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Building Relationships, Naturally

Scott Horton

MY SISTER WORKS FOR A SWANKY architecture firm in Santa Barbara, CA, that specializes in residential design where budget is not an issue with clients. The firm has developed a reputation for high-end projects that splash across the pages of glossy design magazines at a scale that parallels the expansive square footages of the houses described. The entire staff flew to Italy last year to bask in Tuscan architecture, culture, food, and wine. They wanted to get "in the mood" for the style-du-jour projects they were working on back on the West Coast. Clients' desires and the trendy urge to keep up with what's "hot" compelled the firm to abandon the rich heritage of vernacular Spanish colonial architecture of Southern California that in its pure form uses local materials in techniques including adobe, rammed earth, round-wood beams, beautiful plasters and details, and glorious red and glazed tiles for floors, roofs, and patios. It's an architecture that to me, a native Angeleno, defines California history and frames a profound, relaxed sense of place here. It engenders a feeling of connection to the land, the light, and the air and an easy functionality and flow that surely must be what good design is ultimately all about.

Tuscan buildings do the same for Tuscany, of course, and evoking nostalgia for a remote cultural heritage is nothing new or surprising—colonists have been doing it for centuries. On the bright side, new hybrid forms often emerge. But there's a disturbing sleight-of-hand about building Etruscan villas and steroid farmhouses thousands of miles from Italy. And there's something downright outlandish about importing hundreds of tons of just the right shade of rose-dawn stone to face a beach house because it matches the color of the cheeks on the Madonna a client saw in that sweet little chapel in San Gimignano.

If some architects and designers understand this—and I know many that do—why don't they seem to have more influence over their capricious clients and the tastes that fuel the market?

My sister is interested in permaculture and ecological design, at least by contact. She has generously executed computer drawings for me when I've needed super-flashy, professional presentation materials, and she really gets into the gestalt of holistic design. A colleague of hers at the firm is affectionately known as "Mudboy" because of his youthful obsession with making model buildings with the same Santa Barbara clay the mission builders used there centuries before. Mudboy still keeps many of his models in his garage, the most impressive of which is a mini-adobe dome he built when he was a teenager without any experience or training. He learned the structural properties, possibilities, and advantages from the earth itself, supplemented by a keen sense of observation and trial-and-error over time.

With passionate, innovative, and experienced employees like

these, you'd think the firm would consider specializing in something other than Italian hilltown knockoffs. I suspect that Mudboy could effectively and happily head up a natural building or LEEDS arm of the shop. Perhaps then there would be opportunity and impetus for genuine advocacy and subtle, right-minded client education that could have an effect on the professional field at large.

We do have friends at court. There are many ecologically and socially responsible architects, designers, builders, and code officials out there and their numbers are growing, as are the ranks of natural builders and permaculture designers. We need more in all quarters. Hopefully someday soon these largely discrete populations will achieve substantial interaction and mutual exchange. We could do more than just dream of a world where the priorities in building are health—ours and Nature's—minimal input, zero waste, maximum function, accessibility, comfort, and beauty.

For the moment, at least, it seems that in much commercial and residential architecture, he who writes the check ultimately controls the design. So how do we reach the decision makers and key influencers that drive the housing market's whims? How can we build partnerships that bring housing and design out of the market and back into the garden? The contributors to this issue are on the trail of solutions to these and other challenges.

The articles in this issue all focus on the state of the art and field of natural building with an emphasis on expanding our reach and impact, written by leaders who are building the dream on and from the ground right now. Activists and communarians Warren Brush, Dafyd Rawlings, Lydia Doleman, and Michael G. Smith outline strategic thoughts about a movement that is afoot to build bridges between permaculturists, natural builders, intentional communities, and "conventional" architects, engineers, builders, developers, and government. Veteran natural builders Catherine Wanek, Kelly Lerner, Albert Bates, Ianto Evans, and Ali Sharif hold up a mirror for us to see what our field is doing here in the US and abroad with examples from the grassroots to the technological.

The real theme of this issue is that the most important thing we must keep building are relationships that will yield increased awareness and action as we continue to design and build a healthy future. △

Scott Horton is Editor of Permaculture Activist. He lives in the San Jacinto Mountains of Southern California and works and teaches throughout the US and in Mexico.

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Permaculture Activist welcomes your articles, news items, photos, and other materials of interest. Please contact the Editor in advance of your submissions at editor@permacultureactivist.net to request writers guidelines and present your ideas.

Future Issues: Themes and Deadlines

#64 Waste = Food	March 1
#65 Climate, Micro and Macro	June 1
#66 Animals in Permaculture Design	September 1

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Permaculture is a holistic system of DESIGN, based on direct observation of nature, learning from traditional knowledge, and the findings of modern science. Embodying a philosophy of positive action and grassroots education, Permaculture aims to restructure society by returning control of resources for living: food, water, shelter, and the means of livelihood, to ordinary people in their communities, as the only antidote to centralized power. For 25 years Pc has combined top-down thinking with bottom-up action to make a world of difference in over 60 countries. We are everywhere.

How Do We Want to Dwell?

Dafyd Rawlings

“WHAT IS THE USE OF A HOUSE if you haven’t got a tolerable planet to put it on?”
—Henry David Thoreau

One of the first jobs I ever did as an intern architect was to visit, with the principal of the firm I was working for, an older retired couple wanting a new kitchen in their Santa Fe home. After much discussion about expensive kitchen appliances, imported stone countertops, and drawing iterations showing deconstruction and remodeling with “the look” of the much-marketed Southwest Style they wanted, the contractor generated a preliminary estimate of \$200,000.

They didn’t even blink.

I was shocked, but I shouldn’t have been. I cannot defend or explain the impulse to spend large amounts of money on such extravagances, but I do understand the desire to replicate the images we are taught to covet. Current design stereotypes are largely driven by consumption and style. What surprised me

more than this, however, was that my boss gave the clients neither feedback about the ecological consequences of their decisions nor advice about our capabilities to reapportion the spaces they already had. Clearly, this was more about ego than practicality and we acquiesced out of fear of losing the job.

This accepted indulgence contradicts the stated aims of the firm and of the green building movement—still in its infancy—to design structures that are more environmentally friendly. Of course, green design and building are marketing memes, reflecting decisions to follow the current trend of environmental sensitivity in practice or appearance. But they are also, perhaps above all else, a moral obligation to act differently, one that sometimes, unfortunately, takes a backseat to the marketplace.

A few months after this episode, I resigned my position with the firm, my idealism battered from constantly crashing into economic pressures to take any design work that came along. With this decision I wondered, “Is this the nature of architecture? Is this the professional route I want to follow?”

Elegantly integrated into a hillside, this Moroccan village fits seamlessly into its surroundings because it was built by the villagers themselves from local natural materials. Ancient principles of strength, function, and beauty have operated here for millennia.



I tell this story because it is commonplace, substantiated by a number of my architecture peers who are, for the most part, CAD monkeys, drawing and redrawing digital lines in the hopes of someday having the opportunity to make a difference in society.

This story is bigger than my experience. It is about a growing awareness that our human activities do impact the planet. Our collective history of exploitation seems too grand to change, but all is not lost.

It doesn't have to be this way.

Obligation to survival and responsibility

In October of this year, the population of the United States of America passed the 300 million mark. The population of the world is expected to double within a generation. It is obvious that strategies for living regeneratively (sustainably at minimum) are crucial to making do with our increasingly limited resource base.

Designers of all specialties and concerned citizens want to reduce the negative impact of today's building practices on the natural and social environment. We understand that ethical and regenerative design principles must become the core values of how we live.

This is where design meets its obligation to the common good.

The question facing us is, "How can design meld with other systems and considerations to address the pressing needs and concerns of our world today?"

Design is a science that can contribute to our growing knowledge of the links between our activities and natural processes. It can bridge the worlds of technology and art in the great experiment to live better within our means and to take responsibility for our impacts on the natural world. At its most conscientious, design investigates how best to create buildings and sites that enrich and are appropriate to place, that embody the principles of sustainability, and that support the people and communities using them.

This mirroring embodies respect for nature and can be achieved by balancing local building traditions and native materials with the introduction of renewable energy technologies, responsible waste reuse, community development, and cultural awareness to form the basis of each building endeavor.

Thus, the designer's lead role is to advocate for better use of natural, cultural, and social resources in building, while at the same time paying attention to site, history, and cultural context. In this way architecture and other design fields can establish and maintain their relevance into the future. The ultimate goal is to pass meaningful dwellings on to future generations.

Thinking beyond slogans

"To work our way toward shared and living language once again, we must first learn how to discover patterns, which are deep, and capable of generating life."

—Christopher Alexander

At this point, we have to discuss some terms.

"Conventional" refers to the building systems used commonly throughout the country. We have all seen concrete foundations, wood or steel frames, gypsum wall coverings, plywood or oriented strand board sheathing, and some sort of roofing material, with copper or PVC pipes for plumbing, insulated copper wiring for electrical circuits, and fiberglass for insulation. This is not to mention finish materials. What we often don't hear about conventional building is that concrete can have toxic admixtures, that unhealthy electro-magnetic fields may be created by wiring and steel elements in the building, and that pollution from volatile organic compounds, toxins, and pesticides may be present because of the materials and methods used.

The terms "green," "natural," and "sustainable" all seem to be used interchangeably in the design and building communities, but it is important to distinguish between the three.

The term "green" has been muddled by a misguided desire to advertise products or practices as better than the rest. Because of its history, "green" is most often used to describe efforts toward sustainability. Green products and services vary in their degree of responsiveness to ecological processes. For instance, waste-denim insulation is called green because it's made from material that would otherwise be incinerated, buried, or sunk at sea. It's also less toxic than other forms of insulation. So, we call it green. Obviously, being able to use denim for insulation is better than throwing it "away," but the real question should be, "Why do we have this waste at all?"

Not all things labeled green are suspect. I would direct your attention to the United States Green Building Council (USGBC) and their LEED (Leadership in Energy and Environmental Design) system. This protocol has achieved growing recognition as the new standard to be met. It came about from an incredible effort on the part of architects, designers, contractors, and different organizations to make the shift toward sustainability by instituting a rating system. As Harry Gordon writes in his white paper, *Sustainable Design Goes Mainstream*, the LEED standards are "creating a common understanding for what it means to be green."

In terms of "sustainability," I would argue for the very strictest definition: that the impacts of any design must be balanced or outweighed by beneficial inputs to the systems it draws upon and of which it is a part. Sustainability is within our grasp and there are some precedents for this. Sustainability is an important concept to grasp. It is not the end goal, however, but a process of attaining the baseline measure for any design and building endeavor. Most design and building projects now are consumptive and exploitive. Sustainability means that the project achieves a balance point between negative and beneficial impacts

on the world.

I would emphasize another term that occupies the most forward-thinking end of the spectrum—regenerative design; of which natural building is a part. This is where design meets its obligation to the common good. In this whole-systems approach, cycles of materials, energies and flows are created, maintained, and improved; the term waste is replaced by food; the end of one use is the beginning of another, and harmony is recognized as the measure of success. This is not a lofty goal. It is business as usual for nature on our planet.

Our obligation to each other and to the planet is to make this a livable world for future generations, to be fair in taking our share, and to renew and replenish the biosphere for all species of the future.

Cultivating awareness

Growth in awareness of environmental problems is key to making changes happen. A story from Honolulu makes the point.

Former Mayor Jeremy Harris took responsibility for a declining tourist trade. In a classic case of “the solution became the problem,” what had first been responses to accommodate tourism became the very elements that led to its decline. Pineapple fields and greenbelts at the ocean became tracts of vacation condominiums and broad avenues for car traffic that cut people off from the beach.

Once this was recognized, the mayor, against very strong protests in the community, asked citizens in each of the city’s 19 neighborhoods to generate a list of what they liked and didn’t like about their island. Citizens were given cameras to record their likes and dislikes about the city. With this process as a prelude, the city issued a strict budget to each neighborhood, allowing the residents of those districts to decide how to spend the money. Amazing things began to happen.

Given information on the effects of the lifestyles that they had chosen, the people of Oahu came to support changes, including electric bus systems that are now the best in the nation, infill development, and the narrowing of roads to encourage people-oriented relationships

and to cut down on traffic. In the end, both citizens and tourists alike came to respect and enjoy the natural environment more.

Though Mayor Harris hired architects to organize this transformation, it doesn’t take architects to do it. Architects can be the facilitators, though they are seldom the catalysts. What this kind of broad systems-based change does take is the willingness to challenge our mindset. Design of this breadth and magnitude is possible.

When we speak of architecture, we usually think of structures. I am frequently asked, “So, what do you do? Residences?” It’s hard to explain that architecture is really about defining how we relate to each other and the environment.

Ed Mazria, a Santa Fe architect, is working within the legal and socially recognized systems to change guidelines and requirements for energy use in buildings. His Architecture 2030 project is a three-pronged effort to change industry guidelines, design education parameters, and modify building codes.

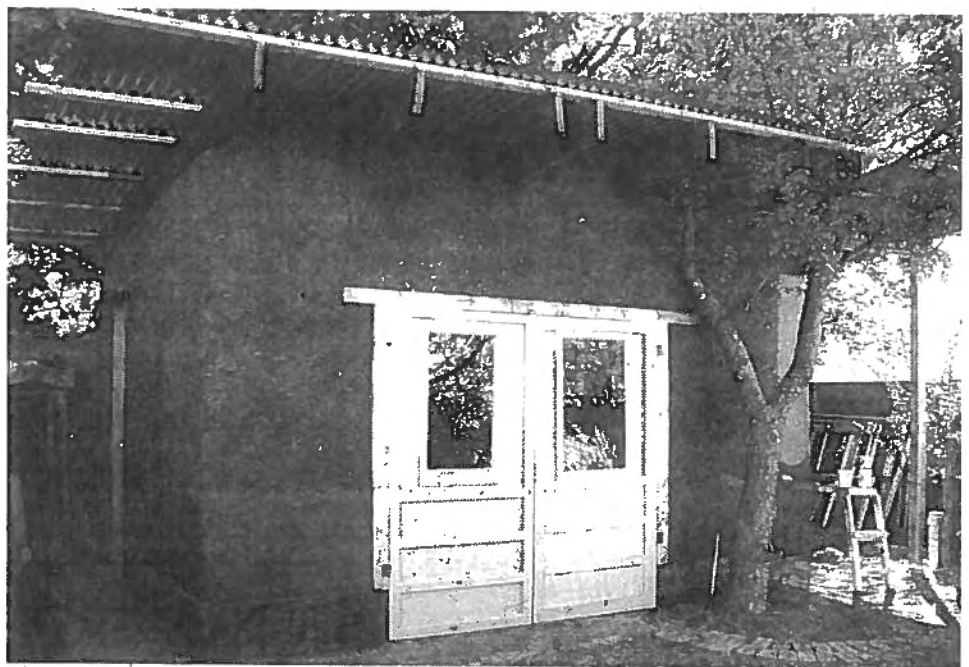
Mazria has shown that reconfiguring the way we calculate carbon emissions gives us a far different picture of the impact of building on the environment than is commonly held. When we measure the energy needed for all construction, maintenance, and deconstruction, we see

that 48% of US carbon emissions comes from buildings. As stated on the Architecture 2030 website,

“Combining the annual energy required to operate residential, commercial, and industrial buildings along with the embodied energy of industry-produced building materials like carpet, tile, glass, and concrete exposes buildings as the largest energy consuming and greenhouse gas-emitting sector.”

If the current design standards and built form of regulated architecture are creating a disaster, as Mazria’s research points out, how can we create a framework for ecological architecture based on a whole-systems or permaculture approach? Activism within the community pitches design to re-create natural systems: observing and interacting, self-regulation and feedback, and integration rather than segregation.

There are many more examples of these kinds of activist design interventions. (See *Design Like You Give a Damn*, *Good Deeds*, *Good Design*, and *Studio at Large* in Resources at the end of this article.) One shining example of design activism with a tangible outcome is shown by the structures designed and built by students of the late Samuel Mockbee at Auburn University’s Rural Studio.



Even simple structures—like this cob workshop, built by the author and his wife Yolanda in their Santa Fe backyard—can embody appropriate design principles, making them comfortable, useful; and easy on the eye.



Exposed structural members with plastered infill reveal the bones of this Kyoto temple.

Right now grassroots efforts, intentional communities, and natural builders all over the country are offering alternative methods and materials for building. In California a newly formed group is working to introduce alternative and natural building to the California residential building code.

Reclaiming our creative power

"The tracks of our ancestors have been wiped away by the Great Forgetting. It's not up to us to replant their exact footprints, but to make our own, equally original tracks."

—Carl Cole

Native American experience counsels us against hasty decisions and to consider the consequences of our acts on generations to come. We are seeing these impacts play out in our world—right now. I won't go into global warming, peak oil, suspect food sources, or dwindling clean water supplies here, but we must recognize that in the short 200-year span of the age of fossil fuel technology, we have managed to destroy, exploit, and endanger natural systems all around the globe. Much of the damage stems from the way we have built in the modern era.

During the last half century, we designed houses primarily to profit developers and contractors. These buildings were not expected to last longer than 50 years. This is dumb design. Our mastery of technology has blinded us to the perennial wisdom of buildings that live and endure for centuries. Cheap energy has introduced needless complexities. If we look to the structures from our past and from traditional cultures, we can find the answers we will need to shape our dwellings in the future.

Function and spatial relationships

For example, in the stone buildings of northern Italy, functions are literally stacked within the housing structures. On the bottom level are two distinct spaces. One shelters animals, and allows their heat to rise to the floor above. The other space on this level stores wine and cheese at cool temperatures, allowing them to mature safely. On the next level up are spaces for people. The dwelling areas are above the cold ground and benefit from the heat of the animals below, while the storage loft above, piled 3m (10 ft.) high with hay from the fall harvest, provides amazing insulation!

Adaptation to site and context

In addition to this strategy, the hill-towns of the Italian Alps are built on the valley slopes; the flatter agricultural land is kept free for farming and animals. Even with the introduction of roads, the land is terraced in and around the towns so that car traffic uses only a small area. The rest of the land is reserved for homes, gardens, yards, and wilderness. This is smart planning. Even the land used for traffic was shaded with trellised grapevines; legend has it that one could walk under grapevines south from the Simplon Pass to Milan—a journey of over an hour and a half by train.

Size matched to function

Building size is the first consideration for energy efficiency. In the last few decades, the average house increased from around 1200ft² (120m²) to over 2000sf (200m²). But family size has decreased over the past two generations, so dwelling area per person has increased tremendously. Before 1965, people lived comfortably with much less space than today. Cultural expectations driven by marketing and profit have fed the growth in house size. But that growth has been unrelated to function. Function has to do with the amount of space needed for an activity. More people are not being housed in each house, nor is more work being done in those spaces. Instead, more consumer goods are being stored. This unproductive growth has only been possible in a world of increasing energy supplies. It must now change.

Smaller buildings require less energy to heat and cool. As the building footprint shrinks, if the construction cost per square foot can be kept the same, finishes and materials can then be of higher quality. If we look at any indigenous culture and even our own of the past, dwelling spaces were more compact, reflecting historic and natural limitations of time, energy, and materials.

Density

Looking again at indigenous cultures, people lived close together. Sharing walls and even the same enclosed space is a much more efficient use of material and lowers maintenance costs. With a legacy of land conquest, Americans' embrace of virtual realities in television and computers, and the availability of cheap energy, we seem both to have built larger indoor spaces and spread them out further from each other. Whatever the cause of sprawl, it is easy to see that increasing the density of our built environment would leave more land to be used for cropping or forest. In my hometown of Santa Barbara, vast areas of orchards

Activism within the community pitches design and permaculture to recreate natural systems

and farms have disappeared under tracts of homes and shopping malls. It makes no sense to cover up the land that feeds us.

Density also allows residents close access to services needed. Sprawling single-family homes take up huge areas meaning that many more people have to drive to work, schools, and shopping.

Natural building with healthy materials

We are faced with growing problems of pollution in our modern cities, and of indoor air pollution in many conventional buildings. Much of the consequent illness derives from exposure to elements that are catalysts for disease. The direct solution is to build an environment that models nature as closely we can, eliminating toxic chemical residues from industrial processing. Natural building is one way that we create healthy shelters for ourselves with less impact to the environment.

Healthy and non-toxic materials are, in most cases, close to their origins in the earth. Building materials that meet these criteria and are at the same time abundant, renewable, and widespread include wood, grasses, and bamboos for fiber and reinforcement, stone, gravel, clay and sand for bulk, and tar, tree saps, and plant gums as adhesives. With just a little processing, we could add lime to this list as a mortar and plaster. I have seen Roman bridges still in use in Turkey that were built with lime mortars and stone.

Comfort and beauty

Cost and time are not the only factors to be aware of during the design and building of a structure. Comfort is a qualitative measure of the success of a space. Lacking comfort, the built environment is without delight, which we experience partly in the qualities of the space: temperature, volume, and light. I am

reminded of ancient structures still standing and of ancient towns still occupied by descendants of their original builders. What do we find so compelling about these places? It is certainly not the new electrical panel, or the modern plumbing. It is the quality of the space. As the ancient architect Vitruvius asserted, a structure must have the three qualities of *firmitas*, *utilitas*, and *venustas*—that is, strength, functionality, and beauty. Beauty is found in the quiet repose of a structure, the way light filters through an opening, the feeling of embrace in the thickness of the walls and structural elements.

Ventilation and daylight

Adequate airflow is important. New buildings are so airtight that people can get sick from the lack of fresh air. Toxins, dust, and gases can build up to unhealthy levels. As Paula Baker-LaPorte writes in *Prescriptions for a Healthy House*, "...in recent years indoor air quality has become five to ten times more polluted than outdoor air and is often too polluted for optimal health." Air is the element we can't live without for even a few minutes. We don't realize how precious it is until it is cut off or contaminated. For a house to be healthy, exchanges between

Form and function are literally stacked in the design and construction of this Italian farmhouse.



outside and inside air must happen regularly. In a conventional house, this may be done through an air exchanger. But that seems like a lot of effort compared to simply stepping out of the house or opening a window.

And how could we forget the sun? It doesn't seem possible, yet we do. Have you ever been to a casino or an office building without windows? Why do we build this way? I think it's part of

Beauty is found in the quiet repose of a structure. . .

a cultural shift to take us away from nature and to make us focus on a task without regard for the rhythms of the day. We need our structures to interact with nature. This can be accomplished through a variety of strategies.

Windows and doors bring nature into the house. Placing them for good views and to gather winter sunlight is just smart design. Extensive glazing on the south side of a dwelling should direct sunlight to warm floors and walls made of massive materials like stone, earth or tanks of water, while north and west windows should be kept to a minimum. Windows should be placed on opposite sides of a structure to catch the air currents particular to the site for natural ventilation.

Recycling and re-envisioning

We are seeing the cumulative effects of our building choices in climate change, but despite the fact that much of our housing stock is inefficient, sometimes toxic, poorly placed or configured for today's needs, we cannot simply demolish it. We must use what we have and improve it as best we can. Rooftops can collect solar energy and rainwater. The wood in the framing is doing its job, we just need to improve wall systems by adding insulation on the outside and mass on the inside for temperature regulation. Lawns are food forests waiting to happen. Human waste is soil in the making. Greywater is nutritious irrigation water.

Al Gore said, in *An Inconvenient Truth*, that people jump from denial to despair without considering that there is a moment for decision in between. We are at the juncture between denial and despair when we can decide to employ strategies that will bring us back into harmony with the systems aboard our mother ship, Planet Earth.

Onward

We shape our dwellings, and afterwards our dwellings shape our lives.
—Winston Churchill

We don't all have to be trained architects, but we can participate in design decisions from the backyard to the



Steep sides and thatch shed rainwater off this house in Java.

community level. I believe everyone should see design and planning as a civic duties. The decisions we make, whether through active participation or apathy, have consequences. Small changes can make huge results. While we can't change our consumptive lifestyles in a day, we can in a few years. Indeed we must. We have only a decade before human-induced climate change will cause irreversible damage to the biosphere.

It would be hypocritical to advocate for change without admitting that I, too, have changes to make. We drive, but we will be selling one of our two vehicles; we use lights at night, but we switched all of our light bulbs to fluorescents; we use the natural gas furnace for heat, but also have solar air heaters and keep the thermostat at 68°F or below. We collect dish water to irrigate our trees. And we search for more ways to dwell with less impact.

As Antoni Gaudi observed, "Those who look for the laws of nature as support for their new works collaborate with the Creator." We have the power to make decisions that influence the world around us and the world of the future. We have the intellectual capacity to question assumptions, stereotypes, and preconceptions. We also have the ability to answer the question the environment is putting to us: How do we want to dwell? Δ

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We must use what we have and improve it as best we can.

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Natural Building 'Outlaws' Meet the Code

Warren Brush and Dafyd Rawlings

THIS PAST SUMMER WARREN and his wife Cyndi struck up a conversation with another couple at a restaurant. As the conversation deepened, it was clear that the other couple was very interested in Warren and Cyndi's work with natural buildings at Quail Springs Learning Oasis in Ventura County, CA. It soon came out that the man was about to retire from his job as a building inspector for a Los Angeles suburb. Warren asked him why he chose this profession, and he answered, "It was the only way I could feed my growing family." He shared that sustainable building mattered to him personally and as a professional yet he had long felt "his hands were tied," that he was unable to explore natural building.

After breakfast, as the four were leaving the restaurant, Warren remarked to Cyndi: "We need to remember that local building officials aren't the 'bad guys' and we must respect them as fellow humans. They are trying to do the best they can within the system to protect the health and safety of so many people."

Just as the four were enjoying breakfast together, an entourage of building inspectors, fire and environmental health officials descended on Quail Springs. When Warren and Cyndi arrived home that night, they found a note from one of the caretakers along with a pile of citations and cease-and-desist orders.

The founders of Quail Springs were no longer just teachers of sustainable living skills, they had become natural building "outlaws." Although they didn't expect to have to deal with inspectors so soon, they have chosen to view the citations as an opportunity to develop collective strategies which can benefit not only Quail Springs, but the larger natural building and permaculture communities.

Since the inspections, Warren and other Quail Springs residents have done a number of things in response. They helped organize a meeting with natural building experts (see Michael Smith's account in this issue). And they have arranged to meet in early 2007 with Ventura County building and code officials to begin researching natural building. Everyone involved wants the natural building "outlaws" to become "in-laws" as we and they marry two ways of building. The hope is that both sides can learn from and support each other.

The events of this story have led to a groundswell of dialog in California and nationally about the future of natural building and sustainable development in a climate of bureaucratic vigilance and increasing legal controls.

The dialog begins by acknowledging the imperative for sustainability: Present practices must fail from a shortage of energy and materials. Do we wait for the end game, which is not many years away, before figuring out what to do next? Or, do we try now to create a building industry where we renew, restore, and replenish the resources we use?

All the choices we make about resource use should be viewed against the demand for multi-generational sustainability. We are entering an era where our environmental legacy is points toward a potentially catastrophic "rebalancing of the books."

For over a decade, natural builders have been experimenting with materials and techniques to address the demand for sustainability. They have often done so outside the legal building permit process because it has been seen as both inflexible and antithetical to the requirements of multi-generational sustainability. Code officials, working to uphold standards that

... local building officials are not the 'bad guys' ...

ensure community health and safety, have, despite individual openness to new ideas and ecological thinking, been hobbled by regulations that are in some cases outmoded or serve primarily to support existing industries and financial interests.

It's our hope that both sides in this debate can grow from the encounter and learn to work cooperatively. We must integrate sustainable and regenerative building practices into the permitting process, so that we maintain safety as we reduce our ecological footprints.

The current problem

Our buildings and the way we construct them contribute significantly to global warming by adding greenhouse gasses to the atmosphere unnecessarily.

Our priority now must be to ensure that our homes are safe and sustainable as we face the inevitabilities of fossil fuel energy depletion, resource exhaustion, water quality degradation and scarcity, economic fluctuations, and extreme weather events as a result of human-created climate change.

Sustainability is not in the building codes

Regulatory systems in the building sector were established to protect the health and safety of people, as well as to protect the environment from the actions of builders and building dwellers. Unfortunately, although the idea of safety is still paramount, the codes enforce the use of industrial materials to the exclusion of alternatives. New products are often included based solely on immediate safety and convenience. Yet when many building

products are analyzed through their life cycle, including manufacture and disposal, they reveal a high-embodied cost in energy and negative effects to human and environmental health.

Thus, one effect of existing regulation is to require that homes and communities be built in a manner that isn't consistently healthy or sustainable and is dependent on an infrastructure that is both wasteful and toxic to the environment and the people in it.

Current regulations and most financial institutions make the following sustainable practices difficult or impossible to implement.

- Rain- and surface water catchment and storage for domestic, fire safety, and emergency backup use

- Home food production
- Tiny houses
- Co-housing
- Phased building

Housing is a security issue and we are at risk

The most effective means of reducing our contributions to global environmental degradation and our dependence on non-renewable resources are simple, sensible, inexpensive, ...and often illegal. If homeowners are not allowed to build sustainably, how can we hope to make ourselves and our communities secure?

What is needed?

Citizens working alongside regulatory officials must develop standards for ecologically sustainable and regenerative buildings and the accompanying systems that take into account a broad picture of health and safety for future generations within our immediate, local, regional, and global ecology.

Research into the safety of natural building must become a collaborative effort with those officials entrusted to guard public safety. As part of this effort, work is underway to identify strategies and propose legislation to allow property owners to take part in research and development efforts to substantiate the safety and sustainability of various natural building systems.

