Sustainable Development: An Architectural Imperative

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"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
- Gro Harlem Brundtland

Sustainable development is crucial for humanity for it is the only way to meet our current needs without constraining future generations. Sustainable development is crucial for the architectural profession for its role within the construction industry is diminishing as expanding numbers enter the profession. Sustainable development is crucial for architectural education for it is only through changes in its knowledge base that the architectural profession can become part of the solution rather than remain part of the problem.

This paper explores the potentials of sustainable development for the continued viability of the architectural profession and suggests changes within architectural education that are appropriate to achieve these potentials.

INTRODUCTION

At various times and for various groups, different environmental concerns have surfaced as crucial for the architectural profession. In the early 1950's, environmental adaptation emerged as a way to adjust the International Style for the specifics of particular building sites. Twenty years later, with an increasing awareness that our energy resources are finite and costly, concern shifted from a general interest in environmental adaptation towards energy conscious design and a more direct use of solar energy. Today, with growing recognition that there are limits to continued growth, sustainable development is emerging as a theme that must be addressed. While some might interpret this merely as the beginning of another cycle of changing interests, there are clear indications that the risks attendant with not adopting the principles of sustainable development are real and considerable.

THE LIMITS TO GROWTH

These risks where introduced 20 years ago in various publications, and they have been restated in the recent publication *Beyond the Limits*. The conclusions of this text, which is a follow-up from the 1970's *Limits to Growth*, constitute a serious warning, not a revelation of disaster. These conclusions are:

"1. Human use of many essential resources and generation of many kinds of pollutant have already surpassed rates that are physically sustainable. ... 2. (Two) changes are necessary. The first is a comprehensive revision of policies and practices that perpetuate growth. ... The second is a rapid, drastic increase in the efficiency with which materials and energy are used. 3. A sustainable society is technically and economically possible (but this) requires a careful balance between long-term and short-term goals and an emphasis on sufficiency, equity, and quality of life rather than on quantity of output. It requires more than productivity and more than technology; it also requires maturity, compassion, and wisdom."[1]

The critical question is not whether the warnings about continued growth are accurate. Even if they are not, the projections clearly indicate that continued growth, as distinct from ongoing development, will have an overwhelmingly negative impact on the future of humanity. Although "disaster" might be extreme, the predictions of growth limits that can be sustained on this "spaceship Earth" still provide an alarm that must be considered seriously by all, especially by those involved in the architectural profession. The challenge is not how we do without but how we meet our present requirements without exhausting the potential for future generations to meet theirs. That is, how can we achieve sustainable development?

SUSTAINABLE DEVELOPMENT

In his 1970's text *Small is Beautiful: Economics as if People Mattered*, Ernst Friedrich Schumacher introduced certain strategic principles that should underlie sustainable development.

"There can be 'growth' towards a limited objective, but there cannot be unlimited, generalized growth. It is more than likely, as Gandhi said, that 'Earth provides enough to satisfy every man's need, but not for every man's greed.' ... The cultivation and expansion of needs is the antithesis of wisdom. It is also the antithesis of freedom and peace. ... The economics of permanence implies a profound reorientation of science and technology, which have to open their doors to wisdom and, in fact, have to incorporate wisdom into their very structure. Scientific or technological 'solutions' which poison the environment or degrade the social structure and man himself are of no benefit, no matter how brilliantly conceived or how great their superficial attraction. ... Wisdom demands a new orientation of science and technology towards the organic, the gentle, the non-violent, the elegant and beautiful. ... The neglect, indeed the rejection, of wisdom has gone so far that most of our intellectuals have not even the faintest idea what the term could mean. As a result, they always tend to try and cure a disease by intensifying its causes."[2]

Schumacher's seminal message was that we must commit to appropriate technology rather than continue our attempt to retain dominion over all.

THE CRISIS OF ARCHITECTURAL PRACTICE

A number of adjustments in architectural practice have occurred in recent years. For one, over the last 50 years there has been more than a 50% increase in the proportional number of architects practicing in the US.[3] As a probable result of this increase, the number of architectural design firms has also increased. Today there are approximately 25,000 firms, the majority of which are small practices, including a significant number of one-person operations. But while the number of architects and architectural firms seem to have increased, the level of construction activity has remained relatively constant. Although there have been cycles between high and low points, based on past, long-term trends and adjusting for inflation, construction activity has remained fairly stable. "In short, statistically speaking, the magnitude of gains in the size of professional ranks has outstripped increases in demand for building construction activity. Resulting unemployment and underemployment are thus hardly surprising."[4] Paradoxically, while this change is known, the number of students enrolling in architectural schools continues to rise, with many recent graduates compelled to pursue alternative vocational roles.

