SANDRA IVANY

time standing still, yosemite, 2004
photographic print, 16 x 22 in

courtesy: the artist

JOHN MOIR

Nature's Blinded Visionaries:
John Muir, E. O. Wilson, and the Sixth Extinction

As twilight is settling over Indianapolis on March 6, 1867, an industrial engineer at Osgood, Smith & Company, a manufacturer of wooden wagon wheel parts, notices that a circular-saw drive belt has come loose. He is a twenty-eight-year-old Scottish immigrant, a brilliant mechanic who has won awards for his ingenious inventions and whose work at this factory has earned him rapid promotions from his employers. His name is John Muir.

To repair the saw, Muir decides to cut a small section from the drive belt. With the sharp end of a file, he begins to loosen the tightly bound laces that hold it in place. It's a simple task, but as he pries at the stubborn laces, the file slips. The metal point shoots upward and punctures Muir's right eye.

Stunned, Muir covers the wound with his hand while fluid trickles through his fingers. It is the aqueous humor, the liquid that fills the area between the cornea and lens. To his horror, when Muir opens the injured eye he sees nothing but blackness.

"My right eye is gone," he says, "closed forever on all God's beauty."

A shaken Muir makes his way along the icy streets back to his room at a nearby boardinghouse. He has no doctor to call, no family nearby. He lies alone on his bed, his body trembling with shock and excruciating pain. His thoughts turn to the oak, ash, and walnut forests outside the city where he delights in spending his spare time. Despite Muir's talent with machines, his true passion has always been the natural world. Now, with the loss of an eye, he despairs that he may never again be able to fully enjoy the wild places he loves.

Within hours, Muir suffers another setback. The shock of the injury produces a sympathetic reaction, and the vision in his left eye also vanishes. John Muir is blind.

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The first time I heard the name John Muir, I was a young boy sitting by a campfire in Yosemite watching sparks pirouette into the night. My dad, always a storyteller, filled our evenings by spinning yarns about the bearded conservationist who saved this valley I loved. Night after night, he recounted Muir's ongoing adventures: climbing cliffs,

discovering glaciers, rescuing a lost hiker. Some of the tales may have been true. It didn't matter; those boyhood trips made a lasting impression.

Of course, it wasn't just the stories by Yosemite campfires that later steered me toward writing about the environment. It was the experience of being a kid in that magical place: the scent of pines and wood smoke in the brisk evening air and hikes to the top of Nevada Falls, where my dad claimed we could drink the purest water in the world.

Still, it's the tales of John Muir that I remember most. The fact that Muir came from the same Scottish clan as my family and carried a name nearly the same as my own only added to his mystique. On those camping trips, I assumed that Yosemite National Park had always been there. Only later did I come to understand how astonishing it was that John Muir succeeded in promoting the radical idea of permanently setting aside public lands to be protected and enjoyed by everyone.

Through his writing, and as the first president of the Sierra Club, Muir decried the plundering of his beloved "Range of Light" by timber companies, mining interests, and sheepherders. And he was one of the first to recognize the vast destructive force of human enterprise on the environment that in his time was already becoming apparent. The desecration spread far beyond Western lands. During Muir's life, tens of millions of bison that once roamed the American prairies were slaughtered, leaving a population of only a few hundred. The billions of passenger pigeons that Muir remembered darkening the skies during his youth in Wisconsin were shot into extinction. In Muir's view, the continent's resources that many treated as inexhaustible looked finite and vulnerable.

Today, the profound consequences of human activity on the entire planet have led many scientists to compare the current crisis to the five great extinction events that have occurred in Earth's history. The most recent of these mass extinctions happened sixty-five million years ago, when an asteroid strike wiped out the dinosaurs.

The scope of the human assault on the natural world rivals these previous catastrophes; it has become known as the Sixth Extinction. It threatens the ecosystems and biodiversity that underpin civilization. *Homo sapiens* has crossed a threshold never before reached by any species, becoming a geophysical force on the planet.

This time, we are the asteroid.

