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CARBON CAPTURE

Has climate change made it harder for people to care about conservation?

BY JONATHAN FRANZEN

To slow global warming, we could blight every landscape with biofuel crops and wind turbines. But what about wildlife today?

ILLUSTRATION BY OLIVER MUNDAY

Last September, as someone who cares more about birds than the next man, I was following the story of the new stadium that the Twin Cities are building for their football Vikings. The stadium's glass walls were expected to kill thousands of birds every year, and local bird-lovers had asked its sponsors to use a specially patterned glass to reduce collisions; the glass would have raised the stadium's cost by one tenth of one per cent, and the sponsors had balked. Around the same time, the National Audubon Society issued a press release declaring climate change "the greatest threat" to American birds and warning that "nearly half" of North America's bird species were at risk of losing their habitats by 2080. Audubon's announcement was credulously retransmitted by national and local media, including the Minneapolis *Star Tribune*, whose blogger on bird-related subjects, Jim Williams, drew the inevitable inference: Why argue about stadium glass when the real threat to birds was climate change? In comparison, Williams said, a few thousand bird deaths would be "nothing."

I was in Santa Cruz, California, and already not in a good mood. The day I saw the Williams quote was the two hundred and fifty-fourth of a year in which, so far, sixteen had qualified as rainy. To the injury of a brutal drought came the daily insult of radio forecasters describing the weather as beautiful. It wasn't that I didn't share Williams's anxiety about the future. What upset me was how a dire prophecy like Audubon's could lead to indifference toward birds in the present.



Maybe it's because I was raised as a Protestant and became an environmentalist, but I've long been struck by the spiritual kinship of environmentalism and New England Puritanism. Both belief systems are haunted by the feeling that simply to be human is to be guilty. In the case of environmentalism, the feeling is grounded in scientific fact. Whether it's prehistoric North Americans hunting the mastodon to extinction, Maori wiping out the megafauna of New Zealand, or modern civilization deforesting the planet and emptying the oceans, human beings are universal killers of the natural world. And now climate change has given us an eschatology for reckoning with our guilt: coming soon, some hellishly overheated tomorrow, is Judgment Day. Unless we repent and mend our ways, we'll all be sinners in the hands of an angry Earth.

I'm still susceptible to this sort of puritanism. Rarely do I board an airplane or drive to the grocery store without considering my carbon footprint and feeling guilty about it. But when I started watching birds, and worrying about their welfare, I became attracted to a countervailing strain of Christianity, inspired by St. Francis of Assisi's example of loving what's concrete and vulnerable and right in front of us. I gave my support to the focussed work of the American Bird Conservancy and local Audubon societies. Even the most ominously degraded landscape could make me happy if it had birds in it.

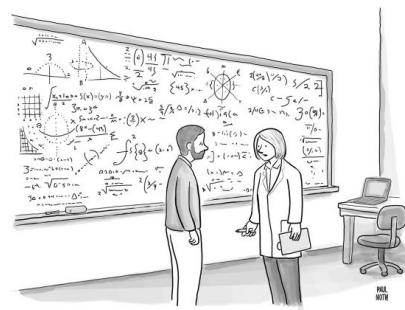
And so I came to feel miserably conflicted about climate change. I accepted its supremacy as the environmental issue of our time, but I felt bullied by its dominance. Not only did it make every grocery-store run a guilt trip; it made me feel selfish for caring more about birds in the present than about people in the future. What were the eagles and the condors killed by wind turbines compared with the impact of rising sea levels on poor nations? What were the endemic cloud-forest birds of the Andes compared with the atmospheric benefits of Andean hydroelectric projects?

A hundred years ago, the National Audubon Society was an activist organization, campaigning against wanton bird slaughter and the harvesting of herons for their feathers, but its spirit has since become gentler. In recent decades, it's been better known for its holiday cards and its plush-toy cardinals and bluebirds, which sing when you squeeze them. When the organization shifted into Jonathan Edwards mode, last September, I wondered what was going on.

In rolling out its climate-change initiative, Audubon alluded to the "citizen science data" it had mobilized, and to a "report," prepared by its own scientists, that justified its dire predictions. Visitors to its updated Web site were treated to images of climate-imperilled species, such as the bald eagle, and asked to "take the pledge" to help save them. The actions that Audubon suggested to pledge-takers were gentle stuff—tell your stories, create a bird-friendly yard—but the Web site also offered a "Climate Action Pledge," which was long and detailed and included things like replacing your incandescent light bulbs with lower-wattage alternatives.

