people come from earth
STEPHEN BAXTER

Like many of his colleagues writing near the beginning of the new cen-tury—Greg Egan comes to mind, as do people like Paul J. McAuley, Mi-chael Swanwick, Iain M. Banks, Bruce Sterling, Pat Cadigan, Brian Stableford, Gregory Benford, Ian McDonald, Gwyneth Jones, Vernor Vinge, Greg Bear, David Marusek, Geoff Ryman, Alastair Reynolds, and a half dozen others—British writer Stephen Baxter has been engaged for the last ten years or so with the task of revitalizing and reinventing the "hard-science" story for a new generation of readers, producing work on the Cutting Edge of science which bristles with weird new ideas and often takes place against vistas of almost outrageously cosmic scope.

Baxter made his first sale to Interzone *in 1987, and since then has become one of that magazine's most frequent contributors, as well as mak-ing sales to* Asimov's Science Fiction, Science Fiction Age, Zenith, New Worlds, *and elsewhere. He's one of the most prolific of the new writers of the past decade, and is also rapidly becoming one of the most popular and acclaimed of them. Baxter's first novel,* Raft, *was released in 1991 to wide and enthusiastic response, and was rapidly followed by other well-received novels such as* Timelike Infinity, Anti-Ice, Flux, *and the H. G. Wells pas-tiche* The Time Ships *(a sequel to* The Time Machine), *which won both the John W. Campbell Memorial Award and the Philip K. Dick Award. His other books include the novels* Voyage, Titan, *and* Moonseed, *and the collections* Vacuum Diagrams: Stories of the Xeelee Sequence *and* Traces. *His most recent books are the novels* Mammoth, Book One: Silverhair *and* Manifold: Time. *His stories have appeared in our Eleventh, Twelfth, Fourteenth, Fifteenth, and Sixteenth Annual Collections.*

"People Came from Earth" takes us to a troubled future, to an embattled, desperate world dancing on the brink of extinction, for the autumnal story of people struggling to hold on to what they have... and perhaps even regain something of what has been lost.

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At Dawn I stepped out of my house. The air frosted white from my nose, and the deep Moon chill cut through papery flesh to my spindly bones. The silver-gray light came from Earth and Mirror in the sky: twin spheres, the one milky cloud, the other a hard image of the sun. But the sun itself was already shouldering above the horizon. Beads of light like trapped stars marked rim mountain summits, and a deep bloody crimson was working its way high into our tall sky. I imagined I could see the lid of that sky, the millennial leaking of our air into space.

I walked down the path that leads to the circular sea. There was frost every-where, of course, but the path's lunar dirt, patiently raked in my youth, is friendly and gripped my sandals. The water at the sea's rim was black and oily, lapping softly. I could see the gray sheen of ice farther out, and the hard glint of pack ice beyond that, though the close horizon hid the bulk of the sea from me. Fingers of sunlight stretched across the ice, and gray-gold smoke shimmered above open water.

I listened to the ice for a while. There is a constant tumult of groans and cracks as the ice rises and falls on the sea's mighty shoulders. The water never freezes at Tycho's rim; conversely, it never thaws at the center, so that there is a fat torus of ice floating out there around the central mountains. It is as if the rim of this artificial ocean is striving to emulate the unfrozen seas of Earth which bore its makers, while its remote heart is straining to grow back the cold carapace it en-joyed when our water —and air—still orbited remote Jupiter.

I thought I heard a barking out on the pack ice. Perhaps it was a seal. A bell clanked: an early fishing boat leaving port, a fat, comforting sound that carried through the still dense air. I sought the boat's lights, but my eyes, rheumy, stinging with cold, failed me.

I paid attention to my creaking body: the aches in my too-thin, too-long, calcium-starved bones, the obscure spurts of pain in my urethral system, the strange itches that afflict my liver-spotted flesh. I was already growing too cold. Mirror returns enough heat to the Moon's long Night to keep our seas and air from snowing out around us, but I would welcome a little more comfort.

I turned and began to labor back up my regolith path to my house.

And when I got there, Berge, my nephew, was waiting for me. I did not know then, of course, that he would not survive the new Day.

