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The Last Green Leaf

The picture is hard to unroll... so bleak, so full of despair in the surround, but there, centered, is also the green leaf, a window opening through to the green shining which is Corcovado. It so captures the essence of what I learned from Corcovado that I am going to cheat and my moment will be from the year 2000, when I first saw Corcovado and was overwhelmed by its beauty.

It was at San Pedrillo on the north edge of the Park and it was a black garlic tree that first brought me to a standstill. I see it in my mind standing alone, rising 30 meters before the first branch, its sense of presence silencing me. The scale surpassed my camera and I put it away, or rather, something within me put it away. Another black garlic tree beside the trail, roots swelling around a fallen log, and the same overpowering sense of presence, the same quiet within me. Somewhere above, rumor of sky but down here in the pools of shadow I could see none of it. A stream split the canopy and sun leaked through... sun was like butter spread on the leaves, dripping in the heat down to the earth and soaking in, leaving oil spots on the brown fallen leaves. On the slopes, a fallen giant lying on an angle, white luminous mushrooms rising from within, steam rising, life transforming, and down the fallen trunk, a line of leaf-cutter ants paralleled the mushrooms, leaves dancing down single-file, over the side and into a hole in the earth, the green pieces disappearing one after the other, hesitating or shoving ahead impatient, traffic jam at the entrance to the underworld. The edges dissolved and even the earth seemed simply where matter had thickened enough to stand. Above, within, below no longer separate, nor individual nor species nor I separate from the whole, the whole not even separating death from life. I think ultimately it was the experience of the whole that undid and overwhelmed me.

The news is so bad everywhere on the planet, the Arctic ice thinning, our polar bears thinning, forests up in smoke, the sea emptied of fish. I had insulated myself by hard won emotional controls and cynicism. When I flew into Costa Rica in 2000, I flew in looking for landslide scars on the hills. I was coming to Costa Rica to go bird watching before there were no more birds to watch. Many things contributed to the realization of hope on that first trip, traveling with Alvaro Ugalde one of them. When I walked out of the forest at San Pedrillo, I wept. I wept for all that the planet will lose in the coming century, for my sense of helplessness, for my cynicism with which I excuse my inaction, for my participation in the destruction. And I wept for something else entirely, I wept for beauty. And I wept because hope let me. That is what is so important about hope. Grief becomes bearable and suddenly beauty fills the world. Had it been devastation, I would not have cried, but hope... that's tough to deal with because it speaks of all that's not been done, of all that might yet be.

The green leaf does not live in Corcovado, it lives in each of us. On that first trip, there was an incident between Alvaro and the head of a local research station to do with garbage... what about the recycling program? .. no money to keep it running, too dispersed to collect, no transportation, too costly, nothing they could do. Alvaro steamed away and erupted... It is the attitude that is wrong. You have to decide that it will be solved and then it is solvable. And it is that simple. Decide to do and things become do-able. Do that and the strangest things happen.. suddenly the world conspires with you. Let yourself love this planet. Open yourself to its beauty. There lies strength; there is where the last green leaf grows.

—— Ann Gallie

Dr. Gallie is a professor of Environmental Sciences at Laurentian University, Ontario. Her research is on Remote Sensing. After the above trip to Corcovado National Park as a tourist, Dr Gallie's "To Do" list took a leap and eventually included a much-needed solar powered communication system for the Sirena Research Station inside the same park. Single-handedly, she raised the funds from Rotary Club in Canada, oversaw the equipment design, contracted engineers and completed its installation – all quite do-able even for a foreigner from Canada. Every other year, Dr. Gallie brings her students to Costa Rica (and Nectandra) as part of their extracurricular environmental education. She joined the Nectandra Institute Board of Directors in 2006.

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I Am What I Eat

That's what I used to believe.

For most of my life, I deferred to my subconscious when it came to my sustenance. Food was something needed to keep my body sated and my palate happy. By the time I became of age, I thought I knew enough about what and how much to eat and drink, what was safe to put in my mouth, what constituted human food and what was junk food. My career as a medical microbiologist informed me of the critical relationship between diet, physiology and health. By all criteria, I should rate as an above average, well-informed food consumer.

That I did not give food, a topic of supreme importance to all, enough thought is becoming very clear. While I was growing up, my mother had complained about my recalcitrant food habits. When told to eat my well balanced meals on my plate or else, I chose the latter. As an adult, I did not always evaluate the quality of my food as a life investment. As a consumer, I often neglected to vote with my money for better choices. Finally, as a scientist, I committed the error of not analyzing all the critical variables associated with human food. Thus, I never understood what food really meant to me as an organism. I missed seeing the relationship between what I chose to eat and what the evolving *homo sapiens* should consider as "natural food". Lastly, I did not connect my choice of food with its direct consequence on the environment. This was a startling realization, one that I lately have given a lot of thought.

Let's return to the misleading title. To start with, I was what my mother ate during the first nine months of my existence. Her difficult pregnancy with me was during a stressful time historically (W.W.II) and personally (she was still recovering from an untreated case of malaria, which had killed my newborn older brother shortly after birth).

