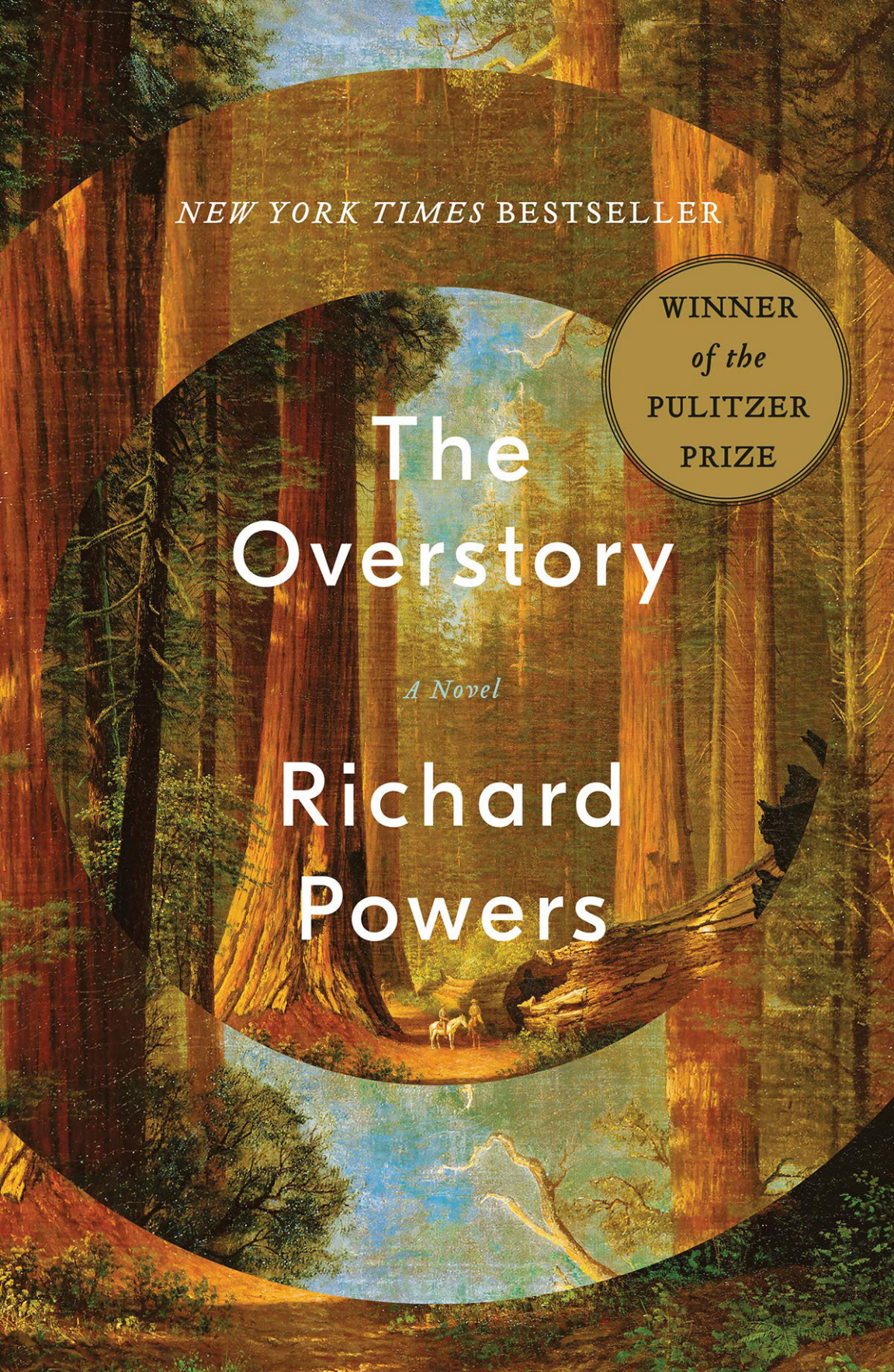
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A Novel
Richard Powers

THE OVERSTORY

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THE OVERSTORY

A NOVEL

RICHARD POWERS

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This is a work of fiction. Names, characters, places, and incidents are the products of the author's imagination or are used fictitiously. Any resemblance to actual events, locales, or persons, living or dead, is entirely coincidental.

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For Aida.

CONTENTS

The greatest delight which the fields and woods minister, is the suggestion of an occult relation between man and the vegetable. I am not alone and unacknowledged. They nod to me, and I to them. The waving of the boughs in the storm, is new to me and old. It takes me by surprise, and yet is not unknown. Its effect is like that of a higher thought or a better emotion coming over me, when I deemed I was thinking justly or doing right.

—Ralph Waldo Emerson

Earth may be alive: not as the ancients saw her—a sentient Goddess with a purpose and foresight—but alive like a tree. A tree that quietly exists, never moving except to sway in the wind, yet endlessly conversing with the sunlight and the soil. Using sunlight and water and nutrient minerals to grow and change. But all done so imperceptibly, that to me the old oak tree on the green is the same as it was when I was a child.

—James Lovelock

Tree . . . he watching you. You look at tree, he listen to you. He got no finger, he can't speak. But that leaf . . . he pumping, growing, growing in the night. While you sleeping you dream something. Tree and grass same thing.

—Bill Neidjie

PATRICIA WESTERFORD

It's 1950, and like the boy Cyparissus, whom she'll soon discover, little Patty Westerford falls in love with her pet deer. Hers is made of twigs, though it's every bit alive. Also: squirrels from pairs of glued walnut shells, bears made of sweetgum balls, dragons from the pods of Kentucky coffee trees, fairies donning acorn caps, and an angel whose pine-cone body needs only two holly leaves for wings.

She builds these creatures elaborate homes with pebbled front walks and mushroom furniture. She sleeps them in beds fitted with magnolia-petal comforters. She watches over them, the guiding spirit of a kingdom whose towns nestle behind closed doors in the burls of trees. Knotholes turn into louvered windows, through which, squinting, she can see the inviting parlors of woody citizens, the lost kin of humans. She lives there with her creatures in the minuscule architecture of imagination, so much richer than the offerings of full-sized life. When her tiny wooden doll's head twists off, she plants it in the garden, certain it will grow another body.

All her twig creatures can talk, though most, like Patty, have no need of words. She herself said nothing until past the age of three. Her two older brothers interpreted her secret language for their frightened parents, who

began to think she must be mentally deficient. They brought Patty into the clinic in Chillicothe for tests that revealed a deformation of the inner ear. The clinic fitted her with fist-sized hearing aids, which she hated. When her own speech started to flow at last, it hid her thoughts behind a slurry hard for the uninitiated to comprehend. It didn't help that her face was sloped and ursine. The neighbors' kids ran from her, this thing only borderline human. Acorn people are so much more forgiving.

Her father alone understands her woodlands world, as he always understands her every thickened word. She has a pride of place with him that the two boys accept. With them, Dad may throw softballs and tell bubble-gum wrapper jokes and play tag. But he reserves his best gifts for his little plant-girl, Patty.

Their closeness bothers her mother. "I ask you. Has there ever been such a little nation of two?"

Bill Westerford takes Patricia with him when he visits southwestern Ohio farms on his tours as an ag extension agent. She rides copilot in the beaten-up Packard with the pine side paneling. The war is over, the world is on the mend, the country is drunk on science, key to better living, and Bill Westerford takes his daughter out to see the world.

Patty's mother objects to the trips. The girl should be in school. But her father's soft authority prevails. "She won't learn more anywhere than she will with me."

Mile after plowed mile, they hold their roving tutorial. He faces her so she can read his moving lips. She laughs at his stories —thick, slow booms—and stabs enthusiastic answers to each of his questions. Which is more numerous: the stars in the Milky Way or the chloroplasts on a single leaf of corn? Which trees flower before they leaf, and which flower after? Why are the leaves at the top of trees often smaller than those at the bottom? If you carved your name four feet high in the bark of a beech tree, how high would it be after half a century?