He was eager to talk about Leonardo da Vinci.

* * * *

He had taken off his wings and stacked them up against the concrete wall of my house. I could see how the wings were thick with frost, so dense the paper feathers could surely have had little play.

I scolded him even as I brought him into the warmth, and prepared hot soup and tea for him in my pressure kettles. “You’re a fool as your father was,” I said. “I was with him when he fell from the sky, leaving you orphaned. You know how dangerous it is in the pre-Dawn turbulence.”

“Ah, but the power of those great thermals, Uncle,” he said, as he accepted the soup. “I can fly miles high without the slightest effort.”

I would have berated him further, which is the prerogative of old age. But I didn’t have the heart. He stood before me, eager, heartbreakingly thin. Berge always was slender, even compared to the rest of us skinny lunar folk; but now he was clearly frail. Even these long minutes after landing, he was still panting, and his smooth fashionably-shaven scalp (so bare it showed the great bubble profile of his lunar-born skull) was dotted with beads of grimy sweat.

And, most ominous of all, a waxy, golden sheen seemed to linger about his skin. I had no desire to raise that—not here, not now, not until I was sure what it meant, that it wasn’t some trickery of my own age-yellowed eyes.

So I kept my counsel. We made our ritual obeisance — murmurs about dedi-cating our bones and flesh to the salvation of the world —and finished up our soup.

And then, with his youthful eagerness, Berge launched into the seminar he was evidently itching to deliver on Leonardo da Vinci, long-dead citizen of a long-dead planet. Brusquely displacing the empty soup bowls to the floor, he produced papers from his jacket and spread them out before me. The sheets, yellowed and stained with age, were covered in a crabby, indecipherable handwriting, broken with sketches of gadgets or flowing water or geometric figures. I picked out a luminously beautiful sketch of the

crescent Earth —

“No,” said Berge patiently. “Think about it. It must have been the crescent *Moon,”* Of course he was right. “You see, Leonardo understood the phenomenon he called the ashen Moon—like our ashen Earth, the old Earth visible in the arms of the new. He was a hundred years ahead of his time with *that* one....”

This document had been called many things in its long history, but most fa-miliarly the Codex Leicester. Berge’s copy had been printed off in haste during The Failing, those frantic hours when our dying libraries had disgorged their great snowfalls of paper. It was a treatise centering on what Leonardo called the “body of the Earth,” but with diversions to consider such matters as water engineering, the geometry of Earth and Moon, and the origins of fossils.

The issue of the fossils particularly excited Berge. Leonardo had been much agitated by the presence of the fossils of marine animals, fishes and oysters and corals, high in the mountains of Italy. Lacking any knowledge of tectonic pro-cesses, he had struggled to explain how the fossils might have been deposited by a series of great global floods.

It made me remember how, when he was a boy, I once had to explain to Berge what a “fossil” was. There are no fossils on the Moon: no bones in the ground, of course, save those we put there. Now he was much more interested in the words of long-dead Leonardo than his uncle’s.

“You have to think about the world Leonardo inhabited,” he said. “The ancient paradigms still persisted: the stationary Earth, a sky laden with spheres, crude Aristotelian proto-physics. But Leonardo’s instinct was to proceed from observation to theory—and he observed many things in the world which didn’t fit with the prevailing world view—”

“Like mountaintop fossils.”

“Yes. Working alone, he struggled to come up with explanations. And some of his reasoning was, well, eerie.”

“Eerie?”

“Prescient.” Gold-flecked eyes gleamed. “Leonardo talks about the Moon in several places.” The boy flicked back and forth through the Codex, pointing out spidery pictures of Earth and Moon and sun, neat circles connected by spidery light ray braces. “Remember, the Moon was thought

to be a transparent crystal sphere. What intrigued Leonardo was why the Moon wasn't much brighter in Earth's sky, as bright as the sun, in fact. It should have been brighter if it was perfectly reflective — "

"Like Mirror."

"Yes. So Leonardo argued the Moon must be covered in oceans." He found a diagram showing a Moon, bathed in spidery sunlight rays, coated with great out-of-scale choppy waves. "Leonardo said waves on the Moon's oceans must deflect much of the reflected sunlight away from Earth. He thought the darker patches visible on the Moon's surface must mark great standing waves, or even storms, on the Moon."