“Sorry, Josh, but I need to stay in and work on my
Theory of Everything but Josh.”

The climate-change report was not immediately available, but from the Web site’s graphics, which included range maps of various bird species, it was possible to deduce that the report’s method involved a comparison of a species’ present range with its predicted range in a climate-altered future. When there was broad overlap between the two ranges, it was assumed that the species would survive. When there was little or no overlap, it was assumed that the species would be caught between an old range that had grown inhospitable to it and a new range in which the habitat was wrong, and would be at risk of disappearing.



This kind of modelling can be useful, but it’s fraught with uncertainties. A species may currently breed in a habitat with a particular average temperature, but this doesn’t mean that it couldn’t tolerate a higher temperature, or that it couldn’t adapt to a slightly different habitat farther north, or that the more northerly habitat won’t change as temperatures rise. North American species in general, having contended with blazing July days and frosty September nights as they evolved, are much more tolerant of temperature fluctuations than tropical species are. Although, in any given place, some familiar back-yard birds may have disappeared by 2080, species from farther south are likely to have moved in to take their place. North America’s avifauna may well become *more* diverse.

The bald eagle was an especially odd choice of poster bird for Audubon’s initiative. The species nearly became extinct fifty years ago, before DDT was banned. The only reason we can worry about its future today is that the public—led by the then energetic Audubon—rallied around an *immediate* threat to it. The eagle’s plight was a primary impetus for the Endangered Species Act of 1973, and the eagle is one of the act’s great success stories. Once its eggs were no longer weakened by DDT, its population and range expanded so dramatically that it was removed from the endangered-species list in 2007. The eagle rebounded because it’s a resilient and resourceful bird, a generalist hunter and scavenger, capable of travelling large distances to colonize new territory. It’s hard to think of a species less liable to be trapped by geography. Even if global warming squeezes it entirely out of its current summer and winter ranges, the melting of ice in Alaska and Canada may actually result in a larger new range.

But climate change is seductive to organizations that want to be taken seriously. Besides being a ready-made meme, it’s usefully imponderable: while peer-reviewed scientific estimates put the annual American death toll of birds from collisions and from outdoor cats at more than three billion, no individual bird death can be definitively attributed to

climate change (since local and short-term weather patterns have nonlinear causes). Although you could demonstrably save the lives of the birds now colliding with your windows or being killed by your cats, reducing your carbon footprint even to zero saves nothing. Declaring climate change bad for birds is therefore the opposite of controversial. To demand a ban on lead ammunition (lead poisoning is the foremost cause of California condor deaths) would alienate hunters. To take an aggressive stand against the overharvesting of horseshoe crabs (the real reason that the red knot, a shorebird, had to be put on the list of threatened U.S. species this winter) might embarrass the Obama Administration, whose director of the Fish and Wildlife Service, in announcing the listing, laid the blame for the red knot's decline primarily on "climate change," a politically more palatable culprit. Climate change is everyone's fault—in other words, no one's. We can all feel good about deploring it.

There's no doubt that the coming century will be a tough one for wild animals. But, for countless species, including almost all of North America's birds, the threat is not direct. The responses of birds to acute climatic stress are not well studied, but birds have been adapting to such stresses for tens of millions of years, and they're surprising us all the time—emperor penguins relocating their breeding grounds as the Antarctic ice melts, tundra swans leaving the water and learning to glean grains from agricultural fields. Not every species will manage to adapt. But the larger and healthier and more diverse our bird populations are, the greater the chances that many species will survive, even thrive. To prevent extinctions in the future, it's not enough to curb our carbon emissions. *We also have to keep a whole lot of wild birds alive right now.* We need to combat the extinctions that are threatened in the present, work to reduce the many hazards that are decimating North American bird populations, and invest in large-scale, intelligently conceived conservation efforts, particularly those designed to allow for climate change. These aren't the only things that people who care about birds should be doing. But it only makes sense *not* to do them if the problem of global warming demands the full resources of every single nature-loving group.

A little tragicomedy of climate activism is its shifting of goalposts. Ten years ago, we were told that we had ten years to take the kind of drastic actions needed to prevent global temperatures from rising more than two degrees Celsius in this century. Today we hear, from some of the very same activists, that *we still have ten years.* In reality, our actions now would need to be even more drastic than they would have ten years ago, because further gigatons of carbon have accumulated in the atmosphere. At the rate we're going, we'll use up our entire emissions allowance for the century before we're even halfway through it. Meanwhile, the actions that many governments now propose are *less* drastic than what they proposed ten years ago.