While these adjustments might not represent a crisis, they do indicate a serious challenge for the architectural profession. To confront this challenge it would be logical to explore ways to expand opportunities for architectural involvement. But contrary to this, certain segments within the profession seem intent on reducing the areas of architectural responsibility by embracing a rather narrow interpretation of architectural practice and abandoning many areas of traditional involvement. While many of the prominent voices in the profession are consumed in a theoretical dialogue on stylistic priorities, the architect's traditional leadership role in environmental development is being significantly reduced. In many situations, in fact, oblivious to the profession's fundamental responsibility to insure that environmental development is nurturing and sustainable, architects are contributing to the degradation of the environment.

So, although the numbers of architects and architectural firms have been increasing when the level of construction activity has remained relatively constant, the profession seems intent on reducing its involvement in environmental development, and this is a crisis! It is a crisis for the architectural profession and for environmental development. For the profession, it further reduces the opportunities for involvement when there already exists a shrinkage in the market for traditional services. For environmental development, it limits the potential contributions that architects, through their commitment to the design process, can provide for the resolution of some of our most severe environmental challenges.

The ultimate and quintessential role of architectural practice is the interpretation of ideas through physical form for human habitation. Designing is the actual act of interpretation. However, the idea of the architect as creative designer operating intuitively and independently in this effort of interpretation, although romantic, is unsubstantiated by fact and is a notion that inhibits realization of the architectural potential. While designing is obviously a critical responsibility of architecture, there are numerous activities with which architects have regularly been involved and upon which designing relies. Just in terms of traditional practice, these usually include: promoting and selling architectural services; educating the public, clients, and future professionals; preparing a project brief; developing contract documents; selecting contractors and determining costs; and inspecting construction progress. In addition to these activities, there are also a number of allied services which are frequently included.[5]

Although these various activities collectively constitute the overwhelming portion of architectural practice, a presumption remains, even among many architects, that designing is the most dominant aspect of professional services. In reality, designing accounts for only around 10% of the actual effort expended in fulfilling the demands of most architectural practices! While the actual act of interpretation is critical, all efforts necessary to accomplish this interpretation are essential and crucial to the architectural endeavor, not merely the interpretation itself.

Regrettably, however, there is a distinction between the value and importance placed on designing as compared to that typically given to the "non-design" components of architectural practice. This has created an unfortunate hierarchy within the profession. Designing has become the only aspect of architectural practice that many presumed professionals would admit to being worthy of their attention. But since designing represents only a small percentage of the activity

related to practice, considerable confusion and disillusionment exists throughout the profession. Based on the realities of practice, many architects are encouraged to claim to be something they are not (i.e., designers); forced to admit that they have not attained stature within the profession; or, being impressionable, enticed to abandon the broad responsibilities of professional life in order to seek rewards within a limited area of architectural concern. While distinctions will remain, any assumed hierarchy in the various areas of architectural involvement will continue to be extremely divisive to the profession. To remain effective in the field of environmental development, architects can no longer indulge themselves with a biased, myopic view of their diverse professional responsibilities.

Through development of new building materials, advances in construction technology, improvements in environmental control systems, and electronic communications, architects have achieved a prodigious potential to modify the natural conditions in support of human habitation. However, this expanded capacity to achieve positive results carries a concomitant potential for enormous harm. Architects have a responsibility to recognize the net value of their actions. This can only done from a knowledge base which supports proper interpretation and from a perspective that is conscious of the impact beyond the contiguous context of both place and time.

At a time when the architectural profession should be actively involved in supporting sustainable development, the profession's continued infatuation with a narrow set of design priorities might reasonably be interpreted as equivalent to rearranging the deck chairs on the *Titanic*. Rather than narrow its options, the profession should be pursuing ways not only to regain its traditional, prominent role in environmental development but to increase its level of participation through an expansion of services. By embracing the principles of sustainable development, the profession should take the opportunity to build upon its problem-solving methodology and substantially extend its realm of participation. It should reinterpret the basic notion of what constitutes architectural practice.