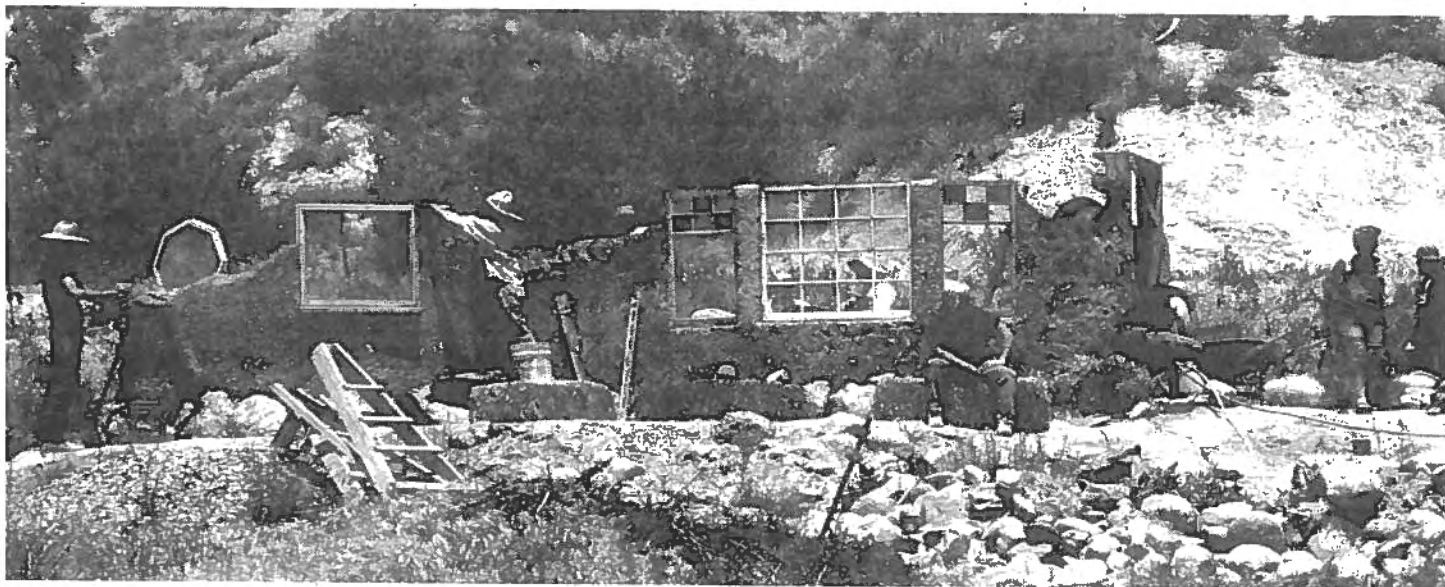
Amnesty and observation of natural buildings

Existing natural buildings, through the smart development of new systems of promotion, can be introduced to the mainstream with the goal of social acceptance and subsequent endorsement by the building regulation system. As it stands now, only a tiny fraction of the human population are choosing to build and live sustainably. More must be done to spread these practices.

Everyone involved wants the natural building "outlaws" to become "in-laws" . . .

- Nutrient circulation systems (i.e. greywater, blackwater)
- Use of natural building materials with low ecological footprint (clay, straw, roundwood, lime plasters, etc.)
- Use of locally harvested wood even when milled
- Building with salvaged and reused materials
- Appropriate technology and landscape-integrated building and site design
- Low-technology methods suitable for self- and community-building
- Alternative energy use and passive energy capture (such as biogas digester systems, solar, hydro, and alternative fuels)
- Reduced consumption of energy and materials
- Retrofitting of existing buildings for passive solar gain
- Thermophillic humanure composting and soil production

Residents, volunteers, and workshop participants have undertaken an ambitious natural building program at seven-year-old Quail Springs Learning Oasis in Ventura County, CA. Building officials shut down their projects last year.



Unless sustainable living become a broadscale movement, we are all headed down a trail of ecological catastrophe. This must be the impetus for us to set aside ideologies and pull together. We now have the available resources and diverse skill sets among individuals and within systems to catalyze massive and appropriate change. We just need the will.

Rebooting our human operating system

We are at a place in our history where a re-evaluation of our impacts is crucial to ensuring our survival.

1. Responding to environmental imperatives.

Climate change affects all of us. The evidence is overwhelming and undeniable. We're already seeing changes—glaciers are melting, plants and animals are being forced from their habitats, and severe storms and droughts are increasing.

The latest projections, based on state-of-the-art climate models, indicate that if global heat-trapping emissions proceed at the current medium to high rate, temperatures in California will rise 4.7-10.5°F by the end of the century. (1) Higher temperatures are already causing increased flooding and drought, more extreme weather, rising sea levels, and the spread of infectious disease, all of which pose serious risks to terrestrial and aquatic ecosystems everywhere.

Over the last century, the average temperature in Fresno, CA, as an example, has increased from 61.9°F (1899-1928) to 63.3°F (1966-1995), and precipitation has decreased by as much as 20% in many parts of the state. (2)

The past 10 out of 14 years have been the hottest on record according to national climate statistics. (3)

Natural building can significantly change this.

2. We're making the world our children and grandchildren will inherit.

Preparing for climate changes will require minimizing further stresses on sensitive ecosystems and implementing management and regulatory practices that bring climate risks into long-term planning strategies. Because most global warming emissions

remain in the atmosphere for decades or centuries, the quality of life our children and grandchildren experience will depend on whether we reduce these emissions, and how rapidly.

3. The measure of a healthy and safe home includes its impact on the planet.

Buildings and their construction account for nearly half of energy consumed in this country and a third of all greenhouse gas emissions. (4) Globally, the percentage is even greater. How has

Present practices must fail from a shortage of energy and materials. Do we wait for the end game...?

this happened? Current building and health regulations require industrially processed materials (which often emit highly toxic by-products) and construction practices. The resulting buildings are highly energy dependent both for the processing of the materials and to keep the buildings at a livable temperature.

4. Regulatory mandates need to tax toxics and subsidize regeneration.

The regulatory conditions that exist in our "over-developed" world have been slow in responding to current social and environmental imperatives. We need to be able to build homes that are affordable, healthy, highly energy efficient, built by community effort, with local materials that have low embodied energy, and have a small ecological footprint. Current government programs subsidize unsustainable practices and often penalize sustainable systems. This needs to be reversed. Citizen mandates should create a political climate that supports the taxing of toxic systems and unsustainable practices, and that subsidizes ecologically smart and sustainable practices.

5. Access to housing and our very survival are at stake.

The definition of human rights should include access to shelter, water, energy, and food in a manner that maintains ecological equitability. This can be accomplished within a performance-based regulatory model for residences.

There are both immediate and long-term dwelling and ecological degradation issues in requiring homes to be connected to the grid. An elaborate, costly, wasteful, and dangerous infrastructure transports energy, water, raw materials, food, and waste products vast distances for centralized processing instead of allowing people to shelter, heat, and feed themselves within a more efficient, local setting. We must change the paradigm.

6. Public health.

Everyone's health is affected by air pollution, intensifying heat waves, an expanding range of infectious diseases, and diminishing available energy and water resources.

Our health is put at risk when we are forced to live in houses and communities contaminated by toxic substances. It should be

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our goal to eliminate the release of persistent bio-accumulative toxins from the materials required by current building regulations. These include chlorinated plastics, PBT-based material treatments, formaldehydes, polyvinyl-chlorides (PVCs), volatile organic compounds (VOCs), and heavy metal additives or components.

Our homes should be built with local and global health in mind and should require very limited energy inputs, using materials that are non-toxic and natural and appropriate to the region. A natural building and sustainable site infrastructure accommodate most of these basic human needs on-site or nearby with no or low-impact and low resource-consumption techniques.

Naturally built homes and sustainably designed living environments with daylighting and plants measurably improve the health and productivity of the occupants.

7. Water resources.

Continued global warming and population growth will increase pressure on water resources, which are already overstretched by the demands of our growing economy, industrial practices and population, not to mention policies resulting in inadequate water collection and unnecessary usage.

Surface water catchment and storage for domestic use and greywater collection and distribution systems for landscape irrigation can be major contributors to soil fertility around the home for growing shade and food trees, gardens, etc. Yet these and other innovative solutions to "drought-proof" homes by harvesting rainwater and reusing waste water face regulatory and institutional barriers.

One-third of all drinking water gets flushed down toilets. (5) Safe, proven alternatives are available. Research on waterless excreta management would yield very large dividends.

8. Energy resources.

An average of 23,000 pounds of carbon dioxide is emitted annually by each American home. (10) The increase in atmospheric CO₂ is driving global warming.

As temperatures increase, snow packs will decrease even further, which will reduce hydroelectric power in California, for example, by as much as 30% by the end of the century. (6)

Higher temperatures will likely push electricity demand due to increased air conditioning use, as was seen in the 2006 summer heat waves throughout North America. Even if the population were to remain unchanged through the end of the century, annual electricity demand could increase by as much as 20%. (7)

Average household energy costs are projected to rise dramatically in the next few years. Many homes and buildings require

Access to housing and our very survival are at stake.

large amounts of energy to build and maintain. In contrast, the use of appropriate natural building materials and designs can lower utility costs by moderating extreme temperatures. It also reduces the energy cost of construction, and eliminates much of the fossil energy embedded in building materials.

9. Other natural resources.

Our forests and soil-building landscapes are being stripped of carbon and nutrients faster than they can regenerate, which greatly contributes to global warming and reduces the productivity of agricultural systems in both short- and long-term.

The average new home requires 13,837 board feet of lumber (more than 70 trees) and 19 tons of cement, among many other highly processed, toxic, and high-energy embodied materials. (8) Every ton of cement produced releases one ton of CO₂ into the atmosphere, increasing the greenhouse effect. (9) Research on alternative building materials could be highly beneficial.

Our current use of sophisticated technology, industrially processed materials, and specialized component design ignores the consequences of their impact on natural systems.

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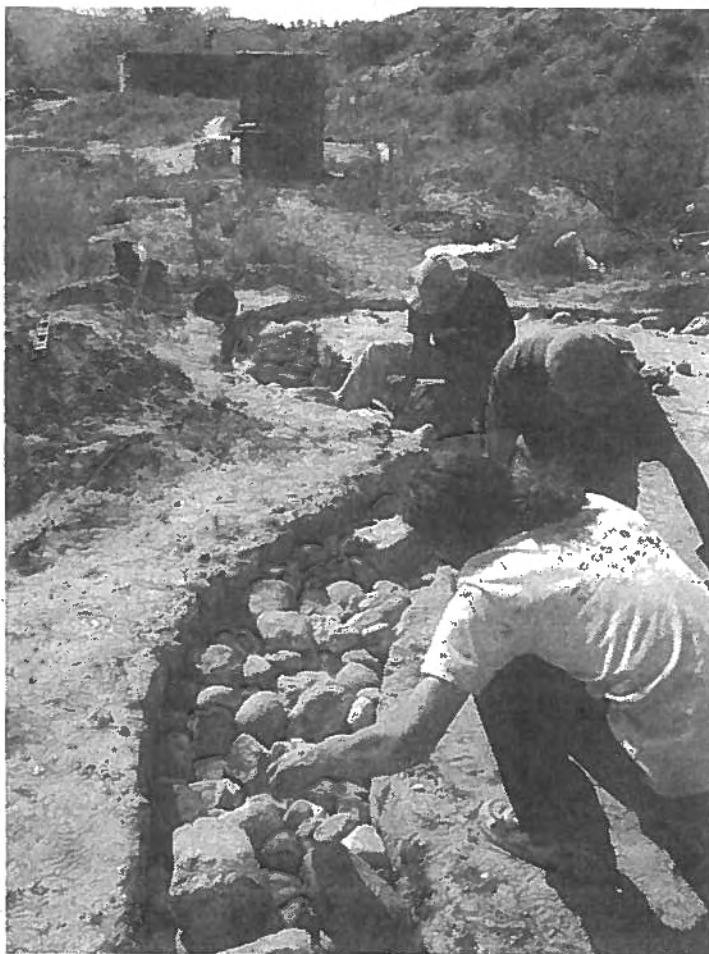
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Building an undulating rubble-trench foundation for a cob structure at Quail Springs.

As natural resources dwindle, an effort must be made to change both public perceptions and the law to permit the building of tiny homes (500 sq. feet or less). This would allow the use of mostly local, natural (non- or minimally processed) materials, as well as reduce overall demand for resources. Right now, in many places, it is illegal to build a primary residence of less than 800 sf.

Healthy and expanding forests are required not only to remediate global warming but to supply energy and materials for a post-fossil fuel economy. In addition to reforestation strategies, there must be a concomitant reduction in the use of forest products in construction. One way this can be achieved is by legalizing the use of cob (clay, sand, and fiber), strawbale, wattle-and-daub, earth brick, rammed earth, or other technologies that don't depend on large amounts of wood.

Another overlooked but valuable resource is indigenous knowledge. It represents centuries of relationship with a particular site and bioregion. Through study of local indigenous knowledge, we gain access to appropriate technology that works within the delicate resource web of the area.

10. Affordability.

Because of their potential to lower costs substantially, natural building materials and small homes are two key strategies that could bring home ownership within reach of many more people.

The design and engineering expertise and legal wrangling required to negotiate the permitting process to build simply and sustainably imposes a financial hurdle to expanding home ownership and lowering energy consumption. Without official recognition and approval of alternatives, people are forced into undesirable expedencies that damage their environment and quality of life, such as living with toxic housing conditions (manufactured homes and industrial composite materials), long commutes, and longer work hours to support big mortgages. People who pursue simple, sustainable alternatives are frequently forced into "outlaw builder" status, causing alienation rather than integration into communities. Innovative building suffers without the advice of regulating officials whose input and experience with local conditions could be very useful. Eventual discovery taxes the already overburdened local enforcement community, and causes costly legal battles and remediation.

We must move away from regulations that have brought economic gains for a few at the expense of sustainable habitation for the many.

By using natural building techniques, a family with basic skills could build a natural, comfortable, safe, healthy, and affordable home for less than the cost of the permit fees in most counties in the state of California. This assumes not assigning a monetary value to labor because much of it can be self-generated.

Implementing change

Our ability to change as a species comes from individuals living the change in their own lives, not from placing our hopes on political reform nor from an attitude that monumental catastrophe is needed to spur broadscale human change.

It is time to steer a new course. It may seem strange to propose cooperative measures with code officials who have been perceived to be yes-men for an unmerciful system, but when we open our ears and minds we find that we all want to make the best decisions for our descendants. Δ

Warren Brush (w@quailsprings.org) is a storyteller, poet, permaculture designer, writer, applied ecologist, and co-founder of Quail Springs, Mentoring for Peace, Wilderness Youth Project, and the True Nature Society. Dafyd Rawlings is a Santa Fe-based architect. (dafydrawlings@yahoo.com, see bio. pg. 11)

Notes

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Natural Builders Coordinate Efforts to Change the Code

Making Natural Building a Legal Option

Michael G. Smith

FOR THREE DAYS THIS PAST NOVEMBER, a group of about 25 natural builders, permaculture designers, activists, organizers, and educators met at the Occidental Arts and Ecology Center (OAEC) in northern California. Pinned to the wall of the meeting room was the question, "How can we support sustainable habitation becoming accessible to all, quickly?" From direct personal experience as well as analysis, we understood that current building regulations are contributing to global warming and environmental catastrophe by condoning energy- and resource-intensive building practices while throwing up hurdles to low-impact solutions such as the construction of tiny houses and the use of unprocessed natural materials. We had come to brainstorm solutions, not limited to natural building practices but encompassing the whole field of sustainable land and resource use. If we succeed in changing the regulatory climate in California not just to allow but actually to promote environmental building and land use, that could have a "domino effect" on other states and even on the nation as a whole.

Three weeks before our meeting, Sir Nicholas Stern, the former chief economist at the World Bank, released his report commissioned by the British government on the economic implications of climate change. In sharp contrast to previous government reports, the Stern Review states unequivocally that global warming is real and has already had measurable impact. If current trends continue, we are headed for global economic collapse within 50 years. According to the report, the severity of that collapse can be reduced by a concerted global effort to limit greenhouse gas production, but only if we act resolutely within the next decade.

According to the American Institute of Architects, "buildings are the largest source of both energy consumption and greenhouse gas emissions in America as well as around the world. Buildings account for as much as 48% of all greenhouse gas emissions and 68% of electricity consumption." (See the full text of the statement at www.aia.org/static/state_local_resources/adv_sustainability/) (If those numbers seem unbelievably high, keep in mind that only 20-30% of that energy goes into building materials and construction. The rest is used over the lifetime of the building, especially in electric heating, cooling, and lighting.) The AIA has called for the immediate reduction of energy use by all new and renovated buildings to one-half the national average for that building type. In collaboration with the AIA, the US Council of Mayors has called for all public buildings to be "carbon neutral" (meaning they will use no fossil fuel energy to operate) by the year 2030.

While scientists and policy makers are beginning to recognize the severity of the problems associated with both climate change

and peak oil, overcoming the inertia of "buildings as usual" will take a sustained effort. It will require partnerships at many levels of society, between builders, homeowners, regulators, and industry. At this stage in the game, the natural building movement has an important contribution to make to the conversation. Among us all we have many decades of experience creating homes that require far less energy in both their construction and operation. We know how to use low-embodied-energy materials including earth and unmilled wood and agricultural by-products

How can we support sustainable habitation becoming accessible to all, quickly?

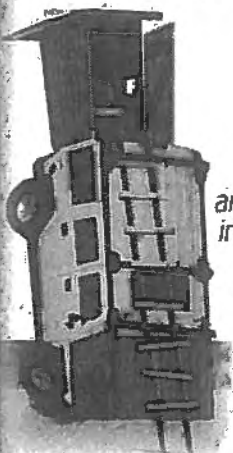
like strawbales to make safe and durable houses. We know how to use passive solar principles to make buildings that mostly heat and cool themselves and provide natural daylighting. We know how to build very small homes that are nonetheless comfortable, practical, and inspirational in their beauty. We have successful examples to point to. And although much of our experimental work over the last few decades has been conducted on the back currents of the mainstream, away from the scrutiny of building departments, and without the support of banks, the building materials industry, or major research institutions, the secret is starting to get out.

In the last six months, the mainstream US press has shown an unprecedented level of interest in our work. Many media outlets seem to be working on stories about the natural building movement and how it offers solutions not just to the environmental crisis but to health and economic concerns as well. Some have called and written to leading natural builders requesting information and input. After many years of building, learning, teaching, and sharing information among ourselves, we seem to be receiving an invitation to step out of our accustomed circles and introduce ourselves on a larger scale. Clearly public awareness is on the rise.

At the OAEC gathering, Ianto Evans, a pioneering natural builder and director of the Cob Cottage Company and the North American School of Natural Building (www.cobcottage.com),

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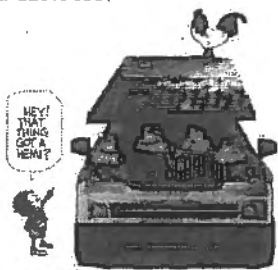
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put it this way: "It's as if there were a group of us sitting around a campfire on a cold night. We're making music, telling stories. We have the fire. And out beyond us in the dark there's a tall fence with razor wire on top. The people on the other side of the fence can hear us laughing and can see little glimpses of the fire. They're

studying on-the-ground examples of innovative buildings and alternative systems, many of which are non-permitted and illegal. If an amnesty could be developed to enable those projects to be studied (and, where dangerous, brought up to minimum safe standards), we could greatly accelerate the research efforts that

...we seem to be receiving an invitation to step out of our accustomed circles and introduce ourselves on a larger scale. . .

shivering and alone. They want to know what's going on. And every once in a while someone manages to get over the fence to join us around the fire." But to scale the barrier of public ignorance, unsupportive building regulations, and lack of financial support requires a great deal of commitment. The question before us now is "What can we do to help tear that barbed wire fence down?" We're heading into a long, cold night, but there's plenty of room around the fire.

David Eisenberg, director of the Development Center for Appropriate Technology (www.dcat.net), has lots of experience tearing down fences. He has spent much of the last two decades building bridges between the communities of natural builders and building officials, including developing codes for strawbale building which have been adopted in several states. He reminded us that most building officials care passionately about the purpose of their work as they see it, which is to protect the public health and safety. Our job, he said, is to help them expand the scope of hazards they consider, to include a long-term, widespread research effort to find solutions that work.

While rigorous laboratory testing would clearly help us all to improve our practices, gaining useful knowledge through formal channels can be slow and expensive. An enormous amount of information is available right now by

are clearly needed now.

How exactly to achieve these ends remains to be clarified. A campaign committee was formed to research strategies and organize a strategic planning meeting in the spring. To be successful, this campaign will need as many supporters as possible. We are looking for help with political strategy, grass roots organizing, and fundraising.

Last year at a Natural Building Colloquium, Jack Stephens founded the Natural Building Network to serve as a hub for coordinating among natural builders and for communication between the natural building community, media, and the public. NBN organized the OAEC meeting along with Warren Brush and has stepped forward to facilitate communication around the on-going campaign. On the web site (www.naturalbuildingnetwork.org), you will find the following paragraph:

"Legal and bureaucratic obstacles exist in most jurisdictions in the United States for people who wish to apply sustainable solutions to land use and building construction. From rainwater harvesting to permaculture, water storage to strawbale building, the onus is heavy on the owner builder to reinvent the wheel one jurisdiction at a time; acting as educator and advocate for a way of living that is often superior to the status quo. What we are developing in California is a strategy to legalize sustainable human habitat in

cooperation with communities, architects, code officials, legislators, and other stakeholders."

This may be the most significant effort yet to facilitate the adoption of sustainable land-use and building strategies at a state and national level in the US. More

What we are developing in California is a strategy to legalize sustainable human habitat. . .

information and updates on progress may be found at naturalbuildingnetwork.org.

At the conclusion of the three-day meeting, legendary natural builder Sun Ray Kelly rose from his place by the fire. He reminded us of the critical role that the annual Natural Building Colloquia have played in creating the natural building movement as we know it today, starting with the seminal gathering in a field in western Oregon in 1994, at which he, Ianto Evans, Penny Livingston-Stark, myself, and about 50 others were present. The work of the last 12 years, he said, has been creating a foundation, a network of communication, and support among natural builders along with a common understanding of how sustainable habitation can be accomplished. The OAEC meeting marks the beginning of the next step, of creating much broader public knowledge and acceptance of natural building and permaculture. "The flower is opening now," said Sun Ray, "and the sweet smell of the good work we've done can radiate out to the world." Δ

Michael G. Smith lives at Emerald Earth, an intentional community and learning center in northern California. He teaches workshops about many aspects of natural building and has co-authored several books including The Hand-Sculpted House and The Art of Natural Building. Write michael@emeraldearth.org.

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Catherine Wanek

STRAWBALE CONSTRUCTION MADE IT to the world stage in 2005 when a development project in China was awarded the prestigious World Habitat Award. The Strawbale Energy Efficient Housing Technology Transfer Project captured the attention and admiration of the U.N. judges for its successful completion of over 600 fuel-saving strawbale homes and schools. In addition, the project sets a positive example in the most populous nation on earth—if the technology is accepted in China, the benefits are potentially enormous.

China is developing at a tremendous rate. A new coal-fired power plant goes online every week, and the country currently uses 50% of the world's production of cement. Commercial buildings are largely built with concrete, and brick houses are aspired to by anyone who can afford it. Yet during northern China's long cold heating season, coal combustion fills the air with eye-watering particulate matter, and contributes to respiratory illnesses. Coal is also relatively expensive for the rural populace, while rice and wheat are staple crops. Even so, strawbale homes were a hard sell in China.

The successful strawbale housing program was the brainchild of Scott Christiansen, the Asian director of the Adventist Development Relief Agency (ADRA), who first read about it on a flight to Mongolia in 1995. Scott chose architect Kelly Lerner as designer and technical consultant, and together over six or seven years they created a most remarkable building program in China. By training local leaders, and overseeing projects built by the local people, they spearheaded strawbale housing communities in five provinces in the coldest regions of the country.

With lots of give and take, Kelly came up with a solar design that incorporates a brick structural framework infilled with straw bales. While not ideal from an energy standpoint, it satisfies the Chinese safety perceptions and costs no more than a pure brick structure. And most importantly it manages to reduce by two-thirds the amount of coal needed to keep a home habitable during the long cold winters.

This savings translates to about one-third of the annual income of rural farmers, while significantly reducing carbon emissions. In terms of greenhouse gases, over a 30-year lifetime a 650-square-foot strawbale home in China will save over 150 tons of carbon from entering the atmosphere. Not to mention greater comfort, increased seismic safety, improved health and air quality, and reduced clay mining for brick manufacturing.

Last July I had the good fortune to visit this award-winning strawbale housing project in Tang Yuan, Heilongjiang Province, as part of a study tour sponsored by the Building and Social Housing Foundation (BSHF), who give out the U.N. World Habitat Awards. The tour included a strawbale school that serves a thousand students, as well as a community of 42 small homes with detached greenhouses that we all found particularly impressive.

The greenhouse community seemed very efficient for families, as there the living/working arrangement eliminates commuting. Although the lots are small (about 75' wide by 150' deep) an amazing amount of food was being grown on the tiny plots, which also might house chickens, ducks,

pigs, and cows. Some homeowners found they could eliminate coal as fuel altogether, and could cook and stay warm by burning corn stalks and other ag wastes. We talked to one mother who had sent her child off to college, funded with the revenue from raising vegetables and hogs.

The following article (originally published in *The Last Straw Journal*, www.thelaststraw.org) describes some of Kelly and ADRA's lessons learned while introducing bale building to China. Since it was written, ADRA-China has eliminated financial subsidies for building with bales, hoping that its money-saving energy efficiency will allow strawbale to survive on its own in the marketplace and in the hearts of the people. One very encouraging sign is that the government of Heilongjiang will soon be distributing the blueprints for a school and five small strawbale homes for replication throughout the province—a significant endorsement for the technology, and for the hard work of the committed visionaries who planted the seeds. △



A strawbale development in China makes housing and energy costs accessible to hundreds of families.

Scaling Up Sustainable Technologies

A Sleeping Red Giant

Kelly Lerner

WHICH COUNTRY HAS THE LARGEST concentration of strawbale buildings? If you answered the United States, you're correct today, but you could be wrong soon. If China's current strawbale building boom continues along the same exponential trajectory (from one school in 1998 to over 250 buildings in 2001), plastered strawbale will eventually replace the ubiquitous red brick seen throughout northeastern China. An upcoming ban on the use of brick in many provinces may spur strawbale construction to even faster growth.

In 1994, when I first started working with the Adventist Development and Relief Agency (ADRA) introducing strawbale construction in Mongolia, the projects were small—six or seven buildings per season. Similar to my work for private residential clients in California, I focused on architectural design, integrating climate, site, local materials, cultural traditions, and program into buildable, energy efficient designs. Together with experienced Mongolian builders, I trained professional construction crews and then visited building sites all over the country.

In the summer of 2001, the ADRA strawbale project built over 150 houses at seven locations in four Chinese provinces—Jilin, Liao Ning, Heilongjiang and Inner Mongolia. This coming summer, we hope to build over 800 strawbale houses in the same areas. Projects of this scale require an entirely different approach.

The ADRA team and I have worked for the past five years in China to create a project management system and refine our building techniques. Like the drivers of an overloaded bok choy cart on the way to market (seen in every Chinese village), we're scrambling to keep the donkey in front of the cart on a slippery downhill slope.

Here are a few principles we've learned about large-scale projects so far. Though we're working primarily in development, I think they may apply to commercial projects of a similar scale.

Successful projects are born out of local needs and enthusiasm. If there isn't local interest, take the time to educate

and build local excitement and investment. Though this may be painfully obvious, too many times the impetus for a project comes from outside. An outside team might be able to build a couple of buildings successfully, but without local commitment, more complicated large projects can easily flounder and flop.

Successful projects are born out of local needs and enthusiasm.

Of course, interest is born of knowledge. Small projects educate, demonstrate, and build interest. ADRA projects often offer a higher subsidy in the first few years as an added incentive to those willing to take a risk on a new technology.

After a community experiences and understands strawbale construction, it usually takes hold on its own. If it doesn't take hold maybe it was never meant to.

Small projects provide the opportunity for exploration without

Greenhouses attached to the small strawbale homes allow for year-round food production, energy efficiency and savings, improved interior air quality, and minimal commute time.



much risk. **Start small and work out all the kinks.** Behind every successful large project are the lessons of countless little projects—some successful and some not so successful.

"Experiments" (be they with project organization, plasters, structure, building technique, or design) are best tested on one building or project first and then evaluated before being applied on a larger scale. We've tested and discarded many approaches

already in use in the field.

For instance, though load-bearing strawbale construction can be super energy- and material-efficient, in a land with heavy tile roofs and concrete bond beams, big south facing windows and rainy summer weather, there is just too much that can go wrong with load-bearing. Post and beam makes more sense.

Brick columns, concrete bond-beams and concrete lintels aren't the most energy efficient (they act as thermal breaks), but every Chinese builder knows how to work with them. I don't have to teach builders a whole new system—just how to adjust brick construction a little to accommodate some bales.

In successful projects, all partners are invested—both creatively and financially.

After trying out all kinds of project agreements and arrangements, we've found that the success of a project is directly proportional to the creative and financial investment of all the participants. ADRA, the local government, and the house owners share equally in the cost of the houses we're building.

