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Extreme tree

Richard Preston on climbing the tallest redwood



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TALL FOR ITS AGE

Climbing a record-breaking redwood.

BY RICHARD PRESTON

Before the world's tallest tree, a coast redwood, was discovered this past summer, most people assumed that California had been pretty much explored. On July 1st, two amateur naturalists named Chris K. Atkins and Michael Taylor were bushwhacking in a remote stretch of Redwood National Park, in Humboldt County, near the coast of Northern California. The park is a temperate rain forest crossed by dozens of small creeks that wander through tight, winding V-shaped canyons, which are sometimes referred to as notch valleys. Atkins and Taylor found their way into a valley that may not have had human visitors in thirty years. (Timbermen had probably been there during the seventies.) There they discovered a magnificent, previously unidentified grove of giant redwoods. In the grove grew a tree that was extraordinarily tall, even by redwood standards, springing out of a slope. Both men had handheld laser range finders, which can be used to quickly estimate the height of a tall tree. The readings indicated that the tree was about three hundred and seventy-five feet tall—five feet taller than the tallest known tree, a redwood called the Stratosphere Giant, which Atkins had found six years before. The naturalists named the tree Helios, after the Greek god of the sun. Near it, they found another tree, a darling needle of a redwood with a dead, sun-bleached top that looked like driftwood, which the laser readings indicated might be three hundred and seventy-one feet tall—taller than the Stratosphere Giant but shorter than Helios—making it, perhaps, the world's second-tallest tree. They named it Icarus. "Icarus flew too close to the sun and got burned," Taylor said a few days after their discovery.

If the tallest tree were anywhere, it would be in California. The coast redwood, or *Sequoia sempervirens*, which is most often simply called the redwood, is a massive conifer, of ancient lineage. The

trunk of a redwood is a tapering, grooved cylinder that can measure up to thirty feet in diameter near the ground, and it can soar upward for more than two hundred feet—twenty stories—before the first limbs appear. The crown of a giant redwood is a cloudlike plume that can rise to more than thirty-five stories above the ground. Today, virtually all the living giant redwoods exist inside a handful of small state parks, and in Redwood National Park, along California's north coast. The tallest trees that aren't redwoods—Douglas firs, in the Pacific Northwest, and *Eucalyptus regnans*, of southern Australia—can be slightly more than three hundred feet tall.

The redwood rain forest occupies a steep, mazelike terrain, jammed with trunks and vegetation. It is considered by some botanists to be among the densest kinds of rain forest on earth, rivalling those of southern Chile and east-central Peru in its resistance to humans trying to move through it on foot. The land can slope more than sixty degrees, and in many places there seems to be no solid ground, nothing to stand on but a tangle of fallen redwood branches and debris. Downed redwood trunks, ten or twelve feet in diameter, lie across one another like pickup sticks. A person trying to climb over a jumble of trunks could slip into a gap, fall thirty feet down into the center, break a leg, and never be heard from again.

The laser range finders of the type that Atkins and Taylor used can get a reading to within a few feet, but the only way to measure a very tall tree accurately is to climb it. Getting up to the top of a living structure taller than most office buildings is no trivial thing. One of the first people Atkins called after finding Helios was Stephen C. Sillett, a professor of botany at Humboldt State University, who is a friend of his. Sillett studies the redwood-forest canopy—the portion of the redwood forest that extends in the air—by

climbing the trees. He began to assemble a team to make the first ascent of Helios, and invited me to join it. (Last year, I wrote an article for this magazine about Sillett, and during the course of reporting I learned how to climb redwoods.)

On August 25th, while Sillett was still planning the climb, Atkins and Taylor penetrated another notch valley, and discovered a redwood that was even taller than Helios. It, too, was growing on a slope. They named it Hyperion, after the Titan who was the father of Helios. Using their lasers, they estimated that Hyperion was close to three hundred and eighty feet tall. The tree's apparent height stunned them. Sillett and the others decided that they would climb Hyperion first, and find out how tall it really was.

For years, scientists believed that the world's tallest tree was a redwood discovered in 1963 by Paul A. Zahl, a naturalist and writer with *National Geographic*. At the time, timber companies owned most of the redwood forest, and only about fifteen per cent of the old-growth tracts—those with mature redwoods that are anywhere from five hundred to twenty-five hundred years old—remained standing. (Today, about four per cent is left.) Melville Bell Grosvenor, who was then the head of the National Geographic Society, seems to have thought that if an extremely tall redwood, perhaps even the world's tallest tree, could be discovered on timber-company land it would strengthen the conservationists' case for federal protection of the redwoods. The tallest known tree was the three-hundred-and-fifty-six-foot Rockefeller Tree, discovered in 1957, in Humboldt Redwoods State Park (about an hour's drive south of Redwood National Park). "Keep your eyes open," Grosvenor said to Zahl. "It would be wonderful to find a record-breaker."

