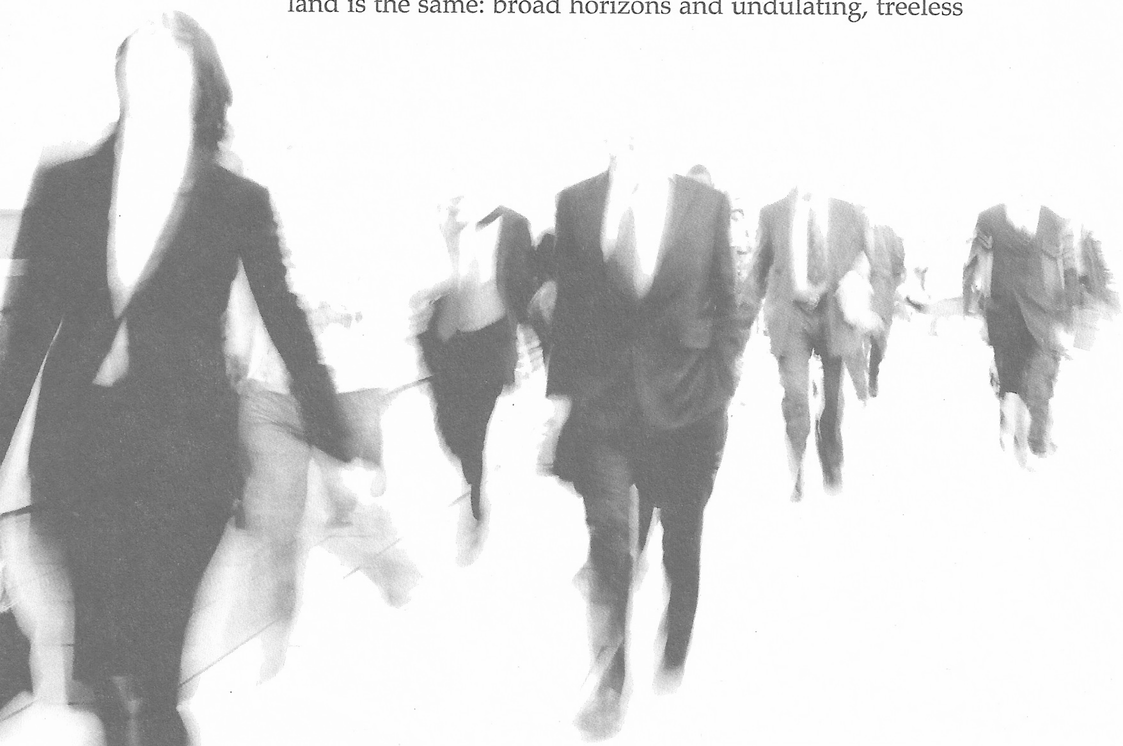
JAN DEBLIEU

Evolution Mobile

Five thousand years ago, on the rolling grassy sea of Saskatchewan, the Blackfoot people and other northern Plains tribes developed a culture based exquisitely on movement. Traveling much of the year, following bison and other game, they kept only what they could carry. Their clothing and headwear, festooned with beads and feathers, were also lightweight and sturdy. Like the Indians of spaghetti westerns, they lived in tepees, but they had no horses, only dogs. At the height of their civilization, they numbered almost two hundred thousand.

So what? you may be thinking. Perhaps you're not in the mood for an anthropology lesson. But here's something new: On the far side of the globe, in the Samara region of Russia, other tribes were living parallel lives. There are differences between the Saskatchewan prairie and the Samara steppes, but the overall feel of the land is the same: broad horizons and undulating, treeless



sweeps, with grasses lush in summer, sere in winter. And as it turns out, the prehistoric tribes in the two regions were remarkably and similarly self-sufficient. They lived in family groups of twenty to fifty people and engaged in some trade. They venerated their warriors and fought frequent battles with their neighbors. They were deeply spiritual. In time the steppe tribes bumped up against the Indo-Iranian and Chinese civilizations, so they learned how to build vehicles with wheels and, under Genghis Khan, how to build empires. The Saskatchewan nomads remained isolated and traveled on foot.

There's one last similarity between the two cultures, and it is arguably the most important. They died. They died shortly after the arrival of widespread agriculture made it possible for people to lead sedentary lives. As an exhibit at the Canadian Museum of Civilization in Quebec put it, "The end of the nomadic era came around the same time for both groups when Europeans and Euro-Americans invaded their territories and brought with them the fivefold threat of disease, firearms, immigration, agriculture, and formidable administration." It's a familiar story, with long-term implications. The disintegration of nomadic tribes around the globe set in motion what may turn out to be, twenty or so generations from now, one of the most profound evolutionary shifts in the history of the human race.

