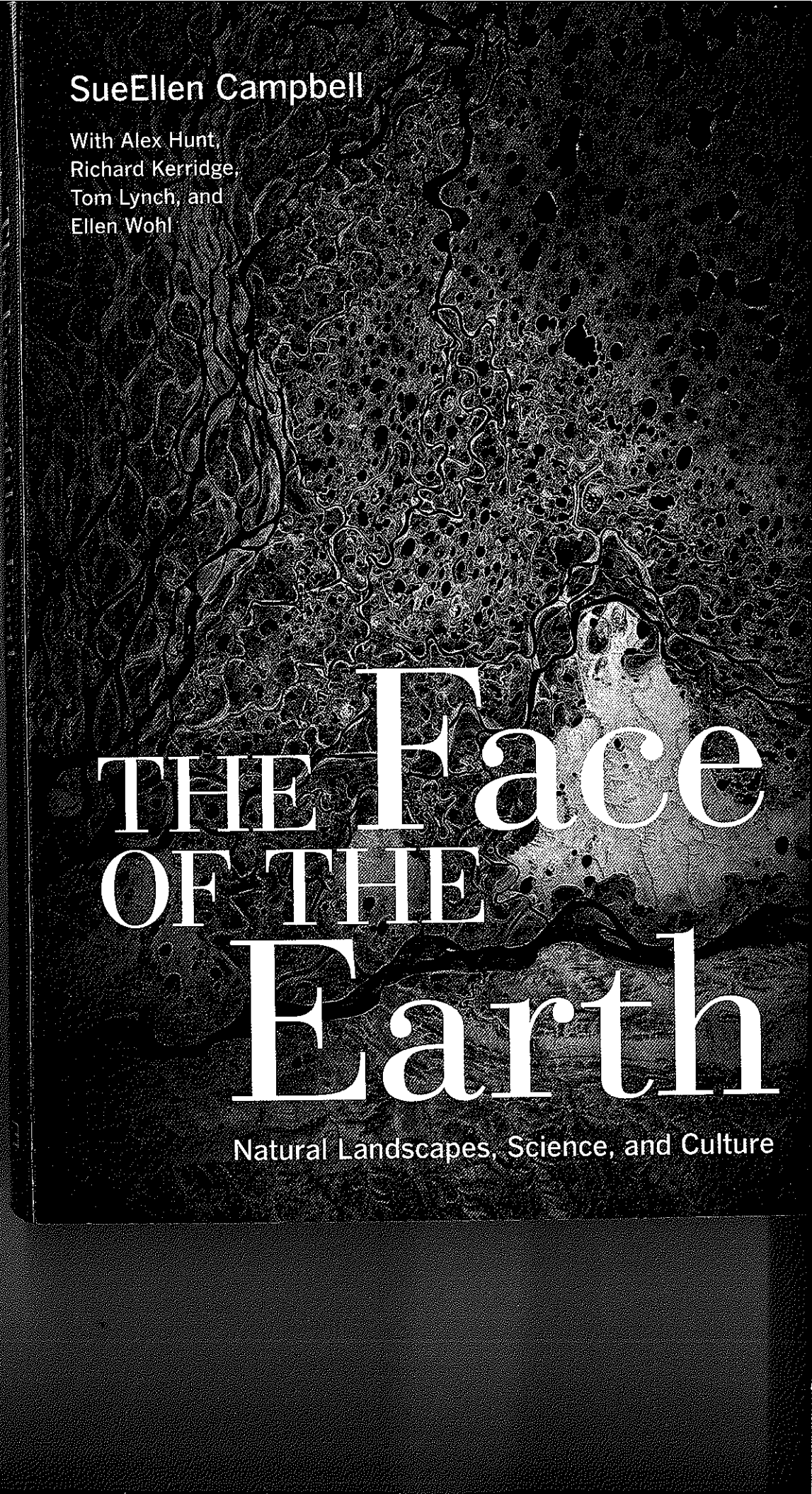
SueEllen Campbell

With Alex Hunt,
Richard Kerridge,
Tom Lynch, and
Ellen Wohl



THE Face OF THE Earth

Natural Landscapes, Science, and Culture

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scientists are watching while another bit of Hawaii, Loihi, builds its way up from the ocean floor—as the Pacific plate continues to move over the stationary magma plume at a rate of about four inches a year.

ON THE SPOT: ALONG THE DISTURBANCE GRADIENT

Charles Goodrich

The deep forests of the Cascades seem so steady, so imperturbable. The straight boles of the towering conifers are like the pillars of a great hall, the very sign of stability and hope. Hard to remember that almost anywhere we go in the Cascades, we're walking on a volcano, a rollicking landscape that is always moving, always faulting, uplifting, eroding, and sometimes, along the sutures where tectonic plates overlap, violently exploding.

I'm traveling with a group of ecologists, philosophers, and writers to various places around Mount Saint Helens, to see how the 1980 eruption affected the plant and animal communities, how it altered the very topography of the land. We're visiting stations along what ecologists have dubbed the disturbance gradient to witness these changes and to think about what it means to live in a volcanic landscape. How do the Cascade volcanoes shape our weather, our waters, our soils? How do they enter our consciousness, influence our thoughts and dreams?

