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Cheryl Bradbee works at her desk on the main floor of a custom-built healthy home. The concrete railing absorbs daytime heat which helps warm the house at night.

Breathing space

Beth Northrup starting feeling vaguely ill in the early '80s. By the mid-'80s, she felt sick all the time.

Her head hurt. Her muscles ached. She was tired, congested and confused. As a student living in a Vancouver apartment, her diminishing health affected her ability to work and play. She became so ill that she had to move back to her parent's home to be cared for.

Almost 15 years later, having left behind a trail of medical professionals who insisted that "it was all in her head," Northrup was diagnosed with a condition known as multiple chemical sensitivity (MCS), which means she has allergic reactions to chemicals and compounds used every day in construction and renovation.

The diagnosis was partially empirical; when Northrup eliminated certain foods from her diet, she felt marginally better. So she decided to explore whether there might also be irritants in her surroundings. There were.

The list of things triggering the reactions included everything from carpets, glues and adhesives to paints and fabric sizing (a spray put on fabrics) — all staples of conventional building and furnishing.

The solution? Northrup needed to eliminate as many allergens as possible from her surroundings. She needed a healthy house to live in.

Fortunately, when Northrup

Three women decide they want a place without adhesives, gas-emitting paints
Architect designs non-allergenic, eco-friendly home, *by Vicky Sanderson*

and two friends, Cheryl Bradbee and Grace Terrett, decided to build and share a home in Mississauga a few years ago, all three wanted it to be a healthy one.

They weren't prepared to live in a standard box built with dry-wall and chock full of adhesives and gas-emitting paints. And they wanted to create a co-operative living arrangement that would give each person private space while they shared a recreation and living area.

The three bought a half-acre lot in Clarkson and then set about finding the best architect for the job.

Enter Martin Liefhebber of Breathe Architects of Toronto (www.breathebyassociation.com).

When Liefhebber isn't designing beautiful homes made from improbable materials like straw, tires or earth, he takes on more mainstream gigs, like the new Bambu Club.

Long attracted by the notion of making building "a more rational process" and by reducing energy consumption, he's arguably Toronto's best-known eco-friendly architect.

In 1991, Liefhebber won a national healthy house competition mounted by the Canadian Mortgage and Housing Corpo-



A carport and garden shed was built with an attractive "green roof" of hardy Canadian rye grass. A downspout from the home's roof diverts water to this garden.

ration (CMHC) to design an affordable house that suited its community, was environmentally sound and provided a healthy indoor setting.

His winning design, built by Rolf Paloheimo of Creative Communities Research of Toronto, along with a team of engineering experts, was a 1,700-square-foot semi-detached three-bedroom home on a small

lot in Riverdale. The house was designed to be totally self-sufficient, with 75 per cent of its energy needs coming from solar power and a self-contained water recycling and purification system.

Liefhebber and Paloheimo continued to focus on building healthy housing, and were a logical choice to collaborate on Northrup's new home. (Palo-

heimo replaced an earlier builder mid-way through construction).

The design is unusual; each woman has a 1,000 sq.-ft., self-contained unit.

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► How to keep the air in your home healthy. **H7**

Breathing Space



ANDREW STAWICKI/TORONTO STAR

Beth Northrup's bedroom, left, has a tree in it, part of her home's natural décor features. The bathroom in the energy-efficient home has heated flooring.

Home reduces chemical emissions



ANDREW STAWICKI/TORONTO STAR

A high-efficient glass skylight over a staircase allows natural light and solar heat into the home.

► Healthy From H1

Each contains a bedroom, living, bathroom and small kitchen area.

But the interior of the building is comprised of an oversized kitchen with two sinks and work islands, which leads into a large communal living area and separate dining area.

What they came up with was a 5,000 sq. ft., 2½ storey building, which sits on a lot that features "green landscaping." Traditional materials like drywall, paint, and man-made fibres were reduced or eliminated. The entire building is made of straw bale construction—dense bales of hay sandwiched between layers of chicken wire and covered with stucco. Straw bales emit no fumes or emissions, and have excellent insulation value.

The home is also energy-efficient. Solar panels are used for both the hot water system and for energy, one-third of which comes from the panels.

Drawing up a menu of "healthy house materials" is difficult, explains Paloheimo, because it can vary so much according to who lives there.

Healthy homes share three elements: they promote the health of the occupants, protect the environment and make efficient use of natural resources.

But the way they achieve that varies widely because they have to meet the needs of their inhabitants.