"O.K., now—on three, I'm going to toss a second job in there!"

A book that does justice to the full tragedy and weird comedy of climate change is “Reason in a Dark Time,” by the philosopher Dale Jamieson. Ordinarily, I avoid books on the subject, but a friend recommended it to me last summer, and I was intrigued by its subtitle, “Why the Struggle Against Climate Change Failed—And What It Means for Our Future”; by the word “failed” in particular, the past tense of it. I started reading and couldn’t stop.



Jamieson, an observer and participant at climate conferences since the early nineties, begins with an overview of humanity’s response to the largest collective-action problem it has ever faced. In the twenty-three years since the Rio Earth Summit, at which hopes for a global agreement ran high, not only have carbon emissions not decreased; they’ve increased steeply. In Copenhagen, in 2009, President Obama was merely ratifying a fait accompli when he declined to commit the United States to binding targets for reductions. Unlike Bill Clinton, Obama was frank about how much action the American political system could deliver on climate change: none. Without the United States, which is the world’s second-largest emitter of greenhouse gases, a global agreement isn’t global, and other countries have little incentive to sign it. Basically, America has veto power, and we’ve exercised it again and again.

The reason the American political system can’t deliver action isn’t simply that fossil-fuel corporations sponsor denialists and buy elections, as many progressives suppose. Even for people who accept the fact of global warming, the problem can be framed in many different ways—a crisis in global governance, a market failure, a technological challenge, a matter of social justice, and so on—each of which argues for a different expensive solution. A problem like this (a “wicked problem” is the technical term) will frustrate almost any country, and particularly the United States, where government is designed to be both weak and responsive to its citizens. Unlike the progressives who see a democracy perverted by moneyed interests, Jamieson suggests that America’s inaction on climate change is the *result* of democracy. A good democracy, after all, acts in the interests of its citizens, and it’s precisely the citizens of the major carbon-emitting democracies who benefit from cheap gasoline and global trade, while the main costs of our polluting are borne by those who have no vote: poorer countries, future generations, other species. The American electorate, in other words, is rationally self-interested. According to a survey cited by Jamieson, more than sixty per cent of Americans believe that climate change will harm other species and future generations, while only thirty-two per cent believe that it will harm them personally.

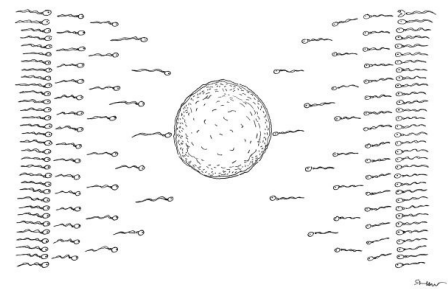
Shouldn't our responsibility to other people, both living and not yet born, compel us to take radical action on climate change? The problem here is that it makes no difference to the climate whether any individual, myself included, drives to work or rides a bike. The scale of greenhouse-gas emissions is so vast, the mechanisms by which these emissions affect the climate so nonlinear, and the effects so widely dispersed in time and space that no specific instance of harm could ever be traced back to my 0.0000001-per-cent contribution to emissions. I may abstractly fault myself for emitting way more than the global per-capita average. But if I calculate the average annual quota required to limit global warming to two degrees this century I find that simply maintaining a typical American single-family home exceeds it in two weeks. Absent any indication of direct harm, what makes intuitive moral sense is to live the life I was given, be a good citizen, be kind to the people near me, and conserve as well as I reasonably can.

Jamieson's larger contention is that climate change is different in category from any other problem the world has ever faced. For one thing, it deeply confuses the human brain, which evolved to focus on the present, not the far future, and on readily perceivable movements, not slow and probabilistic developments. (When Jamieson notes that "against the background of a warming world, a winter that would not have been seen as anomalous in the past is viewed as unusually cold, thus as evidence that a warming is not occurring," you don't know whether to laugh or to cry for our brains.) The great hope of the Enlightenment—that human rationality would enable us to transcend our evolutionary limitations—has taken a beating from wars and genocides, but only now, on the problem of climate change, has it foundered altogether.

I'd expected to be depressed by "Reason in a Dark Time," but I wasn't. Part of what's mesmerizing about climate change is its vastness across both space and time. Jamieson, by elucidating our past failures and casting doubt on whether we'll ever do any better, situates it within a humanly scaled context. "We are constantly told that we stand at a unique moment in human history and that this is the last chance to make a difference," he writes in his introduction. "But every point in human history is unique, and it is always the last chance to make some particular difference."

