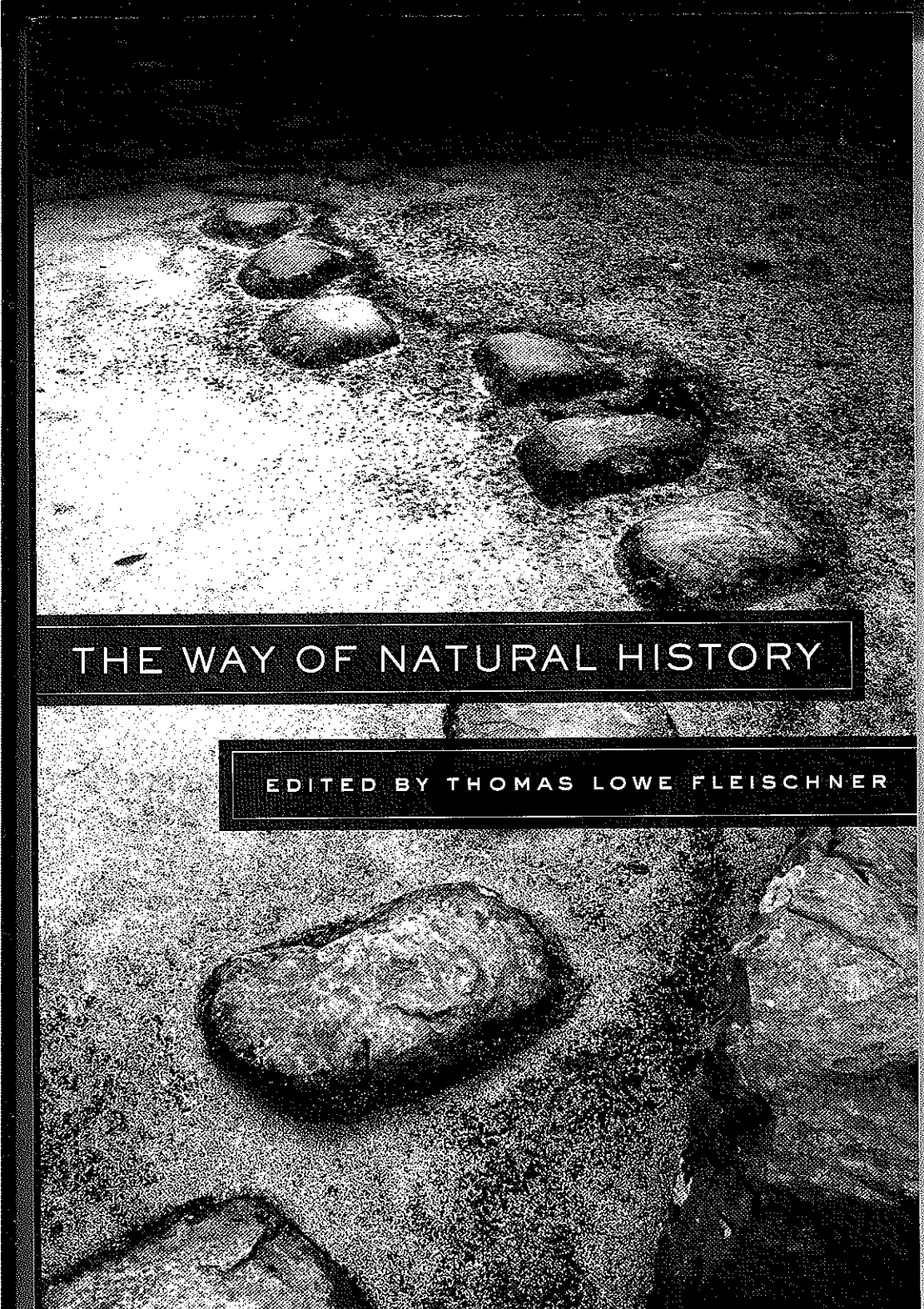

THE WAY OF NATURAL HISTORY

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Mind in the Forest

I touch trees as others might stroke the fenders of automobiles or finger silk fabrics or fondle cats. Trees do not purr, do not flatter, do not inspire a craving for ownership or power. They stand their ground, immune to merely human urges. Saplings yield under the weight of a hand and then spring back when the hand lifts away, but mature trees accept one's touch without so much as a shiver. While I am drawn to all ages and kinds, from maple sprouts barely tall enough to hold their leaves off the ground to towering sequoias with their crowns wreathed in fog, I am especially drawn to the ancient, battered ones, the survivors.

