



Photos Shannon McIntyre, Sarah Purgus and Liz Johndrow

## A Quaker Meetinghouse in Costa Rica

**D**EEP in Central America near the Continental Divide, where you might not expect to find chisels, mallets and an antique boring machine in working condition, the tink, tink, tink of timbers being framed can be heard above squawking toucans and screechy parrots. I came to Monteverde, Costa Rica, in January to spend three months helping to lay out timbers and coordinate volunteers to build a new meeting hall for the community of American expatriate Quakers who've settled these hillsides. Building this frame has been a remarkable demonstration of the potential for collective accomplishment when people are organized and dedicated. Although this was not a Timber Framers Guild project, it certainly fell in line with the Guild's central mission and it was orchestrated by some of its members. Timber framing is not part of the local vernacular in Costa Rica, nor the tradition for those who moved here and founded this community, but it sits well with Quaker values of simplicity and an appreciation of the natural world, and it brought people together in that special way a timber framing project does.

The physical and spiritual center of a Quaker community is the Meeting for Worship, where people come together in silence unless moved to speak. Quakers believe that any person is capable of sharing profound messages and communicating with God without intermediary clergy. The new meeting hall will be for this prayer service, a large open space so every person can see and hear every other and feel present with all. The space will also serve as a community center for monthly square dances and for the many large events hosted by the adjacent Quaker (Friends) School. To meet all these needs, the main hall is a sizable 31x65-ft. frame with a 30-ft. clearspan in four of the six bents. The building is between the school's library and the existing school building, and a 15x45-ft. covered courtyard closes the space between the school and meeting hall and will provide space for eating and gathering. Dancers will enjoy not only the wide open space, but also a sprung floor.

The vibrant community in Monteverde has a unique history. In the late 1940s, three members of a Friends Meeting in Fairhope, Alabama, were arrested for refusing to register with their local draft board. Pacifism is a deeply held belief for Quakers, and they could not accept the first national draft during a time of peace. They spent a year in prison and were motivated by their experience to form a separate Meeting in 1950 in Costa Rica, which had recently abolished its army and pushed forward a series of social reforms. They were dairy farmers in search of land suitable for pasture. The land they eventually found within their means required a long trek up a (still) treacherous road in Puntarenas province. Since the 1980s, the surrounding area has become internationally celebrated for its unique cloud forest ecosystem, but in the early days much of it, cleared by squatters for pasture, was a blustery hilltop full of wild animals, complete with mudslides. The 40 or 50 people who moved here built their own houses, delivered their own babies, fed their families and set roots down deep.

The first meetinghouse was a disused squatter shack. When they were ready to build a better space, the community held a pie auction to raise the funds for the materials and built the first schoolhouse, part of which served as a meeting hall. Nearly constant winds combined with 118 in. of rainfall per year were tough on the schoolhouse. The next meetinghouse, also on school grounds and dating to 1957, was a "bee" project in which members of the meeting all pitched in money and time to get the project done without outside help. It's beautifully built and has served the community well.

The design for the newest meeting hall includes a hip roof on one end of the building to moderate the wind's effects, along with a concrete retaining wall to combat weather-driven erosion.

As the population of Monteverde has grown and changed, Quakerism has remained the fundamental root of the community. More expats have settled in the area and many children and grand-





Facing page, walls and three trusses up, hand-raising proceeds apace. At top, volunteers at the ready and celebrating the halfway construction point. Above, from left, David Hooke tutors elementary timber framing; sawyers hard at work with portable mill; sprung floor layout.

children of the original families have stayed close to home. Many have married Costa Ricans, and Meeting is now held in English and Spanish twice per week. David Hooke, a partner in the building company Timberhomes in Vershire, Vermont, decided to spend a year in this community with his family. The idea of making a new meeting hall as a volunteer-built project seemed a natural fit to him. David revels in doing these projects at home in Vermont and seems to have been drawn to timber framing mostly as a vehicle for bringing people together.

