



CROSSOPTILON CROSSOPTILON

China's Hengduan Mountains

BY VIRGINIA MORELL

PHOTOGRAPHS BY MARK W. MOFFETT

"ALL THE TREES AND PLANTS HERE MAKE AN UMBRELLA FOR THE BUDDHA, all the animals are his gatekeepers, and like the lakes in heaven, the waters of this holy spring can never be finished." Dongga Luzhui, an elder from a Kham Tibetan village in China's Yunnan Province, finished his recitation and bowed toward the trees that towered over us. The grove was thick and dark with ancient firs, yews,

Long before environmentalism the sacred esteem that Buddhists hold for the Hengduan Mountains helped preserve the region's wildlife. Now secular law also protects species like the white eared-pheasant (above) and the dove tree (right), whose blossoms waft in the breeze like wings.





Vivid sprays of rhododendrons spangle Xiao Nong Valley in China's Yunnan Province. Botanists have identified 230 species of rhododendrons in the Hengduan Mountains. Early 20th-century British explorers collected these and thousands of other plants that today

are lovingly cultivated in the gardens of England, the United States, and other countries around the world. Likened by scientists to "islands in the sky," south-central China's steep, isolated peaks help preserve numerous plant and animal species unique to their locales.

hemlocks, and spruces. The trees had never been cut and never would be, Luzhui explained, because they hold the spirits of the Buddha and Living Buddhas, men believed to be reincarnations of other high holy ones.

I had joined Luzhui on a pilgrimage to a sacred waterfall in the Hengduan Mountains near Yunnan's border with Tibet. Two young Tibetan anthropologists accompanied us to document the holy sites that abound in this land of tall trees, soaring peaks, and rushing rivers. "It's not only these trees that can't be touched," said Xirao Sangbo, one of the anthropologists, "but also all the trees and animals beyond a sacred line" the local Tibetans had demarcated centuries ago. "Everything above that line belongs to the spirit of the highest mountain, and anyone who wants to take something from this forest must offer many prayers to the gods."

Such beliefs, common in the vast reaches of the Hengduan Mountains, are largely responsible for the remaining patches of old-growth forest in this part of south-central China. Running north and south, the many ranges of the Hengduans march from eastern Tibet into the provinces of Yunnan and Sichuan and cover more than 300,000 square miles. Between the ranges run four of Asia's greatest rivers: the Yangtze, Mekong, Salween, and Irrawaddy. The combination of high mountain peaks (many soar more than 15,000 feet), plunging river canyons (some as deep as 10,000 feet), and a monsoonal climate has created one of the few biological hotspots that is predominantly temperate.

Here in the Hengduans live nearly 50 species of conifers. Numerous species of maples, oaks, bamboos, rhododendrons, lilacs, primroses, and roses grow among the evergreens, forming forests that look as if they'd been planted by someone consulting a gardener's catalog. Indeed, one of the most beloved of garden plants, the elegant regal lily, was discovered less than a hundred

HOT SPOTS

The Earth's richest and most threatened reservoirs of plant and animal life

SOUTH-CENTRAL CHINA MOUNTAINS

AREA 309,000 sq. mi.

HABITAT TYPES Mountains, forests, savannas, wetlands, prairies

FLAGSHIP SPECIES

Giant and red panda, golden monkey, takin, snow leopard, white eared-pheasant

ENDEMIC SPECIES

3,500 plants, 75 mammals, 36 birds, 16 reptiles, 51 amphibians

PRINCIPAL THREATS

Logging, firewood collection, overgrazing, soil erosion, human population growth

years ago in a canyon of the Hengduans. Yet the mountains are wild, and in their deepest haunts roam some of the last remaining populations of giant pandas and red pandas, golden monkeys, snow leopards, blue sheep, and black-necked cranes.

But that rich abundance of species has been lost in most of the Hengduan ranges, primarily because of uncontrolled clear-cutting, fuelwood collecting, and hunting. Despite the sacred protection afforded to holy sites, conservationists estimate that less than 10 percent of the mountains' original forests remain. Now, however, Beijing has launched a massive effort to preserve what is left. In 1998, following devastating floods along the Yangtze River (which officials attributed to the intensive timber harvests), the Chinese govern-

ment enacted a ban on commercial logging in the Hengduan region. It also forbade hunting, created dozens of parks and reserves to attract Chinese and foreign tourists, and began promoting conservation education, often through public slogan campaigns. Through that combination of bans, tourism, and education the government hopes to turn the environmental tide in China—and ultimately preserve the country's richest region of biodiversity, the Hengduan Mountains.