My mother tried to breast feed me, but she was too malnourished to lactate. For the next few months, I was what my mother's neighbor friend ate. Another little girl had to give up some of her milk to keep me alive. Mother and her friend's diet at the time was pretty unvarying. As city folks temporarily stranded in the countryside during the war years, my parents did not grow their food. Rice, wheat, soy, peanuts and greens (bought or collected), salt, sugar were all the main staple foods they could afford or buy. Meat and animal by-products were rare treats. Cooking fuel (wood from countryside) was scarce. There was no refrigeration. Most of the dishes were long on preparation (involving multistep, combinations of brining, sun drying, fermentation, enzymatic digestion, etc.) and short on cooking time (steaming and stir frying).

After that, I was what the goat ate. The goat was free ranging around our one-room house at 1900 m elevation at the foothills of the Himalayas. It had the run of the lush countryside, consuming all the grass, wild herbs and possibly the plentiful mushrooms growing in the area. (This may explain my partialness to mushrooms). Of course, all the insects on the goat's food also found their way into mine. I grew for many more months on goat's milk.

In my early childhood, I grew up on a non-Western diet, lots of greens, legumes and vegetables, no dairy products, low in meat, sugar, and infrequently insects (yes, intentional as well unintentional). Most of what one ate fresh was grown within less than a few dozen kilometers. Foods from further away were dried or preserved, but only the wealthy could afford exotic food from afar. This diet was very likely familiar to my ancestors. It evolved only slowly during the 10,000 years agriculture had been around in that part of the world. By my mid teens, the long, probing fingers of the modern global economy reached us. Milk products and temperate-climate fruits (apples, oranges, pears) from the USA started to appear in the local markets. Corn-fed animal products and highly-processed food followed. Since then, we humans and food stuffs traveled, mixed, combined, morphed, thanks to faster and faster modern transportation and technology. We no longer live where our familial ancestors lived. Our diets changed not just as a consequence of the geography, cultural traditions or availability, but as a result of how we chose to live and what to eat. In the developed world, the unlimited choice of food items and their relative low cost means access to ingredients, fresh or not, from practically anywhere in the world, anytime, in quantity as much as we care to stuff our cheeks.

Food today is cheap and plentiful in the developed world, with more choices than ever before and more "experts" to advise us on how to eat them. So what is the problem? The problem is we are far from eating well in spite of all that. By well, I don't mean according to diet gurus, or to what constitutes excessive calories from fats vs. proteins or carbohydrates, vegetarian vs. non-vegetarian, raw or cooked, organic vs. chemically supplemented. I am referring to eating optimally for a *homo sapiens*—the increase of diet-associated human

health problems (obesity, diabetes, osteoporosis, cardiovascular diseases etc.) are obvious indicators that not all is well.

First of all, it is an enigma as to why humans have problems knowing what to eat. No other animals share our dilemma! Wild or domesticated animals instinctively know what food to select over others. Modern humans ironically seem to have lost the natural skills to search out optimal foods and diet in spite of the increase of our brain size. Our physiology seem to be frozen in the "all you can eat" mode, even in time of plenty. This is perhaps the outcome of the millions of evolutionary years superimposed on the explosive anthropocentric changes of the last two hundred years.

If we were to look back to the last common evolutionary branching, the closest relatives to hominids would be chimpanzees with whom we share 98-99% of our genes. Gorillas and orangutans are our next closest relatives. The well-known work of Jane Goodall showed that chimpanzees ate fruit 60% of their feeding time, 20% for leaves/flowers/seeds, 10-17% for insects, 2-6% for meat (small mammals and other vertebrates) and 4% miscellaneous (eggs, nuts, honey etc.). Just as humans, chimps also drink water separately from food (directly from streams). In the wild, they are opportunists, switching from one food source to another, *e.g.*, from fruits to insects, to whatever is in abundance. Gorillas and orangutans also eat more fruits and leaves, though not exclusively, including food items (insects, nuts, eggs) that overlap with those of chimps. The most significant difference between our western diet and that of the apes' "average" diet is the lack of alpha-linolenic acid, one of the two essential fatty acids from vegetable oils (mainly seeds, legumes and nuts) that is not produced by our body and must be acquired through food.

What about our humanoid ancestors? What did they eat? According to a most impressively detailed series of reports in *Science*, 2 Oct. 2009, the earliest (4.4 Mya) hominid predecessor to share lineage with *homo sapiens* is now believed to be *Ardipithicus ramidus*, whose fossils were uncovered in Ethiopia about 15 years ago. *Ardipithicus* predated *Australopithecus* (3.3 Mya) and *homo sapiens* (0.5 Mya). Analyses of *Ardipithicus* dental isotopes and enamel wear are consistent with a plant-based diet dominated by woodland plants (*vs*. soft ripe fruits) and of food items with intermediate hardness (perhaps insects and nuts). Perhaps our modern primate cousins, unburdened by a superior brain, have it right after all. I can't help but think they can teach us a thing or two about optimal diets.

