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Introduction

Christopher Bardt

1 Adolf Loos. “Architecture.” *Neue Freie Presse* (Vienna), 1910.

Tectonics and the Grammar of Program

> If we were to come across a mound in the woods, six feet long by three feet wide, with the soil piled up in a pyramid, a somber mood would come over us and a voice inside us would say, "There is someone buried here." *That is architecture*.[1]

In Loos's image, what makes the mound architecture is its indivisible coherence, presence and immanence, manifested in silent evocations of life, death, truth, and mystery. The mound encountered by chance, in the woods, is meaningful in its setting. Indeed, its setting is inseparable from its meaning. Here, architecture presents as a singular phenomenon. But is it really so? The mound, the path, the woods, the proportions, geometry, the material: all are directly experienced, but are also comprehended poetically as a symbolically charged, emotionally, sensually embodied and intellectual complex grasped through recollection, associative references, grammar, and syntax—the language of architecture.

For architecture to be meaningful, it must fulfill its double function as symbolic language and as a built phenomenon.

Architecture's ontological and epistemological entanglement with its spatial, constructional, and historical contingencies and references is reflected in the topic at hand—the grammatical relations between tectonics and program. One cannot isolate the former from the latter, yet doing so may be a necessary prelude to gaining a better sense of their intertwinement or, metaphorically speaking, their special way of "constructing" architecture.

Classical Architecture, arguably, the most grammatical of all architectural movements, traces the relation between tectonics, program, and construction back to its roots embedded in the logic of construction. The refinements of base, capitol, entablature, proportions, and so on all echo origins in building, structure, gravity, durability, and the behavior of physical material. The Greek temple's transition from wood tectonics to stone structures emancipated construction from the intrinsic joinery of wood assemblies transforming the wooden joists, pegs, and wedges of wooden antecedents into skeuomorphs of triglyphs, mutules, guttae, and metopes of the Doric frieze. The very act of freeing the tectonics of wood construction from their utility, while continuing to deploy their appearances transformed construction into language and associated tectonics with the construction of both meaning and building.

The architect is tied to the building process, not by direct action but at a distance that simultaneously liberates and blinds. Drawings and other

2 Marc-Antoine Laugier. *Essai sur l'architecture*. Paris: Chez Duchesne, 1753.

representations, while free of the restraints of gravity and structure, delete the propelling realities of physical material that underpin tectonics. Since projection drawing was adopted by the profession, architects have navigated the schism between representation and building through a gradual process of codifying the relation between building and drawing: essentially, building technique remained tacitly understood and controlled by the builder while the architect had authority over the form, geometry, and visual language of building—that is, the grammar of tectonics. In addition, the architect took instrumental control of spatial organization—that is, program—empowered by the plan drawing. The precarity of the situation was managed through stability: as long as architects worked somewhat within the norms of architecture and the builder built according to well-understood techniques, a certainty of outcome would be ensured. It was only natural, then, for post-renaissance construction to remain fundamentally static while architecture's progress was limited to formal, stylistic, and decorative developments, focused on what was available for the architect to articulate through drawing—namely, the grammar of program and building tectonics.

Tectonics in Architecture

By the eighteenth and nineteenth century, the proliferation of formal rules, stylistic manipulations, ornamentation, and semantics, reduced to visual representations, had undermined architecture's cultural authority, which had been rooted in historical continuity, structural and constructional integrity, and an inherent stability that bestowed it timelessness. A return to origins, to roots, was the cure, marking for many twentieth-century historians the emergence of modern architecture.

European origin myths of architecture, from Marc-Antoine Laugier to Godfried Semper to Adolf Loos, shared a belief that architecture arose from a natural order. Laugier, in his *Essai sur l'architecture*, [2] saw structure as the origin of architecture and called for the return to authentic building through recovering the essential elements of architecture: columns, beams, and pediments, reuniting formal elements with their original structural purpose. His allegorical "primitive hut" *(as the famous frontispiece represented*) underscored the origins of architecture as given by nature; tree trunks (columns), forks, and branches (beams) providing for the most primitive of needs—shelter. Unironically Laugier saw nature bequeathing to primitive humans the means (tectonics) to protect themselves (program) from nature, no craft or skills required.

3 Gottfried Semper. *The Four Elements of Architecture and Other Writings*. Translated by Harry F. Mallgrave and Wolfgang Herrmann. Cambridge, UK: Cambridge University Press, 1989 Originally published 1851.

4 Online Etymology Dictionary, https://www.etymonline.com.

In his book *The Four Elements of Architecture*,[3] Gottfried Semper makes an anthropological case for building origins arising from human activity rather than nature's divine gifts. Unlike Laugier's idea of the primitive hut as a tectonic re-imagining of nature, Semper's "Caribbean Hut" proposed that the social action (program) of gathering around a fire gave rise to the primary, essential element of architecture: the hearth. The other three elements follow logically; the hearth is set on a raised plinth or earthwork to protect it from the ground and water; a woven enclosure is hung around the gathering space/hearth to protect it from wind and animals; and finally, a roof is draped to shelter the fire from weather. While Laugier's primitive hut manifests as an image, wholly formed, Semper's is all process—the drawings of the Caribbean Hut are far more technical than allegorical. Here the subject of tectonics appears as a response to the program, a need addressed through available craft skills centered on material processes. The fire/hearth is the purview of those skilled in ceramics and metallurgy;, the textile walls made by weavers; the evolving roof advancing both the skills of the weaver and carpenter; and the earthwork, masons.

While both Laugier and Semper argued the authenticity of architecture is rooted in its origins as structure and construction, Laugier's primitive hut is an abstraction, a representation, an archetype presumably having informed the design of the Greek temple. Semper's hut is all fabrication, craft, and material joinery. The etymology of "tectonics" follows similarly: the terms "context," "pretext," "subtle," and "text" all allude to joining, weaving together in the abstract, dissociated from physical material. Tectonics is also rooted in **teks*, meaning "to weave" as well as "to fabricate," especially with an ax and "to make wicker or wattle fabric for (mud-covered) house walls." Here the physical and material conditions of weaving are at the forefront. In other etymologies, the craft and maker are the origin: Sanskrit *taksati* meaning "he fashions," "constructs," and *taksan*,"carpenter"; Avestan *taša* meaning "ax, hatchet," and *thwaxš-*, "be busy"; Old Persian *taxš-* meaning "be active"; Greek *tekton*, "carpenter" and *tekhnē*, "art"; Old Church Slavonic *tesla* meaning "ax, hatchet"; Lithuanian *tašau, tašyti*, meaning "to carve."[4]

As for the architect, as Laugier makes clear in his frontispiece, she points to the primitive hut but is not the maker; her role is as guide pointing us to true building. The architect in Semper's treatise is nowhere to be found, but is nevertheless etymologically nearby: the arche-tekton, the "chief carpenter," fully versed in the art and craft of making. Only the arche-tekton has the broad capability and responsibility of synthesizing the work of multiple trades that building entails. In both instances, the

5 James J. Gibson. *The Senses Considered as Perceptual Systems*. Boston: Houghton Mifflin, 1966.

architect is still at a remove from the work, no longer *homo faber* but one who slowly acquires instruments, not to build with but to direct, control, script, and envision the outcome of the building process.

The "crisis" of architecture that led to the emergence of the modern movement was a crisis of meaning. By the early twentieth century the now sclerotic formal language of classical architecture was rendered irrelevant by Europe's societal upheavals and the loss of the mytho-poetic dimension of architecture as a means of contemplating the greater cosmic order. The symbolic language of tectonics, reduced to empty rhetoric, a "facade" of tired tropes detached from advances in building technology, had become complicit in the unmooring of the language of architecture from the physical making of building, once again bringing into question the "what" of architecture and its sources of authenticity.

Program in Architecture

The idea of program in Laugier's primitive hut is similar to what was coined as "affordances" by psychologist James Gibson, referring to the potential of an environment or element for use–as in stair, which "affords" ascending.[5] The trees in Laugier's forest "afford" the making of a primitive hut; architecture "affords" and does not prescribe its uses. Semper's version is the opposite: the act of gathering calls in programmatic needs and elements. The hearth, the wall, and other elements are made in response to the need; program brings architecture into being. If we give some credence to Laugier's and Semper's concepts, program both precedes and is determined (or afforded) by architecture, as Churchill's famous maxim underscores: "We shape our buildings, and afterwards our buildings shape us."

Until the recent past, program shared a language-like role with tectonics. The use of a room was understood culturally and symbolically more than prescriptively, and it was generally accepted that the sequence, scale, and general spatial conditions would be sufficient to accommodate (or provide the "affordances") for a range of uses/functions. The physical and economical constraints of construction that limited early buildings to certain arrangements of space tied activity/use to general conditions of space and vice versa. The continuous symbiosis and frictions between buildings and human actions activated architecture as a symbolic and language-like discipline, whose value lay in bringing the logos of construction together with the mythos of human existence. Architectural meaning lay in the semantics of architecture–in which tectonics inscribed and described program—that is, the "public proclamation" and elevated cons-

6 Alva Noë. *Varieties of Presence*. Cambridge, MA: Harvard University Press, 2012.

truction from brute assembly to architectural language. Architecture itself was an inscription, a representation of the program as symbolic proclamation, the foreshadowing of its role in the constellation of worldly elements being assembled into buildings and cities that revealed the larger and mysterious cosmic world order.

Typologically, buildings were more strongly propelled by construction, and only weakly associated with function, yet building type remained a stronger predictor of use over time than any program of use. As long as architecture was the "form" of culture, program could be understood as what contemporary philosopher Alva Noë (paraphrasing Goethe) calls "frozen habit," [6] in which human actions are guided by the spatial arrangements of buildings (which in turn are tied to structural and construction logic) not prescriptively but implicitly and pre-reflective as the embodiment of symbolically understood "form"—not unlike how a fork is understood to be held "properly."

While tectonics was at the epicenter of the aforementioned modern search for an authentic relationship between building and architecture, program was under less scrutiny. Initially, there was little interest in revisiting the relation between human activity and building organization. The Behrens AEG Turbinenhalle was a turning point: celebrated for its authenticity, the building's dramatic tectonic language was guided by the spatial uniformity and tectonic logic of the daylit steel and glass bays which mirrored its Taylorist factory program dedicated to homogenous and continuous production spaces. The new modern architecture eventually came to fundamentally rethink program as an "unfrozen" spatial condition, and a new grammar of program ensued as the idea of movement and the unbounded continuity of space were adopted as the new fundamentals of architecture.

The conflicts between methods of building construction and the spatial concepts of modern architecture sparked a period of unprecedented invention. The demand of the new program of architecture—unbounded continuity of space, stripped of weight, gravity, or any references to traditional construction—was a wellspring for architecture *because* it conflicted with construction, which remained bound to the laws of physics and nature. The new spatial program could be projected, drawn on paper, where conveniently gravity and mass were absent. But to build, say, a floating space, meant architecture had to operate symbolically between a new grammar of program and grammar of tectonics, which manifested a *feeling* of floating space. When Mies designed the Barcelona pavilion, every detail was designed with the erasure of gravity in mind: the extruded chromed cruciform columns (reflections dissolve mass), supporting an

7 In Gaston Bachelard, *On Poetic Imagination and Reverie*. Edited by Collette Gaudin. Putnam, CT: Spring Publications, 2014, 89.

8 Dalibor Vesely. *Architecture in the Age of Divided Representation: The Question of Creativity in the Shadow of Production*. Cambridge, MA: MIT Press, 2004, 97.

9 *Ibid*, 106.

impossibly thin horizontal roof (it was only thin at the visible edge), a ceiling of equal luminosity as the floor (the direct sun on the travertine floor matched the reflectively lit white ceiling). The grammar of these details generated the experience both phenomenally and intellectually—one can "read" the suprematist composition as well as experience the unbounded space and Boustrophedonic movement of the pavilion.

The "rub" between tectonics and program are not dissimilar to the "rub" between words in poetry. When words resist a prosaic reading, they come alive to their neighbors—potentially transmitting/evoking new insights. Consider this translated excerpt from "Poisson," a poem by Paul Éluard:

> Water is soft and moves
> only for what touches it
>
> The fish proceeds
> like a finger into a glove[7]

Architecture's cultural importance lies in its presence, which cannot be reduced to the legible aspects of the grammar of program or the grammar of tectonics, though both play critical roles in the grasping of architecture's meaning and significance. When program and tectonics generate poetic tensions—even contradictions—associations, both metaphoric and symbolic, multiply and densify architectural meaning. The Barcelona pavilion's dematerialized and abstracted space is contradicted by its opulent materials yet the overall effect is one of unity and immanence, not one architecture as a representation that must be read or deciphered. Dalibor Vasily observed: "It is not the representation but what is represented that matters— and what is represented is always a world that the work of art reveals and articulates, at the same time contributing to its embodiment. We have already seen that Architecture is not as crucial in explicitly articulating the world as in embodying and implicitly articulating it."[8]

"Taking them together," he added, "we see the silence of embodiment is also to a certain extent also a voice of articulation. It is only under these conditions that we can understand the language and the cultural role of Architecture."[9]

What, then, does architecture articulate? At minimum, architecture is a palimpsest of self -inscription into the world, articulating the *imagining* of how we live and might live, which plays a critical role in our being-in-the-world. The grammar of program ideally gives agency for life to be inscribed into architecture, which depends on an open symbolic grammar as poetry is "open" to interpretation. It is the same with tectonics. The play between representations of construction and actual construction demand an "open" condition in which the symbolic nature or culture of building is revealed.

A small detail serves as an example. The brickwork of Frank Lloyd Wright's Robie House is manipulated to accentuate the horizontal. From the choice of elongated Roman bricks, to choosing brick-colored mortar exclusively for the vertical joints, to raking the light-colored mortar of the horizontal joints, the tectonic logic of the brickwork symbolically and literally joins with and builds the spatial horizontality of the house.

The Digital Influence

Digital tools and building techniques—widely insinuated to represent getting the same job done but in a better "way"—have had unintended consequences for architecture. The digitization of the practice of architecture has changed not only the design process but also the ways in which architecture is *conceived*. The shift from projection drawings and physical making to digital models as the locus of design decisions has vastly simplified the making of complex formal compositions and like any technology at its inception, the sheer ability to do something never before possible has become the "means justifying the ends." Digital tools, by their nature, generate a homogenous datascape architecture—an architecture incapable of registering the profound and complex symbiosis between program and tectonics arising from the challenges of joining, seaming, intersecting, and colliding architectural assemblages and materials. In short, digital design/fabrication/installation has successfully bypassed the interpretive component between design and construction and thus has negated the tectonic grammar, craft, and human sensibility that has made architecture a meaningful cultural activity.

Tectonics, which I have discussed as literally and symbolically representing the *techne* of building, is being displaced by the technological systemization of buildings. Rather than attention to architectural language arising from putting disparate elements together, much of large-scale building design is focused on evidence-based design (EBD) and digital management and coordination of technological systems, including roof

assemblies, facades, synthetic material systems, circulatory and mechanical devices. Contemporary architectural projects are more often aimed at achieving measurable performance-based outcomes, which diminishes the immeasurable, non-quantifiable—that is, *meaningful*—architectural questions at hand.

In the digital era, the grammar of program has transformed from a more interpretive spatial language that the imagination could inhabit and inscribe *itself* into something more prescriptive and inflexible. The pressures on architecture to perform/function as precisely as any machine have only increased with the adoption of digital tools—since they, if not promise, insinuate a greater degree of precision both of the physical artifact and its exacting fulfillment of the programmatic brief. This short-circuits the necessary exchanges between program, tectonics and inhabitation wherein each redefines the another—an essential part of any design process. Program is no longer something that arises from and defined by its architecture, but became something external to architecture that demands transposition and performance compliance. As a consequence, program is increasingly at odds with architecture's capacities and with architecture's potential to re-imagine inhabitation. Program today is more directive—"to cause to be automatically regulated in a prescribed way" (as the call for this special issue of *AR* notes), which reduces programmatic flexibility and often paradoxically results in a self-fulfilling "failure" because space gets "mis-used," that is, it doesn't conform to the external written programmatic demands made on architecture without including spatial and tectonic considerations in the defining of program.

There is a troubling contradiction between the prescriptive nature of contemporary architectural programs and the supposed celebration of freedom and individual volition. The current tendency to fear space—more specifically, *unregulated* space—has led directly to the overcontrol of space, which manifests as overprogramming, overprescribing, and overproscribing, intolerant of provisional or opportunistic uses. Architectural tolerance is both a spatial and material value: spatial tolerances anticipate and helps one imagine the possibilities of human relations extended to the social body. The grammar of program is culturally valuable because its connotative role in architecture keeps open the interpretation of program and actions and thus the potential for self-inscription.

Architecture's generative role in affording and inscribing human aspirations is colliding with the culture of technologically determined, data-driven, and evidence-based design.

In materials, tolerances are the intelligent and sensible anticipation of physically joining dissimilar physical things. The formal homogeneity fost-

ered by digital tools extends to fabrication, where digital production processes almost invariably minimize tolerances for deviation, movement, and differential material behavior. Optimization has supplanted meaning as the goal of design, which can be observed in building details computationally resolved—such as the complex intersection of two parts, which are made into the digital dream of seamless smoothness, effacing the grammar of relations between tectonic and program.

The erasure of material tolerances goes beyond joinery. The relentless efforts by the building industry to duplicate the appearance of materials with synthetic replacements is symptomatic of a greater effort to transform the immaterial digital realm into its physical replica. New synthetic materials strip away the inconvenience of material behavior and the tolerances necessary to handle that behavior. The digital realm, within its exclusively ocular environment, denies presence, *umwelt*, character, change, tone, and atmosphere, the ambience which renders the language of architecture meaningful. It's as if the constructed building is not the work of "the first order" (to use Ezra Pound's term), but rather is a representation of the "perfect" digital model and its attendant renderings, which have now become the primary work of architecture.

The gains achieved by digital tools have occluded the losses, the greatest being the loss of reciprocity between maker, material, and space in the architectural design process. A willful methodology, made more confident with data, is supplanting the quiet process of reiterative exchange, associative reasoning, and metaphorical insight that has long nourished and centered the relation between program and tectonics as architectural language. Since the nineteenth century, the attempt to turn architecture into a science—from Durand to behavioralism to parametrics—has been fueled by the idea that architecture can and should be reframed as reductive logic and now, in the digital age, data. Not only data, but data with an ultimate aim of predictability. The fear and suppression of sensibility, paradox, the odd, strange, accidental, the unknown, the unpredictable has become not a bug of digital tools but a feature.

The grammar of program and tectonics in this context shares the connotatively indeterminate and unstable aspects of language, which paradoxically is one of the stabilizing aspects of architecture that allows, for instance, the transformation of an old factory into new housing, or a Greek temple to articulate stone details that evoke an eidetic memory of wooden joinery.

10 Martin Heidegger. "The Origin of the Work of Art." In *Basic Writings*. Edited by David Farrell Krell, revised and expanded edition. San Francisco: HarperSanFrancisco, 1993.

Architecture and Resistance

> By contrast the temple work in setting up a world, does not cause the material to disappear but rather causes it to come forth for the very first time and to come into the open region of the work's world. The rock comes to bear and rest and so first becomes rock; metals come to glitter and shimmer, colors to glow, tones to sing, the word to say. All this comes forth as the work sets itself back into the massiveness and heaviness of stone, into the firmness and pliancy of wood, into the hardness and luster of metal into the brightening and darkening of color, into the clang of tone and into the naming power of the word.[10]

Heidegger contrasts "world" with "Earth," the former being what we physically articulate and the latter the physical reality that stands in contrast or resistance to our articulations of the world. Articulation and resistance, in Heidegger's thinking, combine to make meaning or more precisely to bring the Greek term *Alethia*, which can be translated as "truth," "unconcealedness," "disclosure," or "bringing into presence." In other words, articulation needs resistance to be meaningful. Artists are fully aware of this and have continued to use their respective physical medium(s) as the basis for their work. Architects, in contrast, have almost completely embraced the shift from physical media (paper, pencil, ink, wood, chipboard, etc.) to digital software, leaving behind resistance and focusing exclusively on articulation.

Buildings, in getting built, recover resistance, not in relation to articulation, but as a problem to be managed and "smoothed" away. The result is increasingly specialized and inflexible buildings devoid of the meaning that arises from articulation in conversation with resistance.

Digitally conceived buildings clad in synthetic materials are, conceptually, "forever" buildings, providing no or almost no allowance for the patinas of time (such as *Wabi Sabi*), and finally achieving what early European modernism dreamt about—an eternal present. An unconscious fear of aging, of deterioration, of decay, of change, motivates the erasure of the temporal dimension of buildings and with it the idea of building as a complex, evolving cultural project in which the past is tied to the future by the architectural language of program and tectonics. For example, the shift from wood to stone in Greek temples generated a new language of architecture that mediated and absorbed the constructive change from the past while providing a means of articulating architecture into the future. In short, tectonic and program grammar allows architecture to evolve with

time, independently of its being prone to the obsolescence of "forever" technology.

Digital tools in and of themselves are not the problem; rather, the problem lies in the shift away from long-held values and understanding of architecture a shift those tools have subtly influenced.

As a cultural project, architecture has endured because its authenticity and meaning derives from the non-fixed relation between its symbolic and physical content, enabled by the interdependent grammar of tectonics and program. Contemporary academic discussions about program and tectonics show signs of resistance to the relentless technological logic of contemporary architecture: the cheeky pop-up; social- and environmental justice-framed programs; a yearning for the hand to be involved in making; the interest in biophilia; re-adoption of natural renewable materials; a return to craft and materiality; All these are, in themselves, critiques of the brittleness of technology and its inevitable and rapid obsolescence. Architecture has the latent capacity to reconcile technological advances with the human condition, to be guided by empathy and place specific conditions without ignoring data and technology. But that requires a return in many respects to *timelessness* and *meaning*, pre-modern values in which the grammar of program and tectonics play a central role. If from here on architecture can recover timelessness and meaning, it may turn out to be our discipline's greatest value to culture, providing the record of and the means for society to understand the world as it is and to imagine it as it might be.

Uvodnik

Christopher Bardt

1 Adolf Loos. »Architektur« (1910), iz: Trotzdem, Prachner, Dunaj 1982. Objavljeno v zborniku Oikos in Drugo, o Loosu in Witgensteinu, Krt 1988, prevedla Mojca Dobnikar. *Neue Freie Presse* (Vienna), 1910.

Tektonika in programska slovnica

> »Če v gozdu naletimo na gomilo, šest čevljev dolgo in tri čevlje široko, z lopato oblikovano v piramido, se zresnimo in nekaj v nas nam pravi: tu je nekdo pokopan. *To je arhitektura*.«[1]

V Loosovi prispodobi gomila nastopa kot arhitektura zaradi svoje nedeljive povezanosti, prisotnosti in imanence, ki se kaže v tihih evokacijah življenja, smrti, resnice, in skrivnostnosti. Gomila, ki smo jo po naključju zagledali v gozdu, je pomenljiva v kontekstu, v katerega je postavljena. Ta kontekst je dejansko neločljiv od njenega pomena. Arhitektura tu vznika kot enkratni pojav. Pa je res? Gomila, pot, gozd, razmerja, geometrija, material – vse je del neposredne izkušnje, obenem pa je dojeto v svojem poetičnem smislu, s svojim simbolnim nabojem, kot čustveno in čutno utelešen intelektualni skupek, ki ga dojamemo prek spomina, asociacij, slovnice in sintakse – torej govorice arhitekture.

Da bi bila arhitektura pomenljiva, mora izpolniti svojo dvojno funkcijo simbolne govorice in grajenega objekta.

Ontološka in epistemološka prepletenost arhitekture z njenimi prostorskimi, konstrukcijskimi in zgodovinskimi slučaji in sklicevanji se odraža tudi v tokratni témi – slovničnem razmerju med tektoniko in programom. Prve ne moremo ločiti od drugega, pa vendar bi bilo to morda potrebno, da bi lažje razumeli njuno prepletenost ali, če uporabim prispodobo, njun specifičen način "gradnje" arhitekture.

Klasična arhitektura, ki naj bi bila najbolj slovnična od vseh arhitekturnih gibanj, sledi razmerju med tektoniko, programom in gradnjo vse do njegovih korenin v logiki gradnje. V izboljšavah podstavkov, kapitelov, ogredij, razmerij, in tako dalje, odmeva njihov izvor v gradnji, konstrukciji, težnosti, trajnosti in obnašanju fizičnega materiala. Na poti, ki jo je grški tempelj prehodil od lesenih do kamnitih konstrukcij, se je gradnja osvobodila svojih lesnih spojev, tramovi, zatiči in klini iz lesenih prednikov pa so dobili novo življenje kot posnemovalci (skeuomorfi) v obliki triglifov, mutulov, kapelj (gut) in metop v dorskem frizu. Prav ta osvoboditev tektonike lesene konstrukcije od njene uporabnosti ob hkratnem ohranjanju njenega videza je gradnjo preoblikovala v govorico, tektoniko pa povezala z gradnjo pomena in stavbe.

Arhitekt(ka) je povezan(a) s procesom gradnje, ne sicer neposredno dejavno, temveč z razdalje, ki obenem osvobaja in slepi. V risbah in drugih reprezentacijah, kjer ne veljajo omejitve težnosti in konstrukcije, je realna zmogljivost fizičnega materiala, na katerem sloni tektonika, izbrisana. Odkar je stroka risanje projekcije vzela za svoje, se arhitekti prebijajo

2 Marc-Antoine Laugier. *Essai sur l'architecture*. Paris: Chez Duchesne, 1753.

3 Gottfried Semper. *The Four Elements of Architecture and Other Writings*. Translated by Harry F. Mallgrave and Wolfgang Herrmann. Cambridge, UK: Cambridge University Press, 1989. Prvič objavljeno 1851.

skozi shizmo med reprezentacijo in gradnjo v procesu postopnega kodiranja odnosa med gradnjo in risbo: v osnovi je tehnika gradnje implicitno sodila pod nadzor graditelja, arhitekt pa je bil pristojen za formo, geometrijo in vizualno govorico stavbe – torej za slovnico tektonike. Poleg tega je imel arhitekt kot tisti, ki je risal načrte, ključni nadzor nad prostorsko organizacijo oz. programom. Negotovost položaja je uravnavala stabilnost: dokler so arhitekti delovali v okviru arhitekturnih norm, graditelji pa gradili skladno s tehnikami, ki so jih dobro poznali in razumeli, je bila zagotovljena gotovost rezultata. Povsem razumljivo je torej, da je postrenesančna gradnja ostala v temelju statična, medtem ko je bil napredek arhitekture omejen na razvoj form, slogov in dekorativnih elementov, zato je bil osredotočen na to, kar je arhitekt lahko artikuliral z risbo – namreč slovnico programa in tektonike stavbe.

Tektonika v arhitekturi

Do 18. in 19. stoletja je razmah formalnih pravil, slogovnih manipulacij, ornamentike in semantike, zvedenih na vizualne reprezentacije, spodkopal kulturno avtoriteto arhitekture, ki je bila utemeljena v zgodovinski kontinuiteti, strukturni in konstrukcijski celovitosti, in njej lastni stabilnosti, ki ji je zagotavljala brezčasnost. To je popravila šele vrnitev k njenemu izvoru, h koreninam, kar je po mnenju številnih zgodovinarjev 20. stoletja zaznamovalo nastanek moderne arhitekture.

Evropskim mitom o izvoru arhitekture, od Marca-Antoina Laugierja do Godfrieda Semperja in Adolfa Loosa, je skupno prepričanje, da je arhitektura nastala iz naravnega reda. V svojem *Essai sur l'arhitecture* [2] je Laugier izvor arhitekture prepoznal v konstrukciji in zahteval vrnitev k avtentični gradnji prek prevzemanja bistvenih elementov arhitekture: stebrov, gred in pedimentov, ter formalne elemente znova povezal z njihovo izvorno konstrukcijsko funkcijo. Njegova alegorična »primitivna koča« (kot je prikazana na slavnem frontispicu) je poudarjala izvor arhitekture kot nečesa, kar je dala narava; drevesna debla (stebri), rogovile in veje (tramovi) zadovoljujejo najosnovnejšo potrebo, kar jih je – zavetje. Laugier je brez ironije v naravi prepoznal silo, ki primitivnemu človeku predaja sredstva (tektoniko), s katerimi se lahko zaščiti (program) pred naravo, ne da bi za to potreboval posebne rokodelske spretnosti ali veščine.

V svoji knjigi *Štirje elementi arhitekture* [3] je Gottfried Semper antropološko razložil izvor gradnje kot nekaj, kar ni več božanski dar narave, temveč izhaja iz človekove dejavnosti. Če je Laugierjeva primitivna koča tektonsko osmislila naravo, je Semperjeva 'karibska koča' v družbenem dejanju (programu) zbiranja ob ognju prepoznala začetek primarnega, bistven-

4 Online Etymology Dictionary, https://www.etymonline.com.

ega elementa arhitekture: ognjišča. Ostali trije elementi si logično sledijo okoli ognjišča; to je postavljeno na zemeljni nasip, ki ga ščiti pred vplivi tal in vode; pletena ograda, obešena okrog zbirališča/ognjišča ga ščiti pred vetrom in živalmi, streha, ki pokriva zavetišče, pa daje ognju zaklon pred vremenskimi vplivi. Če se Laugierjeva primitivna koča kaže kot celostno oblikovana podoba, je Semperjeva proces – risbe karibske koče so precej bolj tehnične kot alegorične. Tektonika tu nastopa kot odziv na program, potrebo, ki zahteva razpoložljive rokodelske veščine, osredotočene na materialne procese. Ogenj oz. ognjišče je v pristojnosti tistih, ki so vešči dela s keramiko in metalurgije, tekstilni zidovi so delo tkalcev, v nastajajoči strehi pa veščine združita tkalec in tesar; zemljin nasip je delo zidarjev.

Tako Laugier kot Semper sta avtentičnost arhitekture prepoznala v njenem izvoru v konstrukciji in gradnji, vendar je bila Laugierjeva primitivna koča abstrakcija, prezentacija, arhetip, na katerem naj bi temeljila zasnova grških templjev. Pri Semperjevi koči gre nasprotno za izdelavo, rokodelstvo, in spajanje materialov. Podobni logiki sledi etimologija »tektonike«: izrazi 'kontekst', 'pretveza', 'subtilen' in 'tekst' namigujejo na spajanje, prepletanje v abstraktnem, ločeno od fizičnega materiala. Beseda tektonika ima svoj izvor tudi v korenu **teks*, ki pomeni »tkati«, pa tudi izdelovati, najpogosteje s sekiro, ter »izdelovati pleteno tkanino iz šib in protja za (z zbito zemljo prekrite) hišne zidove«. Tu so v ospredju fizični in materialni pogoji tkanja. V drugih etimologijah sta njena izvora rokodelstvo in izdelovalec: V sanskrtu *taksati* pomeni »on oblikuje«, gradi; *taksan* pa pomeni »tesar«; *taša* v Avesti pomeni »sekira«, *thwaxš-* pa »biti zaposlen«; staroperzijski koren *taxš-* pomeni »biti aktiven«; grška beseda *tekton* opisuje »tesarja« in *tekhne* »umetnost«; beseda *tesla* v stari cerkveni slovanščini pomeni »sekira«, litovska beseda *tašau, tašyti* pa »vrez(ov)ati« [4].

A če pogledamo arhitektko na Laugierjevem frontispicu, ki s prstom kaže na primitivno kočo, takoj vidimo, da je ni naredila sama; nastopa v vlogi vodičke, ki nas usmerja k pristni gradnji. V Semperjevi razpravi arhitekt(ka) sicer ne nastopa, a vseeno ostaja etimološko blizu: *arche-tekton*, »prvi tesar«, ki popolnoma obvlada umetnost in veščino izdelovanja. Samo archi-tekton ima širšo sposobnost in odgovornost združevati delo različnih obrti, ki sodelujejo pri gradnji. V obeh primerih je arhitekt še vedno ločen od dela, ni več *homo faber*, temveč nekdo, ki zlagoma zbira instrumente – ne zato, da bi gradil, temveč da bi usmerjal, nadzoroval, začrtal in si zamišljal rezultat procesa gradnje.

»Kriza« arhitekture, ki je vodila k nastanku modernizma, je bila kriza pomena. Do začetka dvajsetega stoletja je tedaj že okorela formalna govorica klasične arhitekture spričo družbenih pretresov v Evropi in zaradi

5 James J. Gibson. *The Senses Considered as Perceptual Systems*. Boston: Houghton Mifflin, 1966.

izgube mitopoetične dimenzije arhitekture kot sredstva razmišljanja o višjem vesoljnem redu izgubila svoj nekdanji pomen. Simbolna govorica tektonike, zvedena na prazno retoriko, »fasado« zlajnanih tropov, ki se jih tehnološki napredek v gradbeni industriji ni dotaknil, je postala sokriva za to, da je arhitekturna govorica izgubila svoje mesto v fizični izdelavi stavbe, kar je znova postavilo pod vprašaj »kaj« je arhitektura in »kaj« so izvori njene avtentičnosti.

Program v arhitekturi

Predstava o programu v Laugierjevi primitivni koči je podobna temu, kar je James Gibson imenoval »afordance« (affordances), s katerimi opisuje potencial okolja oz. elementa za uporabo, kot na primer stopnica, ki omogoča (*affords*) vzpon.[5] Drevesa v Laugirjevem gozdu »omogočajo« izdelavo primitivne koče; arhitekt »omogoča« in ne predpisuje njene rabe. Semperjeva verzija je ravno nasprotna: dejanje zbiranja je neposredno povezano s programskimi potrebami in elementi. Ognjišče, zid in drugi elementi so narejeni zaradi potrebe; program omogoča nastanek arhitekture. Če sprejmemo veljavnost Laugierjevih in Semperjevih konceptov, je program pred arhitekturo, obenem pa ga ta določa (oz. omogoča), podobno kot je nekoč poudaril Churchill: »Najprej mi oblikujemo stavbe, nato pa naše stavbe oblikujejo nas.«

Do nedavnega sta imela program in tektonika enako, govorici podobno vlogo. Uporaba prostorov je bila bolj kot nekaj predpisanega, razumljena simbolno in kot nekaj kulturno določenega, in splošno prepričanje je bilo, da bodo zaporedje, merilo in splošni prostorski pogoji omogočili (oziroma zagotovili »afordance« za) različne rabe oz. funkcije. Fizične in finančne ovire, ki so omejevale gradnjo prvih stavb na določene ureditve prostora, so dejavnost/rabo zvezale s splošnimi prostorskimi pogoji in obratno. Stalna simbioza in trenja med stavbami in človekovim delovanjem so arhitekturo aktivirala kot simbolno disciplino, podobno govorici, ki je bila pomembna, ker je logos gradnje povezala z mythosom človeške eksistence. Arhitekturni pomen je izhajal iz semantike arhitekture (v kateri je tektonika zapisovala in opisovala program), tj. iz »javne razglasitve«, in povzdignil gradnjo od robatega sestavljanja v arhitekturno govorico. Sama arhitektura je bila vpis, reprezentacija programa kot simbolne razglasitve, napoved njene vloge v konstelaciji tosvetnih elementov, ki se sestavljajo v stavbe in mesta ter razkrivajo večji in skrivnosten vesoljni red.

S tipološkega vidika je stavbe v večji meri poganjala gradnja, funkcija pa je imela pri tem zgolj manjšo vlogo; vseeno je stavbni tip ostal uspešnejši pokazatelj rabe skozi čas kot katerikoli program rabe. Dokler je bila

6 Alva Noë. *Varieties of Presence*. Cambridge, MA: Harvard University Press, 2012.

arhitektura »oblika« kulture, je lahko program nastopal kot tisto, kar sodobni filozof Alva Noë (ko parafrazira Goetheja) imenuje »zamrznjena navada« [6], kjer so prostorske ureditve stavb (ki so določene s strukturno in konstrukcijsko logiko) tiste, ki implicitno (in ne preskriptivno) usmerjajo človekova dejanja in so kot utelešenje simbolno razumljene 'forme' pred refleksijo – podobno kot je samoumevno, kako se 'pravilno' drži vilico.

Medtem ko je bila tektonika v središču prej omenjenega modernega iskanja avtentičnega odnosa med stavbo in arhitekturo, je bil program deležen manj pozornosti. Sprva so se le redki posvečali odnosu med človekovim delovanjem in organizacijo stavbe. Prelomnica je bila Behrensova tovarna turbin AEG, ki je navduševala s svojo avtentičnostjo; njena silovita tektonska govorica je temeljila v prostorski enovitosti in tektonski logiki, ki je izhajala iz steklene fasade z jeklenim ogrodjem, skozi katero je v stavbo prodirala dnevna svetloba in v kateri je odseval tayloristično organiziran program tovarne, namenjen homogenim, zaporednim proizvodnim prostorom. Nova moderna arhitektura je sčasoma temeljito spremenila razumevanje programa, ki postal »odmrznjen« prostorski pogoj, temu pa je, ko sta bili kot nova temelja arhitekture sprejeti ideja gibanja in neomejena kontinuiteta prostora, sledila nova programska slovnica.

Trenja med načini gradnje stavb in prostorskimi koncepti moderne arhitekture so spodbudila celo obdobje neslutene domiselnosti. To, kar je zahteval novi program arhitekture, – neomejena kontinuiteta prostora, osvobojenega teže in težnosti ter kakršnegakoli sklicevanja na tradicionalno gradnjo – je bilo neusahljiv vir naviha za arhitekturo prav *zato,* ker je bilo v nasprotju z gradnjo, ki je ostala zavezana zakonom fizike in narave. Novi prostorski program se je dalo projicirati, narisati na papir, kjer težnost in masa na srečo nista prisotni. A zgraditi, na primer, lebdeč prostor, je pomenilo, da je morala arhitektura simbolno manevrirati med novo programsko slovnico in slovnico tektonike, s čimer je prikazala *občutje* lebdečega prostora. Ko je Mies snoval barcelonski paviljon, je prav vsak detajl oblikoval z mislijo na izbris težnosti: ekstrudirani križni stebri so kromirani (odsevi razblinjajo maso); na njih sloni nemogoče tanka ravna streha (tanka samo na vidnem robu); strop je tako svetel kot tla (neposredna sončna svetloba na tleh, obloženih s travertinom, se ujema z belim stropom, v katerega se odbija). Slovnica teh detajlov je ustvarila pojavno in intelektualno izkušnjo – opazovalec lahko »razbere« suprematistično kompozicijo ter obenem doživi izkušnjo neomejenega prostora in bustrofedonskega gibanja paviljona.

»Trk« med tektoniko in programom je podoben »trku« med besedami in poezijo. Ko se besede uprejo prozaičnemu branju, zaživijo ob svojih

7 V: Gaston Bachelard, *On Poetic Imagination and Reverie*. Uredila Collette Gaudin. Putnam, CT: Spring Publications, 2014, 89. (Voda je mehka, odmika se / samo tistemu, kar se je dotika // Riba gre / kot prst v rokavico)

8 Dalibor Vesely. *Architecture in the Age of Divided Representation: The Question of Creativity in the Shadow of Production*. Cambridge, MA: MIT Press, 2004, 97.

9 *Ibid*, 106.

sosedah, kar jim daje moč posredovati/prebuditi nova spoznanja. Lep primer je angleški prevod pesmi »Poisson« Paula Éluarda:

Water is soft and moves
only for what touches it

The fish proceeds
like a finger into a glove[7]

Kulturni pomen arhitekture je v njeni prisotnosti, ki je ni mogoče zreducirati na berljive vidike programske slovnice ali slovnice tektonike, čeprav imata obe ključni vlogi pri dojemanju smisla in pomena arhitekture. Ko program in tektonika ustvarjata poetične napetosti (ali protislovja), se asociacije, tako metaforične kot simbolne, množijo in zgoščajo arhitekturni pomen. Dematerializirani abstrahirani prostor paviljona v Barceloni je v protislovju z razkošjem materialov, ki so bili uporabljeni zanj, a celota kljub temu daje vtis enotnosti in imanence, in ne arhitekture kot reprezentacije, ki jo je treba razbrati ali dešifrirati. Dalibor Vasily je povedal: »Ne gre za reprezentacijo, temveč za to, kar je prezentirano – to pa je vedno svet, ki ga razkriva in artikulira umetniško delo, ki obenem prispeva k njegovemu utelešenju. Videli smo že, da pomen Arhitekture ni toliko v tem, da eksplicitno artikulira svet, temveč v tem, da ga utelesi in implicitno artikulira."[8]

»Če pogledamo oboje skupaj,« je dodal, »vidimo, da je molk utelešenja do neke mere tudi glas artikulacije. Samo pod temi pogoji lahko razumemo govorico in kulturno vlogo Arhitekture.«[9]

Kaj torej artikulira arhitektura? Arhitektura je najmanj palimpsest samo-vpisovanja v svet, ki izraža *zamišljanje* tega, kako živimo in kako bi lahko živeli, kar ima ključno vlogo pri našem bivanju v svetu. V idealnem primeru daje programska slovnica življenju moč, da se vpiše v arhitekturo, za to pa je potrebna odprta simbolna slovnica, saj je poezija »odprta« in si jo lahko vsak razlaga po svoje. S tektoniko ni nič drugače. Igra med reprezentacijami gradnje in dejansko gradnjo zahteva »odprt« pogoj, v katerem se razkriva simbolna narava oziroma kultura stavbe.

Kot primer vzemimo majhen detajl. Opeke na hiši Robie Franka Lloyda Wrighta so položene tako, da poudarjajo horizontalo. Tektonska logika polaganja opek, od samega izbora podolgovatih rimskih opek do izbora

barve malte, ki je bila za vertikalne spoje opečnata in svetla za horizontalne, simbolno in dobesedno gradi prostorsko horizontalnost hiše in se staplja z njo.

Vpliv digitalizacije

Digitalna orodja in gradbene tehnike – za katere se na splošno trdi, da opravljajo enako delo, a bolje – so nenamerno spremenile arhitekturo. Digitalizacija arhitekturne prakse ni spremenila le procesa oblikovanja, temveč tudi načine *snovanja* arhitekture. Premik od risanja projekcij in fizične izdelave k digitalnim modelom kot lokusu oblikovalskih odločitev, je močno poenostavil ustvarjanje kompleksnih formalnih kompozicij, in tako kot ob vsakem prihodu nove tehnologije, je tudi zdaj zgolj možnost narediti nekaj, kar prej ni bilo mogoče, postala »sredstvo, ki upravičuje cilj.« Digitalna orodja že po naravi ustvarjajo homogeno arhitekturo podatkovne krajine – arhitekturo, nezmožno zaznati globoko in kompleksno simbiozo med programom in tektoniko, ki izhaja iz izzivov povezovanja, spajanja in križanja asemblažev in materialov ter trkov med njimi. Skratka, digitalno oblikovanje/izdelovanje/nameščanje je uspešno obšlo interpretativno komponento, ki povezuje oblikovanje in gradnjo, s tem pa negiralo slovnico tektonike, obrtništvo in človeško rahločutnost, zaradi katere je arhitektura pomenljiva kulturna dejavnost.

Tektoniko, za katero ugotavljam, da dobesedno in simbolno predstavlja *techne* stavbe, je izrinila tehnološka sistematizacija stavb. Pozornost do arhitekturne govorice, ki izhaja iz spajanja povsem različnih elementov, je v oblikovanju stavb velikega merila večinoma nadomestilo projektiranje, utemeljeno na dokazih (evidence-based design, EBD) ter digitalno upravljaje in usklajevanje tehnoloških sistemov, vključno s strešnimi konstrukcijami, fasadami, sistemi umetnih materialov ter mehanskimi napravami in sistemi prehajanja med prostori. Sodobni arhitekturni projekti so večkrat naravnani k doseganju merljivih rezultatov, ki se ocenjujejo glede na učinkovitost, to pa zmanjšuje pomen zastavljenih arhitekturnih vprašanj, ki so nemerljiva, količinsko nedoločljiva in torej *pomenljiva*.

V digitalni dobi je programska slovnica kot prostorska govorica, ki dopušča različne razlage in daje prostor domišljiji, postala nekaj normativnega in togega. S prevzemom digitalnih orodij so se pričakovanja, da mora arhitektura delovati tako natančno kot vsak drug stroj, dodatno zaostrila, saj digitalna orodja, če že ne zagotavljajo, vsaj obljubljajo večjo natančnost tako fizičnega predmeta kot njegovega natančnega izpolnjevanja programske naloge. To ovira nujne izmenjave med programom, tektoniko in bivanjem, ki omogočajo, da ti vzajemno na novo opredeljujejo en drugega,

kar je bistveni del vsakega oblikovalskega procesa. Program ni več nekaj, kar izhaja iz arhitekture, obenem pa ga ta opredeljuje, temveč je postal nekaj zunanjega arhitekturi, kar zahteva preobrazbo in skladnost z merili učinkovitosti. Posledično je program vse bolj neskladen z zmožnostjo arhitekture in njenim potencialom, da si na novo zamisli bivanje. Danes je program bolj usmerjevalen – »povzročiti samodejno regulacijo na predpisan način« (kot je zapisano v pozivu k oddaji prispevkov za pričujočo številko *AR*) – njegova prožnost pa je zaradi tega toliko manjša, zato pogosto paradoksalno konča kot samoizpolnjujoč »neuspeh«, saj je prostor uporabljen »narobe«, ker se ne prilagaja zunanjim zapisanim programskim zahtevam, postavljenim arhitekturi, ne da bi se pri opredeljevanju programa upoštevali prostorski vidiki in tektonika.

Med preskriptivno naravo sodobnih arhitekturnih programov in domnevnim poveličevanjem svobode in posameznikove volje obstaja skrb vzbujajoče protislovje. Strah pred prostorom, – ali *nereguliranim* prostorom, če smo natančni, ki trenutno prevladuje, je neposredno kriv za pretirani nadzor nad prostorom, viden v prekomeren programiranju ter preštevilnih predpisih in prepovedih, ki ne prenašajo začasnih ali priložnostnih rab. Toleranca v arhitekturi je tako prostorska kot materialna vrednota: prostorske tolerance predvidevajo in posamezniku omogočajo zamišljanje možnosti medosebnih odnosov v razširjenem kontekstu družbenega telesa. Programska slovnica je kulturno pomembna, ker njena konotativna vloga v arhitekturi razpira interpretacijo programa in delovanja, s tem pa potencial za samo-vpisovanje.

Generativna vloga arhitekture, ki omogoča in vpisuje človekova hotenja, je v navzkrižju s kulturo tehnološko določenega, s podatki opredeljenega in na dokazih utemeljenega oblikovanja.

V kontekstu materialov, tolerance pomenijo inteligentno in smiselno pričakovanje fizičnega združevanja medsebojno različnih fizičnih stvari. Formalna homogenost, ki jo zagotavljajo digitalna orodja, velja tudi za izdelovanje, kjer postopki digitalne produkcije skoraj brez izjeme minimizirajo tolerance za odstopanja, gibanje in različno obnašanje materialov. Optimizacija je izpodrinila pomen kot cilj oblikovanja, kar je vidno v računalniško rešenih detajlih stavb (npr. v kompleksnih stikih dveh delov, izvedenih kot digitalne sanje o brezhibni gladkosti), ki brišejo slovnico odnosov med tektoniko in programom.

Izbris materialnih toleranc presega zgolj izvedbo spojev. Vztrajna prizadevanje gradbene industrije, da bi poustvarila videz materialov z umetnimi nadomestki, je simptom širših prizadevanj preobraziti nematerialno digitalno sfero v njeno fizično repliko. Z novimi umetnimi materiali odpadejo nevšečnosti, ki jih povzročajo obnašanje materialov in tolerance,

10 Martin Heidegger. "The Origin of the Work of Art." V: *Basic Writings*. Ur. David Farrell Krell, prenovljena in razširjena izdaja. San Francisco: HarperSanFrancisco, 1993.

potrebne za njegovo obvladovanje. Digitalni svet v svojem izključno okularnem okolju zanika prisotnost, *umwelt*, značaj, spremembo, ton, in atmosfero, vzdušje, ki daje arhitekturni govorici njen pomen. Kot da zgrajena stavba ne bi bila delo »prvega reda« (če uporabim izraz Ezre Pounda), temveč reprezentacija »popolnega« digitalnega modela in njegovih upodobitev, ki so zdaj postale osnovno delo arhitekture.

Prednosti digitalnih orodij so skrile, kar je bilo zaradi njih izgubljeno, v prvi vrsti izgubo vzajemnosti med izdelovalcem, materialom in prostorom v procesu arhitekturnega oblikovanja. Vztrajna metodologija, ki je s podatki postala še bolj samozavestna, izpodriva tihi proces ponavljajočih se izmenjav, asociativnega sklepanja in metaforičnih uvidov, ki je dolgo ohranjal in središčil odnos med programom in tektoniko kot arhitekturno govorico. Od 19. stoletja dalje poskuse spremeniti arhitekturo v znanost – od Duranda do behaviorizma do parametrike – poganja ideja, da se arhitekturo da in mora preoblikovati v reduktivno logiko, danes, v digitalni dobi, pa v podatke. Ne zgolj podatke, temveč podatke, katerih končni cilj je predvidljivost. Strah pred občutljivostjo, protislovjem, nenavadnim, čudnim, naključnim, neznanim, nepredvidljivim in zatiranje tega zdaj ni več zgolj hrošč, ki moti delovanje digitalnih orodij, temveč njihova lastnost.

