



# R

## edwood Ring

Come. Stand among us for a moment on this flat above the rolling river. Be wholly here. Root for a time. You are alone—good. We are a ring, never alone, each identical and each different, one life entwined at root and crown. We are the descendents of deep time, of earth, air, water, and light.

The soil beneath us is dark, rich, and deep. Drops of mist fall from our canopy three hundred feet through silver air to the brown duff, the fallen needles and decaying plants covering the ground. Light dances on the river, but here within our ring it barely dapples the duff. Bright gnats swirl through still air.

A community thrives within our ring. Our life is a gift beyond reason and measure. Beyond measure and reason, our

life makes sense. But only if you stand among us will you understand us, this place, this time in which we live. Get to know us, our world, before we are gone, before it is gone.



We are a redwood ring. We have stood on this alluvial flat for 823 years—not ancient by earth’s time, but far older than almost all other living organisms. A few of our close relatives are well over 1500 years old.

To the west, the river, now brown with silt, bends toward the ocean. The river’s bank rises sharply for thirty-seven feet, protecting us, most often, from floods. The valley’s half-mile-high slopes also protect us, at least sometimes, from the most severe storms. Time shears both the banks and slopes. Our grove, interspersed with fir and pine and broadleaf trees, now covers twenty thousand acres.

The tallest of us in the ring is 319 feet, the shortest, our albino, only forty-two. Nearby redwoods rise above 350 feet, but none of us will likely reach that height. The thickest of us is thirty-nine feet in circumference. Broad, certainly, but nowhere near the girth of some of the neighboring giants. Originally thirteen of us encircled our parent, but three of us have been windthrown, two in the terrific storm 154 years ago, and one just last year. So, though we remain a ring, we are no longer a circle.

We do not have individual brains, but we are as a ring mindful. We understand life—just as this forest does, just as the earth itself does. We are cognizant of diurnal rhythms and solar rotations. We stand; we do not stand for something else.

We respond to the world each moment. Every moment is integral within the cycles, and every moment is present for us. We are rooted in earth, nourished by air and water, and growing toward light. We need all four, but light, ultimately, gives us—and everything else—life.



Who exactly are we? Well, obviously, we are trees, the largest of all plants. As trees, we have roots, trunks, branches, leaves, and seeds. We grow fast, spiraling into the sky toward light, and continue to grow as long as we live.

Though we are the tallest of all earth’s organisms and our groves have the greatest terrestrial biomass on the planet, our roots do not run deep. We have no taproots that bore straight down. Rather, our roots spread shallowly, penetrating only ten feet or so but extending out a hundred. Our roots interlock, providing much more mutual stability than any one of us would have alone.

Our evergreen leaves are shaped like needles. Toward our conical crowns, our needles grow smaller and more tightly together. Our cones are tiny, only the size of olives, but each of us may still spew more than a million seeds a year.

At our core is heartwood, our oldest wood, which adds strength and resilience. Sapwood surrounds our heartwood. Sap, water and minerals, flows from the soil through our roots and trunk to our branches and needles. Beyond our sapwood is our cambium, which produces new wood. It grows swiftly but changes our appearance by only the width of one ring each year—sometimes less than an inch and sometimes more, depending on the cycle's mood.

Our inner bark sends sugars from our needles to every other part of our bodies, right down to our root tips. Our outer bark is thick, fibrous, red, and furrowed with ridges. The color comes from our tannin, a chemical that resists fungi, fire, and flood. Our bark also protects us from insects and pretty much everything else. We live so long because we really have no natural enemies.



We were born of fire—that most energetic of earth's light. Fires occur naturally here, but not often—and never spontaneously. Oxygen unites with other substances all the time, but a fire starts only when that union is swift. To exist, fire needs fuel and oxygen and enough heat to ignite. Our grove provides abundant oxygen and plenty of fuel, especially in the late summer when the duff is less damp, but seldom is there enough heat for ignition. Here, lightning usually provides that necessary spark, though occasionally flames invade from

other regions, climbing ridge after ridge until they reach us.

