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An Explosion of Green

The reforestation of the eastern United States -- thanks partly to conservationists and mostly to accident -- can show the developing world how to make room for people, farming, industry, and endangered species of plants and animals, which have been returning. We can give the rest of the world a better example if we address the problems that even this fortunate region still faces

by **Bill McKibben**

ON August 18, 1587, Virginia Dare became the first child born to English parents in the New World. Her birthplace--on Roanoke Island, in what is now North Carolina--was Britain's first attempt at colonizing this continent, and was the site of the first recorded British murder of an Indian chief. Though Dare's band of settlers did not survive intact, Roanoke Island was the beginning of the historical process in which English-speaking Europeans settled

and subdued North America over the next four centuries.

On September 14, 1987, 400 years later, a team of biologists from the U.S. Fish and Wildlife Service office on Roanoke Island opened the gate of a pen and released a pair of red wolves wearing radio collars into the Alligator River National Wildlife Refuge. The animals disappeared into the woods perhaps half an hour's drive from the spot where Dare was born. Their species was the first ever to go extinct in the North American wild and then be reintroduced into the natural world from a remnant population in zoos. They were, as surely as Dare, pioneers.

See the transcript of an online conference in which Bill McKibben discusses this article and comments on broader issues of environmentalism.

The forces set in motion by European colonization had all but erased red wolves from the continent: settlers made wolves a symbol of the devil, placed bounties on their heads, organized state and federal predator control programs, and farmed and developed their last few strongholds. The Roanoke Island biologists have watched and listened for the past eight years as the animals they released have reproduced and spread across the refuge's swampy, mosquito-infested 150,000 acres. As of this winter the biologists had counted sixty-one wild-born puppies. One wild-born female had borne four litters, and one of her pups had in turn given birth; a third generation of wild red wolves was howling in the night.

BACK TO NATURE

FIVE hundred miles to the north, from his home on Nantucket, Peter Dunwiddie, a plant ecologist, studies core samples of swamps and bogs, looking at pollen under a microscope to figure out what was growing on Cape Cod and the neighboring Atlantic islands in the time before and after the Pilgrims debarked in nearby Plymouth. It's easy to spot the onset of European settlement in his pollen samples. "Literally in a matter of decades," he told me recently, "the forest was cleared. There's no more oak pollen, and all of a sudden lots of grass pollen. That persisted throughout much of the following couple of hundred years," as Europeans turned most of the area into a giant sheep pasture.

In the late 1800s, just as the agricultural economy was beginning to dwindle, local residents started taking photographs. In addition to his pollen samples, Dunwiddie has gathered a vast library of original pictures along with ones taken from the same places fifty or a hundred years later. "Here's Prospect Hill, on Martha's Vineyard, in 1916," he said to me, choosing one in which a stone wall marched up and over the top of a hill. "There's not a tree to be seen. The retake of the photo today is entirely of an oak forest--a mature oak forest. You can't see the stone wall; you can barely make out the contours of the hill at all, because of the forest."

The scenario--oak and pitch pine replace pasture--has repeated itself all over the area. "Sometimes we had to use a ladder and a pole to get the camera above the treetops just to take a picture," Dunwiddie said. In his bog cores "the pollen is beginning to resemble the pre-European." Coyotes, which in the 1970s crossed the Cape Cod canal and established themselves on the Cape, have recently managed the ocean crossing to the remote Elizabeth Islands. "They've very quickly decimated the feral sheep that were left out there," Dunwiddie said. "They're taking quite a toll on the deer population. The deer and the sheep had been browsing down the seedlings; there's likely to be a really dramatic spurt of growth."

IMAGINE the view from a satellite, Alan Durning writes in the 1994 edition of the Worldwatch Institute's *State of the World* report. A time-lapse film that showed you a thousand years each minute would reveal only the slightest changes in the earth's forests, which for millennium after millennium covered about a third of the planet's land surface. But in the film's last three seconds, he says--the years after 1950--the change "accelerates explosively."

Vast tracts of forest vanish from Japan, the Philippines, and the mainland of Southeast Asia, from most of Central America and the horn of Africa, from western

North America and eastern South America, from the Indian subcontinent and sub-Saharan Africa. . . . Southeast Asia resembles a dog with the mange. Malaysian Borneo is scalped. In the final fractions of a second, the clearing spreads to Siberia and the Canadian north. Forests disappear so suddenly from so many places that it looks like a plague of locusts has descended on the planet.

If you stared from space at eastern North America in the same three seconds, however, you'd see something different: a patch of green spreading like mold across bread, and spreading fast. In the early nineteenth century the cleric Timothy Dwight reported that the 240-mile journey from Boston to New York City passed through no more than twenty miles of forest. Surveying the changes wrought by farmers and loggers in New Hampshire, he wrote, "The forests are not only cut down, but there appears little reason to hope that they will ever grow again."

Less than two centuries later, despite great increases in the state's population, 90 percent of New Hampshire is covered by forest. Vermont was 35 percent woods in 1850 and is 80 percent today, and even Massachusetts, Connecticut, and Rhode Island have seen woodlands rebound to the point where they cover nearly three fifths of

southern New England. This process, which began as farmers abandoned the cold and rocky pastures of the East for the fertile fields of the Midwest, has not yet run its course. Forest cover in New York State, for instance, continued to grow by more than a million acres a decade through 1980. In sum, writes Douglas MacCleery, of the U.S. Forest Service, "the forest and farmland landscape of the Appalachians, as well as many other parts of the East and South, has come full circle. By the 1960s and 1970s, the pattern of forest, fields, and pastures was similar to that prior to 1800, its appearance much like it must have been prior to the American Revolution."

This unintentional and mostly unnoticed renewal of the rural and mountainous East--not the spotted owl, not the salvation of Alaska's pristine ranges--represents the great environmental story of the United States, and in some ways of the whole world. Here, where "suburb" and "megalopolis" were added to the world's vocabulary, an explosion of green is under way, one that could offer hope to much of the rest of the planet. The forests, as a recent federal study pointed out, will still take centuries of care before they recover their original grandeur. And backsliding is always a danger; the regreening of the East faces many threats. But it is undeniably real. In his journal Thoreau listed the species gone from Concord by the middle of the nineteenth century: bear, moose, deer, porcupine, "'rav'nous howling Wolf,'" and

beaver. In 1989 environmental police had to kill a moose that had decided to make its home on the median strip of Route 128, famous as "America's Technology Highway." "We've never been faced with a moose ten miles from Boston," said one game warden, who donated the animal's carcass to a Salvation Army soup kitchen.

