THE GREAT FOREST

It once stretched almost unbroken from the shores of the Atlantic to the banks of the Mississippi. Now we battle to save the remnants—and sometimes, with a mix of sadness, rage, and hope, we speak of restoration.

By Christina Bolgiano

Rage is not the politically correct emotion to feel in an old growth forest. Awe, veneration, respect, humility—these are expected. But I want to pummel the furrowed bark with my fists, stamp my feet on the moldy ground, scream into the dappling canopy. I want to weep. The thought of the forests lost, fragmented, and degraded throughout the east only an eyeblink ago, during the logging booms of the nineteenth and early twentieth centuries, is overwhelming. It's not that the trees on this rocky Blue Ridge mountaintop in western North Carolina are huge and imperial, the charismatic megafloral equivalents of bears and wolves. On the contrary: they are stunted white oaks, forty feet tall and eighteen inches in diameter, yet they have been documented at 350 to 450 years old. Their limbs ripple sideways like braided hair undone; their trunks are hirsute with mosses. From them emanates a mysterious life of which we know almost nothing. These living sculptures are the most perfect biological expression of which this ridge is capable. Once cut, half a millennium would pass before such trees appeared again, if at all. This, and a scattering of

Remnant: Some sense of what these woods used to be can be discovered in such still-protected groves as this spruce-fir forest in Great Smoky Mountains National Park. DAVID MUENCH

If protected, the national forests of North Carolina could make "a world-class reservoir of biodiversity," botanist Karen Heiman says. Left, an ovenbird; right, a maple-oak forest in Nantahala National Forest, North Carolina.

LEFT: BOB SIMPSON; RIGHT: DAVID MUENCH

places like it, far more than we have any right to expect, far less than there should be, are all that's left of the original Great Forest, the immense expanse of eastern woodland through the canopies of which it was said a squirrel could travel from the Atlantic to the Mississippi without ever touching ground. Nearly four centuries of cutting for settlement, agriculture, and timber extraction has reduced it to a fraction of its glory, leaving little more than tiny primeval islands in an otherwise manmade landscape.

In ways we don't yet know how to measure, this loss of the forests of yesterday reverberates through the forests of today. The mere fact that large tracts of trees once again billow green across the landscape through much of the East doesn't mean that eastern forests have fully recovered from the assault of earlier decades. Too many species of forest plants and animals are rapidly declining, and disease, pest, and regeneration problems are too widespread and persistent. As research on the remaining virgin woodlands of the Pacific Northwest continues to reveal the stunning complexity of ecological functions performed by old growth, scientists are beginning to wonder whether managed forests anywhere in the world can sustain long-term productivity without a complement of old growth. New understanding of the role of old growth in a forest ecosystem mandates a new look at the remnants and the potential restoration of the once great eastern forest.

"The first thing is to identify what's left," Bob Zahner says as we stand beneath the white oaks. Long and lanky, with white hair swept back from a thin face, Zahner looks the academic he is, albeit a renegade. Retired now from a career of training Ph.D candidates in silviculture, he has rejected the manipulative approach of professional forestry and become a leading figure in the burgeoning grassroots movement to preserve eastern old growth. "There are more differences than similarities between western and eastern old growth," he tells me. "Tree species are far more varied and tend to be smaller and shorter lived in the East. Also, there are quantitative differences in such things as the amount of deadwood and canopy layers. In particular, eastern old growth has a greater richness of herbaceous species and their insect pollinators." Zahner and other biologists have worked out a general definition of eastern old growth that encompasses about a dozen characteristics. As the dwarfed white oaks proved, huge tree sizes are not a determining factor. Age, however, is, although "old growth" doesn't refer to the age of individual trees but to the long-term undisturbed nature of the forest community. Charles Cogbill, a forest ecologist in Vermont, suggests that half the dominant trees in a stand should have reached at least half of the longevity expected for their species (in itself a complex and variable figure). Long periods of time without catastrophic disturbances allow the canopy to be nicked by random windthrows, lightning strikes and insect infestations, which generally kill a small number of trees at a time.