"I'm just hoping to make it to the Final Four."

This was the context in which the word "nothing," applied to the difference that some Minnesotan bird-lovers were trying to make, so upset me. It's not that we shouldn't care whether global temperatures rise two degrees or four this century, or whether the oceans rise twenty inches or twenty feet; the differences matter immensely. Nor should we fault any promising effort, by foundations or N.G.O.s or governments, to mitigate global warming or adapt to it. The question is



whether *everyone* who cares about the environment is obliged to make climate the overriding priority. Does it make any practical or moral sense, when the lives and the livelihoods of millions of people are at risk, to care about a few thousand warblers colliding with a stadium?

To answer the question, it's important to acknowledge that drastic planetary overheating is a done deal. Even in the nations most threatened by flooding or drought, even in the countries most virtuously committed to alternative energy sources, no head of state has ever made a commitment to leaving any carbon in the ground. Without such a commitment, "alternative" merely means "additional"—postponement of human catastrophe, not prevention. The Earth as we now know it resembles a patient whose terminal cancer we can choose to treat either with disfiguring aggression or with palliation and sympathy. We can dam every river and blight every landscape with biofuel agriculture, solar farms, and wind turbines, to buy some extra years of moderated warming. Or we can settle for a shorter life of higher quality, protecting the areas where wild animals and plants are hanging on, at the cost of slightly hastening the human catastrophe. One advantage of the latter approach is that, if a miracle cure like fusion energy should come along, there might still be some intact ecosystems for it to save.

Choosing to preserve nature at potential human expense would be morally more unsettling if nature still had the upper hand. But we live in the Anthropocene now—in a world ever more of our own making. Near the end of Jamieson's chapter on ethics, he poses the question of whether it's a good thing or a bad thing that the arcadian Manhattan of 1630, lushly forested and teeming with fish and birds, became the modern Manhattan of the High Line and the Metropolitan Museum. People will give different answers. The point is that the change occurred and can't be undone, as global warming can't be undone. We were bequeathed a world of goods and bads by our forebears, and we'll bequeath a world of different goods and bads to our descendants. We've always been not only universal despoilers but brilliant adapters; climate change is just the same old story writ larger. The only self-inflicted existential threat to our species is nuclear war.

The story that is genuinely new is that we're causing mass extinctions. Not everyone cares about wild animals, but the people who consider them an irreplaceable, non-monetizable good have a positive ethical argument to make on their behalf. It's the same argument that Rachel Carson made in "Silent Spring," the book that ignited the modern environmental movement. Carson did warn of the dangers of pollution to human beings, but the moral center of her book was implicit in its title: Are we really O.K. with eliminating birds from the world? The dangers of carbon pollution today are far greater than those of DDT, and climate change may indeed be, as the National Audubon Society says, the foremost long-term threat to birds. But I already know that we can't prevent global warming by changing our light bulbs. I still want to do something.

In “Annie Hall,” when the young Alvy Singer stopped doing his homework, his mother took him to a psychiatrist. It turned out that Alvy had read that the universe is expanding, which would surely lead to its breaking apart some day, and to him this was an argument for not doing his homework: “What’s the point?” Under the shadow of vast global problems and vast global remedies, smaller-scale actions on behalf of nature can seem similarly meaningless. But Alvy’s mother was having none of it. “You’re here in Brooklyn!” she said. “Brooklyn is not expanding!” It all depends on what we mean by meaning.

Climate change shares many attributes of the economic system that’s accelerating it. Like capitalism, it is transnational, unpredictably disruptive, self-compounding, and inescapable. It defies individual resistance, creates big winners and big losers, and tends toward global monoculture—the extinction of difference at the species level, a monoculture of agenda at the institutional level. It also meshes nicely with the tech industry, by fostering the idea that only tech, whether through the efficiencies of Uber or some masterstroke of geoengineering, can solve the problem of greenhouse-gas emissions. As a narrative, climate change is almost as simple as “Markets are efficient.” The story can be told in fewer than a hundred and forty characters: We’re taking carbon that used to be sequestered and putting it in the atmosphere, and unless we stop we’re fucked.

