Prospects for Ecological Design Education

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> *"If I were a young architect today looking at supposed eco-architecture, I wouldn't want to do it; it's a one-liner. When ecology becomes the major issue, you're left with a scientific box that does nothing for the spirit. I cannot separate the idea of the poetic and the rational. If there's not a junction, we've got merchandise, not architecture."*
>
> – Glenn Murcutt[1]

Introduction

When I read the call for essays on ecological design education I was reminded of the monthly column that appeared in seven issues of the *ACSA NEWS* during the 2000-2001 academic year that was intended as an opportunity for administrative officers to report on their schools' offerings in sustainable design.[2] The authors (all deans or department heads) focused on the importance of integrating sustainable design into the core curriculum, discussed the difficulties in doing so, and offered suggestions for improving the situation.

Their suggestions ranged from increased support for research, more emphasis on multi-disciplinary collaboration, and a serious focus on how buildings work – to more fundamental re-evaluations of how architecture is taught and practiced. Many of them appeared to express a concern that sustainable design remains a largely marginalized activity in many schools and much of the profession, even though a special report published by the Carnegie Foundation in 1996 recommended "that architects and architecture educators assume a leadership role in preserving the environment and the planet's resources" (Boyer, 43).

But what exactly is meant by the term "sustainable design"? Of the seven authors, only two actually defined the term. In her column affirming Carnegie Mellon's commitment to sustainability, Vivion Loftness presented a working definition that is quite specific, but very prescriptive. For her it is "a collective process whereby the built environment achieves new levels of ecological balance through new and retrofit construction, towards the long term viability and humanization of architecture" (Loftness, 6). This is not likely to inspire the "deep understanding of how buildings work" advocated by Berkeley's Harrison Fraker (Fraker, 10), and it doesn't really address the more "radical implications of sustainability" raised by Minnesota's Thomas Fisher. He suggests that if we are "to

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[1] As quoted by Raul A. Barreneche in an article reporting Murcutt's receipt of the 2002 Pritzker Architecture Prize, which appeared in the May 2002 issue of *Architecture* magazine.

[2] The *ACSA NEWS* is the newsletter of the Association of Collegiate Schools of Architecture (ACSA). The monthly columns were co-sponsored by the American Institute of Architects (AIA) Committee on the Environment (COTE).

achieve a more sustainable future, we need to start talking not just about energy-conserving techniques, but about need itself and what that means in terms of architectural education and practice" (Fisher, 6).

Esmail Baniassad, of the Chinese University of Hong Kong, also suggested a "radical examination of the content and the form of architectural education." One that would involve "research into the fundamentals of our field, premises underlying the history we teach, assumptions about culture in terms of programmes we give to the design studios" (Baniassad, 5). Linda Sanders, of Cal Poly Pomona, suggested integrating "the work of historians, community activists, materials, and developers of business competencies to make our students' educational experience more filled with the creation of environments which are in touch with natural systems" (Sanders, 5); while MIT's William J. Mitchell proposed alternatives to standard remedies to energy crises, all employing digital technologies, along with the need to expand the "metaphor of urban metabolism" to include sensory and nervous systems (Mitchell, 5).

While only one of the six authors mentioned above actually defined "sustainable design," in reading their columns one could sense subtle but significant differences in their use of the term. The seventh author, Peter Wheelwright of the Parsons School of Design, addressed this issue directly, describing sustainability as "an umbrella term for many (often conflicting) forms of proactive attempts to mitigate humanity's transformation and negative impact on particular natural systems" and "a cultural formation still very much in the making" (Wheelwright, 5).