Zahl decided to explore the Redwood Creek valley, in Humboldt County. He carried with him an Abney level, a small, disk-shaped instrument that can estimate height. One day, he followed a logging road and spotted a grove of strikingly tall redwoods growing in a bend of the creek. On the opposite bank, logging crews had clear-cut the slope. Zahl spent the next few days moving around in deep



The tallest redwoods test the limits of the possible for the height of any plant.

underbrush. When he found a tree that appeared to stand above the others, he phoned Grosvenor. *National Geographic* hired a team of surveyors to measure it as accurately as possible. Using a transit, they estimated that it was 367.8 feet tall. The National Geographic Society named it the Libbey Tree, in honor of Howard A. Libbey, the president of the Arcata Redwood Company, which owned the land and the tree. Libbey promised never to cut it down. The Libbey Tree came to be called the Tall Tree, and the grove in which it stands was named the Tall Trees Grove. Redwood National Park was created by an act of Congress in 1968, and it was centered on this grove. Sometime in the early nineteen-seventies, the top of the Tall Tree died, and later fell off. At that point, a redwood named the Dyerville Giant, in Humboldt Redwoods State Park, was

thought to be the tallest, but surveyors couldn't agree on its height—they got readings that ranged from three hundred and fifty-eight feet to three hundred and sixty-nine feet—and in 1991 it fell down in a storm.

By the time the national park was formed, about two-thirds of the land in it had been logged. During the nineteen-seventies, as legislation to expand the park was being debated in Congress, the rate of logging increased dramatically in the adjacent, unprotected old-growth tracts, as timber companies rushed to cut down redwoods while they still could. Bulldozer roads, called cat tracks, began converging on the park. Timber crews worked twenty-four hours a day, using floodlights at night, in an effort to get the redwoods out before the government bought the land. In 1978, President Jimmy Carter signed the legisla-

tion, and forty-eight thousand acres were added to Redwood National Park. By then, about eighty per cent of the land had been logged or was empty of redwoods, apart from very young trees that might, if left undisturbed, pass the two-hundred-foot mark in a couple of centuries. Even so, the addition to the park contained nine thousand acres of old-growth redwoods, tucked away in the deepest ravines and notch valleys, where the crews hadn't been able to push cat tracks. A mishmash of alder trees and tiny redwoods and Douglas firs grew on the logged land, surrounding and walling off the remnants of the ancient redwood forest. It was within these lost fragments of Eden that Atkins and Taylor searched for the world's tallest tree.

In July, 2000, Atkins discovered the Stratosphere Giant, growing on an alluvial flat in Humboldt Redwoods State Park. Not long afterward, Sillett made the first ascent of the Stratosphere Giant, along with a tree climber named James Spickler. (Redwood-canopy scientists climb in teams. "If you were by yourself in those trees and something went wrong, you'd be utterly screwed," Sillett told me. A person could get stuck thirty stories above the ground, with no way down.) Sillett and Spickler stretched a reel of fibreglass measuring tape from the topmost sprig of foliage to a point near the ground, and determined the height of the Stratosphere Giant to an accuracy of about an inch. It was 368.6 feet tall. Sillett began climbing and measuring the tree every year, with a botanist named Marie Antoine (Sillett and Antoine are married). They learned that it was growing between two and five inches a year.

The tallest redwoods exist at an outer limit of biology, on the edge of the possible for the height of any plant. Redwoods have the ability to bring moisture into their tops against the overwhelming pull of gravity, and scientists still aren't sure exactly how they do it. George Koch, an ecologist and plant physiologist at Northern Arizona University, said that to him the most exciting aspect of the discovery of Hyperion was that it was growing in a place no one had expected the tallest tree to be—on a slope, not in the more hospitable flat ground at the bottom of a valley. "It tells us that there's another kind of location where

redwoods can grow to heights that approach their potential as organisms," he said. "I think there could probably have been four-hundred-foot redwoods."

Because it is pushing itself to an extreme, a very tall redwood may be sensitive to slight changes in the climate. The tallest trees, by the rate at which they grow from year to year—or by their failure to grow at all—may be able to reveal how forests are responding to increasing levels of carbon dioxide brought on by human activity, and the resulting global warming. By taking very thin cores from the tops of redwoods and studying their growth rings, the scientists hope to reconstruct the climate of the Pacific Northwest over past centuries.

The Stratosphere Giant stands in an undisclosed location. Botanists and park officials fear that if the public could find it the pressure of many human feet passing over the ground would compress the tree's root system, damaging its health. "I'd say the chances of finding a tree that's taller than the Stratosphere Giant are almost zero," Chris Atkins said one day in 2002. "But you never know."

On September 16th, Sillett, Antoine, Spickler, and I hiked into Hyperion Valley wearing backpacks full of tree-climbing gear. A number of other people came along, including Atkins and Taylor, three officials from the Save-the-Redwoods League, and the chief ranger of Redwood National Park, Pat Grediagin. Among national-park employees, the exact location of Hyperion was supposed to be known only to Grediagin, for the time being. "There's been a lot of talk about this discovery," Grediagin said. "I'm just worried that someone will get a wild idea to try to find this tree."

