Richard Schultes, 86; was ethnobotany pioneer

By Tom Long
GLOBE STAFF

Richard Evans Schultes of Waltham, a Harvard botanist once described as "the last Victorian explorer," died Tuesday in Boston. He was 86. 10 Apr 01

During 45 years of botanical exploration and annual trips to the Amazon jungle, Mr. Schultes uncovered 2,000 tropical plant species used by natives as medicines or poisons, hundreds of them new to science and many of them with potential applications in modern medicine. He came to be known as the founder of ethnobotany, the study of how people use their native plant resources in food, drugs, and rituals.

He didn't covet the title.

"I'm not the 'father of ethnobotany' nor even the discoverer of arrow poisons, as some would have it," he said in a story published in the Globe on Dec. 20, 1987. "Ethnobotany," he said, "has been around since the pharaohs — we have scrolls of theirs with formulas for medicines. I'm not quite that old. And Sir Walter Raleigh, not me, found arrow poisons in South America — in the 1500s."

Mr. Schultes was the author of several books and scores of elegantly written papers in English, Latin, and Spanish. His championing of rain forest preservation won him many awards, including a $75,000 Tyler Prize for Environmental Achievement.

A 2.3 million-acre Amazon preserve is named in his honor, as well as several groups of orchids and other plants and even a 4-inch cockroach.

Mr. Schultes canoed deep into the jungle — where he braved biting ants, malarial mosquitoes, and 8-foot snakes — to collect his specimens. He shared natives' indigenous foods, slept in their vast communal long houses, sampled their hallucinogens, and danced in their ceremonies.

RICHARD SCHULTES

He was an ardents royalist who claimed to have cast his ballot for Queen Elizabeth in presidential elections.

In 1987, a former student, World Wildlife Fund director Mark Plotkin, described him as "the last of the Victorian explorers."

Born in Boston, he earned a bachelor's degree and doctorate at Harvard University, where he taught until his retirement in 1985.

He leaves his wife, Dorothy Crawford McNeil; and three children, Richard E. II, Neil P., and Alexandra Ames Schultes Wilson.

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Harvard botanist's photos capture images of Amazon

By David Arnold
GLOBE STAFF

A showing of photographs by the eminent botanist Richard Evans Schultes of Harvard University opened last night, and for a sense of the man and where he has been, consider his tampering with the regal wording of a major award.

Prince Philip, Duke of Edinburgh, had intended to laud Schultes as author of "the definitive work" on medicinal plants when Philip presented the coveted Gold Medal of the World Wildlife Fund a few years back.

But Schultes nudged the duke and had him change the wording to "a definitive work."

Peering through wire-rimmed glasses yesterday, thumbs snapping at his red suspenders, the 75-year-old professor quietly scoffed: "Oh for Pete's sake, it's only a matter of time before somebody comes along and does something better."

Such is the humility and stature of Richard Evans Schultes, director emeritus of the Botanical Museum of Harvard. Admirers say he is the gentleman who charted jungles before Gore-Tex and fancy gadgets, that he believed the best way to leave a people and place was as he found them. They say he is the last Victorian explorer.

"Where the Gods Reign" is a collection of 75 photographs by Schultes on display for the next four weeks in Dudley House at Harvard. He took the pictures during a 14-year residence with Indians of the Colombian Amazon from 1941 to 1954 while studying the medicinal value of plants and arrow poisons. "When you take 8,000 negatives, how can you miss?" Schultes said before the opening.