Ecological Design

I use the term "ecological design" because of the theme of this retreat, not to consciously differentiate it or preference it over others, but in a broad sense, and interchangeably with "sustainable" or "green." These simply being different terms, as Ken Yeang has suggested, for designing with nature in an environmentally responsive way (Yeang, 1). In the context of architectural design I find the word "sustainable" to be too broad; and "green" is somehow too limiting, being easily confused with political and/or marketing labels. The etymological roots of the word "ecology," and the appropriateness, as William McDonough has observed, of an architectural discourse about the logic of our planet's household also influence the use of the term (McDonough, 402). Nevertheless, the same concerns I will raise apply equally to all three terms so I will use them synonymously for the purpose of this discussion, which questions how students of architecture can be encouraged to practice something they have difficulty defining.

Ian McHarg has suggested that non-ecological design is "either capricious, arbitrary, or idiosyncratic, and…certainly irrelevant" (McHarg, "Ecology," 321). But what is ecological design, specifically in the discipline of architecture? Sim Van der Ryn and Stuart Cowan have defined it as "simply the effective *adaptation to* and *interaction with* nature's processes" (Van der Ryn, 18). For Nancy and John Todd it is "design for human settlements that incorporates principles that are inherent in the natural world in order to sustain human populations over a long span of time" (Todd, 1). In concluding his now

famous "sermon" at the Cathedral of St. John the Divine in 1993, William McDonough said:

> *We have to recognize that every event and manifestation of nature is "design," that to live within the laws of nature means to express our human intention as an interdependent species, aware and grateful that we are at the mercy of sacred forces larger than ourselves, and that we obey these laws in order to honor the sacred in each other and in all things. We must come to peace with and accept our place in the natural world (McDonough, 407).*

Renzo Piano, in discussing sustainable architecture, enjoins that: "Architecture is a second nature that is laid on top of the real one. When people who practice our profession speak of the environment they ought to remember this" (Piano, 248). And Ken Yeang, with a nod to Ian McHarg, titled his book on the ecological basis for architectural design *Designing with Nature.*

My point is simply that all of these definitions employ the word "nature," and if students of architecture are to understand ecological design it seems reasonable that they would need more than a passing acquaintance with the multiple interpretations of that word.

Nature

In an interview shortly before his death, Ian McHarg lamented that his book, *Design with Nature*, which, according to him, was described by the ACSA as one of the most widely read textbooks in architecture schools, has, to the best of his knowledge, had no effect whatsoever (McHarg, "Why," 54). I would argue that, if this is true, an important reason might be that many architecture students, in my experience, have very little, if any, understanding of what the word "nature" means.

In her book *The Language of Landscape*, Anne Whiston Spirn reminds us that "nature is an abstraction, a set of ideas for which many cultures have no one name," and that "A. O. Lovejoy found sixty-six meanings of the words *nature* and *natural* in literature and philosophy from the time of the ancient Greeks to the eighteen century" (Spirn, 248). She describes an academic exercise, one that I too have assigned, in which she asked her students to define "nature" in their own words. The responses always reveal a wide range of often contradictory and clashing perspectives; not unexpected, she points out, for a word Raymond Williams called "perhaps the most complex word in the language" (Spirn, 248). And it is a word that invariably is employed by students when asked to define ecological design.

It is not within the scope of this essay to even begin to explore the relationship between the idea of nature and the discipline of architecture. Nor is it my intention to attempt to articulate an ecological design ideology based on an interpretation of our relationship to nature. What I am suggesting is that a better understanding of how the word "nature" can be interpreted would help students to sort through the complexities of new and often contradictory ideologies.

In his *ACSA NEWS* column, Peter Wheelwright described two often contradictory and conflicting approaches to ecological design currently present in schools of architecture: the "organic," which combines an activist social agenda with a "Wrightian" design ethic; and the "technological," which is "futurist in orientation and scientific in method" (Wheelwright, 5-6).

Steven Moore, of the University of Texas at Austin, identified four variations of these approaches in a review of four relatively recent books on the subject. He added the issue of style, which could easily be applied to both, as well as the issues of political and economic doctrine. He also noted at least three sets of opposing aesthetic and political assumptions embodied in these approaches, indicating that they apparently agree only on the primacy of ecological responsibility. He concludes, "that it is reasonable to hope that the emergent horizon of meaning embodied in these books may contribute to a collective reconstruction of our relationship to nature" (Moore, 249).

