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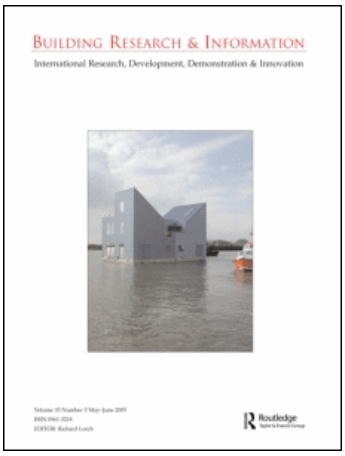

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Forum

Shifting from 'sustainability' to regeneration

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Sustainability, as currently practised in the built environment, is primarily an exercise in efficiency. In other words, the use of environmental rating systems and other mechanisms allows a reduction in the damage caused by excessive resource use. However, instead of doing *less damage to* the environment, it is necessary to learn how one can *participate with* the environment by using the health of ecological systems as a basis for design. The shift from a fragmented to a whole systems model is the significant cultural leap that consumer society needs to make – through framing and understanding living system interrelationships in an integrated way. A place-based approach is one way to achieve this understanding. The design process begins by attempting to understand how the systems of life work in each unique place. The role of designers and stakeholders is to create a whole system of mutually beneficial relationships. By doing so, the potential for green design moves beyond sustaining the environment to one that can regenerate its health – as well as our own.

Keywords: construction management, consumption, design process, mental models, sustainability, whole systems

La durabilité, comme on l'entend aujourd'hui dans le contexte du milieu bâti, est avant tout un exercice d'efficacité. En d'autres termes, l'usage de systèmes de classement de l'environnement et d'autres mécanismes permet de réduire les dégâts causés par une utilisation excessive des ressources. Toutefois, au lieu de *moins endommager* l'environnement, il convient d'apprendre comment chacun peut *contribuer* à l'environnement en utilisant l'état des systèmes écologiques comme base de la conception. Le passage de systèmes fragmentés à un modèle de systèmes complets représente le saut culturel significatif que la société de consommation doit faire, en cadrant et en comprenant les relations entre systèmes vivants de manière intégrée. Une approche basée sur la place est une manière de parvenir à cette compréhension. Le processus de la conception commence par la tentative de comprendre comment les systèmes de vie fonctionnent dans chaque endroit unique. Le rôle des concepteurs et des parties prenantes est de créer un système complet de relations mutuellement avantageuses. Ainsi, le potentiel de la conception écologique va au-delà du simple soutien à l'environnement pour passer à la régénération de sa condition et de notre propre santé.

Mots clés: gestion de la construction, consommation, processus de conception, modèles mentaux, durabilité, systèmes complets

Introduction

> The power of abstract thinking has led us to treat the natural environment – the web of life – as if it consisted of separate parts, to be exploited by different interest groups. … To regain our full humanity, we have to regain our experience of connectedness with the entire web of life. This reconnecting, 'religio' in Latin, is the very essence of the spiritual grounding of deep ecology.
> (Capra, 1996, p. 296)

Need for a new model

It is fair to say that we are in a situation where rapid change to a healthy relationship with the planet is in

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order. The concept of a Factor 10 society (reducing the ecological burden in developed countries by 90% by 2050 simply to maintain fair access to the world's resources, as well as stabilizing global climate change) is unachievable at the rate of 'improvement' we are making by means of incremental and fragmented efficiency. We are unlikely to make the changes needed quickly enough unless significant and radical change occurs. A piecemeal, technological approach certainly opens the way. But more of the same type of incremental change is not really effective, especially at this stage our degrading practices. For example, architects and engineers address the efficiency of buildings while failing to understand the earth systems, the very systems we are trying to sustain. It is time to change our mental model to one that better reflects the new understanding of how the universe actually works, and also enables us to design, build and heal with the whole system in mind – a deeply integrated worldview.

Whole systems and living systems thinking

This paper outlines the issues and need for a shift and suggests a process, Whole Systems and Living Systems Thinking, that can help transform the way we think about and practice sustainability in the design and development field. Efforts at linking the natural and built environments in a holistic manner have been suggested in the past (e.g. Lyle, 1994; McHarg, 1999; Yeang, 1994; Van der Ryn and Cowan, 1996). A renewed emphasis on this theme is motivated by the numerous sustainable built environment efforts around the world, perhaps signalling the dawn of a renewed effort to move to higher levels of understanding and collaboration.

