

Stewardship and Mediating Artifacts: Forwarding the Incomplete

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Introduction

"[T]he purpose of architectural drawings is to discover and disclose aspects of the world that are not immediately apparent and never will be."

– David Leatherbarrow¹

"The various means of representation of architectural ideas (plans, sections, three-dimensional drawings) show the building as an artifact imagined not so much through the existence of any one of these fragments, but by the understanding of the tension among them."

– Michael Graves²

Despite wide acknowledgement of a specifically architectural reliance on incomplete or fragmentary mediating artifacts, contemporary publishing of sustainable architecture suggests a strong interest in artifacts promoting complete architectural solutions, such as all-encompassing photographic images and statistical tables proposing to unambiguously resolve architectural questions.^{3,4} This interest is also empirically evidenced by the increase in popularity, both in academia and in practice, of building-information modeling software,^{5,6} and by the increase in interest, both inside and outside of the architectural discipline, in LEED accreditation and certification.^{7,8,9} It appears that the contemporary uses of software and LEED tend to focus attention on complete architectural solutions at the expense of those kinds of mediating artifacts acknowledged to be specific to architecture. Without attempting to deny the obvious value of complete solutions to

practice (systems must be coordinated, buildings must be built), it is nevertheless important to ask: what can be done either to or with specific digital tools, and to or with LEED, to forward the incomplete and to refocus practical attention on the fragmentary? And how, in exploring this question, might the relevance of contemporary tools of persuasion to the production of an "architecture of stewardship" be challenged?

Footprints, and the tenuous value of complete solutions

The idea of "ecological footprint," though inconsistently defined, has currency in contemporary discussions on sustainability and stewardship.^{10,11,12} Wilfried Wang defines a building's "cultural footprint" as the extension of its territory of influence beyond a perceptible and measurable physical extent into the realm of media.¹³ Wang argues that from the point of view of advertisers charged with selling products, and increasingly from the point of view of architects faced with competition in a "green" market, "[t]he ideal building's cultural footprint ... establishes a visual hegemony worldwide."¹⁴ He observes that even as architects' interest in reducing ecological footprints has increased, their interest in expanding cultural footprints to global scales has increased: to remain competitive, it has become necessary that architects and publishers disseminate their ideas and images through globally accessible media. To achieve this end, it seems obvious that architects and publishers should rely increasingly on those types of mediating artifacts which most easily enable the reader to "identify with attributes of a particular visual fashion or trendy ideology."¹⁵

1 David Leatherbarrow. "Showing what otherwise hides itself." *Harvard Design Magazine* 6 (1996): 51-52.

2 Michael Graves. "The necessity of drawing: tangible speculation." *Architectural Design* 47 (1977): 388.

3 Christopher Hawthorne. "The case for a green aesthetic: sustainability needs star architects, media coverage, and a few great buildings." *Metropolis* 21, 2 (2001). http://www.metropolis-mag.com/html/content_1001/gm/ (accessed July 31, 2007).

4 Wilfried Wang. "Sustainability is a Cultural Problem." *Harvard Design Magazine* 18 (2003): 2.

5 American Institute of Architects (AIA). *Report on Integrated Practice*. 2006.

6 Scott Simpson. "Architects belatedly are moving toward the light." *Engineering News Record* 258, 9 (2007): 31.

7 David Kozlowski. "Defining the future of green buildings." *Building Operating Management* (Sep. 2002).

8 Jerry Yudelson. "Forecasting market demand for green buildings 2004-2007." *Environmental Design & Construction* 7, 9 (2004): 34-35.

9 Rick Fedrizzi. "Positioned to make a difference." *Environmental Design & Construction* 9, 11

(2006): 30-31.

10 William E. Rees. "Ecological footprints and appropriated carrying capacity: what urban economics leaves out." *Environment and Urbanization* 4, 2 (1992): 121-130.

