THE SEMANTICS OF SUSTAINABILITY

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Abstract

Sustainability. Is it philosophy, theology, policy, environmental science?--a utopian or reactionary world view? And is there actually such thing as Sustainable design? If so, what does it mean, and does it relate to design as process, product, or both?

1. Introduction

Sustainability is the new buzzword. Since the term ‘sustainable development’ was first coined in the United Nations Brundtland Report of 1987, ‘sustainability’ has been appropriated by every field and political agenda, suggesting the advent of a new era of environmental consciousness in which government and industry, professional and academic circles may find consensus. This is indeed and encouraging phenomenon, but its very popularity may be cause for suspicion. We must ask if the meaning of sustainability is truly understood: if not, is its elusiveness at least partially responsible for its appeal and quick acceptance? Is the ambiguity of this “motherhood” principle a convenient tool for false marketing and political manipulation? Surely the objectives, methodologies and evaluation tools associated with sustainability will only find legitimacy if their roots are solidly anchored. The semantics of sustainability deserves our wholehearted attention, for without the benefit of clarification, the continued use of the term may undermine even the noblest intentions of its proponents.

2. Background

For most, ‘sustainability’ is synonymous with environmental consciousness. This is particularly true in design circles, where ‘sustainable’ and ‘green’ are used interchangeably. The phenomenon of environmental consciousness emerged in popular western culture in the sixties. Some suggest it was triggered on a global scale by the first photos of the earth taken from space: photos which revealed with haunting clarity the fragility of our small planet.[1] The conquest of space also provided a metaphor for our understanding of the earth’s limits; as UN Ambassador Adlai Stevenson expressed so passionately in 1965, “we travel together as passengers on a little spaceship, dependent on its valuable reserves of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work, and I say the love we give our fragile craft.”[ Thom, 62]

The love of technology and material domination which is characteristic of the sixties, and epitomized in space travel, nuclear power and cold-war politics, also produced a social and material backlash with the back-to-earth movement of the radical left. The Whole Earth Catalogue, the unofficial bible of the back-to-
earth movement with its emphasis on rustic self-sufficiency and its compendium of low-tech tools and home remedies, is ironically best-remembered for this iconic cover image embodying both high- and low-tech aspirations.

Environmental issues took a practical turn in public consciousness in the seventies with the oil crisis: public interest shifted towards a greater economy of scale in cars and homes, as well as improved home insulation and fuel-efficiency. Building science focused on energy efficiency and perfected the mechanically controlled, well-insulated, sealed environments which are commonplace today. Earth shelters, solar panels and trombe walls also made a short-lived appearance. But architectural culture is fickle, and prone to the superficiality of image-making. Such alternative architectural solutions soon dropped off the radar screen of mainstream fashion.

Formalism held sway in the eighties, first under the guise of historicism, then abstraction. Yet this seemingly unrelated phenomenon actually helped to lay the groundwork for the conservationist orientation of current environmental thinking. Historic preservation was legitimized, as were the values of regional character and cultural variety. Historicism also found its expression in the ‘post-modern’ revival of traditional decorative styles: although a short-lived architectural trend, this shift in taste had a lasting impact on popular building culture. Most importantly for the environmental movement, it encouraged a renewed interest in traditional urban form, with its emphasis on pedestrian activity, social diversity and human scale.

The social dimension of architecture was also neglected in the eighties. Whether because of the failure of public housing formulas of earlier decades, the political conservatism of the times and subsequent lack of government funding, or the seduction of patronage and high society, architects turned instead to the intimate domain of psychology, and the poetics of narrative. This introspective orientation contributed little to issues of social equity, but did give a new subtlety to the interpretation of human behaviour and the spatial accommodation of ‘function’.

Growing scientific evidence of the degradation of the earth’s eco-system accumulated through the seventies and eighties. The evidence pointed not only to the destruction of forests and elimination of species, but to a significant global-scale deterioration of air, food and water quality. Fear is a great motivator: as the invisible industrial fall-out of a supposedly benign consumer life style was gradually exposed, the fear of the immediate violence of war and mass destruction which had characterized the sixties was superseded by a more insidious, personalized threat to our bodily health and to the material comfort and convenience we had recently come to take for granted. Consumer demand for organic foods, bottled water and natural products increased, while a growing interest in alternative earth-centered world views and ‘new age’ spirituality emerged in mainstream culture.

