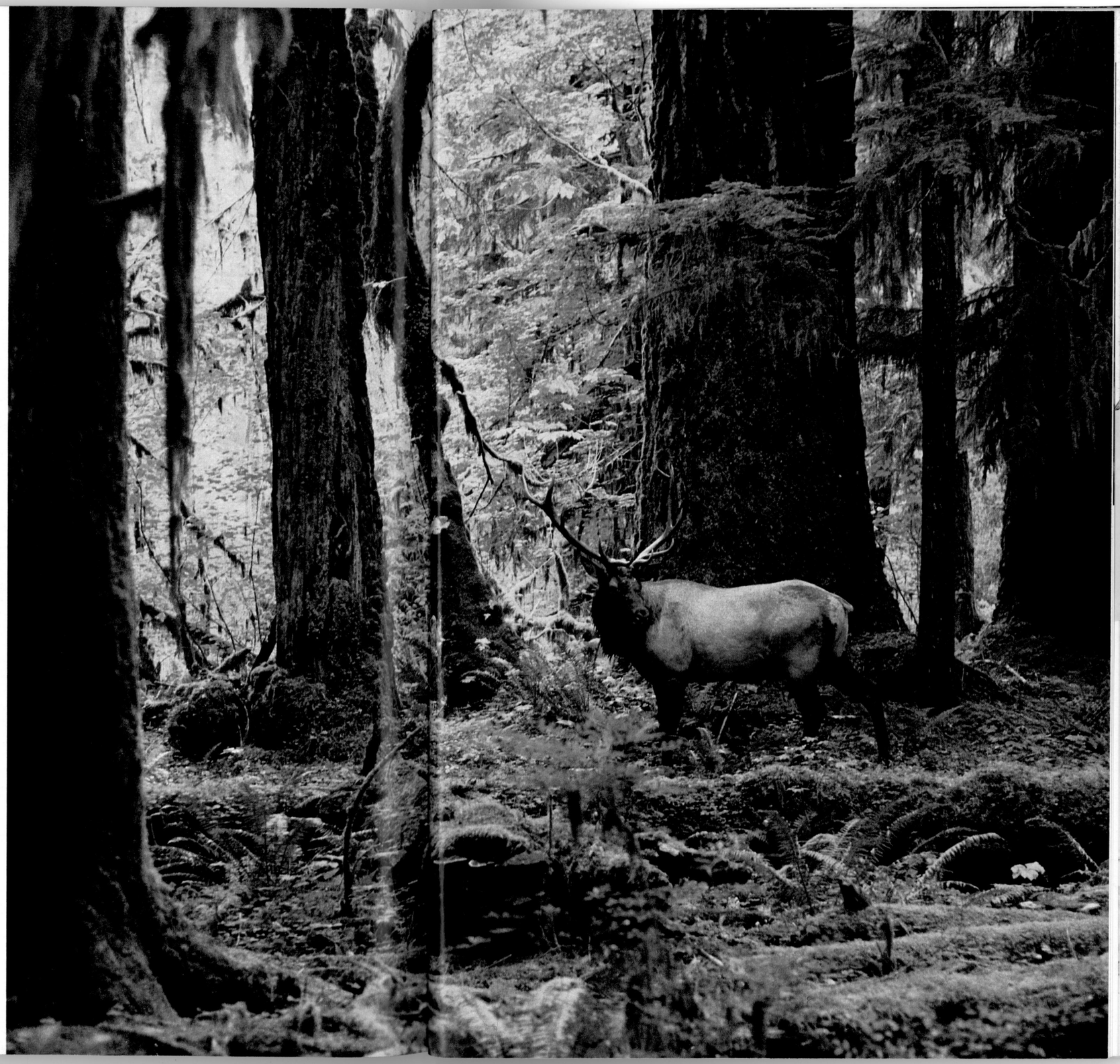
Loggers in Washington State work in the eye of a storm over the fate of the world's greatest temperate rain forest. As the old trees fall, North Americans ask,

Will We Save Our Own?

By ROWE FINDLEY
ASSISTANT EDITOR

Photographs by JAMES P. BLAIR
NATIONAL GEOGRAPHIC PHOTOGRAPHER

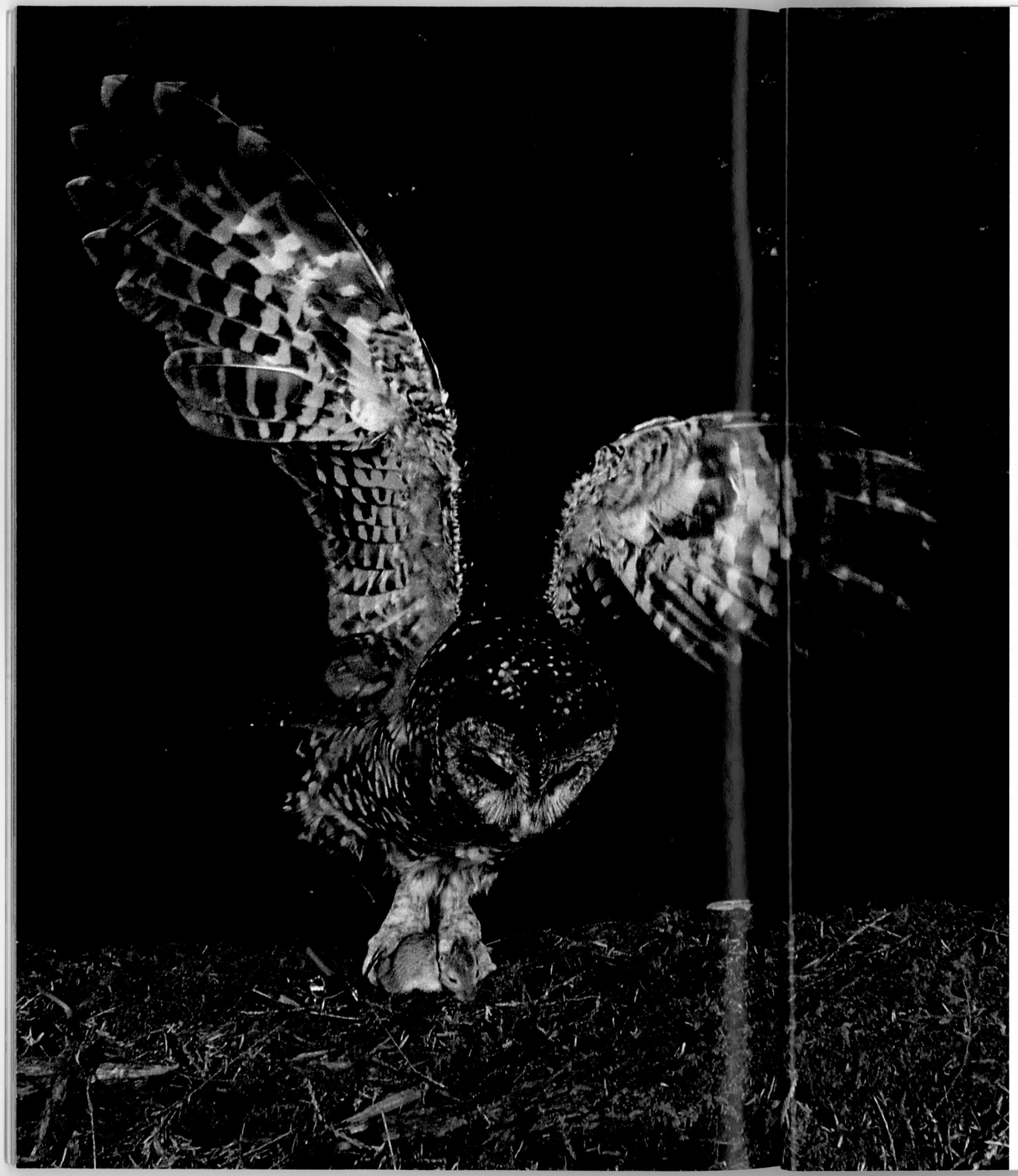


Beyond the chain saw's bite, a Roosevelt elk surveys Gothic depths of an old-growth forest in Olympic National Park. Elsewhere heavy logging and hunting have eliminated two of six elk subspecies; others have been stressed almost to extinction. Only a fraction of virgin forest on public lands in the United States and Canada is wholly protected.

A view that timber cutting favors such animals by increasing shrubs and foliage along forest edges has drawn increasing challenge from researchers. Recent studies indicate that some species, such as the Roosevelt elk and black-tailed deer, need the tempering microclimate of old growth to get through summer's heat and winter's cold.

Bearing antler racks three feet across and weighing as much as a thousand pounds, the Roosevelt ranges through a realm that provides luxuriant ferns and grasses in summer and browse shrubs in winter. Once hunted relentlessly for meat and sport, it has made a comeback through wildlife management programs and protective refuges.

TOM AND PAT LEESON



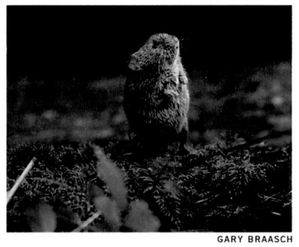
EDWARD VIDINGHOFF

Bird that has rattled the timber interests of the Pacific Northwest, the northern spotted owl polarizes environmentalists and loggers. The former have seized on research linking the bird's survival to old-growth forest, making it a surrogate for the forest's survival.