11 Mathis Wackernagel and William Rees. *Our Ecological Footprint: Reducing Human Impact on the Earth* (New Society Publishers, 1995).

12 Manfred Lenzen and Shauna A. Murray. *The Ecological Footprint - Issues and Trends: ISA Research Paper 01-03* (Sydney, Australia: The University of Sydney, 2003).

13 Wang, 2003, 2.

14 *Ibid.*

15 Andrzej Piotrowski. "On the practices of representing and knowing architecture." in *The Discipline of Architecture*, ed. Andrzej Piotrowski and Julia Robinson (Minneapolis, MN: University

This helps to explain why dramatic perspective images of buildings are prominent in current mass-media publications, not just generally for architecture, but specifically (as Christopher Hawthorne argues) for “green” architecture:

“Without a sexy aesthetic profile, a green building doesn’t stand a chance of capturing contemporary public interest ... To have wide influence, green buildings will need to advertise their sustainability in ways that register in photographs shot from helicopters zooming by overhead.”¹⁶

Although both Wang and Hawthorne, in drawing attention to images and publishing, foreground a critical aspect of contemporary practice of an “architecture of stewardship,” they both fail to acknowledge the influence within this practice of a culture dedicated to the production and dissemination of statistics and measurement. Jerry Yudelson writes of the importance of providing “factual presentation of benefits” and “solid cost data” to consumers of sustainable architectural services prior to buy-in.¹⁷ By satiating the consumer-client’s demand for information, the LEED Rating System provides a means by which architects, consultants, and owners compete for recognition in a crowded marketplace. To compete means to produce documents such as scorecards, spreadsheets, charts, and drawings demonstrating compliance with LEED criteria. System-performance diagrams serve the same purpose as they attempt to clarify in a reduced and accessible manner the complex functioning of interrelated systems. Contemporary architectural publications, particularly in articles related to sustainability, often reveal statistics, charts, and diagrams, organized to promote easy apprehensibility, competing for space with seductive perspective images, framed and arranged to persuade an audience of the aesthetic value of complete projects.

Clearly, the production and publication of artifacts like seductive images, LEED scorecards, and easy-to-understand diagrams anticipates those clients, potential clients, consultants, and publishers seeking concise and unambiguous means of judging or operating on a work of architecture, as well as an information-hungry general audience. But, as architects work to expand

cultural footprints, does it necessarily follow that incomplete and fragmentary mediating artifacts (such as discussed by Graves and Leatherbarrow) must be displaced by persuasive mediating artifacts (such as discussed by Wang, Hawthorne, and Yudelson)? Is it true that an “architecture of stewardship” must necessarily place its greatest reliance on conclusive artifacts, focusing attention on complete solutions? If so, does this in turn imply that architects must abandon a reliance on media held to be specific to architecture (fragmentary and incomplete artifacts), and come to rely instead on media specific to advertising (e. g., “photographs shot from helicopters”)? The next section discusses this question in the context of specific tools of persuasion enjoying wide contemporary use in architectural practice.

Fragmenting the tools of persuasion

1. Building Information Modeling

The long-promised capability of digital technology to provide fully integrated and comprehensive “building information modeling” or BIM capability has achieved commercial viability through the development and commercialization of software products like Autodesk Revit.^{18,19} BIM software operates by establishing and sustaining an arbitrarily large number of logical relationships between and among defined components of a digitally modeled work of architecture. To use BIM software as a means of entering a work architecture into discourse, whether that work of architecture is projected or existing, assumes that the work is expressible in the particular geometrical-simulation language of the software (as is generally true of any three-dimensional modeling software) and also that the work can be unambiguously understood as consisting of discrete components, between which rational relationships can be articulated. Thus, if the software’s maximum commercial potential is to be achieved, incompleteness and ambiguity must be minimized or eliminated. Moreover, because BIM software permits the entering-into-discourse of a work of architecture through the production of an arbitrarily extensible body of statistics and data, its popularity supports both Wang’s notion of an expanding cultural footprint and Yudelson’s acknowledgment of the use of statistics in “green marketing.” Finally, should the possibility of integrating

¹⁶ of Minnesota Press, 2001): 40.

