Competing Dualisms in Sustainable Technology

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INTRODUCTION

Rather than contribute to the argument that one dualism is more accurate than another in representing the conditions of contemporary technology, this paper will consider three dualisms as heuristic devices which are equally helpful in understanding the social construction of technological systems. The three dualisms to be investigated here are *high tech/low tech, souped-up/un-plugged*, and *opaque/transparent*.

Understanding a philosophical principle as essentially two-fold has been a popular instructive method since Plato and Aristotle. However, Thomas Hyde introduced the term *dualism* into philosophical discourse only in the year 1700. In documenting the appearance of the term *dualism,* I am suggesting that language reflects the social construction of reality. The appearance of the term dualism in Western philosophy, then, documents the emergence of the modernist view of reality as already divided between two orders of being. It has been the project of various postmodern philosophers to either reunify Being as a single order, or to further fracture the possibilities for being. My point here is not to resolve this debate, but simply to affiliate myself with the general postmodern position that challenges the ontological validity of the dualisms constructed by modern science and philosophy. By nature a dualism is a conceptual axis that magnifies the significance of two related concepts and suppresses those concepts that refuse to orbit in the gravitational pull of the constructed axis. This paper will contribute to the axis constructed by the conference organizers, yet avoid reductive inquiry by illustrating the discursive relevance of competing dualisms.

In challenging the accuracy of dualisms to describe the material conditions of the world, however, I do not wish to deny their helpfulness in revealing social conditions. To the contrary, the value of any dualism is found, not in its explicit description of material conditions, but in its implicit description of social conditions. If a society is more engaged in perceiving the distinction between, say, light and dark skins than between degrees of wealth and poverty, it tells us something about the reality constructed by its members. Likewise, if we imagine that "soupedup/unplugged" is a more accurate way of describing the tensions contained in contemporary technology than "high tech/low tech," or "opaque/transparent," then there is something to be learned by examining these competing views of reality.

So as to focus the investigation of these three dualisms more sharply, I will relate them to the discourse concerning "sustainable" technology. Each dualism is first discussed in theoretical, or ideological terms. Two contemporary cases of architecture are then reviewed which make concrete the opposing interpretations of ecological relations contained within each dualism. The paper concludes by considering the political implications of the dualisms considered.

HIGH TECH/LOW TECH

The term "high tech" means something quite different in architectural discourse than it does in common parlance. For architects, the term refers specifically to the work produced by a few contemporary British practitioners — Sir Norman Foster, Nicholas Grimshaw, Richard Rogers, and their respective office alumnae — who share similar attitudes toward: materials, tectonic expression, flexible space, industrial production, and the appropriation of technologies and imagery from other industries.'

The fact that high tech exists as a movement in Britain, but in no other country, tells us more about the reception offered to it by the British market than it does about the intentions of a few British architects. Colin Cathcart has argued that the "technological optimism" of the British was not suppressed after World War II as it was in America or the Soviet Union.' The political optimism of progressive British politics created a climate that favored the use of the high tech aesthetic in a large number of industrial and office buildings.

Colin Davies tells us that high tech is "... a forward-looking, optimistic architecture that believes in progress through industrial technology."' It follows that:

> ... high tech reinforces industrial capitalism's claim to be working for the general good. It is the willing servant of industrial society, ready to receive instructions from those in power and carry out its tasks conscientiously."

The instructions issued by the patrons of high tech have historically valued the flexible space conceptualized by modern architecture itself. Where the enabling technology of the high tech building is given the greatest degree of articulation possible, the institutional spaces served by technology are inarticulate to the point of anonymity. They are what Davies refers to as "omniplatz."[5] *In the production of space, the "omniplatz" of the high tech architect is assumed to be neutral and value-free. Such spaces are produced in the name of programmatic flexibility. This claim by modern architecture is, of course, the same as that made by modern science—that knowledge produced by the scientific method is neutral and value free. However, as citizens to both the Right and the Left have experienced the industrial disasters of corporate science (the Exxon Valdez, Bhopal, et.* al.), *the claim that either space or knowledge might be value-free has been revealed to be ideological. As a result, high tech now looks like a naive (or, perhaps sinister) industrial cartoon.*

The most important legacy of the high tech movement may be, however, not the rhetorical message of triumphant technocracy, but the manner in which that message has been produced. High tech architects themselves detest the term "high tech." For these practitioners it is the "practice innovations" of research and collaboration with industry, not the appearance of the objects themselves, which distinguishes their work as a movement. I will agree. If high tech architects aspire to construct machines, it is not the representational machine imagined by Le Corbusier that interests them. Rather, it is the productive process itself. I'll *argue, then, that the most positive legacy of high tech is the practice of reengaging architecture in the elemental considerations of materials and the method of its production."*

