield

Suriname's forests sit almost entirely atop the ancient craton commonly known as the Guiana Shield. Like its close neighbours, Guyana and French Guiana, Suriname has experienced little deforestation relative to other tropical regions. With a population of less than one-half million, it also has the second highest forest area per capita in the world (Hammond 2005). In a world where unmodified forests continue to disappear at alarming rates, Suriname has largely remained a safe haven. A commitment to protect a large portion of its forests led to the amalgamation of various existing parks and national forests into the 16,000 square kilometre Central Suriname Reserve in 1998, one of ten 'mega-parks' (over 10k km^2) located in the Guiana Shield region.

The Guiana Shield is of Precambrian age (>550 MA BP) and entered the tropical belt sometime during the Late Carboniferous (306 Ma BP), making it one of the longest-standing tropical terrestrial environments on the planet. Up until the Late Cretaceous, much of the area is thought to have been largely arid (Scotese 2001).

Since then, high rainfall combined with extremely weathered, crystalline geology have combined to create an uncommon set of living conditions typified by very low pH and the effects that this condition by proxy has had on plant and animal life. White sands, blackwater rivers, isolated tablelands (tepuis) and massifs, dyke and sill-borne river rapids and oligotrophic scrub savannas produce a landscape full of uncharted biological surprises. Some of the highest densities of Caesalpinoid legumes and Chrysobalanaceae in the wet tropics typify many forests in Suriname (ter Steege and Zondervan 2000), as well as some of the highest abundances of other distinct lowland tree taxa, such as the Lecythidaceae, Sapotaceae, Annonaceae and Lauraceae (Maas 1971). Many of these local dominants are considered to belong to basal, or ancestral, clades within their respective groups (e.g. *Sextonia* and *Chlorocardium* in the Lauraceae (Chanderballi et al. 2001)).

Many of the largest-bodied, neotropical fauna also remain an integral part of forest life here. The Harpy eagle, Giant river otter (*Pteronura*), Jaguar, Anaconda (*Eunectes murinus*), Black caiman (*Melanosuchus niger*), Tapir (*Tapirus terrestris*), red-faced Spider monkey (*Ateles paniscus*) and troops of a pernicious seed-eater, the bearded saki (*Chiropotes satanus*) combine with roving herds of white-lipped peccaries (*Tayassu peccari*), flocks of grey trumpeters (*Psophia*) and some of the most diverse bat and rodent communities known. The region as a whole also sports some bizarre and spectacular symbiotic and saprophytic fungal communities (e.g. Henkel et al. 2002; Perreijn 2002), some of the largest-seeded tree communities (van Roosmalen 1985), impressive armoured catfish, and the flamboyant, socially sophisticated cock-of-the-rock (*Rupicola rupicola*), to name a few. With few taxa unique to the country, but the best cross-section of what the region has to offer, Suriname is at a biogeographic crossroad, making it perhaps the best place to see it all at the heart of the Guiana Shield.

Biological Research in Suriname

Much of this outstanding diversity is known through a long legacy of biological enquiry dating back to the 17th century. During most of the period between 1667 and 1975, Suriname was a Dutch colony, and consequently most of the explorations were carried out by the Dutch. However, the first naturalists to study Suriname were all German and French, among them Maria Sybilla Merian, who arrived in 1699. In those days most naturalists were hobbyists that collected plants and animals to find new species. Consequently, Linnaeus received many specimens from Suriname, making its forests the type locality for many of the larger Neotropical animals and trees.

The exploration of Suriname was taken up seriously in the 20th century, and more than 42 expeditions to the interior were carried out (reviews in Holthuis, 1959 and Hoogmoed, 1973). Applied biological and ecological research was also begun in the early 20th century. Before World War II the focus was mainly on agricultural and medical entomology. Most of the studies on vegetation science, animal ecology and ecosystem functioning were only initiated after 1960. In the sixties, one of the major projects focused on biological changes occurring in the Brokopondo Reservoir after closing of the dam in 1964 (e.g. v. Donselaar, 1968; v.d. Heide, 1973; Leentvaar, 1975, 1993). At that time the Brokopondo Reservoir was the largest man-made lake in the humid tropics. During the period 1970-1980 inventories continued, now focused on the Kabalebo area (e.g. Vari, 1982) in relation to plans to create another man-made reservoir in that area, and the vegetation of the Coastal Plain and Savanna Belt (Teunissen, 1976, 1978). In addition, the Mammal Division of the Carnegie Museum carried out expeditions in Suriname (e.g. Genoways *et al*., 1982). The Nature Conservation Division established a research department and

Brokopondo Lake, at Brownsberg National Park. Photo by P.M. Forget.

several foreign scientists worked on conservation related issues (Spaans, 1975; Duplaix, 1980; Spaans & de Jong, 1982). In this period the Raleighvallen/Voltzberg area was developed for biological research and Mittermeier and van Roosmalen initiated ecological and ethological research on primates (e.g. Mittermeier, 1977, 1978; v. Roosmalen, 1980; Mittermeier & v. Roosmalen, 1981). By this time enough data were gathered for the fauna of Suriname to start publishing monographs on several taxonomic groups: water bugs (Nieser, 1975), Crustacea (Holthuis, 1959), tree frogs (Goin, 1971), lizards (Hoogmoed, 1973), birds (Haverschmidt, 1968;

Canopy view at Brownsberg National Park. Photo by P.M. Forget.

Haverschmidt & Mees, 1994) and mammals (Husson, 1978).

The period that followed was one of little activity. A civil war during the 1980-90's made visiting the interior of Suriname risky but some limited biological research activities in the period 1982-1996 were conducted on armoured catfish (Mol , 1993, 1994, 1995, 1996), on freshwater ecosystems (Ouboter, 1993) and on caimans (Ouboter and Nanhoe, 1987, 1988, 1989; Ouboter, 1996). However, it is also the period when Surinamese institutes, in particular the National Zoological Collection (NZCS) of the University of Suriname, start organizing expeditions to the interior: 6 expeditions were carried out to Sipaliwini River and Sipaliwini Savanna, Zuid River, Upper Nickerie River, Upper Tapanahony River and Oelemari River, focused on terrestrial arthropods, fish, amphibians and reptiles.

After stabilization of the political and economical situation, approximately from 2000 on, the number of visiting biological researchers has increased. At the local level, most forest research has gravitated towards environmental issues attached to the logging and mining industries. The University of Suriname acts as the main local institute active in biological and environmental research in the country. The NZCS and the Environmental Research Center (CMO) are fused, re-directing the focus more on integrated research of animal responses to environmental disturbances, including the identification of indicator species/groups and the use of these in monitoring. Much effort continues to be made in monitoring mercury pollution in aquatic ecosystems (Ouboter, 2007) and the evolution of aquatic ecosystems stressed by mining activities, especially increased turbidity (Mol & Ouboter, 2004). Fish inventories of the Brokopondo Reservoir have started again to investigate the continued evolution of the system (Mol et al., 2007). Many of these projects are being done in collaboration with the Centre for Agricultural Research in Suriname (CELOS), another affiliate of the University of Suriname. Biological inventories of hardly known areas continue, but with an emphasis on future mining areas (Bakhuis Mountains, Nassau and Lely Mts.) and protected areas (Tafelberg and Upper Coppename River Basin (Alonso & Berrenstein, 2006) in the Central Suriname Nature Reserve). Three recent inventories in the Nassau Mts. have revealed several species new to science, including dung beetles, fish and frogs (Alonso & Mol, 2007; Larsen, 2007; Mol et al., 2007; Ouboter et al., 2007; Watling & Ngadino, 2007). CELOS is also active in forestry research and the CELOS Management System (CMS) is being further assessed for its potential use. Raleighvallen/Voltzberg is selected as a long-term monitoring site for TEAM, an initiative of Conservation International. The Foundation for Nature Preservation in Suriname (STINASU), was active in sea turtle monitoring on two of the beaches and wildlife and vegetation monitoring at Brownsberg. Unfortunately, by 2005 their activities became very limited and monitoring at Brownsberg fully stopped.

Several foreign scientists have been active in Suriname during recent years, including Pierre-Michel Forget (animal-plant interactions at Brownsberg), Jim Sanderson (camera trapping at Brownsberg, Raleighvallen and Bakhuis), Sue Boinski (primates at Raleighvallen) and Marilyn Norconk (saki monkeys at Brownsberg), among many other respected researchers. Scientists of the Geneva Museum of Natural History visited Suriname for several expeditions and scientists of the Utrecht Herbarium (e.g. Hans ter Steege) carried out inventories on three high bauxite plateaus.

The number of local institutes active in biological and environmental research has decreased over the years. However, the quality of the research projects is generally increasing, in part through greater cooperation with institutes abroad. For the near future, the focus of the local institutes will be on inventories of high bauxite plateaus (Nassau, Lely, Brownsberg) and protected areas. Research on mercury pollution will continue with a focus on Western Suriname and the Brokopondo Reservoir. It is likely that research on the CELOS management system will continue on large-scale applicability of the system. The research on indicator species and taxonomic groups is evolving from a taxonomic-driven programme to one emphasizing forest community responses to environmental disturbance and change.