Of course the degradation of the environment was nothing new; it was simply global rather than local in scale, and more accurately monitored than ever before. As explained in the 2002 Canadian Mortgage and Housing Corporation (CMHC) report Sustainable community Planning and Development, “Throughout history humans have impacted the regions in which they have lived. Until recently, populations were small and the impacts localized; the design and management of the community had effects only on the sustainability of the local region. Since the industrial revolution, however, the growth in industrial technology and activity, combined with the exponential growth in population and the associated impacts of a growing consumption-driven society, have become a threat to the stability and longevity of the earth’s regional and planet-scale eco-systems.

Institutional response was slow, but the seventies and eighties did see the quiet growth of environmental institutions and capacity building at the national and international level: “At the international level were the United Nations Conferences on the Environment (1972), Habitat (1974) and Population (1976). From the 1972 Stockholm Conferences came the United Nations Environment Programme, the Earth Watch monitoring system, a global fund, and other initiatives. At the national (U.S) level, we see laws being passed, government institutions like departments for the environment, and procedures put in place like the EIA and EIS.”[Thom, 63]

The late eighties saw the birth of multi-nation action plans for environmental improvements, as witnessed by the Montreal Protocol of 1987 and the Helsinki Declaration of 1989. It was at this time too that the Brundtland Report was published, followed five years later by the United Nations Conference on Environment and Development in Rio de Janeiro (The Earth Summit), where participating nations agreed on an action plan for the next century known as Agenda
21. The environmental movement suddenly took on new momentum under the guise of ‘sustainable development’.

3. Definitions

3.1 Sustainability

So what exactly is ‘sustainability’? Some have tried to give the word authority by asserting its familiarity. As Leslie Hoffman claims in the introduction to Sustainable Architecture: White Papers, “Many of the tenets of sustainability are old ideas. Some are ancient understandings, others are developments of the last decades.” Similarly, architect Barry Johns argues that sustainability is “a new word for an old idea, addressing issues of materials, place and climate, as architecture has always done.” While these assertions may win converts, they belie the complexity of the issue. The term in fact has multiple meanings in common usage, as well as particular associations in different disciplinary settings.

In biology, sustainability has come to be associated with the protection of biodiversity. In economics it is advanced by those who favour accounting for natural resources. In sociology it involves the advance of environmental justice in situations where some groups make decisions over the use of natural resources and other groups are affected in their daily lives. In environmental ethics it means alternatively preservation, conservation or ‘sustainable use’ of natural resources.[Basiago]

The 1993 Oxford Dictionary of Current English defines sustainability as “avoiding using up natural resources” and refers its usage to industry, development or agriculture. Each of these associations is related to environmental impact, yet strictly speaking, sustainability implies long term viability without particular reference to environmental viability. Any action or object may in fact be considered sustainable within defined parameters: thus sailing, for instance, is sustainable given the proper wind conditions, whereas it might be considered unsustainable as a regular, reliable means of transport over the long term. The meaning of sustainability is therefore a matter of context and association.

Confusion over the meaning of the word sustainable is compounded in bilingual Canada, where the French translation in common usage is durable rather than the more accurate soutenable. ‘Durability’ is consequently used interchangeably with ‘sustainability’, focusing undue attention on the quality of solidity over time. Although durability is undeniably one aspect of this complex term, it must also be recognized that an action or object may be durable without actually being sustainable.

The word is derived from the Latin sustinare. The Shorter Oxford English Dictionary (1950) gives the following definitions of sustain: ‘to succour, support, back up; to keep in being; to cause to continue in a certain state; to furnish with the necessaries of life; to endure without failing or giving way; to bear, support, withstand, maintain.” Current usage (1993) includes, “to strengthen or support (someone) physically or mentally; to bear (the weight of an object); to suffer (something unpleasant); to keep (something) going over time or continuously.”

The word sustainability resonates with duration and continuity, so poignantly out of keeping with our time. An antidote to despair in an era of crisis, it suggests a state of stability arising from continued effort. Sustainability rings with virtue and good common sense. It embodies both the traditionally feminine quality of nurturing and the traditionally masculine characteristic of strength. In the context of human behaviour, it is associated with perseverance, thoughtfulness, loyalty and ethical responsibility. It is arguably a static state, far different from ‘progress’, the leitmotiv of the last century. In this sense it may also be perceived as a reactionary position, censoring innovation and imagination.

The conservative implications of the term are undoubtedly partially responsible for its appeal. Sustainability suggests that we maintain what we have—that we preserve what we value. This aura of conservatism provides the traditionally left-wing environmental cause with a veil of social acceptability, uniting the call for radical change with the preservation of the status quo.