Conservation work, in contrast, is novelistic. No two places are alike, and no narrative is simple. When I travelled to Peru last November to see the work of a Peruvian-American partnership, the Amazon Conservation Association, my first stop was at a small indigenous community in the highlands east of Cuzco. With Amazon Conservation’s help, the community is reforesting Andean slopes, suppressing forest fires, and developing a business in a local legume called *tarwi*, which can thrive on degraded land and is popular enough in Cuzco to be profitable. In an old and dusty and dirt-floored building, women from the community served me a lunch of *tarwi* stew and dense, sweet *tarwi* bread. After lunch, in a neighboring courtyard, I toured a nursery of native tree saplings that the community will hand-plant on steep slopes, to fight erosion and improve local water quality. I then visited a nearby community that has pledged to leave its forested land intact and is operating an experimental organic farm. The scale of the farm is small, but to the community it means clear streams and self-sustenance, and to Amazon Conservation it represents a model for other communities. The regional and municipal governments have money from petroleum and mining royalties, and could



spend it revitalizing the highlands according to the model. “We’re not jealous,” Amazon Conservation’s Peruvian director, Daniela Pogliani, told me. “If the government wants to take our ideas and take the credit, we have no problem with it.”

In an era of globalism of every sort, a good conservation project has to meet new criteria. The project has to be large, because biodiversity won’t survive in a habitat fragmented by palm-oil plantations or gas drilling. The project has to respect and accommodate the people already living in and around it. (Carbon emissions have rendered meaningless the ideal of a wilderness untouched by man; the new ideal is “wildness,” which is measured not by isolation from disturbance but by the diversity of organisms that can complete their life cycles.) And the project needs to be resilient with respect to climate change, either by virtue of its size or by incorporating altitudinal gradients or multiple microclimates.

The highlands are important to the Amazon because they’re a source of its water and because, as the planet heats up, lower-elevation species will shift their ranges upslope. The focal point for Amazon Conservation is Peru’s Manú National Park, a swath of lower-elevation rain forest larger than Connecticut. The park, which is home to indigenous groups that shun contact with the outside world, has full legal protection from encroachment, but illegal encroachment is endemic in the parks of tropical countries. What Amazon Conservation is attempting to do for Manú, besides expanding its upslope potential and protecting its watershed, is to strengthen the buffer on the flanks of the park, which are threatened by logging, slash-and-burn farming, and a boom in wildcat gold mining in the region of Madre de Dios. The project aspires to be a protective belt of small reserves, self-sustaining community lands, and larger conservation “concessions” on state-owned land.

On the fifty-five-mile road down from the highlands, it’s possible to see nearly six hundred species of bird. The road follows an ancient track once used to transport coca leaves from the lowlands to pre-Columbian highland civilizations. On trails near the road, Amazon Conservation researchers peaceably coexist with modern-day coca traffickers. The road bottoms out near Villa Carmen, a former hacienda that now has an educational center, a lodge for ecotourists, and an experimental farm where a substance called biochar is being tested. Biochar, which is manufactured by kiln-burning woody refuse and pulverizing the charred result, allows carbon to be sequestered in farm fields and is a low-cost way to enrich poor soil. It offers local farmers an alternative to slash-and-burn agriculture, wherein forest is destroyed for cropland, the soil is quickly exhausted, and more forest has to be destroyed. Even a wealthy country like Norway, seeking to offset its carbon emissions and to assuage its guilt, can’t save a rain forest simply by buying up land and putting a fence around it, because no fence is strong enough to resist social forces. The way to save a forest is to give the people who live in it alternatives to cutting it down.

At the indigenous village of Santa Rosa de Huacaria, near Villa Carmen, the community's cacique, Don Alberto, gave me a tour of the fish farm and fish hatchery that Amazon Conservation has helped it develop. Large-scale fish farming is ecologically problematic in other parts of the world, but smaller-scale operations in the Amazon, using native fish species, are among the most sustainable and least destructive sources of animal protein. Huacaria's operation provides meat for its thirty-nine families and surplus fish that it can sell for cash. Over lunch—farmed paco fire-roasted with yucca inside segments of bamboo, with heliconia-leaf plugs at each end—Don Alberto held forth movingly on the effects of climate change that he'd seen in his lifetime. The sun felt hotter now, he said. Some of his people had developed skin cancer, unheard of in the past, and the larvae of a palm-tree parasite, which the community had traditionally eaten to control diabetes and stimulate their immune systems, had vanished. Nevertheless, he was committed to the forest. Amazon Conservation is helping the community expand its land title and develop its own partnership with the national park. Don Alberto told me that a natural-medicine company had offered him a retainer and a jet in which to fly around the world and lecture on traditional healing, and that he'd turned it down.