Financially, if all the money for the project comes from outside, local participants have no incentive to keep construction costs low and no "ownership" for the houses after we are gone. On one project, we paid triple the usual price for

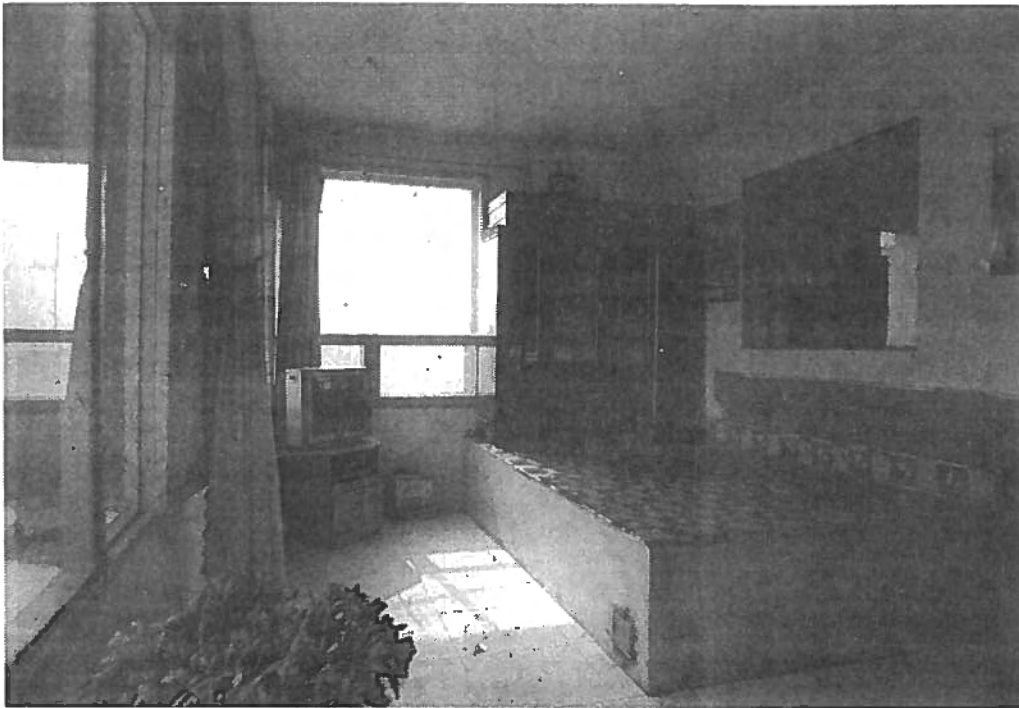
cement because the contractor and supplier were in cahoots. Price gouging disappears when everyone is sharing the cost.

Learn where to give up control and where to retain control. Most decisions ultimately belong in local hands. Sharing creative control is the quickest way of adapting designs and construction techniques to local materials, skills, and aesthetic preferences.

No outsider can ever know what an insider knows intuitively. I've structured our strawbale trainings so that after they learn about strawbale construction, local teams design their own buildings while I look over their shoulders, ask questions, and offer suggestions.

On critical technical issues (which could make or break the project) like waterproofing and structure, I retain enough say to prevent problems. I also press hard on energy efficiency issues like insulation and passive solar design. Other than that, the teams have the freedom to design for their own situation.

Partnering on the design short circuits any mistakes I would inevitably make out of a lack of knowledge about local materials and practices. I learn about local construction and they learn (and teach) how to incorporate strawbale. We all win.



A traditional platform bed circulates heat from the cookstove, distributing warm air through the house, cycling energy, and making sleep during the cold months welcome and snug.

on the way. We're still in process. I look back and laugh at my own naiveté—you don't know what you don't know until you learn it the hard way.

Scale informs design and detail

Large building projects and rapid dissemination raise the stakes and force the use of more conservative building techniques. In building terms I'm usually not conservative, but when faced with potential mass replication, I go with proven details that have worked over time even if I think I have a better (though unproven) innovation.

I explore my ecological purism and cutting edge innovations (vaults, new earth and lime plasters, etc.) on small (and sometimes not so small) projects here at home. I can always apply my small successes to next year's big project, and I don't have to see hundreds of my mistakes.

When we're building hundreds of houses it's impossible to monitor the construction closely. I need to balance energy efficiency and ecological concerns with systems and details that work in China—details that employ the same skills and materials

That's not to say that I appreciate all their designs. The Chinese tend to like plastered walls dead flat and often apply rectangular white tile on their front walls. I just smiled and nodded when the village head in Benxi proudly told me that they had decided to paint all the new strawbale houses pink.

Process based on personal relationships

Take time to develop the personal relationships and trust that will cushion the bumps along the way. A friend and I often joke that construction is so complicated it's amazing anything ever gets built. That's even truer for large-scale projects—especially in cross-cultural situations. Friendships and their influence (*guan xi*) grease the wheels. No lubrication—too much friction.

... you don't know what you don't know until you learn it the hard way.

Though we may write contracts and memos of understanding, personal relationships—usually developed in China over bottles of rice wine and mountains of delicious morsels like dog meat, pickled vegetables, and mud eels—are what really move the work forward. Informal friendships and trust bridge the gaps in the formal contracts.

In one case, our jeep driver solved a huge problem getting electrical power installed to a 65-unit housing development with a bottle of rice wine and an afternoon of drinking with his old school mate, the power district manager.

Take time to create relationships and partnerships at all levels—national and local governments, regulatory agencies, architects and engineers, contractors and owner/builders. Each of these participants has information vital to the success of the project. The more that all the levels are informed, involved, and invested in a project, the more they will go out of their way to make it successful.

A call to a friend in the right position can keep a small problem from becoming a much bigger one.

If they aren't getting positive attention by being involved in the process, agencies or individuals (like children) may try to get attention by blocking the project.

Large-scale projects shift creative energies from architectural and structural design to project design and management. In China, ADRA started small with one strawbale school in 1998. Engineer David Mar and I could afford to explore some intricate structural detailing aimed at resisting earthquakes, because Frank Meyer oversaw the whole construction, carefully checking details.

In the summer of 2001, after a thorough strawbale training and design charette, the ADRA team (consisting of three non-technical managers, Paul Lacinski and myself) was responsible for seven construction sites spread over four provinces. Clearly we couldn't provide the same kind of close construction supervision Frank did that first year.

Instead of overseeing construction, we spent our limited energies on project management and on training local builders. Most of the work had to be completed well before the building actually started. Here are some successful strategies we applied:

- Identifying the best communities to work with and crafting good working agreements with them.
- Identifying the right people to train, getting them to the training, and delivering a high quality instruction.
- Communicating frequently with the trainees to solve technical problems in the field.
- Timing our site visits so that we could have as much impact as possible on the building techniques and quality.
- Meeting with the whole range of participants at each site: local government officials, builders, and owner/builders, to share information and maintain financial transparency.

While good project organization is essential, the public perception of the process and the buildings will make or break an ongoing project. Tang Yuan, a small city in the northeastern rice-growing province of Heilongjiang boasts over 95 strawbale houses. When ADRA and the local government first wanted to

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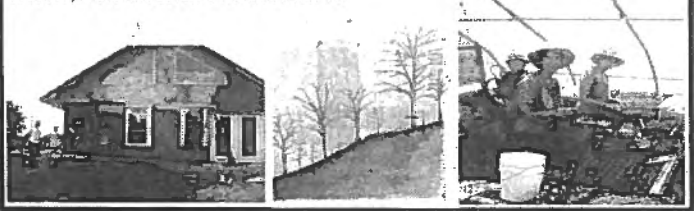
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build ten houses there in 2000, the village head twisted many arms before finding eight "interested" families, even though the local government and ADRA were paying for 2/3 of the cost of the houses.

The winter of 2000 was especially cold with many nighttime lows of -40°F. The new strawbale owners told their neighbors about their warm houses. Their neighbors visited, knocked on the walls, sat in the warm living rooms and saw that the houses looked just like plastered brick houses. Soon the local government was fielding applications from hundreds of families for the 2001 building season.

When there's a lot of excitement and interest, it's easy and tempting to grow too fast. Quality suffers when there aren't enough trained managers, owners, or builders. And training takes time. We learned this the hard way in Tan Yuan.

In the first year, the local manager and ten owner/builders delivered such high quality houses that in the subsequent year we based our training program there and granted their request for 70 new houses.

Early on, there were a few problems with low quality bales and choosing families, but we ironed those out and went off to visit other sites, calling twice a week to check in. Imagine our surprise when we returned, checked a contractor site and discovered bale walls so wet that they had mushrooms growing out of them!

The local manager, who had been so successful with ten owner-builder houses, couldn't deal firmly with a contractor. Touring other sites we also learned he didn't know how to delegate and had fallen behind on the job of training all the new owner-builders.

Over time, the price has come down, too. Our first small houses in Hebei cost over US\$4000 (due to price gouging and a costly design). Currently, the costs for strawbale construction are running neck and neck with similar quality brick

...public perceptions of the process and the buildings will make or break an ongoing project.

As we fixed the problems and educated owner-builders, we planned how to better train and support managers and how to deliver training to owner-builders in future years.

A high quality product, a locally appealing design, and affordability are the critical issues in shaping public impressions and in achieving project success. In Tan Yuan, all our hard-learned lessons from the first three years finally came together. Good quality building and houses that looked and felt right created a positive public opinion, which in turn created a demand for strawbale construction.

construction (about US\$2500 for a typical 650sf house).

When we ask, over 50% of our Tan Yuan owner-builders say they would build a strawbale house over a brick house using their own money. Pretty good for a three-year track record in an area as conservative as housing.

First and last, it all takes time. Upon hearing some of my more difficult experiences in Mongolia and China, Matts Myhrman shared a saying with me: The road to good intentions is paved with hell. While I don't think of large projects as particularly hellish, they are one hell of a lot of work. And they always take more time than can be imagined. To stay sane, allow plenty of time for large projects to develop naturally, because mass replication will quickly reveal any weaknesses in project management or building techniques. Only time and learning from experience can correct problems and ensure success.

The Adventist Development and Relief Agency (ADRA) is active in over 122 countries throughout the world. Contact ADRA China Country Director Art Schwarz at <schwarz@chumsda.org> . Δ

Kelly Lerner is a can't-keep-her-hands-out-of-building architect in the San Francisco Bay area. When she's not globe trotting in Asia, she's designing small strawbale houses or mixing up earth plasters. For more of her work see: <http://one-world-design.com>.

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Repairing the City One Relationship at a Time

Shelter and The Practice of the Local

Lydia Doleman

THE CITY REPAIR PROJECT may be best known for its painted intersections and urban cob bench installations. However, it all began in Portland, Oregon in 1996 as a local response to the realization that all cities are part of an interconnected network of economic and political forces. As all cities rely upon similar institutions and social mechanisms to function across the globe, actively changing one part of the city network synergistically benefits the whole. The interconnected nature of urban centers facilitates a maximum exchange of new ideas, but at its worst can perpetuate systemic stagnation.

Americans move every two to seven years. This restlessness fuels an economic engine that profits from the disintegration of community fabrics. People leave city life for the suburbs or countryside for a variety of reasons, some thinking they may find utopia through the simple act of relocating. Unfortunately, it's quite common for people to fail to realize until it's too late, that their destination is not utopia. In many cases, the problems and challenges they sought to leave behind have traveled with them. A better course of action for many would be to transform themselves and the places they live.

The philosophy behind City Repair is that social change, in order to be successful, must happen here in this place with the people around us, using what we have together. It doesn't require extra funding or infrastructure or anything from elsewhere; our collective place-based creativity can engender authentic changes that reflect our community values.

The best way to make positive change is to overcome isolation and start working together.

We may inhabit a so-called democracy, but we don't live a democratic way of life. This is largely due to the pervasive illusion that power is somewhere else than among us. In our patterned daily existence, we don't build sustainable relationships with people or places. This patterned daily existence forms our



Tomorrow's builders learn sustainable, simple, and fun techniques at City Repair's annual Village Building Convergence in Portland, OR.

social architecture, a space invisibly perpetuated and unconsciously inhabited by us all. When we are disconnected from each other physically (race, gender, poorly planned and grid-based cities, poorly designed buildings etc), economically (class, accessibility, property values) socially (ageism, sexism, you-name-it-ism), and spiritually (apathy, no sacred places, judgment, numbness), then no technology we throw at the world's problems or our own can be solved without reproducing the dilemmas.

Fortunately, the problem is the solution. If we positively and collectively engage the problem we can engender beneficial and relational change. We all share similar struggles, but are isolated on micro- and macro-scales. The best way to make positive change is to overcome isolation and start working together. In

this context, City Repair is a fractal of what Bill Mollison refers to as "Planet Repair." We all have the ability to effect sustainable and systemic change whether we live in the city or the country by working at a local level where so many contemporary problems



Thousands of volunteers of all skill and experience levels show up every year to get dirty, have a good time, participate in community, and create positive social and infrastructure changes.

come to a head. As we begin to repair these concentrated nodes of human culture, we renew the social architecture of culture. With each positive transformation a story is born that is relevant everywhere. As each story spreads, it gives birth to the next, and so on, and so on. In this manner, City Repair Projects have spread to as many as 13 cities in the US and Canada.

Permaculture in action

In City Repair, whether we are reclaiming and transforming intersections, installing water catchment systems in parking strips, or building affordable and natural housing with homeless people, we are preparing for eventualities such as peak oil and possible economic or environmental catastrophes while at the same time increasing community fulfillment. All of these actions are part of a conscious strategy towards a sustainable future based

on proven ideas and lessons learned first in many rural settings by permaculturists and natural builders and then infused into the urban fabric.

City Repair's projects are purposefully located in high-visibility public intersections and rights-of-way to expose urban communities to prototypes that foster community networks, instill familiarity with democratic and co-creative processes, and provide relevant examples of sustainable economic, social, cultural, and ecological principles.

One goal is to show new ways of building and living that can both be learned and practiced by city dwellers. Want to try cob building? Go to the local food coop or the recycled building materials warehouse to see an actual example. We involve urban activists who, like most of us, may be accustomed to reaction and

**Go to the local
food coop or the
recycled building
materials
warehouse to see
an actual example.**

resistance instead of productive and affirmative community building activities. But for activists and ordinary citizens alike, the projects give people a sense of empowerment, and leave them with constructive tools they can use and from which they can directly benefit. We strive to apply permaculture principles to our work and our own lives by building relationships that engender mutual benefit. And of course by having as much fun as possible.

Building the village: people make the place

The Village Building Convergence (VBC) is a community-building extravaganza that takes place in Portland, OR, annually over ten days at the end of May. It is an interactive gathering of hundreds of people from all over the globe, with a focus on social engagement and ecological design to create common spaces for people in the city. This year, more than 35 communities will build ecological and place-based projects during the convergence. The VBC is host to a myriad of workshops (natural building, mushroom cultivation, body ecology, square dancing etc.) and guest speakers such as Starhawk, Penny Livingston, and Malik Rahim from Common Ground in post-Katrina New Orleans, as well as many local builders and community organizers. For ten days a temporary village blossoms in the city. We eat together, build together, learn together, dance and teach together. This gathering displays a living ecology of transformational community consciousness.

The primary daytime focus of the Village Building

Convergence is natural building. It's a form of community building by, for, and of the people.

When a community asks itself "How do we build relationships and structures that reflect our sustainable values? How do we transform our neighborhood into something more than a reflection of property lines?" it is delving into the causes of alienation and social disintegration. Then the healing has already begun. As the analysis goes deeper, other questions arise, "How do we overcome the history of colonization, political greed, and outdated zoning laws that separate home from work and perpetuate a chronic sense of isolation? How do we create the world we want to live in?" The best answer to that, we have found, is literally by building it! Using safe and friendly low-tech materials we are able to include people of all ages and abilities, and at all levels of skill. Natural building embodies the principles of permaculture, but above all else is recognized for being the most fun and engaging way to build.

Why natural building?

As the dimension of permaculture that addresses human shelter, natural or ecological building primarily reflects the imperative to relocalize economic and social life. In the urban context local resources are a colorful variety of materials from reclaimed building parts to the ubiquitous clay, sand, and straw. In Portland, the Village Building Convergence has seeded the urban landscape with over 70 ecological building prototypes and

has turned terms like "cob," "strippable," and "light straw clay" into household words. The focus on local sources for building materials stimulates an emerging local economy, helping to build awareness of their availability.

City Repair is rebuilding the urban fabric by creating places, objects, and buildings that reflect the emerging cosmology of humans living with nature and with each other. By focusing on what is missing, such as convivial public spaces, public art, meeting places, and low-cost building systems we cultivate a new awareness. By using local materials, we help ground the local stories of place, giving them greater potency and authenticity. Visible reminders of both place and of the popular struggle to build it help to empower the community. Natural building as we know it directly creates this form of empowerment.

Within the current context of industrial construction, natural building is viewed negatively as being "labor intensive." But of course, the problem is the solution: Seen through the lens of permaculture we understand that "labor intensive" means there is an opportunity to engage the community, to increase participation, increase collective ownership, and strengthen democratic decision-making. Because the materials and the process are both low-tech and non-toxic, we can involve members of the community who normally get relegated to the sidelines, if not shut out altogether, among them children, women, and the elderly. Thus, the spectrum of energies reflected in the building and the physical architecture of the place becomes more truly inclusive. Building with the entire community is

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democracy in action. Everyone can have a place because the methods themselves are easy to learn. After all, who doesn't love to play in the mud?

Natural building methods are human-scaled. For instance, cob is made of clay soil, sand, and straw mixed together in the correct proportions with tools as simple as your feet (and some friends' feet for an increased fun factor) and a tarp. With those few things you can build an entire wall system for a house, or a bench, or a kiosk, or an oven, or some wonderful piece of public art. In communities where there may be language barriers, a visual demonstration can be enough for a person to learn and participate. Children are masters at making mud pies; cob building presents a great opportunity for children to become valued contributors.

Cob has some beneficial limits: Only so much can be stacked in a day. This allows time for non-work activities. There are usually no power tools involved, a fact that creates a worksite quiet enough for meaningful conversation, unlike most conventional building situations. Clay is known for its curative properties, and is a joy to work with. The playful nature of getting covered in clay is healing in many ways.

Cheap and priceless

In Portland alone, City Repair, chiefly through the Village Building Convergences, has helped create over a hundred

structures, sixty major sites, over a hundred community events, and twenty citywide celebrations. Projects like the Dignity Village, a guerilla-initiated, legalized transitional village run for and by homeless people, used natural materials not only to portray the residents' ecological visions, but also to allow the villagers to do most of the work. Those who have built their own shelter know that the process engenders a much deeper sense of connection to place than is possible when one simply occupies a

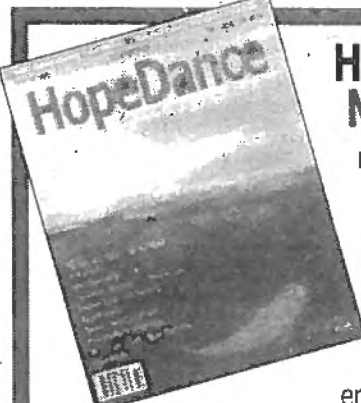
Restoring true human habitat renews a sense of spiritual connection to shelter, nature, and each other.

house. A community that builds itself both literally and figuratively is an empowered community. Dignity Village now boasts the most ecological and affordably built structures per capita of any community within the city of Portland with ten straw-clay dwellings. When we talk about affordability most people ask how much this type of building costs. And while great savings in money and material have been attained, the real answer is that this type of building is priceless!

If you don't have an excited and engaged community and you don't have a relationship with your local resources, you will have to throw money at the project, which will almost certainly yield unsustainable results. The Village Building Convergence draws on wealth of social capital: the volunteers who locate available materials, who spread the word, and who erect the structures. As much as possible we use materials that are outside the market and come with no money pricetag. One of the best things to be found in cities is the bountiful waste stream. Projects that would cost a lot of money for labor and materials if built conventionally, can be done for very little within the context of a creative and resourceful community.

Spiritual healing and an economy of justice

Restoring true human habitat renews a sense of spiritual connection to shelter, nature, and each other. As we see more and more natural building in the city, more connections form, including relationships between neighbors and neighborhoods, between citizens and city officials, and between farmers and city dwellers. A healthy social ecology is based on healthy and sustainable relationships. Natural building brings people together, and in an era of isolation and privatization that is subversive. Every one needs shelter and everyone deserves a healthy home.



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"What a breath of fresh air," writes Barbara Kingslover.

Home ownership fosters community responsibility. It sends us down a road to talk about things in the sense of "we" not "I" because we are reminded through these building practices that we very much need each other. In contrast to what Brock Dolman of the Occidental Arts and Ecology Center calls "Ego-Nomics," we can begin practicing "Eco-Logics," where value is measured by a healthy social ecology, not the distorted calculations of the GDP or the Dow Jones industrial index.

At a certain point we begin to ask, "what is sacred?" What can be bought and sold and what cannot? Sorting through these questions we begin to realize that our communities are not for sale, our public space is not for sale, our air, our earth, and our children are not for sale. We begin to wake up and see the world through different eyes.

At a certain point we begin to ask, "what is sacred?"

The connection we cultivate through natural building happens in the quiet intersection of what architecture does. Buildings reflect not just construction, but an intersection of an economic and cultural and spiritual architecture that takes place in the parentheses of space and time. A down town high-rise is not just the expression of the architect but of the grand social theater in which its design was really shaped. Put on your clarifying permaculture lenses, and when you look at the same rectilinear building made of concrete, glass and steel you now see a pyramid of embodied energy and the social pyramid of power it took to build the society that uses energy-intensive materials. If you could look through the layers of glass and steel to see the spirit of the building you would see that it is not based on the human spirit, but on property and accumulation through severance.

Take the same lenses and look at a natural building project and you see human scale, life as sacred declaration of human community, and deeper still, the story of love and abundance. You might even hear the embedded messages in the building. "To give is better than to receive." "Love your neighbor." "Practice random acts of kindness." Buildings are full of messages; they are extensions of culture. That is why architecture must come back to the realm of community.

With public dialog being saturated with global warming and peak oil and the general cultural state of mind being one of escapism and depression, we are in a time when we must accentuate the positive. Now is not the time just to hope for something better, now is a time for action. We all possess tremendous transformative power. Consider the metaphor of the "butterfly effect." We live in a world so interconnected and complex that you cannot separate one event from any others. With that, something as seemingly innocent and minuscule as the fluttering of a butterfly's wings can precipitate a tornado 1000 miles away. Here we are, tremendous butterflies equipped with revolutionary wingspans and light ecological footprints.

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Lydia Doleman is a natural builder and activist practicing in Portland, OR. For the past ten years her work has been a culminating point for ecology, art, and social justice. Her natural building company, Flying Hammer Productions, focuses on pushing the limits of affordable and energy-efficient housing, training people and communities in various building skills, and infecting the dreary urban fabric with structures that display beauty, sustainability, and community.



Dignity Village, a project of City Repair, is a guerilla-initiated, legalized transitional settlement run for and by otherwise homeless people who chose natural building materials in part to learn skills and create their own humane habitat.

Armenia: The Mountainous Republic of Natural Building

Mr. Cob Goes to Eden

Ianto Evans

WHEN YOU READ "NAGOMO KARABAKH" what do you think of? Is it a familiar term? Most of us probably don't recognize the name of this small country in Asia Minor. How about Armenia? We've all heard of Armenia though some of us aren't quite sure it still exists, or exactly where it's located.

Armenia has been independent only 15 years, Nagomo Karabakh a little less. Armenia fits tightly between Iran and Georgia, Turkey, and Azerbaijan. The mountainous Republic of Karabakh lies to the east of Eden, perhaps where Cain ended up following the fratricide. I'm fairly certain of this now because I have been working in Karabakh, introducing cob construction to the Karabakhtsis.

In every story is an autobiography. Reading almost anything, I first want to know about the writer, the personality and viewpoint that mediate all that he or she writes. Handwriting reveals much, e-mails little. So this is a letter from me to you with some history so you can better know from where I am coming.

Twenty-two years ago I was asked to teach a permaculture course. Then dozens more, in Mexico, Brazil, Guatemala, Ecuador, the US and Europe. I went to Africa and Asia. Always I co-taught; usually other instructors presented things horticultural, my own direction was more eclectic. By training and practice, for 40 years I've been an architect and ecologist, an eco-architect or archi-ecologist. I have followed, through building, that edge where human activity meets Nature. How we build has fascinated me, be it a hut or a town or a field, factory, or freeway; not the mechanics of structure, that's the easy part, but how that construction has and will affect the land and all its inhabitants. Humans build, I watch.

There is a Chinese proverb that says, "To tame the dragon, it is useless to throw rocks. Instead, climb into his mouth and pull out his teeth." By the late 1970s, the US had been unrivalled in sheer consumption for 30 years, so in the the spirit of a true

dragon slayer, I deliberately chose to move from Wales to the US with a totally unreasonable objective. I wanted to halt industrial consumerism. Everything since has been predicated on that goal and in searching out the biggest leaks in the system, the incentives and imperatives that keep us going to jobs we detest. I have sought out areas where a buck's worth of bang will be biggest.



The author as Johnny Appleseed: Spreading the Gospel of Cob.

Soon others joined me in a collective with common focus. At first we worked on food self-sufficiency, then transportation (this was soon after the OPEC oil embargo so transportation was in the public eye). But housing was getting little attention and offered the biggest gains. It still does. In the world's most wasteful society, about half of our total energy use is in buildings, mostly the houses we live in, in

their construction, maintenance, and thermal modification. By contrast, transportation uses less than 10% of US energy. US buildings consume a tenth of all energy used on Earth.

The energy put into housing translates two ways: one, into dollar costs in paying for the house, the other in ecological damage incidental to that energy use. Energy used quickly becomes energy wasted; waste equals ecological damage and social disruption. We notice conspicuous waste, particularly if it's shiny, noisy, and moving quickly. But what keeps us trapped in a cycle of work and waste is the quiet hulk of our house with all its expense.

My contribution to permaculture has focused for a couple of decades on the houses we make and live in, with their ecological and social effects. At first my interests lay in improving the materials of which houses are made. After we had developed low-impact construction systems, attention turned to how much house is enough. Now that we can build small, efficient houses without poisons for less than \$10,000, I'm most fascinated by the idea of the house as the theater in which we act our lives, what a dwelling can allow, encourage, or prevent. You could say that the house is a moderator of feelings. Of course to have the luxury of

Back to Nagorno Karabakh, Karabakh for short, where this story began. Last year an Armenian foundation based in New York asked if I thought cob would be suitable as permanent housing for refugees in Armenia. They had been working in demonstration villages, models of how to re-house the million or so refugees in this country of three million. Funds are limited and progress has been slowed down by the sinking U.S. dollar and fast rises in the price of materials. After 70 years of Soviet rule, Armenians had become accustomed to concrete and steel houses with almost no insulation, despite -30°F winters and hot continental summers. The houses are modeled on the latest suburbs of Moscow, so the foundation was bravely trying to match that standard by building concrete boxes with steel roofs sitting squarely in rows in cyclone-fenced yards.

The Armenian culture, one of the world's oldest, has survived largely in a worldwide diaspora of its people, who outnumber Armenian residents by two to one. Karabakh is an outpost of Armenian culture surrounded by Azerbaijan-claimed territory. The Armenians claim Mt. Ararat, supposed the resting-place of Noah's ark, and will also tell you that biblical Eden was in traditional Armenia. Karabakh is southeast of Armenia in the jumbled mess of the Caucasus, a series of mountain chains higher than the Rockies. The housing project is in the politically sensitive lands, originally in Azerbaijan, that Armenia holds by military force. It is the most remote place I have ever been.

When the Soviets left abruptly in 1991 they took with them most of the physical and administrative infrastructure. Then in the early 1990s, war with Azerbaijan took most of the remainder. Karabakh was left without road maintenance, agricultural irrigation, neighborhood heating, wells, bridges, schools, or clinics. Armenia/Karabakh has no oil and the supply from Azerbaijan was closed off. Agriculture, which had been forcibly collectivized since the 1920s, was suddenly thrown into the free-market, without wells, machinery, or trading partners. Worst, in the war zone between Karabakh and Azerbaijan, advancing armies left no survivors. The road into Karabakh passes scores of ghost towns, every house a burned-out shell, rusting Russian tanks overturned at the roadside, and no trees older than 15 years. The fields are still alive with landmines and the ruined hulks of collective and individual farms. Factories collapse as concrete walls degrade and steel trusses rust.

Adding to the post-apocalyptic landscape are the social difficulties of emerging from communism. Almost overnight there was no free housing or medical attention, everything cost money, which nearly nobody had. There still are few paying jobs and the commercial infrastructure may take decades to balance itself out. As in other ex-Soviet countries, a few greedy opportunists quickly seized assets, became slumlords, mafiosi, and drug dealers. One result is an impoverished population. After all, there's only so much to go around. Many foodstuffs cost as much as they do in the US, yet a good daily wage in Karabakh is about \$7 US.

www.permacultureactivist.net

My experience of international work in "development" is that most of it goes grievously wrong. Either it's resented out of justifiable xenophobia, unnecessary (the foreign perpetrator thought it might be a good idea), or downright damaging. Foreign experts come in, sometimes well intentioned, push a new technology at local people, and rapidly go home to their huge,

My experience of international work in "development" is that most of it goes grievously wrong.

overheated houses and gas guzzlers. The locals are left to pick up after the party, often in worse condition than before. My office gets a lot of requests to go to exotic places, so we can afford to be picky. This project looked very different, so we went.

In months of meetings and phone calls, I liked what I heard—a family business owned by diasporan Armenians, selling pure wool carpets in the US woven to traditional designs. They employ 1000 people in Armenia and several thousand more Tibetan refugees in Nepal. Modest, steady annual funding mostly spent in Armenia and Karabakh on ecological improvement, reforestation, and refugee housing. I observed a track record, willingness to learn from mistakes, true idealism, and good business acumen.

Finding timely solutions

The problem: fast-rising construction costs were limiting the number of houses that could be built, providing fewer demonstrations, housing fewer families, slowing down a goal of building many new villages along the particularly fragile border. Could cob and natural building techniques cut construction costs? My answer was cautious. Yes, I said, there's a chance we can build cheaper, but we need to expose all possible stumbling blocks before plunging into demonstration buildings. Dividends could be potentially very high—a million people needed cheap houses. We could influence national housing policy and rewrite all the rules. So I agreed to an exploratory visit.

Paul Dillon and I went together. Paul's from Ireland, a permaculturist who apprenticed with me. He's young and very observant. We made a good team. There were downsides. We're not Armenian; we don't speak the language. Neither can we speak or read Russian, the second language. We don't really understand the culture.