American heads turn west when the subject of nature comes up. I have before me the Sierra Club engagement calendar for 1995, with fifty-eight gorgeous pictures, most of them sweeping western vistas. Precisely two come from the thousand-mile sweep of the Appalachians--a patch of orchids in Tennessee and a picture from Maine titled, accurately, "Leaf in Stream." We are raised on what the writer Jose Knighton calls "eco-porn"- sunset-tinted photos of the Grand Tetons and other swelling bosoms of the West. But we might take as our emblem the pine: not towering white pines, marked by the first lumbermen in North America with a "King's Arrow" to reserve them for the Royal Navy, but the spindly pine that springs up when cows leave a pasture, the pine that begins the long process of reclamation. From the Pisgahs, the Unakas, and the Nantahalas of the southern Appalachians to the Whites and Greens and Adirondacks of the North, the woods are coming back, and people are starting to notice. In the late 1980s Congress called for a study on how to protect the 26 million acres of forest in New York, New Hampshire, Vermont, and Maine --forest

that in some cases wasn't there a hundred years ago. "Show me another twenty-six-million-acre chunk," says John Harrigan, a New Hampshire newspaper editor who sat on the study commission. "Outside of Seward's Folly, I don't think you can." Yellowstone Park, in contrast, covers 2.2 million acres.

QUICK DEVASTATION, QUICK RECOVERY

THE story of this recovery begins long before Europeans arrived on these shores. It is worth remembering that no spot on the globe was originally more natural or wild than any other: if America had been settled west to east, we might think of the East Coast as the wild shore, and our calendars might concentrate on Chesapeake Bay and the Everglades. Over time the mountains of the East have risen to heights we would consider western, been eroded, and risen again. The rock on Grandfather Mountain, rising 4,000 feet above the Piedmont Plain in western North Carolina, is more than a billion years old, among the oldest on the planet. Along the Blue Ridge and its surrounding highlands neither glacier nor ocean has covered the land for hundreds of millions of years; the result is a rare biological refuge that preserves much of the story of evolution. Plants could travel slowly north and south along the ridges of the Appalachians as climates changed,

escaping extinction. Thus the Smokies boast more than 1,300 flowering plants and a hundred types of trees. Arguably, the southern Appalachians form the most diverse temperate forest in the world.

Farther north the landscape was a mile deep in glacial ice until comparatively recently--perhaps 11,000 years ago. On the glaciers' retreat the rock and till were colonized by fungi and lichens that eventually converted the rock to soil. The soil provided a home for forests that were spreading northward, but the North has never been especially hospitable. Though cold fronts from Canada and warm air from the Midwest and the Gulf bring abundant precipitation, the soils are not deep. Often acidic and fragile, they make agriculture difficult; the short growing seasons have favored spruce-fir forests in the colder places and a mixture of maple, beech, and birch in slightly warmer sections. Nonetheless, about three quarters of America's original forests were found in the eastern third of the nation, and today about three quarters of the nation's forests are in the East.

Very little of the forest is virgin, of course. Most of it is haunted by the human history that brings time into being--a history that long pre-dates Columbus. Paleo-Indians moved into the northern forest not long after the glaciers receded. Scientists continue to debate whether their arrival caused the sudden dying-off of megafauna--mammoths and mastodons, armadillos and ground

sloths, giant beavers, dire wolves, and saber toothed tigers--that once roamed the East. There is no question, however, that over thousands of years Indians rearranged the landscape to suit their needs. "It is tempting to believe that when the Europeans arrived in the New World they confronted Virgin Lands, the Forest Primeval, a wilderness which had existed for eons uninfluenced by human hands," William Cronon writes in his masterly account of New England's early history, *Changes in the Land*. "Nothing could be further from the truth." Indians cleared land for agriculture and burnt some forests once or twice a year, keeping them open and parklike.

The Indian disruptions, though extensive, were usually temporary. When Indians had used one area for a time, they often moved to another. Not so Europeans. Early logging was bad enough, but farmers cut down *every* tree as they cleared pasture, and then brought in grazing animals that ate the native grasses down to dirt. New plant species arrived in shipboard fodder: mulleins and mallows, for instance, and nightshades, stinging nettles, and dandelions. Other agricultural techniques left their own devastation. Instead of rotating crops, farmers planted corn year after year, and corn quickly exhausts soil. Colonial farmers often used fish as fertilizer--at the end of the eighteenth century, Cronon writes, a dollar could buy a thousand fish.

This was merely a warm-up, however, for the destruction in the first century of the new republic. From 1780 to 1850 the population of the United States grew nearly eightfold, from nearly three million to about 23 million. It took about three acres of cropland to feed each person. For a while the trees that farmers cleared for fields met the nation's demand for timber, but in the second half of the nineteenth century lumber consumption rose from 5.4 billion to 44.5 billion board feet a year.

Wood was used for *everything*--it was the cornerstone of the economy in the same way that petroleum is today. What iron existed was smelted using wood charcoal; to produce a thousand tons of iron a year, a furnace needed 20,000 or 30,000 acres of forest, MacCleery writes. A square forty acre field required 8,000 fence rails. In the latter half of the nineteenth century, when barbed wire began to replace wood, there were more than three million miles of wooden fence in America. Railroads soon claimed the wood freed up by wire fencing; at the turn of the century the demand for railroad cars, ties, fuel, bridges, trestles, stations, and telegraph poles was taking a quarter of the nation's timber production. Steamboats burned wood for fuel until the Civil War, consuming a fifth of all the wood sold for fuel in 1840. In the second half of the nineteenth century forest cover in many areas of the East had fallen from 70 percent to 25 percent or less. Eventually the profligate cutting left lumbermen little

choice but to move west: there were few mature forests left to take. Loggers moved from New England to New York, Pennsylvania, the Great Lakes, and the South.

Something similar was happening in agriculture. Even for those lands that had not been exhausted by poor farming, improved transportation to the fertile soils of the Midwest meant insurmountable competition. The opening of the Erie Canal, in 1835, is as good a starting point as any. In the decades that followed, the Northeast stopped concentrating on supplying raw materials and began the long transition to an economy based on manufacturing and services. For example, the first Merino sheep arrived near Mount Ascutney, Vermont, in 1809. By 1840 there were 1,681,000 sheep in the state, or six per person. Thirty years later the number had been cut in half: the reasons include that western ranches could now ship their wool by rail and undercut Vermonters. The dairy industry has survived, milk being harder to transport great distances, but it, too, has long been in decline.