V tem kontekstu ima slovnica programa in tektonike enake konotativno nedoločene in nestabilne vidike jezika, prav to pa je, paradoksalno, eden od vidikov, ki arhitekturo stabilizirajo; omogoča na primer preobrazbo stare tovarne v nov stanovanjski objekt, ali pa obdelavo kamnitih detajlov v grškem templju, ki prebudijo eidetski spomin na lesne spoje.

Arhitektura in odpor

> Ravno obratno je pri templju, ki vzpostavlja svet, v katerem material ne izgine, temveč sploh prvič stopi v ospredje, v odprto polje sveta tega dela. Kamen tu nosi in sloni ter tako najprej postane kamen; kovine zasijejo in se zaleskečejo, barve zažarijo, toni zapojejo, besede spregovorijo. Vse to stopi v ospredje, ko se delo umakne v masivnost in težo kamna, v čvrstost in voljnost lesa, v trdoto in blesk kovine, v svetljenje in temnenje barv, v zvenenje tonov in poimenovalno moč besede.[10]

Heidegger razlikuje med »svetom« in »Zemljo«, s tem da je svet to, kar fizično artikuliramo, Zemlja pa je fizična realnost, ki nasprotuje oz. se upira našim artikulacijam sveta. Artikulacija in odpor po Heideggerju skupaj ustvarjata pomen, oz. prinašata to, čemur so stari Grki rekli *aletheia*, kar lahko prevedemo kot »resnica«, »neskritost«, »razkrivanje« ali »narediti

prisotno«. Z drugimi besedami, da bi bila pomenljiva, artikulacija potrebuje odpor. Umetniki to vedo, zato svoja dela še vedno ustvarjajo s fizičnimi mediji. Za razliko od njih, so arhitekti skoraj v celoti sprejeli digitalni prehod od fizičnih medijev (papirja, svinčnika, lesa, iverke, ipd.) k programski opremi ter se odpovedali odporu, da bi se osredotočili izključno na artikulacijo.

Stavbe si s tem, ko so zgrajene sicer povrnejo odpor, a ne v razmerju do artikulacije, temveč kot problem, ki ga je treba rešiti in »obvladati«. Posledično so stavbe vse bolj specializirane in neprilagodljive, oropane pomena, ki izhaja iz artikulacije v občevanju z odporom.

Digitalno zasnovane stavbe, odete v umetne materiale, so (konceptualno) »večne« stavbe, ki ne oz. komaj dopuščajo času, da bi jih zaznamoval s svojo patino (kot *Wabi Sabi*), saj so končno dosegle to, o čemer je sanjal zgodnji evropski modernizem – večno sedanjost. Podzavesten strah pred staranjem, propadanjem, razkrojem, spremembami, krepi željo po izbrisu časovne dimenzije stavb, s tem pa tudi idejo o stavbi kot kompleksnem, razvijajočem se kulturnem projektu, v katerem se preteklost navezuje na prihodnost z arhitekturno govorico programa in tektonike. Prehod od lesa h kamnu v grških templjih je na primer izoblikoval novo arhitekturno govorico, ki je posredovala in sprejela konstruktivne spremembe iz preteklosti, obenem pa zagotovila možnosti artikuliranja arhitekture za prihodnost. Če povzamem, slovnica tektonike in programa omogoča arhitekturi, da se razvija s časom, neodvisno on njene izpostavljenosti zastarelosti »večne« tehnologije.

Digitalna orodja sama po sebi niso problem; problem je odmik od tradicionalnih vrednot in razumevanja arhitekture, ki so ga neopazno povzročila prav ta orodja.

Arhitektura kot kulturni projekt še vedno vztraja, saj njena pristnost in pomen izhajata iz ne-trdno določenega odnosa med njeno simbolno in fizično vsebino, ki ga omogoča soodvisna slovnica tektonike in programa. Sodobne akademske razprave o programu in tektoniki kažejo znake odpora do nepopustljive tehnološke logike sodobne arhitekture: predrzni pop-up; programi za družbeno in okoljsko pravičnost; hrepenenje po ustvarjanju z rokami; zanimanje za biofilijo; vračanje k uporabi naravnih obnovljivih materialov; vrnitev k rokodelstvu in materialnosti. Vse našteto je samo po sebi kritika krhkosti tehnologije ter njene neizogibne in bliskovite zastarelosti. Arhitektura ima skrito sposobnost, ki ji omogoča usklajevati tehnološki napredek s človekovo izkušnjo bivanja, dopuščati, da jo usmerja empatija, in postavljati specifične pogoje ob hkratnem upoštevanju podatkov in tehnologije. To pa v več pogledih zahteva povratek k *brezčasnosti* in *pomenu*, pred-modernima vrednotama, v katerih je imela osrednjo vlogo

slovnica programa in tektonike. Če si bo arhitektura lahko znova zagotovila brezčasnost in pomen, bi to prav lahko bil najdragocenejši prispevek naše discipline kulturi, ki bi podal razvid o družbi ter ji omogočil razumeti svet, kakršen je, in si predstavljati, kakšen bi lahko bil.

Faber Tignarium:
Gravity Unleashed

Mark Jarzombek

1 Theodor Adorno, *Minima moralia,* Translated from the German by E. F. N. Jephcott (New York: Verso,1974), 155.

2 Semper, Gottfried, *Über die bleiernen Schleudergeschosse der Alten: und über zweckmässige Gestaltung der Wurfkörper im Allgemeinen; ein Versuch die dynamische Entstehung gewisser Formen in der Natur und in der Kunst nachzuweisen, (*Frankfurt am Main, Verlag für Kunst und Wissenschaft, 1859), p. 4. [translation by author] For a full discussion of Semper's ideas see: Wolfgang Herrmann, *Gottfried Semper: In Search of Architecture* (Cambridge MA, The MIT Press, 1984).

3 John Kersey, *Dictionarium Anglo-Britannicum: or, a general English Dictionary* (London: J. Wilde, 1708). See also, for example: Leonhard Christoph Sturm, *Architektonisches Bedenken von der protestantischen Klein Kirchen* (Architectural Reflections on the Form and Arrangement of Protestant Churches (Hamburg: Benjamin Schillern, 1712 and 1718).

4 Karl Otfried Müller, *Handbuch der Archäologie der Kunst* (Handbook of the Archaeology of Art, 1830), 4.

5 Johann Christoph, "Architekt," *Grammatisch-kritisches Wörterbuch der Hochdeutschen Mundart* (Leipzig: Johann Gottlob Immanuel Brietkopf, 1781).

> *The ungenuiness of the genuine stems from its need to claim, in a society dominated by exchange, to be what it stands for yet is never able to be.* [1]
>
> **Theodor Adorno, *Minima Moralia: Reflections from Damaged Life***

Gotfried Semper, in 1859, wrote that the Greeks "were able to enliven their tectonic whole [*tektonischen Gebilde*] with something quasi-organic." [2] What does he mean by 'tectonic whole'? The word tectonic references back, of course, to ancient Greek wood workers who were mostly associated with the building of ships and temples. But in this case, it is not the origin of the word that is significant, but its more contemporary usage as it was a relatively new concept as an offspring of the word architectonic. That word had been around for about a hundred years or so and was informally associated with the look and feel of a building as a whole or with large-scale matters of massing and plan disposition. [3] An English dictionary from 1708 defined architectonic as that which "builds a thing up regularly according to the nature and properties of it." Immanuel Kant even used it as a metaphor for mastery and control with a huge impact on subsequent aesthetic theorizing. Karl Otfried Müller's *Handbuch der Archäologie der Kunst* (Handbook of the Archaeology of Art, 1830) used *Architektonik* in the Kantian sense to describe buildings where the whole and its parts worked together to create an art object [*Kunstform*] that was grounded "in a general set of rules that appear as mathematical relationships or as organic life forms [*Lebensformen*]. [4]

But Müller also used the stand-alone word *Tektonik* to describe the more intimate processes of making, primarily by woodworkers, but also by other craft specialists. Till then *Tektonik* had been an relatively esoteric term and does not appear in Johann Christoph's *Wörterbuch* from 1781. [5] Müller's use of the word was thus significant, especially since it helped focus on what we might call the processes of making. He envisioned those as a legitimate category of theorization. If *Architektonik* pointed to mental operations, *Tektonik* pointed to corporeal ones.

But Semper added a twist when we referenced a 'tectonic whole'. The convention at the time would have been 'architectonic whole.' By implicitly removing the prefix *archi-*, or, in reverse by shifting the word 'whole' away from 'architectonic' to 'tectonic,' in essence combining the meanings of the two words — architectonic and tectonic — he challenged the separation of idea over body that was more or less a truism in European thinking ever since Aristotle and that was implied in Müller's aesthetics as well as in Kant's philosophy.

What prompted this tour-de-force? When Semper was writing, construction drawings as we understand them today – and which were hardly ever used before the 19th century — had begun to become important for even

6 In fact, in the book, *Über die bleiernen Schleudergeschosse der Alten*, Semper does not discuss word-working but metal smithing. The book discusses the making of the almond-shaped, lead slingshots that were used by soldiers and that had been recently recovered in archaeological sites. In studying the mathematics of the forms, he is following ideas that he expressed elsewhere about the nature of art, which he expressed as a 'scientific' equation : Y = Φ (x, z, t, v, w, .) Y stands for the "General Result." Φ stands for "the exigencies of the work of industry or art in itself, which are based upon certain laws of nature and of necessity which is the same at all times and under every circumstance." These exigencies are represented as x, y, z, t, v, w, the "many different agents, which work together in a certain way." Semper, in setting up this equation is purposefully leaving a lot of room for interpretation, but his main goal is to avoid the hard-and-fast mind-hand distinction where one is active and the other passive. Instead, we have an interplay of exigencies, which are dynamic, and laws of nature which are unchanging. See: Semper, "General Remarks on the Different Styles in Art," London Writings 1850–1855, Edited by Michael Gnehm, Sonja Hildebrand, Dieter Weidmann (Zurich, gta Verlag, 2021), 119–120. See the excellent paper. Sonja Hildebrand, "Mathematische Kurven in der Architekturtheorie um 1850: Gottfried Semper, David Ramsay Hay und die Ästhetik der invisible curves des Parthenon," *Figurationen. Gender – Literatur – Kultur* (Böhlau Verlag, 2020) 57 – 76.

7 Semper, Ibid, 5

8 Christoph, *Wörterbuch*, Column 761. Similarly, in John Kersey, *Dictionarium Anglo-Britannicum: or, a general English Dictionary* (London: J. Wilde, 1708) architect is defined as "master builder, a survey of a building."

the most prosaic of details, given that many of the low wage workers on the construction site had little training in the trades. Since the ancient Greek *tektōnes* did not operate with plans or drawings, Semper was making the case for what we today might call an architecture without – or perhaps before — architects. Semper imagined that the relationship between designing and building back then was more seamless or, in his words, 'organic.' There was, in his view, no modern alienation of mind and body and its translation into design from construction. [6] The monuments of the Greeks, he argued, are special "since they were not constructed by mechanical means alone or made simply from working drawings, but exist as if they 'are grown' by a 'mysterious organic law,'" one that he called *Lebenskraft* [life force]. [7]

There was another equally pressing issue for Semper that had to do with the distinction between architect and contractor. Unlike today, back in the early 19th century, the distinction was still quite fluid. In fact, Christoph's dictionary defines *Baumeister* [Literally: building master] not just as the person who both understands and executes the *Baukunst* [the art of building], but as "an architect." In other words, there was for Christoph no real point of difference. [8] To make matters worse, in France, Jean-Nicolas-Louis Durand, who was a professor of architecture at the École Polytechnique in Paris wrote a book, *Précis des leçons d'architecture données à l'Ecole Polytechnique* (1802–5), that made it easy for any engineer to design even the largest of buildings. Every plan was reduced to a grid. Today, we might give the book the title, *Roman Architecture for Dummies.*

Though a lot of ink has been spilt on the definition and theorization of 'tectonics' we must remember that it is first and foremost a neologism, born as a protest against the emergence of a heartless, and for Semper, mindless, industrial world. It was an argument about rupture and repair. In other words, Semper wanted to impose the relevance of a historical consciousness – and its associated package of erudition and theorization — to the making of architecture that is modelled, ironically, on a pre-architectural and pre-literate sensibility. What we thus see in Semper's writings – though Müller and others are implicated in this as well — is the birth of what we today would identify as Eurocentrism, the moment when the European cultural class sought to invent, define, and enforce Europe's deep history – in this case by going back to the Greeks — as a way to challenge the perceived superfluidity of modernity. But for Semper, unlike other Hellenophiles, to access that world he had to split the Greek word architecture into its component parts, a rupture in the name of the 'organic' to make a concept that was detached from architecture's fluid, but intractable, interconnections with the world of the ambitious *Baumeister* and engineer, and, of course, their thoughtless clients.

9 Plutarch, *Life of Pericles,* Modern Library edition (New York: Random House, 1984), 191–2.

10 It is clear from Greek texts that *tektōnes* were not always woodworkers. Some were certainly skilled in ancillary trades. And there can be no doubt that as their work load diminished they moved to other trades. The word itself became more general over time. With Homer, it meant a skilled ship builder, but by the time of Aristotle, it begins to mean skill in general.

Semper probably did not fully realize that the word architecture was itself a neologism, though its neologistic status, even today, has hardly ever been adequately theorized. The word came into play only around the late 6th or early 5th century BCE during the period of the modernization of the temple building site, meaning that there is an uncanny parallel to the early 19th century situation encountered by Semper, but in reverse. For centuries, temples had been made by *tektōnes* using skills that were handed down from father to son. The change from wood to stone happened extraordinarily quickly in the span of almost a single generation. The Temple of Apollo at Corinth, constructed ca. 540 BCE was among the first. From there, it only took a hundred years for the Greeks to develop the extraordinary skills that went into the making of the Parthenon. With the change-over, construction sites became complicated places bringing into play a vast array of skills and services. Plutarch's description of the building of the Parthenon in Athens is an astonishing read, even today:

> The materials were stone, brass, ivory, gold, ebony, cypresswood; and the arts or trades that wrought and fashioned them were smiths and carpenters, moulders, founders, and braziers, stone-cutters, dyers, goldsmiths, ivoryworkers, painters, embroiderers, turners; those again that conveyed them to the town for use, merchants and mariners and ship-masters by sea, and by land, cartwrights, cattle-breeders, waggoners, rope-makers, flaxworkers, shoe makers and leather-dressers, road-makers, miners. And every trade in the same nature, as a captain in any army has his particular company of soldiers under him, had its own hired company of journeymen and laborers belonging to it banded together as in array, to be as it were the instrument and the body for the performance of the service. [9]

As Plutarch makes clear at the end of the quote, the journeymen and laborers were merely soldiers in the service of the larger project, meaning that the design process of a Greek temple was anything but 'organic.' And tragically for the *tektōnes*, though temples were famously meant to look like wooden temples, the skill of wood working was no longer needed. The only thing left of real wood in these temples were the rafters. The 19th and 20th century literature of Greek architecture is so enamored of the fact that Greek temples preserved their wooded heritage in replica form, that the disappearance of the *tektōnes* from the building site is left unremarked. [10] A modern day parallel would be when the newspaper typesetters were 'phased out' due to the introduction of the computer in the 1970s.

11 Richard Sennett, *The Craftsman* (New Haven, London: Yale University Press, 2008), 22.

12 In the *Statesman* 258[e] (c. 360 BCE), the conversation comes around to *téchnē*. Plato describes two types of *téchnē*. One is productive and the other theoretical (gnostic), "calling the one practical, and the other intellectual." As an example of the "practical," Plato mentions the wood worker or *tektonicos* (τεκτονικός). As an example of the "theoretical" he mentions the *arche-tekton* (ἀρχι-τέκτων), the reason being that the latter places things in order, and so in that sense, Plato argues, is not unlike what a statesman does, though the latter works purely in the world of governance.

13 Imy-r kꜣt would be pronounced 'imir-kat'. There was also an Overseer of All Royal Works (ỉmy-r kꜣt nbt nt nzwt; pronounced: imir-kat-nebet-nt-nut). There was, of course, no such position in ancient Greece.

Richard Sennett noted that something was afoot when he observed that "if the artisan was celebrated in the age of Homer as a public man or woman," by classical times, namely by the time of the Parthenon "the craftsman's honor had dimmed." [11] But Sennett's perspective is too narrow and he misses the fact that we see by classical times a whole new person, the *archē-tektōn*, celebrated by none other than Plato who used the job description of the recently minted *archē-tektōn* as the model for a statesman. [12] Why not? Building a temple, as Plutarch made so clear, is an index of a thriving and well-managed economy. There is an uncanny and perhaps even real link between Plato's *archē-tektōn* / stateman and Kant's "architectonic of pure reason." Both admired the skill of managing complexity, Plato as a political project, Kant as a philosophical one.

The Greeks could have used the Egyptian word 'building-overseer.' After all, that job description goes back to the 3rd millennium BCE, and it is almost certain that the Greeks learned about all of this, including the use of stone, through their military and trade contacts with the Egyptians. [13] But the Greeks, in their rush to modernize their construction industry were never going to introduce a 'barbaric' Egyptian word into their language. They simply added the prefix *archē* (first, leader, principle) to the old word *tektōn*. And so, a word was born that is now so ubiquitous that its historical, ruptural resonances have long since been washed away.

But just because the word *archē – tektōn* existed, the difference between architect (as we understand it today) and chief contractor was not clarified even by the time of Semper. The issue was first exposed by Leon Battista Alberti who asked, How does the presumptive architect – the maker of the design — separate himself from the upstart, and culturally unsophisticated builder who might well be called an architect?

For Alberti, the answer hinged on the fact that the architect had to not only understand this novel thing called Roman history, but also had to be able to convey the esoteric design realities of that unique brand of historicism to the noble class through a combination of writings and drawings. To read and to make presentation drawings was something that very few builders at the time could do with any proficiency. In *De re aedificatoria* (written between 1443 and 1452), Alberti also writes:

> Before I go any farther, however, I should explain exactly whom I mean by an architect; for it is no carpenter (*tignarium fabrum*) that I would have you compare to the greatest exponents of other disciplines: the carpenter (*fabri*) is but an instrument (*instrumentum*) in the hands of the architect. Him I consider the architect, who by sure and wonderful reason and method, knows how to devise both through his own mind

> and energy, and to realize by construction, whatever can be most beautifully fitted out for the most noble needs of man, by the movement of weights and the joining and massing of bodies.

I inserted the Latin to make sure that we understand that the translation of *tignarium fabrum* and later *fabri* should not be 'carpenter.' Instead, those words should be translated as 'contractor' or 'construction manager.' Alberti also uses the word 'discipline' very precisely to convey the fact that if architecture was to be a field it would have to possess ancient texts that allowed the architect to enter to and engage with the literate, aristocratic class. So here, in this quote, the tone of the word architecture changes. If before, the contractor-architect continuum could be seen as part of the natural evolution of the modernization of the building site toward increasing complexity, now, with Alberti, the word has a violent inner life that brings out of hiding the implication of the word's origins. Alberti wanted to finish what the Greeks had started in elevating mind over matter and by elevating literacy over illiteracy. And by literacy, I mean not just the capacity to read, but the capacity to understand the value of Roman and Greek culture to the upper classes. So significant was this that proficiency in Greek and Latin was a hallmark of a good education and social status among the upper and middle classes in England well into the 19th century.

Though Alberti wanted this break between the architect and the contractor to be absolute, his theory was more fantasy than reality. The great architects who built the cathedrals and palaces of Siena, Florence, Milan, and Venice were all master builders most of whom came to architecture late in life. Some started as painters or as masons. Brunelleschi started his career as a goldsmith. Palladio, whose real name was Andrea di Pietro della Gondola, who was nominally literate, started his career as a humble stone carver. His name would have been lost to history had not his wealthy, humanist client, Gian Giorgio Trissino, 'discovered him' and even invited him on a trip to Rome to measure Roman details for his villa. Trissino, however, did not want to be seen as slumming it with a laborer, so he gave the man a fancy new name, Palladio, derived from the Greek goddess Pallas Athena and a character in a poem. Palladio, thus refashioned and coached by his mentor, lived up to expectations. *I quattro libri dell'architettura* (The Four Books of Architecture), first published in 1570, which consisted of a text and accompanying drawings of Roman details and their proportions, was the instrument by which the architect – as a cultured person — performs his elevation over the contractor.

Today, of course, the distinction between architect and contractor is a legal one, even though it still disguises a the old cultural one. When

14 Johann Christoph, "Architekt," Grammatisch-kritisches Wörterbuch der Hochdeutschen Mundart (Leipzig: Johann Gottlob Immanuel Brietkopf, 1781), Column 423.

15 The cleaving of the word *tektōn* from the word architecture works better in German than English. *Architektonisch* means somethings like a well-made and well-ornamented whole. To remove the '*archi-*' and leave only *tektonisch* was to evoke the idea of an even deeper form of 'wholeness'.

I recently rebuilt my barn, even though the contractor did everything, he was required by law to have a licensed architect make the drawings that have on them in big words: "These renderings are for illustrative purposes only," meaning they are not construction drawings. But as a matter of reality, back in the 19th century, the *Baumeister* still had the upper hand. In Germany, the Latin word *architectus* referred mostly to the designers / builders of churches and cathedral buildings. Though it was a word that implied status, it was not a term with deep theoretical implications. In fact, a German dictionary from 1781 has the comment under the heading "architect" that it is a "fully unnecessary word," probably in reference to its Greek pretensions. The better word, it states, is *Baumeister*.[14]

So when Semper *detached* the *tektōn* from *archē,* it was meant to give the appearance of a liberation of the detail-maker (and by extension the detail-*drawing*) from the magisterial, but presumably alienated gaze of the *Baumeister* — contractor – engineer who, given monetary constraints, was well inclined to think of details as 'off-the-shelf.'[15] Semper imagined a non-*archē* world where the detail was not just a dull construction drawing. The semiotic violence – the violence *of* the word that also applied *to* the word – was, for Semper, an unfortunate necessity to get the architect to imagine an unviolated whole and therewith instrumentalize his control over the whole process of design. For Semper, if the emerging discursive distinction between architectonic and tectonic needed to be erased, its parallel, the cultural and class distinction between architect and contractor, needed to be enforced. In other words, the theorizing of 'tectonics' was grounded in a contradiction about the status of the architect in the modern world. The culturally sophisticated architect on the one hand, and the laborer, guided by a custom-made drawing, could outflank the dull and dimwitted contractor.

The defenders of modern-day tectonics are, therefore, not out to truly free the proverbial builder from the rulership of the uncultured contractor. Almost to the contrary, they want to force the builder to follow the mandates of a higher sensibility, the results of which are supposed to be aesthetically pleasing to the 'wholeness' of the design just as much as they may be practical. Kenneth Frampton in 1995 re-affirmed this mandate when – in recasting Semper's notion of the 'organic' — he championed the tectonic as the place where architecture can most effectively challenge the ostensibly, scenographic superfluidities of "global modernism."

> The primary principle of the autonomy of architecture resides in the tectonic rather than the scenographic: that is to say this autonomy is embodied in the revealed ligaments of the construction and in the way in which the syntactical form of the structure explicitly reveals the

16 Kenneth Frampton, *Studies in Tectonic Culture* (Cambridge MA, The MIT Press, 1995), 377.

17 According to Mitchell Schwarzer, tectonics is "a rejection of any ideology of blind progress or global homogenization." Mitchell Schwarzer "Tectonics of the Unforeseen," ANY: Architecture New York 1996, No. 14, Tectonics Unbound: Kernform and Kunstform Revisited! (1996), pp. 62–65. See also: Kenneth Frampton, "Rappel a l'ordre: The Case for the Tectonic," *Architectural Design* 60, no. 3–4 (1990). Reprinted in Frampton, *Labour, Work. and Architecture* (London: Phaidon, 2002), 99.

18 Wolfgang Herrmann, *Gottfried Semper: In Search of Architecture*, (Cambridge, The MIT Press, 1984), 144.

19 According to Mitchell Schwarzer, tectonics is "a rejection of any ideology of blind progress or global homogenization." Mitchell Schwarzer "Tectonics of the Unforeseen," ANY: Architecture New York 1996, No. 14, Tectonics Unbound: Kernform aand Kunstform Revisited! (1996), pp. 62–65.

> action of gravity…The tactile and the tectonic jointly have the capacity to transcend the mere appearance of the technical in much the same way as the place-form has the potential to withstand the relentless onslaught of global modernism. [16]

The idea of a tectonic modernity as a form of resistance (still related by default to academic, upper class sensibilities) to capitalism has by now become implicit in the meaning of the word. [17] So if we think back to Alberti's put-down of the builder as a mere *instrumentum*, it becomes clear that tectonics in this sense does not want to liberate the builder from the *archē*, but rather to empower the architect over the contractor even more. Tectonics allows the architect to borrow down into the design process to the level of 'making.' From that point of view, tectonics requires the outside agency of guilt as enforcement. Karl Bötticher, whose chief work is the "*Tektonik der Hellenen*" (Architectonics of the Greeks; 1844–52), wrote that

> It is in the nature of things that this simple law will *restrain* any subjective and arbitrary desire to cover the core-form haphazardly with symbols...The essence and idea of a structural part *prohibit* arbitrary decoration and *do not allow one* to deal with the decorative elements as one pleases. (emphasis by author) [18]

Buildings are not meant to be put together through the abstract determinations of reason or by aesthetically illiterate builders. There has to be a custom-tailoring of the parts. [19] Ornaments and their associated details had to exist, as Bötticher would phrase it, in a living relationship to the whole, a 'whole' that was endangered by the very people who made it.

But unlike the *archē* who learns about the discipline through books, studio classes, exams and other sources, tectonics has no particular disciplinary grounding. It is, as Semper implied, supposed to be 'organic' meaning that it is produced magically from the inside of a culture. In other words, unlike when we say the word architecture and obviously assume that architects get their position through a process of learning [i.e. enforced through the mechanisms of a discipline], when we say tectonic, there is no clear socio-epistemological equivalent. And just as there is no 'school of tectonics' there is also no category of laborer that corresponds to it. The *tekton*, the actual person in historical time, is of no interest to Semper. Not only is he a cultural imaginary, he is purposefully placed *outside* of the orb of the contractor-builders as an unattainable abstraction that when it does finally reach the construction site can only be sustained and implemented through the armature of a distant, moral control that, if anything, is not 'organic.'



1

1 Frank Lloyd Wright, Marin County Civic Center (1957). Photo by author

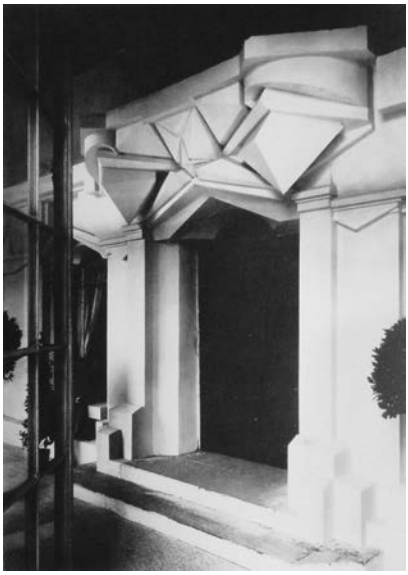
This leaves us with a paradox. Tectonics is an aesthetics, but one that is supposedly not shallow; a way of detailing, but one that is not about the reality of construction; a way of knowing, but one that cannot be found in books; a way of building, but without a corresponding set of laborers.

At stake in this conversation is not how an imagined Hellenic, dignity-of-labor (albeit without laborers) can be used as leverage against the unruly, superficial, industrialized world of today, but rather the role of tectonics / *tektōn* in the play of disciplinary signifiers. If anything, the *tektōn* today might seek to free itself from the compulsions of good 'tectonic' behavior, whether imposed on it from within (either in the form of unreflective tradition) or from without (as in the form of 'good design'). The point is not to make the unconscious of the *tektōn* speak through some imagined aesthetic-of-purity, but to locate it as a sometimes disturbing force in architecture's disciplinary landscape.

Frank Lloyd Wright's Marin County Civic Center (1957) rightly deserves a place in history books **[1]**. But there is one spot that is never discussed. In designing the external colonnades, Wright apparently faced a quandary. Instead of doing a more regular column, Wright decided to float the column and have it rest precariously along the flank of a 'rock' that rises like a mini-monolith from the walkway as it were some natural feature. It is a steel column, but it seems to be made more of wood than metal, looking very much like a gilded 2X4. Wright added an elegant slopping capital to transition to the arch. From the side, the capital is off-center to the line of gravity descending from the arch to create a disturbing and almost dangerous looking situation, made even more pronounced when the column hits the 'rock' along its outward facing slope. These columns do not fall in line with the conventions of tectonics as they not only want to look like they defy gravity, but they also defy the material properties of their constituting elements: concrete and steel. They even defy the constructional principle set out by the building itself. They are a curiosity and a flourish, but also a puzzle to be figured out.

There is no clear picture of the genesis of Frank Lloyd Wright's column, but there is, of course, a dotted line that can be drawn back to Art Deco and even further back to Art Nouveau. Art Nouveau, in particular, had little patience for gravitational realism and an associated ascetics of laconic minimalism that underlies much of what we call tectonics. Perhaps one can cite the entrance to La Maison Cubiste at the Salon d'Automne, 1912 with its asymmetries, chamfered surfaces and gravity defying elements **[2]**.

Compare the Wright columns with a those in the Borre Skodvin's Mortensrud Church in Oslo (2002), which I would venture to say better conform to the conventions associated with tectonics **[3]**. There, a large rock



2



3



4

2 La Maison Cubiste at the Salon d'Automne, 1912.
Raymond Duchamp-Villon, 1912

3 Mortensrud Church, Oslo (2002)

4 Contractor house, California. Photo by author.

protrudes into the space. The architects shifted the columns to accommodate its girth tilting them to emphasize the rock's location in the design. It is without doubt an example of subtle contextualism. The columns speak very openly of the work that they need to do to adjust for the intrusion of the rock. But compared to the columns at the Marin County Civic Center, these do not liberate the structure from its dutifulness. On the contrary. The columns, even the angled ones, are pronouncedly Doric and masculine. Unlike the columns of the Marin County Civic Center, which are, one can say, experimental, the ones in Mortensrud Church are comfortably ensconced in the Hellenic, European sensibilities.

Perhaps we can go even further afield than the Marin County Civic Center in the search for an alternative tectonic – a tectonic liberation — and look to things that fall under the heading of contractor mistakes. The builder of this house added an extra column base for the porch before he realized his mistake, so he left it unfinished **[4]**. When he decided to raise the roof a bit, he left the facing of the gable dangling in the air. It did not really bother him.

This project makes no one happy. The teacher of architecture would see this simply as silliness and note that such a building's resale value has been damaged. Pro-tectonic advocates would cringe at the careless of the carpenter and perhaps see it as even a statement verging on the immoral. What would this world be if everyone just left their mistakes out to rot. And yet I would say that the builder of this house has made a modest but powerful political statement, not about some fantasy of a 'corrected' modernity, but about the tyranny of the ideology of completion and about the pathology of dutiful conformity to expectations all the way down to the detail.

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Steps Towards Negative Tectonics

Nathaniel Coleman

1 Mary McLeod, "Frampton in Frame", *Architecture Today*, 16 Nov. 2020.

Reflecting on tectonics is impossible without thinking about its ideation by Kenneth Frampton, which, despite the quasi-mysticism of Marco Frascari's "Tell-the-Tale Detail", or Peter Rice's structural expressionism (especially as manifested in Piano's best work), is how most architecture students, practitioners, and educators come to and deploy ideas of any poetics of construction (I suppose there is also Zumthor). If Frampton's tectonics conception claims to resist architecture's dissolution by capitalist production, programming mostly speaks the language of that dissolution. Like function (or functionalism), modernity typically limits programming to over systematization (even without informatics, algorithms, or parametric design). Likewise, despites Tschumi's claims, "disprogramming" sits within the systematizing orbit of programming, similarly Koolhaas' performative indeterminateness. In all instances, cybernetic aspirations infuse programming in architecture, inseparably from its happiest home in computer science. At best, tectonics and programming suggest a negative dialectical tension, impossible to resolve but worth pursuing. At worst, tectonics and programming are two sides of architecture's systematizing habits paralleling the long erasure of its disciplinary status as a liberal profession.

Leaving programming aside, the argument here is: instead of providing architecture with a foolproof liberating grammatology, Frampton's attempt to precisely define the parameters of tectonic resistance, as prerequisite for architecture's redemption, disables the concept, and the architecture that follows, ensnaring both within ambits of totalizing system, ensuring results more programmatic than de-systematizing (which would constitute substantive resistance). Hence, the urgency of conceptualizing a negative tectonics, inflected by the initial thoughts on its contours introduced throughout the following pages, anticipates a conception (negatively) dialectical enough to resist easy capture, systematization, or transformation into the banalities of design school briefs, instrumentalized theoretical discourse, or architects' confusedly self-promoting affirmations of art, autonomy, business, science, social justice, and spectacle.

Forward Towards the Negative

Helpfully, in her consideration of Frampton and his tectonics, Mary McLeod offers clues to the genetic defects of Frampton's tectonics: "Frampton seems to be searching for a logic (and, in his case, an aesthetic vision) that would embrace the paradoxes of two seemingly disparate worldviews [phenomenology and Marxism] in his search for reservoirs of resistance against the onslaught of 'commodity culture' and the 'imperatives of production.'" [1]
I guess Marxism in the original quote alludes to the Frankfurt School and

2 Mary McLeod, "Frampton in Frame."

3 Michel Foucault, "Who are you, Professor Foucault?" (1967), in *Religion and Culture*, ed. Jeremy R. Carrette, trans. Lucille Cairns (New York: Routledge, 1999), 93.

4 Foucault, "Who are you, Professor Foucault?", 93.

represents Left/modernism, whereas phenomenology represents Right/traditionalism.

Accepting McLeod's reading, Frampton's search "for a logic", to construct "an aesthetic vision" resistant to architecture's capture by the culture and building industries depends on his embrace of the "seemingly disparate worldviews" of "phenomenology and Marxism." [2] Especially as performed by architects (practitioners, teachers, students), both represent totalizing visions. While Marxist tendencies toward absoluteness are familiar enough, architectural phenomenology mostly evades such badging, perhaps because it largely presumes the continuity of an unfallen golden age despite endless rupturing catastrophes, which sets it Right of center, in contrast to Marxism's Left of center positioning. However, as Foucault concludes, "the phenomenological method certainly wants to account for everything, whether it be to do with the cogito or with what precedes reflection, with what 'is already there' when the cogito is activated; in this sense, it is clearly a totalising method." [3] Arguably, Frampton's persisting impulse to construct the logic of an aesthetic vision requires him to attempt to "account for everything" in totalizing fashion, intermixing Marx and Marxism with phenomenology. However, Frampton's putative struggle against capitalist maximalization amounts to programming solutions ensnared within the constellations of thought and action he longs to resist and overcome.

Conveniently, Foucault provides a route away from tectonics and program by asserting: "from the moment one cannot describe everything, it is through the concealing the cogito, in a way putting aside that first illusion of the cogito, that we can see emerging entire systems of relation that otherwise would not be describable"; including, for example, the associability of phenomenology and Marxism as simultaneously conservative and totalizing in their nostalgic programmatic aspirations. [4]

Arguably, rather than liberating architecture, Frampton's tectonics formulation ensnares it within totalizing system – immobilizing the concept while incapacitating the architecture it prefigures. Recuperating the tectonic entails rescuing it from programmatic Marxism and (Heideggerian) phenomenology alike. Admitting catastrophe and fragmentation rather than denying either are first steps towards a negative tectonics, guided by Adorno's negative dialectics, which continuously thinks thought against itself (in theory and practice), thereby avoiding the resolving tendencies of Frampton's tectonic ambition.

5 Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (Hoboken, NJ: John Wiley & Sons, 2007), 64.

6 Pallasmaa, *The Eyes of the Skin* 64, with my commentary bolded in brackets.

7 Steen Eiler Rasmussen, *Experiencing Architecture* (1957), trans. Eve Wendt (Cambridge, MA: MIT Press, 1962).

Tectonics Yesterday, Today, Tomorrow

The overriding effort of many contemporary purveyors of tectonics to achieve synthesis begs to be overcome negatively. Nowhere is the penchant for eradicating tension, critical historical perspectives, and consciousness from affirmations of the tectonic more pronounced than in the following:

"The authenticity of architectural experience is grounded in the tectonic language of building and the comprehensibility of the act of construction to the senses. We behold, touch, listen and measure the world with our entire bodily existence, and the experiential world becomes organised and articulated around the center of the body." [5]

Unfortunately, too many architecture students are introduced to Pallasmaa's *Eyes of the Skin*, source of the preceding quote, without encouragement to critically interrogate the text. Were I to teach the text (I do not), I would introduce it something like this:

"The authenticity [**what is meant by authenticity? Authentic to whom? How does it compare to the inauthentic?**] of architectural experience is [**is this universal, individual, situated, bodily, or primarily visual? Is architectural experience primarily aesthetic or is it primarily gained through use?**] grounded in the tectonic language of building [**What does it mean to say this? What is the tectonic language of building? If experiencing architecture is grounded in the tectonic language of building – whatever that might be – can there be no accounting of Le Corbusier's arguably a-tectonic work?**] and the comprehensibility of the act of construction to the senses [**How does this explain the generally extruded quality of contemporary construction? Does this simply hint at bodily perceptions of gravity?**]. We behold, touch, listen and measure the world with our entire bodily existence, and the experiential world becomes organised and articulated around the center of the body [**The first part might be true by default, what is the evidence for the second?**]." [6]

Pallasmaa's too problematic to be useful representation reveals Steen Eiler Rasmussen's formulation of nearly the same as much more persuasively pragmatic. [7] Despite its association with Pallasmaa, Frampton's working out of the tectonic is too compelling to ignore:

"Greek in origin, the term tectonic derives from the term *tekton*, signifying carpenter or builder. This in turn stems from the Sanskrit *taksan*, referring to the craft of carpentry and to the use of the ax. Remnants of a similar term can also be found in Vedic, where it again refers to carpentry. In Greek it appears in Homer, where it again alludes to carpentry and to the art of construction in general. The poetic connotation of the term first appears in Sappho where the *tekton*, the carpenter, assumes the role of the poet. This

8 Kenneth Frampton, "*Rappel a L'ordre* the Case for the Tectonic", *Architectural Design*, vol. 60, no. 3–4 (1990): 19–25, in *Theorizing A New Agenda For Architecture: An Anthology of Architectural Theory*, 1965–1995, ed. Kate Nesbitt (New York: Princeton Architectural Press, 1996), 521.

9 Manfredo Tafuri, *Theories and History of Architecture* (1968, 1976), trans. Giorgio Verrecchia (London: Granada, 1980), 141, 153.

meaning undergoes further evolution as the term passes from being something specific and physical, such as carpentry, to the more generic notion of construction and later to becoming an aspect of poetry. In Aristophanes we even find the idea that it is associated with machination and the creation of false things. This etymological evolution would suggest a gradual passage from the ontological to the representational. Finally, the Latin term *architectus* derives from the Greek *archi* (a person of authority) and *tekton* (a craftsman or builder)." [8]

More succinctly, Frampton's good architect is in parts a carpenter and builder, adept at using appropriate tools, including for construction in general. But emergence of its poetic dimension is what makes the tectonic interesting: shifting it from the specific (carpenter), to the general (construction), to arrive at the poetic, which for Frampton charts the movement of the tectonic from the ontological (related to the nature of being), to the representational (relating to symbolic interpretation). Together they confirm Frampton's indebtedness to Heidegger's hermeneutic phenomenology, particularly "Building, Dwelling, Thinking" (1954).

Ultimately, Frampton's debt to the reprehensible Heidegger's tainted thought, especially when he attempts to blend it with Adorno's negative dialectics, produces conceptualizations and programs that are soupier than salad-like and more gruel-like than either. Frampton is an incisive critic but a less powerful theorist: he continuously struggles to frame generative ideas, no matter how seductive. The irreconcilable differences between Heidegger and Adorno suggest forgetting the former to come closer to the latter could have better equipped Frampton's critical regionalism and tectonic representations to resist systematization as aesthetic models of performative resistance, and thereby dissolution into easily digestible jargons of authenticity, ready for deployment in and by the culture industry. Perhaps Frampton – even more so than Zevi or Giedion – confirms Tafuri's prohibition against operative history and criticism by historians, defined as follows:

"What is normally meant by operative [history and] criticism is an analysis of architecture (or of the arts in general) that, instead of an abstract survey, has as its objective the planning of a precise poetical tendency, anticipated in its structures and derived from historical analyses programmatically distorted and finalised. […]. Operative criticism is, then, an ideological criticism (we always use the term ideological in its Marxian sense): it substitutes ready-made judgments of value (prepared for immediate use) for analytical rigour." [9]

By anticipating long before the fact, the failure of Frampton's best-known forays into operative criticism (portrayed as historiography), Tafuri informs my analysis:

10 Tafuri, *Theories and History*, 156.

11 Tafuri, *Theories and History*, 159; Frampton, "Rappel a L'ordre", p. 520.

12 Nathaniel Coleman, *Recoding Architecture Pedagogy: Insurgency and Invention* (London: Routledge, 2025), 23–45; Nathaniel Coleman, "Rehabilitating Operative Criticism", in *The Contested Territory of Architectural Theory*, ed. Elie G. Haddad (London: Routledge, 2024), 67–86; Tafuri, *Theories and Histories*, 155.

"But there is not much evidence that these deformations of history have had much impact, especially on the younger generations. In the last resort, operative historicism fails completely, precisely in the field of concrete action: if we take for granted the inability of architects and of the public in general to state the complexity and specificity of historical events, then the actualisation of history consciously ratifies the proliferation of myth. And myth is always against history."[10]

Frampton's planning of precise poetical tendencies is cognate with Tafuri's characterization of operative criticism as preoccupied with the current "architectural situation"; for Frampton "the primacy given to the scenographic in the evolution of the bourgeois world" manifests "the predominant tendency today […] to reduce all architectural expression to the status of commodity culture."[11] For Tafuri, to construct accounts of how dominant forces play out in cultural production, history must reject operativity by remaining independent of current activity. Perhaps Frampton's inclination towards manifesto-like pronouncements – operative criticism – reveals an enduring attachment to himself as a practicing architect. Readers familiar with my most recent publications will be aware that much like Tafuri, I extol the value of operative criticism for artistic and architectural invention, so long as it is not portrayed as "scientific history".[12]

Steps Towards Negative Tectonics

While I remain preoccupied with the oft neglected social dimension of architecture (mirroring general suppression of its political dimensions), these are symptoms rather than causes. Admittedly, identifying the sources of architecture's emptying – which preoccupies Frampton – presents nearly impossible problems, not least because the condition is profoundly overdetermined. Consequently, the shift from disciplinary knowledge to technicity, summed up as anti-theoretical commercial (or neo-avant-garde) practice, could begin to seem something like causes. But even these are symptomatic of something preceding them. Fixating on causes –diagnosis – preserves symptoms and their aetiology by shielding project (prognosis) from Utopia (*the science of alternatives*). Ultimately, no matter how much systemic transformation is claimed for performative *Newness* (its appearances), the claims themselves, and the results, sustain systemic homeostasis; even amplifying the dominant's decisive hold on reality, including the production of space. The most obvious example of this, which each passing decade crystalizes, is the nearly complete dissociation of aesthetic and social claims from results in the case of stylistic postmodernism.

13 Caroline A. Jones, “Post-modernism,” in *Grove Art Online*. 2003.

Ostensibly, postmodernism revalued intuition, locality, and ordinariness (irrationality) in reaction to modernism's reputed scientific rationality. In art historical terms, as in the public imagination, this denoted "buildings that courted a selective eclecticism, often utilizing elements of Classical or Neo-classical origin." Most charitably, 1970s and 1980s postmodernism is "perceived as growing out of the resistance to a canonical modernism in the 1960s, in turn related to the growing pluralism in art and architecture that came to be associated with Post-modernism from the early 1980s."[13] Despite apparent variety, architectural postmodernism's poles, staked out by so-called *greys* and *whites*, across a spectrum encompassing Venturi's populism, Eisenman's abstractions, Graves' whimsy, Rossi's initial seriousness, or Johnson's cynicism (amongst many others), little changed. Instead, socioculturally, the myriad repackaging exercises were consolidating, unsurprisingly, since in most instances, apparent transformation was superficial – mere aesthetics, even when masked as either political or autonomous. From within this context, Frampton's imagined critical regionalism and then tectonics represented third way alternatives to populism (stylistic postmodernism) and abstraction (deconstructivism / the neo-avant-garde), able to resist the universalising tendencies of globalised production.

Although Fredric Jameson's influential readings of architectural postmodernisms (at least for architecture academics; a select grouping of self-referencing architects; some PhD candidates in architecture, history, theory, or criticism; and fewer students) could seem a kind of boosterism of neo-avant-gardist pretences, his deepest insights (intriguingly close to Tom Wolfe's conclusions in *From Bauhaus to Our House*, 1981) are revealed in the title of arguably his best known book: *Postmodernism: Or the Cultural Logic of Late Capitalism* (1991). As simultaneously captured by the building and culture industries, architecture – no matter the claims – decorates capital above all else. With very few exceptions, architecture's sociopolitical project is feeble, its claims to autonomy unconvincing, and its results commercial. It is within this frame that Frampton's tectonics, appropriated thereafter by others, begs to be interrogated; as an expression of postmodernism; more a manifestation of the cultural logic of (late) capitalism than a convincing form of resistance to architecture's dissolution (whether aesthetic or political).

14 Tafuri, Manfredo. *Architecture and Utopia: Design and Capitalist Production* (1973), trans. Barbara Luigi. La Penta (Cambridge, MA: MIT Press, 1976), ix-x.

15 Tafuri, *Architecture and Utopia*, ix, 48, 76, 135, 182.

16 Tafuri, *Architecture and Utopia*, p. x.

Opening Salvo

In his 1973 book, *Architecture and Utopia: Design and Capitalist Development*, Tafuri militated for nothing less than reimagining architecture, far beyond Frampton's remediations:

"when the role of a discipline ceases to exist, to try to stop the course of things is only regressive Utopia, and of the worst kind. […]. What is of interest here is the precise identification of those tasks which capitalist development has taken away from architecture. That is to say, what it has taken away in general from ideological prefiguration."[14]

What if divisions of labour are the primary cause of architecture's perpetual crises, just as its more critical observers have identified. Bereft of its previous tasks, emptied of its political (ideological) dimensions, and social project (Utopia), and dissociated from art, architecture's projects struggle against consumption and dissolution. In *almost* every instance, architectural conception and production are circumscribed by habituation to the logic of capitalism; limited to "form without Utopia", the "ideology of the plan"("as an operative mechanism"), and the performative (or futile) resistance of outmoded "hopes in design", which transforms *most* work into contributions to the "plan of capital".[15]

Whether plans, or constructions extruding them into three-dimensions, the "ideology of the plan" precludes social transformation – the basis for a resistant architecture, even prefiguratively (the architecture and transformation it imagines or that precedes it). In recapitulating Tafuri's lamentations on architecture's demise, I have introduced at least some provisionality – tempering his absolutist tone with fugitive agency's feeble possibility: *almost* or *most*, rather than *all*. Even so, this is no giddy optimism. All it suggests is skirmishes with capitalism, mainly doomed to failure, but extolled in my book *Recoding Architecture Pedagogy*.

Amongst all the schematising divisions of labour architecture has been subject to, engineering's split-off from it around 1750 remains decisive. Into the void, image-making, spectacle, performative ethics, and technicity threaten to overwhelm almost all other concerns – the very things Frampton sought to counter. As a commercial enterprise, dominated by the building industry, myths of autonomy, dreams of escaping use, disregard for tectonics (gravity), and the bodily experience of buildings (use as primary) constitute false promises that sharpen the divisions of labour Tafuri believed deprived architecture of "a corresponding institutionally defined role", which "illusory hopes" in design offered no hope in redressing.[16] Ultimately, even the pivotal split between architecture and engineering is less cause than symptom; it simply advances intensification of the divisions of labour capitalism depends on.

17 Dominique Bonnamour-Lloyd and Harris Dimitropoulos, "Tectonics as a Political Act: Arrière-Garde or Avante-Garde", in *Proceedings of the ACSA European Conference, Berlin, 1997*, eds. Beth Young and Thomas C. Gelsanliter (Washington, DC: ACSA, 1997), 244–249.

Nonetheless, the critical juncture marked out by engineering's separation from architecture demands attention, not as fixable by education, any more than by picturing suturing the cut with magical remediation, even if persuasively represented as either an aesthetic or a form of resistance, which overburdens the tectonic. Inevitably, liberal fantasies of progressive education are ineffectual in shifting matters of consciousness or influencing systemic transformation, highlighting a conundrum of the tectonic: no matter how it finds its way into architecture culture, or at whichever level – as structural expression, exhibitionism, as sober and disciplined, or as a mediated poetics of construction – prevailing modes of production, of space and of buildings, defeats it.