Most people in surrounding areas live in makeshift shelter—rusty iron sheeting pulled hastily over a single room in a ruin—or

enjoying your house in daylight, it needs to be inexpensive enough that you don't spend your daytime paying for it. This means simplicity in materials, design, construction, and maintenance.

The principles that have evolved are now lumped into the term "natural building." Applied to houses, here are a few key characteristics in my own words—feel free to add your own and create your own list:

Dividends could be very high—a million people needed cheap houses. We could influence national housing policy and rewrite all the rules.

- Your house should improve your health, not poison you.
 - No synthetic materials, they are toxic. Clean air, water, food.
 - Your house should fit your activities as a glove fits a hand.
- Arbitrary, rectilinear box spaces work for warehousing. People should never be warehoused.

- Avoid geometries that have names: square, rectangle, circle, pentagon, etc.

- Every part of the house has multiple uses, every action can happen many places.

- Construction materials should be processed as little as possible. Earth, stone, trees, sand, and grasses are all time-tested, reliable resources. There are new combinations and many traditional ways to use them.

- The social and ecological damage your house does should be minimal, both locally and worldwide. Also, what does your house put out? Dirty water, CO₂, noise, light, electromagnetic radiation, pollution, smells, etc., and what are their long-term effects?

- Your house must be economical to build and manage. No debt, no treadmill to pay for it.

- Don't overbuild. Know when you have enough, both structurally and spatially.

- Invite Nature in, integrate the wild; bird nests in eaves, sunset views, wild plants in patio paving, frogs, bats, weeds in garden, growth on the roof, full-moon windows.

- A natural house is passive solar and stays comfortable during temperature extremes without mechanical aids.

- In any question ask, "What principles can I use from Nature?"

Shelter is the second face of permaculture, our next need following food. It can be our greatest expense. Thirty years ago I found I could apply the principles of permaculture to the work I did then, helping people in traditional societies improve their traditional cookstoves. At that time more than half the world cooked on smoky open fires (two billion still do). I came up with a simple way of combining sand and clay into a material we called *lorena* that allowed communities to make their own kitchen stoves. They are low-cost, smoke-free, and saved fuel.

Lorena stoves and other types took me to remote villages in the Himalayas, Nairobi, the Black Mountains of Lesotho, and the refined urbanity of Europe. Playing with mud, however, didn't stop with stoves. My team applied mudology to housing and by the late 1980s we were adapting knowledge gained internationally to build the first cob houses in the US.

Cob is a word from England for what is perhaps the world's most common building technique: using mineral-fiber composites of mud and straw. In its refined form, clay soil, sand, water, and straw are smeared together by foot or machine and applied by hand or forkful to build monolithic walls. Cob sets up to become a material with characteristics of soft rock and tire rubber—hard to cut, hard to break. Its flexibility resists earthquakes and hurricanes; it repels rainwater and snow. It's easy to work with, and most people can master its techniques in a few days. After the civil war in Yemen we found out that it resists combat well, proof against machine gun, mortar, and cannon fire. Now we supply information and training worldwide on natural building from the Cob Cottage Company, deep in the Oregon rainforest.

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share a barn with the animals. In some ways Karabakh appears like one of those "after the bomb" movies, and may be a cautionary example for all of us. Any success in improving things sustainably may be a model the rest of the world could follow.

The foundation's central program is located in a series of burned-out villages along a river valley in arid country. It looks a bit like the Rio Grande valley south of Albuquerque. They have established a rural flour mill and a clinic, and have restored acres of vineyards run down by war and abandonment. The first crop came in while we were there. It's a ten-hour drive from the nearest civil airport—in fact, during three weeks we saw not a single aircraft overhead. The roads are precipitous, alarming, and unpredictable. From the building site we could see the huge mountains in Iraq, just ten miles to the south, but of course we couldn't get there.

People live with considerable self-sufficiency. Almost nothing is brought in, and there's almost no money to pay for things. In the village nearly all the food is homegrown. They buy coffee, but everything else is provided from local sources. Bread is made daily from homegrown flour, cheese by each household. Eggs, fruit, vegetables, and grains supplement the richly flavorful diet—we ate very well.

The director wanted a fast trial building, a demonstration of what could be done. Very quickly we undertook soil assays, test holes, located lumber and straw, negotiating and trading. Tools are scarce, so we brought them in. Windows were ordered from carpenters. We would have preferred to spend most of the first visit just coming to know, talking with people, observing, asking questions. Culture and land are everything. In most cultures there are traditional earthen houses. We were curious what had become of them here. We needed time to answer hundreds of questions, any one of which could be the key to the project's success or its kiss of death. Above all we wondered, in a country littered with beautiful building stone, why isn't it the first choice for new buildings?

The technical stuff is always easy—any fool can stack mud—but success would depend on understanding what the people involved see as their problems, not imagining what we see them to be. There's a danger of pulling out a good trick irrespective of context or need, just because it's easy and you know how to do it. There's a dilemma here. As a consultant I want to show off my best act, the thing I do better than anything else. Also, like the sponsors, I want to see visible results.

Reluctantly I agreed to teach a workshop though I knew we needed to slow down and to know more. The students were a group of six village men 20-55 years old, most of whom had never built before. In twelve days we built most of a tiny house for the caretaker of the vineyard. We collected materials, dug foundations, built a stone stem wall, raised the walls to nine feet, put in windows and door, and set the roof beams. We used a system called balecob where strawbales and cob are knit structurally together. It was a very ambitious workshop. The building is finished now, six weeks later, a showpiece eye-catcher on top of a small hill alongside the main highway to Iran. With luck and diligence, if we don't screw up, if the crew sticks together and builds again next season, the project may become the seed for a national movement for more sustainable housing. The project's leaders may yet recognize that simpler, smaller houses will accomplish what we all need. Housing in the US would do well to follow suit. △

Ianto Evans is Director of Cob Cottage Company (www.cobcottage.com), the senior dispenser of natural building information in North America. He runs the North American School of Natural Building. Ianto is prime author of The Hand Sculpted House and Rocket Mass Heaters—Super-efficient Woodstoves You Can Build (and Snuggle Up To). He teaches cob and natural building workshops and runs an apprentice program. He can be reached at 541-396-1825.

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Albert Bates with Leila Dregger

IN THE SUMMER OF 2005 I FOUND MYSELF at the Gulbenkian Foundation in Lisbon for a meeting of peak oil analysts and, deciding that I had some time to spare, hopped a train to southern Portugal to see the Tamera ecovillage. Tamera was started as a warm-climate colony of the larger and older ZEGG community near Berlin, Germany. It is the brainchild of Deiter Dumm, ZEGG's founder, and a small group of German and Portuguese settlers. Tamera is an ecovillage and learning center with a Peace University, youth exchange program, and local reforestation program. It is also home to 70 brave permaculture pioneers from all over the world.

Five gallons of water can be brought to a boil in 5 minutes. . .

My visit to Tamera coincided with their Summer University. Gathering at the ecovillage were specialists in agroforestry, natural building, ecology, water systems, conflict resolution, public relations, and solar energy. The last of those subjects, solar energy, was being taught by Juergen Kleinwaechter.

Kleinwaechter is an engineer who conceived the idea of the "solar village" after traveling through Africa. He wondered why a village of typically 50 inhabitants could not provide all its energy needs without expensive diesel generators or photovoltaic systems. Kleinwaechter tasked his company, Bomin Solar in Lörrach, Germany, to play with designs using direct-gain passive solar and Stirling engines for cooking, pumping water, and milling grain at a village scale. Tamera ecovillage volunteered to provide the first full-scale test model.

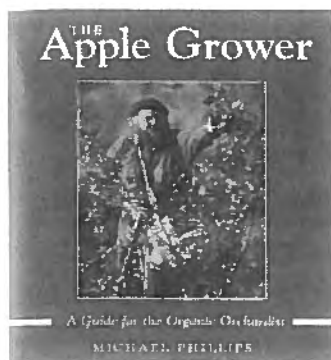
Simple, multiple solutions

There is great elegance in the simplicity of the Bomin design. A 400 sq. ft (35 sq m) polytunnel greenhouse shelters the collector while providing space underneath for winter gardening or a tree nursery. It regulates the temperature inside the polytunnel by using waste convection heat from the collector. A transparent plastic tube carries vegetable oil through a suspended parabolic trough with a reflective coating. Fresnel lenses arrayed

over the trough further concentrate the sun on the tubing, while reducing heat loss. As the oil passes through the tube, it heats to twice the boiling point of water. At the end of its run, the oil passes into an insulated tank where it can retain most of its heat for days at a time. As needed, rain or shine, hot oil is piped to stoves, ovens, water heaters, or back to the greenhouse. A Stirling engine is one use for the hot oil, and that engine makes electricity to power the whole enterprise—lights, pumps, fans, and music. A heat-powered pump especially designed by Bomin also allows the system to work without using electricity at all.

A solar array uses Fresnel lenses to concentrate sunlight on oil-filled pipes. The heated oil is used to cook and to heat buildings and water for Tamera Ecovillage in Portugal.





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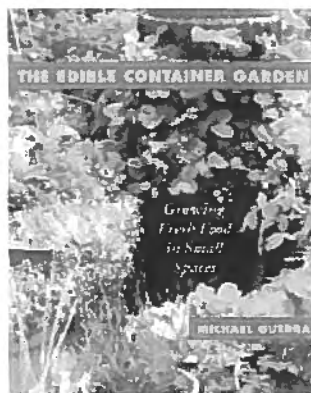
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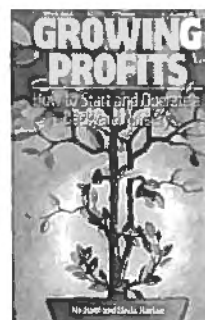
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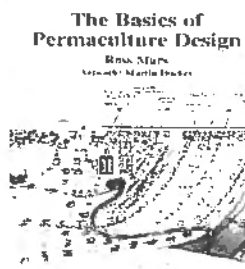
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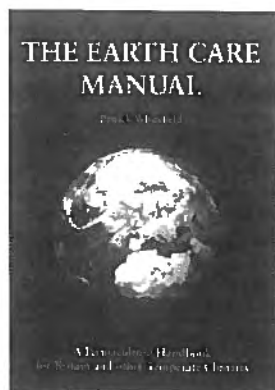
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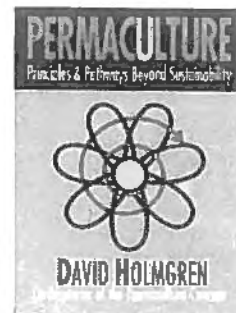
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In the experimental kitchen at Tamera, hot oil is conducted to a row of double-jacketed boilers. Five gallons of water can be brought to a boil in five minutes once the oil is switched on. After circulating through the stove, the temperature of the oil is reduced but still useful. It is hot enough to bake bread, for instance. The remaining oil can then provide warm water for sanitary needs and for irrigating the greenhouse.

Simple, cost-effective construction

The manufacture of the components, particularly the stoves, is something African village craftspeople could readily undertake. None of the designs are especially challenging, and a small blacksmith shop could fashion most of the major parts, although reflective coatings and fresnel lenses might have to be given up in the simplest versions. Kleinwaechter experimented with glass-coated, black-painted copper tubing before trying the clear plastic tubing. Copper is long-lasting but increasingly expensive and hard to find. The high-temperature plastic is a petroleum product, but presumably could some day be made from vegetable sources.

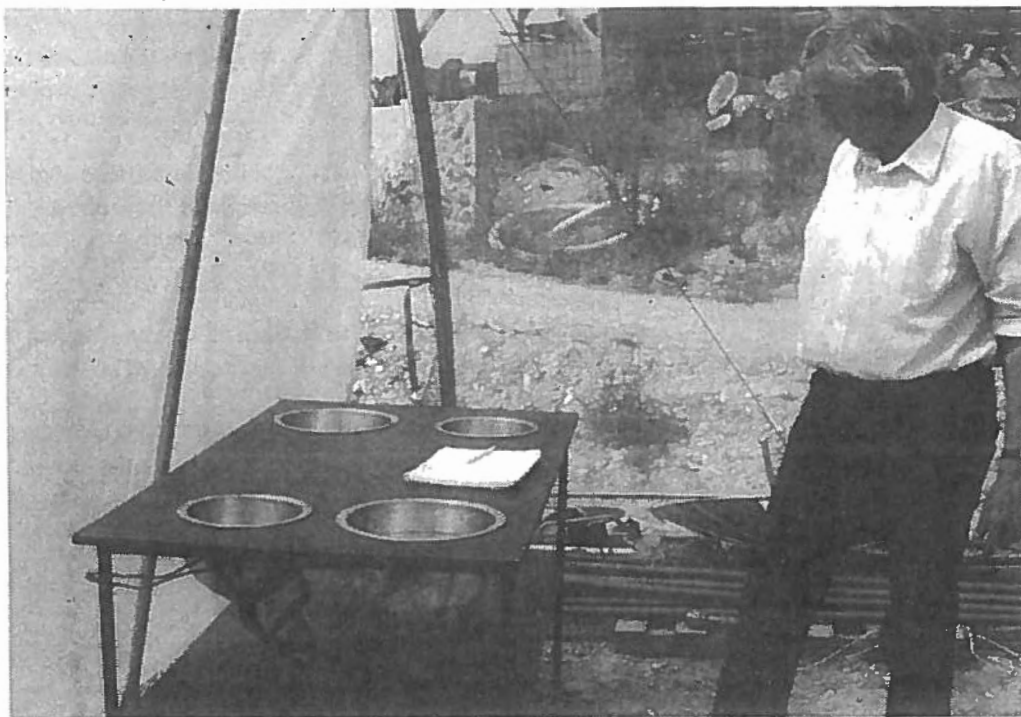
Kleinwaechter says: "Solar cooking reduces deforestation, desertification, and erosion. This simple technology allows for local production, i.e. decentralized work places. Vegetable oil is available everywhere in the Third World. Here the oil serves as a carrier of heat. As the oil flows through the concentrated energy zone it heats up easily to 220 degrees C."

Solar cooking reduces deforestation, desertification, and erosion.

As a second heat storage, Kleinwaechter developed a chemical, but environmentally friendly system using magnesium hydrate alanate. Heat energy can be stored as a chemical to run the Stirling engine or for other uses without the need to store electricity in expensive and toxic batteries.

Bomin Solar has refined the design of its heat-powered water pump and has patented it as the "Sunpulse," which is now going into full production.

Tamera ecovillage is in the early stages of taking a nearly



Engineer and inventor Juergen Kleinwaechter, with Tamera's solar-heated cooktop. Kleinwaechter conceived of a solar village while working in Africa.

desertified former cork forest back to a balanced, edible landscape with wooded areas and extensive vegetable and fruit cultivation, despite a climate that seems to get considerably warmer and drier by the year. The efforts being made to develop modular energy systems for Africa seem wholly appropriate, because it seemed to me when I was there that Africa was in the process of coming to them. Five hundred years ago the Moors brought an Arabian culture and aesthetic to the lower Iberian Peninsula. The Moors are gone, but their desert is coming back. Δ

Albert Bates has been Director of the Global Village Institute for Appropriate Technology since 1984 and of the Ecovillage Training Center at The Farm in Tennessee since 1994, where he has taught sustainable design, natural building, permaculture, and restoration ecology to students from more than 50 nations. He is author of The Post-Petroleum Survival Guide and Cookbook: Recipes for Changing Times (see review in this issue).

Leila Dregger has been a freelance journalist for 15 years, writing and working for newspapers and radio stations in Germany. She was publisher of The Female Voice—Politics of the Heart magazine and the book I am not Peaceful Yet. She lives at Tamera Ecovillage where she has plans for a school for peace journalism.

An Exemplary Owner-Built Home in the High Desert

Building with Vision

Catherine Wanek

A WELL-DESIGNED BUILDING WORKS on many levels. It looks good and feels good. It meets its owner's functional needs, reflects regional vernacular style, and fits into the neighborhood. And if it's totally working, it expresses the designer's worldview.

Just such a home stands unassuming along a dirt lane off of Corrales Road, north of Albuquerque. At first glance, the not-so-

worked in satellite communications, and one day brought home a couple of small photovoltaic panels that had been developed to power satellites. These early prototypes put out just enough wattage to run Ted's transistor radio. He would leave them in the window to catch the sun as it rose in the morning, which would turn on his radio like an alarm clock. This caught his imagination, and developed in Ted a consciousness about the sun and its path

in the sky, and a keen interest in solar energy.

At the age of 15—before he could drive a car—Ted got a sailplane student pilot's license and learned to use rising air currents to climb his sailplane up to the cloud base at over 1,000 feet per minute—all without an engine. School finally made sense when he enrolled at Art Center College of Design in Pasadena, where he received a BFA degree.

Now a design generalist, with an emphasis on appropriate technology, Ted has designed film graphics and solar ovens, and consulted on small homes to multi-million dollar structures. "Whether it's a house or a coffee cup, design means solving problems," Ted asserts. "It is all about looking at the problem and then finding a solution that invisibly works for the end-user. It is about form and function working in harmony."

Ted worked successfully in the Los Angeles area, designing and directing award-winning video and multimedia documentaries and corporate image projects for architectural firms and major corporations such as GTE and

Computer Sciences Corporation. But something was missing. Ted founded Synchronos Design in 1988, to promote the use of appropriate technology and sustainable design in our built environment.

Around 1990 he moved away from corporate-image projects and started focusing his work on sustainable design and ecological issues, as well as developing his own projects. "[At Synchronos] we emphasize the balancing of materials and user requirements with environmental considerations. Our main emphasis is currently on education about sustainable living."

Living in West L.A. began to seem incongruous, and, fed up with the time it took to get across the city, Ted moved to Corrales in 1990. Not that he knew his destination, but like many transplants, he was enchanted by something intangible. "As soon as I crossed the border into New Mexico, I thought, 'this is it!' It



With a smaller floorplan and efficient use of space, the focus of budget and work shifted from cost of materials and finishes to comfort and aesthetics.

big rectangle with a corrugated-metal gabled roof, plastered with deep brown mud, could be an historic New Mexico adobe. Yet this modest new home may well be a model of resource and energy efficiency for the 21st century.

Certainly for Ted Owens, owner and builder, it is the culmination of years of work and several passions—for solar energy, for simple, elegant design, and for creative media-making. His resulting labor of love is a finely crafted 830 sq. ft. home of timber, strawbales, adobe, and stone that is powered by the sun and collects and stores its own water supply.

History leads to practice

Ted grew up in Southern California, building and flying model sailplanes and making Super-8 movies. Ted's father Al

was the quality of light. There's a luminosity here like nowhere else I had been."

He settled in Corrales for the sense of community he felt, just driving through. "It was fall, the light was beautiful, there was this glow....," Ted remembers. "Then when I moved there, I found out a number of other solar people, like solar pioneer Steve Baer [founder of Zomeworks], live in Corrales, too. I felt right at home." Ted's parents, Al and Peggy, retired to Albuquerque two years later, where they built an adobe house that he helped design.

Initially Ted built and marketed solar ovens. Later he got involved as videographer of a documentary about constructed wetlands at Corrales Elementary School. He was amazed to see "pure sewage going in at one end and at the other end it's testing so pure that you could potentially drink it. Just from plants. I thought 'What is it that the rest of the world is not working this way?'"

When he was ready to build his own home, Ted knew that it had to incorporate everything he knew about solar energy and sustainable design. And he realized that he wanted to make an educational DVD about it. "The purpose of the video would be to give a sense of the actual process of building. I wanted to show how easy or hard each step of construction would be for a first-time builder like myself. So, the entire project was driven by the experience of designing and building the home and the fun-value of getting to make a documentary about it."

This became a long-term commitment: Ted spent a couple years researching and designing, and the house took two and a half years to build. The size and proportion were influenced by "a couple of very old adobes on Canyon Road in Santa Fe that to me felt just right, [they had] a sense for the human scale." He also found inspiration in a classic about space design, *A Pattern Language*, by Christopher Alexander. "It's always the one book I recommend if you are going to build your own house. It makes you think about how the house flows, and where does your eye go? Small spaces always have a view outside. Windows should illuminate all rooms with natural light from two directions." The result is a home design that is both aesthetic and ergonomic, and its livability is not dependent on size.

In addition to their ecological qualities, Ted was attracted to adobe and strawbales for their natural pliability, "...being able to have subtle curves and bullnoses that you can't get with conventional stick frame construction. Using older, more traditional materials can effortlessly make for beautiful structure. The flaws and imperfections become beautiful."

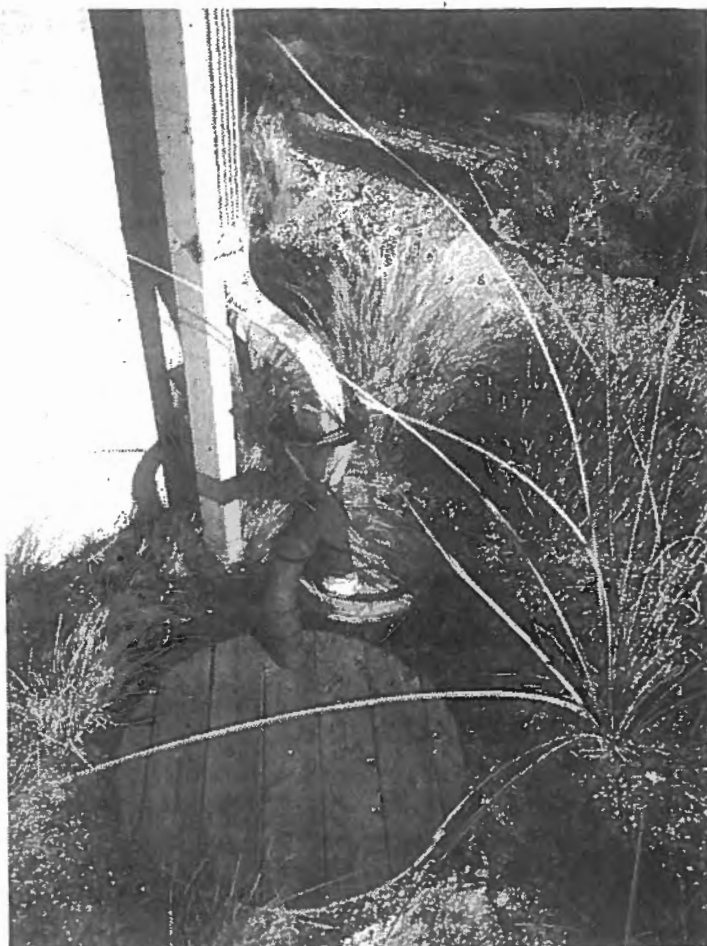
Ted warms to his subject: "I was brought up and went to school in boxes. Something is missing in mass-produced housing. What's missing is that feeling of comfort.... You look at a human form—there's not a straight line in it. Coming from the perspective of an artist and designer, it's great to have a material that naturally forms to your vision—which you can push and warp into place. It becomes something you can sculpt with and the imperfections become the beauty of it. In nature there are no hard lines. In a natural house there's this aesthetic that cues us into what we're used to seeing in our environment."

However, Ted concedes there is a place for straight lines in

architecture, "There's kind of a compromise—since our furniture is mostly straight, it's good to have rectilinear forms of rooms. Maybe in a city the hard edges work better."

Natural building = cost efficiency

Waste has no place in good design. "The other thing that



Integrated roofwater catchment delivers rainfall to an underground sand filter and storage tank.

screams at me [in conventional construction]—there's absolutely no concept of where the sun rises and sets. These are the basic design parameters that add nothing to the cost of the home and should be core elements ingrained into the design by the architect." Ted shakes his head, "An inefficient house is only taking a few dollars here and there. It's invisible so it's accepted. People would be astounded at how it adds up. [Since] you have no reference, no comparison, there's no incentive for change."

"Fortunately," Ted points out, "the most important aspects of green building do not add a dime to the cost." Solar design principles are the same throughout the Northern Hemisphere, and include orientation, insulation, glass, and mass. "Orient the house so the long side faces south and place most of the windows on this side. Keep the windows on the north and west side of the home to a minimum." "North-facing windows don't benefit from

solar gain, so they will be a net heat loss in the winter. And as the sun sinks slowly in the west, windows facing this direction will overheat the home in the summer.

Ted advises designing the south-facing roof overhang so that the summer sun directly overhead can't enter, but the low-angled winter sun will shine in and provide heat when you want it. Thermal mass walls and floors will absorb and store heat during the day, and release it at night when you need it most. Earth, in the form of adobe or cob, is a great thermal mass, and so are stone, brick, rammed earth, and water. Ted's adobe thermal mass wall was more expensive than conventional framing, but he is confident this upfront investment will be recouped in saved energy costs over the years.

Increasing insulation in more severe climates is always a good idea, and strawbales are both a good insulator (R- 2.67 per inch, as measured by Sandia Labs in 1994) multiplied by a naturally thick wall (at least 20 inches with plaster). The thick coat of plaster inside adds up when you are considering your requirement for mass materials.

Thermal mass helps in cooling strategies, too, when it is combined with ventilation. In the desert Southwest, summer days can be 100+ degrees, yet often nights are pleasantly cool. High windows or vents should be opened at night to catch the breeze. If there is no breeze, create one with your ceiling fan. Ted

employs this strategy successfully in his home. "By opening windows at night and cooling down the thermal mass walls and plaster—then closing them in the morning—the house stays comfortably cool all day. My office, which is just a mile away and is built with conventional materials, has to have the air conditioner running all day."

Small spaces always have a view outside.

Learning as he went

While Ted was researching the materials and imagining his dream design, he realized there was still much to learn in the building process. "I knew I wanted to use strawbale and adobe," Ted explains, "but wondered 'what is it actually like to try to put it all together to turn it into a house?' The apprehension I felt was going into the unknown." And, even with the small size, the house turned into a massive project for a first-time owner/builder.

Many days there was just Ted and one or two others working. Plus, he was shooting a documentary as he went along, so often he would take off his tool belt and pick up the camera. Ted began construction in 1998 and finally moved in March 1, 2000. He is especially grateful for the support of his father Al. "My dad showed up on the first day of construction and kept showing up till the house was done. He was a huge help."

According to the New Mexico building codes, strawbales may only be used as insulation in a post-and-beam framework. Ted chose 4x4 posts with double 2x8 beams for structure. The roof support comes from pre-engineered 2x4 trusses that create a gabled roof with a depth to accommodate about 15 inches of cellulose insulation, (rated R-55.) A simple shed roof covers a roomy front porch on the east end of the home. In true New Mexico vernacular, the roof material is shiny silver corrugated metal. Ted's home differs from the traditional: when you walk around to the south side, you're greeted by a mounted array of shiny blue solar panels.

In the dining/living area, the gabled roof creates a vaulted cathedral ceiling on the west end. An intimate kitchen is tucked under a sleeping loft on the east end of the modest 25x60-foot rectangle. Although it's a small space, the kitchen is efficient and functional, with an easy-care concrete counter top and open shelving, some created from salvaged wood. A small round bathroom and a long narrow storage room along the north wall are separated from the living space by a thick adobe interior wall, plastered with a white clay *alizi* (essentially a clay paint).

In the tradition of strawbale construction, Ted decided to host a wall-raising workshop to get the bales into the walls. He met Stephan Bell, his strawbale maestro, teaching someone else's strawbale workshop, where a group of people came to help and to

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learn themselves how to build with bales. A flamboyant personality, Stephan also turned out to be a professional juggler—and during the workshops would entertain at lunch! At least on the strawbale part, Ted discovered that natural building could be done by someone with relatively little experience.

"We put 80% of the bales up in two days with an inexperienced crew," says Ted excitedly. "And the entire first coat of earth plaster was also applied with volunteer help in just a couple of days." However, Ted disagrees with "the hype that strawbale homes can be built for \$10 per square foot. If you are going to build to code, this just is not the case. But if you are willing to put in your own time, you can save a lot of money."

Over the course of a weekend, Stephan Bell led a merry group of novices through the ins and outs of bale building. Strawbales were laid flat, end to end, and notched around the 4x4 posts. Each course overlaps the one below, in a running bond, and they were staked together with lengths of rebar. The bale wall was connected to the structure with strips of expanded metal lath attached to the posts and held into the bale with landscape stakes. An electric chain saw was used to shape corners and carve

niches. On the non-bale gable ends, they stuffed loose straw behind stucco netting to maintain the stuffed-pillow look of strawbale.

During another weekend workshop with Stephan Bell, Ted's house received its first coat of clay plaster inside and out. Local clay, mixed with sand and chopped straw, was applied with hands and trowels in two joyous days of playing in the mud. On a couple of interior walls, Ted experimented with gypsum plaster, but if he were to do it all over again, he says he would choose all clay finishes.

Certainly as applied by Keely Meagan, author of *Earth Plasters for Strawbale Homes*, a clay *aliz* is a thing of beauty. Beginning with white kaolin clay from a pottery supply store, Keely mixes it with sharp plaster sand, finely chopped straw and powdered wheat paste. Sold as wallpaper paste, the wheat paste is like a magic ingredient which acts as a glue and a binder, creating a hard surface that doesn't dust off the wall. Like a cake mix, the dry ingredients are combined first, before adding water to the consistency of chocolate mousse. The previous plaster coat is misted with a spray bottle before the *aliz* coat is painted onto the

Features of Ted Owens' Design and Construction

- Passive solar design is enhanced by 18-inch-thick strawbale walls (about R-40), 15" of cellulose insulation in the ceiling (about R-50) and combined with a 2-foot thick adobe interior wall, concrete floors, and thick clay and gypsum plasters for thermal mass storage.

- A rubble trench foundation topped with a concrete grade beam costs less, and saved more than half of the concrete normally used in the foundation. Salvaged wood and strawbales were used as forms for the grade beam.

- Strawbale building is ecological and user-friendly for the do-it-yourselfer. Clay plaster is vapor-permeable and creates healthful indoor air quality. It also reduces the use of cement and can often be found on the building site, making it "dirt cheap." Both are low in embodied energy.

