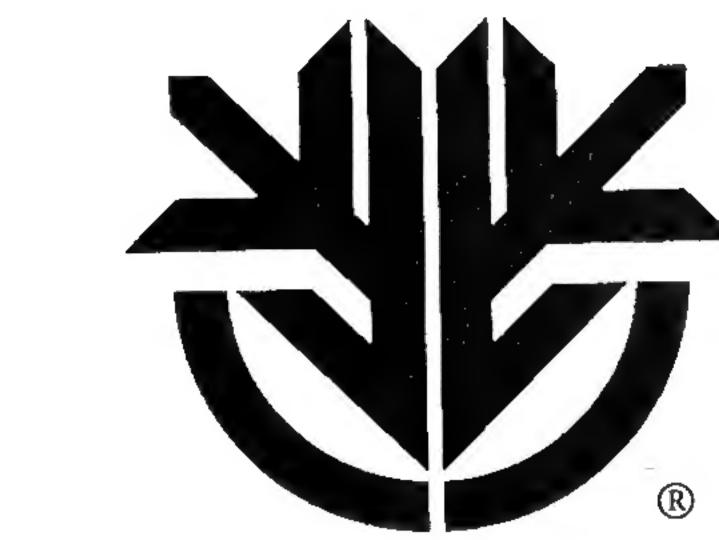


Research at the Missouri Botanical Garden

Center of Biodiversity-Ecuador





Ecuador, in northwestern South America, is the smallest of the Andean countries (about the size of Colorado) and the most densely populated, with 13 million people. Over 16,000 native plant species are known from Ecuador—about as many as in all of the continental U.S.—of which over 4,500 species are endemic to the country. This number is still growing because an average of 160 new species of plants are discovered in Ecuador each year.



Meriania pastazana (Melastomataceae),

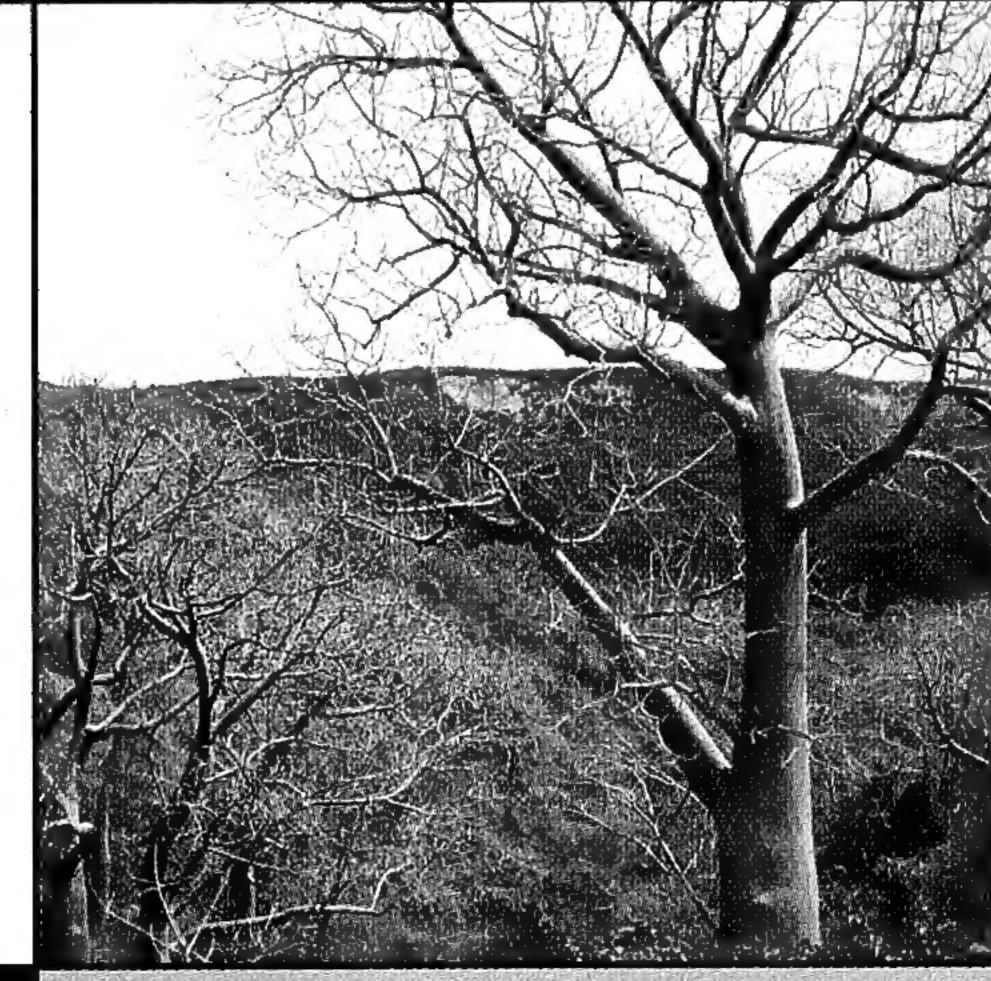
above, is a spectacular flowering tree

known from only two sites in

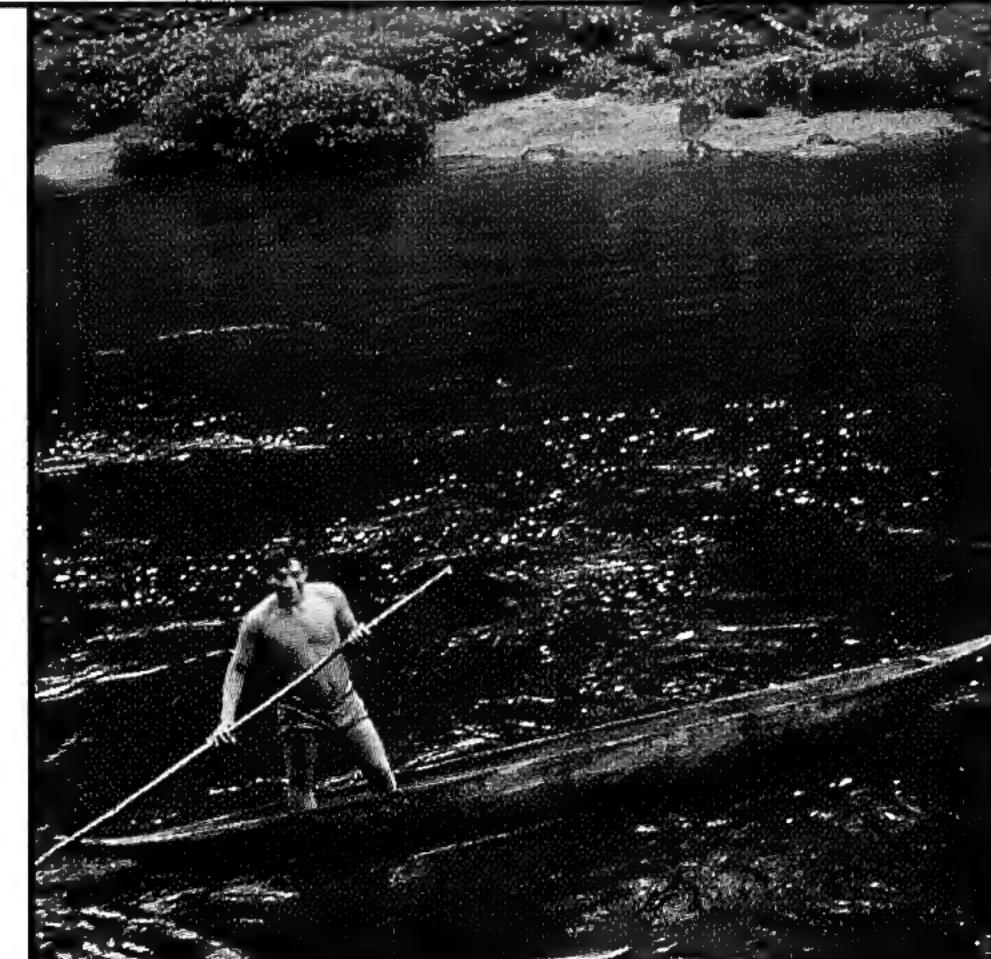
Amazonian Ecuador. [WF]