Most fires crawl along the ground, consuming duff and ferns, seedlings and saplings and thin-barked trees. The flames, flickering only a foot or two in the air, check disease and kill hosts of bacteria and fungi. Our bark, eight to ten inches thick, insulates us. We also lack resin and pitch, which attract flame, and so, though we are often scarred, we seldom succumb. New growth has masked most, but not all, of our scars. Seven of us still bear scars, and the easternmost of us has a twenty-foot scar deep enough into the heartwood for a bear to sleep in it.

The rare wildfire leaps from tree to tree, gulping oxygen and swallowing whole branches—feeding far more like an animal than a plant. Its temperature soars, and its light bounds. Living on this flat, we have been lucky enough to escape the two 1000-degree fires in our life. The river thwarted the spread of the first, and the second, just two hundred years ago, leapt past us along the far ridge.

Our parent, deeply scarred by earlier conflagrations, was enveloped by a wildfire. The flames climbed the trunk and inhaled the crown. Only the charred stump, the burl just beneath the ground, and the roots remained. We began life together in our parent's burl, a knobby clump of dormant buds buried in the ash. The fire woke us, and we sprang in a circle around the scorched remains, each of us genetically identical to our parent. Our roots interlaced with our parent's and

each other's. We sprouted through the rich, nutritious ash into the sunlight created when the fire razed the canopy—and became, in a deep sense, our own parent.



Though our genes are all the same, our responses to the world are, through the fullness of time, distinct. In every moment, each of us reacts to light and water, sun and storms, wind and flood, drought and fire—and the earth itself. We share the same predispositions but live at the whim of nature. Each of us has a different height and girth. We all have 823 rings, but none of our rings is identical. Each of us has a crown that shapes our shared canopy. From a common root system, we grow diverse boles, burls, and branches. Each of us, in unison, is unique, and all are one.

So, genetics drives us—but in divergent ways. We respond to each other's lives and to the lives of others, the infinitesimal and the immense, the fungi and the fir in our midst. Only two of us rise purely vertically; the others, always seeking light, lean from five to fifteen degrees. Ten of us have multiple trunks, iterations of ourselves, trees growing out of trees. One splits just above the duff, and another has grown, at thirty feet, a horizontal buttress that supports a forty-seven-inch-thick secondary bole. Our albino, of course, produces only ivory-white needles that lack chlorophyll.



We stem from the oldest living woody plants on earth. Sixty million years ago, our ancestors covered much of this continent, much of this hemisphere. But spreading ice and uplifting mountains cut our population to a small fraction and drove us northwest toward the coast. Though we depend on fog, salt spray harms us—so we thrive just inland. The temperate climate and winter rains suit us. Here our forest became stable.

Stability doesn't, however, suggest stagnation. Our ring and this grove always grow, always change. The grove's canopy is deep and multilayered. Most nearby trees are more than two hundred years old, but each stand adds two or three trees per century. And each stand loses about the same number to wind and fire and flood. Around us, among the woody debris, fallen trunks lie in various stages of decay—an ongoing reformation of matter. The grove, quite simply, exists within a stable cycle of birth, growth, death, decay, and birth again, all the while recycling the same chemicals. And within this cycle, myriad organisms, including us, wheel through our lives.

Time slows in this grove, but it never stops. Though time rings, we ourselves always live in the present. We are scarred by wind and fire, but we barely age physiologically. Ephemera appear and disappear, both individuals and species. We provide a home, a world even, for generations upon generations—

newts and slugs, voles and chickarees, spotted owls and marbled murrelets. They creep or scramble or flap about, but we are. The seasons turn, our ring alters, and our rings accumulate.

Our roots, enmeshed with our parent's and our older forebears', have been alive for five thousand years. Through our shared roots and genes, the flow of light each day, and the coursing of the seasons, experience accrues. We travel through time, but we remain present. Our time, each moment and the flowing spiral itself, abides.



