And in the racial memory, Ko-sahn had seen the falling stars. For her there was no distinction between the individual and the racial experience, even as there was none between the mythical and the historical. Both were realized for her in the one memory, and that was of the land. This landscape, in which she had lived for a hundred years, was the common denominator of everything that she knew and would ever know—and her knowledge was profound. Her roots ran deep into the Earth, and from those depths she drew strength enough to hold still against all the forces of chance and disorder. And she drew from the sustenance of meaning and of mystery as well. The falling stars were not for Ko-sahn an isolated or accidental phenomenon. She had a great personal investment in that awful commotion of light in the night sky. For it remained to be imagined. She must at last deal with it in words; she must appropriate it to her understanding of the whole universe. And, again, when she spoke of the Sun Dance, it was an essential expression, something of her relationship to the life of the Earth and to the sun and moon.

In Ko-sahn and in her people we have always had the example of a deep, ethical regard for the land. We had better learn from it. Surely that ethic is merely latent in ourselves. It must now be activated, I believe. We Americans must come again to a moral comprehension of the Earth and air. We must live according to the principle of a land ethic. The alternative is that we shall not live at all.

From Moore, K.D. and M. Nelson. 2010. Moral Ground: Ethical Action for a Planet in Peril. San Antonio: Trinity University Press.

Spring's Hopes Eternal

Curt Meine

The time of renewal has arrived again in the American Midwest. In the wetlands, migrating ducks and geese find open water, silver maples bud out, marsh marigolds explode with sun-yellow blooms, muskrats jostle for territory, chorus frogs click, and spring peepers testify to their name. In the woodlands, ephemerals appear. A month ago, sugar maples sprouted sap buckets. Now the anemones and Dutchman's breeches and spring beauties emerge from below, and transitory warblers arrive overhead. Ferns unfurl. The invasive garlic mustard seizes the daylight and overtakes entire woodlots. In the prairies, pasque flowers open the season, soils and grasses dry, and human beings with torches, matches, and water cans train fires to restore the land's vitality. In gardens and barnyards and fields and orchards and pastures, we mingle again with soil and plants and animals in the year's opening acts of production; vegetables, greens, grains, fruit, milk, and meat will follow. In towns and cities, we shed, layer by layer, our winter pelage and torpor. We all come upon that instant when we are struck by the lengthening and warming of the days—and take the moment to congratulate ourselves for *making it* through the months of cold and darkness.

Every spring in Wisconsin our topography recapitulates our geology. Winter gives way to spring as the Pleistocene gave way to the

CURT MEINE is director of the Center for Humans and Nature, a Senior Fellow with the Aldo Leopold Foundation in Baraboo, Wisconsin, and a research associate with the International Crane Foundation. He is a conservation biologist, historian, and writer who has edited and authored several books, including *Correction Lines: Essays on Land, Leopold, and Conservation* (2004).

Holocene. The ice melts back, south to north. Snow piles persist late on the north slopes, in the deeper valleys, under the conifers. Thawing snowbanks leave behind mini-moraines of sand and gravel, lost gloves, beer cans, and candy wrappers. People venture forth again into reopened territory, and plants and animals reclaim the land. Pools of meltwater linger in fields, holding the tractors back and the ducks on for at least a few weeks. When the water table is high, as it has been lately, and the pools stay, cattails and arrowheads sprout amazingly from the over-corned, mucky seed banks.

Maybe it was this annual recapitulation that inspired the flood and origin myths of the Midwest's Native people. Maybe it encouraged early naturalists and geologists to see so well the region's glacial past and to understand the reality of geologic and climatic change. In his fresh Wisconsin youth in the 1850s, John Muir imprinted on glaciated lands and waters, developing the imagination that allowed him to see the way of the ice through Yosemite's high cirques and valleys. In the 1870s, geologist T. C. Chamberlin began his field studies of the moraines of southeastern Wisconsin. This work allowed him to piece together the epic story of North America's glacial past, to track the pulsing advances and melt-backs that shaped the lay of the land (and ultimately the fate of its ecosystems and peoples). Chamberlin's expertise led him to literally define the terms of the Pleistocene. In an 1896 contribution to the *Journal of Geology*, he provided the first classification and names for North America's glacial stages. Chamberlin called the most recent period the Wisconsin Stage, reflecting the prominence of glacial features in his home landscape—moraines, boulder fields, basins, drumlins, eskers, kames, lakes, ponds, beach ridges. In speculating on the causes and effects of glaciation, Chamberlin was among the first scientists to consider the Earth as an entire, complex, dynamic system. He was also among the first to identify the critical role that long-term carbon cycling played in influencing climatic conditions.

The work of Chamberlin and other early Earth scientists pulled back the curtain on Earth's environmental past, revealing its incredible panoply of climatic change. Older stories of creation, change, and human origins took on new meaning. In the process, we took a bite out of Eden's apple, gained self-awareness, came to new under-

standings of our earthly reality. But in the bargain we also lost the pure innocence of spring and the easiness of hope.