▲ Rare, endemic trees

Regions: Coastal dry forest. Contintental Ecuador comprises three geographic regions: the Pacific coast on the west, the Andes mountains in the center, and the Amazon basin in the east. The Galápagos Islands are considered the fourth region. Pictured: dry forest in the coastal region, where the trees drop their leaves during the dry season; the dominant tree is Ceiba trichistandra (Bombacaceae). [DAN]



Indigenous groups: training. Ecuador has many indigenous ethnic groups whose territories include some of the country's most diverse forests. MBG botanist David Neill, with zoologists from the Wildlife Conservation Society, is conducting a training program in conservation biology for two indigenous groups: the Awá in the northwest and the Shuar in the southeast. Pictured: a native Awá in a dugout canoe. [PMJ]



◆ Coastal resources. The southern

bathed by the cold Humboldt Current,

Lorenzo (pictured) are along the coast;

Ecotourism has developed around the

arriving from the Antarcic to breed in

with its rich marine resources. Many

small fishing villages, such as San

fisherfolk go out in small boats to

catch tuna and other species.

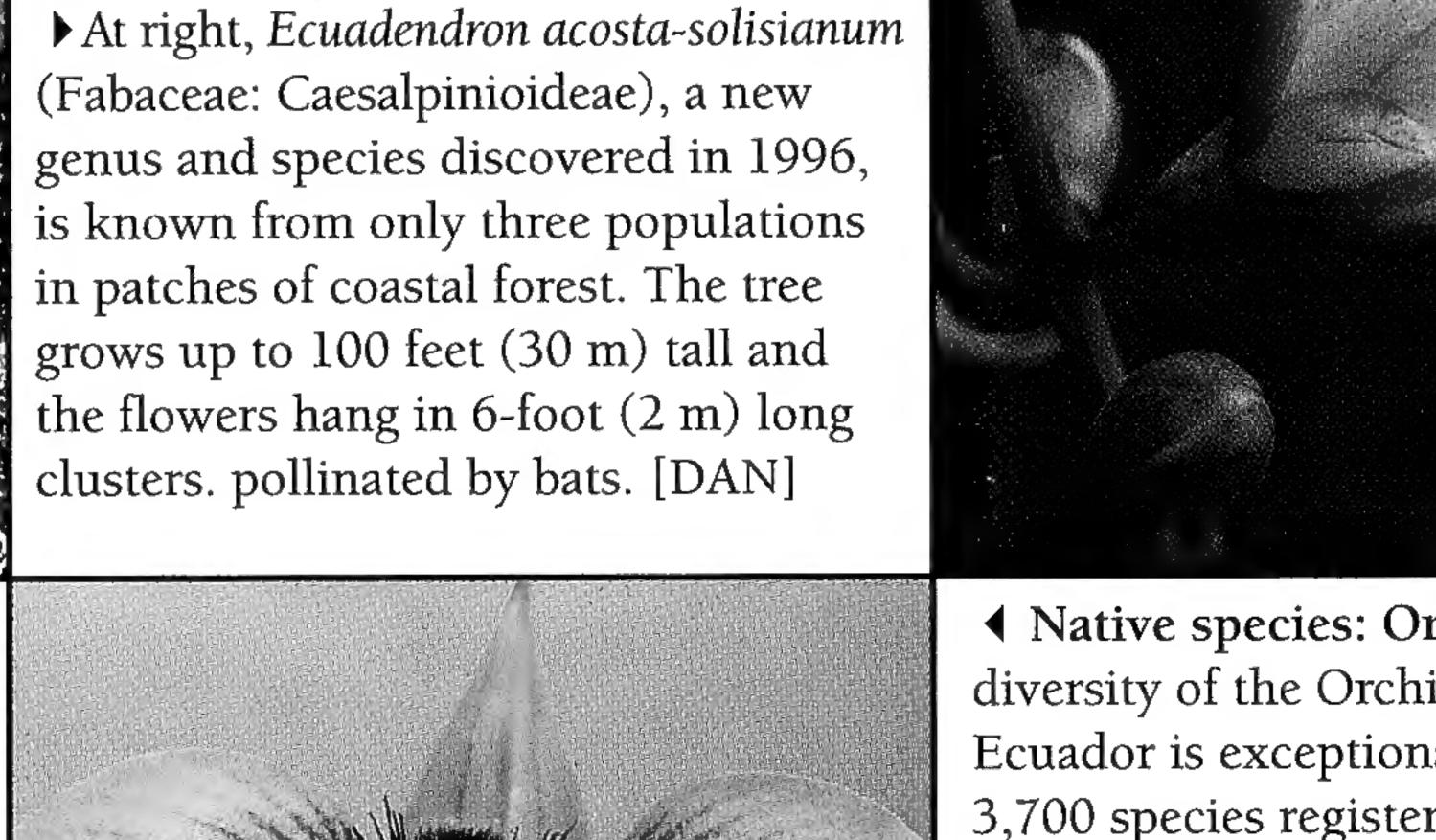
October. [DAN]