It is hoped that a wellspring of scientific research will develop with new found political and economic stability in Suriname, greater interest and opportunity for research at the University of Suriname and a growing interest from collaborating foreign scientists and long-standing institutional partners.

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The Nigerian Montane Forest Project

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INTRODUCTION

Afromontane forests are found from 990 m to 4000 m altitude depending on latitude and proximity to the sea. They contain broad-leaved, hardwood trees, and less frequently conifers. Fig. 1 illustrates the Afromontane regional systems identified by White in 1983, in which he described them as an Afromontane Archipelago because they are discontinuous and separated from each other by lowlands. Despite their disjunct distribution, the endemic Afromontane flora is surprisingly uniform in tree species composition and structure, which has led many authors to recognize Afromontane vegetation as belonging to its own, biogeographically distinct, Afromontane phytochoria. The structure and tree species composition of any single montane region depends on a combination of factors including rainfall, altitude, age and ecoclimatic stability. Lower, wetter forests have emergents up to 35-40 m high such as *Entandrophragma, Pouteria* and *Ekbergia*. Characteristic canopy species (which are typically between 15-25 m high, depending on location) include Podocarps (genera *Podocarpus & Afrocarpus,) Prunus africana, Ilex mitis, Hagenia abyssinica, Polyscius fulva* and species of *Maytenus, Neobutonia, Olea* and *Drypetes* (White 1983). The plant families Curtisiaceae and Oliniaceae are Afromontane endemics, and the family Barbeyaceae is a near-endemic. The tree genera *Afrocrania, Curtisia, Balthasaria, Hagenia, Kiggelaria, Ficalhoa, Leucosidea, Trichocladus, Platypterocarpus, Widdringtonia,* and *Xymalos* are Afromontane endemics or near-endemics. West African montane forests are less rich in tree species than East African ones, and are often located in disturbed grassland and forests of more Guineo-Congolian affinities (Thomas & Achoundong 1994).

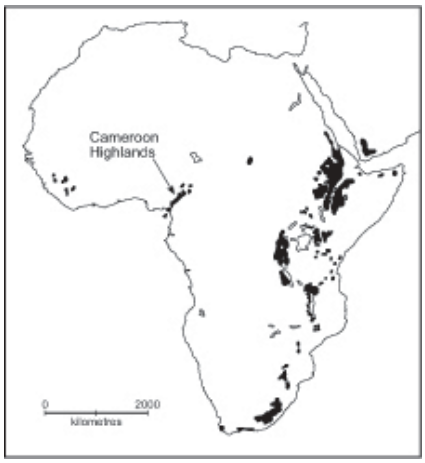

Fig. 1. Map of Africa showing the disjunct distribution of the Afromontane regions in black. The arrow points to the Camaroon Highland Region, of which the Nigerian Mambilla Plateau is part.

The fauna and flora of the Cameroonian Highland forests (Fig 1), have high levels of endemism and are a priority for conservation on a global scale (Fishpool, 1997), yet they are poorly protected and highly fragmented. Fragmentation and degradation of the Cameroon Highland forests is being exacerbated at a rapid rate by land clearance for farming and grazing, and hunting for bush meat is leaving these forests empty of larger animals.

Historically, Nigeria's montane forests were rich in wildlife, and the whole of the Cameroon Highlands has been recognized by Birdlife International as an Important Bird Area (IBA) (Ash et al., 1989). In Nigeria, despite some of these forests being officially protected, all Nigerian montane forests are vulnerable to exploitation, and animal populations have been severely reduced since the 1970's (Chapman et al. 2004). Such a decline in frugivores, pollinators and seed predators is likely altering forest structure and floral diversity by altering patterns of critical ecosystem processes.

If Nigeria's montane forests are to survive, and if restoration into degraded areas is to succeed, it is important that we understand how these forests function in terms of plant-animal interactions, something we currently know little about. While there is a growing literature on frugivore decline and its consequence on forest structure and function in the wet tropics (eg. Chapman, 1995; Forget and Jansen, 2007), little has been published from Afromontane forests.

In 2002 I led a group comprising colleagues and students from the University of Canterbury, New Zealand, the Nigerian Conservation Foundation (NCF), and Nigerian National Parks, to re-survey the montane forests of Taraba State, Nigeria (Fig 2). The forests had first been surveyed during 1970's when my father, J. D. Chapman, made detailed botanical investigations as part of his work with the Nigerian Government Forest Service (Chapman & Chapman 2001). One outcome of this 2002 expedition was the identification of Ngel Nyaki Forest Reserve as a potential research site for studies into different aspects of the ecology and evolution of Nigeria's montane forests, in particular plant- animal interactions. Because Ngel Nyaki is fairly typical of many of Nigeria's montane forests in terms of plant and animal species composition, the idea was to use

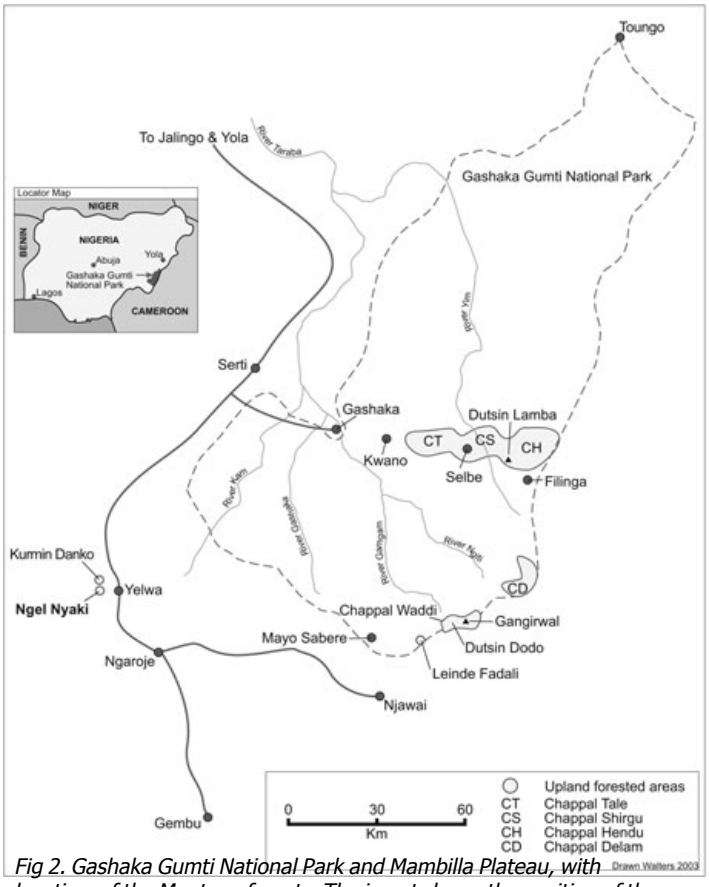

Fig 2. Gashaka Gumti National Park and Mambilla Plateau, with locationsof the Montane forests. The insert shows the position of the main figure within North Eastern Nigeria.

Ngel Nyaki forest as a model system from which to extrapolate research findings to Nigerian montane forest ecosystems in general, and apply findings to forest management. Ngel Nyaki Forest Reserve (07o 14' N, 011o 04' E) is approximately 46 km2 in area, with about 7.2 km2 of undisturbed forest, and is located between 14500-1500m elevation on the western escarpment of Mambilla Plateau, an area of 3100 km2 in the south east corner of Taraba

Montane forest confined to steep, relatively inaccessible slopes at 2000m in Chappal Waddi, close to the highest point in Nigeria.

Montane stream fringing forest on Chappal Hendu, approximately 1600m.

State (Fig. 2). The Plateau is dominated by rolling, overgrazed grassland, at an altitude of 1500-1600m asl. Ngel Nyaki is one of the most floristically diverse montane - submontane forest stands in Nigeria (Dowsett-Lemaire, 1989); at least four endangered tree species *(Entandrophragma angolense, Lovoa trichilioides, Millettia conraui* and *Pouteria altissima)* are common. Emergents up to 30m tall include *E. angolense, Newtonia buchananii, P. altissima* and *Lovoa trichilioides*. The forest is also rich in mammal species, especially primates, including the Nigerian chimpanzee *Pan troglodytes vellerosus*, putty nose monkeys *(Cercopithecus nictitans)* and tantalus monkeys *(Chlorocebus tantalus.)* Despite the poaching pressures, wildlife (animals and birds) are still relatively abundant.

The forest was gazetted a Local Government Reserve in 1969, and was patrolled throughout the 1970's. However a lack of Government funding from the early 1980's onwards resulted in the neglect of Ngel Nyaki Forest Reserve by the State and Local Government Forestry Department, and a rise in hunting and people infringing into the Reserve for farming and cattle grazing. The climate on Mambilla Plateau is seasonal; the dry season is from November to March with the first rains in early April. Mean annual rainfall exceeds 1780 mm with little to no rain falling in the dry season (Chapman & Chapman 2001).