Recently I spent a week in the company of ancient trees. The season was October and the site was the H. J. Andrews Experimental Forest, a 15,800-acre research area defined by the drainage basin of Lookout Creek, within Willamette National Forest, on the western slope of the Cascade Mountains in Oregon. It's a wet place. At higher elevations in the Andrews, annual precipitation averages 140 inches, and even the lower elevations receive 90 inches, twice the amount that falls on my well-watered home region of southern Indiana. Unlike Indiana's hardwood hills,

this is conifer country. The oldest of the Douglas-firs, western hemlocks, western red cedars, and Pacific yews that flourish here range in age from five hundred to eight hundred years, veterans of countless fires, windstorms, landslides, insect infestations, and floods.

On the first morning of my stay, I follow a trail through moist bottomland from my lodging in the headquarters compound toward Lookout Creek, where I plan to spend half an hour or so in meditation. The morning fog is thick, so the treetops merge with gray sky. Condensation drips from every needle and leaf. My breath steams. Lime-green lichens, some as long as a horse's tail, dangle from branches. Set off against the somber greens and browns of the conifers, the yellow and red leaves of vine maples, bigleaf maples, and dogwoods appear luminous despite the damp. Shelf fungi jut from the sides of old stumps like tiny balconies, and hemlock sprigs glisten from nurse logs. The undergrowth is as dense as a winter pelt.

Along the way, I reach out to brush my fingers over dozens of big trees, but I keep moving, intent on my destination. Then I come upon a Douglas-fir whose massive trunk, perhaps four feet in diameter at chest height, is surrounded by scaffolding, which provides a stage for rope-climbing by scientists and visiting schoolchildren. Something about this tree—its patience, its generosity, its dignity—stops me. I place my palms and forehead against the furrowed, moss-covered bark, and rest there for a spell. Gradually the agitation of travel seeps out of me and calm seeps in. Only after I stand back and open my eyes, and notice how the fog has begun to burn off, do I realize that my contact with this great tree must have lasted fifteen or twenty minutes.

I continue on to a gravel bar on Lookout Creek, a jumble of boulders, cobbles, pebbles, and grit scoured loose from the

volcanic plateau that forms the base of the Cascade Mountains. Because these mountains are young, the slopes are steep and the water moves fast. Even the largest boulders have been tumbled and rounded. Choosing one close to a riffle, I sit cross-legged and half-close my eyes, and I am enveloped in water sounds, a ruckus from upstream and a burbling from downstream. Now and again I hear the thump of a rock shifting in the flow, a reminder that the whole mountain range is sliding downhill, chunk by chunk, grain by grain.

Although I have tried meditating for shorter or longer stretches since my college days, forty years ago, I have never been systematic about the practice, nor have I ever been good at quieting what Buddhists call the monkey mind. Here beside Lookout Creek, however, far from my desk and duties, with no task ahead of me but that of opening myself to this place, I settle quickly. I begin by following my breath, the oldest rhythm of flesh, but soon I am following the murmur of the creek, and I am gazing at the bright leaves of maples and dogwoods that glow along the thread of the stream like jewels on a necklace, and I am watching light gleam on water shapes formed by current slithering over rocks, and for a spell I disappear; there is only this rapt awareness.

When the H. J. Andrews Experimental Forest was established in 1948, what we now call "old growth" was labeled on maps as "large saw-timber." The original purpose of the forest was to determine the best methods of harvesting big trees. The assumption was that they should be cut down—the only question was how. Fortunately, since 1948, many people, both inside and outside the U.S. Forest Service, have come to see that venerable trees possess values other than supplying lumber.