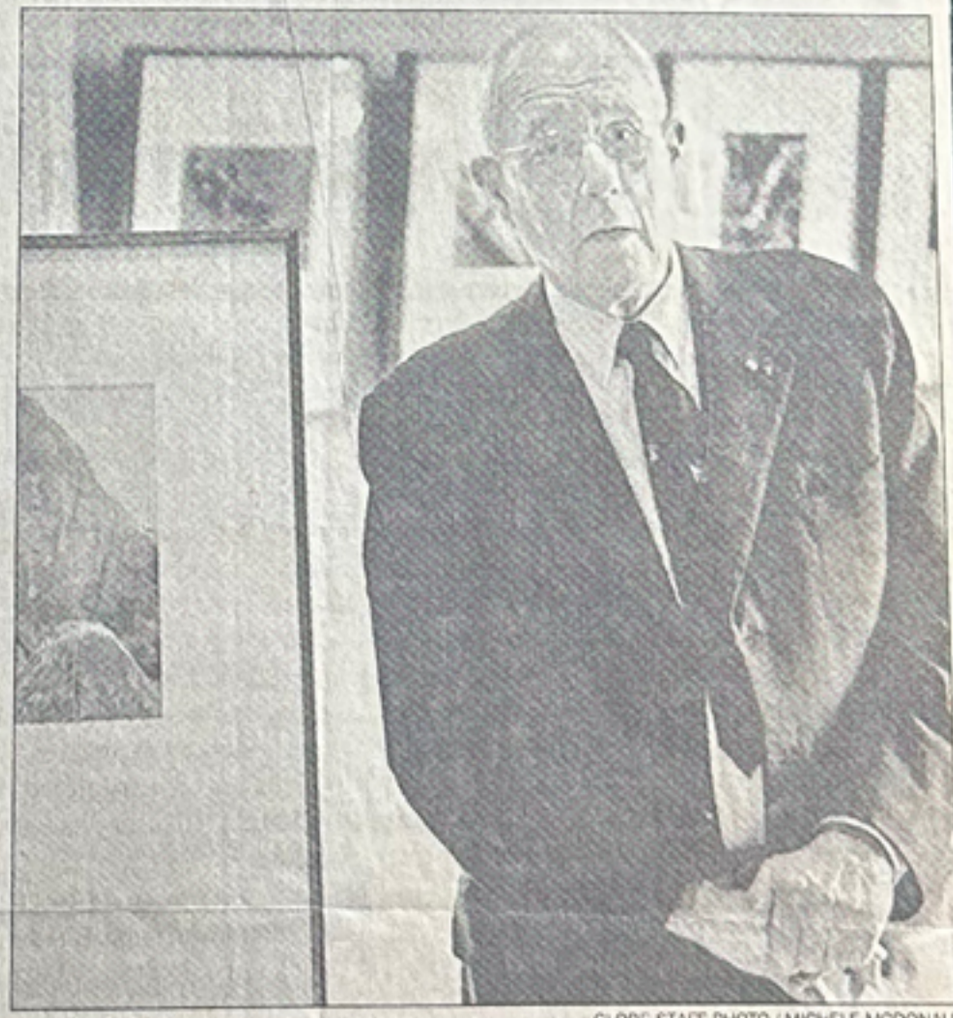
Schultes has studied the effects of 80,000 species of Colombian plants by working and living with the local populations that use them. For the Colombian government (one sponsor of the show) and its efforts to conserve its tropical forests and the tribes that dwell there, Schultes has much praise.

"There is no South American government so concerned and so active in conservation," he said. The respect goes both ways.

"Colombians have to come all the way to Harvard and Dr. Schultes to learn about our own Amazon," said Bertha Ospina, the Colombian consul general in Boston.

Schultes' black-and-white photographs illustrate what he said continues to be a relatively unspoiled, remote region of the planet. With only one navigable river penetrating the entire southwest quadrant of the country – and 69,000 square miles designated for the exclusive use of Indians – the photographs convey a wilderness of rapids and primitive culture that still exists, Schultes said.

During his work – he still returns to the region each year – he survived bouts with malaria, beri beri, the venomous bites of giant insects and several encounters with anacondas.



GLOBE STAFF PHOTO / MICHELE MCDONALD

Richard E. Schultes, botanist and photographer, stands by one example of his work at an exhibit last night at Harvard University.

He also learned 50 dialects of tribal languages.

"The Indians have always been wonderful and never threatening to me," Schultes said. "When you start giving people clothes and teaching them civilization, that's when it's time to watch out."

The plant man

RICHARD SCHULTES: The life and times of a gentleman and a scholar

BY DON LESSEM

On a January morning nearly 41 years ago, Richard Evans Schultes, a Boston botanist, lay in his hammock beside the Rio Negro, deep in the Colombian jungle. He made the following brief entry in his journal:

"The launch did not return today, so we had no warm food again this evening. As always when I do not feel well, I am terribly homesick. I really wish something would open up for me in New England."