If the practitioners of high tech suffer from a bad case of technocratic optimism, the practitioners of low tech suffer from what Hal Foster has described as "techno-schizophrenia" *or, "the belief... that technology will save us from death and that technology has foreclosed the possibility of a natural life."' Advocates of low tech recognize that positivist science has produced catastrophic, if unintended consequences in the natural world. As a result, they, like the philosopher Martin Heidegger, are concerned with the ontological implications of technology. These skeptics would like to engage technology, not as the instrumental means of corporate capital, but as the integrated practices of "a natural life." In this view, the mundane, day-to-day process of constructing the world is more important than the result predicted by overly optimistic technocrats. Although the less sophisticated practitioners of low tech are often viewed as romantic reactionaries (or worse, as Luddites) the ontological critique of modern technology remains* substantial.[8]

Rather than discuss the seemingly opposed principles of high tech and low tech in abstract terms, it will be helpful to briefly examine two concrete cases. First, the work of Hassan Fathy *is regarded as an exemplar of the low tech approach to technology. His I.F.A.O. Dighouse in Egypt exemplifies two constant themes in* Fathy's *work. First, the house uses* bio-

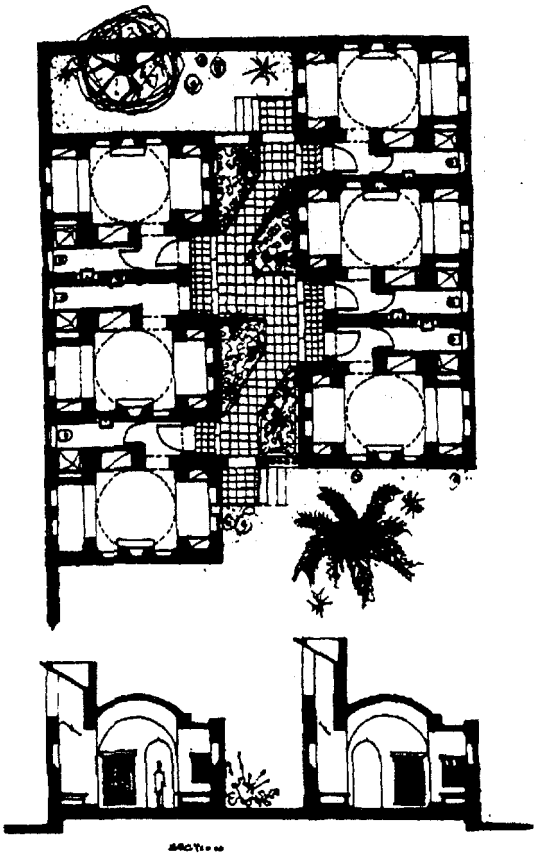


Fig. 1. I.F.A.O Dighouse by Hassan Fathy, *Egypt.*

climatic design strategies to environmentally condition interior spaces. In this case of a house in a hot/arid *climate, the principal methods used is nocturnal ventilative cooling. By passively channeling cool night breezes through the house, the building mass is charged with enough coolth to maintain comfortable daytime temperatures. In mechanical terms, the house was conceived as a duct that would make evident the diurnal natural conditions of the place. Second, the construction techniques employed in* Fathy's *house reinforce local cultural practices. In this case, Nubian adobe vaulting techniques were used. In cultural terms, the construction of the house was conceived as a ritual that would make evident the historical conditions of the place. In both the mechanical and the cultural* realms, Fathy's *intentions were not representational, but ontological. The goal was to participate in natural and cultural processes, not to comment upon them from a distance.*

If we compare Fathy's *small house in Egypt to Sir Norman Foster's Commerzbank in Frankfurt, we find unexpected parallels. Foster's bank project is one of the new low-entropy designs that have become increasingly associated with high tech practitioners. The interest of Foster and his colleagues in low-entropy design does not, of course, reflect their own ideological commitment to the principles of* sustainability. *In the past ten years the governments of Northern Europe have enacted several waves of legislation that have required* archi-

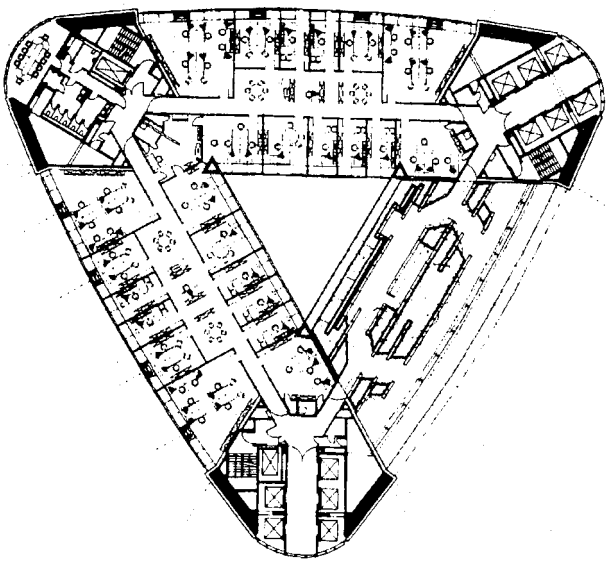


Fig. 2. Plan, Commerzbank by Sir Norman Foster and Assoc.: Frankfurt, Germany.