- Radiant floor heat is more comfortable and efficient than forced air heating. A conventional hot water heater, not a higher-priced boiler, works well for the low-temperature requirements of radiant heat. It can also be heated with a solar hot-water system in the future.

- Reclaimed and natural materials are used throughout the interior, including salvaged oak flooring, surplus tile in the kitchen and bathroom, flagstone window seats and shelves, etc. Flexible bamboo forms arch over the windows, are filled with loose straw, then plastered, for a sculpted finish. One

gabled end is finished with reed mats (lath) and mud (plaster), topped with a gypsum plaster.

- Windows are double-paned, low-emissive (low-e) glass on all sides, reducing heat loss—and heat gain from the sun. Operable high windows allow the venting of hot air at night, for natural cooling.

- Paint finishes on wood and drywall contain no volatile organic compounds (VOCs). Shellac protects the wood floor, and the concrete floor was colored with an acid wash (versus a more toxic powdered pigment).

- Ted plumbed the house to make use of greywater from the shower and sink in his landscape. Now that greywater use is accepted into NM building codes, he plans to hook it up.

- Rainwater harvested from the roof flushes the toilet and waters the landscape. His 1000 sq. ft. roof will capture 625 gallons of water from a one-inch rain.

- Metal electrical boxes are safer and longer lasting than plastic, reducing PVC use.

- A reliable, stand-alone photovoltaic system with 900 watts of power serves all of Ted's electrical needs. His "Energy Star" refrigerator and compact fluorescent lighting reduce his electrical needs dramatically.

wall. To assure a good bond, it is buffed when nearly dry with a stainless steel trowel (the Japanese make fine trowels in many shapes and sizes). Another useful tool is a plastic disc made from a yogurt lid, and wet plastic wrap to smooth out rounded corners.

The thick interior adobe wall was built by a small experienced crew over the course of a couple weeks. Because of his concern for indoor air quality, Ted used "unstabilized" adobes and mud mortar—except for the first course of adobes, which, by code, are asphalt-stabilized with cement mortar, to be more water-resistant. Electrical wiring is sandwiched in between courses of adobe, as well as through stud walls. Ted confined the plumbing to interior walls as much as possible, and made the conscious decision not to use PVC. He chose copper for fresh water, and ABS for drainpipe, which he considers the lesser of two evils.

Minimizing embodied energy

"Using PVC, and fiberglass as insulation seems crazy to me. They both have high embodied energy and are damaging to the people who manufacture and install them." Ted also minimized the use of concrete, trying to use it only when serving multiple functions due to its high embodied energy and its contribution to global warming gases (7%!).

One such appropriate use was for the floor, where concrete serves as structure and mass, and offers a beautiful aesthetic. In a time-consuming process, Ted poured numerous sections of concrete in free-form patterns, and used an edging tool to etch in control joints to emulate flagstone. Later the floor as a whole was acid-stained and the joints grouted like tile. The resulting floor belies its origins. Rather than a monolithic slab, Ted's floor has an organic, hand-made look and feel.

Topping off this sustainable home is a photovoltaic solar array and a water catchment/storage system. Typical gutters are all that is needed to catch the rain falling on the roof, which is filtered, then stored in a 1,500-gallon underground polypropylene cistern. Burying the tank insures that it is protected from damaging UV

radiation, and keeps the water from freezing—plus the large tank is out of the way and out of sight. Also buried in the ground is a 55-gallon drum that holds the pump and pressure tank, which can be lifted out for easy maintenance. Ted's cost was 50 cents per gallon of water storage.

The 900-watt solar system converts sunlight into electrical energy, which is stored in batteries. Ted's store about 1050 amp hours of electricity, or enough to run his life for about two and a half days. Admittedly, he is more conservation-minded than most. "When you're living off the grid, you become really conscious of how much it takes to wash a load of clothes."

Maintaining this consciousness can be a challenge with modern computers and appliances, most of which have internal capacitors, clocks and indicator lights that constantly suck power from the system. "Every component is drawing a couple of watts from the circuitry so there's only a small warm-up time, which is an incredible power drain," complains Ted. So he installed his stereo and TV on a separate plug-strip that he can manually switch off when not in use, to eliminate these "phantom loads." A lamp plugged into the same circuit reminds if they are on or off.

Even with this acute awareness, Ted had some surprises. He chose an energy-efficient gas range, but discovered that while burning gas for baking, the oven also draws 700 watts of electrical power! Still, some advances in technology are heartening: The first two small solar panels his dad gave him years ago probably cost \$10,000 at the time. Ted grins, "That same ten thousand dollars is now powering my entire home."

He calculates that he spent \$88,000 total for his custom 830 square-foot home, not including the land—or his considerable sweat equity. Ted also paid for some experimental "extras" that he wouldn't necessarily repeat, such as a custom ridge vent for additional cooling. Ted loves the aesthetic, but hasn't yet figured out a practical way to open the ceiling vents while standing down below.

The price does include his photovoltaic system, which will pay itself back by eliminating a monthly electric bill for many



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years to come. Making use of passive solar heating and nighttime cooling also keeps gas consumption to a minimum. Along with water harvesting, this house is a model of self-sufficiency—it could be sited nearly anywhere in the Southwest on or off the grid. Says Ted, “I wanted a system that would offer maximum energy-efficiency and be easy enough to build for a do-it-yourselfer.”

I wanted a system that would offer maximum energy-efficiency and be easy enough to build for a do-it-yourselfer.

Still, it was a huge effort—one he advises others consider fully. “If you build small you can put your focus on the details and not bust the budget. [But] even a small house is a lot of work. Do you have the time and energy to see it through?”

Ted points out that a real problem with “alternative” building is that few professionals have experience with the materials, so it can be hard to get sub-contractors to work on the project—or, they don’t do a good job. “The housing industry is very slow to change its ways. These are the people I’d really like to change through a tour of my house.... The tree huggers you’ve already got.”

Fortunately he believes this is changing. “The cost of running an old home is bound to become much more expensive due to increased energy costs. So a green home is going to hold its value over a conventional home that will eventually become an energy money-pit down the road.” Ted laughs, “If the contractor or designer were required to pay the utility bills, green building would become the norm overnight.”

Ted has faith in education. While making the documentary about the Corrales wastewater system he “was shocked to find out that three percent of the electrical energy consumed in the U.S. is used to push sewage around! Therefore if you cut down on water use, you are reducing energy use somewhere else. You see everything is connected.”

From foundation to plaster, Ted caught his entire building process on video, and sometimes splurged by shooting 35mm film, for the beautiful quality of the

medium. Eventually he wound up with dozens of hours of material, which he cut down to a detailed five-hour DVD. Called “Building With Awareness,” the elegant movie is clearly put together by an accomplished filmmaker—it is both a documentary and a “how-to” video artfully edited into a beautiful viewing experience.

The DVD includes a virtual tour of the artful home, while Ted explains the design and how many functions are incorporated into a small footprint, literally and ecologically. The low entry opens into a relatively large space with a cathedral ceiling. Smooth and textured surfaces created by wood, stone and clay plaster offer a visually rich interior.

Ted is proud that the majority of the materials he used came from the region and respect the traditions of New Mexico. “They look great and the energy-efficiency is a free bonus.” He advises, “Creativity can make up for a low budget. Build only what you really need, this alone will save more money than anything else, both in construction costs and energy costs.”

The priceless payoff is that “You’re getting an aesthetic that comes naturally with the material, even if you don’t know how to use it that well. If you make a building that is functional and aesthetic, you know no one is going to tear it down anytime soon.” Build to last, Ted Owen’s natural sustainable home will likely stand as just such an example for decades to come.

Ted’s website has the total cost of the house and components. www.buildingwithawareness.com. △

*Catherine Wanek organized the building of a strawbale greenhouse in 1992, and has been an advocate ever since. She’s traveled from Orange County (California) to Red Square (Russia) to document the strawbale movement. Along the way, she produced four strawbale videos, spent five years managing and editing *The Last Straw*, the *International Journal of Strawbale and Natural Building*, and co-edited *The Art of Natural Building*. Author and photographer of the book *The New Strawbale Home*, she is also a founding member of *Builders Without Borders*. She lives in Kingston, New Mexico.*



**To order DVD and Guidebook, see p.51.
www.permacultureactivist.net**

Bioregional Permaculture Centers Flourish in Brazil

A Nation-Scale Permaculture System Emerges

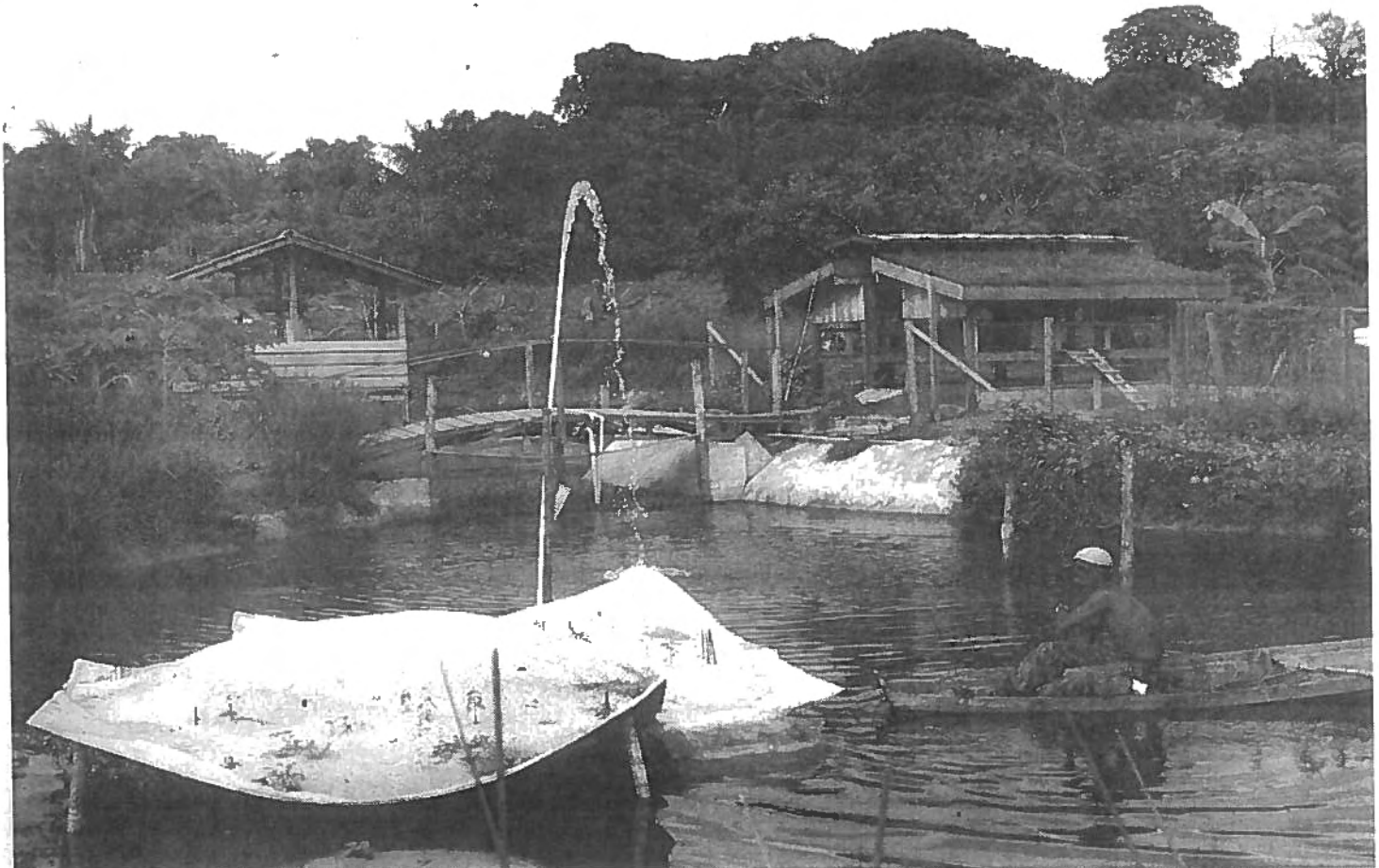
Ali Sharif

I HAVE BEEN WORKING IN THE FIELD for 17 years straight without a break and that, I suppose, gives me the right to offer some words of advice to younger people who might read this article. Development work is tough; you can lose old friendships, you sometimes lose family, and sometimes you feel you lose your mind. But, if you have some fire to burn at the end of the day, here are some hard-earned pointers you can have for free: You have to create partnerships right from the beginning, you have to learn to diversify your funding sources right from the word go, you have to understand what long-term commitments mean, and you have to realize that development projects are amazingly expensive and may just eat you alive. But, someone may smile at you and say 'thank you' whom you didn't even know you had helped. Can't buy that at the store!

Permacultura America Latina (PAL) is a US-based not-for-profit that was established in Santa Fe, NM, in 1989. Its two most notable achievements have been pioneering permaculture in Latin America and introducing US foundations to financing permaculture projects as a feasible development strategy. Over the last 18 years we have helped establish eight autonomous permaculture institutes in four Latin American countries, which in turn have taught permaculture design courses to approximately 15,000 students.

PAL's first seven years were dedicated to establishing permaculture projects in Ecuador, Peru, and Guatemala. The accumulated information, experience, and contacts from these laid the groundwork for the rapid expansion and growth of permaculture in Brazil.

Water management, aquaculture, and soil health are just a few of the integrated design elements at Permacultura America Latina's Amazon center, one of four on-the-ground sites in Brazil.



Taking the plunge

PAL was initially invited to Brazil in 1995 by a Brazilian affiliate (PNFC) of the United Nations Development Fund (UNDP) to conduct a series of courses throughout the country. On completion of the tour we presented to the UNDP authorities a paper outlining a development strategy that could take permaculture from an orientation of community based projects to a national level of application that would open the doors to government, banks, universities, and the private sector. The time frame suggested was an outrageously informal guess of a decade.

We proposed to build six comprehensive permaculture demonstration centers—one in each of the country's six major ecoregions. Each would be autonomous and legally register itself as a non-profit institute. Concomitantly, each would assume a bioregional charter of responsibility and would build sufficient infrastructure to instigate a vigorous broad-scale program for education, community extension, leadership training, and the development of local technologies, thereby creating the basis for financial independence to promote permaculture in all its forms.

Remarkably the UNDP folks at the PNFC (sorry for all the acronyms but this is a development story in Latin America) were thinking along similar lines because they not only offered to provide the seed funding for this venture but simultaneously to create a national coordinating body within their own organization with the primary aim of bringing permaculture courses to every region of Brazil—an area larger than the continental United States. This promised to be an enormous logistical challenge and a costly enterprise.

Subsequently documents were signed, lives were rearranged, primary characters in the drama positioned themselves, and in 1997 work began on the first center in the Amazon. This is all history now, as exactly a decade later we have four centers built from the ground up, brick by bloody brick, in four different ecosystems and are starting to sink our roots into the fifth. The sixth continues to be a dream, incubating but still alive.

Our four centers have evolved as an informal network called the Rede Permacultura Brasileiro (RPG) or Brazilian Permaculture Network. We lost the UNDP support after two years as their program fell victim to internal Brazilian politics, and thus we had to find alternative funding resources from Europe, North America, and increasingly from within Brazil.

Linking with larger economic players

In order to attain that larger mission of a national program we have linked and begun working with two remarkable organizations—the Avina Foundation and the Apel Consult Group. This relationship has transformed our operational capacity. Avina is a Swiss foundation that concentrates on

developing and supporting leadership in Latin American society. They support the leaders in all of our projects in Brazil. Apel Consult is one of the most influential business consultancy groups in the country. Its CEO has turned his company on its head and moved it in the direction of convincing other corporations to address social and environmental responsibility. They are nationally sought out. Several of their 150 professional



A fanciful dome rises above the underground soil museum at IPEC in Central Brazil, site of IPC8's convergence in May 2007.

lawyers, accountants, and consultants have taken the Permaculture Design Course.

It was as if we were working in the understory heads down, building up the soil mycorrhizae, and the understory plants reached the canopy unnoticed, then stalled. Avina and Apel Consult provided the link to the emergent species that could burst through the Amazon canopy. Two major initiatives have grown from this association. One involves Avina's national network of leaders. Experts representing a wide-range of backgrounds in bamboo, radio, adult literacy, recycling, renewable technology, and so on have formed an initiative with a well-known local non-profit—Centro Popular de Cultura e Desenvolvimento (CPCD) in the state of Minas Gerais, in the Vale de Jequitonha—which is considered the driest and poorest part of Brazil—to establish a regional permaculture program centering on water issues.

A prize-winning proposal, first from among 900 applications, won large-scale funding from Petrobras, the national petroleum company, for this project—a first for its kind in permaculture. One may very well question this association, but Petrobras is a highly respected entity in Brazil. It maintains rigorous environmental impact strictures in its operations. A symbol of national sovereignty, it has kept Brazil free from foreign oil domination. Further indicative of its reputation for integrity, President Lula has selected the agency to manage the Zero Hunger program.

The second initiative has been to work with corporations that have officially signaled their willingness to assume their social responsibilities. This was a major soul-searching decision for

many of us, but one we felt we had to take. Thus far, no other sustainability organizations have emerged to partner with business. A group has been formed including Banco Real—Brazil's most progressive bank, Amanco—the largest PVC manufacturer in Latin America (a critical player in rural water supply); and Sadia—the largest pork producer and worst polluter of groundwater in the country, to test a system capable of handling 800 pigs without damaging the environment. The venerable George Chang, a world authority in both waste management and aquaculture systems, will be a consultant to this project, which will begin sometime next year.

To get these things going takes rounds and rounds of meetings and it has been interesting (some say rewarding) for us as the hobbits in the drama to watch these behemoths struggle to adjust themselves to the challenge of change. The winning piece of the puzzle for us every single time has been our centers and the animal systems, which work and just cannot be rebuked by hostile conventional experts any longer. It's straightforward David and Goliath, but we have the permaculture rocks.

So this, along with our publications, translations, magazines, etc., is where our national development strategy has taken us. No doubt we are in uncharted waters, but the government, which is difficult to work with, does pay for various educational programs. A couple of prominent Sao Paulo universities will most likely be hosting the two pre-IPC8 design courses.

Amazonas: our first demonstration center

The first center was begun in 1997 in the Amazon on the outskirts of Manaus, which sits between the Rio Solimões and the Rio Negro where they merge to become the Rio Amazonas—the convergence of the two largest rivers on the planet, each larger than the next eight biggest rivers in the world combined. Sometimes it's so hot there you can hear your own brain cells crisping up. The project site has the distinction of being the very first area deforested by the military dictatorship to introduce the Green Revolution during the 1960s. In a military operation the area was denuded, burned, ripped up, sprayed, and planted to hybrid seeds for the next several years. It passed from crop experiment to a cattle pasture (which was later abandoned, totally leached and compacted), to a training ground for agriculture students learning to drive heavy machinery.

Needless to say, it was a joke for us 20 years later to assume this burden of callous folly, but with the UNDP, the Ministry of Agriculture, and the Agriculture College on whose land it sat, all looking on intently, we had had no choice but to stare them down and take it on. The first few years saw massive compost production and planting of legumes. Interestingly, swales proved useless for us because in compacted Amazon soils, the ants get to work rehabilitating the subsurface, thus creating remarkable megascale tunnels which rapidly drain any surface overflow and deposit it miles away in the most surprising places. I love telling this to Australians but some of the driest places in the project are the swales we built based on their advice!

Simultaneously a large plant nursery was built and fruit seeds were smuggled in from PAL projects in Ecuador and Peru. More

were collected from the jungle and from the fabulous collection of that unsung hero of tropical seeds, Jim West, working in Ecuador. People had to be trained, a legal structure created (Instituto Permacultura da Amazonia (IPA), and outreach launched through publications and courses. Eventually, after a few years of serious sweat, the permaculture design began to produce more than the intensive effort it took to get it going.

The winning piece of the puzzle for us every single time has been our centers and the animal systems. . .

Today, with the endless spread of Manaus—one of the fastest growing cities in the world, we have been encircled and are indeed an urban farm. Energy for the project, both vehicles and infrastructure, comes from "griesel," and a staff of 14 young men and women manage 6 ha (15 ac) of food forest, six dams, and just about every animal system we can think of: cows, pigs, sheep, chickens, ducks, geese, quail, rabbits, worms, fish, and bees.

The work with cattle is based on the French Voisin rotational system which we are anxious to prove viable for the Amazon (a rainforest strategy to reduce the number of cows by making production more efficient). We are experimenting with various fodder grasses. Both the chicken and pig systems are based on original designs. They have proved very productive, and we are replicating them in communities. Damaged areas in the Amazon can be such hostile terrain that we say that if it works well here, it could work anywhere.

We have recently learned how to inoculate fish and our fingerling factory is just taking off. This will enable us to serve scores of small farmers wanting to cultivate fish. The factory will give us a capacity to grow approximately half a million fingerlings by next year. This is the only urban fish production system in Manaus and has been established in the face of astonishing resistance from vested local economic interests.

The work with bees is mostly with the stingless Amazonian *Mellipona* species. This has been a long, drawn out drama, but finally a couple of cooperatives have been established, and over a hundred farmers last year produced about four tons of honey. We have been able to get it into the supermarkets of Rio de Janeiro. Beekeeping is a very specific sustainable economic strategy in defense of the rainforest, as the *Mellipona* pollinate about 75% of the Amazonian rainforest species. We now have extensive data on the bees, and local corporations are supporting marketing and expansion of this program.

Our formal extension work is in 12 towns and villages but our reach is far greater. A forward jungle center, a day's boat ride from Manaus and complete with permaculture facilities, has been

established in Boa Visto do Ramos which will be on the official tour during the 8th International Permaculture Convergence (IPC8). There are lots of river dolphins and alligators to be seen.

In five of these 12 extension communities we have established aquaculture, animal systems, and a community perma-banco. There have been only two defaults from among a hundred loans in the micro-credit program, and we consider this a great success. We think that the future economic engine of our program in these communities will be the extraction of native palm oils, starting some time next year. We have already built the extraction machinery, and are now trying to figure out the electrical requirements, which are considerable. The Amazon is the Saudi Arabia of native palm oil, but we don't need destructive soy plantations to harvest this rich product, thank you very much.

Animals key to achievement

The single greatest achievement of the Amazon center has been the development of animal feed from organic waste materials and local biomass. The subjugation of small farmers and their perpetual condition of near bankruptcy can be understood as the story of soy and animal feed. The truth is, a mafia of economic interests controls it. To get ahead, a small farmer inevitably takes out a loan and has to buy soy-based animal feed at a controlled high price. That, of course, is a trap.

It took us two years of experimenting without access to labs—and once again we met astonishing resistance from vested interests—to develop several formulas for feed for various animals—including fish. These have reduced costs by 70% and eliminate the use of soy. Our animal products taste better. You will have to come and check it out yourselves. We are now incorporating medicinal plants into the feed in an alchemical fashion to wipe out further veterinary expenses and also because it's fun being creative. The objective is excellence. Of course, the Amazon has a pretty extensive pharmacopoeia from which to draw.

To finish the Amazon story, our experiment with the Bore system must be mentioned. When I took my permaculture course in 1984 on Whidbey Island with Bill Mollison we learned about the Bore Farm. I have never heard much more about it since, but it stuck in my mind. Beginning this year all the animal systems and other activities, including hosting courses, composting, animal feed, fingerlings, etc. have been turned over to individuals or groups of our workers to take on as economic enterprises. It is a form of privatization. There have been mixed results so far as the relationships between the various resources and inputs and outputs have to be realigned and generally organized but, all in all, we feel there might be something to this.

The objective was to place our sustainable system within an economic context that could be modeled by the government agencies responsible for creating large settlements in the

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Amazon. We can't stop their displacement and destruction of the rainforest, but we may be able to come up with a complete agro-economic system that they could replicate, mitigating much harm.

A start in the Cerrado

In 2000, just after the UNDP program collapsed, some money was found and 50 acres of land bought in the very pretty colonial town of Pirenópolis, two hours from Brasília. The local ecosystem is referred to as the Cerrado—the dry area. This savanna is a transition between the Amazon and the Atlantic Rainforest. The ecoregion is second in size only to the Amazon, but we chose it as the site for a permaculture demonstration center because of its proximity to the seat of government in Brasília.

The land was just a cattle pasture with a small, abandoned building, home to more bats than anyone can imagine. A stream marks the property boundary and there is a small patch of native forest along its banks. Once the project gained its legal status as the Instituto Permacultura e Ecovilas do Cerrado (IPEC), volunteers began arriving and work commenced with the construction of basic infrastructure.

The late Fiz Harwood, who was at that time on the board of PAL, suggested the concept of Ecoversity, which in Portuguese became Ecoversidade. This was way before the Ecoversity property had been purchased in Santa Fe, but the concept sprang to life in Brazil. Funding manifested, and the Ecoversidade leadership training curriculum was born. Once dormitories had been built and a kitchen organized, students from permaculture projects supported by PAL in Guatemala, Peru, Ecuador, and all over Brazil began interning for periods of up to four months. They returned to their projects with a lot more information and leadership skills than when they arrived.

Diversity of architecture

If you visit IPEC today you will see probably the most diverse array of natural architectural forms and building materials found anywhere. The superadobe techniques of Nader Khalili are apparent in the student village, the large sophisticated domes, vaults, and arches of which are worthy of Middle Eastern builders. The underground soil museum demonstrates the excellence of tactile learning, and the children's playground is a testament to the visit of Paulo Lugari, who gave a course and stayed awhile. The kitchens and food gardens are a delight and the numerous technology systems are quite unique. Official groups of apprentices have interned here from Ethiopia and Haiti, and there is a yearly program where young North Americans from various universities spend three weeks at the school.

IPEC's academic calendar is as busy as that of any university. In fact, it has a formal relationship with the faculty of architecture from the University of Brasília. The annual Bioconstruindo event hosts architects and architectural students from around the world

for hands-on workshops and thousands of visitors have strolled what is now a campus. Other notables such as the late Jose Lutzenburger and Bill Mollison have stayed and taught.

IPEC has won national prizes for architectural innovation and will be the host site for the Convergence activities following the Conference in Sao Paulo.

The third Center was established in 2002 in Bage in the southern state of Rio Grande do Sul close to the border of Uruguay and a five-hour bus ride from Porto Alegre in Southern Brazil. This is the Pampa, grasslands that extend all the way down to southern Argentina, a region that has evolved a unique gaucho culture. The Pampa is a transition between the Atlantic Rainforest and the Araucaria systems further west. The winters here are cold and wet, and the summers hot.

The undulating hillsides leave large bodies of water in the landscape, making it ideal for a rice culture, so the project has a very sophisticated intensive rice farming system based on the work of Takao Furuno, author of *The Power of Duck*.

Solutions to southern land issues

The Instituto Permacultura e Ecovilas do Pampa (IPEP) was formed to serve southern Brazil and the southern cone of South America. Its focus has been working with building materials and useful technologies to facilitate its service to the neighboring rural communities and the many communities of the Brazilian Landless Movement (MST).



The elegant curvature of natural forms infuses the design of this ferrocement shower block at IPEC, central Brazil.

IPEP has a very active volunteer program and accepts many university students from throughout South America. It also builds the youth village and sanitation facilities for the World Forum whenever it's held in Porto Alegre. IPEP's seed program was the offshoot of its directors' work with the establishment of Bionatur, the largest Brazilian organic seed production program and a vital tool in the struggle against the destructive activities of Monsanto, which is very active in this region.

Although not formally on the IPC8 Tour because it takes time to travel there, this project is well worth visiting.

The fourth Center was established in 2005 in Salvador in the coastal state of Bahia. The legal institute formed to manage it is called Organization of Permaculture and Art (OPA), and it works with four school programs in downtown Salvador. OPA is based in two large buildings in the picturesque Pellorino neighborhood that are being reformed as a base for an urban permaculture initiative. We have also acquired a property in the community of Diogo a few hours distant, where a community-based youth program is underway. The staff of OPA represents a very capable younger generation to whom the reigns of responsibility are being handed over.

The IPC8 Tour will end up in Salvador where there will be some beach time as well as visiting the community project.

Meet the leaders

In summation, I have to list the primary leaders who have made the Permaculture Demonstration Centers in our Network possible.

Carlos Miller lives in Manaus and has been responsible for IPA from its outset. He is the regional director for Avina Foundation in northern Brazil and one of the most influential players in the development scene in the country.

Andre Soares is the director of IPEC. His skills in both natural building and teaching have flourished in the work of establishing a permaculture education center.

Lucy Legan is an educator, gardener, and author of the *Escola Sustentavel*. She is co-director of IPEC.

Joao Rockett is the director of IPEP, a master seedsman, natural builder, and permaculture teacher.

Isabela Coelho and Yarrow Snow are the directors of OPA, and between them have a host of skills which range from social organization and street theatre to building and gardening.

Aerton Paiva is the CEO of Apel and a business consultant at the highest levels of the corporate structure.

Traditionally the International Permaculture Convergence switches between continents and is held every two years. The 8th Convergence will be held in Brazil—the first time in Latin America. There are four events associated with this tradition.

- The Designers Course is presented as a courtesy by international teachers of standing on behalf of students in the host country.

- The Conference is a public presentation.

- The Convergence is an opportunity for the global permaculture family to gather and discuss its affairs and agendas and to learn from one other.

- There is also the Tour, which is an opportunity for visitors to see projects and work underway in the host country.

This is the first time that a theme has been imposed on the Conference which is “Greening Our Economy.” Our intention for the event is for it to be provocative. It will be a unique opportunity for green economists of all stripes to gather in



Like the plants in the forest that embraces them, the buildings of the Amazon center occupy many levels, from ground-hugging to tall and emergent like this tower surrounded by a food forest.

dialogue with prominent members of the business sector, progressive and social finance banks, and permaculture leaders from various parts of the world. There will also be a full complement of US and European foundations and financial agencies present and many well-known earth repair scientists. Brazil as an emerging economy, a world leader in alternative fuels, and very much in the world's attention, will present an exciting backdrop for an encounter of this scale.