And yet, the pull of Frampton's tectonics represents an apparent holding action against architecture's wayward descent into an abyss of meaninglessness. But it is at best a placebo – devoid of curative capacities that nonetheless on occasion produce efficacious outcomes (Miralles more than Zumthor). No matter its apparent rude health, or however much the tectonic promises cure, or sporadically produces worthwhile results, identifying new tasks for architecture within the present reality – free of mythifying delusions, or masquerading as scientific history – is pressing.

Architecture's Death & Rebirth?

With my thinking influenced by Lefebvre, Ruskin, and other (mostly Jewish) romantic anti-capitalists, often anarchist in name or spirit, my estimation is reconstructing architecture entails imagining demythologised tasks for it (an argument developed in *Recoding Architecture Pedagogy*). Preoccupied with rooms in one direction, cities and land in the other, mediated by buildings; addressing architecture's multitudinous problems to define its tasks – beyond image or technicity – depends on intensifying tensions between conflicting desires, including between artistic autonomy and the burdens of use, to establish cross-axes out of which promising work could emerge (but only if Frampton's confused aesthetic/activist inclinations are resisted).

Complexifying Frampton's tectonic brackets its tendencies toward (fictionally resistant) polarities – ostensible mediation between extremes (the aesthetic and the political), and its drive towards synthesis (as a poetics of construction); necessary to shield it from being "essentially non-transgressive", by "in fact" affirming "the framework" it ostensibly criticizes.[17] Indeed, this makes the tectonic incapable of transgressiveness – despite Frampton ascribing noncompliant aspirations to it: by affirming what it criticises, it is subsumed within the construction industry. But identifying unacknowledged tensions in the tectonic (it cannot be both autonomous – art, and political –

18 Adorno, *Aesthetic Theory* (1970), ed. and trans. Robert Hullot-Kentor (London: Continuum, 1997), 44.

19 Adorno, *Aesthetic Theory*, 44.

action simultaneously), or its theoretical shortcomings (the attempt to synthesise art and politics deprives it of a critical position by making it neither political nor art), can chart a path towards recuperating its pragmatic value as semiautonomous, thereby unleashing it to agonistically skirmish with capitalist production, disabused of its current mythologising distortions.

Without replacing one systematization with another, Adorno's reflections on art and architecture suggest how the tectonic could become more robust if freed of impulses to synthesise, or to conceptualise dialectics as opposites, to instead intensify its internal tensions by embracing perpetual collision. And, inevitably, Heidegger must go. According to Adorno,

"Art is not to be reduced to the unquestionable polarity of the mimetic and the constructive, as if this were an invariant formula […]. But what was fruitful in modern art was what gravitated toward one of the extremes, not what sought to mediate between them; those works that strove after both, in search of synthesis, were rewarded with a dubious consensus."[18]

Despite its apparent clarity, there is a softness to Frampton's tectonic conception, which sets it drifting toward mediation, if not synthesis, including between Adorno and Heidegger (and the Frankfurt School and phenomenology more generally). While synthesis might seem the aim of dialectical thinking, Adorno is clear, gravitating toward one of the extremes – ontological or representation in Frampton's tectonics – protects efforts from "dubious consensus". The tectonic would benefit from gravitating towards the extreme of representation, or better yet, use, in tension with production. As framed by Adorno, it is a fruitful dialectic of "construction" in tension with "expression":

"Construction is not the corrective of expression, nor does it serve as its guarantor by fulfilling the need for objectivation; rather, construction must conform to the mimetic impulses without planning, as it were […]. Similarly, construction cannot, as a form empty of human content, wait to be filled with expression. Rather, construction gains expression through coldness."[19]

One pole of the dialectic neither corrects nor guarantees the other, rather, intensifying tensions between them leans toward work that in maintaining some degree of autonomy persists as critical, which makes it significant. The *human warmth of expression* in intensifying tension with *the coldness of construction* establishes a dynamic condition wherein mimesis inflects construction, gaining in expressiveness through intensification of its nonhuman coldness. Without anticipating anything beyond the hidden causes of significant work, the contours of Adorno's reflections are nearly untraceable in Frampton's affirmational tectonics. Clarifying the point further – right up to identifying great architecture with its "superfunctional language", Adorno

20 Adorno, *Aesthetic Theory*, 45.

21 Adorno, *Aesthetic Theory*, 45.

22 Theodor W. Adorno, "Functionalism Today" (1965, 1966), trans. Jane O Newman and John H. Smith, *Oppositions* 17 (Summer 1979): 38.

provides a much stronger conception of an intensified tectonic – a negative tectonic:

"Functionalism today, prototypically in architecture, would need to push construction so far that it would win expression through the rejection of traditional and semitraditional forms. Great architecture gains its suprafunctional language when it works directly from its purposes, effectively announcing them mimetically as the work's content."[20]

A major shortcoming of Frampton's tectonic is sacrifice of a negative dialectic in favour of practice-ready schemas for ostensibly good work. Not only does this deprive his conception of traction, but its failings also sets the ground for an overabundance of precisely the sort of work he hoped adherence to his concepts could resist: the scenographic preponderance of architectural production today that reduces architecture to commodity, mirroring the bourgeois world.

What if instead, the suprafunctional language of great architecture was understood to be gained only "when it works directly from its purposes [uses], effectively announcing them mimetically as the work's content", achieved by pushing "construction so far that it [wins] expression through the rejection of traditional and semitraditional forms", including renouncing buildings as decorative spectacles adorning increasingly incomprehensible cities.[21] "Architecture would thus attain a higher standard the more intensely it reciprocally mediated the two extremes — formal construction and function."[22] But not the tectonic, so long as Frampton's diffusive appropriation of intellectual sources prevails, limiting its capacities for pushing beyond superficial amelioration.

The Best of All Possible Worlds

For Frampton, the world is overwhelmingly just, reconcilable to the will of the good, but it is precisely this affirmation that ultimately binds the tectonic to what already is – building production transparently manifesting the dominant that dominates, propagating exactly the sort of work Frampton seeks to resist. In this way, Frampton's tectonics is ultimately a phenomenology of spirit – identified with direct access to a golden age of unfallenness supposedly accessible simply by turning toward it. It presumes the possibility of absolute knowledge, informed by comprehensive understanding, ostensibly ensuring overcoming alienation, or rendering it a nonissue. Apart from being tainted by Heidegger's unrepentant affinity for National Socialism, with its indivisible antisemitism, aligned with the ideology and results of the Holocaust, Frampton's tectonic disregards the intransigent conditions of alienation that Catastrophe renders a permanent fixture of existing in the world,

23 Tafuri, *Architecture and* Utopia, ix.

24 Marianela D'Aprile and Douglas Spencer. "Notes on Tafuri, Militancy, and Unionization", *The Avery Review* 56 (April 2022).

25 Theodor W. Adorno, "Cultural Criticism and Society" (1949), in *Prisms*, trans. Samuel and Shierry Weber (Cambridge, MA: MIT Press, 1967), 34.

including for cultural production and recovery's limited prospects. Crucially, this reveals nothing more than Frampton's apparent naiveté in one direction and underdeveloped critical historical grounding, or dialectical thought processes, in the other.

The alternative to insurgent and inventive practices is submission to the seemingly inexorable eradication of architecture's remnant roles (social, cultural, political/ideological), transforming it into little more than a protected title. Following successive dissolution of its capacities, including prohibition against engaging in what Tafuri called "ideological prefiguration", architecture's destiny (intensifying since its digitisation from the late 1980s onwards) – the apotheosis of its disciplinary cessation – appears to be on the near horizon, as more of its tasks are inevitably displaced to Ai. [23]

More than fifty years ago, Tafuri argued that architects transformed into technicians in building industries demanded reconceptualising their tasks, starting with architecture education. His motivations were dialectical, not subservient (or instrumentalizing) – even in his darkest estimations, sparks of alternatives are findable, though not by him (stymied as he was by Marxian orthodoxies). His welcoming the instauration of new tasks for architecture is emancipatory, not conformist (despite being obscured by the interminable wait for revolution). Today, architects' next transition seems their transformation from building industry technicians (with few exceptions), to fully fledged imagineers — devolving the last remnants of architecture's discipline to the new tasks of effective but compliant prompt engineers. And yet, embracing their proletarianization could translate into architects' self-organisation (unionisation), which promises at least the return of a modicum of autonomy to their practices. As Spencer and D'Aprile observed, "this movement […] does not spell the death of architecture but rather, in the long run, a new life for it". [24]

Beginning with the complexities of Adorno's proposition that writing "poetry after Auschwitz is barbaric", the comforts of phenomenology and program in their tectonic and technocratic guises beg for abandoning, to begin working in the fallen world as it is, guided by desires for alternative relationships, anticipatorily illuminating elusive revolution. [25] A negative tectonic foregoes illusions of continuity without renouncing use (bodies or gravity), while disavowing autonomy myths, even as some artistic distance is maintained. The persisting political context of architecture's production implicates it in making and maintaining brutal inequalities, including despoiling the planet, confirming the persisting significance of Adorno's thinking for working in and through catastrophe, necessitating foregoing repetition in favor of reconstruction, while surrendering all prospects of resolution, if not desires for it.

26 Fredric Jameson, *The Seeds of Time* (New York: Columbia University Press, 1994), 189.

27 For an earlyish overview of the tectonic, see, Robert Maulden, "Tectonics in Architecture: From the Physical to the Meta-Physical", (M. Arch Thesis, Cambridge, MA: Massachusetts Institute of Technology, 1986).

Slicing through cross axes is the operative procedure for recovering tectonics from the totalizing conceptions that neutralize its potential power. Frampton's error was to fall into the trap of sloganeering, coining easily digestible catchphrases that make his brand of radicalism palatable. Although this popularized his most powerful ideas, it also defanged them, most dramatically his "critical regionalism" conceptualization, which quickly devolved into a jargon of authenticity perfectly aligned with the culture industry, a failing Jameson adeptly observed when writing about Frampton's "critical regionalism", one cause perhaps of Frampton later backing away from the concept. His "tectonics" appears to have fared much better. But Jameson's reservations about "critical regionalism" are largely applicable to "tectonics" as well. For example, Jameson notes that "critical regionalism" inevitably seeks, "by describing the constitutive features of authentic works of art as they already exist, to suggest invariants and norms for the production of future works." [26]

Ideations of regions are ultimately as circumscribed as any poetics of construction subject to (subsumed within) the building industries determined by technicity; shaped by capitalist production; beholden to performance standards; and restricted by material costs. In short, just as the idea of a region, the regional, and the local are at best fragile, but increasingly implausible (notwithstanding stubborn traces), Frampton's tectonic presumes a barely existent solid ground to support the normative presumptions animating both "critical regionalism" and the "tectonic". Perhaps Frampton's age or his professional status when he wrote both is significant. He was 52 or 53 in 1983 when "Critical Regionalism" was published (the age when many architects finally come into their own), and 64 or 65 in 1995 when *Studies in Tectonic Cultures* was published, the capstone of his work on the topic and of his career. His reflections on a poetics of construction extend back through "*Rappel a L'ordre* the Case for the Tectonic", 1990, and *Modern Architecture: A Critical History*, first published in 1980, which contains some of Frampton's strongest writing, especially the sections where he powerfully intertwines cultural expression and technological production, from the 17th-century to the near present in the 5th edition (2020). [27]

Inevitably, Frampton's tectonic conception is more persuasive than critical regionalism, not least because the latter is so clearly a mythologization of a wish in the form of a project, while the former is a powerful fairytale – a utopian longing – potentially compelling enough to begin reshaping reality. Perhaps that has less to do with its hopeful narrative than with moribund architecture culture, generally weak teaching in architecture schools, and the corrosive effects of professional cultures, the representative bodies of each,

28 Jameson, *Seeds*, p. 40.

and the downward direction legislated by accreditation – the milieu Frampton by default is constrained to represent, rather than effectively resist.

Though he arrived from practice, Frampton is first and foremost a career academic. Hierarchically organized bureaucratically rational organizations cannot countenance agitation or insurgency. As such, utopian aspiration is incompatible with career progression within institutions. In the event, Frampton is as much consumed by the culture industry as his Institute for Architecture and Urban Studies (IAUS) office-mate Eisenman. But since the tectonic and critical regionalism constituted some form of putative resistance for Frampton, or his contribution to activism, the moment his programs took the form of an aesthetic they could no longer be political in an operative sense, nor could they be art, which is why both tended toward ideology in its bad sense: mythologizing resistance, thereby limiting it to performative displays. Naming critical regionalism and the tectonic were the first missteps on the road toward lost marginality, to become subjects of architecture school modules, learned conferences, and journals, edited collections, or single authored books: just more platitudes for architects to pay lip service to. Despite being compelling, or precisely because of this, the tectonic is neither a form of resistance nor autonomous (difficult) art. It is instead just one stream of professional culture (amongst others) mostly beyond reflection, with its thought structures immune to modes of thinking against itself, dialectically (and negatively). As Jameson observes,

"If, as Adorno came to think, current society reproduces itself by way of practices and habits, and technocracy and consumerism not only no longer require ideational grounding but aim precisely to eliminate the last vestiges of distance implicit in ideas and concepts as such […] then ideological critique loses its mission, and the tracking down and correction of intellectual error is a less urgent ideological and political activity than the elimination of philosophical activity altogether."[28]

Paradoxically, what makes Frampton so much more agreeable than many architecture writers (who fantasize autonomy by way of third level abstraction, while dutifully attending to their careers), also entraps his concepts in a kind of not-political, not-autonomous, not aesthetic netherworld, whereby they too easily become toothless soundbites unable to resist consumption, lacking the robustness to take the first steps towards changing the world. But since revolution remains as far off as ever, its promised redemption constitutes yet another distortion amongst others. At best, all that is possible, and hardly that, are skirmishes with capitalism that must ultimately be self-destroying, not as nihilistic acts of self-abnegation but as autonomous maneuvers capable of fending off – even momentarily – the solvent of consumption.

29 Adorno, 'Functionalism Today'.

The thing Frampton never quite deals with but learned anarchists cannot avoid, is the relative obdurateness of the very structures that all but nullify Frampton's split concepts: aesthetic dictates masquerading as resistance, or resistance masquerading as aesthetic dictates. While Frampton knows the shape of architecture, its tectonic or critical regional potential does not reside in the hands of architects, since the production of space is ultimately out of their control; he does not subject his thinking to the necessary discomforts of thinking against itself, which a negative tectonic must do to do to resist, even quixotically, its immediate devourment. And just as Utopia can be desired but not depicted, or 'Pataphysics is nameable but undefinable, a negative tectonics is a matter of consciousness, not a politics, nor an aesthetics — it has no final form. But as this is an architecture paper, proffering some model seems obligatory, even if only by way of analogy, which brings me to van Eyck and back to Adorno (though other architects and philosophers are available).

Inevitably, alongside Adorno's negative dialectics, taking steps towards a negative tectonics follows a parallel track vigorously laid out by Aldo van Eyck in his extraordinary 1962 essay "Steps Toward a Configurative Discipline", which persists as a surer path to reform for architecture than the tectonic offers, although barely trod by educators, students, or architects. Echoing the substance of van Eyck's proposition, Adorno argues,

"A work must cut through the contradictions and overcome them, not by covering them up, but by pursuing them. Mere formal beauty, whatever that might be, is empty and meaningless; the beauty of its content is lost in the preartistic sensual pleasure of the observer. Beauty is either the resultant of force vectors or it is nothing at all. A modified aesthetics would outline its own object with increasing clarity as it would begin to feel more intensely the need to investigate it. Unlike traditional aesthetics, it would not necessarily view the concept of art as its given correlate. Aesthetic thought today must surpass art by thinking art. It would thereby surpass the current opposition of purposeful and purpose-free, under which the producer must suffer as much as the observer."[29]

Adorno's thought breathes in and out in ways Frampton barely approaches in his thinking. Aldo van Eyck envisioned an architecture likewise, organised around the interstitial in-between referring to psychological ambivalence as to its spatialisation as thresholds, but never primarily abstractly as might be imagined — material prevails as the first point of contact between buildings and their users, manifested by strongly defined structural systems, and forms offered up for continuous appropriations, fully cognisant of the building industry.

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Alfred De Credico and the Tactility of Meaning

The paintings and drawings of Alfred De Credico are presented here as a palate cleanser for the intellect and an opportunity to consider the topic at hand from another perspective.

Anthropologist André Leroi-Gourhan in his important book "Gesture and Speech" argued the hand and mouth guided the development of the human brain (Broca's area in particular) which intimately ties physical making to speech and writing. De Credico's work exemplifies Leroi-Gourgan's premise, fluctuating between legibility and animal action, figuration and material scribing.

The primal marks of De Credico's paintings belie an underlying sophistication: a self-reflective dialogue between an inner voice and active hand, speech begetting gesture as gesture begets speech. De Credico's visceral dialogic marking, scratching, digging, pouring is a kind of calligraphic inscribing activity of the soul. A precursor to the tectonics of language, paralleling this journal's probing of tectonics and language, De Credico's work offers a glimpse of the connective pre-symbolism that binds making, material and language.

Artist's Statement:

The images in my work are intended to function as visual hypertext. Umberto Eco best describes this concept as "a multidimensional network in which every point or node can be potentially connected with any other node." I use historic references, recognizable images, and real objects in my work as well as non-objective calligraphic marks and forms, which become meaningful when, placed in the context of "connection." These elements occupy a non-linear, non-representational, non-western spatial organization and are connected conceptually rather than literally or sequentially. In addition, I explore classical and mythical themes, seen through the filter of contemporary experience.

Drawing is a solitary activity during which the artist engages in the act of creating, not replicating, an experience. IT has the capacity for relevance beyond "aesthetic" – cannot distinguish between the painter or the architect, the sculptor or the designer of objects. IT allows for existence in a place of possibility, between the present and the future, where "knowing" and "discovery" collide and merge.

When I am making a drawing I am continually aware of the seductive nature of the materials I use – I am careful not to succumb to their seduction while allowing them to work their magic. If materials are allowed to take control of a drawing, or if the reason for a drawing is only to explore material means, then "the serious artistic point" of the activity is undermined.

Serious DRAWING is, by necessity, about the abandonment of will and ego as much as it is about embracing them. IT is about contending with the precarious balance that must exist between these aspects of the persona and the inventiveness of the conscious mind.

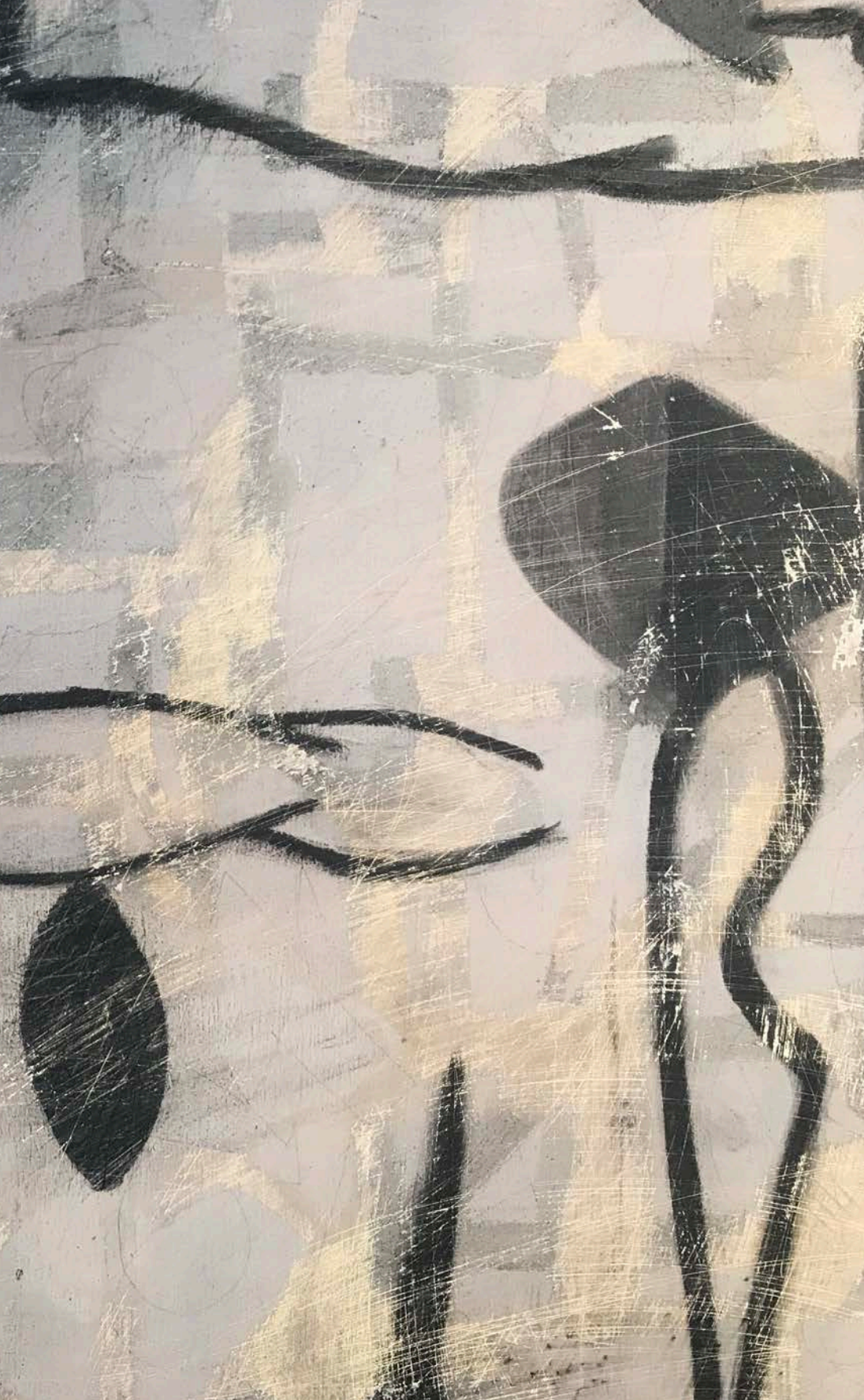
Alfred De Credico—1944 – 2009—was professor of Foundation Drawing at the Rhode Island School of Design for over thirty-years.





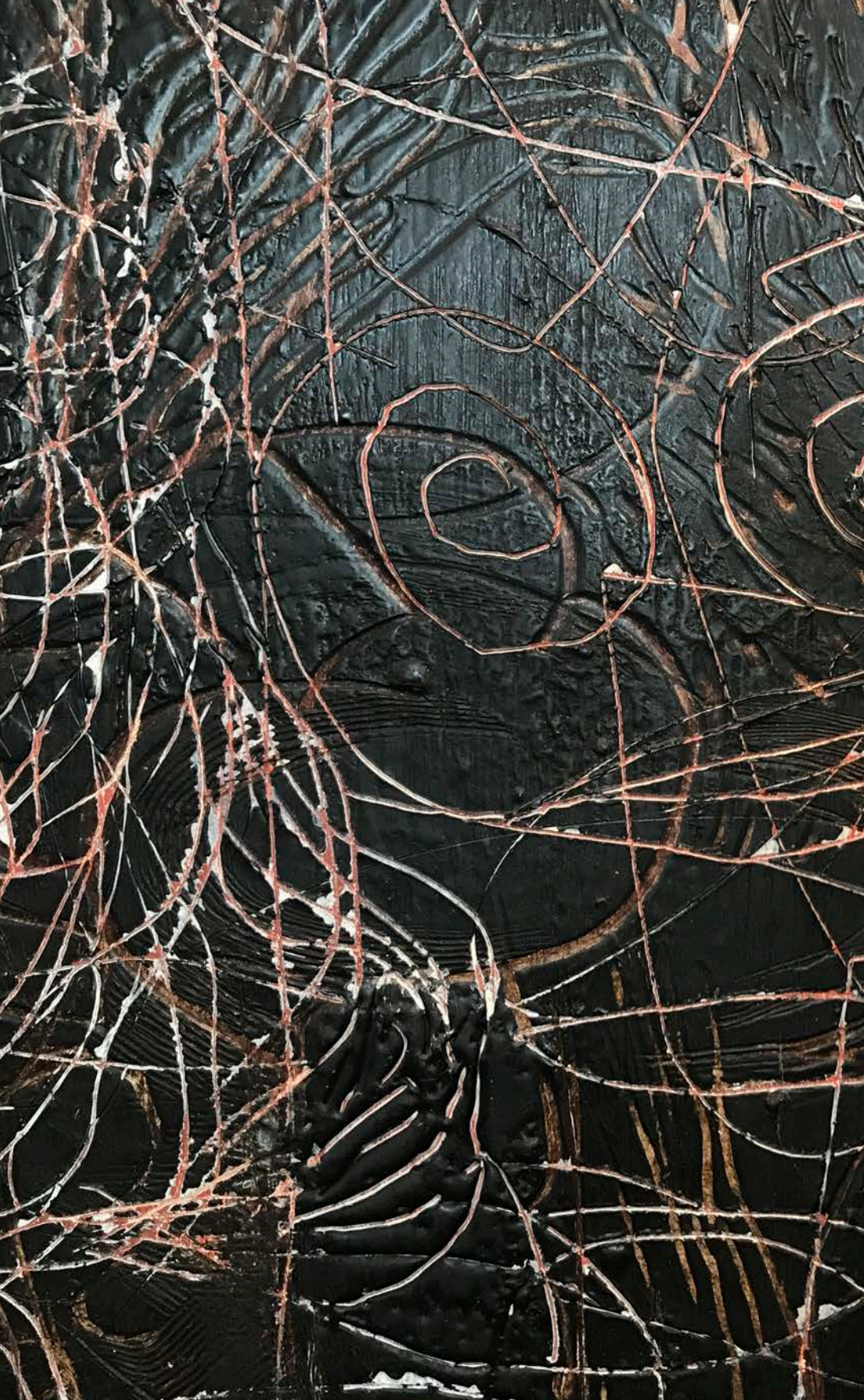




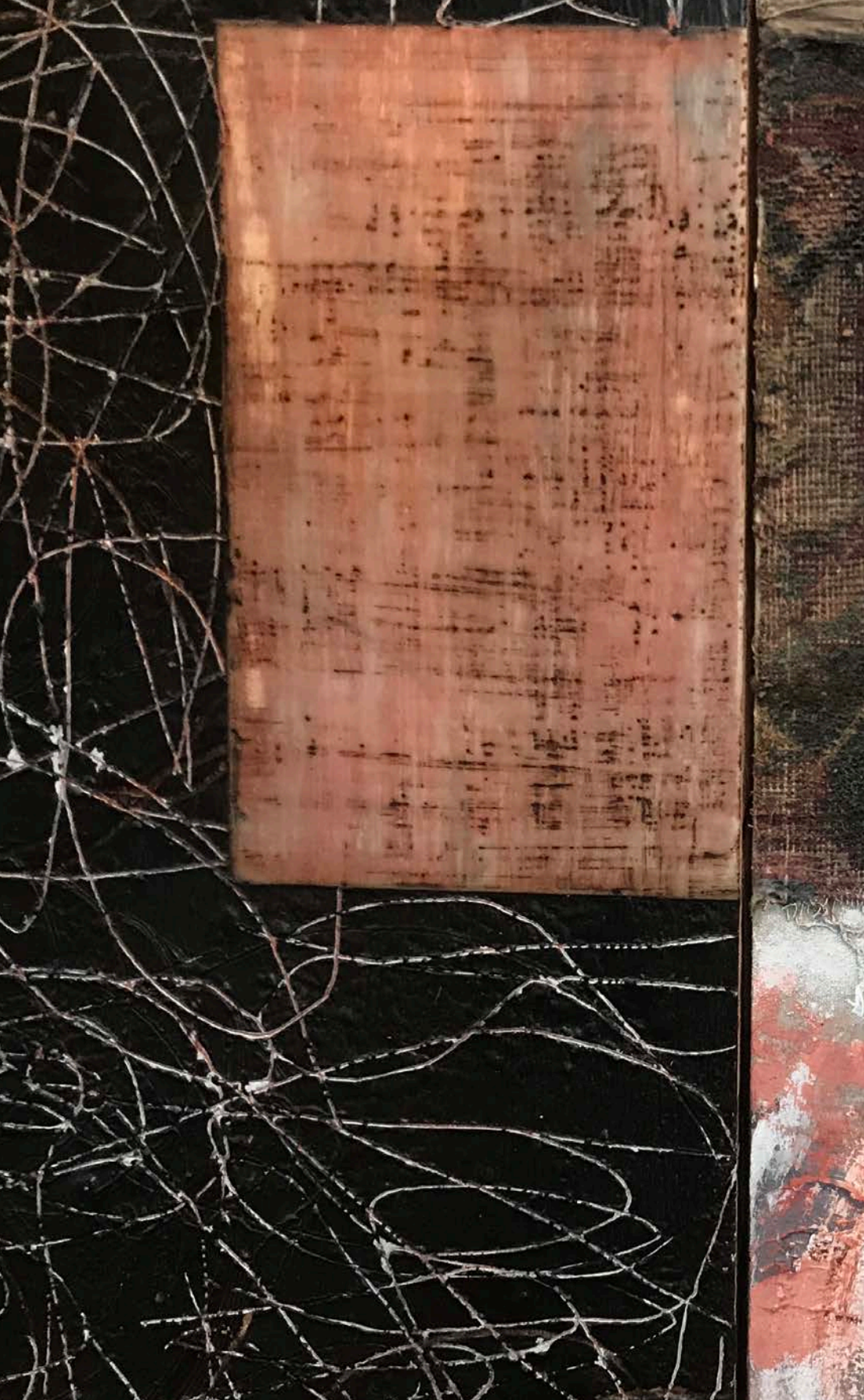




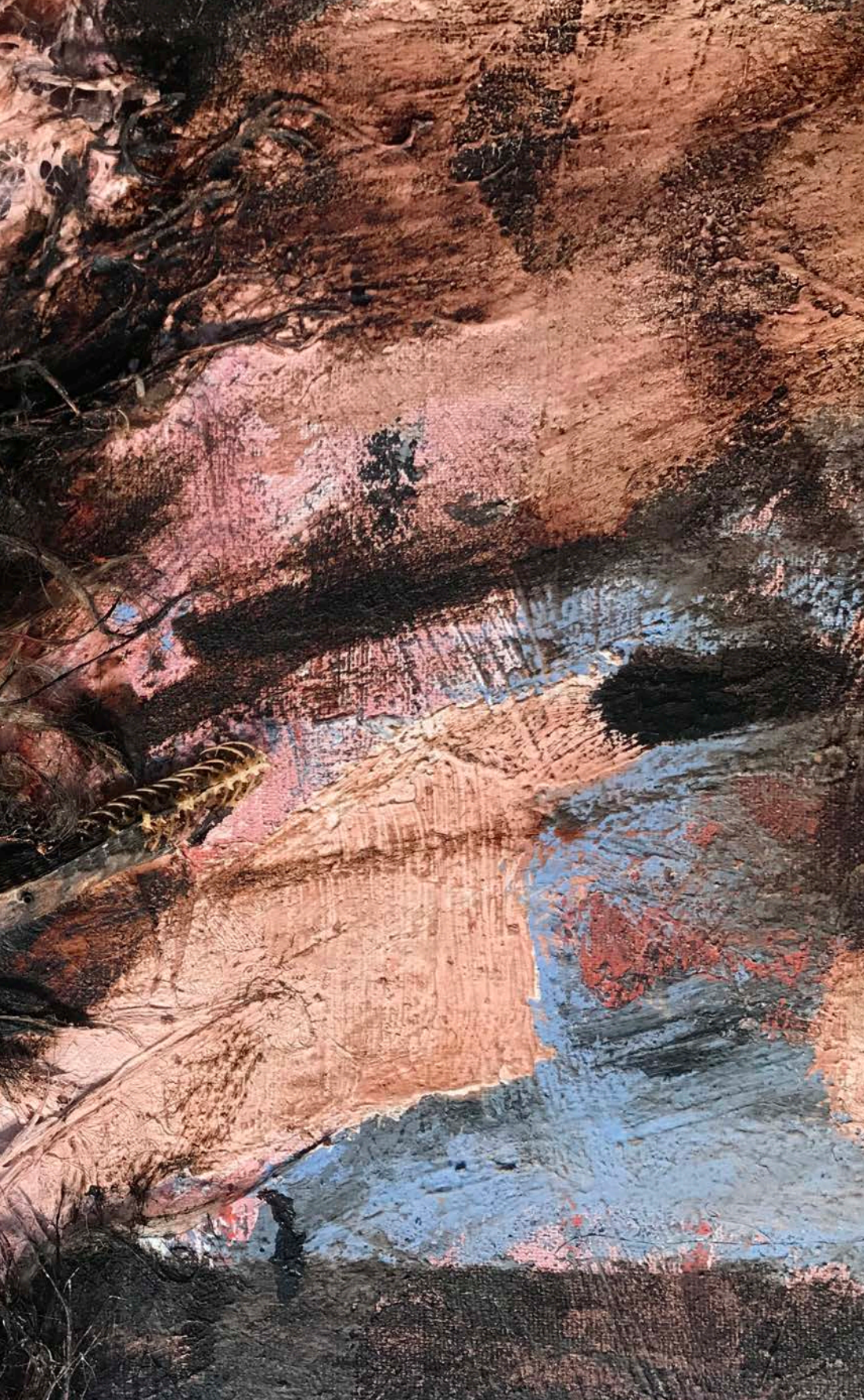




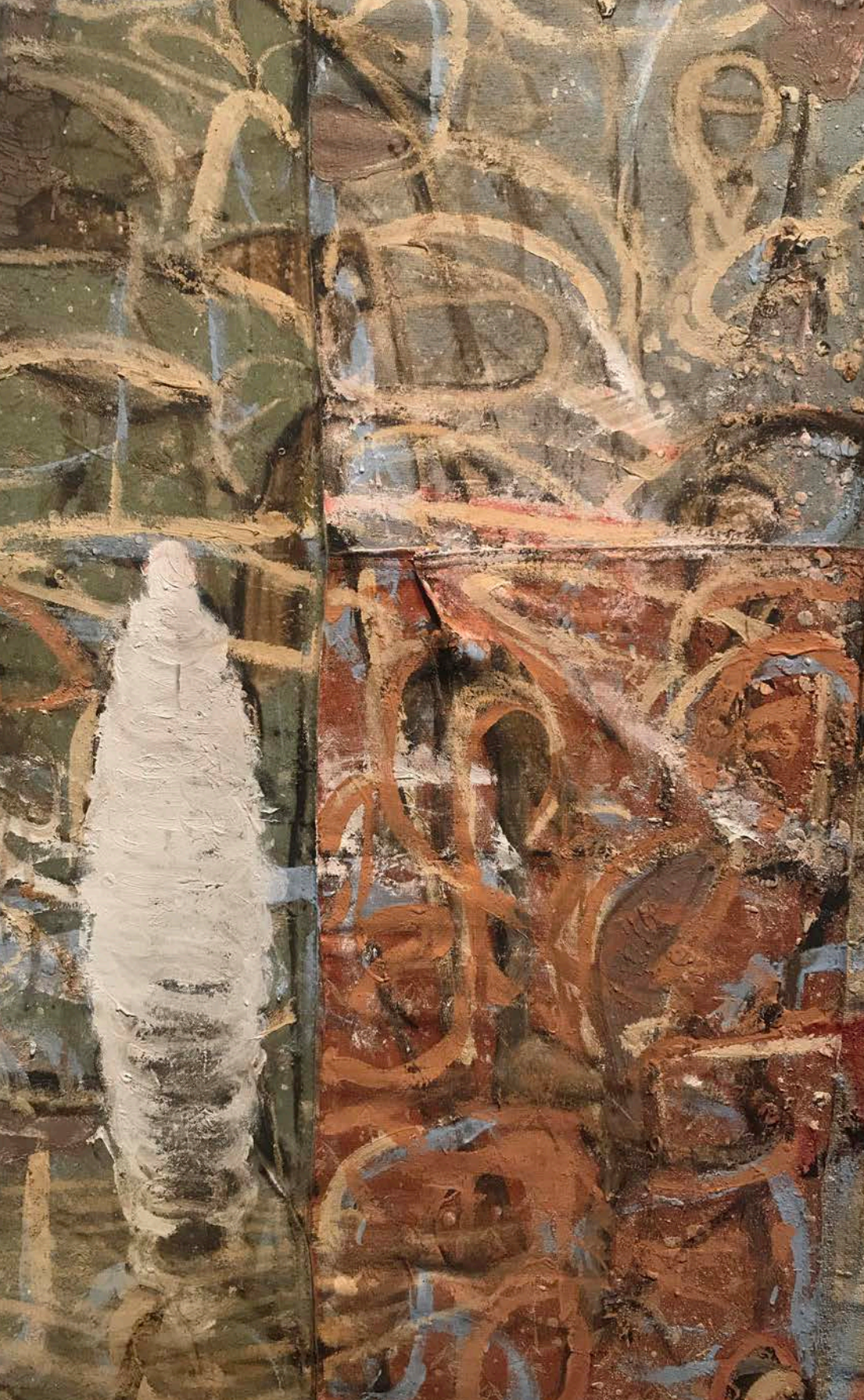














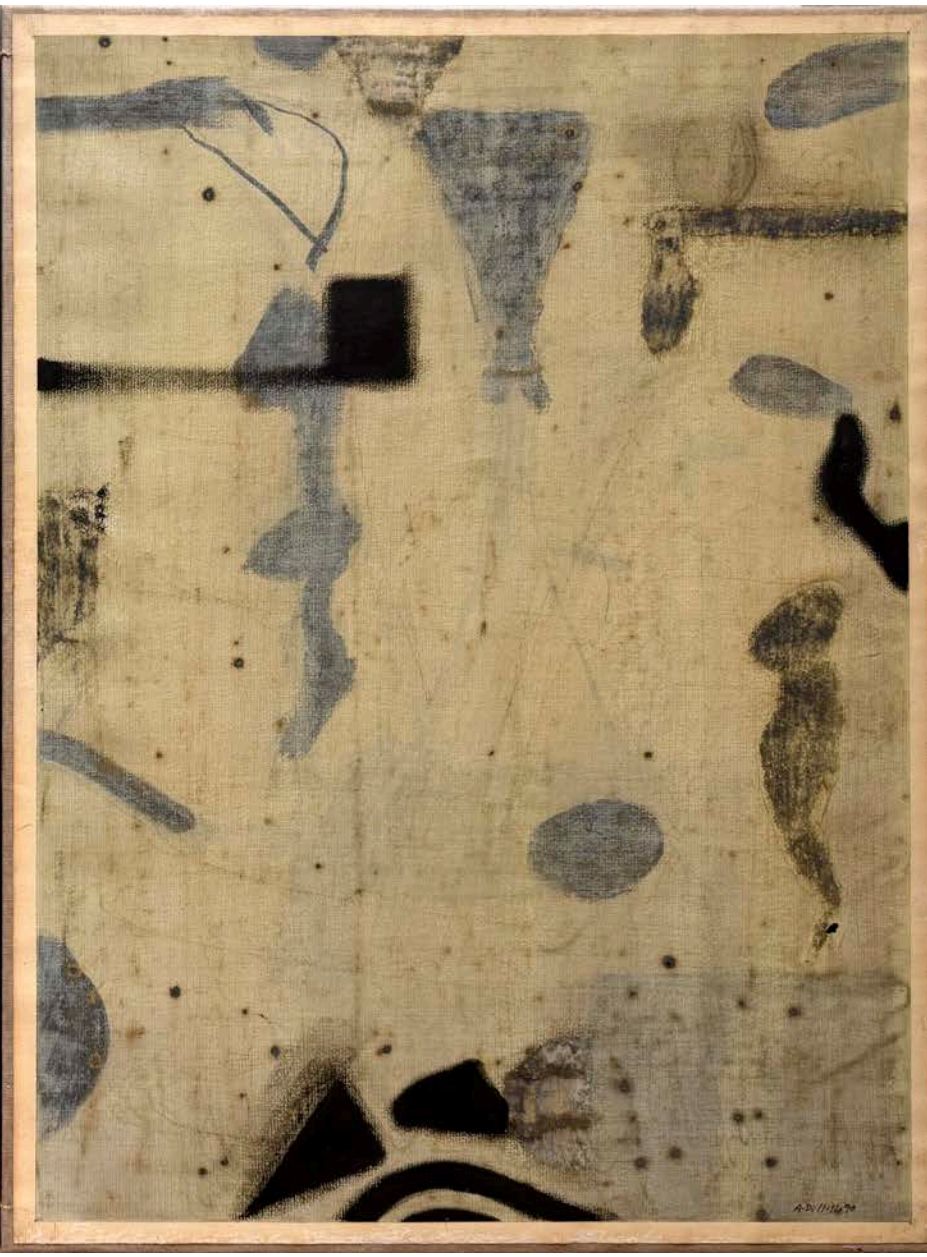


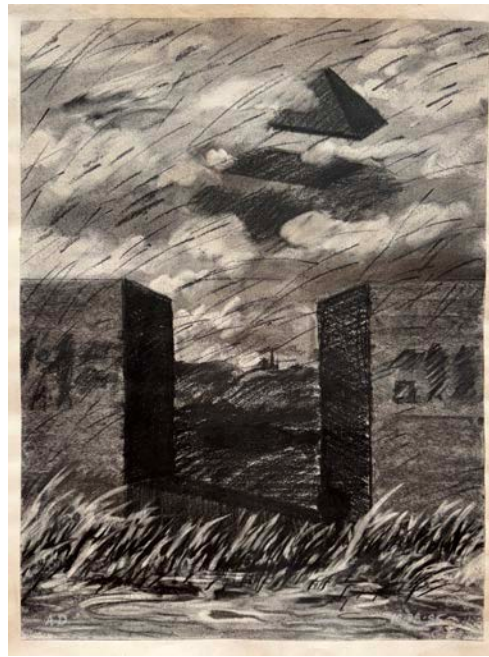












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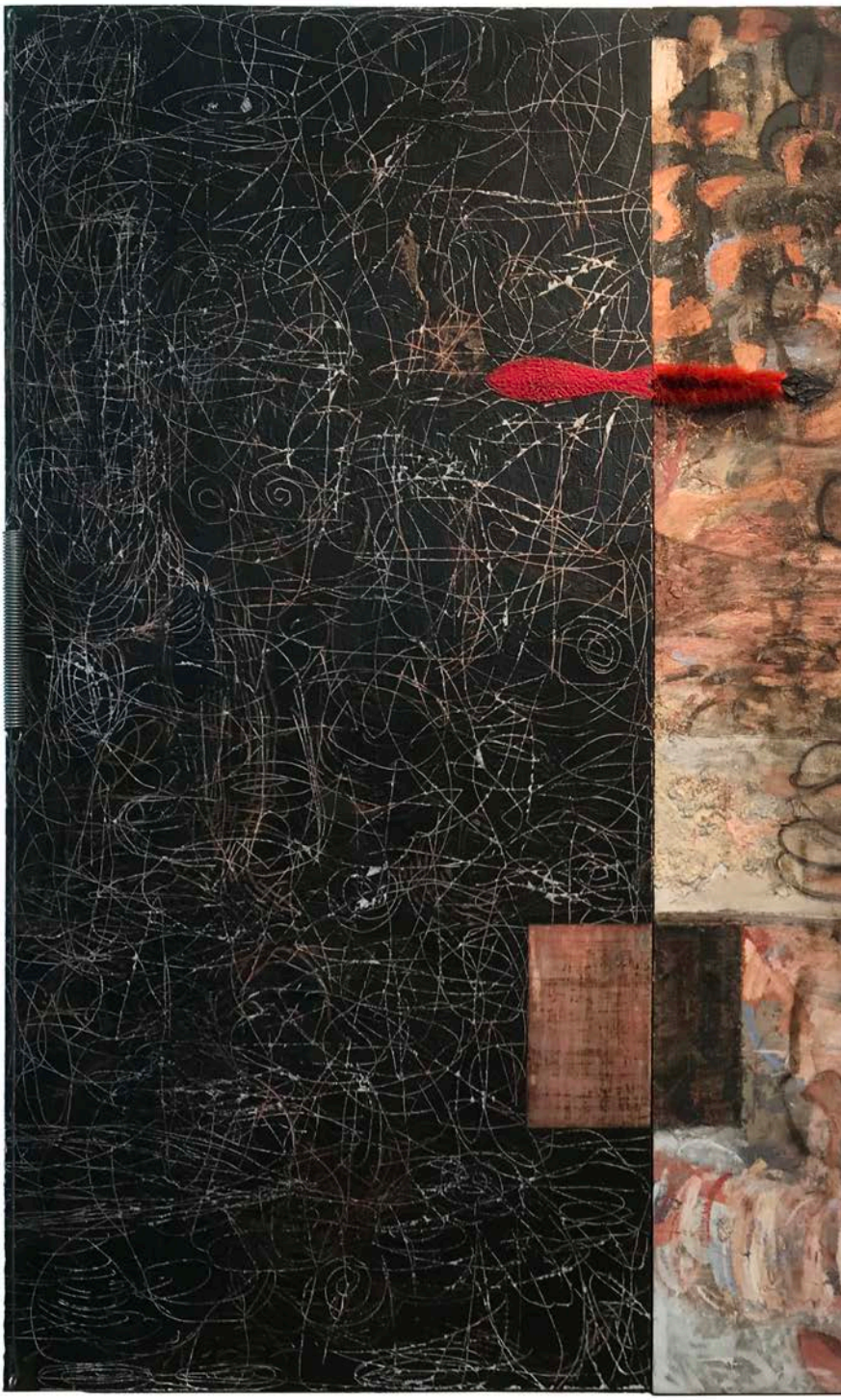
Krahen Uber einem Weizenfeld Crows Over a Wheat Field



Zussmmengesetzt an den Huften Joined at the Hip



Musik fur eine Messe Music for a Mass



The Contemplations of Padre Pio





Broken Toes



The Second Cataract

The Thinning Space of Architecture
AI Image Generation and the Reversal of Design Logic

Anne-Catrin Schultz



1

1 ChatGPT-generated Image. Prompt: Create a contemporary 20-story building in the seaport district of Boston next to the ICA museum with restaurants on the ground floor and apartments on upper floors. (https://chatgpt.com/share/68471ad5-0a7c-8004-93e8-2c573088a57a)

1 Numerous researchers are working on this topic, for example: I. As, S. Pal, and P. Basu, "Artificial Intelligence in Architecture: Generating Conceptual Design via Deep Learning," *International Journal of Architectural Computing* 16, no. 4 (2018): 306–327.

Introduction: The Design Process and Changing Representations

The urgency to address issues related to climate change and other global challenges of the 21st century is placing increasing pressure on architectural production to reconsider conventional approaches to both process and product. The need to conserve the planet's resources and to work towards circular construction is accompanied by the availability of generative digital tools such as AI diffusion models that synthesize images from text-based prompts by composing pixels algorithmically. This essay traces the evolution of the role of drawings in design throughout history and examines the shifting conception of tectonics, linking both themes at the end to the shifts introduced by digital technologies such as AI image generation. **[1]**

While AI tools are emerging for all areas of life and production, AI-generated images might have a specific impact on architecture by moving finalized-looking images to the early schematic design phase, thus changing the format of articulating ideas and defining concepts. First ideas of buildings were traditionally developed through sketches, models, and conceptual diagrams. Architecture representation during the design process evolved from conceptual and abstract to more specific. Perspectives and renderings were typically produced towards the end of the process to share a "real view" of the project with clients and stakeholders.

AI-generated images are generated by deep learning models, typically trained on large-scale datasets comprising millions of images and their associated textual descriptions. When prompted to visualize an image of a speculative architectural concept, the model draws upon patterns learned during its training to synthesize new images. These generative models infer correlations between visual features and linguistic prompts, enabling them to produce outputs that reflect statistical associations between text and image. In response to a prompt related to architecture, the model may generate compositions that are visually compelling, surprising, and even inspiring. However, the results reflect a collage-like amalgamation of stylistic tropes and formal elements, echoing biases embedded in the training data. The statistical associations mentioned above are far from an architect examining precedents and exploring an iterative design process. The output is void of tectonic logic, material and structural performance, or construction methodology. This raises unresolved questions around ethics, intellectual property, and data governance. It might be necessary to adjust the training of designers and of AI models to develop competent new workflows for design ideation.[1] This essay traces the historical evolution of architectural drawing as a crucial part of the design process. It also examines the changing understanding of

2 Spiro Kostof, "The Practice of Architecture in the Ancient World: Egypt and Greece," in *The Architect: Chapters in the History of the Profession*, ed. Spiro Kostof (Berkeley: University of California Press, 2000), 5.