Research conducted at the Andrews has taught us much of

what we know about old growth in the Pacific Northwest. In addition to stands of ancient trees, the watershed contains naturally burned areas, open glades, recovering clear-cuts, and managed research plots. Some of these plots are devoted to studying the effects of various harvesting practices. But of the more than one hundred experiments currently under way, many focus on the role of forests in protecting water quality, controlling stream flow and sedimentation, cycling and storing carbon, and providing habitat for wildlife, including endangered species such as the northern spotted owl.

Aside from these ecological gifts, what does an old-growth forest offer to the human heart and mind? Science is not set up to answer that question—but art may be. Five years ago, the Spring Creek Project at Oregon State University, in collaboration with the Andrews Forest Long Term Ecological Research Group, began inviting a series of writers to spend week-long residencies here in order to provide ways of observing the land that might complement the ways of science. Writers' responses—poems, stories, essays, field notes, journals—will be added to the stream of instrument data, technical reports, scientific papers, aerial photographs, statistics, and maps, to give a more comprehensive vision of this place. And a vision not only of the present, but of the forest evolving through time, for the sponsors have designed the series of residencies to extend over two centuries.

Designing any human enterprise to last two hundred years may seem brash in an era of headlong haste. Yet precisely because we live in a culture addicted to instant results, such a long-term plan strikes me as visionary and generous, for it seeks to free our thoughts from present needs and to accumulate knowledge that will benefit our descendants. Colleges, museums, and libraries have been founded in the same spirit, to serve the needs not only of the living but also of those not yet born.

Without benefit of planning, the oldest trees in the Andrews have survived since the time of the Crusades, and those along the trail to Lookout Creek have endured since Spaniards first set foot in the New World. These veterans haven't had to contend with wars, religious schisms, economic depressions, regime changes, corrupt government, or the other ills that humans fall prey to, but they have withstood countless natural hazards. And now they must contend with a destabilized climate, a tattered ozone layer, invasive species, and other hazards imposed by humans. At this perilous moment, I have traveled here from Indiana to add my mite of observations to a record that is designed to be kept for generations. I suspect I will come away with far more questions than answers, but that proportion seems in keeping with the spirit of science as well as art.

During my week in the Andrews Forest, each morning at first light I repeat the journey to Lookout Creek, and each time I stop along the way to embrace the same giant Douglas-fir, which smells faintly of moist earth. I wear no watch. I do not hurry. I stay with the tree until it lets me go.

When at length I lean away, I touch my forehead and feel the rough imprint of the bark. I stare up the trunk and spy dawn sky fretted by branches. Perspective makes the tops of the surrounding, smaller trees appear to lean toward this giant one, as if conferring. The cinnamon-colored bark is like a rugged landscape in miniature, with flat ridges separated by deep fissures. Here and there among the fissures, spiderwebs span the gaps. The plates are furred with moss. A skirt of sloughed bark and fallen needles encircles the base of the trunk. Even in the absence of wind, dry needles the color of old pennies rain steadily down, ticking against my jacket.

I don't imagine that my visits mean anything to the Douglas-fir. I realize it's nonsensical to speak of a tree as patient or generous or dignified merely because it stands there while researchers and children clamber up ropes into its highest limbs. But how can I know a tree's inwardness? Certainly there is intelligence here, and in the forest as a whole, if by that word we mean an organism or system responding appropriately to its circumstances. How does that intelligence compare with ours? What can we learn from it? And why, out of the many giants thriving here, does this one draw me to an embrace?

The only intelligence I can examine directly is my own and, indirectly, that of my species. We are a contradictory lot. Our indifference to other species, and even to our own long-term well-being, is demonstrated everywhere one looks, from the depleted oceans to the heating atmosphere, from poisoned wetlands to eroding farmlands and forests killed by acid rain. Who can bear in mind this worldwide devastation and the swelling catalog of extinctions without grieving? And yet it's equally clear that we are capable of feeling sympathy, curiosity, and even love toward other species and toward the Earth. Where does this impulse come from, this sense of affiliation with rivers and ravens, mountains and mosses? How might it be nurtured? What role might it play in moving us to behave more caringly on this beleaguered planet?

