PUSHING THE LIMITS FOR MORE THAN A CENTURY

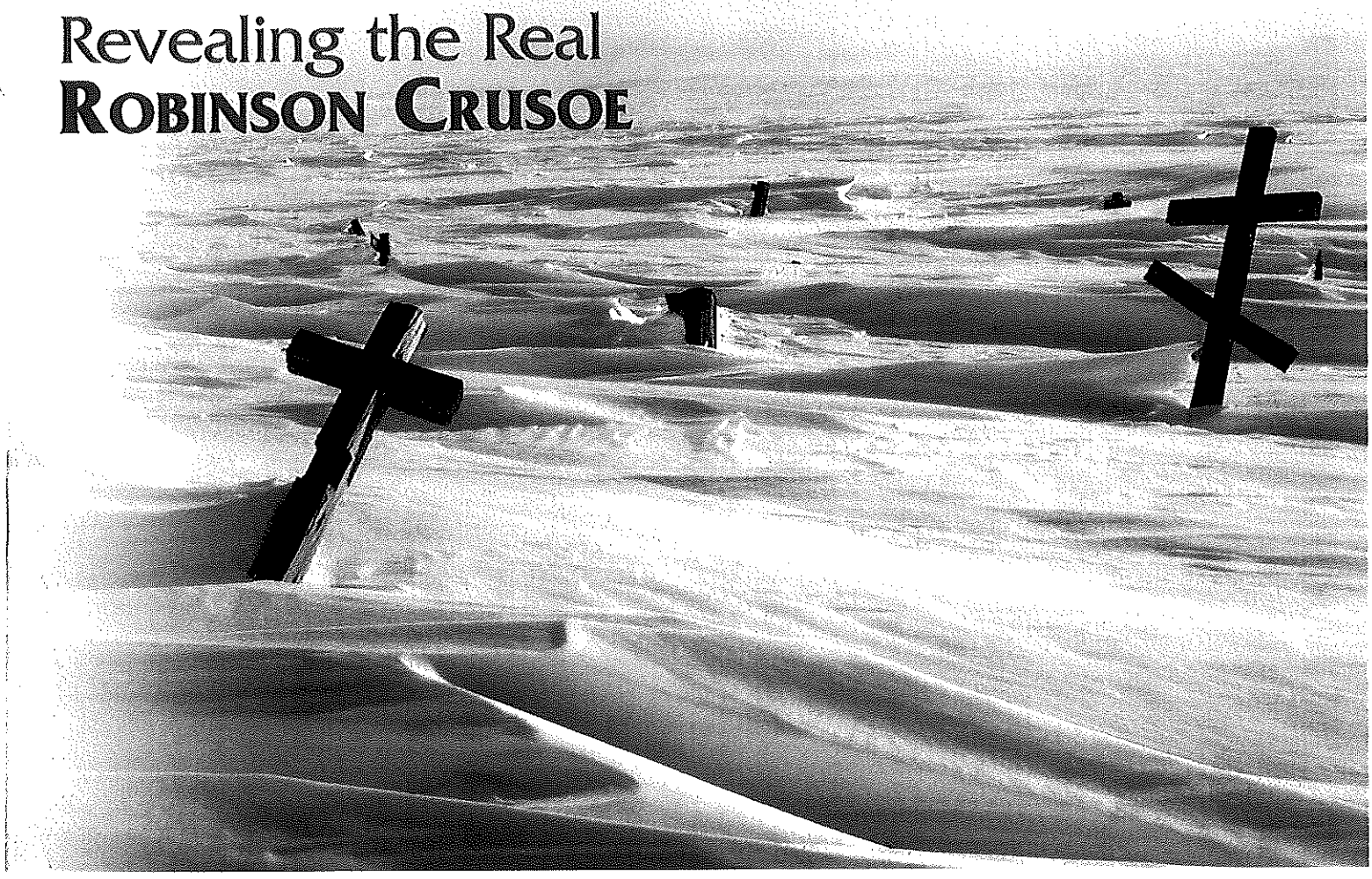
THE EXPLORERS JOURNAL

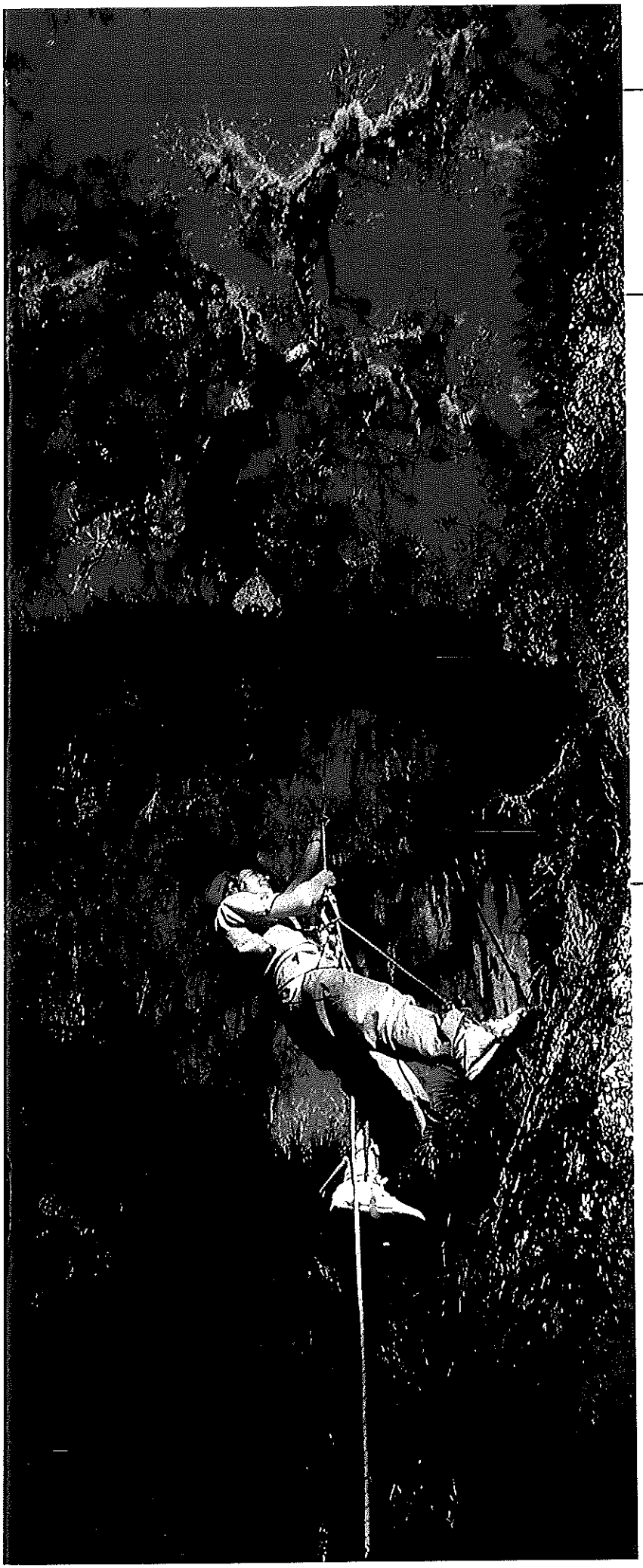
WINTER 2005/2006

A WICKED WINTER IN SIBERIA

KING KONG'S ORIGINS at The Explorers Club

Revealing the Real ROBINSON CRUSOE





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FEATURES

DEPARTMENTS

OUT on a Limb

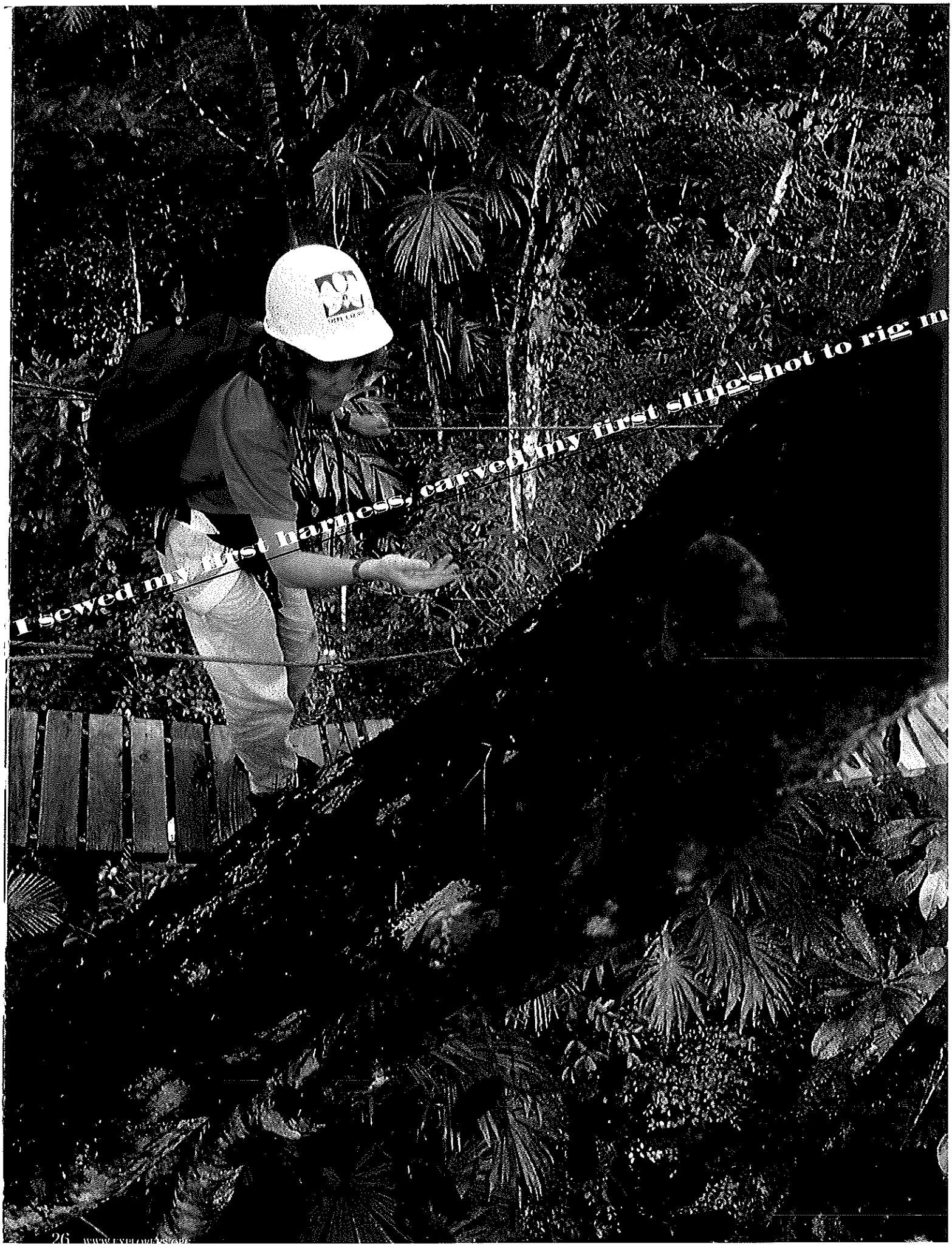
By Meg Lowman

During the 1970s, tropical rain forests were scientifically considered a "black box" (translation: a big dark region full of the unknown). As a young graduate student—armed with a tolerance for leaches, mud, and smelly socks—I wanted to solve the mysteries of tropical jungles. For instance, how many species exist on our planet? What lives in the tops of tall forests? Why don't those millions of beetles eat up all the foliage? How do tropical forests control the climate and lifestyle we enjoy in the temperate zones? In order to study tropical trees, I needed to climb to reach their foliage. So I packed some ropes, a harness, climbing hardware, a camera, and notebooks into a rucksack—bound for the jungles of Australia.

My career has been unconventional—I climb trees for a living. I voyaged to Australia some 30 years ago because a graduate school scholarship in botany seduced me. Upon arrival, I decided to study the tropical forests of this "lucky country," in part because no graduate students at the University of Sydney had previously studied rain forests "down under." Only an estimated five percent of the original Australian rain forest had escaped the chainsaws by 1978. I had to hurry. In trying to find something important to study, I realized that almost 95 percent of every tropical tree was both out of sight and reach. In essence, these jungle canopies were never seen, much less studied. I sewed my first harness, carved my first slingshot to rig my ropes, and set my sights on exploring at the top.

The author rappels down a great kapok tree in Amazonian Peru.

