Studies in Tectonic Culture:  
The Poetics of Construction in Nineteenth  
and Twentieth Century Architecture

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1 Introduction:
Reflections on the Scope of the Tectonic

The history of contemporary architecture is inevitably multiple, multifarious even: a history of the structures that form the human environment independently of architecture itself; a history of the attempts to control and direct those structures; a history of the intellectuals who have sought to devise policies and methods for those attempts; a history of new languages which, having abandoned all hope of arriving at absolute and definitive words, have striven to deﬁnitely delimit the area of their particular contribution.

Obviously the intersection of all those manifold histories will never end up in unity. The realm of history is, by nature, dialectical. It is that dialectic that we have tried to pin down, and we have done what we could not to smooth over conﬂicts which are cropping up again today in the form of worriesome questions as to what role architecture itself should or can have. It is useless to try to reply to such questions. What needs to be done, instead, is to trace the entire course of modern architecture with an eye to whatever cracks and gaps break up its compactness, and then to make a fresh start, without, however, elevating to the status of myth either the continuity of history or those separate discontinuities. Manfredo Tafuri and Francesco Dal Co, L'architettura contemporanea, 1976

The great French architectural theorist Eugene-Emmanuel Viollet-le-Duc would compile his magnum opus of 1872, his Entretiens sur l'architecture, without once using the term space in a modern sense.1 Twenty years later nothing could be further from the structuralism of Viollet-le-Duc's thought than the primacy given to space as an end in itself in August Schmarsow's Das Wesen der architektonischen Schöpfung (The Essence of Architectural Creation), first published in 1894.2 Like many other theorists before him, Schmarsow would advance the primitive hut as the primordial shelter, only this time he would see it as a spatial matrix, or what he would call the Raumgestalten, the creatress of space.3

To a greater extent perhaps than any other late nineteenth-century theorist, including the sculptor Adolf von Hildebrand, who gave primacy to kinetic vision, and Gottfried Semper, from whom Schmarsow derived his thesis, Schmarsow came to view the evolution of architecture as the progressive unfolding of man's feeling for space, what he called Raumgefühl. Between 1893 and 1914 Schmarsow's identification of space as the driving principle behind all architectural form coincides with the evolving space-time models of the universe as these were successively adduced by Nikolai Ivanovich Lobachevsky, Georg Riemann, and Albert Einstein. As we know, such paradigms would come to be deployed early in this century to rationalize in various ways the appearance of dynamic spatial form in the field of avant-garde art.4 This conjunction was reinforced through the experience of speed and the actual transformation of space-time in an everyday sense, due to the mechanical inventions of the last half of the century: the familiar Futurist technology of the train, the transatlantic liner, the car, and the plane.

Space has since become such an integral part of our thinking about architecture that we are practically incapable of thinking about it at all without putting our main emphasis on the spatial displacement of the subject in time. This quintessentially modern viewpoint has clearly underlain innumerable texts treating the intrinsic nature of modern architecture, ranging from Sigfried Giedion's Space, Time and Architecture of 1941 to Cornelis van de Ven's Space in Architecture of 1978. As van de Ven shows, the idea of space established a new concept that
not only overcame eclecticism through a relativizing of style, but also gave priority to the spatia-plastic unity of interior and exterior space and to the nonhierarchical assimilation of all instrumental forms, irrespective of their scale or mode of address, into one continuous space-time experience.

Without wishing to deny the volumetric character of architectural form, this study seeks to mediate and enrich the priority given to space by a reconsideration of the constructional and structural modes by which, of necessity, it has to be achieved. Needless to say, I am not alluding to the mere revelation of constructional technique but rather to its expressive potential. Inasmuch as the tectonic amounts to a poetics of construction it is art, but in this respect the artistic dimension is neither figurative nor abstract. It is my contention that the unavoidably earthbound nature of building is as tectonic and tactile in character as it is scenographic and visual, although none of these attributes deny its spatiality.

Nevertheless we may assert that the built is first and foremost a construction and only later an abstract discourse based on surface, volume, and plan, to cite the "Three Reminders to Architects" in Le Corbusier's Vers une architecture of 1923. One may also add that building, unlike fine art, is as much an everyday experience as it is a representation and that the built is a thing rather than a sign, even if, as Umberto Eco once remarked, as soon as one has an object of "use" one necessarily has a sign that is indicative of this use.

From this point of view, we may claim that type form—the received "what" deposited by the lifeworld—is as much a precondition for building as craft technique, however much it may remain open to inflection at different levels. Thus we may claim that the built invariably comes into existence out of the constantly evolving interplay of three converging vectors, the topos, the typos, and the tectonic. And while the tectonic does not necessarily favor any particular style, it does, in conjunction with site and type, serve to counter the present tendency for architecture to derive its legitimacy from some other discourse.