The U. S. Fish and Wildlife Service recently listed the owl as threatened, mandating protection of habitat that could withdraw several million old-growth acres in public forests from timbering. This appeared to be a victory for environmentalists until the Bush Administration announced a program to blunt the loss of logging jobs by easing environmental strictures, including the Endangered Species Act itself.

David Marshall, a 25-year Fish and Wildlife veteran who helped research the owl, regrets that the listing did not come a decade earlier: "Our options for wildlife and logging alike would have been much broader."

Swooping for a snack, the owl at left seizes a mouse provided by researchers. An immature offspring (above, at left) awaits parental sharing. Each of the estimated 3,000 to 5,000 pairs of owls needs as much as 3,000 acres of old forest for foraging, according to radio-tracking data. Snags and tree holes offer nest sites, and red-backed voles (below) and flying squirrels provide meals.



GARY BRAASCH

We can't see the forest for the trees. That old saw has new teeth as logging of old growth accelerates, while many call for a pace more in step with nature.

FOR MORE THAN A YEAR I have lived with troubling vistas of a realm that once made me serene: a realm of trees, among them the world's biggest and tallest and almost its oldest . . . valleys and slopes and mountaintops of trees, sheltering wildlife, nurturing lesser foliage, regulating watersheds . . . factories for solar energy, purgers and rechargers of our dynamic atmosphere . . . mature giants of trees that once gave our continent the monarch forests of the world, but lately those forests have become so shrunken that creatures formerly thriving there are nominated for the endangered list.

We live in an age of endangered lists. The specter of plants and creatures made extinct by our civilization haunts our collective conscience. Losses of unknown value to life's genetic pool trouble our minds.

Consider the furor over the northern spotted owl. In the Pacific Northwest 3,000 to 5,000 pairs survive in remnants of the monarch forests. Levered by years of research, environmental advocacy, and lawsuits, the U. S. Fish and Wildlife Service has added the shy bird to its list of more than 500 threatened or endangered species. This could mean withdrawal of several million public-forest acres from logging sales. Citing its own research, the timber industry has asserted that the owl is not threatened; rather it is the loggers, truckers, and mill hands who are the endangered species.

Owls or jobs? The Bush Administration dealt with the dilemma warily. It proposed to delay restrictions on logging—and to dilute the Endangered Species Act itself—to soften the effects on industry. The timber industry greeted the plan with guarded optimism; environmentalists saw a campaign "to gut the Endangered Species Act."

All too clearly, the monarch forest itself is on the endangered list. In the Pacific Northwest nine-tenths of the virgin woodland has been hauled to the mill; on the continent as a whole less than 5 percent survives. Called "old growth" to connote its many ancient trees, it has been labeled "overage" and "decadent" by foresters of tree-farm persuasion. Its vulnerability raises a question for North Americans already concerned for tropical rain forests: Will we save our own?

Increasing efforts to save viable remnants of our temperate rain forests spark confrontations, lawsuits, legislative offensives, logging-community rallies, sit-ins high in trees by environmental activists.

But 1990 finds more voices calling for new approaches to the problem. Favor rises for a new forestry in phase with nature's cycles of growth, with wood harvests pulled back toward the tempo of nature's pruning. The vision of sustained yield enlarges to embrace sustained ecological systems. But we work with an ever shrinking resource, with fading options. Are we already too late?

IT'S A WAR OUT THERE in the greatest temperate rain forest in the world, and it is no mere metaphor that clear-cuts look like battlefields. The heat is on the woodlands that offer the greatest timber value—the kingdoms of the giant sequoia in the Sierra Nevada and the coastal redwood in northern California, the Douglas fir's domain in Oregon and Washington, the Alaska Panhandle's wealth of great Sitka spruce, and finally British Columbia's empire of spruce and fir.

My initial dismay came from a Cessna's-eye view of Sequoia National Forest, which cloaks the slopes and folds of the southern Sierra Nevada in California. There, I had heard, John Muir's "noblest forests of the world" were the concern of an alliance of environmental groups. "Come out and get in my airplane, and I'll show you what we're concerned about," invited Martin Litton, veteran Colorado River runner and Sierra Club activist.

A few mornings later I was in his vintage Cessna 195 as he lifted it off Porterville's airstrip and headed eastward.

First I saw the sweeping undulations of ever higher ridges beneath low clouds, drifting,

Nurturing new life, intermittent canopies of old-growth forests admit dappled sunlight for seedlings like this young alder that rises against the girth of a centuries-old redwood.

broken, doing glorious things to the sunshine's play on Muir's "range of light." Then increasing altitude gave me a vantage that revealed many patches in the forest's cloak—the numerous clear-cuts that have become a fact of life in most of our national forests.

But now Martin dips a wing toward a particular clearing where a few lone giants stand forlorn in a field of stumps. These trees are sequoias, known the earth around as the largest in the tree world and, indeed, as the largest living things on our planet. (One record behemoth stands 274.9 feet tall and has a diameter of 25.1 feet at waist height and a volume of 52,500 cubic feet.)

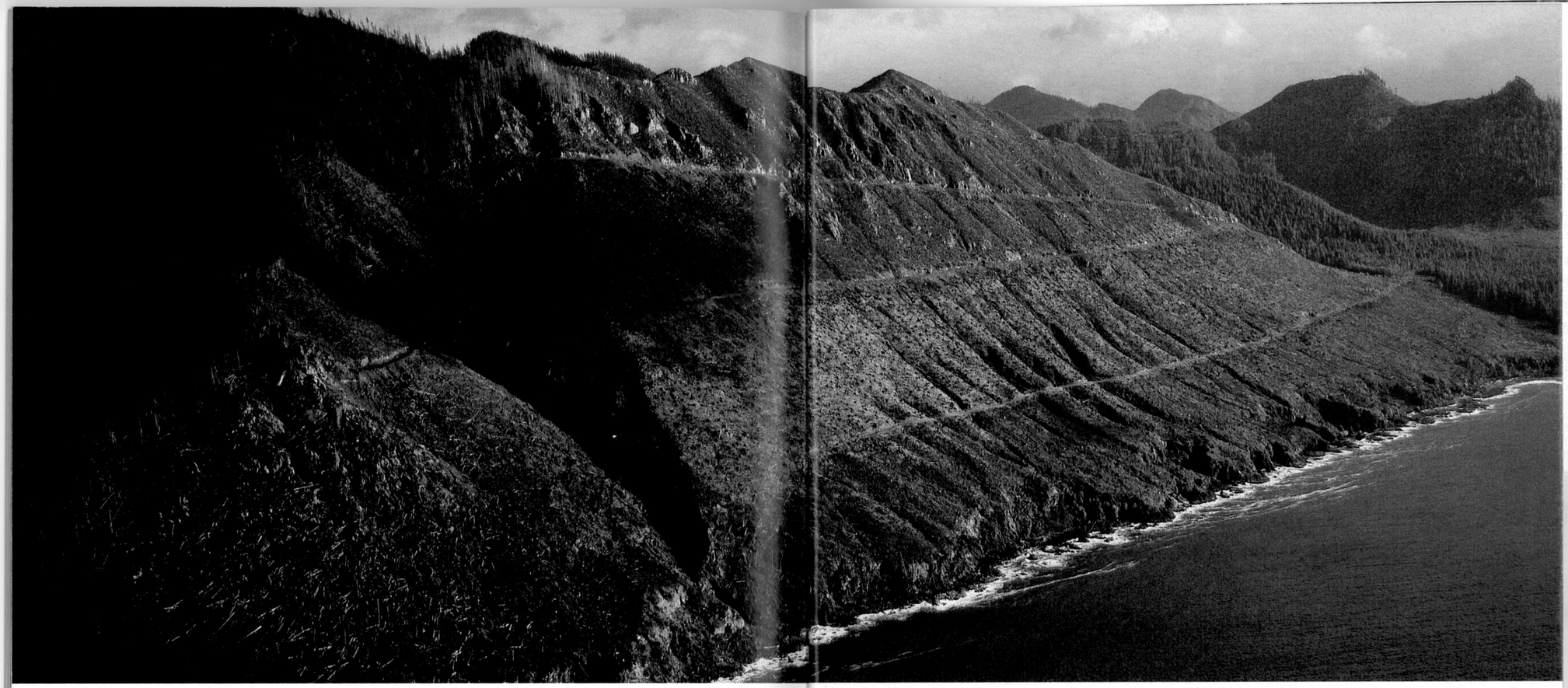
These giants lately presided over a family of lesser trees, now commemorated by the stumps and by ash piles of burned slash. As we scout the western divide of the Sierra, I see other clearings guarded starkly by lonely great trees. Without consulting a map, Martin recites the names of the truncated groves like a litany—Peyrone, Starvation, Black Mountain, Long Meadow, Converse Basin. . . .

Our three-hour flight was followed by two days in a sturdy van, bumping over logging roads to set foot in some of those groves. At the cutting edge of a harvested tract I found giant trees wearing tiny yellow signs bearing the Forest Service Type I designation.

"We thought those signs meant protection for the groves," said Ardis Walker, Sierra Nevada poet and environmentalist. "Then one day we saw all the cutting. We couldn't believe it. We were outraged."

I had troubling questions for professional forester Bob Rogers at Sequoia National Forest headquarters in Porterville. He explained about the three classes of management—preservation, in which no trees are cut; intensive, in which all trees are cut; and nonintensive, in which not every tree is cut. The sequoia groves that concerned me were receiving nonintensive management. Why?