Once upon a time, we knew nothing about carbon dioxide and methane concentrations, Milankovich cycles and paleoclimates, albedo effects and thermohaline circulation. We could appreciate the spring for what we experienced it to be: the return of warmth and light and life. The hope we found in the spring could be wildly and wonderfully *ungrounded*—effortless, irrational, even unrealistic. We could simply feel the season's sensations and processes: anticipation, energy, promise, renewal, revival, rebirth.

Then we gained critical understanding of the seasons. We came to know the return of spring as a contingent phenomenon, an expression of complex and interacting natural forces changing ceaselessly over space and through time. We grew to understand how the creatures of the air and land and sea responded to such changes. How, as the continental glaciers melted back over the millennia, species ranges expanded and shrank, populations rose and fell, migration routes stretched out, anatomies adapted, life cycles shifted, ecological relationships reordered themselves. And how, through the Pleistocene, human beings began walking out of Africa.

Then we gained critical understanding of our contribution to a changing spring. How we came out of the ice ages with new ways to both exploit and symbolize the living world around us, intensifying our relationships within it and our impacts on it. How we built human civilization over twelve postglacial millennia by drawing upon the energy-rich carbon held in the soils, forests, coal beds, oil and natural gas fields, using it to fuel our Agricultural, Neolithic, Industrial, and Information Revolutions. How through exploitation of those increasingly dense forms of energy we changed the land, with consequences both intended and unintended. How those consequences included the further buildup of warming gases, the scrambling of ecosystems, the altering of soils and hydrologies, and the diminishing of biological diversity at accelerated rates and on expanded scales. How we changed ourselves and our communities in the process. We now track the oncoming spring not just as an astronomical or meteorological phenomenon, but as in part a *social* phenomenon. Through phenological studies, we chronicle the recent changes in frosts and thaws,

bloomings and callings, migrations and hatchings—but now we calculate degrees of human influence on those changes.

At the beginning of this century, scientists coined a new term—the Anthropocene—to distinguish the current geologic era of unprecedented human impacts on the Earth, its systems, and its other lifeforms. As our actions as *Homo sapiens* have changed the spring, so have they changed the very geography and phenology of hope. How can one *hope* when spring now signifies such drastic change—when it does not just warm our chilled bodies, but liquefies the polar ice sheets? How can one *hope* when facing an increasingly uncertain future?

And so, in the Anthropocene, hope too becomes an increasingly human artifact. From time immemorial hope has been a joyful human *response* to geological, orbital, and environmental flux. Now hope must become more and more a human *creation*. In a spring that is several degrees more humanized, we cannot just rely on the Earth's circling of the sun to provide our free supply of hope. We will need to do more than just gather the expectations and aspirations that arise spontaneously from the Earth and sun. We will need to cultivate it, to *make it*. We will need to generate hope out of the human heart, expanding the circle of our concern and compassion.

We confront a great challenge and a daunting obligation: to ensure that, for future generations, spring remains a season of hope and renewal rather than of concern and fear. To do so we will need to ground hope, redefine it, put it to work. In its innocent, pre-Anthropocene incarnation, hope was (in Emily Dickinson's timeless rendering) a thing with feathers that perched in the soul and flew on its own. In its newly sobered form, hope must become a thing of encouragement, attentiveness, and mindfulness; of competence and commitment; of confidence in our ability to perform wisely and well as human beings. If our naive hope has flown off, our mature hope must gain the self-assurance of the spring migrant, ever alert to change, yet able and determined to wing its way onward. We are bound now to renew the experience of renewal itself.

Dawn for All Tim

Linda Hogan

The moon is filling, a bowl of earthlight reming in the first of dawn. Venus is near Earth in its orbit behind tlblack branches of a tree where a large bird sits. Morning arriving.

Standing with others, we smell pine smoke, hr the whispers, and gaze toward the mountains.

And then it is blue dawn. At the top of the mntain is a deer. No, he of the antlers is a man. No, the man is a deethey are one, standing majestic and powerful. Smoke rises from bnd the mountain in dark gray clouds. It smells like the history of es. It is the odor of ancient places, old trees the deer and the gathrs walked beneath. At the crest of the next mountain, another deerith antlers wide and great as old branches. It takes my breath away.

For thousands of years this has been a momt of awe, this holy beauty. They come down the mountain, stickn their front hands used as forelegs of the deer, walking in gracef animal movement. As one comes to a patch of snow, he moves to e side, around sage, mesquite, and walks beautifully through the almisa plants. The other animals come from behind the mountai crying out with all their life. Drums begin as a heartbeat, and the men sing, wrapped in woven blankets. From an old adobe buildingie sacred deer moth-

---

LINDA HOGAN is a Chickasaw essayist, poet, andovelist whose writings explore the connection between humans and anima She has served on the National Endowment for the Arts Poetry Panel and rently retired from teaching creative writing at the University of Colorado. S has published sixteen books, including the Pulitzer Prize–winning novel *M Spirit* (1990), and her most recent book, *People of the Whale: A Novel* (200