She loves the answer to that last one: *Four feet*. Still four feet. Always four feet, however high the beech tree grows. She'll love that answer still, half a century later.

In this way, acorn animism turns bit by bit into its offspring, botany. She becomes her father's star and only pupil for the simple reason that she alone, of all the family, sees what he knows: plants are willful and crafty and after something, just like people. He tells her, on their drives, about all the oblique miracles that green can devise. People have no corner on curious behavior. Other creatures—bigger, slower, older, more durable—call the shots, make the weather, feed creation, and create the very air.

"It's a great idea, trees. So great that evolution keeps inventing it, again and again."

He teaches her to tell a shellbark from a shagbark hickory. No one else at her school can even tell a hickory from a hop hornbeam. The fact strikes her as bizarre. "Kids in my class think a black walnut looks just like a white ash. Are they *blind*?"

"Plant-blind. Adam's curse. We only see things that look like us. Sad story, ain't it, kiddo?"

Her father has a little trouble with *Homo sapiens* himself. He's caught between fine folks whose family farms are failing to subdue the Earth and companies that want to sell them the arsenal to bring about total dominion. When the frustrations of the day grow too much for him, he sighs and says, for Patty's impaired ears alone, "Ah, buy me a hillside that slopes away from town."

They drive through a land once covered in dark beech forest. "Best tree you could ever want to see." Strong and wide but full of grace, flaring out nobly at the base, into its own plinth. Generous with nuts that feed all comers. Its smooth, white-gray trunk more like stone than wood. The parchment-colored leaves riding out the winter—*marcescent*, he tells her—shining out against the neighboring bare hardwoods. Elegant with sturdy boughs so much like human arms, lifting upward at the tips like hands proffering. Hazy and pale in spring, but in autumn its flat, wide sprays bathe the air in gold.

"What happened to them?" The girl's words thicken when sadness weighs them down.

"We did." She thinks she hears her father sigh, though he never takes

his eyes off the road. "The beech told the farmer where to plow. Limestone underneath, covered in the best, darkest loam a field could want."

They drive from farm to farm, between last year's blights and next year's vanishing topsoil. He shows her extraordinary things: the spreading cambium of a sycamore that swallowed up the crossbar of an old Schwinn someone left leaning against it decades ago. Two elms that draped their arms around each other and became one tree.

"We know so little about how trees grow. Almost nothing about how they bloom and branch and shed and heal themselves. We've learned a little about a few of them, in isolation. But nothing is less isolated or more social than a tree."

Her father is her water, air, earth, and sun. He teaches her how to see a tree, the living sheath of cells underneath every square inch of bark doing things no man has yet figured out. He drives them to a copse of spared hardwoods in the bottoms of a slow stream. "Here! Look at this. Look at *this*!" A patch of narrow stalks, each with big, drooping leaves. A sheepdog of trees. He makes her sniff the giant spoonlike foliage, crushed. It smells acrid, like blacktop. He picks up a thick yellow pickle from the ground and holds it to her. She has rarely seen him so excited. He takes his army knife and cuts the fruit in half, exposing the buttery pulp and shiny black seeds. The flesh makes her want to scream with pleasure. But her mouth is full of butterscotch pudding.

"Pawpaw! The only tropical fruit ever to escape the tropics. Biggest, best, weirdest, wildest native fruit this continent ever made. Growing native, right here in Ohio. And nobody knows!"

They know. The girl and her father. She'll never tell anyone the location of this patch. It will be theirs alone, fall after prairie-banana fall.

Watching the man, hard-of-hearing, hard-of-speech Patty learns that real joy consists of knowing that human wisdom counts less than the shimmer of beeches in a breeze. As certain as weather coming from the west, the things people know for sure will change. There is no knowing *for a fact*. The only dependable things are humility and looking.

He finds her out in the backyard making birds from the twinned wings

of maple samaras. An odd look comes over his face. He holds up one of the seeds and points it toward the giant that shed it. "Have you noticed how it releases more seeds in updrafts than when the wind is blowing downward? Why is that?"

These questions are her favorite thing in the world. She thinks. "Travels farther?"

He puts his finger to his nose. "Bingo!" He looks at the tree and frowns, working through old puzzlements all over again. "Where do you think all the wood comes from, to get from this little thing to *that*?"

Wild guess. "The dirt?"

"How could we find out?"

They design the experiment together. They put two hundred pounds of soil in a wooden tub by the south face of the barn. Then they extract a three-angled beechnut from its cupule, weigh it, and push it into the loam.

"If you see a trunk carved full of letters, it's a beech. People can't help writing all over that smooth gray surface. God love 'em. They want to watch their lettered hearts growing bigger, year after year. *Fond lovers, cruel as their flame, cut in these trees their mistress' name. Little, alas, they know or heed how far these beauties hers exceed!*"

He tells her how the word *beech* becomes the word *book*, in language after language. How *book* branched up out of beech roots, way back in the parent tongue. How beech bark played host to the earliest Sanskrit letters. Patty pictures their tiny seed growing up to be covered with words. But where will the mass of such a massive book come from?

"We'll keep the tub moist and free of weeds for the next six years. When you turn sweet sixteen, we'll weigh the tree and the soil again."

She hears him, and understands. This is science, and worth a million times more than anything any person might ever swear to you.

IN TIME, she gets almost as good as her father at telling what's wilting or gnawing on a farmer's crops. He stops quizzing her and starts consulting,

not in front of the farmers, of course, but later, back in the car, when they have the luxury of thinking through the infestations as a team.

On her fourteenth birthday, he gives her a bowdlerized translation of Ovid's *Metamorphosis*. It's inscribed: *For my dear daughter, who knows how big and wide the family tree really is.* Patricia opens the book to the first sentence and reads:

Let me sing to you now, about how people turn into other things.

At those words, she's back where acorns are a step away from faces and pine cones compose the bodies of angels. She reads the book. The stories are odd and fluid, as old as humankind. They're somehow familiar, as if she were born knowing them. The fables seem to be less about people turning into other living things than about other living things somehow reabsorbing, at the moment of greatest danger, the wildness inside people that never really went away. By now Patricia's body is well along its own tortured metamorphosis into something she in no way wants. The new flare to her chest and hips, the start of a patch between her legs turns her, too, halfway into a more ancient beast.

She loves best the stories where people change into trees. Daphne, transformed into a bay laurel just before Apollo can catch and harm her. The women killers of Orpheus, held fast by the earth, watching their toes turn into roots and their legs into woody trunks. She reads of the boy Cyparissus, whom Apollo converts into a cypress so that he might grieve forever for his slain pet deer. The girl turns beet-, cherry-, apple-red at the story of Myrrha, changed into a myrtle after creeping into her father's bed. And she cries at that steadfast couple, Baucis and Philemon, spending the centuries together as oak and linden, their reward for taking in strangers who turned out to be gods.

Her fifteenth autumn comes. The days shorten. Night falls early, signaling the trees to drop their sugar-making project, shed all vulnerable parts, and harden up. Sap falls. Cells become permeable. Water flows out of the

trunks and concentrates into anti-freeze. The dormant life just below the bark is lined with water so pure that nothing is left to help it crystallize.

Her father explains how the trick is done. "Think about it! They've figured out how to live trapped in place, with no other protection, whipped by winds at thirty below zero."

Later that winter, Bill Westerford is coming home from a field trip after sundown when the Packard hits a patch of black ice. He's thrown from the car as it flips off the road into a ditch. His body flies for twenty-five feet before crashing into a row of Osage orange that farmers planted for a hedge a century and a half earlier.

At the funeral, Patty reads from Ovid. The promotion of Baucis and Philemon to trees. Her brothers think she has lost her mind with grief.