¿Como te gusta viajar? "How do you like to travel?" I'm in Cusco, Peru, the navel of the ancient Incan empire, studying Spanish in a language-immersion program. My Spanish is pretty good, but I could use some practice in conversation, and I was hoping to find it here. I wasn't expecting the simplistic, high school–style worksheets. Blank lines await my response; the other students are scribbling answers. I'd like to write, *de cualquiera manera,* meaning I love to travel and will jump at any opportunity. But I dutifully write, *en tren*. I prefer to travel by train. It's a little odd to be in an ancient city that was originally built by hand, focusing on such a question of modern convenience.

The following day I actually board a train heading north from Cusco, deeper into the mountains. It's a narrow-gauge, bone-rattling line, but with spectacular views of the slate green glacial melt of the Urubamba River. We clatter through the dull terracotta mountains, fourteen thousand feet high and higher with surprisingly little snow, though it's the dead of winter. I can't take my eyes off the scenery. As the train bends and sways I'm constantly moving from my seat to the

aisle so I can crane up toward the summits or down at the pouring water. Large boulders crowd the riverbed, and in places the water runs more white than green. I can't imagine that anyone could raft it and come out alive. Trees that look like cottonwood and eucalyptus grow in clumps along the banks. To either side the mountains rise steeply, their slopes dull and wrinkled, the color of corned beef.

I'd love to get a real sense of this landscape, which was once a lacework of Inca and Wari trails and pueblos. But I'm sliding by it too fast; the only sense I'm getting is of being cut off from the world by thick glass. Traveling *en tren* is turning out to be more like watching a movie than exploring the land.

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The best way to experience the Andes, of course, would be to go on foot. Unfortunately, this is not easy to arrange. Hiking alone here is dangerous, and I'm not sure I want to walk in a large group, marching for hours at someone else's pace, looking at all those backs. The Inca Trail requires a permit now and is clogged with people, some of whom we glimpse, strolling along with day packs and cameras, while porters dressed in bright red jumpsuits (perhaps the uniform of a trekking company) trot quickly up the trail in front of them. The porters have their hands turned backward to support the weight of their huge packs. "They don't pay those poor buggers hardly anything," says the man from Australia in the seat in front of me.

Ten years ago a friend from Cambridge, Massachusetts, took a long-planned trip to Nepal, where she met a boy of about sixteen in a remote village. To her surprise, the young man spoke English. Surrounded by Himalayan grandeur, they talked of the places they most loved in the world. The young man mentioned a nearby lake. My friend described Walden Pond, fifteen miles west of Cambridge, which she visited on quiet Sunday mornings.

"This Walden Pond," the young man queried, "how long does it take you to walk there?"

Face it, when those of us from the richer regions of the world walk somewhere, it's generally for exercise—or because we're stranded by a broken car.

I stumbled across the Web site for the Canadian Museum of Civilization a week before my flight to Peru. Reading about the Saskatchewan and Samaran tribes got me thinking about the physical changes the human race must have suffered in the millennia since we all traveled on foot, foraging for vegetables and hunting meat with arrows and spears. The life-changing ingenuity that brought us agriculture has also granted us nearly unlimited mobility and made physical activity largely unnecessary.

True, plenty of people in poor countries must still walk long distances and work brutally difficult jobs. But when it comes to physical exertion, the earth's populations are largely segregated. It makes me wonder if we're all still the same animal. In November 2001, when American journalists traveled to the Tora Bora region of Afghanistan to report on the hunt for Osama bin Laden, they were amazed at the toughness of their guides, who scurried up and down sheer mountains in ragged footwear, ate little besides rice, and seemed comfortable in their light clothes, despite the snow and bitter temperatures. The Americans, in their down jackets and Gortex boots, were hungry, exhausted, and freezing.

We are the same species, but with markedly different vocations and lifestyles and—increasingly—physical capacity. Especially since cars became common, Westerners have wandered down the kind of side spur that someday might lead to a branching of the family tree. In this case it would be the splintering of the fit from the unfit—or the toughened but underemployed members of the human race cleaving from the pampered technocrats. We're not likely to create a new species through our couch potato ways, but perhaps we're moving toward the genesis of separate populations, or maybe even a new subspecies.