If architects are to play a prominent role in sustainable development, significant adjustments will have to occur within the profession. Those committed to strengthening the architectural role will need to: reaffirm their commitment to technology; promote an alliance between science and humanism; develop the creative talents that can effectively blend diverse, and sometime conflicting, issues; increase their level of expertise; take on expanded responsibilities; accept greater professional risks; and lead through example. In this endeavor, the demands on academe will be considerable, for it is upon education that the foundations of responsible professional action rest.

EDUCATION

A basic premise of sustainable development is that interventions with the natural condition must result in an improvement rather than a destruction of the ecological balance. As presented in *Caring for the Earth*:

"Living sustainably depends on accepting a duty to seek harmony with other people and with nature. The guiding rules are that people must share with each other and care for the Earth. Humanity must take no more from nature than nature can replenish. This in turn means adopting life-styles and development paths that respect and work within nature's limits. It can be done without rejecting the many benefits that modern technology has brought, provided that technology also works within those limits. This strategy is about a new approach to the future, not a return to the past."[6]

The professional role must be based on understanding, knowledge, and expertise. With an expansion of their knowledge base and a resurgence of their commitment to professional responsibility, architects will be prepared to accept greater professional risks, expand their role in realizing sustainable development, and achieve greater rewards in terms of financial gain, social prestige, and personal satisfaction.

Architectural responsibilities are complex and diverse, although they tend to relate to a common core: the interpretation of ideas through physical form for human habitation. While this core is assumed to be the essential component of the architectural profession, since architectural design must integrate a myriad of concerns, many of which are often in opposition to each other, into holistic reality, the action of interpretation is effective only when it is integrative. As with what Buckminster Fuller called synergy, integrative design incorporates the notion that each part of the whole serves in the capacity of the others. Truly creative talents are required to accomplish integrative architecture which contributes to sustainable development and generates value for society. But such talents require a broad and substantial knowledge base. As recently presented by Donald Watson:

"We are thus presented with choices, one of which is to deny or ignore or set aside the discussion as peripheral to the discipline and profession of architecture. This is a convenient option, one that will be supported by conventional practices and by vested interests. The other choice is more difficult and will involve the constant challenge to transform ourselves and our institutions to address what is now emerging as a worldwide agenda towards stewardship of cultural and environmental diversity and sustainability."[7]

Schumacher suggested that "it is man, not nature, who provides the primary resource. . . . In a very real sense, therefore, education is the most vital of all resources"[8] But he also said that education has no purpose in sustainable development if that education does not establish an understanding of fundamental principles and a recognition of the effects that the application of these principles may have. Whatever the discipline, if the teaching fails to clarify our basic convictions, it "cannot be of real value to society."[9]

"The problems of education are merely reflections of the deepest problems of our age. They cannot be solved by organization, administration, or the expenditure of money, even though the importance of all these is not denied. ... Education which fails to clarify our central convictions is mere training or indulgence."[10]

There are two ways of questioning the relationship between architecture and sustainable development. Traditionally, in a manner related to the positive rationalist's attitude, the question would be: "What is sustainable about architecture?" This point of view supports the rationalist's design process model which is based on the translation of the designer's understanding of certain principles into architectural design. The technological design process model tends to be based on technical rationality which suggests that designing is "made rigorous by the application of scientific theory and technique."[11] But this model does not fit with the traditional process of architectural design. As Donald Schon observed, designing seems more appropriately based on "complexity, uncertainty, instability, uniqueness, and value conflict."[12] Therefore, while there is a desire to understand the scientific principles of an issue such as sustainability, there is a general rejection of structuring a curriculum so that design is presented as the mere application of these principles in some linear process.

The question as to the relationship between architecture and sustainable development should be restated as: "What is architectural about sustainable development?" This reversed inquiry suggests that design, rather than being an act of translation is an act of interpretation such that understanding the principles of sustainable development provides for design opportunities, not specific solutions.

To establish the basis for such an approach to design, a general understanding of the various disciplines which impact on human society must be included in the educational preparation for an architectural career. Since this understanding is the domain of a four-year liberal arts education, architectural studies should probably be delayed until the graduate level. While practical experience might be incorporated with graduate studies, such experience should also be gained following academic studies through an organized, formal internship. While issues related to architectural design might be included in the undergraduate experience, designing should not be emphasized until the graduate level when it should serve as the core of the curriculum around which various specialized professional tracks are organized. But in this role, a broad interpretation of designing is appropriate. In addition to being the core, designing taken to greater depth might also be one of the optional, specialized tracks. That is, from the current potpourri of graduate, undergraduate, and mixed programs, the educational preparation for the architectural profession should be standardized at the graduate level on a model similar to that used in medical education. By requiring a four-year liberal arts undergraduate degree prior to entrance into professional architectural studies and by increasing the intensity and breadth of the academic dialogue, including relevant connections between the various architectural issues that legitimately impact on sustainable development, the significance and substance of our architectural programs will improve and future architects will be better prepared to contribute to environmental development in a positive, sustainable manner.