This reassertion of the tectonic derives in part from Giorgio Grassi's critical polemic as this was advanced in his essay "Avant Garde and Continuity" of 1980, in which he wrote:

As far as the architectural vanguards of the Modern Movement are concerned, they invariably follow in the wake of the figurative arts... Cubism, Suprematism, Neo-plasticism, etc., are all forms of investigation born and developed in the realm of the figurative arts, and only as a second thought carried over into architecture as well. It is actually pathetic to see the architects of that "heroic" period, and the best among them, trying with difficulty to accommodate themselves to these "isms"; experimenting in a perplexed manner because of their fascination with the new doctrines, measuring them, only later to realize their ineffectuality.

Despite the retardaataire implications of this Lukacsian critique, Grassi's observation nonetheless challenges the prestige that still seems to attach itself to the figurative in architecture. This challenge comes at a time when architecture appears to oscillate uneasily between a deconstructive aestheticization of its traditional modus operandi and a reassertion of its liberative capacity as a critical form. It is perhaps a measure of Grassi's professional alienation that his work remains somewhat hermetic and indeed paradoxically removed, when built, from the poetics of craft construction. This is all the more inexplicable given the care

Architecture is posited as a craft, that is to say, as the practical application of established knowledge through rules of the different levels of intervention. Thus, no notion of architecture as problem-solving, as innovation, or as invention ex novo is present in showing the permanent, the evident, and the given character of knowledge in the making of architecture.

... The work of Grassi is born of a reflection upon the essential resources of discipline, and it focuses upon specific media which determine not only aesthetic choices but also the ethical content of its cultural contribution. Through these channels of ethical and political will, the concern of the Enlightenment... becomes enriched in its most critical tone. It is not solely the superiority of reason and the analysis of form which are indicated, but rather, the critical role (in the Kantian sense of the term), that is, the judgement of values, the very lack of which is felt in society today. In the sense that his architecture is a meta-language, a reflection on the contradictions of his own practice, his work acquires the appeal of something that is both frustrating and noble.

Etymology

Greek in origin, the term tectonic derives from the word tōkton, signifying carpenter or builder. The corresponding verb is tektaínomai. This in turn is related to the Sanskrit taksan, referring to the craft of carpentry and to the use of the axe. Remnants of a similar term can be found in Vedic poetry, where it again refers to carpentry. In Greek it appears in Homer, where it alludes to the art of construction in general. The poetic connotation of the term first appears in Sappho, where the tōkton, the carpenter, assumes the role of the poet. In general, the
Term refers to an artisan working in all hard materials except metal. In the fifth century B.C., this meaning undergoes further evolution, from something specific and physical, such as carpentry, to a more generic notion of making, involving the idea of poesis. In Aristophanes it would seem that the notion is even associated with machination and the creation of false things, a transformation that would appear to correspond to the passage from pre-Socratic philosophy to Hellenism. Needless to say, the role of the tekon leads eventually to the emergence of the master builder or architekton. That the term would eventually aspire to an aesthetic rather than a technological category has been remarked on by Adolf Heinrich Borbein in his 1982 philological study:

Tectonic becomes the art of joinings. "Art" here is to be understood as encompassing tekon, and therefore indicates tectonic as assembly not only of building parts but also of objects, indeed of artworks in a narrower sense. With regard to the ancient understanding of the word, tectonic tends toward the construction or making of an artisanal or artistic product... it depends much more upon the correct or incorrect applications of the artisanal rules, or the degree to which its usefulness has been achieved. Only to this extent does tectonic also involve judgment over art production. Here, however, lies the point of departure for the expanded clarification and application of the idea in more recent art history: as soon as an aesthetic perspective—and not a goal of utility—is defined that specifies the work and production of the tekon, then the analysis consigns the term "tectonic" to an aesthetic judgement.

The first architectural use of the term in German dates from its appearance in Karl Otfried Müller's Handbuch der Archäologie der Kunst (Handbook of the Archaeology of Art), published in 1830, wherein he defines tekttonische as applying to a series of art forms "such as utensils, vases, dwellings and meeting places of men, which surely form and develop on the one hand due to their application and on the other due to their conformity to sentiments and notions of art. We call this string of mixed activities tectonic; their peak is architecture, which mostly through necessity rises high and can be a powerful representation of the deepest feelings." In the third edition of his study Müller remarks on the specifically functional or "dry" jointing implications of the term. "I did not fail to notice that the ancient term tekttones, in specialized usage, refers to people in construction or cabinet makers, not however, to clay and metal workers; therefore, at the same time, it takes into account the general meaning, which lies in the etymology of the word."