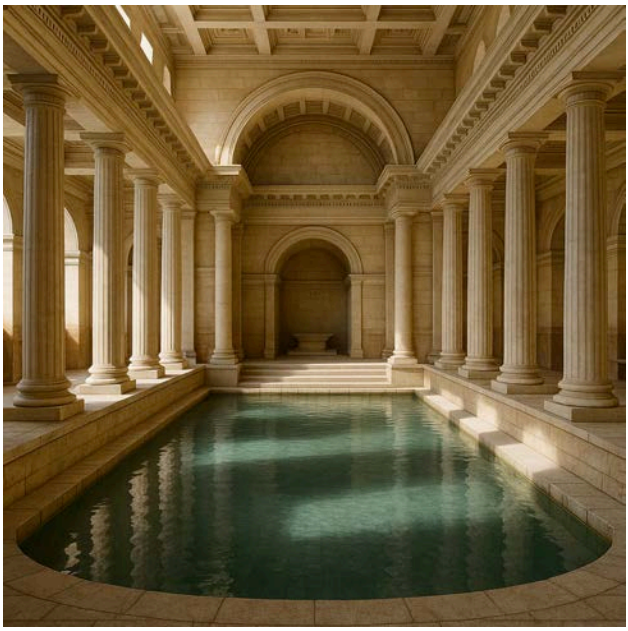
3 Spiro Kostof, "The Practice of Architecture in the Ancient World," 7.

tectonics, linking both themes to the shifts introduced by digital technologies such as AI-driven image generation.

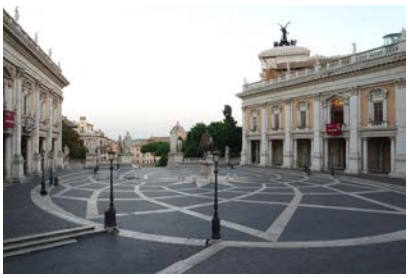
The conception of an architectural design ultimately leading to a building is a complex endeavor. Design is impacted by cultural forces, economic and functional requirements, regional conditions, and technological capabilities, all brought together by the architects' and engineers' approach. 'Design' as an activity represents a problem-solving act that is not limited to architecture but takes place in all professions. There is a specific goal, an appropriate solution, but the problem posed is multifaceted and must be defined and refined throughout the process. Building design frequently evolves from the abstract to the concrete, with precedents and previous examples leading the way. Depending on culture and timeframe, the drivers for architectural production (program, technology, expression, etc.) vary. In ancient Greece, for example, the form and configuration of the iconic Greek temples were given by a higher order. Spyro Kostof states: "The form of the temple must be God-given, and the recipient must be the highest representative on earth of divine authority. This often meant the king." [2] Written instructions for buildings were archived on rolls of papyrus or leather to be consulted by the state architect as necessary. Rulers, squares, and triangles were used to develop and document the design. Drawings were drawn with reed pens on papyrus or leather. [3] Exploring further how design narratives and tectonic frameworks were generated and communicated throughout the architectural design process might illuminate how the increased resolution of formal expression is impacted by AI-image generation. Tectonics in this context is defined as the duality of technology, craftsmanship, and resulting form: the art and science of construction as an indissoluble unit.

Inspired by the architecture of ancient Greece, the Romans also valued proper proportions, believing that proportional relationships ensured both structural stability and formal harmony. Roman architects were less interested in the tectonic systems of their precedents –column orders were flattened as superficies and predominantly applied to facades, exemplified by the Colosseum in Rome.

Inspiration was largely drawn from built examples of Greek architecture and their reinterpretations, aligning politically and culturally with the cultural power communicated by them. The Roman architect, engineer, and theorist Vitruvius gives a sense of the range of drawings to be drawn during the design process: plans, elevations, and perspectives (which he refers to as *scaenographia*). Drawing tools—a compass and ruler—were used to set the outlines of the building. Elevations represented the façades and the building's overall appearance. Beyond recording the geometric information, Vitruvius also refers to the term *sciographia* as "a perception of the building's totality in



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2 ChatGPT-generated Image. Prompt: Generate a Roman temple according to the guidelines written in Vitruvius's Ten Books on Architecture, using Greek architecture as precedent, applying proper proportions but adapting it to Roman culture and programs.(https://chatgpt.com/c/688f8080-b7d8-8004-b0c7-9badad7a3b42)

3 Michelangelo, Capitol Square, Rome, Italy: view from Senator's palace, 2015. Photo by Kameister, CC by 4.0.

4 Cited after Alberto Perez-Gomez, "Architecture as Drawing," in JAE 2 Vol 36 (1982), 3.

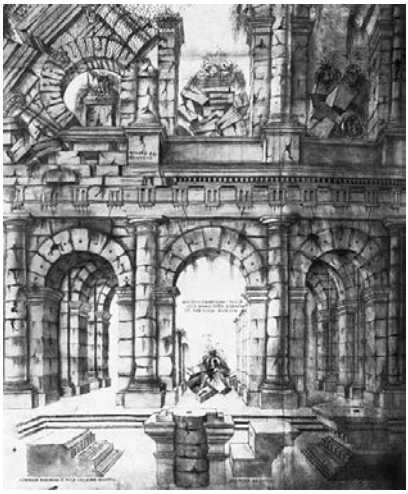
5 Spiro Kostof, "The architect in the Middle Ages, East and West," in Cuff, Dana. 1977. *The Architect: Chapters in the History of the Profession*. Edited by Spiro Kostof. First California paperback printing 2000. Berkeley: University of California Press 64.

6 Spiro Kostof, "The architect in the Middle Ages, East and West," 60.

depth, a view which reconciled the internal and external orders, the plan and the elevation."[4] During Byzantium's architecture production (the end of the Roman Empire), roles and responsibilities in construction started to diversify.[5] **[2]**

The Middle Ages, encompassing diverse phases and territories, from the decline of the Roman empire to the onset of the Renaissance—relied on a range of representational tools, including scaled parchment drawings, full-scale templates of details or building elements, and drawings at full scale, geometrically laid out with compasses and squares. Master masons and carpenters predominantly employed plan drawings to communicate geometric principles and to resolve constructive decisions and details. During this period, architects were less frequently mentioned than patrons—who were often credited with the realization of buildings—and skilled masons.[6] Architectural narratives, typically conveyed through ornamentation, were closely aligned with ecclesiastical authority or the governing aristocracy. The role of the architect evolved into that of the master-builder, a figure responsible for both the conception and supervision of construction. Knowledge and expertise were transmitted through guilds and trade organizations. Visual and tectonic expression emerged largely through the hands of craftspeople, often reflecting regional material practices and artisanal traditions. The rediscovery of perspective by Filippo Brunelleschi in the 15th century—who is believed to have worked predominantly with wooden models—enabled a more effective presentation of spatial experience than was possible through orthographic drawing alone. Artists and architects took advantage of the tool, using section perspectives especially for building interiors. The manner in which the new tools impacted architectural design can be seen in Michelangelo's "constructed" perspective of the Piazza Campidoglio in Rome **[3]** or Michelozzo's design for the Tuscan city of Pienza. As with other tools and technologies, the use of perspective has significantly influenced the architectural design process by shaping the visual representation of space; however, it still necessitates the architect or designer's control over formal expression and the skills needed to construct the drawings. In comparison to the architect's and artist's skills needed to master historic representational tools, AI image generation requires barely any training or expertise—machine learning takes on the generation of the images. This simplification has the potential to shift the architect's role towards a mere curator of machine-generated content, losing agency and abandoning the iterative development of structure and form.

Historically, drawings became the primary medium of architectural communication, while perspective emerged as the essential technique for representing and designing architectural space—fundamentally transforming both design practice and architectural treatises. An impact of this magnitude



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7 Giovanni Antonio Pecci and Giuliano da Sangallo, *Siennese Sketchbook of Giuliano da Sangallo.* Library of Congress. (1490) https://www.loc.gov/item/2021667838/.

8 Alberto Pérez-Gómez, "Architecture as Drawing," Journal of Architectural Education JAE 36, no. 2 (Winter 1982): 2.

9 Alberto Perez-Gomez, "Architecture as Drawing," 2.

10 Mark Hewitt, "Representational Forms and Modes of Conception: An Approach to the History of Architectural Drawing." *Journal of Architectural Education (1984-)* 39, no. 2 (1985): 2–9. https://doi.org/10.2307/1424961. 7.

4 Giuliano da Sangallo: Ruins of the Ancient Roman Theater of Marcellus, 1480s, Vatican Library Collection. Wikipedia Commons, Public Domain.

can be expected from the mechanics of the AI-generated images as well, allowing for an easier amalgamation of different architectural languages and offering a set of new possibilities—and conundrums—for historicizing buildings. The design methods of architects changed with the onset of Humanism influenced by a push to return to antique ideals. Biographers confirm that the architect, goldsmith, and sculptor Filippo Brunelleschi traveled to Rome to learn from the principles of their architecture, working once more with antique precedents. It was common for architects to visit and study Roman ruins to fill sketchbooks with measured as-built drawings, such as the ones by Giuliano da Sangallo (1445–1515).[7] **[4]** These drawings were used to educate masons and builders back home, taking on the role of pattern books. Many others produced sketchbooks and drawing collections as well as theoretical writings to instruct architects about reviving antiquity. Treatises increasingly distinguished the architect developing buildings from the mason and carpenter executing them. Text and drawings operated simultaneously as instructions and a theoretical basis for architecture, while precedents served as examples to learn from. All these elements of the design process remain crucial when prompting AI to generate drawings or images. However, the elements are not directly emerging out of the designer's personal study, experience, and evaluation. Technology has always been disruptive: the invention of the printing press fundamentally transformed the dissemination of information, making it accessible to a significantly broader audience. This technological breakthrough marked a revolution in information processing, comparable in scope and impact to the transformations currently unfolding with the rise of generative AI. *Disegno, encompassing both drawing and perspective,* emerged as the conceptual and practical foundation of the architect's role, extending from ideation to the management of construction. As Alberto Pérez-Goméz notes, the "Renaissance architectural drawing was perceived as a symbolic intention to be fulfilled in the building, while remaining an autonomous realm of expression."[8] The architect recognized "that the distance between idea and matter, between design and construction, would be reconciled through his own involvement in building."[9] These observations highlight the enduring significance of precedents and representation—both visual and textual—throughout the history of architectural design.

Renaissance artists also cultivated the use of sketches as part of the design process. Leonardo da Vinci is credited with the trial-and-error mode of design,[10] using abstract sketches as the basis of the development of design and ideas. In the centuries following the Renaissance, architecture as a profession, discipline, and educational field became increasingly formalized. Architectural publications began to provide theoretical and methodological grounding for practice. The École des Beaux-Arts in Paris influenced not

11 Witold Rybczynski, "Ideas in Architecture," *The Yale Review* 101, no. 4 (2013): 1.

12 Dalibor Vesely, *Architecture in the Age of Divided Representation: The Question of Creativity in the Shadow of Production* (Cambridge, Mass.: MIT Press, 2004), 17.

13 Dalibor Vesely, *Architecture in the Age of Divided Representation*, 17.

14 Dalibor Vesely, *Architecture in the Age of Divided Representation*, 17.

15 Dalibor Vesely, *Architecture in the Age of Divided Representation*, 17.

only architectural education in the 19th century and beyond, but also shaped traditions of a detail-oriented, rendered version of architectural representation and thus deeply influenced the way ideas were transmuted, communicated, and visualized. Representations aimed at showing architecture in its monumental state and idealized reality. A curriculum based on competitions supported skill building and the advancement of visualization techniques. The selection of a 'parti' was crucial and would potentially guide the solution along a set of conditions given by the parti. [11] The Beaux-Arts representational conventions were replaced by a focus on technology and functionality as a driving force for design and expression. Architecture historian and theorist Dalibor Vesely writes:

"The primary conditions for a new relationship between architecture and technology were first established in the seventeenth century when a gap opened up between the traditional symbolic and instrumental representation. In this period, in the late seventeenth and the early eighteenth century, architectural thinking, which had always been closely associated through its long history with the mathematical representation of its principles, was overtaken by the new developments in the natural sciences." [12]

This shift contributed to the establishment of engineering schools, which formalized the separation between structural and performance-based education and that of architectural design. Vesely identifies this period, beginning in the early 18th century, as marked by the "growing arbitrariness of architectural decision making," [13] a waning interest in classical traditions, and what he describes as a "discontinuity between the means and the content of representation." [14] Despite these shifts, Vesely argues that the "dual nature of symbolic and instrumental representation was preserved in the cultural memory" [15] across centuries.

In the late 19th and early 20th centuries, various movements sought to reconcile technology with architecture. However, in doing so, technology itself often became the dominant force, displacing the layered architectural narratives of the past. The 20th-century efforts to codify the principles of design into rational laws and rules have proven insufficient in capturing the qualitative dimensions that contribute to a building's quality. Along with a strong belief in rational functionality and the precision of technical drawing, artistic movements, such as Cubism, introduced the concept of fragmental representation through collage in both fine arts and architecture. This approach allowed for the simultaneous presence of elements from different contexts and media. Pioneered by artists such as Pablo Picasso and Georges Braque, the tendencies around cubism included abstracted ideas of space by means of geometric shapes, frequently with a political leaning embedded.

16 Colin Rowe and Robert Slutzky, "Transparency: Literal and Phenomenal," *Perspecta* 8 (1963): 45–54.

17 See a more comprehensive theory of layering in architecture by author: Anne-Catrin Schultz, *Carlo Sarpa: Layers* (Stuttgart: A. Menges, 2007) and Anne-Catrin Schultz, Time, Space, and Material: The Mechanics of Layering in Architecture (Stuttgart: Edition Axel Menges, 2015).

The technique of combining photography and drawing to convey conceptual and spatial ideas was adopted by Mies van der Rohe and many others, serving as a generative representational strategy across a range of architectural projects. Collage, as a design methodology, enabled the integration of diverse visual media and content into one composition. Overlapping possibly unrelated fragments of space are simultaneously perceived, a phenomenon later examined as literal and phenomenal transparency.[16] Le Corbusier and others would translate the layered concepts[17] into three-dimensional architectures, where overlapping spatial conditions could be experienced concurrently. While traditional graphic collages retain visible seams and discrete edges, AI-generated imagery tends to produce seamless integrations—collages in effect, but not in appearance. This shift, prefigured by the sophisticated use of digital tools like Adobe Photoshop, marks a transition in representational aesthetics from the visibly composite to the algorithmically synthesized.

The Reversal of Tectonic Syntax

Over the course of history, changes in formal expression have coincided with social evolution and technological progress. The early ideas regarding tectonics emerged from the analysis of Greek temples, where construction and expression were understood as inherently linked. The discovery that Greek temples were originally covered in a layer of paint (highlighting sculptural and architectural details) challenged prevailing perceptions of Greek architecture, revealing a layered system that told stories through both structure and ornamentation. These archaeological findings, along with the ongoing search for the appropriate architectural expression in industrializing societies, initiated the discourse of architectural tectonics. In the 19th Century, German archaeologist Karl Friedrich Boetticher examined architectural expression based on underlying structural and functional necessity, differentiating ontology from representation. He argued that a building's ornamental layer narrates its structural and material conditions, thereby uniting the two into a single entity. Decorative elements illustrate the mechanical forces or material conditions of the structure. Gottfried Semper expanded this discourse with a comprehensive examination of artistic language connected to practical and material conditions of craftsmanship. He traced the origins of architecture to textiles. For Semper, one of the most important elements of architecture is derived from the knot created to connect yarn or terminate woven fabric. Translated into built form, the knot became the joint or connection detail between components. The knot represented the beginning of all expressive details and a tool for material transformations that would reverberate through the forms of previous technologies, even when



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5 ChatGPT-generated Image. Prompt: Please design a contemporary building programmed as an office building. Consider the tectonic theories of Gottfried Semper and make sure the facade expresses architecture's roots in the textile arts. (https://chatgpt.com/c/687d29ad-c654-8004-9f8c-7db6cff06c44)

18 Kenneth Frampton, *Studies in Tectonic Culture; The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, edited by John Cava (Cambridge, MA: MIT Press, 1995), 2.

20 J. Reiser and N. Umemoto. *Atlas of Novel Tectonics* (New York: Princeton Architectural Press, 2006), 23.

21 J. Reiser and N. Umemoto. *Atlas of Novel Tectonics*, 23.

22 Anne Beim, *Towards an Ecology of Tectonics: The Need for Rethinking Construction in Architecture* (Copenhagen: The Royal Danish Academy of Fine Arts, Schools of Architecture, Design and Conservation, 2014), 20.

23 N. D. Leach, D. Turnbull and C. Williams. *Digital Tectonics* (Chichester: Wiley Academy, 2004).

24 W. Jabi, "Digital Tectonics: the intersection of the physical and the virtual" Paper presented at ACADIA, http://papers.cumincad.org/data/works/att/acadia04_256.content.pdf

materiality had changed from soft textiles to brick and stone. In the 20th and 21st centuries, theorists continued the explorations around tectonics, expanding its scope from the building as a separate object to a larger context of global and regional conditions. **[5]**

The architect, theorist, and educator Kenneth Frampton is well-known for writings that examine tectonics at a time when industrialized construction dominated architecture production. Frampton clarifies that his study does not seek to deny the volumetric character of architectural form, but rather aims "to mediate and enrich the priority given to space by a reconsideration of the construction and structural modes by which, of necessity, it has to be achieved."[18] He further emphasizes that the 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."[19] This emphasis on the spatiality of architecture beyond its visual qualities is particularly noteworthy. Frampton initiated a renewed and more differentiated look at tectonics, re-introducing the poetic and symbolic notions of construction during a time when modern and postmodern architecture had revealed its deficiencies.

In 2006, architects Jesse Reiser and Nanako Umemoto published an 'Atlas of Novel Tectonics,' shifting the discourse from a static exploration to a dynamic one shaped by digital tools. They describe the transformation they observed: "We've gone from seeing temporal work in contrast to permanent architecture to seeing the temporal entering into the very fabric of architecture itself, rendering it ambient. […] We assert the primacy of material and formal specificity over myth and interpretation."[20] For Reiser and Umemoto, the question no longer focuses on the question "What does this mean?" but "What does this do?"[21] While Gottfried Semper explored methods of making rooted in materiality and craftsmanship– along with the transformations of materials over time–computational design and digital fabrication methods have fundamentally altered how construction-related problems are approached and resolved. Therefore, the question becomes "how is this done?" Variables have shifted and continue to shift from specific products and trade conventions to parametric operations that are only recognizable as such but not readable to the user. Contemporary tectonic theories moved beyond the traditional expression of structural loads and material-appropriate craftsmanship to encompass the influence of digital tools and the environmental crisis, thereby linking the discourse to broader contemporary themes. Anne Beim articulates an ecology of tectonics, embedding "the concept of buildings as parts tied together as a whole in a broader context of natural and cultural systems."[22] In the early 2000s, theories of "Digital Tectonics"[23] emerged, operating at "the intersection of the physical and the virtual."[24] These theories explored the relationship between fabrication and the

25 Branko Kolarevic, "Digital Fabrication: Manufacturing Architecture in the Information Age," in *Proceedings of the 21st Annual Conference of the Association for Computer Aided Design in Architecture (ACADIA)*, Buffalo, NY, October 24–27, 2001 (2001): 270.

26 Rivka Oxman, "Informed Tectonics in Material-Based Design," *Design Studies* 33, no. 5 (2012): 427.

27 Antoine Picon, "Architecture and the Virtual: Towards a New Materiality," *Praxis: Journal of Writing + Building* 6 (2004): 117.

28 Antoine Picon, "Architecture and the Virtual: Towards a New Materiality," 117.

29 Antoine Picon, "Architecture and the Virtual: Towards a New Materiality," 118.

30 Antoine Picon, "Architecture and the Virtual: Towards a New Materiality," 119.

assembly of complex forms, merging tools of representation with those of production and construction. Branko Kolarevic notes, "The predictable relationships between design and representations are abandoned. The typological, curvilinear geometries are produced with the same ease as Euclidean geometries of planar shapes and cylindrical, spherical, or conical forms."[25] Digitalization has also disrupted the predictable connections between structure, materiality and expression. In this context Rivka Oxman introduces the term "informed tectonics"[26] as a concept of material-based design, examining a shifting taxonomy and new digitally driven materiality. Antoine Picon describes the transformation in material culture resulting from digital tools as the ability to manipulate light and texture in an infinite combination of factors.[27] He observes that these surface conditions allow any image to be mapped onto facades and architectural elements, often devoid of the tectonic implications of physical materiality.[28] Picon also states that the gap between digital representation and traditional tectonics is not synonymous with a dematerialization of architecture, but merely a redefinition of materiality.[29] Picon advocates for a redefinition of design objectives and procedures, a new visual practice with the potential to navigate both local and global contexts. In times of crisis and instability the "distinction between abstraction and concreteness"[30] become increasingly blurred. This is further evidenced by a shift from abstract sketches and conceptual diagrams during the schematic design phase to fully rendered images of finalized buildings generated from brief textual descriptions. The evolution of tectonic theories mirrors the changing landscape of digitalization of the design process, which simultaneously reflects the cultural changes of everyday life. Again, it becomes evident that tools change process and outcome. As we remain immersed in the screens of our cell phones, our perception of materiality becomes almost constantly mediated by images. Architecture has not dematerialized but has absorbed some of the surface characteristics of the image-saturated world in which it operates.

Historically, the relationship between drawings and tectonics in the design process was closely tied to the moment of transition between representation to making, the handover to construction. In the industrialized content of the 20th century, the design process typically followed a sequence of phases: schematic or conceptual design, design development, and construction or execution drawings. Perspectives and renderings were often produced later in the process, either to reassure clients that the project was progressing as intended or to market the building to its future audience. With the decline of trade conventions and traditional materiality—particularly the shift toward industrialized construction products—the generation of generative ideas (understood by the general public) became more arbitrary and



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6 Chat GPT-generated Image 1/3.
Prompt 1: Produce an image of a 2-story building that is aware of tectonic conditions (structure, gravity etc.) and interprets the architecture of Carlo Scarpa. (https://chatgpt.com/share/68421aca-dc68-8004-ab14-02581aad33af)

7 Chat GPT-generated Image 2/3.
Prompt 2: This is very monolithic, please add a few overhangs, a wood trellis, and a more proper, distinguished roof structure please.

8 Chat GPT-generated Image 3/3.
Prompt 3: This looks too much like it was borrowed from Japanese architecture. Could you please keep the roof lines straight and more modern? Also add some color (blue) to the building?

31 Mario Carpo, *The Second Digital Turn: Design Beyond Intelligence* (Cambridge, MA: MIT Press, 2017). 4.

32 Douglas C. Engelbart, *Augmenting Human Intellect: A Conceptual Framework* (Menlo Park, CA: Stanford Research Institute, 1962) https://www.dougengelbart.org/pubs/papers/scanned/Doug_Engelbart-AugmentingHumanIntellect.pdf

individual. According to Mario Carpo, this first digital turn in the 1990s allowed the variability that architects, designers, craftsmen, and engineers craved. "Technology was meant to produce variations, not identical copies; customized, not standardized products."[31] The road to mitigating the scale of standardized mass production and the embedded technical logic was and is long. The cost structure of digitally manufactured construction elements is different from the conventionally industrialized version. **[6][7][8]**

The Evolution of Artificial Intelligence in Architecture

The impact of digital tools on the architecture design process and ultimately on the built environment can hardly be overstated. Computers have transformed the visualization and production of architecture, ultimately changing the way architectural form itself is conceived and configured. Conceptual design in architecture has long served as a bridge between past experiences and contemporary problem-solving, enabling the development of new spatial and formal ideas. Precedent studies remain integral to architectural practice (and education), offering inspiration and insight from existing built works, while sharing symbolic content. Computer-Aided Design (CAD) revolutionized the design process and the production of drawings or models required for construction, eventually evolving into Building Information Modeling (BIM). The design sequence, once rooted in hand-drawn sketches on tracing paper and inked vellum, transitioned to digital representations of lines and volumes on screen. Artificial Intelligence also emerged in the 1950s and 60s as general problem-solving machines. Paving the road for the presence of AI in design and beyond, a report written at Stanford in 1962 by Douglas C. Engelbart[32] proposed that the integration of object-based design, parametric operations, and relational databases could elevate architectural problem-solving. While the report showcases the great potential of a general augmentation of the human intellect through the digital "clerk," Engelbart uses an architect's workflow as an example:

"Let us consider an 'augmented' architect at work. He sits at a working station that has a visual display screen some three feet on a side; this is his working surface and is controlled by a computer (his 'clerk') with which he can communicate by means of a small keyboard and various other devices. He is designing a building. He has already dreamed up several basic layouts and structural forms and is trying them out on the screen. The surveying data for the layout he is working on now have already been entered, and he has just coaxed the 'clerk' to show him a perspective view of the steep hillside building site with the roadway above, symbolic representations of the various trees that are to remain on the lot, and the service tie points for the different

33 Douglas C. Engelbart, *Augmenting Human Intellect: A Conceptual Framework*, 4.

34 Nicholas Negroponte, The Architecture Machine (Cambridge, MA: MIT Press, 1970), 1, https://monoskop.org/images/1/1f/Negroponte_Nicholas_The_Architecture_Machine_1970.pdf.

35 Nicholas Negroponte, The Architecture Machine, 9.

36 INDESEM, "AI and the Future of Architecture – Neil Leach | INDESEM 2023," YouTube video, 1:08:46, posted June 2, 2023, 4:29, https://www.youtube.com/watch?v=SZ3JOkQXRK0.

37 Vilém Flusser, "The City as Wave-Trough in the Image-Flood," *Critical Inquiry* 31, no. 2 (Winter 2005): 324.

utilities. The view occupies the left two-thirds of the screen. With a 'pointer,' he indicates two points of interest, moves his left hand rapidly over the keyboard, and the distance and elevation between the points indicated appear on the right-hand third of the screen. […]"[33]

Engelbart's vision of AI has, in part, materialized over the last decades. In 1969, Nicolas Negroponte voiced concerns that many might still share about architecture created by machines: "Computer-aided design cannot occur without machine intelligence — and would be dangerous without it. In our era, however, most people have serious misgivings about the feasibility and, more importantly, the desirability of attributing the actions of a machine to intelligent behavior. […] As soon as intelligence is ascribed to the artificial, some people believe that the artifact will become evil and strip us of our humanistic values. Or, like the great gazelle and the water buffalo, we will be placed on reserves to be pampered by a ruling class of automata."[34] Negroponte also anticipated that the future fluid and capable machines would remove the barriers between architects and computing machines, changing the professional structures along the way. He writes: "With natural communication, the 'this is what I want to do' and 'can you do it' gap could be bridged. The design task would no longer be described to a 'knobs and dials' person to be executed in his secret vernacular. Instead, with simple negotiations, the job would be formulated and executed in the designer's own idiom. As a result, a vibrant stream of ideas could be directly channeled from the designer to the machine and back."[35] Negroponte's vision appears strikingly accurate in light of today's large language models. The 1990s saw the rise of neural networks and machine learning, which entered the mainstream discourse and application. AI has gained increasing visibility in architecture in the 2000s, with significant advancement and easier access in the 2020s. Neal Leach looks for the "logic informing these systems,"[36] which is necessary to comprehend the tectonic consequences of AI in the design process.

From Idea (image) to Building

The impact of the overwhelming presence of images has been the subject of commentary by theorists since the 1990s and early 2000s: Vilem Flusser observed the phenomenon of the "image flood," (referring to photographs and film) foreshadowing the intensified concentration of images on our cell phones in the 21st century. He writes, "We are accustomed, for example, to see the solar system as a geographic place in which individual bodies orbit around a larger one. We see it as such because it has been shown to us in images, not because we have perceived it with our own eyes."[37] Architect and theorist Juhani Pallasmaa attributes the bombardment of visual imagery to

38 Juhani Pallasmaa. *The Embodied Image: Imagination and Imagery in Architecture* (Chichester: John Wiley & Sons Inc. 2011), 14.

39 Juhani Pallasmaa. *The Embodied Image: Imagination and Imagery in Architecture*, 14.

40 Juhani Pallasmaa. *The Embodied Image: Imagination and Imagery in Architecture*, 14.

41 Juhani Pallasmaa. *The Embodied Image: Imagination and Imagery in Architecture*, 19.

42 Alberto Perez-Gomez, "Architecture as Drawing," 6.

43 Alberto Perez-Gomez, "Architecture as Drawing," 6.

44 The AI tools that are able to link conceptual images to plans, sections, structure and symbolic narrative might exist at some point. This essay is examining the effect that image generation has that is limited to a visual of the exterior of a building/complex in schematic design.

mass consumerism and globalized economies.[38] He calls the profusion of images "a kind of suffocation in an endless Sargasso Sea of Images,"[39] giving rise to "an oppressive feeling of excess and eutrophication. He argues that the physical world, cities, and natural environments are all colonized by the (short-lived) image industry, questioning if the prevalence of the image pushes humankind back to prehistoric times of "gestures and images."[40] Pallasmaa argues that the physical world has become a "pale reflection of the image," possibly leading to the demise of imagination. For him, historic architecture was a vehicle to convey narratives and embody the meaning of stability far beyond individual consumption. As if foreseeing the intensified loss of tectonic intention through AI-generated imagery, he writes:

"Today's forceful imaging techniques and instantaneous architectural imagery often seem to create a world of autonomous architectural fictions, which totally neglect the fundamental existential soil and objectives of the art of building. This is an alienated architectural world without gravity and materiality, hapticism, and compassion."[41]

Pallasmaa refers to an absence of tectonics, a lack of material presence that is brought about by a reality increasingly dominated by images. Flusser's *image flood* and *Pallasmaa's Sargasso Sea of Images* have only expanded in scale. Prompting an AI image generation tool to suggest a design for a building initiates the process with an amalgam of references, seemingly collaged into a proposed visual. If the role of a conceptual drawing is the "embodiment of architectural ideas,"[42] what, precisely, is the role of the rendering or AI-generated image? Alberto Perez-Gomez asserts that: "Drawing is the architecture, a privileged vehicle for expressing architectural intentions: intentions that are poetic in a profound traditional sense, as poesis, as symbol making."[43] The question of whether architectural design process can or should be based on AI-assisted image generation of final buildings evokes centuries-old debates about architectural production. Issues of design representation, construction technology, and tectonics remain deeply intertwined. AI-generated images are produced by models trained on extensive datasets of existing images paired with textual annotations, reflecting historical visual patterns rather than introducing novel creative concepts. Assuming a concept idea emerges through a written prompt, the simultaneous consideration of plan organization, access, sectional relationships, etc., must still to be addressed separately; they are not (yet) integrated into the tool.[44] The intentional message must come from the architect (or anyone else); political and cultural associations are difficult to trace unless explicitly embedded in the prompt. Architectural elements and forms drawn from a variety of contexts can't convey a coherent cultural message – editing is necessary to maintain control of the narrative, especially since AI's sources and inspirations remain



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45 See more about layering in architecture: Anne-Catrin Schultz, Time, Space, and Material: The Mechanics of Layering in Architecture (Stuttgart: Edition Axel Menges, 2015).

46 Alicia Imperiale, *New Flatness: Surface Tension in Digital Architecture* (Basel: Birkhäuser, 2000), 5.

47 Herzog & de Meuron, "166 IKMZ BTU Cottbus – Information, Communications and Media Centre, Brandenburg University of Technology," Herzog & de Meuron, accessed August 1, 2025, https://www.herzogdemeuron.com/projects/166-ikmz-btu-cottbus-information-communications-and-media-centre-brandenburg-university-of-technology/.

9 Herzog and De Meuron, West-north-western view of the library of the Eberswalde University for Sustainable Development in Eberswalde, Eberswalde municipality, Barnim district, Brandenburg state, Germany 2005. CC BY-SA 4.0, (Photo: KAORYK)

10 Herzog and De Meuron, University library in Cottbus by the architects Herzog & de Meuron, 2005. CC BY-SA 3.0 (photo: Alexandru.giurca)

completely unknown. AI-generated images represent a form of collage that is much more advanced than the fragmented collages of the early 20th century design. The elements are fused into a seamless whole, and the layered overlaps that once allowed for the simultaneous existence of discrete objects and spatial narratives are no longer readily apparent.[45]

The rise of social media, the use of Pinterest boards (and other similar websites and applications) in design, and society's increasing focus of society on imagery have contributed to the evaluation of architecture primarily through visual appearance rather than spatial experience. This shift is driven by the pervasive presence of images and screens, and perhaps by a lack of cultural and spatial education and public awareness. The dominance of the image and resulting loss of depth is not a new phenomenon and has been widely discussed. Alicia Imperiale, writing in 2000, identified the resulting reduction of depth and emphasis on surface as a profound issue. She uses the term "flat" to describe the paper or screen, and "surface" when referring to "issues that develop when architecture is built, when the emphasis shifts from the flatness of the representational space to the depth of the three-dimensional building."[46] The ubiquity of images has appeared in façade design and architectural surfaces in a literal fashion, moving the attention from materiality to the surface. The façade as screen emerged in the early 2000s, with media facades and projections entering the architectural repertoire. The image appeared on facades as a thin layer printed on glass or the exterior skin. Facades as surfaces to print on, just as paper, also expressed society's overall affinity to images. Herzog and De Meuron's university libraries in Eberswalde and in Cottbus, both in Germany, illustrate the use of images on concrete and on glass. The skins of both libraries do not express structural forces or tectonic articulation; instead, they highlight the programmatic function of the buildings. The facades become commentary on the usage of the buildings, in both cases, their role as libraries and archives. The volumes follow a logic distinct from the visual language of the facades. In Cottbus, the building evokes associations of scrolls of paper. The architects refer to the glass skin imprinted with highly pixelated lettering as cladding the building "like a veil."[47] **[9] [10]**

When employing an AI model that ingests broadly sourced, non-curated data from across the internet, the resulting image constitutes a synthesis of prior architectural forms and visual conventions. Rather than producing genuinely novel outputs, such models tend to recombine and recontextualize historical data, yielding visuals that reflect accumulated cultural artifacts more than intentional innovation. To move beyond mere recombination of existing patterns, the architect's design literacy and creative agency become essential. A critical emerging skill for architects and designers will be the precise crafti-

48 Christina Hilger, "2. Raum und Vernetzung," in Vernetzte Räume, ed. Christina Hilger (Bielefeld: transcript Verlag, 2014), 14, https://doi.org/10.14361/transcript.9783839414996.53.

ng of text prompts, paired with the ability to critically assess facades and models whose origins remain obscured. Political associations and consistent cultural messages will be left to the correcting hand of the designer, having to decode the conceptual framework instead of creating it. Conceptual principles that go beyond visual expression are difficult to embed. Gravity is not a factor in language-to-image generation, and the tectonic logic therefore has to be applied after the fact, which is the opposite of a process that starts with an abstract geometric, functional, and contextual concept that expands in specificity through alterations.

Concluding Remarks

In this examination of the potential impact of AI-generated images on the architectural design process and its outcome, it becomes evident that architectural design has historically relied on the interplay of images and precedents to reinvent expressions, typologies, and spaces. As building conventions shifted across societies and time frames, they involved the re-crafting of embedded messages into new narratives, alongside evolving technologies of representation and construction. A similar impact is to be expected from digital tools, particularly as they transition from replicating pre-digital tasks (drafting conventional sets of drawings for design communication, engineering coordination, and construction) to actively shaping design processes and tectonic possibilities. The consequences of a digitally driven design process have already led to profound changes in architectural expression. In some cases, this has resulted in dynamic parametric designs; in others, it has contributed to a thinning of architectural space and substance, raising questions about the tectonic presence of materials and structures. Digitalization has enabled design approaches that rely on algorithms and parametric modeling, establishing relationships between elements through a range of parameters. Yet, the spatial understanding of the 21st century continues to be informed by modernist ideals and the legacy of industrialized construction methods.[48] With the *image flood* discussed above, now amplified by vast quantities of AI-generated representations, considerations around architectural space risks becoming obsolete. Architects may unintentionally relinquish their authorship of the architectural narrative that has historically allowed them to embed both symbols and critical commentary related to politics and social conventions.

Architecture increasingly becomes image, potentially communicated through what might be termed machine hallucinations. Space hasn't been explored as a resource for contemporary society with the same dedication as visual representation in contemporary discourse. Michael Hensel observes,

49 Michael Hensel, Achim Menges, and Christopher Hight, Space Reader: Heterogeneous Space in Architecture (Chichester, U.K.: Wiley, 2009), 11.

that while space (naturally) continues to play an active role, "our repertoire of spatial concepts and our ability to understand and work with them remain relatively underdeveloped compared to the formal innovations, programmatic savvy and critical sophistications of the past decades."[49] What Douglas Engelbert referred to the "augmented architect" demands a transformation in education and skillsets, one that reconciles the internal and external orders of architecture. While future AI software may significantly expand architecture's generative potential—including spatial and organizational configurations, code compliance, and engineering coordination–the uncritical use of finished imagery derived from unknown and uncited sources poses an opportunity for novel expression and risk of losing all intentional narrative. The lack of focus on spatial qualities might get intensified by AI-generated solutions, or the confluence of all digital tools might lead to profound innovation and a renewed spatiality. Counteracting a tempting invitation to forego the critical evaluation of the evolving tectonic conditions of architecture, all emerging technology must be assessed for its capacity to support the built environment in expressing human culture and addressing the challenges of the 21st century.

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Gravitivity
Architecture's Defiance in a Post-Structural Society

Matej Blenkuš
Maja Dobnik

Introduction

The thematic focus of the journal – namely the programming of architecture in relation to its tectonic narrative – is reflected in the following article through questioning whether, in contemporary architecture, the relationship between the programmatic structuring of a building's content and its means of construction remains relevant in a time of post-structural social relations. The tectonics of buildings, grounded in their recognizable articulation and syntax – which we, in principle, compare to so-called solid structures – are contrasted with the dynamics of *bodies without organs* and *desiring machine*s, as theorized by philosophers Gilles Deleuze and Félix Guattari.

On the basis of theoretical insights into architecture as a dynamic responsive *form*, which are considered through the widely disseminated concept of *temporal layers* closely related to architect Stewart Brand, we relativize the importance of tectonically and thematically consistent buildings. Part I explains that in a time when architectural form is constantly transforming – driven by the economic and social currents of contemporary society – such consistency is subject to strong formal disintegration that gradually erodes and undermines the meaning and identity of contemporary architecture. Through analysis of the various manifestations of temporal layers, it is emphasized that the dynamic responsiveness of architecture is not only connected to utility and economy but also addresses its users in an existential sense – through its relations to gravity, matter, mass, and time.

Brand's understanding of architecture's capacity for continuous adaptation and transformation is often cited as a tool for a pragmatic and sustainable response to current economic, social and environmental needs. Yet, as an argument for our thesis – that through the dynamics of changing architectural form architecture's identity is gradually dissolved – we present several examples of contemporary architecture that manifest the influence of the layering of the building's skin on the potential dissolution of its meaning and identity. Citing several examples of temporal layering in contemporary buildings and public spaces, we posit the thesis that among all of the layers, a building's structural system plays a critical role in enabling architecture to withstand the increasingly invasive influences of a post-structural society.

Part II introduces the concept of *gravitivity*, where unlike the tectonic constitution of buildings, we explain those design principles that allow architecture to embody temporal and spatial resistance.

1 In this article, the phrase "to think society" is employed as the translation of the Slovene expression "misliti družbo". Its meaning extends beyond the more ordinary sense of "to think about society" and conveys a philosophical connotation: it designates a mode of conceptual reflection, a way of thinking that seeks to "re-think" society as a whole, taking it as an object of thought in its entirety.

2 In essence, the term "solid structures" describes solid and strong, established relationships between the elements that constitute a whole. In the context of a social order, it can stand for repressive regimes, in which relationships between an individual and power are strictly defined, and any changes thwarted or limited to the minimum.

3 The phrase *function under* refers to the so-called *solid structures*.

4 Here, the word "psychoanalysis" refers to Freud and focuses on an individual's internal conflicts, in the first place the Oedipus complex, which places desire in the framework of the family structure and prohibition. Deleuze and Guattari's perspective is different – they criticise the reduction of desire to a family drama (hence *Anti-Oedipus*).

5 See Gilles Deleuze and Félix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia*, trans. Robert Hurley, Mark Seem, and Helen R. Lane (Minneapolis: University of Minnesota Press, 1983), 286–289.

In the Face of Solid Structures

It is axiomatic that Architecture, as a social activity, is deeply embedded within its historical socio-political context. Contemporary architecture operates within an unpredictable and rapidly changing context of global capitalism in which recognizable social structures are becoming increasingly difficult to discern. More specifically, emergent social conditions are usurping previously predictable power relations and institutional modes of operations.

In their collaborative work *Anti-Oedipus*, French philosophers Gilles Deleuze and Félix Guattari drew a telling picture of this situation. Anti-Oedipus will serve as the basis for an overview of the practice of architecture in increasingly uncertain times, as we believe that – although they are far from being the only authors to analyse contemporary social dynamics – they possess the interpretative power that offers critical insight into social processes. Rather than offering straightforward answers, their critically provocative challenging of established social conventions proffers questions and new ways of *thinking society*[1]. Although the authors describe social structures by developing definitions and conceptual networks that do not address architecture per se, we can nevertheless apply their theoretical baselines to *the role of architecture in the contemporary world.*

In their texts, Deleuze and Guattari shed light on the socio-structural relationships that are evident yet systemically hidden from us; they describe those social process that continually take place before us.

Their goal is clear: to demystify, by means of careful analysis, rigid, hierarchical, controlling social systems – so-called *solid structures*[2] – that place individuals into predefined positions within institutional and *ideological frameworks, and function under*[3] *the pretext of objectivity, understood as an inevitable process of structuring contemporary social organisations.* But Deleuze and Guattari claim otherwise: social processes are not systemically established beforehand, but evolve organically, from themselves.

According to Deleuze and Guattari life takes place outside strictly defined systems. It is non-linear, chaotic, and embedded in *flows of desire*. The authors centre their writing around the concept of desire, and unlike psychoanalysis[4] define it as a productive and creative force – the force that generates social connections, relationships, and new possibilities of operation. This constitutes the basis for their concept of "desiring machines" (*machines désirantes*), which can be described as the *basic unit of social dynamics*. To be more precise – desiring machines take part in social life and connect bodies with people's desires in concrete processes of functioning in the material world.[5] Desiring machines are always already embedded in, but never completely defined by social conditions. Their connecting is not hiera-

6 See Gilles Deleuze, "Gilles Deleuze and Félix Guattari on *Anti-Oedipus*," in *Negotiations, 1972–1990*, trans. Martin Joughin (New York: Columbia University Press, 1995), 22.

7 See Félix Guattari, "Balance-Sheet for 'Desiring-Machines,'" in *Chaosophy: Texts and Interviews 1972–1977*, ed. Sylvère Lotringer, trans. David L. Sweet, Jarred Becker, and Taylor Adkins (New York: Semiotext(e), 2009), 90–115.

8 Throughout this article, similar formulations appear in which collective or abstract phenomena (e.g. architecture, society) are used as grammatical subjects. Such phrasing does not suggest that buildings or society as such literally act or survive, but rather that we are referring to architectural practice or social processes in general. This shorthand reflects the original usage of Slovene and should be understood accordingly.

rchical, but networked – they connect with other operations that "are thinking, feeling and working in similar directions." [6] They define their own mode of operation, i.e. acting *irrespective* of socially determined conditions and solid structures. Desiring machines are only able to function this way because of "bodies without organs" (*corps sans organes)* – conceptual fields where desire can work beyond social hierarchies. Bodies without organs can be defined in two ways: firstly, they are an example of *anti-structures*, where desire operates irrespective of the pre-set order. It is for this reason that they, secondly, represent the basis for new, unpredictable possibilities of action. [7] Summerly, bodies without organs are unstable, changing forms subordinated to continuous changing desires, thus allowing them an *open field of action*: a dynamic, unstable, and open structure where possibilities emerge that are not predetermined, but are created through the desire desire emanating from bodies.

As aforenoted, contemporary architecture operates within a rapidly changing world in which solid – social – structures are increasingly difficult to recognise. To be able to survive in such an unstable and unpredictable world, architecture has developed ways of adapting to new expectations, desires and behaviours of its users. [8] Risking oversimplification, we nevertheless feel compelled to note that such an architectural practice, subordinated to ongoing social dynamics, is becoming increasingly similar to the logic of bodies without organs. Architecture is becoming less identifiable, both in terms of use (program) and meaning (what it communicates).

Here is where, if we understand architecture as a social activity in Deleuze and Guattari's terms, an important contradiction occurs in the understanding of architecture as a social activity. Although the authors foreground unorganized and non-hierarchical action, it cannot be completely denied that a certain measure of order and organisation remains *necessary* for one's existence in the world. Our premise is that architecture plays a key role, as in its essence it is subject to certain laws of physics and spatial limitations. It is therefore important that we understand solid structures in their other sense – as an *internal logic of architecture itself* which is based on order, composition, organisation, and laws of construction. In other words: for architecture to be able to manifest itself in the material world, it requires a certain order – a structure that makes its function and meaning possible.

On this basis, we can discern a certain duality of contemporary architecture. On the one hand, architecture is inevitably bound to order, structure, and the material conditions that make its very existence possible. On the other, it allows for processes to unfold within a social field that is increasingly unstable, non-linear, and shaped by flows of desire. To better understand how this duality is expressed in space, we can explore it through the concept of

9 In the article, the concept of the architectural skin will be presented and examined in greater detail. In the continuation of the text, the term *skin* will be used to describe the complex, multi-layered material envelope surrounding space. This is to be distinguished from the term *envelope*, which in the article refers to the individual layers of the spatial enclosure. For a proper understanding of the text, it is important to emphasize that the skin is composed of multiple envelopes. As will be described further on, each envelope follows different principles and possesses distinct temporal and material characteristics.

10 The concept of "becoming" is derived from German word *werden*.

11 See Gilles Deleuze and Félix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia,* trans. Robert Hurley, Mark Seem, and Helen R. Lane (Minneapolis: University of Minnesota Press, 1983), 96.

12 See Stewart Brand, *How buildings learn: what happens after they're built* (New York: Penguin Books, 1994).

13 See Frank Duffy, *Measuring Building Performance* (London: Facilities, 1990), 17–20.

14 See Dietmar Eberle, *baumschlager eberle: 200 100 50 20 10* (Vienna: TU Wien, 2015).

temporal layers. These allow us to think of architecture not only as a material construct governed by physical laws, but also as a practice embedded in time.

Part I
Temporal Layers

To understand how described social relations reflect in architectural space we should first define what it is that forms the space of architecture. Even though space is characterized as a void, that is an absence of matter, an empty space defined by its own characteristics and properties of limiting surfaces, its manifestation is only possible through the materialization of the physical envelope that surrounds it. Architectural space is therefore defined by the materialization of its skin. [9]

We have above posited that contemporary social relations, driven by post-structural social forces, defy architectural space. In addition to its own metabolism and ongoing reproduction, the continuum of functioning *desiring machines* and *bodies without organs* also requires a constant metabolic transformation of the space in which *desiring machines* operate. This process never stops running and takes place at different timescales. Metabolism of space is a reflection of the dynamics shaped by contacts, interplays, contractions, transformations and metabolisms of contemporary society's contents and activities. Its key trait is best described with the concept of *becoming* [10], which in philosophical terms replaces the concept of *being*. Nothing is just what it is anymore, but is already that, which it is always becoming anew. Deleuze and Guattari say as much when they write that becoming means to generate movement that does not follow a template. [11]

The architectural space of *becoming* is therefore a space capable of its own continual transformation from one form to another, from one materialization to another, but with no final form. The question of dynamic transformation, metabolism and reproduction of space, through its material skin is therefore the key to understanding the relationship between social processes and architectural space.

An important shift in the understanding of the post-structuralist ontology of space occurred when architecture began to be understood primarily through the dimension of time at the expense of the dimension of space. The formal framework that allows for such conceptualisation of architectural space, firstly through its formation of the dynamic skin compound of various envelopes, can be found in the concept of *shearing layers* developed by American architect Stewart Brand [12], as well as in Francis Duffy's *four layers of time in buildings* [13], and in the lecture *200, 100, 50, 20, 10* by Austrian architect Dietmar Eberle [14].

According to the cited authors, understanding how architecture operates over an extended period of time requires us to accept that its adaptations and transformations occur at different intervals and in different parts of a building. The authors therefore divided the constituent elements of buildings into layers, with the aim of more precisely defining the causes and formal consequences of the changes that take place within them. Stewart Brand and Francis Duffy base their approach on the principles of pragmatic adaptation of buildings to the inevitably necessary changes over a longer period of time. In doing so, they look for models in vernacular and anonymous architecture. Dietmar Eberle, by contrast, is considerably more academic in his interpretation, attempting – through the naming of individual building components and their expected lifespans (200 years, 100 years, etc.) – to define the potential impact on the identity and meaning of construction in a specific cultural context. For him, temporal layers also represent a framework for understanding tradition and continuity.

All three approaches to understanding the structure and functioning of a building envelope share the idea that the skin that defines architectural space is composed of several envelopes broken down into layers that can be transformed or replaced independently and in different intervals. The building's skin, and consequently also the architectural spaces which it surrounds, are no longer homogenous, but split into onion-like layers. Since they are defined by their expected lifetime and rates of change, we can call these layers the *temporal layers* of the architectural skin. Said authors, who agree that architectural space materializes through *temporal layers*, each propose a different set of layers that are key to understanding the hierarchically structured, but contextually and technically independent layering of the architectural envelope: Brand identifies six, Eberle five, and Duffy four layers. They differ in the detail to which they break down the internal spatial separations in various spaces (the innermost layer of the building skin) and the importance they attribute to the physically invisible, yet normative envelope of the urban structure (the outermost layer). All of them identified four fundamental layers: the structural framework, internal partitions, installations and other mechanical systems, and various contents and activities, which materialize with equipment and other objects in a building's interior.