Like the sporadic twinkling of lightning bugs against a summer night, but on a longer time scale, these sudden bursts of light form a changing pattern through the forest. Wildflowers, shrubs, and subdominant trees swiftly fill the sunny spaces, resulting in a population of trees of all ages (called "uneven aged") and a complex understory. Deadwood is abundant. Trees that have blown over often pull their roots from the ground, mixing mineral soils with leaf humus and giving the terrain a texture called "pit and mound topography." Soil is otherwise undisturbed and so buffered from erosion that streams draining from ancient woods are among the purest waters ever tested. These are relatively simple external criteria; nutrient cycling and other ecological processes are so intricate that they are not yet and may never be fully understood, much less defined.

Using these external criteria, old-growth sleuth Bob Leverett has been able to find dozens of previously undocumented stands in nearly a decade of searching. A computer consultant in Massachusetts, Leverett has been enamored of forests since boyhood and claims to hold the national record for falling down in old growth. "I wouldn't be surprised if we end up finding close to a million acres," he says. Once believed virtually extinct except for a few famous showcases like Joyce Kilmer Memorial Forest in North Carolina, the surprising extent of ancient-forest remnants throughout the East was first documented in 1990 by Earth First! activist Mary Davis, who painstakingly contacted dozens of resource agencies to publish a state-by-state compilation. The list ran to 23 pages and totaled more than 300,000 acres—and in 1993 Davis produced an expanded version. In the introduction, Leverett listed the Great Smoky Mountains National Park, Michigan's Upper Peninsula, Adirondack State Park, northern Minnesota, private timberlands in northern New England, and parts of the Arkansas Ozarks as the locations of the largest remaining acreages of old growth.

Davis and Leverett concentrate their efforts on forests that were already established when white settlers

Human beings have been at work on these forests for so long that the term "virgin forest" is problematical. But as the scene (right) in the Cranberry Wilderness of Monongahela National Forest indicates, "antiquity" and "beauty" definitely still apply. Below, a gray fox.

RIGHT: SCOTT T. SMITH; BELOW: TALMADGE E. LEWIS

arrived and that managed to survive with relatively little change. This is the kind of eastern old growth to which the term "ancient forests" might properly be applied, but "relatively" is the key word. Even where the timber wasn't valuable enough for commercial cutting, every acre of eastern forest was altered by human influences: piecemeal logging, arson, grazing, and the extermination of native elk, bison, wolves, mountain lions, passenger pigeons, and Carolina parakeets. We'll never know what shade-loving shrubs, what secretive salamanders, were obliterated in the rush, just as unnamed species are being lost everywhere today. Introduced pests and diseases, of which the chestnut blight is merely the best known, caused and are still causing dramatic shifts in forest composition. Fire suppression has favored shade-tolerant red maples over shade-intolerant oaks. Air pollution is damaging many species; Orie Loucks, an ecologist at Miami University in Ohio, believes that the grand hardwood forests of West Virginia and eastern Kentucky are literally—and quickly—dying from it.

In short, the term "virgin," which connotes a total lack of human influence, can't be applied to any eastern forest, and some argue that millennia of Native American burning and foraging would obviate the word even if Columbus had never landed. Nonetheless, old-growth remnants remain our truest measure of the productive capacities of eastern forests. "Old growth becomes the original hypothesis," says Peter White. "It gives us our only chance of understanding what we've done to the rest of the landscape." Currently the director of the Botanical Garden at the University of North Carolina in Chapel Hill, White spent most of the 1980s as a research biologist for the Great Smoky Mountains National Park, producing a panoply of papers on forest dynamics. He concluded that due to the high average rainfall in the Smokies the entire region probably suffered soil erosion and loss of productivity even where logging cleared the land only once. "It's impossible to prove it by numbers without data from original soils," he says, "but the fact that there are places in the Park today that are treeless after being logged more than half a century ago provides an example in the extreme. We'd be best off protecting the small amount left for scientific study, because old growth could teach us how to have sustainable logging."

Old growth in national parks is protected, of course, at least from direct human impacts like logging. Similarly protected are old growth bits and pieces on some other public lands; the federally owned Boundary Waters Canoe Area Wilderness in Minnesota and Adirondack State Park in New York are preeminent examples. But in the largest single ownership of old-

Some of the largest remnant stands of old growth in the eastern United States spread around the lakes and marshes of the Boundary Waters Canoe Area Wilderness of Minnesota (below). At left, the ubiquitous white-tailed deer.