part of Ecuador's Pacific coast is

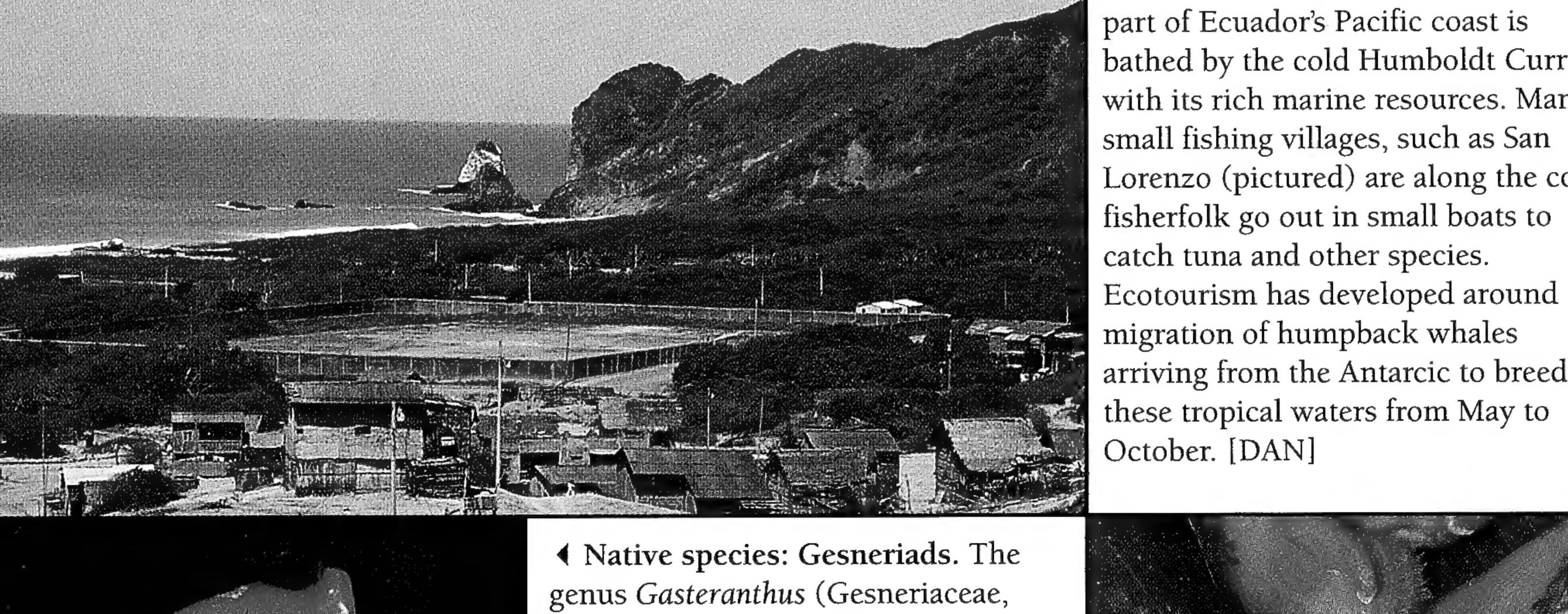
Since the 1970s, development of petroleum reserves in the rainforest of Amazonian Ecuador has lead to colonization and deforestation of vast areas. Oil is piped over the Andes to the Pacific coast. But some new pipelines are being built with reduced environmental impact, such as this new narrow clearing above. [DAN] ▼ Brownea macrophylla (Fabaceae: an Ecuadorian moth, Rothschildia sp. Caesalpiniodeae), a flowering tree in Amazon rainforests. [PMJ]

▲ Insects: Animal-plant interactions. Insects, like plants, are very diverse in Ecuador, but have not been studied very thoroughly. Butterflies are the best-studied insect group; other groups such as the beetles are exceptionally diverse, but poorly known. Insects are vital to ecological processes, including insect-plant interactions such as

pollination and herbivory. Pictured is



◆ Native species: Orchids. The diversity of the Orchidaceae family in Ecuador is exceptional, with over 3,700 species registered at present, more than half of which are endemic to the country, and new species are being described every year. Pictured is Telipogon hirtzii from the eastern Andean cloud forests. The center of the flower mimics a female fly and is pollinated by visiting males. [LJ]



African violet family) includes 35 species from Mexico to Bolivia. It is most diverse in western Ecuador, with 25 species, of which 16 are endemic to the region. Many of the endemics are highly endangered by habitat destruction. Pictured is Gasteranthus corallinus from the eastern and western Andean slopes. [JC]

