

CREATING HARMONIOUS HUMAN HABITATS

COMMUNITIES

Life in Cooperative Culture

Summer 2018 • Issue #179

ECO-BUILDING

Renovation: From Blight to Beautiful

A-Frames, Breeze Homes, Adobe Cottages

High-Performance Buildings for Cohousing

Building Collectively: Greener, Easier, and Cheaper

Natural Materials in Community-Scale Construction

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You've probably heard of Network For a New Culture's (NFNC's) Summer Camps (www.nfnc.org/sc)... but we're so much more!

Fall camps • Winter camp • Spring camp • Intentional Communities • Intentional Village

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HOME | SPRING CAMP | NC COMMUNITY PRINCIPLES | MORE

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 CFNC East Coast: July 13-22, W. VA
 NFNC West: July 27-Aug 5 + 6-9, So. OR
 CFNC Fall Camp: Oct 5-9, W. VA

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Community Wisdom: What can we create together?

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Presenters include

Miranda Rudolph

Jalisa and
 re, Kal
 more!



New Culture Northwest
Cascadia Fall MiniCamp
Southern Washington
 Thursday September 28 --
 Sunday October 1, 2017

Held in the beauty of the Gorge at Windward Intentional Community, MiniCamp is a 3½ day tent camp with workshops, forum, and much fun! We work to connect deeply, build tribe, explore sustainability, support relationship freedom, create intimacy and step into our power for critical social and personal change. Registration opens August 1, info: ncnw.us

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Allegheny Crest Intentional Village
 Mount Storm West Virginia



We uniquely combine sustainability, personal growth, rural revitalization, community creates strong bonds among the members while connecting with and serving the people in the surrounding area as well. New Culture skills, experience, and insights (www.cfnc.us) provide the basis for a positive, joyful, and effective way of living.

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- Sustainability
- Entrepreneurship
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- Diversity
- Social change
- Clear communication
- Life in community
- Life outside of community
- Consent Culture
- Being "at choice"
- Personal growth
- Radical freedom
- Radical responsibility
- Effective activism
- Skill-sharing
- Power sharing
- Transparency

CONTACT US: aciv@cfnc.us 304-825-3555 <http://aciv.cfnc.us>

Visit www.new-culture.org for a list of all NFNC related organizations and events.

CREATING THE IDEAL INTENTIONAL COMMUNITY (OR REVITALIZING AN EXISTING ONE)



I, Sahmat, grew up in intentional communities and have lived in 10 of them. I have been so dedicated to Community with both humans and Nature that I've been called "The Community Guy". The communities I grew up in shared a fairly strong "sense of community". I call this deep and sustained sense of community "Common-unity" because it's a state of unity we share in common, with the unique individuality of each human and each species still honored. It's this state of Common-unity that I've found most valuable in life and to me it's the main reason for living in an intentional community. When a group is deep in Common-unity together, there's a shared sense of love, joy, and peace that tops any other group experience.

However, I've found that in all the communities I've lived in, the sense of community is not nearly as deep and sustained as it could be. It's precisely this lack of Common-unity that is the root cause of the catastrophic global suffering of racism, wars, child abuse, abuse of women, environmental and species destruction, etc. So the ultimate goal is ending global suffering through "Global Common-unity": the spreading of Common-unity throughout the world by forming a global network of Common-unity-dedicated Communities.

So I've spent my life learning how to create Common-unity-dedicated communities that share true Common-unity: a deeper and more sustained sense of community. There are two keys to starting a Common-unity community (or moving an existing community into deeper Common-unity):

1. The first key to Common-unity is for everyone to be "Common-unity-dedicated" as their top common priority. This doesn't seem to be the case in any existing community, which results in focus and energies being bled off into other priorities. So maintenance of Common-unity doesn't get enough time and energy.
2. The second key to Common-unity is to learn "Common-unity Skills"; skills that must be practiced to maintain Common-unity: Speaking from the Heart, Empathetic Listening, Emptying of Ego-attachments, Conflict Resolution, Consensus, Heart Wound Healing, Cooperative Housing, and Cooperative Economics. Modern culture does not teach us these skills.

We at the Alliance for Global Community have developed free workshops that train you in these Common-unity Skills. The workshops contain the Sharing Circle process developed by M. Scott Peck, a Nature connection exercise developed by John Seed and Joanna Macy, healing exercises developed by Byron Katie and Richard Moss, and exercises in creating Cooperative Housing and Cooperative Economics. We've tested various versions of these Common-unity Skill Building workshops over the past 25 years, and we've found them to be quite effective in teaching Common-unity skills that can help maintain Common-unity. If you'd like to start a Common-unity-dedicated community, or if you'd like to bring more Common-unity into an existing community (perhaps through a Common-unity sub-community or "pod"), you need to learn or improve these Common-unity skills as soon as possible.

To find out how to sign up for a free public Common-unity Skills workshop or schedule a free workshop for an existing group or community, please go to my website thecommunityguy.org There you can also find out how to get a free copy of the book "Skill Building for Global Common-unity".



COMMON-UNITY WITH HUMANITY AND NATURE



ON THE COVER



At Earthsong Eco-Neighbourhood, a 32-home cohousing community in Auckland, New Zealand, the main path flows between the clustered houses and gardens. This view is from the upper deck of the common house, looking out over the common green with fruit trees. Photo by Robin Allison.

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COMMUNITIES

Life in Cooperative Culture

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COMMUNITIES (ISSN 0199-9346) is published quarterly by the Fellowship for Intentional Community at 23 Dancing Rabbit Ln. Rutledge MO 63563. Postmaster: Send address changes to **COMMUNITIES**, 138 Twin Oak Rd, Louisa VA 23093. Indexed in the Alternative Press Index.

SUBSCRIPTIONS: \$25 US, \$35 outside US for four issues via periodical/surface mail. Single copies are \$8 US, \$10 outside US. All payments in US dollars. Available from **COMMUNITIES**, 138 Twin Oaks Rd, Louisa VA 23093; order@ic.org; 800-462-8240; ic.org/subscribe.

BACK ISSUES: 23 Dancing Rabbit Ln. Rutledge MO 63563; order@ic.org; 800-462-8240; ic.org/back-issues.

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FELLOWSHIP FOR INTENTIONAL COMMUNITY: 23 Dancing Rabbit Ln. Rutledge MO 63563; order@ic.org; 800-462-8240; ic.org.

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ADVERTISING: Gigi Wahba, **COMMUNITIES** Advertising Manager, Memphis, MO; 415-991-0541; ads@ic.org.

WEBSITE: ic.org/communities-magazine.

This magazine printed by Johnson Press of America, Pontiac, Illinois, USA.

Letters



Myriad Microaggressions

I was inspired by the Spring 2018 **COMMUNITIES** (#178) to attend the “Building a New World Symposium” at Koinonia Farm in Sumter County, Georgia. It was fitting to host this Christian civil rights symposium at Koinonia (whose name is Greek for “community”) as it’s famous for 75 years of multiracial farmers working for the same pay and eating beside each other, thereby living their activism in the face of a history of violent attacks by local white supremacists.

During the symposium, I witnessed a familiar obstacle to overcoming racism. Charismatic speakers spoke voluminously about their tribulations in attempting to overcome the “other”—close-minded, dangerous Americans—yet it was uncomfortable to address the microaggressions Black people were experiencing during the symposium. One Black young

person was a consistent briar in the cotton patch, calling other attendees out about gentrification during small group breakouts and calling out the interpersonal racism at the symposium when they were given the stage.

Organizers finally addressed this tension by rebranding one of the final presentations as a racism discussion forum. Without a skilled facilitator the conversation sputtered in many monologue tangents; however, the fragility of white folks’ self-confidence became clearer. Some white folks were resistant to admitting that they had made someone else feel insulted or in their ignorance had perpetuated racism. Male-identified white folks were requesting, even demanding, clarity on what offenses they had committed, but the answers were not forthcoming. Most people walked away from this meeting feeling at least confused, but many even angry, distraught, and discriminated against.

Looking back, I think this tense and unresolved discussion was the most profound learning experience at the symposium, because it showed me that racism starts at the root of interpersonal interaction, and therefore that is where the solution lies as well.

Thumbs

NextGEN North America
Cambia Community, Virginia

Clarifying History

I was just reading “Tracking the Communities Movement: 70 Years of History and the Modern FIC” in the Fall 2017 **COMMUNITIES** (#176) and noted a few minor corrections and additions needed:

1. I don’t think Arthur Morgan was one of the FIC founders, though he was certainly involved in founding both The Vale and Celo communities. My father, Al Andersen, was actually one of the founders. My father always told me that it came about this way: He and Griscom Morgan (Arthur’s son) called a conference of intentional communities in 1948, I believe at The Vale in Yellow Springs Ohio, where our family lived for a time. He never mentioned Arthur Morgan as being directly involved. At that conference, the original Fellowship OF Intentional Communities was formed.

2. The article mentions “Margaret Loomis,” who was actually Mildred Loomis, who I believe was kind of a “disciple” of Ralph Borsodi (not “Robert” Borsodi).

3. Ralph Borsodi’s original community was primarily an educational center called the School of Living, in Suffern, New York, founded in the ’30s, which happens to be where I was born in 1944, when my parents were staying there for a while, having been influenced by Borsodi’s book *Flight from the City*. They left there after I was born to go to Yellow Springs so my father could

work with Arthur Morgan in his “Community Service” organization, which was one of the early seedbeds of the intentional communities movement. The School of Living is now primarily a Community Land Trust, which at one point established itself at the Heathcote Community and has provided land for several other communities.

4. On the question of racially integrated communities: Our family lived in one of the early ones for years, a somewhat Quaker-inspired community near Philadelphia called Tanguy Homesteads. There were a few black families, and my best friend growing up there happened to be a boy from one of those families. I think to really connect with other races, you have to grow up with them in community like this. Unfortunately, since you had to buy in to a portion of the common land and build your own house, living in this community was beyond the means of most black families. I think the only way to have truly race and class integrated communities is to have no buy-in necessary, as with, for instance, Twin Oaks.

In the Spirit of Community,
Sahmat
Charlottesville, Virginia

Editor’s Note: Thanks for the corrections and additions. We have corrected the names of Ralph Borsodi and Mildred Loomis in the reprinted version of “Tracking the Communities Movement” in Volume 1 of the new Wisdom of Communities book series, Starting a Community. And in reference to the final point, former FIC executive secretary Laird Schaub, which whom we shared this letter, observes that in his experience, “intentional communities have tended to have more success at achieving racial diversity when located in urban areas, where there already exists racial diversity.” We welcome further reflections, as well as corrections to errors in our pages.

Diversity and Inclusion in Intentional Communities

The International Communal Studies Association will gather for its 13th international conference, July 18-21, 2019 at the Camphill Communities near Hudson, New York, to focus on Diversity and Inclusion in Intentional Communities. We will explore strategies that intentional communities use to promote the inclusion and empowerment of persons of diverse abilities, cultures, races, economic backgrounds, religions, ages, genders, and sexualities. We welcome the submission of proposals for scholarly papers, scholarly panels with two to four presenters, workshops, and cultural events.

We especially welcome proposals related to intentional communities and community movements that focus on the experiences of particular groups that have historically been marginalized—as, for example, the Camphill movement does for persons with intellectual disabilities. What can the field of communal studies learn from the unique experiences of such communities? We also especially welcome proposals that explore the implications of community choices that seek to increase or to limit diversity. How have communities succeeded or failed in their efforts to increase diversity or strengthen inclusion? Under what circumstances is it appropriate or necessary for an intentional community to limit certain forms of diversity? What is the relationship between the mere presence of previously excluded persons in a community, and the full inclusion and empowerment of those persons? What lessons might intentional communities share with other persons and organizations committed to diversity, inclusion, and empowerment?

Deadline for submission of proposals is November 1, 2018. For more parameters and to submit a proposal, please email conference chair Dan McKanan at dmckanan@hds.harvard.edu or find more information at the ICSA website: www.communa.org/il/icsa.

Thank you for spreading the word!

Dan McKanan
International Communal Studies Association

We welcome reader feedback on the articles in each issue, as well as letters of more general interest. Please send your comments to editor@ic.org or COMMUNITIES, 81868 Lost Valley Ln, Dexter OR 97431. Your letters may be edited or shortened. Thank you!

Twin Oaks Communities Conference



Aug 31 – Sep 2

Twin Oaks Community
Louisa, VA

Workshops * Networking
Open Space * Dance Party!
Tours of 4 Communities

communitiesconference.org
conference@twin Oaks.org

Sep 14 - 16

Sahale Retreat Center
Near Seattle, WA

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Open Space * Community!

Camping and indoor accommodations



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COMMUNITIES Editorial Policy

COMMUNITIES is a forum for exploring intentional communities, cooperative living, and ways our readers can bring a sense of community into their daily lives. Contributors include people who live or have lived in community, and anyone with insights relevant to cooperative living or shared projects.

Through fact, fiction, and opinion, we offer fresh ideas about how to live and work cooperatively, how to solve problems peacefully, and how individual lives can be enhanced by living purposefully with others. We seek contributions that profile community living and why people choose it, descriptions of what's difficult and what works well, news about existing and forming communities, or articles that illuminate community experiences—past and present—offering insights into mainstream cultural issues. We also seek articles about cooperative ventures of all sorts—in workplaces, in neighborhoods, among people sharing common interests—and about “creating community where you are.”

We do not intend to promote one kind of group over another, and take no official position on a community's economic structure, political agenda, spiritual beliefs, environmental issues, or decision-making style. As long as submitted articles are related thematically to community living and/or cooperation, we will consider them for publication. However, we do not publish articles that 1) advocate violent practices, or 2) advocate that a community interfere with its members' right to leave.

Our aim is to be as balanced in our reporting as possible, and whenever we print an article critical of a particular community, we invite that community to respond with its own perspective.

Submissions Policy

To submit an article, please first request Writers' Guidelines: COMMUNITIES, 23 Dancing Rabbit Ln, Rutledge MO 63563-9720; 800-462-8240; editor@ic.org. To obtain Photo Guidelines, email: layout@ic.org. Both are also available online at ic.org/communities-magazine.

Advertising Policy

We accept paid advertising in COMMUNITIES because our mission is to provide our readers with helpful and inspiring information—and because advertising revenues help pay the bills.

We handpick our advertisers, selecting only those whose products and services we believe will be helpful to our readers. That said, we are not in a position to verify the accuracy or fairness of statements made in advertisements—unless they are FIC ads—nor in REACH listings, and publication of ads should not be considered an FIC endorsement.

If you experience a problem with an advertisement or listing, we invite you to call this to our attention and we'll look into it. Our first priority in such instances is to make a good-faith attempt to resolve any differences by working directly with the advertiser/listener and complainant. If, as someone raising a concern, you are not willing to attempt this, we cannot promise that any action will be taken.

Please check ic.org/communities-magazine or email ads@ic.org for advertising information.

What is an “Intentional Community”?

An “intentional community” is a group of people who have chosen to live or work together in pursuit of a common ideal or vision. Most, though not all, share land or housing. Intentional communities come in all shapes and sizes, and display amazing diversity in their common values, which may be social, economic, spiritual, political, and/or ecological. Some are rural; some urban. Some live all in a single residence; some in separate households. Some raise children; some don't. Some are secular, some are spiritually based; others are both. For all their variety, though, the communities featured in our magazine hold a common commitment to living cooperatively, to solving problems nonviolently, and to sharing their experiences with others.

Building for the Future



Chris Roth

For reasons both practical and ideological, intentional community has long been a hotbed of eco-building activity. On the practical side, eco-building can be more labor-intensive than conventional building techniques, while utilizing local resources that are often more easily accessible on collectively-held land. Eco-building also serves human needs best when part of a larger community context and a landscape-scale permaculture design. On the ideological side, eco-building perfectly aligns with communal aspirations toward sustainability, lower ecological footprints, bioregional placemaking, and (though this can get tricky due to affordability challenges) social justice. Many communitarians expressly seek to “live in harmony with myself, others, and the earth”—a vision often articulated even before their first practical experiences in community, and which doesn't tend to shift significantly (although optimism about how easy it may be to achieve that goal is likely to fluctuate over time). Eco-building often serves as a key part of enriching all of those relationships (to self, community/culture/society, and nature)—of bringing them into greater balance, of making them tactile, of putting them into the realms of lived experience, both personal and shared (rather than letting them remain just theory or hope).

Our authors in this issue share their eco-building journeys, involving everything from nearly-free stick-framed shelters to high-end green developments. They examine how to assess whether an “eco-building” project is actually “eco,” hard choices they've needed to make along the way, the benefits and challenges of taking on eco-building projects in community, the advantages and drawbacks of retrofitting vs. building new, and much more. We hope you'll draw useful information, inspiration, and insight from their stories.

• • •

The magazine itself has been “building”—in this case, the accessibility of the resources we offer, rather than a physical dwelling—and this year has been a pivotal one for these efforts.

First, we held a crowdfunding campaign for our new *Wisdom of Communities* book series. Thanks in part to a grant from the Fund for Democratic Communities, as well as generous support from 69 other backers, we raised more than twice our fundraising goal for this project. In April we completed and shipped out Volume 1, *Starting a Community*, to Kickstarter supporters and to those who had ordered separately through our website. We are currently finishing up Volume 2, *Finding a Community*, to be followed by Volume 3, *Communication in Community*, and Volume 4, *Sustainability in Community*. We'll be rolling out these individual volumes officially every few months, but we anticipate that the entire set will be ready for delivery (if ordered together) by the end of June. You can find it at ic.org/wisdom. (Scroll down on that page to find individual volumes as they become available.) Once published, each 350- to 400-plus-page book (containing more than 100 articles each) will also be available in digital form. In four carefully

curated volumes, these books bring together material that was previously dispersed over dozens of back issues of the magazine, making it accessible in a format that we hope will find its way into libraries and onto bookshelves in a wide range of settings. Please help spread the word and consider ordering a set for yourself!

Our other major initiative this year has been embracing the “gift economy” with our new digital magazine editions, now available for a donation of any size (starting at \$0) from our website. We started this experiment with Spring’s “Class, Race, and Privilege” issue, and are continuing it with this one. Please encourage those you know to visit ic.org/communities and download this issue, as well as the previous one. Everyone involved with the magazine (from its community of readers, to its writers, to its advertisers) benefits from wider readership of COMMUNITIES—and we’d like to believe the world at large benefits from that too.

Finally, we’d like to welcome a new member of our Editorial Review Board: Crystal Farmer, who contributed the story “Barriers to Diversity in Community” to our Spring issue. The Editorial Review Board serves a vital function for the magazine and the FIC, providing feedback on everything from our front cover design choices to magazine article submissions that may be controversial or sensitive in nature—and on a broader scale, assuring that published materials are consistent with the FIC’s mission and policy. Crystal replaces Parke Burgess, who has stepped down after years of service on the ERB, and joins Valerie Renwick (who replaced long-time ERB member Deborah Altus nearly two years ago) and Marty Klaif (whose service to the magazine, in various capacities, goes back decades). All of these ERB members, past and present, have provided much-appreciated support, providing bigger-scale perspectives to those of us on staff who can become lost at times in the minutiae.

Speaking of staff, we also welcome Gigi Wahba, who has joined us as Advertising Manager, Thomas Veccio, who has expanded beyond his role as Directory Manager to become Social Media Manager, and Carrie Rasmussen, who became FIC’s new Development Director this year. COMMUNITIES is a community effort; without the support of the people I’ve mentioned and many others (see the masthead for just a subset of them), it would not happen, and/or would not be all that it is today.

Thank you for reading and continuing to spread the word!

Chris Roth lives at Lost Valley Education and Event Center/Meadowsong Ecovillage (Dexter, Oregon) and edits COMMUNITIES.



ECOVILLAGE PROJECT



IT'S TIME TO MAKE A CHANGE!





If we keep living the way we do today, our planet soon won't be able to sustain human life.

Our Alternative

- ◆ Create an EcoVillage based on Permaculture principles, peace, respect, and an abundance mentality.
- ◆ Work with local communities and rediscover ancient wisdom about how to live in harmony with the land.
- ◆ Use appropriate technologies and resources.
- ◆ Re-learn how to live in community and cooperation with all living things while helping to strengthen the local economy and creating opportunities through innovation.

We're Seeking PIONEERS — co-founders, and long-term volunteers to help us **DESIGN THIS PROJECT** on our

- ◆ 21 Hectares of land located between a river and a stream with no existing infrastructure, and our
- ◆ Guest House and operations center that sleeps up to 30 people, and is run as a commercial venture to help fund the project.

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O.U.R. ECOVILLAGE

Sustainable community...for a change!

O.U.R. ECOVILLAGE is a 25-acre Regenerative Living Demonstration Site and Education Centre. We base our work on Permaculture principles, wellness, and community. OUR onsite school offers: Permaculture Design Certification, Permaculture Teacher Training, Earth Activist Training, Social Permaculture, natural building, short- and long-term internships, OUR Ecovillage Explorer Program, fully-customized courses, and much more. Volunteer, skill trade, and landshare opportunities also available. Please visit our website for more details and up-to-date course listings. K-12 and University/college credit courses available.

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ADVENTURES OF THE MINI MOON

Realities of building your own earthen house with reused materials and volunteer labor

By Jenny Leis



The author elated at a successful day of light straw-clay wall building. Inch by inch the walls grow!



Live music and horse manure plaster party! People offered all kinds of skills to make the workparties special!



Kids get so excited to help build!

“So when are you going to move in?” Ummm, a year ago?
“Horse manure? You built your house out of horse manure?” Yup.
I didn’t know what I was doing. I thought that after building a wood shed and a deck, it wouldn’t be that much harder to take on an actual building—just a little 200 sq. ft. cozy home using volunteer labor and all local, natural, reused, creatively-sourced materials. Silly me! I’m writing this article now to share tidbits that I wish I knew before I started building the Mini Moon.

When I began this project, I suddenly became a general contractor for a project way beyond my abilities. The project I thought would take a summer is now two years long (and counting). Every time I meet a builder, I fall to the ground in respect: I had NO IDEA how complicated a building was. Every single inch taught me a new book of knowledge and complexity—how to space rebar in a concrete foundation (that you even need rebar!), how to estimate how much space 10 tons of small stones will fill (for the drain) and what kind of dump truck can be driven backwards down a long dirt driveway, what happens if you are a half-inch off in the length of some boards, what product will stick to windows and earthen plaster to be a flexible flashing (what flashing is!), what can be used to create a round gutter, what’s the difference between nails and screws...and on and on.

And the labor! So far, I’ve had over 300 different people put their hands into this project. That’s a lot of advertising and coordinating work parties. So while I was learning how to be a contractor and builder, I also put on my community organizer hat to recruit a nonstop flow of volunteers. Now I have 300 new or deepened friendships!

For years I’ve hung out with natural builders at my community and around Portland, Oregon (a hotspot of urban natural building) yet I’d never actually done much of the physical work. I was more of a talker, and even went on a national speaking tour about the community- and relationship-building power of natural building (many of you have heard about the Village Building Convergence). Now, I finally get it. It’s awesome. Every inch of this building is woven with relationships, conversations, learning, sharing, loving touch.

The Basics

The Mini Moon is a 200 sq. ft. light straw-clay, cob, and recycled wood building with electricity but no plumbing. It’s a satellite bedroom and mini-community center. I designed it specifically to have a dozen people in a circle for a meeting, good lighting and movable tables for art parties, the proper electrical lines to be a small music recording studio (foot-thick earth walls make the best sound quality!), and space for overnight guests and cuddle piles. I am community through

and through, and my deepest hope was that the Mini Moon became a hub for community activity. And it is working!

Context is key. I live at Tryon Life Community Farm (TLC Farm) in Portland, Oregon, a seven-acre public nonprofit community education center. About 18 of us live here within two residential collectives (The Bridgewalkers Alliance is specifically for people of color and trans folk; I am part of the other collective, Cedar Moon). On this land we host many events, workshops, and retreats. So when I called for workparties every weekend for two years, many people already had a relationship with this land and community, and for new folks TLC Farm was an attraction.

The Magic of Facebook; the Tenacity to Keep Asking

I hosted over 125 public workparties in 20 months. I rode the Facebook wave. I created a buzz and kept my public story consistent—for two years, my FB feed was a broken record. I posted a lot of photos, each time with a call to the next action: Come to the workparty on Saturday! Who has scrap plywood? Anyone know of a place to get reused windows?

It worked. Everywhere I go, people ask me about the project, comment on how hard I’ve been working, that it’s taking so long (yeah, thanks, I know), and that they really want to help. It’s created a buzz that people want to be part of.

And yes, it's hard to keep asking for help. I was embarrassed at times. But every time I asked, people showed up. And had a great time. And told me that my persistence was inspirational. So I kept asking.

I've learned that it's OK to ask because people will say yes when they choose to. I made sure to show my gratitude, explain how they made a meaningful impact on a big project, and tried to make it fun! It feels better to give than to receive, so when you find yourself asking for help, a lot, remember that you are also offering the opportunity for people to feel connected to something special.

Recipe for Successful Workparties

People who show up at workparties are cool. They are ready to work and I learned that I don't have to provide a lot of bells and whistles to make the experience meaningful. They came for a reason—to learn a skill or participate in a community activity or do something outside, not because I had great snacks or a live band (which I thought I'd have at every workparty—ha!).

People gave me a lot of great feedback about how I hosted workparties; here are some things I learned. My number one suggestion is to take time to share a warm welcome and a grateful goodbye for every person who shows up (details below). My number two suggestion is to be prepared! Know what you need to do that day and have the tools and materials at hand. No one likes to show up ready to work and then wait while you awkwardly fumble around.

Some more workparty secrets:

- **Honest advertising:**

Food. After the first couple workparties I got real about my ability to provide food so I always said to bring a lunch. I provided at least some snacks, but most people were perfectly happy to provide for themselves.



The vision!



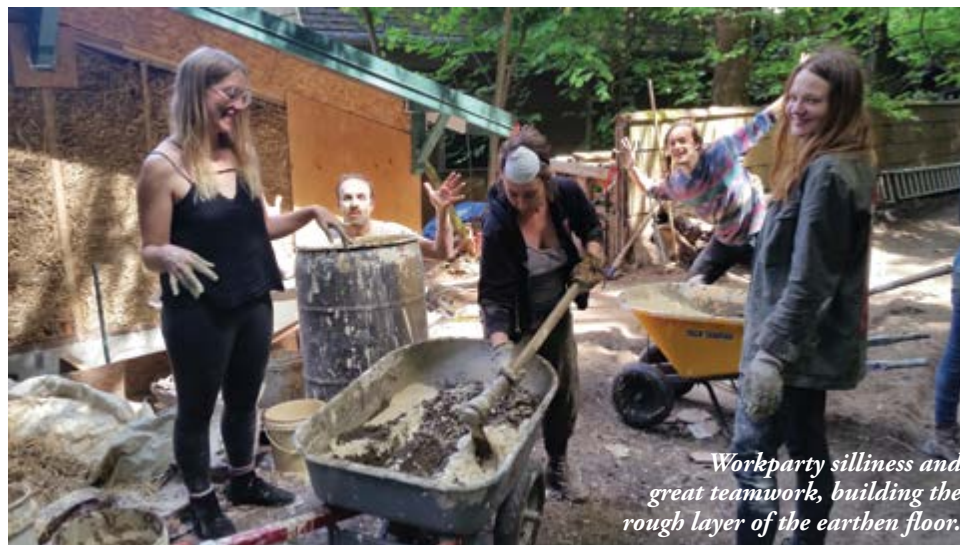
Poured foundation, June 2016.



Frame done! Late July 2016.



Light straw-clay done! Late August 2016.



Workparty silliness and great teamwork, building the rough layer of the earthen floor.



At the Village Building Convergence sub-floor workparty: gearing up to move 30,000 lbs. of small stones into the house!



Cob wall finished, roof begins. October 2017.



Finished!

Photos courtesy of Jenny Leis

Workplan/timing. Tell people exactly what they are in for, and if there will be options for folks of different ages/abilities. Have clear start and end times and stick with them.

Kid friendly? Make this explicit. Don't assume that kids will get in the way; in fact, they can be the most tenacious workers and creative visionaries, and I find that parents who bring kids to construction parties are damn cool and ready to work hard.

Dog friendly? I invited only dogs who could happily hang out on a leash.

• **A warm and connective welcome:** This is so important! Every time someone showed up, I stopped what I was doing and walked up to greet them. If someone has never been to your site before, they are likely feeling a little nervous or confused (remember they are walking into an active construction zone with tools and materials and partially built things everywhere!). I would always do the following:

Introduce myself with my gender pronoun (more on this below) and offer a warm welcome and gratitude for them showing up.

Find out what brought them here today.

Give a quick tour: big picture vision, what we're doing today, and how they can fit in.

Sparkles! At this point, they have received a lot of information, and I wanted to give them a quiet moment to take it all in and make a personal connection to the project. So, I gave them a pinch of sparkles (yes, I know, I know, microplastics...) to put anywhere they wanted in the project and I asked them to offer an intention for their work here today, or a blessing for the space, or TLC Farm, or the world: "Add your own bit of sparkle to the dirt!" Then I left them alone. I found that after people took a moment alone, they felt relaxed, happy, intrigued with my strange building site, and ready to go!

• **Meaningful work, something for everyone:** Some parts of the project lent themselves more easily to all-hands-on-deck-super-fun work, like building straw-clay or cob walls. Other days were more technical or heavy lifting. But no matter what, I always had a plan in my back pocket for someone with either less or more physical ability or knowledge. I tried to put everyone to use in appropriate ways. It felt good to have choices to offer.

• **Realistic and successful work:** Even on days where it felt like we trudged through only a small amount of work, I always made sure to celebrate what we accomplished. Everyone wants to feel their contribution was meaningful and that they helped out.

• **Community questions/conversations:** Inevitably people ask a lot of questions about the intentional community and education center. "So, how many people live here now?" is almost always the first question. I learned to anticipate the basics, share them up front in a condensed form, and politely say that I'm happy to answer more questions as we work or on a break. I also shared upcoming TLC Farm events and encouraged them to walk around and check the place out.

• **Photos:** Since Facebook advertising was so important to me, and I wanted to document the project, I took a lot of photos. It's very important to ask: Is it OK if I take your photo? And can I post it on FB?

• **A warm and connective goodbye, with gratitude:** Just as when folks arrived, when they left I always took a moment to stop, look them in the eye, and thank them for their contributions. These are very meaningful moments!

• **Sparkle in, Sparkle out!** Just as they took a quiet moment to "sparkle in" to the project, I asked people to "sparkle out" by signing my "Purple Sparkle Participation Book." In my little dirty sparkly notebook, I asked folks to sign their name and date, and whatever else they want-

ed—what they did that day, what it meant to them, etc. This helped people solidify the feeling that they were part of something special and to reflect on their own journey.