She won't let her mother throw anything out. She keeps his walking stick and porkpie hat in a kind of shrine. She preserves his precious library—Aldo Leopold, John Muir, his botany texts, the Ag Extension pamphlets he helped to write. She finds his copy of adult Ovid, marked all over, as people mark beeches. The underscores start, triple, on the very first line: *Let me sing to you now, about how people turn into other things.*

HIGH SCHOOL tries to kill her. Viola in the orchestra, the maple howling with old hillside memories, under her chin. Photography and volleyball. She has two almost-friends who understand the reality of animals, at least, if not quite plants. She shuns all jewelry, dresses in flannel and denim, carries a Swiss Army knife, and wears her long hair wrapped around her skull in braids.

A stepfather arrives, one who's smart enough not to try to reform her. There's a trauma involving a quiet boy who dreams for two years of taking her to the senior prom, a boy whose dream must die from a white-oak stake through the heart.

In the summer of her eighteenth year, preparing to head to Eastern Kentucky to study botany, she remembers the beech growing in its tub of soil, out by the barn. Shame rushes through her: How could she have forgot-

ten the experiment? She has missed her promise to her father by two years. Skipped sweet sixteen altogether.

She spends an entire July afternoon freeing the tree from the soil and crumbling every thimble of dirt from its roots. Then she weighs both the plant and the earth it fed on. The fraction of an ounce of beechnut now weighs more than she does. But the soil weighs just what it did, minus an ounce or two. There's no other explanation: almost all the tree's mass has come from the very air. Her father knew this. Now she does, too.

She replants their experiment in a spot behind the house where she and her father liked to sit on summer nights and listen to what other people called silence. She remembers what he told her about the species. People, God love 'em, must write all over beeches. But some people—some fathers—are written all over by trees.

Before she goes away to school, she puts the tiniest notch in the smooth gray booklike bark of the trunk with her army knife, four feet above the ground.

EASTERN KENTUCKY UNIVERSITY turns her into someone else. Patricia blooms like something southern-facing. The air of the sixties crackles as she crosses campus, a change in the weather, the smell of days lengthening, the scent of possibility breaking the cast of outdated thought, a clear wind rolling down from the hills.

Her dorm room overflows with potted plants. She's not the only one on her floor to fit a botanical garden between the student desk and bunk bed. But her plants are the only ones with strips of data taped to their terra-cotta pots. Where her friends grow baby's breath and blue-eyed violets, she grows tickseed and partridge pea and other experiments. And yet, she also cares for a bonsai juniper that looks to be a thousand years old, a spiky haiku of a creature with no scientific purpose whatsoever.

The girls from upstairs come down some nights to check on her. They've made her into a pet project. *Let's get Plant-Patty drunk. Let's fix Plant-Patty up with that beatnik econ guy.* They mock her studiousness and laugh at her

calling. They force her to listen to Elvis. They slip her into sleeveless sheaths and pile up her hair in a bouffant. They call her the Queen of Chlorophyll. She's not of the herd. She doesn't always hear them well, and when she does, their words don't always make sense. And yet her frantic fellow mammals do make her smile: miracles on all sides, and still they need compliments to keep them happy.

Sophomore year, Patty gets a job in the campus greenhouses—two hours stolen every morning before classes. Genetics, plant physiology, and organic chemistry take her through evening. She studies every night at her carrel until the library closes. Then she reads for pleasure until she falls asleep. She does try the books her friends are reading: *Siddhartha*, *Naked Lunch*, *On the Road*. But nothing else moves her more than Peattie's *Natural Histories*, books from her father's shelves. Now they're her endless refreshment. Their phrases branch and turn to catch the sun:

> *Thrones have crumbled and new empires arisen; great ideas have been born and great pictures painted, and the world revolutionized by science and invention; and still no man can say how many centuries this Oak will endure or what nations and creeds it may outlive. . . .*
>
> *Where the deer bound, where the trout rise, where your horse stops to slather a drink from icy water while the sun is warm on the back of your neck, where every breath you draw is exhilaration — that is where the Aspens grow. . . .*

And of her father's beloved tree:

> *Let other trees do the work of the world. Let the Beech stand, where still it holds its ground . . .*

She never exactly becomes a swan. Yet the senior who emerges out of freshman ugly ducklinghood knows what she loves and how she intends to

spend her life, and that's a novelty among the youth of any year. Those she doesn't scare away come sniff her out, this keen, homely, forthright girl who has escaped the stoop of constant social compliance. To her astonishment, she even has suitors. Something about her perks boys up. Not her looks, of course, but an ever-so-slightly head-turning quality to her walk that they can't quite place. Independent thought—a power of attraction all its own.

When boys come calling, she makes them take her for a picnic lunch in Richmond Cemetery—serving the needs of dead people since 1848. Sometimes they flee, and that's that. If they stick around and mention the trees, she'll see them again. Desire, she scribbles into her field notebooks, turns out to be infinitely varied, the sweetest of evolution's tricks. And in the pollen storms of spring, even she turns out to be a more than adequate flower.

One boy sticks around, month after month. Andy, the English major. He plays in the orchestra with her and loves Hart Crane and O'Neill and *Moby-Dick*, although he can't say why. He can get birds to land on his shoulder. He's waiting for something to come and redeem his aimless life. One night, over cribbage, he says he thinks it might be her. She takes him by the hand and leads him to her narrow bed. Clumsy and green, they peel back the shields of clothing. Ten minutes later, she's turned into a tree just a little too late to be spared.

REAL LIFE STARTS in graduate school. There are mornings in West Lafayette when Patricia Westerford's luck scares her. *Forestry* school. She feels unworthy. Purdue pays her to take classes that she has craved for years. She gets food and lodging for teaching undergraduate botany, something she'd gladly pay to do. And her research demands long days in the Indiana woods. It's an animist's heaven.

But by her second year, the catch becomes clear. In a seminar on forest management, the professor declares that snags and windthrow should be cleaned up from the forest floor and pulped, to improve forest health. That doesn't seem right. A healthy forest must need dead trees. They've been around since the beginning. Birds turn them to use, and small mammals, and

more forms of insects lodge and dine on them than science has ever counted. She wants to raise her hand and say, like Ovid, how all life is turning into other things. But she doesn't have the data. All she has is the intuition of a girl who grew up playing in the forest litter.

Soon, she sees. Something is wrong with the entire field, not just at Purdue, but nationwide. The men in charge of American forestry dream of turning out straight clean uniform grains at maximum speed. They speak of *thrifty* young forests and *decadent* old ones, of *mean annual increment* and *economic maturity*. She's sure these men who run the field will have to fall, next year or the year after. And up from the downed trunks of their beliefs will spring rich new undergrowth. That's where she'll thrive.

She preaches this covert revolution to her undergrads. "You'll look back in twenty years, amazed at what every smart person in forestry took to be self-evident truth. It's the refrain of all good science: '*How could we not have seen?*' "

She works well with her fellow grads. She goes to the barbecues and hootenannies and manages to take part in departmental gossip while remaining her own little sovereign state. One night there's a dizzy, warm, wild misunderstanding with a woman in plant genetics. Patricia puts the embarrassed fumble away in a drawer of her heart and never takes it out again, even to look at.

A secret suspicion sets her apart from the others. She's sure, on no evidence whatsoever, that trees are social creatures. It's obvious to her: motionless things that grow in mass mixed communities must have evolved ways to synchronize with one another. Nature knows few loner trees. But the belief leaves her marooned. Bitter irony: here she is, with her people, at last, and even they can't see the obvious.

Purdue gets hold of one of the first prototype quadrupole gas chromatography-mass spectrometers. Some pagan god brings the machine right to Patricia, as a reward for her constancy. With such a device, she can measure which volatile organic compounds the grand old eastern trees put into the air and what these gases do to the neighbors. She pitches the

idea to her advisor. People know nothing about the stuff trees make. It's a whole new green world, ripe for discovery.