¹⁶ Hawthorne, 2001.

¹⁷ Jerry Yudelson, *Marketing Green Buildings: Guide for Engineering, Construction and Archi-*

ecture (Lilburn, Georgia: The Fairmont Press, 2006): 153-154; also see Chapters 5 and 11.

¹⁸ AIA *Report on Integrated Practice*, 2006.

¹⁹ Simpson, 2007.

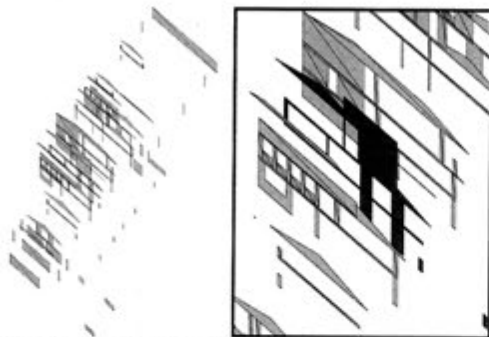


FIGURE 1. Archaeological Profiles, Robie House, Chicago

BIM with energy-analysis software become fully realized, the resulting digital models will achieve a sort of meta-completeness, a completeness which actual buildings do not possess: fully data-mineable, fully parameterized, fully coordinated, unambiguous architectural solutions will exist on screen, leaving no doubt of their optimal functioning and performance, as models. The risk inherent in this situation – a digital model capable of encoding all possible relationships and characteristics of performance – is that the incomplete and the ambiguous (that which is specific to architecture) will vanish, to be replaced by predictive and instrumental simulation. However, a modulated use of BIM software is possible which need not lead to this result. The production of serialized sections from digital models, or *archaeological profiling*, is in this sense an attempt to draw from BIM deliberately fragmentary mediating artifacts – precisely those kinds of artifacts specific to architecture. Most digital modeling software applications can easily produce serialized section profiles of digital models, as shown here of Frank Lloyd Wright's Robie House in Chicago (Figure 1).

The use of BIM software to produce archaeological profiles of a solid model ensures that as the model's three-dimensional attributes are changed, the serialized sections will automatically update. However, certain changes could be made to the three-dimensional model which would not register in the generated sections. Because a modeled work of architecture can be thus fragmented in such a way as to highlight (in the sense of Leatherbarrow) "aspects of the world that are not immediately apparent and never will be,"²⁰ it follows that a BIM-produced model need not uniformly encode all measurable attributes of the work in order for it to enter into constructive discourse. Such a model constitutes a deliberately incomplete means of initiating such discourse. This strategy, if not yet constituting a "stripped-down version of BIM",²¹ nevertheless demonstrates that a the production of mediating artifacts specific

to architecture (i. e., fragmentary, incomplete, and generative, in the sense of Graves) is in principle possible with BIM.

2. Sensory Simulation Software

The use of software which is designed to enter architecture into discourse through the digitally-driven production of sensory simulation assumes that simulated experience is relevant to the construction of architectural knowledge. Digital three-dimensional architectural models are constructed because the works of architecture to which they refer are assumed to possess meaningful experiential attributes which digital modeling is expected to reveal. This assumption does not relate solely or primarily to visual perception, as buildings are frequently modeled to study measurable attributes of temperature, air flow, and so on.