Gender

An unexpected aspect and extremely meaningful part of this project was learning how this building site became a safer space for people who identify as gender non-binary and/or trans. At least a dozen participants thanked me—and kept showing up—because they had been wanting to learn these skills and had not felt safe or comfortable at many other building sites. Building is a cis-male dominated world and not only was I a woman running this show, but I also made sure to include gender pronouns in introductions, and to do the work to teach folks who had never encountered concepts like gender non-binary. I used my gender privilege and workparty leadership to intervene and gently teach cis-people if they seemed confused, used incorrect pronouns, or asked inappropriate questions.

Again, context is key: TLC Farm is known as a gender-variant-supportive place, due to the Bridgewalkers Alliance residential collective and monthly "Tranimal Nature" events on the land. Many folks from these communities came to my workparties. As a cis-woman, I was humbled to spend many hours over dozens of workparties hearing about their gender-related experiences in the world and at other building sites. I recommend for any workparty host to learn about the importance—and nuances—of including pronouns in introductions, at least as a start for creating safer spaces.

Ponderings for Intentional Communities

I'll be honest: this project was hard on my community. Not only did I disappear from other responsibilities on the land, but I also constantly asked for help and spilled stressful



Building with cob weaves so many stories and conversations into the wall!



Kids are builders, too!



Sparkles were added at the end of each major accomplishment. Here, the rough layer of the earthen floor.

energy to my community-mates.

When my community agreed to this project, they anticipated my physical and emotional stress and asked me to incorporate rest days and a daily practice into my schedule. I didn't. I let the stress consume me and obsessively kept working. I always felt like I was racing the rainy season. Every week, I needed to plan a workparty, learn the skills needed for that weekend, advertise, prepare snacks and materials, and then do the work. I was constantly exhausted, had trouble sleeping, and broke down crying a lot. My community-mates saw that I got myself into something way over my head and gently tried to slow me down, but I didn't listen.

Many workparty folks asked why my community-mates weren't joining in. I explained that they did a lot of late-night truck unloading and random heavy-object moving for me, and that they were there when I really needed it. If you live in a land-based intentional community, you know that there are endless projects and responsibilities. I didn't want to ask more of my land-mates; I was appreciative that they kept things going while I was focused on the Mini Moon.

But an element of resentment also grew, both directions. They were frustrated at my stress and non-involvement in things like weekly cooking chores, and I got sad when people didn't help at my workparties.

By the second year, I think my community arrived at some kind of balance. The majority of the work was done by me and off-site people. We realized that I was fulfilling TLC Farm's educational mission by having consistent natural building workparties and lively activities almost every weekend. I brought a lot of new energy and attention to the land project. And hopefully in just a couple more months, I will be done and can re-involve myself in the rest of the community work. Plus, the Mini Moon is already starting to function as a mini-community center, which my land-mates are now discovering as a lovely place for meetings, quiet work, and connective conversations.

Unexpected Magic

Even though I thought this would be a summer-long project and it turned into a ton of stress and work over two years, I am so happy with the Mini Moon. At this point, I just laugh at how long this is taking. As someone said to me, every workparty adds more love to my walls—more fun and great people. Now, I am a builder and this house is truly a community space—a beautiful, hand-crafted, relationship-full, cozy home for gatherings. I am humbled and honored to steward the Mini Moon! 🌸

Jenny Leis has always lived in community, most recently for 13 years in Cedar Moon, part of Tryon Life Community Farm in Portland, Oregon (www.tryonfarm.org). She loves bringing sparkle to the dirt!



The light-straw clay insulation is completed—a major success moment!

What I Learned about Local, Natural, Reused Materials

- Reused wood: It takes five times longer than new wood to source, pull out nails, avoid broken screws when cutting, deal with warped and mismatched boards...but it is so damn satisfying! There is so much scrap wood in cities! Neighbors have little piles left over from projects, new buildings have trash piles, dumpsters are gold outside of a remodel (old growth 2x4s!), and builder-friends often have extras. Friends would keep an eye out and text when they saw a fantastic free pile of wood—that's how I got my live-edge gorgeous trim!

- Clay, sand, straw: Every location is different so I will defer to all the natural building books to tell you how to do a soil test. Useful hint: find a pottery maker with clay scraps.

- Horse manure: Easy to get for free from farms, usually lovely places to visit. Fantastic plaster material, and quite fun to work with! (It doesn't smell when it dries, and has a lovely fibrous texture.)

- Hardware: You probably want to buy your nails and screws new and you will probably end up needing a ton more than you think. Invest in the giant boxes! Costs of hardware really add up!

- Styrofoam, gooey chemicals, Tyvek, tar paper, and other yucky stuff: Sometimes you just gotta use plastic/oil products, but the good thing is that I could reuse other people's leftovers. Best creative reuse story: my neighbor had Structural Insulated Panels sitting in his backyard for 10 years. Now, my "Cozy Cob Corner" ceiling is insulated with eight inches of styrofoam—a perfect example of using something un-enviro-friendly that would otherwise rot in a forest or landfill.

- Windows: More expensive than I anticipated, even used. Hard to get the same size so why not make them all different sizes? Tip: there are a lot of interesting-shaped large windows that get thrown out, so if you plan to have a big or odd window, find it early in your design process and design the wall around it!

- Sparkles: OK, so I know that microplastics are evil, but I really love sparkles. Every inch of this building has layers of sparkles built into it. I even took small handfuls and carefully blew them onto the wet plaster, inside and out. They are magical at night when they glint in light!

—JL

My Budget

I was told that you can have two of the magic three: good, fast, or cheap. I still wanted all three. "They" were right. I ended up letting go of the "fast," since I stuck with my value of finding used materials, which took a LOT of time on Craigslist and Facebook, and driving around town.

At the end of this project, I expect it to total about \$18,000. This includes about \$7,000 for consulting support and labor (at a few key moments, we hired some friends) and about \$9,000 for materials. I also put in over \$2,000 for gas/driving, snacks, and odds and ends. I didn't count my personal expenses—endless hours, many days of missed work, health care costs for hurt body parts—and the time of my superstar volunteers.

- Labor: \$7,000 (consultant and some friend-labor)
- Foundation and drainage: \$2,000
- Frame: \$500
- Electrical: \$400
- Light straw-clay insulation: \$400
- Stove pipe: \$500
- Windows and door: \$500
- Cob wall, including foundation: \$600
- Roof, ceiling, and insulation: \$2,000
- Earthen subfloor and floor: \$1,500
- Structural plywood and earthen plaster: \$400
- Not counted: Snacks, gas-mileage, or the value of my time, volunteer time, and all of the free materials!

—JL



Lancaster Cohousing.



Panya Project.

BUILDING COLLECTIVELY Is Greener, Easier, and Cheaper

By Jenny Pickerill

Building a house is hard work. A decade ago my mum and I built an eco-house together. We loved it—the freedom of designing what spaces we wanted, the excitement of choosing only materials we wanted to use, and most of all the pure joy of moving into the finished house. I have lived in many places but up until then I had never realised that a house could actually make me happy. Sitting on a reclaimed-wooden floor warmed by the sun streaming in through a draught-free window, knowing my water was being heated, and electricity generated, for free by the sun, I felt a surge of happiness.

I also suffered from a wave of exhaustion, a realisation that there was no money left, a worry about all the jobs still to do, and a fear about whether the house would stay standing, endure a storm, and if the systems (like the rainwater harvester) would carry on working. But it was at this moment, despite the work, stress, and worry, that I fell in love with eco-building and its possibilities. I also realised how terrible most of the other houses I had lived in had been. They were cold, damp, draughty, dark, and even mouldy. Since then I have been exploring how we can build better houses that are affordable, comfortable, and ecological.

Communities are sites of innovation and experimentation in eco-home design. I first encountered eco-building at the Centre for Alternative Technology in Wales, where they were experimenting with timber-frame and strawbale construction. The buildings of eco-communities shape many communities' functions. As Jan Martin Bang argues, "we are what we live in. When we plan our buildings, we are also planning what kind of society we want to create...we make the buildings and the buildings make us."¹

Karen Liftin² calls this the "architectures of intimacy" where buildings in communities are purposefully designed to encourage social interaction. When designing and building using circles—as a house shape, as houses around a communal circular garden, as an arrangement for seating—the circle is used to avoid hierarchy and enables everyone to see each other. Building houses together is also a way to build community. Using materials such as strawbale which require little specialised training means anyone can get involved. Yet building collectively and in

community is not always easy.

Eco-communities benefit from a shared work force, shared infrastructure costs, and economies of scale, and builders benefit from mutual support and a niche space in which to innovate and take risks. However, the costs of building in eco-communities tend to be the time required to make decisions and an experimentalism that can mean ignoring established building approaches or building physics. It is easier and cheaper to build eco-homes in communities, but the results are more variable.

Building in a community requires effort to be focused into communal systems of decision-making, living together, and processes of sharing. Numerous social and economic benefits result from this, but the houses themselves can suffer. In some cases eco-communities offer important space for periods of innovative and creative experimentation that go on to influence eco-home design elsewhere. But those who seek to focus on housing can be accused of specialisation or elitism, and be marginalised.

Opportunities

Building together is cheaper than building alone. Numerous strategies can reduce the costs of construction; building smaller houses, using cheap marginal land, using reclaimed materials, or reducing labour costs through self-build. Eco-communities use all these tactics and some have managed to build incredibly inexpensive homes. For example, Tony Wrench built his roundhouse at Birthdr Mawr (Wales) for a total cost of \$4,000. However, eco-communities are also able to benefit from their size to reduce the costs of building by sharing infrastructure and devising cost-sharing schemes. LILAC (Leeds, England) developed a new home ownership model to ensure the houses remained affordable. Residents only pay a housing charge of 35 percent of their income. In effect the higher earners subsidise those on lower incomes.

Eco-communities also provide a ready pool of labour that significantly reduces costs. Labour costs in building are conventionally half of the total costs of construction. Communities also buy construction materials in bulk, further reducing costs. Clutching to the steep hillside of the Sangre de Cristo Mountains north of Taos, New Mexico, the Lama

Foundation has been building since 1968. Principally a spiritual centre, it has an eclectic mixture of eco-homes. Building here is a collective process and part of a spiritual practice for many; one resident said they “build with clay, mud, and love.”

Building is a process of sharing—sharing tools, skills, and roles—as Chelsea Lord, a volunteer explains: “Building a building has to be a collective thing... In regular construction it’s all portioned out...everybody is separate... It’s just so un-cohesive and it ends up costing the homeowner so much for all these specialised people to come in with all these really expensive specialised tools. Whereas in natural building the same crew of people all build together start to finish, and you don’t have to have a bunch of specialised tools and you don’t have to have a bunch of specialised knowledge. If there is someone directing, you don’t have to know how to use a nail gun or a [circular] saw. So it’s just much more human, and then they’re so beautiful when they’re done, they just feel good.”

Perhaps the most effective way to build more ecologically is by building smaller homes and by sharing large communal spaces and facilities. Eli Spevak (Peninsula Park Commons, Oregon) explains: “The most effective thing you can do is simply build smaller and attached housing. Most of the carbon impact of housing comes from heating it, so if you have a smaller space you do not need as much energy to heat it and if it is attached, side by side with your neighbours, then you also need less heat because the common walls share the heat across the buildings. One of the things we do is build smaller spaces and then have common spaces to provide a little extra space.”

In Panya Project (Thailand), large communal spaces include the

shared kitchen, gardens, sitting area, office space, laundry, workshops, greenhouses, guest space, and bathrooms. Panya Project is near Mae Taeng, Chiang Mai, northern Thailand. Established in 2004, the 10-acre site has become a place for experimentation and education in permaculture and natural building. Built using either sun-dried adobe bricks or wattle and cob, homes are purposely small—one house is just three metres by four and a half metres floor space, because it contains only space for sleeping and privacy. Most simply contain a bed and some storage space. All cooking, dining, and washing occur in communal spaces. This reduces both build time and material requirements.

Even in cities, eco-communities often offer small personal spaces compensated for by large communal areas. At Los Angeles Eco-Village, an eco-retrofit of an old brick apartment block in downtown L.A., residents rent private apartments with individual kitchens and bathrooms, but they share the gardens, bike storage room, bulk food storage, meeting space, and a large entrance seating area.

Despite the compact size, the physical and emotional sense of home extends far beyond the house. Peninsula Park Commons, initiated by Eli Spevak and Jim Labbe in 2003, is a cohousing development created by renovating six existing houses and building four new structures. Beyond the buildings lie the communal gardens and raised vegetable patches. Rather than stop the development at the edge of the plot, however, Peninsula Park Commons stretched out into the street and reclaimed the sidewalk with planters. Plant beds overflow and merge the communal garden with the public space. This is a very deliberate approach; in Eli Spevak’s words, “we want to slip into existing communities.” They hold

Lama Foundation.



Dance at Lama Foundation.



Open Day, Peninsula Park Commons.



Kailash Ecovillage.

Photos courtesy of Jenny Pickertill

community events like their annual community ice cream social and garden party to reach out and draw people in.

This sharing and communal spirit is a vital support mechanism for eco-building, especially when it involves risk-taking. Being surrounded by like-minded individuals and communal infrastructure provides invaluable mutual support. Kailash is an urban ecovillage situated in a 32-unit apartment building in Portland, Oregon. All the units are one-bedroom small apartments and the community is gradually eco-retrofitting the whole building. As Maitri, a cofounder of the ecovillage, argues, “you really have to be the model. You have to be what you want other people to be. So you really need to work on your own self first.”

Encouraging change requires appropriate infrastructure, as Maitri explains: “We have individual [garden] plots so that people can put themselves into that and be creative. I think it’s very important that people have that opportunity. Like the bike parking—we put those bike-parking racks and oh, we need two more already! You provide a community; people come and have a good time.”

Challenges

If communities self-build they take time and energy away from other tasks. Even using external volunteer labour has costs—the time taken to train newcomers, the costs of repairing mistakes, or the inefficiency of unskilled labour. Lama Foundation struggled to maintain their buildings because they relied on volunteers to build, and yet natural materials were used which require regular attention and patching. The community didn’t anticipate this need for maintenance. In Richard Gomes’ words, “we are financially OK, but we do not have the staff to maintain the buildings. We need a bigger staff if we are to only have lime plasters;

that is why we have started to use some regular plaster—stucco—on external walls.”(Stucco has a bigger environmental impact.)

The cost of labour—whether it is measured in time, efficiency, training requirements, or the consequences of using unskilled labour—needs to be understood. Diana Leafé Christian proposes that all eco-communities create a budget for labour needs: “if you don’t create a labor budget, you’ll be forever tempted to add new projects and ask the community to allocate labor credit for them, leaving you wondering why you have six half-done construction projects sitting around for years.”³

Eco-building therefore requires significant negotiation, time, patience, and compromise, and careful attention to decision-making structures. The more democratic and shared the approach, the longer the process takes. At Kailash Ecovillage effort went into building community, as Ole explains: “We have a weekly community night...when we moved in the residents didn’t know each other and now everybody knows almost everybody...so it’s created a tremendous sense of community out of basically zero community before.”

But they decided against the democratic approach in decision-making in order to save time and reduce conflict. According to Ole, a cofounder and owner of the land and apartments, “we’re a hierarchy—we’re basically a benevolent dictatorship here and we take the decisions and we invite a lot of community input but ultimately we are the decision-makers. I think for some people that actually is probably preferable because most people don’t want to be involved in a lot of the decisions we do—they just want things to be done and maintenance to be done and there’s no need for them to give any input in that.”

Ole and Maitri adopted this approach because when they were part of a previous attempt to establish cohousing in Portland, they felt that





the consensus decision-making approach paralysed the progress of the build. In Ole's view, "it just takes forever as there are so many voices... and they agonise over these silly things: the colour, the finishes, and stuff like that."

Lydia Doleman, a self-builder, argues that "buildings have the capacity to equalize people or segregate them."⁴ Eco-communities need to design their buildings and shared spaces to accommodate diversity. While communities have developed new forms of interpersonal relationships, often rejecting the notion of a nuclear family, other forms of diversity have been paid less attention, especially race, disability, and class. Camphill communities seek to provide places for disabled people to live and work, and new cohousing communities are being designed for seniors, but in most eco-communities little provision is made for differently abled bodies.

Finally, Jonathan Dawson argues it is time for eco-communities to start to accept the need for professional support: "as planning regulations have tightened, it has become more difficult for groups to create substantial new settlements without professional assistance."⁵ Eco-communities are generally quite poor at collaborating with professionals. While many examples of outstanding, high quality eco-building exist in eco-communities, in many other examples little reference was made to existing building knowledge, resulting in simple mistakes. Communities can fall prey to anti-professionalism, a rejection of the importance of experts, specialists, or building professionals such as architects and engineers.

The journey of Twin Oaks (Louisa, Virginia) exemplifies the tension between unskilled building and a professional approach. The community had the input of professional architects and builders who had given up their jobs and settled there. Over time some of these builders began to get frustrated with the need to work with volunteers and constantly teach others, and eventually a key builder departed. At Dancing Rabbit (Rutledge, Missouri), Alex Whitcroft, a trained architect, sought to overcome this tension by being a "brave specialist," someone who lived on site and worked with residents: "what is needed is not specialists but...brave specialists who can listen, ask the right questions, and design with communities while integrating their expertise."⁶ This compromise approach is perhaps the most productive way forwards in terms of ensuring quality eco-buildings.

Ten things to consider when eco-building in community

1. Sharing space, objects, equipment, and skills reduces costs and environmental waste, but robust systems of sharing with clear agreements are needed.
2. Living in compact spaces works if there is communal space available to share, particularly access to green spaces.
3. There is a need to balance participation in eco-building and collective decision-making with the need to complete projects and take risks.
4. Without explicit effort to encourage diverse types of residents and self-builders, eco-building will likely remain the preserve of the white middle classes.
5. Although learning by doing is useful, the need to learn from the past, from experts and professionals, and to seek out existing knowledge is too often ignored, wasting time, effort, and resources.
6. That many eco-communities relied upon volunteers to build (and maintain) their houses has unintended costs. Sometimes this results in inefficient building practices, incomplete projects, failure to consider and plan for maintenance, and poor quality buildings.
7. Residents and self-builders rely upon mutual support in building their eco-homes, not just in sharing physical labour but also emotional support.
8. Eco-building does not necessarily require destroying existing structures. Such structures can be renovated and often there is still space in which to add new additional eco-homes.
9. Eco-communities' focus on social issues, on commitment, building community, and collective governance, has sometimes led to neglect of the need to learn and understand the physics of how buildings work.
10. Building by anticipating future change in occupiers, and thinking through how to, for example, maintain affordability, are essential to the success of eco-homes. 🌱

Jenny Pickerill is a Professor of Environmental Geography at the University of Sheffield, England. She has worked with many eco-communities worldwide and recently published a book, Eco-Homes: People, Place and Politics (Zed Books). Information about her work and contact details are at www.jennypickerill.info.

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Harmonious Homemade Habitat

By *Laura Harris*

I had been dreaming of building a strawbale house for many years, despite having no experience with building. I was very idealistic, and using natural construction satisfied my goal to use nontoxic materials. I had lived in several urban intentional communities, but was ready to find a rural IC where I could build and farm. I had lived in Washington state for over a decade when I discovered Tolstoy Farm, and I was fortunate to be accepted by this decentralized community in eastern Washington. The climatic extremes of the Columbia basin are perfectly suited for strawbale buildings.

In 1997 I moved to Tolstoy Farm, which was formed in 1963 by hippies, back-to-the-landers, draft dodgers, and social visionaries. They had begun building structures out of whatever they could find. Builders who had started out as amateurs went on to work in the industry and became experts in their field. By the time I arrived some of the older homes were being remodeled and modernized; others had crumbled into ruins.

Between the knowledge of the people in the Tolstoy community, their willingness to teach and share tools, and the archive of success and failure that the existing buildings provide, I found a vast resource from which aspiring builders can learn. On the 180 acres owned by the community, much of which has been preserved as natural forest, there are raw materials that would not normally be available. There also exists a tradition of neighbors coming together and helping each other out when extra hands are needed. I discovered that this network of natural materials, experienced builders, and people willing to help out and share tools makes intentional community an excellent place for eco-design and natural building. The bylaws of Tolstoy Farm require residents to have as little environmental impact as possible, including that all homes be off the grid. This suited my ideals perfectly.

I wanted to design my house in order to utilize the natural forces to my benefit, while protecting my structure from destructive elements. I picked a spot near enough to a creek that I could hear the water flowing, but far enough away to avoid flooding and the inevitable migration of the creek bed. I observed the wind, the slope of the terrain, geology, drainage, availability of water, access, solar exposure (especially in the winter), privacy, rain and snow fall, fire safety, food and water storage, aging, proximity to other homes and tall trees that could fall on the house. I imagined my house in ruins, being able to compost back into the earth.

Observing these elements informed my eco-building design. I had hoped to use only natural construction materials such as straw, soil, clay, lime, rock, wood, metal, and water. But as I planned the structure, I had to also take into consideration how much money I had to build with and live on, which limited my time. I had



Laura pounding in corner brace. Experimental thatch structure can be seen in background.

D. Dolph

Concrete foundation with posts in place.



L. Harris

Completed log frame with roof before stacking bales.



L. Harris

Plastering workparty, southeast corner.



L. Harris

also to consider the wear on my body of doing such intense physical work, and the carbon footprint involved in moving materials around. So I ended up choosing to use concrete rather than fitted rock for my foundation, tar paper as a moisture barrier in the roof, man-made metal roofing, and a worn-out set of tires packed with rock to support internal posts.

Since recycled and repurposed materials are commonly used in eco-buildings, I felt good about reusing my old tires. Other Tolstoy residents have replaced fiberglass with insulation made from recycled jeans, reused old barn beams rather than buying lumber, and packed an unfinished house frame with light clay (straw wetted with clay slip and packed into forms). One house was made entirely of rocks and mortar, and several underground cellars and ice houses have lovely living roofs. A log cabin stands as a reminder of the beauty of wood in the round. Another resident used fibercrete (concrete mixed with shredded newspaper) to super insulate his walls and make beautiful stairs. I used cardboard, dogwood branches, and papier mâché for my ceiling rather than sheetrock. Repurposing and recycling can save money, energy, and reduce the need for resource extraction.

People who want to learn natural building and eco-design are drawn to intentional communities and become willing helpers in a fun and nontoxic work-play endeavor. Women and children become active participants, gaining skill and expertise not encouraged in conventional construction. Those with artistic inclinations will find fulfillment in the malleability of earthly materials. Natural and eco-building can be less expensive, yet more labor intensive, than conventional construction.

During my research and the two years I spent building my strawbale house, I learned some of the things that can go wrong:

- A wall coated with natural plaster needs a significant roof overhang, and the two-and-a-half-foot overhang I made is not quite enough. In the winter snow slides off the roof and heaps up against the plaster, degrading it.

- I tried using dry stone work for the floor and stairs of an attached porch, but it was very unstable. Later I used concrete mortar to stabilize the rock work.

- During a winter of very deep snow I had thick ice buildup on my metal roof. Once it started to melt, the whole sheet slid down and smashed my stovepipe. My partner then designed and welded a V-shaped ice splitter that we mounted above the stovepipe to prevent this.

- While it is soothing to have a river or creek flowing close enough to hear it, I have seen several

homes swamped during floods. I took care to place my house more than 100 feet away from the creek.

- My experimental papier mâché ceiling has held up pretty well on the inside, but not so well outside under the eaves. Moisture decayed the paper, allowing wasps, bats, and flying squirrels to move in. Last winter I removed the damaged areas and lined the eaves with hardware cloth and tar paper, which I secured to the top of the walls with a decorative arrange-

By utilizing the extra labor offered by community members, I created a super-insulated unique home with raw materials for under \$5000.

ment of apple and pear cuttings.

- My adobe floor is soft and beautiful, but areas with heavy wear develop potholes and cracks. Chair legs bore holes as well. I have tried many different recipes for patching, and have found oat water mixed in with my usual mix of fine fiber, sifted sand, dirt, and clay to work wonders. Using a hole saw, I cut disks out of plywood, screwed them to the bottom of the chair legs, and glued a layer of homemade felt to the bottom. This solved the chair problem.

- I used scavenged one-and-a-half-inch pipe for my drain, and buried it under the adobe

floor. I ignored the advice of a seasoned builder who said this was a mistake. The drain pipe got plugged up as predicted. I recently rerouted a new drain through the wall which feeds through proper drain pipes and into a buried hugelkultur greywater system.

• I visited a cob/strawbale hybrid cottage in Oregon where the builder had used curved saplings for window headers, creating an arch. The weight of the strawbales and cob stacked on top of this was too heavy and broke the window. Learning from this I made two-inch by 16-inch wood headers using a chainsaw mill and allowed two to three inches between the window and the header to accommodate settling of the walls. I filled this gap with long cigars of straw wrapped with string, and plastered over it. In some places I have successfully stacked 10 vertical feet of bale wall on top of these window headers without compromising the window.

Even when things go wrong and the natural builder has to undo and redo, this is a nontoxic job. Most materials can be reused, and there is little to no trash. Natural plaster and cob can be rewetted, remixed, and put back into action. While professional builders often use a modified cement mixer to blend plaster, I used the simpler method, mixing plaster on a tarp on the ground and squishing it with bare feet. This mix is safe for the skin; the clay in the mix can actually draw venom out of pesky bug bites. Once your feet are rinsed off from mixing cob or plaster, they feel super clean! This divergence from the caustic contents of concrete enables participation by young and old alike without protective gear.

Which of the many natural and eco-building options are best really depends on the climate and the locally available materials. Strawbale building has shown promise in climates with extremes of heat and cold, and where grains are grown. Light clay has been used to infill conventionally framed structures, replacing fiberglass. When plastered, the walls look similar to bale walls, but lack the extra insulating value. Old tires are filled with rammed earth in the earthship homes popular in the Southwest. Cob and adobe bricks are appropriate wherever there is enough soil; rock building, where there is an abundance of rock; log building, where there is an abundance of logs. Underground structures like cellars, ice houses, basements, and hillside hobbit holes are incredible temperature regulators but must be placed well away from flood waters and need good ventilation to prevent mold.

Retrofitting and remodeling with eco-materials is a good option for those wanting to replace toxic elements while saving the framework of a beloved home. When to retrofit or rebuild is a decision made after careful inspection of the structure. Is the design workable or inadequate for the conditions? Is the the frame rotten or infested with termites? If so you may regret the time spent trying to revive the dead.

As long as the frame and roof are sound and not infested with rodents or insects, it is likely rebuildable. If the foundation and location are still suitable, an eco-remodel is the best response to limits that a community may place on new construction. It may not save time nor headaches, as rebuilding involves tearing down and hauling off trash, then figuring out how to make what

you want out of what is left. Retrofitting with strawbales requires extending the roof out and/or reducing the inside floor space, changing the window and door frames, and assuring the foundation is adequate.

I found natural building to be a fine way to live my ideals. By collecting downed trees I framed a house without the killing of live trees. By milling boards with a chainsaw mill I did not support the timber industry. By using local strawbales, dirt, sand, clay, and cardboard I avoided using sheetrock and fiberglass.

Two years after I started, I moved into an unfinished yet livable shell. By utilizing the extra labor offered by community members, I created a super-insulated unique home with raw materials for under \$5000. It took several more years to finish the walls and floor. Now, in 2018, it has been 20 years since I started, and I also have a rock porch, a cob root cellar, a log-framed outbuilding, a greenhouse framed with curved saplings, and a cob bread oven. The most recent improvements include a well, a hugelkultur greywater drain, and upgraded solar power.

I hope my story inspires others to use natural building and eco-materials to construct durable, nontoxic, low-impact, energy-efficient, and creative structures. With determination, hard work, and the support of an intentional community, you too might be able to create the home of your dreams. 🐦

Laura Harris is a 20-year member of the Tolstoy Farm community, where she enjoys communal living, organic farming, and fiber arts.

L. Harris



Laura's strawbale house in 2018.



Creating the cardboard ceiling, insulated with loose straw.

L. Harris



BUILDING IN AN ECOVILLAGE: LESSONS LEARNED

By Tony “Papa Bear” Barrett

When the founders of Dancing Rabbit Ecovillage were searching for our land, they had a short list of criteria to keep in mind. The freedom to explore alternative construction was on that list, so you could say that alternative construction is written into our DNA. It was certainly a large factor in my decision to join the community (located just outside Rutledge, Missouri) in 2006.

I first visited Dancing Rabbit in fall 2005, after abandoning a MFA program studying furniture making. The next spring, I came back as a work-exchanger/intern working on the Ironweed co-op kitchen, my first chance to really get my hands dirty. Before my work-exchange was over, I was designing and collecting materials for my first building project, a 400+ sq. ft. light clay-straw insulated cabin, named Larkspur. I have had the great fortune to earn my living doing what I love working in my community ever since.

Having studied furniture making, I was no stranger to design, tools, and joinery, but I had never designed or built anything bigger than a table before. What I now know about architecture, construction techniques, natural building, and building science has come from personal experience, research, lots of reading, asking others, and a healthy dose of making it up as I go along. Even after designing and building many structures over the course of 12 years, I often feel my knowledge is woefully lacking. Please keep this in mind when selecting the grain of salt

with which to take these words.

Here are some of the lessons I have learned along the way:

Yes, you can build your own house. So long as you are reasonably handy and highly motivated, there is no reason you can not pull this off. Time, money, and skill are all you need, and to be honest, you could get away with any two of those three. Even a small building project is made up of hundreds of small, discrete tasks, but most of those a trained monkey could perform. A much more important part of the construction process than experience swinging a hammer is knowing how it all needs to come together, and in what order.

You don't have to do it alone. There is certainly something to be said about going out into the wilderness and carving out a shelter with nothing but your wits and bare hands, but there is nothing particularly heroic about solo building as a practice. In fact, it can be faster, safer, and more fun to work with other people—particularly when it comes to labor-intensive natural building techniques. If the people you enlist to help have more experience, all the better.

You don't have to do it all. Don't be afraid to bring in the experts. Don't know much about plumbing? Hire that part out. Really hate working with concrete? Ditto. This will (ideally) provide you with quality work, and save you from having to become your own expert in every trade.

Keep it simple. A building project of any size is complicated. Don't make it any more complicated than you have to, unless you really want to stretch your limits. In which case, why are you even reading this article?

Start small. If you are new to building, don't make your first project a 1000+ sq. ft. house. Maybe start with a chicken coop, a garden shed, or a garage. You will gain real-world experience understanding the building process with significantly lower stakes.