"How will that produce anything useful?"

"It might not."

"Why do you need to do this in a forest? Why not the campus test plots?"

"You wouldn't study wild animals by going to the zoo."

"You think cultivated trees behave differently than trees in a forest?"

She's sure of it. But his sigh is as clear as a public service announcement: Girls doing science are like bears riding bikes. Possible, but freakish. "I'll reserve some trees in the wood lot. It'll make things easier and save you lots of time."

"There's no hurry."

"Your dissertation. Your time to waste."

She wastes it with the most intense pleasure. The work isn't glamorous. It consists of taping numbered plastic bags over the ends of branches, then collecting them at measured intervals. She does this over and over, dumbly and mutely, hour by hour, while the world around her rages with assassination, race riot, and jungle warfare. She works all day in the woods, her back crawling with chiggers, her scalp with ticks, her mouth filled with leaf duff, her eyes with pollen, cobwebs like scarves around her face, bracelets of poison ivy, her knees gouged by cinders, her nose lined with spores, the backs of her thighs bitten Braille by wasps, and her heart as happy as the day is generous.

She brings the collected samples back into the lab and spends hour after tedious hour puzzling out the concentrations and molecular weights, determining which gases each of her trees breathed out. There must be thousands of compounds. Tens of thousands. The tedium makes her ecstatic. She calls it the science paradox. It's the most brain-crushing work a person can do, yet it can spring the mind enough to see what else but the mind is really out there. And she gets to work in the dappling sun and rain, the stink of humus filling up her nose with relentlessly musky life. Out in the woods, her father is with her again, all day long. She asks him things, and the mere act of asking out loud helps her see. What starts a shelf fungus growing at just a certain height up a trunk? How many square meters of solar panel does a given tree put

out? Why should there be such tremendous difference in size between the leaf of a serviceberry and that of a sycamore?

It's a miracle, she tells her students, photosynthesis: a feat of chemical engineering underpinning creation's entire cathedral. All the razzmatazz of life on Earth is a free-rider on that mind-boggling magic act. The secret of life: plants eat light and air and water, and the stored energy goes on to make and do all things. She leads her charges into the inner sanctum of the mystery: Hundreds of chlorophyll molecules assemble into antennae complexes. Countless such antennae arrays form up into thylakoid discs. Stacks of these discs align in a single chloroplast. Up to a hundred such solar power factories power a single plant cell. Millions of cells may shape a single leaf. A million leaves rustle in a single glorious ginkgo.

Too many zeros: their eyes glaze over. She must shepherd them back over that ultrafine line between numbness and awe. "Billions of years ago, a single, fluke, self-copying cell learned how to turn a barren ball of poison gas and volcanic slag into this peopled garden. And everything you hope, fear, and love became possible." They think she's nuts, and that's fine with her. She's content to post a memory forward to their distant futures, futures that will depend on the inscrutable generosity of green things.

Late at night, too tired from teaching and research to work more, she reads her beloved Muir. *A Thousand-Mile Walk to the Gulf* and *My First Summer in the Sierra* float her soul up to her room's ceiling and spin it like a Sufi. She writes her favorite lines in the inside covers of her field notebooks and peeks at them when department politics and the cruelty of frightened humans get her down. The words withstand the full brutality of day.

We all travel the Milky Way together, trees and men. . . . In every walk with nature one receives far more than he seeks. The clearest way into the universe is through a forest wilderness.

PLANT-PATTY becomes Dr. Pat Westerford, a way to disguise her gender in professional correspondence. Her work on tulip trees earns her a doctorate. It turns out that those thick, long lengths of culvert pipe stood on end

are factories richer than anyone suspects. *Liriodendron* has a repertoire of scents. It breathes out volatile organic compounds that do all kinds of things. She doesn't yet know how the system works. She just knows it's rich and beautiful.

She lands a postdoc at Wisconsin. She searches Madison for relics of Aldo Leopold. She looks for the towering black locust, with its fragrant racemes and pea-pod seeds, the tree that stunned Muir into becoming a naturalist. But the world-changing locust was cut down twelve years before.

The postdoc turns into an adjunct position. She makes almost nothing, but life requires little. Her budget is blessedly free of those two core expenses, entertainment and status. And the woods teem with free food.

She starts to examine sugar maples, in a forest east of town. Her breakthrough comes as breakthroughs often do: by long and prepared accident. Patricia arrives in her copse on a balmy day in June to find one of her bagged trees under full-scale insect invasion. At first it seems that the last several days of data are ruined. Improvising, she keeps the samples from the damaged tree, as well as several nearby maples. Back in the lab, she widens the list of compounds she looks at. Over the next few weeks, she finds something that even she isn't ready to believe.

Another nearby tree gets infested. She measures again. Again, she doubts the evidence. Fall begins, and the leaves of her complex chemical factories shutter and drop to the forest floor. She battens down for the winter, teaching, double-checking her results, trying to accept their crazy implications. She wanders the woods, wondering if she should publish or run the experiment for another year. The oaks in her forest shine scarlet still, the beeches a stunning bronze. It seems wise to wait.

Confirmation comes the following spring. Three more trials, and she's convinced. The trees under attack pump out insecticides to save their lives. That much is uncontroversial. But something else in the data makes her flesh pucker: trees a little way off, untouched by the invading swarms, ramp up their own defenses when their neighbor is attacked. Something *alerts* them. They get wind of the disaster, and they prepare. She controls for everything she can, and the results are always the same. Only one conclusion makes any

sense: The wounded trees send out alarms that other trees smell. Her maples are *signaling*. They're linked together in an airborne network, sharing an immune system across acres of woodland. These brainless, stationary trunks are protecting each other.

She can't quite let herself believe. But the data keep confirming. And on that evening when Patricia finally accepts what the measurements say, her limbs heat up and tears run down her face. For all she knows, she's the first creature in the expanding adventure of life who has ever glimpsed this small but certain thing that evolution is up to. Life is talking to itself, and she has listened in.

She writes up the results as soberly as she can. Her report is all chemistry, concentrations, and rates—nothing but what the gas chromatography equipment records. But in her paper's conclusion, she can't resist suggesting what the results spell out:

> *The biochemical behavior of individual trees may make sense only when we see them as members of a community.*

Dr. Pat Westerford's paper gets accepted by a reputable journal. The peer reviewers raise their eyebrows, but her data are sound and no one can find any problems except common sense. On the day the article appears, Patricia feels she has discharged her debt to the world. If she dies tomorrow, she'll still have added this one small thing to what life has come to know about itself.

The press picks up on her findings. She does an interview for a popular science magazine. She struggles to hear the questions over the phone and stumbles with her answers. But the piece runs, and other newspapers pick it up. "Trees Talk to One Another." She gets a few letters from researchers across the country, asking for details. She's invited to speak at the midwestern branch meeting of the professional forestry society.

Four months later, the journal that ran the piece prints a letter signed by three leading dendrologists. The men say her methods are flawed and her statistics problematic. The defenses of the intact trees could have been activated by other mechanisms. Or these trees might already have been com-

promised by insects in ways she didn't notice. The letter mocks the idea that trees send each other chemical warnings:

> *Patricia Westerford displays an almost embarrassing misunderstanding of the units of natural selection. . . . Even if a message is in some way "received," it would in no way imply that any such message has been "sent."*

The short letter contains four uses of the word *Patricia* and no mention of *Doctor*, until their own signatures. Two Yale professors and a name chair at Northwestern, versus an unknown adjunct girl at Madison: No one in the profession bothers trying to replicate Patricia Westerford's findings. Those researchers who wrote her for more information stop responding to her letters. The newspapers that ran the wide-eyed articles follow up with accounts of her brutal debunking.