BELOW: DAVE SCHIEFELBEIN; LEFT: BOB SIMPSON

growth remnants—the 24 million acres of national forests in two administrative regions that stretch from the Atlantic to Minnesota and Texas—protection of old growth is anything but automatic. One of the largest remaining clusters of unprotected old growth, for example, lies within 14,000 acres of slopes and coves in Pisgah National Forest in North Carolina. The area, called Big Ivy (because in local parlance mountain laurel is known as ivy), came to the attention of Karin Heiman during her year in the early 1990s as the botanist for the national forests of North Carolina. Hired to identify areas of high species-diversity, Heiman quickly became mired in timber politics, was fired, and is now embroiled in an appeal founded on the word "whistleblower." Logging had been going on in Big Ivy for two decades and more was planned, but Heiman documented over fifty rare plant and animal species there, some of them with hearteningly healthy populations.

A small, compact blonde with aquamarine eyes, Heiman's face was sunburned from field work as a self-employed consulting biologist when we met for a hike in Big Ivy. The buzzy trills of black-throated blue and green warblers drifted down from the canopy. Fringed orchids and bead lilies bowed over the trail. In the lushest places grew every conceivable form of leaf, every imaginable elegance of blossom. Here we found huge trees—sugar maples, northern red oaks, hemlocks—all in a row from the linear womb of a nurse log and now grown as thick and stout as prominent citizens. Heiman stepped almost unconsciously out of her way to touch the largest of them in passing. Since her dismissal from the Forest Service, she has made the preservation of Big Ivy a personal crusade. "This could be a world-class reservoir of biodiversity," she declared.

Big Ivy's special characteristics also attracted the attention of Dan Boone, an ecologist for The Wilderness Society, in the early 1990s. To analyze the Pisgah National Forest Plan, Boone used Big Ivy as a case study and projected fifty years of management actions proposed for the area. "The current management plan would reduce old-growth conditions to small patches," he noted, "so that species that need old growth may be relegated to areas too small to sustain them. Some species would definitely be imperiled." This lack of consideration for old growth, as well as other deficiencies, prompted The Wilderness Society (in conjunction with the Sierra Club and the North Carolina Wildlife Federation) to submit a thorough critique of the plan.

Sensitized to old-growth controversy by bitter experience in the West, the Forest Service recognized an emerging issue. Through a 1991 cooperative agree-

When left generally undisturbed, the old-growth forests of the East can maintain a celebration of diversity. Below, a line of southern cooters annotates a log in Congaree Swamp; right, mountain laurel buds in Shenandoah National Park; far right, an eastern screech owl.

BELOW: TALMADGE E. LEWIS; RIGHT: PAUL REZENDES; FAR RIGHT: BOB SIMPSON

ment with The Nature Conservancy, which has built a large library of plant community classifications, the Forest Service acquired broad descriptions of thirty-five eastern woodland communities, with references to more than 100 subtypes. Here are vignettes from every part of the Great Forest, from the rustling beech-maple-basswood woodlands that swept from Minnesota to New England to the assemblages of river birch, sycamore, cottonwood and elm that shadowed the banks of major waterways; from the cypress-tupelo swamps along the southeastern coast and the Mississippi River that harbored baldcypress trees more than a thousand years old to the fragrant pine-oak forests that graced dry, shallow soils almost everywhere. The most widespread communities were the grassy woodlands of longleaf pine, with their handful of trees per acre and low understories of forty species per square meter; they once covered 92 million acres of coastal plain and piedmont from Virginia to Texas. The group of surviving white oaks that tapped my reservoir of anger at ancestors that afternoon on the Blue Ridge were remnants of one of the dry oak forests that grew on well drained and upland soils south of the Adirondacks. Most diverse were the forests from the central and southern Appalachians westward to the Ozark and Ouachita Mountains. With their dozens of tree species and a thousand kinds of shrubs, herbs and forbs, these were some of the richest temperate forests in the world.

For each of these communities, precise definitions of what constitutes old growth—such as number of snags per acre, percentage of the canopy in gaps, and size and spacing of trees—are being written by Forest Service scientists and academic researchers. This will mostly be an exercise in literature review, because so few functioning old-growth ecosystems are available for field verification. Where no data are detailed in the literature and no examples exist in the field, there will be blank spaces on the tables of old-growth attributes. A project underway at Great Smoky Mountains National Park to describe oak and hemlock old-growth stands, before their inevitable alteration by gypsy moths and hemlock woolly adelgids (two introduced insects), may fill in some of the blanks, but others can be completed only as time makes old growth available for study.