Aside from our formal responsibility to the IPC8, both PAL and the Brazilian Permaculture Network have some points on our own agenda, one of which will be to influence agricultural loan policy. At present banks make loans to farmers requiring them to strip vegetative cover from their lands and apply a host of chemical fertilizers. These conditions are verified by agronomists to vet the loans. Some senior bank management officers who have visited the IPA center in Manaus are open to a pilot program under which this requirement will be replaced by the farmer's completing a design course. Bringing these subjects up in public will lend credence to the Conference program and will help create an environment where agreements can be undertaken.

To register for IPC8, visit www.ipc8.org. The organizers are looking for contributions to support scholarships for North American participants in IPC8. Please contact PAL at the website above to contribute. We hope to see you in Brazil next May! Δ

Ali Sharif is the founder of Permacultura America Latina (PAL) and has lived and worked in the Amazon for the last 17 years.

Movement Musings

Proposing Plan C: Community, Creativity and Curtailment

Megan Quinn

YELLOW SPRINGS, OHIO—Participants at the Third U.S. Conference on Peak Oil and Community Solutions learned how they must use less energy, save and share resources, and grow food in their communities.

This response to the coming peak and permanent decline of global oil production, dubbed "Plan C: Curtailment, Cooperation, and Community," was a major theme at the conference last September in this small southwestern Ohio town, the epicenter for a growing national movement.

Peak oil and community solutions

More than 300 activists, educators and others from 33 states and provinces attended the three-day conference at Antioch College to hear from nationally-known experts on ways to meet food, housing, transportation and other needs in an energy-starved world through lifestyle changes—not promised technologies.

At the conference, participants learned energy-saving tips and other practical strategies and gained new perspectives and visions of a post-peak oil world.

More than 300 activists, educators and others from 33 states and provinces attended the three-day conference.

"The food to feed the world is not going to come from farmers—it will come from everyone," said Peter Bane, an expert in designing sustainable food production systems, including food gardens and edible landscapes.

Other experts included simple living guru Vicki Robin, author of the best selling *Your Money or Your Life*, who talked about living fully on far less energy; Oberlin College Professor David Orr, who discussed the obstacles posed by corporate power in confronting peak oil and climate change, and peak oil educator Richard Heinberg, who talked about his latest book, *The Oil Depletion Protocol*, a plan to avert oil wars and economic collapse.

The conference, subtitled, "Beyond Energy Alternatives," was organized by The Community Solution, a non-profit organization based in Yellow Springs which promotes local, low-energy solutions to peak oil and climate change.

Answers in more than technology

Pat Murphy, the non-profit's executive director, spoke about Community Solution's Plan C, contrasting it to more conventional approaches which focus on competition over remaining resources and on more technology as a way to try to maintain increasing energy consumption and economic growth.

"We are no longer attracted by the siren singers of breakthrough technologies that promise us we can continue living in a manner that denies a future for our children," Murphy told conference participants.

"The solutions are not going to come from the same people who created the problem," Murphy said. "The answers are not in the corporations of technology but in the villages and neighborhoods."

Murphy's theme was echoed by Bane, who zeroed in on the need for local, low-energy food production and consumption to replace the energy-devouring long-distance transport of processed and packaged food. "Who feeds you and who do you feed will be the central questions for the next few decades," said Bane, publisher of the quarterly magazine, *Permaculture Activist*.

"Going beyond conserving, permaculture aims to turn people who are now consumers into producers, making them independent of a centralizing authority that is increasingly derelict," Bane said.

Bane estimated that lawns in the US could feed 70- to 110-million people, and would "pull the guts out of agribusiness." He emphasized "top-down thinking and bottom-up action" to take the economy back into the household and to become domestically self-reliant.

Bane expounded on the tremendous opportunity to use the remaining finite fossil fuels to build a sustainable low-energy infrastructure, and thus give a lasting gift to future generations.

Sharon Astyk, a back-to-the-land activist known through her posts on the Yahoo internet discussion group "Running on Empty," shared Bane's vision of a local agricultural revolution.

"Before the industrial revolution it took six people farming full time to support one person doing something else. If fossil fuels and industrial agriculture aren't going to feed the world ... how are we going to feed them?" Astyk said.

"I felt if not me, who? If not now, when? And if we need a 100 million new farmers, I guess I'd better be one," said Astyk, who runs a community supported agriculture (CSA) subscription farm in upstate New York which delivers vegetables weekly to its members.

Astyk called on participants to see themselves as part of a revolution. "Most revolutions start with many fewer people than are gathered in this conference hall," she said. Coming out from behind the lectern, she said, "I am not thin, I am not athletic. If I can do it, every one of you can do it!"

"We can't just consume our way out of this one. You can't just join the CSA, you can't just buy organic. More is going to be asked of every single one of us," Astyk said.

Simplicity movement leader Vicki Robin encouraged participants, in the words of Mahatma Gandhi, "to be the change they wish to see in the world."

"Simplicity is about having enough and living frugally with a high joy-to-stuff ratio," Robin said. "It is living a life that is outwardly simple, and inwardly rich and where we live simply so that others may simply live."

"We can't just consume our way out of this one."

Of those in the peak oil awareness movement, Robin said, "You are the people who are engaging the conversation of our time. Even though the critique is very severe, there is a background sense of delight that we're up against it, that we can do better than before."

"Some people call this the doom-and-gloom crowd, but I haven't seen that. I call it the 'creative engagement with the ultimate limits' crowd," Robin said. She described limits as the shaping tools of freedom, even though many Americans think that freedom is having no limits.

Robin claimed that 25% of Americans want to live a more simple life. She suggested that those in the peak oil awareness movement appeal to people's desire for self-reliance, not be afraid to talk about values with them, and work to solve systemic problems in such sectors as the "sickness care industry," that hinder efforts to live simply.

Inaction is reaction

In the conference's opening talk, Professor Orr, a pioneer of environmental literacy and ecological design at Oberlin, focused on the risks of inaction in the face of peak oil and climate change. He discussed the melting glaciers and ice sheets that foretell of global sea levels rising by up to 20 feet in the next few decades, and the rising global temperatures that suggest a rapid onset of unstable and unpredictable climate. He cited a World Health

Organization statement that global climate change now causes more than 150,000 deaths per year.

Orr said the challenge is to reduce global carbon emissions from 8.5 billion metric tons of carbon per year to less than 3 billion tons by 2050—which he described as a daunting task for a growing global population with an ever-increasing appetite for energy.

Still, according to Orr, there remains another major challenge in dealing with climate change and peak oil: confronting corporate power. He quoted Thomas Jefferson as saying, "I hope we shall crush in its birth the aristocracy of our moneyed corporations which dare already to challenge our government to a trial of strength."



Participants at the Third US Conference on Peak Oil in Yellow Springs, Ohio, in September 2006.

As Orr sees it, despite Jefferson's hope, today's corporations, now blessed with personhood and citizenship rights granted by the U.S. Supreme Court, have immense power over government and society. With nearly total control over the major media, corporations, Orr said, manipulate the public to overconsume through advertisements which appeal to infantile self-gratification.

Orr proposed to re-frame political dialogue from the present dichotomy of liberal and conservative. "The real dividing line is how we relate to future generations," Orr said. "Those on the left and right of the political spectrum need to work together."

"The challenges of peak oil and climate change aren't just a matter of technology or politics," Orr said. "They are a test of our heart and our goodness. When we get to the post-peak world after we've stabilized carbon and protected the rights of future generations, it needs to be a world of compassion and joy, a lot better than it has been."

Murphy, Community Solution's executive director, said in his talk, "Plan C: Curtailment, Cooperation, and Community," that the solution to peak oil is to conserve, share and save resources—not compete for them, hoard them or overconsume them. He contrasted "Plan C" with what he described as Plans A and B.

"Plan A is to find alternative fuels like clean coal, tar sands, and oil shale. Plan B is to use wind, solar, and biofuels," Murphy said. "Both assume technology will save us and that we must

increase economic growth by increasing energy consumption."

"Yet the results of an economic model based upon increasing consumption aren't good," Murphy said. "With high crime rates, record high incarceration, continuing environmental degradation, soil depletion, growing inequity, deteriorating health, and the loss of civic engagement and community, we need a better way."

Murphy gave strategies for a Plan C lifestyle in the key areas of food, housing, and transportation. For food, he suggested participants eat less, avoid manufactured food and industrial meat, and grow, prepare, and store their own food. For transportation, he recommended buying more efficient cars, including hybrids, and sharing rides. Housing strategies included living in a smaller space, retrofitting homes by increasing insulation and replacing or covering windows, and upgrading to more energy-efficient lighting and appliances.

Peak oil educator Heinberg noted that oil production is now in decline in 33 of the 48 largest oil-producing countries and that Chris Skebrowski, editor of the highly respected UK Petroleum Review, now says it is his gut feeling that worldwide oil production may peak in 2008.

Heinberg then criticized the much-touted anti-peak oil argument that there have been many incorrect predictions of oil production crashing throughout the 20th century. "In fact, false predictions of abundance have been much more common," Heinberg said.

Heinberg cited as an example the U.S. Department of Energy's International Energy Outlook 2001 which stated, "The United Kingdom is expected to produce about 3.1 million barrels/day by the middle of this decade (~2005), followed by a decline to 2.7 mb/d by 2020." But, Heinberg said, the actual production peak was in 1999 at 2.68 mb/d, which fell to 1.65 mb/d by 2005.

Heinberg dismissed the idea that peak oil is a fringe concept, noting recent comments by former President Bill Clinton on peak oil and a *New York Times* associate editor stating, "The concept of peak oil has not been widely written about. But people are talking about it now. It deserves a careful look—largely because it is almost certainly correct."

Heinberg also talked about his most recent book, *The Oil Depletion Protocol: A Plan to Avert Oil Wars, Terrorism and Economic Collapse*. "We need an agreement to gradually reduce oil consumption in order to discourage competition, stabilize prices, aid with planning and preparation, and protect the resource base," he said.

Heinberg compared the emphasis today on developing alternative energy sources such as wind and solar power to heroin addicts lining the shelves with methadone instead of reducing their heroin use.

"How about if we just start using less oil? That's the only thing that's going to make any difference, because as long as we're lining the shelves with alternatives we're going keep increasing our oil consumption," Heinberg said.

"So the Oil Depletion Protocol goes straight to the problem and says that each nation shall aim to reduce oil consumption by at least the world depletion rate," Heinberg said. He explained that the protocol can be implemented by organizations and individuals who assess their current oil consumption and plan to

reduce the total by three percent per year.

"I realized the best way for me to feel less fear about the coming crisis is to follow the ideas of the Oil Depletion Protocol as an individual," conference attendee Kelley O'Connor of Sterling, Massachusetts said. "In a way, I have already been following it, I just haven't been measuring it," she continued, "and if I can see a number, I can feel like I'm making progress towards using less energy."

Community-level strategies

Julian Darley, founder and director of the Vancouver-based Post Carbon Institute, offered strategies at the community level for "global relocalization" as a response to peak oil. Darley summarized his strategy as "Reduce Consumption: Produce Locally."

"All civilizations are built on surplus," Darley said. "What happens as that surplus reduces or even becomes non-surplus?" he asked. He described humanity as being in ecological overshoot of the earth's carrying capacity, and suggested that relocalization will help humanity return to a "safe carrying capacity" well within its ecological limits. "We need to move from great surplus to sufficient—from abundance to enough," Darley said.

Post Carbon's Relocalization Network, with 122 "outposts" throughout the world, offers support, knowledge, and tools for communities to produce more food, energy, and other necessities locally, move from a fuel to a foot economy, and relocalize currency, governance, and culture.

Darley highlighted other Post Carbon initiatives, including an energy farm, its internet broadcasting station Global Public Media, a proposal for community supported manufacturing and energy, and a tool kit to help citizens get their municipalities to pass a peak oil resolution, form a peak oil task force, and sign on to the Oil Depletion Protocol.

Going deeper into the details of Plan C, Community Solution board member and University of Dayton physics professor Bob Brecha described his recently-built strawbale house. The Yellow Springs home has a solar hot water heater, radiant floor heating system, earth plaster, and passive solar features. "Straw bale construction has low operating energy use and low embodied energy because of using 'waste.' It uses local and recycled materials, and involves the community," Brecha said.

Brecha gave participants practical tips for saving energy in housing. Along with building low-embodied energy buildings such as straw bale houses, he suggested, "Insulate, insulate, insulate, use renewable energy, build smaller and fewer houses, change lighting, and heat and cool to less extreme temperatures."

"Setting back (the thermostat) by 2°F during the day and 10°F during the night would save approximately 15% on heating energy," Brecha said. He urged participants to get a home energy audit from a growing field of "home energy doctors" to help them retrofit for energy efficiency.

Housing expert Jeff Christian of the Building Technology Center at Oak Ridge National Laboratory in Tennessee explained his experience with five "zero energy" homes and dozens of different kinds of construction materials. "Each home has a

simple house plan, is 50 percent more energy efficient than the typical home, includes a two-kilowatt solar array for electricity, and is constructed using structurally-insulated panels," according to Christian. Other energy saving features include geothermal heat pumps, high performance windows, and air-tight houses.

For retrofitting existing homes, Christian encouraged participants to get a home energy inspection. Because the largest energy use in a home is space heating, which uses 30% of the total energy, Christian suggested adding insulation in the attics, walls, and floors, caulking and weather-stripping windows, sealing all ducts, setting back thermostats and considering window replacements. He also suggested upgrading appliances to energy-efficient standards, particularly refrigerators and front-loading washers, and installing compact fluorescent light bulbs.

Many solutions to be found in housing

Richard Olson, an environmental studies professor at Berea College in Kentucky, shared the energy-saving strategies of the Berea College Ecovillage which include a community-wide sewage processing plant called an "ecological machine," an underground rainwater collection cistern, and community composting. The homes were built with structurally-insulated panels to a passive solar design. One residence, the Sustainability House, has an attached greenhouse to treat water from the sinks and showers, maintains a composting toilet, and gets all of its electricity from solar photovoltaic panels. "If we're to have a future economy, the primary energy source will be the sun," Olson said.

Olson talked about other sustainability initiatives at the college, where, he said, "students, staff, and faculty are transforming their campus into an institution that can survive the coming perfect storm of peak oil and climate change." He said they are retrofitting campus buildings for energy efficiency, developing a local food initiative to promote a sustainable food system in Berea, and creating educational programs on sustainability.

Olson also emphasized personal responsibility. "We need to start looking at what we can control and how our actions as consumers impact other people," he told conference participants. "Unless you translate what you learn here into action, then it wasn't worth the fossil fuels used to get you here."

Olson left participants with a quote from 19th century nature writer Henry David Thoreau as they contemplated returning to their communities to integrate the conference's lessons into their lives and work: "Though I do not believe that a plant will spring up where no seed has been planted, I have faith in a seed. Convince me that you have a seed there, and I am prepared to expect wonders." △

Megan Quinn is the outreach director for the Community Solution, a nonprofit organization in Yellow Springs, Ohio which educates about peak oil and community-based solutions (www.communitysolution.org). To order DVDs of the conference, visit its website, contact megan@communitysolution.org or call 937-767-2161.

Building With Awareness

"...the best investment in time and money an aspiring owner/builder could make."

—Catherine Wanek

An award-winning documentary by Ted Owens about building his own solar powered post-and-beam-and bale home of natural and reclaimed materials. The film follows construction step by step from foundations to finish details: rubble trench, concrete grade beam, adobe interior walls, earth plasters, metal roof, PV electric, and rainwater catchment tank.



5-hr. DVD + 152 pp. Guidebook with addl. photos.

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Reviews

A Survey of New Straw-bale and Natural Building Books and DVDs

Reviews by Catherine Wanek

BRUCE KING

with Contributing Authors

Design of Straw Bale Buildings—The State of the Art

Green Building Press, San Rafael, CA, 2006 260 pp, paper, illustrated. \$40.

CLARKE SNELL & TIM CALLAHAN

Building Green—A Complete How-to Guide to Alternative Building Methods

Lark Books, Ashville, NC 2005 611 pp, paper, illustrated. \$30.

ANDREW MORRISON

The How-To Guide to Building With Straw Bales (Post and Beam Infill)

Straw Bale Innovations, Jacksonville, OR, 2005. DVD. 90 min. \$39.95.

TED OWENS

Building With Awareness—The construction of a hybrid home

Synchronos Design, Corrales, NM. 2006. DVD. 5 hr. + Guidebook. 152 pp, paper, illus. \$42.

CAROL VENOLIA & KELLY LERNER

Natural Remodeling for the Not So Green House—Bringing your home into harmony with nature

Lark Books, Ashville, NC 2006 280 pp, paper, illustrated. \$25.

"All construction begins with destruction." —Ianto Evans

Permaculture principles are at the heart of the recent revival of natural building. A passive-solar building literally stacks functions when earth-plastered strawbale walls are simultaneously structure, insulation, and mass. Emphasis on local, minimally processed materials and energy-efficient design reduces the overall ecological footprint of each new natural home constructed, including its lifetime requirement for fossil fuel energy. And in this age of peak oil and global warming, energy efficiency tops the list of design criteria for conscious architects and builders.

When *The Straw Bale House* was published in 1994, it awakened the mainstream world to super-insulating straw bales, and helped renew interest in other healthy, natural building methods. A dozen years of enthusiastic experimentation, and serious study followed. The verdict is in: Strawbales have proven themselves as viable insulating and structural wall systems.

A variety of different post-and-beam and load-bearing systems have been used in construction, tested in laboratory settings, and adopted into building codes. Judging from the plethora of book and DVD resources recently released, the challenge now is sorting through the many structural approaches, plaster options, and aesthetic choices, not to mention deciding which book or DVD(s) to buy. The following survey intends to help the reader sort through these resources.

The latest book published has literally been years in the making. *Design of Straw Bale Buildings—The State of the Art* sums up the results of the considerable laboratory and field testing of strawbale wall systems worldwide to date and includes best practices from a panel of expert contributors and author Bruce King, PE. In chapters that include Structure, Moisture, Fire, Insulation, Acoustics, Plasters, Detailing, and Codes, the scholarly tome thoroughly examines how straw bales stand up to contemporary standards for building materials.

California engineer Bruce King has been at the forefront of the strawbale

building movement for over a decade. The state's surplus of rice straw and its seismic potential create a unique regulatory climate that both encourages strawbale construction and enforces strict building codes. From the collective activity of California building professionals has come an impressive amount of strawbale testing data, which King and his co-authors have updated, added to, and interpreted in this book.

Appropriate charts, graphs, and photographs are interspersed throughout the meaty text in a reader-friendly layout. King's writing style is intelligent, clear, and often witty. He also injects levity into the technical discussions with quotes from the likes of Yogi Berra and an occasional cartoon.

The text covers strawbale wall structural behavior under compressive, lateral, sheer, and seismic loads, with two- and three-tie bales, bales stacked flat, and on edge. Reinforcing methods and plasters of all types are also presented, with a refreshing weight given to earthen and lime plasters, due to their permeability and low embodied energy. (Cement contributes significantly to global warming by spewing a pound of carbon into the atmosphere for every pound produced.)

For the serious seeker, the enlightening discussion of clay, lime, gypsum, and cement plasters is the best I have read anywhere; moreover, an understanding of each material's unique qualities is essential to making the right plaster choice for varying climates and aesthetic sensibilities.

Equally impressive is the chapter on moisture, authored by Canadian expert John Straube. Straw bales must be protected from water—as precipitation, vapor, and ground moisture. Straube stresses "designing moisture problems out, not solving them after they have been needlessly designed into the enclosure." A thorough discussion ensues, ranging from the microscopic properties of water, to site-specific design approaches.

Some of these design strategies are well known, such as sheltering roof overhangs and capillary breaks at the foundation. Straube also illuminates how water vapor moves through wall

assemblies, and how excess moisture can be safely "stored" in natural plasters and mass walls, and later removed by evaporation. I wish all construction professionals could read and understand this information, which is critical to the longevity of all buildings.



Design of Straw Bale Buildings is an essential resource for engineers, architects, designers, and builders who need data to back up their design choices. But it is not just a reference for professionals. As it promotes the understanding of material properties, it offers a fair-minded view of accepted practices and the choices available, from the best information to date. Anyone thinking about building with straw should read this book.

Once you have a thorough understanding of the theory and best bale-building practices, the following resources offer a hands-on, how-to approach of the actual building process. These case studies follow the step-by-step construction of three unique buildings, each with individual aesthetic preferences, in three completely different climates.

Building Green—A Complete How-to Guide to Alternative Building Methods by Clarke Snell and Tim Callahan chronicles the construction of a small guesthouse in North Carolina. Built as a practical demonstration, the structure features four different wall systems: Cob on the south, cordwood on the east, stick frame on the west, and strawbale on the north. Topped with a "living roof," the charming cottage is a personalized work of art.

At first glance, with its comparison of

different wall systems in the same building, *Building Green* seems like the how-to book we've all been waiting for. The layout is inviting and the hundreds of full color photographs offer clear, step-by-step visuals. The building itself incorporates many good ideas, and Snell amply explains the decision-making thought process.

Perhaps too amply. The book is over 600 pages and weighs over four pounds, which for me became a liability just holding it up to read. The weight of the information also became hard to process. Green building philosophy, structural basics and design theory precede construction, and it is page 118 before they begin preparing the site.

Snell does most of the writing, with an occasional page of pithy practical comments by Callahan, an experienced conventional contractor. Snell's writing is intelligent, but repetitious, particularly when philosophizing. The photographs are good, too, but many are repeated without good reason.

The heart of the book is the construction process shown and explained in detail. The authors' techniques when building cob, cordwood, and stick frame walls, are generally sound. And the lovely living roof is great to see demonstrated step-by-step. (Although I have read that fire ants can and do eat through EPDM roofing membranes.)

However, I felt that the straw-bale design and methods lacked a thorough understanding of the material, with potentially serious consequences.

In a mixed humid climate like North Carolina, bales are at their most vulnerable. It rains a lot, and, if bales get wet, the humidity prevents them from drying very fast. Yet Snell and Callahan placed the strawbale wall on the gable end of the building, where it must endure skimpy overhangs, and a stem wall just a few inches above grade where rain is likely to pour off a nearby hill. Additionally, located on the north, the bale wall will never benefit from the drying heat of the sun.

Rightly concerned about splashback and ground moisture, Snell decided to completely wrap the first course of bales in Tyvek house-wrap to keep out the rain.

House wrap, a permeable fabric, is designed to repel liquid water, but allow moisture vapor to move through. In practical applications, water vapor can sometimes condense inside the house wrap, where the moisture becomes trapped next to biodegradable materials.

Unfortunately, a sheet-metal termite barrier under a nearby post will inadvertently drain onto the foundation under the first course of bales. Also, during installation, the builders punctured holes in the moisture barrier that wraps the bales. In my opinion it is likely that a rainy spell in the not-to-distant future will deliver enough moisture to the bale wall that some will find its way to the inside of the house-wrap. There it will sit, with no good reason to evaporate. And after a couple weeks in above 40°F weather,

A dozen years of enthusiastic experimentation, and serious study. . .

fungus will begin to grow, and the straw bales will be in trouble.

I wouldn't imitate the rest of their straw-bale wall building technique, either, which makes extra work out of a simple wall assembly.

For a big book, it inexplicably makes no mention of how much the building cost, or how many hours were spent on it. Nor is there insight into building codes for any of these "alternative" techniques. Still, there is much value and inspiration in *Building Green*, and for only \$30 it deserves a place on your bookshelf. But before you crack it open, I recommend a thorough reading of Bruce King's book (above).

The How-To Guide to Building With Straw Bales (Post and Beam Infill) DVD by Straw Bale Innovations features the construction of a 200 sq.ft. post-and-beam-and-bale demonstration building in Jacksonville, Oregon. While the 1-1/2 hour DVD contains generally good information, and the on-screen teacher, Andrew Morrison, is appealing and knowledgeable, it was ultimately

unsatisfying, mostly due to the inexperience of the filmmakers.

Ironically the biggest drawback to the video is its lack of visuals. There are long stretches of Morrison standing, talking to the camera and describing how to do something, without any images of what he is talking about. And though the building under construction is tiny, not once does a viewer catch a glimpse of the entire structure.



The DVD does show some useful techniques—I particularly liked the bed-of-nails foundation detail and the window flashing segment. But it portrays its straw-bale building methodology as the latest and the best, without discussion of alternative approaches. Morrison employs the 2"x2" welded-wire reinforcement strategy, developed by California engineers to withstand seismic forces. But in areas without earthquakes, many of the techniques are overkill. The DVD would also benefit from a discussion of solar design, climate specifics and different plaster choices. For the price, there is much more and better information in any strawbale book, and the DVD below.

A DVD and guidebook packaged together, *Building With Awareness—The Construction of a Hybrid Home* shows a post-and-beam-and-bale house being built in dry sunny New Mexico. Combining natural and reclaimed materials with photovoltaic technology, designer and owner/builder Ted Owens crafted an artful, energy-efficient home powered by the sun. Also a filmmaker, Owens turned his two-year construction process into a five-hour instructional DVD, and a full-

color companion book that contains additional how-to photos, diagrams, and text.

This DVD and guidebook is a true boon to aspiring owner-builders, as it follows the construction process step by step from foundation to finishing details. The home features a rubble trench with a concrete grade beam supporting a wooden structure with a metal roof. The design integrates passive solar orientation, with adobe thermal mass interior walls insulated with exterior strawbale walls, plastered with natural earth and gypsum plasters and a stained concrete floor. The home also includes a rainwater catchment system with an underground storage tank and PV electric panels installed on the roof.

Throughout construction, Owens was conscious of his resource use, choosing durable, ecological materials, and minimizing the use of concrete, PVC, etc. The finished home is passively heated and cooled, and celebrates the regional thick-walled, smooth-plastered aesthetic. While following the local building codes, at several steps along the way Owens offers alternatives to the conservative New Mexico straw-bale guidelines.

Excuse me while I gush about the beautiful design of the DVD, which won three Telly awards for outstanding multimedia DVD, editing and graphics. The photography is excellent and the pacing is deliberately unhurried, as there is a lot of information to absorb. Owens states, "The purpose of the video is to give a sense of the actual process of building. I wanted to show how easy or hard each step of construction would be for a first-time builder like myself."

A year after completing the DVD, Owens self-published the Guidebook, which is printed on 100% recycled paper. In over four hundred color photos, it closely follows the video with additional construction details and addresses the pros and cons of each difficult decision along the way. The final chapter frankly discusses problems that have occurred, and choices that might have been different. This honesty, with the benefit of hindsight, gives *Building with Awareness* tremendous value. It is the best investment in time and money an aspiring

owner/builder could make.

It's nice to build your dream green home from the ground up, but often the most ecological thing to do is to remodel where you live now. It makes use of existing resources, reduces encroachment on nature and usually saves money. The new book *Natural Remodeling for the Not So Green House—Bringing your Home into Harmony with Nature*, by architects Carol Venolia and Kelly Lerner, offers a gold mine of ideas for affordably renewing your personal space. The authors point out that humans resonate with the natural rhythms of the sun as it traverses its daily and seasonal path. Light, heat, shade, a breeze...these elements of nature are part of human evolutionary heritage. The body and psyche are not made for the monotony of most indoor environments, and walling people off completely from natural surroundings diminishes their well-being. Therefore a primary measure of success in a home is how it feels—which is linked to how it creates shelter from, and connection to nature simultaneously.

The book kept me turning pages with an attractive layout enhanced by over

Natural Remodeling offers a process for increasing the vitality of your home's biosphere, with life-enhancing effects for its human residents. It begins with taking stock of your home as it is now, and where it is on the planet. A key prerequisite is an understanding of your climate and its challenges.

One of many useful charts divides North America into climate zones. Other useful lists include a pre-design questionnaire, comparison tables for selecting green materials, and a regenerative checklist for design and construction. This allows individuals to develop their own specific natural strategies for increasing energy efficiency and comfort.

Interspersed are instructive case studies from different climate zones that

illuminate the creative process by telling the people stories behind each remodel. Usually homeowners believe they need more space, then discover ways to make existing space better. A la "The Natural Step," the authors suggest plucking the "low-hanging fruit," with low-cost ideas for virtually immediate improvement, before tackling major projects. They also offer ideas on how to survive the upheaval that is a normal part of the remodeling process.

The book kept me turning pages with an attractive layout enhanced by over 400 color photos and numerous sidebars. Appendices, glossary, and extensive resource lists support this useful resource. The cumulative effect left me inspired and empowered. Even if you aren't planning to remodel, this new book encourages an awareness of how to connect your home more fully to nature's vitality. And it expands the concept of a green home to a green lifestyle that brings greater enjoyment, and an example for others to emulate.

Before building or remodeling, a period of observation and education will help avoid making a Type-One error with Zone Zero. Of course there is not one right way to build with straw bales or any other material. This is why real education includes reading and viewing from a variety of sources. It only makes sense before investing thousands of dollars in remodeling, or hundreds of thousands in building a home, to invest in trusted informational resources that will ultimately save time and money during construction. Δ

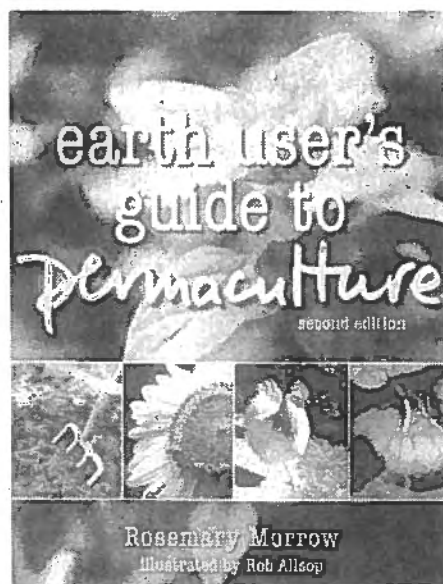
Catherine Wanek organized the building of a strawbale greenhouse in 1992, and has been an advocate ever since. She's traveled from Orange County (California) to Red Square (Russia) to document the strawbale movement. Along the way, she produced four strawbale videos, spent five years managing and editing The Last Straw, the International Journal of Strawbale and Natural Building, and co-edited The Art of Natural Building. Author and photographer of the book The New Strawbale Home, she is also a founding member of Builders Without Borders. She lives in Kingston, New Mexico.