"Decades of fire suppression had let ground cover build up," Bob told me. "Even the sequoia's thick bark couldn't protect against the fires we were risking." Colleague Julie



Allen added that sequoia seeds need bare ground to take root in.

Environmentalists concede some fire danger but insist the Forest Service uses it as an excuse to cut and market lesser trees—mostly fir and pine—to the jeopardy of great sequoias representing the investment of centuries. An injunction secured by the Sierra Club banned further cutting in five earmarked groves. Law requires each national forest to issue a forest-management plan, and when Sequoia's was issued in 1988, the Sierra Club Legal Defense Fund appealed. "The forest planners were only talking about saving some sequoias, but we wanted guarantees for the integrity of the groves," said attorney Julie McDonald.

With his timber-sales program crippled, Sequoia National Forest Supervisor Jim Crates opted for mediation between his staff and all interested parties, a process now well advanced but one that ultimately entrusts the fate of the groves to the Forest Service.

THAT'S WHY two leading environmentalists are proposing alternative ideas. "Why not," wondered Sierra Club Chairman Mike McCloskey, "make the sequoia groves a world heritage site? That would give them protection under international treaty and remove them from any commercial timber category."

Under United Nations auspices a World Heritage Convention was adopted in 1972 and soon acquired membership by more than a hundred countries, including the U. S. Its purpose is to help preserve great landmarks around the earth, natural and man-made. Some 300 sites already designated include St. Peter's in Rome, the Taj Mahal, Yellowstone National Park, and the Grand Canyon.

"Sequoias hold a special place in the eyes of the world," said Mike. "They are a treasure that transcends national boundaries."

The initiative for his plan could come from Congress or from the President.

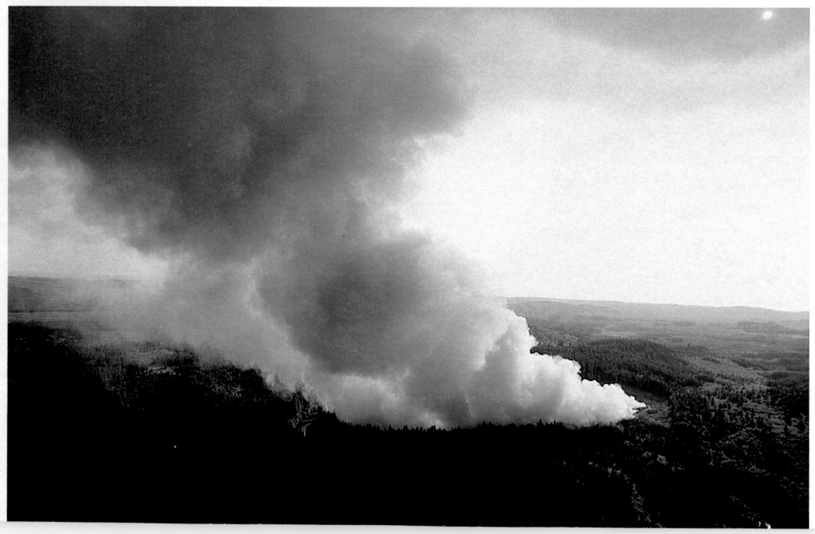
The White House is the hope of Executive Director John Dewitt of the Save-the-Redwoods League. Last November he appealed to President Bush to declare the sequoia groves a national monument. John's letter reminded the President that he would be following a precedent that created Muir Woods National Monument in 1908. That action came from Theodore Roosevelt, whom Mr. Bush quoted at a recent ceremony: "A grove of giant Redwoods and Sequoias should be kept just as we keep a great and beautiful cathedral."

I met John Dewitt as I explored the fate of the sequoias' sister trees. The coastal redwoods, not as massive but with a greater reach for the sky, easily qualify as the world's tallest living things. Given centuries to adolesce, they may top 350 feet, swaying masterpieces of richest color and flawless grain. And that is part of their trouble.

"As timber the redwood is too good to live," John Muir said almost a century ago, and he was uttering prophecy. By that time we already had Yosemite and Sequoia National Parks to protect stands of the sequoia, but not one acre of coastal redwoods then enjoyed such protection, state or federal. Mostly for a price of around $2.50 an acre, the redwood lands had all passed from public domain to private hands, from near Monterey, south of San Francisco, for some 400 miles northward into Oregon. Cathedral groves fell before the fierce energy of antlike men and straining mules. Growing naturally only in a coastal band limited by the inland reach of wet maritime mists, "the glory of the Coast Range," as Muir described the trees, began to suffer a diminution that continues today.

Our beachhead against an ultimate wipeout is a string of state parks, largely the 70-year achievement of the Save-the-Redwoods League, and Redwood National Park, midwifed by the National Geographic Society. The park, born in *(Continued on page 122)*

Stripped to the shoreline, gullied slopes of Mount Paxton shock visitors to Vancouver Island on Canada's Pacific coast. Slides, silting, and loss of ground cover penalize wildlife and fish on the 280-mile-long island, where only a fourth of the original forest survives and controversy flares over corrective logging policies. Slash fire (below) on private land in Washington removes logging debris but pollutes air and robs soil of enriching wood decay.



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National Geographic, September 1990

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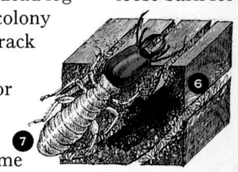
Deadwood metropolis

AFTER FIVE CENTURIES of life, a Douglas fir lives on by proxy for another half millennium as a downed log (shown in cutaway in the painting at left). It may once have housed in its branches a secretive marbled murrelet (right), a bird whose nest is so rarely seen in the trees of North America that this one is only the fourth ever recorded. Researchers Nancy Naslund and Robert Burton made the discovery in California's Big Basin Redwoods State Park.

Now, however, the dead log supports an immense colony of small life—from a crack in the bark, used by a folding-door spider **1** for its nest, to the log's center, where black heartrot fungi **2** consume the heartwood. Boreholes of Douglas fir bark beetle larvae **3** remain long after the insects have damaged the tree. Large larvae of the ponderous borer **4** and golden buprestid **5** tunnel their way through bark and sapwood to the heartwood.

Fungi such as white pocket-rot **6** spread through the wood, cracking apart the annual growth rings and opening the tree to invasion by the elements. Eventually termites follow, with thousands of soldiers and workers building citylike chambers **7.**



Below ground, living Douglas fir roots **8** benefit from yellow and black mycorrhizal fungi **9**, which pass along nutrients. Some of the fungi fruit as truffles **10** to be dug and eaten by the red-backed vole **11.**

Hunters, such as the pseudoscorpion **12** and the centipede **13**, and scavengers, like the oribatid **14** and the earwig **15**, prowl loose bark for a meal.

When a flying squirrel **16** alights to dig for truffles, it can come to a quick end in the jaws of a marten **17**; the limbs of a tree provide relative security but no guarantee against the talons of a spotted owl **18.**

Logs that rot in streams create pools, retard erosion, and enrich fisheries. When a log falls partly into a stream, it creates a mini-rapid, where the water is aerated and cooled by turbulence. Aquatic insect larvae **19** thrive in the clean water and use bits of wood for food and habitat building.

This cool, oxygen-rich water is vital for coho salmon **20** and steelhead **21**, and they in turn feed on the aquatic insects.

Old-Growth Forests: Will We Save Our Own?

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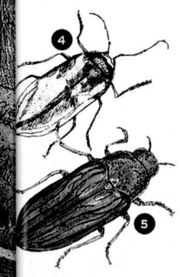

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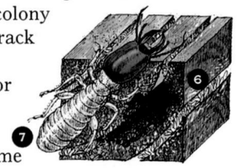

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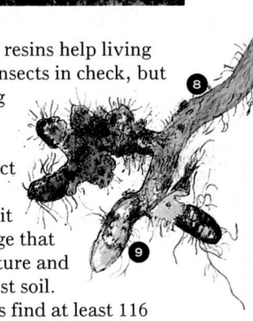
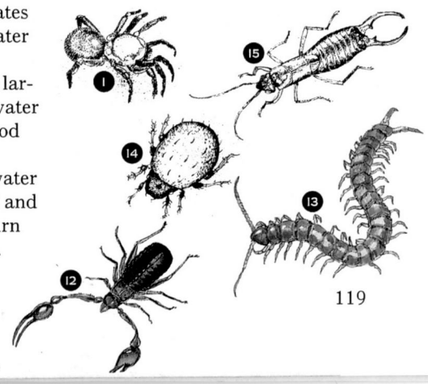
Saps and resins help living trees keep insects in check, but the dead log provides shelter and food to insect armies, which turn it into a sponge that stores moisture and renews forest soil.

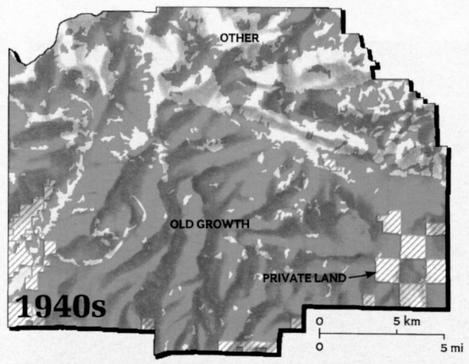


Biologists find at least 116 vertebrates at home in an old-growth stand, and more than 40 species may need such a habitat to survive.

