CRRA

Architecture as Pedagogy II

"The worst thing we can do to our children is to convince them that ugliness is normal."
Rene Dubos

As commonly practiced, education has little to do with its specific setting or locality. The typical campus is regarded mostly as a place where learning occurs but is, itself, not believed to be the source of useful learning. It is intended, rather, to be convenient, efficient, or aesthetically pleasing, but not instructional. It neither requires nor facilitates competence or mindfulness. By that standard, the same education could happen as well in California or in Kazakhstan, or on Mars, for that matter. The same could be said of the buildings and landscape that make up a college campus (Orr 1993). The design of buildings and landscape is thought to have little or nothing to do with the process of learning or the quality of scholarship that occurs in a particular place. In fact, buildings and landscape reflect a hidden curriculum that powerfully influences the learning process.

The curriculum embedded in any building instructs as fully and as powerfully as any course taught in it. Most of my classes, for example, are taught in a building that I think Descartes would have liked. It is a building with lots of squareness and straight lines. There is nothing whatsoever that reflects its locality in northeast Ohio in what had once been a vast forested wetland (Sherman 1996). How it is cooled, heated, and lighted and at what cost to the world is an utter mystery to its occupants. It offers no clue about the origins of the materials used to build it. It tells no story. With only minor modifications it could be converted to use as a factory or prison. When classes are over, students seldom linger for long. The building resonates with no part of our biology, evolutionary experience, or aesthetic sensibilities. It reflects no understanding of ecology or ecological processes. It is intended to be functional, efficient, minimally offensive, and little more. But what else does it do?

First, it tells its users that locality, knowing where you are, is unimportant. To be sure, this is not said in so many words anywhere in this or any other building. Rather, it is said tacitly throughout the entire building. Second, because it uses energy wastefully, the building tells its users that energy is cheap and abundant and can be squandered with no thought for the morrow. Third, nowhere in the building do students learn about the materials used in its construction or who was downwind or downstream from the wells, mines, forests, and manufacturing facilities where those materials originated or where they eventually will be discarded. And the lesson learned is mindlessness; it teaches that disconnectedness is normal. And try as one might to teach that we are implicated in the larger enterprise of life, standard architectural design mostly conveys other lessons. There is often a miscalibration between the lesson of interconnectedness when it is taught in classes and the way buildings actually work. Buildings are provisioned with energy, materials, and water, and dispose of their waste in ways that say to students that the world is linear and that we are not part of the larger web of life. Finally, there is no apparent connection in this or any other building on campus to the larger set of issues having to do with climatic change, biotic impoverishment, and the unraveling of the fabric of life on Earth. Students begin to suspect, I think, that those issues are unreal, or that they are unsolvable in any practical way, or that they occur somewhere else.

Is it possible to design buildings and entire campuses in ways that promote ecological competence and mindfulness (Lyle 1994)? Through better design is it possible to teach our students that our problems are solvable and that we are connected to the larger community of life? As an experiment, I organized a class of students in 1992-1993 to develop what architects call a pre-program for an environmental studies center at Oberlin College. Twenty-five students and a dozen architects met over two semesters to develop the core ideas for the project. The first order of business was to question why we ought to do anything at all. Once the need for facilities was established, the participants questioned whether we ought to build new facilities or renovate an existing building. Students and faculty examined a dozen or so possibilities to renovate and for a variety of reasons decided that the best approach was new construction. The basic program that emerged from the year-long class called for an approximately 14,000-square-foot building that

- discharged no wastewater, i.e., drinking water in, drinking water out;
- generated more electricity than it used;

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- used no materials known to be carcinogenic, mutagenic, or endocrine disrupters;
- used energy and materials with great efficiency;
- promoted competence with environmental technologies;
- used products and materials grown or manufactured sustainably;
- was landscaped to promote biological diversity;
- promoted analytical skill in assessing full costs over the lifetime of the building;
- promoted ecological competence and mindfulness of place:
- became in its design and operations, genuinely pedagogical; and
- met rigorous requirements for full-cost accounting.

We intended, in other words, a building that caused no ugliness, human or ecological, somewhere else or at some later time.

Given opposition of the college president, the project sat on the shelf for nearly 2 years before being endorsed by a new president in the spring of 1995. With the approval of the trustees, the project went forward in June of 1995. The terms of the approval required funding from "sources not otherwise likely to give to the college." and two years in which to do the design work and bring the project to groundbreaking. Both requirements influenced the pace and character of the project. The fact that we could not solicit funds from donors affiliated in any way with the college required that the building be designed to be as widely appealing as possible. But no other kind of building would be worth doing. The 2-year timetable required that we move quickly to select an architect and design team and get on with the job at hand.