"He was wrong," I said. "In Leonardo's time, the Moon was a ball of rock. The dark areas were just lava sheets."

"But now," Berge said eagerly, "the Moon is mostly covered by water. You see? And there *are* great storms, wave crests hundreds of kilometers long, which are visible from Earth — or would be, if anybody was left to see."

"What exactly are you suggesting?"

"Ah," he said, and he smiled and tapped his thin nose. "I'm like Leonardo. I observe, *then* deduce. And I don't have my conclusions just yet. Patience, Un-cle ..."

We talked for hours.

When he left, the Day was little advanced, the rake of sunlight still sparse on the ice. And Mirror still rode bright in the sky. Here was another strange forward echo of Leonardo's, it struck me, though I preferred not to mention it to my already overexcited nephew: in my time, there *are* crystal spheres in orbit around the Earth. The difference is, we put them there.

Such musing failed to distract me from thoughts of Berge's frailness, and his disturbing golden pallor. I bade him farewell, hiding my concern.

As I closed the door, I heard the honking of geese, a great flock of them fleeing the excessive brightness of full Day.

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Each Morning, as the sun labors into the sky, there are storms. Thick fat

clouds race across the sky, and water gushes down, carving new rivulets and craters in the ancient soil, and turning the ice at the rim of the Tycho pack into a thin, fragile layer of gray slush.

Most people choose to shelter from the rain, but to me it is a pleasure. I like to think of myself standing in the band of storms that circles the whole of the slow-turning Moon. Raindrops are fat glimmering spheres the size of my thumb. They float from the sky, gently flattened by the resistance of our thick air, and they fall on my head and back with soft, almost caressing impacts. So long and slow has been their fall from the high clouds, the drops are often warm, and the air thick and humid and muggy, and the water clings to my flesh in great sheets and globes I must scrape off with my fingers.

It was in such a storm that, as Noon approached on that last Day, I traveled with Berge to the phytomine celebration to be held on the lower slopes of Ma-ginus.

We made our way past sprawling fields tilled by human and animal muscle, thin crops straining toward the sky, frost shelters laid open to the muggy heat. And as we traveled, we joined streams of more traffic, all heading for Maginus: battered carts, spindly adults, and their skinny, hollow-eyed children; the Moon soil is thin and cannot nourish us well, and we are all, of course, slowly poisoned besides, even the cattle and horses and mules.

Maginus is an old, eroded crater complex some kilometers southeast of Tycho. Its ancient walls glimmer with crescent lakes and glaciers. Sheltered from the winds of Morning and Evening, Maginus is a center of life, and as the rain cleared I saw the tops of the giant trees looming over the horizon long before we reached the foothills. I thought I saw creatures leaping between the tree branches. They may have been lemurs, or even bats; or perhaps they were kites wielded by am-bitious children.

Berge took delight as we crossed the many water courses, pointing out engi-neering features which had been anticipated by Leonardo, dams and bridges and canal diversions and so forth, some of them even constructed since the Failing.

But I took little comfort, oppressed as I was by the evidence of our fall. For example, we journeyed along a road made of lunar glass, flat as ice and utterly impervious to erosion, carved long ago into the regolith. But our cart was wooden, and drawn by a spavined, thin-legged mule. Such contrasts are unendingly star-tling. All our technology would have been

more than familiar to Leonardo. We make gadgets of levers and pulleys and gears, their wooden teeth constantly stripped; we have turnbuckles, devices to help us erect our cathedrals of Moon concrete; we even fight our pathetic wars with catapults and crossbows, throwing lumps of rock a few kilometers.

But once we hurled ice moons across the solar system. We know this is so, else we could not exist here.

As we neared the phytomine, the streams of traffic converged to a great conflu-ence of people and animals. There was a swarm of reunions of friends and family, and a rich human noise carried on the thick air.