NIGERIAN MONTANE FOREST PROJECT

The Nigerian Montane Forest Project (NMFP) was initiated in 2003, with the Project Partners being the Nigerian Conservation Foundation (NCF), the Taraba State Forestry Department and The Federal University of Technology, Yola. Since then Gombe State University has become involved and supports the project both logistically and financially.

The aims of the Project are to: 1) combine scientific research with education at both tertiary and local community level in order to develop long term sustainable management of Nigeria's montane forests; 2) facilitate the involvement of national and international researchers in Nigerian montane forest research; and 3) involve the community in the management and restoration of montane forest ecosystems. To this end the Project facilitates the training of Postgraduate research students from Nigerian and International Universities in a range of ecological / evolutionary research topics, with an emphasis on plant-animal interactions. All field assistants are trained in plant identification, and several have been sent on computer courses to learn word processing and data input techniques.

Initially (2003-2004) the Project had no physical base, and research was restricted to the dry season. The Project then employed two field assistants and support staff from Yelwa village. During 2003-2004 four postgraduate students undertook research work with the Project, and two thousand trees along transects within the forest were labelled with aluminium tags and are now scored on a monthly basis for phenological traits such as flowering and fruiting. On January 1st 2005 the local youth group began making the bricks for the field station – the local farming community were determined that the Project should have a base, and were very supportive of it. The land on which the field station is built was donated by the Taraba State Forest Service, and is within the Forest Reserve. Funding was donated by the Canadian oil company Nexen Nigeria. By mid 2006 we had a herbarium and computers, and now have a nursery which is growing native trees for restoring forest into the neighbouring degraded grasslands. Together the nursery and herbarium are invaluable aids to tree and seedling identification. Other support offered by the Project to researchers are the phenology data (we now have four years data), daily temperature and rainfall data, and importantly, field assistants trained in tree species identification.

A variety of projects have been established at the site, exploring

The field station during the rainy season, July 2006.

aspects of the botany, zoology, and ecology of the region. From these projects and other ongoing research at Ngel Nyaki we are beginning to build up an understanding of the frugivores in the forest and their role in seed dispersal, as well as rates of seed predation and secondary dispersal. This year we are beginning a large project aimed at producing a pollination web of the forest. In addition to postgraduate research projects the NMFP runs a postgraduate field course for Forestry and Wildlife MSc students from the Federal University of Technology Yola. The field course includes workshops on herbarium, plant collection and identification techniques, as well as lectures on biodiversity. The field station also acts as a base for Postdoctoral research studies for biology lecturers from the new Gombe State University, which is in the process of developing its postgraduate curriculum.

The NMFP employs eight full time field assistants as well as three addition logistic staff from Yelwa village and the surrounding communities. Five patrollers are paid for by the Leventis Foundation, and work through the NMFP with NCF.

Support for the Project comes from many sources ranging from corporate sponsors to friends in Lagos. Our long term sponsors are Nexen Nigeria, the North of England Zoological Society and the Leventis Foundation. The American Woman's Committee Lagos Branch, DHL Nigeria, and the American International School have all made major contributions. Scientific grants have come from a range of granting bodies including The Rufford Laing Foundation, Flora and Fauna International, NZAid, and the University of Canterbury.

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ATBC ASIAN-PACIFIC CHAPTER MEETING IN SARAWAK

The next meeting of the ATBC Asia-Pacific Chapter will be held in Kuching, Sarawak from 23-26th April 2008. The theme chosen for the meeting was "Towards sustainable land-use in tropical Asia-Pacific," to reflect the pressing need in the region, with its burgeoning populations and increasing levels of consumption, for solutions to the over exploitation of biological resources.

Papers are invited. Please submit abstracts (300-500 words) for oral or poster presentations to atbc_asia@yahoo.com.

For further information and online registration please consult the meeting's webpage; www.atbcasia.org.

The meeting is being organized in collaboration with the Japanese Society for Tropical Ecology, and guest and keynote speakers include Pierre-Michel Forget (current ATBC president), Isamu Yamada (JASTE president), Priya Davidar, Vojtech Novotny, Bill Laurance, and Jeffery Vincent.

Registered symposia include;

1) Forest-based production systems in Mainland Southeast Asia: Community forestry and agroforestry.
2) Impacts of oil palm and other plantations on biodiversity
3) Biodiversity conservation in natural production forests
4) Effects of rainfall variability on water and nutrient cycling in tropical forests under the Asian monsoon climate
5) Plant-animal interactions in a changing tropical landscape
6) Molecular ecology symposium
7) Toward understanding of the structure, dynamics and functional roles of Arthropods in tropical forests
8) Research and conservation activities at Gunung Palung National Park, West Kalimantan, Indonesia
9) Biodiversity and people in Borneo

Late symposium proposals will be considered.

Asian ATBC 2007 Meeting Papers Available Online

A variety of papers from the Asian ATBC meeting held in Mahabalipuram, India, in March, 2007, are accessible online in the Indian journal *Current Science*. The special section on The Asian Biodiversity Crisis was edited by ATBC Council Members Priya Davidar and Richard Corlett. *Current Science* Volume 93(11) includes papers by Peter Ashton, William Laurance, Nihara R. Gunawardene and colleagues, Priya Davidar and colleagues, Richard Corlett, Charles Cannon and colleagues, Julie Denslow, Miriam Goosem, and Shigeo Kobayashi. The papers can be accessed at http://www.ias.ac.in/currsci/dec102007/contents.htm

An End to Wishful Thinking

Review of: McShane, T. O. and M. P. Wells, 2004. *Getting Biodiversity Projects to Work*. Cornell University Press, Ithaca, NY. 464 pp.

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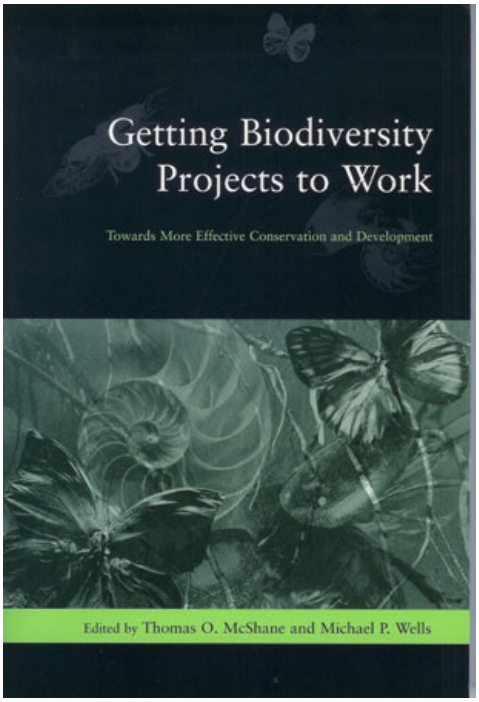
While the foolishness of causing a massive and largely uncontrolled disturbance to the few remaining natural areas seems patently obvious, the means to prevent such an event are much more difficult to discern. Since its inception in the late 1970's, the international movement to save the Earth's biodiversity from wasteful destruction by simple human appetite has gone through a rapid and rocky evolution. Confronted by the global imbalance between economic and biologic wealth (countries with small economies generally have the most diverse ecosystems and human cultures), the good intentions of experts from wealthy countries have often been lost in translation. T.O. McShane and M.P. Wells, editors of "Getting Biodiversity Projects to Work", have produced an important book which provides a hard-nosed appraisal of the latest trend in the movement: the Integrated Development and Conservation Project (IDCP).

The first few chapters of the book provide informative overviews of the current IDCP approach and how it is a necessary improvement over previous efforts that focused primarily on the protection of natural resources. These efforts were largely doomed to failure because they ignored the economic and social development of the people who would have to forfeit their own opportunity to gain wealth through natural resource exploitation. Ideally, a successful IDCP would generate a robust balance between human prosperity and biotic sustainability. But, as most authors in this book recognize, this 'win-win' philosophy is simply not feasible in the vast majority of situations and is a dream that needs to be amended. More reasonable goals need to be identified and sacrifices must be made. As the critical global trends in human population growth and conversion of natural landscapes continue towards an apparent boiling point, the invaluable lessons learned from these natural experiments in human nature and culture must be carefully examined so that the same old mistakes are not made time and again.

As outlined by K. Brown (Chap. 11) and clearly discussed by Salasky and Margolis (Chap. 16), the IDCP must be a continued process of negotiation and trade-offs between the various players involved. Robinson & Redford (Chap. 2) and McShane & Newby (Chap. 4) emphasize the many dangers of entering into an IDCP without first defining clear objectives and generating reasonable expectations. Starting from the implausible 'win-win' standpoint, an IDCP is prone to actually generate more negative tensions and lead to major frustrations, leading to 'lose-lose' situations. Another strong message that emerges from the book is that a balance between the "D" and "C" in the equation is possible, but generally if the "P" is removed. Sayer and Wells (Chap. 3) point out the many inherent contradictions between the lifespan of a 'project' and the real objectives of "IDC". Short time horizons, a flood of international money, and externally defined objectives often do little but stir up an ant's nest of trouble. The examples of success in the book all stem from long term commitment by the people involved and a true integration of the objectives and activities of both the 'projectee' and the 'projector', as described in the chapters on IDC efforts in Costa Rica (Brandon and O'Herron, Chap. 8), Zambia (Child, Chap. 12), and India (Singh, Chap. 13).