Wheelwright offered a third approach that calls for more emphasis on the social and natural sciences in core architecture courses. His proposal that all architecture courses "simply begin with the assumption that the affinity of architecture with natural processes is historically based, theoretically critical, and a technologically inventive way to (re)inform design" (Wheelwright, 6) is admirable, but I question the ability or even the will of many schools to effectively accomplish such a goal.

I would argue that a fundamental understanding of humanity's relationship to nature is necessary for architecture students to learn to practice ecological design. Therefore, if a school lacks an effective means of providing an opportunity for students to gain such an understanding it could be seen as a significant shortcoming.

Site and Perception

A second problem, closely related to the one I have just discussed, that I see in attempting to educate students capable of practicing ecological design is the inability of many students to perceive a site, especially a "natural" site as a human construct and to conceptualize its potential to be reconstructed and interpreted through architecture. Over the past decade a site that represents many of the fundamental issues implicit in a discourse on humanity's place in nature has been utilized by all of the units in the College of Art and Design at LSU for a variety of student projects.

The site is a beautiful but ecologically sensitive area consisting of sixty-eight acres located within the city of Baton Rouge, Louisiana, and surrounded by commercial and residential development. It is a unique ecosystem consisting of an upland hardwood forest and a cypress-tupelo swamp that is believed to have been formed in the late eighteen century when German settlers disrupted normal drainage patterns, possibly by road building, turning a fast moving stream into a slow moving swamp. The site is owned by the city and functions as a public nature center.

Time prevents me from giving a detailed description of the student projects, but they included individual graduate and undergraduate research projects, and undergraduate design studio projects. Several of these were collaborative projects involving students from different disciplines in the College (Architecture, Art, Interior Design, Landscape Architecture) as well as the University (English, Environmental Studies, etc.).

The effectiveness of these projects as vehicles for learning can be evaluated in many ways. The question I pose is whether the use of this unique site can establish a framework that encourages, as David Orr has suggested for all architecture curricula, "a more sophisticated and ecologically grounded understanding of place and culture" (Orr, 23). An understanding that helps to foster design solutions that are not abstract impositions upon the landscape, but that derive from explorations of a specific place and the ways that built form could reveal and possibly reinforce a cultural narrative. In this case the measurable indicators would fall into two broad categories: the ability to go beyond the more traditional methods of site analysis and represent the experiential character of the site,[3] and the ability to use these perceptions in the sensitive integration of buildings within the landscape.

The stated learning objectives of most of the design studio projects included the development of skills that would enhance the students' abilities to identify relationships between a specific site and architectural program that would assist them in accomplishing the goals outlined above. The clearly revealed cultural construct of the site combined with programs that, in part, sought to create a framework for interpreting this unique condition appeared to present opportunities to encourage these objectives. However, with a few notable exceptions, the projects failed to fully capitalize on this opportunity.

There appear to be two primary reasons for this failure. First, the students were not provided with an effective methodology for exploring and representing their perceptions of the physical, experiential qualities of the site. They were encouraged to essentially invent their own without any specific guidance. The second reason these projects were not as successful as they might have been is that even those students who were able to develop a reasonably clear perceptual model of the site were often unable to re-envision the site in a way that didn't impose a preconceived idea upon it. Their design solutions often had little if any relationship to the specific nature of this site and more to do with their own preconceptions about "nature."