Or perhaps not. This isn't a question science can answer with any authority. For one thing, a wimpy or overweight person can decide on any day to get in shape. The human body carries the memory of fitness in its muscles and marrow. Also, creating a new subspecies is no simple matter. It would require a sexually isolated population—improbable, given the modern human's love for leisure travel—and the introduction of some factor that would influence reproductive success. Evolutionary theorists aren't quite sure how many genes would need to be altered for a split to occur, or which genes might be tied to physical fitness.

A century and a half after Darwin published *The Origin of Species*, we know little about how quickly evolution unfolds in our own species.

We've seen adaptations occur in certain insects, guppies, and segregated populations of birds, and with surprising speed. But tracking evolution in humans, with our longer (twenty to twenty-five years) generations, is much more difficult. And although many prehistoric human populations were completely isolated (the Australian and North and South American aboriginals come to mind), modern humans share virtually all the same genes. Worldwide, we are remarkably the same.

In addition, technology has introduced a new and powerful factor into the evolution equation. Besides giving us the tools for speedy travel, it has brought us astounding improvements in nutrition. We are what we eat, and we eat a lot—enough to counter some of the decline in our fitness. A study of common lizards in France, published in the journal *Nature* in 2004, found that young, physically underperforming lizards markedly picked up their pace when they were given better nutrition. Within a few months they were able to run with the same speed and stamina of normal lizards. "Physical performance and Darwinian factors are tightly linked," the authors note. "But physical performance remains highly variable in human and other animal populations."

Better food and cleanliness make for better health. Still, isn't there a pinnacle on which humans stop gaining in physical prowess and begin eating themselves into a decline? Indeed, this is what researchers have found. Early agriculture offered humans a steady supply of food—when the weather was good. In years of crop failure, people starved. A regular exposure to famine reinforced our bodies' natural tendency to store fat. Agriculture created a hierarchy of haves and have-nots, landholders and peasants. People on the low end of the economic scale frequently had little to eat. They responded to times of plenty by gorging and gaining weight. But the hard times always returned. Because of this, the ability to store fat proved to be an adaptive advantage. Our bodies became better and better at it. In many parts of the word, the cycle of feast and famine continues. Where it does not, humans either learn to control their appetites, or get fat.

Few modern Americans walk long distances or engage in hard physical work for more than an hour or two a day—much less time than they generally spend thinking about food and consuming it. Even in vocations that demand physical strength and toughness—construction work, say, or commercial fishing—machines do much of the heavy lifting. Few of us endure harsh, uncomfortable conditions of the kind encountered by the reporters in Afghanistan. It's difficult to believe we

bear any relationship, even fleeting, to the ancient long-distance hikers of the Great Plains.

People in leisure societies often try to stay in shape through exercise, diet, and body-sculpting activities like weight lifting. This is Darwin's legacy in its purest form: Our desire to be sexually attractive trumps our innate laziness—sometimes. Again, the human body remembers being fit. I like the feeling of strength and adrenal well-being that comes from working out. When I'm in shape, I vow that I'll stay in shape. This lasts until I get distracted by work or family. Malaise returns; I gain weight. Our desire for fitness usually isn't sturdy enough to best our overdeveloped work ethic ("Have it on my desk in the morning"; "Mom, I need sixty cupcakes for school tomorrow") or our inability to stop eating when we've had enough.

Evolution changes us in baby steps. Adaptations can occur in as little as two or three generations during times of environmental stress, but they may melt away if conditions return to normal. In their study of Darwin's finches in the Galápagos Islands, Peter and Rosemary Grant observed rapid alterations in beak characteristics during a prolonged drought, when certain foods disappeared. But the changes nearly vanished a generation or two after the return of normal rainfall. Evolution apparently oscillates, rather than moving in a straight line. Given this, it will be difficult to track adaptations in humans' physical capacity without studies that last many generations.

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If we do manage to document changes in our strength and stamina, we may not like what we see. Evolution is not necessarily nudging us toward a physical apex. It's a random process; it doesn't care where we end up. If fat, lazy people consistently have more babies than thin, strong people, *Homo sapiens* will become fatter and lazier until natural conditions force us to be otherwise.

Our technological skill has placed us a notch or two beyond the normal reach of evolution, but not out of its grasp. Natural selection may work on us a little differently than it does on other species, because

we have tools that enable even the weak and stupid to survive. We also have medicine to heal the infirm. Nonetheless, we're animals, and evolve we will. Our future in this world will be determined no more by our oversized brains than by our genes.

My train through the Andes sways so hard from side to side that at times I wonder if it's going to jump the narrow track. That's what I get for taking the Backpacker Special instead of the more upscale Vista Dome. We are bound for Machu Picchu, that most famous of Incan retreats, so remote that archaeologists didn't stumble across it until 1911.