In his highly influential Die Tektonik der Hellenen (The Tectonic of the Hellenes), published in three volumes between 1843 and 1852, Karl Bötticher would make the seminal contribution of distinguishing between the Kernform and the Kunstform; between the core form of the timber rafters in a Greek temple and the artistic representation of the same elements as petrified beam ends in the triglyphs and metopes of the classical entablature (fig. 1.2). Bötticher interpreted the term tectonic as signifying a complete system binding all the parts of the Greek temple into a sing whole, including the framed presence of relief sculpture in all its multifarious forms.

Influenced by Müller, Gottfried Semper would endow the term with equally ethnographic connotations in his epoch-making theoretical departure from the Vitruvian trivium of utilitas, firmitas, and venustas. Semper's Die vier Elemente der...
**Baukunst** (Four Elements of Architecture), published in 1851, indirectly challenged the neoclassic primitive hut as posited by the Abbé Laugier in his *Essai sur l'architecture* of 1753. Based in part on an actual Caribbean hut that he saw in the Great Exhibition of 1851, Semper's primordial dwelling was divided into four basic elements: (1) the earthwork, (2) the hearth, (3) the framework/roof, and (4) the lightweight enclosing membrane. On the basis of this taxonomy Semper would classify the building crafts into two fundamental procedures: the tectonics of the frame, in which lightweight, linear components are assembled so as to encompass a spatial matrix, and the stereotomies of the earthwork, wherein mass and volume are conjointly formed through the repetitious piling up of heavyweight elements. That this last depends upon load-bearing masonry, whether stone or mud brick, is suggested by the Greek etymology of stereotomy, from *stereos*, solid, and *tomia*, to cut. This tectonic/stereotomic distinction was reinforced in German by that language's differentiation between two classes of wall between *die Wand*, indicating a screenlike partition such as we find in wattle and daub infill construction, and *die Mauer*, signifying massive fortification. This distinction will find a certain correspondence in Karl Gruber's 1937 reconstruction of a typical German medieval city, which illustrates the difference between heavyweight battlements built of masonry and lightweight residential fabric framed in wood and filled with wattle and daub (*Fachwerkbau*) (fig. 1.3). This distinction between light and heavy reflects a more general differentiation in terms of material production, wood construction displaying an affinity for its tensile equivalent in terms of basketwork and textiles, and stonework tending toward its substitution as a compressive material by brickwork or *pise* (rammed earth) and later by reinforced concrete. As Semper was to point out in his *Stoffwechseltheorie*, the history of culture manifests occasional transpositions in which the architectonic attributes of one mode are expressed in another for the
The general validity of Semper's Four Elements is borne out by vernacular building throughout the world, even if there are cultures where the woven vertical screen wall does not exist or where the woven wall is absorbed, as it were, into the roof and frame, as in, say, the North American Mandan house (fig. 1.6). In African tribal cultures the enclosing vertical screen covers a wide range of expression, from primitive infill walls, plastered on the inside only, as in the Gogo houses of Tanzania (fig. 1.7), to precisely woven wall mats that line the exterior of the chief's hut, as we find in Kuba culture. Moreover according to climate, custom, and available material the respective roles played by tectonic and stereotomic form vary considerably, so that the primal dwelling passes from a condition in which the earthwork is reduced to point foundations, as in the boulder footings of the traditional Japanese house (fig. 1.8), to a situation in which ste-
1.7 Gogo houses of Tanzania detail of infill walls.

1.8 Traditional Japanese one-story house.

Rectom walls are extended horizontally to become floors and roofs, made up of the same material although reinforced with brushwood or basketwork (fig. 1.9). Alternatively the basic cell is covered by a vault of the same material, both techniques being equally prevalent in North African, Cycladic, and Middle Eastern cultures.

It is characteristic of our secular age that we should overlook the cosmic associations evoked by these dialogically opposed modes of construction; that is to say the affinity of the frame for the immateriality of sky and the propensity of mass form not only to gravitate toward the earth but also to dissolve in its substance. As the Egyptian architect Hassan Fathy was to point out, this is never more evident than in mud brick construction, when the walls tend to fuse with the earth once they fall into ruin and disuse. However, untreated wood is equally
Topography

No one has argued more persuasively as to the cosmogonic implications of the earthwork than the Italian architect Vittorio Gregotti, who in 1983 wrote:

The worst enemy of modern architecture is the idea of space considered solely in terms of its economic and technical exigencies indifferent to the ideas of the site.