The frame was designed by David and Timberhomes's Josh Jackson to meet the diverse needs of the community. In December, David invited me down to be his assistant in layout and in training volunteers who would cut the joinery. By the time I arrived in January, framing was already under way.

I was energized by the idea of a community project, but also aware of the realities of constructing a building this size. I spent the long, dusty bus ride to Monteverde poring over the drawings and pondering how beginners would fare with the modified English tying joints, curved braces and tropical wood. All told, 1292 joints would be cut by volunteers. The extent of the tool set was a single boring machine, a single bit to drill all 260 pinholes, and enough chisels, saws and planes to keep the anticipated ocean of workers busy. The framing site was half a basketball court, thanks to the compassion of the schoolkids and generous support from their teachers. Heavy tropical timbers had to be loaded by hand from the sawmill onto a pickup truck, driven to the school over rocky roads that locals navigate with ATVs, and unloaded at the site. This community is well versed in working together but had only one resident with timber framing experience. The budget was tight, the timeline abbreviated and the supply of power tools short. Given these constraints, I had serious doubts that we could even come close to our deadlines. But with plans in hand we began training volunteers, and the sawyers started up their portable bandsaw mill.

Almost all of the timbers are a Mexican species of cypress from a mature grove of suitable trees within a half-mile of school planted as a windbreak in the 1970s by Jon Trostle, a Quaker settler. Much of the forest in Monteverde is in reserves (one a 26,000-acre territory where biologists come to study cloud forest ecology) and harbors endemic wildlife valued and protected by both locals and the international community of biologists studying here, but Mexican cypress is non-native, and therefore less valued for its role in local ecosystems than other trees. The windbreak provided nearly all the wood needed—timbers, roof boards, floorboards and infill wall framing. It is rare for the person who planted the trees to witness them put to use in one's own lifetime: Jon (second from left in photo top left) celebrated his 91st birthday during construction and, with his wife Sue, was a regular volunteer.

**Roof trusses** The trusses' interrupted 7x9 lower chords are housed into the kingposts and held in tension by 1¾x5-in. Guapinol (*Hymenaea courbaril*) splines 5 ft. 9 in. long and transfixed by six 1¼-in. pins, in a design reviewed and approved by a structural engineering professor at the University of Costa Rica in San José. (Drilling 1¼-in. holes through this tropical hardwood resembled how I imagine arm-wrestling a large angry puma must be.) Two of the trusses are reinforced across the tension joint at the kingpost by frequently fastened steel plates as part of the lighting system for the theater. The 6x7 upper chords are at a 3:12 pitch, and their tenons, 3 in. thick, bear on one another inside a through-mortise in the kingpost rather than conventionally bearing on the kingpost itself. If the kingpost shrinks, the chords will retain nearly full bearing. The outer-wall end of the tie beams is part of a modified English tying joint.

The professionally built foundation for the meeting hall comprised a grid of deep concrete piers linked together with structural grade beams around the perimeter and parallel to each bent.





At top, raising complete at courtyard end of frame. Above left, truss assembly on horses: David Hooke drills for spline pins while assistant eyeballs plumb and author checks for drillbit blowout. Above right, swervy brace accommodates procedural error in great style.





From left, wedding dancers test the sprung floor of multipurpose building, which will serve as meetinghouse, school theater and monthly square-dance hall; all-star volunteer David Guindon wields a prize commander; sunrise Quaker Meeting in completed frame ready to cover.

Reinforced block walls additionally connect these piers particularly in the stage area. Building a sprung floor meant keeping the foundation separated from the floor. A grid of metal joists spans the transverse concrete stem walls, providing some of the needed flex over 12 ft. spans, and floats on rubber cow mats where the joists cross the concrete. So far, all dancers approve. The local crew building the foundation also fabricated steel hold-downs for each post, welded to rebar inside each pier, to prevent the frame from slipping off the foundation during earthquakes. Seismic and wind forces are primary here. The posts were routed for a flush fit of the hold-down that would not interfere with wall siding.