But sustainability is generally understood as an ideal. As an extension of sustain, the word literally implies potential without the guarantee of actualization. While many of us are eager to embrace this cautiously optimistic vision, others are quick to criticize its lack of specific focus. As Diamond and Moezzi observe in “Revealing Myths about People, Energy and Buildings,”

Sustainability is often used in its mythic sense, one suggesting environmental stewardship. Because sustainability can be attained and defined only in a relative sense but gives some
appearance of being objective, it is susceptible to misuse. Though (it) comprises a hopefulness and attention that is often sincere, it is so unhinged from measurability that it can be used for a wide range of purposes without sufficient specificity or articulation. It is thus a myth with a myth, a utopian ideal that can rarely be realized in any absolute sense in the contexts of modern technology in which it is used.

Indeed, the call for sustainability does not specifically identify what is to be sustained, potentially allowing room for both utopian and reactionary visions of the future. Is it possible for a principle to be both radical and conservative? Are we proposing to change the world, and at the same time make it like it was?

Some of the term’s apparent contradictions may be resolved with the understanding that sustainability refers to a constant state achieved through dynamic balance. The notion of process is implicit: action and reaction interplay in a recurring pattern which provides continuity over time. The concept requires the rejection of linear thinking and the associated interpretation of stasis as the arresting of movement. In this light, sustainability involves both stasis (preservation) and change (process).

Nature, of course, provides the model:

A sustainable system…is one that is either in equilibrium, operating at a steady state, or a system which changes at a rate considered to be acceptable. The concept of sustainability is best illustrated by natural ecosystems. These function as closed “loops” that change slowly. For example, the hydrologic or water cycle involves the continuous evaporation from…surface bodies of water into the atmosphere. The vapor then moves over land where precipitation occurs...(returning) the water to (its source)...where the process is repeated over again... [Roberts, 47]

We know that the earth sustains us through a complex interweaving of a myriad of dynamic systems. Indeed sustainability is generally maintained over large stretches of space and time, difficult to measure and even more difficult to predict:

A social - ecological system can be resilient at one timescale because of technological innovations. Iron axes, for example, helped agricultural societies to persist over a particular time span because they enabled their owners to clear more forests and grow more food. But at a longer time scale, once some threshold of forest cover had been crossed, fallowing could no longer maintain soil fertility and the resilience of the systems eroded. Social-ecological resilience in one time period was gained at the expense of the succeeding period (Carpenter et al. 2001a). Similarly, resilience at one spatial extent can be subsidized from a broader scale, a common pattern in human cultural evolution (Redman 1999). Through the use and dependence on fossil fuels and freshwater reservoirs, current social-ecological systems are subsidized by resources from a past era and from distant places. [Resilience and Sustainable Development]

The increased use of the term over the last decade suggests a new self-consciousness, combining the awareness of what we have with a fear of loss. Sustainability carries with it the shadow of its opposite, hovering ever ready to tip the balance with the slightest failure of will or strength or understanding. Given that the big picture is slightly beyond our reach, cautiousness is preferable to blind haste. While the transformations we have unleashed may well be sustained by the earth over the long run, they may not include us in the big picture, or, less drastically speaking, may not include the bounty and complexity we so cherish. The clarion call for sustainability comes from the general observation, based on accumulated evidence and some degree of intuition., that we are out of synch, on a global scale, with the natural processes on which we depend.

It has been suggested that the transition to sustainability derives from a fundamental change in the way people think about the complex systems upon which they depend. Thus a fundamental challenge is “to change perceptions and mind-sets, among actors and across all sectors of society, from the over-riding goal of increasing productive capacity to one of increasing adaptive capacity, from the view of humanity as independent of nature to one of humanity and nature as co-evolving in a dynamic fashion within the biosphere. [Resilience and Sustainable Development]

### 3.2 Sustainable Development

“Sustainable Development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.”

- Brundtland Report, 1987
The catchphrase ‘sustainable development’ and its much quoted source, the above definition offered by the United Nations World Commission on Environment and Development (WCED), introduce another level of complexity to the issue of sustainability. The broad-based acceptance of this definition as authoritative makes it imperative that we consider how ‘development’ qualifies ‘sustainability’s’ meaning, and how the Brundtland Report sets the tone for its general application.

The phrase sustainable development is arguably an oxymoron—a conflation of stable and unstable states which fails to resonate with the cyclical view previously described. The loaded term development recalls conventional notions of progress—or increased material prosperity, and is commonly associated with physical expansion. It is therefore inherently problematic from a conservationist point of view, for it raises the ominous question, “How much development (transformation of nature) is sustainable (acceptable)?” One is left with the gnawing feeling that there must be another word to describe our active role in the ecosystem. In this equation certainly, the environment takes second place.