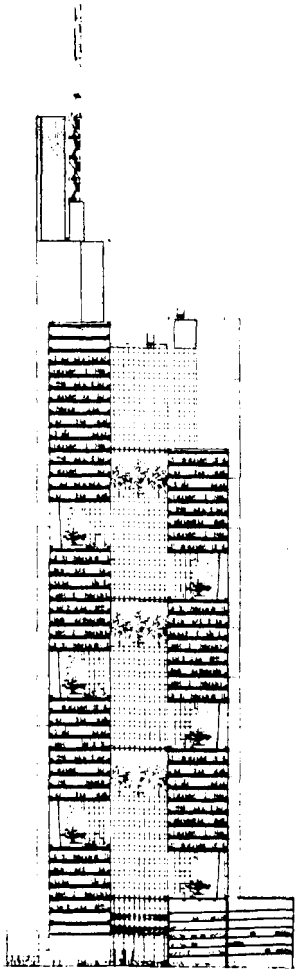


Fig. 3. Section, Commerzbank by Sir Norman Foster and Assoc.; Frankfurt, Germany.

tects, and their patrons, to radically alter the methods by which interior spaces are environmental conditioned. Left to their own devices, *high tech* designers would. no doubt, still be burning the oil produced by their corporate sponsors. Reluctantly or not, *high tech* practitioners have discovered that machines which mediate climate can be as expressive as machines that mediate gravity. In the case of Foster's Commerzbank, the environmental control technique that gives the building its expressive form is basically the same as that used by Fathy in his small Egyptian house; nocturnal ventilative cooling. Utilizing a very sophisticated array of electronically controlled dampers, cool night air is passed through the building envelope and concrete floor slabs thus charging the building mass with *coolth* and significantly reducing the daytime cooling load in summer. Foster's environmental control strategy utilizes a far more complex mix of ventilation sources than does Fathy's, yet they participate in the same cycles of natural energy flow. Although their political attitudes toward technology differ fundamentally, both buildings were conceived as diurnal ducts.

In lieu of focusing on the characteristics that distinguish *high tech* from *low tech,* such as light vs. heavy, or dry vs. wet, it may be more instructive to focus on the characteristics they share. On this account, both ideologies propose to integrate elemental research concerning the materials and methods of production with the design process. If I am correct in this regard, the ideological distinction between *high tech* and *low tech* will erode as building codes demand that *high tech* architects become more environmentally responsible, and as *low tech* architects gain access to more sophisticated materials and methods that are sustainably produced by industry. The erosion of seemingly opposed principles is occurring, not because of the aesthetic preferences of a few British architects, or a few romantics, but because of changing values in the market for architectural services and because of legislated performance standards.

SOUPED-UPNN-PLUGGED

To *soup-up,* or "augment in power," or conversely, to *unplug,* or "disconnect," begs the question, ... from what? To consider the architectural qualities of this dualism requires that we examine these terms spatially. So, how does one *soup-up* or *uti-plug,* space?

In the simplest of metaphors, electrical power can be understood as a spatial network. The complex grid of power lines, generators, and consuming appliances can be either *souped-up* by the contributions of local power producers at different locations in space, or we can literally *un-plug* ourselves from the power network. The sociologist/philosopher Bruno Latour has argued that developments in science and technology can best be understood in terms of such "networks."[9] We are accustomed to using the term "network" to describe the sets of interrelated human interests that dominate business and institutional practices. Latour, however, uses the term to describe not only the hierarchy of power relations, but the spatial relation between humans and those

nonhuman resources that are required by technological operations. In this sense, a "technological network" includes not only the complex web of human interests that collaborate to design, finance, regulate, build, and inhabit a building, but it also includes an equally complex list of spaces where the nonhuman resources effected by the mining of materials, the production of sub-assemblies, and the disposal of wastes are located. I wish to argue here that architecture should be understood as a technological network, not as an aesthetic object. The production of places involves hundreds or thousands of people and sites, not a single architect and a few critics. It follows that architecture promoted as a static aesthetic object is a purposeful obfuscation of material and political reality. To *soup-up* architecture, in the sense that I intend here, is to seek aesthetic autonomy. In other words, those who promote the aesthetic autonomy of the architectural object most vigorously are usually those who have the most to gain by diminishing the social and environmental impact of architectural production.