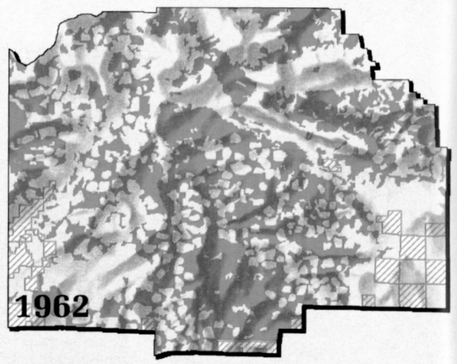
Though not as diverse as a tropical rain forest, this temperate rain forest surpasses it in sheer mass of life by seven to one.

PAINTING BY JACK UNRUH
CONSULTANTS: JERRY F. FRANKLIN, UNIVERSITY OF WASHINGTON; LOGAN NORRIS, OREGON STATE UNIVERSITY; CHRIS MASER

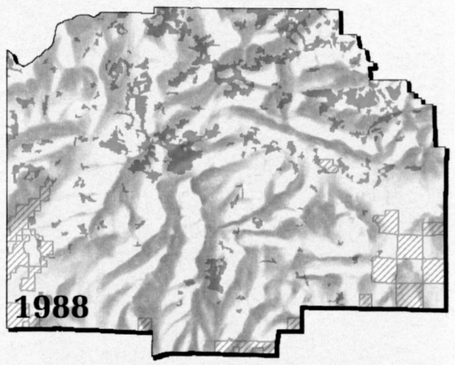




Wearing the dark green of never-cut forest, a southeastern portion of Olympic National Forest in Washington—prime old-growth habitat—shows almost no loss to logging across its 217 square miles.



Most of the area's mature private timber having been cut, logging advances into state and Indian reserves. In Olympic's southeast section about one-fourth of the old growth has been cut under Forest Service license.



Only 14 percent of the old growth remains in scattered pockets. Federal and state agencies replant for wood-crop sales in 60 to 100 years. An ecological web centuries in the growing has been made a woodlot.

SERIES MAP DATA AND IMAGERY BY PETER MORRISON, THE WILDERNESS SOCIETY, BASED ON SATELLITE DATA AND U. S. FOREST SERVICE AERIAL PHOTOGRAPHY

Shrinking realm of the primeval forest

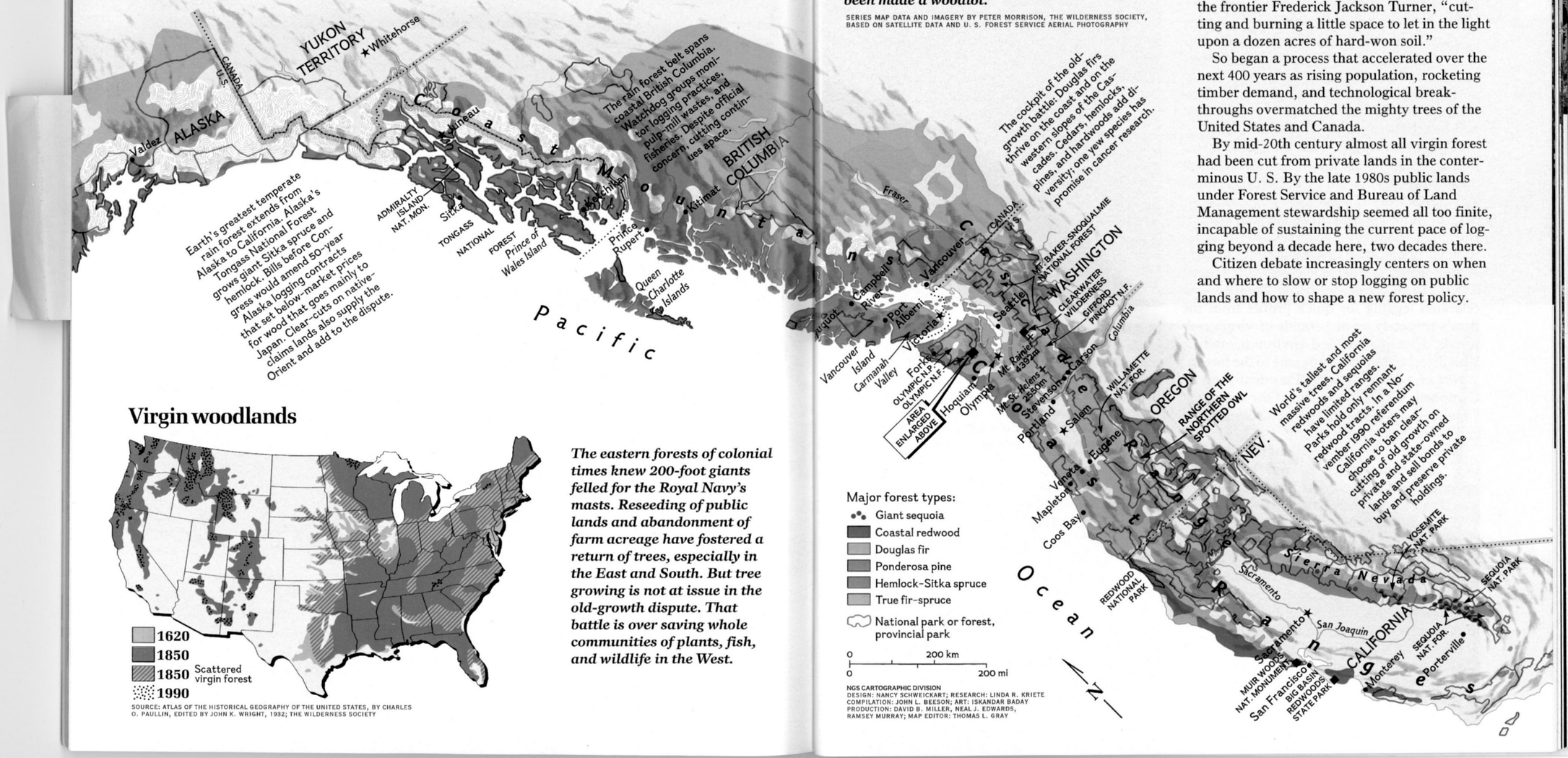
NATURAL WEALTH astonished and wilderness terrified the first Europeans who entered the seemingly boundless North American continent.

Great forests swept from the Atlantic Ocean to the Mississippi Valley. They offered what appeared to be an inexhaustible wood supply. Yet for a time they slowed the way westward, concealed bear and cougar and Indian—and intimidated many a settler. "He must wage a hand-to-hand war upon it," wrote historian of the frontier Frederick Jackson Turner, "cutting and burning a little space to let in the light upon a dozen acres of hard-won soil."

So began a process that accelerated over the next 400 years as rising population, rocketing timber demand, and technological breakthroughs overmatched the mighty trees of the United States and Canada.

By mid-20th century almost all virgin forest had been cut from private lands in the conterminous U. S. By the late 1980s public lands under Forest Service and Bureau of Land Management stewardship seemed all too finite, incapable of sustaining the current pace of logging beyond a decade here, two decades there.

Citizen debate increasingly centers on when and where to slow or stop logging on public lands and how to shape a new forest policy.



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PRODUCTION: DAVID B. MILLER, NEAL J. EDWARDS, RAMSEY MURRAY; MAP EDITOR: THOMAS L. GRAY

Virgin woodlands

SOURCE: ATLAS OF THE HISTORICAL GEOGRAPHY OF THE UNITED STATES, BY CHARLES O. PAULLIN, EDITED BY JOHN K. WRIGHT, 1932; THE WILDERNESS SOCIETY

The eastern forests of colonial times knew 200-foot giants felled for the Royal Navy's masts. Reseeding of public lands and abandonment of farm acreage have fostered a return of trees, especially in the East and South. But tree growing is not at issue in the old-growth dispute. That battle is over saving whole communities of plants, fish, and wildlife in the West.

(Continued from page 115) 1968 after decades of frustration, encloses a few great groves linked by mosaics of second growth.

The state parks bead the Redwood Highway (U. S. 101), a sample of the great trees that once mantled the region. Partners in the Save-the-Redwoods League campaign have been a responsive public and landholders willing to sell, notably the Pacific Lumber Company—owner of a 195,000-acre realm of redwoods in northern California. For most of its 120 years, Pacific has been a rarity among lumber firms, enjoying public esteem, but lately it has become a company with an image problem.

UNTIL FIVE YEARS AGO Pacific had been perceived as a benevolent family-owned firm that practiced sustainable-yield forestry—cutting no more timber than was being replaced by new growth. Its practice included selective logging, cutting only a portion of trees in one area. Then it was acquired by Charles Hurwitz and his Maxxam financial empire in what has been described as a leveraged buyout involving junk bonds. Last year indictments against junk-bond king Michael Milken included charges of unlawful deals accompanying Hurwitz's takeover of Pacific with the help of junk-bond trading colossus Drexel Burnham Lambert, now mired in bankruptcy. Soon after the Hurwitz takeover environmentalists perceived what they called a "cut and git" policy by Pacific Lumber—accelerated logging for quick profits from the firm's privately owned stands of virgin redwoods. Clearly, declared environmentalists, Wall Street economics had come to the forests.