"The government wants visitors to come to scenic areas and spend money," explained Bob Moseley, an ecologist with the Nature Conservancy who had joined our pilgrimage. "And the officials recognize that to attract tourists, they have to preserve the forests and biodiversity as well as the vibrant Tibetan culture."

A tall, lanky man with a mountaineer's love of vertical terrain, Moseley has spent the past year helping the Yunnan government assess the flora and fauna of the region's forests and offer ways to conserve both. Officials believe a national park to be the best solution for preserving the land and local cultural traditions. The proposed park will encompass the Tibetan village of Yubeng as well as its sacred forests, meadows, and ice-capped peaks. And



Scraping the sky, trees climb the slopes of the Hengduan Mountains above a Tibetan village in Sichuan. High-altitude forests remain mostly unexploited, partly because they are believed to be the abode of Buddhist spirits and partly because they are so inaccessible.

Twice as big as California, this south-central China hotspot harbors many peaks above 15,000 feet. Biologically it is among the world's richest and most diverse regions.





A small mountain of firewood stands ready for winter in a village in the Hengduans. Wood collecting and clear-cutting erased more than 90 percent of the original forests, prompting a ban on logging in 1998, though taking wood for personal use is allowed. Elsewhere in the Hengduans workers plant native spruces (left) as part of a reforestation program.

since the park will further protect these holy areas from the chain saw, the villagers view it as a good thing.

"My heart and soul are in these mountains, in these forests," said Luzhui. "And we are glad to share their beauty with others."

Until 1998 the villagers earned some money from small-scale logging, taking trees from the mixed conifer and deciduous woodlands below their sacred line; now they hope tourists will help make up the wages lost when logging was banned. Still, the promise of the park hasn't brought an end to all timber harvesting. Farther along the pilgrimage route we encountered a small stream-powered sawmill, where locals are permitted to shape planks for their homes.

"The villagers do occasionally use some trees above the sacred line for small projects like fences," said Moseley. "Below it they also cut trees for fuel, something that will continue since it's the only means they have right now for heating their homes and cooking. But most of this forest appears not to have changed much over the past 75 years. It's largely intact due to the people's religious beliefs."

To ensure that the local Tibetans' beliefs are respected in the park's plans, the anthropologists have mapped the sacred sites and recorded the stories that go with each. Their map of holy spots largely overlaps the biodiversity map that Moseley and his team of local botanists have developed from their surveys. "I guess that shouldn't be a surprise," Moseley

said, "since many rare species are found at the higher elevations," which is also where the Tibetans have traditionally refused to log.

Along the pilgrimage trail to the sacred waterfall, Luzhui stopped about every quarter mile to point out a holy site. One was a large boulder, where a woman from Yubeng once saw a vision of the Buddha; female pilgrims now stop to pray here, attaching offerings of prayer stones and flags, coins, and even long tresses of their own hair to the boulder and vines that cover it. At other points Luzhui pointed out particularly large fir trees. These were like brave young men or strong prayers, he said, and guided the faithful on their journey.

Near each holy site Moseley spotted some botanical treasure as well: the Yunnan *Rhodiola*, whose scalloped green leaves are used to make a tea for altitude sickness; a giant jack-in-the-pulpit with a purple-green curl unfurled like a lure for the insects that pollinate it; and groves of oak trees with leaves colored such a dark green they are almost black.

Rhododendrons bloomed in shades of red, white, pink, and yellow, their blossoms lighting up the dark woods like miniature Chinese lanterns. Some of the rhododendrons were as tall and sturdy as the oak trees, while those in the alpine meadows tidily hugged the ground—and dazzled the eye with fat clusters of electrifying purple and garnet flowers. "This area really is the center of the world's rhododendron diversity," Moseley said, standing at the





AILURUS FULGENS (PHOTOGRAPHED AT CHENGDU PANDA BREEDING CENTER)

A precarious perch reflects the uncertain future of the endangered red, or lesser, panda, whose numbers have declined due to habitat loss and hunting for its handsome pelt. Still, the population and range of the red panda exceed those of the larger giant panda,

which is even more endangered. A shy and solitary animal, the red panda spends its days sleeping in trees, descending at dusk to eat. It feeds almost entirely on bamboo, with the occasional addition of other plants, insects, eggs, small birds, and rodents.