Gain experience any way you can. Volunteer for work parties, participate in workshops. Better yet, work on someone else's project first. You can earn money, gain experience, benefit from their experience, and ultimately not have to live with the inevitable mistakes you make.

You are going to make mistakes. There is no way around this. Your best bet is to learn from them, and not repeat them. Also, be open and honest about your failures—you may save someone else from a similar fate. May all your mistakes be small.

Prepare yourself. Building your own home will be an enormous undertaking. It will require more time, money, and materials than you think it will. I am still regularly shocked by how quickly even a small house will go through lumber.

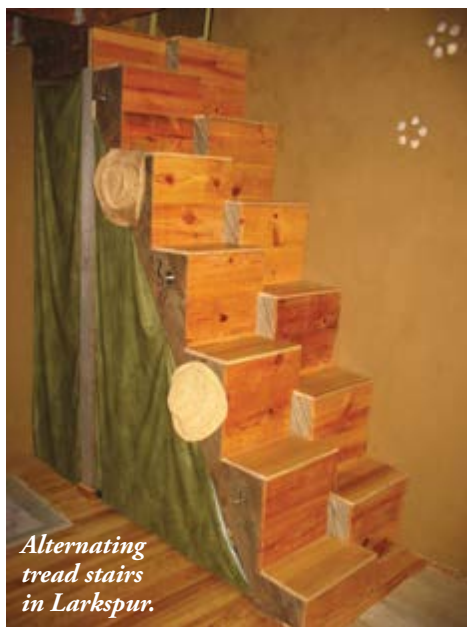
Give careful consideration to your site. Understand the ways

wind, water, sun, and shade move throughout the year on your property. Think about how your building will relate to both existing and future structures. Understand the local architectural vernacular—those design techniques have proven themselves a good match for your region. Familiarize yourself with Permaculture design, passive solar design, and consider incorporating them into your project.

Use more insulation. Code-minimum levels of insulation are simply not enough. Remember, a code-minimum construction project is the lowest quality project that can be legally built. Insulation is a great area to go above and beyond the minimums. Your building will perform better, and your energy requirements will be lower.

Reclaim materials. It is possible to save money while introducing character to your project by using reclaimed materials, whether that is lumber, flooring, lighting or plumbing fixtures. You can buy those materials from salvage companies, or salvage them yourself from dumpsters, demolition sites, or standing buildings. In my rural area, I have deconstructed many houses and outbuildings to salvage materials. Not only was I able to acquire materials at zero cost beyond my labor, but I also learned a wealth of information about how buildings are put together. As a bonus, reusing old materials in your project often adds instant charm and a sense of history.

Many ways to build. There are as many ways to build buildings as



Alternating tread stairs in Larkspur.



The Bear Cave.



Building the porch on Larkspur.



Lobelia.

Photos courtesy of Tony "Bear" Barrett



there are people building them. No two of the 100+-year-old buildings I have deconstructed were built the same way. I like to think that there is no one right way to build...unfortunately there are plenty of wrong ways.

Educate yourself. If you understand basic building science, and implement best practices in each aspect of your project, there is no reason your house won't be standing tall in 100+ years.

Know the code. Even if building permits and inspections are not necessary where you live, it is a good idea to know what the requirements are for such things as structural elements, electrical systems, plumbing, etc. You may choose to meet those requirements, or not, but you should be familiar.

Don't experiment for experimentation's sake. Find out what works well in your area, and why. Talk to and learn from area builders. Then you can sit down to design a building you know will succeed. Sure, you could try to insulate your walls with plastic bottles stuffed with chicken feathers, but maybe your neighbors have had a lot of luck insulating with local strawbales. You may want to repeat their successes rather than take a chance on your experiment.

Use the Critical Path. The Critical Path is the order in which a building project comes together. What are my next steps and what do I need in order to complete them? This will help prevent you from leaving something out, or doing things out of sequence. The longer and more detailed your Critical Path the better.

Water is the enemy. Apart from cataclysmic natural disasters, most buildings eventually crumble thanks to the presence of water. Water freezing under your foundation, or being blown into your wall or roof assemblies, can make short work of your building. If you want your house to last a long time, protect it from water with a good foundation, a good roof, and careful attention to flashing and drainage details.

Buy the best quality windows you can afford. Windows and doors are very high-ticket items and it is tempting to try to save money with lower quality, or reclaimed units. My choice to install reclaimed windows in our current strawbale-insulated home may have saved us thousands of dollars during construction, but it was the single biggest mistake I made in terms of efficiency and performance. Window and

door technologies are advancing so quickly that it is now possible to buy windows with insulative values as high as R-10, roughly equal to that of a 2x4 wall with fiberglass batts.

Plan for the future. Remember that your life will be changing, and your building may want to change with it. Furthermore, you want this building to outlast you. It is important to think beyond your needs right now. Think about how your home will serve you as you and your family grow, and age. Due to design restrictions, the lofted sleeping area in my first cabin was accessed by an alternating-tread staircase. That worked great for me until my son was born—but then it seemed a bit too dangerous. The second house I designed for us is a single story with doorways wide enough to accommodate a wheelchair. Take the long view.

Know what is important to you. The more you know what you like and don't like, the more likely you are to love your new home. For instance, if you prefer to sleep in, maybe you don't want your bedroom on the East. If you are allergic, those strawbales may not be such a good idea after all. If you love cooking, go for a bigger kitchen. If you want to do a lot of food preservation, be sure to include a pantry. Even a small office area could make working from home a reality. If you have a fondness for wood heat, by all means include a wood stove. If you hate processing and handling firewood, maybe don't. A custom cabinet could display your extensive collection of wadgets while also providing the perfect personal touch that says home.

Look for inspiration everywhere. I am constantly expanding my design vocabulary just by keeping my eyes open as I go about my day. I try to examine the buildings I interact with closely. How does this floor-plan flow? What are the proportions of that window? That trim? How high is this ceiling? With the help of my ever-present sketchbook and tape measure, I can usually take note of the things that appeal to me, file them away in my brain, and pull them out the next time I am looking for a design solution. 🐾

Tony (Bear) Barrett, owner of Papa Bear's Tiny Homes, has been designing and building at Dancing Rabbit Ecovillage in northeast Missouri since 2006. When Bear is not building, he is often seen trying to keep up with his partner, Alyssa, and their son, Zane, around the village. Their strawbale home Lobelia can be seen featured in Small Homes, by LLoyd Kahn.

IONIA'S BARN PROJECT: Where Community and Natural Building Meet

By Eliza Eller



It is a winter solstice dawn on the Kenai Peninsula in Alaska, and I stand almost 40 feet above the ground in our barn cupola, peering over the treetops at the first rays of the winter sun. I can see my breath in the frigid air, but the bright sun rays come streaming towards me like a river. This cupola is such an amazing space, I am frozen in time, dancing with the coming light, feeling like I am the first person in the world to see this day. The barn is magical, and this space will make a liberating special meeting area/meditation nook/reading loft when the barn is done. It's been a long nine years of building for our village, and we are more than ready for the barn to be finished. In fact, it's become a running joke: "When are we going to _____?" "When the barn is done!"

Ionia is a cooperative ecovillage located on 200 acres of spruce forest on the Kenai Peninsula in Alaska, created in 1986 by five disenfranchised families with members who experienced emotional traumas navigating modern times. The founding families met each other in the movement known as macrobiotics, and we had that love of simple plant-based foods in common. Coming from the large Boston-based macrobiotic community (our grandparent) we also all had a sense of human beings being part of natural forces, part of an infinite universe just like other natural phenomena; we were and are attracted to non-human-centric points of view. This is part of the foundational ethos of Ionia.

All of the original families received SSI disability benefits which barely paid the bills in the city. In our humble beginnings, we bought 10 acres of flat muskeg-covered land on the Kenai Peninsula, built a road, dug a well, and put up five tipis. For \$500 down and \$300 per month, we had a beginning. As one of the founding mamas, I felt happy and safe in our own little paradise in the making. It was a cold, snowy winter that year but we were cozy in those tipis: the kids ran around in the spruce forest and we cooked on wood stoves which we kept cranking 24 hours a day. We began to talk with each other daily in morning meetings, pool resources, and attempt to create a culture of trust, imagination, tolerance, and cooperation: we felt that "Shared sorrow is half sorrow and shared joy is double joy," a wise Swedish proverb.

Ionia has evolved over the past 30-plus years to become a bustling little village. Our kids have grown and gone off to explore who they are in the world, and many have returned to raise their own children as part of our endeavor, so now third-generation babies and toddlers are running around laughing and screaming. We have had 16 babies born in the last four years. Ionia

is primarily a community of families, and our year-round population hovers between 40 and 50, of all ages and abilities, from newborns to elders. Many people join us in the summers to learn, help out, and sometimes to heal.

Spending time at Ionia is definitely a commitment of attention, reflection, and change. We are trying to create a way of life which embodies more social and environmental justice than modern times' usual alternatives. We mill spruce logs to build homes and furniture, and grow and cut firewood. Organic gardens, greenhouses, and a grain field help to feed us throughout the year. We share resources and pool strengths, providing an umbrella for all. We partner with local social service organizations, the State of Alaska Division of Behavioral Health, and the college to provide wellness and recovery training for people on the Central Kenai Peninsula who experience addiction, trauma, and emotional imbalance. Our activities usually always encompass macrobiotics, or whole foods for whole health, peer support and close family support, and simple, seasonal activities based in the natural world. Building with natural materials is a great fit for this community: we hope to live lightly on this pristine Alaskan land...plus natural buildings often need many hands.

In the first 10 years, the residents joined together to build 10 beautiful log cabins: first, five 1,400 square foot family homes, then five smaller cabins of various sizes as our kids grew up and more families moved in. In the beginning, we built the traditional Alaskan way with logs, and heated with wood stoves. We created our own design process, which is easy in rural Alaska where building permits are not an issue. All our cabins have open floor plans, on-demand propane hot water, and outhouses.

The long summers of daylight are our building season. Log building relies heavily on people with strong arms to lift logs. In our community, the women and children peeled logs every day for weeks and weeks all summer long. The guys mostly lifted purlins and wall logs into place, and everyone hammered the roof boards on. My young children learned to cook whole meals in that first summer, by necessity, as we built and built. When we moved into my family home, my kids dumped sand in the middle of the living room floor without a second thought because they were so used to living outside!

The cabins have housed numerous people over the years, and they continue to be a strong comforting presence, demonstrating the amazing beauty of nature, the financial and creative power of community, and a balanced mix of

individual expression with community norms and neighborhood planning. However we needed more housing.

As the pressure to have a true common space finally boiled over, in 2001-2003 we gathered our strong young men and women, and all our experienced builders together to design and build a 12,000 square foot log community center, which was named the Longhouse. The Longhouse has a large and comfortable meeting room where we can gather in circle meetings, an administrative office with computer access, a music corner with many instruments, a sewing corner, plenty of space for private corners and storage, and a community-size kitchen, pantry, and root cellar. Ionia is known for its delicious, wholesome cooking; fermented foods such as miso, sauerkraut, kimchee, vinegars, and tempeh, plus sourdough breads, sugar-free desserts, and jams, are all made from scratch in the community kitchen.

The Longhouse is also where our morning meetings are held; it has a home-schooling circle for its youngest residents; we celebrate monthly full moon celebrations and holidays there; we let the youngsters run around together; and it is home to many, many conversations, therapies, planning meetings, sewing and art projects, classes, music jams, and other happenings in village life. It is also a way for the larger surrounding community to interface with Ionia, and has been the beginning of a more open era for us. For example, we began to have public cooking classes—and I learned to teach.

The Longhouse has huge log trusses which sweep across grand high peaked ceilings, wood floors, log post and beams, and log walls, as well as majestic soapstone masonry heaters which save us firewood and give us steady hours of cozy gentle warmth. The masonry heaters are of Northern European tradition, designed by Albe Bardon of Maine Wood Heat Company especially for this space, and built by a team of masons from all over the country. It was a sight to behold as they were built, and gave me so much respect for the all but lost art of masonry work. When they first agreed to build these massive stone heaters, they had some requests: a home to stay in on the property, and a build site that was roofed over, dry, and warm. Well, as they were arriving, we were rushing to hammer on the roof boards—literally as they set up to build, the roof was closing up. It was September and getting chilly, so it was dicey but we did it and the masons were quite gracious. They bunked all together in a log cabin, ate macrobiotic meals, and had never experienced such rustic and peaceful surroundings, full of wild children and wild eagles.



Photos courtesy of Eliza Eller

The Longhouse was another log building; there were miles of logs to peel and place, and every course of logs gave us new excitement and a feeling of accomplishment. We knew this method of building, yet as we have seen over the years, logs are lovely but not great insulators. The six inches of log is a poor keeper of heat, not to mention the many cracks between the logs. So when it came time to plan the next big project—the “Barn” as we have come to call it—we were perplexed as to what materials would be best suited.

The barn was conceived to be a series of shops: woodshop and wood beamery, mechanics shop, metalworking shop, pottery/clay shop, bicycle/cart shop, and a dojo/yoga studio. It has space for processing the harvest, drying beans, squash, seeds, grains, and sea vegetables, plus space for the spring starts. It has a hay loft (which hopefully some couples have rolled in!). Ionia, being a plant-based community, has very few animal residents, excepting a

matter how “green” (energy efficient) they may be. But then, one of our young men spent a winter volunteering in Mexico, where he helped to build with straw and mud. He called, super excited, and said that this was it—this is how we must build the barn.

Whoops, we might have a change of plan! We had to stop and think, frustrate the architect, spend more money we didn’t have on his time, have mad planning meetings in the middle of the barn construction site, and finally—after much debate—decide that yes, this really did sound like a fitting alternative more in line with our values and more exciting to explore. This was a very backwards process and not recommended, but there you have community life, with all its complications and unknowns.

Luckily, homemade natural buildings are more suited for this kind of redesign-and-rebuild-as-you-go kind of organic process! The barn has been a learning curve from the beginning. Luckily, our architect is a patient, creative, flexible man with vision. He was able to dance with Ionia’s group process and found a way to communicate our changing plans successfully with the fire marshal and permitting entities. This was a huge boon to us.

We researched, found some strawbale and straw/clay homes in Alaska, and traveled to talk with the builder-owners. It seemed to us that in our wet cold climate, strawbale has the best insulation value hands down, but it had other drawbacks: rodents enjoyed building their nests in straw in the long cold winters; and any rain or snow that found its way in created big mold issues. In our buildings, which are heated with firewood, and must withstand months of rain and snow, we started to look more seriously at the light straw-clay alternative.

Straw and clay creates a wall which is fireproof, thick and insulative, and hygroscopic—which means it can breathe, and wants to let in and let out moisture as it breathes. This means that no moisture barrier is wanted! This was a whole new concept, and quite welcome. It also means it needs a good hat (low overhanging roof) and good boots (dry and high foundation which keeps the walls off of the ground). The walls can be load-bearing or not, but it makes a gorgeous combination with load-bearing timber frames. There are many traditional and recently improved versions of building with straw and clay, from cob to adobe, but in our cold and wet climate, the method which makes the most

Everyone, no matter age or ability, can get involved and get trained up in most of the tasks. It’s been a great way to enjoy our collected energy.

few ducks, cats, and dogs so far, so it need not be a space for animals to stay. The barn has big dreams for becoming a folk school for learning traditional crafts, a house-building production line, and a model for alternative building methods and alternative energy technologies. It is yet another huge community-size building—3,000 square feet, with two stories plus a cupola. Ah yes, a cupola to better view solstice sunrise from...

But what to build it with? Our first idea was a basic post and beam skeleton, wrapped in Structural Insulated Panels (SIPs), billed to be super energy efficient and cost efficient. OK, so that was the plan...we hired an architect this time, to satisfy some of our grant funders, and created a modern design pleasing to all. It has a north overhanging roof for outside vehicle parking, huge southern roof for future solar panels, plenty of windows, and another open floor plan.

In 2008 construction commenced, with unique steel foundation posts, thick wood flooring, the first posts and beams. But wait, somewhere along the way, we had a series of discussions and decided we might need to switch to logs; maybe we couldn’t live with the “ka ka” (made from oil) building materials no

sense is known as light straw-clay.

Our local Kenai Peninsula clay is perfectly suitable; dry baled Delta Junction straw is readily available. In the summer of that same year, our main building crew drove to Salt Spring Island in Canada for a three-week intensive natural building workshop called Econest. This exciting workshop connected us to the big wide world of the natural building movement and covered the basics of clay/straw and timber frame construction, combining lectures with practice. Returning as an inspired force, the building commenced in earnest.

We found a local natural builder to apprentice with, Lasse Holmes of Canyon Arts Natural Building in nearby Homer, who has helped us create a building system and style which supports all of us working together. Lasse has been an invaluable resource. With his help, we built from scratch a mechanized system for the production of straw/clay insulation and clay plasters. We found parts in junk yards and neighbor’s back yards and fish packing plants to put together an efficient user-friendly production line which includes storage tanks and settling tanks, clay slip mixers, and a straw/clay mixer/tumbler. The Ionia sawmill is an integral part of this production line as well, and most of the posts, beams, and boards in the barn structure have come off our own mill. This has taken more time than expected but is enormously satisfying. In fact, all aspects of this way of building seem to take a long time, we are finding out.

Each summer’s work has been accomplished by setting up a “train” of crews: each crew’s daily tasks allow the next part of the train to move, and each crew’s work depends on the last. The crews consist of saw millers, carpenters, clay processors, clay slip makers, straw fluffers, straw/clay insulation mixers, form builders, straw/clay stuffers, and plasterers. And this is Ionia, where we are all about the food, so don’t forget the snack makers! Everyone, no matter age or ability, can get involved and get trained up in most of the tasks. It’s been a great way to enjoy our collected energy, all summer long for many summers.

The barn now has been home to many natural building workshops, including rocket mass heater, timber framed bridge, and clay plasters. The staircase up to the cupola is the crown jewel, sweeping up in a square spiral of local wood. It was built as the last creation of one of our founding fathers, who died last spring. The barn is his legacy, along with countless other builders.

Master craftsmen have created doors that will last several lifetimes, and the clay walls breathe with you as you work, creating a nourishing fresh environment.

Within this process of building, we have confirmed and reconfirmed that simple hands-on collected natural activities are foundational to our way of life. Building the barn provides a tangible, accessible pathway for many residents to be involved in a community process; to learn new skills; to be drawn in by the teamwork approach and by the natural materials themselves.

The barn has connected Ionia to the larger natural building movement in Alaska, the lower 48, and all over the world. It has been an epic nine-year journey and has changed the pace and tone of our community quite a bit: it has brought in curious builders and volunteers from Taiwan, Japan, Europe, South America, other communes, and all over Alaska every year. A handful of our residents have been inspired to travel to other builds, and are planning homes here made from straw and clay. I feel we will always be building now—first to finish the barn, then to build homes here at Ionia, then onwards to homes around us in Alaska.

This summer is hoping to be the last major building season, with the final colorful lime and clay finish plasters. We welcome volunteers to come to Alaska to help with this amazing project. It is our vision that the barn can be a place to create, but also to retreat, to contemplate, and to reconnect with what is important to you. I have heard people give the barn credit for healing their traumas, and it's been a great meeting site for romances as well. I have become a budding natural builder, and much of my family has been involved with this building in ways that will forever im-

print their lives. What will we do next? I guess we'll find out, "When the barn is done!" 🌸

Eliza Eller lives on the Kenai Peninsula in Alaska at the village of Ionia (www.ionia.org). She spends her days growing food in the summers and carrying firewood in the winters, soaking in the arctic sun, organizing events and trainings, cooking, keeping in touch with her growing family, and scrambling to keep up with the ever moving generations of change at Ionia. She hangs out around guys who love building with clay and straw, and it is catching, so on a warm summer day, if she isn't weeding in one of the many greenhouses, one might find her, covered with clay, madly mixing a barrel of slip. For more information about volunteer opportunities this summer on the Ionia Barn Project, write eliza@ionia.org or call her at (907) 252-2314.



Cherry blossoms in front of the house. Having orchards and gardens on the south side of the house helps keep the solar clearing open, and makes good use of the space.



By Alexis Zeigler

Humans modify our environment more than any other animals. We want to, we have to, protect ourselves from the elements. Is it possible for us to do so while respecting the sacred creation? The answer to that question cannot be summarized in a simple list of commandments, but the complexity of the answers only underscores the importance of our mindfulness.

I have lived in community all of my life. I have built conventional buildings, super-insulated buildings, and a variety of renewable energy systems. I have also organized some successful environmental campaigns. Green building could be our salvation or hasten our destruction, depending on what we pursue and how.

When I teach green building workshops, I talk to the participants about three levels of planning to consider, each of more importance by an order of magnitude than the one below. The most important level is context—what are you building, where, who’s using it, and for what purpose? The single family house on a mountaintop may have some appeal, but if you are driving an hour to work, another hour to pick up the kids and go shopping, and coming home to shovel firewood into the stove, you cannot add any “environmental” technology onto that situation to make it sustainable. Poor context means isolated. Good context means building the right thing in the right place. Though Americans have a near obsession with their own independence, by far the most important environmental “technology” ever developed is cooperative use—in a word, community. Community is THE technology that

makes renewable energy viable.

The second order of magnitude is conservation and insulation. It is always cheaper to save energy with good insulation and conservationist design than to generate energy. Make no mistake, current incentives to put up grid-tie solar and other “renewable” energy sources on American homes instead of focusing on insulation and smart context have everything to do with politics and nothing to do with environmental protection.

Renewable energy sources are the third level of design consideration. Renewable energy when added onto conventional American buildings is a feeble supplement to fossil energy sources. Once one has considered appropriate context and developed wise conservationist design, then renewable energy becomes a powerful, liberating energy source that can allow us to live sustainably, and support communities that empower our democracy from the ground up.

Want to build green? Here’s your checklist (and there is a resource section at the end with links to material sources):

1) Don’t do it alone, or with just your spouse. Find a group to work with or live with. The more you can share, the lower your footprint will be. If you live in a tropical climate, the tiny houses are fine. If you live in a climate that gets cold, then free-standing housing will always have a devastating footprint compared to shared spaces.

2) What works great in one place would be foolish in another. A subterranean house that works great in New Mexico would be a hor-

rible mold pit in Virginia (absent significant mechanical ventilation). A strawbale house would work great in the Dakotas, and it would be silly in Florida. Environmental solutions are always local.

3) Spend your money on good roofing (enameled metal), good windows, insulation, and sub-grade insulation. The rest you can do as cheap as you want.

4) Don't get anything less than decent quality double-pane windows. Never, never, never rebuild and install old single-pane windows. A decent quality double-pane window will have the same thermal performance as a multi-thousand-dollar triple-pane if you put thermal curtains in front of the double-pane window. Beware there are numerous different kinds of "low-e" coatings, many of which are designed to keep heat out, not let it in (to minimize air conditioning bills rather than maximize winter solar gain). Do not buy cheap used windows.

5) Passive solar is a "no-brainer." There are lots of good design guides around. Don't sweat the details too much, just put a good amount of glass on the south side.

6) Don't think that adding a bit more insulation than most people use is a good level of insulation. I have made super-insulated walls with straw, crumpled newspaper, leaves, and bamboo. Super-insulated walls need to be 18 inches or so thick. Blowing lots of insulation in the attic is easy enough. If you live where it rains, you need to keep the moisture out of your thick walls. The "breathability" issue is bogus unless you are building a commercial greenhouse or bathhouse. You DO need good overhangs,

and some control over rainwater falling off the roof. While there are numerous variations of cob that work fine, beware that insulation and thermal mass are two different things. Walls of dirt and rock that conduct heat out of the building will burn a lot of energy in a cold climate.

7) Ask 10 different carpenters how to build a dog house and you get 10 different dog houses, nine of which keep the dog dry. There are lots of well-intentioned green builders without a lot of conventional building experience, and lots of conventional builders who get really nervous about changing anything. There is more than one right answer to any important question. Ask lots.

8) Avoid dead air spaces, especially in any climate with damp summers. Everything must cross ventilate.

9) Unless you are building a teepee, flat, straight building lines are cheaper, faster, and will yield a much tighter insulation shell. A flat ceiling is better. Clearstories and skylights are always heat leaks. Put your creativity into making an effective shell look and function better. The American norm is to sacrifice function to making buildings look like micro-mansions. Funk that leaks like heck is no better. Avoid hiring an architect. They draw pictures. Your kid can do that. An experienced carpenter is far more useful.

10) Plan your utilities as an integral part of the design, not something that simply has to conform around the edges of a pretty design. I always put the utility room in the middle of the bath and kitchen so pipe runs are short.



Cherry blossoms.



Sub-grade insulation: often overlooked, but very important. See resources list for cheap foam source.



Strawbale and stucco are perfect for workparties—helping build community, keeping costs down, and resulting in super-insulated buildings.



Passive solar windows in strawbale walls make for deep window wells and great alcoves for plants and kids!

Photos courtesy of Alexis Zeigler

11) Do not not not even think about adding solar features until you have worked out the questions of context and insulation. I have seen some really expensive and ineffective solar heating and power systems added to badly insulated buildings. The results are not inspirational. Solar photovoltaic power is your last priority. Really.

12) Do not buy cheap or used appliances unless you have the ability to assess their energy use.

That's the nuts and bolts, and an opinion or two. We brought this all together at Living Energy Farm (Louisa, Virginia), and went a bit further. We built a community that is intended to run (and almost does) without fossil fuel. More critically, we designed it to be cheap so people all over the world can do what we do. We have found that people almost always confuse self-sufficiency and sustainability. At LEF, our definition of sustainability is focused on what seven billion people can do, not what we with privilege can do. Our focus on keeping things simple and widely accessible is unique, so far as we can tell.

Our design is intended to maximize the use of unskilled labor. Specifically, we use strawbales stacked inside a conventional (and cheap) stud frame design. In researching and working with strawbales, we realized that the rebar pins and cabling needed to build a load-bearing strawbale is more expensive than the 2x4s needed for a cheap stud wall, and that stud wall is also much cheaper than post and beam. Strawbales are simply leaned up against a wall by unskilled labor. Then stuccoed, again with unskilled labor. A good stuccoer can radically accelerate your unskilled stucco workers. Inexperienced people can move really, really slowly if not taught properly. Some strawbalers stick religiously to lime plaster on the outside. We use a bit of cement in the plaster and thus end up with a wall that can last for centuries without maintenance.

Building LEF has sharpened my focus on what works in green building. We run our entire economy on about 200 watts per person. But we did that AFTER we insulated well, AFTER we built a very integrated community with a high degree of shared use. The DC microgrid system we have built works really well, and is very different from anything else we have found. Our system is much cheaper than other power supply systems. It is also made of much more durable components. It is modular, so you can build it one piece at a time. It also has a multi-linear energy flow, so there is no such thing as a system-wide power outage.

There is a darker side to all of this as well. The hyper-productive American economy relies on consumerism, people buying gobs of junk they don't need. The pinnacle of consumerism is the American home, a micro-model of European royal mansions. That's one reason "green building" can be such a popular topic. At its worst, green building becomes greenwash for the greatest orgy of consumption in America. But we all have to have shelter. So where is the line between green and greenwash? The line is community.



Reusing old tiles to make a rainbow mosaic in the shower.

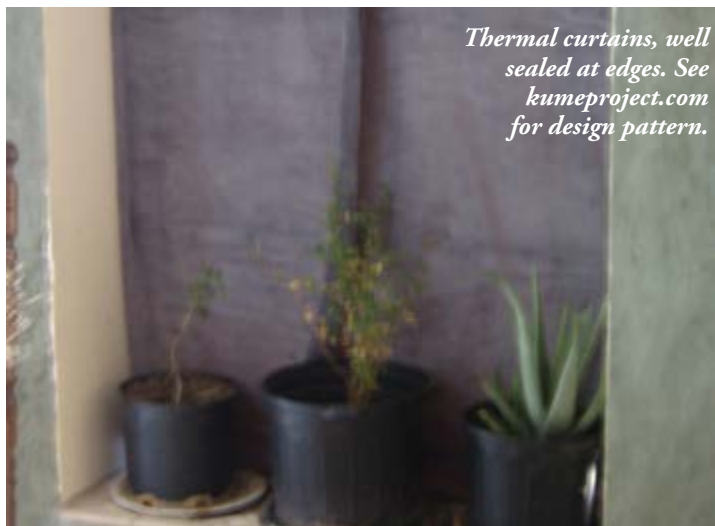
Community is the "technology" that makes renewable energy work.

When solar photovoltaic is added to ordinary American homes, the ecological footprint probably increases because the energy demand is so high. In communities like LEF, we are using somewhere around two percent as much energy per capita as the average American, all of it renewable. Renewable energy applied to conventional houses and industrial economies is a weak, intermittent, expensive, and ineffective energy source. Once you have a good community design that needs two percent as much energy, then suddenly renewable energy becomes a powerful, enabling energy source that can make life comfortable and easy. It is no exaggeration to say that our future hinges on our ability to form effective community organizations.

Resources

- Overview of the DC microgrid system used at LEF (beware: this is a large PDF file): livingenergyfarm.org/raff20.pdf
- High quality DC brushless pumps: see Sun Pumps (some brushless and some brushed), Grundfos, Lorentz, and Robison.
- High quality, moderately priced wood-fired equipment: DS Machine in Pennsylvania. Great Amish company, they have water heaters, canners, furnaces, and other useful devices. They do not have a private website, but are listed on their county website, reallancastercounty.com/local-services/house/heating-cooling-hvac-coal-firewood-propane-fuel-oil-stoves/ds-stoves
- Good design for thermal curtains: kumeproject.com
- Good source for reclaimed foam insulation for sub-grade use, or for building homemade solar heating panels: insulationdepot.com
- Waterproofing admix we use in exterior stucco, cheap and nontoxic, much better than just adding a spray-on water seal. We have not used this product long enough to give it an unconditional endorsement, but so far so good: www.kryton.com/products/krystol-mortar-admixture-kma
- If you do use skylights, here is a design that can convert them from a thermal liability to a thermal asset. These can be homemade as well, with aluminum roofing metal: www.zomeworks.com/sunbender
- Solar hot water pumps, closed loop only: see El Sid pumps, numerous suppliers.
- Other solar hot water components, including very high quality stainless water tanks: www.aetsolar.com 🌱

Alexis Zeigler was raised on a self-sufficient farm in Georgia. He has lived all of his adult life in intentional community. He has worked as a green builder, environmental activist, and author. His book Integrated Activism explores the connections between ecological change, politics, and cultural evolution.