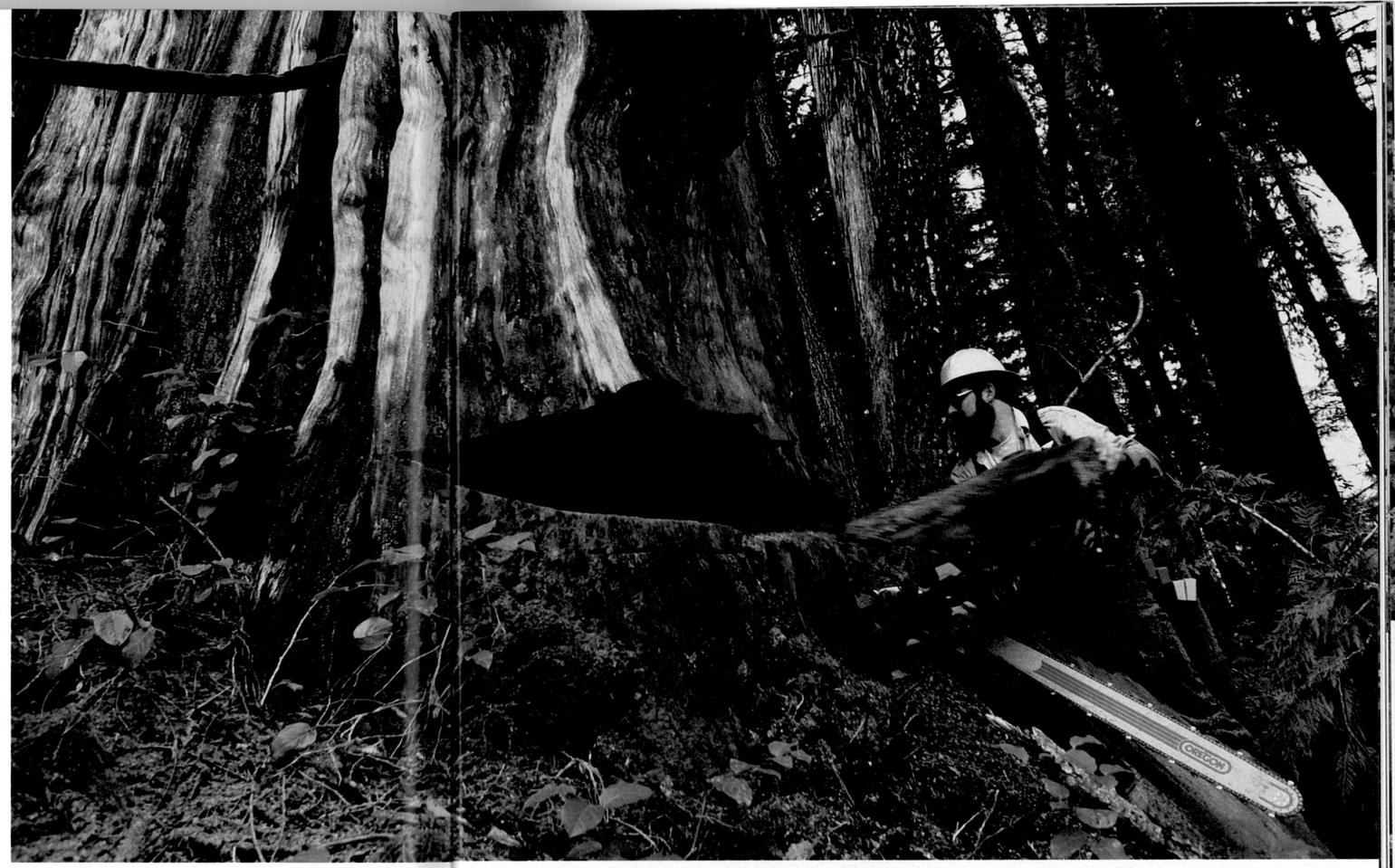
Not so, rebutted Pacific President John A. Campbell, a 21-year veteran of the company: "These stories get started in the media and you can't catch up with them."

What about selective logging? That practice, Mr. Campbell said, was economical under an old California tax law—but the law was changed, and it became uneconomical.

What about "cut and git"? "We've increased our cut in recent years only because a new inventory showed 30 percent more timber base than we thought we had. We cut only on about 3 percent of our land a year, we're buying more land, and we're making capital improvements. We're here to stay."

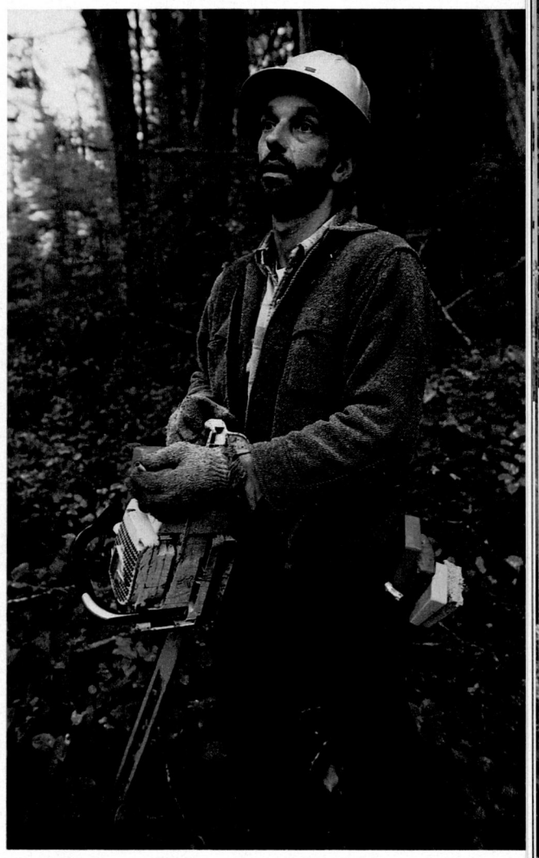
His rebuttals failed to slow reports that Pacific's cut had more than doubled, that Hurwitz had used two years' accelerated profits to pay off his junk bonds, that employees who tried to buy out Pacific Lumber were being penalized and had appealed to the National Labor Relations Board.

Such episodes, incredibly complex in their details, demonstrate the intensity of the war over the trees. It is an index to the heat in the issue that Californians this November will vote on far-ranging "green" proposals to stop clear-cutting of old growth and purchase



Making a critical undercut, Chet Hunt sets the angle of fall for a 120-foot, 800-year-old red cedar. Partner Loren "Butch" Pearson (right) watches its crackling fall to earth on Bull Ridge near Forks, Washington. Down, it is a commodity, wood for homes and furniture, worth $10,000 at the mill. Chet and Butch can earn $175 a day each, felling 10 to 15 trees.

Tree farm, national forest, and national wilderness share hills north of Mount Rainier. At right logging roads link clear-cuts, new stands, and a few older groves on Weyerhaeuser Company land. At left clear-cuts on steep slopes pock the Mount Baker-Snoqualmie National Forest below the Clearwater Wilderness. Butch Pearson (below) takes a smoke after felling another tree.



pristine redwood tracts now in private hands.

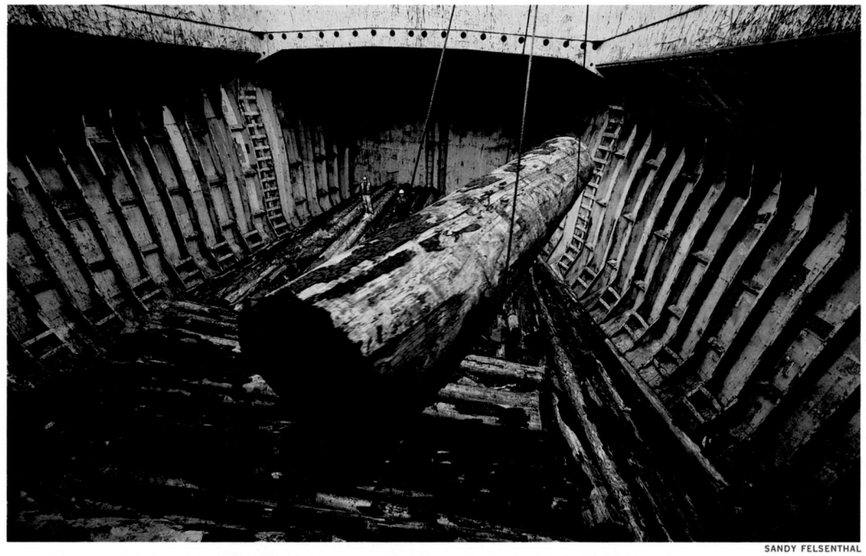
A growing sense of what we have lost rode with me as I drove northward to Oregon. The splendid coastline, set with a gemstone series of state parks, buoyed me until I reached Coos Bay and a dockside mountain of giant logs awaiting loading into a Panamanian freighter for Japan. By paying prices a third higher than market, the Japanese get top quality and offend both American environmentalists, who mourn the loss of forests, and American mill workers, who mourn the loss of jobs.

I turned from the log mountain to talk with Gene Fuller, who is in the chipping business next door, working with mountains of splinters. The leavings at lumber mills that once were casually wasted now are resourcefully rendered into usable composites or pulp by an increasingly efficient industry. He eyed the Japan-bound timber: "You won't find logs like that going to the mills here."