"A healthy house is one that's healthy for the people who live there," Paloheimo says. "Different people are sensitive to different things, and that has to be taken into account."

For Northrup, as for many people, the process of determining which products she could tolerate was complicated. Taking small amounts of potential symptom-triggering materials, she wrapped each up in a small piece of tin foil and left them to "cook" on a sunny windowsill for a few weeks. Then she would open the package, sniff, and observed symptoms, which could range from a rash to headache to dizziness.

It's not scientific but in the absence of documented lists of "healthy" building materials, it was the best process available to Northrup.

Multiple chemical sensitivity is a tricky condition to diagnose and is often greeted with skepticism by family physicians who know little about it, says Dr. Lynn Marshall, medical director of the Sunnybrook and Women's College environmental health clinic.

But there is evidence the health problem may be on the rise, she adds. The most common symptoms are a height-

ened sense of smell, lack of concentration and feeling groggy, dull or "spacey." Air quality can be improved through simple measures such as eliminating tobacco smoke, pesticides, harsh household cleaners or strong smelling toiletries.

But could the next step be a growth in healthy housing?

Both Liefhebber and Paloheimo say interest is growing, but they agree that healthy housing does not constitute a hot new trend.

"There aren't many people in a position to build something from the begin-

ning," says Liefhebber, "and lots of people are more comfortable with a house that's already standing than with something that doesn't yet exist."

There's also a perception that healthy housing is more expensive to build than conventional housing, says Paloheimo, even though some design elements can save money.

For example, cleaner air is achieved by using inert materials like concrete for flooring and using old-fashioned lime plaster instead of drywall.

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Homeowners are breathing easier

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That saves money, and so does passing on wall-to-wall carpeting and wall coverings.

Straw bale construction is an increasingly popular choice for people with environmental sensitivities and needn't cost more, says Ben Polley, whose company, Harvest Homes, began building straw bale houses in 2000. "It's a bit tough to speak to the issue of cost," he says, "because like all the straw bale builders in Ontario, we're doing custom work."

"Anecdotally, though, I know that we've bid against conventional builders on projects and have been told that we come in at the middle to low-end range of the bids." Northrup's home came in at about \$1.5 million (split between three people). But she maintains that the cost would have been lower had they not switched builders, and had there been fewer problems and slowdowns because of the city's reluctance to issue permits for the build.

Costs can begin to rise when the design includes energy and water systems that work with nature. Solar panels aren't cheap and although they'll knock down utility bills, it can still be an expensive proposition to outfit a home with them.

Leonard Allen of Phantom Electron in Whitby says that a homeowner could spend between \$500 and \$50,000 on solar panels. His company has begun selling a "Gridtie" package that allows homeowners to get at least part of their energy from solar panels, for under \$5,000.

Rich Krechowicz of Callrich Eco Services in Whitby, which sells solar panel packages for hot water systems, suggests that with an investment of about \$3,500, a homeowner can begin to obtain part of the energy necessary to heat water.

A truly healthy house will probably also include a reasonably sophisticated ventilation

system. Northrup, Bradbee and Terrett didn't scrimp on their healthy home. "We probably did spend more than average," says Bradbee. "Some of that depends on the finishing. But we also built a house to last a couple of hundred years, and that means something to us."

Bradbee, a spatial design consultant, whose company, POV, focuses on community development and has a robust enthusiasm for sustainable building practice, contributed lots of ideas on how to make a healthy, practical space that worked for all three occupants. For example, she insisted the two work islands in the kitchen be of different heights to accommodate individuals' combination of short/long arms and/or legs.

It was a simple idea, but one of several that initially seemed insurmountable to more conventional tradespeople. "The response to a request like that is that the standard counter height is 36 inches. But when you ask why you can't deviate from that, the answer is often 'because it's standard.' But I don't care about being standard, I care about having a home that works for me."

After lots of consultation, hours of sharing ideas and a few showdowns between Bradbee and obstinate tradespeople, the three women were left with a light-filled home that's as beautiful as it is practical and healthy.

Today, Northrup is still working on regaining full health. But she feels well and looks great. And she knows that her house isn't making her sick.

★ The Environmental Health Clinic at Sunnybrook and Women's College Hospital can be reached at 416-351-3764.

★ The Canada Mortgage and Housing Corp. has information on healthy housing at www.cmhc.ca. Click "Improving quality & affordability" in left box and then "Healthy housing & sustainability" in the drop-down menu.