E.O. Wilson of Harvard University characterized forest canopies as the last biotic frontier on Earth. Tree crowns escaped scientific exploration over the past 100 years for the simple reason that the logistics of overcoming gravity were never solved. Charles Darwin allegedly was hoisted in a chair by South American natives to view the canopy, just as a novelty. Some 150 years later, I was fortunate to become one of the first explorers into this uncharted frontier, and I remain awestruck by each and every return voyage out on a limb. The canopy is home to the greatest number of species on Earth, now considered a hot spot for biodiversity. Current scientific literature estimates that our planet houses up to 100 million species, of which almost half live in the treetops. Many, not surprisingly, are insects. Forest canopies are centers for photosynthesis, foods


I sewed my first harness, carved my first slingshot to rig m

This walkway, left, winds at a height of 75 feet through lowland tropical rainforests of Belize. A red noose and snake stick, below, were used to capture the Gabon viper living under our sleeping platform.

ropes, and set my sights on exploring at the top.

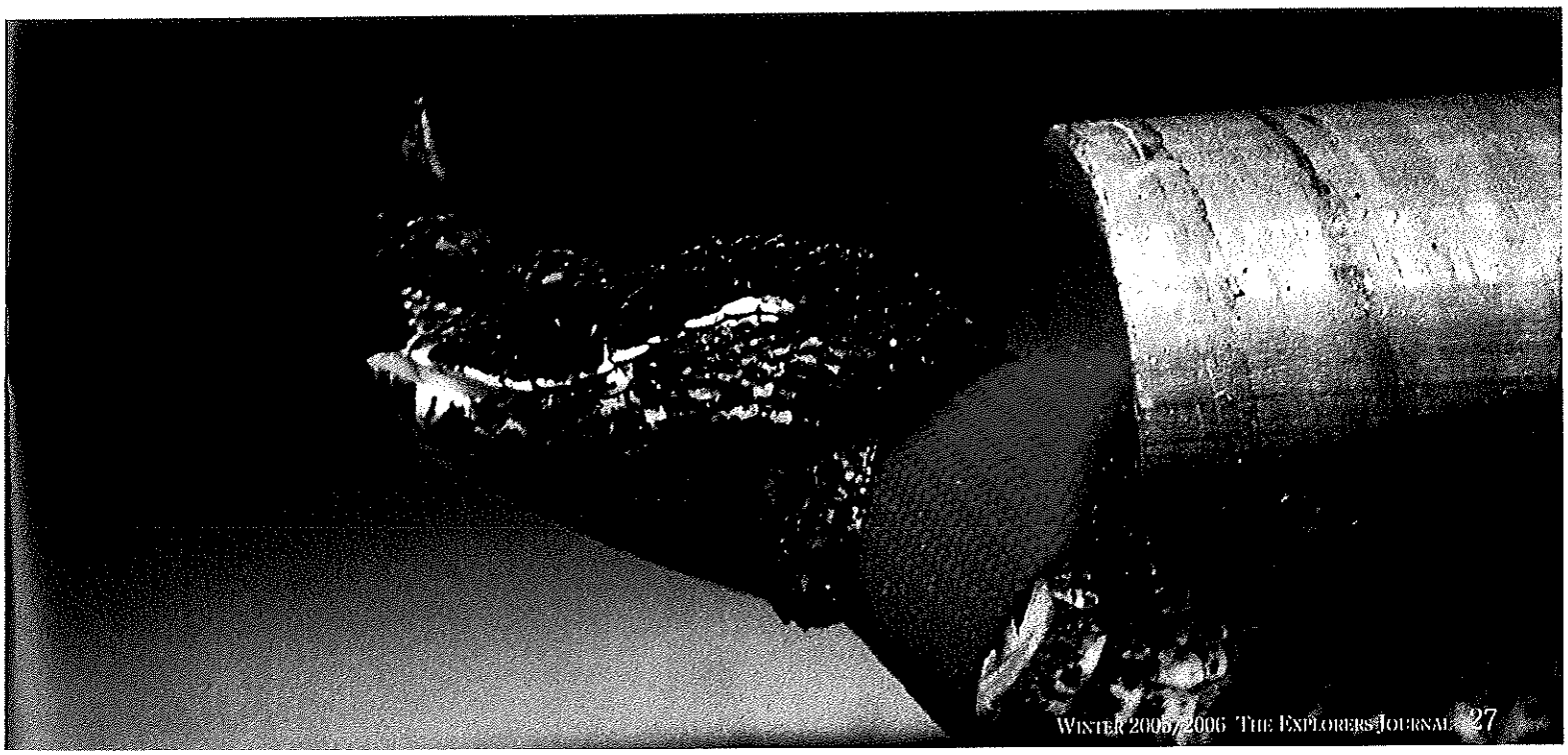
and medicines flowering and fruiting, and growth, so it is logical that animals will tend to live up there amongst the sunlight and foliage.