I'm really rather floored to be making this trip. When I first read about Machu Picchu, decades ago, it never occurred to me that I might someday see it, at least not as a casual tourist. I had fleeting dreams of visiting as a journalist, or with an archaeologist on a dig. But the site is now a common destination. There are even ads for it on the *New York Times* Web site: "Where the mountains are gods." Still following the river, we roll by stone walls that form the terraces of Incan agricultural fields. They're nearly as common here as the two-hundred-year-old farmhouses that dot the New England countryside, but they're four to five times as old.

The mountains grow in height until we begin to glimpse glaciers. Against the bright sun and dusty mountains, they cast a remote glimmer. I'm again overcome by the feeling that I'm cut off from the world. As the ice fields slide past, high above, I pretzel myself so I can keep them in sight. What I would give for a quiet hillside where I could sit and take all this in. I try not to think about the diminished snowpack in the Andes and the evidence that pegs it to global warming.

The shining cordillera doesn't seem to be having much of an effect on anyone else. Behind me a woman bends over her knitting; another reads. The British men in the seats across the aisle chat about the various stomach upsets they've encountered. "I'm usually not ill," one says, "but Thailand . . ." He holds his gut and groans.

I think back to a flight I once took across the United States, when we passed above desert slickrock country so deeply red it looked as if pigment had been poured over the earth. It was late afternoon. Shadows edged the chiseled canyons and mesas. I was in the middle of the row, craning to see. The woman with the window seat pulled down the shade because the sun was bothering her. I got up and wandered the

aisle, peering over the backs of seats, until a flight attendant told me to sit down. "Where are we?" I asked.

She looked annoyed. "About thirty-five thousand feet in the air," she said.

Years ago I wrote a book that explored the differences between truly wild animals and those that had been taken into captivity so zoologists could try to breed them. These were the rarest of animals, and captive breeding was deemed necessary to bolster their waning numbers. I talked with numerous experts about how animals perceive their worlds. Is a polar bear in a zoo, confined to a vista of a few dozen yards, the same as one raised to scan the open horizons of the Arctic, keenly attuned to the movement of seals? I didn't think so, and neither did some of the biologists to whom I spoke.

Now, on the rattletrap train, I wonder about human powers of vision. If we seldom look outside except to admire the scenery, if the bulk of our waking hours are spent gazing at computer screens, video games, or television, might we be altering the muscles in our eyes and the synapses in our brains? Fish that live in dark caves lose their eyes over time. Might physical changes befall those of us who bathe constantly in close, artificial light?

Neither do we hear well, living as we do with constant background noise—the humming of hard drives and refrigerators, the drone of talk shows, the roar of traffic. Except for the odd neo–Davy Crockett, Euro-Americans haven't studied their landscapes with the care of hunters for many generations. In our leisure travels, our senses are flooded with exotic sights and colors—just as they are in the modern mall. What do we take in as we scan our surroundings before moving on? Only that which we choose not to block out.

The train enters a tunnel, darkness closing around us. When we emerge, we are no longer in dry, dusty terrain, but in a dense cloud forest. I'm stunned by the rapidness of the change. Bananas and palms mix with vines and tall, skinny trees I've never seen. With no warning, we have entered the humid shadow of the Amazon. No one seems to notice.

They say the light at Machu Picchu is most splendid in early morning and late afternoon. When our train reaches the village of Aguas Calientes in midday, everyone else quickly queues up for the

next bus ride up the mountain to the ruins. I check into my hotel and relax over lunch. By one thirty, when I board a bus to make the climb, I'm one of the only passengers. This is my plan. I've heard that the ruins are overused, and I'm hoping to avoid the large tour groups. UNESCO has recommended that no more than five hundred people be allowed into Machu Picchu each day, in order to keep the ruins from being damaged. The Peruvian government views the site as too much of a cash cow to comply. My bus grinds up the road that's stitched into the cloud forest, rounding switchback after switchback. Vegetation clings to the precipitous slopes. Muddy clefts show places where trees have toppled. In the distance, clouds tear against mountains shaped like granite torpedoes. When we reach the top, I present my ticket, and make my way to the funerary hut.