These are the questions I find myself brooding about as I sit in meditation beside Lookout Creek. One is not supposed to brood while meditating, of course, so again and again I let go of thoughts and return my awareness to the water sounds, the radiant autumn leaves, the wind on my cheek, the stony cold chilling my sitting bones. And each morning, for shorter or longer spells, the fretful *I* quiets down, turns transparent, vanishes.

Eventually I stir, roused by the haggle of ravens or the chatter of squirrels or the scurry of deer—other minds in the forest—

and I make my way back along the trail to the zone of electricity and words.

In the evenings I consult field guides to learn the names of organisms that have captivated me here. The pale green, wispy lichen that dangles from branches is known as old man's beard and belongs to the genus *Usnea*. It contains potent antibiotics, a fact understood by Native Americans, who used it to staunch wounds. The flat lichen that grows on top of limbs is *Lobaria oregana*, commonly called "lettuce lichen" or "frog skin lichen"; it fixes nitrogen from the air and thereby enriches the soil when it tumbles to the forest floor. Pacific yew (*Taxus brevifolia*), which grows hunched and gnarled in the understory, is the source of a medicine now widely used in treating cancer. Noble fir (*Abies procera*), favored as a Christmas tree, prefers higher altitudes. Douglas-fir (*Pseudotsuga menziesii*) is not a true fir, and Western red cedar (*Thuja plicata*) is not a true cedar. And the Western hemlock (*Tsuga heterophylla*) bears no relation to the European hemlock, whose poison put a famous end to the life of Socrates.

When I return to my Indiana home, I will write up my Andrews reflections before a window that looks out on an Eastern hemlock (*Tsuga canadensis*), which for thirty-five years now has been a shaggy companion to my shaggy thoughts.

At midday, sunlight floods the gravel bar on Lookout Creek, illuminating strands of spider filament that curve from one boulder to another over an expanse of rushing water. I can't fathom how spiders managed this engineering feat. The wind might have blown them one direction but not back again, yet at least a dozen gossamer threads zigzag between the massive stones.

Against a halcyon blue sky, the spires of trees stand out with startling clarity, their fringe of lichens appearing incandescent.

Moths and gnats flutter above the stream, chased by dragonflies. The creek is lined by drift logs in various states of decay, from bone-gray hulks to rotting red lumps. Wet boulders gleam as if lit from within. Cobbles jammed against one another look like the heads of a crowd easing downstream. The muscular current, twisting over rocks, catches and tosses the light. The banks on either side blaze with the salmon-pink leaves of dogwoods, those western relatives of the beloved understory tree of my Indiana forests. Everything I see is exquisite—the stones of all sizes laid against one another just so, the perforated leaves of red alders, the fallen needles gathered in pockets along the shore, the bending grasses, the soaring trees.

Can all this reaching for sunlight, nutrients, and water mean nothing? And if it means something, what does it mean, and to whom? What power draws the elements together and binds them into a fern or a forest? If we answer, "Life," we give only a name, not an explanation.

One afternoon, I stroll down the entrance road from the forest headquarters toward the mouth of Lookout Creek, where it empties into the Blue River. The murmur of water accompanies me the whole way. The air is still, yet butter-yellow maple leaves come sashaying down, littering the pavement. A pewter sheen glints from the bark of young Douglas-firs, which is surprisingly light in color, almost like aspen or gray birch.

At the bottom of the slope I pause on a bridge that leads across the Blue River into a National Forest campground, which is closed for the season. In summer, with the floodgates shut in a dam south of here, the river would be backed up into a reservoir, but now, in October, the water curls unobstructed through bedrock as knobby and gray as elephant hide. The streamside terraces look as green and trim as well-kept pasture. The spa-

cious view of sky and river and mountains cheers me, and helps me understand the sense of oppression our ancestors felt in the deep, dark, dank woods.