When the crowds grew too dense, we abandoned our wagon and walked. Berge, with unconscious generosity, supported me with a hand clasped about my arm, guiding me through this human maelstrom. All Berge wanted to talk about was Leonardo da Vinci. “Leonardo was trying to figure out the cycles of the Earth. For instance, how water could be restored to the mountaintops. Listen to this.” He fumbled, one-handed, with his dog-eared manuscript. *“We may say that the Earth has a spirit of growth, and that its flesh is the soil; its bones are the successive strata of the rocks which form the mountains, its cartilage is the tufa stone; its blood the veins of its waters.... And the vital heat of the world is fire which is spread throughout the Earth; and the dwelling place of the spirit of growth is in the fires, which in divers parts of the Earth are breathed out in baths and sulfur mines. . . .* You understand what he’s saying? He was trying to explain the Earth’s cycles by analogy with the systems of the human body.”

“He was wrong.”

“But he was more right than wrong, Uncle! Don’t you see? This was centuries before geology was formalized, even longer before matter and energy cycles would be understood. Leonardo had gotten the right idea, from somewhere. He just didn’t have the intellectual infrastructure to express it. ...”

And so on. None of it was of much interest to me. As we walked, it seemed to me that *his* weight was the heavier, as if I, the old fool, was constrained to support him, the young buck. It was evident his sickliness was advancing fast—and it seemed that others around us noticed it, too, and separated around us, a sea of unwilling sympathy.

Children darted around my feet, so fast I found it impossible to believe I could ever have been so young, so rapid, so compact, and I felt a mask of old-man irritability settle on me. But many of the children were, at age seven or eight or nine, already taller than me, girls with languid eyes and the delicate posture of giraffes. The one constant of human evolution on the Moon is how our children stretch out, ever more languorous, in the gentle Moon gravity. But they pay a heavy price in later life in brittle, calcium-depleted bones.

At last we reached the plantation itself. We had to join queues, more or less orderly. There was noise, chatter, a sense of excitement. For many people, such visits are the peak of each slow lunar Day.

Separated from us by a row of wooden stakes and a few meters of bare soil was a sea of green, predominantly mustard plants. Chosen for their bulk and fast growth, all of these plants had grown from seed or shoots since the last lunar Dawn. The plants themselves grew thick, their feathery leaves bright. But many of the leaves were sickly, already yellowing. The fence was supervised by an un-smiling attendant, who wore —to show the people their sacrifice had a genuine goal — artifacts of unimaginable value, earrings and brooches and bracelets of pure copper and nickel and bronze.

The Maginus mine is the most famous and exotic of all the phytomines: for here gold is mined, still the most compelling of all metals. Sullenly, the attendant told us that the mustard plants grow in soil in which gold, dissolved out of the base rock by ammonium thiocyanate, can be found at a concentration of four parts per million. But when the plants are harvested and burned, their ash contains four *hundred* parts per million of gold, drawn out of the soil by the plants during their brief lives.

The phytomines are perhaps our planet’s most important industry.

It took just a handful of dust, a nanoweapon from the last war that ravaged Earth, to remove every scrap of worked metal from the surface of the Moon. It was the Failing. The cities crumbled. Aircraft fell from the sky. Ships on the great circular seas disintegrated, tipping their hapless passengers into freezing waters. Striving for independence from Earth, caught in this crosscurrent of war, our Moon nation was soon reduced to a rabble, scraping for survival.

But our lunar soil is sparse and ungenerous. If Leonardo was right—that Earth with its great cycles of rock and water is like a living thing—then the poor Moon, its reluctant daughter, is surely dead. The

Moon, ripped from the outer layers of parent Earth by a massive primordial impact, lacks the rich iron which populates much of Earth's bulk. It is much too small to have retained the inner heat which fuels Earth's great tectonic cycles, and so died rapidly; and without the water baked out by the violence of its formation, the Moon is deprived of the great ore lodes peppered through Earth's interior.

Moon rock is mostly olivine, pyroxene, and plagioclase feldspar. These are sil-icates of iron, magnesium, and aluminum. There is a trace of native iron, and thinner scrapings of metals like copper, tin, and gold, much of it implanted by meteorite impacts. An Earth miner would have cast aside the richest rocks of our poor Moon as worthless slag.

And yet the Moon is all we have.