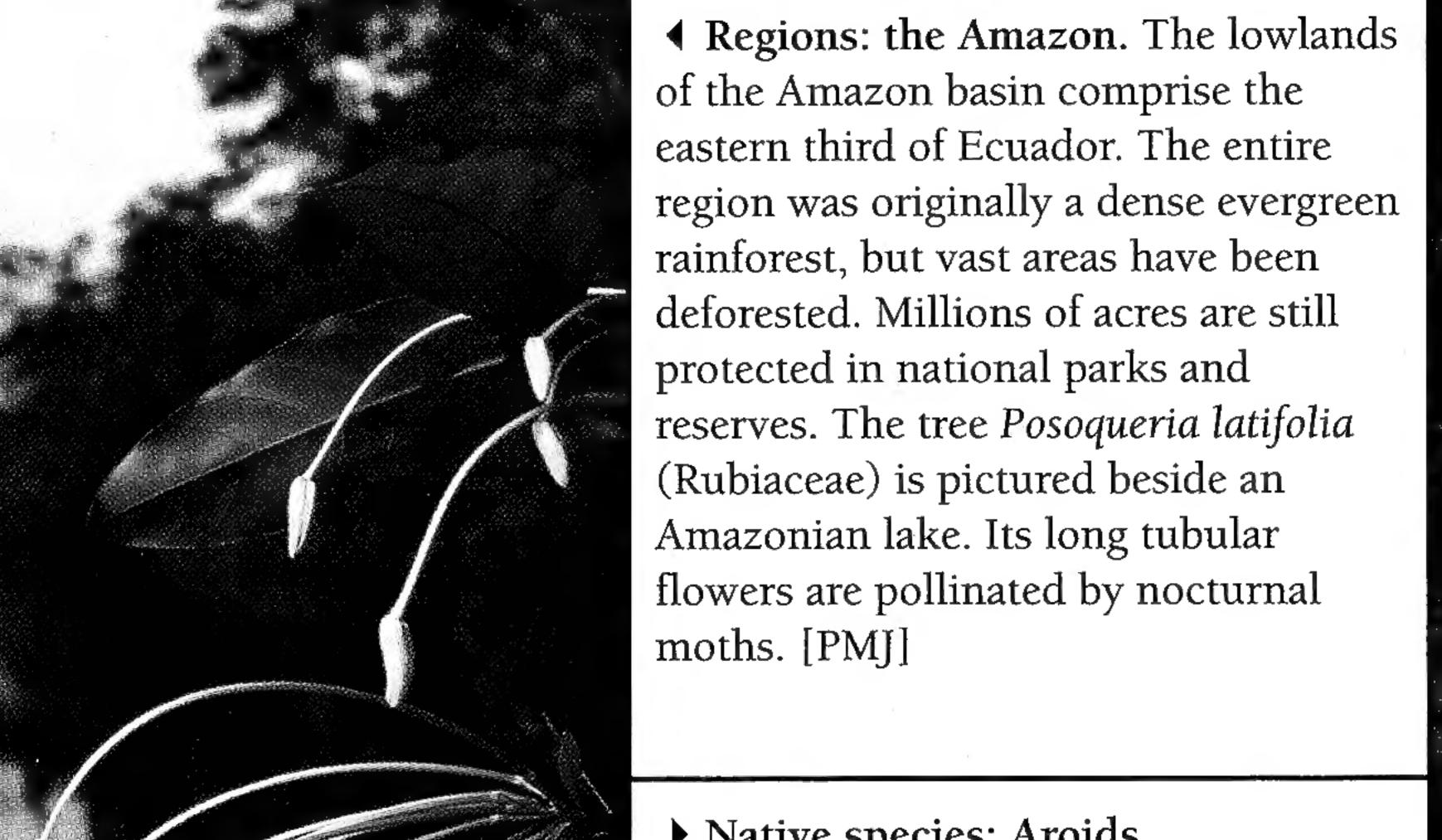
◆ Training. Over 15 years, MBG has

trained more than 70 Ecuadorian

botanists in botanical inventory,



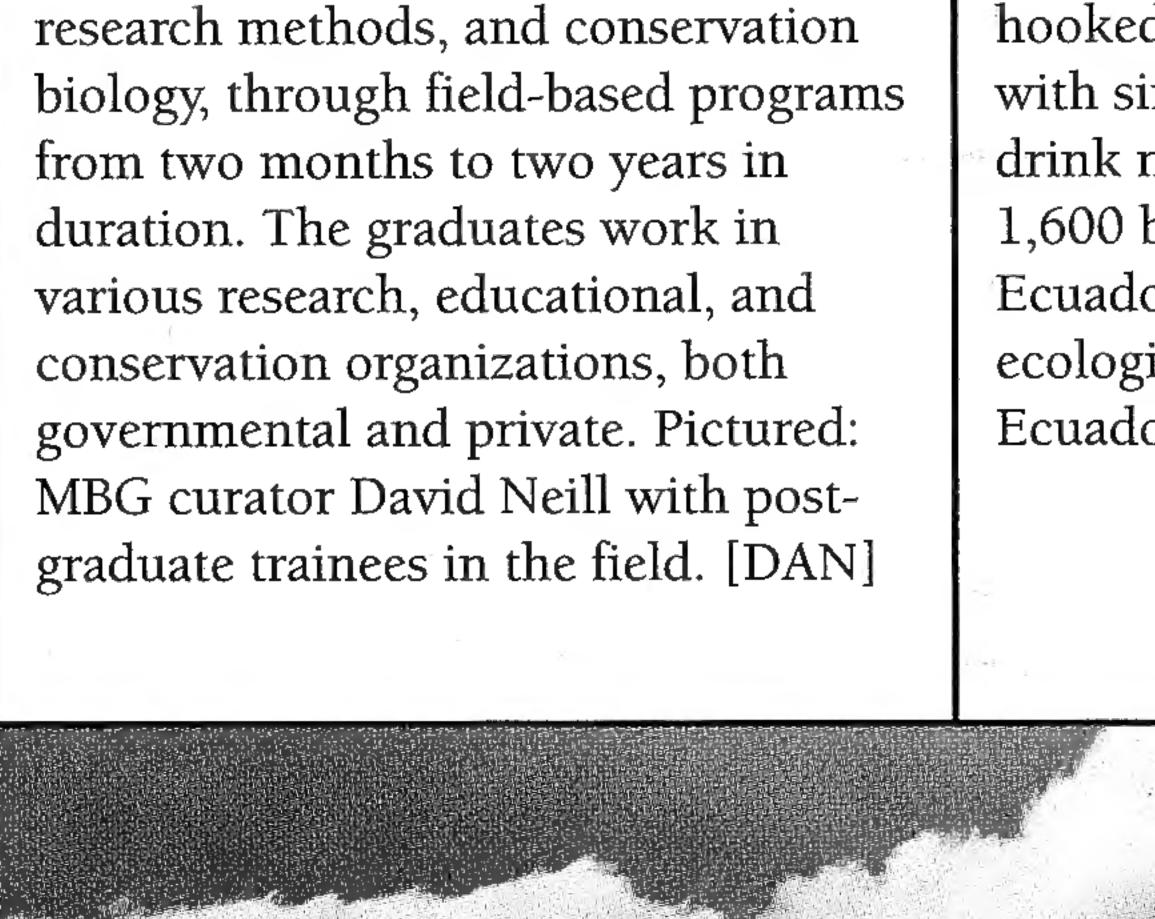
▼ Drugs. Brugmansia arborea, the angel's trumpet, belongs to the Solanaceae (Nightshade or Potato family) It contains many alkaloids and is a dangerous hallucinogen. It has been used in the Andes for hundreds of years to calm neurological pains. Shamans use this or other species from the genus to contact the spirit world. Not known in the wild, but these plants are one of the most common ornamentals praised for their large fragrant trumpet-shaped flowers. [CUU]



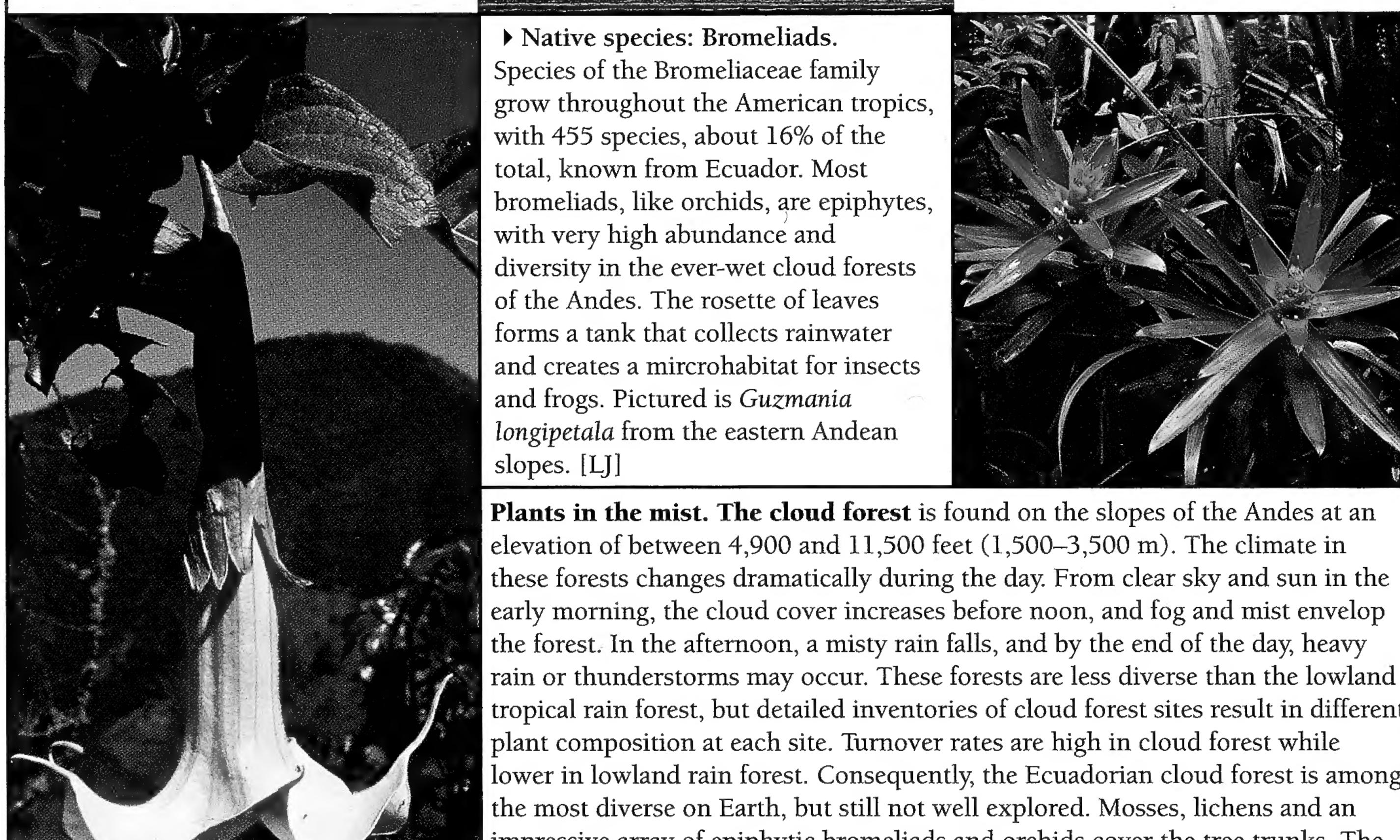
Native species: Aroids. Over 400 species of the Araceae family, have been recorded in Ecuador. An additional 1,000 species occur here, but are yet to be described. Important genera in the family are Anthurium and Philodendron. Seen here: Anthurium andraeanum, endemic to a small area of northwest Ecuador and southwest Colombia, is cultivated worldwide for the florist trade. [DAN]



