

Technology Form and Culture in Architecture: Misconception and Myth*

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My intent in this paper is to engage issues that touch on architectural education when three concepts — technology, form and culture — intersect. First I shall touch on some aspects of that intersection and the architectural significance of technology, and then I shall look at some issues for architectural education that seem to emerge. I will deal chiefly with architecture in the West and with examples where technology has been consciously incorporated into the architectural aesthetic. Because architecture in the West is so often used to support various arguments about architecture in the Muslim world, I felt it essential to dispel certain misconceptions — that technology demands specific formal expression in architecture, or that its incorporation necessarily prohibits designs that are regionally and culturally appropriate — and to distinguish these misconceptions from myths that surround and project technology in architecture in the modern world. I believe that there are lessons for the education of architects in the Muslim world that can be drawn from this Western insider's story, and I shall try to indicate some of those possibilities.

ISSUES AT THE INTERSECTION

At the intersection of technology, form and culture are three apparent oppositions that will help to frame the rest of my discussion. These are: traditional versus modern technology, means versus ends, and centralisation versus regionalisation of the means of production.

Good building since the advent of modern construction technologies, and with increasing sophistication, has contained these oppositions, taking simultaneous account of traditional and modern techniques, engaging local enterprise in environmental improvement programmes and benefitting from the economies of centralisation without sacrificing regional specificity. Such possibilities rest in part on forces outside architecture, but they rest as well on architects' understanding that building functions as sign and symbol as well as to satisfy practical needs, and on architects' memory of good building of the past. The possibility of bad building, while it, too, depends on forces outside architecture, requires as well a naive and compliant semantically inept profession. It is to these that architectural education address themselves. Before discussing the architectural significance of technology, I need to develop a few ideas about significance in architecture more generally.



*Great Mosque at Djenne, Mali.
Men resurfacing mihrab tower.*

ARCHITECTURAL SIGNIFICANCE OF TECHNOLOGY

Architecture is an internally ordered world. Its elements take on meaning in relation to one another and to the environment, both natural and architectural, in which they are located. Language has as its primary aim to convey meaning. It

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signifies things outside itself. Of course, its internal structure must be consistent enough to make clear its reference to external things. Architecture can signify, too. The orientation of a mosque toward Mecca, which can make its street façade very different from the orientation of the rest of the street, signifies the presence of that institution. Minarets may convey the idea of a connection between heaven and earth, or, like the towers at San Gimignano, between wealth and a particular individual or family! Buildings like the Pantheon or Hagia Sophia have successfully supported a variety of associations and uses. The fact that many architecturally distinguished buildings have sustained a variety of different uses and meanings over time underlines the point that the life of architectural form does not depend primarily on its association with a specific use or meaning.

Like language, architecture has the capacity to define new ideas and to convey new meanings, but it also accumulates bits and structures of older languages that have unpredictable connotations when reused. Most architects are aware of this, and it affects the aesthetic attitudes that many architects and their clients have toward technology, and that arguably have driven the making of architectural form. *Bricolage* is the term sometimes used to refer to these cultural artifacts that in their reuse cause surprise, delight, and add meaning to the buildings in which they are found. *Bricolage*, if generously interpreted to include both elements and structures, can provide the chief connections to the past and to cultures elsewhere.

By rejecting the use of inherited architectural elements with their associated uses and meanings, the architect can demonstratively reject any past meanings and project a building that is intended to be entirely of its own time, without precedent, and embodying only the current and promised societal order. It is here that we turn back to questions of modernity in general and technology in particular.

Le Corbusier, inspired in part by environments like those of an ocean liner in which the design is determined in large part by forces that must be efficiently responded to, translated ordinary human activities like dwelling metaphorically into describable systems of forces for which designs can be sought.

From this came his “machine for living.”¹ The idea was not, of course, to shape the house as precisely as a ship would be shaped. “Living” implied the user’s adaptation of a basic form that modern construction would provide.²

His formulation of the “five points” for residential design, pilotis, free plan, free façade, long horizontal sliding window, and the roof garden that restored the ground were embodied in his project for the Stuttgart Weissenhofsiedlung of 1927 and the Villa Savoye at Poissy, 1929–1931. These could be thought to represent a transposition to architecture of the engineer’s aesthetic and the products of the new modern construction technology that Le Corbusier had so long admired to at least the basic structural frame for living. In that transposition another important issue for modern architecture was dramatised: the opposition between freedom from place that modern technology implied and the locale-specific qualities that people bring to building and need in order to reinforce their own sense of identity.

There are many other examples that would display distinctive attitudes toward technology that formed a fundamental part of an architectural aesthetic. Mies Van der Rohe’s corner of the Alumni Hall at Illinois Institute of Technology demonstrates an insistence to emphasise the materials of the building’s making even though the actual structure lies behind the brick, mandatory for fire reasons. The truth of the condition is revealed by allowing the brick to pass under the steel corner elements, thus conveying their non-structural role.