Patricia goes through with her scheduled talk at the midwestern forestry conference, in Columbus. The room is small and hot. Her hearing aids howl with feedback. Her slides jam in the carousel. The questions are hostile. Fielding them from behind the podium, Patricia feels her old childhood speech defect returning to punish her for her hubris. For the three agonizing days of the conference, people nudge each other as she passes them in the halls of the hotel: *There's the woman who thinks that trees are intelligent.*

Madison doesn't renew her lectureship. She scrambles to line up a job elsewhere, but it's too late in the season. She can't even get work washing glassware for some other researcher. No other animal closes ranks faster than *Homo sapiens*. Without a lab to use, she can't vindicate herself. At thirty-two, she starts substitute teaching in high schools. Friends in the field murmur in sympathy, but none goes public to defend her. Meaning drains from her like green from a maple in fall. After long weeks in solitude replaying what happened, she decides it's time to shed.

She's too cowardly to give in to the scenarios that play in her head most nights as she tries to fall asleep. The pain prevents her. Not hers: the pain she'd inflict on her mother and brothers and remaining friends. Only the

woods protect her from undying shame. She tramps the winter trails, feeling the thick, sticky horse chestnut buds with her frozen fingers. The understory fills up with tracks like longhand accusations scribbled on the snow. She listens to the forest, to the chatter that has always sustained her. But all she can hear is the deafening wisdom of crowds.

Half a year passes at the bottom of a well. One bright blue crisp Sunday morning in high summer, Patricia finds several unexpanded caps of *Amanita bisporigera* under a stand of oak in the bottomlands of Token Creek. The fungi are beautiful, but take forms that would make the old Doctrine of Signatures blush. She gathers them in her mushroom bag and brings them home. There, she cooks up a Sunday feast for one: chicken tenderloins in butter, olive oil, garlic, shallots, and white wine, all seasoned with just enough Destroying Angel to shut down both her kidneys and her liver.

She sets the table and sits down to a meal that smells like health itself. The beauty of the plan is that no one will know. Every year, amateur mycologists mistake young *A. bisporigera* for *Agaricus silvicola* or even *Volvariella volvacea.* Neither her friends nor family nor former colleagues will think anything but this: she was wrong in her controversial research, and wrong in her choice of fungal fruiting bodies for her dinner. She brings the steaming forkful to her lips.

Something stops her. Signals flood her muscles, finer than any words. *Not this. Come with. Fear nothing.*

The fork drops back to the plate. She rouses as from sleepwalking. Fork, plate, mushroom feast: everything turns, as she watches, into a fit of madness, lifted. In another heartbeat, she can't believe what her animal fear was willing to make her do. The opinion of others left her ready to suffer the most agonizing of deaths. She runs the entire meal down the garbage disposal and goes hungry, a hunger more wonderful than any meal.

Her real life starts this night—a long, postmortem bonus round. Nothing in the years to come can do worse than she was ready to do to herself. Human estimation can no longer touch her. She's free now to experiment. To discover anything.

Then several missing years. From the outside, yes: Patricia Wester-

ford disappears into underemployment. Sorting storeroom boxes. Cleaning floors. Odd jobs leading from the Upper Midwest through the Great Plains toward the high mountains. She has no affiliation, no access to equipment. Nor does she try for lab positions or teaching stints, even when former colleagues encourage her to apply. Pretty much all her old friends add her to the roster of science roadkill. In fact, she's busy learning a foreign language.

With few claims on her time and none on her soul, she turns back outside, into the woods, the green negation of all careers. She no longer theorizes or speculates. Just watches, notes, and sketches into a stack of notebooks, her only persistent possessions aside from clothes. Her eyes go near and narrow. She camps out many nights with Muir, under the spruce and fir, completely lost, turned wildly around by the smell of inland oceans, sleeping on beds of thick lichen, sixteen inches of brown needle pillow, the living earth beneath her bag, its fluid influence rising up into the fiber of her and all the towering trunks that surround and watch over. The particle of her private *self* rejoins everything it has been split off from—the plan of runaway green. *I only went out for a walk and finally concluded to stay out till sundown, for going out, I found, was really going in.*

She reads Thoreau over wood fires at night. *Shall I not have intelligence with the earth? Am I not partly leaves and vegetable mould myself?* And: *What is this Titan that has possession of me? Talk of mysteries!—Think of our life in nature,—daily to be shown matter, to come in contact with it,—rocks, trees, wind on our cheeks! the* solid *earth! the* actual *world! the* common sense*!* Contact! Contact! Who are we? where are we?

Now she drifts farther west. It's amazing how far a little war chest will go, once you learn how to forage. This country is awash in food free for the eating. You just need to know where to look. She glimpses her own face once, while splashing water on it in the bathroom of a service station near a national forest in a state where she's the merest beginner. She looks marvelously weathered, old beyond her years. She has gone to seed. Soon she'll start to scare people. Well, she has always scared people. Angry people who hated wildness took away her career. Frightened people mocked her for saying that trees send messages to each other. She forgives them all. It's

nothing. What frightens people most will one day turn to wonder. And then people will do what four billion years have shaped them to do: stop and see just what it is they're seeing.

On a late fall afternoon she pulls her ancient beater over to the side of the road along a stretch of the Fishlake Scenic Byway, on the western edge of the Colorado Plateau in south-central Utah. She has followed back roads from Las Vegas, capital of clueless sinners, toward Salt Lake, capital of cunning saints. She gets out of the car and walks up into the trees on the crest west of the road. Aspens stand in the afternoon sun, spreading along the ridge out of sight. *Populus tremuloides*. Clouds of gold leaf glint on thin trunks tinted the palest green. The air is still, but the aspens shake as if in a wind. Aspens alone quake when all others stand in dead calm. Long flattened leafstalks twist at the slightest gust, and all around her, a million two-toned cadmium mirrors flicker against righteous blue.

The oracle leaves turn the wind audible. They filter the dry light and fill it with expectation. Trunks run straight and bare, roughed with age at the bottom, then smooth and whitening up to the first branches. Circles of pale green lichen palette-spatter them. She stands inside this white-gray room, a pillared foyer to the afterlife. The air shivers in gold, and the ground is littered with windfall and dead ramets. The ridge smells wide open and sere. The whole atmosphere is as good as a running mountain stream.

Patricia Westerford hugs herself, and, for no reason, begins to cry. The tree of the Navajo sun house chant. The tree Hercules turned into a wreath, the one he sacrificed, when coming back from hell. The one whose brewed leaves protected native hunters from evil. This, the most widely distributed tree in North America with close kin on three continents, all at once feels unbearably rare. She has hiked through aspens far north into Canada, the lone hardwood holdout in a latitude monotonous with conifer. Has sketched their pale summer shades throughout New England and the Upper Midwest. Has camped among them on hot, dry outcrops above gushing streams of snowmelt, in the Rockies. Has found them etched with knowledge-encoded native arborglyphs. Has lain on her back with her eyes closed, in far southwestern mountains, memorizing the tone of that restless shudder. Picking

her way across these fallen branches, she hears it again. No other tree makes this sound.

The aspens wave in their undetectable breeze, and she begins to see hidden things. High up on one trunk, she reads claw-gashes above her head, the cryptic writing of bears. But these slashes are old and rimmed with blackened scars; no bears have crossed these woods in a long time. Tangled roots spill from the banks of a rivulet. She studies them, the exposed edge of a network of underground conduits conducting water and minerals across dozens of acres, up the rise to other, seemingly separate stems that line the rocky outcrops where water is hard to find.

At the height of the rise is a little clearing, slashed down with a chain saw. Someone has been out improving things. She produces her loupe from her key chain and applies it to one stump to estimate the number of rings. The oldest downed trees are about eighty years. She smiles at the number, so comical, for these fifty thousand baby trees all around her have sprouted from a rhizome mass too old to date even to the nearest hundred millennia. Underground, the eighty-year-old trunks are a hundred thousand, if they're a day. She wouldn't be surprised if this great, joined, single clonal creature that looks like a forest has been around for the better part of a million years.

