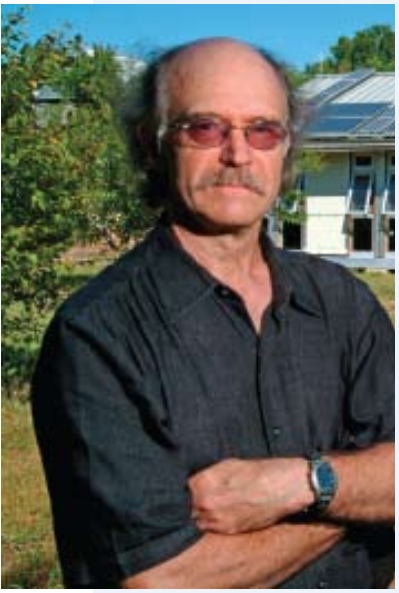
Q&A with Pliny Fisk



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Pliny Fisk is cofounder and codirector of the Austin, Texas–based Center for Maximum Potential Building Systems (CMPBS), the oldest architecture and planning 501c3 nonprofit organization focused on sustainable design in the United States. An associate professor at Texas A&M University, Fisk is a visionary who has innovated or popularized cutting-edge sustainable theory and actions for more than three decades.

The last time I interviewed you was almost 30 years ago, after you had cofounded the CMPBS. Since then, what do you see as the most important changes in approaches to sustainable development?

Thirty years ago, everything being talked about seemed to have the words *alternative* or *radical technology*, not *smart* or *green*. I think the words *smart* and *green* are less threatening, nicer, which is a problem because they don't convey the fact that now we need a drastic and sudden shift. We need to be radical more today than we did 30 years ago.

Ecological land planning promulgated by Ian McHarg 30 years ago was primarily a conservation strategy. Now, we are going beyond the simple protection of nature to active participation, adroitly managing nature to work for—and with—us. At CMPBS, we're creating techniques and methods to balance resource cycles—air, water, energy, food, materials—through a building metabolism that is linked to the land. This was unheard of in McHarg's days.

Thirty years ago, information—good information—was so interspersed with philosophical and political overlays that it took time to understand it. Now, information is abundant and highly accessible. The Web has made the green evolution far faster and with far more peer-to-peer connections of people and organizations. As Paul Hawken describes in his book *Blessed Unrest*, the extent and depth of this movement—potentially representing *millions* of organizations—is fast, flexible, and able to act with almost no money involved. In my estimation, this is a true sign of a deep-seated change.

What is the CMPBS open building approach?

Well, this approach represents several trends all converging simultaneously. We have adapted a procedure that is known in the industry as "design for manufacturing," or DfM, and a life cycle technique referred to as "design for disassembly," or DfD, as open source approaches to the supply chain. In the housing arena, we have developed an open building protocol system. Each of these methods addresses the process of design and the construction of buildings, and how they can anticipate change over time.

Open buildings are engineered and designed to be highly adaptable to the user, organization, or activity using them. They can also be replaced in whole or in part so that maintenance and reuse—which are usually costly over time—can occur, resulting in less waste, more user satisfaction, and even personalization.

On a larger scale, our groCommunity open building approach derives from the simple realization that infill can be planned just as the dimensions within a building can be planned, and that communities can develop as needed. Some of the best-known examples are the "hill town" mixed-use block community known as Next 21 in Osaka, Japan, and Lucien Kroll's work in Europe.

Where can this systems approach be applied most effectively? Is it useful for large and small developers?

This is a big mind-set change for developers and building owners, because right now we still conceive of a building as a collection of many separate parts, rather than as an integrated whole that is designed from the start to use flexible manufacturing protocols and to change. Nor is there money upfront to plan a truly interoperable approach to buildings, as the computer, auto, and aircraft industries were forced to do 30 years ago.