The concept of sustainability moves us into a thoughtful relationship with our 'life support' systems. It opens the gates of communication with various subsystems, hydrology, geology, plants, animals, and humans in a way that can move us from the condition of the disinterested observer toward an awareness of the evolving linkages between all of these elements. The question is how we bring into common understanding the nature of these linkages and our ability to perceive, communicate, listen, and respond to this whole and integrated system:

> Our mental model of the way the world works must shift from images of a clockwork, machine-like universe that is fixed and determined, to the model of a universe that is open, dynamic, interconnected, and full of living qualities.
>
> (Jaworski, 1996, quoted in Elgin, 1999)

The current participation in this 'unified and living universe', however, is an unhealthy one. If we are to shift that, we must understand the nature of the change required. The foundation for this evolution of understanding, and thereby of the way we participate, is whole or living systems thinking. *Whole systems thinking* recognizes that the entirety is interconnected, and moves us beyond mechanics into a world activated by complex interrelationships – natural systems, human social systems, and the conscious forces behind their actions. In the act of building design, we are inextricably engaged in direct and indirect reciprocal influence in the immediate community (place) and the larger systems operating on this planet.

The green building movement, for the most part, has not been focused on or taken into account this interrelated wholeness. It should be noted that there is an increasing recognition of this problem and a growing effort to address it, most notably through the concept of integrated design (e.g. Zimmerman, 2006). Like our culture, we have primarily focused on technical and economic systems when designing, constructing and managing our human habitats. As part of a fundamental change, focus needs to include the prime resources and aspects of life that produce technologies and shelter, the basic foundations – earth systems and the people engaged with them – rather than simply the by-products. Technical systems, of course, need to be understood, addressed and measured. Engineered systems are not unimportant, they are simply insufficient. When architects and engineers begin to understand that the purpose of sustainability is sustaining life-enhancing conditions, the scope of their work will expand to include living systems approaches. A living systems approach is based on the understanding that all things are alive and in a process of 'becoming'. Living systems self-organize to increasing order and complex interrelationships.

British sustainable education pioneer Stephen Sterling uses Gregory Bateson's three levels of learning (*Steps to an Ecology of Mind*) to describe the nature of learning required for paradigm change (Sterling, 2003). Using the metaphor, 'one can't see the forest for the trees' he depicts Learning Level I as only seeing the trees; Learning Level II might be stepping out and seeing the forest as a whole, recognizing its existence for the first time; and Learning Level III might be the helicopter view, seeing fully that a number of alternative forests exist and may be chosen.

> The green building movement … has not been focused on … interrelated wholeness.

In relation to sustainability, Learning Level I is geared towards effectiveness and efficiency – 'doing things better' – rather than 'doing better things' (and rather

than, at a deeper level still, 'seeing things differently'). Watzlawick *et al.* (1980) make the distinction thus:

> there are two different kinds of change: one that occurs within a given system which itself remains unchanged, and one whose occurrence changes the system itself.
>
> (Watzlawick *et al.*, 1980, quoted in Sterling, 2003)

Hawkins (1991) suggests that Learning Level II alone is insufficient. Although it helps us move from 'efficiency thinking' at Learning Level I level towards 'effectiveness thinking' at Learning Level II, 'it fails to address the fundamental question: effective for what, or to what end?' Learning Level III shifts our attention to the context of planetary survival, and the evolutionary need of what he calls 'integrative awareness'. Hence, Learning Level III is associated with epistemological and perceptual change and a transpersonal/transorganizational ethical and participative sensibility (Sterling, 2003).

This last point is very important as it relates to the nature of understanding of the breadth of the whole system, and how we as a culture and planet might come to be in conscious, participatory relationship.

The following graphic and definitions indicate a trajectory of the practice of sustainability relating to the above (Figure 1). Learning Level I corresponds to the Greening level (efficiency). Learning Level II can be seen to align with the Sustainability level (effectiveness). Learning Level III addresses an evolving understanding of the Whole. The Reconciliation and Regeneration levels ask the question of our purpose here. What is the ultimate purpose of sustainability? For what are we being 'effective' and 'to what end'?

Issue-based approaches (fragmented – as currently practised)

Limiting the damage

High-performance design

Design that realizes high efficiency and reduced impact in the building structure, operations, and site activities. This term can imply a more technical efficiency approach to design and may limit an embrace of the larger natural system benefits.

Neutral

Green design

A general term implying a direction of improvement in design, i.e. continual improvement towards a generalized ideal of doing no harm. Some people believe this is more applicable to buildings and technology.

