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EYES THAT DO NOT SEE? THE PRACTICE OF SUSTAINABLE ARCHITECTURE

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Though in many of its aspects this visible world seems formed in love, the invisible spheres were formed in fright.
Herman Melville[1]

Under New York law, roof-top water towers are invisible. The terms of the code are not vague; the silhouette of a water tower and the shadow it casts are transparent to the zoning envelope and the sky-exposure plane. This is not, of course, truly mysterious; it results from the neglect of a small effect in the guarantee of sufficient light at street level. But water towers are invisible in quite another sense and this raises useful questions about architecture.

In current practice the boundary between the visible and invisible parts of a building is situated somewhere between the sprinkler head and its water tower or between the air-conditioning vent and its chiller or even between a light fixture and its panel box. The one we "see," the others are formally ignored, as are dumpsters, electric meters and standpipes. The boundary is not absolute. Every building has a "back of the house" that conforms to different rules of order. But why are fireplaces visible while air-conditioners disappear, even when they appear above the roof line? What forms of reasoning underlie the distinctions?

Each specific case has its history. With the general acceleration of technical innovation, new products and devices were rapidly introduced into buildings whose essential parts -- walls ceilings, windows, doors -- had changed only slowly for centuries. The toilet, the fan and the electric light were injected like viruses into the ancient walls of architecture. They were foreign and they multiplied. The condition can be judged directly. The practical test, the everyday criteria, is that of composition. Sprinkler heads, air-conditioning vents, light switches, smoke detectors, and even motion sensors are drawn and arranged in architectural drawings, while pipes, ducts and cooling towers are

located in the drawings of consulting engineers. There is a region of overlap, of "co-ordination" and the boundary shifts from project to project. This condition nevertheless represents an extremely broad and institutionalized agreement about architecture as the composition of the visible. Such an operating definition of architecture (it is what architects do) is perhaps the best "theory of practice" available. The logic of invisibility is then a primary rule for its investigation.

I do not make these observations simply for the sake of theory, but to investigate the environmental responsibility of architecture. Environmental concerns, such as balance, efficiency, and sustainability, are abstract evaluations of complex systems with little visible presence. This means that the public agreements reached about "resource and energy efficiency" or "healthy buildings and materials" are realized through equipment and procedures not normally determined by principles of visual composition. In other words, these ethical directives contradict the operating definition of architecture that guides the profession. Of course this description of architecture is regularly challenged, as I am doing here, but it is naive to ignore the breadth of agreement which underlies the professional distinction between architects and engineers. This distinction is formalized in education, licensure, contractual obligation and professional culture. It is, moreover, as a visual artist that the architect is known to the public -- generally through the publication of drawings and photographs. Architecture is the production of visibility. Each project begins by fixing the boundaries to the negligible and invisible aspects of building. The struggle for the "sustainable" in architecture is more than an effort to balance the books of resource and energy use, it is a struggle to reconcile ethics with visibility.

William Browning, a member of the AIA Committee on the Environment (COTE), recently characterized this dilemma in an interview with *Architecture* magazine. He was asked, "How is green architecture affecting aesthetics?" to which he responded:

> I remember a line from the essay in your May 1991 issue, "Maybe this hasn't caught on because there is no discernable style associated with green architecture." [but] there probably never will be a style for green architecture. It's a process; it's not a style.[2]

Browning is making a claim for invisible work by questioning the role of representation in architecture. In its narrowest sense, this argument appeals to the simple symbolism which guided the orthodoxy of architectural modernism: "form ever follows function." Nevertheless, the concept of a purely technical, "green process" does suggest the existence of a "natural" style of architecture, resulting from principles of ecological harmony. This is what the interviewer implies and what Browning resists with his disclaimer about style. Yet no human work can remain wholly invisible or wholly procedural. As ecological imperatives are made concrete, their architectural responses will be fixed in forms and styles. These then become the subject of further imitations in the endless play of cultural adaptation and commentary.