As a first step, we hired two graduates from the Class of 1993 to help coordinate the design of the project and engage students, faculty, and the wider community in the design process. We also hired architect, John Lyle, to help conduct the major design charettes or planning sessions that began in the fall of 1995. Some 250 students, faculty, and community members participated in the 13 charettes in which the goals for the center were developed and refined. In the same period we advertised the project nationally and eventually received 26 applications from architectural firms with interests in the emerging field of "green architecture." We selected 5 for interview and in January of 1996, selected William McDonough & Partners in Charlottesville, Virginia.

No architect alone, however talented, could design the building that we proposed. It was necessary, therefore, to assemble a design team that would meet throughout the process. To fulfill the requirement that the building generate more electricity than it used, we engaged Amory Lovins and Bill Browning from the Rocky Mountain Institute as well as scientists from NASA, Lewis Space Center. In order to meet the standard of zero discharge we hired John Todd and Michael Shaw, the leading figures in the field of ecological engineering. For landscaping we brought in John Lyle and the firm of Andropogon, Inc. from Philadelphia. To this team we added structural and mechanical engineers (Lev Zetlin. Inc., New York City), and the contracting firm from Akron. During the programming and schematic design phase, this team and representatives from the college met by conference call weekly and in regular working sessions.

The team approach to architectural design was a new process for the college. Typically, the architects do their work alone, passing finished blueprints along to the structural and mechanical engineers who do their thing and hand the project off to the landscape architects. By engaging the full design team from the beginning we intended to maximize the integration of building systems and technologies and the relationship between the building and its landscape. Early on we decided that the standard for technology in the building was to be state-of-the-shelf, but the standard for the overall design of the building and its various systems was to be state-of-the-art. In other words, we did not want the risk of untried technologies, but we did want the overall product to be at the frontier of what is now possible to do with ecologically smart design.

The building program called for major changes, not only in the design process but also in the selection of materials, relationship to manufacturers, and in the way we counted the costs of the project. We intended to use materials that did not compromise the dignity or health of people somewhere else. We also wanted to use materials that had as little embodied fossil energy as possible, hence giving preference to those locally manufactured or grown. In the process we discovered how little is generally known about the ecological and human effects of the materials system and how little the present tax and pricing system supports standards upholding ecological or human integrity. Unsurprisingly, we also discovered that the present system of building codes does little to encourage innovation leading to greater resource efficiency and environmental quality.

Typically, buildings are a kind of snapshot of the state of technology at a given time. In this case, however, we intended for the building to remain technologically dynamic over a long period of time. In effect we proposed that the building adapt or learn as the state of technology changed and as our understanding of design became more sophisticated. This meant that we did not necessarily want to own particular components of the building such as the photovoltaic electric system which would be rendered obsolete as the technology advanced. We are exploring other arrangements, including leasing materials and technologies that will change markedly over the lifetime of the building.

The same strategy applied to materials. McDonough & Partners regarded the building as a union of two different metabolisms; one industrial, the other ecological. Materials that might eventually decompose into soil were considered part of an ecological metabolism. Otherwise they were part of an industrial metabolism and might be leased from the manufacturer and eventually returned as a feedstock to be remanufactured into new product.

The manner in which we appraised the total cost of the project represented another departure from standard practice of design and construction. Costs are normally considered synonymous with the those of design and construction. As a consequence, institutions tend to ignore the costs that buildings incur over expected lifetimes as well as all of those other costs to environment and human health not included in the prices of energy, materials, and waste disposal. The costs of this project, accordingly, were higher because we included

- students, faculty, and community members in the design process;
- research into materials and technologies to meet program goals;
- higher performance standards (e.g., zero discharge and net energy export);
- more sophisticated technologies;
- greater efforts to integrate technologies and systems; and
- a building maintenance fund in the project budget.

In addition, we expect to do a materials audit of the building, including an estimate of the amount of CO_2 released by the construction, along with a menu of possibilities to offset these costs.