Lest these lines smack of carping, consider that the morning he penned these uncharacteristically personal words in characteristically meticulous script, the botanist was racked with malarial fever and rheumatic pain in every limb, vomiting blood and bile. The dilapidated 30-foot-by-12-foot barge that had carried him, 14 Indians, and a dog to this mosquito-ridden backwater had cracked up on a tree. The botanist, never one to pass up a specimen, took a cutting from the tree. Then, as he often found himself at least figuratively in that decade, Schultes was up the creek without a paddle.

Eight years later, long after Schultes had regained his vigor and enthusiasm for his life in the wild, something did open up for him in New England: Biology 104. Plants and Human Affairs. An undergraduate introduction to economic botany — the application of plants to human needs — it can be found in any Harvard College course catalog of this century. Taught annually at Harvard for more than a century, it was until this year the oldest science course continually taught at the university, perhaps in the world.

Only three men had taught Biology 104 when Dick Schultes returned from 13 years of exploring the Amazon jungle in 1954 to take on the job. Only four men had ever taught it when professor Schultes — the world's most honored man in his field, ethnobotany — retired at 70, two years ago.

PROFESSOR OAKES AMES WAS TEACHING BIOLOGY 104 IN 1935 WHEN Schultes, a burly young premed student from Boston, took the course. Ames was a tall patrician, Harvard to the core (much like his grandson George Plimpton), and not without his grandson's maverick streak (Ames and his *Continued on page 29*

Perched on a cliff in the Colombian rain forest, Schultes collects samples of a then-unknown member of the gloxinia family.

Inset: Schultes, canoeing in the Amazon, examines the flower of *Victoria regia*, the world's largest water lily.

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The plant man

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students made hooch in his laboratories during Prohibition).

Schultes loved Ames' course, "a practical introduction to useful and harmful plants," as he unromantically remembers it. Young Schultes was predisposed toward botany, having collected plants around the Townsend home of his uncle since childhood. Still, Ames cultivated Schultes as carefully as the orchids upon which he earned his world-renowned authority.

Schultes' driving academic interest became ethnobotany, a centuries-old but little-known practice of studying plant uses among "primitive" tribal peoples. Within that esoteric specialty, Schultes developed a particular interest in the uses of hallucinogens in many New World societies and their potential as a source of new medicines. Under Ames, Schultes became one of the university's many loyal "Ibid Boys," completing his bachelor's, master's, and doctoral degrees at Harvard.

But to earn degrees or make a living in economic botany, Schultes had to go well beyond the ivied walls of Harvard's Botanical Museum. Ames sent Schultes to the Midwest to do his undergraduate honors thesis on use of the hallucinogen peyote by Oklahoma Indians, and he found funding for Schultes to travel to Mexico for his doctoral studies of plant use by the Mazatec Indians. "I have a feeling he paid for it out of his own pocket," says Schultes.

Ames' motivation? "It was hard to get PhDs," explains the self-effacing Schultes.

Schultes set off for the Colombian Amazon in 1941 on a year's National Research Council grant to survey arrow poisons of the remote region (one of them, curare, is the source of an important surgical anesthetic). In the year that stretched to 13, Schultes rewarded Ames' faith and philanthropy many times over, and in ways particularly close to his mentor's heart. His first day in Bogota, before he even unpacked his gear, Schultes found a previously undescribed species of orchid at the end of the trolley line. (He stuffed a few specimens into his passport for later pressing.) And after years of searching, he rediscovered the New World's only blue orchid, a much-prized specimen previously noted in the wild by only three Western travelers.

But Schultes was after much more than curare and orchids. The Colombian jungle, in desperate need of inventory, was but one overflowing aisle of the greatest drugstore on earth — the tropical rain forests. From these lands come morphine, codeine, quinine, and at least a third of all modern medicines.

The urgency of gathering useful plants from the western Amazon was, and remains, not the imminent loss of the species but of the native pharmacists themselves. Even now as other parts of the rich Amazon flora are lost, eradicated by expanding agrarian populations at a rate of two Switzerlands' worth of land a year, the headwaters of the Amazon remain carpeted with much the same dense virgin forest they have known for millennia. Treacherous rapids and steep slopes isolate the land from all but the few small tribes that know the forest well. Without the aid of these scattered, dwindling Indian tribes and the plant knowledge they've acquired over thousands of years, there are far too many plant species to gather or to screen for medicinal value. The jungles of western Amazonia are host to some 80,000 species of flowering plants. A botanist would be hard-pressed to find more than 1,900 in all of New England.