We have neither the means nor the will to rip up the top hundred meters of our world to find the precious metals we need. Drained of strength and tools, we must be more subtle.

Hence the phytomines. The technology is old —older than the human Moon, older than spaceflight itself. The Vikings, marauders of Earth's darkest age (before this, the darkest of all) would mine their iron from "bog ore," iron-rich stony nodules deposited near the surface of bogs by bacteria which had flourished there: miniature miners, not even visible to the Vikings who burned their little corpses to make their nails and swords and pans and cauldrons.

And so it goes, across our battered, parched little planet, a hierarchy of bacteria and plants and insects and animals and birds, collecting gold and silver and nickel and copper and bronze, their evanescent bodies comprising a slow merging trickle of scattered molecules, stored in leaves and flesh and bones, all for the benefit of that future generation who must save the Moon.

Berge and I, solemnly, took ritual scraps of mustard-plant leaf on our tongues, swallowed ceremonially. With my age-furred tongue I could barely taste the mus-tard's sharpness. There were no drawn-back frost covers here because these poor mustard plants would not survive to the Sunset: they die within a lunar Day, from poisoning by the cyanide.

Berge met friends and melted into the crowds.

I returned home alone, brooding.

I found my family of seals had lumbered out of the ocean and onto the shore. These are constant visitors. During the warmth of Noon they will bask for hours, males and females and children draped over each other in casual, sexless abandon, so long that the patch of regolith they inhabit becomes sodden and stinking with their droppings. The seals, uniquely among the creatures from Earth, have not adapted in any apparent way to the lunar conditions. In the flimsy gravity they could surely perform somersaults with those flippers of theirs. But they choose not to; instead they bask, as their ancestors did on remote Arctic beaches. I don't know why this is so. Perhaps they are, simply, wiser than we struggling, dreaming hu-mans.

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The long Afternoon sank into its mellow warmth. The low sunlight diffused, yellow-red, to the very top of our tall sky, and I would sit on my stoop imagining I could see our precious oxygen evaporating away from the top of that sky, mol-ecule by molecule, escaping back to the space from which we had dragged it, as if hoping in some mute chemical way to reform the ice moon we had destroyed.

Berge's illness advanced without pity. I was touched when he chose to come stay with me, to "see it out," as he put it.

My fondness for Berge is not hard to understand. My wife died in her only attempt at childbirth. This is not uncommon, as pelvises evolved in heavy Earth gravity struggle to release the great fragile skulls of Moon-born children. So I had rejoiced when Berge was born; at least some of my genes, I consoled myself, which had emanated from primeval oceans now lost in the sky, would travel on to the farthest future. But now, it seemed, I would lose even that.

Berge spent his dwindling energies in feverish activities. Still his obsession with Leonardo clung about him. He showed me pictures of impossible machines, far be-yond the technology of Leonardo's time (and, incidentally, of ours); shafts and cog-wheels for generating enormous heat, a diving apparatus, an "easy-moving wagon" capable of independent locomotion. The famous helicopter intrigued Berge partic-ularly. He built many spiral-shaped models of bamboo and paper; they soared into the thick air, easily defying the Moon's gravity, catching the reddening light.

I have never been sure if he knew he was dying. If he knew, he did not mention it, nor did I press him.

In my gloomier hours —when I sat with my nephew as he struggled to sleep, or as I lay listening to the ominous, mysterious rumbles of my own failing body, cumulatively poisoned, wracked by the strange distortions of lunar gravity — I won-dered how much farther we must descend.

The heavy molecules of our thick atmosphere are too fast-moving to be con-tained by the Moon's gravity. The air will be thinned in a few thousand years: a long time, but not beyond comprehension. Long before then we must have re-conquered this world we built, or we will die.

So we gather metals. And, besides that, we will need knowledge.

We have become a world of patient monks, endlessly transcribing the great texts of the past, pounding into the brains of our wretched young the wisdom of the millennia. It seems essential we do not lose our concentration as a people, our memory. But I fear it is impossible. We are Stone Age farmers, the young broken by toil even as they learn. I have lived long enough to realize that we are, fragment by fragment, losing what we once knew.