The project is on schedule for a 1998 groundbreaking with a tentative completion date of spring, 1999. The basic energy, lighting, and fluid dynamics models have been completed and we now know that the goals described in the building program can be met within reasonable costs. When completed the building will generate most or all of its electricity. It will purify wastewater on site. It will minimize or eliminate the use of toxic materials. It will be designed to remain technologically dynamic well into the future. It will be instrumented to display energy and significant ecological data in the atrium. The story of the building will be prominently displayed throughout the structure. It will be landscaped to include a small restored wetland and forest as well as gardens and orchards. In short, it is being designed and built to instruct its users in the arts of ecological competence and the possibilities of ecological design applied to buildings, energy systems, wastewater, landscapes, and technology.

As important as the building and its landscape are, the more important effect of the project has been its impact on those who participated in the project. Some of the students who devoted time and energy to the project began to describe it as their "legacy" to the college. Because of their work on the project many of them learned about ecological design and how to solve real problems by doing it with some of the best practitioners in the world. Some of the faculty who participated in the effort and who were skeptical about the possibility of changing the institution, came to see change as sometimes possible. And some of the trustees and administrators who initially saw this as a risky project, perhaps came to regard risks incurred for the right goals as worthwhile.

The real test, however, lies ahead. It will be tempting for some, no doubt, to regard this as an interesting, but isolated experiment having no relation to other buildings now in the planning stage or for campus landscaping or resource management. The pedagogically challenged will see no further possibilities for rethinking the process, substance, and goals of education. If so, the Center will exist as an island on a campus that mirrors the larger culture. On the other hand, the College and those that administer it have a model that might inform architectural standards for all new construction and renovation; decisions about landscape management; financial decisions about payback times and full-cost accounting; courses and projects around the solution to real problems; and how we engage the wider community.

By some estimates, humankind is preparing to build more in the next half century than it has built throughout all of recorded history. If we do this inefficiently and carelessly, we will cast a long ecological shadow on the human future. If we fail to pay the full environmental costs of development, the resulting ecological and human damage will be very large. To the extent that we do not aim for efficiency and the use of renewable energy sources, the energy and maintenance costs will unnecessarily divert capital from other and far better purposes. The dream of sustainability, however defined, would then prove to be only a fantasy. Ideas and ideals need to be rendered into models and examples that make them visible, comprehensible, and compelling. Who will do this?

More than any other institution in modern society, colleges and universities have a moral stake in the health, beauty, and integrity of the world our students will inherit. We have an obligation to provide our students with tangible models that calibrate our values and capabilities, models that they can see, touch, and experience. We have an obligation to create grounds for hope in our students who sometimes define themselves as "generation X." But hope is different than wishful thinking so we have a corollary obligation to equip our students with the analytical skills and practical competence necessary to act on high expectations. When the pedagogical abstractions, words, and whole courses do not fit the way the buildings and landscape constituting the academic campus in fact work, they learn that hope is just wishful thinking or worse, rank hypocrisy. In short, we have an obligation to equip our students to do the hard work ahead of

- learning to power civilization by current sunlight;
- reducing the amount of materials, water, and land use per capita;
- growing their food and fiber sustainably;
- disinventing the concept of waste;
- preserving biological diversity;
- restoring ecologies ruined in the past century;
- rethinking the political basis of modern society;
- developing economies that can be sustained within the limits of nature; and
- distributing wealth fairly within and between generations.

No generation ever faced a more daunting agenda. True, but none ever faced more exciting possibilities either. Do we now have or could we acquire the know-how to power civilization by current sunlight or to reduce the size of the "human footprint" (Wackernagel & Rees 1996) or grow our food sustainably or prevent pollution or preserve biological diversity or restore degraded ecologies? In each case I believe the answer is "yes." Whether we possess the will and moral energy to do so while rethinking political and economic systems and the distribution of wealth within and between generations remains to be seen.

Finally, the potential for ecologically smarter design in all of its manifestations in architecture, landscape design, community design, the management of agricultural and forest lands, manufacturing, and technology does not amount to a fix for all that ails us. Reducing the amount of damage we do to the world per-capita will only buy us a few decades, perhaps a century if we are lucky. If we squander that reprieve, we will have succeeded only in delaying the eventual collision between unfettered human desires and the limits of the Earth. The default setting of our civilization needs to be reset to ensure that we build a sustainable world that is also humanly sustaining. This is not a battle between left and right or haves and have-nots as it is often described. At a deeper level the issue has to do with art and beauty. In the largest sense, what we must do to ensure human tenure on the Earth is to cultivate a new standard that defines beauty as that which causes no ugliness somewhere else or at some later time.

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