THE NATURE OF ARCHITECTURAL DESIGN

Design forms the core of architecture. But for all of its apparent importance within the field, the nature of design is not clearly understood. There are a number of reasons for this confusion. One is the distinction between design-as-noun (i.e., the product) and design-as-verb (i.e., the process). Although both aspects of design are important, design-as-verb is more critical for the future of architecture. While design-as-noun relates to various aspects of buildings, such as composition, stylistic expression, and even architectural meaning, design-as-verb incorporates the processes which develop design-as-noun. And these processes of design, rather than any particular set of solutions, should be the primary commitment of the profession. The fundamental responsibility of the architectural profession is to provide services for humanity, not to create objects.

Another reason for the confusion stems from the intense refusal of many architects to admit that architectural design is a problem-solving endeavor. This refusal is derived from the false assumption that problem-solving is not concerned with value generating. But problem-solving is not a means of following prescribed actions to provide answers that conform to specific projected solutions but to offer reasonable, not necessarily the only or best, responses. Effective problem-solving includes value, both in its analytic and synthetic modes. Rejection of design as problem-solving not only represents a failure to grasp the intentions of problem resolution, it also indicates the narrow perspective from which architects often view design. This myopia inhibits acceptance of inclusiveness upon which effective design, especially that which supports sustainable development, must be based.

In her excellent evaluation of architectural practice, *Architecture: The Story of Practice,* Dana Cuff offered another understanding of this matter.

"The dominant belief . . . is that design is a kind of problem solving involving problems that can be defined, are determinate, and can be solved. There is a concomitant emphasis on *decision making* as the primary skill an *individual* needs in order to successfully give form to a project. Based on this research, the more accurate description of the necessary skill is not decision making but sense making."[13]

Cuff recognized that pragmatic concerns, especially business issues, are not typically realized as reasonable design

priorities. This attitude towards design is often reinforced in architectural schools.

> "The dilemma does not exist in schools, where business concerns go unrecognized. There, design quality is challenged only by the designer's ability. Only occasionally do academic exercises challenge design priorities with pragmatic concerns. ... Students do not learn, however, how to achieve design quality within the context of opposing forces. ... (In) school design continues to win out; according to professional theory, design and business are integrated; in practice, they are in constant battle."[14]

The notion that "design quality is challenged only by the designer's ability" seems consistent with the tendency within the profession to presume that design quality is determined by the talents of the designer, not by the appropriateness of the design response to the contextual forces. Architects seem capable of disconnecting their evaluation of a design from consideration of its response to essential requirements. This extraordinary ability to obfuscate severely impacts on the architectural potential to fulfill a positive, essential role in sustainable development. For if architects do not measure the effects that result from their endeavors in a reasonably objective manner, how do they know whether their efforts are part of the solution rather than part of the problem?

Cuff suggested that in order to provide future architects a better grasp of the extent of concerns that design must address, academic design problems should incorporate various issues, not merely manipulation of form. While this is a positive idea, she somewhat refuted it with her comment that: "Although building design will not be as developed for this type of problem, solutions may be more sophisticated in terms of how well they resolve conflicting interests or reflect client concerns."[15] If a design can be praised for its excellence when that design has not addressed certain essential issues and has failed in its treatment of others, there is an obvious confusion as to what constitute design quality.

This confusion impacts on the architectural profession. According to James Marston Fitch, it results from changes that began around 150 years ago with the general industrialization of the construction field. At that time the process of design became isolated from "the healthy democratic base of popular participation."[16] The results of this isolation was an "increasing prevalence of the abstract, the formal, and the platitudinous in architectural design."[17] Fitch claimed that significant adjustments in architectural understanding and performance were necessary if the profession were to regain its appropriate position.