In contrast to those who seek *aesthetic* autonomy, those who promote the un-plugging of technological networks seek *political* autonomy. Bioregionalist, who might be characterized as environmental anarchists, argue that only by *unplugging* places from the boundless interests of technological networks can the common interests of humans and nonhumans be realized. On this view, maximizing one's engagement with natural conditions is an intensely local activity. The landscape architect Rob Thayer has argued that "... for every bioregion there is probably a unique *method* or set of *practices* of planning, design, and management of the land ... ."[10] If the "methods" and "practices" of development are to be made spatially "unique" by boregionalists, then they have been defacto *un-plugged* from the universal network of technoscience. This has been the political project of anarchists since Kropotkin. Examples will be helpful in making this point more clear.

Blueprint Demonstration Farm was jointly developed at Laredo, Texas by the Center for Maximum Potential Building Systems, the Texas Department of Agriculture, the Israeli Ministry of Agriculture, and Laredo Junior College as a demonstration of sustainable architectural and agricultural systems for semi-arid ecosystems. These collaborators developed sixteen nontraditional technologies with the intention of providing local small farmers with an economical and ecologically sound means with which to compete against the large corporate farms that had come to dominate agricultural production in the Rio Grande Valley. Although the history of Blueprint Farm is as troubled as it is complex, examination of one of the sixteen nontraditional technologies put in place at the farm will illustrate the developers intentions.

The wind-towers of the farm served to cool, and thus preserve for market, the agricultural products grown there. The towers operate by harvesting prevailing breezes. In the first tower, adown-draft is induced by evaporative cooling. In the second tower, an updraft is induced in the already buoyant air by the mechanics of the solar chimney. The water con-

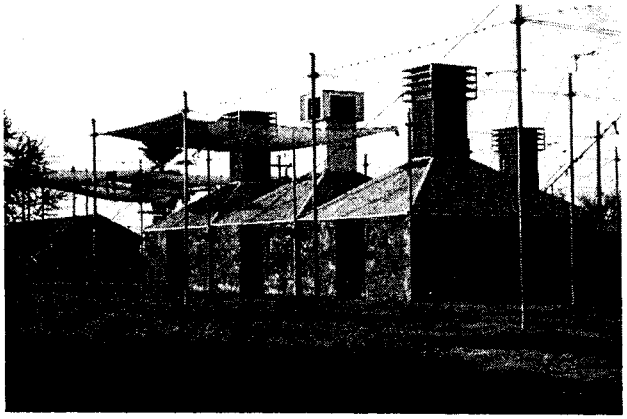
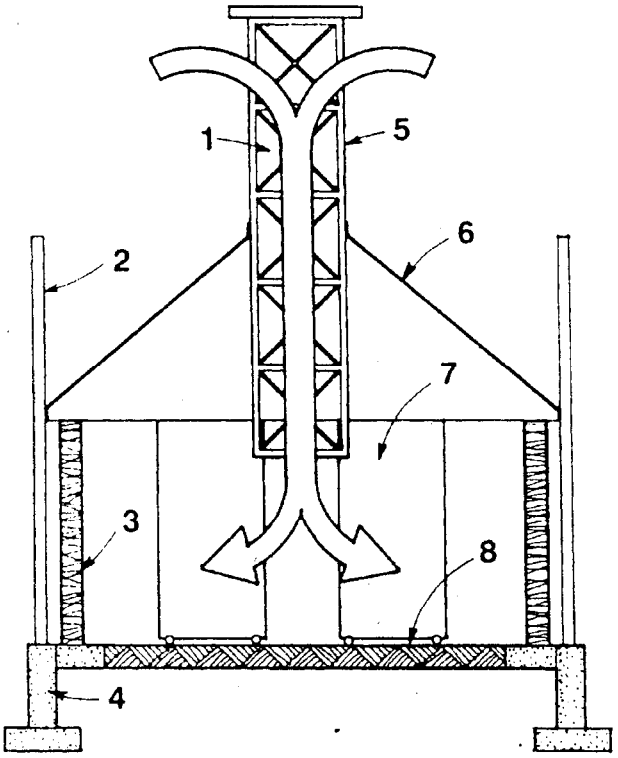


Fig. 4. Blueprint Demonstration Farm by the Center for Maximum Potential Building Systems; Laredo, Texas.



TYPICAL PACKING SHED

1 DOWNDRAFT EVAPORATIVE COOLING TOWER
2 RECYCLED OIL-DRILLING ROD POLES
3 STRAW BALE STUCCO WALLS
4 CONCRETE FOUNDATION (LIME POZZOLAN)
5 LIGHTWEIGHT STEEL TRUSSES
6 CORRUGATED SHEET METAL HOOF (IRON)
7 SLIDING WOOD DOORS (MESQUITE)
8 STABILIZED EARTH FLOOR (CALICHE)

Fig. 5. Section of wind-tower at Blueprint Demonstration Farm, courtesy CMPBS.