We feel energy all about us, within and without. The earth harbors it, the river flows with it, the air trembles with it, the wind carries it, and fire bursts with it. Life teems with it. It shifts, rests, converts, lies dormant, and erupts. Whatever its current form, all energy emanates from the sun; all of it is, or once was, solar energy.

Energy converts—form to form. Lightning strikes a spruce far up the slope. Fire consumes the tree, heat and light licking the sky. Wind whips the flames, and before rain douses the fire, five acres smolder and char. The snag topples, knocking down another fire-scarred tree. Storms saturate the ground, and the topsoil slides to the river, taking the fallen boles with it. Dammed water pools, then sluices, cutting a new course. And energy pulses through all of it in every moment.

Our energy is more subtle than that of storm, fire, landslide,

and flood, but it's still pervasive. It permeates the entwining of our roots, the expansion of our cambium, the rise of our sap, the spiral of our trunk, the turn toward sun of our twigs and needles, and our transformation of light.



We who are green turn light into food. The sun, our star, vibrates with energy, its pulse repeating about every two minutes. It radiates electromagnetic energy, at once both particle and wave, at a fantastic, but finite, speed. We feel the constant vibrations and receive the radiation across space and time. The earth's atmosphere blocks much of the radiation but not all of the heat and light. The sun's energy flows through us, alters, and passes on to all living creatures.

The sun is, of course, the source of the earth's energy past, present, and future, but we use light *directly*. Our sapwood carries water from our roots to our needles, and our needles pull carbon dioxide from the air. Sunshine activates the chlorophyll in our chloroplasts, which then splits the water into hydrogen and oxygen.

The hydrogen and light energy break down the carbon dioxide. All of these combine into sugar. The by-product, oxygen, flows from our needles, helping to form the earth's atmosphere and to enable animals to breathe. And our inner bark transfers the sugar from our needles to our other parts. This cycle binds earth and light and water and air, plants and

animals, star and planet. The transformation engenders and sustains our life—all of our lives.



Night still matters. Starlight doesn't bathe us—in fact, it barely touches us. The aurora flicks us with energy, but only slightly. The moon's cycle is not ours. Stars turn with the seasons, but their song is distant. And yet, dark makes all the difference.

As day fades to evening, our transformation of light slows and stops. We no longer cast off oxygen. But our respiration, the opposite and the complement of the transformation, continues at a steady rate. Our rate of respiration changes considerably with the seasons but not so much with the time of day. In the dark, we go on utilizing the energy we have created. We continue to use nutrients and slough carbon dioxide. We grow.

Indeed, we grow more in the dark than in light. Our transformation of light consumes us in the moments in which it is occurring. At night, our cambium can more readily create us. So, the light of day and its transformation are the basis of life, but night, darkness, is necessary as well. Each reciprocates the other, and both are parts of the whole, the fullness of the daily cycle.



Our lives flow through water. Without it, neither we nor any

other organism can live. Our transformation of light wouldn't occur. We are not, though, merely dependent on water: we are water. Water composes far more than half of us, as it does most beings.

Water falls though air, of course (most often here as rain, though sometimes as snow), but our relationship with fog is most intense. Without fog here, drought would kill us. Summer ocean currents and prevailing winds push coastal fog inland. The fog reduces drought-stress by raising humidity and lowering evaporation, but something more happens here with us. As fog drifts over the ridge and settles, we, the tallest organisms around, snatch it. The smaller, tighter needles in our canopy are especially good at snaring moisture. Our downward hanging branches funnel the moisture, and water itself, being always cohesive, forms drops. Fogdrip has sustained us and all our understory's plants in even the driest seasons. Some years, it produces more than a third of the water we consume.



Water vaporizes, vanishing into air, and re-forms. And, whenever it gathers, it runs. Whether in a deluge flushing our ring or in a river cutting a new channel, it always finds its way. Still, the flow of water from our roots to our needles three hundred feet above pushes the edge of possibility. We lift sap through long hollow cells—against gravity—every moment of every