Into much of this remote wilderness only one scientist, one non-native, had ever gone before Richard Schultes: Richard Spruce, a 19th-century Yorkshire, England, schoolteacher. If Oakes Ames was Schultes' angel, Spruce was his god. "Dick modeled his life after Spruce," says Schultes' collaborator and occasional Amazon traveling companion, Robert Raffauf, pharmacognosy professor emeritus at Northeastern University.

At first glance, Spruce would seem an unlikely choice for botanical explorer par excellence. But only slightly more unlikely than Schultes, a baked-bean-eating Harvard Tory. His wire-

rimmed glasses aside, the beefy, ruddy Schultes never bore much resemblance to Spruce — a lean, dark, and diagnosed tubercular man. But the dissimilarities were only skin deep.

Spruce was far more robust than his appearance or his doctors' diagnoses suggested. He endured more than 15 years in South America (1849 to 1865), roaming from Brazil to Peru collecting thousands of plants previously unknown to science. He gained the first botanical knowledge of eight species of *Hevea,* the source of natural rubber. He made a special study of narcotics and stimulants in eastern Peru, sampling native drugs and participating in their rituals. In meticulous script he kept notes that his more famous contemporary biologist Alfred Russel Wallace edited and called "among the most interesting and instructive books of travel of the 19th century." Wrote Wallace, "Everything is to be found in Spruce and the temptation to quote him is irresistible."

In a 1980 introduction to Spruce's *Notes of a Botanist on the Amazon and the Andes* (first published in 1908, 15 years after Spruce's death), Schultes wrote of his hero: "Spruce never could have written a book about Spruce — he was too self-effacing and humble. . . . He typified that all-around scientist and man of culture that, unfortunately, in this modern period of overspecialization and compartmentalization, is so sorely missed and so urgently needed."

The same might be said of Schultes. And indeed it has. "In an institution filled with large egos, Dick Schultes has none," says an admiring E. O. Wilson, fellow encyclopedic Harvard biologist. "Yet after a lifetime of careful study, his scientific and practical knowledge is almost limitless." Unlike Spruce, who died little-recognized for his accomplishments, Schultes is a living legend in botany.

Schultes prefers to stress what remains for him and others to do, and to disown those accomplishments falsely attributed to him. He points out that none of the plants of native medicinal use he has brought back has been put to commercial use. "I'm not the 'father of ethnobotany' nor even the discoverer of arrow poisons, as some would have it," he says. "Ethnobotany has been around since the Pharaohs — we have scrolls of theirs with formulas for medicines. I'm not quite that old. And Sir Walter Raleigh, not me, found arrow poisons in South America — in the 1500s."

What Schultes has done is to author scores of elegantly written papers (in English, Latin, and Spanish) and several books on matters from *Hevea* to hallucinogens. These and his championing of rain forest preservation have won him many awards — most recently a $75,000 Tyler Prize for Environmental Achievement. Other honors include a World Wildlife Fund Gold Medal and decoration for Amazon research by the Colombian government. Named for him is a 2.3 million-acre tract of Amazon preserve, as well as several groups of orchids and other plants (including one tenacious rain forest cliff-hanging plant in the gloxinia family, *Resia,* named for his initials), and even a 4-inch cockroach.

As he looks back on his years in the forest, Schultes looks out his office window at the well-manicured greenery of Harvard Yard. He's donned tie and white lab coat as he has done

weekdays for three decades. Around him in this narrow room directly above the "Glass Flowers" exhibit of Harvard's Botanical Museum (an exhibit Ames put in evolutionary order) are arrayed materials that reflect this curiously mixed life of cloistered academic and jungle explorer. A half-century's thick volumes of *Chemical Abstracts* line one bank of shelves. Specimens — dried, labeled, mounted — fill the cabinets along another wall. The desk drawers are jammed with Schultes' travel diaries, the walls adorned with a large relief map of the Amazon and Schultes' lush black-and-white photos of Indians in the rain forest. Spiral notebooks full of Schultes' descriptions of plants and their medicinal uses compete for desk space with abstracts of his own papers, copies of which have spread beyond the office into the hall beyond.