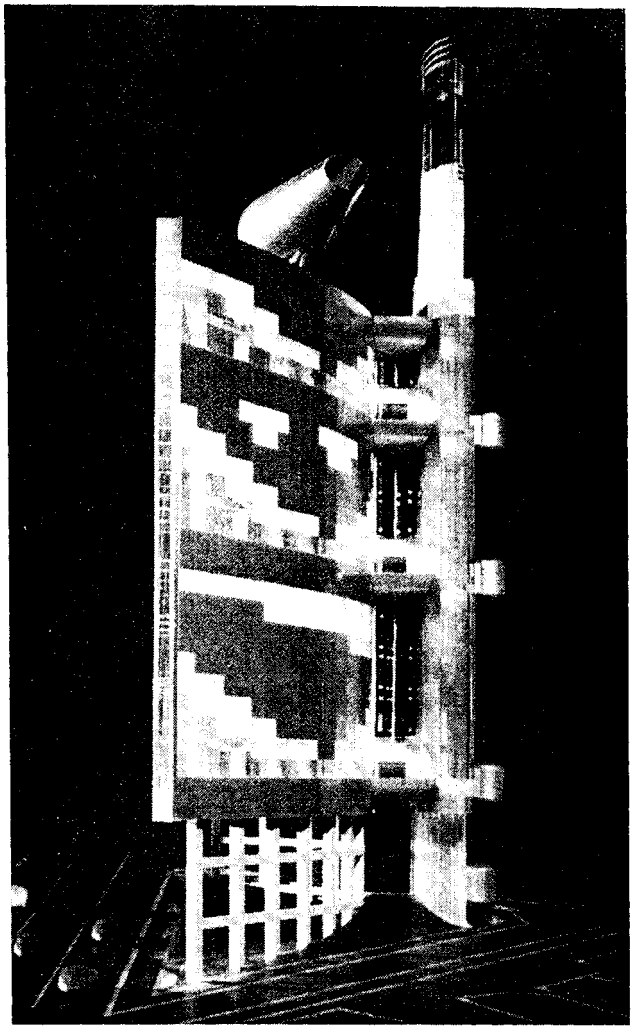


Fig. 6. Model, Tomigaya Office Tower by Richard Rogers and Associates; Tokyo, Japan.

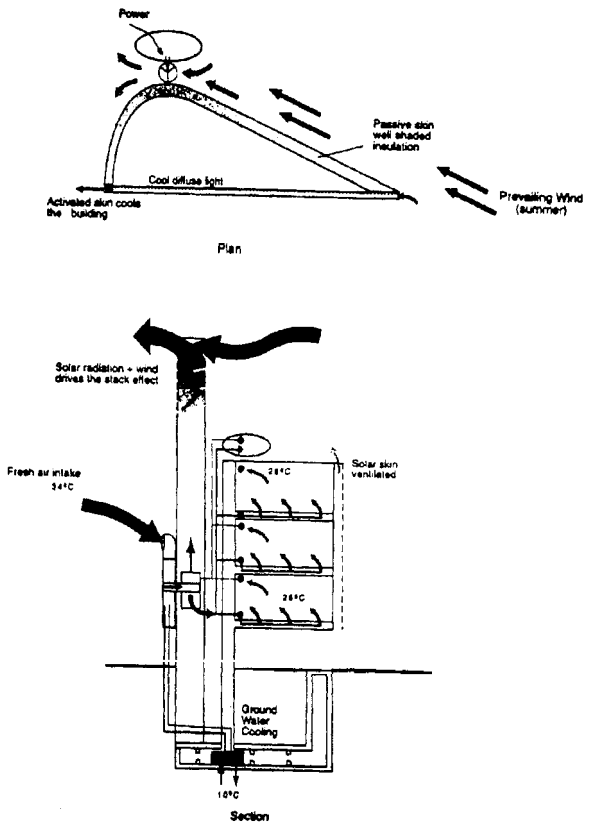


Fig. 7. Plan and schematic section of the thermal chimney; Richard Rogers and Associates.

sumed in the process is furnished by a pump in the Rio Grande that is in turn powered by a wind turbine. In theory at least, the production of highly profitable niche agricultural crops could be produced and distributed without the consumption of the expensive energy from the grid required to operate mechanical air conditioning. The difference between the cost of crop production when plugged into the grid, and when *unplugged* from the grid, was enough to overcome the tremendous economy of scale enjoyed by corporate producers. The political implications of being literally *un-plugged* in this case were that local farmers might avoid the economically forced patterns of migrant laboring and cultural dislocation and stay home to work their small family farms.