del Cóndor. In collaboration with the National Herbarium of Ecuador and several Ecuadorian universities, MBG has carried out botanical inventory programs since the 1970s. Current inventory work is concentrated in the Cordillera del Cóndor, a sandstone mountain range on the Ecuador-Peru border with many endemic plants, and others disjunct from the sandstone Guayana highlands of southern Venezuela. [DAN]

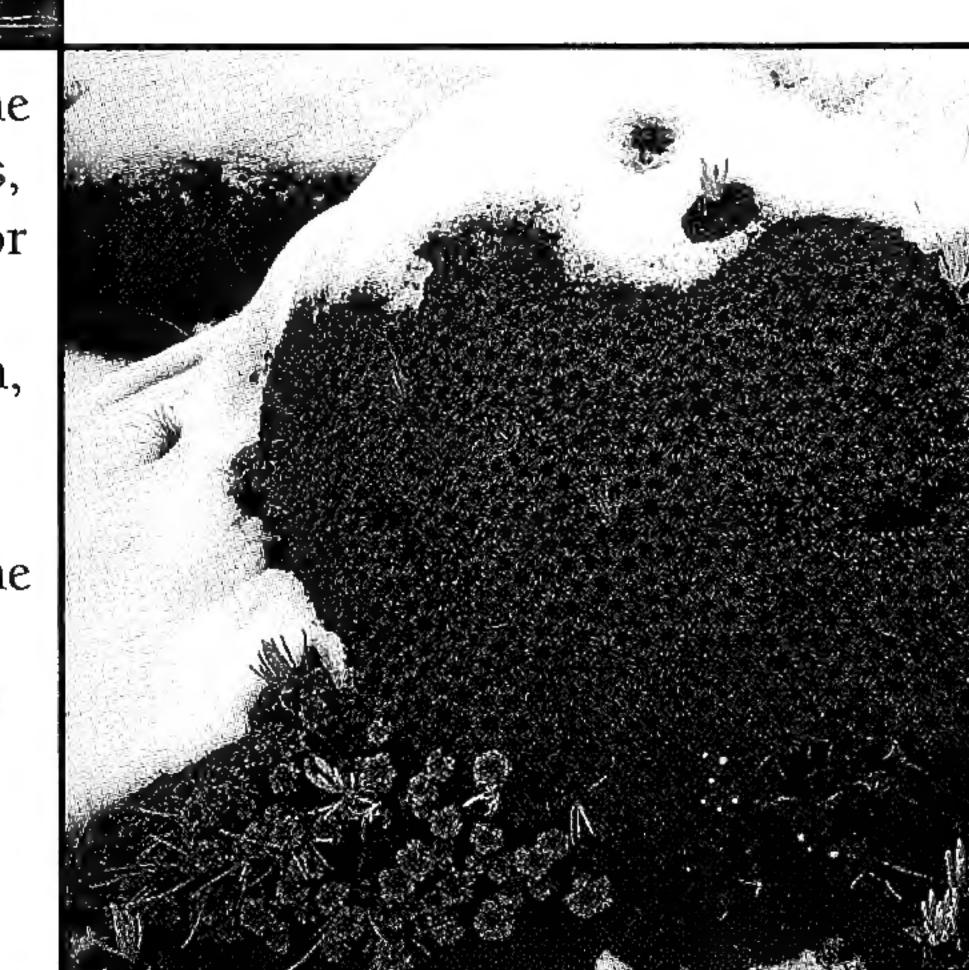


▲ Bird pollination: Heliconia. The curved flowers of Heliconia regalis in coastal Ecuador are pollinated by hooked-billed hermit hummingbirds with similarly curved bills as they drink nectar from the flower. Nearly 1,600 bird species are native to Ecuador, and many have important ecological interactions with Ecuadorian plants.[CUU]



Native species: Bromeliads. Species of the Bromeliaceae family grow throughout the American tropics, with 455 species, about 16% of the total, known from Ecuador. Most bromeliads, like orchids, are epiphytes, with very high abundance and diversity in the ever-wet cloud forests of the Andes. The rosette of leaves forms a tank that collects rainwater and creates a mircrohabitat for insects and frogs. Pictured is Guzmania longipetala from the eastern Andean slopes. [LJ] Plants in the mist. The cloud forest is found on the slopes of the Andes at an