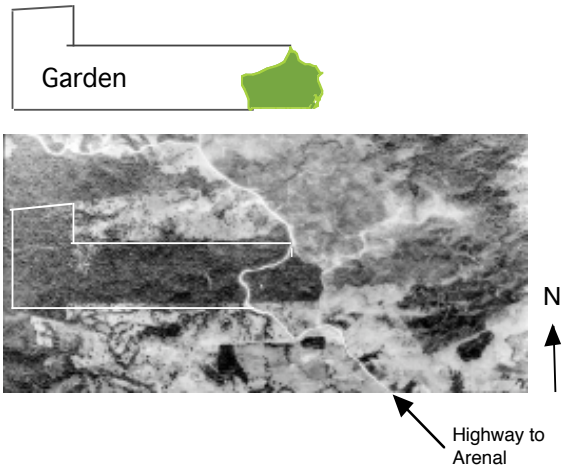
While the science is still out on what constitutes an optimal human diet, the current information we do have about our digestive system is rather intriguing. For one thing, we humans appear to be one big biodigestor, harboring 10 times more microorganisms than there are cells in our body. Once food enters our mouth, hordes of microorganisms converge on it as their sustenance, even before we get the benefit of the nutrients. Our body is a continuous amphitheater for warring microorganisms, where more than 1000 species of microbes colonize our digestive tract. Our health is the outcome of their daily skirmishes. Many are known to have beneficial functions for their hosts, working as our nutrient providers and immune regulators, while others are interlopers and opportunistic pathogens. What we eat determines what metabolic products these organisms generate—some essential to our health and survival, some are toxins that are associated with cancer and aging. Our microflora provide us with essential vitamins, *e.g.*, B12, K, speed up the production of others, *e.g.*, vitamin A, trace-elements such as iron and zinc, etc., at the same time that other organisms are doing their utmost to poison us. Microbiologists have done a fair job in recognizing pathogens in recent decades. Ironically, it is only within the last 5 years that they have the tools to study "normal" microflora, at a time that our human diet has strayed far from normal. It is now highly processed, chemically modified, synthetic, replete with antibiotics and contaminants. We eat thoughtlessly, wastefully, without consideration to our own health and future, let alone that of our fellow creatures.

You may ask, what does our optimal diet have to do with environment? Everything. I am what my fellow Earth-mates eat, first and last. I am them.

••• *The Editor* •••

2009 Highlights

Nectandra Institute purchased 18 ha of mature forest (in green) in December. This piece of forest has been on our wish list for some time now. Before the construction of the highway, it was contiguous with the Garden forest. After the highway was built, it became an island unbeknownst to the wild fauna from our reserve that cross the highway. Any animals that cross into this forest fragment are no longer under the same level of protection from hunters. We want to reunite the two separated forest parcels under common management.



We are very grateful to Marta Arce, Nancy Hillyard, Ann Gallie, David Lennette, Evelyne Lennette, Dougal McCreath, and Daniel Norris for their generosity, their unwavering support. This acquisition would not have been possible without their help.

Dec 09 The second annual water awareness and environmental education program given to 6th graders in the Balsa River watershed (Balsa RW) community of Palmira concluded. This year, 6th graders from the neighboring community of Pueblo Nuevo also participated. The program, titled "Caring for our Community's Water", is a joint initiative between the VIDA clubs of the aforementioned communities and Nectandra Institute. Topics include the water cycle, biodiversity, restoring forests, and avoiding pollution and contamination.

Dec 09 Balsa RW communities dedicated almost 200 person-hours in restoration and monitoring work on the approximately 450 acres purchased thus far with eco-loan financing from Nectandra Institute. Although only two years and a half have passed since the first 27 acres were purchased, some changes are now visible at some locations as trees, shrubs, and other plants slowly make their way back.

Nov 09 Plumbers from ten water management associations providing potable water service to various rural communities in the upper Balsa RW attended in a Nectandra Institute four-day workshop on the use of GPS receivers. Nectandra will continue training and working with these watershed communities to create effective "green maps" of the area: geographic information systems that include data such as extent and type of forest cover, watershed and sub-watershed boundaries, location of freshwater springs, privately protected properties, aqueduct infrastructure, and any other information that can help promote sound land-use strategy and a holistic watershed vision by all.

Oct 09 VIDA club members started monitoring water quality at 14 points along local rivers and streams in the upper Balsa RW under the guidance of Nectandra staff Randall Varela. Monitoring of physical, chemical, and biological variables will continue for five years .

Oct 09 Geography students from the University of Costa Rica in coordination with Nectandra Institute collected field data within the drainage area upstream from the aqueduct intake spring of the Balsa RW (community of Tapezco). They created maps showing the area's various land-uses and presented them to representatives of Tapezco's water management association. The maps will help the community make more informed decisions when it comes to resource planning and strategies for protecting the spring it depends on for its drinking water.

For details of all our Institute's 2009 activities, Please visit us at www.nectandra.org in the Archived News section.