Specifically, the students often employed traditional forms of site analysis such as overlays of contours, soil types, vegetation, drainage patterns, etc. in hopes of discovering a "natural" solution. This desire often resulted in very synthetic solutions with little reference to experience. While it is true that all designs are abstract impositions in the sense that reading and interpreting a site is always a process of abstraction, reliance on purely quantifiable data that serve to define an "environment" without attending to the

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[3] As, for example, discussed in Chapter 6 of Kevin Lynch's seminal text *Site Planning*, 3rd ed., K. Lynch and Gary Hack (Cambridge, MA: MIT Press, 1998), 153-192. While there is a fairly thorough discussion of "the sensed landscape," there is little reference to specific perceptual methodologies, and the discussion of means of representation or "languages" is marginal at best.

more qualitative attributes of "place" will always result in distancing the student from the experiential dimension – in the words of Christian Norberg-Schulz, the "qualitative, 'total' phenomenon, which we cannot reduce to any of its properties, such as spatial relationships, without losing its concrete nature out of sight" (Norberg-Schulz, 414).

Conclusions

So how do we overcome these interrelated shortcomings? In the first case, I suggest that architecture students take at least one required course that explores how a society's predominant conception of nature might affect its relationship to its environment. Ideally such a course would fulfill a general education requirement, would occur as early as possible in the students' academic careers, would include an architectural component, and would be interdisciplinary in nature (possibly part of a larger "learning community").

The National Architectural Accrediting Board (NAAB) currently requires that forty percent of the courses in accredited programs must be non-professional (i.e. liberal arts and science) courses. In most schools the majority of these courses are part of a university-wide general education core, and, while I'm sure there must be notable exceptions, I suspect that most of these core curricula do not require students to take courses that explore humanity's place in nature. Many institutions offer such courses,[4] but I question how many architecture students take them.

If this was not possible on a formal basis, a similar experience could be achieved through discussions in concurrent architecture courses. However, since most universities are actively encouraging interdisciplinary collaboration, I suspect even those with limited offerings in this area would be open to new initiatives, and those with established programs would likely welcome new partners. Intercollegiate participation might also be possible using existing distance learning technologies.

This would not only provide architecture students with an opportunity to become more familiar with a subject that would lay the groundwork for more integrative solutions, such as those suggested by Peter Wheelwright, but they would do so in the company of a broad range of students, some of whom might very well become their future clients.

What I am suggesting is a relatively modest proposal, certainly not a panacea, but it would be an important step toward giving students an understanding of an issue that I believe is essential if schools of architecture hope to follow the recommendations of the Boyer Report and assume a leadership role in preserving the environment.

In the second case, I believe there are two strategies that might be explored. First, a more productive approach to reading and interpreting a site might be to introduce students to

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[4]According to the Boyer Report, William McDonough taught a required course in "Environmental Choices" that involved more than a dozen faculty and visiting lecturers from a variety of disciplines when he was Dean at the University of Virginia. I'm not sure if it's still required or even taught. Of course, William Cronon, Neil Evernden, Leo Marx, Caroline Merchant, Donald Worster, and Michael Zimmerman (to name just a few) have taught such courses for years.

various ways of perceiving and representing environments such as those employed by environmental psychologists and naturalists.

For example, Laura Sewall has identified five perceptual practices that are:

> *"both modifiable by experience and directly relevant for perceiving our ecological conditions. These practices include (1) learning to attend, or to be mindful, within the visual domain; (2) learning to perceive relationships, context, and interfaces; (3) developing perceptual flexibility across spatial and temporal scales; (4) learning to reperceive depth; and (5) the intentional use of imagination" (Sewall, 204).*

Likewise, artist and naturalist Hannah Hinchman has demonstrated methodologies that would encourage students to develop their own means of representation. The fact that her work is aimed at *observers* rather than *designers* of the physical environment is potentially very helpful in this context. She offers no prescriptive form of representation that would suggest an answer to students, but rather offers a methodology – a way of seeing. She encourages the intelligent observation of a world of "events," as opposed to the identification of "things." In her book *A Trail Through Leaves: The Journal as a Path to Place*, she observes:

