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Photo by Laura Wulf

Mark Moffett with Hercules and Goliath beetles. His new book, *The High Frontier: Exploring the Tropical Rainforest Canopy*, presents in text and spectacular photos an introduction to the world of the tropical canopy.

A Wandering Naturalist In the Rainforest Canopy

Biologist Mark Moffett turns his camera lens on exotic fauna and flora, including misshapen ants and strangler figs

By Ken Gewertz
Gazette Staff

Some of Mark Moffett's job skills bear little resemblance to those found on a typical academic resume: a love of arboreal existence, an apparent immunity to tropical diseases, rock-steady hands, and the ability to place his ankle behind his head.

Fortunately, Moffett has discovered the singular occupation that brings

together this exotic collection of talents. As a biologist interested in the rainforest canopy, he has spent countless hours hanging from nylon ropes or clinging to slippery branches observing the activities of rainforest denizens from orangutans to mites.

His new book, *The High Frontier: Exploring the Tropical Rainforest Canopy* (Harvard University Press), due out in March, presents in text and spectacular photos an introduction to the

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By Laura Ferguson
Gazette staff

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Evidence from Siberia Dates Bic

Moffett Depicts Beauty and Biology of Rainforests

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world of the tropical canopy.

"The rainforest canopy is a wonderful place to be; it's an amazing sensory experience," Moffett said.

He also admits to something of an ulterior motive in wanting to share that experience.

"I think there's been too much focus on rainforest destruction and negative imagery," he said. "My decision was that for once people should be given a really well-rounded, positive view of what rainforests are like, how they're put together from top to bottom, and then they'd want to go out and save them."

The large-format book, available in both hard cover (\$39.95) and paperback (\$24.95), and containing 133 of Moffett's color photos, is a lively and accessible account of the teeming labyrinth of life that exists among the branches of the rainforest's towering trees.

It is also an introduction to the newly emerging science of rainforest canopy biology, a discipline that currently has only a few dozen practitioners. Reviewers have compared Moffett's contribution to this new science to the efforts of Jacques Cousteau in introducing the public to the undersea world.

A Wandering Naturalist

Blond, bearded, and rumpled, Moffett, 35, is known to his colleagues for his wry narratives and his appreciation for the incongruous and absurd.

An associate in entomology at the Museum of Comparative Zoology (MCZ), he has been exploring the world's rainforests for fully half his life. As a teenager, he joined an expedition to Costa Rica with the naturalist Max Nickerson and became the scientific team's resident snake catcher.

After earning a bachelor's degree from Beloit College, he began graduate studies at Harvard, working with E.O. Wilson, the Frank B. Baird Jr. Professor of Science. Under Wilson's tutelage, Moffett continued to expand his already extensive knowledge of ants.

"I've always been interested in small critters. I chose ants because their societies are built upon a limited number of behaviors. You can do a whole study of them and figure out how their world works in a couple of weeks."

Moffett has published almost 50 scholarly papers, mostly on ants, the first of them before he started college. He continues to carry out this scholarly work concurrently with his activities as a nature photographer and scientific journalist.

Moffett came up with an original and ambitious idea for a doctoral project. Knowing that morphologically strange ants tend to have fascinating behaviors, he went through the MCZ's ant collection searching for especially odd-looking specimens for which there was no scientific literature. He then proposed to track down these species and observe their behavior in the field. Carrying little more than a duffelbag, Moffett sought out rainforests in places like Borneo, Sri Lanka, and Taiwan, studying ant species that in many cases no one had described before.

"Mark has the soul of a 19th-century explorer," said Wilson, "a wandering naturalist in the tradition of Darwin and Wallace. He's been fortunate to discover a niche in modern life suitable to that instinct."

A Feeling for the Subject

It was while conducting fieldwork for his doctoral dissertation (he received his Ph.D. from Harvard in 1987) that Moffett

discovered his talent for nature photography.

"I knew I would have to be able to take pictures because I'd be wandering around in India for seven months and probably spending some of my time sitting around with gurus, and if I came out with wild stories about ant behavior, people were going to want proof that it wasn't the product of some religious trance."

Teaching himself the technique of macro-photography (the photographing of very small objects), Moffett began taking pictures of ants and other tiny creatures. He sent the undeveloped film to The National Geographic Society, whose Committee for Research and Exploration had awarded him a grant. Mary Smith, senior assistant editor at *National Geographic* magazine, whose job included identifying researchers whose photographs were of publishable quality, was excited by what she saw.

"I took one look at them and said, 'Holy smoke, these are good,'" she said.