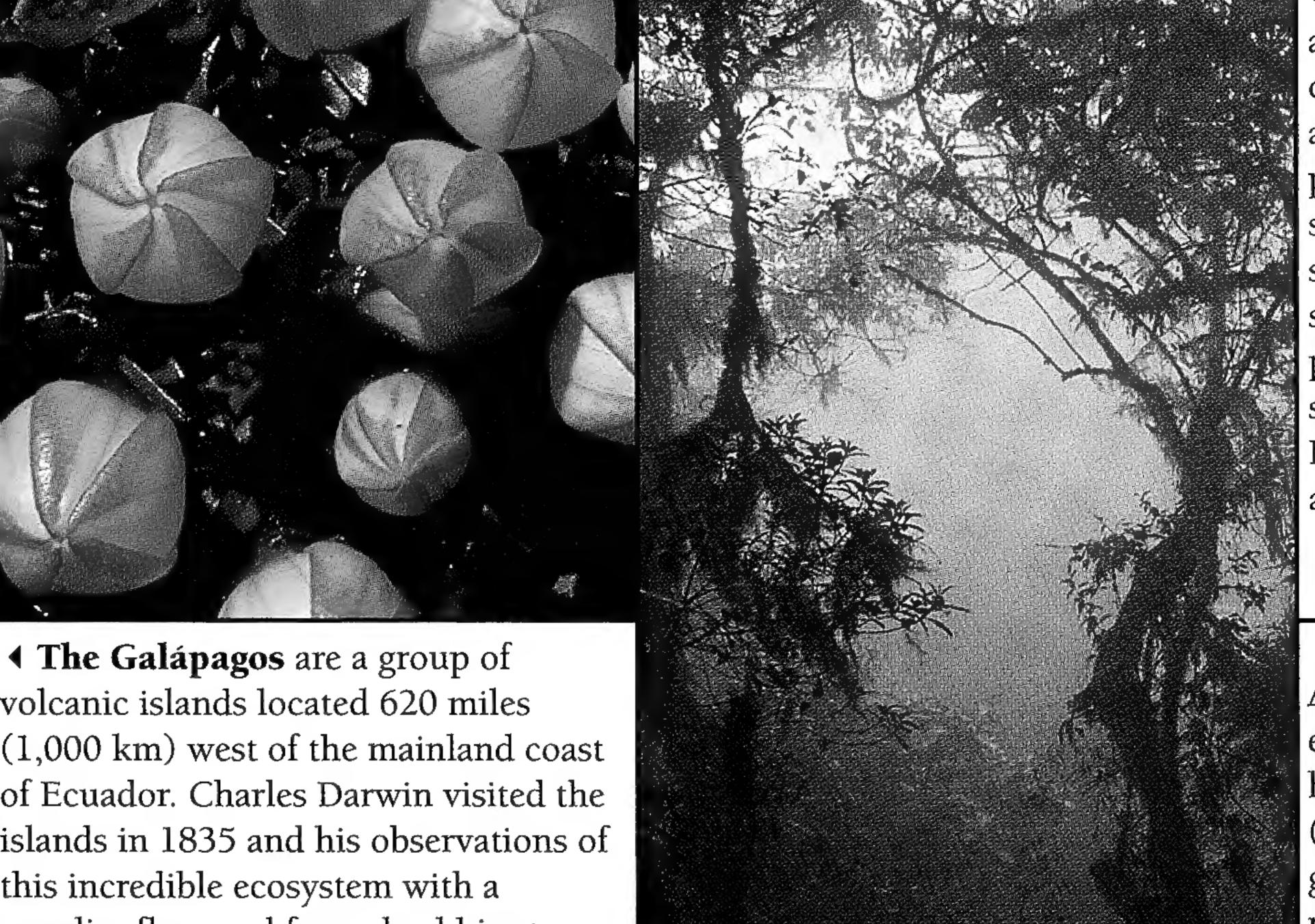
▶ Snow on the equator. To tolerate the cold climate of snowcapped volcanoes, plants grow in cushions, one branch or plant pressed closely to its neighbor. Dead leaves remain inside the cushion, and their decomposition provides warmth. The plants are, so to speak, growing on top of a compost heap. The round cushion illustrated is Plantago rigida that sometimes reaches sizes of more than 3 feet (1 m) across. [PMJ]



→ Páramo is a mainly treeless vegetation type found above 9,800 feet (3,000 m) from Costa Rica to northern Peru. The páramo and cloud forests capture water and gradually release it into the rivers. Plants are adapted to this cold climate, here exemplified by two members of the Asteraceae. Chuquiraga jussieui, with volcano Cotopaxi in the background [DAN] has small, coriaceous leaves, while Espeletia pycnophylla (right) is covered by a dense mat of wooly hairs. [CUU]



▶ MBG botanists Carmen Ulloa Ulloa and Peter M. Jørgensen are working in a collaborative project with Ecuadorian colleagues to produce an illustrated florula of the páramo of the Cajas National Park. The Park has over 15,000 visitors per year; a flora will further stimulate and increase awareness of the plants and vegetation of this complex ecosystem. Pictured is Gentianella hirculus, an endemic gentian only known from Cajas. [PMJ]



elevation of between 4,900 and 11,500 feet (1,500–3,500 m). The climate in

these forests changes dramatically during the day. From clear sky and sun in the

tropical rain forest, but detailed inventories of cloud forest sites result in different

lower in lowland rain forest. Consequently, the Ecuadorian cloud forest is among

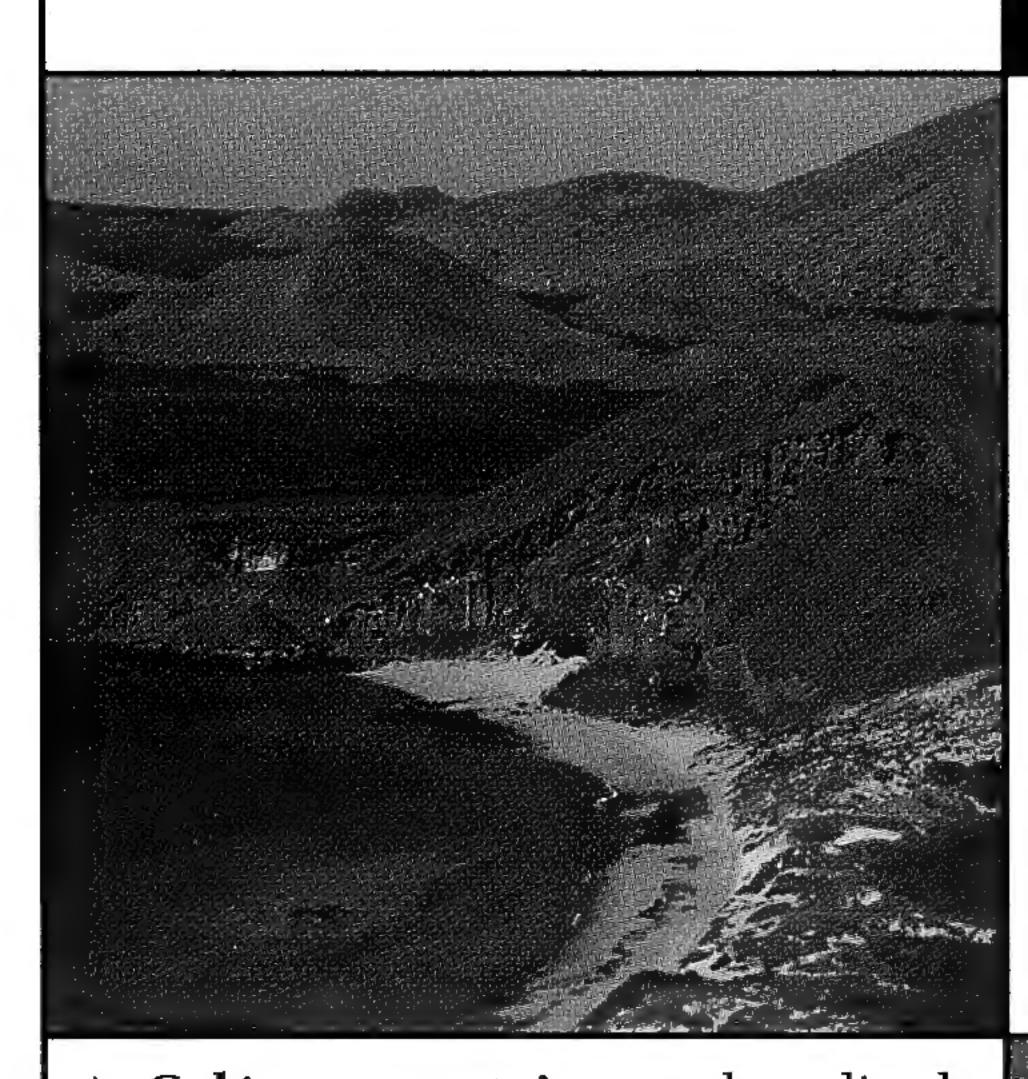
the most diverse on Earth, but still not well explored. Mosses, lichens and an

majority of these epiphytes are endemic, found here and nowhere else. [JK]