It should be noted that, at least for Brand and Duffy, the reason for such understanding of the building structure is in the first-place pragmatic. It has to do with the building's capacity to react to changing expectations and desires of its users and adapt to the ongoing technological progress that allows buildings to maintain "technical" pace with the times. Both Brand and Duffy make it clear that "layer-less" buildings, unable to allow for flexible changes and adaptations, are rigid, and incapable of keeping up with their

15 Ibid.

16 We call “city-forming” those elements of the urban fabric that are capable of creating, through the nature of their design, coordinated dimensions and relative longevity, a continued, relatively homogeneous, and hierarchically organized form of open urban space.

own progress. Rather than a multi-layered structure based on a philosophical understanding of the buildings life-span, for them *temporal layers* are in fact a utilitarian and pragmatic reaction to a society of rapid change, needs, and spatial transformations. However, Eberle is much more cautious: He recognizes in *temporal layers* also the potential keepers of tradition, long-term meaning and resistance in space.[15]

The umbrella principle of *temporal layers* implies that the layers of a building's material envelope follow one another based on their longevity, from the longest- to the shortest-lasting, as a rule from the outside in. A building's exterior form is long-lasting, steadfast, and in turn city-forming.[16] It is materially and formally defined by the temporal layer with the longest lifetime. Gradually moving from the exterior of the building to its interior – towards its actual use – we see internal divisions and partitions emerge which are increasingly closely associated with the building's changing contents and users. The authors admit that commercial buildings are the most dynamic, followed by residential buildings, and only then follow public buildings. Such layering makes sense, both ontologically and programmatically, because it regulates the relationship between (exterior) public interest and expectations of the masses, and one's personal (interior) desires and expectations. The permanent, the common, and the public unfolds outwards, whereas the individual and the private remain more or less covered within.

The names of the layers differ in the works of Brandt, Duffy, and Eberle. For easier understanding and for the purposes of our article, we will assign names to the layers while remaining consistent with the logic that Brandt presented as the original classification. Thus, we will designate the layer that defines the geographical setting, lot or urban location of a building as *the place* (originally, according to Brandt: *the site*). The layer that encompasses the building's façade and roof envelope will be designated as *the envelope* (originally: *the skin*). The layer that entails the load-bearing system, i.e. all structural elements of a building, will be called *the skeleton* (originally: *the structure*). The layer that consists of technical equipment and other installations in a building that support its mechanical operation will be referred to as *the technology* (originally: *the service*). The layer that defines the interior layout of programmes and activities that take place in a building as well as all partitions and separation elements that allow for diverse and physically separated use of a building's interior, will be designated as *the layout* (originally: *the space plan*). The innermost layer, which includes all movable and partly movable furniture and other equipment used in a building, will be called *the equipment* (originally: *the stuff*). This explanation aims to provide readers with a clearer understanding of the individual layers while maintaining conceptual consistency with Brandt's terminology.

17 Based on Alejandro Zaera-Polo and Jeffrey S. Anderson, *The Ecologies of Building Envelope: A Material History and Theory of Architectural Surfaces* (New York in Barcelona: Actar Publishers, 2021).

18 See Stewart Brand, *How buildings learn: what happens after they're built* (New York: Penguin Books, 1994), 153.

19 A closer look at the morphology of a mobile home shows that its design combines two of Brand's temporal layers, namely Structure and Skin. Since the two layers are inseparable, a container's structure to a large extent serves as its thermal envelope. The transformation and development of mobile homes is therefore very fast; its users add a new, independent skin, giving the generic image of the industrial product a more individual appearance, or a new façade as a more authentic expression of the user's desires and expectations.

20 We see a hierarchically organised space as a planned, regulated process where the urban form – a building's dimensions – is not defined from bottom-up, i.e. based on individual inhabitant's interests, but is planned and controlled by a higher-order institution, local administration, region, or state.

21 The timeframe is set between 1990 and 2000, when global socio-political changes accelerated the processes and dynamics of interventions in both the content and form of buildings, whether existing or planned.

22 Driven by the urgent need for ongoing exponential growth, liberal economy reproduces itself through economic mutants, "start-up" enterprises that more often than not produce nonsense, but expecting undreamed-of revival they nevertheless allow themselves the possibility of a sudden economic break-through. These adventures are usually extremely short-lived, but their spatial needs are immediate and always dynamic.

23 One of the most evident consequences of this process is the "energy efficiency retrofitting" process, generously supported by financial incentives and grants, which uncritically disturbs the formal and programmatic design of the exterior building envelope – as a completely separate process whose efficiency is measured with non-spatial indicators.

A more detailed reading of Brand's approach, however, reveals that the "fast" layers are positioned also on the exterior side of the building's skin, whose resistant, long-lasting structural core is thus often obscured by rapidly changing *temporal layers* from both the inner and the outer side. Most of the reasons for this structural specificity derive from the industrial development of the building envelope. In approximately eighty years the solid, rigid, weakly porous standard masonry envelope which was the most common building technique in Europe and was commonplace until the mid-19th century, evolved into a complex technology-based semi-permeable and transparent envelope subject to constant progress, upgrades, and improvements.[17]

If buildings are notoriously transformed in their interiors by the dynamics of changing contents, desires, and consumer habits of their users, their external appearance is constantly shedding and altering just as rapidly as façade-envelope technology evolves, enabling the maintenance of increasingly more and more rigid indoor climatic conditions. As a result, the rigid temporal layer of the *skeleton*, both from the outer and inner side, is veiled by the logic of *fast fashion.* Brand points to the above as conservatively progressive; building his case on examples of growing organisms of building types, such as mobile homes and bungalows; he goes so far as to relativize even the most enduring of layers, the *place*, only to legitimize it in the process of its own reproduction, multiplication and fractalisation as temporally sustainable and thus legitimate in the long term.[18] His interpretation of growing "roots" of mobile home compounds[19] reads as a case of modern vernacular, or as a model of architecture's capacity to conform to the needs of its users in a distinctly pragmatic, spatially non-hierarchical[20] manner.

But architecture's short-lived, two-sided envelope opens the door to spatial schizophrenia and decomposition of a recognizable identity. Schizophrenic because through continual changes of the interior and exterior appearance of a building the two gradually move away from one another, each acquiring its own independent identity alienated from more sustainable and long-lived *temporal layers*. This means that even if a building was originally designed with all its *temporal layers* in visual harmony, its external and internal layers are gradually abandoning their original identity and distinctiveness. Architecture has had to live with the consequences of the phenomenon described above for roughly 30 years[21], faced with trends like the rapid surge in "start-ups"[22], and sustainability-driven technological revival in building technology and facade envelopes[23] – all the while with an efficiency – and profit-driven capitalist modernity gradually dissolving architecture beyond recognition, into a state of obscurity, schizophrenia, and meaninglessness.

24 Svetlana Pushkar, "Application of life cycle assessment to various building lifetime shearing layers: Site, structure, skin, services, space, and stuff," *Journal of Green Building* 10, no. 2 (2015): 198–214.

25 Vesna Krmelj, *Cukrarna*, Umetnine v žepu 3 (Ljubljana: Umetnostnozgodovinski inštitut Franceta Steleta, ZRC SAZU, 2010), 14.

Irrespective of whether Brand's understanding of *temporal layers* is the cause or result of current social relations described in the first chapter, the above leads us to assume that his interpretation of multi-layered materiality of the skin of an architectural space is directly related to the concept of *bodies without organs* in which *desiring machines* live their fast and short-lived dreams. By articulating the structure of the building envelope into temporal layers – capable of responding autonomously to social needs, expectations, and desires, independent of the coherent core of the building – architectural space has become able to function as seamless *bodies without organs*. The transformation of space, in line with the needs and expectations of society, now unfolds smoothly and without conflict. The schizophrenic composition of the individual temporal layers of the architectural skin allows it to continuously adapt and yield to these needs and desires.

It is for that, perhaps ironic, reason one can see how Brand's scheme of *shearing layers of change* has been applied by several sources [24] as one of the criteria in life-cycle assessment of sustainable building design. Ironic because the key value of a sustainable society is not only its capacity for constant and prompt adaptation, but also its resistance and ability to uphold values and its identity and to materialize memory.

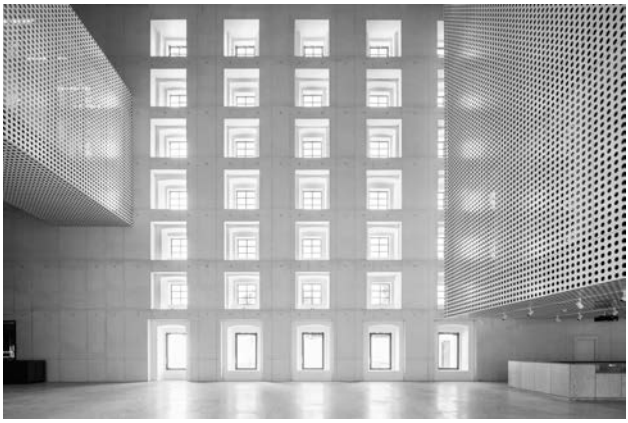
Cukrarna Gallery: The Displaced Logic of Temporal Layers

As previously explained, the concept of temporal layers, allows buildings to manifest themselves through several formally distinctive parts which evolve in various time cycles, thus constructing their specific, long- and short-term identity mostly defined by their time intervals. But what happens when this logic is reversed – when the idea of layers is evident, but displaced, deformed, placed outside its own, characteristic utilitarian framework?

Cukrarna Gallery, located in the centre of Ljubljana, Slovenia, whose temporal layers are distinct and thus identifiable, is our first example, not in terms of any typical hierarchy or sequence of temporal layers as described by Brand, Eberle and Duffy, but as en example of their disarray due to the building's relation to the phenomena of *bodies without organs*. The building, built in 1828, was originally a sugar factory. In 2021 Cukrana was completely renovated and, through extensive structural and programmatic modifications, transformed into a contemporary art gallery. Over the centuries, its purpose changed significantly: first, with the introduction of new sugar production technologies, manufacturing was gradually abandoned, and after the earthquake of 1895, "Cukrarna assumed an unusual role as a refuge for the most vulnerable members of society: earthquake victims, artists, children, patients, released prisoners, and newcomers without shelter." [25] Among other



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26 Scapelab. "Galerija Cukrarna." *Scapelab*, June 23, 2025. https://scapelab.com/si/cukrarna.

1 Scapelab, Cukrarna Gallery, 2021, interior. Photo by Miran Kambič. © Scapelab

2 Scapelab, Cukrarna Gallery, 2021, interior. Photo by Miran Kambič. © Scapelab

things, it provided a home to many literary artists of the Slovenian modernist movement in the first half of the 20th century. The original building was characterized by its very low yet relatively robust floors, illuminated by numerous small square windows. During the renovation, all interior parts, floors, and walls were removed, leaving only the outer shell and a reconstructed roof of the original structure.

The building is currently comprised of two constituent parts – the historic and the contemporary – involved in a relationship of structural and formal interdependence. In a way, both these elements are deformed and taken out of their usual context: the historic part has been stripped of its function and contents, while the contemporary one does not support itself its own foundation, having been hung on the remnants of the past: the exterior walls of the historic – original – building. Both elements have therefore lost touch with their basic structural logic. Since only the perimeter wall and the gable roof remain of the historic part – it is a radically reduced shell, where the only temporal layer left is the *skeleton,* the structural layer, which for that reason also functions as the *envelope* and interior *layout*. Everything else – the *equipment* and as a result the use of space – has been removed. In the authors' words: "The ground floor [of the existing building] is the only part of the building that receives natural light – both gallery volumes are executed as 'white cubes' intended to serve as art exhibition spaces with regulated light, air conditioning, temperature, and humidity. Two floating cuboids are dressed in perforated sheet metal… to give the new spatial interventions a uniform exterior…" [26] The contemporary constituent is thus attached to the historic envelope, its entire structure literally hanging from it. **[1] [2]**

The contemporary insert is an architectural form with three clearly distinguishable temporal layers: the "external" *envelope* (placed inside the existing building), internal steel *skeleton*, and an added, non-transparent interior layer that defines the *layout* of gallery spaces. The paradox is in that the *layout*, is the deepest and the most hidden layer, (which is normally used to be subordinated to the *skeleton* and the *envelope*) standing out as the dominant programmatic, geometrical and formal factor that defines the shape and structure of everything else. Informed by gallery use, the interior division of space dictates the dimensions and rhythm of the steel framework and in turn the entire architectural mass of the contemporary insert. Clearly, this is a diametric shift in the hierarchy: it is not the structural framework that defines the layout of the programme, but the programme defines the structure of the framework – in the context of a hanging form. The latter is only possible because the *envelope* and the *framework* already exist, allowing the *temporal layers* of the new insert to function as well as present themselves in a different, inverted manner.



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27 Contemporary art, especially through the many newly built or renovated visual art galleries in recent years, is entering the tourism sector with intensity and has become one of the most attractive tourist draws in Europe's larger cities. The well-known Bilbao Effect is spreading relentlessly, encouraging cities to open ever more exhibition spaces aimed at broad audiences of visitors. In this way, the architecture of art galleries is increasingly entering the realm of urban touristification and the promotion of cultural consumption.

3 Scapelab, Cukrarna Gallery, 2021, interior. Photo by Miran Kambič. © Scapelab

The most fascinating feature of this example is the double *skeleton*: the external historic walls that are formally dominant, yet devoid of content, and the internal technical *skeleton* of the contemporary insert, which is subordinated to the internal logic of exhibition spaces. There's a gaping void between the two systems, both physical and symbolic. Within, the void there is no contact, no intrinsic transition, just an unfilled distance: an empty zone that carries tension and unanswered questions.

Described architectural construct of disarrayed temporal layers brings us to the phenomenon of *bodies without organs*, something that can be read in urban space through the contemporaneous lens of touristification and cultural consumption [27]. In this case, the specific disposition of *temporal layers* could be interpreted as the spatial expression of cultural consumption: arranged across a sequence of aesthetically defined, formally honed settings, the gallery spaces generate permeable experiences in severe contrast to the original historic building – its rhythm, its original structure of low storeys and its mnemonic references to the broad social range of its former residents. It seems to be an attempt at inserting a flow of contemporary cultural commodification into the rigid structure of history – one that cannot proceed without friction, contradictions, and formal tensions.

If contemporary cultural consumption is an expression of *bodies without organs* – uninterrupted flows of desire, sequences of aesthetic effects, serialized experiences – then Cukrana represents a physical effort to institutionalize this flow within a stratified architectural shell. The result is an inharmonious whole with neither of the constituent parts dominating, each inscribing itself into another through tension. History becomes a stage and the gallery a play produced by the city – moment, an event, a fantastical visual experience. **[3]**

Cukrana does not reject temporal layers, it relocates them. It does not demolish history, but transforms it into the load-bearing structure for something radically different. It could be argued that it confidently subdues the load-bearing structure in order to be something other: no longer a *solid structure*, but a suspended fluid, a *paraphrase*, and *embodiment of bodies without organs*. And therein, in this very trait, resides its essence: contemporary architecture is not necessarily a representation of a continuum, but can also express a rupture – a gap between form and substance, between the *skeleton* and what hangs from it. Given this, a new logic of time manifests – the logic of *bodies without organs*, cultural appropriation and the architectural *void*. Cukrarna Gallery is an example of contemporary architecture that decomposes the concept of the *skeleton* in order to relativize its dominant meaning. If at first sight the entire project seems to be based on the acknowledgment of the existential role of the architectural *skeleton*, a more detailed

28 In this article, the terms classical cities, classical urbanism, and classical spatial design are used to highlight those parts of the organized urban environment that can be ascribed the qualities of solid structures—that is, spaces and urban areas with a clear, recognizable, distinct, and long-lasting image. Examples include the classical design of squares, streets, parks, courtyards, and similar spaces.

29 The personification of urban spatial structures as "persons" with their own desires stems from the authors' conviction that global economic forces, which drive the machinery of commodity consumption and tourism, create conditions through their imperative that impose desires and illusory needs upon people. Even though spaces themselves have no desires or needs, their contents and images establish such a powerful layer that it is uncritically transferred onto the visitors and users of these spaces. From this it follows that the element of desire and need can also be attributed to spaces, even if they lack a biological foundation.

analysis of its conflicting role in the building's structure demonstrates that far less rigid *temporal layers* play a superior role.

Homelessness and Consumerism: The City as a Symbiosis of Structures and Bodies Without Organs

The following illustrates the concepts used herein to describe exposed post-structural social relations and the division of architectural form into dynamic systems of *temporal layers*. The interest, concerning the overall argument, is whether contemporary urban phenomena such as homelessness and consumerism can be described applying the same terms as those used for a single building, like in the previous case. A modern city appears as a complex composition of two intertwined systems: solid structures and *bodies without organs*, referring to Deleuze's and Guattari's terminology. These two systems are not in conflict, they cohabitate in constant friction, interaction, and within the transformation of urban space.

We typically think of cities it as ordered, clearly organized structures defined by the rules of classical urbanism [28], i.e. the separation of public, semi-public and private spaces, formal rules of design and operation, community utilities, traffic regulations, and architectural norms. Such solid structures establish order, boundaries, places, territories, stability, and predictability. On the other hand, there are *bodies without organs* emerging across urban space – elusive, fluid and equivocal systems that evade stable organization and are constantly transforming – *becoming* – something anew.

Bodies without organs are spatial systems without a permanent form or final representational image, but with an eternal desire [29] to be something different: e.g. shopping malls, city cores redeveloped for tourists, shared traffic spaces where various users interact without pre-defined relationships. Similarly, amusement parks and hyper-productive urban advertising landscapes embody a continuum of desires, intensities, flows and transitions where no solid forms exist; rather, they represent a series of continuous shifts and changes. *Bodies without organs* have no beginning and no end; they mingle and intertwine – commercial flows intersects with tourist flows, information flow with entertainment, the visual with the material. A city of consumption is nothing like our normative perception of a city formed by streets, squares and parks. It is an endless, intertwining landscape within the otherwise solidly constructed world.

Even though *solid structures* and *bodies without organs* embody different spatial logics, they cohabitate within cities. *Bodies without organs* increasingly interfere with the classical structure of the urban fabric – perforating and stretching it, redirecting its perception. Urban space thus increasingly loses

30 Except that *layers* in shopping malls derive from the world of "perfection" whereas *layers* of homeless abodes accumulate and emerge where centres "change clothes" and thus produce always new "construction" materials.

its existential qualities, morphing into a stage for making desires come true. It is no longer an area of existence, but is transformed into an event platform for instant experiences and consumption – a field of intensities.

In the logic of *bodies without organs* homelessness is situated as its doppelganger. Seemingly banished from the flows of consumption, homelessness not only cohabits with them, but even *reaps their benefits*. The more smoothly the supply and demand machine runs, the more obsolete materials are generated. And homelessness uses them for its own benefit. The presence of the homeless in urban space does not function like an illogical foreign body, but as an integral (other) part of the consumption landscape that participates in an equally relevant system of desires, demands, and needs. Like consumers, the homeless take part in the cycle of urban intensification. Consumers embody what the system of infinite production of goods desires, and the homeless what this same system spurns – as well as expels at the end of the linear cycle of consumption. Homeless shelters and shopping malls combine a common feature, where neither of their users builds a lasting, nurturing and meaningful relationship with the urban space, which in turn makes shaping one's personal (and urban) identity impossible. The logic of *bodies without organs* simultaneously expels them from space and places them inside a shearing continuum of spatial shallowness.

The typical spatial phenomena of these two constructed spaces, the shopping mall and homeless shelters, can be thus analysed in a similar fashion. In terms of temporal layers, they represent formal extremes of the same phenomenon. A shopping mall is outwardly represented by a rapidly changing envelope that adapts to trend, taste and commercial expectations – which in turn constantly regenerates through the act of consumption. While under the glossy façade hides the utilitarian skeleton – a structural layer that is technical, invisible, and has no aesthetic aspirations. Layouts are made up of cheap, replaceable materials that change rapidly, but even not as rapidly as equipment, which is in fact replaced every season. Similarly, layering in homeless shelters is defined by sheer need, and takes shape through the materials at hand and improvisation. The envelope, a fragile protective structure made up of plastic, textile or in the form of a tent, is virtually instantaneously erected, ephemeral, and subject to wear and theft, which translates to a dynamic exchange.[30] It is difficult to speak of actual layouts in such shelters, even though it is sometimes hard to tell the difference between their envelopes and layouts, which seem to converge in peculiar ways. Makeshift shelters for the homeless are often nothing more than unicellular formations and are often erected without a *skeleton*, neither technical nor symbolic. Rather than setting up a skeleton as something of their own, the homeless merely appropriate already habitable space: bridges, overhangs, fences,

31 The concept of gravitivity, key topic of this paper, defines the minimum condition for understanding architecture's embeddedness in time. It enables us to consider architecture as a specific practice capable of enduring in the contemporary world. This central thesis will be illustrated with selected examples of architecture to show how gravitivity allows architecture to transcend its immediate use and to operate independently of the established relationship between form and function.

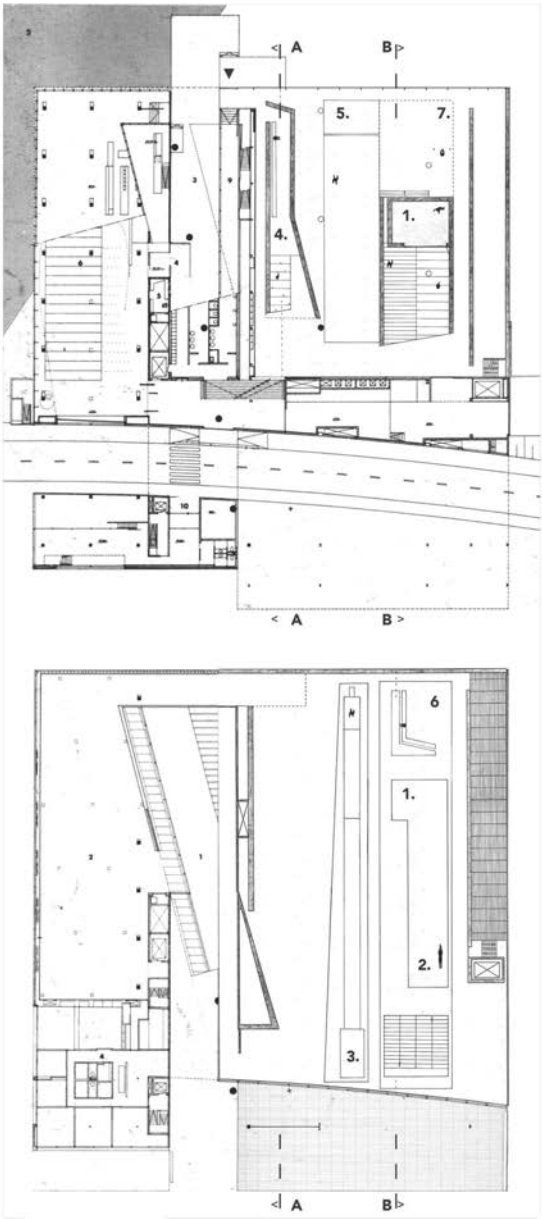
benches, alcoves – appropriating those parts of the city which act as a part of its indispensable infrastructure. We can therefore conclude that for both, the shopping mall and itinerant homeless abodes, the outermost and innermost temporal layers play a much more important functional and meaningful role than the central layer of the skeleton, which is relegated to the background and obscured in the first case, or adopted and improvised in the second. Both forms therefore point to the same logic of an urban body without organs: the overgrowing and obscuring of solid structures, their vacating, morphing into continuously new envelopes.

It is important to understand that this is not a case of opposition between order and chaos, between a classical city and its anomalies, but of two sides of the same process. The city decomposes and regenerates through the ongoing relationship between structures and bodies without organs. Every museum exhibition, every seasonal sale at a shopping mall, every germ of a cardboard shelter under the bridge is an expression of the same flows of desires and intensities that transform urban space. To understand *bodies without organs* in a city means to understand how *temporal layers* interact and formalize in a manner foreign to them, and how desire, not existence, shapes a space: be it in a seemingly organised shop or an improvised shelter, in glossy but "phony" centres or derelict outskirts.

Through the description of the architecture of the Cukrarna Gallery and the principles by which homelessness is capable of re-appropriating the built fabric of public space, we have pointed to two instances where the seemingly straightforward and technically coherent hierarchy of Brand's temporal layers becomes inverted and collapses into self-contradiction. In this inversion, the materialization of space opens itself to bodies without organs. These bodies claim the space, interlacing it into a supple, indeterminate form. The next example however distances one from the broader urban context to the scale of an architectural object to demonstrate how the logic of displacement, layers, and instability represents itself in a complex architectural form. Focusing on spatial experiences that are no longer linear, but shaped through an interplay of various temporal and spatial flows.

Kunsthal: Beyond Temporal Layers

Kunsthal, by Dutch architect Rem Koolhaas, is an example of an architectural object that is radicalized by questioning the relationship between time, space, and the (un)predictability of experience. In the context of our rapidly changing world, the building's *specific temporality*[31] – its distinctive mode of existing, unfolding, and being experienced in time, which allows it to persist and operate beyond immediate function – is strangely manifold. Following



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4 Rem Koolhaas, Kunsthal, 1992, floor plan. © OMA

32 Cynthia Davidson, "Koolhaas and the Kunsthal: History Lesions," *ANY*, no. 19/20 (1997): 39.

Deleuze's and Guattari's argument that contemporary social life is no longer structured through stable forms, but through networked, non-linear connections of desire, flow and movement, Kunsthal does not appear as a coherent, completed architectural whole, but via a tension between differing temporal and spatial layers. This intersectional tension can be explained based on the three aspects of the building's design.

First, its design *negates* the spatial logic of temporal layers. This is indicated by the exterior, allowing for a provisional explanation of the building's *envelope* and *skeleton*: the columns on the south façade are of different sizes and shapes. The striking horizontal steel girder on the top of the building *does not have a load-bearing function*. The stone cladding on the upper floor of the north façade is nearly flush with the glazing on the ground floor, which has no visible structural support, similar to many other elements in the interior. The *technology*, *layout* and *equipment* appear as a kind of simultaneous expression of elements, stacking of several layers one on top of the other so that they are discernible only in their singularity. It is as if none of the elements had a function within the whole of the architectural design. **[4]**

Even the relativity of place can be explained in these terms: due to the architectural principles of the Kunsthal, the concept of *site*, which is usually fixed and unambiguous, becomes relative to and subject to perception, experience, and time. Once inside, visitors lose a sense of space and time, and the building, as a result, appears *anti-tectonic*. Koolhaas's keen interest in the tectonic nevertheless comes through in the architect's *deliberate* use of certain elements in unexpected ways. To elaborate, Kunsthal is designed to challenge our usual perception of a museum building. The following passage says as much: "Seeing each elevation is essential to knowing the building and to seeing it in relation to Koolhaas's view of time. This no longer seems like a static box but rather a series of pictures that play back in the mind. I am reminded of Jean-Luc Godard's filmic jump cut, where time between frames vanishes, no longer providing a continuous narrative sequence and momentarily dislocating the viewer with new visual information." [32] Summarily, the object sets up diverse and unpredictable scenarios and with them operating conditions in the manner of *bodies without organs*. It is a non-hierarchical space: moving around the space, visitors lose their sense of direction and awareness of their specific location, which in the context of *temporal layers* is called the *place* layer.

Secondly, Kunsthal materializes the dynamic relationship between the object's architectural form and programmatic indeterminacy. The building appears as a deliberate attempt at *deconstructing a space* in which it is impossible to recognize clear, idealized forms. In place of a harmonious, balanced composition we see spatial deformations revealing before us – broken lines,



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33 *Object-form* refers to the building as a stand-alone, visible entity, perceived mainly through its shape or figure. It emphasizes *visual form* rather than the spatial experience or interaction of the user.

34 Tibor Pataky, *OMA's Kunsthal in Rotterdam: Rem Koolhaas and the New Europe* (Zurich: Park Books, 2023), 118–119.

5 Rem Koolhaas, Kunsthal, 1992, floor plan. Photo by Delfino Sisto Legnani and Marco Cappelletti. © OMA

staggering, unusual cross-sections and unexpected passages, ascents and descents that consciously undermine established architectural principles. The object's forms derive not from proportions, but from deliberately deformed entities that create the sense of spatial uncertainty of *bodies without organs*. Rather than a single whole, the building appears as an open, fragmented space that can only be comprehended through *movement*. In this sense, Kunsthal is in fact a *result of movement itself*. **[5]**

Through the third aspect – the creation of conditions – the observer senses Kunsthal not merely as an "object-form"[33], but as a series of spatial effects that the space is capable of (not) foreseeing. The building's infrastructure functions as the vessel of experience of the space. To some degree, Koolhaas himself said as much in his essay *Field Trip*: "Its impact was entirely independent of its appearance. […] I would never again believe in form as the primary vessel of meaning."[34]

The primary idea of the thesis that Kunsthal so radically challenges – the fundamental relationship between form and function, i.e. their assumed independence that the building obscures, inverts, or even cancels. Rather than an unchanging answer to a certain use, the building is designed as an architectural condition for the possibility of the *emergence of various spatial scenarios* that have not yet been written. And this is exactly what it is – a space of multiple scenarios: a diversity of spatial relations, possibilities, and accumulation of stories. The architecture offers visitors the idea of free use, which makes way for a different *temporality* and *presence* from what was expected. This openness, unpredictability, and decentering of meaning opens to the concept of *gravitivity.* With its conscious distance towards fixed meanings and deliberate deconstructing of the architectural form, Koolhaas's design establishes architecture as a practice that defies rapid change and simple programmatic solutions.

Part II
Gravitivity

Gravitivity is a component of a built space through which space is *re-grounded* and *embedded in time*. It is a local temporal characteristic of a space, which separates it from those objects and beings that move freely around it, and from the matter that is subject to rapid change, decomposition, or metabolism. The *gravitivity* of a space unquestionably stems from its need to withstand, by means of a sound technical and material design, the forces of gravity and other loads associated with a space. Gravity is a universal force that surrounds the Earth, defining the basic physical behaviours of all bodies in nearly identical quantity and direction. Without gravity, the planet as an

35 See Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge, MA: MIT Press, 1996).

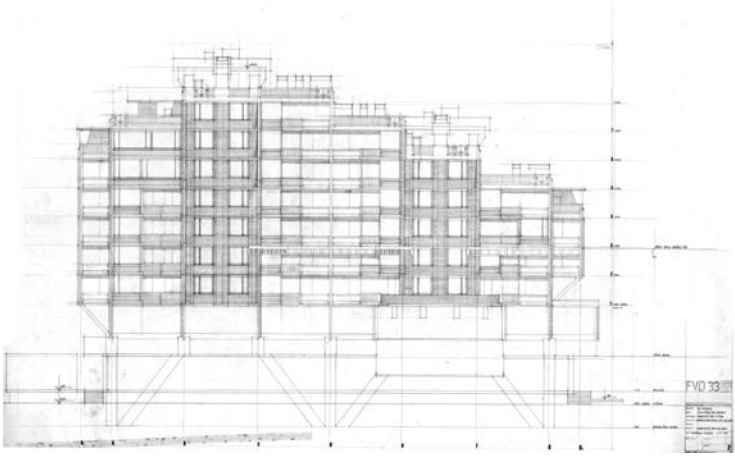
36 See Ákos Moravánszky in Mario Rinke (ed.), *The Bones of Architecture: Structure and Design Practices* (Zürich: Triest Verlag, 2019), 27.

accumulation and condensation of matter would not form and as a result, the phenomena such as the diversity of matter, life, and in turn sensory experience within a space would never develop and take shape. Gravity not only defines the behaviour of all matter on the planet, but enables its existence. Gravity is an invisible, but omnipresent force that shapes the physical, biological, and chemical conditions for life on Earth. Without it, the planet would not be able to contain the atmosphere or hold water, there would be no day and night, plants would not grow upwards, and humans would not even be capable of walking. Gravity is one of the key foundations for a stable biosphere – the formation and existence of matter, life, and space as we know depend on it.

Although gravity defines the basic physical conditions for key atmospheric, hydrological, and biological processes on the planet, its all-encompassing presence is so ubiquitous that it is no longer seen as something special or different – we have come to take it for granted as something omnipresent and universal. Its universality is comparable with the heart's beat, the contraction and expansion of the lungs, and evaporation of sweat on the skin. Its unquestionable physical constancy thus pushed to the background of our actions, turning into a part of our subconscious routines. In what way then does the fact that a built space must comply with the laws of gravity shape its significance for humans living in space and time?

To grasp the term *gravitivity*, it is important to differentiate it from two well-established and meaningfully related concepts of *tectonics*[35] and *anatomy of space*[36]. Kenneth Frampton explains *tectonics* through its etymological roots, i.e. as the expression of construction of spatial structures composed of several smaller carpentry elements integrated together in an architectural way. Architectural way derives from the manner in which materials are worked, i.e. technique, as well as from the need for solid and enduring – thus useful – structures. Interestingly, he interprets the concept in very broad terms, recognizing the importance of assemblage and joints in the broader sense of the word. For him, tectonics means that trait of architecture which in its essence assembles and joins spaces and contents rather than just matter. His understanding of tectonics was influenced by theoretical concepts of Karl Otfried Müller, Karl Böttlicher and Gottfried Semper.

Akos Moravánsky uses the concept of *anatomy of space* to focus on the similarities between built structures and living beings, recognising in both a (building or living) body made up of a skeleton and muscles, solid and soft structures, i.e. the supporting and supported systems. His interpretation of similarities derives from key authors who laid the foundations of modernist understanding of architecture: Gottfried Semper, Viollet-le-Duc and Hendrik Petrus Berlage. Frampton's tectonic is therefore something capable of cons-



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38 Tactility in architecture is understood in terms of architecture's material nature through which it engages the sense of touch, enhancing the sensory experience beyond sight and sound. We find that a direct contact of a human body with the material that provides gravitivity to a building evokes authentic experiences of mass, matter and force that transcend the rational, physical understanding of tension and loads imposed on buildings by gravity.

40 Roman Emona was built on the site of today's Ljubljana as a military encampment and by 14 AD evolved into an urban settlement with lively trade. It was a part of the Roman province of Upper Pannonia (later Noricum or Italy, depending on the era) and had the status of a colony, which means that its inhabitants included retired Roman soldiers with full citizen rights.

37 Changes in Earth's gravity are so minute that living beings cannot perceive their impact. Gravity changes because of the planet's gradual rotational deceleration, ongoing tectonic changes from redistribution of geological masses as well as redistribution of water in different states due to climate change.

39 Sonja Ifko, Brina Britovšek, Andraž Keršič, Miha Rijavec, Polona Šušterič and Tatjana Adamič, *Ferantov vrt: sustainable approaches for protection of post-war architecture of 20th century*, trans. Mojca Vilfan (Ljubljana: Fakulteta za arhitekturo, 2018).

41 See "Kazuo Shinohara: Casas/Houses", *2G*, no. 58/59 (Barcelona: Editorial GG, 2011).

6 Edvard Ravnikar, Residential and commercial complex Ferantov vrt, 1964-1975, section. © Museum of Architecture and Design, Ljubljana

tructing (through the process of joining smaller parts into a whole) its integrity, coherence, and identity, while preserving the awareness of the process, material, and the traces of human craftsmanship. Moravánski's anatomy, on the other hand, is a system that is functionally and structurally separated from other parts of the building, defying gravity and allowing the building its necessary load-bearing capacity. Both authors recognize the cultural elements of these characteristics of architecture, which through centuries of development transform into artistic, stylistic, and meaningful characteristics of construction.

On the one hand, gravitivity is the *physis* of the space that has to do with its tectonics and anatomy, but owing to its universality, matter-of-factness and immateriality it is also a *metaphor* – a covertly veiled thought, i.e. a mental transfer of a genuine ontological meaning of space. Not only something that *is*, something measurable and analytically explicable (e.g. by using mathematical tools of static analysis), gravitivity is also something that only represents and metaphysically interprets the territorial and temporal independence, i.e. expulsion of architectural space from the concrete here and now.

As a physical perception of gravity, gravitivity is immediately comprehensible, material, and empirical, but at the same time it is also omnipresent and unaffected by time[37], possessing the properties of the universal, all-encompassing, and eternal. It is an unmediated element proper to a body and as such is tactile.[38] It is an element that is never purely conceptual or such that it would demand a mental interpretation of the perceived, conversely, it is sensory, directly biological and therefore ontic (in the narrow sense), it is of this world, and thus material. An example of such gravitivity at work is the residential-commercial complex of Ljubljana's Ferant Garden (1975)[39] designed in 1975 by the Slovene architect Edvard Ravnikar. The building is constructed directly over the archaeological remnants of the Roman settlement Emona, erected between 14 BC and 14 AD.[40] With Y-shaped concrete columns that dominate the space of the half-buried basement gallery, the architect upheld the programme's extensive structural frame on six points where the building, its mass and its essence barely touches the ground. By means of this gesture, he physically and mentally connected the horizontal space of the more than 1000 m² gallery (which also receives daylight through the openings on the two longitudinal sides) with the public space outside without having to add any additional supporting walls. **[6]** The horizontal openness, and the gallery's attachment to its surroundings evoke a feeling of an uninterrupted flow of the space, whereas the unadorned materiality of the concrete columns pierces through the space as a contrast, mass, pure *physis*. **[7]** A very similar approach to spatial design was used in the design of the house in Uehara (1976) by Japanese architect Kazuo Shinohare.[41] Running in



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7 Edvard Ravnikar, South Basement Gallery, 1964-1975, interior. Photo by Miran Kambič. © studio abiro

two perpendicular directions, V-columns "roughly" cut through the central living quarters of the home, like independent bodies or housemates. **[8][9]**

Like in the case with Ravnikar's gallery, the technical solution, the logic of load bearing, and even understanding of the object's syntax of tectonics matter far less than the "raw" immediacy of these structural elements, which introduce an exceptionally primal, direct, and haptic presence of *weight* and *substance* into the otherwise homely family house. In both of the described cases, gravitivity does not manifest itself through the representation of architectural syntax or the specificity of materiality, but through the sheer presence of matter, which enters space on equal terms with human form, presence, and relentlessness. Gravitivity cannot be described in an analytical manner; it is both sublime and real.

The other important characteristic of gravitivity is its *non-territoriality*, timelessness and in turn detachment from the present, and consequently from the context of concrete time and space. Architecturally, this is manifested through a design of a building's skeleton or load-bearing system that does not specify an explicit method of construction or composition, nor does it prescribe its exact material and substance. It has no desire to be concrete, precise in the manner of structure and composition, precise in the choice of material and its substance, but deliberately evades such precision – wishing instead not to be understood as something expressly concrete, fleeting, and replaceable. It shuns any straightforward, legible interpretation of time, both in terms of its formation and its disintegration.

Proffering the question of the temporal dimension of a building's structural framework, the concept of *gravitivity* is closely related to *temporal layers*. According to Brand, Eberle and Duffy, the part that ensures its solidity, structural support and in turn the basic spatial geometry is assumed to be more, or even the most long-lived.

Its longevity and endurance, as a rule longer than in any other layer that makes up the building envelope, ensures *hierarchical co-dependence* of assembly and disassembly, because the structural skeleton is in fact the supporting system to which all other subordinated elements attach in one way or another. If the timescales of the structural *skeleton* were shorter than those of other layers, the *supported* parts would require changing in parallel with any intervention into the *supporting* parts. Hierarchical interdependence translates to temporal interdependence, demonstrating the necessity of designing the structural framework to last. The system of temporal layers is therefore subject not only to the principles of temporal dynamics and adaptability of different levels of a building's use and adaptation, but also to the hierarchical interdependence of a building's component parts or layers, which is immanent to this system. According to Brand, Eberle and Duffy, a sound building



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42 The concept of suppressed growth, originating in botany, denotes the phenomenon in which a plant, due to surrounding obstacles, does not develop evenly or to its full potential. Instead, its growth framework – the stem – adapts and yields to the surrounding obstructions. The growth becomes deformed and fails to display the plant's expected formal structure.

8 Kazuo Shinohara, House in Uehara, 1976, interior. Photo by Hiroshi Ueda.

9 Kazuo Shinohara, House in Uehara, 1976, interior. Photo by Hiroshi Ueda.

design that pays attention to the internal hierarchy of layers ensures its sustainability, longevity, and capacity of adaptation to unexpected changes and uses that come with unpredictable future. In architecture, the structural *skeleton* plays the leading role, hierarchically governing all other layers but the *place* (which remains independent). The *skeleton's* structure directly and indirectly determines the material and spatial elements of architectural space.

Contemporary works of architecture respond to the relationship between gravitivity of a space and the dominance of the structural skeleton in different ways. Most contemporary architectural production does not pay any noteworthy attention to the structural skeleton, which is treated as a utilitarian, pragmatic, and technically correctly set system that merely serves its purpose for a concrete space and time in which it was created. This means that its "dominance" is neither specifically underlined and presented, nor does it reveal its longevity or even timelessness. Its place in the architecture of *bodies without organs* is in the background, where it does not show off its seniority and hierarchical superiority. In order to facilitate constant transformation and metabolization of other *temporal layers*, the structural skeleton lingers at the level of *suppressed growth*[42] – like a skeleton that only loosely fits with the organs clinging on to it. With its invasive dynamics, the life of *bodies without organs* gradually comes to demand that the structural skeleton adapts to it as well. As a result, the latter gradually becomes amputated, broken, and ultimately barely recognizable.

To explain this further, the system of *temporal layers* requires architecture to ensure the layers maintain their hierarchical interdependence, in line with the dynamics of their timescales. Most buildings, however, are not designed with this principle in mind; what's more, the expected scope and dynamics of change in the use of a space also calls for spatial interventions (e.g. into structural elements and the façade envelope to accommodate the current needs of the building's programme) that often outrun the envisaged timescales of *temporal layers*. This is why through increasingly destructive and unstructured transformations, where the layers no longer alternate according to an organized principle, the complexity and aggressiveness of the space of *bodies without organs* dissolves and rubs out their legibility and identity.

Gravitivity is resistance against this process. A building designed to purposefully reinterpret the principles of gravitivity manifests the role of the structural skeleton in several ways. To begin with, its form and presence consistently defy the processes of constant transformation of *desiring machines*. The *physis* of the skeleton transcends the exclusively utilitarian role of the structure. What's more, it even transcends the limitations of the *temporal layer*, because the *skeleton* layer might come with the functions of the *envelope*

or *technology* layers. It is visible, perceived, present, and excessively defining. As follows from the above, it is contradictory to the principle of *temporal layers*, because it imposes on the layers with more intense dynamics and authority. It is irrational and therefore subversive; it compromises the rationality of the structure of a space, but only in order to protect its being. More than the skeleton of a mammal it resembles the shell of a vertebrate. It is rigid, crude, and archaic, but only to maintain its presence and longevity. As such, it helps architecture to stay *regrounded* and *embedded in time*, despite the potency of *desiring machines*. So that it can exist in its own, i.e. material, yet timeless manner. Gravitivity represents itself through the raw materiality of the structure, its generic regularity and its lyrical autonomy, through the capacity of its own individuality that transcends the question of the right or wrong programme. Through universality of its content on the one hand, and individuality of its form on the other.

The final part of the paper presents two case studies of architectures at different spatial scales, both of them demonstrating how the principles of gravitivity find their expression in space, and how they allow architecture to maintain its autonomy and identity in increasingly precarious times of our modern world.

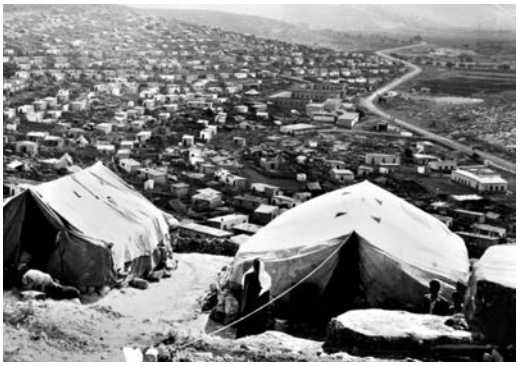
DAAR: Refugee Camps and Articulation of Time

The first example illustrating the principles of gravitivity focuses on the tension between temporary, informal abodes (similar to those discussed above for the homeless) and permanent built structures. Refugee camps are an expression of the spatial challenges that come with increasingly uncertain living circumstances. They are a specific form of spatial adaptation to crisis situations, where the need for safety and responsiveness often falls victim to limited time and resources. Our basic argument, namely that *gravitivity* allows us to understand architecture as a practice capable of persevering in the world, is especially relevant in the case of refugee camps.

The point of departure is that these spaces, which in the context of contemporary social instability represent an *extreme spatial situation*, emerge as a response to different socio-political crises and manifest themselves as examples of forced temporary housing and improvisation. They are interesting because they reveal the gaps in our understanding of architecture as a stable, permanent, and planned activity. They invite one to reflect on relationships between space, time, and structure. Whereas in the previous chapters we discussed architecture as an activity that articulates certain order and stability, refugee camps in general represent the exact opposite. They come not from the structure, but from the mode of operation of *bodies without organs*.



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10 Dheisheh refugee camp, 1952. © UNRWA archive

11 Dheisheh refugee camp, 1959. © UNRWA archive

12 Dheisheh refugee camp, 2011. © DAAR

43 DAAR, a collective of architects and a residency programme, was co-founded in 2007 by Sandi Hilal and Alessadro Petti in Beit Sahour (West Bank, Palestine). Their research, architectural and artistic practice focuses on the decolonisation of space.

44 Located in Betlehem in the West Bank (Palestine), Dheisheh was established 1949 as a temporary tent camp.

45 The Concrete Tent was set up in different refugee camps, including Dheisheh, Abu Dabi, Rabat, and Sharjah, which goes to show the versatility and adaptability of thisr spatial intervention in various socio-political contexts. See Alessandro Petti, Sandi Hilal, and Eyal Weizman, *Architecture after Revolution* (Berlin: Sternberg Press, 2013).

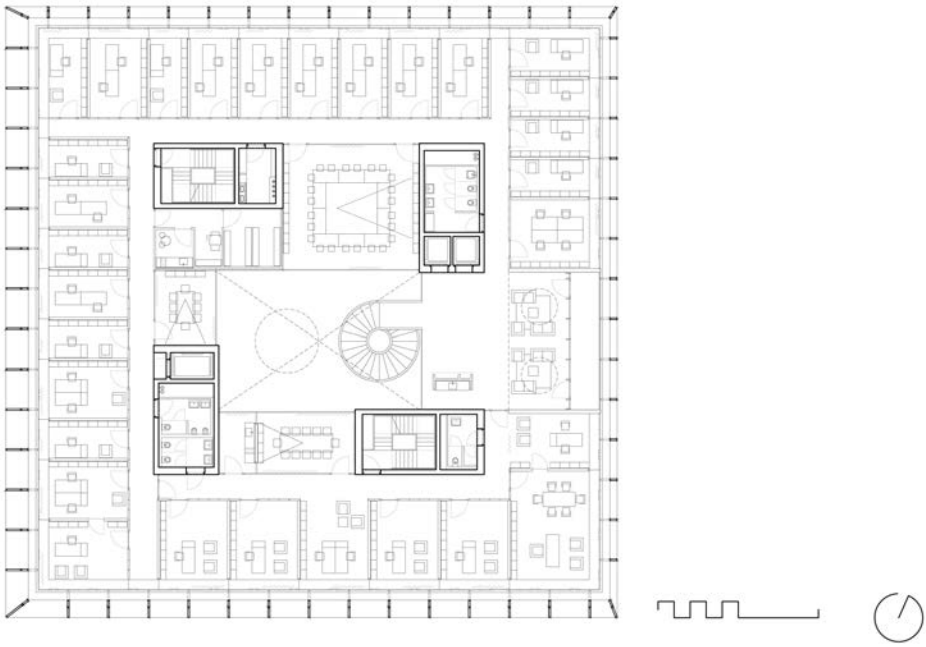
Working at the intersection of architecture, art, and politics, the DAAR (Decolonizing Architecture Art Residency) collective has been researching these "unpromising", uncertain spaces for more than a decade, investigating and intervening in the context of Palestinian refugee camps.[43]

The refugee camp Dheisheh will serve as an example of their spatial practice[44], showing how over decades an originally disorganised structure can evolve into a persevering, functional and community-shaped urban structure. Dheisheh demonstrates the capacity of a space to *solidify* even in the absence of specific planning. More specifically: it reveals a form of gravitivity that does not derive from initial stability, but from everyday use, improvisation, and group action through time. How?