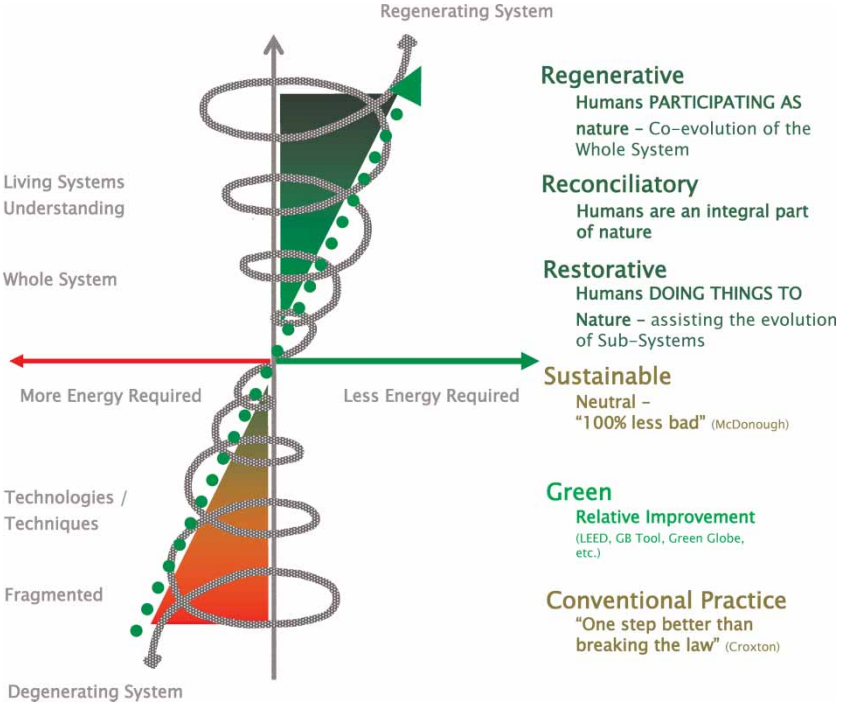

Figure 1 Trajectory of Environmentally Responsible Design

Sustainable design
See 'Green Design' with an emphasis on reaching a point of being able to sustain the health of the planet's organisms and systems over time.

Living system approaches (increasingly more whole)

Restoration

Restorative design
This approach thinks about design in terms of using the activities of design and building to restore the capability of local natural systems to a healthy state of self-organization.

Reconciliation design
This design process acknowledges that humans are an integral part of nature and that human and natural systems are one.

Regeneration

Regenerative design
This is a design process that engages and focuses on the evolution of the whole of the system of which we are part. Logically, our place – community, watershed and bioregion – is the sphere in which we can participate. By engaging all the key stakeholders and processes of the place – humans, other biotic systems, earth systems, and the consciousness that connects them – the design process builds the capability of people and the 'more than human' participants to engage in continuous and healthy relationship through co-evolution. The design process draws from and supports continuous learning through feedback, reflection and dialogue, so that all aspects of the system are an integral part of the process of life in that place. Such processes tap into the consciousness and spirit of the people engaged in a place, the only way to sustain sustainability.

Note that these levels of the sustainability trajectory are not exclusive of one another, they are a progression, and each is nested in the more whole level. All practice levels are necessary to achieve the change required.

> A reconnection to place … would help foster the shift from sustainable design to restorative and regenerative design.

Shifting to a new worldview

In general, environmental building assessment systems, triple bottom-line indicators, and other mechanisms address generalized, planetary and regional issues. The missing aspect to achieving planetary health is how we specifically heal the damage we have caused and how we continue in healthy interrelationship with living systems. A healing process requires continual, thoughtful and caring engagement. We can best engage in healing in the places we inhabit. Our communities and land are where we can learn about what makes life possible on a continuing basis. Concurrently, with our approaches to efficiency we need to become local biologists, ecologists, and community systems thinkers. Regeneration of the health of the humans and local earth systems is an interactive process – each supports the other in a mutually beneficial way. This awareness or consciousness of vital and viable interrelationship is the beginning of a whole system healing process.

Both planetary scale and place-based approaches are not mutually exclusive. The process of developing a regenerative relationship cannot abandon the efforts of large-scale system approaches and the quantitative measurement of smaller scale systems that address planetary concerns – such as energy, persistent toxics, global warming, etc. But the process of place-based engagement can frame and integrate these planetary issues in manageable, meaningful and, literally, grounded context.

As noted above, to make this shift it is necessary to move from Learning Level I, doing the same things in a better way (efficiency) to Learning Levels II and III, which generate new levels of systemic understanding. If the process of transformative change is the greatest barrier standing in the way of achieving a sustainable condition, it seems the aspect of 'how one changes' should be of great interest to the design and building community. The following section gives an overview of a Learning Level III process – a regenerative approach to design. This approach requires a level of commitment from a client to break out of the conventional, linear design management process and reconsider the opportunity of design as an opportunity for learning. This co-learning process requires the design team to engage deeply, to participate, and to be conscious of the earth systems and human systems that are essential to the long-term health of the place. In effect, the design and client team become a learning organization.