Thermal curtains, well sealed at edges. See kumeproject.com for design pattern.

ECO-BUILDING AT THE ECOVILLAGE (I Have Built a Home)

By Arjuna da Silva



The author's home Leela, after completion.



Arjuna begins to settle in.

There are several natural buildings at Earthaven (Black Mountain, North Carolina), designed and constructed with the Earth in mind—both to use as much of what we find right here on this patch of her, and to use materials with little to no negative impact on the planet. Some are timber-framed, some have simple rectangular designs, many have sheetrock interior walls, and most have earthen and lime plaster on the outside.

Those built primarily from earth and straw (and wood) are quite small—experiments to see how far folks wanted to venture into new and traditional modalities. They're all still standing and in good use today. One community-sized splendid result of our early forays into natural building is the 13-sided earth, wood, and straw Council Hall. If a room has ever been loved, it's this one!

I'm not sure why I latched onto the idea of natural building. The idea of building simple structures we could live well in, made out of easily available materials, thrilled me. I'd never owned a home, so I knew nothing about construction, but I was romantic about the aesthetics of spaces; the round, earth-toned warmth of a natural house promised me a luxury and comfort I felt I needed to feel.

When it came time for me to develop the homesite I'd leased at Earthaven, I got involved in what turned into a mystical journey that carried me from the most rudimentary sense to an ongoing experience of the dance of design and manifestation. "Leela," a sensual, earthy, womb-toned *being*, part temple, part hideaway, part evolving dreamscape, led the way.

In the eighth year of Earthaven, after several ideas for building within a pod design (shared facilities with radiating private spaces) disappeared into other folks' priorities, I got the idea of gathering my permie girlfriends for a design charrette on Site #7 in our Bellavia Gardens neighborhood, not far from the Village Center. We gathered outside my trailer on a lovely fall day, and I talked about my dreams of a home within the bigger home of Earthaven. Then we took measurements on the site, talked about water sources, wind tunnels, and solar angles, and dispersed to work on sketches focused on the key features I'd need to start with, including orientation, entrances and exits, facilities, connection to the commons, and so on.

When we compared all the sketches, some details were obviously similar and some unique, but I felt encouraged. I would have to mull over the designs, make some choices, and figure out the next step. But as the unfolding mystery would have it, one of the gals was an adventurous budding natural builder who suggested we walk back to the site and take a stab at designing the house. We stood where I thought the door was likely to be, and I followed her instructions about closing my eyes and imagining walking into the house. What would I see?

As I described where I imagined the walls would be, how far from each other, how they curved, she took notes. She jotted down where I said different things took place, adding questions to round out the sketch she was making. Where would the bathroom go? Would the toilet be in it? The resulting sketch could only be called an amoeba, but it didn't stop my friend from taking it seriously.

Another friend was learning the new AutoCAD program folks were talking about, and he agreed to mess with my amoeba. His result was a more symmetrical structure with more clearly defined areas. Then I made another deal: I said I'd have the foundation ready when my friend returned in the spring with a group of natural building interns.

Getting from sketch to foundation, however, became complex enough for its own chapter in this epic. Suffice to say, I was still figuring out how to dig the foundation when the group appeared. I had no foundation, no frame, no roof—and nothing much to offer a builder to get started on. There was an interlude for building accessory structures that helped the interns carry on learning about natural building, and we had some delightful plaster parties led by my friend (and Earthaven member) Mollie Curry of MudStrawLove.

Steveo is a local transplant, like lots of us, with considerable conventional building experience and a talent for sculpture. He'd worked

with my natural builder friend on an adobe project and relished the idea of taking on a full-scale natural building project. His upbeat and confident personality got my attention, as he walked around the site, observing the little progress we'd made on the footprint, talking about rates for carpentry versus those for the mud and straw work. When, in a couple of hours, he'd already built a small shed out of scraps he found lying around, and set the tools and other materials inside it, I felt we were onto something with potential.

It took five years to build Leela (a Sanskrit word for "divine play"). During our first year, Steveo designed the timber-frame and we got several resident carpenters to put it together while he completed another job. We managed to pull a permit with the building department by explaining that the building was basically a timber-frame with masonry walls, and with

could be gently removed as the panel was pressed into place.

Following principles of passive solar design, most walls were made at least 24 inches thick. For the east, south, and west walls, we wanted plenty of thermal mass to radiate the sun's warmth into the house. (Remember, in summer the sun is high above and mostly beams its rays straight down, rather than at a penetrating angle to the walls and windows.) For the north wall, we wanted insulation instead of thermal mass, to shield the house from shady, windier zones, so we chose strawbale construction, learning to create specially shaped bales to fit angular spaces created by the roof line, managing—with Steve Kemble's expert guidance—to follow the curve in our foundation and meet the straighter side walls in unbroken connection. Steve brought many innovative techniques for "cutting" and "sewing" bales together, and we also used bamboo poles as studs to firm up parts of the strawbale "bricks."

On the inside, we designed an earthen wall with an arched opening above the hearth and an arched entryway into the kitchen and dining alcove. We were able to use compressed earth blocks (CEBs), made in a contraption that extruded big, dry blocks faster than we could pile them up. Although we didn't get our hands on that technology until all the exterior walls were in place, we got to use the blocks to create the arches.

To complete the design for the roof and upper-floor windows, Steveo built a clay model and we played with various cardboard roof panels and several cathedral-like rounded window shapes. Leela was built with wood, clay, and sand almost entirely from Earthaven. We bought pine floor joists wider than our trees could provide, and for some uses chose builder's sand rather than the cruder sand from our creeks. We made lime plaster for both interior and exterior walls to mini-

mimize mold, but were able to cover the interior arched walls with a reddish earthen plaster as they would be dried by the fire in the wood stove. Selecting pigment was an adventure, and Mollie was a patient provider of samples and test panels as we attempted to guess what a small patch of color would look like on an entire wall.

The other interior clay walls are plastered

with a mixture of builder's sand and lime, which resulted in a beautiful shade of tan that complements the warm colors of all the poplar and pine posts, beams, and paneling. The deep rose-colored pigment we chose for the arched wall brings a rich and healing energy into the space. Each one of these decisions was treated with great care, some of them taking us weeks or longer to settle on.

Once Leela was all walled in, we could work through the winter, though often we had to quit when it was too cold. Perhaps the most challenging of all the aspects of the project were the earthen floors, which we only much later discovered are really *sand* floors, at least in this climate, with the lesser clay part essential for holding all the sand together. Our first few attempts, however, using a clay-heavy recipe, resulted in so much shrinkage and cracks that we had to do two out of three of them over. Luckily, our interns at the time were so determined that they worked tirelessly to fill, tamp, and repair the myriad cracking that made the living room floor look like a giant topographical map. Then Steveo did a hero's job of soaking and then pressing all the repaired surfaces into a smooth, flat, shining (after nine coats of linseed oil) floor. It took us two more floors before we got the recipe right, but Steveo always managed to come up with a way to make the best of things.

The last phase of construction was spent trimming, tiling, and delighting in opportunities to add lovely features and many spontaneously creative details. Meanwhile, the electric wiring, propane lines, wood heat, and water systems were finalized, the composting toilet was ordered, and a second-hand wood stove was refurbished and installed. Our final intern was with us the whole last year, and she was able to help us complete our work in time for me to move in at the beginning of winter in 2010, with wood heat, gas cookstove, bathtub, and on-demand propane-heated running hot water in place. The following year the photovoltaic system was designed and installed by neighbor friends learning the tricks of that trade.

Seven years later this past December, I can say I have logged more compliments and praises for the house than I ever could have imagined, not to mention the joy and comfort of living in it! There are still things to improve, such as adding insulated window and door shades downstairs on the south side, where we were a little excessive with the amount of glass we installed. (Classic passive solar design would have recommended at least one less window in the dining alcove and, possibly, one—not two—sets of French doors in the living room. I had to replace the initial solar panels and batteries by the time I learned how to manage the system, but now I'm getting additional amps twice a day from a shared micro-hydro station in the creek below, which has eliminated the use of a generator in our neighborhood for the past year.

While my experience planning, building, working with others, and living in my house has been

My experience planning, building, working with others, and living in my house has been a dream come true on so many levels.

an engineer's signature assuring them that the ridge beam was broad enough. Neighbors at Earthaven built an Earthship (tire house), and they dealt with the county's lack of data by finding a local engineer who signed off on plans that had been approved in New Mexico.

Even with the roof up, though, it had to be slow going; one, because Steveo had other things to attend to and, two, because we could build only from May to mid-October since earthen and plastered walls that aren't completely dry will crack when they freeze.

In the beginning, we practiced techniques, embellishing our design as we went along. We hosted long weekends and weeklong workshops with dozens of pairs of hands plopping cob loaves onto foundation walls and smushing them into place, or pitchforking straw through clay slip for upper wall systems or (later on) mixing and spreading plaster on the interior (and even later on the exterior) walls. Though most folks were novices at this work, Steveo and good friends Mollie Curry and her partner Steve Kemble made sure that surfaces were well-shaped and smooth.

Leela is a 900 (somewhat) square foot, timber-frame construction with walls of cob, clay-straw, adobe brick, and a few other systems developed as we went along. On the second-story curved walls, for example, Steveo and several interns came up with the *chorizo*, a long, flexible sausage-like panel of clay-straw laid into wide strips of burlap, then rolled around a bamboo stake and carried up the scaffolding, where the bamboo

a dream come true on so many levels, others in my community have not been so enthusiastic about working with earth and straw as their primary materials. Many folks who come to Earthaven now seem to be more excited about jumping into community life with both feet, meaning they prefer to move into something already built and available (though these are still in limited supply). And if they do have to build, they have mostly preferred to take the fastest route and use more common methods.

During the years we were building Leela, we started a nonprofit project called The Natural Building School and ran all our workshops and internships through it as a project of Culture's Edge. Within a few years after I moved into my house, though, the options for more natural building education became pretty limited, as no one had yet decided on building a natural house or other structure folks could learn on. There have been several natural building classes, introductions that let folks experiment with the basic techniques, but in general the Natural Building School is on hold here until someone comes up with a project we can sponsor.

In the meantime, there's plenty to do in an evolving ecovillage, both administratively and in developing our neighborhood, as new folks move in and the commons become a feature in our deliberations. I've started to pay long-needed attention to Leela's outside appearance, and a few features—stone knee walls, a stone patio, a swinging bench—have been added in the last few years that make a promising big difference. At the rate I'm going, there won't be a stage of completion, only

the turning of a corner. But I can say, with a very happy heart, that I have managed to create a beautiful home that people will enjoy for generations to come. Praise be to the ancestors! 🙏

Arjuna da Silva was among the team of intrepid cultural revolutionaries who started Earthaven Ecovillage in 1994 and the educational nonprofit, Culture's Edge, in 1996. Her semi-professional life included many forms of psychotherapy and group counseling, but her passion for transformative community has used most of the last two decades in the unfolding Earthaven experience. Arjuna still focalizes the work of Culture's Edge at Earthaven. She was given the name "Shunyam Arjuna" (which means "emptiness of the morning sun") by the great spiritual master, Osho.



Visiting school group in Earthaven's Council Hall.



Adding a patio to the front of the house.



Intern Mana McLeod (now a member) examines the plaster undercoat on the upper north wall.



Interior arches today.



Builder/instructor Steveo Brodmerkel installs a stair railing



First workshop after the frame and roof were up.



Sue and Geoff Stone in front of their Earthship.



Earthaven Council Hall—Restorative Circles panorama.

Photos courtesy of Arjuna da Silva

GOOD NEIGHBOURS WITH EARTH: Using natural building materials in community-scale construction

By Robin Allison



The annual Earthsong boat race on the pond.

“Mmmm, what’s that beautiful smell?” asked the young visitor to Earthsong as she came into the common house, looking around with a small wondering smile. I ceased noticing the subtly fragrant, slightly spicy smell soon after moving into my new house in this cohousing community, but it is a typical first response of visitors. Earthsong houses smelt beautiful from the beginning, a combination of the resins of the solid timbers, and the natural tung tree oil and citrus thinners applied to the timber. Standard new construction often smells strongly of chemicals and can precipitate a headache within minutes. Our noses are highly sensitive organs that have evolved over millennia to give us information about our environment, and especially if something is healthy for us or not. Trust your nose!

Earthsong Eco-Neighbourhood is a 32-home cohousing community in Auckland, New Zealand. A fundamental part of our vision was to build to the “highest practical standards of sustainable human settlement.” We chose materials that best fitted a range of sustainable criteria, including local and renewable where possible, low environmental impact and embodied energy, low toxicity, naturally durable, preferably reusable and recyclable.

But is it possible to use healthy and sustainable building materials in cohousing and still stay affordable? Does the group consensus process inevitably lead to compromises in green building decisions, or can it enable more courageous choices than a single household might consider? How much risk should a cohousing group take in trying less standard construction methods in order to

build green? Earthsong faced these and other conundrums in our determination to be good neighbours to ourselves and the planet.

Appropriate sustainable building materials don’t have to be expensive; many simple and effective solutions can be found using materials close to their natural state; cheap, beautiful, and sustainable. The rammed earth walls, solid timbers, natural oils and paints, and other sustainable materials at Earthsong have created a beautiful and healthy neighbourhood.

Innovative natural building materials are more typically used by owner-builders or passionate small-scale artisans building single homes. Owner-builders can respond to opportunities of material supply. They are willing to experiment, modify techniques on the job, and most importantly, they are willing to live with

the (not always successful) consequences of experimentation.

Applying these same materials and systems to higher density multi-unit developments built by contractors in a profit-driven environment raises different issues and challenges. Commercial developers of multiple-unit developments look for design and materials acceptable to mainstream buyers. They value consistency of supply and reliable cost, and need a choice of contractors and tradespeople skilled in working with the materials for competitive tenders. They prefer no surprises in construction, and want predictable performance of materials so there are minimal “call-backs.”

At Earthsong we operated in both of those worlds. We wanted to build a multi-home housing development, and we were a group of individuals with passion and drive and willing to innovate. We wanted to use natural and sustainable materials, and we needed a financially viable and cost-effective development. We set up a nonprofit company to be our own developer, and were willing to make braver choices than a commercial developer. And it was challenging!

If we want sustainable nontoxic materials to come into more mainstream use, it's essential that we talk about the challenges and learn from experience; even, or maybe especially, when it has been painful. Here are some of the challenges we found using natural building techniques for production housing. Some of these would apply also to one-off homes, but the logistics can get much more complicated with larger scale projects.

Craftsperson building techniques applied to production housing

In multi-unit housing, most would expect cost savings with repetition of design and processes and bulk buying of materials. This did not really eventuate in our case, because with rammed earth walls, timber structure, and lots of solid timber joinery and linings, they are crafted houses with a high skill and labour content.

One can argue, however, that using highly skilled labour is more sustainable and socially beneficial than using highly manufactured materials. Skilled labour usually makes possible the use of less processed materials with a lower embodied energy and shorter travel distances. Builders working with natural materials take pride in their work, and their skills are visible and valued. Skilled builders can respond to opportunities, working with the variable natural material to create something special.

Working with natural materials is usually healthier for the builders, and much more satisfying than the standard high-volume low-skill technology that relies on fossil energy use and highly manufactured products. Builders run on sandwiches, not fossil fuels!

Scale and density

With 32 houses on 1.2 hectares (three acres), Earthsong is considered a medium density development, and this affected both the design (two-story attached dwellings) and the means of construction (clusters of dwellings built by a single contractor). While it was not possible for individual owners to build their own houses, we did build in stages of two or more attached clusters.



Earthsong houses surrounding the common house.

Attached houses require good fire and acoustic separation between them. Rammed earth construction is brilliant for both; very little sound and no fire gets through solid earth construction. The upstairs timber-framed walls between houses, using standard detailing for party-walls, also presented no problems. What was more challenging was the external timber board-and-batten weatherboards on the upstairs walls. After much discussion with the local consenting authority to achieve sufficient fire separation between units, they accepted the external timber cladding with a small nib wall between houses to push any flame from one house away from the next.

Earth walls usually require a “good hat” to keep the high New Zealand rainfall off the walls. Two-story houses meant that the shelter of the roof was well above the ground-floor earth walls. Portland cement and agricultural lime aggregate was added to the rammed earth mix to improve durability and resistance to water penetration. In the later houses, small roofs or “hoods” were built above the earth walls to give local shelter.

Limited choice of building contractors

Any large building project requires contractors skilled in using the materials and systems involved. Because we were using non-standard eco-friendly materials and construction systems, there was only one company at the time skilled in rammed earth and of sufficient size to handle our project, so a competitive tender process was not feasible. Instead we worked early with the identified company to incorporate their cost-effective construction details into our design, and negotiated the contract



Common house acoustic ceiling.

Photos courtesy of Robin Allison

price and conditions. While they were well established in building single rammed earth and solid timber houses, they hadn't built more than one house at a time, so we hired professional project managers to work alongside and mentor them in the management systems required for such a large project as ours.

However, the unthinkable happened for us when three quarters of the way through building Stage I (the first 17 houses), the construc-

tion company found themselves in financial difficulties largely caused by previous jobs and went into liquidation. This was a very serious setback to an already challenging project and we lost a substantial amount of money in delays, complications, and non-delivery of materials that we had paid for in advance.

We were committed to making buildings that foster the health and well-being of both the people who occupy them and the global ecosystems of which they are part.

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Fortunately, almost all the rammed earth walls had been completed by then, and we managed to find mainstream builders willing to finish the houses, at great extra cost. We managed financially by deleting all non-essential items from the new contract and enlisting personal pledges from over 30 friends and relations to cover any shortfall at the end. Owners did their own painting, oiling, and sundry

Supply issues

Many natural building materials are not available "off-the-shelf." This entails finding a suitable supply well ahead of time, of appropriate quantity and quality, and often committing money up front to secure, and sometimes to process, that supply.

Timber was our biggest supply problem. Our houses have a lot of internal and external timber, all untreated and naturally durable species not readily available in bulk. In Stage I, the contractor proposed buying the living trees (mainly old farm shelterbelts) and getting them milled to

ensure supply and save costs. They had to find and buy enough trees of the right species from several different sources, and get them harvested, milled, transported, and stored for seasoning. This required ongoing work for the contractors throughout construction, and upfront money from us to pay for it.

The winter that year was very wet. It was an ongoing problem getting enough of the right species and sizes of timber available and dry enough to use when needed. It created

a major nightmare with the timeline, and no doubt contributed to the builders' troubles. The contractors' methodology may have worked for them on single house builds, but the logistics of processing the quantities required for 17 houses just proved too difficult. We didn't have the same supply issues in the later stages of building, however, as the Stage II contractor had a reliable supplier who sourced and supplied the appropriate timber when needed.

Variable materials

Most natural building materials are, by definition, less processed, less homogenized, and more variable. This is part of their charm, but can cause issues in construction, especially when building in bulk with added time and cost pressures. The ramming earth gave us problems late in construction.

Earth or subsoil suitable for ramming contains a range of particle sizes from fine (clay) to coarse (gravel). In some locations this occurs naturally and can be dug straight from the ground. If the local earth is not ideal, it needs additions of sand, lime, or other material to give an appropriate mix.

The earth walls in most of our houses are strong and beautiful. But problems appeared in the last stage of construction, with the walls having a crumbly surface and fine cracking. The strength of these walls was found to be acceptable, though lower than the earlier walls. The real



Attached terrace houses with nib wall in the timber cladding.



The main path flows between the houses and gardens.

problem was that they absorbed water, which we feared would weaken the walls and result in damp houses. Testing and soil analysis eventually showed that the clay content of the ramming earth had dropped significantly to almost zero. Some clay content is important because clay gives the initial cohesion to the material when the wall is rammed and being the smallest soil particle, helps the wall resist water penetration. In the few weeks between the soil being excavated for the pre-construction test wall and the actual wall ramming, the soil composition in the part of the bank being excavated at the time had changed.

By the time we realised there was a problem, the earth walls of three ground-floor units had already been rammed. Extra hoods were built around the building to protect the lower walls, and an earth wall sealer was used in some locations to minimize dusting and crumbling. Several mixes were trialed with test walls to develop a successful new recipe for the upper walls. It was very stressful and costly in time and money to both the contractor and us. But in this case the contractors worked hard with us to address the problem, and what we learnt has contributed to earth building knowledge in New Zealand.

Unusual design details

The other main area of difficulty and challenge has been in materials incompatibility. One consequence of pioneering new techniques to address environmental aspects of construction is that inevitably some mistakes were made, as other aspects of the materials were not understood or were overlooked. One example was the accelerated corrosion of unpainted zincalume (zinc/aluminium alloy coated steel) roofs through copper-laden runoff from the solar hot water panels. This was annoying but relatively simple to fix by applying protective paint.

Another example was more serious: corrosion of zinc flashings installed at ground level to protect the concrete floor slab insulation in the common house. These ground level flashings required substantial research, redesign, and expensive replacement. This was a painful process that delayed full completion of the common house by nearly two years, but we eventually found a solution that met our criteria of sustainability, durability, and ground-floor accessibility, and the repair was done.

All worth it in the end

This might sound like a litany of woes, but it wasn't all bad! While some problems were more complex than others, we found solutions for them all and carried on. It was a challenging journey, but we knew the journey was worth making, and we learnt a lot along the way that we can share with others. Few problems are insurmountable, and hopefully our experience will help others to anticipate where problems might occur and to plan ahead, so they don't trip you up in the heat of construction.

Do we wish we'd chosen more standard construction? No. We have beautiful, solid, timeless

buildings, lovely to live in and with good thermal performance. The smell of well-being still infuses our lives 15 years later.

Is it possible to use sustainable materials and stay affordable? Yes. Many sustainable materials don't cost more than standard materials, although they might require more research and more effort to supply. There will often be a higher labour content, but also lower material and maintenance costs. It's a different aesthetic. Solid, natural timbers gain character with the knocks of age and use, unlike painted plasterboard which just starts to look shabby. Purchasers paid more money for the added costs of construction challenges, but our houses still ended up affordable relative to the standard housing market, and ongoing running costs for heating and cooling are very much less.

Does group consensus mean compromise, or more courageous choices? This depends on the strength of your vision and group commitment to sustainability. In our case I believe we held each other to account, pushed each other further to uphold our vision than we might have gone individually. The consequences of the difficulties were held by the group, not individuals, and together we stood stronger.

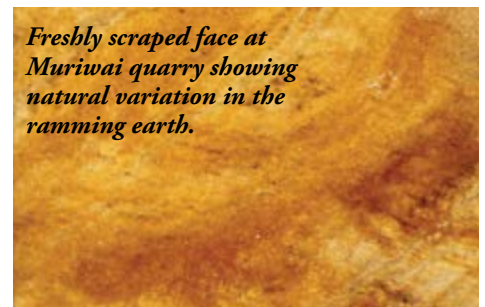
How much risk is reasonable for a group to take on? Again, it's up to the group to decide. Balance your vision and commitment with sensible, well researched decisions. We went out on a limb by choosing earth building, but it was backed up by solid research and professional support. We certainly had our issues, but those few challenging years have produced lovely buildings that will last generations into the future.

At Earthsong we were committed to making buildings that foster the health and well-being of both the people who occupy them and the global ecosystems of which they are part. We offer our mistakes, successes, and learnings in the hope of encouraging the wider use of natural building materials and systems in cohousing projects. 🐦

Robin Allison was an eco-architect before founding and driving the development of Earthsong Eco-Neighbourhood. She now teaches and supports other community projects, and is writing a book of her cohousing experience to be published in 2018. See www.robinallison.co.nz.



*Muriwai quarry,
the source of our ramming earth.*



*Freshly scraped face at
Muriwai quarry showing
natural variation in the
ramming earth.*

A High-Performance Building for Cohousing: From Vision to Move-In

By Michael Mariano



So, you want to design, build, and live in community in the most ecologically positive building that can be built? This is the vision that my partner and I had as well, and here's the story and aspirations that took us on the decade-long course to move-in in July 2016, along with lessons learned along the way.

A Brief Personal History

The introduction to cohousing for my partner, Grace H. Kim, and me came in early 1992 with our Washington State University classmates at the Architectural Association in London during a study-abroad program. A Danish architecture professor and author of a book on the history of housing in Scandinavia, Jorn Orum-Nielsen, presented this concept of resident-developed housing, or *bofællesskab* in Danish. Back in the United States, architects Katie McCamant and Chuck Durrett had recently translated this into the English word “cohousing” in their seminal book, *Cohousing: A Contemporary Approach to Housing Ourselves*, published just four years prior.

During a subsequent month of travel in Europe, I visited a friend's father's friend who was a doctor in Milan, Italy. We were there for a week, staying in a five-story historic building that was owned by the doctor's extended family: he lived in the top-floor apartment with his family, his mother lived on the floor below, his brother below that with his family, a floor was rented out, and he had his doctor's office on the

ground floor. While a similar live/work configuration has occurred for millennia, it was entirely new to me. Fast-forwarding, our experience there was followed by completing our studies, architectural internship and licensure, six years living and working in the heart of Chicago, our return home to Seattle, a year-long certificate program in commercial real estate development for myself, and finally in 2004, the founding of our architecture practice, Schemata Workshop.

Site Acquisition

In 2006, Grace and I began a concerted effort to develop a cohousing project where we would live in community above our architecture studio. Our hope was to find a site in an urban village of Seattle, one that was within walking distance of public transportation, park space, arts and cultural amenities, healthcare, farmers' market, and grocery stores—criteria that has since been bundled into a concept called a high “walk score.” We were fortunate to connect with a local real estate broker who intently listened to us, did the extensive legwork, and responded with potential sites to consider.

Around this time, we became familiar with and deeply appreciated the holistic approach presented by the International Living Futures Institute (ILFI) in their Living Building Challenge 1.0 (LBC). The LBC uses the premise that all buildings should have a positive, regenerative impact on the world, and not simply be “less-bad” than other buildings.

We used the LBC as a resource while designing Daybreak Cohousing, and later Dharma Rain Cohousing, both in Portland, Oregon. While Daybreak Cohousing is built and demonstrates the success of thoughtful passive design strategies, neither project achieves the high performance that each community professed as design began.

For our cohousing project in Seattle, we would attain as many LBC imperatives as possible: it was the right project, at the right time. Our intended location already met the LBC imperative of “Limits to growth” by considering only greyfield or brownfield sites, in an effort to make better use of land that has already been exploited. This opened up opportunities for previously developed sites—specifically, sites that are not on or adjacent to sensitive ecological habitats, erosion-prone or unstable slopes, nor poor soils, such as the peat or liquefaction areas common around Seattle.

The project would contribute to a walkable, pedestrian-oriented neighborhood, one that does not require building any onsite automobile parking. Some future residents were already living car-free and locally; some using public transit and local car-sharing; and others are avid walkers and cyclists. Bicycle use in the building would be encouraged by providing easily accessible, safe, and secure bicycle storage (including tandems, trailers, cargo bikes), and bicycle workspace. Showers and lockers would be provided for commuters in the commercial space.

After considering a number of different, scattered locations around Seattle, we focused our pursuits on a two-block-long stretch of geologically stable soil on the edge of the Capitol Hill Urban Village. For site acquisition, we would leverage the rent our architecture practice could pay for office space, as well as that of our personal residence. We found a site that was one-tenth of an acre, with 40 feet of street frontage on one side, and 40 feet of alley frontage opposite. A dilapidated, but still usable, single-story, unreinforced masonry building with 2,400 square feet of interior area had stood there since 1919, and a single-family home for the 20 years prior to that.

In mid-2007, we sent a letter of intent to purchase, and earnest money to the owner of the property, while we put our condo up for sale, hoping to use that profit as equity. Real estate sales took a downturn around the same time (eventually falling off completely), and we looked for investors that could make up our equity shortfall for purchasing the site.

To get a bank on board to finance the site acquisition, we proposed to keep the two tenants (a tattoo parlor, and an espresso cart) in the

existing building and would hold their rents at their current rates. To increase revenue from the site in support of the purchase price, we designed and obtained a construction permit for a two-story, prefabricated component building to be erected on the unused and unbuilt portion of the site, to the east of the existing structure. The new building footprint of 20 feet by 50 feet would extend to the alley and partially cantilever over the existing building.

We collaborated with a local fabricator on a self-contained kitchen and bathroom module that would be delivered and simply plugged into the plumbing, electrical, and ventilation systems on each floor of the new building. The building structure would consist of prefabricated three-inch tubular steel frames that are bolted together in the field, with an exterior envelope of insulated metal panels and glass curtainwall outboard of the structure for energy efficiency. The fabricator and general contractor projected a four-month construction period. Within five to 10 years, the temporary building would be disassembled and moved to a new location. This would clear the site for a complete redevelopment of a multi-story, mixed-use building and cohousing community.

Course Correction: As we approached construction and mobilization for the drilled concrete pier foundation of the temporary structure, we were also finalizing loan terms for the construction project. Having recently completed the property acquisition with the same lender, we were optimistic, but this was early 2008, and the full impact of the Great Recession was now becoming apparent. Instead of erecting the temporary building, we moved our six-person architecture studio into the former garage of the existing building, with an entrance that took us past the espresso cart, and where a decade earlier “Hot Rod Pinstriping” had occurred, with hand-painted door signage that proclaimed the same. With the property now under our ownership, and a five-year loan term with our outside investors, we settled in to the quiet buzzing of tattoos from the other side of the wall, and the constant aroma of coffee. The unbuilt, prefabricated component building design, in which we invested a lot of research and development time and money—both personally and through the office—received a national award from the EPA for an unbuilt “Lifecycle Building,” but the construction permit and shop drawings still lay in a flat file in the office.

Lesson Learned: Find a location for your future community that supports how you want to live, both now and in the future. An urban infill site takes advantage of the myriad of amenities, conveniences, and



Living Building Charrette with the Design Team, General Contractor, and City Deep Green Technical Assistance Group.

existing infrastructure to support livability. Be flexible, patient, take one deliberate step at a time, and accept that while some efforts may not come to fruition, they are not necessarily wasted. Everything described above led to acquiring a great site for our future cohousing community.

Building Community for Cohousing

In late 2009, Grace and I restarted offering monthly, local Cohousing 101 sessions (free and open to the public) that would raise awareness of the resident-developed model of an intentional community, and we discovered a variety of levels of interest among attendees. In early 2010, Grace and I announced that we had a site and if the location met expectations, they may be interested in an upcoming meeting to discuss moving forward. A number of families came and went during what we projected at the time would be a four-year development process. For some, there were too many meetings; it was going to take too long to complete; there was no off-site parking; homes were going to be too small and/or too expensive. The group adopted the placeholder name of Capitol Hill Urban Cohousing, or “CHUC” for short. With facilitation help, we wrote and coalesced around a vision and values statement, put up a website, and began design of the building in anticipation of the public meetings required to obtain City land use and building permits.