Smith, who subsequently became Moffett's mentor as a scientific photojournalist, found the photos to be not only good, but something of a revelation. They were the first clear, intelligible photos she had seen of ants in action. "It was common knowledge that you can't photograph ant behavior," she said. "They're just too small and too fast. I wondered at first if the ants in Mark's photos hadn't been anesthetized or chilled in the deep freeze, which are some of the tricks that insect photographers sometimes use."

Getting Beyond the Gear

Moffett's success did not depend on trickery, but rather on an instinctive mastery of the technical problems of photographing very small subjects.

"For some reason I have a very good capacity for holding myself extremely steady," he said. "I've shot whole articles for *National Geographic* on subjects like aphids that require magnification of 15 times, and I've taken those photos in the field, hand-held, with a depth of field that was about the length of a paramecium."

But he insists that nature photography requires more than just a steady hand and a knowledge of lighting and exposures. Like other types of photography, it demands a feeling for the subject, even though that subject happens to be an eighth of an inch long.

"You have to get beyond the gear and connect emotionally with what's happening. That's something scientists often don't do very well because they're so into the number-crunching game. There's real tragedy and excitement going on in the natural world that they sometimes forget about."

Smith, who finds Moffett to be that rare combination of scientific expertise and journalistic instinct, agrees that rapport with the subject is the primary ingredient of good nature photography.

"The way Jane Goodall looks at chimpanzees is the way Mark looks at bugs and ants and spiders."

Moffett's abilities have made him one of *National Geographic*'s best writer/photographers. Wilson calls him "probably the foremost insect photographer in the world and certainly in the front ranks of nature photographers generally."

Moffett took his research and photogra-



Photos by Mark Moffett

Mark Moffett's documentation of rainforest diversity includes photos of (above, left) a birdwing butterfly (*Ornithoptera priamus*) of the New Guinea rainforests; (above, right) a rainforest research tower in Costa Rica; and a Hanuman langur (*Semnopithecus entellus*) of India.

phy skills to the trees in 1989 when he joined an intrepid group of scientists who were using rock climbing gear to ascend into the rainforest canopy. Despite a childhood spent climbing oaks and maples in the Midwest, Moffett found that the soaring, branchless trunks of the rainforest trees were another matter entirely.

"I got into the canopy not knowing if I could handle it. Basically, I'm afraid of heights. But once I'm really concentrated on photography or science, I forget where I am, so I can be swinging out in space at some odd angle, hopefully doing a good job, and people will scream up at me, 'Mark! Are you all right?'"

A Labyrinth of Interrelationships

In *The High Frontier*, Moffett describes canopy life in the rainforests of Asia, Africa, South and Central America, focusing not only on the strange and multitudinous species of plants and animals to be found there but on the ways they interact to create a rich and complicated environment.

It is a place of multiple dependencies. Epiphytic bromeliads take root high in the branches of giant rainforest trees, collecting rainwater in a central reservoir, which then becomes home to small frogs and freshwater crabs. Strangler figs wrap their roots around the trunk of a host tree, crush it to death, then remain standing, a cylindrical basket of interlocking tentacles, long after the host tree has decayed.

It is also a place of incredible diversity. Several acres of forest may contain 1,000 tree species. A single tree may provide a home for 2,000 different kinds of beetles, eight out of ten of them previously unknown to science. Moffett finds the ques-

tion of how this diversity is generated to be the most fascinating feature of rainforests from a biological point of view.

"The question is the locomotion and dispersal of plants and animals—from spores and microbes to orangutans. How these things move around determines how populations of different plants and animals are going to be structured."

After spending most of the past year 1991 aloft taking photographs for the book, Moffett is ready to keep his feet on the ground for a while, but that doesn't mean he is abandoning the rainforest. He is working on another book on the rainforest canopy, but written for a more scholarly audience. He is also planning to do a book on jumping spiders, creatures that have fascinated him since childhood. And National Geographic will undoubtedly be supporting his future photojournalistic excursions to parts unknown.

But always, underlying the desire for new scientific knowledge or the quest for more powerful photographic images, there remains a concern for the tropical rainforests themselves, the places where Moffett has spent so much of his life. It is a concern that mimics the rainforest's complex interactions by combining equal parts of pessimism, hope, and love.

"The rainforests I see today are going to be mostly gone in a few years. I've traveled for many years in the tropics, and most of the places I pass through are just trashed environments. You have to go quite far in to see the really pristine forest. Destruction is everywhere, and it's not going to cease, but my tack has always been that people have to love the place before they will want to save it."