... Through the concept of the site and the principle of settlement, the environment becomes [on the contrary] the essence of architectural production. From this vantage point, new principles and methods can be seen for design. Principles and methods that give precedence to the siting in a specific area. This is an act of knowledge of the context that comes out of its architectural modification. The origin of architecture is not in the primitive hut, or the cave or the mythical "Adam's House in Paradise."

Before transforming a support into a column, a roof into a tympanum, before placing stone on stone, man placed the stone on the ground to recognize a site in the midst of an unknown universe: in order to take account of it and modify it. As with every act of assessment this one required radical moves and apparent simplicity. From this point of view, there are only two important attitudes to the context. The tools of the first are mimicry, organic imitation and the display of complexity. The tools of the second are the assessment of physical relations, formal definition and interiorization of complexity. 

It is difficult to find a more didactic modern example of this last than the acknowledged masterwork of the Greek architect Dimitris Pikionis. I have in mind his Philopapou hillsdale park, laid in place during the second half of the 1950s on a site adjacent to the Acropolis in Athens (fig. 1.10). In this work, as Alexander Tzonis and Liane Lefaivre have remarked, Pikionis created a topographic continuum that was removed from any kind of technological exhibitionism. This serpentine causeway, passing across an undulating rock-strewn site, constituted, in essence, a stone tapestry, bonded into the ground through irregularly coursed pavers, furnished with occasional seats, and studded here and there with iconic signs. Collaged rather than designed, it reinterprets the genius loci as a mythic
Dimitris Pikionis, detail of park paving, Philopappou Hill, Athens, 1951-57.

1.10

narrative, part Byzantine, part pre-Socratic, a promenade to be experienced as much by the body as by the eyes. That this was always central to Pikionis's sensibility is evident from a 1933 essay entitled "A Sentimental Topography":

We rejoice in the progress of our body across the uneven surface of the earth and our spirit is gladdened by the endless interplay of the three dimensions that we encounter with every step. . . . Here the ground is hard, stony, precipitous, and the soil is brittle and dry. There the ground is level; water surges out of mossy patches. Further on, the breeze, the altitude and the configuration of the ground announce the vicinity of the sea. 13

Pikionis's work testifies to the fact that the earthwork tends to transcend our received perceptions about both aesthetics and function, for here the surface of the ground is kinetically experienced through the gait, that is to say through the locomotion of the body and the sensuous impact of this movement on the nervous system as a whole. There is moreover, as Pikionis reminds us, the "acoustical" resonance of the site as the body negotiates its surface. One recalls at this juncture Steven Eiler Rasmussen's Experiencing Architecture and the remarkable chapter entitled "Hearing Architecture," where he notes the all but imperceptible acoustical character of built form. 19 Rasmussen reminds us that the spatial reflection or absorption of sound immediately affects our psychological response to a given volume, so that we may find it warm or cold according to its particular resonance rather than its appearance. Similar psycho-acoustical effects have been remarked on by Ulrich Conrads and Bernhard Lethner in a 1985 essay in which they comment on the spiritual aura evoked by the reverberation time of the Taj Mahal and, rather coincidentally, on the way in which Mediterranean vernacular forms appear to be suited to the articulation of certain diphthongs and vowels and not others, with the result that such dwellings prove unsuitable as vacation homes for people speaking northern languages. 20 That even formal integrity may depend in part on acoustical effect is confirmed by Luis Barragán's San Cristóbal horse farm realized in the suburbs of Mexico City in 1967, wherein the central reflecting pool and the sound of its water fountain jointly assure the unity of the whole.
Corporal Metaphor

The capacity of the being to experience the environment bodily recalls the notion of the corporeal imagination as advanced by the Neapolitan philosopher Giambattista Vico in his Scienza nuova of 1730. Against the rationalism of Descartes, Vico argued that language, myth, and custom are the metaphorical legacy of the species brought into being through the self-realization of its history, from the first intuitions deriving from man's primordial experience of nature to the long haul of cultural development running across generations. In his 1985 study Michael Mooney had this to say about Vico's conception of this metaphorical process:

In a moment of stirring oratory, Vico held, when the beauty of a conceit overwhelms the spirit as its truth impresses the mind, both speaker and listener are caught up in a rush of ingenuity, each making connections that were not made before; their spirits fused by the freshness of the language, their minds and finally their wills made one. So here, too, analogously to be sure, the first dim seeing of Jove is an event in which body through language becomes conscious, the poetry of a thundering sky evoking in response the poetry of giants made men, struck dumb with awe.