For Schultes, reflection is a distraction from the task at hand — reordering his papers. The time for exploration is long past. The time has come for putting things in order.

Much has changed in the world, in the wilderness, and in the realm of ethnobotany since Spruce, and for that matter Schultes, worked the Amazon. Yet, a century apart, they may well have touched the very same trees, a communion made possible not only by the long-lived trees of the virgin forest, but by the meticulous record-keeping of Spruce as well. Following Spruce's notes, Schultes found, "I'd read, 'I came on a rock in the river shaped like a sitting frog. I tied up the canoe, walked NNW 150 paces to white sand, and saw this tree.' Sure enough, the tree was there," Schultes marvels.

Schultes, like Spruce, was sustained in his arduous travels by his consuming interest in his work. Spruce wrote, "I look upon plants as sentient beings, which live and enjoy their lives." Schultes also admits to "the deepest love for plants. They are my profession and my hobby."

Even when traveling in Spruce's footsteps, Schultes was very much on his own in the jungle. His own resolve was considerable, buoyed by "an inner calm" that colleague Wilson envies: "Much as I love the rain forest, I could never stay out more than three months." Yet Schultes returned to "civilization" but every two years and then only for two months.

Schultes would argue, however, that he never made it on his own in the jungle. Traveling by seaplane, on horseback, on foot, and principally by canoe, Schultes placed his trust in the preliterate Indian peoples. They treated their first Caucasian visitor with awed curiosity, generosity, and, in time, enduring loyalty. As gifted at languages as he is poor in mathematics ("I can't add a cipher"), Schultes learned the region's two mother tongues, Witoto and Makuna, well enough to communicate in most of the nearly 50 regional languages.

Schultes shared the natives' food (a starchy diet heavy on tapioca and manioc), slept in their vast communal long houses, sampled their hallucinogens (though in more modest dosages), and danced in their ceremonies. And Schultes was careful to document their ways as unobtrusively as possible. He learned to shoot his Rolleiflex while standing at right angles to his subjects. Not that the results would have meant anything to his unsuspecting targets. "A one-dimensional image is meaningless to them. Show them a picture, they see only patches of colors," says Schultes.

Schultes scrupulously refrained from imposing Western values and culture on the people who were at once his study subjects, his friends, and his hosts. He relaxed that posture only once, when he came upon a small girl dying of a venomous snake bite. He gave her his antivenom serum but cautioned, "My medicine may not work for you." He insisted a witch doctor first perform "his mumbo jumbo, blowing tobacco smoke on the wound," so the shaman might, as he did, take credit for the girl's swift recovery.

While Schultes will talk willingly, at length, of the still unexploited pharmacological potential of the Amazon, his personal accounts are not so freely shared. "I didn't have *adventures,*" he says, spitting out a word that to him smacks of poor preparation and unscientific thrill-seeking.

"He said he had no adventures. Unbelievable!" Wilson chuckles. Like Schultes' other close colleagues and students, Wilson knows differently. "He didn't tell you about the time he was sent to a part of the rain forest that was like a Devil's Island for

hardened criminals? He was told to wear a gun at all times."

Former student, now author and ethnobotanist, Wade Davis is just as incredulous. "Didn't he tell you about waiting weeks for an airplane to fly him and his specimens out, then giving up his seat to a sick nun, thinking it more important to send the specimens? The plane crashed, and everyone aboard was killed."

Davis' favorite Schultes saga is what he calls an "extraordinary feat of endurance." After mistaking a numbness in his fingers that marked developing beriberi for the effects of the formaldehyde used to preserve species, Schultes battled spreading paralysis in his extremities and ever-worsening fatigue in paddling 40 days to reach a doctor.

Our man in the Amazon when World War II broke out, Schultes was assigned by the US government the crucial task of shipping north a supply of natural rubber, essential for airplane tires. The rubber industry had long since departed for Malaya, leaving bitter memories among disfigured Indian survivors of the torturing, murdering ways of Peruvian rubber-procuring companies. Schultes acknowledges he met Indians "without ears, fingers" on the Putumayo, "The River of Death" upon which the latex moved. But he notes, "I had no problems working with them." Says Davis, "It was very dangerous work. Schultes was the first to go there after Pearl Harbor, 30 years after terrible atrocities. And yet he persuaded the Indians to work for him."