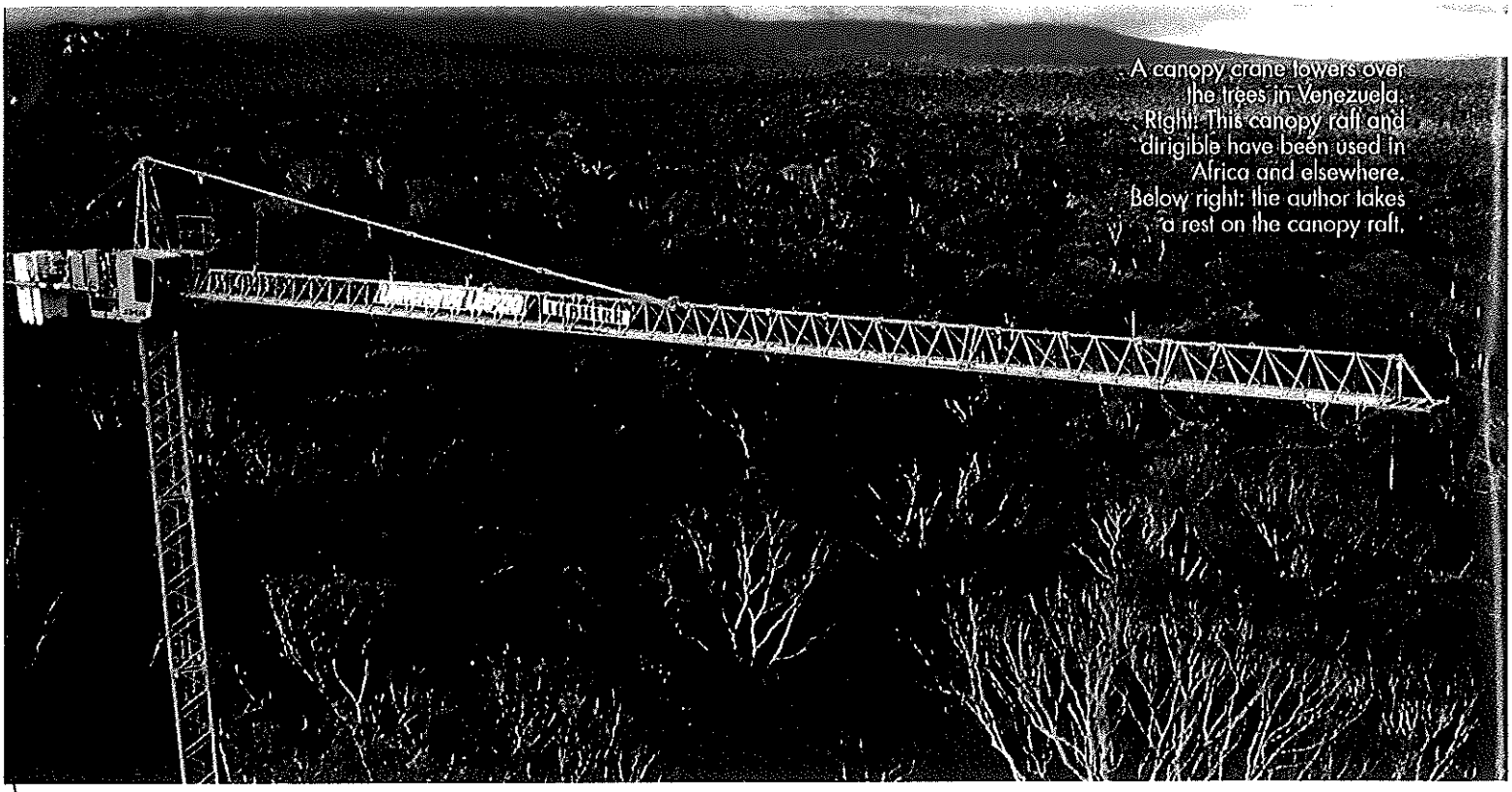
Initially, my biggest challenge was to design safe methods to reach the treetops. I spent long hours becoming adept with a slingshot and propelling my fishline through a safe passage up and over a strong branch. On the back of a napkin in an Australian pub, I sketched the first walkway for ecotourism. With another colleague, I adapted a nautical bosun's chair to hoist kids into the treetops. Several years later, when I was back at Williams College as a professor, a team of us built the first research canopy walkway in North America. More recently, the first walkways for public visitation and another accessible for wheelchairs were completed outside Sarasota, FL. While I was busy perfecting rope techniques and walkways, other colleagues created additional methods. Cherry pickers, hot-air balloons, inflatable rafts, canopy bubbles, zip lines, and construction cranes complete the toolkit for treetop exploration. Once the methods were designed and tested, the stage was set to solve the biological mysteries of these aerial ecosystems. How do the treetop inhabitants interact? What are the dynamics of growth, death, productivity, and diversity? In essence, what makes these complex systems function, and how can we ensure their stability for future generations?