To a certain extent, this approach has been happening in hospitals, and in some commercial structures like factories. However, the sector where we need this approach most and where we will get the most benefit, i.e., the sector with the greatest overall economic and environmental impact—single-family housing, condominiums, townhomes, and apartments—is almost never even discussed. The residential sector needs a total building systems rethink. It still believes somehow that structural insulated panels [SIPs] are the solution. SIPs are as far from a building system as you can get—they are *part* of a building system—they are not the building system. It's like we believe that a body panel is the key to the total system of a racing car, when it is really just one of many things that you need to consider.

You've developed an alternative land planning and design methodology that you call Eco-Balance Planning and Design. How does this methodology differ from something like new urbanism, smart growth, and the LEED for Neighborhood Development program?

Eco-Balance Planning and Design balances the life cycle within each step of the development process. It literally balances resource use within an ecological context.

The U.S. Green Building Council's LEED program, whose early work I participated in, is a checklist and a sort of conscience-raiser. Although it is a giant leap from where we were about 15 years ago when I collaborated on the development of the AIA's *Environmental Resource Guide*, LEED is evolving, acknowledging that systems integration, bioregional diversity, social equity, and life cycle analysis are necessary elements.

When we design buildings, we are designing and engineering the ecosystems of the future. In any ecosystem, the *rate* of flow is more important than *conserving* the flow. In good design, these functions are intrinsic and visible.

LEED, smart growth, and almost all the other programs are beginning to hint at how natural systems function. Nature is self-repairing, regenerative, evolving, unlike our current buildings and communities; when they decline, it's a full collapse. To position buildings within the context of on-site life cycles, we have to insert into the design tools and rating systems the cycles of air, food, water, energy, and materials at all scales of development. This involves a wide spectrum of often thousands of strategies that connect building metabolism to the land and to natural processes. In this way, the "list" becomes a cyclical resource management protocol.

The traditional approach to water, for example, is to conserve it, not regenerate it. Too often we look only at one end of the life cycle, like water harvesting, but not at the other end—water treatment within the scale or boundary within which we are working. Instead, we pass these responsibilities on to a next scale of development, which is usually well outside the project boundary.

Eco-balancing water, however, starts with all the renewable *sources* of water: roof harvesting, wall harvesting, street and pavement harvesting, land harvesting, renewable ground and surface water, etc., and *re-sources* them using regenerative methods such as wetland plants, or microbial rock bed filters, or sewage ponds, or living machines like the forest floor and golf courses and open-space systems. Other cycles overlay and are integrated with these. The important thing is to complete the life cycle.

If you do not keep flows going within some performance boundary, then zero energy, zero waste, or zero anything is not really possible. It's all about balance!

In the past, new urbanism was the epitome of masking everything in a do-gooder way. This tends to divorce aesthetics from nature. Yet it tried to be sincere in the deepest sense, because it was trying to make up for a lack of design and community planning education on top of terrible financing incentives that catered to the old Rustbelt nostalgic aesthetics.

Recently, working with some new urbanists, we have started to open the door to balancing at multiscale, or multitransect levels. Because new urbanism, like LEED, has a structure that can be readily understood, it can be enriched with new dimensions, like eco-balance, and create a very good inroad into what a balanced community development could become.

What is the equal-area infinite grid projection system that CMPBS uses for its master-planning projects? What does it do? How does it create sustainable projects?

One of the most important efforts—from the standpoint of conceptualizing and planning where we have to go—lies in providing an easily understandable framework for interactive multidisciplinary discussion.

We use the Platt Carree Quad Grid Projection, which creates an adequately accurate

and simplified flattened view of the Earth based on an equal-sided square that is continuously divisible into four equal squares. It complements Will Wright's merger with Google Earth. Imagine SIM CITY and SIM EARTH really done well with a resource-balanced sustainability overlay that conceptually grabs people at every step and at every scale, from house to planet! Thousands of life cycle stages could be interconnected by a dynamic object-oriented programming that communicates with city officials, students, design professionals, city planners, regional planners, etc., in a truly understandable way. It would have feedback probes in the environment that inform the system, smart icons found everywhere telling multidepth stories of how we are doing, how we did, and what should be done uploaded to a "gaming" platform that helps us participate in the one big game for our lives. This game could provide cities with an unprecedented level of visibility about what makes them tick in the context of playing a game—this is cool!