When considered as a medium through which architecture is made available, simulation software clearly focuses attention on those aspects of architecture which are immediately perceptible through the senses. However, aspects of architecture which transcend the immediately perceptible, such as memory, anticipation, or imagination, are left aside and in some cases actively subverted by the software. "Any technology that aims at replacing imagination with fully controlled visual stimulation may work for the entertainment industry," writes Plotrowski, "but it trivializes architecture."²²

A critical question then becomes: how to recover from sensory simulation software the kind of mediating artifact which is specific to architecture? For example, is it possible to enter an apparently fixed image into a realm of uncertainty and speculation? Intentionally blurring an image certainly decreases the possibility that it can be used to establish direct, nameable correspondence with its subject site. However, because blurred images are conditioned by the composition and content of their original (source) images, they

²⁰ Leatherbarrow, 1998, 51-52.

²¹ Renee Cheng, "Suggestions for an integrative education." In *AAA Report on Integrated Practice*.

²² Plotrowski, 2001, 55.

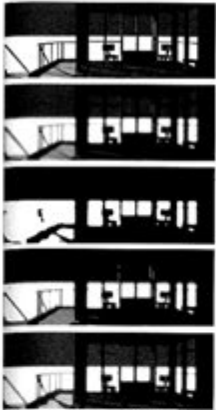


FIGURE 2. Blurred Stratification, Private Residence, Minnesota

constitute a specific and powerful kind of “tangible speculation”²³ about a site: speculation comes about through abstractness, while tangibility remains present because specific visual characteristics derive from a specific photographic source. Furthermore, digitally stratifying a blurred image into discrete tones promises the possibility of revealing subtle and unanticipated effects of light and texture within original images. The following example of this technique (Figure 2) shows, from the top downwards, a still image captured from a digital model of a projected work of architecture, a blurred version of this image, and three “stratified” versions of the image, filtered into increasing numbers of gray tones. Particularly as a fixed area within an image is observed to change, step by step through the series of stratified images, between relatively dark and light tones, the technique reveals subtle effects of light not immediately apparent if the original image alone is inspected.

Such discoveries of conditions which, though registering visually, are not immediately perceptible, suggest that this technique of *blurred stratification* could be used to identify possibilities for change within the subject architecture. How, for example, might modeled conditions be modified to affect perceptibility of specific conditions of daylight registered through the technique?

3. LEED

The use of the LEED Rating System enables the production of a certification label conforming to agreed-upon standards, identifying a work of architecture as having achieved a certain level of environmental responsibility, and thus, it permits comparison of products (buildings) according to their position on a scale (e. g., Silver, Gold, or Platinum). If LEED is understood solely to constitute a set of targets or benchmarks to be achieved, its use will almost certainly promote the production of complete solutions freed of

ambiguity, as such “immediate and measurable”²⁴ solutions provide convincing evidence that criteria are satisfied. Thus, when LEED is used as a design development tool, it will tend to de-emphasize the production of mediating artifacts which are specifically architectural, again meaning those which are fragmentary or deliberately incomplete.

Could LEED be restructured in a way to establish deliberately fragmentary frameworks for architectural thought? This is not simply a matter of establishing a false binary position between “quantity” and “quality,” and calling for less of the former and more of the latter. Instead, the attempt should be to modify LEED such that it can continue to provide what is expected of it (a score) even as its use actively promotes the production of deliberately incomplete artifacts. Consider, for example, language in Credit 8.2 from LEED for New Construction (Version 2.2), related to “Line of Sight”:

“Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building. ... Achieve [a] direct line of sight to the outdoor environment via vision glazing between 2’6” and 7’6” above finish floor for building occupants in 90% of all regularly occupied areas. ... Line of sight may be drawn through interior glazing.”²⁵

Critically important ends are established – specifically, appropriate (i. e., environmentally responsible) daylight conditions – but the means for achieving them are suspect, not only in regard to the earlier comments on complete architectural solutions, but also because the LEED criterion enforces the production of a specific kind of unambiguous architecture (as should be clear from the way in which it enforces a distinct separation of indoor and outdoor

23 Graves, 1977.

24 USGBC (U. S. Green Building Council), “Leadership in Energy and Environmental Design,” <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19> (accessed July 31, 2007).