That's why she has stopped: to see one of the oldest, largest living things on earth. All around her spreads one single male whose genetically identical trunks cover more than a hundred acres. The thing is outlandish, beyond her ability to wrap her head around. But then, as Dr. Westerford knows, the world's outlands are everywhere, and trees like to toy with human thought like boys toy with beetles.

Across the road from where she's parked, aspens tumble down the basin toward Fish Lake, where five years earlier a Chinese refugee engineer took his three daughters camping on the way to visiting Yellowstone. The oldest girl, named for a Puccini opera heroine, will soon be wanted by the feds for fifty million dollars of arson.

Two thousand miles to the east, a student sculptor born into an Iowa farming family, on a pilgrimage to the Met, walks past the single quaking aspen in all of Central Park and doesn't notice it. He'll live to walk past the

tree again, thirty years later, but only because of swearing to the Puccini heroine that no matter how bad things get, he won't kill himself.

To the north, up the curving spine of the Rockies, on a farm near Idaho Falls, a veteran airman, that very afternoon, builds horse stalls for a friend from his old squadron. It's a pity hire, one that comes with room and board, and the vet plans to leave the gig as soon as he can. But for today, he makes the corral siding out of aspen. As poor as the wood is for lumber, it won't shatter when a horse kicks it.

In a St. Paul suburb not far from Lake Elmo, two aspens grow near the south wall of an intellectual property lawyer's house. He's only dimly aware of them, and when his free-spirit girlfriend asks, he tells her they're birches. In time, two great strokes will lay the lawyer low, reducing all aspens, birches, beeches, pines, oaks, and maples to a single word that will take him half a minute to pronounce.

On the West Coast, in the emerging Silicon Valley, a Gujarati-American boy and his father build primitive aspens out of chunky, black-and-white pixels. They're writing a game that feels to the boy like walking through the forest primeval.

These people are nothing to Plant-Patty. And yet their lives have long been connected, deep underground. Their kinship will work like an unfolding book. The past always comes clearer, in the future.

Years from now, she'll write a book of her own, *The Secret Forest*. Its opening page will read:

> You and the tree in your backyard come from a common ancestor. A billion and a half years ago, the two of you parted ways. But even now, after an immense journey in separate directions, that tree and you still share a quarter of your genes. . . .

She stands in the clearing at the top of the rise, looking out over a shallow gully. Aspens everywhere, and it boggles her mind that not one of them has grown from seed. All through this part of the West, few aspens have done so

in ten thousand years. Long ago, the climate changed, and an aspen's seeds can no longer thrive here. But they propagate by root; they spread. There are aspen colonies up north where the ice sheets were, older than the sheets themselves. The motionless trees are *migrating*—immortal stands of aspen retreating before the latest two-mile-thick glaciers, then following them back north again. Life will not answer to reason. And *meaning* is too young a thing to have much power over it. All the drama of the world is gathering underground—massed symphonic choruses that Patricia means to hear before she dies.

She looks out over the draw to guess which way her male, this giant aspen clone, might be headed. He has been roving around the hills and gullies in a ten-millennium search for a female quaking giant to fertilize. Something on the next rise punches her in the chest. Carved out from the heart of the spreading clone, a housing development sits among a ribbon of new roads. Condos, a few days old, cut through several acres of the root system of one of the earth's most lavish things. Dr. Westerford closes her eyes. She has seen dieback across the West. Aspens are withering. Grazed on by everything with hooves, cut off from rejuvenating fire, whole groves are vanishing. Now she sees a forest, spreading across these mountains since before humans left Africa, giving way to second homes. She sees it in one great glimpse of flashing gold: trees and humans, at war over the land and water and atmosphere. And she can hear, louder than the quaking leaves, which side will lose by winning.

IN THE EARLY EIGHTIES, Patricia heads northwest. Giants still grow in the Lower 48, pockets of old growth scattered from Northern California on up to Washington. She means to see what uncut forest looks like, while there is any left to see. The western Cascades in a damp September: nothing in her experience prepares her. From mid-distance, with no clue for scale, the trees seem no larger than the biggest sycamores and tulip poplars out East. But up close the illusion disappears, and she's lost in reason's opposite. All she can do is look and laugh and look some more.

Hemlock, grand fir, yellow cedar, Douglas-fir: buttressed monster conifers disappear in the mist above her. Sitka spruces bulge out in burls as big as minivans—pound for pound, a wood stronger than steel. A single trunk could fill a large logging truck. Even runts here are big enough to dominate an eastern forest, and each acre holds at least five times as much wood. Beneath these giants, way down in the understory, her own body seems freakishly small, like one of those acorn-people she made in childhood. A knothole in one of these columns of solidified air could be her home.

Clicks and chatter disturb the cathedral hush. The air is so twilight-green she feels like she's underwater. It rains particles—spore clouds, broken webs and mammal dander, skeletonized mites, bits of insect frass and bird feather. . . . Everything climbs over everything else, fighting for scraps of light. If she holds still too long, vines will overrun her. She walks in silence, crunching ten thousand invertebrates with every step, watching for tracks in a place where at least one of the native languages uses the same word for *footprint* and *understanding*. The earth gives beneath her like a shot mattress.

An exposed ridge takes her down into a basin. She swings her singing stick before her, and the temperature plummets as she passes through a thermal curtain. The canopy is a colander stippling the beetle-swarmed surfaces with specks of sun. For every large trunk, a few hundred seedlings huddle in the litter. Sword fern, liverworts, lichen, and leaves as small as sand grains stain every inch of the dank, downed logs. The mosses are themselves as dense as thumbnail forests.

She presses on fissures of bark and her fingers sink in knuckle-deep. A bit of bushwhacking reveals the extent of the prodigious rot. Crumbling, creature-riddled boles, decaying for centuries. Snags gothic and twisted, silvery as inverted icicles. She has never inhaled such fecund putrefaction. The sheer mass of ever-dying life packed into each single cubic foot, woven together with fungal filaments and dew-betrayed spiderweb leaves her woozy. Mushrooms ladder up the sides of trunks in terraced ledges. Dead salmon feed the trees. Soaked by fog all winter long, spongy green stuff she can't name covers every wooden pillar in thick baize reaching higher than her head.

Death is everywhere, oppressive and beautiful. She sees the source of

that forestry doctrine she so resisted in school. Looking at all this glorious decay, a person might be forgiven for thinking that *old* meant decadent, that such thick mats of decomposition were cellulose cemeteries in need of the rejuvenating ax. She sees why her kind will always dread these close, choked thickets, where the beauty of solo trees gives way to something massed, scary, and crazed. When the fable turns dark, when the slasher film builds to primal horror, this is where the doomed children and wayward adolescents must wander. There are things in here worse than wolves and witches, primal fears that no amount of civilizing will ever tame.

The prodigious forest pulls her along, past the trunk of an immense western red cedar. Her hand strokes the fibrous strips that peel from a fluted trunk whose girth rivals the height of an eastern dogwood. It reeks of incense. The top has sheared off, replaced by a candelabra of boughs promoted to stand-in trunks. A grotto opens at ground level in the rotted heartwood. Whole families of mammals could live inside it. But the branches, a thousand years on, drooping with scaly sprays a dozen stories above her, are still crammed full of cones.

She addresses the cedar, using words of the forest's first humans. "Long Life Maker. I'm here. Down here." She feels foolish, at first. But each word is a little easier than the next.

"Thank you for the baskets and the boxes. Thank you for the capes and hats and skirts. Thank you for the cradles. The beds. The diapers. Canoes. Paddles, harpoons, and nets. Poles, logs, posts. The rot-proof shakes and shingles. The kindling that will always light."