Which raises one major aspect of this process that the book generally neglects: the identity and motivations of the 'projector'. The view from the book is largely unilateral: 'we, the conservationists'. While careful attention is paid to defining the local human populations, their goals, needs, and settings, very little attention is given to the characteristics of the 'projector'. Salafsky and Margolis begin with a conceptual discussion of 'does a hammer work?' but without any mention as to who picked up the hammer or why. The interaction between the external, educated, and monied projector and the local, impoverished, and rural projectee is an essential and bilateral one. More attention should be given to how the characteristics, management styles, and even personalities of the foreign counterparts have an impact on the success or failure of IDCPs. It would have been nice to have had an overview of how different local cultures interact with IDCPs. Contrast the setting described by Gartlan (Chap. 10) in Cameroon, where the bushmeat trade is a major concern and many villagers live in the protected areas themselves, with that found in India (Singh, Chap. 13), where the people are vegetarians and nature is held in a sacred regard. In many places, like in Zambia (Child, Chap. 12) and India, the breakdown of traditional hierarchical structures in society are necessary before even well-designed IDCPs can be successful. While this type of social revolution is beyond the scope of the typical IDCP, it is necessary to recognize when this is the case.



The numerous case studies presented in the middle of the book are where the true lessons lie. The chosen studies illustrate a wide range of perspectives, from large multi-national organizations like CARE (Franks and Blomley, Chap. 5), which balance IDCPs around the globe, to the struggles of a minority tribal group in the Philippines in their attempt to claim their basic human rights (Tongson and Dino, Chap. 9). The decision of the editors to include Glick's chapter on the Greater Yellowstone Ecosystem (USA) was a valuable one, as well. In this example, the issues of land tenure are turned on their head, with one of the major issues limiting conservation options in this setting being the prevalence of private property around Yellowstone. As Tongson and Dino describe, getting land tenure is often the first step for local communities in IDCPs. We need more examples from developed countries, which are the longest running experiments in conservation in existence. Just because a country's economy is strong, its biodiversity is not secure.

This book is a valuable read for anyone seriously interested in biodiversity conservation, whether you have years of experience or are just thinking about getting involved. But it leaves one fundamental question unaddressed: while 'win-win' is too optimistic, is the only viable answer 'win-lose' and who chooses which side you are on? Humans are essentially biological organisms and we shouldn't be placed any higher than bacteria on the Tree of Life, nor should we expect our collective actions to turn out any better. So, is it possible for a population of rational animals to slowly coast up to their carrying capacity and remain there, or are we doomed to overshoot the mark and come crashing down as old Malthus warned? If left up to natural selection, we'll go screaming past the limits and not even notice until the wheels are coming off. Can humans really learn to be more than just mammals and not just 'do it like they do on the Discovery Channel'? The question is a huge one and far from being answered in the affirmative.

Another Look at Costa Rica's Diverse Avifauna

REVIEW OF: Garrigues, R., and R. Dean. 2007. The Birds of Costa Rica: A Field Guide. A Zona Tropical Publication (from Comstock Publishing, Cornell University Press, Ithaca, NY). 387 pp.

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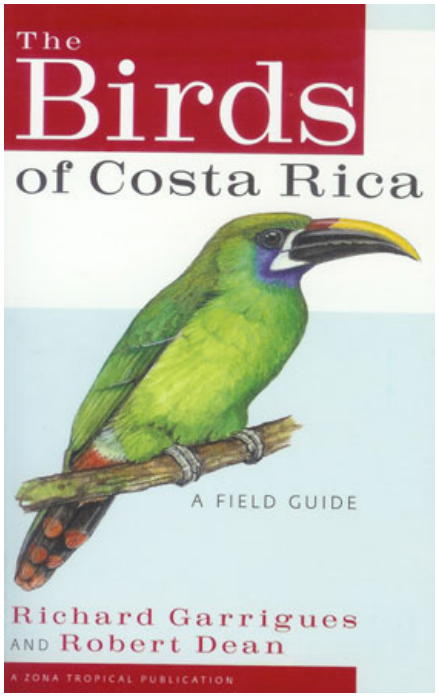
Any new field guide to the birds of Costa Rica needs to escape the long shadow cast by F. Gary Stiles and Alexander F. Skutch's *A Guide to the Birds of Costa Rica* (1989, Comstock Publishing), a classic of its kind. This new pocket-sized guide by Garrigues and Dean succeeds by not trying to outdo its formidable predecessor. Instead, it aimed to be something different. For all of its vast worth, Stiles and Skutch is not really a field guide in the strict sense: it is bulky, heavy, and long on text while being relatively short on illustrations. Mind you, the text is peerless. It contains a wealth of information on the ecology and behavior of Costa Rica's birds, not just clues on how to tell them apart in the field. Moreover, I am loathe to carry books in the field at all—I prefer to study extensively in advance and take copious field notes so I can work out an unknown bird later in the day. I am often favorably disposed, then, to guides "long on text."

Still, I am sympathetic to those who prefer to carry a guide with them; to those people, "transportability" is a cardinal issue. To this end, *The Birds of Costa Rica* is a classical field guide that could slide easily into a hip pocket: it is lightweight and slim, and in contrast to the "central plate" format of Stiles and Skutch it uses the "facing page" format of many of the most popular field guides. By this format I mean that a color plate on the right page faces a page of text and range maps. The well-done and accurate maps are something not to be found in Stiles and Skutch, which relied solely on written descriptions of distribution. For a country as small as Costa Rica, it may seem that the written word would suffice, but with a remarkably diverse fauna, topography, and range of habitats, sound range maps are a great stride forward.



The text is necessarily terse—the "facing page" format is quite restrictive in this sense—but it hits the high points of field identification, with key field marks printed in boldface type. Besides, the authors make no secret that those wishing to learn more than field marks should consult Stiles and Skutch. The accompanying illustrations range from adequate to handsome. Some have odd shapes (e.g., the Black-faced Grosbeak [*Caryothrautes poliogaster*] is much too "box-headed," the Pheasant Cuckoo [*Dromococcyx phasianellus*] not disproportionately tiny-headed enough), but generally both the shapes and colors are captured well. Some groups, such as the wrens (Troglodytidae) and raptors (Falconiformes), are particularly well rendered.

The voice descriptions are also terse, enough so that they are unlikely to be helpful to the neophyte. The descriptions in Stiles and Skutch are better, but the eager traveler need not worry: there are several superb audio sets available of Costa Rican birds. In particular I recommend *Voices of Costa Rican Birds: Caribbean Slope* by David L. Ross, Jr., and Brett M. Whitney (1995) and the *Costa Rican Bird Song Sampler* by Ross (1998), both published by Cornell Laboratory of Ornithology (Ithaca, New York). Once voices are learned, the brief transcriptions in this guide will likely help jog a flagging memory.

There are no taxonomic surprises, as Garrigues and Dean followed the 7th edition of the American Ornithologists' Union's *Check-list of North American Birds* (1998, A.O.U., Washington, D.C.) plus its annual supplements through 2006 (*Auk* 123:926–936). To those familiar with taxonomy and nomenclature in Stiles and Skutch, the authors provide a handy "taxonomic notes" appendix that cross-references current usage to usage in the earlier tome. This section also lists all species added to Costa Rica's burgeoning list since 1989. Garrigues has been meticulous in compiling these data, so the book is as current as one could hope. For example, this guide has accounts for the Southern Lapwing (*Vanellus chilensis*) and Shiny Cowbird (*Molothrus bonariensis*), species that colonized Costa Rica in 1997 and 2004, respectively.

In short, this new book will not supplant Stiles and Skutch, but Garrigues and Dean are to be commended for producing a work that lives up to their goals: a truly portable field guide to Costa Rica's sizeable avifauna.

Belize's Birds Get Their Due

REVIEW OF: Jones, H. L. 2003. Birds of Belize. University of Texas Press, Austin. 317 pp.

