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Waking Up in the Rainforest

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I.

The brilliance of natural design sometimes inspires designers and engineers to use what I call "biologic" or "aikido engineering." By tapping the ingenuity of patterns, structures and flows that are already proven winners -- such as the structure of an abalone shell or the stickiness of euphorbia sap -- innovative designers help move us toward a more sustainable, less disruptive commerce. Equally important is the *software*: nature can and must inspire monumental changes in human behavior, quickly. We need to re-program our culture, step back into the circle of life, and preserve the natural systems that support us -- not solely for altruistic reasons, but also because of enlightened self-interest.

In an economic sense, if we don't collectively understand and appreciate our interdependence with other species and systems, our markets won't embrace bio-inspired products and technologies -- no matter how brilliant and well adapted they are -- because techno-inspired products are so cheap and easy to make. In an ecological, symbiotic sense, unless a fresh, new "bioethic" germinates in our labs, factories, and shell-shocked consumer brains, we won't deliver sufficient feedback to put the brakes on clumsy, insensitive, imprecise technologies that are bulldozing gaping holes in the natural world.

It's clear that humanity at large needs a crash course in layperson ecology. Recently, I did an independent study in a Costa Rican rainforest that was just that. I tell friends that I went in as a hopeful pupa and emerged as a wet-winged butterfly. I understood many things at a gut level that I had somehow missed before.

Allowing myself eight days to stay in a tiny cabin without electricity or hot water, I began to let down my Americanized blinders and defenses, and slow down to the speed of life. It was like sensory deprivation in reverse -- the more time I spent away from the static of everyday American culture, the more I was profoundly moved by the brilliance of a primal, old-growth rainforest that hasn't changed in at least 5,000 years.

I saw and felt complexity-in-balance, and realized how far *out* of balance our industrial complexity is. In the rainforest, species accommodate each other to make the system successful overall. Over the eons, species put on different colors and take different shapes so all nutrients will be used, and all niches occupied. They utilize information and design rather than extra resources. For example, the forest is thick with pheromones, fragrances and odors that relay information of all types: invitations, warnings, and even, I suspect, exclamations! (What makes us think humans are the only species with joie de vivre?)

The wastes and fabricated products of one species are used by another species, because even in a world blessed with 25 feet of rain annually, resources need to be shared among many species. The complexity of industry is infantile and clunky by comparison, having only hundreds of years of experience as opposed to billions. Rather than cooperating to make the overall system sustainable, industrial "species" compete to attain their own, narrow goals. There are fewer safety nets and safeguards, and the system suffers for it.

You can read about the rainforest or see it on TV, but until you spend a little time there, you won't really grasp its incredible complexity. And you won't be able to use it as an inspiration at the gut level, where our new bioethic needs to take root.

I chose Rara Avis, an ecotourist reserve a few hours north of San Jose, for inspiration. I discovered that it's an 800-acre lungful of fresh air, and a masterpiece of biological abundance. Located strategically next to several other wilderness parks, this private nature reserve provides undisturbed habitat for 362 different species of birds, including 24 different species of hummingbird. Twenty different species of orchid were recently counted on a single fallen tree. It struck me that this undisturbed morsel of Earth is like a self-portrait, because the rainforest is *painting itself* in the bold colors of its many species. The red, green, yellow, orange, turquoise and black of a keel-billed toucan; the dark, iridescent blue of a Morphos butterfly; the dappled red of a stained glass palm, and thousands of other splashes of color and nuance

And I realized that humans -- especially those of us whose lifestyles demand so many resources -- need to somehow absorb these colors, this bold brilliance, into our hearts, and re-value the wealth of nature. There's far more to life than the gray of concrete and the drab green of currency. My feeling is that until we acknowledge the butterfly colors inside each of us, we won't gain the momentum to use natural design on a wide scale. Until we launch an

unwavering Mission to planet Earth, we'll keep postponing the homecoming, until there's not much left to come home to.