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In the first days following John Muir's accident, he is confined to his bed. The shock to his body is so overwhelming that at first he cannot eat or drink, and he fears that his blindness is permanent. Friends arrange for an eye specialist to examine his injury, and the doctor advises Muir that by resting and remaining in a darkened room, he might partially regain the sight in his eyes.

As the days pass, Muir's dreams of exploring the natural world call to him with fierce urgency. He realizes that he does not want to go back to his factory job, where the air is thick with sawdust and the shriek of machines rings in his ears. Muir resolves that if he recovers his vision, he will devote himself to nature's wonders. What this new life might look like he doesn't exactly know. But it's all he can think about.

As spring blossoms across Indiana, gradually—miraculously—Muir's sight returns. He quits the factory, bids farewell to his family in Wisconsin, and, carrying only a knapsack, begins walking south. On the inside cover of his journal, he writes, "John Muir, Earth-planet, Universe." He has severed his ties with normalcy, with convention, with societal and family expectations. His decision flies in the face of his practical Scottish upbringing. No one understands what he is doing.

Muir plans to walk a thousand miles to the Gulf of Mexico and then take a ship to the Amazon. On his journey southward, he is like a butterfly emerging from a chrysalis: He is beginning to fly and has no idea where he will eventually land.

A few weeks later, Muir reaches Florida, only to have disaster strike once again in the form of malaria. A kind family nurses him through the worst of the illness, but he is too weak to continue to the tropics. Muir finds himself at another crossroads. He knows that the sensible thing to do is return home and resume his career with machines. But he remembers reading about a place in California with colossal granite cliffs and glorious waterfalls: Yosemite.

He heads west.

Once he arrives in the Sierra Nevada, he becomes a man possessed. He falls in love with the landscape, devoting himself to studying its geology, identifying plants, and observing the animals. His journal entries record his rhapsodic passion for this alpine world. During his high-country explorations, Muir observes evidence that glaciers shaped the Sierra Nevada, a finding that challenges the conventional geology of his time. On a visit to Yosemite, the president of the Massachusetts Institute of Technology listens to Muir's new theory and is so impressed that he encourages Muir to publish his research. Muir's discovery that ice carved the Yosemite Valley garners him national recognition, and he begins to use his writing and lectures to share the wonders of the natural world with a broad audience. Within five years, John Muir—who came to Yosemite penniless, not well educated, and unknown to the world—is becoming famous. His brilliant mind has found its purpose. He becomes *the* John Muir, the conservationist sought out by leading scientists and intellectuals, the naturalist who goes camping with Theodore Roosevelt. He has made the improbable metamorphosis from industrial engineer to environmental visionary.

Much of the modern conservation movement is built on Muir's legacy. These days, one of the many scientists who embody the spirit of John Muir—and the person best known for working to preserve Earth's vanishing biodiversity—is Harvard biologist E. O. Wilson.

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The receptionist smiles and gestures toward a chair. "Dr. Wilson is running a bit late," she says.

It's early morning, and I'm at Harvard's Museum of Comparative Zoology, excited and a bit nervous at the prospect of interviewing E. O. Wilson. Wilson is widely viewed as one of the world's greatest living scientists, and I can't think of anyone who has done more to focus attention on the Sixth Extinction.

A few minutes pass and the receptionist's phone buzzes. "Just a little longer," she says. I continue to scan my list of interview questions.

In preparing to meet Wilson, I discovered uncanny parallels between his life and John Muir's. Like Muir, Wilson grew up poor and with little opportunity. Born in Alabama in 1929, Wilson was the child of parents who divorced when he was seven. That summer, he was sent to live with a foster family in the Florida Panhandle, where he spent his days exploring the beaches and studying the sea life.

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One day, fishing for pinfish, he got a bite on his line and yanked on his pole. The fish flew out of the water and smacked him in the face. The sharp spines on its dorsal fin pierced the pupil of Wilson's right eye. Despite the intense pain, his foster family did not take him for medical treatment. Soon the eye developed a trauma cataract that clouded his vision. Several months after the accident, a botched surgery made things worse, and Wilson was left partially blind.