There is an ironic similarity between the rural wind-tower of Blueprint Farm and the urban wind-tower invented by Richard Rogers, in collaboration with Ove Arup, for a corporate office building in the Tomigaya District of Tokyo. Although Roger's version of the wind-tower does not condition interior space by evaporative cooling, it does generate electrical energy, and like the Blueprint Farm example, it exhausts interior air by the mechanics of the solar chimney."

What is most interesting about Roger's invention is that both the form and surfaces of the building were designed to interact with prevailing breezes so as to maximize exterior wind velocities that would in turn ventilate the interior and produce electrical energy. But, while the Tomigaya office tower reduces operating costs for Roger's client, the building is very much *plugged-in* to the electrical network. The turbine does produce energy to service the building, but not enough to satisfy its demand or to cogenerate power to the grid. The tower has more value to the owner as an aesthetic emblem of corporate responsibility than as a device that modifies social or ecological conditions. Although "sustainable" by some definitions of the term, the Tomigaya wind-tower serves more to *soup-up* the aesthetic presence of its patron than to *unplug* social space from dominant networks.

Where radical bioregionalists would certainly interpret this observation as a criticism, I am less sure. Although I admire the political intent of Blueprint Farm's developers, one real result of its *un-plugging* was that project ultimately failed. Although Blueprint Farm was initially supported by the public, it was not *socially* sustained. The endemic association of the desire to *un-plug* with the asocial processes of utopianism may reveal a hidden intent to construct places that are merely *critical* of the status quo rather than places that are *sustainable*.[12] I will argue that to work toward aesthetic

autonomy by *souping-up* space, or conversely, to work toward political autonomy by *un-plugging* space, may be equally problematic. Democratic space can be neither concealed nor isolated. This claim leads to consideration of the last dualism.

OPAQUE/TRANSPARENT

In "City of Bits," Bill Mitchell has argued that until now, buildings corresponded on a one to one basis with social institutions.[13] It is this correspondence that has made the meaning of institutions visible within the larger society. When institutions are visible, so are the human agreements which constitute them. No longer. Innovations in communication technology have rendered institutions to be aspatial and invisible. Mitchell's prognosis is that, "In the end, buildings will become computer interfaces and computer interfaces will become buildings."[14] Such architectural conditions lead, of course. to profound political questions. If institution are spatially unidentifiable, how are we to make legible the loci of power relations?[15]

It is this question that is embodied in the distinction that landscape architect Rob Thayer makes between *opaque* and *transparent* technologies.[16] Thayer has observed the increasing "cognitive dissonance" in our perception of the landscape. He means by this term that the "surface values" of a given landscape — how it looks — no longer provide access to the "core values" of that landscape — how it works. Rather, the appearance of a place offers an interpretation of its meaning that has nothing to do with its ecological (or social) reality. Communication technologies are, of course, the most opaque to yet emerge in postmodern society. In the modern mechanical world, "what you see is," more often than not, "what you get." The relation of "surface" and "core values" are *transparent*, even if not "congruent." One can see the shed behind Robert Venturi's billboard and recognize the incongruity of the sign and its referent structure. That's Venturi's point. In the postmodern electronic world, however, "what you see" rarely has any relation to "what you get." The relation of appearance and operation are *opaque*. The political problem here is that the observer cannot *detect* incongruity. In a technologically *opaque* world, the observer is denied access to knowledge concerning the structural relations that make things work. Again, it will be instructive to examine concrete cases of *opaque* and *transparenr* technology to make the point.

Skidmore, Owings, & Merrill have been principal promoters of so called "intelligent buildings" for some time. Their recent proposal for the Lucky Goldstar Corporate Headquarters in Seoul, Korea is an exemplar of *opaque* technology in architecture." The innovations proposed by SOM, that will make this 40 story tower "an ultra-modern information system for the 21st Century," are a series of concealed interstitial spaces designed to permit long term wiring flexibility. SOM has efficiently engineered a system of raised floors and "intelligent building cabinets" that will significantly reduce operating cost and maximize long term flexibility. The point is, however, that the electronic technology that will enable the building's inhabitants to workcannot be *experienced* by them. Conversely, those expressive aspects of the building that are accessible to the building's inhabitants (its exterior form and surfaces) are unrelated to the building's mission as an energy efficient communications device. In Thayer's language, the "surface" and "core values" of the Lucky Goldstar Tower are both "opaque" and "incongruent."