Realizing regeneration

Regeneration is a Learning Level III process – a deep search for the nature of relationship between human and earth systems. This moves our frame of discourse from 'doing things TO nature' to one of participation as partners WITH and AS nature:

> The idea that we live in something called 'the environment' … is utterly preposterous. … 'Environment' means that which surrounds or

> encircles us; it means a world separate from ourselves, outside us. ... The real state of things, of course, is far more complex and intimate and interesting than that. The world that environs us, that is around us, is also within us. We are made of it; we eat, drink, and breathe it. ... No settled family has ever called its home place an 'environment'. ... The real names of the environment are the names of rivers and river valleys; creeks, ridges, and mountains; towns and cities; lakes, woodlands, lanes, roads, creatures, and people.
>
> (Berry, 1992, p. 34)

Regeneration is not simply about making a landscape and local habitat more productive and healthy. Effective regeneration requires that we engage the entirety of what makes a place healthy. This may be our home community, a corporate campus, a small lot, or a building. When we start from a whole systems understanding, any of these entities is an entry point into the whole system. Each is an integral part of a living system and a key role can be found for anyone and any system within the smallest to largest physical footprint. The footprint is not the limiting factor as long as a sense of conscious engagement can be realized by the people who are part of it.

Aspects of a regenerative approach to design

There are three essential aspects to catalysing a regenerative condition. These are not necessarily steps but more like an evolutionary spiral because the process continually evolves in a gradual unfolding or emergence as the field changes. The process needs to continue intentionally long after the design leads and consultants are gone. If not, the relationships that have been established can be forgotten and the potential for new, healthier, and more vital relationships left undiscovered.

The three aspects are as follows:

- understanding the master pattern of place
- translating the patterns into design guidelines and conceptual design
- ongoing feedback – a conscious process of learning and participation through action, reflection and dialogue

Understanding the master pattern of place

The first task in the process is to determine the most appropriate health-generating pattern of relationships for a particular project in its place. It requires that the team develop understanding in two areas: the human aspirations the project hopes to realize and an essence, or core, understanding of the unique character of the place the project seeks to inhabit. This level of understanding is in contrast to conventional planning and design. Conventional processes start with gathering discrete packets of knowledge from experts in water, energy, soils, etc. Without an integrative systemic context, such knowledge can be both fragmenting and misleading.

Setting the stage – understanding and aligning human aspirations of a project. To understand the objectives of a project, it is necessary to elicit from the participants the aspirations they have about this project and locale. Questions about what is driving this project, what is important to the client and design team are elicited in a group dialogue. An aspiration is a deeper, heartfelt purpose that, if elicited in the course of the design process, becomes a fundamental aim of the project expressed in qualitative and process terms. The aspirations open up the possibilities of rich and fruitful dialogue with the participants as opposed to laundry lists that fragment and pit sides against each other.

With the fundamental or core aim understood by the participants the way is open to begin exploring how this aim, and its underlying aspirations, can be met within the opportunities and limits of the Nature of the Place.

Learning about the place. In order to address the health of an ecosystem and our role in it (how our aspirations can support and be supported by the system), we need to understand how it works and why. One way is to study the historic and present patterns of human and earth system interrelationship. By understanding the patterns of evolution and health in a watershed, the relationships between the systems (human, plant, animal, hydrology, meteorology, geology, etc.) can be understood with a good level of approximation. When did life express itself more fully than other times; why; what occurred to change these relationships; etc?

Regenesis (2005) notes that:

> Careful reading of the landscape of place (biotic and cultural) enables us to develop mental maps of the leverage points, those key intersections where small interventions can energize the system as a whole. The aim is to ensure that the considerable investment represented by development yields more than just physical stuff (which, being subject to entropy, immediately begins to deteriorate). It also initiates ongoing processes that continue to work to realize the full potential of place, and does so in a way that enables

greater and greater spheres of influence. This requires a firm grounding in the specifics of the place, and how that place is nested in, and influences and interacts with larger wholes. The essential guiding questions are: 'What wants to emerge out of the integration of this project and this place? Therefore, who are we required to be and how do we become that?

Developing the story of place. By expressing these relationships in the form of a 'story of place' it is possible to engage more quickly the layperson in an understanding of the complex relationships in an ecosystem and their role within it. It functions as a metaphor to communicate these ideas quickly and powerfully. The story of place as a context serves multiple purposes.