In part, it is the restlessness of that play which motivates the search for a green style. The implication is that a truly sustainable architecture would stand outside fashion. Such concerns are nearly emblematic of the many cultural responses to modernity which oscillate between the search for immutable principles and recognition of the fragmenting effects of rapid change. Environmentalism itself has repeatedly offered a partial answer those conditions -- implicitly in the arts and crafts movement, explicitly in back-to-the-land efforts between the wars, and again in the activities leading up to Earth Day.[3] It is important for architecture to assess its contribution to these aspirations and to concepts like environment and sustainability.

The architectural dimension of this struggle can be discerned in Le Corbusier's repeated attempts to outline a modern architecture. In *Towards a New Architecture* he compared the harmony of the engineer's work -- the result of a logical process -- to the visible compositions of architecture:

> A great epoch has begun.
> There exists a new spirit.
> There exists a mass of work conceived in the new spirit; it is to be met with particularly in industrial production.
> . . .
> Our own epoch is determining, day by day, its own style.
> Our eyes, unhappily, are unable to see it.[4]

The engineer's work is concealed by "eyes that do not see" -- it is invisible -- while the work of architects is burdened by the history of styles. Le Corbusier was not demanding a choice between the two, but searching for cultural and architectural renewal by making visible the logic and power of utilitarian constructions. The method of that visibility is the architect's art.

According to the equation of visibility and architecture, a green style is realized by relocating the boundary of invisibility to make environmental achievements architecturally visible. This has been accomplished quite literally in the muscular, high-tech buildings that exhibit every organ, or with the solar buildings of the late 1970's, which dramatically gesture toward their sources of energy. Most of the projects that *Architecture* magazine selected for their issue on sustainable architecture (June 1993) follow this logic of literal demonstration: sod roofs, solar collectors, unique materials or dramatic form. In contrast, the National Audubon Society Headquarters by the Croxton Collaborative is surprisingly understated. The architects chose to restore an existing urban building, identifying "embodied energy" in the aged building, just as economic logic was detected in the objects and structures of early industrialization. It was an act of renewal not unlike that proposed by Le Corbusier. There is, however, little visible evidence of this embodied energy or of the increased ventilation, optimized HVAC systems and non-toxic materials. This invisibility challenges the limited definition of the profession, troubling it again with the question of representation. The achievements of the building's low environmental impact must be reported either in charts and statistics or by the anecdotes of those who inhabit it. How else can clean air or comfort be shown?

Environmental mandates are ethical propositions that originate in concerns about health and survival. Such mortal fears form a shadow to all human endeavors, for which the future is necessarily uncertain. Unlike the longstanding medical concerns about "airs, waters and places,"[5] modern environmentalism resulted, in large part, from the mapping of the "conservation laws" from physics and economics onto biology. In other words, our very human fears about health are currently addressed through abstractions like sustainability. I am not suggesting

that ecological analyses are not true nor useful, but rather that the tenor of urgency surrounding them originates in deeper fears which technical solutions and processes can not, by themselves, allay.

The necessity of representation occurs precisely in the margin of uncertainty that exists in all statements, scientific or otherwise, that are made about the future. The reassurances of technical or instrumental arguments are limited by the terms of their reasoning. Reconciliation of environmental concerns requires imaginative representations. The crucial quality of such representations is not direct legibility, like that provided by a written guarantee of safety; people are not so rational nor easily assured. Nor are the formal results of technical procedures, such as those suggested by Browning, sufficient in themselves. Architectural representations require a kind of emotive identification and visible evidence of their action. The original buildings of Sea Ranch exemplify this successful unity of cause and effect. The rigorous environmental criteria of their siting and construction were quickly associated with their characteristic style. The austerity of constructive means -- the planar surfaces, single-pitch roofs and minimum of trim -- implied the near absence of modern technique. However, the weathering of the redwood siding provided an even more evocative symbol. It suggested a graceful acceptance of climatic forces and of the "natural" progression of decay. Analogically, that weathering makes our own mortal aging visible. Architectural representations, like caricatures by a mime, often rest on the ambiguity of just such a single gesture, however ritual or artificial. Of course those gestures, like Sea Ranch's redwood siding, can be repeated without the environmental rigor and eventually lose their evocative overtones. Nevertheless, this imitative quality lies at the heart of the tactics of visibility.