The Centre Pompidou in Paris projects technology in a variety of ways that are much more complex. Severely functional to the point of exaggeration in its mechanical service systems, it does not pick up cornices, arcades or other features of building in the area.³ Transparent, flexible and apparently functional, in clear distinction from its museum predecessors in Paris, it utilises a compulsively simple



Otto Wagner, Postal Savings Bank, Vienna.

scheme, a metric repetition of steel trusses and columns that do not vary in their dimension and that convey the sense of anonymous and non-specialised building — a warehouse (or supermarket) of culture. But because of the extraordinary spans and because of the architects' wish to make these structural elements particularly expressive, columns, trusses and joints are all specially designed for this building and for this building only. Industrialisation and standardisation are here opposed to handcrafted, custom-built one-at-a-time objects. Through its structural exhibitionism it makes references to Notre Dame and the Eiffel Tower, both visible from the front and public façade; but neither of those buildings contains the obvious references to other buildings nor the complex and culturally contemporary equally important oppositions contained in the Centre Pompidou. Apparently simple, but semantically complex, this is an artifact to be “deconstructed” by our critics of contemporary art!⁴

The grid is the last idea that I shall present as characteristic of how architects and artists have projected technology in modern times. The grid has been a much used figure of the avant-garde. “*The absolute stasis of the grid, its lack of hierarchy, of centre, of inflection, emphasises not only its anti-referential character, but — more importantly — its hostility to narrative.*”⁵ Krauss goes on to argue that the grid by virtue of its lack of reference emphasises not only the originality of the art work itself, but also its own organisation and its materiality.⁶ By denying the possibility of signifying other architectures, times, cultures, and human events, the grid turned attention to the means of the building's own making — its technology — which, in turn, could then signify modern technology in general.

The grid struck at the heart of historicism and of eclecticism, and at the symmetries, axes, hierarchies, and other devices of formal organisation practiced by Beaux Arts and neo-classical architects. I say “struck” rather than “strikes” because, by now, the grid is so well established a figure in architecture and art that, when it is now used, it is often used demonstratively as in the case of Agnes Martin's paintings, and it is semantically much more complex than when it began to emerge earlier in this century.

TEACHING TECHNOLOGY

I have tried to put technology, especially modern technology, into an architectural perspective. I have not yet dealt with how technology should be taught. Too narrow a view of technology in architecture has probably dominated the teaching of technical subjects in architectural curricula. I am certain that technology must be taught by technically oriented faculty. I am equally certain that this, while necessary, is not sufficient. It is not sufficient, because technology is related to form and to culture in ways that are complex and subtle and that involve the insights of many, including architects, and theorists as well as those with specific technical competence. Several ideas follow that are rooted in an architectural understanding of technology and that could, I believe, affect how technology is taught.

Deep Understanding. It is not appropriate in architecture merely to teach the calculation of structures or mechanical systems and not the deep understanding such as that espoused by Robert Maillart. This is perhaps the most dominant criterion in good teaching of technical subjects, but one which is very difficult to achieve for most architecture students, and one which is best illustrated by bridges and other engineered structures. The structure of the Hajj Terminal Building in Jeddah, illustrating absolute fidelity to an idea of structure and aided by some of the most powerful computers in the world, gave rise to an extraordinarily powerful and evocative artifact, regardless of its presumed metaphoric origins in the desert tent.



National Commercial Bank,
Jeddah, Saudi Arabia.

Nature Revealed Through Purity of Form. Structure in the hands of master architects has taken various forms. In the quest for clarity in displaying the distribution of forces and in holding spaces for use, the buildings have approached the perfection of form that nature herself does not achieve in the visible everyday world. Mies Van der Rohe's early scheme for a skyscraper, for example, stands as an extraordinary analogue to the crystalline structure of matter. SOM's Jeddah National Commercial Bank building is a fine contemporary illustration of a search for geometrical perfection in another cultural context.