We start in deep forest, amid hundred-year-old Douglas fir and western hemlock. Here, out of the direct path of the volcano's blast, the impacts from the eruption were limited to ash fall. Ash fell heavily enough to bury some of the shrubs and forbs of the understory, but after twenty-five years you wouldn't notice. A foot of ash can smother smaller plants, but it also acts as a moisture-retaining mulch and adds nutrients to the soil. The huckleberry, sword fern, and salal have all recovered and prospered, so the overwhelming impression here is green: green leaves, green needles, and lush green moss everywhere. In modest doses volcanic ash is a fertilizer and soil-builder. The rich agricultural soils of the valleys all over the Pacific Northwest are largely volcanic in origin.

Next stop on the disturbance gradient: Meta Lake. When the mountain blew up, the forest here was leveled. Meta Lake was filled with downed trees. But now, young conifers are growing back amid a vibrant understory of willow, alder, huckleberry, and hardhack.

Amphibians are returning in numbers; the western toad, for instance, which is declining over most of its range, appears to be thriving here. The birdlife is far more varied now than it was thirty years ago, when this was deep forest. White-crowned sparrow, American robin, hairy woodpecker, and red-breasted nuthatch prosper in the openings and edges of the altered landscape, where they find more insects and seeds. Even meadowlarks, unheard of in deep forests at this elevation, are fairly common.

Finally we head for a view of ground zero, the crater itself. The trail up from Donnybrook winds through young alder and grand fir. Then the trail emerges onto a hot, crumbly, windswept ridge where, trudging around an outcrop, we come into sight of the volcano's crater and rim. Echoing with rockfall and intermittently belching smoke, the crater looks like a great rotten tooth, a broken-off molar with a steaming mound of decay in the center. This jagged-edged emptiness is hard to reconcile with my memory of pre-eruption Mount Saint Helens, the svelte, symmetrical mountain we all called The Lady.

Below the crater stretches a vast, sand-colored barrens, sparsely covered with lupine and thin stands of scrub alder and willow. This devastated landscape, the pumice plain, was buried by the collapsing mountainside and then blanketed with pumice and ash. It looks as if ten thousand cement mixers had dumped concrete crudely over the whole plain. This obliterated terrain is what ecologists were most eager to study after the eruption. With essentially all life erased, how would plants, insects, and other animals reclaim the sterilized landscape? The scientists had imagined that repopulation of plant and animal life in these devastated areas would occur (a) slowly and (b) from the less-affected edges inward. To their astonishment, the renewal of the landscape began to occur almost immediately, and it happened from almost everywhere. Survivors persisted in myriad refugia—in underground burrows, beneath lingering snow fields, behind ridges, under logs. Even in the most heavily affected areas, biological legacies persisted: logs were rafted on debris flows, seeds were buried where they could germinate, plants that had been buried were subsequently released by erosion. And in-migration began immediately. Spiders and insects parachuted in. Voles and pocket gophers dug out their burrows and uncovered old caches of seeds, some of which ended up sprouting and growing. Alpine lupines began recolonizing the pumice plain, each plant creating a little

shade, holding a little moisture, and slowly building up a little soil from leaf mulch and detritus, so that each lupine itself became a refuge enabling other plants to gain a toehold on the harsh plain.

On the hike back down, I let my friends walk ahead while I loiter in a spring-watered cleft beside the trail, a lush little grotto full of wildflowers. Coming upon this wild garden, I am taken with a powerful thirst—a thirst for bright color, for intricately textured vegetation, for the cool tang of photosynthesis on the air. This grotto, just a few dozen yards from the edge of the blast zone, must have been protected by the flank of the mountain. It was probably buried in ash, but not so deeply that the shrubs and forbs couldn't come back. Its persistence in such close proximity to the blasted crater stretches my sense of the earth's vitality and creative unpredictability.

It's a temporary refuge from the dust and devastation we've been walking through for the past several days. I sit quietly for a while, thinking about the refugia in my life—my home, my garden, the parks and open spaces of our town, the library, bookstores, coffee shops, friends. The idea of refugia takes root in me. Maybe that's one fruit of this expedition: for those of us who live in volcanic landscapes—in any landscape, really—it's essential that we take care of the vital places and the nurturing relationships from which recovery and renewal are always ready to spring. ◈

VOLCANOES AND THEIR ERUPTIONS

Of course, the most obvious and dramatic effects of plate tectonics, especially for eyes that see in human time scales, are volcanoes. Volcanologists like to say that one in ten of us lives in the shadow of an active one. But if we stretch our imaginations further into the past, the percentage grows; often, we're among the remnants of ancient volcanoes even in places we don't think of in those terms. Like the motions of tectonic plates, the effects of volcanoes on our landscapes may be subtle but are surprisingly widespread.

Many factors influence the nature of volcanic eruptions and the landforms they create, including the ingredients and thickness of the magma, what it passes through on its way to the surface, whether and where it encounters water, the shape of the vent, and how much pressure builds up before an eruption. Most volcanoes are built by more than one kind of event at more than one time, too. Nevertheless, we may divide them into several general categories.