By 1890, 42 percent of the people who had been born in Vermont lived elsewhere. It was a Vermont native, Horace Greeley, who said "Go West, young man"; among those who lit out was another, John Deere, whose machinery would transform the plains. According to the author Ben Bachman, Vermont has produced thirty-five U.S.

senators, 114 congressmen, and sixty governors who have served in other states. "Vermont recovered because the destruction was a one-shot destruction," says Steve Trombulak, a biologist at Middlebury College. "It was cleared, pastured for maybe twenty or thirty years, and then everyone discovered Ohio. I don't believe for a moment that Vermont would look like this if it weren't for the Louisiana Purchase--if we hadn't found places where you didn't break your plough on the stones."

If the nineteenth century was an epoch of destruction for the northern forest, the twentieth century has been a long sleep. If you walk in almost any woods in the East, you can see the recovery process up close--see the cellar holes that sprout birch, the careful piles of stone now covered by moss and surrounded by forest. From the window in the room where I type these words, I can see the crumbling stone dam that powered the small Adirondack sawmill that once skimmed the trees from all the surrounding ridges. Trees gone; sawmill gone. Sawmill gone; trees return.

For me the proof that what is happening is significant--and right and necessary--lies in the recovery not only of the forests themselves but of much of the life they always supported. As early as 1672 wild turkeys were described as rare in Massachusetts. Beaver were disappearing from the Massachusetts coast as early as 1640 and from the Narragansett region by

1660, as Indians and others filled the demands of the fur-trading posts, moving farther up the rivers in search of fresh supplies. Massachusetts had its first closed season on deer in 1694; eventually deer were eliminated from Maryland, New Jersey, Ohio, Pennsylvania, and all but the northern fringes of the Great Lakes states. In *Changes in the Land*, Cronon quotes the nineteenth-century cleric Timothy Dwight: "Hunting with us exists chiefly in the tales of other times."

But just as the last animals were vanishing, organized sportsmen's groups, led by Theodore Roosevelt and others, banded together to oppose market hunting, enact game laws, and establish refuges and reserves. Their efforts meshed with the slow return of habitat, and animal populations boomed. Whitetail deer now number more than 18 million--perhaps half as many as were in the original herd, but forty times as many as existed in the late 1800s. Pennsylvania motorists alone killed 43,000 deer in 1990; deer browse so much suburban shrubbery that some homeowners call them "rats with hooves."

Perhaps 40,000 black bears roam the East. Alligators, placed on the endangered-species list in 1967, after hunting had nearly wiped them out, rebounded within ten years to a population of two million. In 1972, thirty seven wild turkeys were introduced into western Massachusetts--where the species had long since vanished. By now

the population exceeds 10,000.

As game has spread, so have predators. Even in heavily settled Massachusetts, coyotes--not seen until the 1930s--now live in virtually every town. Larger predators, too, may be appearing. In rural uplands throughout the East the part of the imagination that elsewhere is reserved for Elvis sightings is given over to stories about cougars, panthers, pumas, mountain lions, and catamounts--all names for the same long-tailed wild cat. Officially there aren't any. As the final clearing of the region took place, in the nineteenth century, and as the deer herds that were their prey vanished, cougars were wiped out across the East.

The Eastern Puma Research Network, however, has received reports of 1,800 puma sightings in the past decade. During hunting season in 1993, for instance, a Maine hunter heard a sound "like a woman screaming in pain." Topping a rise, he saw a large tawny animal shaking something in its mouth. The animal turned toward him, and he saw a "big angry head- about the size of an average human head." It snarled, dropped its prey, and disappeared in "three tremendous long leaps." The hunter collected the carcass of the prey, which turned out to be a bobcat--a smaller feline that is common in the northern forest. Biologists said that the bite and claw marks on the bobcat were the right size for a cougar. The sightings increase each year; the wildness seems to gather. Last fall

Vermont wildlife officials confirmed that they had found scat from at least one mountain lion.

RECOVERY AND RUINATION

THIS recovery was not automatic. It is an accident of climate, soil, and economics. Recovery has not come to the Midwest, because the soils there continue to be valuable for industrial agriculture. Recovery has not come to the entire East, either-- some places are still logged as brutally as the Pacific Northwest. And even where recovery has progressed farthest, it will not necessarily be permanent. Stand on top of North Carolina's Mount Mitchell, at 6,684 feet the tallest mountain in the East (in 1835, when it was measured, it was the highest point in the then United States), and you see the twin vistas of recovery and ruination. Clear-cut logging had spread within half a mile of the summit before it was finally halted, in 1915. Now the forest is protected by the Blue Ridge Parkway and the city of Asheville's watershed, and so the spruce and fir have grown anew on its slopes. Near the top, however, low-level ozone and acid rain have left a dying and skeletal forest, its branches bony and silver. From the observation deck, signs tell you, you can see "Slick Rock Mountain, a residential and resort development. The flattened, barren area is the end of an airport runway." You can see the scars of feldspar

mines that produce much of the world's high-purity quartz for use in making computer chips, halogen lights, and semiconductors. And you can see the effects of the burning of coal and oil to power all those chips and lights--a semipermanent brown layer of haze that obstructs the view to the distance.

Though the basic physical trends in the East may be toward restoration, increasingly these are running up against renewed human assaults. To use a regionally appropriate metaphor, the East is like a young sapling sprouting from the stump of an old chestnut that was killed off by a deadly fungus in the early twentieth century. It looks healthy, it seems full of vigor--but it isn't going to get much bigger before it, too, succumbs to blight.

Some of the blight is literal. Global trade, which is ever-increasing, introduces new plant diseases through transported nursery stock, packing materials, and timber imports. A devastating beech-bark blight is ravaging trees in the Northeast, while hemlocks across the region are succumbing to a menacing insect, the woolly adelgid. Still, blights move slowly, at least by comparison with a feller-buncher--a machine equipped with a grappling arm that grabs a tree by the trunk and a buzz saw that slices it off near the ground. The machine symbolizes the industrial forestry that dominates the southern and northern extremities of the region.