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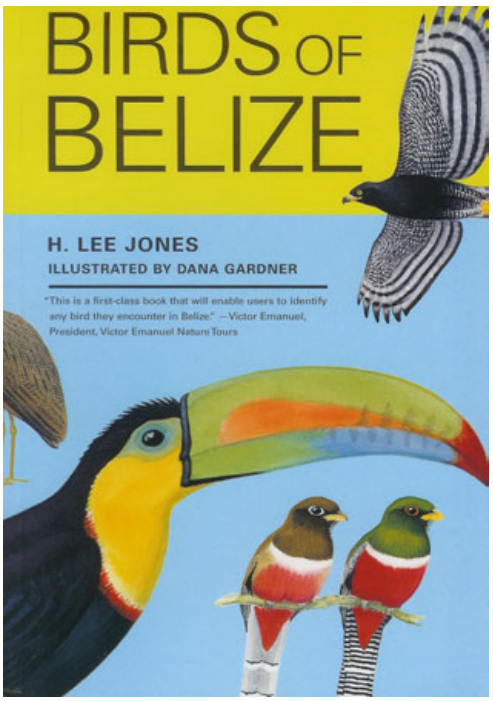
The tiny nation of Belize is an oft-ignored but richly rewarding destination for birders. Despite its small size—it is slightly smaller than the state of Massachusetts—nearly 600 species have been recorded within its borders. Yet until the appearance of Steve N. G. Howell and Sophie Webb's monumental *A Guide to the Birds of Mexico and Northern Central America* (1995, Oxford University Press), the country's rich birdlife was not covered in a field guide. Now, a few short years later, a second field guide covering the birds of Belize has appeared, and this one is devoted solely to that country.



The question many birders and naturalists will have is whether a second guide is needed. The short answer to this question is "yes." Lee Jones' book has a

wealth of information and innovations that make it not only a fine supplement to Howell and Webb but it is superior in several ways. For those focused on Belize, Jones' book will suffice admirably. For those interested in Middle America as a whole, this guide provides a sound introduction to its avifauna.

Key among the strengths is Jones' transcriptions of vocalizations. They are the best I have seen in any field guide, in that they are both easy to understand and, most important, accurate. Penning a written-word description of a song or call is notoriously difficult. One can adopt the strategy of inventing a clever phrase, such as the well-worn "Old Sam Peabody, Peabody, Peabody" for the song of the White-throated Sparrow (*Zonotrichia albicollis*), to say nothing of onomatopoeic English names such as the Sora (*Porzana carolina*) or Dickcissel (*Spiza america*). Alternatively, one can play Henry Higgins and construct a tortuous phonetic description of the song and hope the readers can follow along; Howell and Webb went this route. Jones successfully splits the difference: his transcriptions are neither the cutesy phrases of yesteryear nor long strings of unfamiliar combinations of letters that are difficult to parse.

Another key strength is the distributional information. Building on the *Annotated Checklist of the Birds of Belize* (2001, Lynx Edicions, Barcelona) that Jones coauthored with A. C. Vallely, this guide contains the most accurate and up-to-date information on the status and distribution of the birds of Belize. Knowledge of the country's avifauna has progressed considerably since the Stephen M. Russell's landmark "A distributional checklist of the birds of British Honduras" (1964, *Ornithological Monographs* no. 1). With a critical eye, Jones has compiled all new records for the country and reassessed status of many other species. What stands is a solid reference to where and when each species occurs or has occurred in the country. To these data are added range maps for all species that occur regularly. These maps are far more detailed than those in Howell and Webb, which is understandable considering that that book covered a vastly larger region. Curiously, all of the maps are placed in the back of the book, in a sort of appendix. It is unclear why this choice was made. Range maps accompanying the respective species' account would have been far more helpful. Instead, one flips to the appendix to view the map, rather in the style of the old Peterson series field guides for mammals or herpetofauna for North America north of Mexico.

Unlike Howell and Webb, Jones follows taxonomy and nomenclature established by the American Ornithologists' Union check-list committee (most recently published in full in 1998, the seventh edition, with annual supplements appearing in the July issue of the *Auk*). Obviously, an author can use whatever names and follow whatever taxonomic decisions he or she wishes, but one does so at one's own risk. Howell and Webb is rife with novel splits, a few lumps, and numerous English names either long out of use (e.g., Rosita's Bunting for *Passerina rositae*, the Rose-bellied Bunting) or appearing therein for the first time (e.g., Gray Silky for *Ptilogonys cinereus*, the Gray Silky-flycatcher). Birders invariably love splits—it means more "ticks" for them—but only a handful of splits in that book have since been adopted by the A.O.U. To that end, with its different taxonomy and nomenclature, Howell and Webb has become a competing set of names, one that has led to confusion in many circles.

Jones sidesteps this problem by following the A.O.U. He wisely acknowledges that taxonomy and nomenclature are plastic and that our knowledge is ever evolving, and he does include separate accounts for a few well-marked semi-species not currently split by the A.O.U., such as Ridgway's Rough-winged Swallow (*Stelgidopteryx* [*serripennis*] *ridgwayi*) and the Mangrove Warbler (*Dendroica* [*petechia*] *bryanti*). In the long run, this nomenclatorial stability will ensure the guide's ease of use. He went a step further in another way, by providing local Creole, K'ekchi, Mopan, and Spanish names of birds and a cross reference to names used in other guides.

And speaking of ease, Jones expended no small effort in making certain that birders with little or no experience in the Neotropics could identify birds with confidence. Each family or genus is introduced with its defining characteristics, including "things to note," parts of the bird to examine to distinguish one species from the next in that particular group. These introductions are an excellent means by which to learn the many unfamiliar families or genera a temperate-zone birder will encounter when first setting foot in Middle America.

Last but hardly least is the item the often makes or breaks a field guide: the color plates. Since he burst onto the scene in F. Gary Stiles and Alexander F. Skutch's *A Guide to the Birds of Costa Rica* (1989, Comstock Publishing, Ithaca, New York), Dana Gardner has been a polarizing illustrator. I have met people who adore his work and people who abhor it. For my part, I was cool to his art initially, but over the years I have warmed to it considerably. Gardner's paintings are rather flat, and the shapes are not always ideal, but he has a fine sense of color and, almost unerringly, he captures the phenotypic features most important to field identification. Moreover, his plates in this guide show a more mature skill than those in the Costa Rica guide. In addition to their utility, they are often a pleasure to behold. They will help guarantee that this book will be the field guide of choice for the birds of Belize for years to come.

THE PALANAN PLOT

***REVIEW OF: Forest Trees of Palanan, Philippines: a Study in Population Ecology* by Leonard Co *et al.* (2006). Published by CIDS, University of the Philippines.**

Reviewed by Francis Q. Brearley
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This is a nicely presented book that provides full details on the 16-ha Palanan Forest Dynamics Plot, one of the nodes in the CTFS (Centre for Tropical Forest Science) network. The book is interesting as it contains historical, ecological and taxonomic information on the plot and the species contained within it, thus covering a number of bases which have been missed in some of the other data books in this CTFS series (which currently includes Pasoh, Lambir Hills, Sinharaja, Korup and Bukit Timah). The plot is interesting in that it is typical of lowland evergreen rain forests of South-east Asia in a number of ways, for example the dominance by members of the Dipterocarpaceae. But it also contrasts from these forests in other ways, *e.g.* there is low species diversity of Dipterocarpaceae (10 species) and a high degree of Philippine endemism (45.7 %). The plot is also impacted by hurricanes (although this is not really considered in the book).

The book starts out by describing the site in considerable detail considering, amongst others, climate, vegetation types, mammal species present and conservation issues. A very readable account of the setting-up the plot then follows. After this are some pictures of aspects of the plot (although, sadly, one or two of these have not reproduced well). The bulk of the book then follows which presents data on distribution, sizes and dynamics of each of the species found in the plot. There is a first, more attractive, section on the more common or notable 150 species in the plot which is prevented from becoming too dry by the tasteful use of colour in the maps and with a colour photograph of each species. Generally these photos are of trees in the field and are of taxonomic value as they include both leaf and reproductive structure characteristics. In some cases, one or other of these is missing which lessens the value of the picture somewhat. It might also have been nice to include information on bark characteristics where these are of relevance. The second section is on the less common species and has a map, diameter distribution histogram and voucher specimen information: this section will only really be of interest to those who needed more in-depth information on the plot.

This book provides much more detail than the initial outline presented in Losos and Leigh (2004, *Tropical Forest Diversity and Dynamism*, Chicago University Press) and, overall, it is well-presented with a wealth of information. There are some minor omissions (*e.g.* missing references) but these generally do not really detract from the value of this book, which will hopefully stimulate further research in the under-studied forests of the Philippines.

The Diversity of Peru's Sierra del Divisor

Review of: Vriesendorp, C., T. S. Schulenberg, W. S. Alverson, D. K. Moskovits, and J. Rojas Moscoso (eds). Peru: Sierra del Divisor. Rapid Biological Inventories 17. The Field Museum, Chicago, IL.