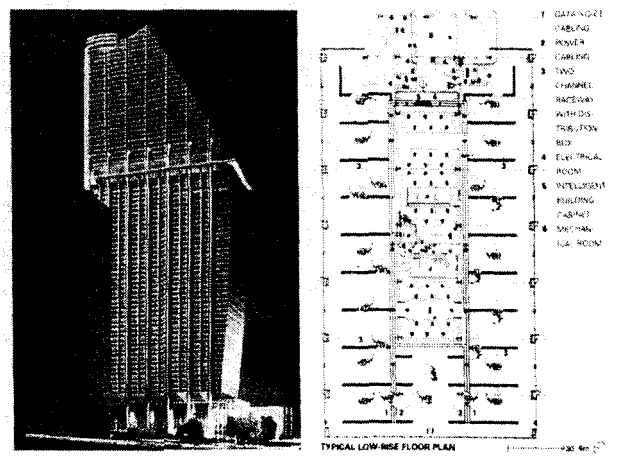


Fig. 8. Model and plan, Lucky Goldstar Corporate Headquarters by Skidmore, Owings, and Merrill; Seoul, Korea.

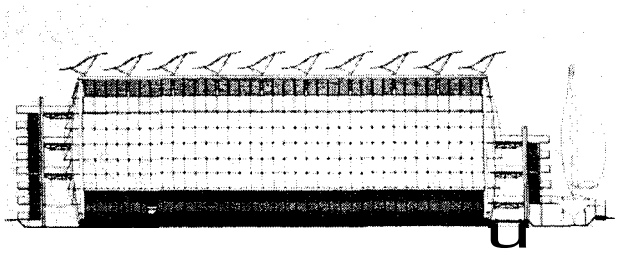


Fig. 9. Longitudinal section, the British Pavilion at Seville Expo '92 by Nicholas Grimshaw and Partners; Seville, Spain.

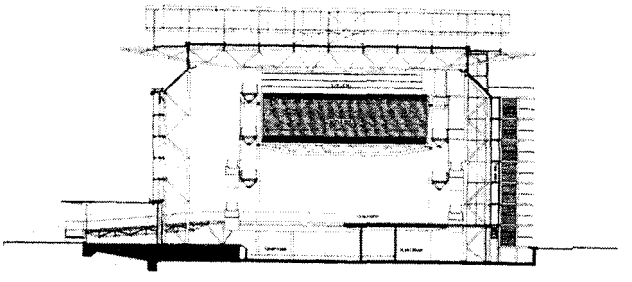


Fig. 10. Transverse section, the British Pavilion at Seville Expo '92 by Nicholas Grimshaw and Partners; Seville, Spain.

In stark contrast to SOM's *opaque* tower on the Pacific Rim, the British Pavilion at the Seville Expo'92 by Nicholas Grimshaw and Partners is an essay in *transparency* and the overstatement of technological means.[18] The purpose of

world exposition pavilions is, of course, to demonstrate the technological prowess of the exhibiting country. The mandate for technological transparency is thus programmatic. In this case, however, Grimshaw has exuberantly and artfully demonstrated the technological means by which Brits would keep themselves cool in a climate as demanding as Sevilla. Each of the five exposed surfaces of the building employ a different technique to mediate ambient conditions on behalf of the building's inhabitants. The east "water wall" mediates direct insolation at the entry by evaporative cooling. The west wall mediates nocturnal temperature swings by employing water-filled shipping containers as thermal mass. The south wall prevents direct solar gain by shadowing the building envelope with horizontally mounted fabric "flies." The north wall operates similarly, but stretches the fabric vertically to intercept the low angled insolation that strikes the north wall early and late in the day. The roof provides both shade and electrical energy by mounting photovoltaic arrays on a ramada-like canopy.

Although the variety of environmental techniques employed by Grimshaw may verge on the carnivalesque, each technique is detailed in such a way as to render its visual appearance to be congruent with its ecological operation. In this case, technology is transparent, and thus instructive of local ecological conditions. The building instructs users about where they are. I would also argue that the techniques of prefabrication and transport which allowed this pavilion to be fabricated in Britain and subsequently erected in Spain are instructive of the global economic conditions that stimulated its construction. Unlike the Lucky Star Tower by SOM, the Seville Pavilion permits an interpretation that relates natural and social conditions.

CONCLUSION

Each of the dualisms investigated in this paper share a central assumption yet are opposed on other grounds. These assumptions and oppositions are summarized in Table 1:

Table 1: Shared assumptions and oppositions contained in competing dualisms.