We hired a general contractor (GC) for pre-construction services that included members of the team that had just recently completed construction of the Bullitt Center about six blocks away from our site. They were in the midst of certification as a “Living Building” under the LBC, with required imperatives around net zero energy and water, nontoxic materials, and locally-sourced construction materials, among other criteria. With CHUC, we applied for permitting under the City’s Deep Green Pilot Program, which was based on the LBC, and intended to encourage the construction of high-performance buildings. In exchange for our commitment to a 75 percent reduction in energy and water use over a comparable, code-compliant building, CHUC could receive a height exemption that could be used for an additional story of height.

We assembled a skilled design team, and held a kick-off/chartering meeting for the entire design and construction team at the Bullitt Center. With this momentum, we had our required LBC Charrette which brought together the entire team, led by a representative of the ILFI, along with a Technical Assistance Group (TAG) provided by the City that was comprised of local pro-

professionals with experience designing high-performance buildings. This day-long workshop and an integrated design process would help ensure the completed building would meet the goals for energy and water efficiency, along with our interest in achieving other “petals” of the LBC. The future cohousing residents were all committed to the highest performing, most environmentally positive building that we could possibly develop.

It is difficult to reconcile aspirations for a great building (one that truly is good for the environment and its residents) and a building whose main goal is to provide for a thriving social network.

Course Correction: None. The design team was united in pursuit of a building to fully comply with the City’s Deep Green Pilot Program, or better.

Lesson Learned: This comprehensive approach to the design and project delivery effort, with the entire design and construction team closely collaborating, can help achieve a collective commitment and support for the vision, and ultimate success of the project. Unlike the speculative projects of this scale (and larger) that most members of the team work on regularly, here we could introduce them to the families that were going to live in the building. Be sure to reach out to the local building department to see what resources they may be able to offer in support of your project.

Heavy timber structural frame of the nearby Bullitt Center, by our preconstruction General Contractor.



Structural System

At the outset of design, our priority was for resiliency—the early ’70s British concept of a “long life, loose fit, low-energy” building, and what Stewart Brand in his book, *How Buildings Learn*, later articulated quite well as a systems approach to building. The primary structure would be clearly distinct and positioned in-board from the building envelope. Our design approach was informed by our Seattle experience living in a 1910 warehouse building in the Pike Place Market that had been later converted into housing, and the 1927 warehouse building that was later converted to office space and where we opened our architecture practice. To truly address flexibility for an unknown future, it is necessary to build a structure that would outlast all of the founding families and be a durable framework for future residents to live in community. Every-

thing inside and outside this robust structural frame will eventually be replaced. The structure, however, will remain while exterior cladding deteriorates, window assemblies fail, electrical systems become obsolete, plumbing and mechanical systems are replaced, and interior walls are removed or relocated. In contrast to the temporal nature of all these systems, the primary structure and foundations are intentionally designed and built to remain fully functional for 250+ years.

In the interest of longevity, we investigated three different structural framing systems: 1) steel, 2) concrete, and 3) cross-laminated timber (CLT). Each of these could provide long-term flexibility related to interior partitions, and repair and eventual upgrade of building utilities and infrastructure. Due to our urban infill location and building out to the adjacent property lines, a steel frame would require expensive fire protection of all structural members, and we would still need the mass of a concrete deck for acceptable acoustic performance between homes. For a typical cast-in-place concrete building, current post-tensioned (P-T) engineering uses steel tendons to optimize the thickness of concrete and spans. Unfortunately a P-T system has an estimated 75-year lifespan, and we have a recent, local example of a high-rise that was entirely demolished due to early, pervasive failure of steel tendons. To avoid post-tensioning the concrete, we could use a dense web of mild-steel reinforcing, but this results in thicker floors than was our preference. Despite the nearly ideal acoustic and thermal performance of a high-mass concrete structure, we decided against this option due to the energy used in producing the cement, sourcing distance, and post-earthquake performance, assessment, and repair of concrete in our active seismic zone. Instead, we designed the building around a material that had already sequestered atmospheric carbon into trees that was then processed into CLT.

This CLT plank material is highly engineered and permitted under the Heavy Timber section of the building construction code. In addition to exceptional seismic performance, it also offered visible infrastructure and systems, such as surface-mounted electrical conduit, outlets, and light fixtures. Earthbound hold-downs at the exposed ends of CLT panel shear walls would also be visible and could be assessed after an earthquake. All plumbing would be consolidated to a limited number of vertical shafts through the building, with mechanical equipment, ductwork, and fire sprinklers visible and easily accessible within each home. While the Bullitt Center used an in-field, nail-laminated timber deck instead of CLT, our GC brought lessons learned related to fire-ratings and beam-to-column connec-

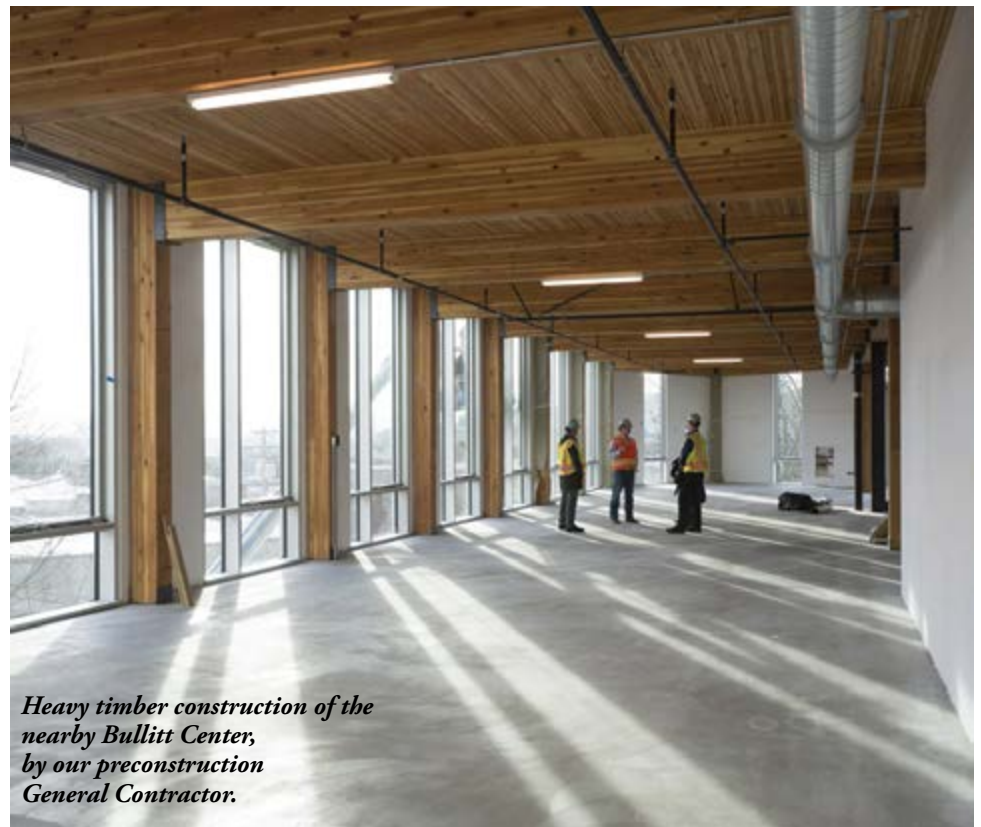
tions that we would also employ. With a CLT structural system, a lightweight-concrete topping slab is poured over a high-performance acoustic mat to provide acceptable sound isolation between homes, without having to suspend an insulated ceiling below the CLT deck and beams. CLT offered the attraction of visible wood ceiling and wall planes, in conjunction with the concrete floor that could be left exposed. Engineered flooring could be laid on top of the concrete for a more finished appearance, at the discretion and expense of the future resident.

Course Correction: Pre-construction services with the GC included two rounds of construction cost estimates. After reviewing and cutting everything that we reasonably could from the project, the cost estimate was still substantially higher than our budget could accommodate. The design team then redesigned the building from CLT to a more typical stick-built wood frame, over a first floor podium of mild-steel-reinforced concrete between the commercial space and residences above. A lot of the cost was also in how our selected GC delivered high-quality, well-crafted buildings. This simply required a lot more time and staff, as well as using reliable subcontractors that they could count on. We had to find a more economical GC, and chose one that had just completed an adjacent apartment building and provided a cost estimate that met our budget.

Lessons Learned: It is difficult to reconcile aspirations for a great building (one that truly is good for the environment and its residents) and a building whose main goal is to provide for a thriving social network, while connecting residents to light, air, food, nature, and community. Raising more investor equity would not work, due to the high interest we would pay for a loan subordinated to the bank. The future residents had already spent months running “sensitivity analyses” on a wide range of rent and equity scenarios and were using a reasonable principal and interest rate in our proforma. In order to increase the construction budget, we would need more low/no-interest “patient money” from the future resident families, but everyone had already contributed what they could. Time to get to work with what we could count on from the families that were committed to making this happen.

Net Zero Energy

LBC required that 100 percent of the project’s energy needs be supplied by on-site renewable energy on a net annual basis, while the Deep Green Pilot Program required a 75 percent reduction of energy use over a conventional building. Our limited site and roof area had space for a 10kW photovoltaic system, which translated into needing to achieve an Energy Use Intensity (EUI) of 16. This low EUI is a challenge in a residential building, primarily due to daily hot water use by residents. To achieve the target EUI, we analyzed and optimized the building envelope using Passivhaus Institut energy strategies.



Heavy timber construction of the nearby Bullitt Center, by our preconstruction General Contractor.

To help ensure an airtight building with sufficient fresh air changes, the same fluid-applied Air and Water Barrier (AWB) refined specifically for and used on the Bullitt Center would be used on our building as well. Daylighting through individual unit configuration, shallow unit depth, window sizes and locations reduces the need for electric lighting. High-efficiency LED light fixtures with occupancy sensors, and efficient, Energy Star-rated appliances will be used throughout the building. Per LBC, no fossil fuels are permitted to serve the building, which also helps ensure indoor air quality by eliminating carbon monoxide output during cooking with natural gas. Cooktops are all electric induction for efficiency, and a central high-efficiency domestic hot water system serves all homes. A heat recovery ventilator (HRV) for each home was explored by the team, but we determined that energy use by the HRVs, and the noise generated, were both unnecessary and that a whole-house exhaust fan with fresh air supplied by window fresh air ports will be sufficient. Highly-insulated, full-height, operable tilt and turn, fiberglass-frame, triple-pane windows would provide for natural convection and night-flushing of the individual homes, taking advantage of the thermal mass of the building. A shallow balcony would extend the full length of the west façade, providing shading of the glass on hot summer days for interior comfort. All common area circulation space is unconditioned to reduce energy use of unoccupied space.

The commercial tenant (architect Schemata Workshop for a minimum five-year term) would commit to a maximum wattage allocation under the terms of their lease with the cohousing ownership entity, with

a financial penalty if it is exceeded. The office space will use an electric hydronic baseboard at the exterior window wall, with CO₂ sensors operating windows for fresh air, which combine with bathroom exhaust fans to provide for necessary fresh air changes.

Course Correction: Due to construction costs, the rooftop PV array was not installed. As unit layouts were being refined, families moving into the west-facing homes stated a preference for interior space instead of exterior balconies. We omitted those balconies and designed an exterior sun-shading screen system that could slide out of view, but these screens were outside of the budget and omitted as well. Triple-pane fiberglass windows were too expensive to use throughout the building, and were installed only at the east façade of the sole residence with an exterior balcony overlooking the alley. Insulated, double-pane, vinyl windows are used elsewhere, while cost dictated a minimally code-compliant, fire-rated, insulated entry door and frame to each home.

Lesson Learned: A 10-year cost/benefit analysis of a variety of upgrades beyond energy code minimum provided guidance to the design team, with a final designed EUI of 31. We determined that an additional layer of insulation outboard of the wall sheathing that would substantially reduce thermal bridging, along with a continuous fluid-applied AWB, were low-cost options for a high-performance building envelope. Be sure, however, to find a qualified applicator that understands and can work with the specific AWB material selected. It's most practical to invest in cutting energy demand with a more efficient building, e.g., better windows and exterior doors, an efficient alternative to electric



Entry hall mosaic designed by a CHUC resident and assembled by the community.

resistance heating, and electric induction cooktops in all homes, before considering energy production.

Net Zero Water

LBC required 100 percent of the project's water needs be supplied with captured precipitation or other natural closed-loop water systems that account for downstream ecosystem impacts, in addition to onsite blackwater (sewage) treatment. The Deep Green Pilot Program required a vaguely defined 75 percent reduction in potable water usage and outflow compared to a conventional building, with no requirement for blackwater treatment. Due to our limited site area, high residential water demand, and the rooftop farm, we would need to also collect stormwater from the adjacent building to the north, which would supply a 20,000 gallon cistern under the street-level commercial space. Historically dry summers would be insufficient to refill the cistern, but rainwater would be used year-round for toilet flushing, clothes washing, and irrigation in order to minimize negative downstream ecosystem impacts. The lower roof with farm would discharge contaminated water, not available for use in the building, while the upper roof with PV array, along with water collection from the adjacent building rooftop would charge the cistern.

Course Correction: A secondary water supply system of "purple pipe," used solely for treated rainwater distribution to each home, along with the additional cost of excavation for the cistern, proved to be outside of the construction budget. At this point, it became apparent that we would not be able to achieve the City's minimum requirements under the Deep Green Pilot, and would need to back out of the program. This also translated into building only nine homes, versus the 12 anticipated with the height exemption allowed under the Deep Green Pilot program.

Lessons Learned: A multi-family apartment building is inherently challenging for water usage, in comparison to other buildings that have more commonly pursued the LBC. Residents shower, wash clothes, and have dishwashers. We would still have a central domestic hot water system that efficiently routes hot water to each home, along with high-efficiency plumbing fixtures.

Urban Agriculture

Our community made a commitment to integrating opportunities for and being stewards of urban agriculture, while making a positive contribution to a local food network. Toward that goal, we partnered with and received some minor financial support from both a local private university and a public college. A farm-to-table restaurant a half-mile south contracted with an urban farmer to oversee a majority of the farm that was dedicated to their food selection, production, and distribution. Staff from the restaurant can pick produce in the morning, and serve it in the restaurant that evening. At the same time, residents of the building will have access to designated areas for growing produce used in common meal preparation as well.

Course Correction: While we originally envisioned gardens on both roof levels, we omitted the elevator stop to the uppermost roof, which prohibited a farming use due to accessibility requirements of the building code. Construction costs were reduced by not reinforcing the upper roof for the heavy soil loading required by a garden. The upper roof is, however, designed to support a future PV array with conduit provided to the basement electrical room.

Lesson Learned: Be adaptable, while maintaining and finding a way to achieve the vision. Prospective residents who had expressed a commitment during early design to manage the farm instead moved to an actual farm, so the partnership with a restaurant was one way that allowed the farm to be used to its full potential. Installation of a PV array can still occur in the future, and after additional energy efficiency

upgrades, such as more efficient central hot water heaters, or cooktops, or wall heaters in homes.

Human Scale and Places

As described in the LBC, the project is designed to create human-scaled rather than automobile-scaled places, so that the experience brings out the best in humanity and promotes culture and interaction. Homes are organized such that there is a public-to-private gradient in the lives of residents, with kitchens immediately adjacent to common areas, and more privacy and seclusion offered further inside each home. The courtyard provides a human-scaled, intimate, vertical urban space that can be personalized, effectively serving as the central circulation path seen in other ground-related, suburban or rural cohousing communities. Salvaged brick from the original building paves a portion of the entry hall, and a prominent glass tile mosaic designed by a resident, with tiles set by all residents including the children, is a great reminder of the success of participation in building community.

The Common House, located on the second floor and directly adjacent to the outdoor patio, functions as a hearth/heart of the community and provides for communal meal preparation and dining three times a week, as well as informal gatherings, an impromptu "third place," celebrations, and fostering of community. Community spaces allow residents of the building to live larger than their compact and efficient homes would suggest.

In Closing

While aspirations were ambitious and paths toward a high-performance building were clear and exhaustively pursued during design, the single most significant goal was to live in community. With only 160 built cohousing communities in North America, adding one more to the list should be considered quite an accomplishment in itself. All nine families moved into the building over a three-day period in June 2016 to occupy six homes at 850 square feet each, two at 1,100 square feet, and one at 1,300 square feet. Common meals occur three times per week, and the building feels more lived-in every day. As with any construction project, we still have some challenges with warranty issues and maintenance to deal with, but staying focused made it all a reality. Be open to adapting the process in order to overcome the inevitable challenges along the way to be sure that future residents are all engaged in and committed to the project. Groups that are forming an intentional community need to accomplish the business of real estate development, while at the same time building community and social capital with each other. While participation by residents will fluctuate over the course of each of our lives, we will adapt, and living in community has proven to be well worth our collective effort. 🍷

Michael Mariano is a principal and architect at Schemata Workshop, Inc. in Seattle, Washington, where his partner/spouse and their daughter live in the cohousing community above their office. Michael also co-chairs the Capitol Hill Ecodistrict, which anticipates certification in 2018 as one of the first-ever neighborhoods under the strict and holistic EcoDistricts protocol. CHUC is located at the geographic center of Capitol Hill and its population of 30,000 residents, and serves as the epicenter of their personal and professional efforts to improve livability while building community (schemataworkshop.com).

Recommended Reading:

Brand, Stewart. *How Buildings Learn: What Happens After They're Built*. Viking Press, 1994.

Leupen, Bernard. *Frame and Generic Space*. 010 Publishers, 2006.

EcoDistricts: www.ecodistricts.org

Capitol Hill Urban Cohousing: www.capitolhillurbancohousing.org

FROM BLIGHT TO BEAUTIFUL: Renovating an Urban House By and For Community

By Lindsay Speer



Westcott Street house when first purchased in 2008.



Westcott Street house from the rear, 2017.

The start of it all: a compost bin

The first Bread and Roses Collective house is a large brick Victorian on a small lot on a residential street in the City of Syracuse, New York. In the early 2000s, when we first built our compost bin, the large lot behind our garage was an overgrown mess of broken box elders, Japanese knotweed, and piles of dumped trash, owned by an unresponsive slumlord. Our compost bin fit right in. As we spent time out there, we began to dream of urban gardens beyond our tiny Food Not Lawns front garden. When the land came up for sale in 2007, we knew we wanted it. What we weren't sure about was the derelict, empty house that was attached to it.

The Westcott Street house had been neglected. A tarp covered the back third of the roof, which we had watched disintegrate over the course of five years. Water damage contributed to the whole place stinking of cheap chemical soap and mold, on top of decades of cigarette smoke. The old garage leaned precipitously. If we were to look for a second house to buy, this would not have been it, but to get the land we had to get the house.

The Bread and Roses Collective is a 501(c)3 nonprofit organized for providing affordable, sustainable, low-income housing. The first members of the collective moved into our first house as a rental property in 1997, and eventually organized themselves to form a nonprofit and purchase it from the landlord in 2004. We are a community of activists, often working for local nonprofits and engaged on our own time with various local campaigns, including fights for social and environmen-

tal justice. At the same time, we are building the world we want to live in at home, making decisions by consensus and working together to accomplish what none of us alone could do—

Such as buying and renovating a house.

When deciding whether or not to buy the Westcott Street house, the combined factors of already having a large mortgage on our first house and the state of disrepair of this new one gave many of us pause. As in many property transactions, time was of the essence. We came to an agreement that one of our members who could afford to would purchase the house, and at the very least we'd purchase the land from him. We'd take our time to consider the house's future. In the midst of this, the 2008 housing crisis hit and we ended up getting the property for only \$57,000.

Should it stay or go?

Now that it was ours, we went to work pulling out the weeds, clearing out the junk, and expanding our compost operation to collect from a local vegan restaurant and a coffee shop to build the soil for the raised beds of our urban garden. We began to dream about what to do with the house. Despite its being legally owned by only one of us, the decision-making about its future was done collectively from the beginning. We came to the conclusion that the back third of the house was beyond saving. Should we only tear off that part, or should we demolish the whole house? Ultimately, the decision was made to save most of the house and design an addition to fit our needs and dreams. Bread and Roses committed to the project, and financed it through personal loans at interest rates below what the banks could offer.

“In retrospect, it would have been cheaper and easier to tear the whole thing down and build a new house from scratch,” reflects Bread and Roses member Steve. Retrofitting the existing old house for energy efficiency and designing an addition to match its design was costly, in both time and money, but there were benefits too. “By keeping the existing house and carefully deconstructing the elements we wished to change, we saved a lot of material from ending up in the landfill. We also kept the character of the house, which is consistent with the neighborhood.”

Hammering the nails out of every single piece of lath was an inefficient use of our time, although we now have a great supply of nail-free kindling for the highly efficient Avalon wood stove. On the other hand, removing the nails from larger old unpainted boards, installed before the days of presurized lumber, was well worth it. They are now the sides of the raised beds in the garden.

Dreaming a future

The process in dreaming up what the future house would finally look like was extensive. The collective started by conducting interviews with each member about our hopes and dreams. We were lucky enough to have Simon, a longstanding guest at our weekly potluck who worked for an architectural firm, to guide us through the process of designing the addition of our dreams. He patiently worked with the collective and the architects through a consensus-based design—and

the redesign that took place as financial realities set in. A committee of four people led the extensive research and decision process, following the guidelines and broad decisions set by the collective (eight people at that time).

Key to the new addition was a large kitchen. The kitchen at the old house was small even by current single-family home standards. We wanted a kitchen in which we could host parties and workshops; a space that could serve as the hearth of the community. We also knew from experience that one bathroom was not quite enough for second-floor living quarters with five or more bedrooms. Finally, we wanted the first floor of the house to be accessible, both with an eye to accommodating anyone’s eventual disability, and to currently provide accessible meeting space for the local activist community.

Eco-friendly design choices

We strove to build as eco-friendly as possible, but early on we realized that many compromises would have to be made in order to meet the City of Syracuse’s building codes. We couldn’t do strawbale walls, but we could use FSC-certified lumber. We had to hire a con-



Richard and Alison install ceiling drywall during the Spring 2012 Workweek with instruction from a friend.



Tearing down the back portion of the house, 2011.



Deconstruction of upstairs bathroom. It’s now the “flex room.”



Original front stairs circa 2012.



Upstairs kitchen during pre-purchase walk-through, circa 2009. The stain on the floor is from water damage from a leaking roof. When we look back on this, we can’t believe we actually bought the place.

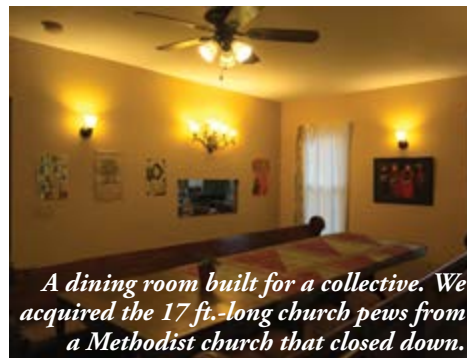
Photos courtesy of Lindsay Speer



2016 Native Plant Sale, organized as a joint fundraiser with the Alchemical Nursery Project, in front of the renovated Westcott Street house.



New kitchen as the tile is being installed.



A dining room built for a collective. We acquired the 17 ft.-long church pews from a Methodist church that closed down.



tractor to do the actual building envelope, as well as plumbing and electrical. Picking a good contractor is key, and it can be a challenge to find one who will work with a collective. Take the time to read reviews and listen to your gut. You want someone you can trust to build you a good house—this is not a place to cut costs or skimp. We may have saved ourselves many headaches if we'd had that advice.

We did most of the finish work inside ourselves, many of us learning along the way; it is amazing what you can learn from online videos. We taught each other the necessary skills and consulted often with friends and family. We hung drywall, painted, installed the tile and wood floors, cabinetry, countertops, internal doors, and trim. What materials we could, we bought secondhand, scouring Craigslist, the local Habitat for Humanity ReStore, and Freecycle. It was a continuous treasure hunt for the right items, with surprising finds like the granite countertops, or the wooden pews.

Our neighbors were another important source of materials. We carefully watched when

things went out on the curb as others remodeled their homes, acquiring a substantial number of doors coated with thick layers of old paint this way. We researched lead paint remediation and developed a process to strip the doors using a heat gun, citrus-based stripper, and careful disposal, always wearing N95 masks, gloves, and changing our clothes and shoes so as to prevent lead contamination elsewhere. When Jessica became pregnant she had her blood tested. Her blood lead levels came back as acceptable, a relief and validation for our process. To be extra safe she only worked on the later stages (staining, poly) of door refinishing through her pregnancy. Her daughter, now nearly three years old, is talkative and clever and has us all wrapped around her little finger.

After living for years in a large, drafty Victorian, we knew the importance of adequate insulation and double-pane, low emissivity (or low-E) windows to ward off the chill of Syracuse winters. We installed high-density foam panels for insulation, between the narrow four-inch studs framing the old portion of the house. If we had built new, this could have been a more eco-friendly material. We sprayed the attic with a thick layer of insulation, resulting in a roof with an R-value of 50.

The light-colored metal roof is an eco design choice. High reflectivity in the summertime means a cooler house, especially when combined with the used ceiling fans we installed in each room. By avoiding asphalt shingles we ensured we could use the rain water on our gardens. We installed homemade rain barrels at each of the downspouts, our contribution to the Save the Rain campaign to keep storm water out of our combined sewers and therefore out of Onondaga Creek and Onondaga Lake.

Most of our lighting fixtures were previously used, and we found some great deals on very pretty fixtures. When the electrician wanted light bulbs in every socket as he worked, Jessica diligently replaced every incandescent light he installed with LEDs. On-demand water heating not only saves energy, it also ensures that no one is upset someone else drained the hot water tank during the last shower!

We used a zero VOC stain with no petroleum distillates and Vermont Natural Coatings' Poly-Whey on all of our woodwork. The polywhey is a groundbreaking product developed in Vermont, made from dairy whey, a dairy industry waste product. It performs well and you can re-coat in a matter of a couple of hours as compared to traditional poly which requires at least 24 hours between coats, so it also makes the whole process much faster. All of the paint on the walls is also zero VOC. This was and is a great benefit, allowing us to work through the winters and while people are living in the house without headaches. By talking about the scale of our project and commitment to zero VOC with the owners of a local paint store, we were introduced to a zero VOC paint that was half the price of anything else we'd seen on shelves. Personal connection is everything.

Impact on membership

The building inspector awarded us a temporary Certificate of Occupancy (COO) in early 2014, allowing new people to move in and expand the number of hands working on the project, which has fluctuated between 10 and 13. We are working towards the permanent Certificate of Occupancy. We were surprised to learn that we had to install all the wood trim before a permanent COO would be granted, despite the rest of the house being fully functional. We had all the trim custom-milled but sent to us unfinished in order to save money. This has cost us in time as countless hours go into sanding and staining each piece. However the finished look, which matches the original trim of the house, is absolutely worth it.

In the 2000s, we would have work-weekends twice a year to maintain and improve the first house. With this project, we moved to work-weekends every month with people working on projects in-between as well. While some dedicated housemates stayed through it all, the amount of work involved did contribute to turnover. For a collective dedicated to providing housing to activists, it is a struggle to balance between building the house, working our day jobs, all while doing our best to contribute to local activist movements. Over the years, 40 members have all contributed to construction of the house. Some people have stayed only a short time; others gave significant years of their life to the project. Only four of us remain from those who made the decision to purchase the house, and I left for a few years. The biggest impact of turnover is the loss of acquired building skills, and the need to train and empower new members. Few people these days come to us with any practical building experience, but they leave with skills and confidence to tackle their own projects. Ultimately our project is not only benefiting our collective, but the community: five of our former members have now purchased and renovated houses nearby.

Even those who leave still appreciate the work they put in, and seeing the progress of the house. "I like coming back and seeing how I left my mark," observed Sienna when she visited recently, also noting how much she learned in the process. "The skills of building a house are transferable

to fighting for a cause: both need organization and people working together."

The secret to organizing people: good food

The once overgrown lot we originally covered is now home to an urban permaculture oasis of 10 garden beds, three terraces, fruit trees, and rain gardens, providing the houses with abundant organic homegrown food. Our compost bin collection has grown from one to six with an impressive system of rotation. Many of the damaged trees we cleared were inoculated with oyster and shiitake mushroom spawn and have kept us happily eating mushrooms for years.

As the construction work winds down, Bread and Roses members find ourselves able to return more fully to the activism that brings us together in the first place. As the arena of national politics becomes increasingly chaotic, we find ourselves glad to be in a supportive community, with room to grow, personally and physically. For many members, it's the coming together in radical spaces with radical support that makes it all worth it. Here, we have bread, and we have roses too. 🐦

Lindsay Speer is an organizer on indigenous rights, environmental justice, and energy policy. She is a graduate of Starhawk's Earth Activist Training Permaculture Design Course. Born and raised in Syracuse, she has lived at Bread and Roses from 2006-2010 and 2015-present. She is rooted deeply in this land and loves its crazy winters and glorious green summers. See @care-oftheearth on Twitter.



Backyard with raised beds, circa 2014.



Creating the first raised beds on the abandoned lot, now our backyard.



Learning to mud drywall, 2013.

A Life Recycled

By Helen Iles



I thought I'd seen it all, but it turns out "seeing" things from behind a camera is NOT the same as DOING them. Who knew?!

All right, I did live in a low-impact community in Wales for 12 years, in a falling-down shack which I helped, over time, to spruce up a bit. But my camera was trained on the real pioneers. Roundhouses with reciprocal-framed turf roofs, strawbale eco-lodges, adobe walls and floors, lime renders, and recycled windows. I filmed them all, and their inhabitants.

As part of my *Living in the Future* series, I pointed my lens at all sorts of projects. From people practicing permaculture in the woods to those creating a whole ecovillage from scratch. I knew the jargon. Sustainability. Resilience. Offgrid. Closed-loop systems. I was contented in this little world. I had found my tribe and we were doing good things. We were saving the planet!

And then I met my husband.

Now, before I go any further, I want to say that my husband is a good bloke. He must be, or he wouldn't be my husband, would he? But he did have a few ideas of his own. He's a scientist, for starters, and he felt his career path demanded that he travelled a bit. Got to know the scene elsewhere. That's how we landed up in Australia. Nothing wrong with that, you might think, except perhaps for the long flight. And you'd be right, in a way. Australia gave me a new film—*Deep Listening*. Taking advantage of the many long-term communities down under, I went and visited a few and asked them questions about how they had survived when so many communities fail. I was even lucky enough to visit an Aboriginal elder, who told us about the way community is done—blackfella-way. I don't think it's too much of a spoiler to tell you that the "secret" is in the listening. Listening to land, listening to ourselves, and listening to each other. The Aboriginal elder called it *dadirri* and in a way, it's not so different from the now very popular practice of mindfulness.