According to Weld Coxe, management consultant for architectural practice, professionalism is essential to all aspects of architectural practice. To fulfill this professionalism, architects must accept a greater responsibility than they seem to have been willing to do in recent times. Although architects claim they are merely reacting to avoid exposure to possible litigation, Coxe emphasizes that liability is a matter of insurance and "has nothing to do with the professional obligation to be responsible."[18]

> "The leading architects of the next millennium will be the ones who take more responsibility for the social impact they know architecture can have. They're going to be 100 percent professional. They're going to be much more willing to accept responsibility for their part of the work than ever before. They're going to be confident about what they do, and they are going to have a very high and well-deserved sense of self-worth."[19] <text> However, many recent "prestigious" buildings do not seem to be a product of such responsible action as much as a response to a limited, narrow set of design concerns. Although some of these buildings might represent quality in terms of compositional form, they are generally unresponsive to environmental concerns and are frequently void of any significant social connotation or functional meaning. Only through an understanding of and appreciation for the tenets of sustainable development and technological propriety can the architectural profession move from its recent role of "agent and spokesman for the elite" [20] to provide a more meaningful contribution to the popular community. Only through a respect for the ecological fragility of the natural environment and an understanding of the limits of our technological potential, can architects hope to achieve environmental development of significance, quality, and meaning.

CONCLUSION

Architecture is a dynamic and innovative profession which periodically seems to metamorphose. Some feel that now is the time for a major transformation. While the current debate within the profession continues over the primacy of stylistic approaches, it seems that a more critical issue with which the profession must become involved is the relationship between architecture and the sustenance of life on this "spaceship Earth." And this issue clearly impacts on architectural education.

As was presented at the 1994 ACSA Summer Institute at Cranbrook, architectural practice must be set on a broader, more substantial knowledge base and embrace, in a non-hierarchical manner, all the diverse expertise demanded for sustainable development. While design will remain the quintessential activity and serve as the core of the profession, concern for compositional form and stylistic expression can no longer dominate. To achieve a new interpretation of design, to establish an appropriate knowledge base, and to eliminate the unfortunate hierarchy that prevails within the architectural profession, the current structure of architectural educational must be radically altered.

Sustainable development, a requirement for the future, provides a real potential for the architectural profession. By expanding the awareness of the various issues that influence

and are influenced by environmental development and by developing the expertise necessary to address these issues, it is expected that the quality and effectiveness, and thereby the influence, of the architectural profession will be extended. This will not only enhance the social potential derived from future development, it will also increase both the financial rewards and the stature of the architectural profession.

The question then is: "What is architectural about sustainable development?"

NOTES

[1] Meadows, Meadows, Randers, *Beyond the Limits*, Chelsea Green Publishing Co., Post Mills, Vermont 1992, pages xv-xvi.

[2] Ernst Friedrich Schumacher, *Small is Beautiful: Economics as if People Mattered*, Harper & Row, New York 1973, pages 33-34 & 38.

[3] Shortly after the 2nd World War, there were around 2.6 architects per 10,000 population. In 1975, this had increased to around 2.8 per 10,000, but by 1992 the number had expanded to 4 per 10,000.

[4] Peter Rowe, "Symposium on Architectural Practice," *GSD News*, Winter/Spring 1994, page 37.

[5] As part of a recent article "It's Still a Design Firm - Or Is It?" by Norman Kaderlan in *Architectural Record*, March 1994, there was a listing of alternative services provided by a few firms. These listings included: appraisals; computer graphics; construction management; cost estimating; ecs design; energy audits; engineering consultation; environmental assessments; facilities programming; furniture design; graphic design; historic preservation; industrial design; interior design; landscape design; lighting design; master planning; post occupancy evaluation; regional and urban planning; site analysis; site engineering; site planning; solar energy design; space planning; structural design; transportation studies.

[6] IUCN, UNEP, & WWF, *Caring for the Earth* , Gland, Switzerland 1991, page 9.

[7] Donald Watson, "Sustainability: A Literature Review," Unpublished Manuscript, 1994 , page 26.

[8] op. cit., Schumacher, page 79.

[9] ibid., page 93.

[10] ibid., page 101.

[11] Donald A. Schon, *The Reflective Practitioner*, Basic Books, Inc., New York 1983, page 21.

[12] ibid., page 18.

[13] Dana Cuff, *Architecture: The Story of Practice* MIT Press, Cambridge, Mass. 1991, page 254.

[14] ibid., page 72.

[15] ibid., page 255.

[16] Fitch, James Marston, *American Building: The Environmental Forces That Shape It*, Houghton Mifflin Co., Boston 1972, page 316.

[17] ibid., page 317.

[18] Weld, Coxe, "Reflections," *Practices*, University of Cincinnati, Spring 1992.

[19] ibid.

[20] op. cit., Fitch, page 319.