

The First 30 Years of Natural Life Magazine

Building With Straw

Natural Life has published many articles on straw bale construction. (Some of them are archived on our website; visit www.life.ca/home/strawbale/index.html for links.) Here is an excerpt from the first article, written by Jeff Johnston and published in the September/October 1995 issue.

Straw bale building construction has recently become popular with people looking to build an inexpensive, ecologically sound house or other structure. Straw bale construction was pioneered in the mid-1800s in the Sand Hills of Nebraska, and some straw houses are still standing in the American midwest. Such houses have been built recently in the United States for as little as \$4 per square foot.

Straw bale construction is not just straw bales, of course. Left exposed to the elements, a straw house would soon be a sodden mass of rodent-infested fiber or a heap of ashes resting on the foundation. The trick to preserving a straw house is to stucco it – inside and out – with concrete. This gives a high level of fire resistance – double that required in Canada, for instance.

The Nebraska style is the original, and most popular, method of construction. Straw bales 35-inches long, 18-inches wide and 14-inches high are piled on top of each other just like bricks, with each bale resting on the two immediately below it. Rebar (metal reinforcement rods) or poles are jammed through the bales (two per bale) to prevent the wall from falling apart. A top plate is added, and the roof sits on the plate, with the bales taking the entire load of the roof. After allowing two to four weeks for the building to settle, the walls are parged, or covered, with concrete. These walls can be flimsy, and if they become infested or wet from leaking rain or water on the ground, entire walls can be damaged.

In the late 1970s, Louis Gagnon developed a building method he hoped would be used in the Canadian north because of the superior insulation properties of straw bales (walls have an R30 value). This method became known as the Quebec style. Each bale stands on top of the one below, but each bale is totally encased in concrete – inside and out, as well as the ends, top and bottom. This gives the house much greater rigidity and strength, as the concrete takes the weight of the roof, unlike the Nebraska style. In addition, the walls are impervious to water, rodents and insects; if mice or rain do damage a bale, the harm is restricted to that one bale. Unfortunately, the Quebec style is almost as expensive as a conventional wood frame house. Gagnon and his team use concrete forms and pumpers to build a house, which will cost approximately ten to 20 percent less than a comparable wooden home.

David Cameron and Nancy Sherwood are the owners of the Ovens Natural Park in Riverport, Nova Scotia, near Lunenburg on the south shore. They decided to build a straw bale house af-

ter a friend mentioned that he had seen Louis Gagnon build an inexpensive Quebec-style house and had Gagnon's rudimentary description of construction techniques.

After altering their design plans three times, David and Nancy began construction. Six weeks later, their walls were up one story and parged on the exterior. The walls enclosed 1,200 square feet of floor space, and had cost less than \$10,000, including the cost of hiring two helpers. In the process, they altered their construction method from the Quebec style to what David now calls the Nova Scotia style.

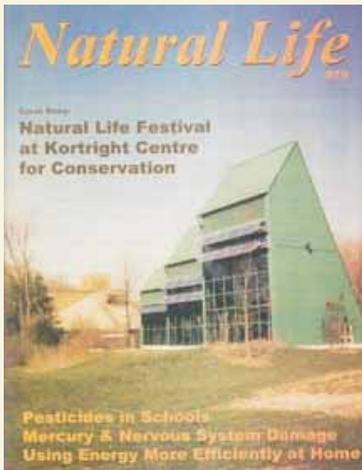
David Cameron's Nova Scotia style uses the same principles as the Quebec style. Bales are stacked directly on top of each other, with columns of concrete forming the load-bearing portions of the wall. Where this style differs is in the horizontal layer between the bales.

The Quebec style uses concrete as mortar, sandwiched between bales and holding them together. However, concrete has less strength when used horizontally. David and his friend/house designer Sterling McCann realized that two lengths of rebar on top of a row of bales would act the same way as a layer of concrete, especially once they were secured in the concrete columns. In addition, the rods could tie in to the corner construction. This modification took much less time and effort, eliminating the use of concrete forms at each layer and allowing them to build the walls three bales at one time.

The result is a first layer topped with concrete, onto which are laid all window frames, followed by six or seven layers with rebar rods laid horizontally, with concrete load bearing columns, solid concrete corners, and a three-inch thick concrete bond-beam on top of the last row of bales.

Read the complete story, along with some of Cameron's money- and work-saving tips on the Natural Life website. -NL-





Celebrating Sustainable Living With Natural Life Festivals and Expos

Over its 30-year history, *Natural Life* magazine has often been ahead of its time. Among the things we have pioneered is the eco-fair concept – rare a decade ago but quite common these days. Beginning in the 1990s, we organized a series of *Natural Life* Festivals and Expos in various locations across Canada. They featured a Green Marketplace of sustainable, healthy products; dozens of free workshops and demonstrations; a natural foods café; music; organic farmers’ market; children’s environmental activities and much more. The events were designed as showcases of environmental responsibility. Green Marketplace vendors were chosen with that responsibility in mind and presented with guidelines to ensure their booths met our standards. Food vendors were required to serve only healthy food without using disposable dishes or utensils. One memorably creative food vendor served curried rice on banana leaves! At that same event, all the organic waste was fed to worms in a vermiculture project left in the community as a legacy. Musicians played on a solar-powered stage, a straw bale structure was built by

workshop participants, hybrid cars were test driven and kids of all ages pedaled a stationary bike to generate power. A Trashy Fashion Show showcased clothing made of organic cotton and hemp, as well as outlandish clothing fashioned by *Natural Life* readers from the contents of their recycling bins. The sobering events of September 11, 2001 – and people’s subsequent eagerness that fall to cocoon within their homes – led us to discontinue these events and concentrate our resources on magazine publishing. But we continue to sponsor the increasing number of similar events held throughout North America and further afield. **- NL -**

The Autonomous House

In 1979, Nick Nicholson, solar pioneer and author of the book *Harvest the Sun*, wrote a series of how-to articles for *Natural Life* on low cost solar and wood heated energy-efficient home construction.