Log exports and environmental constraints are both perceived as the enemy by those whose paychecks depend on making sawdust. At a flea market in Mapleton, Oregon, I bought two "spotted owl rocks" from Chuck Epperson, who gathers stream-ovaled pebbles and paints them with owl features to sell to pilgrims like me. It's a recourse when jobs in the woods slow down. "I think this spotted owl business is just a plot to jack up the price of lumber," he said. "If you want the loggers' views, go to Crazy Al's bar in Veneta."

For an exchange of ideas, early Saturday afternoon is the ideal time to visit Crazy Al's. There's down-home music, upbeat service, and people willing to talk about a subject dear to their hearts—the future of logging. Over frosty cans of Rainier and under a bar-mirror slogan suggesting spotted owls as toilet paper, I met three men whose lives have been in the timber industry—Rolland Temple, now retired, and brothers Fred and Gary Hawke.

"We don't believe that stuff about the owl



SANDY FELSENTHAL

Wood exports raise the hackles of environmentalists and mill workers. In Alaska's Tongass National Forest, where below-market pricing has been an issue, a tug nuzzles logs (left) toward a Ketchikan pulp mill; most of the pulp will be sold abroad. In Hoquiam, Washington, raw logs load an Orient-bound freighter. Bills in Congress would greatly reduce exports.

being dependent on old growth," Fred began.

"We see them all the time in the second growth, and they look healthy enough," said Gary. "They don't seem to be all that rare."

They agreed with Rolland that the dire talk about the Northwest's running out of trees to cut seemed exaggerated, views that pretty much dovetailed with the speechmaking heard at an all-day rally in the logging community of Forks, Washington, and at a special meeting of the Board of Commissioners of Skamania County, Washington, convened to help me understand their plight.

Commissioner Kaye Masco of District 1 stressed the critical nature of the timbering industry in Skamania: "Only 13 percent of our county is privately owned. Eighty-seven percent is in public forest."

Three-fourths of the 1,900 jobs in Skamania depend on the timber resources of the public forest. More directly a concern to local government and education, federal law directs the return of 25 percent of timber revenues to the jurisdiction of origin; last year the Skamania government received five million dollars—46 percent of county revenues—and the local school system got another five million.

"We don't have the land base or resources to diversify into other lines of industry," Tom Jermann, executive director of the county's Economic Development Council, told me.

"This spotted owl situation could put us out of business," said District 3 Commissioner Ed Callahan. "If that thing goes through, it will mean the end for the towns of Carson and Stevenson. People will just have to move out and go somewhere else. The last one out, please close the door and turn out the lights."

THE NORTHERN SPOTTED OWL, a scant two pounds packaged in white-barred brown feathers, seems a lightweight for the heavy role ascribed to it. How did it become the alleged destroyer of the logging life and the pursuit of happiness in the public woodlands?

"Because recent research has greatly increased the amount of forest thought to be critical to the bird's survival," said Eric Forsman of the U. S. Forest Service Research Laboratory in Olympia, Washington.

Much of Eric's life has centered around this little owl. "There'd been only about 25 sightings in Oregon by 1968, when I first found I

could call them out of the woods," Eric said. During a field trip I had witnessed Eric's calling style—a dovelike *who-whoo-whoo-whoo* that floated into the vespertine forest and soon fetched an interested echo.

Over the years Eric continued to call and locate pairs, taking note of the owls' preference for the deep mature woods. He gradually learned why: They nest in tree holes or snags and deftly navigate the intermittent foliage to prey on flying squirrels and red-backed voles. The squirrels and voles feed on various root fungi, including truffles, that tap the great trees for sap sugars and help the trees get more nitrogen from the soil. The trees in turn shelter the flying squirrels, voles, and owls, completing one of multitudinous interlocking life cycles that give old forests their special richness and diversity.

"And it seemed that every new pair of owls we located was living in the middle of a proposed timber sale," noted Eric. He and his research teammates would dutifully advise the Forest Service. The reaction?

"At first they might say 'What's a spotted owl?' But gradually there came an awareness that they had a problem."

Researchers used tiny radio transmitters on selected birds to plot their subsistence range. Earlier acreage estimates around 300 hadn't caused much concern; it was a different story when the transmitter numbers passed 2,000. "That's when people began to get spooked."

"If the preservationists didn't have the owl, they would find something else," said Arnold Ewing of Eugene, who has spent his life helping run Oregon lumber mills. Arnold wanted me to see reforestation practices in the Willamette National Forest, and from a helicopter we looked at helicopter-logged clear-cuts, where choppers lifted out great trunks to spare steep slopes, at streams he said ran clear because of logging restraint in riparian zones, and at experimental tracts where a few old trees per acre had been spared to serve brown creepers and spotted owls.

Timber people speak religiously for growing trees while environmentalists crusade for saving forest systems, and arguments of the two camps air on different wavelengths—each side has trouble tuning the other side in.

While the fighting goes on, the old trees keep falling at a rate of 170 acres a day, so how much do we have left?

Like other figures in this fight, acreages keep changing. Five years ago the Forest Service was talking about 6.5 million acres of old growth in Oregon and Washington. When a more precise definition emerged—of at least eight 200-year-old trees an acre, with appropriate numbers of snags and downed logs and undercanopies of shade-tolerant growth—the total shrank to 2.3 million acres, with about a third already protected in national and state parks and wildernesses. On the remaining 1.5 million acres, the pressure to cut is intense, and the old trees won't last long—up to thirty years in extreme cases, but in some areas no more than five or ten.

AN ELEGY for the old forests is playing out in the labors of Peter Morrison and his small Wilderness Society research team in Seattle. In cramped rooms above the roar and sirens of downtown traffic, they perform a dedicated drudgery of comparing 1988 satellite images from space with earlier Forest Service aerials and maps to pinpoint the chain saw's advance.

By mid-century an idea was taking root in the minds of foresters that Western forests held overage, rotting trees that were "decadent" and nonproductive, a "biological desert" shading out other life. It was the duty of foresters to cut old trees and make way for soldier-like files of fiber-producing seedlings, often a single species to replace nature's varying mix.

The campaign has been disturbingly swift.

"Only a fourth of the old growth remains on the Olympic," says Peter, reporting on his team's first completed survey of a national forest. "At present rates of cutting, the old growth will be virtually gone in 14 years. Our preliminary findings on other national forests in the Northwest point to similar figures."

For those of us consoled by the awareness of old growth safe in national parks and wildernesses, Peter delivered a further blow. I had visualized the quarter-million acres of virgin forest inside the Olympic Peninsula's national park and wilderness areas as a more or less contiguous, unfragmented block. Not so!

"The old growth in the park and wildernesses fills narrow valleys, separated by high ridges," Peter explained. "These fingers originally were contiguous with old growth that extended in a sweep across the lower country outside the park. But now in many places that forest ends in clear-cuts at the boundary, fragmenting the woodlands in the park—and hence fragmenting the ecological systems."

So plants and animals that formerly could migrate through continuous forest now must play an uncertain game of ecological leapfrog.

"It's one of the worst environmental disasters ever to beset the Northwest," Peter concluded. "The costs to be paid will stretch over hundreds if not thousands of years."

Some mill owners are already experiencing a crunch in log supplies not entirely blamable on the spotted owl. Bill Wilkins, WKO Mill superintendent in Carson, Washington, goes as far as 230 miles into northeastern Oregon to truck timber back to keep his 190 workers employed. Stressing efficiency and utilization of every chip of wood, Bill is determined that his mill will not be a casualty of shrinking supply. But with the spotted owl on the endangered list, he's not sure he could make it.

"The number of mills in Washington and Oregon would drop by 80 percent," he said.

AS WITH OTHER STATISTICS in this dispute, forecasts on industry cutbacks vary by precinct, but survival is a common denominator—of jobs on the timber side, of life systems on the environmental. Thus I heard those same themes restated in Alaska.

Alaska . . . the last frontier . . . surely the chain saw had made few inroads on its wildernesses. That's what most of us non-Alaskans thought until newspapers and television began to report a toll to trees, land, and fisheries in the Tongass National Forest. Bigger than West Virginia, it spans the entire panhandle and holds more virgin woodlands than Washington, Oregon, and California combined.

And now here I am, flying over 130-mile-long Prince of Wales Island, seeing the same pattern of clear-cuts and logging roads that crosshatch forests in the lower forty-eight.

Riding with me is Roy Clark, a soft-spoken Tongass National Forest timber-sale administrator with a name for hard-line enforcement of Forest Service standards. He points out a slide, some stripped streamsides, a vast clear-cut as examples of bad practices that are now history; he points to smaller cuts, care in road placement and log removal on slopes, and streamside bands of trees as examples of increasing environmental sensitivity. "We used to make clear-cuts of 200 acres and more; now it's seldom over 80. We leave the riparian zones along streams to protect fisheries."

It is the familiar theme—tightening the rules on forest management. The Forest Service points with pride; environmentalists credit pressure tactics. The logging industry thinks it could live with new USFS standards, but not with the greater restrictions advanced by an environmental alliance.

Congress took center stage in the conflict with passage of House and Senate versions of a Tongass Timber Reform Act. Approved by a six-to-one margin last year, the House bill would terminate two 50-year contracts that guaranteed a flow of wood to two Tongass mills at bargain-basement prices, chiefly for Far East markets. One mill, Japanese owned, sends most of its output to Japan. The Senate bill, passed 99-0 in June, would renegotiate pricing and logging restrictions in the contracts but let them run their course. Both bills would kill an automatic 40-million-dollar annual appropriation that has subsidized the below-cost contracts. In addition, the House measure would give protective wilderness status to 1.8 million acres. The Senate's would protect only 673,000 acres. As the two measures were shunted into conference committee, environmentalists cheered the House bill and criticized the Senate's, while loggers could applaud neither version.