CMPBS has even gone as far as equal-area gridding the entire country and placing within that grid 12.5 million businesses with of all their greenhouse gas criteria, all of their air pollutants and toxic releases, all within an equal-area cell system. Like the original SIM CITY, the equal areas are easily understood and can become a preliminary design and planning tool based on the footprint requirements of the life support cycles being addressed.

At the community scale, the more the space is used in an integrated manner, the more efficient it becomes.

For example, a single person requires approximately 5,000 square feet [464 sq m] of temperate forest for oxygen and 7,500 square feet [696 sq m] of forest to mitigate the carbon dioxide that person exhales to balance his or her requirements for air. Plants supply oxygen and act as a carbon "sink." Say we feed sewage into the community system and treat it using the forest and forest floor. We know that the forest grows about 20 percent better using these nutrients. So, now we have a sewage treatment system producing oxygen while also improving the carbon sink capacity of that city or region.

You can extend this life cycle footprint procedure to include anything—materials, energy, food, etc. As long as they are land-based plant-driven renewable regenerative systems, they all possess multiple functions.

Existing conventional buildings make up the vast majority of our built environment. What are the best ways to retrofit them?

There are many ways to convert these buildings to open building systems as they are renovated and remodeled, from inserting flexible flooring, wall, and ceiling systems to the selective separation of structural systems from wall and floor infill. It's also important to integrate as much passive solar function as possible.

This implies different financial commitments and relationships of owners to buildings. The building becomes a reusable armature, adaptable to any user. When industry retains ownership of its core product in which it has invested, for example, that product continues to be leased, maintained, and leased again. It is infinitely reusable and as such infinitely financially rewarding over the long term. A reusable building is not very different.

What do you consider the continuing roadblocks to sustainable development?

We cannot wait for a crisis to happen. We need a comprehensive, anticipatory action plan within a framework of adaptive cycles and underpinned by operations research strategies.

Second, we need to undo our education and financial systems that are divorced from nature. We need to both learn from and respond to the diverse bioregions and the people who understand them.

What is it going to take to make the built environment truly sustainable and, it is hoped, reverse global climate change? Regulations?

We need a serious reevaluation of "value." Today, nature-produced oxygen is not valued, nature's ability to metabolize waste is not valued, and life support techniques that adroitly manage natural systems without destroying them are not valued. We need economic incentives to change our values. There needs to be thousands of types of living machines, for example, where humans get paid to use nature without destroying it.

Recently, we exhibited a simple living machine on the Washington Mall. It used bats instead of insecticides to get rid of insects. It also collected the bat guano to replace the chemical fertilizers used on lawns.

Residential lawns [account for] approximately 20 million acres [8.09 million ha] in the United States. More than $5 billion is spent on chemical fertilizers for lawns, most of which runs off due to inappropriate timing or dosage, which pollutes surface [water] and groundwater. Consumers also spend about $700 million using around 67 million pounds of synthetic pesticides on their lawns each year.

Of the 36 most commonly used lawn pesticides, 14 have possible carcinogens, 34 are sensitizers and/or irritants, 15 are linked to birth defects, 21 to reproductive effects, 24 to neurotoxicity, and 22 to liver or kidney damage.

A simple invention like the living machine we demonstrated on the Mall could displace those toxic solutions.

Having helped create the world's first green builder program and national models to understand life cycles and flows as they relate to the built environment, I'm encouraged by a general acknowledgment that change is needed. However, what will be essential to achieve the magnitude of change that is needed is for economic value to align with ecologic value. The key is to design for balance. **UL**

CHARLES LOCKWOOD is a green real estate authority and consultant in southern California and New York City.