Permaculture for Everyone

Review by Peter Bane

ROSEMARY MORROW
Earth User's Guide to Permaculture, 2nd ed.
 Illustrated by Rob Allsop
 Kangaroo Press. Pymble NSW. 2006.
 264 pp. paper. illustrated. \$29.

As the title implies, we are all users of the earth. *Earth User's Guide to Permaculture*, a much-loved doorway for many entering the permaculture movement—offered a handbook for managing our footprints when it first appeared in 1993. We are pleased that it has been brought back into print after a lapse of several years. This revised and much expanded edition establishes Ro Morrow as a primary contributor to the permaculture canon. Her strong and



distinctive voice will resonate for many non-scholarly learners and those who primarily seek direction for practical work. In this area the book excels.

The author has worked for many years in war-torn countries: Vietnam, Cambodia, Afghanistan, Albania, among the poorest and most desperate of the world's people, helping women and men, but especially women, re-establish their lives, families, and communities. Speaking from this experience, her simple words are

powerful and eloquent. Addressing home gardens, food, and nutrition, she speaks against a backdrop of hunger. Who could fail to listen?

Ro Morrow has also written a curriculum guide for Permaculture teachers, and she knows the subject matter well. This book is written for everyone, however, and its amply illustrated text is highly accessible. You can open it anywhere and find a wealth of practical information arrayed before you. Virtually every page spread is accompanied by drawings or tables, many of them written in a clear hand script. The whole book feels very friendly. Despite being easy on the first reader in permaculture, the text leaves out nothing essential. It emphasizes design from the very beginning, and one of the five main sections covers social design: money systems, bioregional organization, and communities, key subjects often neglected by plant- or building-oriented practitioners.

Accomplished designers and others knowledgeable about permaculture will find inspiration in these pages and many gems of experience to enhance their own practices. Notes on permaculture for the office, shop, or factory explore everyday but often neglected venues for making change. The section on Preparation for Disaster is more than topical, with its references to Hurricane Katrina and the Indian Ocean tsunami of 2004. It is the best short compendium I have seen in print on the subject, recognizing not only the immediate challenges of disaster, but the long-term implications and requirements for recovery. Permaculture designers with any exposure to international projects have long understood that the majority world is on the leading edge of the 21st century in many ways. As hunger, poverty, and environmental catastrophe continue to spread, they will move from the present margins of world society toward its metropolitan centers. Permaculture offers us tools to prepare for the rolling catastrophes of the coming decades.

As householders realize the imperative of taking responsibility for their shelter, food, energy, water, waste, and community relations, *Earth User's Guide* should find a wide readership. It has the simplicity and directness of a field manual

or even a cookbook, and the amplitude of experience and depth of understanding to cover the entire range of home applications from small city apartments to rural acreages.

As in the first edition, Rob Allsop's charming line drawings and charts illustrate every section, bringing horticulture, environmental design, and the home economy vividly to life.

While *Earth User's Guide* addresses an Australian audience, the range of conditions down under makes it highly relevant for North American readers. Some translation of plant species and a reorientation of solar directions may be required, but this is minor, and should in no way impede the reader ready to get to work.

Ro Morrow's practical discussions of pond management, animal forage systems

and breeds, food forestry, and the ecological house gain solidity from their presentation in a context of climate change, peak oil, and irresponsible government authority. The reasons for permaculture are more trenchant and immediate than ever before. This passport to a better world could not have come at a more appropriate time. Highly recommended. Δ

Eating at Nature's Table

Review by Peter Bane

SAMUEL THAYER

The Forager's Harvest
A guide to identifying,
harvesting, and preparing
edible wild plants
Forager's Harvest Press.
Ogema, WI. 2006.
360 pp. paper. color photos. \$23.

Samuel Thayer has set a new standard for wild food guides. This handsome, prolifically illustrated, and personably written volume is the first of a planned series. Rather than offer an encyclopedic listing of plants recycled from other volumes and superficially described, as many food and plant guides do, Thayer has selected 32 choice plants common in the wilds of North America, and of which he has years of intimate knowledge. These he describes with charming personal stories, scientific rigor, and clear color photographs.

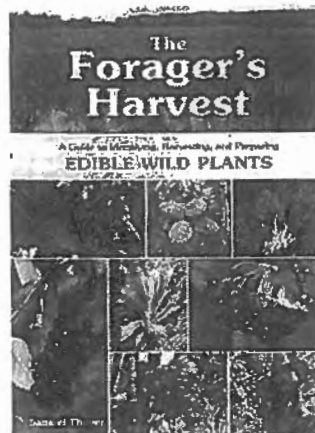
The author writes with a lifelong passion for the wild abundance of nature. He shares tales of his boyhood in suburban Milwaukee learning the (sometimes forbidden by parents) pleasures of wild foods. He likes wild foods, preferring them to many items of standard cuisine. The plants characterized in this book yield some of the planet's finest foods. They are nutritious, delicious, relatively abundant if you know where to look, and worth getting to know.

Thayer makes a practice of foraging, and he has written to encourage others to do so as well. He gathers much of his food from the wild each year. He cans, he dries, he freezes, so that he can enjoy these

treasures throughout the long winters of northern Wisconsin. And while we learn how properly to prepare the edible parts of the wild plants described, he eschews recipes, focusing instead on accurate identification and careful rendering of the edible parts. What you do with them after that is primarily a matter of taste. Sam Thayer often eats his wild foods in the wild.

Fittingly for someone with knowledge and passion, the author has opinions about his field and is not bashful about sharing them. He surveys the edible wild plant and wild foods literature and finds much of it wanting: inaccurate, unoriginal, and shallow. He admires Euell Gibbon and gives a short list of texts he regards as useful or essential reading. He stakes out the intellectual territory he intends to cover and addresses it comprehensively. In a disarmingly natural manner, he uses the feminine pronoun presumptively throughout the book, "The savvy forager will equip herself with..."

One might be a little skeptical of someone criticizing his peers, but Sam Thayer's authority shines through his writing. You know he has done exactly what he describes. He shares his mistakes and his learning processes as well as his



evident successes. You appreciate his hard-won discernment. Each chapter is filled with gems of practical knowledge: How to collect underwater tubers (you will get muddy); what simple tools will make the job much easier; how to distinguish delicious edible plants from others vaguely similar; how to crack tough shells or extract bitter seeds, and when to expect to find the foods ready for harvest. The level of detail in the writing attests to Thayer's keen observational skills and long practice of thoughtful inquiry. I imagine the author would be a fine companion in the field or in the kitchen—sanguine, helpful, witty, and dedicated. His workshops on foraging are in all likelihood delightful.

The book lays out a proper attitude and ethics of conservation for the forager. The author loves nature and has no wish to see its gifts squandered. He reviews foraging safety and the imperative of careful identification. He surveys harvest and preparation methods for different categories of foods: greens, shoots and stalks, underground vegetables, fruits and berries, seeds and grains, and nuts. A chapter discusses methods of storing wild foods, and another examines timing and the calendar of harvest. Aside from an extensive bibliography and glossary of terms, the remainder of the book consists of chapters describing ostrich fern, burdock, wild rice, sumac, lambsquarters, ramps, butternut, evening primrose, hog peanut, pin cherry, Siberian elm, parsnip, and 20 more of North America's most nourishing and delicious wild foods.

Engagingly written, modest in price, with good color photos on almost every page, well referenced, positive, and authoritative, *The Forager's Harvest* deserves a wide readership. It will stand the test of time. Highly recommended. Δ

The 2.6% Solution review by Peter Bane

RICHARD HEINBERG

The Oil Depletion Protocol:

**A plan to avert oil wars, terrorism,
and economic collapse**

New Society Publishers.

Gabriola Isl. BC. 2006.

194pp+xii. paper. illustrated. \$16.95.

If the arresting subtitle of this book doesn't draw you in, you're in denial. Despite the grim possibilities Heinberg points to here and in his earlier books, *The Party's Over* and *Powerdown*, this is a hopeful treatise. It offers a simple, comprehensible protocol by which individuals and nations can begin now to reduce their consumption of a finite and diminishing resource, petroleum.

With worldwide oil production at or near peak and set to decline beginning anytime between last year and about 2010, there is an urgent need for industrial economies to conserve fuel, reduce consumption, switch to alternatives (where practicable), and begin the complex and demanding process of social and economic redesign.

While changing our infrastructure to reverse the most egregious impacts of sprawl and diminish dependence on automobiles will not be easy, it is only by such deep-seated transformation of our land use and economies that we will be able to maintain much of the wealth, social capital, and individual freedom that we have created over the past two centuries.

Redesign of settlements and transportation will not happen fast enough to meet the requirements of shrinking oil production, but by beginning now to curtail our use of oil 2.6% (or more) per year, we can hope to stabilize (though not reduce) prices, ensure fair access to necessary supplies for all nations, and rationalize planning for the energy transition. This will be of great benefit to municipalities, corporations, and all sectors of society.

Because of the importance of liquid fuels in the transportation sector and the relatively slow turnover of the vehicle fleet, shrinking auto use is the fastest way to bring down consumption of oil.

Switching over to local and organic agriculture will help, as will continuing efforts to conserve energy use in buildings, however both of these sectors of the energy economy draw on more diverse sources of fuel: natural gas for fertilizers and domestic heating, and electricity for heating, cooling, and lighting, neither of which is yet at such a critical juncture of falling supply and rising demand.



Heinberg has analyzed costs and benefits for a number of strategies which could be adopted immediately to curb transport energy use. Among those yielding the highest benefits and costing the least are simple forms of carpooling, partial driving bans (alternate odd and even license plate restrictions, for example), reduction in speed limits, telecommuting, and compressed work weeks.

Many medium and long-term measures will also be required, such as improved vehicle fuel efficiency standards, reinvestment in long-distance and commuter rail, contraction of the airline industry, and a moratorium on new highway construction, but none of these measures, important as they will be, can adequately address the 5-10 year horizon of oil consumption, which must shrink. We must all learn and undertake to tighten our energy belts. The sooner we begin, the simpler and less painful the process will be, not only for ourselves, but for the entire world.

Heinberg addresses how the ODP may be adopted incrementally. Individuals can use the 2.6% figure as a personal guide for shrinking their energy footprints. Municipalities can endorse the protocol, and politicians can be induced to pledge its adoption when a critical number of other

nations or jurisdictions do so. In this way, it can gain momentum without incurring the opposition of business groups who may feel they will be at a competitive disadvantage under selective adoption.

The Oil Depletion Protocol is itself simple. Conceived by noted petroleum geologist Colin Campbell, and variously presented in recent forums as the Rimini Protocol or the Uppsala Protocol, it requires exporting nations to limit exports to their annual rate of depletion (total

This book is a manifesto for action

reserves divided by current annual production). It demands complete transparency in reporting both production and reserves. It requires importing nations to reduce their consumption by the world depletion rate (2.6% per year). Additional provisions exclude non-conventional oil, allow for appeals in the event of changed circumstances, accommodate future discoveries in the assessment of reserves, and provide technical specifications.

This subject, which is of utmost importance to all humans on the planet, could scarcely be drier. Fortunately, Heinberg is a good writer. The book includes a section of valuable and trenchant analysis of the current energy markets that should lay to rest any doubts about the immanence of Peak Oil. Also of great value is the book's marshaling of production and reserve data for 63 producing nations, including their year of peak or expected peak production, and the degree to which their official reserve declarations are inflated or inaccurate. But the most hopeful and engaging material Heinberg presents are examples of effective strategies already at work, and of political entities and groups already moving toward adoption of the Protocol.

For a more thorough analysis of Peak Oil itself, readers are referred to *The Party's Over*. This book is a manifesto for action. Get your city council members to read it and lobby for the adoption of the ODP. Use this and other resources to curtail your own consumption 2.6% each year. Show that it can be done. There's little time and no reason to wait. Δ

Working in the City

Review by Peter Bane

HEATHER C. FLORES

Food Not Lawns

*How to turn your yard
into a garden
and your neighborhood
into a community*

Chelsea Green. White River Jct. VT. .
2006. 334 pp. paper. illustrated. \$25.

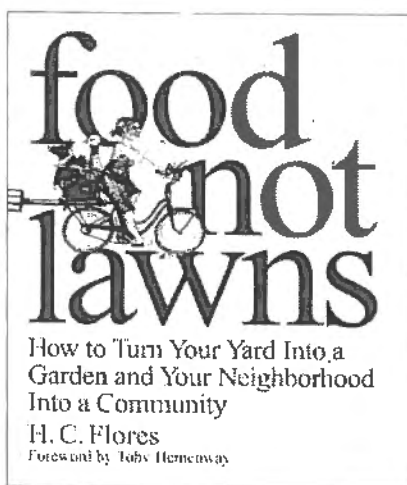
From the moment I heard the title some months back I've been eagerly anticipating the arrival of this book. Since David Watkin's *Urban Permaculture* passed out of print ten years ago, there's been a strong need for a guide to working in the city and suburbs. Heather Flores has filled that important niche, and we can expect her work to remain on center stage in the urban arena for some time to come.

Flores writes from an activist's perspective, having grubbed her way up out of difficult circumstances in Los Angeles to a (presumably) more genteel setting in green Eugene, Oregon, learning much along the way. She has not forgotten her roots or how she achieved success. The book is long on practical tips for growing food and increasing social and biological diversity in your neighborhood while spending little money. The author, though ahead of the mainstream in recognizing the fluidity and value of discarded resources in our still-rich society, is scarcely a prophet, but if she were, this might be regarded the gospel of dumpster diving. It is also much more.

On the way from a critique of toxic agribusiness and Frankenfoods to a treatise on social change, we learn a lot about the ecology of cities. The emphasis is on direct action. Collected in these chapters is a plethora of good advice on creating and restoring soils (including contaminated ones) with compost, plants, and biomass harvested from the urban wastelands. Seed-saving wisdom vies with suggestions for mobilizing the community; worm bin construction with bicycle activism. Surprising notes include guidance on "better public speaking," obviously with a nod toward the disenfranchised youth, so

many of whom Flores has met on her path. Part of a chapter on "Reaching Out," the advice for speakers is followed by notes on composing a brochure, pithy remarks on managing media, and a few rhetorical tips for the road.

Besides the obvious effort that has gone into learning the many disciplines represented in *Food Not Lawns*, Heather Flores gives good evidence of serious research and scholarship to support her strong writing. There is a long and thoughtful bibliography, list of resources, and more notes than might have been expected.



A clear sign of the author's intelligence and a strength of the book is revealed in her ability to translate important ecological concepts into the urban context. An example is alleycropping—a technique for interplanting rows of trees with arable crops—which is here brought back to the alley as Flores suggests that rows of fruit trees might replace fences between lot boundaries to bracket vegetable gardens within the lines. Shifting perspective from big-picture subjects like creativity, global justice, or life counseling to detailed technical problems like tree pruning, wastewater treatment, or making biodynamic nutrient preps gives the book a muscular, can-do feel that supports the author's primary aim of empowering her readers.

There are some raw moments in which the focus on the youth activist community seems overdone, as when, discussing ethics, Flores chastises people (she's obviously met a few) who've shoplifted

from businesses from which they were trying to solicit donations. No, it doesn't make any sense and it deserves criticism, but this is ethics for first-graders, I'm afraid, and a little embarrassing to find in print.

Flores borrows widely and freely, and you can view this either as a strength or a weakness, perhaps a bit of both. Certainly her permaculture training encourages cross-disciplinary thinking, and she puts the kind of emphasis on creativity that urban dwellers of the present and future will need in rich measure to respond to increasingly chaotic conditions. At the same time as she's borrowed from many traditions, the curt treatment of memes and ideas from so many sources left me vaguely unsettled. While I found her willingness to pull biodynamic techniques out of their mystical context daring, I suspect we may still not be getting the full story because she doesn't really know it.

Most of this "plucking" of fruits from many trees serves the reader with catholic interests, as urban activists must have or must develop, but at times Flores exhibits too much need to dispossess the source lineages, as if biodynamics came down to a few counter-spiralled homeopathic weed tonics. She makes much of a notion she calls "Ecological Design," trying—vainly in my opinion—to distinguish it from permaculture, which she has studied and which is written all over the text. This is the most challenging aspect of the book for me, and makes her opening chapter, in which she introduces permaculture prominently, disingenuous if not intellectually dishonest. Her rendering of the three ethics of permaculture dumbs down the powerful and subversive third ethic: FairShare. She calls it "Recycling Resources." Maybe this is a euphemism for Robin Hood-style guerrilla actions against the rich and established, but aside from the association with a feeble substitute for systematic change (recycling is mostly "feel-good" activity for guilty consumers), the failure to adequately characterize permaculture's core tenets does a disservice to a tradition from which Flores has derived her main thesis.

Criticizing the community of permaculture teachers who have sustained

this important movement for so many years (in the wilderness of social indifference and institutional disdain), while setting herself up as an authority wasn't in the least bit necessary to the very important work she has undertaken in

this book. It merely affronts people who might have been enthusiastic allies without adding any useful information for the reader. There are ample venues for criticism of the permaculture movement; indeed it's a recurrent theme among the

grassroots activists who take up revolutionary gardening. But this book would have been stronger without it. And as a leader, Heather Flores will need to build coalitions, not merely tilt at the windmills of power and privilege. Δ

Culture Grows from the Table

Review by Peter Bane

SANDOR ELLIX KATZ *The Revolution Will Not Be Microwaved* *Inside America's underground food movements*

Chelsea Green. White River Jct. VT. 2006. 378 pp. paper. illustrated. \$20.

"Each of us reclaims some of our power when we become small-scale producers or part of the informal sector that supports them, living the slow food ethic."

So writes Sandor Katz in a chapter called, "Slow Food for Cultural Survival," giving perhaps the essence of this biography of alternative, or might we say, REAL food. Perhaps no better description of the moving force behind permaculture has ever been written.

The power of the state rests on control of food, and the center of political struggle for many decades past and future has been and will continue to be food, farming, and diet. Thus permanent or perennial agriculture and culture, slow food, organic farming, and dozens of related movements to reclaim household and community-scale sovereignty over food, and with food the resources to sustain life.

The author's 2003 book, *Wild Fermentation*, introduced the idea of live-culture foods. Nourished and enhanced by cultivated microbes, fermented foods have formed the core of culture for 10,000 years and longer. This book provides a fitting sequel by exploring the flourishing, nourishing edge where food and cultural ferment meet.

Sandor Katz writes in an elegant and lively style, at once soft-spoken and

unflinchingly self-revelatory. This is work of reportage from the food front. Its pages are peppered with recipes, peopled with friends, and strengthened by scholarship. Wise and humane, succinct but not cynical, informed by curiosity and personal commitment, Sandy's fine prose moves easily from farm to table to slaughterhouse to the barricades of the WTO, weaving an unbroken tapestry of resistance to corporate domination and the constant convenience consumerism that supports it.



As a queer communitarian, grandson of immigrants, and a survivor of AIDS, Sandy brings the quintessential outsider's perspective to this revolution at the margins of society. His own struggles with health lead directly to his explorations of fermented foods. And he has followed this thread down the rabbit hole into the underground world of real food and the struggle for control of the body.

We visit informal bread markets, meet traditional cheesemakers turned outlaws by European Union prohibitions, probe the terrain of activists who feed the homeless, get down on the farm with conscientious herders harassed by USDA officials; each story in this world of stories by turns soul-nourishing and heart-rending. Katz

surveys local and seasonal food, seed-saving, land and labor struggles, slow food, the raw underground, food and healing, plant prohibitions, the ethics of meat and slaughter, feral foraging, and water, all in the context of politics. A map of the "Place-based Food Traditions" of North America provided special delight when I found it deep in the heart of the slow-food chapter: From Clambake to Wild Rice to Bison, Piñon Nut, and Chili Pepper Nations, the great native food tribes sprawl from sea to sea.

Seasoning his text with recipes for bone broth and souse (rendered pig's head), sprouted seeds, vegetable nut paté, and gefilte fish with horseradish sauce, Katz has given us not only a first-class political education, but a guide to cultivating our own resistance. The book affirms the core practice of slow food: it is based on pleasure, possible only with informed moderation, and everywhere and always subversive to centralized authority. If we are not to wind up with a world that looks like the film *Soylent Green*, a 70s apocalyptic dystopia in which surplus humans are recycled into wafers for the masses, then we must seize and uphold our right to slow, nourishing, delicious, pleasurable food grown from the earth we walk; grounded in our senses we will not be cowed into swallowing tasteless, toxic, violence-born Frankenfoods.

As the author reminds us in the chapter on plant prohibitions, anti-drug and anti-plant laws increasingly focus on "knowledge." Poppies are not illegal and their seed pods are commercially available for flower arrangements, but knowledge of how to prepare opium tea from the seed pods can land you in prison. The insanity of a system hell-bent on control must be named, resisted, and ultimately banished. Take your destiny into your hands—eat of this fruit: it comes from the tree of the knowledge of good and evil. Δ

EVENTS

Permaculture Design Course Argentina

Dates: February 16-28
Location: Gaia Ecovillage, Navarro, Buenos Aires, Argentina
Description: This is a 13-day certificate design course taught in Spanish only. Topics include PC principles, patterns and cycles of nature, climate, soils, cultivated ecosystems, energy, water, appropriate technologies, developing settlements, natural building, design strategies, ecovillage design, alternative economies, and more. Lecture, discussion, hands-on practice, and mentored small group design projects.
Instructors: Gustavo Ramirez & Silvia Balado, and guests.
Cost: \$600 includes materials, lodging, and meals. Application form required. 50% deposit to confirm.

Contact: Argentine Permaculture Institute - Asociación GAIA
 +54-2272-492072
 Fx+54-11-47522197
www.gaia.org.ar
gaia@gaia.org.ar

8th Intl. Permaculture Conference (IPC 8) Brazil

Dates: May 16-18
Location: Sao Paulo, Brazil
Description: "Greening our Economy with the Principles of Permaculture." Workshops, lectures, field trips, and case studies will highlight public policy changes needed to encourage sustainable economies at the local, state, and national level. Focus on local currencies, cooperatives, micro-financing, global environmental markets, ecological restoration, carbon credits, fair trade, economic democracy, certification, green accounting, and other related themes.

Instructors: Speakers will come from all over the world—from Grameen Bank to favela coops to barefoot economists, to prominent green thinkers, to US millionaires ecologically transforming their corporations, to successful credit banks.

Contact: www.ipc8.org
ipc8@lists.riseup.net

Permaculture Design Course Patagonian Andes

Dates: April 2-15
Location: Argentina
Description: This 13-day course takes place at the 110,000 acre Estancia Ranquileo.
Instructors: Darren J. Doherty
Cost: \$750-1750 (sliding scale).
Contact: www.permaculture.biz
www.patagoniacartharsis.com

Permaculture Design Course Central America

Dates: February 11-25
Location: San Pedro Columbia Village Toledo District, Belize
Description: Join us at Maya Mountain Research Farm, an established permaculture demonstration farm cultivating hundreds of species of useful plants. Learn the principles that make ecosystems self-sustaining and apply them to your designs for integrated homes and gardens, energy and water systems, thriving communities, economies, and global political movements.
Instructors: Toby Hemenway, Larry Santoyo, and local guests.
Cost: \$1200 incl. indoor lodging and home-grown organic meals. \$100 non-refundable deposit due upon registration.
Contact: Maya Mt. Research Farm
 San Pedro Columbia,
 Punta Gorda BELIZE
www.mmrfbz.org
info@mmrfbz.org

Fundamentals of Permaculture Design Central Canada

Dates: July 16-22
Location: Orangeville, ON
Description: This intensive course combines theory with practical hands-on learning. Topics include: permaculture design techniques & principles, site analysis, soil fertility, organic gardening techniques, herbs & medicinal plants, fruit & nut trees, water uses and ecological buildings.
Instructors: Gregoire Lamoureux, Richard Griffith, and guests.
Cost: CAN\$740.
Contact: Russell Scott
 Ecology Retreat Centre
 RR#1
 Orangeville, On. L9W 2Y8
 519-941-4560
 1-800-486-5460
bookings@ecologyretreatcentre.com
www.ecologyretreatcentre.com

Introduction to Permaculture and Green Building Central America

Dates: April 25-May 4
Location: Rabinal, Guatemala
Description: The Qachuu Aloom (Mother Earth) Association is a Maya-run Permaculture organization that works to preserve traditional farming and building practices in rural Guatemala. Students will learn Permaculture fundamentals through a variety of hands-on activities, with natural building—adobe, bamboo and cob, as well as garden design, water catchment, preparation of natural medicines, seed saving, alternative economics (micro-lending), and cultural history. We will learn how Permaculture principles have been applied in traditional societies and visit rural farming villages and women's groups. We will be working with the community on an improved adobe building to be used as a seed storage facility for the association's seed bank. An unforgettable experience of learning and solidarity.

Instructors: Sarah Montgomery, Alex Barrows, and local guests.
Cost: \$650 (not including airfare)
Contact: Sarah Montgomery
saritamontgomery@hotmail.com
 Alex Barrows
BarrowsAsb@aol.com

Permaculture Design Course Northern California

Dates: March 17-30
Location: Oaec, Occidental, CA
Description: Two-week certificate course in land-use design based on permaculture. Students will enjoy our 80-acre site with its 30-year history as a cutting edge learning institution. Topics to be covered include permaculture theory, food diversity, soil enrichment, water use, erosion control, natural building, organic gardening, forest farming, and more.
Instructors: Brock Dolman, Dave Henson, Adam Wolpert, Doug Gosling, Michelle Vesser, Carol Nieukirk, and others.
Cost: \$1,350 includes lodging and meals. \$1250 if registered ahead two weeks.
Contact: Occidental Arts & Ecology Center
 15290 Coleman Valley Rd.
 Occidental, CA 95465
 707-874-1557 x201
 707-874-1558 fx
oaec@oaec.org

Send Event and Calendar Listings to:
pcaeditor@earthlink.net

Permaculture Design Course San Juan Islands, WA

Dates: July 15-August 4

Location: Bullock's Permaculture Homestead, Orcas Island, WA

Description: A three-week certificate design course on the Bullock's 25 year-old permaculture homestead. Approximately 144 hours of classroom and hands-on education, including design methodologies, observation, annual and perennial foods, water/energy/waste management, appropriate building, plant propagation and culture, outdoor mushroom cultivation, herbs, and natural fiber use. Parents: Call for info on concurrent wilderness awareness course for kids!

Instructors: Douglas, Joseph, & Samuel Bullock, John Valenzuela, Toby Hemenway

Cost: \$1600. (\$100 discount by 6/1). A \$250 non-refundable deposit to register.

Contact: Dave Boehnlein
360-840-8483

permaculture.dave@gmail.com
www.permacultureportal.com
www.permaculturenow.com

Permaculture Teacher Training San Juan Islands, WA

Dates: August 12-18

Location: Bullock's Permaculture Homestead, Orcas Island, WA

Description: Being excited about Permaculture is a good place to start, but pulling off a great Permaculture course in your community takes good planning, a bit of homework, and some sharing of ideas. It's a huge concept and in this course we will focus on how to deliver Permaculture to your local communities in an organized, productive, and empowering way that will get others as excited as you are about it. We will explore three areas:

1. How people learn and how can we create experiences that people get the most from;
2. How effective planning and logistics lead to improved course outcomes;
3. Improving our own understanding of Permaculture concepts and hands-on skills.

There will be ample time for networking and sharing specifics about your intended course particulars.

Prerequisite: Permaculture Design Course Certificate or equivalent experience.

Instructors: Michael Becker, Dave Boehnlein, Douglas Bullock, and Samuel Bullock.

Cost: \$700 (\$650 if paid-in-full by June 1st). A \$250 non-refundable deposit is required for registration.

Contact: Dave Boehnlein
360-840-8483

permaculture.dave@gmail.com
www.permacultureportal.com

Village Building Convergence Pacific Northwest

Dates: May 18-27

Location: Portland, OR

Description: A ten-day participatory conference of workshops, presentations, and celebrations that includes Urban Permaculture, Natural Building in the Streets, Intersection Reclamations, Community Democracy, Leadership Trainings, Urban Communication Systems, Water Systems & Permeable Surfaces, Ecological Public Art, Sacred Spaces, and Homeless Empowerment. The intention of this event is to provide an experience of sustainable, village-scale living in the urban environment during which time participants will be able to "practice" living in a socially and ecologically sustainable human culture.

Cost: \$270 for ten days or \$30 per day. Includes lunches & dinners, all day and evening events, and homestay lodging. Worktrades available.

Contact: vbcregistration@vbc.org
www.cityrepair.org/vbc

Ecovillage & Permaculture Certificate Program Western Oregon

Dates: June 18-August 10

Location: Dexter, OR

Description: This dynamic residential program offers the full PDC curriculum plus a holistic introduction to permaculture, ecovillage design and implementation, and community living. Includes course work and hands-on activities in organic agriculture, eco-forestry, green building, renewable energy, community building, personal growth, and consensus training.

Instructors: David Holmgren, Diana Leafe Christian, Rick Valley, Tree Bressen, Mark Lakeman, Toby Hemenway, Rob Bolman, Marc Tobin, Jude Hobbs, Joshua Smith, and Marisha Auerbach.