In the deserted campground, a bulletin board carries a warning about invasive plants and a notice about a local woman who has been missing since August. I recall this notice a few minutes later when, crossing back over the bridge, I find on the railing a woman's high-heeled sandal, size 7. The toe-strap and three-inch heel are made of clear plastic impregnated with glitter. Bold letters on the insole spell out the brand, which reads like a slogan: NO BOUNDARIES. The bottom of the shoe identifies the model as "Cinderella" and the place of manufacture as China. Bemused, I start spinning a story that would bring this fairy-tale object from Asia to a forest road in Oregon.

A roaring distracts me, and I look up to see a red pickup hurtle by carrying a mud-spattered four-wheeler—another expression of the No Boundaries creed.

As I climb the hill, I think about how we impose our machines and schemes everywhere, in the atmosphere and oceans and on every acre of ground, including the Andrews Experimental Forest. Off-road joy riders, National Park snowmobilers, wilderness oil-drillers, factory boat trawlers, 24/7 merchants, cornucopian economists—all deny the notion of limits. But without limits we cannot have ethics, which require us to accept boundaries, to refrain from certain actions, to distinguish between what is possible and what is right.

Then what about our compulsion to find human stories in nature? Isn't that another defiance of boundaries? We envision bears and hunters and wandering sisters in the stars. We spy dragons in the shapes of clouds, hear mournfulness in the calls of owls. Reason tells us that such analogies are false. For all its delicious sounds, the creek does not speak, but merely slides

downhill, taking the path of least resistance, rubbing against whatever it meets along the way. Bedrock is not elephant hide, lichens are not horsetails, moss is not fur, spiders are not engineers, ravens do not haggle, and trees do not confer. Scientists are schooled to avoid such anthropomorphism. Writers are warned against committing the "pathetic fallacy," which is the error of projecting human emotions or meanings onto nature. But if we forgo such analogies, if we withhold our stories, we estrange ourselves from the universe. We become mere onlookers, the sole meaning-bearing witnesses of a meaningless show. So can I uphold the necessity of constraints on human actions, while denying such constraints on thought?

Those who fancy themselves separate from nature often use "tree-hugger" as a term of ridicule, as if to feel the allure of trees were a perverted form of sensuality or a throwback to our simian ancestry. Of course, many who decry tree-hugging don't believe we *have* a simian ancestry, so perhaps what they fear is a reversion to paganism. And they may have a point. The religions that started in the Middle East—Judaism, Christianity, Islam—are all desert faiths, created by people who lived in the open. Theirs is a sky god, who would be eclipsed by a forest canopy. In every civilization influenced by these faiths, trees have been cut down not merely to secure wood for cooking and building or to clear ground for agriculture or to open vistas around settlements where predators might lurk, but to reveal the heavens.

Worship of a sky god has been costly to our planet. Religions that oppose the heavenly to the earthly, elevating the former and denigrating the latter, are in effect denying that we emerge from and wholly depend on nature. If you think of the touchable, eatable, climbable, sexy, singing, material world as fallen,

corrupt, and sinful, then you are likely to abuse it. You are likely to say that we might as well cut down the last old-growth forests, drain the last swamps, catch the last tuna and cod, burn the last drops of oil, since the end time is coming, when the elect few will be raptured away to the immortal realm of spirit, and everything earthy will be utterly erased.

But our language preserves a countervailing wisdom. In Latin, *materia* means stuff, anything substantial, and in particular it means wood. *Materia* in turn derives from *mater*, which means mother. In the collective imagination that gave rise to these meanings, trees were understood to epitomize matter, and matter was understood to be life-giving. Perhaps we could tap into this wisdom by recovering another word that derives from *mater–matrix*, which means "womb." Instead of speaking about "nature" or "the environment," terms that imply some realm apart from us, perhaps we should speak of Earth as our matrix, our mother, the source and sustainer of life.

One morning beside Lookout Creek, enveloped as usual in watery music, I sit leaning against a young red alder that has sprouted in the gravel bar, its leaves nibbled into lace by insects. Everything here either starts as food or winds up as food. None of the alders growing on this ever-shifting bank are thicker than a baseball bat. The next big flood will scour them away. Beside me, the sinewy roots of an upturned stump seem to mimic the muscular current in the stream. The bar is littered with gray and ruddy stones pockmarked by holes that betray the volcanic origins of this rubble.