The final load of timbers came a mere six days before raising. Toward the end, it became difficult to find large-enough trees for the bigger members of the frame, the sawyers were working hard to meet deadlines, and the volunteers were now up against sopping wet, heavy wood and some serious wane. By that late in the game, over 60 people had come to volunteer once a week or more (mostly more), for two months, and over 100 people had participated in some way. A smaller, dedicated crew had formed who would put in a few hours every day. People rallied beyond all expectations to put in over 4000 hours of work just in cutting joinery. The massive efforts to treat and oil the timbers and to raise the building were additional. The school ran a weekly minicourse for 15 middle school and high school kids to learn the basics of timber framing. After three or four sessions, many could follow layout lines on their own. Even with hand tools and limited experience, eight to ten people chipping away at joinery at any given moment started to feel like a well-oiled machine chugging toward the finish line.

Between layout, cutting joinery, moving timbers, treating for termites, oiling, test-fitting bents, keeping tools sharp and rust free, and maintaining some minimal sense of organization, there were more than enough tasks to go around. Schoolkids came out at recess to lend a hand. Numerous original Quaker expats, now octogenarians, were consistent volunteers, and even people from other nearby schools all came out to help finish the frame. Excitement grew as we marched toward raising day.

Talk of renting a crane to lift the trusses met with antagonism by those managing finances and by community members sure that enough people would come out to get it done. The financial cost of getting a crane up that hill and the moral cost of raising with machinery were too great. In the first two days bents and wall sections went up by hand, and then came a break for a wedding, during which the sprung floor got its first test by happy guests. We were then ready to face the trusses.

All told, the trusses weigh approximately 1200 pounds each and had to be lifted up piece by piece and assembled in the air. Two towers of staging carried cribbing level with the wall plates. Large

crews of 20 to 30 people moved each truss member aloft, where the whole truss was assembled, cinched together with truck straps and pinned. At this point, all 30 people on the staging would line up, lift the entire truss and lower it down one end at a time onto its respective posts. None of these trusses required trimming on raising day, a testament to the newfound skills of the volunteer framers and the test-fit crew's attention to detail.

With relatively little funding, limited electrical power and a small tool set, this community built its own space to gather, worship, hold weddings and funerals, and come home to. Building a large timber-framed structure this way has been an eye-opening lesson in the key elements to make such an effort feasible, safe, of long-lasting quality and enjoyable for all involved. David Hooke, as the orchestrator of the project, came up with the list of requirements below.

It goes without saying that each community is different and that, when they are really needed, characters come out and shine: the practiced woodworker who fabricates 260 beautiful hardwood pegs, or the enthusiastic youngster looking at things like this for the first time and who asks the questions that spark fresh debate, or the architecture student who works behind the scenes to make it all happen. My initial doubts about finishing the meeting hall arose from seeing a lack of tools, equipment and experience, but I now realize that what makes this kind of project a reality comprises a much different list.

—SHANNON MCINTYRE  
*Shannon McIntyre (sionainn.mcintyre@gmail.com) was a Heartwood apprentice and works at Timberhomes, LLC, in Vershire, Vermont.*

### Checklist for Volunteer-Built Project

- ☞ Consensus that there's a need for the structure.
- ☞ Active support by those directly affected by construction.
- ☞ The necessary trees.
- ☞ A crew of skilled carpenters to do things impractical for volunteers (such as to build the foundation or put on the roof).
- ☞ Enough money to pay the skilled carpenters.
- ☞ A vast number of volunteers, willing to work consistently with hand tools, the important characteristic of a volunteer being not age, strength or experience, but consistency.
- ☞ Enough young bucks to help move many very heavy timbers.
- ☞ Enough handsaws, chisels and planes to keep the workers going, and someone willing to keep the tools sharp.
- ☞ A solid core of three to five people who are completely comfortable doing layout and at the same time able to shift easily to teaching someone how to start a saw cut, pare a tenon or whatever else it might be—and to do this teaching over and over and over.