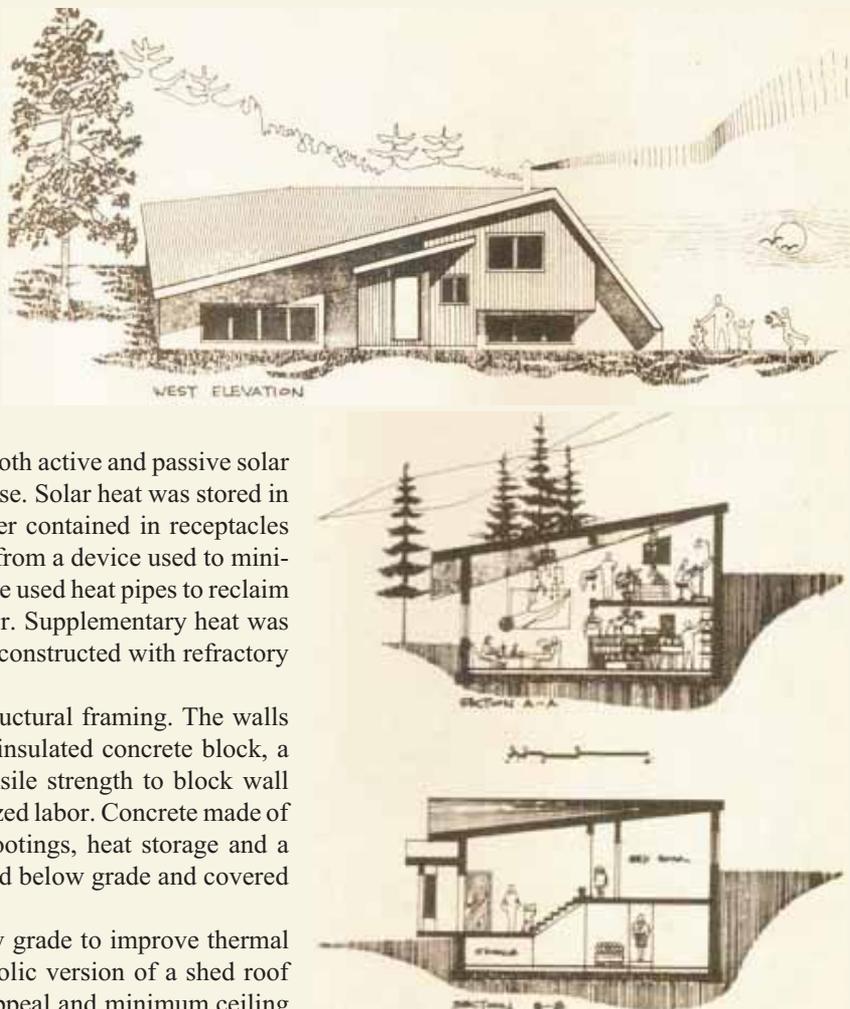
Nicholson, who ran the Ayer’s Cliff Centre for Solar Research in Quebec, introduced to our readers his Autonomous House project, which he described as providing “viable alternatives to obsolete building practices.” In a series of articles, Nick documented the house’s construction.

The Autonomous House (drawings, right) had both active and passive solar systems to heat living spaces, water and a greenhouse. Solar heat was stored in rocks placed beneath the ground floor and in water contained in receptacles placed in a “heat storage bin.” In a design adapted from a device used to minimize temperature differences in spacecraft, the house used heat pipes to reclaim surplus heat from flue pipes and exhausted stale air. Supplementary heat was provided by an economical site-built wood-burner constructed with refractory cement and wire mesh.

Demolition timbers were recycled for basic structural framing. The walls were constructed of surface bonded, dry stacked, insulated concrete block, a new system that added thermal efficiency and tensile strength to block wall construction while eliminating the need for specialized labor. Concrete made of cement bonded polystyrene beads was used for footings, heat storage and a soak tub. Precast insulated concrete slabs assembled below grade and covered with earth provided annual food storage.

Half of the vertical surfaces were placed below grade to improve thermal protection and reduce maintenance costs. A parabolic version of a shed roof minimized roof area while maintaining aesthetic appeal and minimum ceiling heights. It was constructed with a system that combined urethane foam with a silicone rubber coating.

Nick shared his experiences with our readers but he cautioned: “Beware the pitfall of emulation. Books and reports are the remains of past experiences. They report the truths of the past. They do not contain the truths of the future.” **- NL -**



Design, construction, drawings and architecture by Nick Nicholson and Hai Toh Lim