Precious little prime eastern land, even that owned by the federal government, is protected from clear-cutting and other devastating "management" techniques. The damage is not new. Steve Trombulak, the biologist at Middlebury, talks of the many plant and animal species that have gone extinct in the Northeast, in part because they depended on old growth forest that vanished long ago. Whatever the eastern equivalents of spotted owls were, we lost them two centuries ago. "And of course we'll never know about soil microbes, things like that," Trombulak says. And the losses are not confined to the past. David Cameron Duffy, who has studied wildflowers in the southern Appalachians, reported recently that even ninety years after the forests were last cut, many species have not returned. The smaller, denser stands of trees that mark a recovering forest mean changes in soil conditions, temperature, and water availability. Beyond mere species, a recovering forest lacks the richness of *interactions* found in an ancient forest--the relationships between species big and small which are at the heart of any forest.

For example, a recent study of national forests in western North Carolina found that catches of salamanders were five times as high in mature stands as in forests clear-cut less than ten years ago. Because they need to keep their skin wet to breathe, salamanders generally seek moist microhabitats. A clear-cut, which leaves an

unshaded field, dehydrates the forest floor, reduces leaf litter, and increases soil temperature. All in all, says James Petranka, an expert on amphibians at the University of North Carolina, clear-cutting is killing about 14 million salamanders annually and "chronically reducing regional populations." When the clear-cut woods come back, they are no longer what we think of as a forest but an "even aged" stand, often composed predominantly of one species, and, in the words of a recent report from the Interior Department, "structurally and biologically less diverse than natural forests of any age."

The coastal plain of the Southeast has perhaps been the most badly damaged--the great mature stands of longleaf pine have nearly vanished, replaced by faster-growing species in vast pulp plantations. The same attack of industrial forestry has afflicted the Maine woods in recent years. The ten million acres of the core Maine forest--the largest green blob on the map of the East--houses virtually no permanent inhabitants. Loggers go there, and so do some hunters and fishermen who pay the usage fees required by the enormous timber and paper companies that own almost the whole spread. People routinely mistake the emptiness for wildness, but in fact the Maine woods produce huge quantities of pulp for paper, and export large quantities of raw logs. The cutting has been most Bunyanesque in the past fifteen years; as companies scrambled to salvage timber that was threatened by an infestation of spruce

budworm, huge clear-cuts spread across the region.

The damage inflicted on the woods by cutting at such a rate is a sight to behold. You can behold it only if you happen to be in a small plane, though, which allows you to peek over the "beauty strips" that protect watercourses from runoff and also shield the view of what can look like vast deserts. Rudy Engholm, the New England director of the Environmental Air Force, a group of ecologically minded private pilots, picked me and a couple of environmentalists up at a small airport in northern New Hampshire last summer. We flew across Lake Umbagog and into Maine, flying for hours over land that knows no human settlement and yet is devastated in ways inconceivable in many more-densely settled parts of the Northeast. We could see the occasional moose standing on a logging road, but mostly the view was of clear-cuts--tracts sometimes thousands of acres in size on which almost every tree was gone. Other spots had been spared clear-cutting but had been "high-graded" so relentlessly, with every big tree removed, that the land looked as if it had mange. Many huge patches had been sprayed from the air with herbicides to keep down "undesirable" hardwoods and produce more fir and spruce, which are the woods easiest to use for paper; in the middle of summer the leaves of the dying trees were awash with the colors of autumn. The Allagash Wilderness Waterway was instantly recognizable along much of its

length by the line of trees a few hundred feet wide that ran along each side of it. From a canoe in the river you would think you were in the wilderness, but if you walked a quarter mile to pee you might find yourself staring out across a plain nearly devoid of life. In recent years new legislation has limited the size of clear-cuts. In some cases this has led to more partial cutting; in other spots strange geometric figures are now cut from the forest--huge assemblages of clear-cuts separated by narrow "wildlife corridors" that may lead nowhere.

"That's the Ragmuff area," Michael Kellett, the director of the small environmental group RESTORE, said as we flew over one particularly barren clearing. "Thoreau wrote about it. It looks like it could be Kansas now--a few little clumps of trees and then vast fields." Engholm, who frequently takes passengers up to let them see the damage firsthand, told me, "Almost universally, they are just aghast. It's not any one cut in particular--it's that they just go on and on and on. There's virtually no place in Maine where from a couple of thousand feet up you don't see a manipulated forest." With the old trees gone, the loggers quickly return for the young ones. Log trucks in Maine today carry eighty or a hundred skinny trunks in one load, where once only a score would have fit.

In the eighties the cutting of the Maine woods, according to Kellett, proceeded

faster, relative to the woods' size, than the clearing of the rain forests of South America. According to data supplied by landowners to the Maine Forest Service, nearly 2,000 square miles--as much land as in all of Delaware--were clear-cut from 1980 to 1992, and thousands of miles of roads have been cut since the river drives ended, in the late 1960s and early 1970s. From the air we clocked log-truck drivers, some of whom are paid piecework rates rather than salaries, topping 90 mph on the gravel roads, their roostertails of dust visible twenty miles away.

A few days after the flight I visited Mitch Lansky, a Maine woods resident who began to investigate the forest industry when, in 1976, he was sprayed with pesticides from three modified Second World War bombers while leaving for his job at a sawmill. He unrolled a huge photo for me on the floor of his cabin, near the town of Wypitlock. "I want to show you what northern Maine looks like from outer space," he said. "This is a satellite photo from 1990, and these white blotches are six-mile-square townships. Just in this one little corner are a hundred and thirty square miles of clear-cut." Lansky took me for a drive around the area, where the clear-cuts stretch for miles. They are growing back heavy in poplar, which once made up less than three percent of the forest. "One other species does really well," he told me. "Raspberries."

Paper companies and timber barons have

mounted a large-scale public relations campaign to persuade people not to trust the feeling in their gut that comes from looking at the ugly face of industrial forestry. "Trees are renewable resources" was the industry mantra for years, until the realization grew that what matters is not simply the number of trunks but the quality of the forest. Later, responding to cries for biodiversity, industry spokesmen argued that clear-cuts created more "edge" (places where woods meet open land), which is good for certain species of wildlife--white-tailed deer, for example.