It is this matter of old growth to come—the potential for a new Great Forest—that adds a decisive twist to the issue of eastern old-growth. Decades after the worst of the logging, large tracts of eastern forest are aging toward old growth. Many of the maturing trees are held in private woodlots, but these plots are generally too small and disjunct to function as full-fledged ecosystems. Besides, unless social priorities are significantly reordered, market incentives will tend to eliminate them just as they have in the West, where precious little old growth remains on private land. It is mainly the national forests that are expansive enough to overcome two great obstacles to the development of an ancient forest ecosystem: the distortion of edge effect (the invasion of light, wind, predators, and parasites along the perimeters of any disturbance larger than about half an acre) and the need for habitat connections (such as wide swaths of forests along streams and across open spaces) to link woodlands for the dispersal of plants and animals necessary to avoid the inbreeding of populations. "We need to be thinking about old-growth landscapes, not old-growth stands," says Dan Boone. "It's a matter of scale." Old-growth on a landscape scale raises the same questions that bedevil forest managers in the West: How much is enough? Where should it be?

"This is a hallucination," Bob Zahner quipped as a family of ruffed grouse exploded from the undergrowth. "Grouse aren't supposed to use old growth." We were on a hillside above a stream, upwind and downslope from the ancient white oaks on the Blue Ridge. Looking into the hollow, the world was an airy, spacious, green and gold place, with sun gleaming on brown trunks. The almost unbearably sweet, melting notes of a wood thrush flowed from some hidden place in the greenery. "For years foresters and hunters have said that grouse can live only in young forests, but grouse eat acorns," Zahner said. "Oak trees don't even start to produce good crops until they're around eighty years

"The strongest thing we could do for biodiversity is promote old growth," says Jane Holt, who has spent years surveying eastern forests to count increasingly rare songbirds, like the Kentucky warbler at left. At the far left is a pine martin, and below are cypress trees reflected in Congaree Swamp.

LEFT: BOB SIMPSON; FAR LEFT: PAUL REZENDES; BELOW: TALMADGE E. LEWIS

old. Grouse love old growth." So do dozens of other forest creatures, from deer to deermice, who feed on nuts. Mature oaks, hickories, and beeches capable of dropping heavy crops have gained tremendous value since the nutritious chestnuts died.

Aging forests also offer niches unavailable elsewhere. Dams of fallen branches form pools that serve as refugia for various fishes, and catch nutrients for aquatic organisms. Downed logs harbor the small mammals that eat and disperse mycorrhizal fungi, without which young trees can't survive. The deeply fissured bark of very old trees provides the only habitat for dozens of lichen species. Trees big and hollow enough to fulfill a black bear's preference for a den fifty feet high take centuries to form. A soil deeply littered enough for salamanders takes nearly that long. A lithe and exquisite lifeform, salamanders often weigh in as the most abundant group of vertebrates in mature woods, and play a crucial role in the food chain. As for invertebrates, they are so poorly known in old growth that new species are being discovered even in the otherwise overcollected East: a possible new millipede in Virginia, new mites and other arthropods in the Great Smoky Mountains National Park. Any megafauna wholly dependent on old growth is probably extinct—the last such species was probably the ivory-billed woodpecker, which disappeared in the 1940s with the last of the original oak-gum forests—so the spotted owl of the East might be a mite, not the most charismatic of creatures.

As in the West, concern for wildlife in old growth has focused on birds. The red-cockaded woodpecker is barely hanging on in the last pine-grass forests of the South. Neotropical migrating songbirds are showing steep, continuing declines that were first blamed on deforestation of their winter habitat in Latin America, but strong evidence is now pointing to forest fragmentation across the East.

Jane Holt is helping to gather that evidence. She began her career as an ornithologist on the Highlands Plateau, a four-thousand-foot high plain at the corner of Georgia, North Carolina, and South Carolina that hosts the greatest diversity of songbirds in the Southeast. In the late 1950s, and again in the 1970s, Holt resurveyed the same forest stands that pioneering ecologist Eugene Odum censused in the 1940s. When I met her at an old-growth conference in Asheville (where she teaches at the University of North Carolina), she was working on getting permission to do her third survey. Shy and soft spoken, with an air of gentle Southern formality, Holt ticked off three species of warblers—black-and-white, black-throated blue, and blackburnian—as well as wood thrushes, rosebreasted grosbeaks, and ovenbirds as the species most rapidly disappearing. Each of these fast-vanishing birds gleans insects from a very specific structural element of the forest, like the leaves at a certain canopy level, or tips of branches, or bases of trees. "The multilayered vegetation of old growth supports the most birds, and the most different species," Holt told me. "We love our generalists, but it's the forest interior specialists that are suffering. The strongest thing we could do for biodiversity is promote old growth."