Reviewed by
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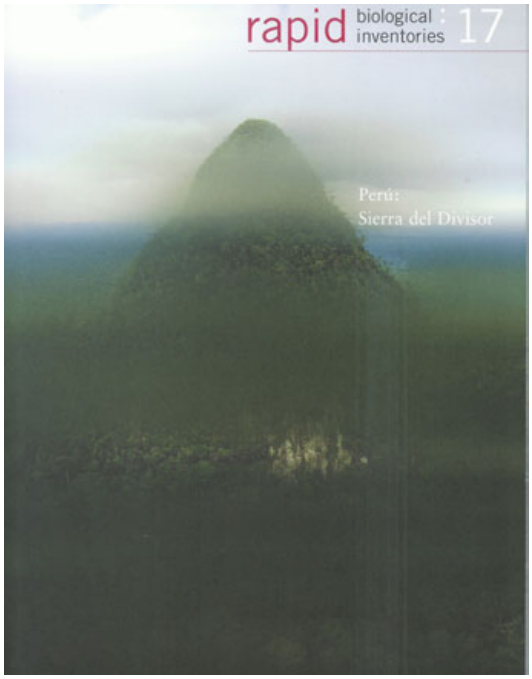
Sierra del Divisor is a region of Peru I have unfortunately never visited. Nonetheless, after reading this report I find myself wanting to explore it. The report is well divided into an extensive executive summary, followed by a series of sections detailing the fauna, flora and the corresponding habitat differences in the area of study. An especially important addition is a sociological survey of the region that is quite often missing in similar literature. The report is completed by an appendix with lists of species of plants and vertebrates found both during the survey and in previous assessments of the area. This last piece serves as the most useful tool for any scientist wanting to develop research plans for that area, but also provides baseline data for possible future environmental impact assessments. Each section of the report identifies critical species and habitats of particular importance in the area of study. There is also a section clearly outlining the biological rationale for creating an expanded transnational protected area including land in both Brazil and Peru which would encompass the Sierra del Divisor region.



The report is well written, although having multiple authors always creates a somewhat different reading format. From the perspective of my own past experience in the Amazon Basin, I was especially interested in the topographic differences (with their associated diversity and habitat changes) in the Ojo de Contaya region of this study area. The Ojo de Contaya strikes me as the most attractive area for further exploration and potential management. With this said, I think it is important for the report to have a broad distribution beyond the traditional biological conservation community, to ensure that it is not simply preaching to the converted.

Looking at the report from the viewpoint of a decision maker, I only wish that the authors had made their recommendations for preservation of this area even more compelling. It is not a lack of information *per se*, but the conundrum of writing for a mixed audience, that somehow keeps this report from making its points as strongly as I wish it had. It is likely that most decision makers will only read the executive summary. Although the report delivers a large amount of information in a limited space, it falls a bit short, in my opinion, of really convincing the reader of the utmost importance of conservation and effective management of the study area. At the same time, the report itself does outline potential management plans and analyzes the threats facing the region. These sections are a must-read for anyone trying to get better understanding of the complex nature of real-life resource management.

Despite these misgivings, the Sierra del Divisor report provides an important reference for those involved in conservation and preservation in the Andean-Amazonian margin. It provides a wealth of important reasons to create a joint conservation park, and to continue biological exploration in the area. It is a worthy reference for future studies.

Two Lives in the Cerrado

Review of: Gottsberger, Gerhard and Silberbauer-Gottsberger, Ilse. 2006. Life in the Cerrado, a South American Tropical Seasonal Ecosystem. Vol. I – Origin, Structure, Dynamics and Plant Use, 277p; Vol. II – Pollination and Seed Dispersal, 383p. Illust. Ulm; Reta Verlag.

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Our understanding of tropical biology owes much to the enormous contributions from European naturalists through their reports, papers, drawings and books, mainly during the late 19th century. In fact, the book of Johannes Eugenius Büllow Warming published in 1892, *Lagoa Santa*, presenting for the first time details on the ecology of the Brazilian tropical savanna, can be considered the initial textbook in tropical ecology. More than a hundred years after the study of Warming, two other European naturalists are offering a gift to tropical biologists and everyone that loves nature, another scientific masterpiece with the cerrados, the Brazilian tropical savanna, as a focus. *Life in the Cerrado* shows that natural history is still alive, more vigorous than ever.

The first volume, with 21 chapters, opens with an extremely interesting preface that describes the pathways followed by the authors during their studies in Brazil, and additionally introducing their main contributors, also important names to the tropical biology of savannas. This volume characterizes the cerrado in terms of geology, geomorphology, climate, water balance and nutrient availability, seasonality and all aspects of cerrado variation in plant physiognomies, floristic diversity, fire effect and medicinal or economical utility of its plants. Chapter 4 is one of the clearest texts presenting the geological origins of tropical savannas in South America. All chapters are very well written and illustrated in this volume, and the bibliographic review is, perhaps, the most complete related to the issues of the volume. Chapter 11, where the authors present the plant physiognomies and life forms of cerrados, deserves special attention. It is without any doubt one of the best descriptions ever done of the cerrado vegetation. Extremely well illustrated, with full-page pictures, in fine colors, marvelous tables, clear and detailed, this chapter, as the whole book, can fascinate not only biologists but any nature lover. To the students and researchers on biology of tropical plants this volume is an obligatory source of consultation and citation. With this volume in hand a teacher that has never visited the cerrados is full equipped to organize a graduate course about the origins, characteristics and community ecology of tropical savanna plants.

The second volume, with 36 chapters, and more related to the main interest of the authors, pollination biology and seed dispersal, is a text absolutely indispensable to anyone who is interested in the study of all aspects linked to tropical plant reproduction. The authors describe thoroughly the pollination systems, vectors and their syndromes, seed formation and dispersal, with a clear evolutionary view in how each aspect has developed in cerrados. Furthermore, it is an extremely

important comparative source of information for those who work with pollination biology in other tropical vegetations and to researchers interested in coevolutionary aspects of biodiversity. The most representative and particular cases of special forms of pollination in cerrados are detailed. This second volume is, if possible, even more effectively illustrated than the previous one. The tables and figures maintain a masterly quality and clarity in presentation. There are many tables summarizing the results of important papers already published, showing the exact relation between plant species, floral rewards and visitors. The richness of color photos and hand drawings by the authors and by other researches are captivating. Again the bibliographic review is complete; all important papers and books in animal-plant interactions published on the Brazilian tropical savanna are properly cited.

To close this short review, a small consideration about the title. Perhaps "Two Lives in Cerrado"could represent better the impressive amount of dedication, effort, and real love we feel in each page of these books. Reading them, ones feel like a child learning again the first steps of how to be a real naturalist.

FELLOWSHIPS AND COURSES

Conservation Society Research Fellowships-
Next round of applications due March 15, 2008. The WCS Research Fellowship Program is a small grants program designed to build capacity for the next generation of conservationists by supporting individual field research projects that have a clear application to the conservation of threatened wildlife and wildlife habitat. WCS seeks projects that are based on sound and innovative conservation science and that encourage practices in conservation that can contribute to sustainable development. Most of the grantees are professional conservationists from the country of research focus and/or post-graduates pursuing a higher degree. The grants program supports marine or terrestrial field research in Africa, Asia, and Latin America regardless of the nationality of the applicant. Grants are for up to $25,000 The average grant is $10,500. For details, please see http://www.wcs.org/international/tcbp/rfp?preview=&psid=&ph=class%2525252525

The Organization for Tropical Studies (OTS) Las Cruces Biological Station (LCBS) will be hosting a workshop on tropical forest restoration and conservation in late July 2008. The workshop will bring together prominent researchers, graduate students, technicians, and non-profit personnel from the US and Costa Rica to: 1) discuss LCBS research projects within the context of the overall state of the field of tropical forest restoration and prioritize future research directions, 2) promote data sharing and collaborative restoration research at LCBS and other tropical sites, 3) introduce non-LCBS graduate students and faculty from the U.S. and Costa Rica to research in the region, 4) evaluate station facility needs and regional land acquisition for restoration among LCBS researchers and local conservation organizations, and 5) explore ways to actively engage local landowners and educators in research projects. Funding is available for 8-10 graduate students (US citizens/permanent residents) who do not have established research projects at LCBS to cover travel (round trip air-fare from the US) and housing for the workshop. Preference will be given to students who are interested in tropical forest restoration and conservation and are likely to initiate projects at LCBS, or who are engaged in related research at other tropical sites and are interested in providing a comparative perspective. As the workshop will be conducted in a mix of English and Spanish, preference will also be given to students with a working knowledge of Spanish. The 5-day workshop will be held from July 26-31, 2008 (including travel days to/from LCBS and San José).. Review of applications will begin 29 February 2008 and applicants will be notified by 14 March 2008. Students who are selected are required to participate in the entire workshop. Funding will be available for 3-5 small post-workshop awards for students to pursue pilot research at LCBS following up on ideas from the workshop. Further information on LCBS is available at http://www.ots.ac.cr/en/lascruces/

The Research Grants Program of the Center for Tropical Forest Science (CTFS) of the Smithsonian Tropical Research Institute supports research associated with the CTFS network of Forest Dynamics Plots. This grants program is intended to provide opportunities for senior researchers, post-doctoral fellows, and graduate students to utilize existing Forest Dynamics Plots and to conduct research with scientists associated with these plots. For more detailed information about CTFS and the Research Grant Program, please see www.ctfs.si.edu <http://www.ctfs.si.edu/> Submissions will be accepted yearly on the last day of April. The next deadline for applications is APRIL 30th, 2008. Decisions will be made approximately three months after the deadline.