Where better than such a place to recognize that the essence of nature is *flow*–of lava, electrons, water, wind, breath. *Materia*, matter, the seemingly solid stuff we encounter–trees, stones, bears, bones–is actually fluid, constantly changing, like water

shapes in the current. The Psalmist tells us, "The mountains skipped like rams, and the little hills like lambs," and Dōgen, a thirteenth-century Zen teacher, proclaims that mountains are always walking. Both speak truly. Mountains do move, arising and eroding away over geological time, just as organisms grow and decay, species evolve, tectonic plates shift, stars congeal and burn and expire, entire galaxies shine for a spell and then vanish. Nothing in nature is fixed.

Conservationists have often been accused of wishing to freeze the land in some favored condition–for example, the American continent as it was before European colonization. Back when maps described old growth as large saw-timber, scientists spoke of forests reaching climax, as if at some point the flow would cease. But we now realize that no such stasis is possible, even if it were desirable. If flux is the nature of nature, however, we still must make distinctions among the *kinds* of change. We cannot resist the damage caused by human behavior unless we distinguish between *natural* change–for example, the long history of extinctions–and *anthropogenic* change–for example, the recent acceleration in extinctions due to habitat destruction, pollution, climate heating, and other disturbances caused by humans. The capacity to make such a distinction, and to act on it, may be as distinctive of our species as the capacity to use symbolic language.

Thoughts flow, along with everything else, even in the depths of meditation. And yet the human mind seems compelled to imagine fixity–heaven, nirvana, Plato's ideal realm, eternal God–and the human heart yearns for permanence. Why else do we treasure diamonds and gold? Why else do Creationists cling to the notion that all species were made in exactly their present form? Why else do we search for scientific "laws" underlying the constant flux of the universe?

Our yearning for the fixed, like our craving for dominion over nature, may be another expression of our fear of aging and death. This occurs to me as I sit, transfixed, beside the narrowest, noisiest passage in the riffles on Lookout Creek. A dozen dead snags tilt above my head, their bare limbs like the sparse whiskers on an old man's chin. Upstream, a gigantic Douglas-fir has fallen across the creek, its trunk still as straight as when it was alive. Just downstream, another giant has fallen, this one snapped in the middle. I can't help imagining one of the looming snags suddenly toppling onto me and snapping my thread of thought, scattering this temporary congregation of elements and notions bearing my name.

Higher up the valley of Lookout Creek, in a grove of five-hundred-year-old Douglas-firs and Western hemlocks, a hundred or so logs have been placed side by side on the ground, labeled with aluminum tags, and fitted with instruments to measure their rate and manner of decay. This is one of six so-called "log decomposition sites" in the Andrews, part of another experiment designed to continue for two hundred years. This research aims to document, among other things, the role of dead wood in forest ecology and in the sequestering of carbon.

On my visits to the site, I stroke the moss-covered logs, touch the rubbery fungi that sprout from every surface, peer into the boxy traps that catch flying insects and fallen debris, and lean close to the tubes that capture the logs' exhalations. The only breathing I detect is my own. I'm intrigued that scientists are studying decomposition, for as an artist I usually think about *composition*—the making of something shapely and whole out of elements. A musician composes with notes, a painter with colors, a writer with letters and words, much as life orchestrates carbon, oxygen, nitrogen, and other ingredients into organisms.

These organisms—trees, fungi, ravens, humans—persist for a while, change over time, and eventually dissolve back into their constituents, which will be gathered up again into living things.

Art and life both draw energy from sunlight, directly or indirectly, to counter entropy by increasing order. Right now, for example, I'm running on the secondhand sunshine bound up in pancakes and maple syrup. Organisms interact biophysically with everything in their ecosystem, and ultimately with the whole universe. By contrast, the symbolic structures that humans create—songs, stories, poems, paintings, photographs, films, diagrams, mathematical formulas, computer codes—convey influence only insofar as they are read, heard, or otherwise perceived by humans. What happens when we turn our interpretive powers on living organisms? Does raven, Douglas-fir, spider, or lichen mean anything different, or anything more, when it is taken up into human consciousness?