"First, I'd like to thank everyone who believed in me."

MARCH 26, 2001

The most striking thing about Amazon Conservation's work is the smallness of its constituent parts. There are the eight female paco from which a season's worth of eggs are taken, the humbleness of the plastic tanks in which the hatchlings live. There are the conical piles of dirt that highland women sit beside and fill short plastic tubes in which to plant tree seedlings. There are the simple wooden sheds that Amazon Conservation builds for indigenous Brazil-nut harvesters to shelter the nuts from rain, and that can make the difference between earning a living income and having to cut or leave the forest. And there is the method for taking a bird census in a lowland forest: you walk a hundred metres, stopping to look and listen, and then walk another hundred metres. At every turn, the smallness contrasts with the vastness of climate-change projects—the mammoth wind turbines, the horizon-reaching solar farms, the globe-encircling clouds of reflective particles that geoengineers envision. The difference in scale creates a difference in the kind of meaning that actions have for the people performing them. The meaning of climate-related actions, because they produce no discernible result, is necessarily eschatological; they refer to a Judgment Day we're hoping to postpone. The mode of meaning of conservation in the Amazon is Franciscan: you're helping something you love, something right in front of you, and you can see the results.



In much the way that developed nations, having long contributed disproportionately to carbon emissions, now expect developing nations to share the burden of reducing them, the rich but biotically poor countries of Europe and North America need tropical countries to do the work of safeguarding global biodiversity. Many of these countries are still recovering from colonialism, however, and have more urgent troubles. Very little of the deforestation of the Brazilian Amazon, for example, is being done by wealthy people. The deforesters are poor families displaced from more fecund regions where capital-intensive agribusinesses grow soybeans for Chinese tofu and eucalyptus pulp for American disposable diapers. The gold-mining boom in Madre de Dios is not only an ecological catastrophe but a human disaster, with widespread reports of mercury poisoning and human trafficking, but Peruvian state and federal governments have yet to put an end to it, because the miners make much better money than they could in the impoverished regions from which they've emigrated. Besides tailoring its work to the needs and capacities of local people, a group like Amazon Conservation has to negotiate an extremely complicated political landscape.

In Costa Rica, I met a seventy-six-year-old tropical biologist, Daniel Janzen, who has spent nearly half his life doing just that. Janzen and his wife, Winnie Hallwachs, are the architects of perhaps the most audacious and successful conservation project in the New World tropics, the Área Conservación de Guanacaste (A.C.G.). Janzen and Hallwachs began working on the project, in 1985, with many advantages. Costa Rica was a stable democracy whose system of parks and reserves comprised one quarter of its land area and was internationally admired; the northern dry-forest region of Guanacaste, the site of the project, was remote, sparsely populated, and unattractive to agribusiness. That Janzen and Hallwachs created a reserve that meets the new criteria—it is huge, has good relations with surrounding communities, and encompasses a marine reserve, the dry slopes of a volcanic cordillera, and Caribbean rain forest—is nonetheless remarkable, because they were two unwealthy scientists and the politics never ceased to be complicated.

Costa Rica famously has no army, but its park administration has been organized like one. Headquartered in the capital, San José, it freely rotates its guards and other personnel throughout the system, with the parks functioning essentially as territories to be defended from armies of potential encroachers. Janzen and some farsighted Costa Rican policymakers recognized that, in a country where economic opportunities were limited, the amount of protected land enormous, and funding for protection strictly finite, defending parks filled with timber and game and minerals was like defending mansions in a ghetto. The A.C.G. experimented with a new approach: the national parks and the reserves within it were exempted from the park administration's policy of rotation, which allowed their personnel to put down roots and develop allegiance to the land and the conservation concept, and all employees, including the police, were expected to do meaningful conservation or scientific work.

In the early years, this work often consisted of fighting fires. Much of the present-day A.C.G. was once rangeland covered with Africanized grasses. Using money raised with the help of the Nature Conservancy and the Swedish and Costa Rican governments, and from passing a hat after his lectures in America, Janzen was able to buy up huge chunks of pasture and damaged forest between the two existing national parks. After the cattle were removed, wildfires became the main threat to the project. Janzen experimented with planting seedlings of native tree species, but he quickly concluded that natural reforestation, with seeds carried by wind and animal droppings, worked better. Once the new forest took hold, and the fire risk diminished, he developed a more ambitious mission for the A.C.G.'s employees: creating a complete inventory of the estimated three hundred and seventy-five thousand plant and animal species that occur within its boundaries.