But it is plain that the forest the huge companies are creating with their management resembles a real Maine forest about as closely as "extruded seafood product" resembles lobster. Thoreau wrote, "The surface of the ground in the Maine woods is everywhere spongy and saturated with moisture. I noticed that the plants which cover the forest floor there are such as are commonly confined to swamps with us." Now, with sunlight streaming down on the clear-cuts, the forest can dry; in other areas, without roots to soak up the rain, the floor can turn to puddles. Whole-tree clear-cuts take everything--leaves and branches as well as trunk, and with them a higher percentage of the nutrients the tree had sucked from the soil. "The 'working forest,'" Kellett says, "the industry's current euphemism, is classic *Nineteen Eighty-Four* doublespeak. It sounds industrious, it sounds healthy, but it's a disaster. It's a

factory."

TWO ARMIES: LOGGERS AND DEVELOPERS

INDUSTRIAL forestry, for all the trauma it continues to inflict, has produced one great blessing: You can fly for hours over the Maine woods, or drive for days in the national forests farther south, and though you will see clear-cuts, gravel pits, and areas decimated by herbicides, you won't see any houses. You won't see the shopping malls and subdivisions and vacation homes that threaten to fragment and degrade habitat even more effectively than did the farmers' ploughed fields of two centuries ago. "We have two armies of occupation in this state," says the poet and environmental organizer Gary Lawless, a native of Maine. "There are the paper companies in the north, and along the coast the people who move here for a better life and change it in a different way. They're clear-cutting it too, only in very small pieces." In far-northern New Hampshire, says John Harrigan, the newspaper editor, "every year there are more of those all-night lights where there used to be darkness. People from away come here, and they think darkness is the enemy--bears or bogeymen or something." People bring pavement, Harrigan points out. Troublesome as a dirt road or a clear-cut can be, "once you've paved it, you've changed it forever."

Perhaps the paradigm of development can be found forty miles from the middle of Manhattan, in Sterling Forest, a wood that straddles New York and New Jersey. A century ago it had been denuded by more than a hundred years of fueling iron smelters. (The great chain that the Continental Army stretched across the Hudson to block British ship traffic during the Revolution was forged in Sterling Forest.) But like so much of the East, it slowly grew back. Now it is a 17,500-acre patch of green full of rattlesnakes and bear, a critical path for migrating birds. Only one problem: the nicer it gets, the more valuable it becomes. At the moment the owner wants to develop it into five planned towns, with 13,000 units of housing and eight million square feet of industrial and commercial space. The business plan quotes the work of the environmentalist Wendell Berry on the need for ecological stewardship, and the company is indeed plotting carefully clustered homes. But the unbroken forest will vanish, and in its place will arise a chain of suburbs that together will constitute one of the larger towns between New York and Albany.

Susan Sharko, who grew up in the area, and John Gebhards, who heads an environmental project that is trying to persuade New York State and the federal government to buy and preserve the land, took me for a hike one magnificent spring afternoon on the Appalachian Trail, which runs a few hundred feet from one of the

planned communities. "This is literally less than an hour from Manhattan," Sharko said, pointing to a surging brook with shaggy old hemlocks leaning out across it. "Not *much* less, maybe three minutes less, but still . . ." Every time we reached a vantage point Gebhards would point to the next ridge and say, "That's going to be the new town of Tuxedo Estates" or "That's going to be one of the golf courses" (three are planned for the site).

Whenever the trail reached a spot along bare ridge, we saw nothing but forest stretching into the distance. The view is powerful testimony to the enormous vigor of the natural world even on the edge of the megalopolis. But we're trained not to see it. Gebhards told me that although national environmental groups have endorsed his campaign, he had difficulty persuading them to devote their lobbyists' time to winning the congressional battle for funds to save the tract. "No one really believes there could be something like this near the city," he said--let alone that such a large space could be spared development. Leon Billings, a lobbyist for the developers, was more explicit when he spoke to a newspaper reporter about the plan in 1993. His childhood in Montana filled him with "an absolute admiration for the wilderness," he said. But to speak of Sterling Forest in the same breath was ludicrous, because it isn't virgin land. "We're not talking Glacier National Park here," he said. "This isn't even farmland in Virginia. This is an area

that was at one time industrialized." By that reckoning there is hardly an inch of the East that should be off limits.

And, in fact, some of the areas that have most recently been heavily cut are also under the greatest threat of development. One of the chief fears of eastern environmentalists is that the twin plagues of industrial forestry and overdevelopment will merge. In New England, for instance, the forest products industry--which for all the damage it has inflicted has at least kept the vast woodlands it manages free of houses and pavement, and thus theoretically restorable--could decide to start selling off the land it has cleared.

A single deal, one that speaks eloquently of the emerging global economy, touched off this worry. In the early 1980s a British financier, Sir James Goldsmith, took over Diamond International, a forest-products company that owned about a million acres in the northern forest. He quickly sold off most of the divisions of the company, recouping nearly all of the money he had spent to buy it--and was left with all the land, mostly undeveloped forest. This he sold to a French conglomerate that began retailing the land to the highest bidder. The region's economy was booming, and the demand for second homes climbing--a forty-acre lot on Moosehead Lake, in Maine, which sold for \$50,000 in 1986, went for \$250,000 in 1988. It was easy to imagine Loon-Cry Estates and Trillium

Manors spreading across the New England landscape as quickly as the clear-cuts; the economic term for such development is "highest and best use" of the land. Because what builders really want is river and lake frontage, the journalist Ted Williams has pointed out in *Audubon* magazine, highest and best use "translates to suburbanization of remote watersheds."

Alarmed at such a prospect, state governments and conservation groups paid premium prices to acquire some of the land. More important, New England senators pressed Congress to authorize the Northern Forest Lands Study, initiating a process that was finally completed last fall, when a council of government, industry, community, and environmental representatives released their report. Though the report disappointed some activists, especially because it paid little attention to clear-cutting and other logging practices, the council did recommend some modest acquisitions of land by the public, and called for the reconfiguration of tax codes to make development less likely and reduce economic pressures to cut. Its recommendations, if adopted, might help. But the study process also produced an unintended benefit: it spurred the emergence of a new breed of environmentalists in the region.

THE NEW DEFENDERS

EASTERN environmentalism was long a patrician enterprise--the effort of big-city swells to protect the mountain heights where they spent their summers, the lakes where they had their camps. The products of their time and place, these men and women played essential roles in preserving great tracts of land. But their sort of feudal noblesse oblige, although it lives on in many of the region's conservation groups, is clearly insufficient for the future.

The prototype of the emerging environmentalist is perhaps Jamie Sayen, who lives on a back road in a paper-mill town in northern New Hampshire--a road lined with trailers, none of them with clever names carved on wooden signs out front. He has a big vegetable garden, a wood stove, and "running water" that runs from a spring in the woods.