What we think or imagine about other species clearly influences our behavior toward them—as notions about the wickedness of wolves led to their extermination throughout much of their historical range, and as new understanding about the role of predators has led to the reintroduction of wolves in Yellowstone and elsewhere. But aside from this practical impact, does our peculiar sort of mind bear any greater significance in the scheme of things? Is it merely an accidental result of mechanical processes, an adaptive feature that has powered our—perhaps fleeting—evolutionary success? Would the universe lose anything vital if our species suddenly vanished?

We can't know the answer to those questions, despite the arguments of prophets and philosophers. We can only form hunches, and, right or wrong, these will influence the spirit of our work and the tenor of our lives. For what it's worth, my hunch is that what we call mind is not a mere side effect of

material evolution, but is fundamental to reality. It is not separate from what we call matter, but is a revelation of the inwardness of things. I suspect that our symbol-wielding intelligence is a manifestation of the creative, shaping energy that drives the cosmos, from the dance of electrons to the growth of trees. If this is so, then our highest calling may be to composition—paying attention to some portion of the world, reflecting on what we have perceived, and fashioning a response in words or numbers or paint or song or some other expressive medium. Our paintings on cave walls, our photos of quasars, our graphs and sonnets and songs may be the gifts we return for the privilege of sojourning here on this marvelous globe.

If intelligence means the ability to take in and respond to information, then all organisms possess it, whether plant or animal, for they constantly exchange signals and materials with their surroundings. If intelligence means the capacity for solving puzzles or using language, then surely the ravens that clamor above me or the wolves that roam the far side of the mountains possess it. But if we are concerned with the power not merely to reason or use language, but to discern and define meanings, to evaluate actions in light of ethical principles, to pass on knowledge across generations through symbolic forms—then we are speaking about a kind of intelligence that appears to be the exclusive power of humans, at least on this planet.

Some contemplative traditions maintain that this meaning-making capacity is a curse, that it divorces us from reality, enclosing us in a bubble of abstractions. It's easy to sympathize with this view when one considers our history of feuds and frauds. Cleverness alone does not make us wise. Yet here among these great trees and boisterous mountain streams, I sense that our peculiar sort of mind might also be a blessing, not only to

us but to the forest, to other creatures, to life on Earth, and even to the universe.

I recognize the danger of hubris. It's flattering to suppose, as most religions do, that humans occupy a unique place in the order of things. The appeal of an idea is not evidence for its falsity, however, but merely a reason for caution. Cautiously, therefore: Suppose that the universe is not a machine, as nineteenth-century science claimed, but rather a field of energy, as twentieth-century science imagined. Suppose that mind is not some private power that each of us contains, but rather an energy field that contains us—and likewise encompasses birds, bees, ferns, trees, salamanders, spiders, dragonflies, and all living things, each kind offering its own degree and variety of awareness. What if our role in this all-embracing mind is to gaze back at the grand matrix that birthed us, and translate our responses into symbolic expression? What if science and literature, painting and mathematics, photography and music and dance and our many other modes of expression feed back into the encompassing mind? And if that is our distinctive role, how should we lead our lives?

After communing with the great Douglas-fir one last time, I pack my bag, load the rental car, and set off along a forest road flanked by the looming presences of trees, on the first leg of my return trip to Indiana. As I drive, it occurs to me that meditation is an effort to become for a spell more like a tree, open to whatever arises, without judging, without remembering the past or anticipating the future, fully present in the moment. The taste of that stillness during my stay at the Andrews Forest has refreshed me. And yet I do not aspire to dwell in such a condition always. For all its grandeur and beauty, for all its half-millennium longevity, the Douglas-fir cannot bear me in mind,

cannot reflect or remember or imagine—can only *be*. Insofar as meditation returns us to that state of pure, unreflective being, it is a respite from the burden of ceaseless thought. When we surface from meditation, however, we are not turning from reality to illusion, as some spiritual traditions would have us believe; rather, we are reclaiming the full powers of mind, renewed by our immersion in the realm of mountains and rivers, wind and breath.