The name Rara Avis comes from a medieval poem containing the phrase, "Rara avis in terris." The poem refers to a rare bird in the world – or figuratively, something new and fresh happening in human civilization. During my solitary stay at Rara Avis, I soul-searched about the scope of fundamental changes in our world. I asked myself, and fellow travelers I met at the reserve, questions like these:

- What if humanity's bright new goal became "Being healthy together" rather than "Beating Each Other Up for the Resources?"
- What if the world's religions put more emphasis on present life and less on afterlife, acknowledging the sanctity of biology and the need to preserve it, *now*?
- What if we are right at the dawning of a new era -- what historians may someday call the Ecological Revolution? What if we are, in the nick of time, literally coming back to our senses?

II.

The story of my Rara Avis experience begins with a rigorous 3-hour tractor-drawn wagon ride, a trip that's the exact opposite of "luxurious." Imagine a steel-framed wagon lurching and skidding over boulders the size of watermelons and muddy potholes the size of bathtubs. Our small band of international travelers from the U.S., Germany, France, and Costa Rica, clings to the pipes of the frame and tries to invent shock absorbers by standing up and bending knees, but nothing really helps. The women hold their arms tightly across their breasts, and the men wish they'd worn athletic supporters. The experience is a little like having a baby in an earthquake, but when the bumpy journey's over, something in me has been shaken loose.

We walk the last few miles to the waterfall lodge, which will be my home base for the next week. The air is soft and easy to breathe, and since the reserve is at an elevation of 2,000 feet, it's much cooler than the Osa Peninsula in southern Costa Rica, where a friend and I had spent the previous week. There are fewer mosquitoes and flies than I expected, but more mud – fortunately, the office where we caught the wagon ride issues rubber boots to newcomers.

Within minutes, we are seeing many things we've never seen before. A strawberry poison dart frog hops across the trail in search of cover, but before he disappears we get a good look at this character who seems to have some good genes. Our guide, Arnulfo, tells us that as a male with territorial "memory," he just hangs out in his sits and waits for females to come to him. His bright red skin contains toxins so strong that he has no predators, and he'll most

likely die of old age. A little further up the trail, a boa constrictor is wrapped around the trunk of a large bush, and isn't in any hurry to get out of our way, instead relying on his camouflage for protection.

Arnulfo tells us about snakes that are far more dangerous than the boa, for example, the fer-de-lance viper that's one of the deadliest animals of Central and South America. The guide's comments, half in Spanish and half in English, set the stage for a recurring theme that week – communication. Using bits and pieces of French from some neglected footlocker in my head, I also deploy beginner's Spanish to interpret what Arnulfo says. In fractured francais, and with a look of disbelief, I tell Marie, “Costa Ricans have an unusual folk remedy for snake bites: drink kerosene and eat soil.”

“Mange la terre? Pourquoi?” Marie asks, incredulously. We feel an immediate sense of camaraderie, despite the language challenge. Converging on Rara Avis from four different countries, we each have certain expectations about communication: with ourselves, with each other, and with the rainforest itself. Even in those first few moments, the more we discover about the abundance of the rainforest, the more we seem to discover about ourselves as individuals. The cabins and lodge we would stay in didn't have electricity, which would help strengthen our connection with the natural abundance around us. And if torrential rains came down – according to the literature, sometimes more rain in two days than my home state Colorado gets all year – we'd stay in the screened-in cabins and just feel the pulse of the jungle.

Before arriving at the lodge and cabins, we pause to study another of the forest's many assets, the leafcutter ant. We learn how this industrious creature provides both sunlight and soil for other species, by design. Climbing in formation high into the forest's canopy, the ant colony prunes so many leaves that one-third more light reaches the forest floor because of this species' efforts. Then the colony's workers, which can number up to 5 million, bring the leaf fragments back to underground fungus gardens, where they fertilize the fungus crop with compost made from the leaf shreds. In the process, they create soil, a precious commodity in this top-heavy environment, where most of the nutrients are in the living tissue of plants and animals.

The Costa Ricans say that “When it rains, everyone drinks,” and this characterizes ecosystems like Rara Avis. All the pieces fit together to make the system work, and if we dismantle pieces of the system, it begins to break down, as if we'd taken spark plugs out of a car engine.