"We have about 4,500 jobs in the woods here, and probably half of them will go if the House version stands," said Don Finney of Ketchikan, manager of the Alaska Loggers Association. "The Forest Service has excluded a third of marketable timber in the Tongass as wilderness and another third for ecological reasons, leaving a third for timbering. That seems fair, but the tree lovers want more."

"Much of the land that has been set aside as wilderness is rock and ice," Bart Koehler of the Southeast Alaska Conservation Council told me, adding that the ecological reserves likewise are not first-rate tree-growing lands. "The part earmarked for timbering lies along the coasts and lower valleys. That's where the biggest and best trees grow, and here in Alaska, where the timberline is as low as 2,000 or 3,000 feet, it's also the best habitat for deer,

FOLLOWING PAGES >

Once and future forest, the Lady Bird Johnson Grove is sprayed by sunlight in Redwood National Park. The light passes through a nearby clear-cut, done before the park was established in 1968. Park status fosters old growth's return.

JAMES P. BLAIR, JOSEPH S. STANCAMPIANO, AND JOHN A. ECHAVE, ALL NGS STAFF

bear, bald eagles, and salmon. It's also the most desirable land for recreation—at least until it is clear-cut."

"Alaska is not like the lower forty-eight," said K. J. Metcalf, former Forest Service manager of Admiralty Island National Monument. "Growing conditions are less generous. The use pressure is on the lowlands, and they are already suffering a toll."

K. J. resigned and joined the conservation alliance after years of trying to work inside the Forest Service. He explained sadly, "I finally became convinced that they were just interested in getting the cut out."

"CROWN LANDS" is the designation in neighboring British Columbia for the province's public holdings, and the number-one business there has long been timbering. For three and four generations it has been a way of life on 280-mile-long Vancouver Island, and the sound of logging in the woods made happy music. But lately the tune has gone sad, with angry notes sounded fortissimo by environmentalists. Caught in the discord is old-growth forest.

Actually, any jet traveler to Alaska can see what it is about from 40,000 feet—a patchwork of tree cutting that rivals anything stateside. That realization replaced my mental image of Vancouver as one of the world's great wild places. I paid a visit to the island for some on-site looking, first with Peter McAllister of the Sierra Club of Western Canada and then with regional forester Stan Coleman of MacMillan Bloedel, one of Canada's timber titans. My timing coincided with an inspection Peter had laid on for 26 people representing a cross section of environmental concerns. He said he would show me the worst eyesore in the Pacific Northwest, and my Missouri-mule skepticism triggered doubt; I had seen an array of bad practices from California to Alaska.

But one long look at the St. Pauls Dome-Mount Paxton area northwest of the village of Kyuquot killed my skepticism. Guarded by a parklike cluster of islands, framed by rugged headlands stretching away to infinity north and south, percussioned by the ocean's cadenced breathing into shoreline sea caves, a slope of stumps climbed steeply to the skyline, braided laterally by roads and vertically by erosion, continuing into a curling valley beyond, fringed at its distant edges by some blowdowns, branded in places by fire.

Here, in a two-square-mile area, were showcased some of the worst instances of bad forestry practices I had witnessed anywhere (pages 114-16).

From the folks in Kyuquot, on a cove beneath St. Pauls' shorn pate, I got an earful of unhappy effects of the forest's retreat.

"Since logging started here ten years ago," said Ralph John, "wildlife has decreased. We have fewer deer, fewer fish. None will be left for our children."

Last November a torrential rain blew in on vicious winds, and the plummeting runoff created new gullies and slides on logged slopes and put an unprecedented clot of mud and debris into the sound as far as three miles offshore. Stan Kujala sailed out to look at the prawn traps he had set in 30 fathoms. "When we picked them up, they had been dragged to 70 fathoms with both buoys sinking. They were covered with silt and had no prawns." He also had traps in the mouth of the Tahsish River, where logging has been minimal; they were clean and silt free.

At a town meeting in the community hall, Kyuquot villagers took stock of their plight and saw a need for concerted action.

"We've been too generous, too gentle," said Alex Short, speaking hesitatingly but with deep feeling. "We've been sleeping. Now all must help."

Don Sluggett, district manager of provincial forests at Campbell River, voiced regret for mistakes in the Kyuquot area clear-cuts and told me of improved logging practices that would avoid such problems: "Those roads were built with bulldozers, which simply pushed the dirt over the edges; today we use backhoes, which lift it out and replace it. We're going back into some areas to get rid of the roads, restoring the original contours."

He said a storm blew down a seaside buffer originally left on the cut: "We had to harvest the blowdown; then a slash fire got out of control, and we had to do more harvesting."

President John C. Southcott of Interfor, the company that logged the St. Pauls Dome-Mount Paxton area over the past ten years, stressed his firm's improving standards of cutting and planting. Sincerity and zeal marked his words, but it was the old refrain: Mistakes have been made, but now we're doing better. From California to Alaska lessons are learned at a cost to forest and land.

I got the tree grower's perspective from

SHAN GORDON

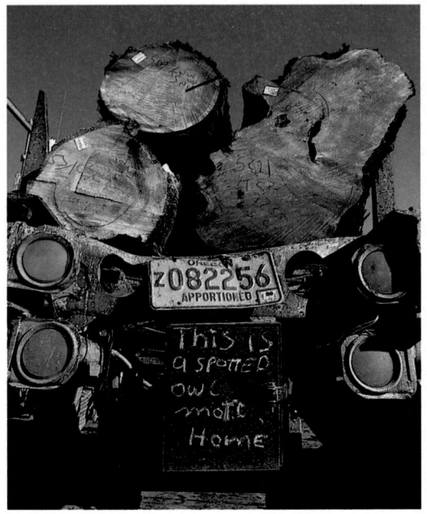
To protest cutting in the Willamette National Forest, Oregonians bind themselves to a Douglas fir with bicycle locks under the eye of the sheriff's deputy who arrested them. They belong to Earth First!, a group that stages sit-ins and promotes such tactics as disabling logging machinery. Cedar logs ride to a Coos Bay mill on a "spotted owl motor home," a logger's joke.

Stan Coleman, MacMillan Bloedel's regional forester in the firm's huge Alberni Region. We helicoptered to the Franklin River Division office to pick up engineer Dennis Bendickson. They explained how they cut and replant trees under their long-term tree-farm license from the province. I saw company mills, aircraft, and motor pools—an economic empire connoting jobs for 4,000.

On a sunlit afternoon we choppered gently onto a gravel bar of Carmanah Creek and plunged into stained-glass lights of pristine forest for a moss-carpet stroll under ancient giants whose crowns were beyond our seeing. Aloft once more, we skimmed those crowns until Stan pointed out one that modestly topped the rest.

"That is the Carmanah giant," he said simply. In its centuries of living it had reached 312 feet and been proclaimed the tallest tree in Canada. "One of our people found it in a routine flyover," said Stan.

As its fame spread, the big tree became a symbol of the struggle over forests. MacMillan Bloedel offered to protect a 1,300-acre enclave, but environmentalists wanted the whole 13-mile sweep of the Carmanah Valley. A recent government compromise saved about half the valley, disappointing both sides.



SO HOW MUCH is enough? This question looms over all the old forests of the U. S. and Canada. "The truth is that there isn't that much left to protect," said Brock Evans. He leads the National Audubon Society, a member of the Pacific Northwest's Ancient Forest Alliance of 80 environmental groups. They have fostered a bill in Congress that would stop all cutting of old-growth forests on federal lands.

The fire under the legislative pot received new fuel in an April 4 announcement from a panel of scientists known as the Interagency Scientific Committee. A chief recommendation concerns how much timberland should be embargoed for the spotted owl; this formula favors owls over tree cutting. The Forest Service says the committee's plan would cut timber production on public lands by 30 percent.

Meanwhile, Congress was at work on a new accommodation between cutters and savers; September 30 is the expiration date for the current compromise, which has been known for its chief architects, Senators Mark Hatfield of Oregon and Brock Adams of Washington. This being an election year, action was expected early to let lawmakers go home to campaign. Add to the pot the anticipated action on some version of a Tongass National Forest reform bill, and you begin to expect fire, smoke, and boilovers on the legislative front.

It's not all cease and desist by environmentalists, as was stressed in the Wilderness Society's recommendation last January to Congress. While reducing national forest cutting from 4 billion to 2.3 billion board feet a year, it would make additional timber available to domestic mills by slashing almost in half the present 4.3 billion board feet a year in raw log exports and let states tax remaining exports to finance schools and economic development in mill-dependent areas.

The log-export brake drew fire from export spokesman Nick Kirkmire, who heads Washington Citizens for World Trade.

"We're not Johnny-come-latelies to the industry," he said. "Exporters, shippers, and stevedores might lose more than milling and processing would gain, and the anticipated diversion to domestic mills is questionable." A graduate forester, he saw hope in closer adherence to sustained-yield forestry.