In the spring of 1987 Sayen published a map and an essay, "The Appalachian Mountains, Vision and Wilderness." In the years since, he has repeated his call for "continuous wild habitat the length of the Appalachian Range which in time could enable the return of unique plants and large animals--panthers, bears, wolves, moose--that have been exterminated throughout all or part of the mountain chain." The Appalachian Trail, stretching from Maine to Georgia, could be the "backbone" of this recovering wildness--one strong enough to "support the weight of the massive wild areas throughout the eastern reaches." These

areas would be joined by corridors through zones of human habitation. Sayen wrote with confidence, because he had begun with a simple assumption that drove the rest of his thinking: the East, and by extension other spots on earth, would be successfully restored when the animals and plants that belonged there could safely return.

His assumption ran counter to the prevailing mood of the Reagan-Bush years, when environmentalists tried to hang on to the small victories of the past; in the new Congress that mood might prevail again. "Is this a radical crackpot idea?" Sayen has written. "Certainly the defenders of the status quo would have you believe it is. But their ilk dismissed Benton MacKaye's 1921 proposal to create an Appalachian Trail . . . as the idea of a fool. Yet, the Appalachian Trail, one of the most treasured landmarks in the east, was completed less than two decades after it was first proposed!"

Following Sayen's lead, others have forwarded similar proposals. Michael Kellett's group RESTORE, for instance, recently proposed a three-million acre Maine Woods National Park, which would be the largest such area in the lower forty-eight states except for the newly created Death Valley National Park. All day as we flew above Maine's huge clear-cuts in the small plane, Kellett would announce, "We're crossing the park boundary now" or "We've just flown out of the park." At one point Rudy Engholm took us up to about

4,000 feet and turned the plane in a tight circle. "From here you can see about three million acres," Engholm said. "It makes it all a little more real." And it did. It was easy to envision the northern anchor of a renewed wilderness system, a block of green vast enough to nurture packs of wolves and herds of caribou, solitary cougar and lynx. "It's not too late," Kellett said. "The loggers have done a lot of damage, but there's still a chance for regeneration."

Conservationists up and down the eastern mountains are thinking on the same scale. Wilderness proposals covering big tracts of land have surfaced for the Monongahela National Forest, in the central Appalachians, and for the Green Mountain and White Mountain national forests, in Vermont and New Hampshire respectively--indeed, for all the surprisingly large eastern tracts still devoid of houses, which with changes in management might become reservoirs of wildness for the entire region. The Southern Appalachian Biodiversity Project recently published detailed recommendations for reclaiming the Blue Ridge Mountains. In some ways the task is easier in the Southeast than in the North, because the public already owns much southern land as part of its national forests. Many of the millions of acres of national forest in the mountains stretching from Virginia down to Georgia are still heavily logged, however, and are crisscrossed with roads that must be gradually closed if the most sensitive plants and animals are to

survive.

A map that environmentalists imagine is easy to visualize--though perhaps unlikely to be made real, given the current Congress. It would start with a big chunk of the Maine woods, to be bought by the federal government and set aside as a national park. Timber companies have sold huge Maine parcels in recent years; the going price seems to be about \$200 an acre and up, which means that a three-million-acre park might be had for less than half the price of a Stealth bomber. The money that could pay for it has actually been collected already, in the federal land-and-water conservation fund, which was intended for land acquisition but hasn't been fully appropriated by Congress in recent years. Farther south the map would show lots of land that already belongs to the public, including the great state preserves of Pennsylvania and the national forests surrounding the Smokies--forests that could be made off limits to industrial logging. It is not inconceivable that wolves will someday wander all the way down the Appalachians, or cougars find their way back to most of the states where they once lived.

The wilderness proposals reflect the emerging wisdom of conservation biologists, whose insight that big is better than small can be traced to E. O. Wilson's studies of island biogeography in the early 1960s. "In the late 1970s people started thinking about habitat surrounded by human

modifications as an island," Steve Trombulak explains, and they soon realized that the smaller such islands became, the greater the chances for species extinction. "By now the evidence is so strong that it seems to me there are probably more scientists who believe you need large blocks of land to protect species than there are who believe in evolution."

Frogs and salamanders, for example, may be unable to recolonize ponds where populations have dwindled in the course of natural cycles, because they are killed while crossing roads during their return to vernal pools. "I'm not saying we need to close every road," Trombulak says. "Underpasses can be built on the major roads. Others might be closed seasonally, when animals are migrating across them."

"One of the things conservation biology tells us is that you don't need all *that* much land set aside for biotic integrity," Trombulak points out. "Species are pretty widely distributed, so you only need to set aside about half the landscape for nature. Now, a lot of people hear that and say it's ridiculous--there's no way we can set aside half for nature. I don't see it that way. That's about what it's like in the Adirondacks. More than half of Maine is for sale by the paper companies. Here in Vermont we've got the Green Mountains. Half leaves so much for humans to do with what they will, so long as they don't create havoc with the air and the water."

GETTING EVERY JOB FROM EVERY TREE

CONSERVATIONISTS have usually been most interested in land that has been left alone for a long time. But if the conservation movement is to make any headway, it will need to consider the human economies of the half that isn't exclusively nature's. At the moment, a strong property-rights movement fears the encroachment of environmentalists. Still, there is a real chance for fundamental change, if only because so much of the area is already so impoverished. The forest-products sector still employs perhaps 100,000 people in the forests of northern New York and New England. But from 1984 to 1992 logging jobs in the Maine woods declined by 40 percent--in large part because the feller-bunchers and other machines required many fewer workers than the old manual methods had. And this works in a vicious circle. Once a logger has the big new machine, he has to pay for it, and the only way to do that is with heavy cutting. A recent report from the Wilderness Society noted that lumber and wood-products workers in the southern Appalachians average \$15,850 a year--a thousand dollars less than the average annual wage for service jobs. In *Beyond the Beauty Strip*, an encyclopedic account of industrial forestry, Mitch Lansky documents how timber interests manipulate state government to ensure low tax rates. Mill

pollution has poisoned some of the region's rivers with dioxin to the point where women of childbearing age are advised not to eat the fish. The state recently issued a warning against eating tomalley from its lobsters, which is tainted with the carcinogen.