Amos Bien, the biologist who founded Rara Avis in 1986, believes he can demonstrate that the forest is worth more standing than cut down for pastureland or timber. His goals are to find sustainable products such as nursery-grown trees and ornamental plants, orchids and bromeliads that can provide income but leave the forest and all its pieces intact. He wants to provide complete isolation in the middle of the forest, for mind-opening experiences like mine; a high quality of attention to ecotourists, with guides available around the clock; intense scientific focus on rainforest conservation; and the education of neighbors and sister regions on the ecology, politics, and economics of rainforests.

One of his managers, Joaquin Gamboa, estimates that the reserve needs 2,500 visitors every year to keep the business going. Joaquin tells me in ‘Spanglish,’ “Four percent of all visitors come back, and many more tell their friends about this place.” His eyes light up when he describes how he’s helped connect people with the colors of the rainforest. “We’ve taught several Costa Rican farming families how to operate successful butterfly farms as a substitute for clearing the land,” he says. Every year, the Rara Avis staff brings in twenty or more students from local schools to stay for a few days at the reserve, to learn about ecology. Symbiotically, they’ve helped many other ecotourism businesses get started in Latin America.

Joaquin’s biggest pleasure is seeing how the rainforest transforms visitors. “They come here with this stony look on their face, still in the grip of their hurry-up-and-make-money lifestyle, and by the time they leave, they’ve discovered something about themselves.” He reverts to pure Spanish to emphasize his point: “Algo para descubrir yo mismo.”

A one-time mechanical engineer, he constantly hears the machinery of nature in the forest he’s come to know so well. “When the cicadas, tree frogs, trogons, owls, howler monkeys, and hundreds of other species all join the chorus, it sounds like a smoothly-running factory -- Taca, taca, taca... sissit,sissit...”

I know exactly what he means, having heard the orderly, repetitive printing presses and assembly lines myself. Given that the mission of each call is to be heard among the other calls, there are all varieties of pitch and syncopation that create a complex, industrious symphony. One morning I was awakened by a cuckoo clock that turns out to be one instrument in the symphony. I count the hours, groggily, but even in half-sleep, I know it can’t be nine o’clock already...

What Hans Zimmermann, a six-time German visitor to Rara Avis, loves about the experience is the visual aesthetic of the rainforest. “On the first day you’re here, you see only greens,” the German explains in near-flawless English. “But walking in the forest on the second day, you begin to see the reds and yellows, in the flowers that grow high up in the canopy. Then you begin to notice the patterns, colors, shapes, and splashes of light that give you masterpieces of art. You come out of your shell, and back to your senses.”

I can relate perfectly to that comment. Having forgotten to bring a backpacking mirror, I’ve been shaving by feel, because the outdoor sink of the casita I sleep in doesn’t have one, either. But I’m finding, as the days go by, that the less I look at myself from the outside, the more I look at what’s going on inside. And the more the inside connects directly with the rainforest. It occurs to me that the word “alive” is really better expressed as the phrase, “alive *with*,” since so many other forms of life share the world with us.

Hans continues, “I’ll never forget the first time I saw the Toucan, what some call ‘the flying banana.’ Sitting on a limb sunning himself, he immediately gave me a sense of delight, and that’s what I keep coming back for.”

On TV programs about rainforests, species appear one after another, like a luggage carousel filled with colorful life strategies and behaviors. In the rainforest itself, you may walk half

an hour before seeing a tropical bird or a stunning orchid. But along the way, you've reduced the speed of your own metabolism, and breathed many lungfuls of the planet's cleanest air. Your skin begins to feel radiant, and there's an involuntary smile on your face. Three days into your rainforest adventure, you're amazed.

I walk down to dinner one evening in the twilight, and my flashlight beam falls on the orange and black stripes of a coral snake. I'm alarmed, knowing she's poisonous, but fascinated that she has slithered into my life. As I bend closer to get a better look, she retracts from the path into the bushes, like the scene in the Wizard of Oz where the Wicked Witch's striped sock melts away under the house that had landed on top of her. With the hair on the back of my neck still standing, I step gingerly from one stepping stone to another, watching the miniature flashlight beams of fireflies hovering in the descending darkness.