Schultes' stamina shows through, even in his self-deprecating diaries. One, from his journey on the Rio Negro in Brazil, chosen at random out of his desk, reveals his nature as well as nature itself. Between the carefully numbered and described collections, the landmarks duly noted, are brief notations of Schultes' malarial agony. On these waters, of which Spruce wrote, "I never saw such a deserted region," Schultes, like Wallace and Spruce before him, took deathly ill.

Yet Schultes dismissed the disease-bearers — "The hungry mosquitos, which bit right through the hammocks, made the rest of the night a delight, indeed" — in much the same way as Spruce had written of them: "My hands, neck, and feet are painted with their bites. To be exposed to such as this is no bagatelle." The greatest disappointment of Schultes' Brazilian journey was spoilage of his specimens due to inferior formaldehyde: "I was never so downhearted." His greatest joy was the rediscovery of *Micrandra siphonioides*, a 100-foot-high specimen of a great rubber tree that Spruce had identified a century before.

Single, self-sufficient, engrossed in work that could easily consume a lifetime, Schultes was, when in good health, largely content to remain in the Amazon. Employed by the US Department of Agriculture to search for new rubber-producing species, he kept up his plant-collecting as an honorary Harvard Botanical Museum staffer. And in the moments of questioning the import of his work, he was comforted by Ames, with whom he corresponded often. "I am not interested in training future teachers," Ames wrote. "My interest is in men who are 'going places' in the big world of intellectual effort." And "if you tend your crucible with an open mind with faith in your venture, you may one day find yourself among those who have triumphed."

Schultes lost his guide when Ames died in

1950, two years after retiring from Harvard. But with the assent of Paul Mangelsdorf, Ames' successor as Biology 104 professor and Botanical Museum curator, Schultes was able to stay on four more years in the field. Then, suddenly, in 1954, as Schultes recalls, "the jig was up." He had exceeded by six years the university's limitation on unpaid appointments. A university administrator discovered the violation, so Mangelsdorf wrote Schultes to offer a way out — a paid appointment as curator of economic botany. His blood still running true crimson, Schultes found the decision between staying with the USDA and going back to his alma mater "wasn't hard for a Harvard man."

Back to Harvard for Schultes meant back to the future. Schultes found himself watching his watch, battling "the tension we're under, the pressure of appointments which hung over me like a sword of Damocles." In his absence, parking meters had surrounded his Harvard domain. To this day he has refused to feed them. (As he is a man of principle, not a scofflaw, Schultes searches out nonmetered parking for his Jeep. He boasts he's never received a parking ticket.)

Schultes courted and married Dorothy McNeil, an opera singer he'd heard perform at church years earlier. Explaining their happy, argument-free marriage, he proudly states, "We have nothing in common." She's a liberal. He is so far right of any known party that he has written in Queen Elizabeth's name on his last two presidential election ballots. They swiftly began a family — first a son (now businessman Richard Evans Schultes II), then twins (now geneticist Neil Parker Schultes and physician Alexandra *Ames* Schultes) — and settled into a comfortable suburban life in Melrose.

At Harvard, Schultes was much the sort of professor Ames was and would have wanted his protege to be, if not a man "going places." Like Ames, Schultes was an inspirational teacher. "He's such a resonant authority on his subject that he is a very entertaining lecturer," says Wilson. Schultes planted a love of ethnobotany in his students and nurtured it financially as well as intellectually (without Ames' private means, Schultes proved an adept grant-winner).

Courtesy of Richard Evans Schultes

Schultes and a Makuna Indian share tobacco snuff in Colombia.