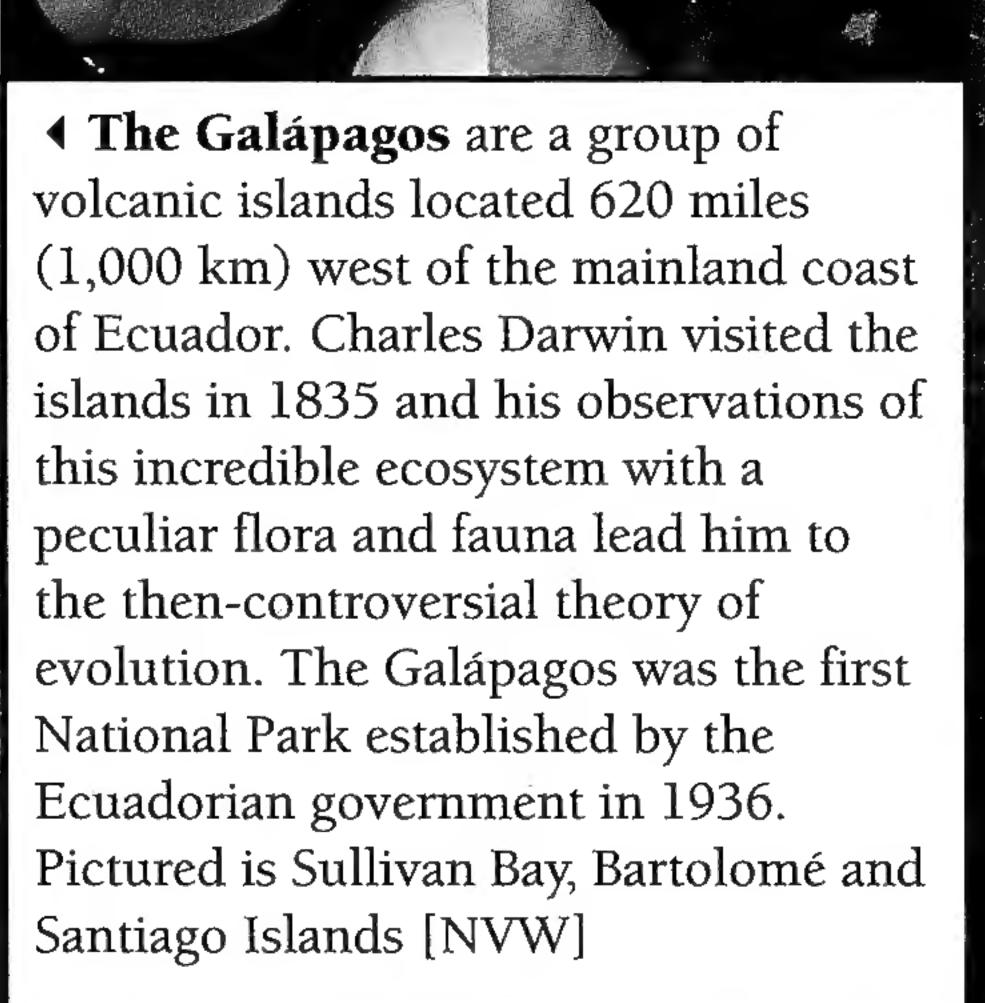
impressive array of epiphytic bromeliads and orchids cover the tree trunks. The

Endemics. Over 4,500 plant species are only found in Ecuador. These correspond to 25% of the country's almost 16,000 native species of vascular plants. Ecuador's "Red List" of endemic species reports that 83% of the endemic species are threatened under the IUCN 🚧 standards. Nothotriche hartwegii, previously considered part of another species, is an endemic from southern Ecuador recently rediscovered after almost 100 years. [CUU]

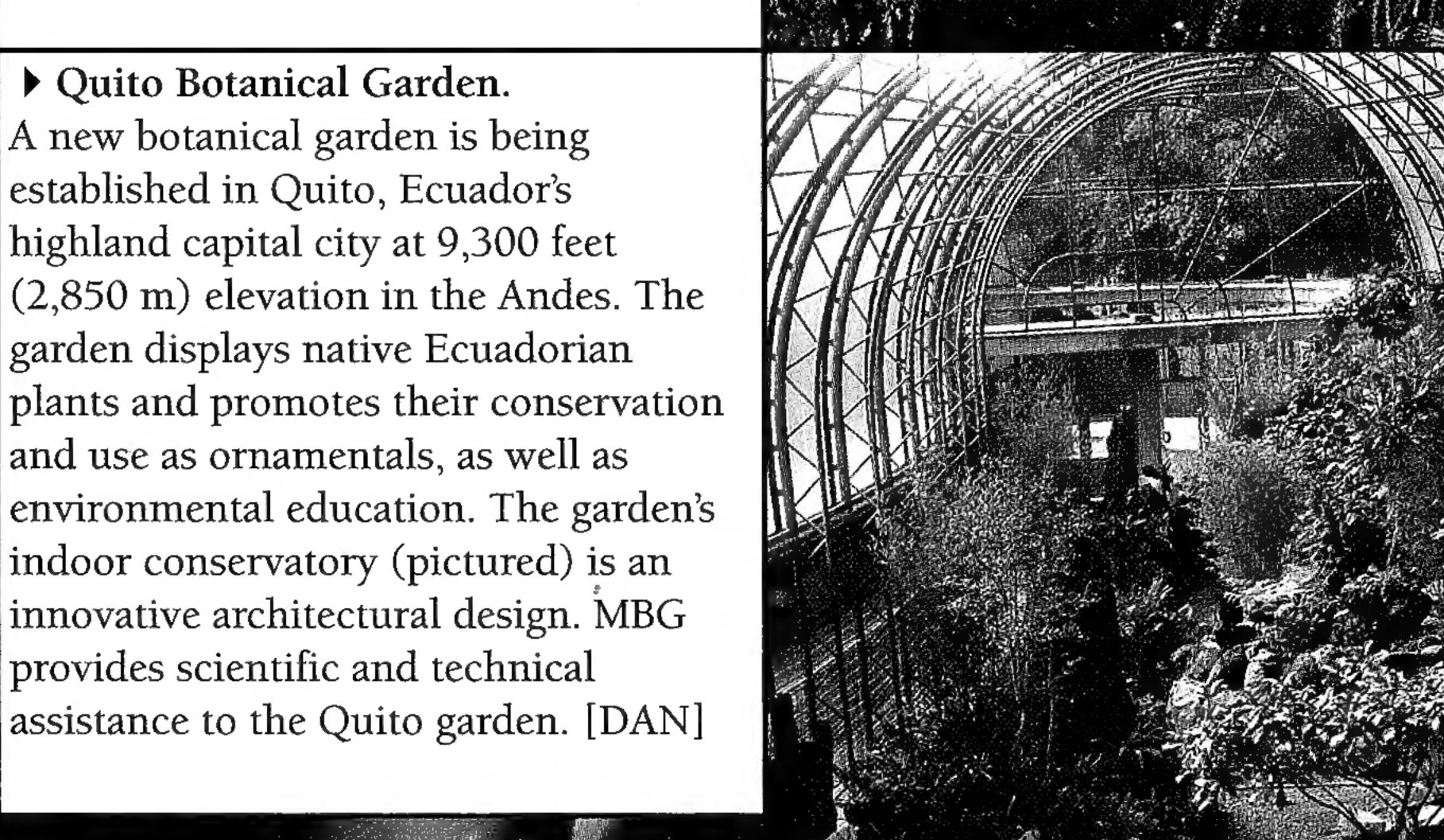
▼ Bee pollination: Calceolaria. The name literally means "shoemaker." Calceolaria is mostly found in the Ecuadorian cloud forests and páramos, with 72 species growing wild, 32 of them are found only here; and some have very restricted distributions. Instead of nectar, these shoe-shaped flowers offer either an oily substance or copious pollen to oil- or pollen-gathering bees. While feeding or gathering their reward, the bees pollinate the flowers. [PMJ]