Folk medicines such as dried monkey blood, ground deer horn, and insects stock a pharmacy in the city of Kangding. In a Sichuan nature reserve (right) hours of tedious searching are devoted to gathering *Cordyceps sinensis*, a fungus eaten to bolster the immune system. Caterpillars hatched from moth eggs burrow into the soil, where they are invaded by fungi that sprout threads rising barely above the ground. Overharvesting is a concern since collectors may strip areas of certain species.

edge of an alpine thicket. "Altogether there are 230 species in this part of China."

It takes time for such diversity to develop. During the last ice age, some 14,000 years ago, the Hengduans had provided a refuge for many plants. "Because this region is so far south, the mountains weren't as heavily glaciated," Moseley said. "Plants and animals could retreat here," saving them from extinction and giving them more opportunities to evolve new species.

The pilgrimage path led through meadows of wildflowers and past fields of more rhododendrons. Above us the ice-and-stone peak of Mount Kawagebo rose like a saber; waterfalls plummeted from its glaciers. When we arrived at the sacred waterfall, Luzhui and the anthropologists stopped to chant and light bundles of incense cedar, letting the smoke carry their prayers to the summits of the gods. Then, fully clothed, they ran one by one through the fall's chilly waters to celebrate the creatures of earth

and sky and the bounty of Kawagebo's meadows and forests. The Tibetans' prayers had protected their land, and the land, in turn, had given them a living. Now, they hoped, the coming national park would do the same.

A GOOD 200 MILES EAST of Mount Kawagebo, in neighboring Sichuan Province, tour buses packed with Chinese urbanites on holiday rumbled down the highways of another part of the Hengduans. Only a few years ago logging trucks had the roads virtually to themselves, but the ban has halted that traffic. "Now it's tourists, tourists, tourists," said professor Yin Kaipu, a plant ecologist from the Chengdu Institute of Biology.

The main highway we were traveling led to one of the newest of the prime tourist spots: Mount Gongga, at 24,790 feet the highest peak in the Hengduans. Here were several

new national parks and nature reserves as well as swank five-star hotels, hot spring spas, and cable car rides. And in every nearby town and hamlet signs hailed China's new environmental era: "Return the farmland to the forest!" "Save the forest and benefit the future generations."

"It's a new way of thinking," said Yin, directing our driver to stop at a trail inside the recently opened Hailuoguo National Glacier and Forest Park. A slight man with a gentle manner, Yin has traveled throughout the Hengduans since the early 1960s, searching for new species and rediscovering others thought lost to science.

"There was a drive, starting in the 1960s, to develop this part of China," Yin explained. "At first the government thought the timber industry was good for the people here because it gave them employment and because they could grow food where the forests had been. I could see that the forests were being destroyed

and many species were going extinct, but the people were very poor, and they had to have a way to make a living."

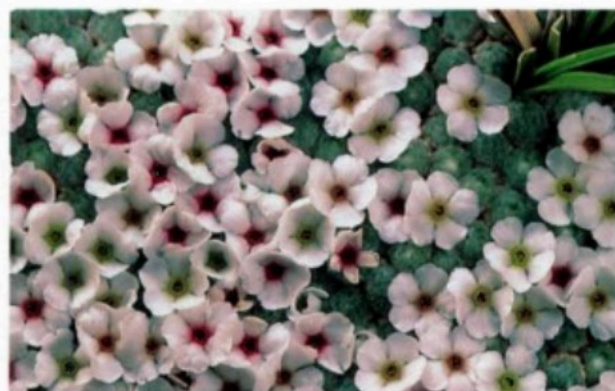
From his explorations, most on foot, Yin knew the flora of Mount Gongga was more than unusual; it was unique, harboring species found nowhere else. So, 20 years ago, he proposed that the entire mountain be conserved. "To me, it is a treasure-house of plants," said Yin, since the vegetation ranges from subtropical orchids to alpine mosses. But the Ministry of Forestry had extensive logging operations on the mountain and at first agreed to save only the valley where Yin's colleague Liu Zhaoguang had discovered a rare plant in the lily family growing high in the branches of an oak tree.

Now guiding us up the trail into that same valley, Yin searched again for the tree-loving plant. He led the way into a forest dense with oaks, magnolias, and bamboos and carpeted with orchids and wild strawberries. Oriental



BERBERIS SP.

