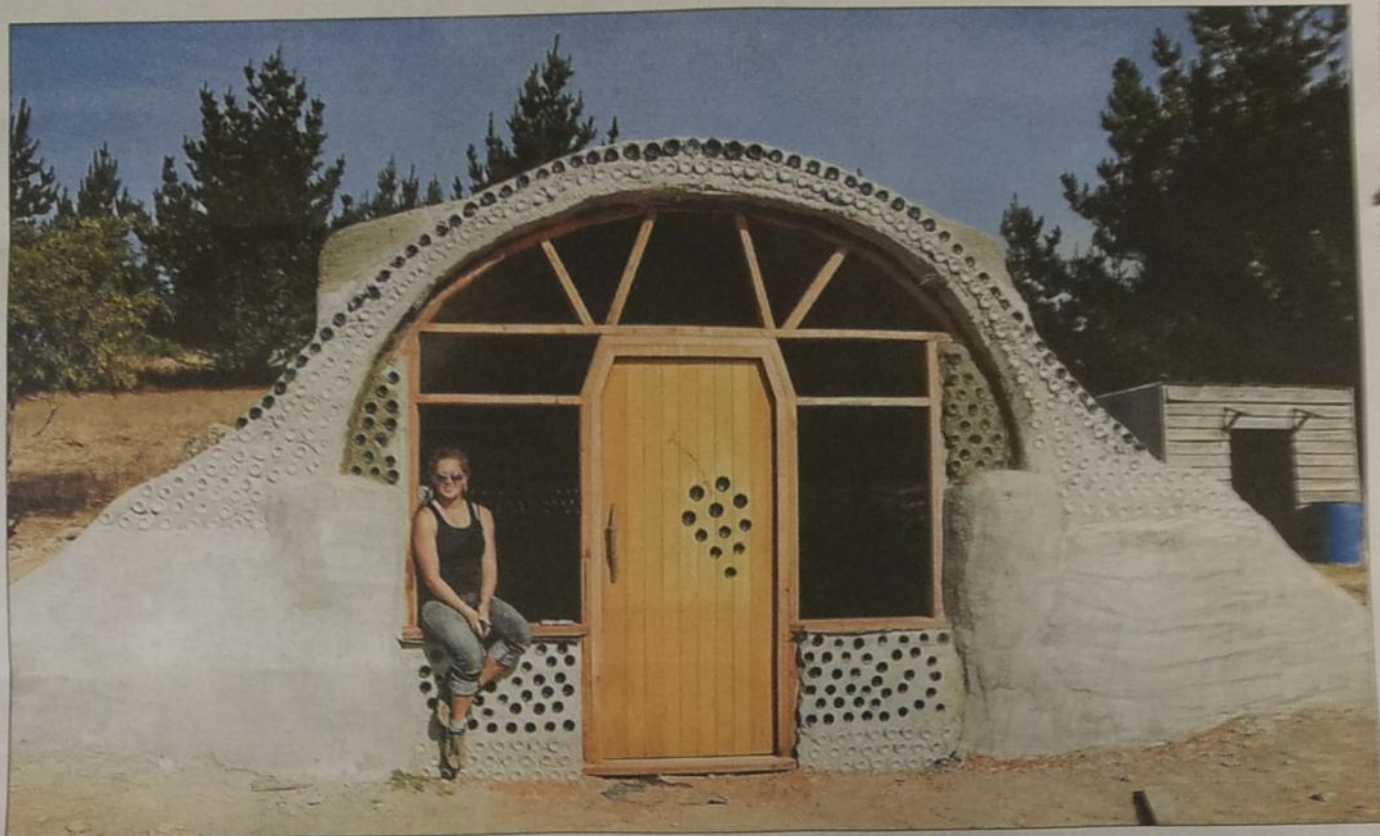


Earthships voyage to the future

architecture

Self-contained living environments may be the ultimate in sustainability, reports **David Killick**. Photos by **Henry Smith**.



Sustainable future: Volunteers, led by American architect Michael Reynolds, build Christchurch's first "Earthship" on Huntsbury hill.

Earthships being built around the world are designed to transport their occupants to the future in comfort and safety. They are tethered to the Earth, but hurtle through space and time along with the rest of the planet, braving climate change, natural and human-caused disasters, and dwindling natural resources. Unlike conventional buildings, Earthships are designed to require minimal maintenance. They are independent, self-contained, and easy on the environment – as sustainable as possible.

Earthships are the concept of American architect Michael Reynolds, who visited Christchurch in March to outline his philosophy and conduct a workshop. He also helped build Christchurch's first Earthship, on Huntsbury Hill. It will join dozens of others around the world, including Reynolds' home base in Taos, New Mexico.

"We are making buildings that really have little or no input from infrastructure," explains Reynolds. "They heat and cool themselves, harvest their own water, make their own electricity. They are made from discards from modern society. They grow food and they contain and treat their own sewage."

Earthships don't utilise energy from coal or nuclear power. The conventional infrastructure required to deliver power is high-maintenance, so having an individual house provide everything that its family needs is better for people and the planet, says Reynolds.