▶ Galápagos tortoises are long-lived animals that can survive months without food or water. They were almost driven to extinction by buccaneers who used them as a source for fresh meat during long sea voyages. Later colonizers introduced plants and animals, threatening many of the native species. The Darwin Research Station and the Galápagos National Park carry out a successful reintroduction program along with a parallel program

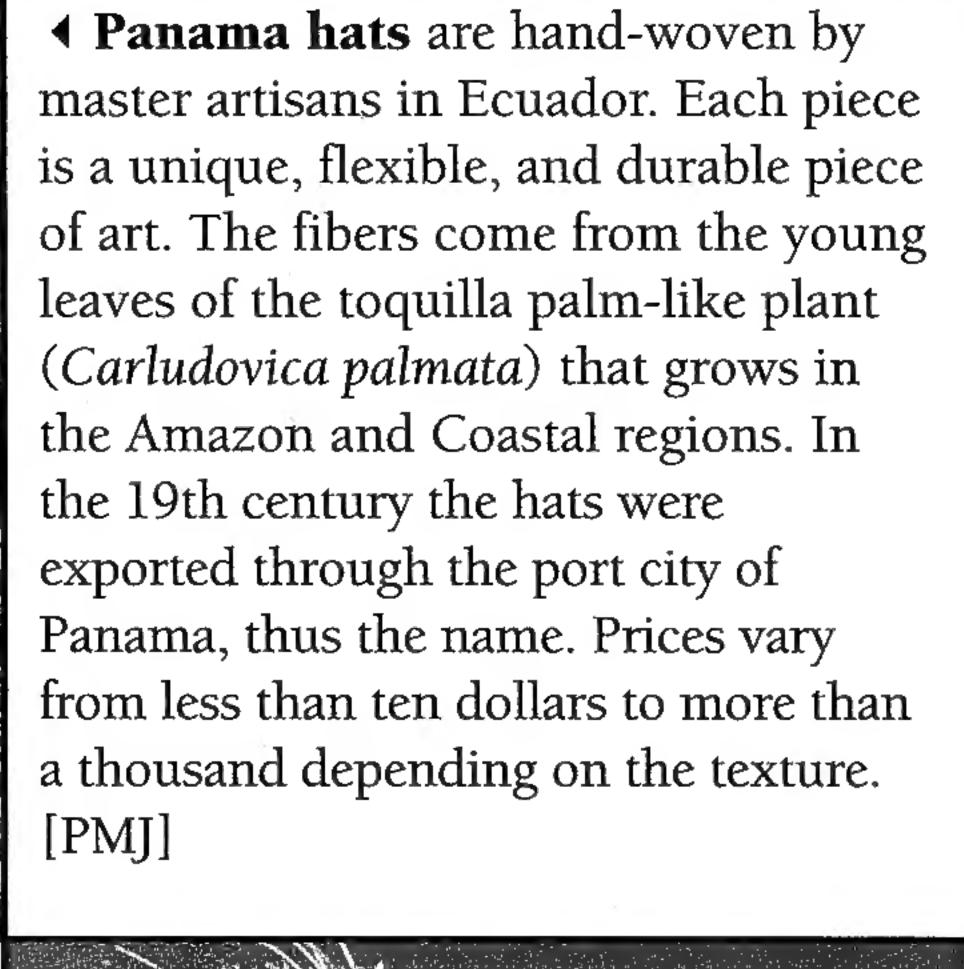


▶ The countess's powders. Cinchona pubescens, quinine. Legend tells that in 1638 the Countess of Chinchón was cured of malaria using pulverized bark from a tree growing in presentday southern Ecuador. In 1753 Linnæus immortalized the name of Chinchón as Cinchona. The only known cure for 300 years, quinine was exported in tons, overexploiting the forests. Synthetic treatments were developed during World War II, sparing the trees, but even today the genus is rare. [CUU]



assistance to the Quito garden. [DAN]

New species. Botanical exploration in the tropics is far from over. Every fourth day a new species of plant is being described from Ecuador. Arnaldoa argentea is an endemic species, recently described by MBG botanists who collected it in the southernmost part of the country. This new species also turned out to be a new generic record for the country, as the genus was previously known only from Peru. [JEM]



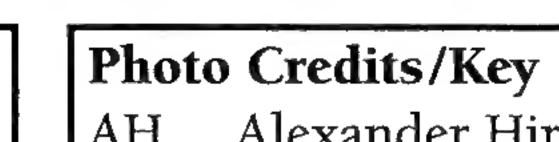
to eradicate introduced species. [NVW]



Research at the Missouri Botanical Garden

Plants are essential to sustaining the stability and quality of human life on this planet. Developing countries have 80% of the Earth's biodiversity, but less than one in 10 of the world's scientists. With operations in over 30 countries around the globe, the Garden is working for change. MBG botanists collaborate with local institutions in each country where they conduct research and field work, provide technical expertise, assist with fund raising, establish better communication with the worldwide scientific community, train botanists in the field and at MBG, and help to build infrastructure. The research division

consists of 45 Ph.D. botanists assisted by 100 support staff and 32 graduate students. Studies concentrate on the plants of Meso- and South America, Subsaharan Africa, Madagascar, China, Vietnam, and North America. Individual MBG scientists are specialists in the plants of particular regions, in the systematics and evaluation of major plant families, and in the interactions between plants and people. The Garden serves as the headquarters from the Center for Plant Conservation and for several major collaborative publications, such as Flora China and Flora Mesoamerica. Visit our website: www.mobot.org.



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Crespo, 1942–2001, Ecuadorian zoologist and ecologist whose teachings, support, and enthusiasm inspired a new generation of biologists and conservationists to be involved in research and preservation

of Ecuador's immense biodiversity.

In memory of Dr. Fernando Ortiz