Written discussion of architectural imitation begins in 27 BC with the treatise by Vitruvius. In the section on temples, he describes the imitation of wood temples in stone:

> In view of [wooden temples] and of carpenter's work generally, craftsmen *imitated* such arrangements in sculpture when they built temples of stone and marble. For they thought these models worth following up.[6]

The matter-of-fact tone of this statement belies the discussions which preceded it and the disputes which it, in turn, has engendered. The use of imitation is bound up with whatever made those earlier wood temples "worth following up." Certainly the value of wood temples had been established in the rituals of the cults that constructed them. The imitation of their rafters, beams and eaves would then have been an accommodation or invitation to the divinities that inhabited the original temples. The absence of Vitruvian comment on these motivations is not surprising given the highly political nature of ritual observances in early imperial Rome.[7] But in a further discussion of imitation, during his presentation of the columnar orders, he explains them by their resemblances to men (doric), women (ionic) and young maids (corinthian). Except for caryatids, columns are not literal resemblances, but imitations made with proportions secured from the measurement of footprints.[8] What this suggests is that architectural representations need not operate according to strictly formal imitation. Like poetry and primitive magic, architecture can employ similarities based equally on contact, association and process.[9]

In the current practice of historic preservation, any fragment of an original building has greater value than its copy. The parts and pieces of these buildings carry the contact of history and, like death-bed medicine, heroic means are fully justified in their perpetuation. Preservation is a technique for resecuring meaningful representations of cultural origins. Significantly, this preservation ethic reaches its limit when confronted with environmental technologies. In the same building whose rotted wood trim will be injected with epoxy to retain every original fragment, modern toilet facilities and air conditioning are readily inserted. This is not merely an inconsistency. It results from the contention between radically different interests. When confronted with issues of actual use, the concern for current comfort generally overshadows that for origins. A toilet room is accepted as new, while the substance of an historical restoration must conceal its modern elements. Project cost also figures in these various compromises, which are as necessary in new construction as in restoration. Architectural visibility results from the pragmatic negotiation of

ethical conflict. It is how buildings "make sense" and how they adapt to the contradictory expectations of their use.

The architecture of environmental sustainability is neither a science nor a philosophy of environment. It is a mediation of the fears surrounding the two poles of environmentalism: future health and the use of the commons -- air, water and soil. The only completely certain environmental statement we can make concerning construction is that it will have an adverse effect on one or the other. That fact may be mitigated by other gains or improvements, based on the judgement of relative needs. However, the underlying uncertainty can produce a cautious imitation of primitive conditions. I am not arguing against the possibility of useful environmental analysis, rather that agreement about acceptable impact must be accompanied by attention to the residue of uncertainty and concern. The difference between specific environmental agreements and that residue is the proper subject of imitation. Such imitations, like the Sea Ranch siding, blur signs with what they stand for. They derive, in part, from the confusion between self and other that arise in conditions of doubt. We see ourselves and our fears in what we do not or can not understand. That is the logic of poetry, of magic and of architectural representations.[10]

Environmental technologies continue to have an ambiguous cultural status. They require new architectural representations that can appeal and persuade. Giambattista Piranesi, the 18th century architect best known for his engravings, struggled with this challenge. He produced an entire work on fireplaces, citing them as the opportunity to develop a modern architecture.[11] The chimney was essentially a medieval development, yet it remained new and unseen to the Neo-Classical architects because it had no ancient prototypes. He elaborated images of fire and sacrifice in vigorous ornamental constructions, but their meanings remained obscure. The necessity of explanation presupposes the failure of his allegories. Successful incorporation of the chimney into architecture probably owes more to the long period of adaptation than to any single contributor or modification. However, Piranesi's emphasis on visibility seems correct. It underlines the cultural recognition required for an innovation to become habitual and fit for inhabition.