After dinner, biologist Amanda Neill explains why she puts her energy into studying a single species of rainforest flower, the bright red *gurania* – commonly known as the jungle cucumber. “It's a very charismatic plant, and a good species to help people become interested in rainforests,” she says. “It's pollinated by the Green Hermit hummingbird and the colorful heliconius butterfly, and its own bright color makes people want to protect it. But think what might happen if the taxonomists mistakenly lump two similar species together. We might assume that there are plenty of these -- don't worry about saving their habitat -- when really there are only a few of each species left, that have traveled a billion years to get here.”

She remarks that the idea of keeping track of what *is* here began when she was an only child in a Texas household. “I'd go out in the backyard and classify all the plants and animals that were there,” she says. “As a doctoral candidate, it stills boggles my mind to think that many of Linneus' specimens from the 1750s are intact, fundamental pieces of our botanical data base.” As we talk, she glances over towards a support beam in a dark corner of the room, and spots a tarantula about the size of a grade school student's hand, eavesdropping on the interview. Hiding my own discomfort over the whole idea of a huge, hairy spider that close to me, I urge her to put it in the palm of her hand and let me take a picture. “You're a biologist, right?” I needle.

“I've already tried that one,” she tells me, “and I got bit.” The sense of ecological urgency in this blond-haired 30-year woman mixes well with her sense of delight. Even in her narrow niche of study, she's traveled widely – to Ecuador, Belize, Peru, now Costa Rica, to study the taxonomy and ecology of her focus species. In effect, she's found her own symbiotic niche in the rainforest. She trades her skills at cataloging and protecting the *gurania* for the privilege of living a month at a time under the lush, protective canopy of the rainforest.

When the time comes for me to return to the “real world,” I take Han's advice and walk the ten miles back to the small village where I will catch the bus to San José -- rather than riding the tractor-drawn wagon. He tells me it will enrich my experience to make a gradual return to civilization. “You leave paradise and walk past the fields being cleared for grazing. You start to hear the sounds of the world outside paradise: the chainsaws, hammers, car engines, airplanes... You put on a clean shirt in place of your grimy old tee shirt, and you start to think about all the things you need to do.”

The tropical sun beats down on me as I walk, looking over my shoulder at the cloud-covered highlands where Rara Avis is perched, like a rare bird. "I may as well have been on another planet," I tell myself, slathering on sunscreen for the first time in a week.

I think back to a few mornings ago, when I had walked the Platenilla trail by myself. (Although the guides discourage solitary walks because of the possible risks, by the time you've been out with them two or three times, they begin to trust you to walk on your own.) Heading down the path towards an idyllic waterfall a few miles away, I was in a state of constant amazement, as if I'd died and this was heaven. Despite the risk of fer-de-lance snakes that could be on overhead branches and vines, I'd taken off my T-shirt and continued walking. I wanted to feel the rainforest on my skin.

Suddenly, a blue dragonfly decided to orbit my head three or four times, giving me a close-up of its amusing, helicopter-like wings. By that time, I had completely opened up to everything the rainforest had to offer, and had acquired a wider, more holistic sense of self. "I" was not enclosed by my skin, but extended out into the infinitely patterned rainforest. I remember thinking as the dragonfly hovered comically around my head, "That's me!"

David Wann is a free-lance writer, speaker, and video producer. He's coauthor of *Affluenza: The All-Consuming Epidemic* and *Superbia! 31 Ways to Create Sustainable Neighborhoods* (September, 2003), and author of three other books: *Biologic*; *Deep Design*; and *The Zen of Gardening in the High and Arid West*. Email him at wanddavejr@cs.com

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Notes from the publisher:

BioInspire is happy to announce BioClips, a sister publication designed to provide readers with high quality and up to date news related to the natural world and design. In addition to essays currently submitted to BioInspire by leading minds, BioInspire will be publishing BioClips. BioClips is a free clipping service that draws upon thousands of articles from leading journals, periodicals, and news sources, and reports summaries of biological news in a digestible format.

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Sincerely,
John Mlade, Biomimicry Guild
Institute for the Built Environment
Colorado State University

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