

The Future of Architecture: The Living Building

By Jason F. McLennan

A few years ago I was asked to give a talk in Northern California on the future of architecture. I had been asked because of work I was doing with Bob Berkebile, one of the pioneers of the "green" architecture movement, on a project in Montana that was partially funded by the National Institute of Standards and Technology (NIST). Berkebile had hired me to help him and a large team of scientists, engineers and educators to develop a proto-type building for the 21st century that would use less energy and resources than any building of its type in the country, while enhancing the productivity and creative synergy of the students and researchers that would inhabit the building.

The project known as the EpiCenter, was to be built at Montana State University and would showcase emerging technologies combined with age-old strategies that together would generate less pollution than any conventional building, both in its construction and operation, all while instructing people on the relationship between the built environment and the natural. In a sense, we had been given the task of designing the future, or at least to show what was possible if we dared to dream of a future where our buildings no longer took from the environment, but were restorative.

My particular role on the EpiCenter was to identify appropriate technologies and then help the design team weave these into the fabric of the project, in other words, to integrate and close loops between systems. My talk in California was timely, because it allowed me opportunity to reflect on the goals of the project and put them in a framework that could be easily described to an audience with varied backgrounds. I realized that what I needed most in describing the future of architecture was not drawings and building images, but a metaphor - a simple way to describe the future that would embody the principles I wished to communicate while conjuring up images that told a complete story.

Describing things as metaphors can provide an astounding amount of clarity and allow us to understand complex systems quickly, but they can also lock us into set ways of thinking. For too long now the machine has been the metaphor for our buildings, which imply a relationship with nature that is exploitative; solving problems with brute force and the addition of great amounts of energy. It is a nineteenth century model that has been carried forth into the 21st century. What is interesting with architecture however, is that when the metaphor changes, new sets of rules of emerge that can guide the design process.

While preparing for my speech I had time to stroll for a few hours on the beach, watching the waves roll in and out and feeling the abrasiveness of the crisp salt air on my skin and lungs. I found myself searching amidst the sand and rocks for this new metaphor, one that could replace the machine, and provide a new construct into which state of the art technologies and age old principles could be placed. Serendipity being the mother of all inventions, I soon came upon some tiny flowers eking out an existence in this harsh, but beautiful climate that would provide inspiration for this new metaphor.

Growing in clumps on the top of the primary dune in poor soil, exposed to harsh brackish water and at the sometimes mercy of gale-force winds were tiny bushes that sported beautiful purple flowers. Here was a beautiful thriving plant that not only had evolved perfectly to suite its environment, but also enriched it, retaining soil, providing habitat and storing rainwater as needed. A perfect metaphor for the buildings of the future.

Flowers are marvels of adaptation, growing in various shapes, sizes and forms. Some that lie dormant through the harshest of winters only to emerge each spring once the ground has thawed. Others that stay rooted all year round -opening and closing as necessary to respond to changing conditions in the environment such as the availability of sunlight. Like buildings, they are literally and figuratively rooted to place, able to draw resources only from the square inches of earth, and sky that they inhabit. The flower, must receive all of its energy from the sun, all of its water needs from the sky, and all of the nutrients necessary for survival from the soil. Flowers are also ecosystems, supporting and sheltering microorganisms and insects like our buildings do for us. Equally important is that flowers are beautiful and can provide the inspiration needed for architecture to truly be successful.

Bucky Fuller, one of the great minds of the 20th century once said, "We do not seek to imitate nature, but rather to find the principles she uses." And by following these basic principles we can imagine whole cities operating like complex ecosystems, processing water and waste while generating energy. Communities in desert regions will be designed to maximize the ability to collect water, and like the plants of the desert retain and conserve that water. In colder climates the focus will shift to retaining heat and capturing the available sunlight. From region to region the focus will change but environmental performance will be constant.

I decided after that walk to call this future of architecture, a future of living buildings. Living buildings, like their flowering counterparts operate from seven simple principles.

The Living Building will...

- Harvest all their own water and energy needs on site.
- Be adapted specifically to site, and climate and evolve as conditions change
- Operate pollution free and generate no wastes that aren't useful for some other process in the building or immediate environment
- Be comprised of integrated systems that maximize efficiency and comfort
- Will improve the health and diversity of the local ecosystem rather than degrade it-move beyond sustainability to restoration
- Be beautiful and inspire us to dream.

When I got back to the hotel from the beach I had my lecture ready on the future of architecture and a fresh perspective on how to discuss design for the 21st century. The amazing thing is that we already have the technology necessary to create buildings that can perform just like the living buildings that will become the future. From photovoltaics to fuel cells, the technology research we performed for the MSU EpiCenter demonstrated that the future is available if we only have the desire and foresight to accept it.