Sustained yield used to carry the clout of holy writ in the United States Forest Service, but now there are doubts. A litany of alarm has begun to find expression within the Forest Service—in the form of staff members who can no longer in conscience subscribe to "getting out the cut" from such ragged remnants.

The most visible spokesman has been Jeff DeBonis, a timber-sale planner with 12 years of wearing Forest Service green. He was truly a voice crying in the wilderness when he began last year to speak out against continued heavy-cutting practices in the already heavily cut Willamette National Forest in Oregon, where he was assigned to the Blue River Ranger District. There were two fast results, as he tells it:

"First, industry wanted my head, and, second, I found there were a lot of my Forest Service colleagues who felt as I did."

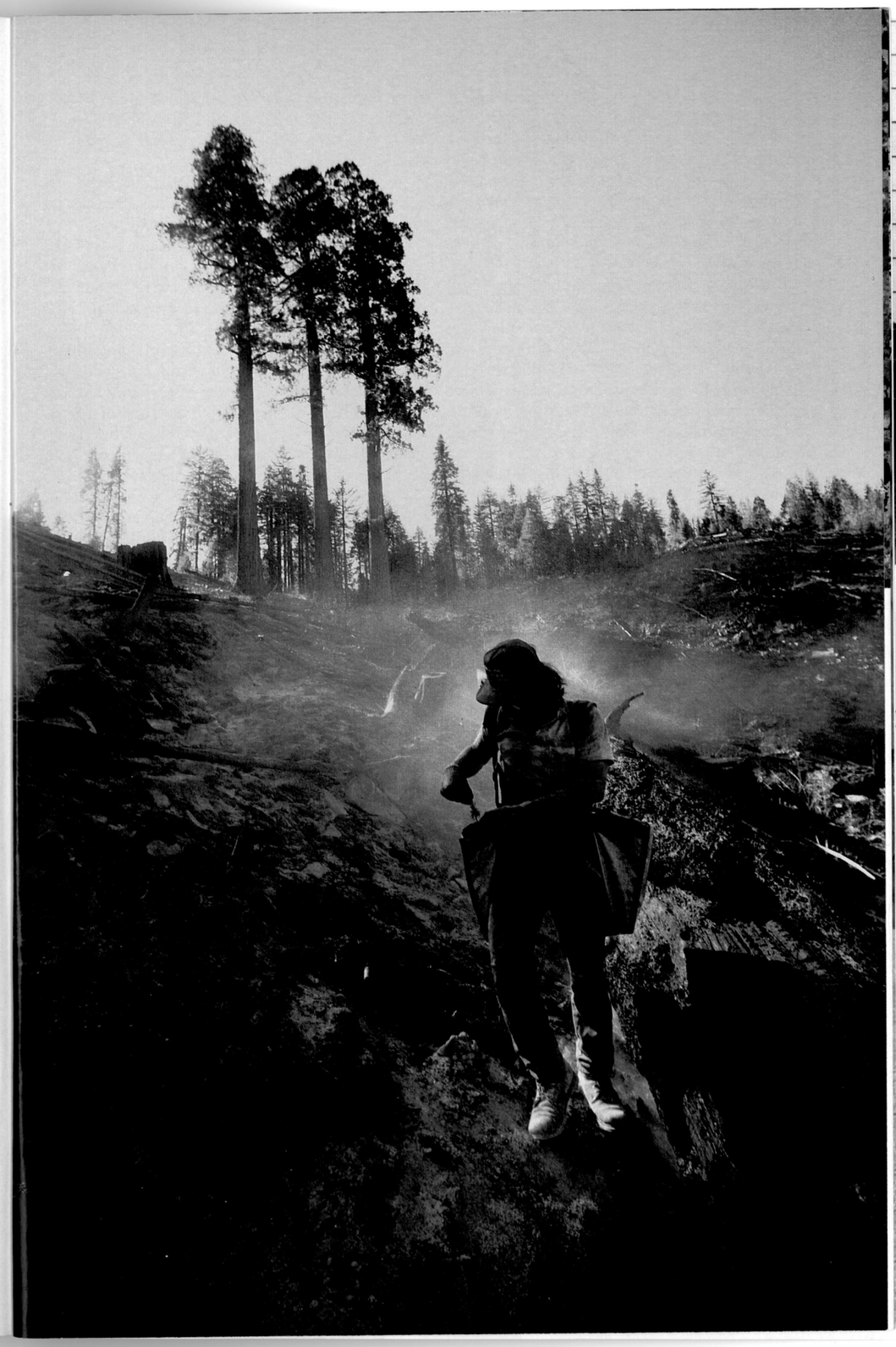
So he began to publish a newsletter called "Inner Voice" for those who wanted to promote change from within the agency, and he organized the Association of Forest Service Employees for Environmental Ethics.

To the credit of the USFS, industry did not get his head, despite a vehement letter to his immediate boss. Instead, and not without hierarchical agonizing, Jeff was counseled as to the house rules for exercising his right of free speech, which mainly amounted to doing it on his own time with private resources. Soon he had a mailing list of 2,000 and so much demand on free time that last February he resigned to devote his full talents to his growing group.

"I can no longer justify my direct participation in the liquidation of the remaining 10 percent of the temperate rain forests," he said. "I believe this will be remembered as one of the most significant ecological disasters of the 20th century."

THAT FEELING found expression at a higher level last November, when regional and forest supervisors expressed deep concern in letters and memos to their chief, F. Dale Robertson.

Region One forest supervisors summed it up, reporting: "Many people, internally as



"Nonintensive management" by the Forest Service in Sierra Nevada sequoia groves left "three sisters" to look down on a dusty slash of lesser trees, where a planter unholsters a ponderosa pine seedling. The trees were cut with the stated aim of reducing fire danger and aiding sequoia propagation; environmentalists saw an excuse for logging.

well as externally, believe the current emphasis of National Forest programs does not reflect the land stewardship values embodied in our forest plans. Congressional emphasis and our traditional methods and practices continue to focus on commodity resources. We are worried that if we don't make some major changes . . . we will never move from rhetoric to reality."

A dozen years ago going public as a whistle blower was the only way to promote such sentiments, at the risk of professional suicide—blind-alley reassignment, early retirement, or resignation. But Robertson's reaction was the establishment of a New Perspectives panel, headed by Hal Salwasser, a deputy director of the agency who was deeply concerned about the spotted owl.

My previous conversations with Hal, a dedicated forester and an adjunct professor in wildlife management at Virginia Tech, had found him voicing strong environmental concerns. After his new appointment I asked him if he believed he could really shift the emphasis away from trees to the forests as entities.

"I believe the new direction in the Forest Service will make the difference," Hal said.

My mentors on a different approach to forestry have divided their time between laboratory and lectern. Jerry Franklin of the Forest Service, whose 33 years of field studies include monitoring the comeback of woods that were clear-cut by Mount St. Helens' 1980 eruption, also teaches at the University of Washington in Seattle. He sees forests as living systems, would trade hopeless fragments of old growth for combinable remnants. "And there should almost never be a total clear-cut," he adds. "Some old trees, snags, and logs should remain for continuity of dependent communities. If you want life to survive, you have to build a bridge."

After years of work in the woods for the Bureau of Land Management and the Forest Service, Chris Maser lectures through books, tours, and interviews on reverence for nature's methods. "We're in trouble as soon as we focus on our own limited goals and lose the broader view. When we destroy all our ancient forests, we will have thrown away nature's blueprint. We must have that blueprint if we are to save forests for the future."

Both Jerry and Chris see a smaller but endlessly sustainable forest industry. "There must be less cutting and more consolidating of remnants into viable entities," says Jerry. "What the balance will be is a subject for study and negotiation. But the need to seek that balance is not negotiable."

"Nature itself is constantly cutting and pruning the forests, through fires, blowdowns, blights, and volcanic eruptions," Chris told me. "Any large expanse of old-growth forest contains stands of various ages. By studying nature's model, we can fit our uses into a cadence of transition and renewal."

WHILE WE PURSUE hopeful visions, our options shrink daily, and somewhere in what remains there stands a tree of no return. It is not a specific spruce or fir but a specific number in the sequence of cutting, beyond which the remaining old growth will have shrunk below what natural processes can repair. Then creatures and plants dependent on the ancient woodland's moist multilayered canopies and rich ground covers, on the shelter and nurture bequeathed by its fallen patriarchs, will limp toward extinction amid the once great forest's crazy-quilt vestiges.

In Boston's Arnold Arboretum I went looking for a celebrated tree. Autumn's colors were coming on for sugar maples and golden larches and Oriental cork trees, but the tree I sought was evergreen. It had a place in history, but a precarious toehold in today's world. At last on a conifered slope I stood under the blue-green needles and spreading arms of a cedar of Lebanon, one of seven on the hill.

King Hiram of Tyre gave King Solomon the wood from the cedars that once clothed the Lebanon Mountains for building the Temple in Jerusalem. Other trees built the prospering ports and great trading fleets that made the Mediterranean a Phoenician lake.

In about four centuries Phoenicia ran out of fleets and forests, setting a pattern that would overtake Greece and Rome and nations into our own time. Though Canada and the United States are politically two nations, they are one community of interest on forestry questions. As I hope for good and prompt answers that will prevent our joining the sad recessional, I recall lines from the 104th Psalm:

The trees of the Lord are watered abundantly,
the cedars of Lebanon which he planted.
In them the birds build their nests;
the stork has her home in the fir trees. □