> *"The idea of encouraging event perception occurred as I noticed, in my teaching, that would-be naturalist/journal-keepers are* prevented *from seeing the natural world. They are prevented first by categories…second, by the habit of seeing the world as dead" (Hinchman, 150).*

The second strategy, closely related to the first, would be to encourage students to view the site as a construct. An environment shaped by climatic and geologic forces (air, earth, water, and fire), and the actions of organisms, including humans – the "events" suggested by Hinchman. In this light, the site is seen not as a fixed, inert entity but as an evolving project. This is certainly not a new idea. Most ecologists view "disturbances" as important integral processes in many ecosystems,[5] and landscape architects are usually quite attuned to this way of viewing a site. In their book *Inside Outside: Between Architecture and Landscape*, Anita Berrizeitia and Linda Pollak construct a framework of interpretation that consists of five "operations," each of which articulates a conceptual approach to relations between architecture and landscape. All of these "operations" could be very useful tactics to employ in this strategy, but their notion of "reciprocity" is directly applicable.

> *"The operation of reciprocity subverts the hierarchy embedded in the historical dichotomy between architecture and landscape, which has construed landscape as merely the ground on which architecture rests. It recognizes the identity of both landscape and architecture as constructed. This formulation challenges the architectural paradigm of the machine in the garden – a vision that opposes*

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[5] For an interesting discussion of this, and ecological systems in general, see O. J. Reichman's *Konza Prairie: A Tallgrass Natural History* (Lawrence, KS: University Press of Kansas, 1987).

architecture's progressive alliance with technology to a nostalgic formulation of landscape as timeless and untouched nature" (Berrizeitia, 11-12).

By consciously encouraging students to view their work in this manner, and providing them with more effective methodologies for perceiving and representing the experiential dimension, it might be possible to overcome their preconceptions. By engaging in a dialogue with the site in an attempt to identify its potentiality – its intended character or essence – the students might, in the words of Norberg-Schulz, "concretize the *genius loci*." That is, they would design "buildings which gather the properties of the place and bring them close to man" (Norberg-Schulz, 426). I believe this is very similar to David Orr's description of ecological design as "a kind of navigation aid to help us find our bearings again." He goes on to say that "getting home means remaking the human presence in the world in a way that honors ecology, evolution, human dignity, spirit, and the human need for connection" (Orr, 30). Norberg-Schulz provides a description of architecture that seems to me to capture the essence of this task, and admirably summarizes the points that I have attempted to make.

> *"The basic act of architecture is therefore to understand the 'vocation' of the place. In this way we protect the earth and become ourselves part of a comprehensive totality. What is here advocated is not some kind of 'environmental determinism.' We only recognize the fact that man is an integral part of the environment, and that it can only lead to human alienation and environmental disruption if he forgets that. To belong to a place means to have an existential foothold, in a concrete everyday sense" (Norberg-Schulz, 426).*

Summation

I certainly do not think that the two problems I have identified are by any means the only shortcomings in contemporary architectural design education that inhibit students' abilities to design ecologically, nor do I claim that the changes I have proposed are in any way a panacea. But I do believe that they might provide some of the tools necessary to foster the "more sophisticated and ecologically grounded understanding of place and culture" suggested by David Orr. They might also help to encourage Glenn Murcutt's "junction" of "the poetic and the rational."

I'm sure that there are schools of architecture that employ at least a variation of one or more of the approaches I have suggested, and I would be very interested in learning more about their experiences. My observations are based on a relatively small sample of the schools of architecture in North America, but I suspect that the problems I have identified are the rule rather than the exception. One final observation: while the last thing I wish to propose is yet another revisiting of the NAAB student performance criteria, it is significant that only one of the 37 criteria specifically addresses the issues we are discussing, and it does so in a very narrow and uninspiring manner. As to how SBSE could best leverage and help initiate the proposed changes (assuming you agree with them), I leave that for us to discuss.

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