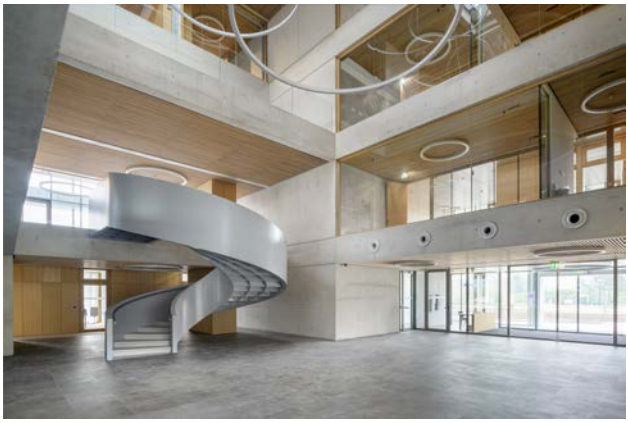
Since 1949, the camp area has evolved into a "solid" urban structure with all basic infrastructure: water, electricity and a sewage network. In place of tents, its inhabitants built concrete objects and paved the streets. Chaotic, segmented, and devoid of any organised guidance, the camp's architectural structure is a result of decades of an improvised, often informal construction process, through which people took the initiative to adapt spaces to meet their daily needs. This seemingly chaotic situation, however, gradually comes to shape a new kind of order – an unplanned, but nevertheless established spatial logic that evolves from a collective construction practice and its temporal layers. This can be read as a transition from an "unsolid" to a "solid" structure, which is based on spatial perseverance. **[10]**

DAAR's practice serves as a good example because of their unique way of articulating the socio-political circumstances of our day. Their spatial research does not investigate a refugee camp as a temporary and therefore insignificant space, but as a spatial reality present here and now. DAAR see refugee camps not as merely utilitarian structures, but as potential architectural spaces, which is evident in their Concrete Tent projects[45], spatial interventions through which DAAR explores and formalizes the contradiction between the temporary and the permanent. The project presents a tent-shaped concrete structure that symbolically embodies the contrasts between movable and immovable, temporary and permanent – as a paradox of *permanent temporariness*. The tent therefore embodies the reverse process of transition, from a non-solid to solid structure, where gravitivity plays its role independently of the course or stage of the construction process. The material permanence of the concrete structure thus allows the tent to become a permanent vessel of memories and of the community identity of its residents. **[11][12]**

A broader conclusion that offers itself is that even in the most extreme conditions, architecture has the potential to harness gravitivity in order to articulate time, structure, and regrounding. The built refugee city of



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13 studio abiro, Poslovna stavba DARS, 2024, floor plan. © studio abiro

14 studio abiro, Poslovna stavba DARS, 2024, interior. Photo by Miran Kambič. © studio abiro

Dheisheh and Concrete Tent projects are important in that they demonstrate the *necessity* of architecture's presence in any given social context. As such, architecture has the capacity to introduce order to the world, order that underpins human habitation.

DARS Office Building: Manifestation of Gravitivity

In many examples of contemporary architecture, the temporal layers manifest themselves through a multi-layered construction, where the structural elements usually stay hidden, covered from the outside by the *envelope* layer and by the *layout* layer from the inside. In the case of DARS office building, a reversed logic is at play: not only is the temporal layer of the *skeleton* exposed, it also assumes a distinctly prominent, even dominant role. Taking on much of the substance of the *envelope* layer, the *skeleton* becomes the external face of the building. The building's load-bearing structure is divided into two levels: the interior of the building rests on four strong monolith concrete stairways, while the peripheral part carries a steel frame pushed to the outer side of the thermal envelope and shaped as a deep, yet slender honeycomb. Clearly defining spatial relationships, the internal part of the structure is rigid and final, while the outer protrudes outwards from the envelope plane, evading any attempt at a predetermined division of space or articulation of the façade envelope. It is a universal building *skeleton* defined by the steady rhythm of 250-cm-long intervals, but independent of the building's internal structure. Materialised on the exterior layer of the building, the structure with its explicit presence is more than a load-bearing core, but serves in the first place to represent the building's meaning. Taking on the job of the *envelope*, it does not perform it in the regular way, i.e. through the predisposition of windows, vertical articulations, or rhythmical articulation of the content, but in an open, grid-like, nearly decomposed manner. **[13]**

All other temporal layers are more or less subordinated to the *skeleton*, but still maintain their dynamics, timescales, and even independence. The façade *envelope* as such is no longer there; what remains is a continuous thermal coat, interrupted only by regularly spaced windows for natural ventilation. The *technological* layers, installations, HVAC and lighting systems are inserted into the space as secondary elements that operate horizontally with their own logic of distribution and operation, but are vertically (cable and connection routing-wise) subordinated to the *skeleton*. With the skeleton removed from content-dedicated parts of the building (those that serve the company's activities), the *layouts* (partition walls between rooms) enjoy full freedom, never obstructed by the building's load-bearing elements. This generates tension between two worlds: the stable and finite one, and the resett-



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15 studio abiro, Poslovna stavba DARS, 2024. Photo by Miran Kambič. © studio abiro

16 studio abiro, Poslovna stavba DARS, 2024. Photo by Miran Kambič. © studio abiro

ling world, which is constantly subject to change. The framework is clear, stable, static, whereas the use of the building remains open, dynamic, potential. This tension is underlined and clearly expressed, yet in essence non-confrontational. **[14]**

The building itself is in no way a *body without organs*. Its form is there and it does not disintegrate into flows. Quite the opposite – it puts in place a clear and *solid* structure. Nevertheless, it accepts dynamic, changeable systems – economic, functional, social – that we understand as a part of *bodies without organs* of the contemporary urban and economic social apparatus. These bodies may operate inside the building, but their supremacy is intercepted: they are neither superior to the structure, nor do they break down the skeleton or take on a form. The building does not refuse them, but it does not give them power either. There is a subtle relationship somewhere between hospitality and restrain, openness and resistance. **[15]**

Gravitivity is the key concept to come out and express itself in the twofold relationship between a *solid structure* and *bodies without organs*. Inside, it is manifested as a monolithic presence: unarticulated concrete towers devoid of human scale, corporeal to the point of being brutal. They evoke a sense of mass and presence. They are immediate, tactile, corporeal – not to be observed, but felt. The external manifestation of *gravitivity*, on the other hand, is abstract: the geometrical grid of the framework that is broken down to the human scale – office cells, individual functions – and at the same time completely alienated, non-tactile, digital. It functions as a conceptual scheme – technical, repeatable, and stripped of any local specifics. The embodiment of the concept of *gravitivity* as defined above is manifested in a distinctly architectural, articulated manner. Assuming, subverting, and setting back the logic of temporal layers without compromising their original role, *gravitivity* reveals itself through the embodiment of the *skeleton* and subsists as the fundamental identity of the space. The space is thus regrounded, but without being caught in a concrete place. For people working in and thinking about this space, *regrounding* appears as the possibility to defy life's uncertainties. For us, living at a time of constant changes in business dynamics, temporary organisational structures, and fluid spatial arrangements, the *regrounding of gravitivity* means regaining and maintaining our capacity to perceive *state* and *duration*.

With its longevity, its unrelenting presence, and manifold role in the system of *temporal layers,* the *skeleton* becomes the vessel of *gravitivity.* It carries an allegorical reflection of resilience against dissolution, incorporeality, dispersion into *bodies without organs*. **[16]**

Gravitivity as a Condition of Perseverance

The paper offers a reflection on the connection between architecture and social structures and proposes a definition of the new concept of gravitivity so as to define this connection. Based on the analysis of different views on the layering of the architectural envelope of a building, which we call "temporal layers", we wanted to bring to light various attempts at defining the relationships between contemporary social conditions and architecture. Temporal layers served to define architecture as a practice with its *own temporality*, which is different from the temporality of the rapidly changing contemporary society. The examples offered in Part I corroborate that, each revealing in its own way the concurrent action of contemporary architecture at two levels: firstly in terms of tension between *solid structures* and *bodies without organs*, and secondly at the level of *temporal layers* of the architectural envelope.

Part II develops the concept of gravitivity to help us understand why and how architecture becomes embedded in time. We illustrated our thesis that gravitivity allows us to think architecture as a specific practice capable of persevering in the contemporary world with two topical examples at different scales: a refugee camp and an office building. We demonstrated that both draw a clear line between the temporality of the contemporary socio-political context and the temporality established in the world by architecture. The two examples may be conflicting, but it is in this conflict that the presence of gravitivity reveals itself. It represents the potential that transcends social circumstances and establishes itself as a *link* between temporal layers of a space: *place*, *envelope, skeleton, technology, layout*, and *equipment*. Gravitivity establishes itself as that which allows architecture to operate regardless of expectations and current uses of a space. It allows architecture to persevere – not only as solid changelessness, but by being able to resist decay. As such, gravitivity can be understood as a tool that re-examines established architectural conventions and transcends them through its own logic of perseverance – transcendence.

Through the explanation of the theoretical framework of temporal layers, as well as the analysis of several architectural works, we have highlighted those characteristics of building's form that grant architecture – governed by the expectations and needs of contemporary post-structural society – the capacity and strength to sustain timelessness and embeddedness in space. The definition of gravitivity as we have developed it, constitutes the minimum condition for understanding architecture's embeddedness in time. It enables architecture to transcend the inherent fragility of local culture and context, as illustrated by selected examples, which demonstrate how

gravitivity allows architecture to operate independently of the established relationship between form and function and to extend its relevance beyond immediate use.

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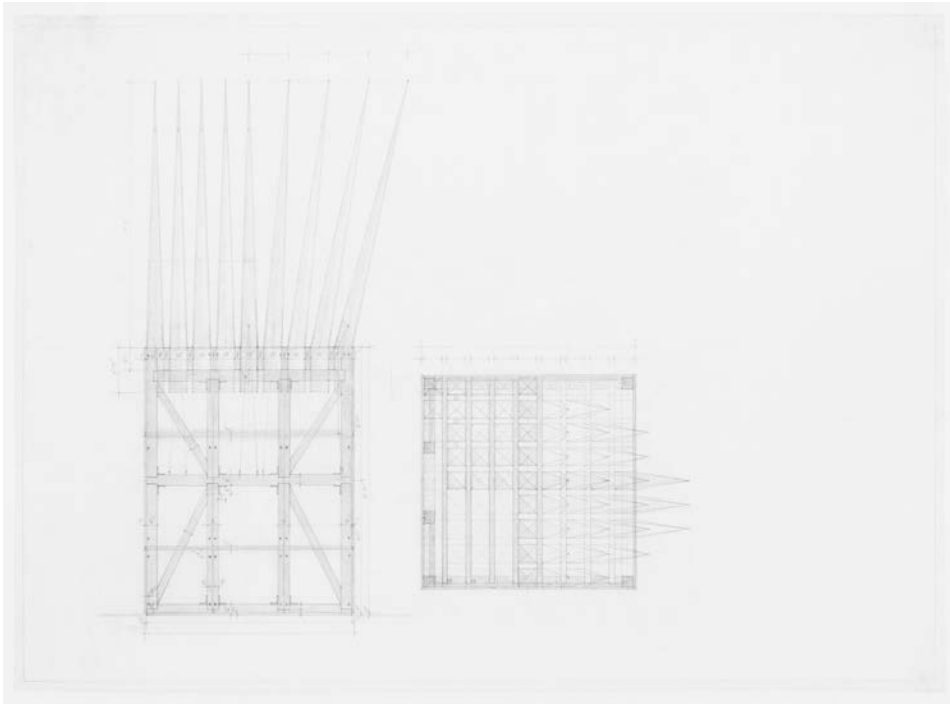
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The Anonymous Detail
The Imaginative Effacement of John Hejduk's Measured Drawings

James Williamson



1

1 Alain Robbe-Grillet, *For a New Novel: Essays on Fiction*. Translated by Richard Howard, (Boston: Northeastern University Press, 1989), 165.

2 See: John Hejduk, *The Lancaster/Hanover Masque* (London: Architectural Association, 1992), 138–52, 404–21.

1 John Hejduk, *Lancaster/Hanover Masque: Elevation and plan for The House of the Suicide* (1979-1983), Pencil and colored pencil on vellum, 59 x 81 cm, Canadian Centre for Architecture

> *"The hallucinatory effect derives from the extraordinary clarity and not from mystery or mist. Nothing is more fantastic ultimately than precision."*[1]
>
> **Alain Robbe-Grillet on Franz Kafka**

Introduction

This writing examines the unique logic of fabrication in architectural drawings of the American architect, John Hejduk (1929–2000), especially as these relate to the last phase of Hejduk's work, generally known as the *Masque Projects*. It proposes that Hejduk's radical reconceptualization of the architectural program and his encompassing effort to give form to that program — through richly expressive drawings, paintings, and narratives — were paradoxically reliant on rather anonymous, even mundane, sets of drawings employed in the dozen or so physical constructions that emerged from the imaginative world(s) that the *Masques* create.

As such, this writing will examine Hejduk's late work in general but will focus on those projects that Hejduk brought forward for more detailed elaboration in the measured drawings that often followed his initial sketches and written vignettes. These measured drawings—particularly those for the *Berlin Masque*[2] and the *Lancaster/Hanover Masque*[3]—must be seen as inseparable from the more provocative aspects in Hejduk's masques, and they provide both an extension of and an essential grounding for the work while placing it in a reality that was, for Hejduk, ultimately and always ambiguous.

The contrast between the Masque's representational provocations and the ordinariness of the measured drawings is essential to their importance, meaning, and our understanding of them. These measured drawings are ultimately not simply about clarifying the process of construction (as architectural drawing conventions would dictate) but paradoxically align with the larger meaning of Hejduk's masques — as part of an allegory that creates an opening into the imagination for both the viewer *and* the interpreter or builder of Hejduk's work.

The subject is approached initially by comparing Hejduk's methods of representation with the surrealist painter, René Magritte. Magritte, as in Hejduk's measured drawings, avoids overt display of painterly or draughtsman-like skill in favor of a more anonymous – and importantly – more open engagement of the viewer's imagination. This anonymity is essential to both the artist's and Hejduk's work and their similar engagement of the viewer as a co-creator in their mutually created worlds, worlds filled with the paradoxical and uncertain.

Outside of the world of art, particularly for those unfamiliar with Modern Art's history and aspirations, the quality of a work of art, more specifically, a painted work of art, may be related to the artist's hand – her or his skill in applying paint in the creation of images. In the popular imagination, this adroitness might even be thought of as chief among an artist's abilities and that which separates artists from non-artists. This may be, of course, too overarching a generalization; the intent here is not to make an unimpeachable statement on Modern Art but to emphasize how skill might be generally viewed by those outside of artistic production.

If the artist is a realist painter, this adroitness goes hand-in-hand with accurate verisimilitude. If the artist deviates from realism, this adroitness may be related to her or his ability or inventiveness within a particular style of painting as in the case of the Impressionists. Even in abstraction, adroitness is privileged — in the calligraphic precision of Jackson Pollack, Robert Motherwell, or the lyric gestures of Motherwell's spouse, Helen Frankenthaler. In this way, the artist's hand is her or his signature – seen in tell-tale details of brushwork or gesture that distinguish one's work from another's, a Monet from a Degas, a Lee Krasner from a Joan Mitchell.

But what of the contrary? What about artists who are uninterested in these distinctions – who are not interested in the skillful artist's hand, with impressing the viewer with a mastery of technique, or with invention within a particular style? What if the artist believes that such things simply obstruct our approach to their work and serve as a distraction from content and, most importantly, from the reception of ideas?

And — given that the subject at hand is architecture and not painting — what about an architect who shares such a disinterest in the skillful hand revealed through the constructed images used so often in architectural representation (drawing), or in the case of the architect, John Hejduk, whose work is addressed in this writing: drawings, paintings, and buildings?

John Hejduk's architectural work is widely understood to be grounded in the revolutions of painterly abstraction of the early twentieth century and in the artists who led these revolutions. The list is long: Piet Mondrian (the *Diamond Series*), Juan Gris (the *Juan Gris Problem* at Cooper Union, where Hejduk was dean of the School of Architecture), Braque (the *Wallpaper Series* of his late works), and Le Corbusier as both a Purist painter and architect (the *Wall Houses,* especially the *Bye House*).

These artists were explicitly intellectual and formal inspirations for Hejduk's remarkable series of architectural inventions. However, two additional artists, also among Hejduk's influences, are of particular interest for

4 John Hejduk, "Silent Witnesses." *Perspecta*, *Yale Architectural Journal*, vol. 19, (1982): 70–80. This should be distinguished from another project of Hejduk's with the same title. This writing refers to the *Yale Perspecta 19* submission of 1982 and not Hejduk's five plinth-like installation of 1976.

5 *Ibid.*

6 Regina Marler, "Every Time I Look at It I Feel Ill." *New York Review*, Oct 25 (2018): https://www.nybooks.com/articles/2018/10/25/rene-magritte-every-time-i-look-at-it-i-feel-ill/.

this writing and to Hejduk's late work: the Belgian surrealist René Magritte [4] (1898–1967) and the Italian painter and printmaker of still lifes, Giorgio Morandi (1890–1964).

Of the two, Magritte may have been the more conceptually influential. His attack on the arbitrary connection between words and images may very well have influenced the disparity between titles, narratives, and images in the formation of Hejduk's *Masque Projects,* and the masques certainly adopt Magritte's dissonance between word and image, with the titles of his objects seemingly detached from their appearance.

Magritte also plays a significant role in *The Silent Witnesses* [5], a wordless compendium of images Hejduk submitted to *Yale Perspecta 19,* at a time when the *Masque Projects* were just developing. Comprised of reproductions of four 35mm photographic slide sheets, images of Magritte's paintings appear prominently in the overall set of images – a collection whose absent text presents the reader/viewer without the captions that might allow for description or any categorical distinction between images. The reader/viewer is left to surmise or conjure their own relationship between images, and this was the key intent in Hejduk's submission.

Magritte was not interested in skill, at least not as we might generally understand it. His paintings are knowingly ordinary, and, in their execution, he deliberately plays down painterly skill. He might even strike someone unfamiliar with his work as an amateur painter or a naïve artist—an observation that purposefully *masks* and even facilitates the fact that he was a painter of profoundly deep thoughts. The apparently unskilled quality of Magritte's work is certainly clear when he is compared to other surrealists. Max Ernst, for example, was a remarkable inventor and master of techniques, while Salvador Dali made realistic depiction his signature, and some might say, a marketing tool.

The origins of Magritte's approach to painting may come from his first impressions of de Chirico's *Song of Love* — he supposedly wept…having "seen" thought for the first time [6]. However, just as likely a source of Magritte's approach to painting was his background as a draftsman of wallpaper and as an advertising designer in the 1920s, an employment he returned to in the 1930s when he ran an agency with his brother, designing film posters under a pseudonym as a means of earning a modest living. Significantly, this is work where easily replicable and ordinary depictions were the dominant approach to image making (the kinds of images which were the currency of advertising at the time).

As opposed to Dali or Ernst, Magritte's intent relative to technique was not to confront the viewer with skillful and powerful depictions of some other reality, thereby enticing the viewer into a dream-like and impossible world



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7 Suzi Gablick, *Magritte*, (London: Thames and Hudson, 1970), 9—10.

2 René Magritte, *The Key to Dreams* (1930), Oil on canvas, 81 x 60 cm. Private Collection

(Dali), nor to invent a world out of the world's detritus, marvelously transformed (Ernst in his early collages and later frotages). As Suzi Gablik comments in her book,*Magritte*, "Magritte's paintings are intended as an attack upon society's preconceived ideas and predetermined good sense"[7] Magritte intended to radically transform the ordinary world through its own terms — to unmoor us from our habits of thought by transgressing the pact between word and image **[2]** and confronting us with the arbitrariness of signs, and most importantly, the delineation between the ordinary and the extraordinary.

In Magritte, we are never quite sure what is ordinary and what is not — as is not the case with Dali and Ernst, where we are clearly looking into their invented worlds. And that is the point, and the absence of technique is vital to this point – an absence that provides a portal into Magritte's confounding world without the need for artistic erudition. Magritte creates this rather egalitarian portal through ordinary means — by painting in a kind of 'dumb' way – the way of a wallpaper draftsman, advertising illustrator, or a sign painter.

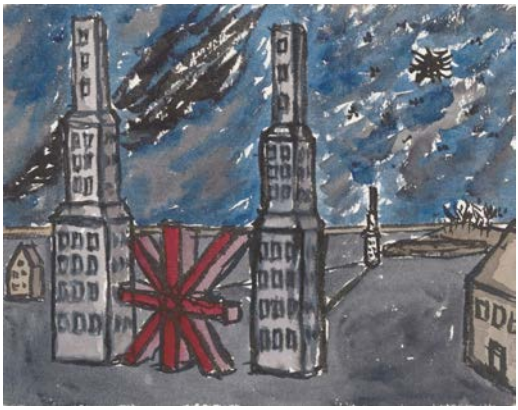
The phrase "sign painter," is a deliberate play on words. Magritte's arbitrary world of signs is achieved through a destabilizing play between word and image where ordinary, unassuming things achieve extraordinariness through a kind of magician's sleight of hand. Ordinary objects — apples, combs, pipes — are painted in the most ordinary way and in a way that emphasizes their ordinariness. This is not a celebration of the hand's facility in rendering specificity or special uniqueness to a depicted object. It is not *that* beautiful apple or *that* exquisite and unique pipe. That apple is *every* apple, and that famous pipe is *every* pipe. It is this ordinariness and absence of specificity that allows our own individual imaginations to enter Magritte's paradoxical world and become authors of our own understanding. — although our own quandary may be a more apt expression.

Although not a surrealist, but also impacted by de Chirico, Giorgio Morandi is a painter of the ordinary in his own distinct way. His most widely known works are still life paintings of objects that he collected and meticulously, even obsessively, arranged and rearranged for each painting, drawing the outline of each object's position (its plan) on a sheet of paper beneath it to note its exact placement — an assembled world of dusty objects painted in a small studio in the apartment he lived in with his sisters for most of his life.

The objects: common bottles, vases, and pitchers, were painted over in mute tones to disguise labels or any tell-tale markings the objects might have, thus ensuring their anonymity while emphasizing their commonness. The lighting, through a single window, was carefully modulated, and the palette



3



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8 See: Hejduk's *City of a Hill* project for the Cooper Union, the *Holocaust Museum* in *Berlin Night,* and the Hejduk Memorial Towers inside the City of Culture of Galicia, Spain.

9 John Hejduk, *Soundings: A Work by John Hejduk.* (New York: Rizzoli International Publications, 1993), 134—137.

3 Georgio Morandi, *Still life* (1955), Oil on Canvas, 25.5 x 40.5 cm, Private Collection

4 John Hejduk, Painting for Berlin Night depicting *Jewish Museum*: (1989), Watercolour on paper, mounted on board 21.5 x 27 cm, Canadian Centre for Architecture

of colors was almost always muted. Additionally, it is said that Morandi never removed the dust that gathered in the studio, nor from the objects that he painted. The overall effect is as if the objects are viewed through a haze – a sort of dusty translucence not unlike looking at an image under vellum – the paper Hejduk used for the measured drawings that will be addressed below.

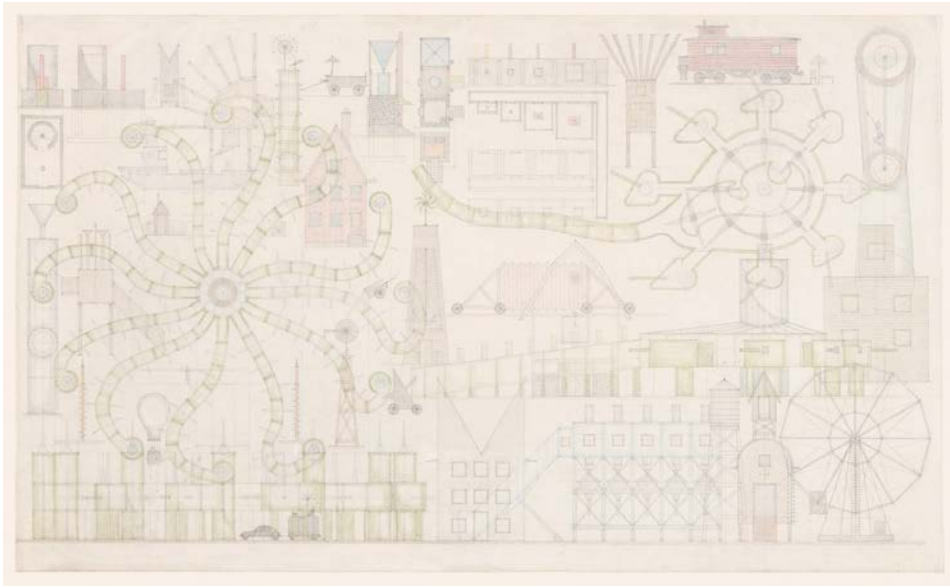
The arrangement of objects on Morandi's table **[3]**, with these same objects appearing repeatedly, is metaphorically related to the city outside his studio window, the city of Bologna, known for its arcades and distinctive medieval towers. Hejduk's masques (themselves a form of urbanism), with their collection of repeated objects/buildings, are certainly analogous to Morandi's still lifes, whose plans are as deliberately worked as Morandi's tracings.

It should also be noted that Hejduk's attention to Morandi is also evidenced in the numerous Morandi bottle-like towers in Hejduk's work.[8] Also of note is the fact that in the many drawings for these towers, especially those in the book *Soundings*[9], Hejduk adopts the cross-hatching of Morandi's etchings to render both the towers and the dark, gray-toned atmosphere that surrounds them **[4]**.

John Hejduk's Masque projects began in the late mid 1970s with such projects as *The House for the Inhabitant Who Refused to Participate* (1974–79), *Thirteen Watchtowers for Cannaregio* (1975), and *The Cemetery for the Ashes of Thought* (1975) but they come into full elaboration and prominence with the *Lancaster/Hanover Masque* (1979–83) and with Hejduk's submission of the *Berlin Masque* (1981) for the International Building Exhibition Berlin (IBA). They continue in various forms until Hejduk's death in 2000, with perhaps their most poignant manifestation in his *Cathedral* project (1996).

In the *Lancaster/Hanover Masque* **[5]**, Hejduk creates an enclosed compound for a small farming community in rural Pennsylvania filled with buildings, building-like objects, and architectural creatures. These are accompanied by a list of sixty-eight subjects and objects (*The Suicide* and *The House of the Suicide* **[1]**, or *The Cellist* and the *Music House*, for example) and followed by associated, fragmentary narratives concerning each subject and object, accompanied by sparse and agitated sketches. At times, some of the objects were later selected to be developed in sets of large, measured drawings in pencil and colored pencil on vellum.

In the *Berlin Masque,* Hejduk responded to a rather straightforward program for social housing on two adjacent blocks in the Wilhelmstrasse area



5

10 Isidore Ducasse Lautreaumont. AZQuotes.com, Wind and Fly LTD, 2025. https://www.azquotes.com/quote/350048, accessed October 7, 2025.

5 John Hejduk, *Lancaster/Hanover Masque:* Presentation drawing for the Lancaster/Hanover Masque (1980-1982), Pencil and colored pencil on vellum, 106.9 x 170.1 cm, Canadian Centre for Architecture

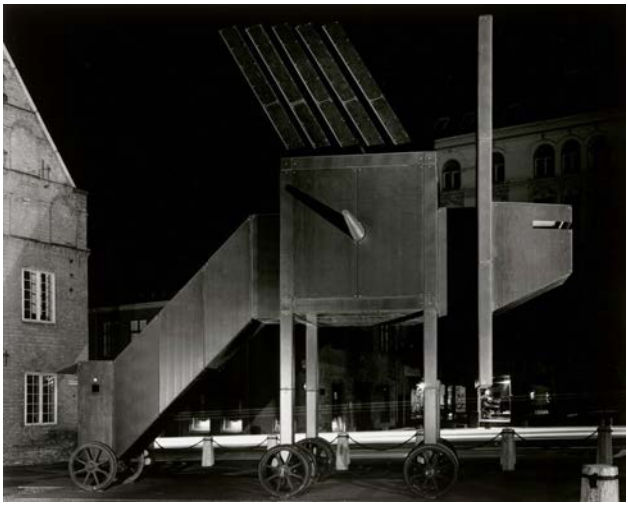
of what was then West Berlin. He discarded the functional brief supplied by the competition and instead drew upon a quote also included in the brief by Italo Calvino from *Invisible Cities* as a starting point. This quote describes one of the many of Calvino's imaginary cities and specifically concerns the fleeting identity of the city over time and in the imagination. Hejduk proposed enclosing the two adjacent sites with walls and filling them with a series of objects like those described and drawn in the *Lancaster/Hanover Masque*.

Both projects might be described as embodying or animating the emerging, occulted consciousness of a community and as an allegory for dwelling that is giving form to a subtle and unspecified mystery. It is also an invitation to imagine the city as a construction of our own imagination—drawing upon the imprecise clues that Hejduk's drawings and narratives provide.

Hejduk radically upends the normative architectural program in these projects, and he notably removes the necessity of a client from the programmatic equation. It is true that in previous seminal bodies of work (the *Diamond Series*, *Texas Houses,* and the series of projects that include *¼, ½, and ¾ Houses* as well as the *Wall House* projects) there was no conventional client, but the presence of a client was implied. In the Masque Projects, no such relationship is present. Hejduk's autonomy in inventing and authoring the program of the masques is clear, and this is as important and radically creative an act as the creation of the individual objects that comprise the masques.

The objects that make up the masques are of a hybrid nature and appear to be a collage of disparate and layered elements. Many of the objects resemble a hybrid of industrial or agricultural architecture and many have clear bio/anthropomorphic qualities: the *Security* **[6]** project for Oslo, for example, resembles both a menacing dog-like head and a military pillbox attached to a suspended wall attached to a cube-like building with stair like a tail and suspended on stilts all of which sit on three pairs of rail wheels. The object, as many of Hejduk's objects are, is faithful to the surrealist's mantra: "As beautiful as the chance encounter of a sewing machine and an umbrella on an operating table," that the surrealists took from *Le Chants de Maldoror by* the Comte de Lautréamont.[10]

The repeated use of stairs, rail wheels, the appearance of carnival-like elements, and the fragmented narratives associated with the objects and even their repeated appearance in other masques all suggest that the objects individually, and collectively, are vagabond and itinerant. Many have shifting and layered meanings. The House of the Suicide, for example, may be the face of apotropaic figure Medusa, the flames rising off the suicide's back, the black



6

11 The first widespread appearance of the masques coincided with Hejduk's publication of *Mask of Medusa*, the subject titled *The Suicide* is related to the Czech dissident Jan Palach, who died by self-immolation in Prague in 1969. Palach's funeral is the subject of Hejduk's friend's, David Shapiro's, poem, *The Funeral of Jan Palach.* Finally, *The House of the Suicide* is the title of a painting by Cezanne also an important painter to Hejduk (it is sometimes titled *The House of the Hanged Man*).

12 Umberto, Eco, *The Open Work* (Cambridge: Harvard University Press, 1989), 19.

13 *Ibid. p.* xii

6 John Hejduk, *Security*, 1987, Oslo, Norway, Photographer: Hélène Binet

spires of Prague, Cezanne's painting *The House of the Suicide*, or even Magritte's painting, *The Rape*.[11]

It is not the intent of this writing to exhaustively address the nature of Hejduk's masque projects, which have been done elsewhere by this author and others. I am describing the masques to the extent that the description may serve as a preface to the discussion of Hejduk's drawing that follows.

Hejduk's *Masques* are historically related to seventeenth-century theatrical productions of the English Renaissance architect Inigo Jones, also titled masques. They are filled with masked actors in elaborate costumes, stage sets, and very large architectural props – building-like elements and even creatures — used in the performance for an elaborate allegorical production.

Hejduk's *Masques* constitute an equally elaborate world: an invented world of architectural characters and contraptions, at times filled with dancers, animals, spirits, and angels. The masques are inserted into the city where their engagement with that city and its implied, occulted, and transient spectacle may be played out, and then the spectacle moves on. This elaborate world (or *other city*) is *multi-form,* a complexly composed, ambiguous whole made of a collage of fragmented narratives, scant sketches, paintings, lists, indexes, and repeated characters whose names often change from masque to masque.

For the reader familiar with Umberto Eco's *The Open Work,* Hejduk's masques will seem familiar. Eco's open work is characterized by its multiplicity of meanings, the audience's (readers/viewers/listeners) participation and interaction with the work, and a dynamic within the work that lacks fixed meaning or conclusion. As opposed to more traditional views of art, the open work invites its audience to actively participate in constructing understanding and meaning; it is a work in which the author offers "the interpreter, the performer, the addressee a work *to be completed*"[12] As such, the audience becomes a co-creator in the work, and this process of co-creation is what allows the work to be considered open and dynamic: a "controlled disorder"[13]. Both the significance of Hejduk's *Masque Projects* and their relationship to Magritte may be better understood in this regard. This point is equally important in approaching Hejduk's drawing—particularly his more anonymous, measured drawings.

The X-Ray
Thoughts of an Architect

14 John Hejduk. 1989. *Victims: A Work by John Hejduk*. Maquette, 8.

15 Hejduk was a Professor, Chair and Dean of the Irwin S. Chanin school of Architecture at the Cooper Union for the Advancement of Science and Art 1964–2000.

1. That architectural tracings are apparitions, outlines, figments. They are not diagrams but ghosts.
2. Tracings are similar to X-rays, they penetrate internally.
3. Erasures imply former existences.
4. Drawings and tracings are like the hands of the blind touching the surfaces of the face in order to understand a sense of volume, depth, and penetration.
5. The lead of an architect's pencil disappears (drawn away) metamorphoses.

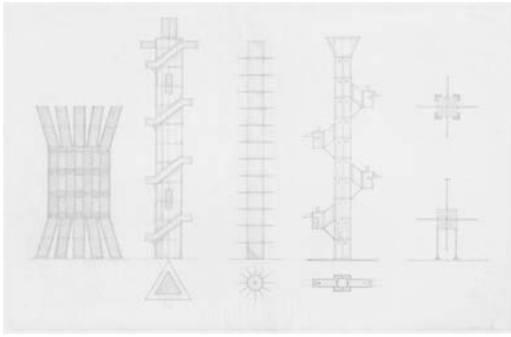
To take a site: present tracings, outlines, figments, apparitions, X-rays of thoughts. Meditations on the sense of erasures.
To fabricate a construction of time.
To draw out by compacting in.
To flood (liquid densification) the place-site with missing letters and disappeared signatures.
To gelatinize forgetfulness.

From *Victims. A Work by John Hejduk* [14]

As mentioned above, in the process of the design of a particular masque, usually near its completion, a set of measured drawings would be made by Hejduk in pencil and colored pencil on vellum. Importantly, these drawings were often made in anticipation of the construction of one of the masque objects in one of the multiple sites around the world where they were built.

These objects were often constructed in academic settings where a group of students and instructors would engage with Hejduk in the construction of one or more of the masque objects. After the *Masque Projects* became known and attracted interest. Several such groups participated in these efforts. Projects were constructed in London (*The Collapse of Time*), in Philadelphia (*Subject/Object*), Oslo (*Security*), Atlanta (*The House of the Suicide and House of The Mother of the Suicide*), Buenos Aires (*Masque*), and Barcelona (*House for a Poet*), as well as several others. These efforts continue to this day.

Typically, and significantly, the drawings were the only direction that Hejduk gave to these groups. As a pedagogue [15], it was Hejduk's view that these were teaching opportunities as well as collective opportunities for discovery, as mutually collaborative endeavors, and as part of an egalitarian desire for the exchange of ideas. This is to say that those who participated in constructing the objects were clearly viewed by Hejduk as co-authors and collaborators.



8

8 John Hejduk, *Lancaster/Hanover Masque:* Retired General's House, Retired General's Place and Tower Hill (1980-82), Pencil and colored pencil on vellum, 86.4 x 137.1 cm, Canadian Centre for Architectur

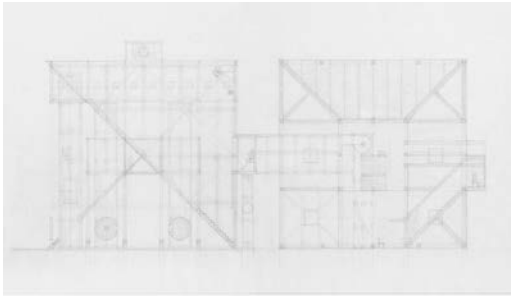
Of all the remarkable representations in the *Masque Projects,* these measured drawings are surprisingly the most ordinary and normative of architectural representations: measured plans, sections, and elevations drawn to scale. Absent are the agitated marks, quick sketches, and painterly gestures that characterized Hejduk's drawing of the individual objects during a masque's earlier development.

These drawings provide a contrasting and complementary grounding to the vibrant, fable-like world of the masques, and they place the masque objects in the real and ordinary world that architects who wish to build inevitably inhabit. This ordinariness, however, is as deceptive as the representations of Magritte or Morandi, and is a contributing, counterintuitive source of the *Masque Projects*' mystery and power. For the students, architects, and academics who engaged in their construction, they represented, and continue to represent, a significant challenge and an invitation for imaginative engagement with Hejduk's work.

Although drawn to scale and measured and approaching the specificity of construction documents (the drawings made to guide the construction of buildings), closer examination reveals these drawings to significantly lack the full specificity of conventional construction documents, which by their nature are highly specific and prescriptive. And just as someone from outside the world of art might assume that Magritte was an amateur or naïve painter, these drawings of Hejduk's might be assumed to be those of an amateur draftsman or beginning student.

As opposed to convention, where multiple line weights each carry their own codified sets of information, these drawings are drawn with only one line weight – a delicate but obscuring simplification. Additionally, important information is left ambiguous. Mechanical connections, for example, are indicated only by a simple small cross — indicating a point or intersection — but not the specific type of connection **[8]**. One might assume they indicate a bolt or a coach screw, but that would be an assumption, as neither is drawn as it easily could be. The notching of a wooden timber is an indication of a *kind* of connection, but the additional information that would be necessary to indicate the nature of this connection is absent.

Colored pencil is applied as a simple tone and used to indicate material or color, but in a painterly way rather than an architectural manner. Color is rarely used in conventional construction drawing; the specification of color is often limited to the detailed, written building specifications. In these drawings, blue may stand for glass, brown for wood, green possibly indicates patinaed metal or possibly paint, black or grayish black may indicate metal or painted wood, but it is unclear and open to some interpretation. Additionally, colors may change if the object is drawn in multiple masques, as many are.



7

7 John Hejduk, *Lancaster/Hanover Masque:* Court House and Prison House (1980-1982), Pencil and colored pencil on vellum, detail, Canadian Centre for Architecture

When part of teaching exercises, the measured drawings are particularly vague, given the customary necessary clarity in a teaching exercise with significant technical (building) content. Further, some of the measured drawings, particularly those for the *Lancaster/Hanover Masque,* are deliberately obscured through the confounding superimposition of plan, section, and elevation, which Hejduk referred to as *X-ray* drawings **[7]**.

Like a painting by Magritte, Hejduk's measured drawings require one to be drawn into them as much as one might draw out of them. They present an interpretive space that oscillates between the proscriptive and interpretive and between the objective and subjective. In other words, the drawings are less about the specificity of construction as would be normative in drawing of this kind, as they are an *open work* that requires its audience to accept its multiplicity of meanings and unfixed conclusions. Like a painting by Morandi, the viewer or interpreter must embrace the subtle metaphors and hazy depictions that are part of the project's content and creatively adjust to the elusive content's impact on the process of building.

The specificity demanded in construction is thus a product of the interpreter's/co-author's efforts. And as such, the measured drawings invert the usual and prescriptive use of drawings in architecture: initial sketches advancing in a linear direction toward a conclusion (in the completed building). Rather, these are drawings whose interpretation demands building (as a verb) or construction (as an interpretive act) to be faithful to the complex world of drawing(s), poems, and figures that precede them: Hejduk's world of allegorical complexity.

This demands a certain space, an openness for the interpreter or viewer, and a certain deliberate ordinariness, just as is the case in a work of art by a Magritte or a Morandi. And it may require a certain normative — even 'dumb' — way of drawing and even a rather 'dumb' way of building, but a clearly contradictory knowing sort of dumbness.

In Hejduk's collaborative project, this open space is essential — an invitation to build the extraordinary world that lies within the drawings or narratives and to build a fragment of that world beyond. One honors richness not by boisterous and articulated speech (the overly articulated detail or self-conscious mastery of building) but by allowing silence and the viewer to try to fill that silence. As such, the measured drawings *allude* to construction rather than specify its exactitude; they are more like signs or cyphers than drawings used for the specific purposes of construction. The measured drawings are in their way: mute…and hazy…their details covered in dust as it were…using their relative anonymity and ordinariness to invite the viewer into their mystery.

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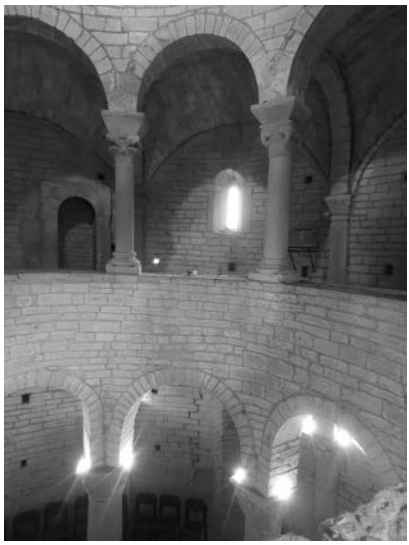
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To Err is Human

Orsolya Gaspar



1

1 Interior space of the Rotunda di San Tomé. The neat overall tectonic order grows out of happenstance stereotomy.

1 Kingsley, 1915.

2 Gáspár, 2022.

3 Designed with architect Ipoly Farkas, and engineer Lajos Semsey. Kollár, 1969.

4 Garcia, 2014.

Introduction

Upon entering on a bright summer day, it takes a couple of seconds to get used to the dim lighting of the Rotonda di San Tomé and absorb the straightforward tectonic order of this 12th-century marvel of Lombard Romanesque architecture.[1] The central domical space is defined by the pyramidal stacking of an ambulatory and a gallery. The building is enclosed by massive, stone walls, with eight columns arranged concentrically on each level in the interior. Upon closer inspection, it becomes apparent that this neat overall tectonic order grows out of total disorder: Each column is different, some capitals are inverted column bases from earlier building phases, the stereotomy of the arches is distinct in each bay, the layers of the stone masonry both in the dome and the wall are uneven **[1]**.

Fast-forwarding eight hundred years, another dome of comparable dimensions was erected in Jena, Germany, for a temporary planetarium. It was the world's first geodesic dome, and a pioneering thin concrete shell (the grid was sprayed with concrete).[2] The steel grid was designed with a precision of 1/20 mm, which is beyond even the current state of the art in metalworking capabilities. Only thirty years later, a late descendant of the Jena planetarium dome —a clever, yet unassuming, thin concrete shell factory roofing in Hungary —got extended.[3] The project marked one of the early uses of computers in design. The extension mimicked the original geometry, but it was based on a more intricate mechanical model, not manageable by hand calculations. The complexity of those calculations stems from the slight modification of the original geometry. Ever so subtle, that it is hardly noticeable; moreover, it barely affects construction.

The builders of all three examples erred in their treatment of precision, as in, alignment: San Tomé is less precise in its details than one would anticipate, while the two shells aim at more precision than what is physically feasible or what is noticeable. Such errors result in inconsistency between design, construction, and perception. However, once we consider precision in the metaphysical sense, as in matching the intent, they all seem to be just precise enough. The paper identifies this conflict between precision in the metaphysical (idea) and the physical (materialization) sense as one way to create poetics in construction. Precision, in its metaphysical sense strongly influences the narrative of the building, which in turn impacts affect.

This paper is not about the vanity of precision. It is also not a swansong for the ancient unity of material, building, and construction in the age of codified design and computers. Rather, it is about the (correct) scale and zoomability of tectonics in a digital era.[4]. I will use Frampton's definition as

5 Frampton, 1990.

6 This is related to concepts virtual and actual form as in Frascari, 1984. p 501

7 Zumthor, 2006.

a starting point, which states that tectonics is "structural and material probity but also a poetics of construction".[5] Such a definition is well-positioned to consider when and which tools and measures are appropriate in design and construction, so that they enable rather than control the process, and hence, ultimately, serve both probity and poetics.

This paper is, furthermore, about being fallible as a builder (that is, being inconsistent as designer and/or constructor). If being fallible, or to err, is essentially human, is that desirable, necessary, or permitted within the realm of architecture today? It is beyond the scope of this paper to lament whether the future of architecture, including program and tectonics, is to be defined by humans or machines. However, I attempt to show that architecture becomes poetic precisely because of the minor inconsistencies, errors, that create a rift between what it is meant to be and how it materializes, i.e., between the act of construing and the act of constructing.[6]

The selected examples are fraudulent in many ways: they all represent the same, special architectural form (domical space), were not conceived by an architect, and are all conveniently dated. However, they share two features that make them well-positioned to illustrate the arguments of this text: They all treat structural and material probity as commonplace, which makes them highly tectonic, and they are all extremely functional or programmatic.[7] Their similarity to each other and their good match with many qualities appreciated in tectonic architecture make them excellent guinea pigs to test the hypotheses of the paper: First, that precision is a design parameter that is dependent not only on the tools and materials but also on intent. While this might seem obvious, it is easily overlooked when our current tools allow practically infinite precision. Second, that subtle inconsistencies between idea and materialization can be virtues, and more importantly, they might be the features that create affect, or poetics. Consistency between design and construction (i.e., focusing on probity) was rightfully pursued when architecture was, by default, created by humans, who are inconsistent by nature. In an era, however, when machines, being presumably consistent by nature, are becoming increasingly involved in the generation of architecture (including design and construction), to preserve poetics, maybe it is the desired level of consistency that deserves a closer look.

Dramatis Personae

As the three buildings used as case studies throughout this paper are not widely known, a short introduction seems adequate.

The Rotonda di San Tomé, also known as San Tommaso, is located near the town of Almenno San Bartolomeo, outside Bergamo, Italy. It was built in

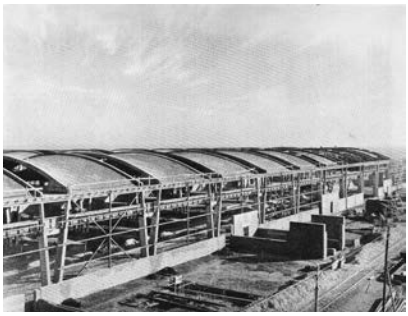


2

2 First Planetarium of Jena, exterior. The geodesic grid is recognizable under the thin layer of concrete.

the 12th century, likely replacing an earlier structure and reusing some of its building materials. It is a well-preserved edifice of Lombard Romanesque architecture, characterized by its distinctive features, including a sparsely decorated exterior (lacking sculptures) and a series of blind arches crowning the walls, divided by pilaster strips. The circular building with a 16-m diameter (exterior) was constructed using local stones, without mortar, and featured 1.15 m-thick walls filled with rubble. The few openings are strategically placed, elevating lighting into the transcendent. While its origins are debated, it is assumed that it was part of a female monastery from the 13th century; as such, it served both the local community and the convent. This dual purpose is evident in the distinct narratives and different craftsmanship of the ambulatory and gallery detailing. The latter, which served the nuns, is more refined and nuanced. The central space is capped by a stone masonry dome with an oculus on top and four openings (two in the shape of a Greek cross and two circular) arranged evenly around the base. The structure repeatedly sustained severe damage over the centuries, due to lightning, and it has been restored multiple times.

The so-called first Planetarium of Jena, built in 1922, was a temporary mockup structure erected on the top of a building in the Zeiss Factory **[2]**. Zeiss, a manufacturer of optical devices, developed a new planetarium device and needed a smooth, spherical surface to test it. The dome was designed by Walther Bauersfeld, the lead engineer of the planetarium device. Due to the temporary nature and limited load-bearing capacity of the roof, he opted for a lightweight solution. The original design of the 16 m-diameter dome envisioned a light steel grid dressed in canvas. However, canvas was not available at the time, and Bauersfeld, advised by the concrete-contractor Dywidag company, decided to spray the grid with 3 cm of concrete. Hence, this dome became the unlikely early prototype of the pioneering Zeiss-Dywidag reinforced concrete shell construction system. While the reinforcement in an ordinary reinforced concrete structure is also assembled before the concrete is poured, it is usually done over formwork. Bauersfeld's grid was self-bearing. It was a triangulated grid, created as the subdivision of a spherical icosahedron, made of approximately 4,000 pieces of 60 cm long steel bars. As such, it was a geodesic grid, built more than 20 years before Buckminster Fuller coined the term 'geodesic dome'. Bauersfeld lacked the means (in terms of theory and computational power) to calculate such a complex structure as a space truss; instead, he devised an ingenious rule for triangulation that allowed him to estimate the strength of the structure as a continuous surface. It also allowed him to use relatively few different bars, all within 20% difference in length. Intriguingly, he settled for a "reasonable" approximation of what he aimed for (equal-area triangulation of the sphere), and yet he pres-



3

8 Mándoki, Gáspár, 2017. The economy stemmed from the construction technology, which benefitted from a reusable formwork and the integration of the scaffolding system with the future-to-be overhead crane of the plant.

9 There was a slight kink between the saddle and the conoid (they were only G0 continuous). The original design relied on the so-called membrane theory of shells for the saddle surface (which has limited applicability but allows calculating the stresses in the shell as if it was a bending-free surface), and the conoid was considered as a cantilever (supported by the wall). The saddle was a second order surface (a quadratic surface). Kollar's design was a fourth order surface, and he relied on the bending theory of shells, which accounts for possible moments in the shell.

3 KÖFÉM Factory, second phase, shell roofing. The design accentuates the uninterrupted horizontal joint between wall and roof, despite the segmented shell roofing.

cribed the length of each bar with 1/20 mm precision (that is less then 0,01%).