The fireplace today is mostly an anachronism, noted in real estate advertisements as a sales feature (wkng wd frplc). Despite the powerful myths of the hearth, it was superseded in the late 19th and early 20th century by stoves and automatic furnaces. The satisfaction of immediate comfort again displaced the representation of origins (though never completely). The mechanisms of that comfort can be discovered in the changing conceptions of human physiology and, more importantly, in the new explanations of its weaknesses and diseases. Therapies for these ailments revolve around mechanical concepts of health and of invasion by microbes and "bad air," which a passive body is helpless to fend off. An important aspect of modern environmental technique is this image of the nearly defenseless body. It depends on and can find no identification with its active and powerful protectors. The docility of modern man has been partly explained as a response to the increasingly sophisticated disciplines for improving and employing them.[12] Environmental technologies have developed into just such pacifying disciplines, exchanging control for promises of comfort.

One contemporary operational equivalent of the fireplace is the cooling tower. It constitutes the external aspect of the air-conditioner and one of the principle environmental exchanges for modern, sealed buildings. Unlike intake and exhaust vents, which are visually and etymologically related to windows (wind-eyes), cooling towers have remained stubbornly distinct from architecture. In most buildings, they are screened or concealed or simply denied, sitting like visitors atop otherwise carefully composed and regulated buildings. They are apt environmental expressions of the passive subject for which they are designed and form a marked contrast to the almost universally ornamented chimney. I am not recommending the decoration of cooling towers, but conversely that a properly sustainable architecture begins by questioning the passivity of modern comfort. Architecture must find demonstrative links between the ecological fears of threatened bodies and the materials or techniques that engage those forces.

Only through direct engagement of invisible environmental forces might the imaginative construction of green buildings proceed. Whereas the metaphorical analogies employed by Piranesi rely on visual resemblance. The corporeal senses -- touch and smell and taste -- are

immediate and activating. How can a memory inspired by sight ever compare with the force of one stirred up by a smell? Furthermore, the habitual use of buildings, as opposed to their visual appreciation, is built on these direct contacts. This form of knowledge figured largely in the early modern attention to toilets and urinals, which grew out of fears about hygiene. The French architect Henri Sauvage explored this in a remarkable poem called *Les Urinoirs*:

> Oh! but urinals are sad!
> Peristyles of an evil place between which are concealed;
> shells of giant insects, bristling with pikes and darts;
> labyrinths of rooms in which acrid odors waft!
> At night, lanterns deaf to their flickering glare;
> mouse-traps for capturing men;
> mausoleums gloomy and full of mystery!
> Why then are you so sad, oh urinals?
> . . .
> I dream, in place of your rejected scrap iron,
> of bowls of pink, white marble like a stork
> that was washed with a water perfumed of verbena!
> Amid the blooming of poppies and cornflowers
> such as in fields of corn or barley
> where one forgets the banality of peeing
> to dream only of watering the flowers.
> Oh! but urinals are sad![13]

Sauvage became famous for his stepped, white tile housing projects which developed from his activism with the *Societe Anonyme des Logements Hygeniques* at the turn of the century. The characteristics of the tile -- white, glassy and cleanable -- came to represent the elimination of invisible dirt, germs and poverty. The Society's projects even included classrooms to train the inhabitants in bourgeois standards. I would, however, distinguish the social aims, which came to dominate the projects, from the dream of flowers. The therapeutic hope of curing poverty with clean air and sunshine presumes the passivity of its subjects. They are simply to be molded by the proper techniques and surroundings. The dream of the clean urinal certainly shares in these assumptions, but its conversion into the watering of flowers is a powerful image of environmental transformation. It suggests an architectural representation that begins with smell yet ultimately requires the sympathetic imagination of its subjects.