The proposed definition supports this bias by prioritizing human need. We must admit that human need is an expandable quantity, difficult to define beyond the requirement for basic sustenance. Need is closely associated with desire and greed. This little word leaves the definition wide open to the whims of over-consumption, as explained further by the report’s stated objective “to achieve a decent standard of living for all people within the limits of natural systems.” In the interests of sustainability we must ask ourselves what standard of consumption ‘decent’ refers to, and how close to the ‘limits’ of natural systems we are willing to go. This is not meant to belittle the notion of social equity, but rather to question the material standard by which equity is measured [see Figure 1]. While the report makes a laudable attempt to tie together the aspirations of the developed and developing worlds, it seems to unwittingly uphold inherently unsustainable patterns of living. “To build resilience for social-ecological sustainability we need first to clarify the human-nature relation, and identify what to sustain and why.” [Resilience and Sustainable Development]

The definition nonetheless succeeds in reinforcing the important notion of intergenerational equity: without explicitly curbing current consumption (development) patterns, it highlights the larger impacts of personal interest, and presents the concept of long term responsibility for a limited pool of resources. It is worth noting that the follow-up Rio Action Plan is more explicitly proactive, with such directives as “environmental protection shall constitute an integral part of the development process” and “States should reduce and eliminate unsustainable patterns of production and consumption.”

![Figure 1. The impact of living standards on sustainable social equity](image1.png)

The Report itself also begins to articulate a methodology by which sustainability may be reached: this is perhaps its most important contribution. The imperatives of economic viability and social equity are introduced to the environmental debate, thereby moving the argument towards a more inclusive, holistic consideration of the problem. As explained by planners Berke and Conroy, “the commission attempted to weave together multiple societal values to confront the challenges of reducing over-consumption and grinding poverty. These values are sometimes referred to as the “three E’s” of sustainable development: environment, economy, and equity. The WCED recognized that the conventional economic imperative to maximize economic production must be accountable to an ecological imperative to protect the ecosphere, and social equity imperative to minimize human suffering.” This tri-partite relationship is commonly illustrated with the following diagram:

![Figure 2. The 3 E’s (popular representation of ideal)](image2.png)
Our current condition, however, clearly favours the economic imperative, and may be visualized as follows:

![Figure 3. The 3 E's (current condition)](image)

### 3.3 Sustainable Design

The proposed tripartite balance of traditionally competitive interests begins to address the complexity of sustainability and the process by which it may be attained. This process is arguably a matter of design, reducible to the issue of how we transform, or ‘re-design’ nature for human use, from interior spaces, buildings, gardens, cities, highways, and power lines to products, tools and artifacts. We tend to speak of nature versus civilization, nature versus culture. But the planted fields and forests too are signals of design intention. Indeed there is so little nature left untouched that the distinction may be irrelevant. We live in a world that is truly, now, of our own making: we must finally admit that the wilderness is within, not without.

Conventional design practice is reduced to a limited number of variables. This clearly provides greater control, and hence a greater chance of ‘success.’ The priority of course, within the dominant economic imperative, is production efficiency. Sustainable design emerges in this context as a labour-intensive application of broad-based synthetic thinking, with the specific objective of long term performance in the largest sense.

The impact of design decisions consequently shifts beyond the immediate environment of our constructions and formalizations to a much vaster scale, reaching from the sites of material production to the landfills of our neglect. The ethical dimension is brought to the forefront, with the designer assuming a new level of responsibility requiring unfamiliar mediating skills. As Paul Hawken states with regard to architecture, “we desperately need mediators between human need and the enduring cycles of nature.”

Environmental design is the part of this new methodology that gives it its colour and technical challenge, but it is clearly a sub-set of sustainable design. Environmental design continues to have both high- and low-tech proponents, and embraces materials, techniques and systems that are largely unfamiliar to conventional design practice, from hydrogen fuel cells and solar panels, to passive solar heating, straw bale and milk paint. In the last ten years increasingly sophisticated building technologies and systems have been introduced to the market and encouraged the increased interaction of architects and engineers in the arenas of building and urban infrastructure design. At the same time, we have seen a renewed interest in indigenous building traditions, locally available primary materials, labour intensive self-build techniques and simple, accessible technologies.