The roofing of KÖFÉM Factory is a cast-in-place thin concrete shell, designed by Lajos Kollár, a structural engineer and internationally established scholar of shell structures. The building is an eminent example of mid-twentieth-century industrial modernism in Eastern Europe, where shell structures enjoyed a late heyday (compared to Western Europe). As labor was cheap, their material efficiency made them an economic choice, a prime argument in the centralized, socialist building industry. It was built in 1967 as an extension of an aluminum processing plant in Székesfehérvár, Hungary. The roofing consists of a series of saddle shells (30 m x 11 m span, with a thickness of 6 cm). The first phase (completed ten years prior, and visually identical to the second phase) spearheaded a renewed interest in cast-in-place concrete shells in Hungary after WWII. It was much celebrated for its economy and simple, but elegant shape.[8] While saddle surfaces are both practical (it is easy to integrate clerestory windows) and structurally beneficial, their joint with the enclosing walls creates a design challenge (the edge of a saddle is curved by default). The original KÖFÉM design addressed this issue by adding a conoid segment to the shorter edge of the saddle, enabling a continuous, horizontal joint with the wall **[3]**. Kollár's main contribution in the second phase was that he substituted the three shell segments (two conoids on the side and a saddle in the middle) with a single, continuous surface, i.e., he 'form-found' a shell with two curved and two straight edges. He achieved a geometrically more honest solution, but it required a different, more complex mechanical model, hence, more complex calculations.[9]

Observing chronologically, there is a move from assembly towards continuum, from rugged to smooth. The two later structures also challenge the Semperian categories of stereotomic and tectonic (i.e., frame-like), eventually dissolving into a hybrid form. It is hence tempting to simplify the emerging story on precision into a trend from lesser to greater. This simplification would miss the point, as it only considers precision as a physical phenomenon. Metaphysically, precision emerges (or should emerge) as a balance between materials, tools, and processes. In short, it is intrinsically linked to the context. In this sense, all three buildings are extremely precise, and it should strangely be most evident for San Tomé, which is the ruggedest of them all: Just imagine what it would take today to erect a building of comparable dimensions as dry (!) construction (no mortar, no binder).

Metaphysically, as I argued, precision is also linked to intent, which creates a non-tangible layer of tectonics. As I will show, the subtle primacy of idea over materialization is apparent in all three cases. All builders erred,



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10 Paris et al, 2024.

11 Kingsley, 1915, p. 41.

12 https://www.lombardiabeniculturali.it/architetture/schede/BG020-00689/ last accessed 07.07.2025

4 Dome, Rotunda di San Tomé, showing the clerestory openings

ever so slightly, on the side of the idea, and this translates into tangible inconsistencies in precision in the physical sense.

Narratives and Perceptions

While the Rotunda has a central layout, it has an orientation: the altar, the focal point in the Christian liturgy, is placed in an apse towards the north-eastern side. This disposition slightly deviates from the traditional east-west orientation of Christian churches, for a good reason: It has been shown that the axis aligns with that of the rising sun on July 3rd, which celebrates the translation of Saint Thomas, to whom the Rotunda is dedicated. [10] Lighting plays a crucial role in the symbolism of the Roman liturgical space. Accordingly, the perpendicular axes created by the clerestory openings on the drum follow the same orientation, allowing the rising sun around the summer solstice to project the Greek cross into the Rotunda. During the winter solstice, the cross appears with the setting sun. This careful overall composition, with the nuanced orientation and shaping of the clerestory windows, is in stark contrast (or, inconsistent) with the 'happenstance' stereotomy of the building, which Kingsley describes as "(…) formed of rather roughly dressed blocks showing great variation in size." [11] **[4]** . While such roughness is most likely related to the incorporation of reused material, and as such, obeys or embraces an external constraint, there is also an intent. There is an apparent preference for alignment with the ethereal by incorporating cosmogonical symbolism, as opposed to alignment in the banal sense, as in obeying the horizontal when laying courses. In terms of precision, as in alignment, the Rotunda is not necessarily a story of what was possible, but about deliberate choice, which results in inconsistent tectonics.

Inconsistency is also encoded into the tectonic narrative more explicitly: as briefly mentioned during the introduction of the buildings, there are marked differences in craftsmanship, material, and, though less relevant to the present discussion, in ornament, between the two stories of the interior spaces. Historians link those differences to the use of the space. [12] They argue that the ground floor is finished in a much cruder manner than the gallery, as per the client's preference. The ground floor was intended for the populus, while the gallery served the community of the convent. Accordingly, their construction is credited to two different groups of masons, with those working on the gallery identified as having more advanced skills. The use of pilfered material is most apparent on the ground floor: the columns are reused from (likely) an earlier building phase. As they did not meet the height requirement for their new placement, they have been accommodated by various measures. This variety is linked to the different dimensions of the pilf-

13 The intricate geometrical proportions shaping Gothic structures (which are closely related to San Tomé, both temporally and technologically) extend from the building scale down to ornaments, providing a well-known example.

14 Frascari, 1984. p 506.

15 Pallasmaa, 2009

16 Yann LeCun, a leading expert of AI and deep learning suggests that the need to focus on selected preferences is inherently human, and stems from the cognitive limits of the human brain. LeCun, 2019.

ered bases (many of them former capitals). The capitals across the eight columns have varying heights and differ in shape and ornament. In contrast, the columns in the gallery appear to be custom-made for the Rotunda. Their formal language is consistent, with all capitals based on the Corinthian style – albeit their ornament is also unique. Having unique ornamentation for each capital was not uncommon in Christian religious architecture, as the sculpted elements were *literally* meant to tell stories, in this case that of Tobit from the Old Testament.

These differences in the tectonics of the two ambulatory spaces can also be understood as differences in precision (as in joining, richness of detail, or smoothness). Based on what we know, this also appears to be a deliberate act. The emerging overall tectonics is not a mere consequence of the use of reclaimed material or a certain level of craftsmanship. It is guided by a programmatic intent; hence, the narrative is carefully construed.

In case of San Tomé, even without the historical details and my interpretation, much of its tectonics is relatable, 'readable', the act of construing can be physically experienced. This also holds, though to a lesser extent, for elements that are intangible, such as the message of the lighting. However, construing can remain unseen for the most part, as is the case for the two other domes discussed below. Just like with a text, the 'readability' of architecture is not, and has never been[13] absolute; it depends both on the creator and the reader (user).

Construing and Constructing

Frascari refers to tectonics as both constructing and construing.[14] Constructing encompasses a whole range of activities from conceptualization to materialization, from material engineering to the joining of steel bars that eventually lead to a construct. Much of the theory of construing, implicitly or explicitly, is related to the idea(l) of a thinking hand, an intuitive (and human) understanding of the innate properties of material and the process of construction.[15] Per the premise of this paper, I suggest that an intuitive understanding of both tangible (as material) and intangible (as geometry and structural behavior) aspects of the act of building can manifest as construing. An intuitive understanding (expertise) is developed over time through dedication. A preference for using that intuitive knowledge is the payoff for such a cognitively costly process. It creates a subjective (or biased) focus during the process.[16] I argue that this focus inadvertently creates minor inconsistencies in tectonics, which can affect (and possibly benefit) its perception, and often manifests itself in relation to precision.



5

17 Assuming pin joints, a single layer gridshell can only be rigid if triangulated. When considering an equivalent continuous surface, the pin-joint assumption in the grid aligns well with the simplified, membrane model of continous shells –bending moments can be neglected in both.

18 Gáspár, 2022. The recursive algorithm he devised cannot achieve equal area tessellation theoretically, but it was easy to calculate, and the resulting tessellation only deviated by 1% from the theoretical optimum.

19 So good that it outperforms most geodesic geometries developed by scholars and practitioners (including Buckminster Fuller) over the rest of the twentieth century. Bauersfeld was aware of the benefits of his design: by incident, I refer to the fact that starting with an icosahedron was not self-evident, but rather intuitive.

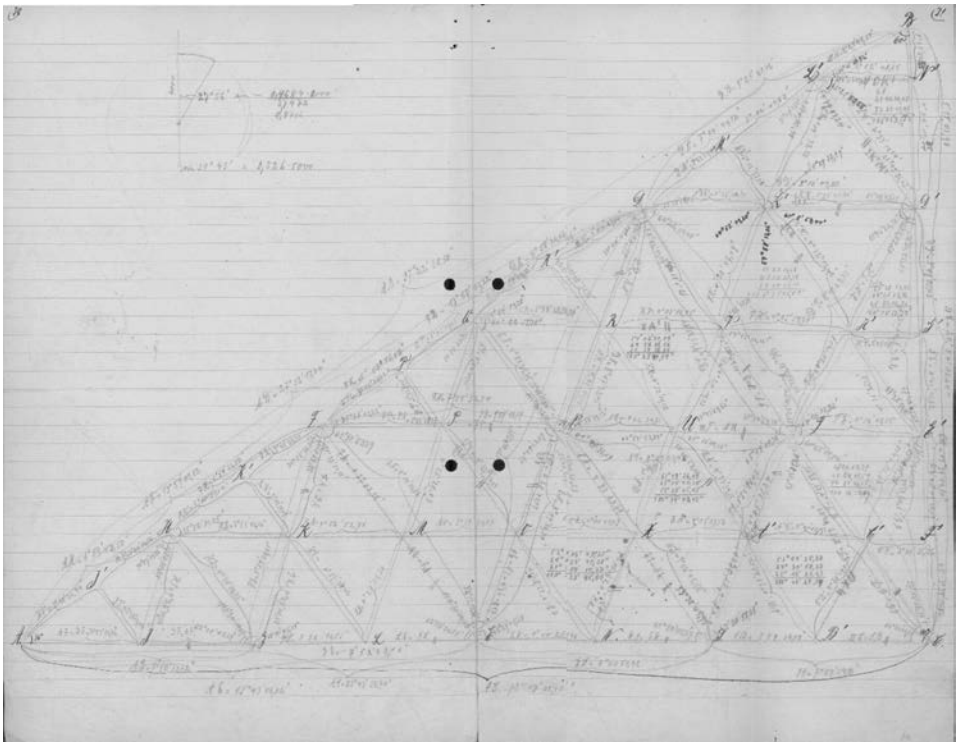
20 Dischinger, 1929. Given the conscious and assertive publication campaign around the Zeiss-Dywidag system (May, 2015), this anecdote might or might not be true, especially, as two similar stories are told by Bauersfeld himself (Bauersfeld, 1942 and 1957), where the casus belli is identified as (a) a (since then proved) temporary stability problem of the incomplete gridshell and (b) the timing of the pouring of concrete (either of them would be less flattering for the new business venture than showing off its almost insane precision).

5 Original Zeiss planetarium projecting device

Bauersfeld, who designed the geodesic gridshell encased in concrete for the Zeiss Planetarium, was a mechanical engineer by training and worked in the optical industry. He developed the concept for the modern planetarium projecting device **[5]**, for which the dome was to serve as a testing ground. When prompted to design a matching, domical projecting surface, he turned to the same Platonic solid, the icosahedron, which served as a base for the design of the planetarium device. Because the structure had to be lightweight, he considered a gridshell. The requirement for smoothness necessitated the subdivision of the icosahedron's faces. He developed a specific subdivision scheme, based on the spherical projection of the icosahedron, which resulted in an almost equal-area triangulation [17] of the sphere **[6]**. [18] Bauersfeld's expressed motivation in pursuing an equal-area triangulation was to ensure a good fit between what he intended to build and the structural model he wanted to use. He aimed to approximate the dense assembly of the bars as a continuous shell surface, and the chosen tessellation provided a reasonably uniform distribution of bars.

By opting for a gridshell, Bauersfeld chose a structural solution that was materially and economically feasible, like any engineer would. There is no clear rationale for connecting the geometry of the gridshell to that of the projecting device, though. As the final surface was meant to be plastered/concreted over, its tangible impact was much limited. Such geometrical finesse was a subjective preference, a poetic component of construing, and yet, not completely l'art pour l'art. Construction and perception also benefited from Bauersfeld's deep, intuitive understanding of the geodesic geometry (i.e., a geometry based on a spherical polyhedron). There is an intricate balance of how a geodesic geometry is perceived (how smooth a tessellation looks) and how complicated its assembly is (how many different bars are needed), and Bauersfeld's solution provided an excellent trade-off. [19]

There is an interesting fluctuation of idealism and pragmatism in Bauersfeld's work that affects both construing and constructing. During the design phase, when he aimed at the equal-area tessellation he was an idealist, when he settled for the approximating algorithm, which also allowed him to standardize much of the bar-lengths, he was a pragmatic. And yet again, in the phase of construction, once the bars needed to be dimensioned, he prescribed their lengths within 1/20 mm precision, neglecting the realities of steel construction. There is an anecdote, however, shared by a long-time collaborator of Bauersfeld's, Franz Dischinger, on a subsequent project, where a bar that was off by only 1 mm (on a 60 cm length) caused such deformations in the grid that construction had to be stopped and the faulty bar replaced. [20] Prescribing precision an order of a magnitude higher than the permissible range of error makes sense. Rather than seeing a fluctuation, the



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21 As appealing as it sounds, it is unlikely(=unproven) that Bauersfeld was consciously aware of the room of error for the bar-length. At best, it can be assigned to the uncertain territory of intuition.

22 It is still an open question if it is theoretically possible to tesselate the sphere similarly, i.e., with 'reasonably regular' equal area triangles

6 Subdivision scheme, geodesic gridshell of the first Planetarium of Jena.

process can therefor also be interpreted as guided by intent[21]. Being loose where possible and strict where necessary. Moreover, the recursive formula he used for the triangulation of the sphere, instead of being a generator of imprecision (even if very small), can be understood as a simultaneous act of construing and construction[22]: It works as if someone were drawing or acting out the subdivision. It can be understood as a metaphysical link between tools and processes.

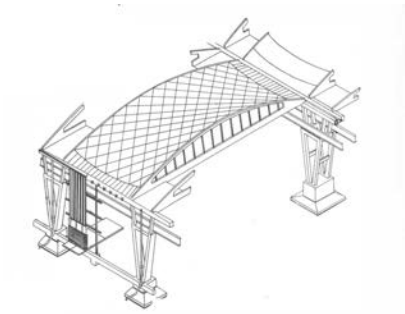
Bauersfeld's brilliance was in his ability to overcome the limitations of his tools (i.e., pen and paper) during the complex optimization task he undertook. His approach was theory-driven. Lajos Kollár, the designer of the KÖFÉM extension, on the other hand, leveraged the then-emerging technology of computers to tackle a problem that was previously successfully approximated by hand calculations. His approach was driven by technology, but, like theory did for Bauersfeld, technology served Kollár's vision.

Kollár was at the same time a practicing structural engineer with extensive experience and a respected scholar and academic. He felt that engineering education lacked strategies to develop design thinking, and he emerged as an advocate for a holistic approach to design, something he actively pursued in his practice. In the case of the KÖFÉM factory, the poetic he sought was an honest match between geometry, structural behavior, and perceived forms.

Enablers and Controllers

The three examples —San Tomé, the Planetarium, and the KÖFÉM roofing —suggest a trend from less to greater control during the design phase, and consequently, less autonomy for the builders. Indeed, such a trend exists. The engineering revolution in the eighteenth century altered our expectations of design: we require more certainty, which is generally a good thing, as it leads to safer construction. We are, nevertheless, obliged to question the desired level of control case by case, so that it enables high precision, in the metaphysical sense, achieving the desired trade-off between materials, tools, and processes.

Shells are extremely thin structures. They can be thin, because (thanks to their curved shape) they primarily carry their loads through compression and tension which is more effective than through bending. Their thinness makes them highly impactful as tectonic objects, but it also makes them highly susceptible to mistakes, including those during design and construction. Therefore, while the theory of shells developed rapidly in the first half of the twentieth century, model building and testing, often on a full-scale basis, remained an integral part of shell design. The collapse of the mockup



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23 Kollár's version was modelled and calculated based on the so-called bending theory of shells, which indeed accounts for the presence of bending moments.

7 Shell surface of the KÖFÉM Factory roofing

built to demonstrate the feasibility of the original design for the KÖFÉM factory roofing (first phase) almost sank the project. Eventually, the design could proceed, as the investigation identified that construction deficiencies caused the collapse. Such dramatic events, as the collapse of the mockup, were rare. Instead, the model experiments helped designers and contractors evaluate their predictions based on theory alone and refine their structural models accordingly. Kollár had extensive experience with physical models, which gave him an intuitive, experiential understanding of the behavior of shells and an appreciation for the more complex, computationally intensive structural models for shells.

The so-called membrane model, which completely disregards bending moments in the shell, is elegant and straightforward, but its applicability is strictly constrained. While it suits certain processes well (such as form-finding), in other situations, it becomes a controlling rather than an enabling tool. Such limiting control affects tectonics. As described in the introduction to the buildings, the first phase of the KÖFÉM Factory roofing appears to be a continuous shell from wall to wall, but in fact, it consists of three shell segments. Moreover, technically only one of them, the saddle in the middle, acts as a shell; the conoids are cantilevered from the walls, and their behavior is closer to a plate. The first phase design, from an engineering point of view, was ingenious: the saddle's shape (side-length ratios) was chosen so as not to exert any thrust on the conoids **[7]**. The design creatively relied on the simpler membrane model to minimize calculations (which were done by hand), but a dissonance remains between perception and behavior. Kollár resolved that dissonance by defining a single, continuous surface that acted as a shell, albeit one that's behavior is more complex[23] than what the membrane model can describe. The then-emerging computers enabled him to apply the more complex model accordingly, and, from a conceptual point of view, to pursue a more holistic aim.

The consistency Kollár achieved in the second phase of the KÖFÉM Factory is exciting from the perspective of this paper, as it is almost post-human, which would make him the opposite of fallible. However, it is essential to note that his design builds upon an existing one. He did not change the material or the construction technology. The two geometries are indistinguishable to the untrained eye (most eyes are untrained). He changed an excellent design mainly to make the unseen, right. Not unlike Bauersfeld's dimensioning, his process seems too precise, in the physical sense.

Epilogue

As exemplified above, high precision in the physical sense can be both a virtue and a vice, and it can be interpreted vastly differently depending on the materials, tools, and processes involved. Today, amidst rapid technological development, it is tempting to opt for higher precision, because the construct is made infinitely zoomable during the design phase. The then-emerging tectonics is only construed, though, it is virtual. To allow for construction to shape tectonics in the physical realm, it is vital to treat precision in the metaphysical sense, which depends on the context and not on scale.

The discussed case studies represent different regions on the broad spectrum of architecture, spanning from the primordial hut to structural art. In the physical sense, their precision is in vastly different dimensions, metaphysically however, all three are just precise enough. They are all highly programmatic; they show honestly what they are made of and how they stand up, and, while for different reasons, each of them is poetic. I argue that they are poetic because they err in their treatment of precision, in the physical sense. They treat it inconsistently. Such inconsistency is present in each case either within the design concept or it creates a rift between the idea and its realization.

These examples are shaped by these subtle inconsistencies, because their creator was fallible. The tangible precision of each project is not only subject to what was possible, but to what the designer intended. Those intents are highly subjective, informed by a dedication (to the divine), or years of training in theory or practice. To fall for one's interest or intuition, to be biased, to err in this sense, is in fact, no longer only a human trait. Just as architecture is no longer practiced by humans without significant assistance from technology. It is therefore vital to be mindful of the role inconsistencies played in creating the various components of tectonics in the past. It might guide us in shaping architecture to our liking in the future, either consistently or inconsistently, but intentionally.

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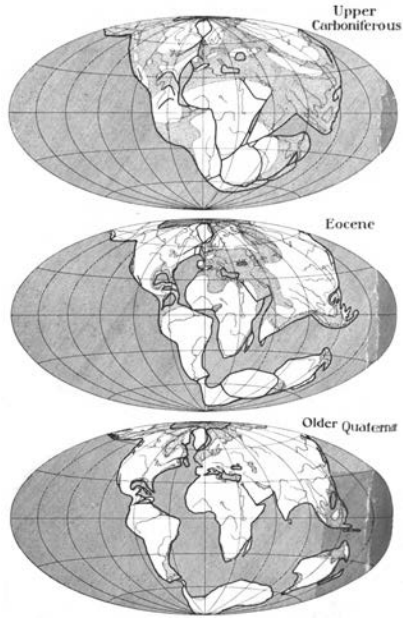
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Drifting Plates
Tectonic Tools

Nicholas Boyarsky



1

1 Alfred Wegener: *Die Enstehung der Kontinente und Ozeane*,1929.
Source: http://commons.wikimedia.org.

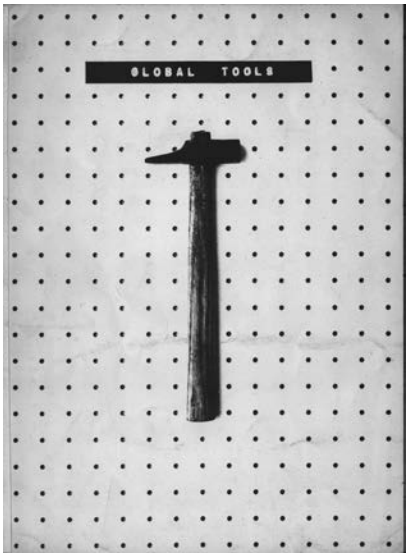
1 Frampton, *Unfinished Modern Project*, 1–2. Frampton refers here to his essay "Labor, Work and Architecture" of 1968 and discusses the influence of Hannah Ahrendt's "The Human Condition" of 1958 which draws distinction between labor, which is a biological process, and work which is the 'activity which corresponds to the unnaturalness of human existence'.

2 Lang, *Superstudio*, 222–227.

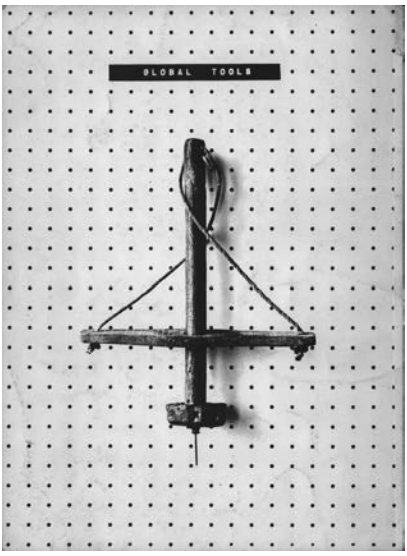
The constant grinding of tectonic plates heralds both transformation and catastrophe.

The awareness of inevitable destruction, often portrayed through the metaphor of ruin, is inbuilt in our building culture yet rarely acknowledged. Architecture negotiates the dialectic between construction and destruction, it is existential to this process yet elusive. It is manifest on the building site which is both a tectonic site of contestation, adversarial in nature, and a forum for collaboration, where finely balanced tolerances are quantified and determined. Architecture sits uneasily between our focus on the building as a discrete object and a search for a cultural consensus of how we might design and build in a broader societal context. Tectonics, in relation to building practice and the pragmatics of construction, as Kenneth Frampton has long argued, [1] challenge the role of the architect calling for a critical resistance to the forces of industrialisation and for the development of alternative models of production. Such resistance has been manifest in a turn towards the ethnographic and to the critical study of vernacular means of building as architects have sought to reconnect, at moments in the 20th century, with traces of pre-industrial behaviours and means of production that were evident in what Superstudio called 'extra-urban material cultures'. [2] Synchronically the tectonics of drifting continental plates, a theory first controversially proposed in the early 20th century by German geologist and explorer Alfred Wegener **[1]**, which result in periodic catastrophes and in turn longer term geological changes have been catalysts in new directions in architectural thinking. Wegener's articulation of the underlying dynamics of tectonic plates had offered an explanation for the disjunct biogeologic distribution of present-day life found on different continents but having similar ancestors. This set a new context for thinking about tools that can be seen in the anthropologist George Kubler's influential writings on the 'Shape of Time'. Writing on the history of things Kubler brought drew attention away from the work of the individual artist to everyday objects and artefacts which, he argued, bore witness to processes of innovation, replication and mutation that were in continuous conversation over time.

Examples of this new focus can be seen in response to tectonic events in the work of Japanese architect and ethnographer Wajiro Kon following the Great Kanto earthquake of 1923, also in the work of COMU in response to the Tohoko earthquake and tsunami of 2011, and, from a slower geological perspective of rock formation, seismic uplifts and erosion, in the work of the photographer and artist Mario Cresci in Matera, Southern Italy in the 1970s. In each case it will be argued that programmatic impulses generated by intense tectonic activity have been the catalyst for the development of new tools to re-position architectural discourse through direct engagement with



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3 Donato, *Encyclopédie*, 12.

4 Illich, *Tools for Conviviality*, 11.

5 Lang, *Superstudio*, 216–217.

6 *Ibid.*, 222–223.

2 Global Tools: *front cover*, 1973.
Source: Alvin Boyarsky Archive.

3 Global Tools, *back cover*, 1973.
Source: Alvin Boyarsky Archive.

local inhabitants and the materials and utensils with which they fashion their lives.

In the context of our contemporary drive to the digital it is instructive to draw distinctions between the production of architecture through the primacy of image that the all-encompassing lens of the computer screen empowers and the ethnographic means by which vernacular architectures have traditionally been realised through what I will call tectonic tools. The tool is an implement, an everyday object which, when it is fashioned, adapted and used, becomes individualised and bespoke. As such the tool, which typically embodies the totalising economic and political forces of labour within building, reverses its role enabling individual creativity and facilitating an alternative approach to society. In this context it is noteworthy how depictions of tools and craft processes in Diderot's 18th century enlightenment project, the 'Encylopedie', gave identity to and "galvanized a new social power base which ultimately led to the destruction of old values and the creation of new ones". [3] Tectonic tools are cultural artefacts imbued with the imprint of their individual makers which have been adopted in architectural discourse often as the means to resist the increasing impact of industrialised production, becoming symbols for an alternative future. This resistance was aptly framed in the writings of Ivan Illich who argued for tools for conviviality that would stand for the opposite of industrial productivity and foster "autonomous and creative intercourse among persons and the intercourse of persons with their environment". [4] For Illich tools have a political dimension and implicit in his call for a "retooling of society" is his argument that the notion of tool, which is intrinsic to social relationships, extends beyond the implement itself to encompass complex systems of infrastructure and interchange. Retooling of society to promote alternatives to its reliance on industrial productivity called for a new understanding of the tool. This expanded definition, whereby the tool became the vehicle for speculation and experimentation with new modes of self-organisation, can be seen, in the late 1960s in the pages of the 'Whole Earth Catalogue'. In the early 1970s the Italian radical education project 'Global Tools' sought to build an anti-disciplinarian space to reflect on arts and crafts in an anti-urban context **[2] [3]**, while Superstudio's 'Project Zeno' [5] and 'Extra-Urban Material Culture' focussed specifically on the agrarian and vernacular and the potential for tools and hand crafted objects in forming alternative modes of operation. [6] Enzo Mari's 'Proposta per un'Autoprogettazione' explored the potentials of tools for 'self design' to challenge the design industry when he published instructions for ordinary people to build his furniture designs themselves with simple materials and hand tools.

7 Illich, *Tools for Conviviality*, 11.

8 *Ibid.*, 23.

9 Flusser, *Philosophy of Photography*, 81.

In 'Tools for Conviviality', published in1974, Ivan Illich put forward the notion that conviviality represented the "opposite of industrial productivity" and was a condition of "autonomous and creative intercourse among persons and the intercourse of persons with their environment".[7] He argued that if an individual relates himself to his society through the use of tools that he actively masters these hand tools would "give each person who uses them the greatest opportunity to enrich the environment with the fruits of his or her vision". Illich made the distinction between convivial and manipulatory tools, which are restricted by institutional arrangements and which "constitute an abuse and changes the nature of the tool…as the nature of the knife is changed by its abuse for murder".[8]

Contrary to this, and marking a profound break with the ethnographic tradition, Vilem Flusser's reading of the photograph as a technical image generated by the functional apparatus of the camera accounted for a loss of human agency that tools embody. By exposing the programmed nature of the photograph Flusser revealed a tension between the photographer's creative goals and the camera's programming that characterises the dilemma of the tectonic tool. He describes the shift in code structures from historical thinking which he argues is linear and rooted in alphabetic writing to the condition of post-history where nonlinear, pixelated technical images predominate. In a world dominated by the apparatus a critical resistance offers "the last form of meaningful revolution: reclaiming significance and freedom through conscious engagement with technology".[9]

Seismic Tools

The Great Kanto Earthquake of September 1923 occurred when the Philippine Sea Plate subducted beneath the Okhotsk Plate along the Sagami Trough in Sagami Bay, with an epicenter 60 kilometers southwest of Tokyo. Over the next ten days there were 1,200 aftershocks across the region. More than half of Tokyo and most of Yokohama were devastated, massive firestorms spread creating chaos and leading to vast numbers of casualties; approximately 2.5 million people were left homeless **[4] [5]**. In the aftermath of the destruction vigilante groups formed targeting Korean and Chinese migrants, an estimated 6,000 Koreans were murdered. The homeless gathered in large open spaces such as Ueno Park and the Imperial Palace grounds. The authorities constructed temporary barracks, many erected makeshift shacks creating vast shanty towns with stores and rudimentary businesses.

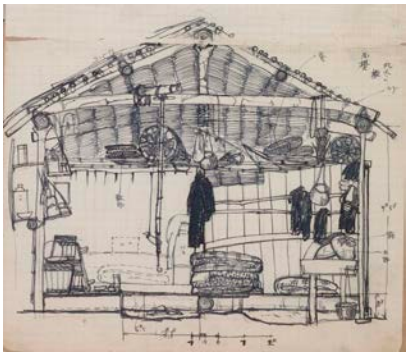
Wajiro Kon, professor of architecture at Waseda University had, since 1917, been surveying traditional Japanese farmhouses in rural areas. In 1922 Kon and Odauchi Michitoshi were commissioned by the colonial government



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10 Traganou, *Design and Disaster*, 12–13.

11 Hsieh, "Disquieting Ghost's," 29. Kon's neologism, *Kogengaku*, which translates as modernology in English, 'removed the central character *ko* in *kokogaku*, the Japanese word for archaeology, and replaced it with *gen*, meaning the present.'

12 Izumi, *Wajiro Kon*, 56.

13 Hsieh, "Disquieting Ghosts." 29.

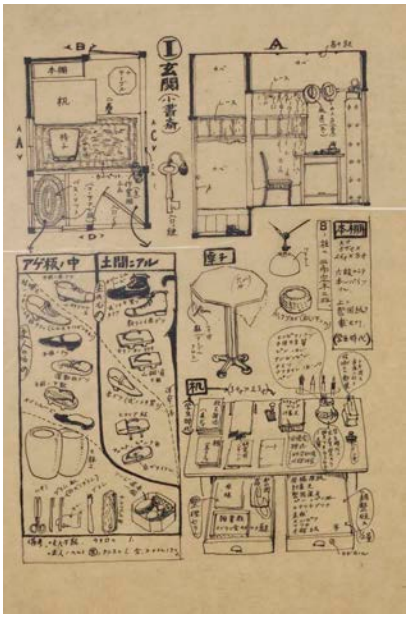
4 Vintage postcard: *The Great Earthquake and Fire of Yokohama*,1923.
Source: collection of the author.

5 Vintage postcard: *The Great Earthquake and Fire, view of Yokohama Town. Yokohama on September 1, 1923.*
Source: collection of the author.

6 Wajiro Kon: *Interior of a hut, Kanmuri-Iwa, Urayama mura, Chichibu district, Saitama prefecture*, 1925.
Source: Kogakuin University.

7 Wajiro Kon: *Variations of resting labors*, 1925.
Source: Kogakuin University.

of Korea to study villages, homes, equipment and customs in several regions. Following the earthquake Kon began visiting areas where the homeless congregated to photograph and sketch the barracks. His recording of the circumstances that people found themselves following the disaster developed into drawn surveys of the lives of the dispossessed, the people themselves and the objects, furniture, utensils and tools of their newfound situation **[6]**. As businesses began to appear amongst the barracks Kon and his colleagues founded the Barrack Decoration Company with students of design and the arts in order to artistically decorate the barracks. Kon's interests in the urban phenomena that he was observing led to surveys of the mores and customs of the Ginza district **[7]**. He later wrote of this ethnographic response to the changed circumstances that he was witnessing as an attempt to "develop an anthropological method in order to record and examine comparatively our contemporary material culture" so that "individuals should be able to distinguish society's diverse personae, and the trends of material culture, in order to prepare for their own way of living, unhampered by compulsions to imitate".[10] Kon extended his surveys, which he called Modernology studies[11], across Tokyo. These studies of urban phenomena focussed on his interest in the rapidly changing urban space and people's lifestyles. Kon created maps showing the distribution of stores, maps combining statistical data and drawings of people. The graphics were made by stage painters and other artists. Kuroishi Izumi has highlighted Modernology's emphasis on the details of everyday life and how economic difference influenced different patterns of habitation, emphasising Kon's interest in "relationships between people and things and space".[12] For Lisa Hsieh Kon "considered his work archaeology, but carried out in the ruins of a present-day city",[13] she has argued that Kon's studies of interiors showed an increasing juxtaposition of traditional Japanese chattels and imported modern novelties such as gas stoves and refrigerators. As such Modernology represented a call to awareness and ultimately a means of resistance to the inevitability of rapidly changing Japan. Kon Wojiro's response to the provisional arrangements following the earthquake crystallised a moment of transformation in Japanese society. His focus on the daily habits of survivors forced to innovate and adapt to change highlighted their dependence on the objects and tools of everyday life as they reshaped their temporary homes. The depth of Kon's ethnographic gaze brought a new focus to the minutiae of daily life and the agency and control that the displaced urban masses exerted on their immediate urban environment **[7][8]**. Observation and focus on the realities of daily living conditions became tools for understanding how people adapt to change, in this case to dynamic tectonic disruptions, and how their reliance on domestic objects and utensils



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14 Kaijima, *Made in Tokyo*, 8–9.

15 Akasegawa, *Hyperart:Thomasson*, 6–7.

8 Wajiro Kon: *Comprehensive illustration of the household of a newly married couple,* 1925.
Source: Kogakuin University

9 Wajiro Kon: *Comprehensive illustration of items needed by a woman in Fukagawa*, 1925.
Source: Kogakuin University

were integral to their interior lives as they confronted change and a growing materialism in society.

The merging of ethnographic and art practices deployed by Kon and his collaborators was to influence Japanese spatial practices in different forms in the later 20th century. It resurfaced in the conceptual art of Neo-Dadaist Genpei Akasegawa, who had studied Modernology with Kon, in his 'Hyperart: Thomasson' project. Akasegawa in turn, influenced Tokyo-based architects Atelier BowWow whose practice embedded an ethnographic lens into their surveys of the banality and strange found phenomena of post bubble Tokyo of the 1990s which Yoshihara Tsukamoto has called "shameless-ness" and "da-me architecture" ("no-good architecture").[14] Akasegawa discovered the first Thomasson, named after the legendary American baseball player Gary Thomasson who was transferred in 1972 at great expence by the Nippon League only to fail disastrously with countless strikeouts. The 'Yotsuya Staircase' was a functionless exterior staircase built against the side of a building which did not have a door or any means of entering the building. The staircase, a landing approached by two flights of steps with a handrail, was effectively purposeless and useless. Akasegawa was puzzled by his discovery, "everything in our capitalist society has to have a purpose. So where does that leave this particular staircase? Could you even call it a staircase? Of course you can't".[15] Akasegawa concluded that the staircase could only be a work of art shaped like a staircase for which he coined the term 'Hyperart'. The discovery and naming of the 'Yotsuya Staircase' led to the identification of multiple examples of redundant and purposeless examples of Hyperart across Japan. The Thomasson Observation Society was founded to encourage the public to identify Thomassons, this in turn led to the development of the Street Observation Society. Drawing attention to redundant architectural elements in the modern Japanese city through direct observation and recording Akasegawa introduced a method to question the drivers of modern development, progress, profit and functionality.

The Tohoku earthquake and subsequent tsunami of 2011 occurred when the Pacific plate subducted under the Honshu plate. The break caused the seabed near the epicenter to rise by 24 meters and to move towards the Japan Trench by 50 meters. The tsunami caused the Fukushima Daiichi nuclear disaster, primarily the meltdown of three reactors and the discharge of radioactive water. Hundreds of thousands of residents were evacuated. Whereas the Great Kanto earthquake was pivotal in Japan's shift to modernity, the Tohoko earthquake came at a time of uncertainty amidst growing awareness of environmental catastrophe and a questioning of the notion of progress. The disaster and subsequent relief measures focussed primarily on large scale infrastructural reconstruction. Meanwhile local residents and surviving commun-



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16 This material is based on personal communicaton with Shintaro Tsuruoka and Yuko Odaira of COMU, 2024.

10 Shintaro Tsuruoka*: Community Furniture Project*, 2017.
Source: COMU LLC.

11 Yuko Odaira: *Community Furniture Project*, 2017.
Source: COMU LLC

ities were housed in temporary barrack structures for many years. The architectural profession's response to this disaster faced many complexities regarding procurement, bureaucratic inertia and an overall mismatch of expectations. Apocryphal stories tell of Japanese star architects approaching local government offices with offers to design buildings only to be met with incomprehension and therefore rejection. Upset rather than humbled these architects withdrew. It became apparent that architects were not able to communicate with either local inhabitants who had been largely left out of the large scale process of reconstruction or local officials who were charged with administering support. The situation called for a recalibration in the ways that architects could contribute. COMU, a practice founded by architects Shintaro Tsuruoka and Yuko Odaira,[16] set a new example by embedding themselves with local communities, living alongside them in barracks for a number of years. This offered a different perspective to the normally transactional relationships between professional and client, a process that COMU calls 'undisciplining' which entailed establishing the means of offering skills and services direct to local communities. To do this successfully involved understanding local resources that were available, seeking to enable local communities to make and construct small scale projects such as public furniture or gardens **[10][11]**, and convincing local government to provide subsidies for local people to participate in the act of making. The Community Furniture Project developed as COMU held over sixty workshops with thirteen different communities to collectively design and construct furniture pieces such as public benches. The success of the project relied on developing skills to communicate directly with community members, to identify and situate achievable projects within the local context, and to encourage participants to assume ownership of the making process. COMU's practice expanded to engage with local government officials in Japan and in Banda Aceh, Indonesia, which had also been affected by the tsunami, through workshops fostering design skills and a refocussing of attention from the large scale to the micro scale. Projects range from furniture pieces and community walks to adaptive re-use of tsunami escape buildings, structures constructed for future disasters, and a disused a bank. Each project is conceived as a 'model action' or catalyst for change within a community. COMU's tools are less to do with making than "making a way to put people together" and as such mark a shift from ethnographic and observational practices initiated by Wajiro Kon and others towards a questioning of the limits of disciplines, the appropriateness of political structures at the local scale, and the promotion of durational projects that coalesce as social constructs.



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17 Levi, *Eboli*, 86–87. Levi's sister's account of a visit to Matera, which she described as 'like a schoolboy's idea of Dante's Inferno': 'in these dark holes (the cave homes) with walls cut out of the earth I saw a few pieces of miserable furniture, beds, and some ragged clothes hanging up to dry. On the floor lay dog, sheep, goats, and pigs. Most families have just one cave to live in and there they sleep all together; men, women, children, and animals. This is how twenty thousand people live... I have never in all my life seen such a picture of poverty'.

18 Franke,"Measure of Autonomy," 66.

12 Mario Cresci: Attrezzi *e modellino dalla serie Misurazioni*, 1977.
Source: Mario Cresci.

Camera as Tool

The town of Matera in Basilicata, Southern Italy, and its surrounding landscape is the product of slow geological change alongside seismic activity which has resulted in tectonic uplifts and faulting that have dramatically shaped the overall topography and exposed the terraced landscapes of soft calcarenite rock to the Gravina River which carved deep canyons and ravines into the limestone. Caves carved into the rock have been inhabited for millenia. By the late 1940s, some 15,000 residents were living in caves in the area known as the Sassi. Poor farming families lived alongside their livestock enlarging their homes by scraping away at the soft rock. These unhealthy and extreme living conditions were first publicised by Carlo Levi in 1945 in his book 'Christ Stopped at Eboli'[17] and this exposure led to government intervention resulting in the 1952 special law for the reclamation and evacuation of the Sassi. All 15,000 inhabitants were decanted into purpose built housing blocks in a move aligned with land reforms and expropriation of land across the south that radically transformed the everyday lives of peasants in an attempt to calm social tensions. Whilst the habits and livelihoods of the cave dwellers were profoundly affected, their material culture, their beliefs, myths and rituals, which the Marxist theorist Antonio Gramsci had referred to, in his 'Prison Notebooks', as "folklore and commonsense", persisted in "implicit opposition" to the dominant class culture of post war Italy.[18]

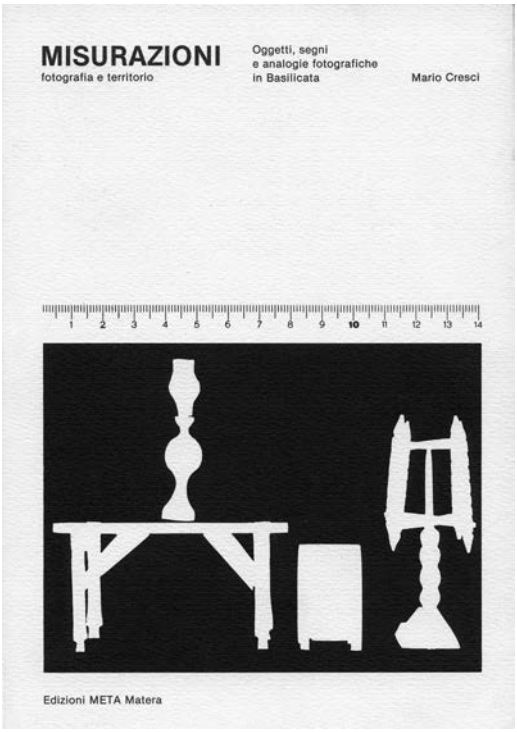
Mario Cresci, photographer and artist, first visited Basilicata in the 1967 as part of the urbanist research group Polis, a team of sociologists, anthropologists, architects and urban designers, who were commissioned to carry out a survey of the town of Tricarico. Cresci settled in Matera where he stayed for the next twenty years developing a remarkable expanded art practice that sought to engage with local people and their customs through recording and documenting their crafts, textiles and work tools **[12]**. Photography for Cresci became a means to reflect on his experiences of the Mezzogiorno and to identify and measure the customs and anima of the rural areas that were undergoing rapid transformation. In the series *Ritratti Reali* Cresci invited multiple generations of the same family to be photographed in their homes holding family photos and other momentos. Cresci invited his sitters to work on images that he had taken of them at home by bringing them to his studio. Often images were further reversed and altered to become drawings and artworks. In this way the textures and geometries that Cresci derived from the landscapes he recorded became a dynamic record of change and continuity. Local neighbours and acquaintances are photographed with the tools and objects that ground and situate their daily lives. Tools are often handmade and personalised, the carving of figurines and miniatures are recorded



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13 Mario Cresci: *Uno di coltelli da lavoro di Pietro Di Cuia*, 1978.
Source: Mario Cresci.

14 Mario Cresci: *Cafagna*, 1978.
Source: Mario Cresci.

15 Mario Cresci: *Misurazioni, book cover*. 1979.
Source: Mario Cresci.

19 Harris, "Cresci in Basilicata', 93.

alongside the implements and wood shavings that were involved in the process of making **[13]**. The viewer is invited to witness traces of an alternative societal model that is close to Illich's vision for conviviality, one that exposes the hidden structures of the South and rejects a nostalgic rendering of the present **[14]**. Cresci collaborated with local farmers, artisans and students to investigate local histories and traditions through photography with the ambition, as Lindsay Harris writes, 'not only to learn the customs, beliefs and physical surroundings that distinguished Matera' but also 'to reposition the Mezzogiorno as the vanguard of contemporary design'.[19] Cresci's 'Misurazioni' (measurement) project was born of this creative collaboration and resulted in the 1979 publication 'Misurazioni. Fotografia e territorio' **[15]**. Exploring relationships between local inhabitants and the objects and tools found in their homes, alongside artworks that Cresci generated from this process, it can be read as a manifesto for cartographies of place that that offer the means towards the imagination for an alternative future in a deeply conflicted society.

If the underlying forces of social change mirror the tectonics of shifting plates as they respond to the dynamics of catastrophe alongside moments of progress, and then regression, the agency of the architect cannot be restricted to a reliance on the current narrow definition of tectonics as the formal act of building. A broadening of terms is called for whereby tectonics, in response to these perturbations, become a means of mediation between materiality and technical objects (tools), and between environmental forces and questions of aesthetics. Tools of seeing that are born from the underlying programmatic continua of slow moving catastrophic events can detect and anticipate advance traces of these disruptions and prepare us to act accordingly.

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What Lies Beneath the Surface

Patrick Doan

"The cosmetic is the new cosmic…"

Rem Koolhaas - *Junkspace*

Introduction

In 2002, the Modern Art Museum of Ft. Worth (or the Modern as it is called in Ft. Worth) located in the museum district of Ft. Worth, Texas, opened to the public. Designed by the Japanese Architect and Pritzker Laureate, Tadao Ando, the new museum was conceived and built to serve as the Modern's new home; replacing the existing museum building which had become too small to hold the museum's vast and growing collection.

Situated across the street from the Kimbell Art Museum designed by Louis Kahn, immediate similarities and nods to the Kimbell can be read in the Modern: a relationship of garden to building, galleries planned and articulated in bays, and emphasis placed on the integration of natural light introduced into the gallery spaces through the ceiling and roof structure. Ando's use of exposed cast-in-place concrete walls are featured prominently within both the conceptual development and the physical realization of the museum, drawing immediate comparisons to the care taken in the design and construction of the Kimbell concrete walls.

However, appearances can be deceiving. A deeper examination into the constructive tale of the Modern reveals that over fifty percent of the form tie holes that articulate the finished face of the exposed concrete walls are cosmetic. They are present only to maintain the visual articulation and continuity of the finished concrete surface and pattern Ando desired, playing no active role in the physical construction of these walls.

In light of this revelation, would Ando's use of the cosmetic form tie be considered a case of architectural blasphemy, where the form tie's constructive nature is reduced to visual imagery, especially in the face of Kahn, whose presence casts a large and influential shadow on questions surrounding a building's making? Or could this be a situation where the use of the cosmetic form tie is not about a disregard for 'constructive honesty' on Ando's part, but rather suggests a different sensibility in the consideration of the wall, where surface expression governs.

This paper will address Ando's use of the cosmetic form tie at the Modern examining the significance of the constructive, formal, spatial, and experiential conditions and questions that emerge from its application.

1 *Making the Modern*, directed by Harry Lynch (a TRINITY FILMS production, 2003), DVD.

2 *Making the Modern*, Lynch, DVD.

3 W. Mark Gunderson, "Architectural Concrete: The Pursuit of Perfection," in *TEX FILES: Issue 01: Toward Architecture 2 The University of Texas at Arlington,* ed. Karen Bullis (Arlington, Texas: University of Texas, School of Architecture, 2004), p.

In Situ

The Modern is situated within the museum district of Ft. Worth, Texas, nestled within a dense and rich architectural array of museums and civic institutions that include The Amon Carter Museum of American Art designed by Philip Johnson, the Kimbell Art Museum designed by Louis Kahn with a just recently completed addition designed by Renzo Piano, and the Will Rogers Memorial Center that includes a 2,800 seat auditorium and a contiguous series of exhibit halls that total 94,000 square feet. The Modern is the oldest established museum in Texas chartered in 1892 as the Fort Worth Public Library and Art Gallery. Prior to the commissioning and completion of the museum's new building by Ando, the Modern's home was located one block to the southwest of the Kimbell. Its first permanent facility was completed in 1954 and offered 12,000 square feet of exhibition space. Because of its growing and extensive collection, a new museum was needed.[1]

In 1996 the Modern held an invited competition asking six architects to provide design proposals for a new 150,000 square foot museum. The six invited architects were Tadao Ando, Arata Isozaki, Ricardo Legoretta, Richard Gluckman, Carlos Jimenez, and David Schwarz. Of the six submissions, the jury unanimously selected Ando's in May of 1997.

Construction began in 2000 and in 2002 the new Modern opened its doors to the public. The Modern sits on an eleven-acre site across the street from the Kimbell Art Museum and provides 53,000 square feet of exhibition space.[2]

Exposed

On March 2, 2004 a symposium entitled *Architectural Concrete — Pursuit of Perfection* was held at the University of Texas at Arlington in Arlington, Texas. Organized and moderated by W. Mark Gunderson, AIA — an architect practicing in Fort Worth, Texas — a panel comprised of Fred Langford, consultant to Louis I. Kahn on the Salk Institute in La Jolla, California, the Kimbell Art Museum in Fort Worth and the Capital complex at Dacca; Tom Seymour, past president of Thos. S. Byrne, Inc., responsible for the construction of the Kimbell Art Museum from 1969–72; and Paul Sipes, Vice President of Linbeck and Senior Project Manager for the construction of the Modern Art Museum of Fort Worth, discussed how Ando and Kahn considered and used concrete in these two museums.[3]

It was from this symposium that the use of the cosmetic form tie in the Modern was revealed. Typically, the form tie is considered a constructive necessity to the making of a cast-in-place concrete wall. They work in



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4 Paul Sipes, e-mail message to author, August 14, 2012.