25 USGBC (U. S. Green Building Council), LEED-NC, *Green Building Rating System For New Construction & Major Renovations*, Version 2.2, 2005.

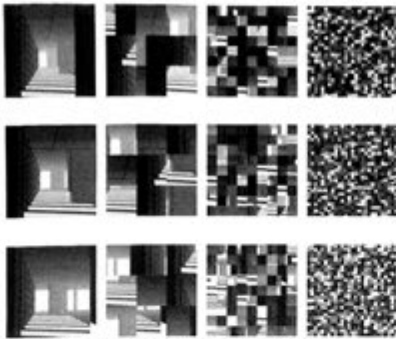


FIGURE 3. Image Field Matrix, Robie House, Chicago

spaces, or the way it promotes a conception of architecture as compartmentalized into discrete spaces). As an alternative means of addressing the daylight conditions related to the "line of sight," consider the construction of an *image field matrix* (Figure 3).

The matrix shown here as an example is based on three original still images extracted from a digital model of the Robie House, in the leftmost column; in successive columns the original images are tiled and scrambled randomly (in this example, the size of an individual tile is decreased by one-ninth with every step). The construction of an image-field matrix encourages the visible disclosure of connections and commonalities where none are otherwise apparent; in short, it shifts images into a realm where they cease to function as conclusive evidence and can begin to stimulate unanticipated questions. Nevertheless, it is certainly possible to extract a score of sorts from such a matrix – for example, by measuring a given image's threshold of atomization (the number of iterated steps beyond which the image ceases to be recognizable), and comparing it to the next image in a sequence. In other words, the image field matrix is in theory capable of addressing the comparative purposes which LEED demands, but it is also by design ambiguous, not forcing the production of a complete architectural solution. This strategy follows Leatherbarrow, who, in writing about the function of architectural media, proposes that "[i]n their very poverty of representation [in other words, in their fragmentary and incomplete nature], they contain the greatest promise of architectural embodiment; their deficiency guarantees their retreat into the margins of spatial experience."²⁶

Conclusions

If establishing a deliberate "poverty of representation" is specific to the discipline of architecture, a consequence arises for the contemporary practice of an "architecture of stewardship." Specifically, it becomes necessary in this practice to engage tools to simultaneously address both instrumental needs (e. g., demonstrating project compliance with established standards; providing a paying client with convincing evidence prior to buy-in) and

that fundamental condition of architecture in which newly created mediating artifacts have potential to generate unanticipated lines of thought.

The LEED Rating System is of course not silent with respect to the production of mediating artifacts, but the artifacts which it demands are for the purpose of demonstrating compliance with established criteria. Consequently, these artifacts predictably inform a binary outcome (a criterion is met or is not met). The question concerning visualization software is analogous: a decision to abandon production of a photorealistic rendering is conditioned by its verisimilitude. BIM, particularly as its use is contemplated in combination with energy-analysis software, leads to the production of meta-complete models, which while clearly satisfying a consumer-client demand for information, subsume possibilities for ambiguity and incompleteness. In summary, the critical aspect of architectural production which remains unaddressed by the standard application of contemporary tools of an "architecture of stewardship" is their capability to generate (not resolve) conflicting information.

Indeed, the struggle to generate and to productively engage conflicting information is a necessary and persistent one in architecture. This struggle is always intensified whenever tools force conceptualization into previously defined frameworks, as does (for example) software which relies on proprietary database structures, or the LEED Rating System. Such forcing is characteristic of any tool which demands the production of a complete architectural solution: one through which all doubts can be resolved, and by which all ambiguity can be closed. It seems clear that to transcend this struggle requires in contemporary practice a (re)affirmation of the disciplinary reliance on fragmentary and incomplete artifacts, an acknowledgement that the generative value of any artifact to architecture does not reside in what it includes, but in what it excludes. This acknowledgment proposes to recover within the practice of an "architecture of stewardship" that which is specific to architecture.

²⁶ Leatherbarrow, 1998, 55.