So Australia was great, and then we moved again, to Spain, where this story has to begin again. Because it felt as though I had to begin again. Strange language. Strange culture. No friends. No job. I was adrift again, far from both my native tribe in Wales and the community of friends and colleagues I had grown in Oz. I have to tell you: it wasn't easy.

To make matters more difficult, and now we come to the crux of the story, we bought a tumble-down shack in the forest. Empty for more than 10 years, the *casita* needed a complete overhaul. She was structurally sound, but aesthetically lacking. She was also completely lacking

insulation, or any eco-friendliness beyond the location, which was beautiful and in nature.

So we set about renovations. By that I mean we gutted the place. Took everything out, chipped tiles from the walls, stripped it back to bare basics. The insides lay in the garden, waiting to be carefully disposed of or better, recycled. This was to be a recycled house.

Since completing this project, we have heard many people say that it is easier to build a house from scratch rather than retrofit. I might have to agree. It's hard to find the absolute optimum way of doing things when you are limited in part by what currently exists. Brick walls no more than six inches thick. Ceilings ditto. Corners which aren't square and lines which aren't straight. At least if you build it this way you have no one to blame but yourself.

But there was a lot, too, that worked. We didn't mess much with the original layout, but instead opened it all up and installed a loft bed. The original wood floor was stripped and varnished and makes the space shine as it catches the bright Spanish sunlight. There are some quirky, unique features like a vent in the wall above the wood-burning fire with a cute door on it and a latch straight out of my granny's house. Vintage kitsch, you could say.

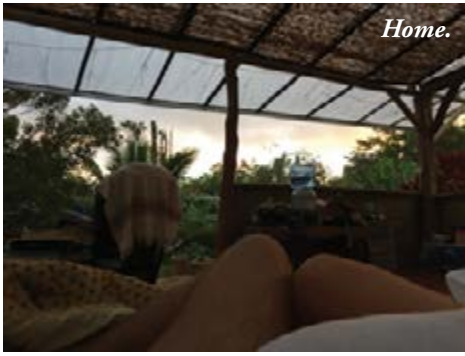
To furnish, we used Wallapop, a Barcelona-based app for local secondhand goods. Comfortable chairs, a sofa bed, shelving, cute kitchen stools, a futon, kitchen work surfaces made of beautiful beech...you can find all sorts on there.

Husband has done most of the grunt work himself, despite holding down his full-time job. I've done what I can, am more handy with a drill and a hammer than I was, and have found a flair for interior design and repurposing old pallets. We're now getting around to installing some solar panels for hot water and some basic lighting—more to provide resilience than save money, as the Spanish laws around solar energy are a little prohibitive. After a simple beginning, we are designing a more sophisticated rainwater capture system to help care for the veggies in the garden. It's a small space, which we supplement by growing in a community *huerto* as well.

All in all, it's been an intense, intensive experience. Our neighbours in this small community have been very welcoming and although it is not an intentional community as such, we are all aware that we have chosen to live somewhere unique, with special circumstances. We get together a few times a year to share *tapas* and red wine, and Husband (whose Spanish, and now Catalan, is much better than mine) is quite active and has even been invited to be president!

The house became a home this week when we took the plunge and finally brought our cat from Wales. He's settling well, in this little *casita* in the forest. It's not so different from his other home, except for the sun, of course. There's a lot more of that. And me? Well, whilst I'll always keep one foot in my community in Wales, the other is getting quite used to the warmth and comfort of its Spanish *comunidad*. As for building, I might have had enough of that for now. 🐾

Helen Iles has one foot in her native Wales and one in Sant Pere de Ribes, near Barcelona. In addition to writing and filmmaking, she facilitates mindfulness and yoga for people of all ages. Helen's Living in the Future series of films on ecovillages and sustainable living are available through Communities Bookstore at www.ic.org/community-bookstore/product/ecovillage-pioneers, www.ic.org/community-bookstore/product/lmmas-how-to-build-an-ecovillage, and www.ic.org/community-bookstore/product/deep-listening.



Photos by Isabel Quarta

A Family Builds its Breeze Home in Paradise

By Stefano Quarta

It was another absolutely beautiful morning in paradise at GaiaYoga Gardens, a tropical permaculture homestead community on the Big Island of Hawaii, when Isabel felt sick. The women of the community knew better than I that it was actually the earliest whispers of communication from our beloved Cosimo, then just a tiny clump of cells growing inside of her. We were going to be parents! We had been living at GaiaYoga for a year and a half; a very trying year and a half. It had been full of learning how to help build a community from the tarp down and learning into a deeper relationship with ourselves and one another. From all the good, bad, and ugly of what we had learned: would we be staying to support the baby through its infancy and toddler years and pre-school and elementary...? Or do we go?

At first I wanted to run; I was downright terrified. As I write this I reflect on how I was pressuring myself to know what *the right way* to grow a person was. I was panicking. On top of that, we were both uncomfortable with the numerous community responsibilities we had already agreed to keep. There was so much uncertainty at that time for me, or was it both of us? I like to think I was fully present for Isabel, but emotionally I didn't know what I was feeling. I began to confuse the strategy of leaving the community for a new set of needs we were now confronting. Within a week of confirming Isabel was pregnant, we arranged to have an interview with another community close by, one that was familiar.

I remember needing to break the news to Ano, one of the owners of the land. In the process of looking him in the eye and explaining we were planning on leaving, I felt a sudden rush of emotions and insight rise from my stomach. I had remembered how much he appreciated slowing down and having conversations that determine the best ways to meet everyone's needs. Ano's presence helped me remember that my current dilemmas with fatherhood were not off the table when it came to asking for his help. Remembering this while knowing the depth of our connection has been one of the biggest gifts he has given me.

I quickly transitioned to explain that if we were going to stay, we wanted to relate to the community in a different way. We wanted the community to support us as parents and a family unit. This was a lot for me to ask, especially knowing I would be asking this of the entire community. Ano curled his lower lip and told me, "Well, I'm willing to figure this out." As soon as I told Isabel of what I said to Ano she quickly started sewing a mental fabric of how it could work: "Well, Stefano, we would have to move into a nicer structure. We are going to need at least a sink, we need to be close to the communal kitchen, and I want to be around people within earshot, not alone with the baby."

This was a special moment in our lives; we were planning how we were going to create the supportive environment we needed in order to raise our baby. This discussion came out very easily between the both of us, a very sweet memory of how when it came to raising the baby it was so easy to connect honestly with our deeper values. We were going to live at GaiaYoga Gardens; we navigated all the responsibilities we no longer wanted and considered what our "white picket fence" was. When looking at the plan we had drawn up on paper I felt nervous and hopeless because I believed the community was not willing to support our request.

We had been at GaiaYoga for two years when we spoke to Ano and Melekai about our intention of giving the community less time and attention to better support our baby and how we wanted to build a new structure if we were going to stay. As we sat down in that room, we four were all looking and listening to each other's best selves. We came together and talked through all the details of the arrangement we wanted. At the end of that evening, we all had smiles on our faces, lights of hope in our hearts, and a new, more connected understanding of one another. Ano and Melekai were willing to entwine community energy to focus on our family, and were dedicated to have GaiaYoga become our long-term home.

Melekai, the other owner of GaiaYoga and a

mother herself, would go on to help me better accept myself and my feelings around becoming a father and ultimately help me be emotionally present for Isabel and Cosimo. She also helped ensure the house had the proper utilities for the first years of motherhood and helped scrape and sand logs for the building project. She also served as Isabel's doula during birth and was the only person, besides myself and the midwife, Isabel wanted to have present at the birth.

Alas, the 10-year-old bamboo breeze home where Cosimo was conceived would not be the breeze home he would be born into. There were certain factors about this breeze home that we liked, but before I dive into this, just so we are all on the same page:

A breeze home is a structure that allows the breeze in, as it is without walls. Two hundred years ago, before mosquitoes were ever brought to Hawaii, we wouldn't have needed screens, but now, lacking a foolproof anti-mosquito system...screens. Since we are a group that practices transparency, not having walls works

for us. That is part of the culture we are creating; overhearing love sounds between a couple is much more pleasant to us than hearing them argue. The vulnerability of our community is reflected in our structures.

I'm proud to say that these structures meet my needs for conserving the environment. A great majority of the wood comes from the land. Dense ohia, a slow growth tree, is what we used for the posts, while we used melochia, a lighter "weed tree," for the upper frame and beams. Tragically, many of the ohia trees on the Big Island are dying off due to the Rapid Ohia Death virus, so we build only with trees that have already passed "over the rainbow." We hand-scrape the wood, sand it down with 60 and 120 grit sandpaper, and paint several applications of saturated borax water solution.

• • •

One day as we were planning the blueprint of the build project, Isabel looked deep into my eyes and said, "Whoa, whoa, whoa, are we really doing this?!"

We were scared and excited and living in community was different from the way our parents raised us. We were choosing not to live close by our parents. "I can't go back to living in the suburbs," I would tell them. "Too much effort to see people when I want to live with them instead; a car to move around because the distance between friends is taken by stores; plus I get winter depression, and the weather here is paradise for me, even during the heavy rain!" "As long as you are happy, Stefanucci," my father would say. "When I retire, me and your mom will be spending half the year with you and the other half here in New York with our other grandchild."

Great expectations can be a tricky thing: a community setting was also a setting where our baby would experience many people entering and leaving for our permaculture internships. We would



After top soil was removed, we laid down volcanic cinders and spaced out the rocks, which serve as the shoes to our footers. These "shoes" prevent the wooden footers from getting wet. A hole is drilled through the rock and the wood for a metal rod to be placed into. This metal rod links the wood to the stone.

Final frame without the fascia boards.



be entering a relatively new world with our child, a choice that would surely have long-term effects on the life of our very very very special someone (yes, that is three very's to you, excuse me!). Did my ancestors thousands of years ago live easily in bands? Was it pivotal need or fear that brought the average Western family to live in their own segregated home, with their own segregated resources and their own private beliefs? I ask again, what goes into a structure? Well, Stefano, a lot of love, hope, fear, and determination!

And with Isabel looking at me, I said, "Yes, we are really doing this."

Which might be one place in my short and ignorant life that I felt into my accountability and ownership for the outcome of my choices beyond just myself. For the template of love that was instilled in me by my parents was not dependent on my setting but came from the depth of relationship I had with them. I felt strong in my love to provide my family a life full of connection, sharing, and empowerment. Thank you, Ma and Pa, for being the best parents you could be!

And powerfully and simply, with a glimmer in her eye, she said, "Let's make it a raised structure!"

I will tell you this, my dear readers: the humidity and mold that ensues within a home amidst the rainforest is an atrocious thing for the people who enjoy finer workings of wood, photographs, clothes, computer technologies, and anything else anyone could ever materially hold valuable. For as thoughtful as she was clever, Isabel affirmed a way to prevent the build-up of humidity and mold to preserve what material essentials we had already. By raising the house off of the ground and on short stills, here known as footers, the house and all our belongings would be floating above the most humidly dense portion of air that stays so low to the ground. We also thought to use a transparent tarp for the roof to allow ample sunlight to extinguish any

accumulating mold.

We had just enough money, thanks to my parents, to have ourselves either a higher quality floor or roof. Typically the eco-structures we make are very low-budget because we aren't afraid to work to meet our goals for quality. The roofs of our breeze homes are classically tarps. The other option we had considered is shingle made from recycled tires. From what we have had explained to us, tarps last longer

Was it pivotal need or fear that brought the average Western family to live in their own segregated home, with their own segregated resources and their own private beliefs?

in the Hawaiian rainforest than the shingles, and if we wanted to change the roof later it would be much easier and cheaper to go with a tarp. Tarps are extraordinarily noisy in the rain, but it is all the more reason to get closer to one another (and don't forget the headphone splitter

for late night movies). When we install the tarp we wrap it around and under a fascia board, so the roof is anchored to the top of the house, not free floating. This is done through tying ropes from the grommets of the tarp to the anchor line running through eyehooks along the top beams of the structure's frame. The tarp is then tied to this anchor line and presto, we have a

biochemistry I had the inspiration to try an eco-solution to the mold and carpenter bees; I would try something that I had not read about but understood only by logic. I thought to infuse the linseed oil with a generous amount of cinnamon, nutmeg, and neem oil. I will learn in time how long the coating will prevent mold and carpenter bees from establishing; so far, it has been only a year since the day the structure was finished and I have not found any foreign blemishes on the wood. I am curious if anyone reading this will find support in this alternative and eco-friendly strategy for protecting their wood.

The breeze home was to be built 16 ft. by 20 ft. on a three-by-three grid of footers, where the footers were one foot high at the shortest point and three and a half feet at the tallest. With this being the first structure I ever built start-to-finish, it seemed daunting to build a house on stilts. Since the ground was on a decline, I put a lot of time and focus on ensuring the foundation was solid. First we cleared the land of jungle, dug out the top layer of loamy soil, and poured several inches of red volcanic cinder (similar to gravel) across the whole plot. The footers were mounted atop

I would agree with anyone who looks at these pictures and judges them as amateur's work. Yes!

roof. To avoid collection of water in the tarp wrapping, a fulcrum can be placed to run parallel along the tarp's underside.

Ano, our ever-so-fearless leader (he hates when I call him that), taught us how to make subfloors out of a grid of pallets, and floorboards from the planks of the pallets. Pallet floorboards are fairly easy to build: all you need is the willpower to pull the pallets apart, rid them of all the nails, categorize them by width, and finally run them through a wood planer, table saw, and chop saw. These planks will warp a bit after planing but not enough to deter us from a sustainably built floor. Pallets are free in Hawaii because of the import economy; it is cheaper for businesses to simply give the pallets away. Now because I wanted to give ample time to Isabel for nest building, we decided to buy our floorboards. We purchased the boards from a local craftsman who made the boards out of on-island Eucalyptus. The floor continues to maintain its rich hues of crimson and cinnamon, which gives the house a particular cozy and genuine feel. Thank you Ma and Pa for helping us buy the beautiful floor!

I was implored by local elders to carefully account for the heat during the Hawaiian summer. With an intention of keeping our belonging mold-free, our first attempt of partially blocking out light involved a double layering of mats made of reeds. Upon coming to a better understanding of the heat, we added a layer of fabric above the reed sheets, and a ceiling fan. The fan had an ingenious quality because it would be drawing power from our photovoltaic system only when the sun was fully out, thank you very much!

Speaking about the mold, a home made of wood would seem all too ephemeral for me to build if I was not going to protect the wood. In addition to the borax, I chose to use linseed oil for the footers and girders along with a kicker. With my background in research and

one-inch-diameter, one-foot-long steel rods, which were anchored within a hole drilled into larger lava rocks; they were brought together with a small application of mortar for even contact between wood and rock. The footers' function was through compression strength which increases with the diameter of wood, so we used melochia with diameters positively correlating to the height of the footer. The tops of the footers were methodically string-leveled and confirmed with a builder's level (no changes after string-leveling were needed).

Atop each pair of footers in the same row we laid the foundational beams that were milled from ohia. The beams averaged seven inches thick and eight and a half feet long; nature decided the width. (See picture for how I attached the beams at the center footer.) From there we installed only one joint across the three lanes of beams, bolted the posts into the foundational beams, built the upper frame supported by bracers, mounted the ridge pole, aligned the bamboo rafters (which we grew), and mounted the fascia boards. The fascia boards were another stroke of eco-brilliance: we made them from pallet planks which were staggered and screwed together. They were two boards thick, which I strongly recommend because the boards have the ability to bend slightly, along two different dimensions. Soon after mounting the fascia board, we placed and tied the tarp down with the help of every community member, thus successfully finishing the roof before the rain(ier) season came to be.



I would agree with anyone who looks at these pictures and judges them as amateur's work. Yes! This house is my first but was also built with a baby in mind. When working with the natural undulations of non-dimensional lumber, there are ways where the wood will simply not fit as expected. This requires special attention with strokes of creativity...using a chainsaw! The beauty of the structure's frame could have been improved if I had given myself a week or two of time (for my level of experience) in cutting the wood so as to better appear seamlessly adjoined. Again, with the baby on the way and wanting to minimize the risk of running out of time, I deliberately skipped the finer carpentry work.

After two and a half months of working on the house six days a week, I had run out of banked overtime hours and needed to go back to my job outside of the community. Isabel, seven and a half months pregnant, confidently expressed that she would install the floor. For flooring we had decided to put the three-quarter-inch tongue and groove Eucalyptus boards directly on 20-foot-long two-inch by eight-inch pine joists we acquired from Honzador. These joists are the only dimensional lumber we purchased. We are fine if the floor undulates slightly if it meant avoiding purchasing plywood!

Using two-inch cleat nails and a pneumatic flooring gun, Isabel finished the floor in two weeks practically all by herself (she had the baby inside to help her). I felt overjoyed when I learned how comfortable and excited she was throughout her engagement in the project because I was needing well-being and empowerment for my wife. Each of the floor boards had two coats of oil-based sealant applied to their bottoms and let dry (I painted them with community members ahead of time; she wasn't around that stuff). After installation and sanding of the floor, a water-based sealant was applied to the top. Today the floor creaks only at the entrance and the house has successfully stood through two small tremors, all 120 earthquakes of the May 2, 2018 Kilauea lava flow, and a magnitude 5 earthquake which had an epicenter three and a half miles away; the earth is alive here atop a volcano and the breeze home built meets my need for structural integrity!

With the breeze home frame, roof, and interior finished, the only ingredients left to add were the door, stairs, and hand rails. (Isabel had moved in by this point.) The door was made out of pallet wood. A dimensional lumber door on an organic door frame will not get the same type of flush closing, but with a jig saw and sander our door was sculpted to serve perfectly for preventing any mosquitoes from entering or leaving. We decided to finish off the entrance with steps made of trex, a material made of recycled plastic usually seen in pool decks. Our stairs needed to withstand the Hawaiian rain.

The front half of the structure was wrapped with a lauhala half wall, while the rest of the breeze home was wrapped in screen. Isabel mapped out the electrical switch boxes with my father over the phone and Kana, our community's elder, did the plumbing for us. Ano made the bed frames out of pallets (not to mention his consistent excellence in cutting the large majority of braces used, all at unique angles!).

• • •

I am aware of many things that could have been improved around the home, but it also feels good to have the inspiration to express my craftsmanship on the next structure I build. The total cost was about \$5,000 and four and a half months of work if you count wood preparation and sourcing all the resources. I reflect on expecting couples who spend or are loaned close to half a million dollars for a house in the suburbs before having a baby and I feel sad because I believe everyone can find their comforts even when living close to nature and especially within communities. I would like to believe that people would value re-learning how to live together over a money-centered lifestyle to meet their needs for security.

One month before giving birth, Isabel was able to move in with enough time to finish building her nest. Cosimo was born perfectly healthy and shares the same name and birthday as his grandfather. Ano continues to build community each and every day, except now sometimes he'll be carrying around Cosimo while at it. Cosimo will oftentimes crawl up to Melekai wanting to be picked up; they have developed a strong, caring relationship from all the times she has cared for him. Kana still parties every day.

Isabel smiles and laughs regularly with the baby. A year since giving birth she is more active in the community than ever before and is growing into a powerful leader. I am very grateful for embracing the lifestyle we have and how it has supported me to spend plenty of time with my son. In some ways when Isabel became pregnant with the baby, the community became pregnant with us as committed members and a breeze home to boot! 🌱

Stefano Quarta has been living at GaiaYoga Gardens since September 2014. He is a regular practitioner of psycho-spiritual integrative awakening, beekeeping, eco-building and -design, and one proud father! You can see the community website at gaiayoga.org or you can email him with any questions, personal or logistical: stefano@gaiayoga.org.



Installing the eucalyptus floor boards with two-inch cleat nails and a baby!



The obia beams are screwed onto the footers.

AN AX, A ROPE, AND TEAMWORK: Build a Simple A-Frame Shelter for Under \$100

By Murphy Robinson

Communities come in all shapes and sizes, and so do their operating budgets. Some build million-dollar community buildings, others start with a vacant city lot and a few vegetable seeds. I'm defining "community" broadly here: any common space where people gather to strengthen their social bonds.

Building a sense of community that includes both the bonds between people and our shared bond with the land is a main focus of mine here at Mountainsong Expeditions. We are an intersectionally-feminist wilderness skills school in the mountains of Vermont. While Mountainsong Expeditions was recently able to buy land (through 100 percent community-based fundraising!) and build a \$3,000 gear storage shed that I'm inordinately proud of, we started five years ago on a few acres of rented forest, with almost no equipment, and no operating budget to speak of. We built our first outdoor classroom for about \$100 in materials, with a volunteer work crew, in one weekend. This article will explain how to build a similar structure for your community space. I hope it will also show that to build community you mostly need a compelling vision, not wads of cash.

Five years later, we still use this same outdoor classroom, since it was easy to transport from our rented site to our permanent home. It's been our rainy-day classroom for hunting classes, hide tanning workshops, fire-building practice, and survival skills instruction. It's basically a 20 foot by 20 foot plastic tarp canopy suspended on a frame of peeled spruce poles. We expect to keep using it for many years to come (although the tarp may need to be replaced after another year or two). This design is based on structures used by white settlers in North America, but lashed pole construction is a common human technology found in traditional cultures all over the world.

Equipment

This is the equipment you will need to build an A-frame shelter:

- a sharp ax
- a 20 ft. by 20 ft. tarp
- 100 ft. of medium-weight nylon rope
- 100 ft. of lightweight rope or twine
- seven straight-trunked trees, five to eight inches in diameter
- safety equipment for felling trees: work boots, leather gloves, hard hat, and eye protection.
- at least two people (four or more is better)

In the mixed woodland of northern New England, I like to use red spruce trees. You could also use most types of spruce, fir, or pine. Coniferous trees will deteriorate more slowly than broad-leafed trees, but you could use any species with a tall straight trunk in a pinch.

I think it's worthwhile to order a white plastic tarp online, rather than use a blue or brown one from the hardware store, because the white lets through more daylight into your shelter. I'm suggesting a 20x20 tarp, but you can use lots of different sizes and adjust the size of your frame accordingly. You can adjust your frame dimensions however you like, to pitch your tarp high (for air flow and to let campfire smoke escape) or low (for more protection from blowing rain). This is democratic architecture: anyone can fiddle with it to perfect the design for their own circumstances. You can use the Pythagorean Theorem if you like exact measurements, or just wing it. I've never used a measuring tape when

building these structures.

One person can prepare this shelter alone, but it will take at least two strong people to raise the frame, preferably more. I've built four of these shelters and each time we did the work with an all-women crew, and twice it was mostly 13-year-old girls. You don't need huge muscle-bound people to do this work, but you do need at least one person who knows how to use an ax safely and how to fell a small tree. Those skills are beyond the scope of this article.

Here are some other tools that will make the job easier, but aren't strictly necessary:

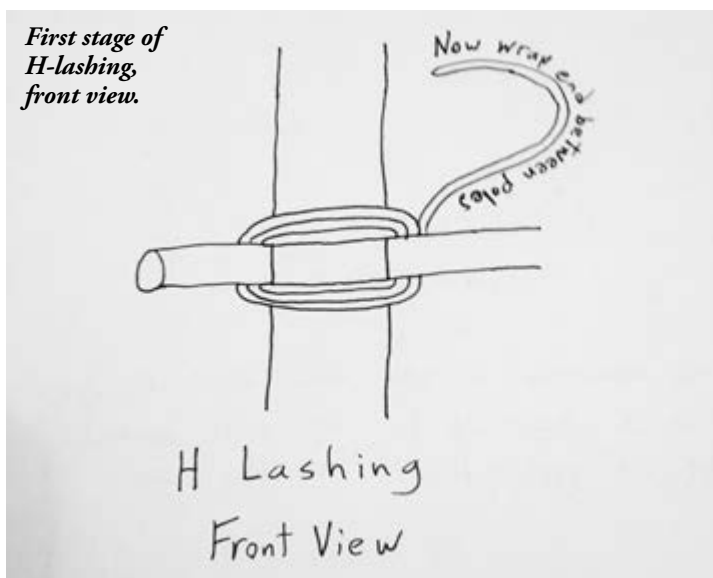
- a buck saw (for cutting poles to length—or just use the ax)
- a plastic felling wedge (for felling the trees)
- a draw knife, or several of them (or just use the ax)
- a stepladder

You should be able to borrow all of these tools pretty easily, and the tarp plus the two ropes should cost you about \$100.

Step One: Felling Trees

First, select your trees. You can cut trees at your shelter site if that's possible, or you can cut them elsewhere and transport them to your site. You want straight tall spruces with a diameter between five and eight inches at breast height. Fell the trees with the ax and take off the limbs with the ax leaving no pointy nubs. A long skinny spruce trunk like this is called a pole. Use either your ax or the draw knives to remove all the bark from the pole, because a peeled pole will last twice as many years as an unpeeled one. You will need three poles that are long and skinny, about 24-30 feet long, for the ridge pole and the side poles. You will need four poles that can be shorter and thicker, about 15-20 feet long, for the scissor poles.

It is best to fell live trees for this project, since dead trees will have already begun to rot in places. You can use a natural blow-down tree that came down in a storm if it is fresh. Taking the life of a tree should be done mindfully. At Mountainsong Expeditions, we do a little ceremony



for the tree, laying our hands on its bark, explaining why we need the tree, and asking the spirit of the tree to move safely to another part of the grove before we fell it. You may want to ask the permission of the tree in some way, and leave an offering behind when you leave. We usually sing the tree a harvest song as our offering, but you can also leave a coin, a beautiful stone, or some sacred herbs. You may want to research the traditions of your own ancestry, and see how they performed an honorable harvest.

Once you have peeled all the poles, you can cut them to approximate lengths (it's always good to leave a little extra, and none of the lengths need to be exact). Then carry them to your shelter site.

Step Two: Select the Site

When selecting your site, find some flat dry ground that has a nicely rooted tree at the four corners of the space where you will raise your frame. Each of these corner trees will be a point for you to lash your scissor poles to a tree trunk. If one of the corners lacks a corner tree, you can set a strong post in the ground instead, but I like to have at least two or three of my corners lashed to trees, since they create strong anchor points. Without a strong anchor, the shelter could fall over. Clear out any brush or small trees inside these corner trees.

Step Three: Lash and Raise the Scissor Poles

The frame is assembled using two different types of lashing, scissor lashing and H-lashing. Cut your medium-weight rope into 10 pieces for the 10 different lashing points.

Next, lash your scissor poles together. Lay them end-to-end, with the skinny top ends overlapping. You want to lash them together at a point that is 15-20 feet from the thick bottom end of each pole. The longer the length of pole below the lashing, the taller your ridgepole will be. To lash them, wrap the rope around both poles, binding them together, then wrap the end of the rope around the lashing between the two poles several times and tie it off (see diagram). These poles will cross each other like the blades of a pair of scissors when you raise them.

When you raise various parts of the frame, it's great to have one or more people with a long and sturdy Y-shaped stick that they can use to boost the poles once they are high in the air. Often you can cut a local sapling to use for this purpose.

You want to raise this scissor pole so that the lashed ends cross at right angles about 10 or 12 feet up in the air, and the two butts of the poles sit on the ground so that they lean diagonally across the trunks of the

corner trees. The more people you can get to help with raising the scissor poles, the better. I've done it with just two burly women in a pinch, but it always feels dicey without more people helping. Once the poles are up, hold them steady while one person lashes the poles to the tree trunks using H-Lashing (see diagram).

You may need to have one or two people hold the first scissor pole steady while the rest of the people raise the other scissor pole and lash it to the other corner trees.

Step Four: Raise the Ridge Pole

Installing the ridge pole is what will hold everything together. A long and skinny ridge pole is easier to install because you can lift it more easily than a thick pole. It also helps if the ridge pole has had an opportunity to dry out, since green wood is heavier than dry wood. You will be able to rest one end of the ridge pole in the "Y" formed by the top of first set of scissor poles. To get the other end up on the other scissor poles, you will have to lift it up over the end of one of the poles using a long sturdy Y-stick. It may help to have several people and several Y-sticks, although I've done this alone several times, with my helper holding the scissor pole steady. It always seems like an impossible task, but if you keep trying you will find a way. Go slow and be safe. If you have a stepladder, you can use it for this step.

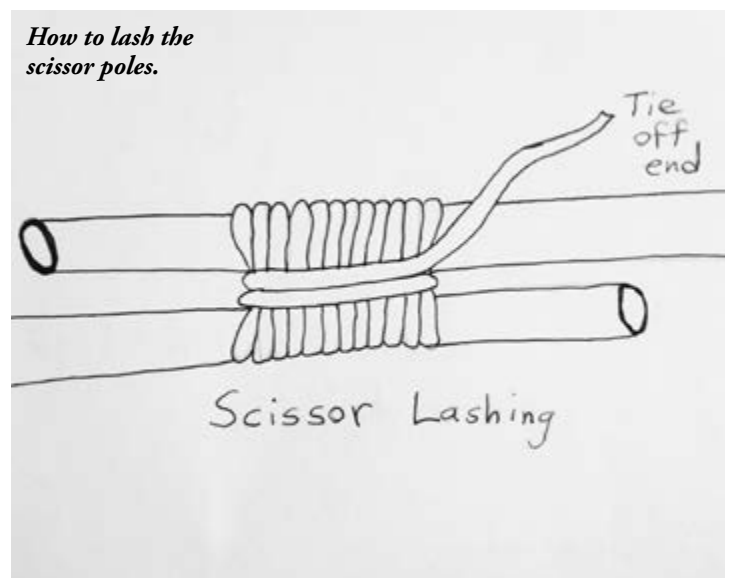
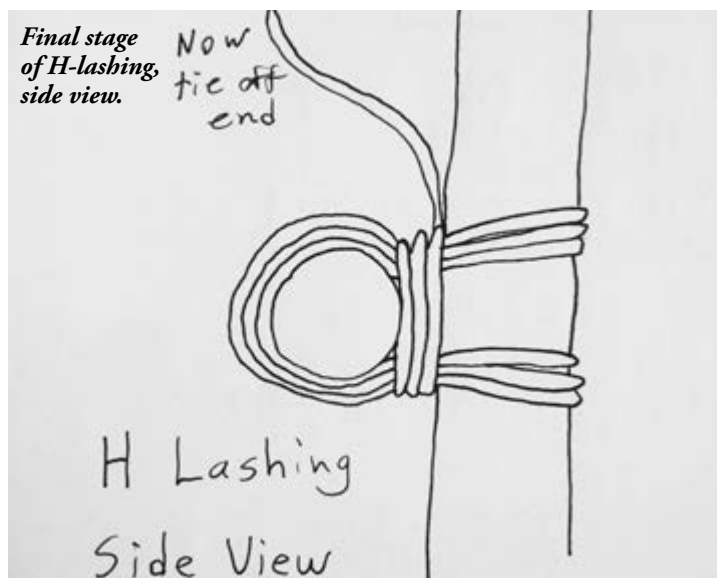
Once the ridge pole is seated securely in on both scissor poles, use some of the lightweight cord to tie it in place. This can be done from the ground by tossing the rope over the ridgepole repeatedly, alternating throwing the rope over the ridge inside the scissor poles and throwing over the ridge pole outside the scissor poles. Or you can use a stepladder.