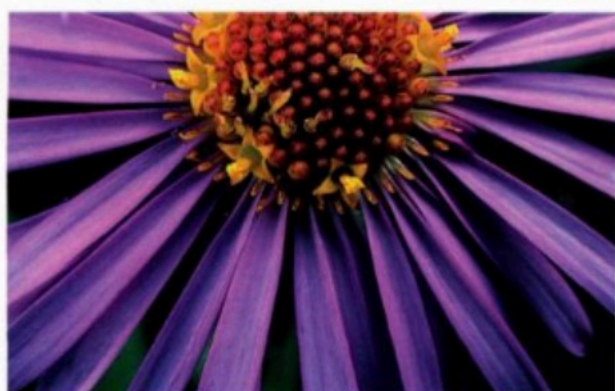
Floral delights please the eye and soothe the body. An ornamental, *Berberis* (above) yields a tonic taken to ease intestinal distress. With its galaxy of blossoms *Androsace* (below left) is popular in rock gardens. The odd *Helwingia japonica* (below right) sprouts star-shaped flowers mid-leaf. The aster (bottom left) is widely used as ground cover and in flower arrangements. Chinese botanists cultivate the endangered *Rhododendron orbiculare* (bottom right) to restock the wilderness.



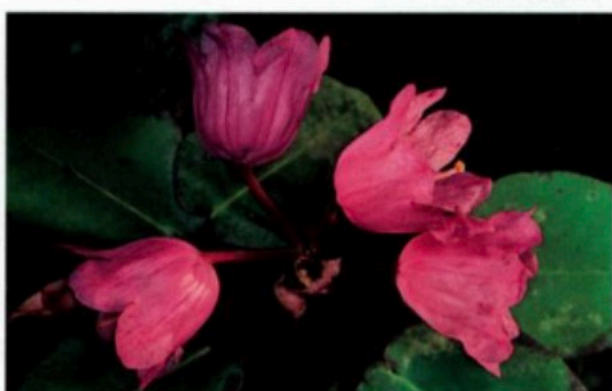
ANDROSACE SP.



HELWINGIA JAPONICA



ASTER TONGOLENSIS



RHODODENDRON ORBICULARE

white-eyes and chestnut thrushes flitted among the bushes, and overhead a large troop of cinnamon-colored, stump-tailed macaques crashed through the trees. "That's a good sign," Yin said, pausing to watch the fleeing monkeys. "A few years ago we seldom saw a macaque—and never a troop this big. I think it shows the hunting ban is working." Then Yin stopped beneath a hoary oak tree and pointed at one strappy-leaved plant growing on a mossy branch. "There it is. That's the 'flying lily,'" the rare plant that had helped him preserve this forest. His colleague discovered the plant, Yin laughed, because he happened to glance up during a call of nature. "That lily grows only in a very narrow range between 6,500 and 7,200 feet," he added. "If we hadn't saved this valley, the lily might have been lost forever."

Persuading the government to preserve the valley pushed Yin and other Chinese conservationists to try to protect more of the forest. In 1995 the government agreed to set aside about 1,550 square miles of Mount Gongga's remaining woodlands and meadows. Now, with the bans against hunting and logging in place, the mountain is largely protected.

The transition from a logging to a tourism economy was rough at first, said Yin. But now many of his friends—men of the Yi people who had worked for him as guides and hunted for a living—are rangers in the new park. Others have opened restaurants or work at the hotels. "I told them tourism would give them a better life," Yin said. "No one believed me. They said, 'This is a fairy tale.' Now even those who opposed me are building guesthouses."

At first glance outsiders may also regard the Chinese government's newfound enthusiasm for ecotourism as little more than a fairy tale. But this is a culture where citizens respond to the directives of the central government, which is now encouraging the growing middle class to spend some of its money on travel. "People used to go only to forests where there are temples and Buddhist monasteries," explained our interpreter. "That is our tradition. Now we are going to places like the Hailuoguo Glacier just to see the glacier and the forest for their beauty. And that is something new for us."