What does this add up to? "The North Country is increasingly serving the role of a third world country, exporting its most valuable raw material . . . for further processing," one study concluded. Mark Lapping, one of America's premier rural planners and the provost at the University of Southern Maine, used a different analogy in *The Northern Forest Forum*, an environmental quarterly.

Northern New England is now the quintessential end-of-the-millennia on-the-periphery down-in-its-cups Appalachia . . . filled with dying towns, an aging population lacking the "necessary skills" to make it in the new world economic order and cultural despair.

Such villages are "chronically poor places which destroy the human spirit as well as the land, animals, plants and water."

To understand what such places feel like, read any of Carolyn Chute's novels--particularly her recent masterpiece, *Merry Men*, set in a northern forest town where most of the trees have been hauled off to the chipping mills, where the only work is "five hammers for five weeks" building new

vacation homes, and where the poverty is so deeply ingrained that no one expects much more. Those that can, get out; almost everyone else subsides into bad health and hopelessness. "Modern education is working on everyone to be desk people or people who fail at being desk people," Chute, who grew up in this world and lives there still, told me recently. "There's no chance for an A-plus in working with old people or growing your own food. There's only desk."

Or visit Mitch Lansky in Wytovitlock, a town that exists, just, amid thousands of acres of trees slowly regenerating from clear-cuts--trees that will be valueless for years to come. Those who work in the woods routinely drive hours to reach the patches still worth cutting. And a local cottage industry--Christmas wreaths--has been harmed by the decision of a timber company in the area to impose a licensing fee on anyone who wants to glean spruce tips from its woods.

Even those places that still have decent jobs--the paper-mill towns, mostly--are watching them disappear. Scott Paper, whose shares have hit record highs, laid off nearly a third of its work force last year. The company also sold its Maine forest and mills to a South African paper company, preserving for the moment the remaining jobs, but moving control even farther from the local area.

Because these places are worked over, and

because they are among the poorest parts of the country, they are also the places with the least to hold on to, and hence may offer the best chance for something new to emerge--or something old. As I was eating breakfast with John Harrigan at a restaurant in downtown Colebrook, New Hampshire, he glanced up every once in a while and made a mental note. When we left, he said, "While we've been sitting here, I've seen five log trucks going north to Canada with logs to be milled. There's a tremendous desire to do something about that--to get all the jobs possible out of every tree that hits the ground. Eighty years ago we had all sorts of factories--barrel staves, ax handles, shingles, clapboards, a host of products from hundreds of small factories. We've lost almost all of that, partly through our own neglect. We have to stop treating wood like a bulk crop, like wheat or soybeans. It's not 'fiber,' damn it."

"Value added" is the catchphrase for the way to improve the economies of these places: instead of selling pine trees to someone who will turn them into tables somewhere else, make the furniture near the forest. The Wilderness Society recently issued a report calling for a "sustaining forest," not a "working forest," in the northern woods. The report observes, for instance, that highway departments are once more interested in timber bridges, because road salt does not corrode them; its recommendations include everything from printing phone books right at the paper mills

to producing ready-to-assemble furniture. "The labor-intensive manufacture of items such as furniture, musical instruments, wooden toys, and boats can provide economic diversity and bring new meaning into the lives of workers," Jamie Sayen says. In some rural parts of Oregon, where according to timber interests the Clinton plan to close parts of some national forests to logging was sure to destroy the economy, unemployment rates are now among the lowest in the nation; private woodlots support the mills, now that some of the federal forests are off limits.

Tourism is usually touted as the other alternative, and for obvious demographic reasons. Seventy million people live within an eight-hour drive of the Green Mountain National Forest, for instance. From 1977 to 1989 tourism's contribution to Maine's economy grew by 5.1 percent a year, even as the timber industry was laying people off. A recent Wilderness Society study found that tourism and recreation in the southern Appalachians' national forests already contribute \$379 million annually, as compared with \$32 million from logging on public land. The study said that the demand for recreation was likely to double in the next forty-five years: two thirds of the American population can drive to Smoky Mountains National Park in less than a day and a half. In the Adirondacks licensed guides have been showing city people where to hunt, fish, and hike for more than a century; for locals who have grown up

loving the woods, it's a dignified way to stay in the mountains. A Maine Woods National Park, or a Nantahala National Forest in the southern Appalachians that was more geared to hikers and campers than to loggers, might well be an economic boon to the surrounding inhabitants.

Such enterprises are also intermediate steps in the long, slow transition to something else. Andrew Whittaker, a Vermont environmentalist, recently looked seventy-five years into the future of his logging region. "The centerpiece of our new economy is the forest," he wrote in *The Northern Forest Forum*.

Small, vertically integrated logging operations have access to a good supply of large sawtimber which they take from stump to board. Local artisans are a more visible element of the economy than previously, and are able to make a living from the production of custom-built furniture, musical instruments, and buildings.

THE PLACE BETWEEN WILD AND TAME

THE patron saint of the American West is John Muir. The ecstasy he committed to paper introduced a whole new grammar of wildness to the world, and just in time.

Inspired by his passion, the first American environmental movement managed to save the last pristine corners of the West: Yosemite and Glacier national parks, the great wild lands of Alaska, the Grand and Bryce and Zion canyons. His hymn gathered a mighty choir.

In his day Muir had an East Coast twin: John Burroughs. They were known as "the two Johns," and in fact, Burroughs was the more famous writer. When he traveled with Teddy Roosevelt on one trip, witnesses said, it was hard to tell whether the writer or the President was more popular with the crowds that turned out to greet them. Generations of American schoolchildren read Burroughs in special educational editions.

Burroughs has pretty well disappeared from the national memory, mostly because the landscape he lovingly described has ceased to be of much interest. Burroughs was the bard of the bird feeder, the poet of the small and homey. Under Muir's tutelage, and under a barrage of photos and calendars and coffee-table books from the West, we have been trained to prize grandeur, awe, spectacle. But Burroughs had little use for the sublime. When he finally did visit Yosemite, he spent his first paragraph extolling the robin, "the first I had seen since leaving home. . . . Where the robin is at home, there at home am I."

Instead of the vast and unexplored wilderness, Burroughs wrote about his

native Catskills, where woodlands gave way to pasture and field, where small brooks ran into the placid Hudson. In *his* hymn people played a pleasing role. "Last summer," he recalled in an essay, he watched a farmer "take enough stones and rocks from a three-acre field to build quite a fortress; and land whose slumbers had never been disturbed with the plough was soon knee-high with Hungarian grass. How one likes to see a permanent betterment of the land like that!-- piles of renegade stone and rock. It is such things that make the country richer."