If I had one simple message to transmit to the future generations, one thing they should remember lest they descend into savagery, it would be this: *People came from Earth.* There: cosmology and the history of the species and the promise of the future, wrapped up in one baffling, enigmatic, heroic sentence. I repeat it to everyone I meet. Perhaps those future thinkers will decode its meaning, and will understand what they must do.

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Berge's decline quickened, even as the sun slid down the sky, the clockwork of our little universe mirroring his condition with a clumsy, if mindless, irony. In the last hours I sat with him, quietly reading and talking, responding to his near-adolescent philosophizing with my customary brusqueness, which I was careful not to modify in this last hour.

"... But have you ever wondered why we are *here* and *now?"* He was whispering, the sickly gold of his face picked out by the dwindling sun. "What are we, a few million, scattered in our towns and farms around the Moon? What do we compare to the *billions* who swarmed over Earth in the final years? Why do I find myself *here* and *now* rather than *then?* It is so unlikely. .." He turned his great lunar head to me. "Do you ever feel you have been born out of your time, as if you are stranded in the wrong era, an

unconscious time traveler?”

I had to confess I never did, but he whispered on.

“Suppose a modern human—or someone of the great ages of Earth—was stranded in the sixteenth century, Leonardo’s time. Suppose he forgot everything of his culture, all its science and learning—”

“Why? How?”

“I don’t know ... But if it were true —and if his unconscious mind retained the slightest trace of the learning he had discarded —wouldn’t he do exactly what Leonardo did? Study obsessively, try to fit awkward facts into the prevailing, un-satisfactory paradigms, grope for the deeper truths he had lost?”

“Like Earth’s systems being analogous to the human body.”

“Exactly.” A wisp of excitement stirred him. “Don’t you see? Leonardo behaved *exactly* as a stranded time traveler would.”

“Ah.” I thought I understood; of course, I didn’t. “You think *you’re* out of time. And your Leonardo, too!” I laughed, but he didn’t rise to my gentle mockery. And in my unthinking way I launched into a long and pompous discourse on feelings of dislocation: on how every adolescent felt stranded in a body, an adult culture, unprepared . . .

But Berge wasn’t listening. He turned away, to look again at the bloated sun. “All this will pass,” he said. “The sun will die. The universe may collapse on itself, or spread to a cold infinity. In either case it may be possible to build a giant machine that will recreate this universe — everything, every detail of this mo-ment—so that we all live again. But how can we know if *this* is the first time? Perhaps the universe has already died, many times, to be born again. Perhaps Leonardo was no traveler. Perhaps he was simply *remembering.”* He looked up, challenging me to argue; but the challenge was distressingly feeble.

“I think,” I said, “you should drink more soup.”

But he had no more need of soup, and he turned to look at the sun once more.

It seemed too soon when the cold started to settle on the land once

more, with great pancakes of new ice clustering around the rim of the Tycho Sea.

I summoned his friends, teachers, those who had loved him.

I clung to the greater goal: that the atoms of gold and nickel and zinc which had coursed in Berge's blood and bones, killing him like the mustard plants of Maginus—killing us all, in fact, at one rate or another—would now gather in even greater concentrations in the bodies of those who would follow us. Perhaps the pathetic scrap of gold or nickel which had cost poor Berge his life would at last, mined, close the circuit which would lift the first of our ceramic-hulled ships beyond the thick, deadening atmosphere of the Moon.

Perhaps. But it was cold comfort.

We ate the soup, of his dissolved bones and flesh, in solemn silence. We took his life's sole gift, further concentrating the metal traces to the far future, short-ening our lives as he had.

I have never been a skillful host. As soon as they could, the young people dispersed. I talked with Berge's teachers, but we had little to say to each other; I was merely his uncle, after all, a genetic tributary, not a parent. I wasn't sorry to be left alone.

Before I slept again, even before the sun's bloated hull had slid below the toothed horizon, the winds had turned. The warm air that had cradled me was treacherously fleeing after the sinking sun. Soon the first flurries of snow came pattering on the black, swelling surface of the Tycho Sea. My seals slid back into the water, to seek out whatever riches or dangers awaited them under Callisto ice.

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