"Your home not only collects heat from the sun, but it stores heat."

Reynolds doesn't talk about architecture; rather he describes his work as "biotechture". He says conventional housing doesn't work in most parts of the planet. Only 17 per cent of the world's population have a house of their own; 83 per cent don't. These people are not concerned about mortgages but basic shelter and sustenance – water, food, and sanitation.

"What I am finding, going to Third World countries, is the hard times that the 17 per cent are having could be certainly lessened if they were to live more like the 83 per cent. It's the way we live on the planet. We are the only creatures that destroy the



Michael Reynolds: Empowering people to save the planet and build a better future.

planet and each other. Humans are making a mess of things."

By contrast with the modern approach to living, indigenous people such as the Native Americans lived without destroying everything. "It's trying to look at a more logical way of approaching life. It's empowering and putting responsibility on people, not being dependent on government."

Reynolds says it is often easier to try something new in developing countries, because they have fewer regulations. These countries could end up leading the way. Earthship Biotechture has built schools and emergency shelters in Central America, India and Africa.

Construction often makes use of materials that would otherwise be dumped like car tyres filled with rammed earth, tin cans, and bottles, covered with plaster.

Reynolds says Earthships are designed to be resilient in the case of natural disasters, and that would benefit Christchurch, rather than building systems and the city back the same way. "Why build it back so the next earthquake can knock it out?"

"I am not against technology. I am using technology to make us more independent."

Hands-on effort
Rosa Henderson describes building Christchurch's first Earthship, on Huntsbury Hill.

Work on this Earthship demonstration project kicked off with Mike Reynolds pounding the first tyre, three hours after landing in the country. The



floorplan is a U, made up of 17 tyres to create 10 square metres of interior space, a humble beginning with lots of loads of dirt at the ready.

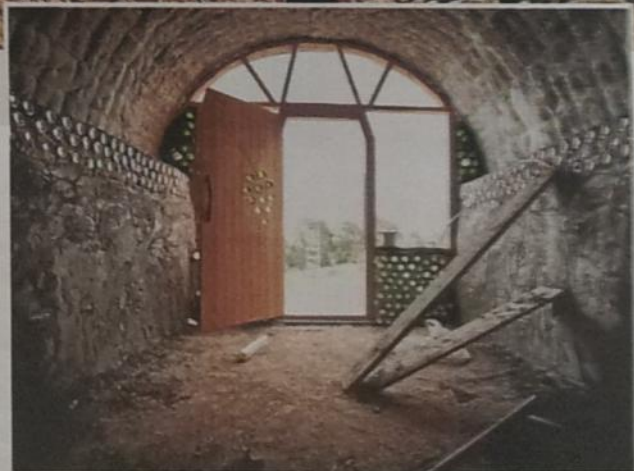
Landowner Robin Woodsford donated the field on his beautiful 4-hectare organic vineyard on Huntsbury Hill, north facing for the light and sheltered from the southerly – the perfect spot for Christchurch's first Earthship community project.

We had a strong core crew of five Kiwis preparing and organising the build, which ran smoothly with Mike at the head and 35 participants from all over bringing their enthusiasm and ideas.

This building is a simple version of a single room, with simple systems including one cistern for water and one solar panel for power. The rebar vault is built on the ground, the five courses of tyres are pounded full of earth at the same time, and at the end of day one, both are complete – the rebar vault is lifted on top of the tyre work, tied and ready for plaster.

Next a cement bond beam, formed by cans, is poured to hold the vault to the tyre work. The vault is then plastered four times, and work is done to surround the building with a vapour barrier and rigid insulation and is then buried with earth.

Organising and designing the bottle wall was the next project,



which meant cutting glass bottles and taping end to end to make a brick that lets in light. At the same time, carpentry was under way to get the front face ready for the front door and windows.

The roof then got a five-centimetre layer of insulation and a vapour barrier and its last 2.5cm coat of plaster. We also built a parapet; cans layered up to create a water catchment which will run into the cistern buried in the berm of the building. Inside, the tyre walls were packed out to a nice shape and plastered. A slab is poured on the floor inside, glass fitted and the door hung.

Earthship buildings have a second greenhouse on the front, which provides solar gain and is a buffer zone, regulating the indoor temperature so the building doesn't need heating or cooling.

Our demonstration room may not get this added feature, depending on regulation.

Done in only three days, this wee room is a wonderful example of water catchment, temperature control, recycled materials and what can be achieved with volunteers in a short time-frame for very little money.

■ A huge thanks to: The NZ team (Robin Woodsford, Mike Lilian, Turei Atkins, Lachlan Grey and Rosa Henderson) and to those who participated in the build. Thanks to Brian, our wonderful backhoe driver and hangi man. To the companies that donated materials (Fulton Hogan, Texco, Fenwick steel, Holcim cement and Pumphouse glass). And especially to Michael Reynolds for inspiring and leading our work. □ Information: earthship.co.nz