If, as Barry Lopez has written, "one of the great dreams of man must be to find some place between the extremes of nature and civilization where it is possible to live without regret," then John Burroughs is as important a writer as Muir, and his vision, too, is essential. His message has been submerged as we have become urban and suburban people who escape to the national parks for relaxation, but perhaps it is beginning once more to be heard. A hundred college students a year apply for the four all-but unpaid internships at Caretaker Farm, in Williamstown, Massachusetts. There, in the shadow of Mount Greylock, which was hiked by Thoreau and which retains some vestigial groves of old-growth forest, they learn the patient work of growing things by hand, supplying vegetables for 130 local families on a plot that might have supported one colonial farmer. Last summer I asked one apprentice, a good child of suburbia, if the

world of the farm had come to feel like home. "It feels completely natural to be here by now," she said. "We're all wondering if the other world will feel as natural when we go back."

Michael Pollan is one of the few writers to have addressed these issues recently. His book *Second Nature* is partly an account of the greening of his Connecticut home and partly a spanking of environmentalists for focusing too much on wilderness. It argues that "the habit of bluntly opposing nature and culture has only gotten us into trouble, and we won't work ourselves free of this trouble until we have developed a more complicated and supple sense of how we fit into nature." He calls the gardener "that most artificial of creatures, a civilized human being: in control of his appetites, solicitous of nature, self-conscious and responsible, mindful of the past and the future." He is, I think, correct in pointing out that we misunderstand the middle ground even more than we misunderstand wilderness. It is there, in the places where we must grow food and cut trees, that we work out what it means to be a human animal. So far, so good; Pollan is a worthy successor to Burroughs. But the human animal is not the only animal, and huge swaths of the East are clearly able to support life both wild and tame.

THE WOLF COMES BACK

BIOLOGISTS often talk about "indicator species." If the well-managed woodlot and the organic carrot are indicators that human beings are living wisely in their place, then the wolf is an indicator that human beings can learn to accept real limits. The wolf avoids people; unlike coyotes, which adapt to suburbs with ease, wolf packs need many square miles--*empty* square miles--to roam.

Save for reintroduced populations of red wolves in coastal North Carolina and now the Smokies, the East is wolf-free. In 1630 Massachusetts enacted the first bounty in the New World--a shilling for every wolf carcass. Wolves were gone from Connecticut by 1837, from New Hampshire by 1895, from the farthest reaches of the Adirondacks by 1899, from Maine by 1909. Once the most widely distributed land mammal on earth, the wolf has been reduced to about five percent of its original range in the lower forty-eight states.

And yet its return is not impossible. Healthy populations still live in Canada, including in Ontario's Algonquin Park and Quebec's Laurentides Park. And perhaps wolves have begun the slow drift back down. Wolves might re-establish themselves voluntarily in New England and the Adirondacks, and perhaps even move farther south. But they may need help--the carefully monitored release of animals from Canada or Alaska, much like the release of wolves that is now under way in Yellowstone Park. Among other obstacles, the St. Lawrence Seaway is

kept clear of ice all winter long, making overland migration nearly impossible. And government officials have shied away from reintroduction plans, fearing that a public raised on Little Red Riding Hood, and a hunting fraternity fearing competition from another predator, could not cope with the wolf. But the experiences of Minnesota and Michigan show that wolves have done little harm. They kill old or sick deer, culling the weakest animals from the herd instead of picking off the prime specimens, as human hunters do.

Stephen Kellert, a professor at Yale and an editor of the book *The Biophilia Hypothesis*, which proposes that there exists an ingrained human affinity for nature, has done surveys that show "a real fondness" for wolves, even among many hunters, as "a symbol of nature's wonder and beauty." John Harrigan has editorialized extensively in his small-town New Hampshire paper in favor of the return of the wolf and other predators, preferably "on their own four feet" instead of through reintroduction. "Ninety percent of the response I get is positive," he says.

Even the lowing cows that Burroughs lauded could prosper alongside the wolf. A wolf is all but genetically programmed to chase deer and moose and such. Of the 7,000 farms within the Minnesota wolves' range, fewer than one percent have ever reported a wolf raid. Those farmers have been compensated by the state, which

should easily be able to afford it--wolves have drawn ever more tourists to the north country, where they buy T shirts and go on howling expeditions. In short, wolves belong here. The East will not be fully renewed until their packs wander its mountains again. That this is even a real possibility is a wonder, nearly a miracle.

Nature's grace in the East offers the most important kind of hope, not only to a region that has been given a second chance to decide how to inhabit itself, but to a world in terrible need of models. For the East is a real place--not a Yellowstone, with clear boundaries to separate people from nature. In that way it looks like the rest of the world--like Siberia and the vast forested stretches of Asia, like Central and South America, like Africa. Like them, too, it is real because of the devastation it has undergone. In Haiti forest cover has dropped during this century from more than 80 percent to less than one; in parts of the Philippines, according to a 1993 article in *The New York Times*, a "chainsaw massacre of the regal hardwoods" has left erosion, silted streams, and weather that "veers from drought to flood." The same was true of much of Appalachia a century ago. Though other climates and soils may offer even greater challenges, the resurgence of forest in the East gives some distant promise that in other places in future days people may be able to depend on a replenished and revived nature to provide them with a modest and reliable life.

Here, where a certain kind of exploitation began, the fever has largely run its course. That fever still ravages most of the rest of the world; indeed, it finds much of its direction and capital in the financial and political centers of the American East. But not far away, outside the cities and suburbs, the ghost map of this place is reasserting itself--bear and turkey and moose are reclaiming their territory; trees are growing up around stone walls. The old frontiers have closed. That, we are told, is the story of American and indeed world history. A new frontier may be opening here--an expanding frontier of recovery that, given infinite human care and nurturing, might follow the waves of destruction across the continent and then around the world. On a hill in coastal Maine the body of the naturalist Henry Beston is buried on the edge of a second-growth pine forest. His epitaph is from his classic book about Cape Cod, *The Outermost House*: "Creation is still going on, the creative forces are as great and as active to-day as they have ever been, and to-morrow's morning will be as heroic as any of the world." We have little choice in this hard-pinned world but to hope that he was right; and the region where he lived his life offers us at least a slender chance that it is so.

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