Having solved the rudiments of access, I now focus on teasing apart the ecology of these forests. Specifically, my long-term research involves plant-insect interactions. It is a *beetle-eat-leaf* world up there, oftentimes noisy at night with millions of foliage-feeding insects chomping on millions of leaves of trees, vines, and air plants. This process of herbivory can lead to pest outbreaks, an important applied outcome of this research. Since plants cannot run away from enemies, leaves have evolved different strategies to defend themselves: thorns, hairs, poisonous chemicals, and toughness. The interaction of insects eating plants actually stimulates the production of chemicals in leaves and serves as a plant's major defense tactic. This response creates a veritable apothecary in the sky.

The living conditions of tropical expeditions are usually worthy of tall tales upon return. Africa was no exception, and I affectionately called our basecamp the Cameroon Hilton. A rudimentary open-air thatched long hut housed 50 scientists who managed to string their hammocks "bottom to bottom" in a long line. As the only female present during this part of the expedition, I was thoughtfully offered the end position to provide some (questionable) privacy for dressing in the morning. The sleeping quarters provided almost as many tales of biodiversity as the treetops. Imagine 50 pairs of muddy, sweat-soaked boots with 50 pairs of dirty, smelly socks, all cramped in a hot, humid shed with relatively little air circulation.

The smells were almost as diverse as the sounds. Forty-nine men plus one lone female sleeping on their backs with knees inclined backwards (which is the only possible posture in hammocks) provided some wonderful snoring concerts, not to speak of the sleep-walking, sleep-talking, and wild dreams triggered by hard sweat-and-toil climbing days in the jungle. Laughing treefrogs, a chorus of crickets and cicadas, intermittent sonar sounds of bats, the chewing noises of beetles and stick insects, titillating screeches by troops of monkeys, plus





A canopy crane towers over the trees in Venezuela. Right: This canopy raft and dirigible have been used in Africa and elsewhere. Below right: the author takes a rest on the canopy raft.

occasional growls of mammals on the forest floor provided a backdrop for sleeping unsurpassed throughout the planet. The night symphony of the forest easily outcompeted the snoring concert on the platform.

Another special feature of the Cameroon Hilton was the challenge of using the outhouse in the middle of the night. (God did not endow women with the precision to aim off the edge of a sleeping platform, so I was the only one to clamber down regularly and walk to the outhouse nestled in the forest interior.) On several occasions, millions of army ants had discovered the outhouse, creating a broiling carpet of tiny, fierce bodies swarming around the hut's perimeter, rendering it unapproachable and downright dangerous. But on most nights, my biggest concern was the Gabon viper that lived in a hole just under the sleeping platform at my edge of the structure. According to the resident herpetologist, Gabon vipers were deadly poisonous with no known antivenin. They are also beautiful to behold. Whenever a visitor came to camp, someone enthusiastically hauled our resident Gabon viper out of its hole using a red noose attached to a snake stick. I am relieved to announce that the Gabon viper and I never came face-to-face during my nocturnal forays to the outhouse, but it has given me a lifelong respect for small dark holes in African soil.