First, history has shown that we will not sustain the will needed to make and maintain the needed changes, day after day, without evoking the spirit of caring that comes from a deep connection to place. A clear cultural narrative is needed to convey the connection to a particular place.

Second, discovering the story of a place enables us to understand how living systems work in a particular place, and enables us to bring greater intelligence to how humans can then align themselves with that way of working to the benefit of both.

Third, the story of place provides an integrative context that helps maintain the spirit and vitality of holding a collective and meaningful purpose.

Finally, the story of place provides a framework for an ongoing learning process that enables humans to co-evolve with their environment.

Design framework/guidelines and conceptual design

Once the desired 'master pattern' of relationship is defined, the second task is to translate it into a conceptual design and a set of design guidelines. This serves as the framework or container for decisions made in the subsequent stages – design, selection of appropriate green materials and technologies, construction, operations, and long term operation and maintenance. In design charettes, the client and the design team draw on the insights and understanding developed out of the first phase of work to generate collectively a development concept that integrates human needs and aspirations in a reciprocally beneficial relationship with the living systems of the site and surrounding contexts.

Marrying story of place with aspirations for future. This is the point where conceptual design can begin. Building on the foundation established, the design team can respond to real issues of the environment and the aspirations of the people in relation to the opportunities in and natural limits of the place as a living system. This stage requires significant dialogue. Through truly listening and learning, we can collectively change our worldview. We shift into Learning Levels II and III and reconceptualize our place in *this* place and the world.

At this point, it is essential to form a Core Team to hold the aspirations in relation to the health of the place and project. This team's responsibility is not in day-to-day activities but to remember, hold, and promote the core aim and higher aspirations of the project – to hold the core which energizes the design process and on-going resiliency of the Place. The work of the Core Team is essential to realize a regenerative process. Without a team holding the aspirations and understanding of the place, the process will revert back to old patterns. When the initial design team disbands, remaining key participants will need to sustain and evolve the thinking and feedback process into the future.

Identify indicators. Once the desired patterns of relationships, and keystone species and key systems are generally understood, metrics and benchmarks to measure levels of improvement can be established. No one can be sure that the understanding of the ecosystem is correct or that the people engaged with the system will interact in the assumed way. Monitoring the work is essential to receive the feedback necessary to allow a system (human and earth systems) to evolve. The feedback process supports the development of conscious engagement and deeper relationship between people and place as time moves on.

Integrative design/construction process. All the design work should support the establishment of the health of the whole as well as other non-conflicting or at a minimum, neutral to the system, objectives. The process of optimizing each system and part in relation to the whole requires more than a few iterations of thinking. Since we work within the framework of time – a linear process – we need to approximate the simultaneity of the whole by rapid and frequent iteration of ideas. This is the basic process of Integrative Design.

Create a process of conscious learning and participation – ongoing feedback

Continuous monitoring and measurement also involves engaging the 'community' as participants as the place evolves. This is practically achieved through an on-going Core Team that holds the long term aspirations for the project/community, and supports and facilitates the iterative cycles of action, reflection, dialogue as a means of deepening place connections and growing understanding and mutual caring.

Conclusions

> By seeing the ultimate aim of all our work as the regeneration and evolution of increasingly vital, viable and inspiriting places, we can reverse this loss [of our places]. The good work we can do needs to be done in place, where we can experience ourselves as being connected with and relevant to the natural and social world in which we live, as playing a meaningful role as co-creators.
>
> (*Leaf Litter*, 2006)

This way of working can deliver not only more holistic and effective projects, but also a higher level of satisfaction. We experience ourselves as part of a larger whole and adjust our needs, aspirations and values. We are increasingly able to play a meaningful role, one that evolves us at the same time that it evolves the living communities we are an integral part of. Inevitably this results in a deep sense of caring, appreciation, connectedness for all who choose to engage in a regenerative level of work.

It is useful to note that the 'story about place' is not a new one. Rykwert (1976, pp. 66–68) wrote about the rituals of the Romans that helped maintain the connection of city to place:

> The city was constituted publicly, its order was accepted and acted out by the whole people in the rites of foundation, and reiterated for them through festivals and the accounts of annalists. It could be inspected daily on those monuments of the town which recalled a legendary past, so that citizens never forgot the connection between the topography of their city and the rite by which its order had been first established.

This is analogous to epic poems, aboriginal song stories, and narrative histories used as the memory of a culture in oral traditions. As is the case with many of the current local and global environmental and resources issues facing human society, a reconnection to place and to the rituals of place would help foster the shift from sustainable design to restorative and regenerative design.

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