As he grew older, he realized that his poor vision rendered it impossible for him to pursue his dream of studying birds and mammals. Nevertheless, he remained determined to follow his passion for the natural world. What he still *could* see were small objects close up. He turned to the only avenue he saw open to him: the study of ants. In the relatively obscure field of myrmecology, Wilson soon distinguished himself, and this opened unimaginable possibilities for his varied talents.

Like John Muir's, Wilson's blindness transformed his life. He landed a professorship at Harvard University, where he became the world's expert on ants. He won two Pulitzer Prizes, authored seminal works on ecology, and created the new field of sociobiology. Yet, as impressive as these achievements are, it is Wilson's work to preserve Earth's biodiversity—a term he helped popularize—that is best known.

The receptionist's phone buzzes again. "He's ready now." She gestures toward the stairwell.

Wilson meets me on the stairs, greeting me warmly, and apologizes for making me wait. "I was going over some edits with my publisher," he says. He's wearing a sports coat and a tie festooned with dinosaurs. A shock of white hair falls across his forehead. He walks with a stooped, angling gait.

"Call me Ed," he says, leading me to his book-filled office. Its long, narrow shape reminds me of a boxcar. The walls are covered with maps and awards. A framed cartoon shows an ant saying to its companion, "It's going to be tough switching over to individual private enterprise."

Wilson's relaxed manner puts me at ease, and we begin to discuss biodiversity loss. "We could be losing roughly thirty thousand species a year," Wilson says. He estimates that the current extinction rate is at least a thousand times above normal, driven by human overpopulation and overconsumption. "To make things even more urgent, most of the species that are going extinct don't even have a name."

Wilson adjusts his large-frame glasses and explains that while approximately 1.8 million species have been identified by science, these represent just a fraction of the total. "We have only the vaguest idea how many species there are on Earth. Are there ten million or one hundred million? Right now, all we can do is guess. What is clear is that as much as 90 percent of life on Earth remains unidentified. And if we don't know what we have, we certainly don't know what we are losing. We're flying blind."

Most of what remains unnamed is small in size: fungi, insects, and especially microbes. In 2008, Wilson was instrumental in establishing a new digital species record called the Encyclopedia of Life. Eventually, every species on the planet will have its own Web page. It's a first step in cataloging life on Earth.

"So … Ed," I say, directing my gaze toward his good left eye, "when did you first start to recognize the planet-wide implications of the Sixth Extinction?"

"It was in the 1950s, when I worked in Cuba and Mexico, and I saw all the destruction. If you were a naturalist, you'd have to go long distances through ruined wasteland, cultivated fields, and eroding hillsides to find natural habitat. Even then, you often had to hike a good distance. At first I thought my job was simply to be an objective observer. But by the 1970s, as the destruction mounted, I could no longer stay silent. I began speaking out."

Through his writing and lectures, Wilson starting telling the story of the past few millennia—an eye blink in planetary time—when the human population spread across the globe, reengineering ecosystems and putting vast areas of land under cultivation. The astonishing success of *Homo sapiens*, a relatively young species, now threatens the future of the biosphere. Wilson says that there has never before been a species with the unique, global-scale destructive capacity of humans. He predicts that unless we can navigate the "bottleneck" of human overpopulation and overconsumption, by the end of this century we could lose half of the earth's biodiversity.

"Civilization was purchased by the betrayal of nature," Wilson says.

Later in the day, I accompany Wilson as he presents a lecture to an undergraduate class. He discusses some of the reasons for the current catastrophic decline in species.

"There are five main drivers of human-caused biodiversity loss," he says. "I like to remember them with the acronym HIPPO: habitat destruction, invasive species, pollution, population, and overharvesting."

A student asks, "What if these forces aren't stopped?"

"Extinction is forever," Wilson says. "Destroying so much of the earth's life is the folly our descendants will least forgive us for. What we are doing is irreparable."

Because of this, he calls for us to make this the Century of the Environment. But he warns that if we lose enough of the earth's life, this time period could have another name: the Age of Loneliness.