During almost 30 years of treetop exploration, I have whittled away at relatively small goals—one tree at a time. I can only hope that my scientific research will strengthen conservation and education about our planet's last remaining wild places for the next generation. As a scientist and explorer, I have managed to discover a few new species; pioneer some new methods of canopy access that opened some new frontiers in forest ecology; leave a modest legacy of treetop walks encircling the globe to encourage ecotourism instead of chainsaws; and share my exploration with kids through the wonders of distance learning. My own children were extraordinary in their patience to accompany me on forays into the jungle, where they, in turn, became explorers in their own right, discovering new species and sometimes eating all sorts of exotic critters. I feel fortunate that I was never knocked unconscious by a falling cannonball tree fruit or bitten by an Australian brown snake.

The greatest exploration remaining in the tropical treetops is perhaps not to map the last remaining remote jungles or climb the tallest trees. The most urgent exploration, with rewards far exceeding the discovery of a new beetle or a lost city, is to discover the secrets of how these complex ecological machines called rain forests function. We do not yet know the commonest tree in South America, nor do we have any idea how many creatures live in a cubic meter of foliage. Yet we know the chemicals that compose Mars, the structure of an electron, and the genetic makeup of a mosquito. Science has advanced in many arenas, but the ability to understand the machinery of our "home" is still lacking. The exploration and scientific advances in canopy biology over the next 20 years are critical to understanding the health of forests that regulate the quality of life on our planet. I hope we can expand planetary explorations "out on a limb," and use our scientific results to generate sound conservation policies. ■

MEG LOWMAN PHD *is the director of environmental initiatives and a professor of biology and environmental studies at the New College of Florida in Sarasota, FL, and currently serves on the board of The Explorers Club. Her scientific text,* Forest Canopies *(coauthored with H. Bruce Rinker), was published in 2004 by Elsevier Publishers. Her next book,* It's a Jungle Up There–More Tales from the Treetops, *coauthored with her two explorer sons, Edward and James Burgess, chronicles their family exploration of forest canopies around the world, with case studies combining exploration and research with conservation and education outreach. The book is due out in March 2006, published by Yale University Press.*

For more information: www.canopymeg.com

One of my favorite expeditions was an international balloon survey of the lowland tropical rain forests in Cameroon, Africa. To travel across two oceans, amongst different cultures, immersed in totally new plant families via hot-air balloons and inflatable rafts represented the ultimate in challenge and adventure for my aerial botanical career. A narrative from *Life in the Treetops* (Yale University Press, 1999) encapsulates the excitement of my unique canopy voyage:

We finally arrived at basecamp. Operation Canopée was aglow with lights, but noisy generators, not quiet candles, were the source of power. The scene was reminiscent of a jungle movie, with thatched huts in a forest clearing.... It was a strange sensation to hear people speaking so many languages in the middle of the African equatorial jungle—French, German, Japanese, and English. The only common thread was a sense of adventure in canopy science....

As the only female in an otherwise male camp, I found showering to be a real challenge, not only because of insects but also because of staff intrusions. I probably became a prime educator of the local Pygmy assistants on the subjects of American female anatomy and ablutions. My Western colleagues were amused that whenever I headed for the shower cubicles with my towel, an attentive group of ground staff would follow. Their most common ploy was to clamber upon the hot tin roof, as if to check the water hoses, and then peer over the edge into my stall. Once they brought machetes and proceeded to cut the grass just outside the shower stall—all ten or so blades that had resisted our continual trampling. Getting dressed in the morning was another challenge, in the open hut with 50 men in hammocks, but just another liability of the field work....

The dirigible was launched daily at 6:00 a.m., weather and health-of-crew permitting. A launch pad had been carved out in the forest and was covered with a plastic tarpaulin to cushion the huge balloon. Entry on to the tarp was permitted only with bare feet. The French have a wonderfully casual sense of organization; everything got done with nothing like the fuss or stress that might occur if Americans were shouting orders and organizational advice to one another. Two Africans held the ropes in front while Danny, the pilot, fired up a small flame just under the dirigible. A tiny balloon was always released first, to test wind conditions: a lovely combination of high and low technology. Finally, liftoff! The colorful balloon sailed quietly over the tips of the umbrella trees that edged the clearing, and then ventured out over the vast sea of green...."