Schultes taught, wrote, and sought to organize his and others' collections, like many a cloistered academic. Yet once or twice a year he'd return to his second home, the rain forest. There, as at Harvard, he was the same unassuming man: "The jungle never changed me," he states unequivocally. But it changed how others looked upon him. In the 1950s he was seen as bold survivor of the "Green Hell," an Amazon filled with cannibals and killer anacondas. "Harvard Botanist Never Wore Side Arms" read the headline of a 1959 newspaper feature. In the late 1960s and early '70s he became an unwilling guru for hallucinogen-happy would-be mystics who sought his wisdom on peyote and LSD. Schultes co-wrote two books on the latter drug but took umbrage at its chief advocate, Timothy Leary, then a fellow Harvard professor, for calling LSD a *psychedelic* drug, when *psychodelic* would have been better Greek. Schultes also disdained thrill-seeking hallucinogen use, though he does admit to some disappointment at never having seen any more than flashes of light "when colleagues report seeing beautiful cities, golden cars, that sort of thing."

For the past decade or more, Schultes has had to fight for recognition of his discipline against the ascendant science of microbiology, the high-tech, high budget, high-visibility world of genetic engineering. He needed the attention not for himself but for funds, for graduate students, for collection space.

Even in a genetically engineered world, it is essential that we gather the greatest stock of genetic variation, which must be drawn from species before they disappear from the earth. Drug companies had backed ethnobotanical searches after the "miracle drug" discoveries of the '60s, including the Madagascar periwinkle, a tropical plant that proved an 85 percent guaranteed cure for once-lethal childhood leukemia. But without follow-up successes since, they have withdrawn much of their financial support.

No man could have reversed the broad trend away from old-fashioned organismic biology, but Schultes, much like Ames, "lacked a taste for administrative battling," as Wilson puts it. As curator of economic botany and director of the Harvard Botanical Museum, Schultes disdained the posturing and politicking that win status and security. "Schultes is not a politician. He doesn't play political games. Consequently, he didn't lay the best foundation for continuation of his activities at Harvard," says ex-student Michael Balick, an assistant director of the New York Botanical Garden. Much arm-twisting was called for because, as Wilson explains, "there are many professors here who haven't the slightest idea what ethnobotany is."

The Botanical Museum, one of but five botanical institutions within the university, saw its collection space taken away in favor of administration and other sciences. Schultes, ever loyal to his alma mater, minimizes the downturn of his department and the university's role in its decline. "I'm happy with most of the changes here. 'Every tub on its bottom' is the motto here. Each department must get its own money." Donald Pfister agrees. He's director of the Harvard University Her-

baria and overseer of all university botanical institutions, including the Botanical Museum. "The Botanical Museum is still a vigorous research, collecting, and teaching institution."

But other ethnobotanists are not so charitable. "The museum has been dismantled and will probably die," says a former Schultes protege, Timothy Plowman, chairman of the botany department at Chicago's Field Museum of Natural History. Davis concurs: "Harvard's destroyed the Botanical Museum as an institution, allowed ethnobotany to die." With it nearly went both Schultes and Biology 104.

Two years ago, Schultes reached mandatory retirement age. The professor who was to take on Biology 104 was called away for research, and no one could be found to fill in. After 111 years of continuous instruction, Biology 104 was shelved. It missed one annual beat but was resuscitated the following year. "The course wasn't going to be taught, so I thought I ought to try," recalls professor Richard Howard, a Harvard botanist, himself near retirement, who stepped in to teach it last year. Where once the course had drawn 75 students, only nine registered, though 25 more, including several faculty members, audited. Schultes guest-lectured. "He gave two of his superb talks, on narcotics and alcoholic beverages," Howard says. "After the course I handed out evaluation forms, and many of the students said Schultes should teach the course forever."

Were it not for Harvard's retirement rules, Schultes might very well do so through this century, as he is a robust descendant of nonogenarians on both sides of his family. But this time last year it looked as if he might not survive another semester. Complications set in following gallbladder surgery, and Schultes was hospitalized for 43 days, slowed for months thereafter. For the first time since he left the Amazon he had to forsake his annual return visit this year. Davis blames the devaluation of his field for Schultes' slow return to health. "I think it was just too painful for him to see what was being done to the Botanical Museum." Plowman adds, "It's very disheartening to see the rug pulled out from under you."

Indeed, as Schultes sits in his office, sorting his papers, two young student employees of the buildings department come to measure his office, for yet another inventory of museum space, perhaps to form the basis for yet another round of cannibalizing Schultes' realm. Schultes, looking pained, questions them at length before leaving them to their task.

Schultes is not presiding over a moribund empire. If his inattention to administrative detail helped sow the seeds of destruction of his discipline at Harvard, his close attention to his students has helped ethnobotany sprout with new vigor throughout the world.