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I was nine or ten years old the first time I sweated up the trail to the top of Nevada Falls. My dad's optimism that I could complete this seven-mile round-trip trek up and down two thousand feet of High Sierra granite was something I did not share: it was too far and too steep. But I kept putting one foot in front of the other, and finally we stood on top of the world, the roar of the falls drowning our words, a stunning view of Yosemite Valley in the distance. My tiredness vanished.

We continued a few hundred yards farther along the river until we found a quiet place to rest. My dad filled our canteen and handed it to me. "Best water in the world," he said with a grin.

Before we headed down the trail, he filled the canteen again, this time to take with us as a memory of the trip. In retrospect, I realize that we were carrying back with us much more than a quart of water. We were carrying the calls of the red-breasted nuthatches foraging in the quaking aspen and the vanilla fragrance emanating from the bark of yellow pines and the pale magenta of first light on granite cliffs. What we carried down from the mountain was precious. I can imagine that when John Muir was walking these paths, he must have felt the same way.

E. O. Wilson calls this feeling *biophilia*—an instinctive connection that humans seek with nature—and he believes it has biological origins. What I know is that those early experiences in the natural world have riveted my attention on what we are losing in the Sixth Extinction.

By any measure, the environmental destruction that appalled John Muir a century ago is now far worse: The human population has passed seven billion; soaring carbon dioxide levels are destabilizing the world's climate; everywhere the earth's biosphere finds itself under siege. Today a sign at the top of Nevada Falls cautions hikers not to drink the water.

When John Muir fought to preserve our nation's most scenic natural places in the early twentieth century, at times his chances of winning seemed risible. Saving Yosemite took years. It pitted Muir against well-financed special interests hell-bent on extracting the last bit of profit from the land. Muir often said that the corporations and wealthy financiers belonged to the "gobble, gobble school of economics"—they always wanted more. At one critical juncture, the transfer of Yosemite back to federal control to create a national park passed the California State Senate by a single vote. Our system of national parks and monuments that we now take for granted was once fiercely controversial.

Like Muir before him, Wilson is also proposing a new set of reserves, this time to protect the world's most biologically rich areas. Wilson's quest seems no less quixotic. But as Muir demonstrated, sometimes all it takes is one person with the right idea at the right time.

Many of the earth's most imperiled life forms are concentrated in specific ecosystems such as tropical forests and other endangered areas. Wilson advocates preserving thirty-four of these biodiversity "hotspots" that cover just 2.3 percent of Earth's land surface. For an estimated $30 billion investment, he says, substantial protection could be provided for roughly 70 percent of Earth's land-dwelling flora and fauna. Although this is not an insignificant sum, Wilson argues that the cost of saving most of Earth's plants and animals is relatively modest for the market economy while providing invaluable returns for the natural world.

"The global conservation effort needs to be raised to the level the problem requires," Wilson says. "We need an environmental rescue operation to save this planet and the magnificent life it harbors."

Despite the challenges, Wilson holds an optimistic view of the situation. "I think that this could turn into an authentically strong movement, and we can save most of what life is left."

But he tempers his optimism with this: "Present-day humans are a mix of Stone Age emotions, medieval institutions, and godlike technology. Managing this volatile mix is a real challenge."

Humanity is now in uncharted territory, our situation unlike those faced by any species that has ever existed. We are at a crossroads—or a precipice.

When Muir and Wilson suffered eye injuries, at first their blindness appeared tragic. Yet both men emerged from these traumas with remarkable new visions that changed their lives—and the world. Perhaps one day we will look at humanity's blindness in destroying so many species as a calamity that produced a new vision, one that enabled us to act as if we were part of the biosphere rather than somehow exempt from the laws of ecology.

Can we navigate our way through this crisis? Wilson thinks that the answer will be decided within the lifetimes of many of us alive today. We are the ones. The integrity of Earth's life and the destiny of the human species are in our hands.

John Moir is an environmental journalist who often writes about preserving biodiversity. His work has appeared in the *New York Times*, *Smithsonian*, *Washington Post*, *Christian Science Monitor*, and many conservation publications. He is the author of two nonfiction books, including *Return of the Condor: The Race to Save Our Largest Bird from Extinction*. Moir has contributed to several anthologies and received numerous awards for his writing.