That was the conclusion arrived at by Peter Kirby, The Wilderness Society's regional director in the Southeast, whose office is currently completing a major ecosystem study of the Southern Appalachian region. "Old growth is essentially an irreplaceable unit in maintaining a full complement of native wildlife," he says, thereby implicitly answering the question of "how much is enough" with another question: How much is needed to support healthy populations of all native species over a time span of centuries?

To address that question at least for neotropical migrants, the federal government in 1989 sponsored a cooperative program called Partners In Flight. Regional working groups from all federal land-managing agencies, plus a sprinkling of university researchers, timber-industry managers, and members of conservation groups, intend over the next couple of years to formulate recommendations for the national forests on size and age of wooded tracts needed to halt the decline of summer migrants. The idea is that these advisory recommendations will be folded into the planning process that produces a new land-use plan for every national forest at least once a decade.

At right, a cave salamander, one of many salamander species that live—and too often die—in old growth. In many eastern forests, clearcutting kills millions of them annually. BOB SIMPSON

It can take centuries for enough layers of soil and detritus to accumulate to support viable populations of salamanders and other creatures that live in the moist and fecund darkness of the forest floor. Below, slime mold and bunchberry in White Mountains National Forest, New Hampshire. PAUL REZENDES

It is through this planning process that a new Great Forest—if there is to be one—will be achieved. A few national forests whose plans are coming due for revision are bandying about the figure of 5 percent as a sufficient allocation of land for the regeneration of old growth. The figure comes from Larry Harris' influential 1984 book, The Fragmented Forest, although he used it merely as an arbitrary starting point for envisioning old growth landscapes (it's now said he rues the day he ever mentioned the figure). Bob Zahner advocates a minimum of 20 percent and talks of whole national forests managed by "benign neglect." Whatever percentage is mentioned, national-forest planners usually consider that it can be found on land classified as unsuitable for timbering, which often comprises 30 to 60 percent of a national forest. But lands too steep, dry, or thin-soiled to grow harvestable trees can hardly be expected to produce highly diverse old growth. And since the designation "unsuitable" can be revoked whenever a forest plan is revised, whatever richer sites might have been included are vulnerable to market whims and political whimsy. Logically enough, the best growing sites can be expected to produce the most luxuriant old growth as well as the most lucrative timber, a fact noted with concern by Dan Boone, who worries that the drive to eliminate below-cost timber sales will concentrate Forest Service cutting on the most productive sites, endangering the best old growth.

Bill Martin, a Forest Service staffer charged with coordinating the Southern Region's old-growth definitions, also noted the incipient conflict between timber and old growth. "One of the benefits of mature trees is high-quality saw timber and veneer logs," he said during an interview in his office. "Hardwoods get bigger the older they get, up to a certain point when they start to have rot spots." (And it is precisely at this point that old-growth attributes begin to form.) Martin emphasized that he wasn't a policy maker, and cheerfully admitted that he wasn't an expert on old growth. A couple of personal touches in his office testified to his real expertise: A cross-stitched sampler of a man with an ax spelled out "Timber Bill," and a model of a log skidder hulked on a countertop. To his credit, Martin at least did not refer to old growth as "decadent," the traditional term many foresters use to describe a stand that no longer produces the maximum amount of wood usable by humans (in their view, the primary "purpose" of the forest). Old trees use about as much energy to maintain themselves through respiration as to build new wood, and foresters prefer the economic benefits of younger, faster-growing trees. But the rededication of good growing sites from timber to old growth would have far less economic impact in the East than the preservation of old growth is having in the Pacific Northwest. Far less than 10 percent of the timber supply in the thirty-two states that comprise the two eastern Forest Service regions comes from national forests—except in Michigan, where it is 35 percent—and only nine communities are classified as economically dependent on national-forest timber extraction.