Schultes' pupils, and their achievements, are legion. Dr. Andrew Weil, a former Schultes student, has written four popular books and is an authority on alternative medicine and psychedelic drugs. Timothy Johns, of the University of Michigan faculty, won a national award for the best PhD thesis for his study of the domestication of the potato. His fellow Schultes-educated Michigan colleague, Richard Ford, is an authority in archaeological applications of ethnobotany. Plowman, perhaps Schultes' most brilliant student, is the world's leading botanical authority on cocaine.

Other Schultes-trained botanists are to be found from Mexico to Europe. And many work in concert in new worldwide efforts to expand the reach of ethnobotany. Mark Plotkin, an apprentice though not a graduate student of Schultes, has been appointed to head a new plant-preservation program for the World Wildlife Fund-US.

Balick helped form the Institute of Economic Botany at the New York Botanical Garden in 1980, now home to 20 full- and part-time researchers, Davis included, who roam the world collecting plants and the botanical wisdom of other cultures. The National Cancer Institute has awarded the institution $627,000 for a five-year program to gather 7,500 plants from South American rain forests. A like amount has gone for the study of African plants by the Missouri Botanical Garden staff, and an even larger grant for studies in the Asian tropics will be overseen by another Schultes protege, Doel Soejarto of the University of Illinois at Chicago. "The fact that he has so many advocates in the field is a tribute to him," says Davis.

But it is Wade Davis whose

efforts are making the greatest public name for ethnobotany. Schultes reassured Davis during his own moments of career doubt with the same letters Ames had sent him four decades before. And he sent Davis in his own stead to Haiti in 1982, at the behest of a New York psychiatrist, to study the chemical composition of voodoo witch doctors' "zombie" powder. Davis found the powder and in it a fish poison capable of producing a genuine limbo state. Last year Davis turned his Haitian research into a thesis Schultes calls "masterful" and a controversial popular book (*The Serpent and the Rainbow*). Sometime in 1988, the book will become a motion picture.

At 33, Davis is rich, famous, and hugely indebted to Schultes. He marvels at his own fortune: "I've got the whole world open to me now, and it is all because of Schultes. He taught me how to write, he dropped everything to help all of us. He's been a second father to me." Davis is planning, following a book on an ethnobotanical exploration of his own that he made in the Amazon this year, a biography of Schultes. "That will be my present to him."

Schultes has neither the inclination nor the time to take on his own past. He has four books in the works now. He's gathered 125 of his finest Amazonian photographs, grouped them by themes (rivers, plants, etc.) and matched them to apposite quotes by explorers, Spruce chief among them. Synergistic Press will publish the collection in March as *Where the Gods Reign: Plants and People of the Northwest Amazon*. After 11 years of part-time effort, Schultes is also nearing completion of his translation of the diary of a Spanish botanist who explored Chile and Peru in the 1700s. He intends to put together a textbook of economic botany "if I live long enough."

But the biggest mountain still to climb is made of a mound of spiral notebooks in Schultes' offices. They contain descriptive notes of thousands of plants collected by Schultes, many seen by no botanist before or since, few recognized by any but Schultes and native witch doctors for their medicinal effects.

Schultes has long postponed the final consolidation and indexing of these notes, matching them with Raffauf's assistance to what is known about their chemistry. "I've told him candidly that a book of useful plants of the Amazon would be his greatest accomplishment," says Plowman.

This past summer Schultes and Raffauf began working full time on the project. But even if Schultes lives to his 90s, he concedes, "there just isn't enough time" to pass on all that he has learned.

Still, he could take comfort, if he ever were so inclined, from the knowledge that his memory, his quest, will endure in the next generation. And his course. No one could be found on the present Harvard faculty to teach Biology 104 this coming semester. But on a November morning the new chairman of the Harvard biology department, E. O. Wilson, made a notation on his yellow work pad for an upcoming faculty meeting. "We must find a person to teach economic botany next year," Wilson says. "It is one of our highest priorities."

Proof once again, as Ames wrote Schultes, that "if you tend your crucible with an open mind and faith in your venture, you may one day find yourself among those who have triumphed." •

Photographs courtesy of Richard Evans Schultes