Each new item is release and relief. Finding no good reason to quit now, she lets the gratitude spill out. "Thank you for the tools. The chests. The decking. The clothes closets. The paneling. I forget.... Thank you," she says, following the ancient formula. "For all these gifts that you have given." And still not knowing how to stop, she adds, "We're sorry. We didn't know how hard it is for you to grow back."

SHE FINDS WORK with the Bureau of Land Management. Wilderness ranger. The job description seems as miraculous as the outsized trees: Help

preserve and protect for present and future generations places where man is a visitor who does not remain. The wild woman must don a uniform. But they pay her to be by herself, carry the welcome weight of a pack, read a topographic map, dig a water bar, look for smoke and fire, teach folks to leave no trace, follow the rhythms of the land, and live wholly within the arc of the year. To clean up after humankind, yes. To gather the endless twisties, baggies, six-pack rings, foil, cans, and bottle caps strewn through meadows of wildflower, on remote scenic outlooks, skewered in the boughs of noble firs, under cold running streams, behind waterfalls. She would gladly pay the government, to do that much.

Her supervisor apologizes for the state of the cabin they give her, on the edge of an ancient cedar grove. There's no running water, and the varmints outweigh the new biped in biomass, many times over. She can only laugh. "You don't understand. You don't understand. It's the Alhambra."

TOMORROW SHE'LL HIKE twenty-five miles, loosening the bolts on the signs attached to trailside trees, so their cambium can keep growing. There's a spot on the other side of the ridge where the bark of a big spruce has swallowed an old Forest Service plaque from the forties that now says only BEWARE OF.

The nightly rain starts. She goes out to the clearing and sits in the downpour, dressed only in a loose cotton shirt, listening to the wood put forth fresh cells. She comes back inside. In the kitchen, she lights the kerosene lamp with chunky strike-anywhere matches and takes the flame into the bedroom. The thump of a bushy-tailed wood rat telegraphs another raid on her worthless belongings. Last week it was a pair of barrettes. Too dark to search for the latest missing loot tonight. She sponges off over the cold-water zinc basin in the corner and gets in bed. No sooner does her ear listen in to the musty pillow than she's transported to the ancestral vacation home, where the future still radiates endless forms most beautiful.

SHE WORKS for eleven blissful months. The wildlife never once threatens her, and deranged campers do so only twice. In the constant rain, everything grows mold. Monster trees suck up the downpour and respire it back into the air as steam. Spores spread across every damp surface. Both her legs sport athlete's foot up to the knees. Sometimes, when she lies down and closes her eyes, she feels that moss will cover her lids by the time she opens them again. She labors for days to make a storage pad, hacking back the brush from a few square feet. By year's end, the little nick in the undergrowth is covered again in shrub and saplings. She loves feeling that every headway man tries to make into the relentless green blitz will be crushed.

UNKNOWN TO HER, while she rehabs backcountry fire rings and cleans up illegal campsites fouled with beer cans and toilet paper, an article appears. It's published in a reputable journal, one of the best that humankind has managed. Trees trade airborne aerosol signals, the article says. They make medicines. Their fragrances alert and awaken their neighbors. They can sense an attacking species and summon an air force to come to their aid. The authors cite her earlier, much-mocked article. They reproduce her findings and extend them into surprising places. Words of hers that she has all but forgotten have gone on drifting out on the open air, lighting up others, like a waft of pheromones.

PATRICIA IS OUT ONE DAY in an unfamiliar drainage, sawing windthrow from a remote trail. She sees a motion in the undergrowth—the most dangerous game. Drawing nearer, she spies two researchers, a couple of vagabond scientists from that loose confederation who gather every summer in the flimsy trailers full of lab gear in a clearing a handful of miles from her own cabin. She dreads these run-ins with her old tribe. She always says as little as possible. Today, she holds back and watches. Through the woods, at this distance, the two men look like upright, blundering circus bears in lumberjack costumes.

The pair bushwhack a little, closing in on a spot that interests them. One of the men hoots softly, a perfect, purring impersonation. She has heard the call at night, although she has never seen the caller. This imitation would fool her. The man calls again. Incredibly, something answers. A duet ensues: the bright, pert, human come-on, followed by the logy but obliging bird, hidden in the trees. A streak in the air, and the owl appears. Bird of wisdom and sorçerers. It's the first *Strix occidentalis* Patricia has ever seen. Spotted owl: the endangered species that scientists propose to save by locking up billions of dollars of old growth, the only place it can live. It settles down, mythic, on a branch three yards from its seducers. Bird and men regard each other. One species takes pictures. The other just spins its head and blinks its enormous eyes. Then the owl is gone, followed, after further note-taking, by the humans, leaving Patricia Westerford wondering if she wakes or sleeps.

Three weeks later, she's near the same spot, pulling invasive plants. The thick, furry twigs of ailanthus suckers leave her fingers stinking of coffee and peanut butter. She climbs a switchback at a good clip and runs into the two researchers again. They're several yards up the slope, kneeling by a downed log. Before she can flee, they see her and wave. Caught, she waves back and hikes up to them. The older man is on the ground, on his side, popping tiny creatures into specimen bottles.

"Ambrosia beetles?" The two heads turn toward her, startled. Dead logs: the topic was her passion once, and she forgets herself. "When I was a student, my teacher told us that fallen trunks were nothing but obstacles and fire hazards."

The man on the ground looks up at her. "Mine said the same thing."

" 'Clear them off to improve forest health.' "

" 'Burn them out for safety and cleanliness. Above all, keep them out of streams.' "

" 'Lay down the law and get the stagnant place producing again!' "

All three of them chuckle. But the chuckle is like pressing on a wound. *Improve forest health*. As if forests were waiting all these four hundred million years for us newcomers to come cure them. Science in the service of willful blindness: How could so many smart people have missed the obvious? A

person has only to look, to see that dead logs are far more alive than living ones. But the senses never have much chance, against the power of doctrine.

"Well," the man on the ground says, "I'm sticking it to the old bastard now!"

Patricia smiles, hope pushing through the ache like a breeze through rain. "What are you studying?"

"Fungi, arthropods, reptiles, amphibians, small mammals, frass, webs, denning, soil. . . . Everything we can catch a dead log doing."

"How long have you been at it?"

The two men trade looks. The younger man hands down another sample bottle. "We're six years in."

Six years, in a field where most studies last a few months. "Where on earth did you find funding for that long?"

"We're planning to study this particular log until it's gone."

She laughs again, a little wilder. A cedar trunk on the wet forest floor: their grad students' great-great-great-grandchildren will have to finish the project. Science, in her absence, has gone as crazy as she always thought it should be. "You'll disappear long before it does."

The man on the ground sits up. "Best thing about studying the forest. You're dead by the time the future can blame you for missing the obvious!" He looks at her as if she, too, is worth researching. "Dr. Westerford?"

She blinks, as baffled as any owl. Then she remembers her uniform badge, on her chest for anybody to read. But that *Doctor.* He could only have gotten that from her buried past. "I'm sorry," she says. "I don't remember ever meeting you."

"You haven't! I heard you talk, years ago. Forest studies conference, in Columbus. Airborne signaling. I was so impressed, I ordered offprints of your article."

That wasn't me, she wants to say. *That was somebody else. Someone lying dead and rotting somewhere.*

"They hit you pretty hard."

She shrugs. The younger scientist looks on like a kid on a visit to the Smithsonian.

"I knew you'd be vindicated." Her bafflement is enough to tell him everything. Why she's in the uniform of a wilderness ranger. "Patricia. I'm Henry. This is Jason. Come visit the station." His voice is soft but urgent, like there's something at stake. "You'll want to see what our group is doing. You'll want to learn what your work's been up to, while you were gone."