The Center for Tropical Forest Science - Arnold Arboretum (CTFS-AA) Asia Program (CTFS-AA) will run its eighth **International Field Biology Course** in July-August 2008 (Jul 13 - Aug 23; 6 weeks) at Pasoh Forest Reserve, Malaysia. The field course is aimed at graduate entry-level students and will provide a broad-based introduction to the ecology of tropical forests in SE Asia. The course is taught by local and international researchers who are experts in their respective fields. Applicants should be graduate entry-level students (Master's course or 1st year Doctorate candidates) in tropical biology / ecology, who are either from SE Asia or will base their research in the region. Students will be selected to provide a broad international representation and preference will be given to those conducting research at CTFS-AA sites. The course is fully funded by the CTFS-AA program. Some students may be asked to contribute to their international travel. Application forms are available on the CTFS website (www.ctfs.si.edu/doc/grants_fellowships/training.html). Completed forms, including contact details for two referees, should be sent to Dr. Rhett D. Harrison, CTFS-AA (ctfs_aa_fieldcourse@yahoo.com) by 30th April 2008. Successful candidates will be informed by 1st June 2008.

The Centre National de la Recherche Scientifique (CNRS, France) (http://www.guyane.cnrs.fr) is funding a Proposals to encourage projects at the Nouragues Station in French Guiana. Graduate students, postdoctoral researchers, and established scientists may apply. Each year, the Science Advisory Board of the Nouragues station will evaluate the projects based on the excellence of the proposed research, the quality of expected publications, and the feasibility of the project. Funded projects will not exceed 10,000 euros in total, and they will be awarded for the year 2008, with a possibility to reapply in 2009, if needed. Reapplications will be evaluated based on the achievements of the previous years. Grant recipients will be expected to provide a scientific and financial report by December 15th, 2008. For more information regarding the Nouragues Research Station, see http://www.nouragues.cnrs.fr

The Organization for Tropical Studies (OTS) is looking for Research Mentors for the Native American and Pacific Islander Research Experience (NAPIRE) Program at Las Cruces Biological Station in Costa Rica. The NAPIRE Program introduces Native American and Pacific Islander undergraduate students to the biodiversity of the tropics. Research Mentors are assigned 1-2 students to provide guidance and support through all stages of the research project. The program begins on June 2 and ends on July 28, 2008. Mentors must be at Las Cruces no later than June 23 and should plan on staying at Las Cruces until the program end date. Mentors do not receive honoraria, but will receive up to 8-9 weeks of station fees plus airfare. REU students will have all their expenses covered by the program as well as a budget for lab and field equipment. Interested researchers should send a letter of interest and mentoring philosophy, curriculum vitae and a short summary (no more than 300 words) of potential student research projects. To be eligible, candidates must have completed their PhD. Inquiries and applications may be sent electronically to the program coordinators, Dr. Doug Eifler (deifler@erellinstitute.org) and M.Sc. Marcela Fernández-Vargas (mf976@umsl.edu) To learn more visit our website at:http://www.ots.duke.edu/en/education/reu_napire.shtml

Tropical Plant Systematics, an intensive, five-week field introduction to the identification, inventory, classification, and phylogenetic analysis of tropical vascular plants, will be held from June 10-July 15, 2008. This course is primarily for plant systematists but will also interest ecologists, zoologists, and conservation biologists - anyone whose research requires a broad knowledge of plant relationships and classification. The course will be coordinated by Brad Boyle (Department of Ecology and Evolutionary Biology, University of Arizona) and Robbin Moran (New York Botanical Garden.) Application deadline is March 25, 2008. For information and application forms, go to:http://www.ots.duke.edu/en/education/ots-09.shtml

WEST AFRICA'S UPPER GUINEA FORESTS AND FLORA

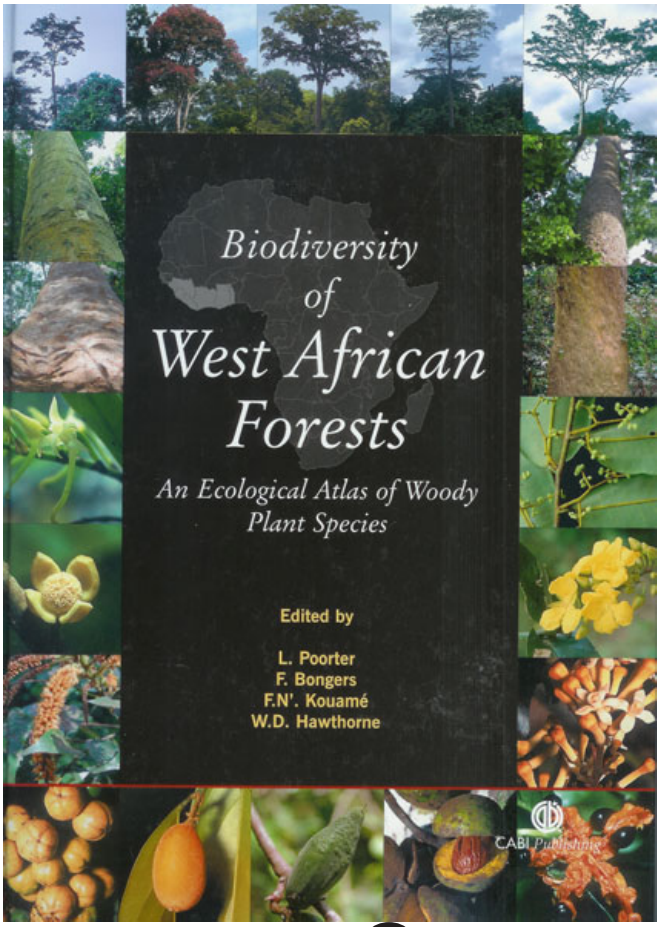
Review of: L. Poorter, F. Bongers, F.N'. Kouamé, W.D. Hawthorne, editors. 2004. Biodiversity of West African Forests: An Ecological Atlas of Woody Plant Species. CABI Publishing, Cambridge, MA, USA. ISBN 0-85199-734-1. 521 pp.

Reviewed by Jimmy Grogan
Yale School of Forestry & Environmental Studies
New Haven, CT, USA

This large, colorful, and extraordinarily informative book, product of the ECOSYN project, a Dutch-Côte d'Ivoirean collaboration supported by the European Community and researchers from across West Africa, introduces and analyzes the Upper Guinean forest formation that stretches west to east from Senegal to Togo. From the satellite's eye-in-the-sky pixellated view to the field observer's hand lens-assisted squint, we are telescoped there and back again by the volume's many authors and contributors, and in the end can only marvel at what is known – and, of course, what is not – about these great forests.

The book is organized in standard fashion, with eight brief "Forest" chapters describing various aspects of Upper Guinea forests at regional and local scales followed by three "Species" chapters profiling 286 rare & endemic species or species groups, 56 large timber species, plus a checklist of 2800 forest species with sources and alternative (preferred) names. Since species are allocated a page apiece, this section occupies the bulk of the book and provides its most entertaining reading (or browsing). Five "Appendices" present full-page color versions of maps featured in descriptive chapters. The book closes with extensive "Sources & index" documentation.

The Guinea forests are truncated into Upper and Lower formations by the Dahoumey Gap, an extension of woodland savanna that reaches south from the Sahel through Ghana and Togo to the Gulf of Guinea. The Upper Guinea forest belt is up to 350 km wide and currently covers approximately 109,000 km2, over nine-tenths of this lowland forest. It grades, generally quite abruptly, into savanna on its north side. Climate across the Upper region is broadly seasonal with a December-to-March major dry period and minor dry during July and August. Forests appear where annual rainfall totals roughly 1300 mm up to 4000 mm, with amounts generally decreasing traveling west-to-east and south-to-north away from the coast. Along the precipitation gradient, vegetation grades from wet evergreen to moist evergreen to moist semi-deciduous and then dry deciduous forest before changing to savanna, except where local site conditions – principally edaphic – overrule broad climatic conditions. Upper Guinea forests, and African tropical forests more generally, are less species diverse than Neotropical and Asian forests. This is mainly due to the smaller total forest area in Africa, and hence smaller species pool, and to the relative aridity of the African continent, with consequent greater sensitivity of forests to global climatic changes associated with past glaciation. For this reason the refugia theory is clearly supported by observed patterns of species diversity across this region, with epicenters of diversity and endemism identified near Cape Palmas and Mount Nimba in Liberia, and near Cape Three Points in Ghana. Forests occupied a much larger total area 6000 years ago when temperatures and rainfall last peaked, bridging the Dahoumey Gap to link with the Lower Guinea formation.