Dualism	Shared oppositions	Shared assumptions
High Tech/	Naive optimism: technoscience is neutral and value-free	Physical and biological processes are the foundation of design
Low Tech	Romantic pessimism: technoscience is the source of unintended consequences	
Souped-up/	Aesthetic autonomy: The aestheticization of the architectural object maximizes concealed economic interests by minimizing the social and ecological content of production.	Technologies are spatial networks that relate human interests and nonhuman resources
Un-plugged	Political autonomy: The localization of architectural processes maximizes social and ecological well-being	
Opaque/	Undetectibility: Technological opacity is the postmodern Zeitgeist.	Ones ability to understand and critique ecological and power relations is directly related to the visibility of those relations.
Transparent	Detectibility: Technological transparency is the test of a democratic landscape	

Within the Hegelian philosophical tradition, a dualism is understood not as an "antinomy," or an unresolvable conflict, but as a "dialectic," or an ideological opposition that is resolvable at a higher plane of truth. Contemporary Critical Theorists, however, would argue that while dialectic relations are not really resolvable in the Hegelian sense of "synthesis," they do furnish the creative energy that informs the changing material conditions of history. In conclusion I will suggest that the three dualisms considered here are best understood as dialectics rather than as static oppositions. Implicit in this recommendation is the argument that these three dialects have no particular claim to truth. Rather, they are convenient heuristic devices that are helpful in theorizing how language constructs contribute to the social construction of sustainable technologies. Other relevant dialectics not considered here include the opposition that Kenneth Frampton observes between the "tectonic" and the "stereotomic,"[19] or the tension between "critical" and "sustainable places" noted above. There are many more. However, on the basis of the three dualisms examined here, we can at least hypothesize that, physical and biological processes are a foundation for sustainable design. Design, however, is not limited to the manipulation of material systems, because all technologies are spatial networks that relate social conditions to natural conditions. And finally, one's ability to understand and critique social/environmental networks is directly related to their transparency.

NOTES

[1] Colin Davies, *High Tech Architecture* (New York: Rizzoli, 1988), p. 6.
[2] Ibid., p. 6.
[3] Ibid., p.14.
[4] Ibid., p. 12.
[5] Ibid., p. 9.
[6] See Tom Peters, "AThe Repercussions of Estrangement: Architecture and Engineering in the 19th Century," in *Design Book Review 28* (Spring 1993): 25-29. Peters effectively argues that in the historic separation of architecture and engineering, architects became the makers of aesthetic objects and engineers became the makers of processes. The contribution of *high tech* architects is to recoup the concept of the building as a process rather an as object.
[7] Hal Foster, "Neo-Futurism: Architecture and Technology," in *AA Files*, No. 14 (Spring 1987), p. 27. See also; Rob Thayer, *Gray World, Green Heart* (New York: Wiley, 1994). Thayer develops a postmodern dialectic that opposes "technophilia" (our love of technology), with "technophobia" (our learned distrust of technology).
[8] For example, see Martin Heidegger, *The Question Concerning Technology,* translated and with an introduction by William Lovitt (New York: Harper & Row, 1977), and Albert Borgmann, *Technology and the Character of Contemporary Life* (Chicago: The University of Chicago Press, 1984).
[9] Bruno Latour, *Science in Action* (Cambridge, MA: Harvard University Press, 1987), pp. 180, 201.
[10] Robert L. Thayer, "The Bioregional Hypothesis: New Directions for Landscape Planning, Education, and Stewardship," in *Landscape Journal* (forthcoming), p. 51 of manuscript, private collection, Steven A. Moore.
[11] Deyan Sudjic, *The Architecture of Richard Rogers* (New York: Abrams, 1994), p. 146.

[12] I have developed the distinction between "critical" and "sustainable" places elsewhere. Although "critical places" are always historically helpful in that they instruct us as to how things might be, they absent themselves from the fraught political processes that form sustaining cultural institutions. See my doctoral dissertation, *Critical and Sustainable Regions in Architecture: the Case of Blueprint Demonstration Farm* (Ph.D. dissertation, Texas A&M University, 1996), p. 213.

[13] William J. Mitchell, *City of Bits: Space, Place, and the Infobahn* (Cambridge, MA: MIT Press, 1996), pp. 46, 103.

[14] Ibid., p. 105.

[15] I discuss this issue at greater length in, "Technology and the Politics of Sustainability at Blueprint Demonstration Farm," in *The Journal of Architectural Education,* Vol. 51, No. 1 (September 1997), p. 2331.

[16] Thayer, *Gray World Green Heart,* pp. 140, 159,321.

[17] Raul A. Barreneche, "Wiring Buildings for the Future," in *Architecture,* Vol. 84, No. 4 (April 1995), pp. 123-129.

[18] See, Rowan Moore, edit., *Structure, Space and Skin: The Work of Nicholas Grimshaw and Partners* (London: Phaidon, 1993).

[19] Kenneth Frampton, *"Rappel a l'Ordre:* The Case for the Tectonic," in *Constancy and Change,* Malcolm Quantrill, ed. (College Station, TX: Texas A&M University Press, 1991), pp. 3-22.