Air fresheners and bathroom cleansers begin with similar hopes. The challenge, as always, is to make these beginnings into convincing buildings. A sustainable architecture must actively engage the contradictions of our environmental position: though the design, construction, and maintenance of buildings makes healthy living possible, the uncertainties of sickness and death remain inevitable. Like sustainability, health is neither a product nor a service. As Ivan Illich explained, health "designates the ability to adapt to changing environments, to growing up and to aging, to healing when damaged, to suffering, and to the peaceful expectation of death. Health embraces the future as well, and therefore includes anguish and the inner resources to live with it."[14] Administering only to the physiological conditions of architecture can actually hinder our effectiveness in the ongoing achievement of real health by marginalizing non-physiological concerns.

Architects should accept the challenge to reexamine the environmental connections of their buildings. They must evaluate the use of common resources and the effect those exchanges have on the health of the occupants. They must heed equally the lessons of visibility. The invisibile concerns, of those realms "formed in fright," are always present. Neglecting them altogether insures their emergence in dogmatic or troubling forms. Trivial buildings arise when it is assumed that the visible can ever wholly represent the invisible. The sustainable in architecture is the imaginative negotiation of the boundary between the two.

NOTES

1. Herman Melville, *Moby Dick or The Whale*, Chapter XLII.
2. *Architecture Incorporating Architectural Technology*, June, 1993.
3. Anna Bramwell, *Ecology in the Twentieth Century: A History,* (New Haven: Yale University Press, 1989).
4. Le Corbusier, *Towards a New Architecture*, (New York: Praeger Publishers, 1927), pp. 9.
5. Clarence Glacken, *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century*, (Berkeley: University of California Press, 1967), Chapter 2 - Airs, Waters, Places.
6. Vitruvius, *De Architectura,* IV, II, 2.
7. The effective manner in which Augustus used all the available forms of divination and ritual observation to strengthen his rule is explored in Frederick H. Cramer, *Astrology in Roman Law and Politics*, (Philadelphia: American Philosophical Society, 1954). The same issues are explored in ancient Greece in Jean-Pierre Vernant, "Speech and Mute Signs," in *Mortals and Immortals,* (Princeton: Princeton University Press, 1991).
8. "When they wished to place columns in that temple, not having their proportions, and seeking by what method they could make them fit to bear weight, and in their appearance to have an approved graced, they measured a man's footstep (*pedis vestigium*) and applied it to his height." Vitruvius, IV, 1, 6.
9. I owe my recognition of the common imaginative dimension of all these practices to Marco Frascari. See Braham and Frascari, "On the Mantic Paradigm in Architecture," Proceedings, ACSA Conference, Montreal, 1994.
10. "...rational metaphysics teaches that man becomes all things by understanding them (*homo intelligendo fit omnia*), this imaginative metaphysics shows that man becomes all things by not understanding them (*homo non intelligendo fit omnia*): and perhaps the latter proposition is truer than the former for when man understands, he extends his mind and takes in the thing, but when he does not understand he makes the thing out of himself and becomes them by transforming himself into them. Giambattista Vico, *The New Science of Giambattista Vico* (1744), (Ithaca: Cornell University Press, 1968), #405.
11. Giovanni Battista Piranesi, *Diverse Maniere d'Adorarne i Cammini*, (Rome:1769). See John Wilton-Ely, *The Mind and Art of Giovanni Battista Piranesi* (London: Thames and Hudson, 1978), pp. 93-109.
12. My translation of "Les Urinoirs." *Henri Sauvage, 1873-1932* (Bruxelles: Archives d'Architecture Moderne, 1978).
13. Michel Foucault, *Dicipline and Punish: The Birth of the Prison*, (New York: Patheon Books, 1977).
14. Ivan Illich, *Medical Nemesis: The Expropriation of Health*, (New York: Bantam, 1977), pp. 270.