"Forest" chapters describe forest cover changes during the past century across this region and in Côte d'Ivoire at increasingly smaller spatial scales. In addition, they discuss the forest-savanna mosaic and reasons for it; gradients in forest composition from Sierra Leone to Ghana, focusing on 40 large and widely distributed timber species or species groups; patterns and causes of floristic diversity in Côte d'Ivoire, where savanna vegetation penetrates south in a low-rainfall area called the V-Baoulé; patterns and reasons for biodiversity hotspots and the distribution of rare and endemic species across the region; and implications of all this for conservation and management. Emphasis throughout is placed on processes at different spatial scales through analysis of forest and species spatial patterns as these correlate with climatic, physiographic, and edaphic factors. We find here the first regional approach to forest classification, unifying the many local and country-level treatments heretofore available. Hierarchical classification yields eight regional forest types with good geographical correspondence, shaped primarily by annual rainfall totals. Species richness increases in wetter forest types near the coast, and especially near postulated Quaternary refugia. Forest cover loss has been dramatic during recent decades, though slowing somewhat since the 1990s for complex and occasionally counter-intuitive reasons. Compared to a century ago, 20 – 50% of forest cover remains today depending on how "initial" or "original" forest cover is reconstructed. But large forest tracts persist only in Côte d'Ivoire's Taï National Park and in parts of Liberia and Ghana.

Ecological profiles of 286 rare and endemic species, representing approximately 10% of the total forest flora of Upper Guinea, occupy this book's most fascinating and possibly most important chapter. As the reader will see from occurrence maps accompanying each species description – compare these with distribution and abundance maps for timber species in the next chapter – these are infrequently collected species with restricted or often disjunct distributions, and therefore highly vulnerable to habitat loss or alteration. These pages offer logical, structurally consistent, and visually stimulating synopses of what is known about each species: technical descriptions including light requirements ("guild") and phenology, distribution (continental vs. regional, continous vs. disjunct), range (local, regional, widespread), and commonness, forest type, habitat and regeneration requirements, dispersal mode, uses, and, as a

valuable addition, data sources to help with further inquiries. Beautifully detailed maps show known distributions at continental and regional scales, and, where data support them, interpolated density patterns. Photos and line drawings, especially of distinguishing vegetative features, are presented for nearly all species, though some apparently remain so poorly known that no illustrations were available. At the bottom of each page a table quantifies species occurrence patterns relative to regional environmental variables such as altitude, precipitation, and soil physical and chemical properties. In a single volume we have intriguing introductions to a large number of species most likely to stump field botanists: 126 trees, 35 shrubs, 79 vines, 36 herbs, 9 epiphytes, and a single saprophyte, in 75 families, including some I'd welcome an opportunity to meet someday: Ancistrocladaceae, Burmanniaceae, Glesemiaceae, Medusandraceae, Rapataceae, Scytopetalaceae.

Profiles of 56 large timber species that follow – "large" is an understatement if the *Entandrophragma candollei* pictured on page 391 is typical – are this book's sugar on top. In fact, these may be the its most informative and useful pages, covering species that many professionals who've never had the opportunity to visit Upper Guinea forests will have heard of and wondered about. Detailed and complete information as for rare endemics is presented for nearly all timber species, including detailed maps showing density patterns.

Great book, highly recommended if you are professionally active or even merely interested in this region and can afford the US$190 / €150 / £95 price tag. Otherwise I assume you'd best look for it in a library somewhere, hopefully having been distributed to many across West Africa and Europe by the grace of European Community funding. Few people in a position to actually use this wonderful book will have the disposable income to buy one.

CONFERENCES AND MEETINGS

17th Annual Philippine Biodiversity Symposium, 14-17 April, 2008 at Visayas State University, Baybay, Leyte. This year's theme is "Human Population Density: Impacts on Biodiversity." Queries regarding the meeting should be directed to Mr. Mariano Roy Duya (mduya@conservation.org) and Dr. Perry S. Ong (ongperry@yahoo.com, 02-9205471)

THE EVOLUTIONARY ECOLOGY OF PLANT-ANIMAL INTERACTIONS -FROM GENES TO COMMUNITIES. 21-23 April, 2008. Symposium of the Spanish Association of Terrestrial Ecology. Gran Hotel, Fundació La Caixa, Palma de Mallorca. For more information, see: http://www.ecoevolutiva.com/

ATBC Asian Section meeting, 23-26-April 2008, Kuching, Sarawak. The theme will be "Toward sustainable land-use in Tropical Asia." More information can be found at http://www.atbcasia.org/public/default.asp

ASSOCIATION FOR TROPICAL BIOLOGY AND CONSERVATION Annual Meeting, 9-13 June, 2008. The theme is "Past and Recent History of Tropical Ecosystems: Cross-Continental Comparisons and Lessons for the Future." The meeting will be held in Paramaraibo, Suriname. For details, visit the web page at http://www.atbc2008.org/

9th International Congress of Ethnobiology, 25-30 June 2008, Cusco Peru. Please see the following WEB links http://www.icecusco.net/ and http://ise.arts.ubc.ca/

SOCIETY FOR CONSERVATION BIOLOGY, 13-18 July, 2008. The annual meeting will be hosted by the University of Tennessee, Chatanooga, and the theme will be "From the Mountains to the Sea." Information is available at the website, http://www.conbio.org/2008/calls.cfm

BOTANY WITHOUT BORDERS: Annual Meeting of the Botanical Society of America, the Canadian Botanical Society, the American Fern Society, and the American Society of Plant Taxonomists. 26-30 July, 2008, University of British Columbia, Vancouver, BC, Canada. For more information, go to http://www.2008.botanyconference.org/

CONFERENCE ON THE ECOLOGY AND EVOLUTION OF PLANT-POLLINATOR INTERACTIONS, 2-3 August, 2008, Milwaukee, Wisconsin, USA. This conference will be held immediately prior to the Ecological Society of America Meeting in the same location. Individuals planning to attend the Pollination Conference must register online at the ESA website: http://www.esa.org/milwaukee/ Registration will open in early April, 2008 and must be completed by June 2, 2008. If you have questions about this Pollination Conference, please contact Jeff Karron (karron@uwm.edu), Randy Mitchell (rjm2@uakron.edu), or Rebecca Irwin (Rebecca.Irwin@Dartmouth.edu). CONFERENCE WEBSITE: http://www3.uakron.edu/biology/pollination/

ECOLOGICAL SOCIETY OF AMERICA ANNUAL MEETING, 3-8 August, 2008, in Milwaukee, Wisconsin, USA. The topic is "Enhancing Ecological Thought by Linking Research and Education." The web site is http://www.esa.org/milwaukee/

IV Latin American and Caribbean Congress of Cacti and other Succulents and XXX Congress of the International Organization for the Study of Succulents. 4 – 8 August, 2008, in Natal, Rio grande do Norte, Brazil. For more information, including registration and the process for submitting contributing papers or posters, please access http://www.59cnbot.com.br/

CAMEROON ETHNOBOTANY NETWORK (CEN) 3rd International Symposium, 11-13 September, 2008, Fidelie Hotel, Kribi, Cameroon. For more information, contact Pr. Bernard-Aloys Nkongmeneck, Président du CEN, e-mail: bnkongme@yahoo.fr or cenrce@yahoo.fr

WORLD BIODIVERSITY CONFERENCE, 20-22 November, 2008, Chiang Mai, Thailand. This converence is organized by the Century Foundation, India. More information at http://www.bgci.org/worldwide/event/0109/

Planning ahead:
5th Symposium/Workshop on Frugivores and Seed Dispersal, 13-17 June 2010 at the Corum Conference Center, Montpellier, France.

Tropinet is published quarterly by the Association for Tropical Biology and Conservation (ATBC) and the Organization for Tropical Studies (OTS) and is available at http://www.atbio.org to all interested readers. ATBC is an international society that promotes tropical biology and conservation in its broadest sense. ATBC publishes the quarterly journal BIOTROPICA and sponsors annual meetings and symposia. Information: W. John Kress, ATBC Executive Director, Department of Botany, MRC-166, National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, Washington, DC 20560. OTS is a non-profit consortium of 63 academic and research institutions in the United States, Australia, Latin America, and Asia. Its mission is to provide leadership in education, research and the responsible use of natural resouces in the tropics. Graduate, undergraduate, and professional training and research facilities are provided at three field stations in Costa Rica. Information: http://www.ots.duke.edu, or at OTS, Box 90630, Durham, NC 27708-0630.

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EMPLOYMENT OPPORTUNITIES

The Smithsonian Tropical Research Institute (STRI), headquartered in the Republic of Panamá, is seeking world-class scientists to establish research programs in any current field of marine or terrestrial research, working anywhere in the tropics. These fields include all biological sciences, anthropology, archaeology, paleontology, geology, and soils science. Ideally, research initiated by the successful applicants will complement existing programs (see http://www.stri.org). We are especially interested in research on vertebrate biology; anthropology and archaeology; paleontology; and climate change. Applicants should have a Ph.D. degree and postdoctoral research experience in their fields. Interested candidates should submit a summary of research accomplishments and interests, curriculum vitae, five significant reprints, and the names and contact information of three potential referees. Review of applications will begin in April 2008. Please send applications electronically to the Director of STRI, c/o Ms. Luz Latorraca, Office of Human Resources at: LatorraL@si.edu. Address inquiries to Dr. William Wcislo, Chair, Search Committee at: WcisloW@si.edu.