What occurs is an exchange in metaphor: the image of providence in a thundering heaven passing into the bodies of awestruck men. The physical universe of deus artifex, itself a poem, everywhere written in conceits, becomes in the bodies of clustered men a poet, henceforth a master of self; the passive ingenuity of the universe comes to life in the mind (however unrefined it yet is) and the spirit (however passionate and violent it may be) of man, now standing erect, becomes the artifex of his own existence.

Vico's concept of the enactment and reenactment of man through history is not only metaphorical and mythical but also corporeal, in that the body reconstitutes the world through its tactile appropriation of reality. This much is suggested by the psycho-physical impact of form upon our being and by our tendency to engage form through touch as we feel our way through architectural space. This propensity has been remarked on by Adrian Stokes, in discussing the impact of time and touch on the weathering of stone.

Hand-finish is the most vivid testimony of sculpture. People touch things according to their shape. A single shape is made magnificent by perennial touching. For the hand explores, all unconsciously to reveal, to magnify an existent form. Perfect sculpture needs your hand to communicate some pulse and warmth, to reveal subtleties unnoticed by the eye, needs your hand to enhance them. Used, carved stone, exposed to the weather, records on its concrete shape in spatial, immediate, simultaneous form, not only the winding passages of days and nights, the opening and shutting skies of warmth and wet, but also the sensitiveness, the vitality even, that each successive touching has communicated.

That such a purview stands in total opposition to all our more recent attempts to impose upon cultural experience a consciously distanced and exclusively semiotic character has been remarked on by Scott Gartner.

The philosophical alienation of the body from the mind has resulted in the absence of embodied experience from almost all contemporary theories of
meaning in architecture. The overemphasis on signification and reference in architectural theory has led to a construal of meaning as an entirely conceptual phenomenon. Experience, as it relates to understanding, seems reduced to a matter of the visual registration of coded messages—a function of the eye which might well rely on the printed page and dispense with the physical presence of architecture altogether. The body, if it figures into architectural theory at all, is often reduced to an aggregate of needs and constraints which are to be accommodated by methods of design grounded in behavioral and ergonomic analysis. Within this framework of thought, the body and its experience do not participate in the constitution and realization of architectural meaning.

Metaphor, rather than being solely a linguistic or rhetorical trope, constitutes a human process by which we understand and structure one domain of experience in terms of another of a different kind. This concept surely lies behind Tadao Ando's characterization of the Shintai as a sentient being that realizes itself through lived-in space.

Man articulates the world through his body. Man is not a dualistic being in whom spirit and the flesh are essentially distinct, but a living corporeal being active in the world. The "here and now" in which this distinct body is placed is what is first taken as granted, and subsequently a "there" appears. Through a perception of that distance, or rather the living of that distance, the surrounding space becomes manifest as a thing endowed with various meanings and values. Since man has an asymmetrical physical structure with a top and a bottom, a left and a right, and a front and a back, the articulated world, in turn, naturally becomes a heterogeneous space. The world that appears to man's senses and the state of man's body become in this way interdependent. The world articulated by the body is a vivid, lived-in space.

The body articulates the world. At the same time, the body is articulated by the world. When "I" perceive the concrete to be something cold and hard, "I" recognize the body as something warm and soft. In this way the body in its dynamic relationship with the world becomes the shintai. It is only the shintai in this sense that builds or understands architecture. The shintai is a sentient being that responds to the world.

This concept parallels similar arguments advanced by Schmarsow and later by Merleau-Ponty, particularly Schmarsow's thesis that our concept of space is determined by the frontalized progression of the body through space in depth. Similar spatio-corporeal connotations are evident in Adolphe Appia's disquisition on the interplay between body and form on the stage, in his *L'Oeuvre d'art vivant* of 1921. A similar phenomenological awareness is also evident in Alvar Aalto, Siynätalo Town Hall, 1949-1952. Plan, section through council chamber, and longitudinal section.
Alvar Aalto, Säynätsalo Town Hall, stair to the council chamber.

Ogine’s Night at the turn of the year, Kyushu. Ritual raising and burning of the hashira.

Aalto’s Säynätsalo Town Hall (1952) where, from entry to council chamber, the subject encounters a sequence of contrasting tactile experiences (fig. 1.11). Thus, from the stereotomic mass and relative darkness of the entry stair (fig. 1.12), where the feeling of enclosure is augmented by the tactility of the brick treads, one enters into the bright light of the council chamber, the timber-lined roof of which is carried on fanlike, wooden trusses that splay upward to support concealed rafters above a boarded ceiling. The sense of arrival occasioned by this tectonic display is reinforced by various nonretinal sensations, from the smell of polished wood to the floor flexing under one’s weight together with the general destabilization of the body as one enters onto a highly polished surface.