From the valley of the flying lily we drove higher up Mount Gongga to a parking lot just below Hailuoguo Glacier. Although the trail to the glacier was still under construction, visitors

were already setting out on it. All were dressed as if arriving for a social occasion: the men in suits and dress shoes gleaming with polish; the women in slacks, sweater sets, and dainty sandals, their hair perfectly coiffed, their lipstick and nail polish shining. Few actually walked to the glacier; most preferred to be carried in chairs slung on two poles and hefted by two strong men. "We are seeing our country, the beauty of it," one couple told me when I asked what had brought them to Hailuoguo. "And we want to walk on the glacier." A few miles up the trail the carriers unloaded their burdens, and the tourists headed tentatively onto the ice in their city shoes, laughing and slipping and then simply stopping to admire the long tongue of the glacier that drifted in and out of view under a low-lying cloud.

At the trailhead local people earned extra money by selling mushrooms, herbs, and medicinal plants they had collected in the forest. In other countries such collecting might be prohibited in a national park, but Yin shook his head at this idea. "These plants are important for people's health," he explained. "There are some that can be cultivated, but others have their power only if they are collected in the forest. It may need some regulation, but not all traditions can be changed overnight."

THE DAY AFTER HIKING to the glacier we drove to a nearby Tibetan village. Twenty-two years ago Yin had explored this area on foot, searching for a conifer that the renowned English botanist Ernest Wilson had collected in 1907. Yin had found Wilson's record of the conifer, a rare spruce, in the papers at the Chengdu Institute of Biology. None of Yin's colleagues, however, could remember seeing the tree in the wild.

On his 1980 expedition Yin was accompanied by a young director of land use for the county, Chen Maolin. "We walked all these hills and valleys," Yin recalled. At that time there was still some forest on the ridges above the valley, but the trees were cut sometime later, and today only shrubs and spindly young evergreens dot the hillsides. The valley itself is green with cabbages and broccoli growing in neat rows. Nevertheless, here in Lao Yu Lin village, Yin and Chen had found Wilson's tree—or what might be the sole survivor. They had taken a picture of it, with Chen facing the camera and beaming



The call of the wild draws throngs to the slopes of Yunnan (left). Ecotourism will require a fine balance: collecting revenue from visitors without spoiling the ecosystem through overcrowding. Blessings lured a pilgrim (right) who walked part-way around a sacred mountain, then passed three times under a waterfall, a ritual in which the faithful are literally immersed in nature.

as he pointed at the spruce's tall, stately spire.

"It brought tears to my eyes to see the tree," Yin said as we drove into the same village. "I had searched many years and finally found it in this valley." He hoped to show me the same tree and had brought along Chen, who was now deputy governor of the county, to help re-create the scene of their discovery. But the two men were worried. They'd heard rumors that their tree had been cut down. And in the short one-mile stretch of village, certainly no towering conifers were to be seen.

Yin's driver parked the car, and the two men, looking glum, walked up a narrow path to investigate. A few minutes later Yin appeared again, waving and calling to me. "Yes, yes, the tree is gone," he said. "I'll show you where it was." We walked through some fenced yards, and he pointed to a low wall. "See, its trunk is still there; it's part of the wall now." Yin took a deep breath and patted his heart. "I feel very sad to see this." He stopped for a moment, then continued. The owner of the land, it seemed, had cut down the tree to make coffins for herself and her husband. He had died a few years ago, and she herself was 89, a bent branch of a woman, and terrified that Yin, Chen (the deputy governor, no less), and a foreigner had come to see her tree. She'd run away from us, locked herself in her house, and wasn't opening the door for anyone.

Yin shook his head. "Now, look here," he said, smiling once again and pointing to several

young conifers that had sprouted a short distance from where the precious tree had stood. "I can't be absolutely sure yet—because I have to wait until one produces a cone—but I'm fairly certain these are the babies of that tree." There were 12 of the young conifers, all about two feet tall, growing in a neighbor's yard. The neighbor's son had stepped out to see what all the commotion was about, and he stood now among the prized trees. Yin grasped him by the hand. "The trees are young like you," he said. "And you must care for them, protect them."

"And if you don't, if you hurt any of these little trees," added Chen, wagging a finger at the young man, "I'll find you, and I'll. . . ." He didn't finish his threat, and everyone laughed.

On a concrete wall outside the village someone had painted an environmental slogan in large, red Chinese characters: "Benefit your children. Save the trees." In the 1960s, when Yin began his collecting campaign, other slogans had been painted on the walls that encouraged villagers to cut down trees and use the wood to make steel and develop China. That was why this valley's hillsides were bare. But the young people of today, like the boy Yin had just charged with protecting the spruce seedlings, were reading different slogans and learning a new ethic. Yin said it gave him reason for hope. □

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