Step Five: Lash the Side Poles

To finish the frame, install the side poles by lashing them to the scissor poles at about three feet off the ground, parallel to the ridge pole. Some times you can rest them nicely in the angle between the scissor pole and the corner tree, but you still want to lash them to the frame. Now your frame is complete!

Step Six: Install the Canopy

To install the tarp canopy, you need to drape the tarp over the ridgepole. To get it up there, I usually tie a bit of rope to two adjacent corners of the tarp, and throw the rope over the ridge pole. Then you can just pull the ropes to get the tarp over the ridge pole. It is important that your ridge pole is very smooth (no nubby branch stubs) so nothing will



Photos courtesy of Murphy Robinson

rip the tarp. Once you have your tarp draped evenly over the ridge, you need to lace each side of the tarp to the side poles using the lightweight cord. Tie the cord to the side pole, run it through the first grommet on the side of the tarp, run the rope behind the side pole, run it through the second grommet, and repeat this pattern. You will need to lace both sides loosely and then adjust and tighten them to make the tarp taut and even on both sides. It's a bit like tightening a corset. Once the tarp is laced tightly to both sides, your shelter is ready to use.

Use and Maintenance

As long as you've raised your frame decently high, you should be able to have a modest campfire in the center of your shelter, and the smoke will rise to the ridgepole and exit the sides of the shelter so that the air at people-height isn't smoky. If you find your ridge pole is too low, you can take down the shelter, lash the scissor poles together higher up on each pole, and put it up again.

This shelter works great in the rain, but the weight of snow on the tarp will usually snap the ridge pole. Installing a new ridge pole isn't too difficult, but you can save yourself the trouble by taking down the tarp and storing it inside during the winter. This will also help the tarp last longer by reducing UV exposure. Alternatively, you can rake the snow off the tarp religiously and keep using it all winter (just beware of those midnight blizzards that dump six inches of snow all at once). For a truly cozy winter gathering space, you can hang a cotton wall tent from the ridgepole and put a small tent stove inside to heat it (but this will cost you a lot more).

Once you understand this simple architecture, you can create these

shelters in all kinds of sizes. Smaller tarps can create a private privy area or a romantic bower for overnight camping. Larger tarps can be used to create larger gathering spaces, although you may reach a limit of the size of ridgepole that your crew can lift into place without using some advanced rigging systems. If you need to move your shelter, just take it down, carry the poles elsewhere (or lash them on top of your car), and put it up again in the new location. You don't need hardware or any tools to put it up, and the lashing is very strong.

Conclusion

Simple living allows us to use people-power and ingenuity instead of dollars, giving us more time to spend nurturing community bonds. If you need proof that a million-dollar cohousing facility isn't necessary to build community, just spend a little time with any of the myriad traditional cultures all over the world that live close to the earth. It's harder to need each other in gentrified community, where we trade the bonds of interdependence for freedom (and loneliness). We all descend from this kind of simple interdependent living, and it feeds something deep in our hearts to build our own shelter from the gifts of the forest. If you have four friends and you each chip in \$20 and two days of work, you can have a hearth for your community. 🌿

Murphy Robinson lives on unceded Abenaki territory, sometimes known as Vermont. She is the founder of Mountainsong Expeditions, where she teaches archery, ethical hunting, and wilderness skills in a feminist, anti-racist environment. You can contact her through her website at www.mountainsongexpeditions.com.



The Concrete Thinking of Hobbits

By Dan Schultz

“In a hole in the ground there lived a hobbit. Not a nasty, dirty, wet hole, filled with the ends of worms and an oozy smell, nor yet a dry, bare, sandy hole with nothing in it to sit down on or to eat: it was a hobbit-hole, and that means comfort.”

—J.R.R. Tolkien, *The Hobbit*



Photos courtesy of Dan Schultz

Nearly everything we build at Maitreya Mountain Village is haphazardly and thoughtfully an integral part of and congruent with our purpose of permaculture-focused, sustainable living. Sometimes we are compelled to indulge in comforts. Structure determines function, after all.

In the realm of permaculture, we marry guilds of differing and complimentary plant species that effectively serve multiple purposes. This is good. Similarly, our most recently completed eco-build project, the Hobbit Hole, is a fine example of this holistic principle at work.

Besides its revenue for the village economy (Airbnb), the Hobbit Hole is an earthquake-proof fire shelter, a cool respite from summer heat, and probably an effective bomb shelter for those of you who might be survivalists. Our would-be utopia is perilously plopped down within a million acres of National Forest in northern California. Not to be taken lightly.

What, besides its varied functionality, indubitably qualifies the Hobbit Hole as an eco-build? It's mostly an underground, or earth-sheltered, structure, so Mother Earth buffers its Hobbitry insides, clad with golden rings and sting swords, with her constant 55 degree blanket. And while it's equipped with a toasty roasty wood stove, not much heating or cooling is necessary. If you're a carbon counter, big carbon-savings there. In fact, insofar as facts can be counted, one study showed that 98 percent of the CO₂ emissions from homes come from heating (natural gas) appliances throughout its 100-year lifetime. Only about two percent was attributed to the manufacturing and construction phase.¹ But that phase must be tallied, too, and we'll get to that shortly.

Our admittedly New Agey, wilderness eco-capitalist rendition of Hobbit lore sports a sustainable² living roof of clover and wildflowers and is nestled into an edible landscape of grapes,

berries, herbs, aloe plants, and orchard trees comprising a veritable food forest in the truest sense. Within the wild lands of beasts and prey, this Hobbit setting makes for a curious example when arguing for the right of human existence there. But for me, what makes it so eco-friendly is that it's constructed of concrete.

You heard me. Concrete. Blasphemy! all the staunch eco-Nazis may be saying, chests puffed out. No, we resisted the temptation to go boasting on a material choice more cool and trendy. Cob, old tires, hemp bricks, or strawbale would have been far more chic, although the dash of colored bottles added into its walls may appease them slightly. Many tons of cool earth rest heavy on this Middle Earth cave, so concrete and rebar won out over what's fashionable. We didn't go tech, either, which is the other big trend. No materials derived from space-age polymers or gadgets of science wizardry. No receipts from the Tesla Corporation. The material is as old as

history and as earthy as, well...the earth. Rock, sand, and lime, essentially, are the determined ingredients held within a sack of 60 lb. Sakrete.

Before the starry-eyed idealists swallow their lashing tongues in violent rebuttal, let me shine some of that natural, earthy light on the subject of eco-building with concrete. Some propose that the high embodied energy of concrete's Portland cement³ disqualifies it as sustainable. But I propose that, in reverent appreciation of its longevity, durability, and maintenance-free properties, concrete proves itself worthy as a sustainable material, and it far outstrips (at least in this application) the other renewable building resource competitors, like wood or steel.⁴ More poignantly, these facts support two of my favorite Eco-theorems: that one shouldn't go throwing stones in glass eco-houses, and that the penetrating magic of a new Context often—and rightly—busts stone-rigid idealism into rubble.

If you ever hear anyone slaggin' on concrete as a building material, refer them to History. He'll fix their little red wagon. He'll rear up, raise his eyebrows, and chime in, pointing his pointy-sharp finger over to those grand structures built wholly and naturally of Roman concrete, Rome's Coliseum and Parthenon. Humbly, stoically, History points us to the lime plasters of the Giza Pyramids and masonry of the Great Wall of China, still there, to surely tell us...something.

So, too, may our Hobbit Hole

Here and Now, within the bowels of our current egregious industrial economic model, we can (re)consider the use of concrete, as it supports recycling in that it can be made using byproducts from manufacturing and power plants. This reduces landfill needs. Its service life is often measured in decades or centuries, but when the end finally comes, concrete can be crushed and recycled as a high-quality aggregate for hundreds of applications. Concrete is also green in that it is manufactured locally, and unlike asphalt, it produces no toxic runoff. In all those ways, concrete is solid, dependable, and eco-friendly. Like Hobbits.

I strive to be as thoughtfully original as I am flexible in my environmentalism, with an eye for how we humans can ecologically engineer ourselves wisely from our "modern world" back into Nature's womb. Otherwise, we're choosing a life of sticks and stones. If we take some time to look carefully outside the conformity of ideas stiffly held as "true," there are treasures to be found in Middle Earth. Tolkien wrote about this in *The Hobbit*, didn't he?: "There is nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after."

And so it is. 🐉

Dan Schultz is director of Maitreya Mountain Village (www.maitreymountainvillage.com), which creates intentional, caring community and farming in an off-grid, wilderness setting. Dan hosts and produces a talk radio program called New Culture Radio focused on sustainability, and leads Transition Del Norte in northwestern California.



Pros and Cons of Concrete

Here are some of the pluses and minuses in the concrete equation (many quoted from Wikipedia):

- The environmental impact of concrete, its manufacture and applications, is complex. Some effects are harmful; others welcome.
- More carbon-neutral or even carbon-negative forms of concrete exist that include magnesium oxide or fly ash.
- The cement industry is one of the primary producers of carbon dioxide, a potent greenhouse gas.
- Concrete causes damage to the most fertile layer of the earth, the topsoil.
- Concrete is used to create hard surfaces which contribute to surface runoff that may cause soil erosion, water pollution, and flooding.
- Conversely, concrete is one of the most powerful tools for proper flood control, by means of damming, diversion, and deflection of flood waters, mud flows, and the like.
- Light-colored concrete can reduce the urban heat island effect, due to its higher albedo.
- Concrete dust released by building demolition and natural disasters can be a source of dangerous air pollution.
- Concrete recycling is increasing in response to improved environmental awareness, legislation, and economic considerations.

—DS

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Rebuilding Remote Island Communities, One Adobe Cottage at a Time

By Philip Mirkin



American interns, interns Winnie Discoo and Emmett Hedin lay out courses of pumice adobe under the shade of a temporary shelter.



Simeli Ratu completes the dome with cured and split bamboo, reused metal fencing, layers of palm fiber, and (later) two thick layers of waterproof adobe plaster.

Photos courtesy of Philip Mirkin

In our search for a permanent campus for the Fiji Institute of Sustainable Habitats (FISH), we revisited Fiji Organic Village (FOV) situated on the Blue Lagoon. When Tropical Cyclone Winston made landfall in February 2016, it cut a swath through this island nation, causing extensive damage. Although FOV was heavily impacted, the local chief invited us to rebuild there. FOV has already proved to be an excellent site to create and test rounded, cyclone-resistant structures, using local, natural materials at hand.

A few of the main structures survived the cyclone, providing quality shelter to commence rebuilding. Our Fijian team reassembled: Simeli, Tai Alesi, Tui, Luvu, Tai Paul, and Laisa. Together we would complete the job of bringing the ecovillage back to life. Nick Kush, a recent graduate and past intern from UC Santa Cruz, joined us, as did other interns from the US and Germany.

Interns were welcomed as family by the lovely people and their gentle culture of gift-giving. They shared all they could including fresh organic food, music, laughter, and a genuine warmth of spirit. They consistently have time for what matters in life: sharing meals, conversation, enjoyable and meaningful work, and mutual support.

Most important to our sustainable building mission, the pumice adobe bathhouse, an experimental structure we built in 2008, had withstood the forces of Cyclone Winston. Except for the metal roof, it was constructed entirely of natural materials, all found within 100 meters of the building site. The bathhouse proved that the pumice adobe material was resilient in even the most devastating storms, a testament to the strength and cost-efficiency of fibered pumice adobe; it served as a guarantee that our work would be worthwhile.

Another post-and-beam building of 700 sq. ft. still serves as a dining room, commercial kitchen, first aid outpost, storm shelter, and storage. Two other small buildings were recreated after the storm using traditional Fijian methods, one as a family kitchen, and the other a small sleeping cottage for the chief. In the year following the cyclone, the team at FOV had already renewed its infrastructure consisting of solar panels, a natural gas stove, a rainwater catchment system, and a toilet/septic system.

Without dedicated bedrooms for interns at FOV (as all were heavily damaged in the cyclone), we put up three large six- to nine-person tents donated by physician assistant Amber Weiss (who

also volunteered medical assessments and basic treatment in the village of Vuake). Soon after, when Amber and her family left FOV, we began building our next cyclone-resistant *bure* (Fijian word for cottage).

Using the concrete foundation from a damaged *bure*, we decided it was the right size for a round bathhouse (referred to in the Commonwealth as a “toilet block”), a structure also requested by elders in other villages. Its small footprint (about 90 sq. ft.) meant it could easily be completed by our team within four weeks, using the part-time labor of three people, and thus serve as a prototype for other larger projects. When completed, it could be easily replicated in other villages across Fiji by a small team.

Once again, we utilized almost entirely natural, locally acquired, and reusable materials, providing an effective model for other remote island builders, who lack funding and access to expensive commercial materials. This open-source example for potential builders empowers them to rebuild with few resources. When the larger 14 ft. x 20 ft. bathhouse survived the hurricane, we had empirical evidence to show the success of this building method, thus confirming the inherent strength of the pumice

adobe material, and the durability of the protective plaster.

Now our task was to build an even stronger, circular, domed cottage capable of withstanding a similar cyclone with no damage. This meant we could not use metal roofing for overhangs, which often tear off during a hurricane, and become weaponized as they fly through the air (causing many of the injuries from Cyclone Winston).

Simple Construction

We chose a point in the middle of the concrete pad to measure out a three-meter (or approximately 10-foot) diameter circular space. That circle was segmented into 16 equal sides to determine the size and placement of rectangular forms, as outlined in chalk on the concrete pad.

Fortunately, ample building materials were at hand as we used the same materials for the bathhouse. However, we upgraded, using stronger fibers in the mix and split bamboo for the roofing structure. Only 60 meters away is a hill containing high-quality, reddish clay. We used this clay to build the bathhouse, as well as adobe stairs to the lagoon, some foot paths, and poured adobe floors. The beach sand is not ideal, as it is broken down coral, shell, and rock, but it worked fine, and is ample and powdery. Mixed with the smooth clay, and piles of gravel-sized pumice (that washes up on our beaches), this combination made for a smooth, solid adobe.

We learned that blending close to equal parts of sand, clay, and pumice, plus sea water, and coconut palm fiber, makes for a very strong “Fiji Block,” or what we call “Easy Adobe”; we use the gridded mat-like fiber connecting the frond to the tree, which is quite strong, especially when woven or twisted in the mix.

It was only a matter of cleaning up some of

our coconut trees to get enough coconut fiber. We also blended in pandanus fiber (or *voivoi*) used to weave mats. The pandanus grows in tall bunches, which the Tokalaulevu family had smartly planted.

We mixed the piles of ingredients together in a wheelbarrow, slowly adding cups of water to keep it dense and thick, so as to dry solid and evenly with minimal shrinkage. We placed stacks of concrete blocks to serve as forms, or used wooden forms that we constructed from discarded wood. We packed the pumice hybrid adobe into the forms, with one wheelbarrow load filling three forms at a time, each form making a two-foot-long wall section.

We pushed two beer bottles into each adobe section to act like Lego pegs. The bottles helped fasten the next course on to the lower one, avoiding the need for concrete or steel reinforcement in the small structure.

Each day we added at least one complete 10-inch-high course of adobe. In this fashion, mortar wasn't used, but rather the next section of material was poured and packed to lock onto the top of the growing walls and protruding beer bottles.

I scavenged wood from nearby cyclone-damaged buildings, and framed out the window casings. The walls quickly rose to meet the casings, and in a week, they were head-height. Interns Nick, Winnie, and Emmett did the bulk of the work, later joined by myself, Simeli, and teenagers who came to the island for the Christmas holidays.

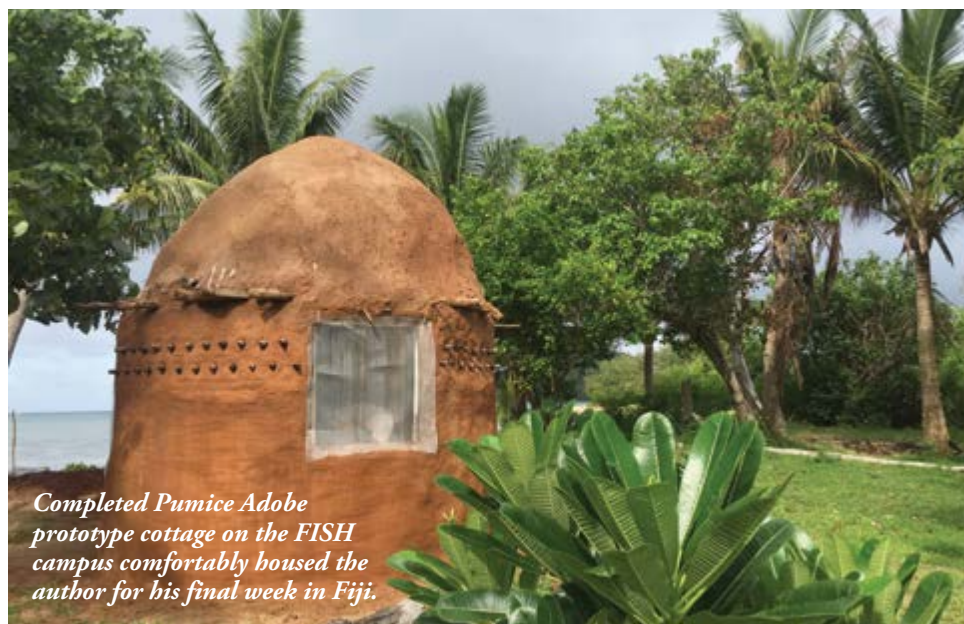
In two weeks, the walls were completed; more adobe was added around the sections integrating them further and rounding the walls. For the plaster coats, we used fresh water, little or no pumice, more sand, and cement (for hardness and waterproofing; about 12-14 percent cement by volume). In fact, the four bags of cement used was our only cash expenditure in building the cottage: US\$28.

At the top of the wall, we added extra cement to the mix to create a bond beam; a circular ring that further ties all the walls together. We used hardwood to create the floor of the sleeping loft above the walls. Simeli and I began construction of the domed roof from discarded PVC pipe, unused after the hurricane. With the PVC, we created a perfectly curved arch, which we affixed to the pumice adobe walls. Large 6-8 meter (up to 26-foot-long) bamboo poles, naturally seasoned and cured from floating in the ocean, washed up on our beaches. We split the bamboo into long, flexible pieces, and wove them into an inverted basket form through the PVC skeleton.

Layer by layer we wove and tied these bamboo ribs into a very strong, bridge-like structure, using their own tension, and hundreds of ties to increase tension and cohesion. I salvaged a small chain-link fence, using it to reinforce the dome and provide a support for applying the adobe roof plasters. Simeli draped it over the bamboo dome, tying it on with thick baling wire. After the metal was affixed, I pinned several sheets of overlapping palm fiber across the entire metal screen using 10-inch-long pieces of baling wire, like huge staples, twisting them around the bamboo.

Now with the dome covered, we could apply the first layer of waterproof plaster without it falling through. With just Simeli and me working together, we were able to cover the domed roof with the first thick layer in less than three days. The second unifying plaster coat took only one long day, further integrating the dome structure into the round walls, and making it a consolidated cap, tied into the walls.

Suddenly the cottage was completely enclosed. Window screen was added to cover the three



Completed Pumice Adobe prototype cottage on the FISH campus comfortably housed the author for his final week in Fiji.





Emma and FISH director Philip Mirkin begin bathhouse.



Early stages of construction.



Early stages of construction.



windows, providing a cross breeze to the large screen door facing the ocean. The insulated walls and cross breeze allowed the building to remain cool and bug-free. Plywood storm windows would be added later.

I enjoyed a lovely week in this cozy, hand-built cottage which stayed cool on even the hottest days. The acoustics are excellent, and the glass bottles protruding from the walls sing in the wind. We named the building *Na Bale ni Lage Sere*, the Singing Cottage.

A Model for the Government

Encouraged by the success of our building efforts, I was eager to share these construction techniques with government ministers in the national capital of Suva. Captain Dan sailed us on the 30-foot fishing boat, “All Saints,” to the Big Island of Fiji to prepare for meetings. The various ministers were quite interested in hearing about our proposed methods to rebuild villages after the cyclone.

As a result of many meetings in Suva, our team has been endorsed to build a pilot project for the Fiji Government. The Acting Prime Minister asked us to build a Women’s Resource Center (WRC), since funding for this project is unavailable in the wake of cyclone costs. Shortly thereafter we were offered logistical support from the Secretary of Education; the Secretary of Women, Children, and Poverty Alleviation; and the Secretary of Sports and Youth.

The construction of the WRC will be much larger than the small *bure*, but with a similar design. To scale up we will add big posts around the perimeter and a central post that will help hold up the loft floor, using coconut wood beams. Likely it will be the prototype for a series of WRCs around Fiji.

Our ongoing programs invite interns from around the world to join us in one or more new projects: to construct a large *bure* up on the hill, help build the WRC, or join us to teach how to construct community buildings in other villages. The Fijian Government sees great promise in domed, natural buildings as a solution for rebuilding on remote islands.

The Secretary of Education, Hon. Iowane Tiko, said this at our meeting: “This is the best response to climate change and the cyclone I’ve seen yet.”

For those wanting to contribute to the mission or join our team, you can donate at www.SustainableFiji.org

or email us at philipmirkin@hotmail.com.

Vinaka Vakalevu (thank you very much)! 🌴

Philip Mirkin is the founder and executive director of the Fiji Institute of Sustainable Habitats, a nonprofit now partnered with the Fiji Government, and the cofounder of the Fiji Organic Village. He is also founder of Hybrid Adobe International, which designs and creates new building materials and architecture to respond to climate change. He has designed ecovillages in Fiji and New Zealand, and is currently designing hurricane-resistant natural shelters and consulting on ecovillage design and Tiny House building construction. Philip has led more than 120 workshops in sustainable building at University of California Santa Cruz, The Institute for Solar Living, the American Institute of Architects, University of Puerto Rico, and many other locations, and was the keynote speaker discussing sustainable building at the 2005 EcoShow in Auckland, New Zealand. Since 1981, Philip has led annual humanitarian aid relief expeditions around the world. He has also authored several books including The Hybrid Adobe Handbook. He can be reached at philipmirkin@hotmail.com. For more information visit www.SustainableFiji.org and www.EasyAdobe.org.

Eco-Design for Behavior Change

By Cheryl Gladu



Sustainability is people

The notion that technological innovations will save the day as it relates to environmental problems such as climate change and “the Great Acceleration” seems simplistic to me, to say the least, and dangerous when we consider the tendencies of human behavior. Design for environmental and social sustainability should never simply be about applying new technologies onto our existing models of living. Rather we also have to consider both behavioral and reflective approaches to design. At the end of the day, we should be looking for opportunities to shift the way that we live together on the planet towards a life that is simpler, yet more meaningful.

I've become less interested in technologies that don't actively encourage us to rethink our patterns of living and working on the planet.

I do support any innovation that can increase our enjoyment or appreciation of life while also decreasing our impact on the planet. I've worked on a number of very advanced buildings in pursuit of such solutions. However, over time I've become less interested in technologies that don't actively encourage us to rethink our patterns of living and working on the planet, as this is the real root of our current situation.

Back in 1992, participants in the Rio Earth Summit concluded that it would take a complete “transformation of our attitudes and behavior” to allow us a future that was both prosperous and

sustainable. This is a call for a deeper kind of transformation than our society's focus on electric cars and solar panels would have you believe. Designers and builders of communities have to consider not only the technological fixes but the ways that design can promote a change in attitudes towards resource consumption and facilitate intentional behavioral shifts towards more sensible living.

On green building

When considering what makes a building “green,” builders and designers are generally interested in elements such as site selection, material use, indoor air quality, energy efficiency, and/or on-site energy production. The positive thing about this is that these considerations are made only once, and then occupants can focus on maintaining or upgrading the building(s) as needed. While appealing, this approach puts most of the learning around sustainable living in the hands of experts and consultants rather than in the hearts and minds of the eventual occupants of these spaces, and this is a real problem.

As part of a team, I led an integrated design process to develop the first Net Zero Energy triplex in Canada. In this case, a triplex means a three-story structure where each floor is a separate apartment. This model of housing is a very common presence in the older neighborhoods of Montreal and contributes to the dense yet livable character of the city.

As part of a national competition run by the Canadian Mortgage and Housing Corporation (CMHC) on net zero energy housing, we received a lot of support from various organizations and companies to build this innovative, albeit very expensive demonstration project. Net zero energy buildings are those that over the course of a year average no energy drawn from the electrical grid. That is, on very productive days (e.g., a sunny summer day) the building will contribute energy *to* the grid, using it like a giant storage battery, and on less productive days (e.g., a cloudy day in the early spring), it will likely draw energy *from* the grid. Net zero buildings are designed so that at the end of the year the building will have contributed at least as much *to* the grid as it took *from* it. Our particular building demanded a design that pulled out all the technical stops: excellent insulation and air circulation, solar photovoltaic and thermal panels, as well as geothermal energy production, etc.

One of the major benefits of participating in a pilot project such as the CMHC EQUilibrium pilot project, as it was called, was the monitoring of the building. Several teams of researchers wanted to learn from this project; some worked on the design with us, and some were from other organizations. A few years later I learned that the results of our project were somewhat dis-

appointing, despite the high degree of confidence we had in its design, and the great skill of its builder. First, the systems required more maintenance to function optimally and this maintenance wasn't executed properly by the owner-occupants of the building. Second, the three units had *very* different rates of energy usage. I have since learned that as far back as the 1970s researchers noted that energy-intensive households are capable of

consuming upwards of three times as much energy as lower energy households. While this might average out with many more households, it's all too clear with only a few to look at. One of my colleagues suggested that it was almost as if the energy systems gave some of the occupants a kind of freedom to consume more than they would normally. This finding is also not new.

In 1865, economist William Stanley Jevons noticed, paradoxically, that the more energy-efficient machines became, the more coal, iron, and other resources were used in production. That is, as there was a decrease in the per-unit cost of production, this allowed for an overall increase in production from a given investment. One needn't look too far to see the “Jevons Paradox” at work today; many of our cars consume less gasoline per mile driven, but we drive further distances. Our homes are more efficient, but they are much larger and shared between fewer people. We make clothing more quickly and with fewer off-cuts and then throw them away after a season or two. This poses a challenge to designers and policymakers with an eye on efficiency, as efficiency alone will not necessarily lead to a reduction in total consumption of any given resource. The end-users have to change their

attitude with regards to the consumption of resources in order for this to happen.

That is, including eco-building into community design may help decrease our collective environmental footprints, but only if we have already taken the steps to incorporate social designs and processes to facilitate more fundamental behavioral change. To drive the point home, when we participated in the net zero energy housing pilot program years ago, only one project aimed to renovate an existing structure and most of the homes were large, free-standing, single-family homes requiring solar arrays similar in scale to the one our team had employed for *three* households. Few projects were located close to public transit or encouraged sharing between neighbors. The irony of putting a large, super “green” building at a great distance from the things you need day-to-day seems to be lost on many.

These findings might suggest to us that we should make use of a more behavioral approach to design when it comes to community development, and consider the liberal use of “nudges” towards more sustainable behaviors. However, it is a particular challenge to do so in shared spaces, where people may be at different stages of adopting sustainable practices. Some people need gentle nudges to encourage them to behave in a way that fits with how they already see themselves (i.e., environmentally-minded). Other people need more information to help them understand why certain behaviors are better for them and the environment.

For example, there is an unpopular expression in building design: “smart buildings make dumb people.” That is to say, when designers and developers seek to incorporate controls for human behavior into a space used by different kinds of people, they make certain assumptions about what should be controlled and why. Not all of the eventual occupants always share these assumptions. A familiar example is sensor-based lighting, which is often quite convenient. This kind of control can come much to the chagrin of the office worker who, while quietly typing away at their desk, now needs to incorporate wild gesticulation into their daily routine to keep the lights on.

The designer assumes, of course, that the person sitting behind that desk cannot or will not learn to turn the light off when leaving the room, so the building does it for them. For the initiated, this helps them to maintain an existing practice of saving energy. On the other hand, the building now trains the uninitiated to not concern themselves with this action, in any environment.

This is where the regular interaction between people within a community can help instill new attitudes and behaviors in a way that technological or behavioral designs cannot. If you are new to composting, but know that your neighbor uses this compost to feed the tomatoes you enjoy together, your adoption of this kind of segmentation of waste may come easier. If your elderly neighbor and friend are able to enjoy a certain vitality on a lifelong vegan diet, you might opt for that form of eating more often, perhaps at common meals.

Shaping sustainable norms

The above is one of the many reasons I became interested in intentional communities and cohousing in particular. The process of co-creating and/or co-managing a community provides many opportunities for people at various stages of change to learn from others about the benefits of living lighter on the planet, without it necessarily being a pedantic experience. Communal living also affords the capacity to better share seldom-used spaces, such as guest and dining rooms, as well as under-utilized tools, books, and the various things that make life fun and creative.

When talking with members of Canadian cohousing communities, I could see that while many of these people were living simpler, greener lives than a lot of dyed-in-the-wool environmentalists, that wasn't the main point for many. The value of such communities came from knowing one's neighbor, feeling engaged and able to start interesting projects with the help of those around you. When I asked them about environmental living, many would talk with me about compost or recycling (the low-hanging fruit of environmental actions). Meanwhile, they were living in a walkable community, growing some of their own food, and sharing cars and other equipment; this was all delightfully taken as a given.

Perhaps most importantly, they were living with, on average, 800 sq. ft. less personal space than they had been previously. The impact of smaller personal spaces is, naturally, compounded over time; less space to heat or cool, to finish and decorate, to clean and maintain. It is difficult for one to make such a switch on their own given the wider social context, but to share the experience with others they are relating to, while also having a greater sense of ownership over common

property, makes such changes in living not only possible, but desirable.