Borrowing from the term “paralegal,” Janzen coined the word “parataxonomist” for the Guanacasteans he hired. They lack university degrees, but after a period of intensive training they’re able to do real scientific work. They walk the dry Pacific-slope forest and the wet Caribbean forest, collect specimens, and mount them and take tissue samples for DNA analysis. There are currently thirty-four parataxonomists, whom Janzen is able to pay respectable salaries with grant money, interest from a small endowment, and dogged fund-raising. Janzen told me that the parataxonomists are as highly motivated and eager to learn as his best graduate students. (He teaches biology at the University of Pennsylvania.) I saw one team early on a Saturday morning collecting an assortment of leaves for the caterpillars it was raising in plastic bags, another team setting out on a Sunday morning to scour the woods.

“All I ask is a chance to ruin my life in my own way.”

JULY 26, 2004

Of the three new criteria for successful conservation projects, integration with surrounding communities is the most difficult to meet. Janzen’s taxonomy endeavor serves this goal in several ways. Most basically, for Costa Ricans to care about biodiversity—their country, which covers 0.03 per cent of the Earth’s land surface, contains four per cent of its species—they have to know what it consists of. Biodiversity is an abstraction, but the hundreds of drawers of pinned and named Guanacastean moth specimens, in an air-conditioned room at Santa Rosa National Park, are not. Hands-on science, the specific story that each toxic plant and each parasitic wasp has to tell, also provides a focus for the Guanacastean schoolchildren whom the A.C.G. has been hosting for thirty years. If you spent a week in the dry forest as a child, examining chrysalides and ocelot droppings, you might, as an adult, see the forest as something other than a purely economic resource. Finally, and perhaps most



important, the parataxonomists create a sense of local ownership. Some of them are husband-and-wife teams, and many live at the research stations that dot the A.C.G., where they exert a more powerful protective influence than armed guards ever could, because their neighbors are their friends and family. During my days at Guanacaste, I passed the station at the entrance to Santa Rosa many times and never saw a guard. By Janzen's account, poaching and illegal logging are much rarer in the A.C.G. than in other, traditionally guarded Costa Rican parks.

Janzen and Hallwachs spend half the year in a tiny, cluttered hut near Santa Rosa's headquarters. Deer, agoutis, magpie-jays, wasps, and monkeys frequent the bowls of water in front of their hut. Over the years, they've kept a porcupine and a pygmy owl as rescue pets; Janzen remarked to me wistfully that he wished it were possible to have a pet rattlesnake. White-bearded and shirtless, wearing only sneakers and dirty green cotton pants, he looks as though he had walked out of a Conrad novel. Hallwachs, who is a tropical ecologist, is younger, more emollient, and skilled at converting Janzen's scientific rationality into conventional social currency.

The forest in Santa Rosa seemed desperately dry to me, even for a dry forest in the dry season. Hallwachs pointed to the cloud cover on the volcanoes and said that during the past fifteen years it has steadily moved upslope, a harbinger of climate change. "I used to win cases of beer betting on the date the rains would come," Janzen said. "It was always May 15th, and now you don't know when they're going to come." He added that insect populations in Guanacaste had collapsed in the four decades he'd been studying them, and that he'd thought of describing the collapse in a paper, but what would be the point? It would only depress people. The loss of insect species is already harming the birds that eat them and the plants that need pollination, and the losses will surely continue as the planet warms. But to Janzen the warming doesn't obviate the A.C.G. "If you had the only Rembrandt in the world," he said, "and somebody came and slashed it with a knife—would you throw it away?"

My visit coincided with the news of a breakthrough in technology for making ethanol from cellulose. From a climate perspective, the lure of efficient biofuel production is irresistible, but to Janzen it looks like another disaster. The richest land in Costa Rica is already given over to monocultural agribusiness. What would happen to the country if second-growth forest could fuel its cars? As long as mitigating climate change trumps all other environmental concerns, no landscape on earth is safe. Like globalism, climatism alienates. Americans today live far from the ecological damage that their consumption habits cause, and even if future consumers are more enlightened about carbon footprints, and fill their tanks with certified green fuel, they'll still be alienated. Only an appreciation of nature as a collection of specific threatened habitats, rather than as an abstract thing that is "dying," can avert the complete denaturing of the world.