We hiked for a long time, passing stumps that were ten to fifteen feet across, and were bitten with chain-saw marks. Deeper in the forest, we waded upstream in a creek and crawled through salmonberry brambles and currant thickets. There were red-legged frogs in the creek—*Rana aurora*. Eventually, we came to a redwood-trunk pile, which choked the canyon and rose far above our heads. We wriggled through. "I call this 'grovelling' to get into the redwoods," Sillett said. Then we entered the Hyper-

ion grove. Big laurel trees filled the understory, but they seemed like shrubbery beneath the redwoods. The branches of the laurels were draped with isothecium moss—a wispy rain-forest moss that hangs down in beards. We pushed through masses of sword ferns, and came to Hyperion. Its trunk is fifteen feet across near the base. Almost nothing of the tree was visible—nothing but a column of wood leading into the green undersurface of the redwood canopy, with a few breaks filled with sky.

Sillett took out a hunting crossbow from a backpack. It had a fishing reel attached to it, loaded with fishing line. He tied the line to a blunt-tipped arrow, and fired into Hyperion. After five or six shots, he got the fishing line over a branch that was about two hundred feet up the tree—a little more than halfway. Antoine tied a nylon cord to the fishing line, and Sillett reeled it in. Antoine tied one end of a climbing rope to this cord—it would be the main rope, which would provide access to the tree's crown. Sillett tied one end of the main rope to a small tree. He put on a helmet and a climbing harness, and ascended the other end of the rope into Hyperion, using rope-climbing devices called mechanical ascenders. Then he disappeared in the foliage. Along with his gear he carried a two-way radio.

Once Sillett reached the top of the main rope, he left it behind and began using a special rig of ropes called a motion lanyard. Attaching alternate ends of the lanyard to branches over his head, he would haul himself up into the tree, moving steadily upward from branch to branch.

After an hour of lanyarding up Hyperion, Sillett called over the radio. "This tree just seems to go on forever," he said. "All the branches are downsloping."

Antoine put on her gear, began climbing, and soon disappeared from view. After a while, she reported by radio that she, too, had moved off the main rope.

"I'm finding tiny golden-brown ants up here," Antoine said. "It's only the second time I've ever seen ants in a redwood."

"That may be a new species," Sillett

said. Often enough, when the scientists encounter something unusual living in a redwood, it proves to be an unknown species. In beds of soil sitting on limbs, they've found large pink earthworms, of a species that doesn't yet have a name.

Three hundred and thirty feet up, Sillett stopped, tied the middle of a rope to a branch, and let the ends drop down opposite sides of the trunk to the ground. Spickler and I got on each end and began to ascend. Every five metres, we stopped, kicked away from the tree, and swung, sometimes arcing twenty or thirty feet out into the air, while we pulled a measuring tape around the trunk. These measurements would allow the scientists to calculate the volume of the tree—the amount of wood it contained (eighteen thousand six hundred cubic feet, it turned out). Sixty metres above the ground—two hundred feet up—Hyperion is a little less than seven feet in diameter.

I continued to climb along a rope that Sillett had placed in the tree. The top of Hyperion speared into space; the creek was lost below in afternoon shadow. Other redwoods floated up, nearly as tall as Hyperion. I was looking at a place in the natural world which had never been seen before by human eyes. A wind had begun to blow, and the top of Hyperion swayed back and forth. The branches here were spindly, and were encrusted with many kinds of lichen. The trunk was ten inches wide at the place where I was hanging.

"This is a young tree," Sillett remarked. "It could be six hundred years old." That would make it about twenty years old in human time. There were reddish cracks

in the bark at the base, which showed that the tree was still growing. "It could get to three hundred and ninety feet in our lifetime," Sillett said.

By two o'clock, Sillett had climbed within twenty feet of the top. He reported that it looked fragile: "There are a bunch of sapsucker holes, and there's a slight curve in the trunk." He stopped climbing. Then he raised an extendable metal pole until it touched the topmost branchlet of the tree, measured the length of the pole, and sent a tape line down. Hyperion was 379.1 feet tall. It was definitely the world's tallest tree.

After hearing that, Chris Atkins and Michael Taylor wandered off, carrying their laser range finders. In less than two months, the three tallest trees in the world had been discovered, hidden in semi-lost valleys. Atkins and Taylor were hoping to find the next one.

A few hundred feet from the base of Hyperion, the alder forest began: an enlarging clear-cut had almost reached Hyperion in the seventies. Nearby, we could see the marks of cat tracks—shelves on the steep slopes—choked with tiny young redwoods that had trunks no thicker than broom handles. "I think the tree was less than two weeks from being cut down," Sillett said. "One thing we can say for sure about Hyperion is that it is a very lucky tree." ♦

From an online poll conducted by AdAge.com.

A report last week by Advertising Age Editor at Large Bradley Johnson noted that about 35 million workers—or one in four people in the U.S. labor force—spend an average of 3.5 hours, or 9%, of each work day reading blogs.

A much-needed break.