The intentionality of such places is a potent design element—one that can do more to change attitudes and behavior than technological interventions alone. In fact, research is starting to show us that within the urban context, cohousing communities tend to perform better on environmental measures than the less interdependent occupants of certified green buildings. All this to say, this is green design; it's just very low tech and set up to work towards human interaction rather than object-human interaction. It is arguably not

Consider the office worker who, while quietly typing away at their desk, now needs to incorporate wild gesticulation into their daily routine to keep the lights on.

as sexy as a massive array of solar panels, but more accessible to many for sure.

Developers interested in green building, like myself, need to recognize that conventional residential development comes ready-made with a social design that does not easily facilitate true, collaborative green living. We have to think about this in the process of any development project and take steps to remedy the problem. To make residential buildings truly sustainable, and more likely to be desirable places to live in the long term, we should consider a parallel process of community development as an integral part of housing development.

Those living in a community, or who are part of a forming community, also benefit by understanding that interaction isn't just about social sustainability: it pours over into environmental sustainability in a way that really affects attitudes and behavior. Knowledge of this might make it easier for the “deep green” dreamers among us to accept less technically advanced green building designs, in favor of flexible designs that can adapt to changes in understanding over time. In this way, without an eye on the perfect green building, you can go ahead and build truly good homes together. 🍷

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Learning to Say “ECO-BUILD” in Your Own Vernacular— Or, What Is Eco-Building, and How Do You Know You’re Doing It Right?

By Oliver Ogden



In this article I want to share my own journey of discovery of what eco-building means. And that definition, for me, continues to unravel, even as I develop this article. In fact, this process of getting my thoughts out and finding ways to share has led me into a deeper understanding of eco-building. So, I want to share my own growth, offer insights into how to work through your own homemaking journey, and try to impart a basic tenet: eco-building is different depending on location. What I’m hoping folks to glean from the article is empowerment to define for themselves what eco-building means to them.

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Denise and I had our first foray into natural building four years ago at the Mud Dauber School of Natural Building in North Carolina. Later that summer we were leaving the East Coast to move back west. We had our minds set to build our own tiny home on family property. We were excited to be heading back home after rounding out our 20s on the East Coast. Our optimism was in full gear—after spending years hustling our little egos around in the big city, we were yearning for a little familial comfort and eager to sink into a community surrounded by loved ones.

Most of all, our minds hummed at the thought of building a shelter

of our own. No matter what, we’d build out of clay, straw, and sand—we fancied we’d build a hybrid system of a strawbale north wall since it’s the coldest side and straw makes for great insulation. And we’d transition into a cob wall for the south, since the sun exposure would naturally load the cob with warmth to keep us warm in the winter.

We had learned so much and were eager to put it to use. Our plan percolated in our minds as we rolled across the country—but, probably somewhere in the hot summer sun of the Southwest, our plans sort of withered. Reality was setting in. While it was hot and humid and sweaty through the East and the South and hot and dry and sweaty in the Southwest, we knew by the time we’d get to the Northwest the rains would be just around the corner and with the rains came the damp and the overcast. We’d roll into Vancouver, Washington (just outside Portland) around mid-August. That gave us, at best, only six weeks to try to get a roof on something—pretty dicey prospects when your walls will be made of straw.

We were feeling pretty defeated. Along with “What were we thinking?” came the thoughts: “What good is our tiny home if it’s not built naturally?” and, a bit more fatalistically, “It’s basically an unexciting fraud of a structure if it has to be built conventionally.”

And these thoughts still surface from time to time. Flash forward to today for a moment. I’ve spent the last three years creating a design-and-

build company based on the principle that we ought to live in harmony with the natural world. While natural building (working with clay, wood, straw, etc.) has been our goal niche from the get-go, we gratefully take whatever work comes to us. Thus we do our fair share of conventional building—or what I dub “conscious conventional” since we seek to use reclaimed materials and employ the latest in “environmentally friendly” products when possible.

I’ve viewed this work almost like a stepping stone to the loftier calling that is natural building and I have a residual feeling of being a fraud every time I lay a pressure-treated beam across some concrete footers. It seems I’m participating in what I know in my heart of hearts isn’t helping our environmental crisis. But these materials are what’s called for by code. And they’re what my client can afford. I’m still working out how to reconcile all that.

• • •

Back on the road, Denise and I were having a good time. We visited the cliff dwelling site Walnut Canyon outside of Flagstaff, Arizona. What a beautiful place to reflect on the meaning of shelter. These mostly south- and west-facing homes effortlessly captured the low winter sun’s rays and in the summer, when the sun was high, the homes stayed cool, tucked into the eroded limestone cliffs. I cynically pondered how foolish we were abandoning the natural (and free) abundance of warmth and further, the basic concept (and Permaculture principle!) of capturing and storing energy.

We camped that night outside of Flagstaff and stared up at a scraggly canopy of ponderosa pines. They stared back, assuring us that we were finally back west. But we couldn’t shake nagging thoughts of not having a solid plan when we got home. And for me, I felt like going conventional for our house was a real setback of my new life dream of becoming a natural builder. I had in my mind a picture of what an ecologically

sound home looked like—you know what I’m talking about: beneath a mop of sedums and native grasses, I pictured undulating walls of lime and earthen plaster with irregular windows, niches on the inside for vases and candles, and a little live-edge shelf for my books about wabi-sabi and raising ducks. And of course, like the cliff dwellings, our home would be working with nature, not against it.

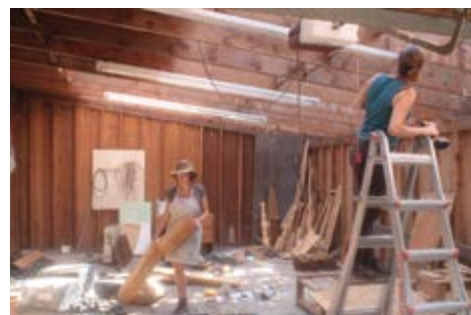
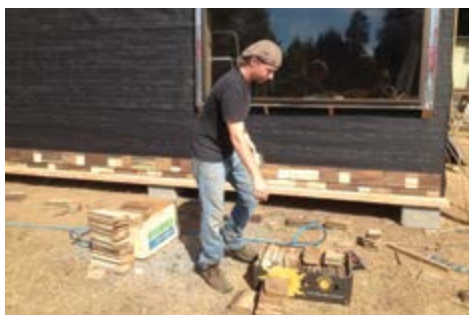
I recall lamenting to Denise, “We’re settling. It’ll basically be a fraud of a structure if it has to be built conventionally. And I’ll be a fraud.” I’m kind of a nervous, self-conscious, anxious type—especially in private. That next morning we learned of an old carport and shed that was being torn down near where we would build. This put a little wind in our sails—to have a local resource—a lead, if you will. Perhaps, even if our vision of a natural home wasn’t an option, at least we could make it from recycled materials.

“That’s worth something,” I thought. “Produce no waste. That’s a Permaculture principle, isn’t it?”

• • •

I’d like to segue into the main question of this article which is, “What is eco-building, and how do you know when you’re doing it right?” Well, when I started to write this, I leaned into my natural building credentials—surely that’s Eco-Building, I thought. I racked my brain and tried to polish a few anecdotal gems full of tips of the trade or goofy lesson-churning escapades. But as I started to unpack those stories, it felt disingenuous. Because, truth be told, up until now, my natural building stories were few and far between compared to the more common and conventional projects that I took on—you know, the jobs that paid the bills, but didn’t make it to my Instagram feed. And the more I thought about it, that conflict—the “trying to do right in a world I perceive is wrong,” and navigating the compromises that come with it—is more at the heart of the matter, isn’t it?

Sure, there are folks with time on their hands building beautiful natu-



Photos courtesy of Oliver Ogden



ral homes from the soil harvested from under their feet propped up by trees they fell in their backyards, and of course there are folks with fistfuls of cash ready to hand over to high-end architects who recruit high-end contractors to build tech-filled, LEED-certified, net zero homes, and I think these are both part of the story of Eco-Building. And when I've been lucky to have been a part of such projects you can be sure I Instagrammed it because I knew I was doing it right.

These types of homes, of course, are the emblems of the enviro-friendly abodes; they're the supermodels of sustainable shelter. But most of us don't live in *Dwell Magazine* cover shoots, nor do we own acreage. So how do we eco-build when we're stuck with our drafty old Craftsman or cookie-cutter ranch home? Everybody you talk to will have an answer, but will it be your answer? Eco-building is different for everyone everywhere.

• • •

“We've got at least 500 square feet of shiplap!” Denise called out. (Now we're back to the Denise and Oliver tiny home caper.)

As soon as we arrived home, we walked down the road to check out the buildings that were coming down. Spending some time with that decrepit, unloved structure, we began to make out a bit of life left in store for the wood. We made a list of what was there. Denise had counted all the siding boards and shiplap on the ceiling.

“That's nice fir, we could use that for ceiling material and flooring,” I said, “and all those 2x10 rafters, that's enough for our floor joists.”

“This plywood is still good and there's plenty of 2x6s for our walls,” Denise added.

“Should we take this old wooden ladder?” I asked.

“It's pretty cool, it could be a temporary way to get into our loft.”

“But I'm gonna build a custom staircase with drawers and niches for books.”

“It'll be temporary,” Denise insisted.

• • •

Our building design evolved based on what we had. And we had most of the ingredients for a house right in front of us—all we had to do was pull it apart and haul it down the road. I admit, there were a few steps, but crowbars! and sledge hammers! Denise and I and a few of our friends and family got to work. And it was still blazing hot and all the grass was a nice August green (brown). We were waking up each day with purpose.

Pretty soon neighbor Bob stopped by to see what was going on—he's a retired foreman who managed the construction of giant commercial buildings. He knew how to build. And pretty soon contractor Mike stopped by to see what was going on. He'd helped Denise's mom and stepdad Bert remodel their home and has been building for decades. And pretty soon Bert came out to see what was going on. And these three guys formed the self-described peanut gallery.

I only had a little more than a year of real building experience under my belt, and here were these pros checking it out. More so than my inexperience, I'd been steeping myself in a totally different way to build—natural building, and these guys who had spent a lifetime learning to do things the conventional way, I was sure they couldn't understand what was in my mind.

“How're you going to insulate it?” Bob barked.

“Well, I wanted to use strawbales,” I said, rather defeated.

Truth was, I didn't know exactly what I was going to use in the walls and ceiling. We'd already done the floor, since we were running short on time, and in an attempt to avoid fiberglass, I rented a blower and blew cellulose into the joist bays. It wasn't at all the same as the peaceful, natural experience we had earlier that summer heaving strawbales around, retying bales for custom fits, chatting with friends all the while. My friend Seth was visiting the day we did the blower—and it was loud

and dusty and awful. I held out hopes that I'd still be able to do something natural, but I was just in denial. It was already mid-September and while we were enjoying an extended summer, we knew it wouldn't last.

"Well I've got about 1000 square feet of fiberglass roll insulation left over from a big box store job just sitting up in the barn," Bob offered.

"Oh yeah, OK. Well that might be good," I said, hoping to skirt the suggestion.

We were framing the roof and likely next week we'd need to insulate to keep up momentum. In any case, I knew fiberglass would not be going into what I hoped would be a model for what's possible with natural building.

But then it did go into it. We were still sleeping in our tent, and nights were getting colder, and we wanted to seal up the walls and ceiling before we moved in. I went over to Bob's and we climbed up into his old Dutch gambrel-roofed barn and pitched a 150 lb. roll of commercial fiberglass insulation out of the hay door. And then he offered his small rolling scaffolding and got the insulation facing and helped me load it all over to our place. In what I felt to be a series of conciliatory actions, this was the real bummer. This project was failing in my eyes.

• • •

What if I reframed my project by judging not how it compared to what I saw in a magazine, or what others have done elsewhere, but thought of it as "how can this project be an expression of the existing resources and human and natural potential of, say, my immediate community?"

The Calapooia people of the Willamette Valley in Oregon referred to the great swathes of immigrants descending into their homeland as "the moving people." We're still the moving people; even if we've stayed put all our lives, we still play a part in the movement of goods, services, and ideas. So, that's who are. We are moving people. The key to ecological building—and frankly, the key to the whole environmental crisis as I see it—is that we need to stop thinking like moving people. We need to get grounded and look around at our surroundings and start to sort out how to get by with what's naturally available to us. We have implicit accountability to our ecological surroundings.

Rather than starting with "strawbale" or "cob" or "light straw-clay"—the heavy hitters of natural building—evaluate what's right for your situation and the resources available to you. Look on your land, or in your community. Be creative and adapt. And don't go into the process with too many preconceived notions. Try to erase the image of what it



looks like globally, in order to discover what it means for you locally.

How do we begin? Observe. This is the primary step in Permaculture—before you begin building a project, make an inventory of your local resources, including neighbors with skills and special tools, materials from old projects, scrap yards, wood waste recycle centers.

• • •

I went over to a new customer's house the other day. She's working with the local nonprofit, City Repair, that supports homeowners and schools and neighborhoods with community-empowering projects. Nancy wants to insulate her garage with light straw-clay and add a greenhouse on the south side with a little window so you can see the plants from the garage and perhaps a little bench will go underneath that. Her goal is to make her garage more welcoming to passersby so that folks can stop in and visit and chat about gardening and neighbors can get to know each other. When I pulled up and met her in the concrete driveway of her 1950s ranch house, she said the perfect thing:

"This is what I can do right now to change"—she was speaking about her garage makeover—"because I'm ready for this house to be for me without worrying about other people's expectations of what this house is supposed to be." 🌱

Oliver Ogden is the owner of Placecraft Design and Build based in Portland, Oregon.



ECO-ENERGY at Heartwood Cohousing

By Richard Grossman and the Common Facilities Team of Heartwood Cohousing

Hearthwood Cohousing is fortunate to be situated on 361 acres of beautiful land. We have good irrigation rights—essential in southwest Colorado where there is little precipitation. Unfortunately, the irrigation water isn't always where we want it. Shortly after we moved in we installed a photovoltaic system that ran a pump, but that system couldn't keep up with the need.

So we got a gas pump which was effective—except for being noisy, requiring us to buy gasoline once or twice a week, and to walk a quarter mile to start it. We thought about a better solar pump and had a reserve fund to save up for it, but the money was accumulating too slowly.

Heartwood was first occupied in 2000, when renewable energy systems were very expensive and somewhat fragile. The cost of renewable energy has dropped amazingly and reliability has improved. We are also aware of the need to decrease our use of fossil fuels to combat climate change. To take advantage of these changes we started a Renewable Energy Fund (REF).

Contributions to the Renewable Energy Fund are voluntary, and are added to our monthly homeowner association bills. Fourteen households contribute regularly for a total of \$152 each month. That adds up to almost \$2000 in a year! The Common Facilities Team administers the fund—although that has been easy. The only decision that we have had to make so far was to use the money for the new, much improved solar pumping system.

We were fortunate to learn about amazing electric pumps that are made in Sweden that can run off of either AC or DC current, and are very efficient through a wide range of voltages. This is ideal for our situation where the amount of electricity generated by the sun varies so much. We decided to more than double the size of the solar array with a second set of panels and to buy one of those amazing pumps. Fortunately the cost was covered by a combination of the reserve and the REF, with just a bit left in REF. That was three years ago and the new pump is almost meeting our irrigation needs. This past summer we had to run the gas pump just a few times during

a dry spell.

Why would someone want to increase their cost of living at Heartwood by contributing to the REF? While there are many generous souls here at Heartwood, there is an additional motivation. We all cause carbon dioxide to be emitted by our daily activities. Driving, heating our homes, the electricity to run our computers are some of the examples of activities that emit CO₂ from burning fossil fuels. Some people plant trees to absorb the CO₂ they emit. In addition to planting trees there are other ways to offset one's carbon emissions. One of my favorites is to pay for family planning; the fewer people, the fewer emissions. Another way, which is closer to home, is to invest in solar power generation, which will decrease the use of carbon-based fuels at a generating plant.

At the time of writing the balance of the REF is almost \$5000, and I think that I know where that money will go, after the balance has grown a bit. This past year each team set its goals. Both the Common House Team and the Common Facilities Team want to decrease our



Finn Brunner

Creating Budgetary Line Items for Ecological Upgrades

In most cases, choosing “ecological” options will cost more than using conventional methods or materials. Both in building my own house, and in our common-house planning, I have found practical wisdom in some advice Chris Scott-Hanson shared in a forum years ago. Chris's advice: build into your budget a line item for ecological upgrades. How much extra are you willing to spend, to have more virtuous options? This avoids nixing one choice after another: Can we use recycled-plastic lumber for the deck? It will triple our cost for the deck, so let's not do that. You may not be able to afford all the upgrades possible, but at least with a line item figure in the budget, you will have budgetary permission to choose some of those options.

—Maraiah Lynn Nadeau
RoseWind Cohousing,
Port Townsend, Washington

reliance on distant power sources and increase our use of renewable energy. The Common House Team put it best: one of their goals is to “bring a solar power system online to provide at least 80 percent of Common House power consumption within the next five years.”

Even the most green-built structure wouldn't really be ecological if it is powered by a coal-burning power plant. Energy efficiency is of utmost importance in eco-building. Once efficiency is maximized one can consider the source of the power. Fortunately, for projects that don't have the cash to generate their own renewable power, “green” power is available in most parts of the US for a small additional cost.

One of our members once said that you have to plan and budget for renewable energy when you are building. The cost of solar photovoltaic systems was very high when our house was built. My wife and I added a rooftop PV system to our home when we could afford it, then we added another PV system to our carport to charge our plug-in Prius. There are now seven privately owned solar arrays (including four solar-thermal) at Heartwood. Furthermore, most people are careful to be efficient in their use of electricity and fossil fuels, and buy renewable energy for a small increase in price.

When we were planning our community two decades ago we planned our buildings so that they would be energy efficient and have as much passive solar gain as possible. Furthermore, most of our homes were also designed so that solar panels would be easy to add. Most of the 24 homes are highly efficient “stick-built,” but we also have some alternative, extra-efficient building techniques. These include straw-clay, strawbale, and pumicecrete. And our workshop is strawbale construction.

Eco-building is important. It benefits not only the people who will live in and use the buildings, but also people of the future. It is important to be as energy independent as possible. If a person or community cannot afford the infrastructure to provide renewable energy at the time of building, they can be certain to build in such a way that it is easy to add later. Also consider setting up a fund to eventually pay for a renewable every system. It is an excellent way to offset inevitable carbon emissions! ☺

Richard Grossman is a member of the Common Facilities Team of Heartwood Cohousing, Bayfield, Colorado (www.heartwoodcohousing.com). In 2000 Richard and his wife, Gail, moved from Durango, Colorado to Heartwood Cohousing—just a few miles to the east. Gail is a retired teacher and Richard a retired obstetrician-gynecologist. His major concern is overpopulation, and he feels that communities help us to live with smaller footprints. You can find his blog at www.population-matters.org.

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The rate for Reach ads is... Up to 50 Words: \$25/issue or \$60/year; Up to 100 Words: \$50/issue or \$100/year; Up to 250 Words: \$75/issue or \$200/year. If you are an FIC Member you may take off an additional 10%.

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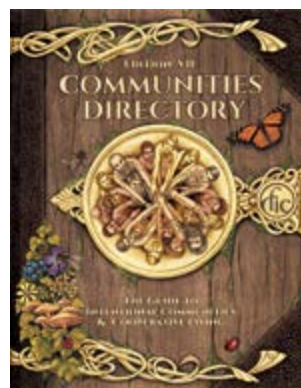
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Bill Mollison

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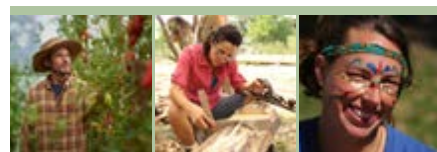
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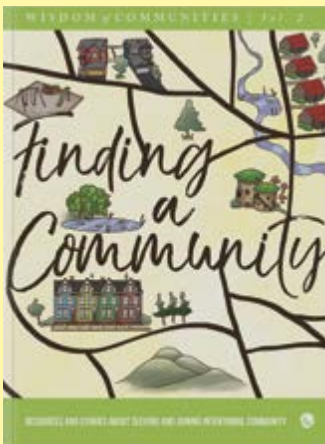
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REMEMBERING ZENDIK

(continued from p. 76)

and internal revolutions during the years she recounts. She entered Zendik as a virgin, uncomfortable and fearful in her own body, having felt increasingly detached from the world around her and ready to embrace a deep immersion in true experience and connection. She dove into life in a community where no subject of conversation, no matter how personal, was off-limits (although questioning the group's underlying assumptions and power structures was taboo); she struggled through hookups and breakups (some voluntary, some group-dictated), lost sight of her power, regained her power, left the group, returned to the group, went through conflicts and reconciliations, eventually liberated herself, and (spoiler alert) ended up married to someone she met while rebuilding her life after Zendik. Her tale is one of accelerated personal growth in a community context; there is no question that the person whom Zendik “spits out” at the end has been transformed, much more capable of manifesting her calling in life than the person who entered, despite and because of all the trials she has endured.

Helen is a riveting storyteller. This book, “sewn...from the frayed cloth of memory” (a remarkable achievement, considering its often journal-like detail and clarity) records her experiences, thoughts, and feelings throughout her Zendik years—interactions that reveal the nature of the group she was part of, but without the intrusion of constant analysis. The reader is immersed in her experience the same way she was, with the same questions—is this a disempowering cult? a unique opportunity to create social revolution? an unmatched opportunity for personal growth and transformation? none or all of these?—and the same shifting perspectives on the answers that Helen experienced. Only at the end do we learn her own ultimate conclusions, which are, essentially, that both can be true—an experience can be terrible and growthful at the same time.

By 2005, she had started describing Zendik as a cult, which helped her wrestle out from under its shadow. By 2017, her take has become more nuanced: “All groups fall along a continuum, from reverence to contempt for self-trust. I find no bright line dividing cult from culture—just stories jointly held, and questions invited or forced by crisis...” (p. 215)

And, after detailing the demise of Zendik Farm in the epilogue (the group dissolved in 2013, less than a year after Arol's death), Helen notes, “I count a number of ex-Zendiks among my dearest friends. Vining through the ruins, human ties remain.” (p. 225)

• • •

I asked my friend Lawrence Siskind—who spent two years at Zendik Farm, leaving just months before Helen arrived (see his article “Relationships in the Crucible,” *COMMUNITIES* #118, Summer 2003, pp. 40-42)—for his take on the book. After completing it in just a few days, he described it as a “compelling read” and said he concurred with “so much” in it; nothing in it rang untrue. The interpersonal dynamics Helen described all struck him as familiar, though he himself had managed to avoid being the brunt of as much “bullying” as Helen endured, likely partly because he'd found himself in a more advantageous position in the organizational hierarchy of relationships.

Was Zendik a cult, in his opinion? He was often asked that question on selling trips, and would always answer “yes—a good cult.” Despite a post-residency money dispute with the group, he continues to believe that his experience there was beneficial in his own life, as it clearly was in Helen's—even as it was essential that each of them leave to continue their journeys. Lawrence admitted not believing in Wulf's philosophy, nor hating the “Deathculture,” nor liking Zendik writings, art, or music (Helen had appreciated at least some of the writing, though she too disliked the music). But he loved the people there, loved living in that community, joining with “amazing people doing incredible things” in the interpersonal realm, giving and receiving feed-

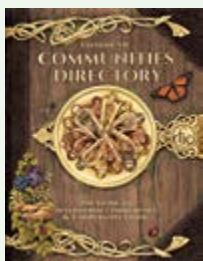
back relentlessly. He says he has never seen that level of honesty within a daily lived culture—neither before nor since.

Although Arol was clearly a “bully”—one who usually didn't have to face feedback on her own behavior, because of her place in the hierarchy—she was also a preternaturally insightful person whose input helped others grow. She would “call bullshit when she saw bullshit,” giving the kind of incisive feedback that we usually protect ourselves and each other from. “Everyone who stuck around hugely valued the experience and her insights,” according to Lawrence. “If someone couldn't take Arol's input, they would leave, usually within a few months.” Those who stayed knew that they had to deal with input they didn't want to hear (but that nevertheless often proved helpful), from Arol and from others—there are “not many places in society where you can get that.”

In Lawrence's view, it is easy to dismiss a group as a “cult,” but there is usually much more to the story—it's a label that shuts down curiosity and the capacity for understanding how the “cultish” group could actually have been beneficial to many people. “Zendik was good for me,” Lawrence says. Helen would probably agree in her case too—it's an experience that liberated her from her old self and helped her become who she is today.

The communities movement would benefit from many more memoirs of this caliber—especially ones coming from communities with healthier power dynamics than Zendik. Even in light of the shortcomings of the group which spawned it, Helen's book can serve as an inspiration to future writers (whether of full-length books or of articles for this magazine) of what is possible in writing about intentional community life. 🌱

Chris Roth has detailed his own quasi-cult-like experiences in “Power and Disempowerment on the Ecobus” (COMMUNITIES #148) and “More Sustainable Than Thou” (COMMUNITIES #115).



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Remembering Zendik

Mating in Captivity [a memoir]

By Helen Zuman

She Writes Press, Berkeley, California, 2018, 240 pages

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Helen Zuman's debut book describes in detail her six-year-long involvement with a radical intentional community that also fits many people's definition of "cult": Zendik Farm, which started in California in 1969 and then moved *en masse* to Texas, then Florida, then North Carolina (where Helen joined it in 1999), and finally West Virginia (around the time of her departure in late 2004). Helen arrived soon after the death of patriarch Wulf Zendik; Wulf's widow Arol and their daughter Swan were clearly "running the show," as they apparently had been for a while.

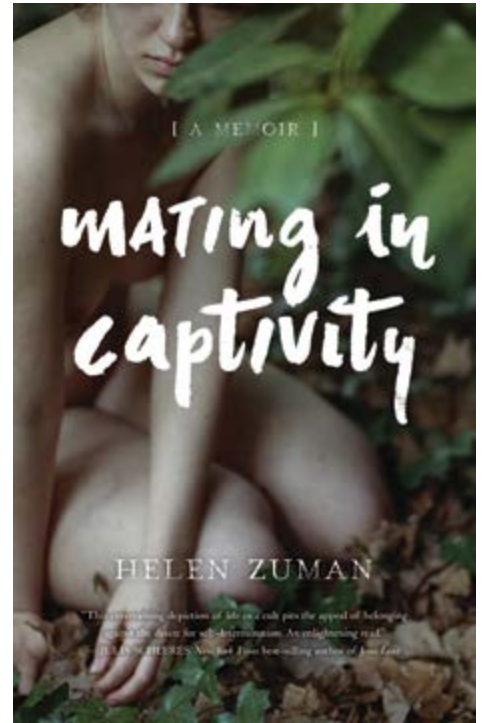
Helen came to Zendik at the age of 22 via the *Communities Directory* (pored over in her Harvard dorm room), inspired by its promise of reconnection to the body, to physical work, to earth, to community, to authenticity. It offered a sense of revolutionary belonging—a vibrant alternative to the soul-destroying "Deathculture" of modern America. Its members—numbering 60-plus at the time of her joining—tended to develop both an emotional and physical dependence on the group (especially once they had given it all their money and possessions, as nearly always happened when they progressed into more serious commitment—"give it up or leave" was the underlying expectation). Many believed they would experience "soul death" if they left the group.

As portrayed by Zuman, life at Zendik combined, on the one hand, the opportunity to test radical ideas about relationship and to align one's life with potentially transformative spiritual truths, with, on the other, the presence of what could easily be perceived as ongoing psychological and emotional abuse. Fear was a driving force—fear of reprimands from the leadership or others in the group, fear of humiliation or banishment, fear of life away from "the tribe." The Zendiks helped pioneer groundbreaking experiments in the "relationship revolution," including polyamory and non-possessiveness, and in open and honest talk about sex. Many of Wulf's teachings seem to align with those that people today (nearly 20 years after his death and 50 years after he cofounded Zendik) still (or again) find liberating—the basis of the inner and interpersonal revolutions necessary for any effective outer transformation. While the Zendik rhetoric about the "Deathculture" often seems extreme, human civilization does appear more and more to be courting self-destruction, fulfilling the darkest aspects of the Zendik analysis of a world-gone-wrong. No wonder 20-somethings looking for a world that made sense, a "tribe," flocked to the Zendik community—it seemed to embody a viable and deeply engaging alternative to what appeared to them as the isolating, meaningless, destructive path of mainstream American life.

Zendik leadership exerted control through a pattern of tearing down and rebuilding its members' self-esteem—then tearing it down again, boosting it back up, knocking it back down, *ad infinitum*. Members went to extreme lengths to gain and maintain Arol's fickle approval; in Helen's words, Zendik's hierarchy "lionized some, belittled many, and throttled dissent." (p. 207) While the leaders (Arol and Swan) were allowed to have steady "consorts," any other members whose relationships became too close would have their relationships broken up by the leadership's decree, as those kinds of exclusive, committed, dyadic relationships threatened loyalty to the group as a whole.

Moreover, the law of "psychic cause and effect" hung heavy over the group, as every misfortune was seen as the result of individuals' (or the group's) failings. Leaders blamed a kitchen-dining room fire on a rise of "square relationships"—romantic pairings that threatened the "Zendik first" philosophy. One's deepest intimacy must be with the whole group, not with an individual; the fire had been cosmic punishment for a lapse in that awareness. Arol also had a habit of separating children from their mothers, once she deemed the latter unfit to raise their own children.

Life at Zendik involved many opportunities for personal growth, whether it was becoming comfortable with "sex meetings," or receiving sometimes overwhelming amounts of personal



feedback, or learning how to "sell"—which is how Zendik made most of its money (other than what its members gave it—often family inheritances). Groups of Zendiks took the Farm's merchandise, or "ammo"—self-produced music CDs, magazines, bumper stickers proclaiming "STOP BITCHING START A REVOLUTION"—to festivals, concerts, and other gatherings, and the seller's performance (success or lack thereof in gathering money, and sometimes in recruiting new Zendiks) was often the cause of either praise or excoriation upon their return home. Selling, too, was subject to the laws of psychic cause and effect. Those who truly believed in Zendik as the only place modeling the right way to be—the one tribe in which they belonged, and the one capable of outliving and transforming the "Deathculture"—would be able to translate that absolute belief in Zendik into sales/donations. Those who couldn't raise money were seen to be coming up short in their inner devotion or belief, and needed to redeem themselves or face grounding from selling trips (and/or possibly expulsion from the tribe itself). Other intentional communities could not measure up to what Zendik was doing—"Escapist hippie bullshit" is how one of Helen's lovers described East Wind, where he had lived for a few years. No other community got kinder treatment; Zendik was the only Real Deal.

Helen herself went through major changes

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