Guanacaste is already the last significant expanse of Pacific dry forest in Central America. To preserve even some of the species unique to it, the reserve has to last forever. “It’s like terrorism,” Janzen said. “We have to succeed every day, the terrorists have to succeed only once.” The questions that he and Hallwachs ask about the future have little to do with global warming. They wonder how to make the A.C.G. financially self-sustaining, and how to root its mission permanently in Costa Rican society, and how to insure that its water resources aren’t all drawn off to irrigate cropland, and how to prepare for future Costa Rican politicians who want to level it for cellulosic ethanol.

The question that most foreign visitors to Guanacaste ask is how its model can be applied to other centers of biodiversity in the tropics. The answer is that it can’t be. Our economic system encourages monocultural thinking: there exists an optimal solution, a best conservation product, and once we identify it we can scale it up and sell it universally. As the contrast between Amazon Conservation and the A.C.G. suggests, preserving biological diversity requires a corresponding diversity of approach. Good programs—the Carr Foundation’s Gorongosa Restoration Project in Mozambique, Island Conservation’s re-wilding of islands in the Pacific and the Caribbean, WildEarth Guardians’ fight to save the sagelands of the American West, EuroNatur’s blending of cultural and biological conservation in southeastern Europe, to name a few—not only act locally but, by necessity, think locally as well.

“He’s becoming insufferably ‘More transparent than thou.’”

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During my time with Janzen, he rarely mentioned other projects. What concerns him is what he loves concretely: the specific dry-forest hunting grounds that he uses as a tropical field biologist, the unprivileged Costa Ricans who work for the A.C.G. and live near its borders. Sitting in a chair outside his forest hut, he was an unstoppable font of story. There was the story of Oliver North’s airstrip for the contras, on the Santa Elena peninsula, and how Santa Elena became part of the A.C.G. The story of Janzen’s discovery that dry-forest moth species spend part of their life cycle in humid forest, and how this led him and Hallwachs to expand the scope of their already ambitious project. And the story of the thousand truckloads of orange peel that the A.C.G. took off the hands of an orange-juice plant in exchange for fourteen hundred hectares of prime forest, and how a mischief-making environmentalist then sued the juice company for illegally dumping the peels on public land, even though, by the time the suit was settled, they’d decayed into a rich, reforestation-promoting loam. The story of how Janzen and Hallwachs learned to do business with multiple landowners



simultaneously, making all-or-nothing offers for bundles of properties, to avoid being taken hostage by an individual holdout. The story of the landowner who invested the proceeds of his sale of ranchland in irrigation for sugarcane production outside the A.C.G.—an example of conservation’s reversal of geographical entropy, its sorting of mixed-used land into areas of stringent protection and intensive exploitation. The story of the A.C.G.’s redesignation of its schoolteachers as “secretaries,” because “schoolteacher” wasn’t a recognized civil-service position in the Ministry of Environment, Energy, and Telecommunications.

In 1985, when Janzen and Hallwachs set out to create the A.C.G., with no training or experience in conservation work, they couldn’t have imagined any of these stories. Guanacaste became the thing that happened to them, the life they chose to live. It may be true, of course, that “where there’s life there’s death,” as Janzen is fond of saying, and I did wonder if the vision of a climate-denatured planet, a world of switchgrass fields and eucalyptus plantations, is secretly appealing to human beings, because, having so much less life in it, it would have so much less death. Certainly there was death all around me in the forest, palpably more death than in a suburb or a farm field—jaguars killing deer, deer killing saplings, wasps killing caterpillars, boas killing birds, and birds killing everything imaginable, according to their specialty. But this was because it was a living forest.

From a global perspective, it can seem that the future holds not only my own death but a second, larger death of the familiar world. Across the river from the lowest-lying of Amazon Conservation’s research stations, Los Amigos, are miles and miles of forest ripped apart by gold miners. The A.C.G. is surrounded by agribusiness and coastal development that its existence has served to consolidate. But within Los Amigos are quetzals, tinamous, trumpeters, and everything else that their ongoing presence represents. Within the A.C.G. is a forest that didn’t exist thirty years ago, with hundred-foot trees and five species of large cat, sea turtles digging their nests by the ocean, and flocks of parakeets sociably feasting on the seeds of fruiting trees. The animals may not be able to thank us for allowing them to live, and they certainly wouldn’t do the same thing for us if our positions were reversed. But it’s we, not they, who need life to have meaning. ♦



Jonathan Franzen is a frequent contributor of essays, stories, and journalism to *The New Yorker*.