Contact: Lost Valley Educational Ctr.
541-937-3351 x 112
events@lostvalley.org
www.lostvalley.org

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Big Green Summer—Intensive in Sustainable Community Design Iowa

Dates: May 25-August 3

Location: Fairfield, IA

Description: Big Green Summer is a 10-week program that includes:

1) A leadership training/adventure sport program, 2) A 2-week permaculture design course, 3) Several field trips and conferences, 4) Internships in for-profit businesses and non-profits involved in renewable energy, organic agriculture and local food systems, nursery and edible landscaping, water and waste systems, building with local materials, and social service, cultural, and political organizations that work in cutting edge sustainable community development. Live with your fellow students in buildings and grounds that are a laboratory for what you are learning—solar power, organic gardens, rainwater collection, community service. Work on projects in our shops, music and art studios. A large book and film library and internet access is available for study and research.

Cost: \$3,000 includes meals and lodging.

Contact: 641-469-5240

www.internproject.com
lonniegamble@yahoo.com

Permaculture Design Course Iowa

Dates: June 1-16

Location: Fairfield, Iowa

Description: Join us for a 15-day permaculture design intensive to learn about: permaculture design principles & methodologies, reading landscapes, mapping, & site analysis, indigenous cultivation, traditions, and practices, perennial polycultures and agro-forestry, energy conservation and renewable energy sources, ecosystem restoration / bioremediation, alternative economic systems & local self-reliance, plant propagation and seed saving, ecovillage design and natural building, urban permaculture strategies, whole systems theory and ecoliteracy, herbs & medicinal plants, integrated animal systems, patterns in nature and much more. Classes include lectures, hands-on projects, research, field trips, & team design projects. The site offers an opportunity to learn the theory, principles, and practice of permaculture in facilities that reflect the principles you will be learning.

Instructors: Douglas Bullock, Lonnie Gamble, Brian Robbins, Grover Stock, & guests.

Cost: \$1,500 includes meals and lodging.

Contact: see above

www.internproject.com

Permaculture Design Course Southwest US

Dates: March 30-April 13
June 29-July 13
August 3-August 17

Location: Santa Fe, NM

Description: 72-hour intensive with emphasis on systems thinking, pattern literacy, dryland strategies, food forestry, community practices, and invisible structures for people from all biomes.

Instructors: Scott Pittman,
Joel Glanzberg

Cost: \$1200 incl. indoor lodging
& meals. \$100 non-refundable deposit to register.

Contact: EcoVersity
2639 Agua Fria Street
Santa Fe, NM 87505
505-424-9797
www.ecoversity.org
info@ecoversity.org

Certificate Program in Earth-based Vocations Southwest US

Dates: March 29-June 8
August 2-October 12

Location: Santa Fe, NM

Description: The 10-week certificate program builds on a permaculture base and includes Natural Building, Sustainable Land & Garden, Alternative Energies and Land Arts and Community Activism. Classroom and field work with real-life projects and installations. Graduates learn skills for living on the land, and working with earth-based enterprises. Recommended for people seeking alternative vocational skills and practical experience to pioneer a meaningful livelihood.

Contact: EcoVersity (see above)
505-424-9797 extn. 10

12th Annual

Permaculture Design Course Southwest US

Dates: February 10-11, 17-18
Mar. 3-4, 17-18, 24-25

Location: Tucson, AZ

Description: Get your Permaculture Certificate in the Southwest drylands. These five weekends on sustainability cover everything from water harvesting to community economics to natural building.

Cost: \$650. \$595 for registration
by December 1st.

Contact: Dan Dorsey
520-624-8030
dorsey@dakotacom.net
www.sonoranpermacultureguild.org

21st Annual

Permaculture Design Course Colorado Rocky Mountains

Dates: September 17-29

Location: Basalt, CO

Description: At 7200' elevation in the Roaring Fork Valley, CRMPI's 26-year old site features maturing forest gardens, commercial greenhouses, small livestock, and a useful plants nursery. Excellent organic food, a superb site, and a stellar teaching team make this a unique experience. Learn practical permaculture from Colorado's most experienced designers.

Instructors: Peter Bane, Jerome
Osentowski, Becky Elder, and guests.

Cost: \$1100 includes meals and
camping, \$100 discount by June 1.

Contact: Central Rocky Mountain
Permaculture Institute
POB 631, Basalt, CO 81621
970-927-4158
www.crmpi.org
jerome@crmpi.org

Permaculture Design Course Through the Seasons Colorado

Dates: April 14-November 11
2nd weekend of each month

Location: Boulder, CO

Description: This eight-weekend design certificate course provides an opportunity to watch the year unfold, giving depth and perspective to design work. Designed in conjunction with the Boulder Valley Relocalization effort, this course will engage participants in a hands-on process of creating resilient local designs and taking tangible steps towards sustainable food, shelter, energy, and community. The extended length of the course will allow instructor feedback for local designs in progress and serve as a foundation for future community projects. Primarily intended for local inhabitants, this course can accommodate a limited number of visiting community organizers, activists, and stray gardeners.

Instructors: Sandy Cruz, Março Chung-Shu Lam, and guest instructors.

Cost: \$950 if registered by 3/21,
\$1080 after. Work-study scholarships available.

Contact: Sandy Cruz
303-459-3494
Marco Lam
pranafarmer@gmail.com

Ecovillage Apprenticeships Middle Tennessee

Dates: April 6-29
May 18-June 10
July 22-August 12
October 1-November 5

Location: Summertown, TN

Description: Learn organic food production, natural building, and permaculture. Field trips to nearby Amish community, local bamboo nursery, and more.

Contact: Ecovillage Training Center
The Farm, POB 90,
Summertown TN 38483-0090
931-964-4474, fx/-2200
ecovillage@thefarm.org
www.thefarm.org

After Peak Oil: Fundamentals of Permaculture Middle Tennessee

Dates: June 15-24

Location: Summertown, TN

Description: The aim of this workshop is to liberate people to provide for their own and their communities' needs from the smallest practical area of land. Learn straw, cob, bamboo, and other natural materials. Perennial gardening, shelter, water and waste management, aquaculture, forestry, and how to organize supportive local economies.

Instructors: A. Goodheart Brown, Scott Horton, Albert Bates, Valerie Seitz, Matthew English.

Cost: \$1200 includes meals,
lodging and course materials. \$1000 includes
meals and lodging.

Contact: Ecovillage Training Center
The Farm, www.thefarm.org

After Peak Oil: Ecovillage Design Practicum Middle Tennessee

Dates: July 13-22

Location: Summertown, TN

Description: The second half of the Permaculture Design Course. Site selection, master planning and pattern design for ecovillages, including consensus and conflict resolution, financial aspects, work issues, and best practices. With the Fundamentals this course completes the Permaculture Design Certificate.

Instructors: Valerie Seitz, Greg Ramsey, Diana Leafe Christian, Albert Bates, Scott Horton, and guests.

Cost: \$750 includes meals, lodging,
and course materials.

Contact: Ecovillage Training Center
The Farm, www.thefarm.org

Next Issue: #64,

Waste = Food

Deadline: March 1st.

editor@permacultureactivist.net

Permaculture Design Courses Ohio Valley

Dates: June 10-24

Location: Paoli, IN

Description: Fifth annual life-changing Permaculture certificate course taught through Indiana University (3 hrs. credit to IU students). Enjoy world-class education from the Permaculture Activist team in a unique and artful setting within Hoosier National Forest one hour from Bloomington; draft horses, swimming pond, organic farm, hot solar showers, excellent music on site. Lose your ignorance; find hope. We have graduates around the world.

Instructors: Peter Bane, Keith Johnson, Rhonda Baird & guests

Cost: \$1000 includes meals, camping, course materials, and dancing.

Contact: www.indiana.edu/~llc/permaculture.html, or for non-credit options and site info: Andy Mahler, 812-723-2430
andy@blueriver.net

www.permacultureactivist.net/DesignCourse/PermacultureSyllabus.htm

Permaculture Fundamentals Western Pennsylvania

Dates: August 6-19

Location: Sandy Lake, PA

Description: Three Sisters Farm is a 20-yr. old bioshelter/market garden farm. Students will plan and design teaching gardens and natural building projects. The course uses hands-on methods and team learning. Our site includes a 10-acre woodland homestead. We will visit local sustainability sites including the Jenkins homestead and Slippery Rock Univ.

Instructors: Darrell Frey

Cost: \$1000 includes tuition, meals, camping, & materials.

Contact: Darrell Frey
Three Sisters Farm
134 Obitz Rd
Sandy Lake, PA 16145
724-376-2797
dfrey@windstream.net

Permaculture Design Course Middle Tennessee

Dates: September 2-19

Location: Summertown, TN

Description: Sponsored by Gaia University as part of their BSc and MSc programs, this course provides the Permaculture Design Certificate.

Instructors: Andy Langford, Liora Adler, Albert Bates, and special guests.

Cost: \$1500 includes meals and lodging.

Contact: Ecovillage Training Center
The Farm, www.thefarm.org

Permaculture Fundamentals Ohio Valley

Dates: July 13-21

Location: nr. Athens, OH

Description: Appalachian Ohio is justly famous for herbal wildcrafting, pawpaw culture, organic farming, sustainable forestry, and a wealth of local economic initiatives. Join us in this trendsetting region of great natural beauty as we empower ourselves with ecological awareness and design literacy. This course, together with a Design Practicum, leads to the internationally recognized certificate.

Instructors: Peter Bane, Keith Johnson, Rhonda Baird, and guests.

Cost: \$475 includes tuition, meals, materials. Lodging options extra.

Contact: Peter Bane
Assn. for Regenerative Culture
812-335-0383
pcactivist@mindspring.com
www.permacultureactivist.net

Permaculture Design Practicum Ohio Valley

Dates: August 24-September 1

Location: Loveland, OH

Description: Second half of the certificate course taught in eight days. Wetland wastewater treatment, youth education, empowered women, progressive and earth spirituality, and an emerging ecovillage distinguish this site on 300 acres near metropolitan Cincinnati. Grailville will host the 10th Continental Bioregional Congress in 2008, and our design work will help prepare the site as well as realize the vision of Heartland Ecovillage. Accommodations at the Grailville conference center make this an exceptional opportunity.

Instructors: Peter Bane, Keith Johnson, Rhonda Baird, and guests.

Cost: \$695 includes tuition, meals, lodging, and materials.

Contact: Peter Bane, as above.

Permaculture Design Course Virginia - 5 weekends

Dates: March 2-4, 16-18, 30-April 1, April 13-15, 27-29.

Location: Charlottesville, VA

Description: Five spring weekends in historic Charlottesville, featuring eastern America's best permaculture teachers.

Instructors: Peter Bane, Dave Jacke, David O'Neill, Christine Gyovai

Cost: \$895 includes tuition, meals, materials. Lodging options extra.

Contact: Christine Gyovai
Assn. for Regenerative Culture
434-982-6464
ChristineGyovai@gmail.com
www.permacultureactivist.net

Permaculture Teacher Training New England

Dates: March 23-April 1

Location: Aryaloka Buddhist Retreat Center, Newmarket, NH

Description: Explore how to: design events that teach permaculture, applying ecological principles and processes to permaculture workshops, courses, and other experiences; create effective learning environments based on student needs, yields, and other niche characteristics. Participants will design and run classes and exercises, speak in public, plan and budget an event, and coteach a one day permaculture workshop. Limited to 25 design course graduates accepted through an application process.

Instructors: Dave Jacke, Jono Neiger, and friends.

Contact: Dave Jacke
15 Riddell St. #2
Greenfield, MA 01301
413-475-3499
davej@edibleforestgardens.com
www.edibleforestgardens.com

Permaculture Design Course Upstate New York

Dates: 5 wkds. February-June

Location: Hancock, NY

Description: This world-recognized course provides an introduction to permaculture. Students are invited to bring details of their own sites or potential sites and explore site-specific permaculture solutions in hands-on workshops. The course serves as foundation for further study.

Instructors: Geoff Lawton, Andrew Jones, Andrew Leslie Phillips, Claudia Joseph, Ethan Roland, and guests.

Cost: \$200 per week-end unit.

Contact: 917-771-9382
greenman124@yahoo.com
www.hancockpermaculture.org

Permaculture Design Course Upstate New York

Dates: November 10, 2006-
March 24, 2007

Location: Ithaca, NY

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 II, 3 Aug. '86 **2nd Int'l PC Conf.**
 II, 4 Nov. '86 **Fukuoka, Keyline, Genetic Cons'vn, City Farms, Oceanic PC**
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 III, 2 May '87 **PC Restoration of Wild Lands, Design for Sacramento Farm**
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 #24 Oct. '91 **Creativity in Design: Examples; Index Issues #1-23;**
 #25 Dec. '91 **Design for Community: CSAs, Restoring Forest; Garden Ecol.**
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 #29/30* July '93 **Networks: Special Media Rvw, Rural Reconstr'n, Leaf Conc., Comnty Food Initiatives, Pc in Palestine, Do-Nothing Educ., Feng Shui, Pc Acad.**
 #31* May '94 **Forest Gdng: Energy & Pc, Mushrm Cultvn, Robt. Hart's F.G., Spp for N. Cal., Alders, Agroforestry in Belize & China, Honeylocust, N-fixers.**
 #32 April '95 **Animals & Aquaculture: Animal Polyculture, Small-scale Cattle, Goat Dairy, Keyline, Feral Chickens, Bee Plants, Constructed Wetlands**
 #33 Dec. '95 **Cities & Their Regions: Green Cities, LA Eco-Village, MAGIC Gardens, CoHousing, Micro-Enterprise Lending, Suburban Conversion.**
 #34 June '96 **Useful Plants: Bamboo Polyculture, Medicinals, Pest Control, Root Crops, Oaks, R. Hart's For, Gdn, Russian Plants, Regl. Plants, Sources**
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 #46 July '01 **Good Work & Right Livelihood: Pc Golf Course, Downsize Cost of Living, New Forest Economy, Energy Currency, Buddhist Mktng., End Wage Slavery, What's Surplus?, Urban Community, Enterprise Facil'n.**
 I, 2 Nov. '85 **Fruit & Nut Trees**
 II, 2 May '86 **IPC-2 & Pc Courses**
 #47 June '02 **Watersheds: Water as Commodity, Basins of Relations, Beavers Watershed Development, Skywater Center, Urban Stormwater Gabions, Conservation Investments, Peat Bogs, Rabbits.**
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 #50 May '03 **Ecosystems: Holmgren on Pc Mvmt; E. Hazelip & Synrg. Agric. Chestnuts/Pigeons; Oak Savannas; Root Crop Polycults.; Alders Fungal Ecosys.; Humans & Wildn; Indoor Ecos.; Humid Tropics.**
 #51 Jan '04 **Traditional Knowledge & Regeneration: Bates on Cataclysm& Collective Memory; Shepard's Wisdom of the Genome; Waru Waru; Biosculpture; Inuit Medicine; Fermented Stimulants.**
 #52 May '04 **Aquaculture: Ecological Aquaculture; Fish for Health; Dowsing; Designing Ponds; Greywater Biotreatment; N. Amer. Polyculture; Managing for Native Species; Integrated Village Fisheries; Vietnam.**
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 #57 Aug. '05 **20th Anniversary Issue: Challenges; Remembrance; Pc in USA; Hawaii Retrospective; Pc Changes; Permaculture; Pc's Soft Edge; PINC; Gaia University; Oil Depletion; IPC-7; Retrofitting Suburbs.**
 #58 Nov. '05 **Urban Permaculture: Urban/Rural Futures; City Zones & Sectors; Growing Food; Detroit Visionaries; Rebuilding New Orleans & Everytown; Transformation of a Military Base; Workers Co-op; Energy Descent.**
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CALENDAR

February 1-18. NICARAGUA. Permaculture Design Course. Chris Shanks, ch_shanks@hotmail.com, www.silentdust.com/bonafide, www.permaculturenow.com.

February 2-10. COSTA RICA. Solar Electricity for the Developing World. Ian Woofenden, Solar Energy International. 360-293-5863. ian@solarenergy.org, www.solarenergy.org.

February 10-11, 17-18, March 3-4, 17-18, 24-25. Tucson, AZ. Permaculture Design Course. Dan Dorsey, 520-624-8030, dorsey@dakotacom.net, www.sonoranpermacultureguild.org.

February 11-25. BELIZE. Permaculture Design Course. Maya Mountain Research Farm. info@mmrfbz.org, www.mmrfbz.org.

February 16-28. ARGENTINA. Permaculture Design Course. Argentine Permaculture Institute - Asociación GAIA. +54-2272-492072. Fx+54-11-47522197. www.gaia.org.ar, gaia@gaia.org.ar.

February 23-25. Coquille, OR. Getting Off the Treadmill. Cob Cottage, PO Box 942, Coquille OR 97423. 541-396-1825. www.cobcottage.com.

February 2007-February 2008. Coquille OR. Apprenticeship in Ecological Food Production. Cob Cottage. 541-396-1825. www.cobcottage.com.

February-June (5 weekends). Hancock, NY. Permaculture Design Course. 917-771-9382. greenman124@yahoo.com, www.hancockpermaculture.org.

Mar. 2-4, 16-18, 30th-April 1st, April 13-15, 27-29. Five Weekends. nr. Charlottesville, VA. Permaculture Design Course. Association for Regenerative Culture and the Blue Ridge Permaculture Network. Christine Gyovai, 434-982-6464. christinegyovai@gmail.com, www.permacultureactivist.net, www.rockfish.org.

March-September. Santa Fe, NM. Beekeeping Certificate Program. EcoVersity. 2639 Agua Fria St. Santa Fe, NM 87505. 505-424-9797. www.ecoversity.org, info@ecoversity.org.

March 3. Summertown, TN. Shiitake Mushrooming Basics. www.thefarm.org.

March 10-19. ARGENTINA. Natural Building with Cob. Argentine Permaculture Institute - Asociación GAIA. +54-2272-492072. Fx+54-11-47522197. www.gaia.org.ar, gaia@gaia.org.ar.

March 15-21. THAILAND. "Build with Us" Earthen Building Workshops. Pun Pun organic farm. www.punpunthailand.org.

March 17-30. Occidental, CA. Permaculture Design Course. Occidental Arts and Ecology Center. 15290 Coleman Valley Rd. Occidental, CA 95465. 707-874-1557 x201. 707-874-1558. oaec@oaec.org.

March 23-April 1. Newmarket, NH. Permaculture Teacher Training. Dave Jacke, 15 Riddell St. #2, Greenfield, MA 01301. 413-475-3499. davej@edibleforestgardens.com, www.edibleforestgardens.com.

March 26-27. Bryson City, NC. Barrel Aquaponics Construction and Operation Workshop. www.aquacultureinternational.org.

March 28-30. Bryson City, NC. Aquaponics Conference. Aquaculture International, 991 Big Horse Branch, Almond, NC 28702. www.aquacultureinternational.org.

March 29-June 8. Santa Fe, NM. Certificate Program in Earth-based Vocations. EcoVersity. 505-424-9797. www.ecoversity.org, info@ecoversity.org.

March 30-April 13. Santa Fe, NM. Permaculture Design Course. EcoVersity. 505-424-9797. www.ecoversity.org, info@ecoversity.org.

April. Santa Barbara & San Luis Obispo, CA. Soil & Water for Every Farm with Keyline Design. Santa Barbara Permaculture Network. 805-962-2571. www.sbpermaculture.org, www.permaculture.biz, margie@sbpermaculture.org.

April 2-15. ARGENTINE Patagonia. Permaculture Design Course. Darren J. Doherty. www.permaculture.biz, www.patagoniacarharsis.com.

April 6-8. Summertown, TN. Introduction to Natural Building. Ecovillage Training Center. www.thefarm.org.

April 6-29. Summertown, TN. Ecovillage Apprenticeship. Ecovillage Training Center. The Farm, POB 90, Summertown TN 38483-0090. 931-964-4474, fx/-2200. ecovillage@thefarm.org, www.thefarm.org.

April 9-18. ARGENTINA. Learning and Exploring Sustainable Life Principles. Argentine Permaculture Institute - Asociación GAIA. +54-2272-492072. Fx+54-11-47522197. www.gaia.org.ar, gaia@gaia.org.ar.

April 13-15. Summertown, TN. Bamboo Cultivation and Construction. Ecovillage Training Center. www.thefarm.org.

April 14-15, May 12-13, June 9-10, July 14-15, August 11-12, September 8-9, October 13-14, November 10-11. Boulder, CO. Permaculture Design Course—Through the Seasons. Sandy Cruz, 303-459-3494 or Marco Lam, pranafarmer@gmail.com.

April 25-May 4. GUATEMALA. Intro to Permaculture and Green Building. Sarah Montgomery, saritamontgomery@hotmail.com. Alex Barrows, BarrowsAsb@aol.com.

April 27-28. Chestnut Ridge, NY. Organic Beekeeping Workshop. Pfeiffer Center. beework@pfeiffercenter.org. 845-352 5020 ext.20. www.pfeiffercenter.org.

April 27-29. Summertown, TN. Permaculture Weekend. Ecovillage Training Center. www.thefarm.org.

April 29-May 8. Coquille OR. Cob and Natural Building. Cob Cottage. 541-396-1825. www.cobcottage.com.

April 25-May 12. Anacortes, WA. Renewable Energy Workshops. Ian Woofenden, Solar Energy International. 360-293-5863. ian@solarenergy.org, www.solarenergy.org.

May 16-18. BRAZIL. International Permaculture Convergence (IPC 8). www.ipc8.org, ipc8@lists.riseup.net.

May 11-13. Dexter, OR. Native Plants and Permaculture: A Gathering of Plant Enthusiasts. Chris Roth, Lost Valley Nature Center, 81868 Lost Valley Lane, Dexter, OR 97431. 541-937-2567, ext. 116. chris@talkingleaves.org, www.lostvalley.org.

May 13-July 6. Coquille OR. Apprenticeship in Natural Building. Cob Cottage. 541-396-1825. www.cobcottage.com.

May 18-June 10. Summertown, TN. Ecovillage Apprenticeship. Ecovillage Training Center. The Farm, 931-964-4474, fx/-2200. ecovillage@thefarm.org, www.thefarm.org.

May 18-20. Summertown, TN. Introduction to Natural Building. Ecovillage Training Center. www.thefarm.org.

May 18-27. Portland, OR. Village Building Convergence. vbcregistration@vbc.org, www.cityrepair.org/vbc.

May 25-27. Summertown, TN. Biofuel Conversion and Production. Ecovillage Training Center. www.thefarm.org.

May 25-August 3. Fairfield, IA. Big Green Summer—Intensive in Sustainable Community Design. 641-469-5240. www.internproject.com, lonniegambles@yahoo.com.

June 1-16. Fairfield, IA. Permaculture Design Course. 641-469-5240. www.internproject.com, lonniegambles@yahoo.com.

June 7-9. Summertown, TN. Herb Identification, Cultivation, and Pharmacology. Ecovillage Training Center. www.thefarm.org.

June 10-24. Paoli, IN. Permaculture Design Course. Andy Mahler, 812-723-2430. andy@blueriver.net, www.indiana.edu/~ilc/permaculture.html.

June 15-24. Summertown, TN. After Peak Oil: Fundamentals of Permaculture. Ecovillage Training Center. The Farm, 931-964-4474, fx/-2200. ecovillage@thefarm.org, www.thefarm.org.

June 18-August 10. Dexter, OR. Ecovillage & Permaculture Certificate Program. Lost Valley Educational Ctr. 541-937-3351 x 112. events@lostvalley.org, www.lostvalley.org.

June 29-July 13. Santa Fe, NM. Permaculture Design Course. EcoVersity. 505-424-9797. www.ecoversity.org, info@ecoversity.org.

July 6-14. nr Athens, OH. Permaculture Fundamentals. Peter Bane, Assn. for Regenerative Culture, 812-335-0383. pcactivist@mindspring.com, www.PermacultureActivist.net.

July 13-15. Summertown, TN. Permaculture Weekend. Ecovillage Training Center. www.thefarm.org.

July 13-22. Summertown, TN. After Peak Oil: Ecovillage Design Practicum. Ecovillage Training Center. The Farm, 931-964-4474, fx/-2200. ecovillage@thefarm.org, www.thefarm.org.

July 14-22. Coquille OR. Complete Cob Construction. Cob Cottage. 541-396-1825. www.cobcottage.com.

July 15-August 4. Orcas Island, WA. Permaculture Design Course. Dave Boehnlein. 360-840-8483. permaculture.dave@gmail.com, www.permacultureportal.com, www.permaculturenow.com.

July 16-22. ONTARIO. Fundamentals of Permaculture Design. Russell Scott, Ecology Retreat Centre, RR#1, Orangeville, On. L9W 2Y8. 519-941-4560, 1-800-486-5460. bookings@ecologyretreatcentre.com, www.ecologyretreatcentre.com.

July 22-August 12. Summertown, TN. Ecovillage Apprenticeship. Ecovillage Training Center. The Farm, 931-964-4474, fx/-2200. ecovillage@thefarm.org, www.thefarm.org.

July 27-29. Summertown, TN. Introduction to Natural Building. Ecovillage Training Center. www.thefarm.org.

August 2-October 12. Santa Fe, NM. Certificate Program in Earth-based Vocations. EcoVersity. 505-424-9797. www.ecoversity.org, info@ecoversity.org.

August 3-August 17. Santa Fe, NM. Permaculture Design Course. EcoVersity. 505-424-9797. www.ecoversity.org, info@ecoversity.org.

August 4-12. Coquille, OR. Complete Cob Construction. Cob Cottage. 541-396-1825. www.cobcottage.com.

August 6-19. Sandy Lake, PA. Permaculture Design Course. Darrell Frey. 724-376-2797. dfrey@windstream.net.

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August 10-12. Summertown, TN. Biofuel Conversion and Production. Ecovillage Training Center. www.thefarm.org.

August 12-18. Orcas Island, WA. Permaculture Teacher Training. Dave Boehnlein, 360-840-8483. permaculture.dave@gmail.com, www.permacultureportal.com.

August 24-September 1. Loveland, OH. Permaculture Design Practicum. Pamela Corcoran, Assn. for Regenerative Culture, 540-344-5013, plcsignup@yahoo.com, www.ARCulture.org.

September 1-16. IRELAND. Cob Construction, Plasters, Lime, Treadmill. Cob Cottage. 541-396-1825. www.cobcottage.com.

September 2-19. Summertown, TN. Permaculture Design Course. Ecovillage Training Center. The Farm, 931-964-4474, fx/-2200. ecovillage@thefarm.org, www.thefarm.org.

September 4-14. Summertown, TN. Alternative Energy. Ecovillage Training Center. www.thefarm.org.

September 4-7. Summertown, TN. Solar Installation. Ecovillage Training Center. www.thefarm.org.

September 17-29. Basalt, CO. Permaculture Design Course. Central Rocky Mountain Permaculture Institute. POB 631, Basalt, CO 81621. 970-927-4158. www.crmipi.org, jerome@crmipi.org.

September 28-30. Flat Rock, NC. Southeast Women's Herbal Conference. Red Moon Herbs. 828-669-1310. www.redmoonherbs.com.

October 1-November 5. Summertown, TN. Ecovillage Apprenticeship. Ecovillage Training Center. The Farm, 931-964-4474, fx/-2200. ecovillage@thefarm.org, www.thefarm.org. November 3. Summertown, TN. Shiitake Mushrooming Basics. www.thefarm.org.

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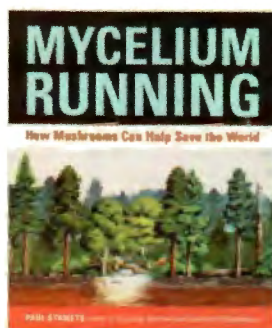
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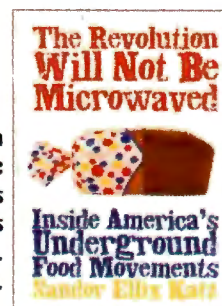
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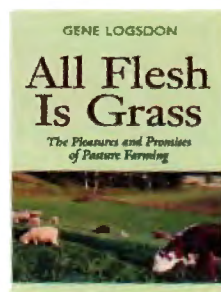
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The Epworth Camp and Retreat Center is located 90 miles north of New York City and accessible by public transportation, on a beautiful 160-acre site in its first year of development.

Contacts:

- 845-687-7646
- wilton@epworthcenter.com
- joan@epworthcenter.com
- www.green-phoenix.org

New Cuyama, California

14-27 May '07

Quail Springs Permaculture Farm

Quail Springs is a 450-acre farm at 3600 feet elevation whose community is shaping the land and our lives toward a model of sustainability and community interdependence. Our course offers an emphasis on dry land Permaculture strategies.

Contacts:

- 805-866-7239
- Kolmi Majumdar, info@quailsprings.org
- www.quailsprings.org

Portland, Oregon

28 May '07 - 9 June '07

Portland Permaculture Institute

The Portland Permaculture Institute is located on 1.6 acres within the city limits of Portland, Oregon. Our goal is to demonstrate and teach in ways that enable people to develop the understanding and skills necessary to move toward a more sustainable life on the planet.

Contact Pam Leitch:

- 503-293-8004
- pam@portlandpermaculture.com
- www.portlandpermaculture.com

Bolinas, California

11-14 & 16-30 June '07

Regenerative Design Institute

Advanced Permaculture Course June 11-14

Will include professional consultancy, earth works, permaculture aid projects, and more.

Permaculture Design Course June 16-30 with Penny Livingston Stark & Brock Dolman. Geoff Lawton guest instructor.

Courses held at on our 17-acre permaculture demonstration farm on the beautiful California coast.

Contacts:

- 415-868-9001
- info@regenerativedesign.org
- www.regenerativedesign.org



Geoff Lawton is the Director of the **Permaculture Research Institute** in Australia and a frequent co-teacher with **Bill Mollison**.

Together with his wife **Nadia**, a registered permaculture design teacher in her own right, Geoff offers courses and works on permaculture projects around the world.

The Permaculture Design Course provides an overview of sustainable living systems in a variety of landscapes and climates. Permaculture design principals work with nature to enhance quality of life, restore previously damaged ecosystems and build community.

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