I approach the ruins with a sense of reverence and awe that turns out to be naive. I'm hoping to be swept off my feet by the spirit of the place. But sitting on a patch of grass, I look out at the cobbled, roofless buildings and stair-step terraces carved into the mountainside and feel—numb. It's too unbelievable, and too loud. Hundreds of voices reverberate off the stones. Above the Temple of the Sun, the sacred peak of Wayna Picchu rises into the sky like a breaching whale. I watch the clouds move against the far ridges and try to ignore the other tourists. Someone—a man or teenage boy—starts making Tarzan calls. He won't shut up. I rise and pick my way carefully up an uneven stone staircase.

Speeding up and slowing down as I walk, I weave through tour groups, taking in the plaza and the carefully squared, sacred stones. Round rocks have been stacked into walls that lean inward, a construction that strengthens them against tremors. Water flows through narrow stone sluices painstakingly built to collect it.

In a long row of interconnected rooms on the edge of the settlement, I find solitude at last. I imagine Incan boys and girls moving through the houses, carrying beaded counting cords or baskets of quinoa. Their soft voices are playful, then serious.

Through a parabola-shaped window I watch a mountain caracara playing on the wind, the large patches of black and white on its wings more like a costume than plumage. How many other people have glimpsed hawks from this very place?

A woman and man step into the room, start to kiss, then see me and back out, apologizing. Tarzan calls again. I'm done for the day. I

glance regretfully at the ruins I haven't had time to explore and promise myself that I'll return in early morning. The tour books say that's the best time to come. Besides finding thinner crowds, I'll be able to enjoy the slanted, clarifying rays of the sun.

But it's not to be. The following morning, clouds greet me when I rise at four thirty. I leave my hostel by five o'clock and walk down to the bus station. Already there's a line that stretches for several blocks. People chatter excitedly; many carry day packs that look heavy. Tour directors load them onto bus after bus. I manage to get on one with a crush of others. I'm not quite awake and completely unprepared for the jostling and noise.

Thirty-eight buses roar up the mountain in procession. As we swing around the endless switchbacks, I look out at the distant, jungle-covered slopes with a deep sense of dejection.

By six fifteen, there are more than thirteen hundred people in line to enter Machu Picchu. There's a lot of calling and joking and good-natured horseplay, plus a long line for the site's only bathroom. The clouds, hanging right over us, amplify the noise.

I don't get in line. Instead, I try to convince a bus driver to take me back to town. "¿Esta enferma?" asks a guide standing nearby. "Are you sick?" Only at heart, I think. She gives me an odd, puzzled look and I apologize, though I'm not sure why. The bawdy noise of the crowd presses down on me. A septic smell drifts from the bathroom, and suddenly it's as if I'm at a rock concert. I don't care about seeing the ruins anymore. I want light and fresh air.

At the train station I'm told there are no seats for the early trains back to Cusco. One small bribe later, I have a ticket for the Vista Dome, the upscale coach with a transparent roof, which affords stunning views of the mountains. There's hardly anyone in my car. I sigh and relax into my wealth. Two smiling attendants come by, offering free snacks and coffee.

We pass through the tunnel and back into desert, just like that. Without warning, the train rolls to a stop. A few cars ahead, I glimpse people getting on. Bandits? Well, yes, as it turns out, but not the gritty, gun-wielding kind. The rail company has arranged for us to have a fashion show, with gorgeous Peruvian men and women modeling alpaca sweaters and dresses. Of course the clothes are for sale. A conductor shoos away the brightly dressed but dusty children who sell handwoven bracelets and trinkets by the tracks.

In the town of Ollantaytambo I debark and haggle for a battered taxi to drive me through the Sacred Valley and back to Cusco. I don't press very hard; in fact, I think about giving the crease-faced, pleasant driver all the cash I've got. The road takes us along the Urubamba, then we begin the climb into the Andes. Dry, brick-colored peaks are everywhere. The driver stops at a vista so I can take pictures of the tallest one, a hulking form with ridges running up to its top like guylines. Glaciers pour down the valleys, but the ridges are oddly naked. I ask the driver if there used to be more snow. "Sí," he says emphatically. When he was a child, the mountains were always covered with snow in winter, but no more.

I thank him for stopping, and we continue on. I think about the evolution of a species, the creeping, lurching pace at which our bodies move toward change, and the helter-skelter ways in which we alter the world, even the weather and air. Without really meaning to, but without being sorry, either, we have imposed vastly more change on nature during the past six or eight generations than nature has managed to inflict on us. It's remarkable, really. We have come to hold the evolution of all other species in our hands.

In a dun-colored farm field, a man has roped three burros together. He turns them in very tight circles to make them trample the yellow stalks of a crop that looks like barley. Again and again they turn, the animals' noses high in the air. The rumbling taxi drives by, leaving a slipstream of dust.