BY DECADE'S END, Dr. Westerford makes her most surprising discovery of all: she may just love her fellow men. Not all of them, but robustly and with enduring green gratitude, at least those three dozen regulars who take her in and make a home for her in the Dreier Research Station, Franklin Experimental Forest, the Cascades, where she spends several dozen months in a row that are happier and more productive than she imagined possible. Henry Fallows, the group's senior scientist, puts her on a grant. Two other research teams from Corvallis add her to their payrolls. Money is tight, but they give her a mildewed trailer in the Ghetto in the Meadow and access to the mobile lab—all the reagents and pipettes she needs. The latrines and the community showers are sinful indulgences, compared to her BLM cabin, with its frigid sponge baths on the porch at night. Then there's cooked food, in the shared mess hall, although some days she's so immersed in work that someone must come remind her that it's time to eat again.

Her public reputation, like Demeter's daughter, crawls back up from the underworld. A scattering of scientific papers vindicates her original work in airborne semaphores. Young researchers find supporting evidence, in species after species. Acacias alert other acacias to prowling giraffes. Willows, poplars, alders: all are caught warning each other of insect invasion across the open air. It makes no difference, her rehabilitation. She doesn't much care what happens, outside this forest. All the world she needs is here, under this canopy—the densest biomass anywhere on Earth. Steep, steely streams scour through rickles of rock where salmon spawn—water cold enough to kill all pain. Falls flash over ridges turned jade by moss and tumbled with shed branches. In the scattered openings, shot here and there through the understory, sit secret congregations of salmonberry, elderberry, huckleberry,

snowberry, devil's club, ocean spray, and kinnikinnick. Great straight conifer monoliths fifteen stories high and a car-length thick hold a roof above all. The air around her resounds with the noise of life getting on with it. *Cheebee* of invisible winter wrens. Industrial pock from jackhammering woodpeckers. Warbler buzz. Thrush flutter. The scatterings of beeping grouse across the forest floor. At night, the cool hoot of owls chills her blood. And, always, the tree frogs' song of eternity.

Through this Eden, her colleagues' astonishing discoveries confirm her suspicions. Slow, long observation makes a laughingstock of what people think about trees. In a nutshell: the rich brown batter of soil—itself mostly unknown microbes and invertebrates, perhaps a million species—channels decay and builds on death in ways she only now begins to suss out. It thrills her to sit at meals and be part of the laughter and shared data, the dizzy network trading in discoveries. The whole group of them, *looking*. Birders, geologists, microbiologists, ecologists, evolutionary zoologists, soil experts, high priests of water. Each of them knows innumerable minute, local truths. Some work on projects designed to run for two hundred years or more. Some are straight out of Ovid, humans on their way to turning into greener things. Together, they form one great symbiotic association, like the ones they study.

Turns out that the temperate jungle's million invisible tangled loops need every kind of death-brokering intermediary to keep the circuits coursing. Clean up such a system, and the countless self-replenishing wells run dry. This gospel of new forestry is confirmed by the most wonderful findings: beards of lichen high in the air, that grow only on the oldest trees and inject essential nitrogen back into the living system. Subterranean voles that feed on truffles and spread the spores of angel fungi across the forest floor. Fungi that infuse into the roots of trees in partnerships so tight it's hard to say where one organism leaves off and the other begins. Hulking conifers that sprout adventitious roots high in the canopy that dip back down to feed on the mats of soil accumulating in the vees of their own branches.

Patricia gives herself to Douglas-firs. Arrow-straight, untapering, soaring up a hundred feet before the first branch. They're an ecosystem unto

themselves, hosting more than a thousand species of invertebrates. Framer of cities, king of industrial trees, that tree without which America would have been a very different proposition. Her favorite individuals stand scattered near the station. She can find them by headlamp. The largest of them must be six centuries old. He's so tall, so near the upper limits imposed by gravity, that it takes a day and a half for him to lift water from his roots to the highest of his sixty-five million needles. And every branch smells of deliverance.

The things she catches Doug-firs doing, over the course of these years, fill her with joy. When the lateral roots of two Douglas-firs run into each other underground, they fuse. Through those self-grafted knots, the two trees join their vascular systems together and become one. Networked together underground by countless thousands of miles of living fungal threads, her trees feed and heal each other, keep their young and sick alive, pool their resources and metabolites into community chests. . . . It will take years for the picture to emerge. There will be findings, unbelievable truths confirmed by a spreading worldwide web of researchers in Canada, Europe, Asia, all happily swapping data through faster and better channels. Her trees are far more social than even Patricia suspected. There are no individuals. There aren't even separate species. Everything in the forest is the forest. Competition is not separable from endless flavors of cooperation. Trees fight no more than do the leaves on a single tree. It seems most of nature *isn't* red in tooth and claw, after all. For one, those species at the base of the living pyramid have neither teeth nor talons. But if trees share their storehouses, then every drop of red must float on a sea of green.

THE MEN want her to come back to Corvallis and teach.

"I'm not good enough. I don't really know anything yet."

"That doesn't stop us!"

But Henry Fallows tells her to think about it. "Let's talk when you're ready."

THE RESEARCH STATION MANAGER, Dennis Ward, drops by with little gifts, when he's on site. Wasps' nests. Insect galls. Pretty stones polished by the creeks. Their standing arrangement reminds Patricia of the one she had with the pack rat she shared her BLM cabin with. Regular visits, lightning and shy, trading in worthless trinkets. Then days of hiding. And just as Patricia once warmed to her resident pack rat, so she grows fond of this gentle, slow-moving man.

Dennis brings her dinner one night. It's an act of pure foraging. Mushroom-hazel casserole, with bread he has baked in a cloche laid in a brush burn. Tonight's conversation is not inspired. It rarely is, and she's grateful enough for that. "How're the trees?" he asks, as he always does. She tells him what she can, minus the biochemistry.

"Walk?" he asks, when they finish rinsing the dishes into a graywater catch. A favorite question, to which she always answers, "Walk!"

He must be ten years older. She knows nothing about him and doesn't ask. They talk only of work—her slow research into the roots of Douglas-firs, his impossible job of corralling scientists and getting them to abide by the minimal rules. She herself is well into autumn. Forty-six older than her father was, when he died. All her flowers have long since faded. But here's the bee.

They don't go far; they can't. The clearing is small, and the trails are too dark to navigate. But they don't need to go far to be in the thick of all she loves. Out into the rot, the decay, the snags, the luxuriant, prolific dying all around them, where a terrible green rises, riding forth in all directions with its converting coils.

"You're a happy woman," Dennis says, somewhere in that great basin between question and claim.

"I am *now*."

"You like everyone who works here. That's remarkable."

"It's easy to like people who take plants seriously."

But she likes Dennis, too. In his spare motions and abundant silence, he blurs the line between those nearly identical molecules, chlorophyll and hemoglobin.

"You're self-reliant. Like your trees."

"But that's just it, Dennis. They aren't self-reliant. Everything out here is cutting deals with everything else."

"That's what I think, too."

She laughs at the purity of his hunch.

"But you have your routines. You have your work. It keeps you going, full time."

She says nothing, spooked now. On the threshold of a contented middle age, this ambush.

He feels her clench; for the length of several owl calls, he adds no syllable. Then: "Here's the thing. It's nice to cook for you."

She sighs long and slides down into the way things need to be. "It's good to be cooked for."

But everything is so much less spooky than she could have supposed. So much lighter. He says, "What if we kept our separate places? And just . . . came to each other from time to time?"

"That . . . could happen."

"Did our work. Saw each other for dinner. Like now!" He sounds surprised to make the connection between his wild proposal and what the present already holds.

"Yes." She can't yet believe that luck might extend so far.

"But I'd want to sign the papers." He peers out into an opening in the western firs, where the sun has undeniably started to set. "Because then, when I die, you could get the pension."

She takes his shaking hand in the dark. It feels good, like a root must feel, when it finds, after centuries, another root to pleach to underground. There are a hundred thousand species of love, separately invented, each more ingenious than the last, and every one of them keeps making things.

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