Nature Revealed Through Distortion. Structure is not the only source of inspiration for fidelity to the nature of things. Ralph Knowles allows the exterior envelope of the building to be shaped by the combination of sun position and the envelope's needs for light and shade. And others in the name of energy have sought systematic transformations that would reveal through form the resolution of forces at the boundary between man and nature. One can imagine pure forms that are distorted by natural forces, like wind or sun, expressing nature, and that at the same time retain their identity, ideas like those of Sir d'Arcy Thompson given architectural expression.⁸

The Idea of Nature, Pursued. The idea of nature itself, as a source of energy and renewal of life, can inspire architectural solutions that themselves take on qualities that endure beyond their original inspiration. The Bagh-i Fin, the celebration of the water source at the low hills above Kashan in Iran, and Shah Jahan's great Shalimar Bagh at Lahore, not to mention the Alhambra itself, illustrate past accomplishments of supreme beauty and inspiration that utilise the technology of exploiting water to build the formal elements and structure of a place.⁹

Recognition of the Semantic Dimension. In architecture, even more than in engineering, it is important to understand meanings inherent in the forms that are taken by construction and other architectural technologies. In one of the more productive analogues with language, Panofsky observes that "To perceive the relation of signification is to separate the idea of the concept to be expressed from the means of expression. And to perceive the relation of construction is to separate the idea of the function to be fulfilled from the means of fulfilling it."¹⁰ Caws observes that the practicing engineer as well as the architect "...may well be *part bricoleur*. He may order his materials and calculate some components of his forms as an engineer, but he will almost certainly allow elements of bricolage into his design..."¹¹ In the teaching of technology, if students became more aware of and adept at handling their inheritance in technical fields, it would help considerably in raising their awareness of that idea in architecture more generally.

Vernacular Reformed. The Halawa house, with careful insertion of modern techniques, conveys the look, and to a large extent the reality, of traditional methods of building in a house for the rich. The juxtaposition of vernacular forms with an upper class contemporary life-style strengthens the image of both. The Nianing Agricultural School was the result of a research effort at UNESCO that in a short time created a whole method of construction patterned after vernacular building, but adapted to modern space requirements for schools and other building types.

Tectonics and Experience. Construction systems only qualify for architectonic systems if, like Herzberger's *Centraal Beheer* in Amsterdam, they are used so that construction and experienced spatial definition merge. Making this distinction evident in alternative examples would also help the architecture student to make the bridge between the technology of structure, for example, and the art of architec-



Hardy, Holtzmann and Pfeiffer's
Columbus, Indiana Occupational
Health Centre.

ture. Herzberger's *Centraal Beheer* and Louis I. Kahn's *Richards Medical Research Towers* in Philadelphia represent a relatively conservative view of how environments are to be experienced and read, because their spatial, functional, and structural systems are essentially congruent. In those buildings multiple and contradictory readings are not supported. Their architectonic systems are neither universal enough to be decoupled from the particular activity and seen in their more general frame of reference, nor specific enough to suggest alternative use associations. Furthermore, the semantic dimension was simply not tapped beyond a not-so-crude brutalism that signified the presence of an aggressive and dominant technology.

Hardy Holtzmann and Pfeiffer's *Columbus, Indiana, Occupational Health Centre* exemplifies a dialectical relationship among architectonic systems, still in the modernist vein and tightly linked to the expression of modern technology and modes of production. Kallmann, McKinnell and Woods' *American Academy of Arts and Sciences building* in Cambridge, Massachusetts and, quite possibly, *Henning Larsen's Ministry of Foreign Affairs building* in Riyadh establish a powerful dialectic as well with vocabularies of the past.

CONCLUDING REMARKS

Many nations, caught up in the problems of their own development, may look to architecture to clarify their identity and express it to others. Many nations in the past have attempted this, with success ranging from the challenging and the beautiful in *Chandigarh*, the diplomatic quarter in *Riyadh*, and some of the recent planning for *Baghdad*, to the less obviously successful *Algerian New Towns* or *King Khalid City* in Saudi Arabia. Religion, too, may look to architecture to validate its claim on the lives and minds of the faithful and to exclude others. And private enterprise had made the same claims on the landscapes of our cities all over the globe by privatising the skyline and even parts of cities' public access system. Architecture has the capacity to support these objectives, but its greater force comes, in my view, from deeper linkages to the cultures that underlie businesses, nations, and religions.

Technology is caught up in this problem of emerging identity. If buildings in non-industrialised countries resemble too closely buildings in industrialised countries of the West, or utilise processes of production associated with those countries, they do not carry a forceful local identity. Moreover, the emerging nations of the Muslim world are not emerging in the vanguard of the new industrialisation, they are emerging as new and distinctive cultures. Technology, as expressed in the *Centre Pompidou* or the *Hajj Terminal* structure, or celebrating the machine as *Chernikhov* did, or any other of the several examples I have cited may not represent the right approach for the people and the institutions of these nations. Indeed, I suspect that too obvious a use of technology as the primary source of formal expression in building may not be appropriate in most countries of the world today, possibly for different reasons in each. But the more important point I have tried to make is that the formal language of architects must be able to support complex readings specific to where each building is built, and the architect must be able to manipulate that formal language in knowing ways.

The aim of this paper was to discuss linkages between technology, form and culture in the architecture of the West, and to distinguish in that discussion between misconception and myth.