In the building industry, numerous tools exist to assist us in moving in the right direction: LEED (US and Canada), BREEAM (UK and Canada), CASBEE (Japan) are the major design evaluation systems currently available. There is no shortage of modeling software, and databases are multiplying. Canada’s C-2000 program goes one step further to proscribe process criteria for technical building design issues. Yet none of these tools identifies a methodology for weighing the three variables—environmental, socio-cultural and economic—, which together determine sustainability: “However important it may be to study in detail specific aspects of the performance and behavior of buildings, the ultimate issue in architecture is one of synthesis in which delicate balances must be sought between often contradictory requirements.” (Hawkes, 109)

If sustainability is about identifying and resolving a maximum number of variables, the convenient coding into three compartments must surely be inadequate. Cultural, political, and psychological issues for instance, are not properly identified. Another perceived limitation of this model is the proposed equivalency of environmental with economic and social concerns: while those involved in practice know all too well the exigencies of functionality and the weight of economic considerations, it may indeed be
pedagogically more useful to present the social and economic spheres within the environmental (see fig. 4).

**Figure 4. The 3 E’s (a more sustainable picture)**

Even more significant is the disjunction between economic, social and environmental theory and the limited scope of inquiry permitted in practice. Design traditionally begins with an expression of need by the client, and ends with the delivery of a product. Economic parameters (the project budget) are fixed and typically bottom line, while social factors (the program) are considered the client’s prerogative. For instance, the designer may suggest but never impose social equity on a user group. And while the conventional design process surely has an educational component, it ultimately has more to do with accounting and evaluating than politicizing. Architect William McDonough argues convincingly that we must be visionaries, making projects happen, and asking questions out of the box. We must redefine practice to extend the boundaries of design to begin earlier—with the establishment of priorities and objectives, and end later—with the consideration of a product’s use (and misuse) over time. One might call it the de-materialization of design: as MacDonough says so prophetically, “We look at design as a signal of intention. And we look in the future and say that the filters of the future will not be on the end of pipes. They will be in our heads.”

But how do we open up the dialogue? In addition to the challenge of engaging the client, there is the further obstacle of existing barriers between professions. The lack of inter-disciplinary agreement over what constitutes a sustainable interpretation of economic and social factors illustrates the point: while planners speak of social equity as manifested in equal access to housing, for instance, architects tend to focus on user comfort, spatial flexibility and social interaction. This appears to be tied to the discipline’s scale of intervention. As Diamond and Moezzi observe with regard to the energy profession, it is “comprised of people with many different theoretical and ideological perspectives who often talk past each other…thus economists and engineers may not be speaking the same language or sharing the same mental models.” Communication is difficult despite a commonality of purpose.

Increased teamwork and inter-disciplinary exchange are some of the new tools. The vision statement developed by the recently formed Inter-professional Council on Environmental Design (ICED), a coalition of architectural, landscape architectural, and engineering organizations, is indicative: “The ethics, education and practices of our professions will be directed to shape a sustainable future. . . . To achieve this vision we will join . . . as a multidisciplinary partnership.” [National Park Service] Lateral as opposed to linear thinking must also be encouraged with regard to the processing of information, and the nature of decision-making must be directed. As Berke and Conroy maintain, “Planners must employ various negotiation and dispute resolution techniques that are essential in formulating the holistic development management strategies needed to achieve balance among sustainability principles.” On a more fundamental note, there is the belief, supported by philosophers such as Jurgen Habermaus and Edward Said, “that communication can work…although that belief is tempered by the understanding that intractable social and cultural differences do exist, making this communication imperfect and difficult, at best. Trying to achieve it, however, is seen as our last, best hope in a rapidly fragmenting world.” [Steele, 231] If we shift to the larger picture—one that includes nature—the patterns of our conversations find their proper place. In the reassuring words of Connie Barlow:

> Conversation is, after all, a community in process. Conversation binds individuals into communities. Similarly, ecosystems, bioregions, and Gaia emerge and are sustained by a kind of physical and chemical conversation among the living and between the living and the nonliving. Evolution is an extension of those same conversations through time. Conversation suggests spontaneity, mutual creativity. It has no pre-established destination, yet we can count on something interesting developing. [268]

### 4. Conclusion

Clearly we must aim for greater precision, yet with each application I have engaged in, the variables seem
to grow more complex, and the ‘right’ solution more elusive. If sustainability can only be witnessed over time, methodologies will necessarily emerge through practice. In the meantime, the most significant step for designers will be to expand the conventional limits of design from a product- to a process-oriented activity. This holds great promise for the better integration of academic and professional domains as the fields of expertise and influence overlap, and opportunities open towards a sustainable future.

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