Martin did downplay the effects of clearcutting and talked about rotation lengths, the time span between one cutting and the next in the same site. "If you go by Hurricane Hugo," he said, referring to a huge, forest-wrecking storm on the South Carolina coast that was labeled a once-in-a-century event, "we could have rotation lengths of 100 years." This assumes a storm of exactly the same intensity slamming into exactly the same place at exactly the same interval to inflict exactly the same level of damage every hundred years—not much of a likelihood. Besides, even such large natural disturbances as hurricanes and fires are much more variegated in their consequences than clearcutting, the results of which we know all too well. With few exceptions, however, rotation cycles in national forests throughout the East are planned for 40 to 150 years, and there is an underlying idea that one 150 year-old stand can be cut when another reaches the 150-year mark. Given the complexity of old growth and the fact that many trees are just reaching maturity (much less old growth) at 150 years, one stand simply can't substitute for another.

A recent comparison of cut and uncut forests in the Southern Appalachians showed that one of the glories of those mountains, the bountiful herbaceous under-

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story, had not recovered 85 years after cutting, and gave few signs that it ever would. Another recent study estimated that clearcutting in western North Carolina killed nearly 14 million salamanders a year and that fifty to seventy years were required for local populations to rebuild. Woodland salamanders are another of the treasures of the cool, moist forests of the Southeast, occurring in more varied forms there than anywhere else in the world. Scientists worry that genetic diversity is being impoverished by chronic reduction of regional populations to the tune of a quarter of a billion salamanders. Where are the animal rights people when you need them?

Despite the Forest Service's obligation to manage for biodiversity and the knowledge, long held, that the Southern Appalachians are a globally important site of salamander diversity, no one had previously monitored the impact of timber harvesting on salamanders. "This is all new to us," I was told by Marilyn Robertson, wildlife ecologist for the Forest Service's southern region. "We're just beginning to realize the ecological importance of microhabitats, and the impacts of fragmentation on different species." Robertson works closely with botanist Susan Hooks and called her to join the interview. They were a jocular pair, but bantering ceased when old growth was mentioned. Neither was much involved with it because the forests in the region hadn't yet asked for their aid, but Robertson anticipated "a major impact on our jobs when they do, because they will be asking for help in selecting Management Indicator Species related to old growth. Our knowledge and experience with such species is limited." These species are supposed to do exactly what their name implies—indicate the impacts of management on the health of the forest. Salamanders and neotropical songbirds are obvious choices, although habitat changes in Latin America must be factored in for avian migrants. But it doesn't matter what Management Indicator Species are chosen if they aren't monitored and there is no standard methodology for collecting, recording, or utilizing data about them. Hooks agreed that this was an astonishing procedural gap, and hoped, as a member of a national working group on monitoring, to coordinate things, at least in the southern region.

Far greater challenges of coordination will be required to stitch together an old-growth landscape from today's chaotic quilt. Few management guidelines on size, location, or connections of old-growth sites currently apply from one national forest to the next, much less between the two regions "because," says Ann Bartuska, director of the Forest Service's new office of ecosystem management, "there is a legal requirement resulting from the National Forest Management Act for every forest to develop its own plan." There could be strategic guidance at the regional level, Bartuska admits, but she does not support the idea of declaring that an arbitrary percentage of land be set aside for the nurturing of old growth across the whole region. "That is unreasonably inflexible," she says. "We don't know what the original amount of old growth in the various forests of the East was. The best we can do is to provide a mix of tree ages and species across the landscape in a way that reflects the natural communities and long-term capability of the land." This sounds alarmingly like the mosaic of "fragments and edges" that the Forest Service has been touting for decades—to very mixed reviews from environmentalists. Although in other ways Bartuska seems to look forward rather than back—mentioning, for example, that "a great deal of thought and some action" is being devoted to harvesting methods that mimic small natural disturbances and discussing the complexities of restoring natural-fire regimes in landscapes dominated by people—it remains to be seen what ecosystem management will mean for the Great Forest.

At the end of our hike in the Blue Ridge, Bob Zahner took me to an overlook, where we seemed to swim above an ocean of mist, with mountains swelling up one after another like waves frozen in place. For the most part, it was a cutover landscape that would not produce old growth in my lifetime. As I took in the scene, I tried to focus on future possibilities and wished that growth could be accelerated by the sheer force of love. But I continued to be haunted by the ravages of the recent yet forever unrecoverable past, and by an infuriating sense of loss. Rage is as real as love.

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