5 "Langen Foundation," PERI-USA, accessed March 14, 2017. https://www.peri-usa.com/projects/cultural-buildings/langen-foundation.html

6 Gunderson, "Architectural Concrete," 69.

7 Sipes, e-mail message to author, August 14, 2012.

1 Form tie hole: 'necessary' or 'cosmetic?' – the Modern

combination with the formwork system to secure the forming panels in place during the placement and curing of the concrete. The formed holes left in the finish face of the concrete wall is the constructive mark left by the form tie.

The reduction of required form ties was enabled using a wood girder wall formwork system developed by PERI, a provider and manufacturer of concrete formwork and scaffolding systems. The PERI – VARIO GT 24 was the specific system used in forming the concrete walls at the Modern. The strength offered by this formwork system to resist the hydrostatic loads generated during the placement of the concrete allowed for a reduction in the number of form ties necessary to secure and hold the formwork in place. [4] To compensate for the reduction of required form ties, and maintain the ordered expression of the wall that Ando desired, the cosmetic form tie, or 'blind plug' as the PERI website described them, was introduced — secured to the face of the formwork and designed to match the diameter and depth of the 'active' form tie holes. [5] Starting from the finish floor every even row of form tie holes is cosmetic in the Modern. [6]

The 'active' form tie openings as well as the cosmetic form tie depressions were sealed and finished with a cementitious grout. The face of the grout was held back from the finish face of the concrete wall one quarter of an inch to provide depth and shadow; bringing emphasis to the pattern the form ties created on the walls surface. Once the wall was completed, it became virtually impossible to distinguish between the two **[1]**.

In discussing the use of the cosmetic form ties at the Modern, Paul Sipes explained that the primary reason they were considered was to,

"…eliminate a major item that could create a form leak problem and therefore produce a less than desirable concrete. Keeping the ties sealed to prevent concrete leakage at the tie hole location of the formwork is more difficult than keeping the formed corners from leaking. The eliminating of a process not needed to produce the result and increase the quality of the concrete was readily accepted by the project team. It did cost less to install the dummies, and the formwork was assembled in less time." [7]

Sipes noted that in conversations regarding the concrete walls, Ando's primary focus was on the finish of the concrete. He wanted to achieve and maintain a continuity of surface that minimized both pour and form panel lines left by the formwork. Ando was not concerned over the type of 'active' form ties specified or the use of the cosmetic form tie, only that what was used would provide the diameter of the form tie hole he desired and that their spacing and arrangement was in keeping with his design intentions.

It was during the initial construction phase of the Modern that the use of the cosmetic form tie was discussed as a viable option. During this time, Sipes was in consultation with PERI in the design and development of the



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8 Ibid.

9 "Langen Foundation," PERI-USA, accessed March 14, 2017.

10 Gunderson, "Architectural Concrete," 70.

2 Exterior Elevation – tapering lunette – Kimbell Art Museum

shop drawings for the formwork system. Ando was aware of and approved the use of cosmetic form ties.[8]

It should also be noted that the use of the cosmetic form tie is not unique to the Modern or Ando's work. The Pulitzer Arts Foundation in St. Louis, Missouri completed in 2001 and the Langen Foundation in Neuss-Hombroich, Germany completed in 2004 are two examples of other buildings of his that have integrated the use of the cosmetic form tie in the casting of the concrete walls. The PERI system was used in the forming of the concrete walls for these museums as well.[9]

Commenting on Ando's use of the cosmetic form tie at the Modern, Fred Langford mused at how Kahn may have reacted to its consideration:

"One afternoon we were walking with Dr. Salk and his son through the courtyard and talking about this very subject. "Well, we've got to plug these things with something unusual," and so the kid said, "How about gold?" We used to repeat that story. To continue with what I learned today at the Modern, I didn't know that every other row was a dummy set. We never used any dummies. Kahn would do back flips if you put a dummy in. He would say, "We'll find another way. Find another expression." If you don't need the tie in there, then don't use it."[10]

Kahn and the Kimbell

Across the street at the Kimbell, a similar constructive tale pertaining to the expression of structural verse formal expression was played out during the design of the north and south exterior elevations **[2]**. In recounting the development of these elevations, Marshall Meyers, Kahn's project architect for the Kimbell, explained that Kahn called for a piece of glass, called a lunette, to be placed between the concrete cycloid shaped diaphragm (the thickened end of the concrete cycloid vault) and the travertine infill wall to make a clear separation and distinction between the building's structure and the non-bearing walls. According to Komendant's initial design, the diaphragm was to maintain a uniform depth of twelve inches. The glass lunette Kahn proposed was to maintain a uniform depth of six inches.

As the project developed a structural revision to the diaphragm made by Komendant changed its depth so that only at the apex of the cycloid vault did the diaphragm need to be thickened to twelve inches. The remainder of the diaphragm could taper in depth. Komendant took the position that this was the correct visual expression of these structural forces. Kahn saw this issue differently and was insistent that the diaphragm maintain its uniform depth of twelve inches. As Meyers points out,



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11 Marshall Meyers, "Making the Kimbell: A Brief Memoir," in *Louis I. Kahn: The Construction of the Kimbell Art Museum,* ed. Luca Bellinelli (Milano: Italy Skira, 1999), 11.

12 Ibid.

3 Interior Elevation – tapering lunette – Kimbell Art Museum

"…to Kahn, this absolute expression of a minor structural condition was not his inclination. He preferred to express the more general aspect of a structural member rather than every nuance. As an example, he would design cantilevered concrete beams with a constant height for the full length rather than reduce the beam's section the farther it cantilevered."[11]

While Kahn was determined on changing Komendant's mind, it was Komendant who prevailed in the end. Responding to this new structural condition Kahn kept the glass lunette in place and allowed it to follow the tapering profile of the diaphragm. The lunette became the mediator between the formal expression of the non- bearing walls and the structural expression of the diaphragm **[3]**. Meyers noted that this type of detailing, which was so unlike Kahn, "generated great attention in the completed building and was a superb demonstration of his artistry."[12]

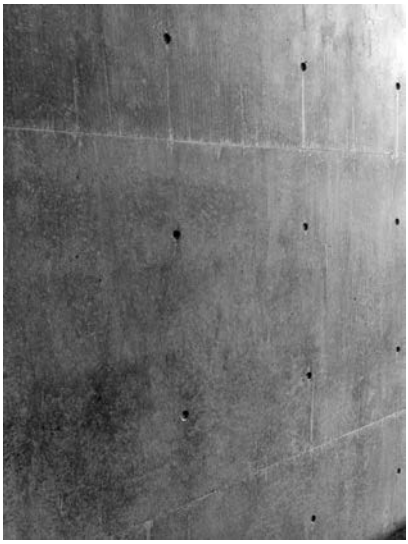
What this tale from the Kimbell helps to illustrate is that Ando is not alone in trying to manage and balance the challenges of technological and constructive demands with structural and formal expression — a line that is (literally and metaphorically) not always so clearly or easily defined and asking the questions: at what point in the architect's decision making are certain architectural conditions selected to be expressed, concealed, or even engaged cosmetically? To what scale are these decisions scrutinized and acted upon?

Mistaken Identity

On the surface, the revelation of Ando's use of the cosmetic form tie appears to be at odds with a body of work that seems to favor tectonic expression demonstrated through the masterful use of exposed cast-in-place concrete. By allowing the form tie to become a 'negotiable' condition within the making of the wall brings this perceived tectonic position into question. Underlying Ando's work might be an inherent preference for the (a)tectonic – a position that may have always been present yet overshadowed by his use of exposed concrete. The concession of the form tie becomes a silent admittance to the desire of maintaining and favoring surface over the 'honesty' of constructive expression or technological advancements.

In writing about architecture's constructive nature, Ando is careful to point out that it is the architect who must control how technology is considered and folded into their work. A point he articulates in the following passage from his essay, *The Traces of Architectural Intentions:*

"I believe it is important to be sensitive to the weight, hardness, and texture of materials and to have an intuitive grasp on the technical limits in their fabrication. Above all, the architect must define his own vision with respect to technology. Without precise individual aims, the architect will become



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13 Tadao Ando, "The Traces of Architectural Intentions," in *Tadao Ando: Complete Works*, ed. Francesco Dal Co (London: Phaidon, 1995), 461.

14 Tadao Ando, "From Self-Enclosed Modern Architecture towards Universality," 448.

15 *Oxford English Dictionary Online*, s.v. "cosmos," accessed February 10, 2017, http://www.oed.com.ezproxy.lib.vt.edu/.

4 Interior concrete wall – the Modern

subject to the economic logic and banal conventions that dominate technology. Technology is nothing more than knowledge. The architect's intentions and ideas control knowledge; these are more essential."[13]

Ando's use and deep understanding of a select material palate, comprised primarily of concrete and glass, helps to bring an acute awareness and focus to his crafting of spatial conditions and building details. The ordering and rhythm of the panel impressions and form tie holes left in the concrete wall establish a measured order and a scaled relationship of the formed spaces to the human body. The dense opaque boundaries that define the exterior walls provides a backdrop for an inward focused orchestration of spatial relationships, sequences, and encounters. Walls of concrete and glass frame, bound, and filter, bringing into focus and intensifying the experience of place through the lens of architectural space. The surface and order of the wall establishes a continuity of architectural thought Ando iteratively maintains from one building to the next. It could be speculated that the opportunity to change both the formal and constructive composition of the wall through a technological advancement in formwork would compromise his larger vision **[4]**.

"I attempt to use a modern material – concrete and, specifically, concrete walls – in simplified forms to realize a kind of space that is possible because I am Japanese. This rests on a simple aesthetic awareness cultivated in me as a Japanese person. It seems to me that at present, concrete is the most suitable material for realizing spaces created by rays of sunlight. But the concrete I employ does not have plastic rigidity or weight. Instead, it must be homogeneous and light and must create surfaces. When they agree with my aesthetic image, walls become abstract, are negated, and only the space they enclose gives a sense of really existing. Under these conditions, volume and projected light alone float into prominence as hints of the spatial composition."[14]

Seen in this light, the word cosmetic seems an apt way of describing Ando's walls. While cosmetic deals with surface, its etymological roots are found in *cosmos* – "an ordered and harmonious system of ideas, existences, etc., e.g. that which constitutes the sum- total of 'experience.'"[15] His treatment of the wall surface begins to suggest a painterly sensibility where surface depth, color, geometry, and order define and govern the walls physical and formal presence and attributes. Ando's sensibilities could be compared to those of the American artist, Donald Judd:

"There is also, of course wholeness and unity of Judd's art itself, both in individual pieces and in the entirety of the work. For Judd, art was a totality, and to be this it had to be clear, with things resolved, and put together in a clear and exact way. (He would be compulsive about detail, and I remember

16 William Agee, "Donald Judd in Retrospect: An Appreciation," in *Donald Judd: Sculpture : September 16 — October 15, 1994, The Pace Gallery 32 East 57th Street NYC* (New York: PaceWildenstein, 1994), p 9.

17 Edward Ford, *The Architectural Detail* (New York: Princeton Architectural Press, 2011), 312.

18 Peter Zumthor, *Thinking Architecture / Peter Zumthor*, 2nd, expanded ed., tran. Maureen Oberlin-Turner (essays 1988- 1996) and Cahterine Schlebert (essays 1998–2004) (Boston: Birkhäuser, 2006), 15.

trying to persuade him, to no avail, that it was probably impossible to join one-ton slabs of concrete in the Marfa field without a seam showing.)"[16]

Detailed Consideration

Edward Ford writes in his book, *The Architectural Detail*, that,

"The good detail is not consistent, but non-conforming; not typical, but exceptional; not doctrinaire, but heretical; not the continuation of an idea, but its termination, and the beginning of another."[17]

What could be taken away from Ford's words is that a condition such as the cosmetic form tie can stand as a detailed counter point within an architectural work, running contrary to building conventions and at times not bringing about a desired harmonic resolution. A dissonance emerges in the play between the formal, constructive, and performative forces coupled with architectural desires and intent. It is in these detailed struggles where the architect's true position is revealed.

If Ando had not built next door to Kahn, perhaps this question surrounding his use of the cosmetic form tie would not resonant so deeply (at least with this author) and might have otherwise been seen more as a construction anomaly in his other buildings. The initial knee-jerk reaction to blasphemy and deception especially in the presence of Kahn gives way to a surprisingly more empathic reading and consideration of its use. The cosmetic form tie is not a technicality, technological residue, or a victim of value engineering or indifference. Rather its use is intentional and controlled; asserting a position rooted within an (a)tectonic expression of an enveloping spatial totality. For Ando the cosmetic form tie's presence resonates at all scales; revealing that it does matter and is consequential — offering another lens in which to view and consider Ando's work.

"Details express what the basic idea of the design requires at the relevant point in the object: belonging or separation, tension or lightness, friction, solidity, fragility.… Details, when they are successful, are not mere decoration. They do not distract or entertain. They lead to an understanding of the whole of which they are an inherent part."[18]

An Argument for Maintaining Obsolete Architecture
A Case Study Into the Relational Character of Tectonics and Program When Transforming an Existing Building

Anne Beim
Magnus Reffs Kramhøft
Line Kjær Frederiksen



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1 Left: Nauticon's blue-toned glass facade and significantly shaped volumes towards the water. Right: Section of the concrete facade facing the neighboring buildings. © Trine Junker Rasmussen, Amalie Skjellerup Bang, Katrine Elbæk Ditlev.

1 Arne Høi et al., eds., *Klimavisioner for modernismens bygningskultur: etageboligbebyggelser 1930–1974*, 1st ed. (Realdania, 2024).

Introduction

This article addresses the growing problem that arises when recent historical buildings become obsolete. They should ideally be altered or refurbished to fulfill current needs to hinder new construction of the same scale on a given site. But their original design often does not fit today's demands without requiring major interventions and maybe unconventional workarounds as deep retrofit. Both economically, sustainably, and architecturally, this circumstance holds significant challenges, and potentially it can become an obstacle for adapting younger historical buildings for new purposes. Buildings we may not have yet learned to 'love'?

The backdrop of the article partly relates to a problem statement created for the graduate course, *Architectural research and innovation in present-day construction,* which is part of the fifth-year semester syllabus of the graduate program: *Settlements, Ecology and Tectonics* at the Royal Danish Academy. The course theme of 2024 addressed: *Transformations of the valuable existing: Valuation, design strategies and construction solutions for the transformation of existing buildings*. It included a highly relevant case study: Nauticon, which is a relatively young, large-scale office building from the 1990s, situated in Copenhagen, that is planned to be demolished.

Based on the findings discussed in the students' value assessment reports, the article identifies and critically examines the main *friction points* between Nauticon's original and present program (intention of use) and its tectonic framework (cultural physical manifestation). The aim is to discuss less destructive and more meaningful building practices. This article addresses 'a new sort of problem' — that concerns young, well-constructed buildings that, due to e.g. their original program, spatial organisation, and aesthetic appearance, are being considered outdated or 'worthless', and therefore in danger of being demolished. Reports funded by the Danish philanthropic foundation Realdania have concluded that modern office buildings with industrialized construction systems typically lack recognition as valuable architectural heritage, raising questions about preserving unappreciated buildings of our recent past.[1]

The Nauticon building is owned by Danica Real Estate, who is among Denmark's largest real estate investors, and until recently, it has been rented out to changing renowned companies. The owner has seen a decreasing interest in the building for several years and concludes that it simply does not align with today's functional, aesthetic, and technical preferences. Since the building did not meet the contemporary standards sought by companies today, the owner first developed a refurbishment project and later a more comprehensive transformation into a residential program. Both proposals

2 Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. H. Lee and J. Romero (Geneva: IPCC, 2023), 45

3 Leonora Eberhardt et al., *Klimapotentialet ved renovering kontra nedrivning med nybyg*, 1st ed. (BUILD, Aalborg Universitet, 2022), 5–6

4 Stefan Breitling and Johannes Cramer, *Architecture in Existing Fabric: Planning, Design, Building*, (Berlin: De Gruyter, 2012)

5 Sally Stone, *UnDoing Buildings: Adaptive Reuse and Cultural Memory* (Routledge, Taylor and Francis Group, 2020), 169

were ruled out because they failed to create the 'product' that the owner meant could serve as a realistic business case.

Adaptive reuse and *transformation* of existing buildings are important architectural strategies for reducing the building industry's environmental impact (GhG) by decreasing the demand for new construction.[2] Thus, reprogramming existing structures for reuse and enabling maintain their relevance is arguably a less resource-intensive intervention than demolition for new construction.[3] However, existing structures hold inherent tectonic features based on their original programming that may be difficult to repurpose.[4] The material reality is already defined in the existing building fabric that must be respected as a particular language and culture of construction. This thoughtful recognition of the existing preconditions can not only be used to restore historical building practices but can also be used to build narratives for renewed relevance.[5]

Research Question

When critically addressing the problem area that is presented in the introduction of the article, it leads to the following research question:

> *What are the tectonic rules and principles that either hinder or support transformation of a building's program?*

Thus, the tension between *tectonics* and the *program* described above forms the core of the case study examining Nauticon, which represents a global commercial building typology often subjected to demolition. Once the building complex was conceived as a prestigious 'architecturally designed headquarters', symbolizing a multinational corporation's future vision and market position, whereas today it fails to be relevant and is instead seen as an unattractive, obsolete structure, difficult to adapt for new purposes.

Theory and Research Approach

In this section, the theoretical framework of the article is presented together with the methods used to critically discuss why/how this rather young building now faces potential demolition rather than being reused.

Theoretical Position

Circular sustainability theory and scientific data are core elements of the study of this article. Reusing existing structures as an answer to

6 IPCC, *Climate Change 2023: Synthesis Report*

7 Buildings Performance Institute Europe (BPIE), *Prioritising Existing Buildings for People and Climate: Sufficiency as a Strategy to Address the Housing Crisis, Achieve Climate Targets and Protect Resources*, ed. Caroline Milne et al. (Brussels: BPIE, 2024), 15

8 Francesca Lanz and John Pendlebury, "Adaptive Reuse: A Critical Review", *The Journal of Architecture 27,* nos. 2–3 (2022), 441–62

9 Sole Bugge Møller, "Hvad Er Bedst for Klimaet – Renovering Eller Nedrivning?," Www.dtu.dk, *Bæredygtigt Byggeri,* DTU (blog), n.d.

10 Stephen Cairns and Jane Jacobs, *Buildings Must Die — A Perverse View of Architecture* (MIT press, 2014), 103

11 Anette Hartung, "Frygt for Bryggens Fremtid," *Ingeniøren*, February 2, 1996, https://ing.dk/artikel/frygt-bryggens-fremtid

12 Morten Stenak, ed., *SAVE: kortlægning og registrering af bymiljøers og bygningers bevaringsværdi*, [Revised version], (Copenhagen, Kulturarvsstyrelsen, 2011)

environmental impacts and resource scarcity is a central strategy to reach international climate targets. [6] But, adopting sufficiency as a strategy could equally lower resource consumption and address society's social implications by utilizing the existing square meters wisely and finding suitable functions for the buildings that are already there. [7]

This focus on preventing demolition and reusing valuable materials and structures aligns with the objectives of 'adaptive reuse theory', where resuscitation of obsolete buildings and prolongation of the user value and identity are central themes. Buildings have historically been considered as evolving entities rather than static monuments. Europeans traditionally approached structures with pragmatic adaptability, continuously modifying buildings to meet changing needs. [8] Moreover, pre-industrial building practices relied on few materials joined in simple ways, enabling easy dismantling, reconfiguration, and reuse. But modern construction has abandoned this evolutionary approach for the benefit of economic efficiency, which has created building systems that are fast to construct but resistant to modification. [9] Also, industrialized systems encourage designing buildings as 'completed' objects with fixed programmatic requirements. The shift moved modernism away from viewing buildings as continuously developing physical necessities toward treating them as temporally bound, unchangeable structures.

This notion of permanence is challenged by Stephen Cairns and Jane M. Jacobs in *Buildings Must Die,* which addresses the natalistic tendencies in modern architecture of praising what is being created. The authors argue for recalibrating our understanding of buildings as finite entities by incorporating their life cycles of decay and death into architectural thinking. They explain how buildings become obsolete when they lose *"…value, sometimes through physical deterioration but often as a consequence of newer or better alternatives becoming available,"* emphasizing that obsolete buildings become structures that are *"in place but out of time"*. [10]

As a 'classic' office building typology of the 1990s, Nauticon exemplifies these structures often subjected to obsolescence — not primarily due to poor physical conditions, but because they have fallen *'out of time'* and lost value due to their 'outdated looks', lack of flexibility in regard of reprogramming, and general negative association with industrialized construction systems. These types of buildings are not celebrated as central parts of our common cultural heritage and have been highly criticized within the professional architectural community. [11]

Also, the formal system for measuring preservation value in Denmark — the SAVE method — is only just beginning to include buildings from the period between 1970 to 2000, [12] but still not embracing them as genuine cultural heritage.

13 Mari Hvattum, *Style and Solitude: The History of an Architectural Problem* (The MIT Press, 2023). 235 and 238

14 Heinrich Hübsch, *In What Style Should We Build? The German Debate on Architectural Style*, ed. Harry Francis Mallgrave and Wolfgang Herrmann, Texts & Documents (Getty Center for the History of Art and the Humanities; Distributed by the University of Chicago Press, 1992).

15 Kenneth Frampton and John Cava, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, with Graham Foundation for Advanced Studies in the Fine Arts (MIT Press, 1995).

16 David Leatherbarrow, *The Roots of Architectural Invention: Site, Enclosure, Materials*, RES Monographs on Anthropology and Aesthetics (Cambridge University Press, 1993). Mohsen Mostafavi and David Leatherbarrow, *On Weathering: The Life of Buildings in Time* (MIT Press, 1993).

17 James Strike, *Construction into Design: The Influence of New Methods of Construction on Architectural Design 1690- 1990*, 1. publ. (Butterworth Architecture, 1991).

18 Liliane Wong, *Adaptive Reuse: Extending the Lives of Buildings* (Birkhäuser, 2017), 38

When looking at the Nauticon building, its age is easily narrowed to a period between the late 80s and early 90s due to its corporate architectural style and bold construction features. But architectural style is about more than visual appearance. As Mari Hvattum has stated in her book *Style and Solitude*, style is perceived "*…not (only) as a representation of the zeitgeist, but as ongoing negotiations of the historicity and agency of architecture's material and motifs.*"[13] The appearance is deeply connected to historical context, cultural values, expressive intent, and the relationship between form and function. Hvattum builds upon Gottfried Sempers' theory of style as an articulation and artistic processing of a basic idea and "*…all intrinsic and extrinsic coefficients that modify the embodiment of the theme in a work of art.*"[14]

This aligns with ideas proposed by important tectonic thinkers and architectural historians as Kenneth Frampton, David Leatherbarrow, and James Strike, who in each their way, understand buildings as correlations between different factors, both physical, systemic, societal, and cultural.

In *Studies in Tectonic Cultures*, Frampton notes that architecture is not only a 'visual phenomenon', but a tactile tectonic practice, where the building's appearance derives from its construction and materials. Frampton sees it closely related to the characteristics of a place, such as topography, climate, traditional construction practices, local materials, and crafts.[15] Leatherbarrow brings a clear phenomenological perspective into the perception of architecture when analyzing its constitutional parts in his books, such as topography, atmosphere and time.[16] Finally, Strike offers an alternative historical account of modern architecture (1690 — 1990), when describing the evolutionary changes in architectural design practice through ongoing innovations in building technology, construction and production of building materials.[17]

Specific circumstances and paradigms point to specific solutions and results. So, we need to understand the aforementioned correlations and hierarchies to be able to grasp the fundamental idea and historical/ cultural value of existing buildings. As Liliane Wong states: *"Interventions to existing buildings and structures, too, begin with an understanding of order."*[18] Therefore, to be able to work with these complex relationships, it is necessary to understand the priorities embedded in the different layers, hierarchies, and entities of the building.

Research Approach

Based on a fundamental tectonic analysis, the article approaches the Nauticon building, both theoretically and methodically, at three different levels/scales: context, building body, and details. This in order to interpret



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19 Leatherbarrow, *The Roots of Architectural Invention*

20 Kieler Architects, "Nauticon" (Kieler Architects, n.d.), https://kielerarchitects.dk/referencer.

2 Nauticon's contrasting facades and the new developed residential area behind.
© Martin Toft Burchardi Bendtsen. Photo not edited and downloaded from https://www.arkitekturbilleder.dk/bygning/nauticon.

their correlations and to get closer to the building's essence and inherent meaning. The three levels refer to Leatherbarrow's definitions *Site, Enclosure,* and *Material* as fundamentals in architectural design practice, which he proposes as a concrete theoretical framework in *The Roots of Architectural Invention*. This article employs the same tectonic framing to analyse and dissect the building, ensuring a comprehensive review of all three levels. Leatherbarrow argues that neither style nor form should be dominant design parameters. Instead, how a building relates to the place/site and creates spatial experience through specific use of materials are important to integrate by thorough analysis. In his view buildings are more than just a passive background — they are active 'participants' in their specific context.[19]

Secondly, the student's value assessment studies and comprehensive transformation proposals generated during the graduate course have served as valuable data for the research, along with an evaluative questionnaire of the process. Danica Real Estate has contributed to the course by providing thorough information, stating their view on market demands and their challenges adapting the building for new purposes. As an additional source, the involved architect, Henning Larsen, has contributed with practice-based and project-specific knowledge to broaden the understanding of the process and its complexities.

We have circumvented the contested style of Nauticon, looking at the constituent elements instead to familiarize ourselves with the potentials of what already exists. By identifying the friction and barriers for both the original version of the building and present-day reality, the hypothesis is that it will inform the adaptation for future use of the building and its anchoring at the site.

Context and Background of the Case

To test the tectonic theory approach that frames the analysis of the paper — the Nauticon building acts as a case study. Nauticon is a large office building of a total of 25.000 m^2[20] developed in 1989–90 by the pension fund Skandia (today Danica Real Estate). It was designed by the Danish architectural office, Kieler Architects. Located in a former industrial harbor district, the building complex heralded a new era of progress following Copenhagen city's struggle with depopulation, unemployment, and economic decline during the 1980s

The bold architectural expression clearly reflects its historical origin, yet the building now faces demolition because renovation and transformation attempts hold too many barriers, creating an economic burden compared to the owner's level of ambition. Over the past 5 years, Danica Real Estate has

explored various reuse strategies with consultants to meet market demands, including renovation proposals by Erik architects and adaptive reuse plans by the architectural offices Over Byen and Henning Larsen. A comprehensive resource mapping was conducted by engineering firm Søren Jensen and demolition company Tscherning, creating a catalogue of material circularity potentials. Despite these efforts, Nauticon still exemplifies the challenges faced by similar buildings — structures that are not particularly old but too difficult to adapt to changing times and present legislation.

Prominent tenants have occupied the building, such as the Swedish telecompany Ericsson, the Danish dairy giant Arla, and the Danish Tax Authorities. The interior has been refurbished according to the changing needs of specific functional and aesthetic preferences of each company. But the exterior has kept its original state for the past three decades, and unlike many other buildings, it represents a clear symbol of a special time in architectural history. In general, this circumstance raises interesting arguments for maintaining newer historic buildings.

Analysis of the Case

Three Interrelated Levels

This article identifies and analyses examples of friction *points* arising between programmatic requirements and tectonic expression across three interrelated levels, while considering how regulatory frameworks influence Nauticon's architectural development. By looking at the relations between I. *Context and Building Body*, II. *Building Body and Floor Plan*, and III. *Materials and Construction Details,* the intention is to highlight challenges and potentials that are found when looking closely at the different scales.

The Nauticon Building

The Nauticon building presents itself as a strictly conceptual and monumental structure positioned on the edge of the water basin. The building complex features four 5-story Y-shaped volumes in a symmetrical layout connected by three transparent entrance staircases. While the facade around the open courtyard towards the waterfront is dominated by blue-coated reflective glass, the rest of the exterior building exposes prefabricated, concrete elements. The heavy concrete building masses stretch in multiple directions, creating a deliberate material contrast with the sharply defined inner facade. This juxtaposition establishes a clear architectural hierarchy that boldly communicates the original design intentions.

21 *Oxford English Dictionnary*, "Context," https://www.oed.com/search/dictionary/?scope=Entries&q=context&tl=true. June 22, 2025

22 *Merriam-Webster*, "Context," https://www.merriam-webster.com/dictionary/context. June 22, 2025

23 Kenneth Frampton, "Towards a Critical Regionalism: Six Points for an Architecture of Resistance". In: *The Anti-Aesthetic: Essays on Postmodern Culture*, ed. Hal Foster, 1st ed. (Port Townsend, Wash: Bay Press, 1983), 21

The structure is constructed with load-bearing sandwich elements and hollow-core concrete slabs spanning between the facade and the row of concrete columns and cores. This provides open floor plans that allow flexible spatial arrangements and different uses of spaces. As one of Denmark's first buildings designed using fully digital CAD programs, Nauticon represents a significant technological advancement in construction practice and celebrates the era's growing embrace of digital design tools.

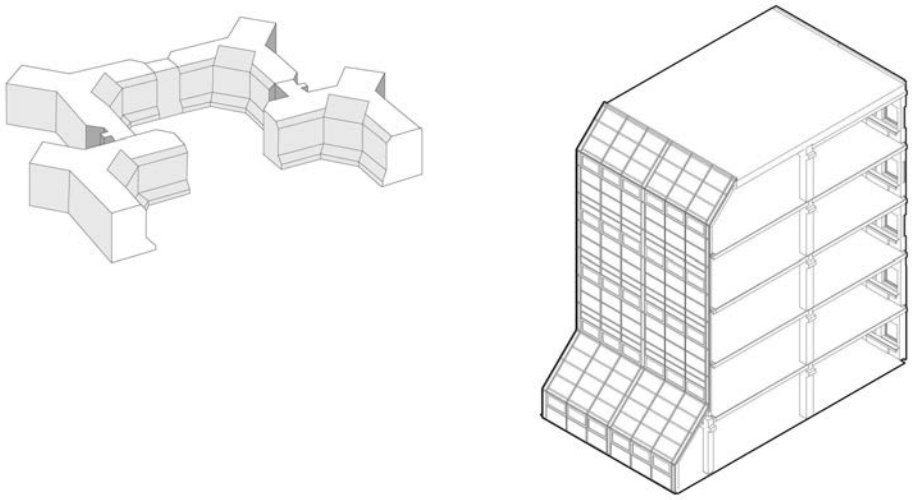
The Continued Life of the Building

Danica Real Estate has struggled to attract tenants for several years. They state that companies who are looking for a place to lease find the building unappealing, as tenants need to see their corporate image reflected in their workspace. This includes both aesthetic considerations and the growing importance of 'green assets' — organizations increasingly prioritize environmental credentials due to public attention and policy pressures. For years, Nauticon's owner has pursued various repurposing strategies: an expensive retrofit plan, a circulation strategy involving only interior surface removal, and finally a radical conversion project that proved too challenging. All together the barriers seem to have overruled the advantages when looking at the way the owner views and manages the building property.

I. The Context and Building Body

The term '*context*' originates from the Latin word contextus (con=together, texere=weave), meaning 'a joining together' or 'to weave together'.[21] The word refers to the circumstances or interrelated conditions in which something occurs, and which help to give it meaning.[22] Through an architectural lens, it is therefore natural to consider the concept as an interweaving of both the influences from the reality, the historical era we are part of, and the local physical circumstances that are created by the building/place itself.

Frampton assigns the concept of context and place a central significance, understood through the notion of 'Critical Regionalism': *"It is the aim of critical regionalism to mediate the impact of universal civilization with elements derived indirectly from the peculiarities of a particular place."*[23] He sees context as a necessary counterpart to the placelessness and loss of identity that characterizes modernism and the 'international style'. He argues that place is about anchoring architecture in sensory and cultural context, as a resistance against global homogenization and generic architecture. Also, he emphasizes that tectonics must be sensitive to the cultural and physical



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3 Left: Nauticon's characteristic Y-shaped volumes forming inner courtyards that are facing towards the water basins of the harbour. © Magnus Baarup Noe, Carl Emil Haslev and Mads Christian Hvidberg. Right: Section of the building volume's 5 floors, highlighting the two different facades and the row of columns © Mads Buus Sørensen and Sylvester Bajda.

24 Frampton and Cava, *Studies in Tectonic Culture*

25 Leatherbarrow, *The Roots of Architectural Invention*.

26 Ibid, p. 28

27 Jesper Engelmark, "Dansk byggeskik: etagebyggeriet gennem 150 år", 2nd ed. (Herlev: Dansk Byggeskik.dk, 2014).

context of a place to create meaningful, identity-forming, and resilient buildings. [24]

The Locus of Site and Market-Driven Thinking

This understanding of context is a prerequisite for the notion *'Site'* that Leatherbarrow discusses as one of the fundamental conditions for good architecture. Leatherbarrow argues that architecture always exists in a specific context – that is, in a particular place, which is both physically and culturally conditioned. The building must relate to and be in dialogue with this place, which makes architecture more than just an object, but also part of a larger environment, landscape, or urban space. [25]

As a pioneering building in the industrial area of Copenhagen South Harbor, Nauticon turns its heavy concrete back on the dirty industrial area and visually points its attention (glass facades) to the waterfront. The building closes in on itself, not relating to the prerequisites of place thus visibility from one of the city's major roads seems prioritized over neighboring engagement. In the transformed area, this closed appearance is a significant problem for interaction with the present local community and emphasizes that Nauticon has a static nature, not able to keep up with time.

With the city's growing wealth and the real estate development of former industrial areas along the waterfront, this site has become increasingly attractive to investors. It gives the owner an economic incentive to utilize the politically adopted building coverage ratio of the site, stated in the local municipal plans, and build more efficient square meters than the existing building can provide. From a business case perspective, it is thus more profitable for the owner to demolish and construct a new building. As Leatherbarrow states, site location is critically defined by land ownership and market value — considered as a commodity — but these economic terms prevent understanding of the place's enduring qualities, as they prioritize transferability over architectural uniqueness. [26] This is a significant systemic barrier to the preservation of existing structures at the site.

The Industrial Practice and Digital Fascination

Nauticon aligns with the building practices of its time, where industrially prefabricated concrete elements have been predominant in Denmark since the 1960s and remain so to this day. [27] The sharply cut volumes have both in plan and facade postmodernist features and almost baroque elements, which show in the distinct symmetrical design and angled volumes, and the courtyards' layout with diagonally oriented basins and bridges.



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28 Byggeriets Videoproduktion *Danmark Bygger — Varieret, Rationelt, Kvalitetsbyggeri* (film), produced by Per Kjærbye et al. (Denmark, Byggestyrelsen, 1990).

29 European Commission, *The European Green Deal: Striving to Be the First Climate-Neutral Continent*, European Commission, accessed June 2025, https://www.commission.europa.eu

4 Left: Picture showing one of the floors with the triangular service core in the center. Right: Picture of one of the top floors, with a higher sloped ceiling and skylight. Both pictures are taken of the building in the state of a soft strip of materials and with the glazed facade on the right side. © Line Kjær Frederiksen.

30 Buildings Performance Institute Europe (BPIE), *Prioritising Existing Buildings for People and Climate: Sufficiency as a Strategy to Address the Housing Crisis, Achieve Climate Targets and Protect Resources* (Brussels: BPIE, October 25, 2024)

31 Carsten Falk Hansen and Marie Louise Hansen, *Bygningsreglement 2018 (BR 18)* (Herlev, Byggecentrum, 2018).

The Y-shaped blocks are contextless, independent volumes that prioritize spatial programming and optimal plan efficiency over site-specific 'response'. According to the research film 'Denmark builds — varied, rational, quality construction'.[28] These blocks could be placed and combined in various configurations, making them products of the period's focus on industrial mass production and the fascination of the possibilities of the digital tools, rather than the result of their specific location. The design does not respond to the actual physical reality, such as orientation according to daylight, but rather seeks to prioritize the program and stick to the formal concept. This approach reflects an introspective, object-oriented architectural stance that primarily relates to its formal logic, rather than engaging with its surroundings—a detachment that has become even more pronounced as the neighboring industrial area has transformed into a residential district.

The era's material and structural choices focused on an emerging efficiency through prefabrication and quick assembly. The heavy materials were chosen for their robust characteristics and ability to withstand heavy loads with minimal maintenance. The building still stands, visually tired but not worn out. Failures occur mainly at joints where sealants have deteriorated, pointing to the importance of ongoing maintenance. Complex custom solutions like the blue-toned in-situ glass facade are challenging to repair since they weren't designed for disassembly and replacement. This reveals that future repairs weren't in focus, but instead a belief that materials and construction were durable and could last virtually indefinitely.

The Reality for Obsolete Buildings

In an attempt to keep up with demand and social development, Nauticon's owner has invested in projects designed to alter both the building's properties, appearance, and use. This aligns with the EU's strategies for reducing energy consumption in the building stock, which aims to double renovation rates by 2030[29] as well as thinking about sufficiency in the use of the structure.[30] This promotes refurbishment interventions, such as upgrading with further insulation or replacement of windows to lower energy costs.

But when buildings as Nauticon need to undergo program changes – from commercial to residential or industrial to office – they must meet current building regulations for fire, accessibility, daylight, energy, statics, etc. that differ significantly from those when the building was constructed.[31] And as Danish society has prioritized welfare and livability, municipal strategies have increased requirements for citizen-oriented functionalities since





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32 Gottfried Semper and Harry Francis Mallgrave, *The Four Elements of Architecture and Other Writings*, First paperback edition, trans. Wolfgang Herrmann, RES Monographs in Anthropology and Aesthetics (Cambridge University Press, 2010), 103

33 Leatherbarrow, *The Roots of Architectural Invention*, 132

5 Limited daylight and visual connection to the outside. Left: Window in concrete facade. © Amalie Westh Bennetzen. Right: Window in glazed facade with its dominant horizontal lintel. © Magnus Reffs Kramhøft

enges, as demands for recreational areas, bike storage, and depositories, though well-intentioned for resident wellbeing, can be difficult to integrate on constrained sites. While these standards naturally apply to new construction, they are also imposed on existing buildings when transformed, creating potential barriers for the preservation and reuse of the building body.

II. The Building Body and Floor Plan

Broadening the Scope of Form and Function

In architectural theory, the notion of architecture's constituent elements is well established, particularly in classical tectonic theory as *The Four Elements of Architecture* by Gottfried Semper. [32]
In this, Semper describes architecture's primordial elements as mound, hearth, roof, and enclosures. Each element is understood as related to a craft and to materials that provide a certain tectonic logic to the design of each individual element, as well as the tectonics of the elements in coherence. Sempers' almost anthropological analysis of the primordial hut as an architectural object, was a reaction to the aesthetic focus on styles of the time. With reference to Semper, Leatherbarrow argues for questioning *"…a specific geometry of purpose, or spatial configuration of a plot, without assuming the antecedent status of either function or form."* as *"…the radical basis for full understanding of architectural enclosure."*[33]

Questioning the correlation between Nauticon's enclosure and floor plan, as proponents for form, is carried out in the following.

The Enclosure and The Plan

It is in the Y-shaped building blocks and in the contrast between the heavy structural concrete facade and the sharpness of the glazed facades, that we find the main architectural statements of the enclosure. As previously mentioned, these geometric volumes seem to be the contextless consequence of designing universal building blocks with the specific purpose of being an office building. As an office building, this layout almost urges a corporate organisation to divide vertically in the four blocks and horizontally throughout the Y-shaped floor plans, even with the possibility of organising smaller divisions within each 'leg' of the Ys. The Y-shape gives three office corridors with a triangular service core in the center. Originally, Nauticon was intended for one single company who had ownership of the whole building. Over time, ownership changed, and Nauticon began housing several smaller companies. The current situation with the owner, a pension fund obliged to make

34 Le Corbusier, *Towards a New Architecture*, trans. Frederick Etchells (Holt, Rinehart and Winston, 1985), 2

35 Byggeriets Videoproduktion, *Danmark Bygger — Varieret, Rationelt, Kvalitetsbyggeri*

profitable choices on behalf of its members, unsuccessfully testing the feasibility of transforming Nauticon to accommodate a new program that is housing — points to questioning the plan in relation to the program.

As previously described, the tectonic language of Nauticons' constituent elements is very much characterized by the industrial logic of its time. The geometric shape of the Y very much defines the bodily experience of the enclosure. The symmetrical layout of the four blocks, together with the symmetries of each open floor plan, makes for a mazelike — even disorientating — experience of moving around between the floors and the blocks. Everything seems to be the same, except for the view out of the windows. For the design of Nauticon, there seems to have been a trust in Le Corbusier's modernist argument: "*The Plan is the generator. Without a plan, you have lack of order, and willfullness. The Plan holds in itself the essence of sensation. The great problem of to-morrow, dictated by collective necessities, put the question of "plan" in a new form. Modern life demands, and is waiting for, a new kind of plan, both for the house and for the city.*"[34]

This specific Y-shaped plan takes great measures to adapt to a different program than what was originally intended. This indicates that Nauticon probably never was intended to accommodate any other program than offices. Though in a different way than intended, Le Corbusier is right in that the great problem of tomorrow puts the question of 'plan' in a new form. From the case of Nauticon it can be argued that the 'new form of plan' should be infused with the *geometry of purpose*, as Leatherbarrow puts it. In the sense that designing purposeful geometries for the future instead of for a function of today, could make way for better adaptable buildings.

Facades and Daylight

In the short film, previously mentioned, Nauticon figures as a prominent example of the possibilities of the time. It is explained that variation and quality were key parameters in prefab construction.[35] The four blocks are connected by three staircases serving as entrances and the configuration of the blocks next to each other is a rational way of securing daylight. The composition of facade elements is underlined by vertical and horizontal joints, grooves and protrusions in the facades. The facades facing out towards the neighboring buildings and roads have smaller square windows that appear as a continuous vertical band following the outer facade, with a slight differentiation of what looks like concrete posts visible in the facade in the lower two floors.

The facades facing the courtyard look like curtain walls of glass, with a spatial protrusion on the ground floor. However, from inside the building,

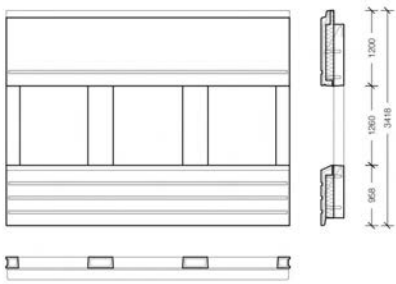
it becomes clear that the facades are structural concrete elements clad in glass panels. The architectural quality of these divergent experiences of the facades from inside and outside of the building remains unclear. The depth of the building volumes makes for grand open spaces, which have been divided into smaller office units, with corridors in the center of the' legs' of the Ys. This means that most office units have had daylight from only one side. The windows on the glazed facade are placed at a height suitable for sitting at a desk to be able to look out. When standing up there is a beam exactly at eye level. One-sided daylight and low windows are not necessarily a problem for commercial buildings, but when adapting to residential use, these issues around daylight and views from windows constitute complications. Therefore, efforts made by the building owner to adapt Nauticon into an apartment complex has focused on adapting the facade. However, because the facades are structural, comprehensive alterations to the facades are needed to comply with current regulation on adequate daylight in residential space.

These points of friction between the program manifested in the building body and floor plan, show that following the tectonic logic of the building, Nauticon either should become an experiment of uniting the existing building codes and the need for adaptability — or Nauticon should remain in use as an office building. Perhaps the radical approach for these types of buildings should be to ask every singular building what it wants to be, instead of trying to make it into something it never can become. This approach, however, leads to a broader discussion on the grammar of programming the city. Could we succumb to losing control over a few of the existing buildings, where the inherent tectonics assume control?

III. Materials and Construction Details

The Tectonic Problem of Post Modernism

At first glance, the Nauticon building does not give an impression of having high ambitions regarding architectural detailing — neither as for elaborate tectonic principles — nor regarding referring to any sort of regional, cultural or historical character traits. At all levels the aesthetic appearance of the building complex signals a high degree of architectural autonomy, showing in a series of formalistic design features. It shows in the symmetrical uniform geometries, repetition of large-scale building components, distinct markers exemplified in the steel covered stairway towers, and a clearly stated color scheme. A similar design approach can be found in the character and tactile sense of the few dominating materials applied, e.g. the smooth concrete surf-



6

36 Kenneth Frampton, *Modern Architecture: A critical history*, (London: Thames & Hudson, 1980), 305

37 Ibid, 307

6 The two most common facade elements of Nauticon. Left: the load-bearing precast concrete sandwich panel with separate windows. Right: the load-bearing precast concrete panel with one horizontal window. © Mads Buus Sørensen, Sylvester Bajda

aces, the cobalt blue reflecting glass panes, and the massive black window frames that frame the apertures.

Kenneth Frampton has eloquently nailed the overall problems that characterizes this era in architectural history, emphasizing the lack of architectural contextual awareness at all levels. In his pivotal book, *Modern Architecture: A critical history*, he states:

> "*... [Post Modernism] cannot be defined in terms of a specific set of stylistic and ideological characteristics, the fact that it tends to proclaim its legitimacy in exclusively formal - not to say superficial - terms, rather than in terms of constructional, organizational or socio-cultural consideration …already separates it, as a modus operandi, from the architectural production of the third quarter of the century.*" [36]

And he continues:

> "*Post Modernism reduces architecture to a condition in which the 'package deal' arranged by the builder/developer determines the carcass and the essential substance of the work, while the architect is reduced to contributing to a suitably seductive mask. This is the predominant situation in city centre development in America [Europe] today, where … [buildings] are either reduced to the 'silence' of their totally glazed, reflective envelopes or alternatively dressed in devalued historical trappings of one kind or the other.*" [37]

These critical circumstances that defined the architectural era of the 1980s suggest that design proposals, which could have embraced durable tectonic principles, may have been suppressed for the benefit of formalistic aesthetic gestures. Furthermore, the architectural design primarily was ruled by the commercial interests of the developers and investors. This also appears to be the case in the Nauticon building. Therefore, it is interesting to examine how the materials play a role regarding the formalistic design and the technical details. This will be addressed in the following.

The Paradox of the Load-bearing Concrete Façade

Kieler Architects may have accepted the client's commercial interests and may have let them affect the architectural design?! Upon closer examination of Nauticon's construction details, it becomes evident that the building's structural design is tailored to the specific program of the first tenant, that was to provide a 'modern office space' which offered efficient workspace.

38 James Strike, *Construction into Design*. (1. publ. Oxford: Butterworth Architecture, 1991).155–156

39 Line Kjær Frederiksen, "Adskillelsens Tektonik — Cirkulære principper undersøgt i to nutidige byggesystemer", (PhD diss., Copenhagen: Center for Industrialized Architecture, Royal Danish Academy, 2024). 70–71

40 Casper Østergaard, Heidi Aistrup Christensen, and Gitte Gylling Olesen, eds., *Analyse af design for adskillelse, Inspirationskatalog*, (København: COWI & Social- og Byggestyrelsen, 2024), 26–29

In general, the structural elements and construction joints hold physical dimensions that have been 'optimized' to serve the maximum functionality of the building. This shows in heavy load-bearing pillars and beams, the large span deck elements, and the bespoke steel frames holding the glass facade. However, the applied construction solutions do not allow (easily) for any subsequent adaptations or changes, since major interventions will be both technically challenging and financially expensive.

As an example, the load-bearing precast concrete facades are difficult to change e.g. cut open or remove, because in addition to serving as the building skin they form the structural skeleton. Moreover, the concrete elements are reinforced with steel rods above and around the edges of the windows to a degree, where creating larger openings for improving the daylight conditions will be technically difficult.
Even minor interventions in the facade will inevitably challenge the building's structural system since the joining of the concrete elements is fixed by use of cast concrete. So, the structural system itself is a problem regarding disassembly and alterations, since large precast concrete panels tend to collect and accentuate any differential movement at the joints between the panels and therefore must be fastened. [38] Up until present time it has been the most applied method. So, the core idea of the original program 'to create open, flexible floor plans,' with a specially designed load-bearing building system becomes more of a barrier than a benefit when the building must be repurposed.

The Trouble of Separating Layers

In present day analysis of reuse and recycling of construction materials, harvested from existing buildings, the 'reversibility 'of construction solutions is central. This means being able to separate the different materials, without destructing them and to be able to sort them into pure material fractions. [39] It helps to gain the highest possible value embedded in the materials and components. [40] That includes — carbon, material uniqueness and/or cultural heritage.

Nevertheless, 'design for disassembly' was not thought of at the time when the Nauticon building was designed, rather on the contrary. To create robust constructions and enable efficiency in the processes of assembly, adhesives have been extensively used to join and glue the building components together.

The dark red-brown tropical wood parquet floors can serve as an example having been glued to the concrete floor deck with a tar-based adhesive. Attempting to dismantle the floorboards proves very demanding — removing

41 Ibid, p. 127.

the adhesive is difficult, making reuse of the wood challenging. This is both because the wooden bars cannot be applied until fully cleaned, because the adhesive is suspected of containing harmful substances that could spread when exposed. This example demonstrates how building layers are locked together, depending on each other, and tied to their specific location in construction. Beyond physical constraints, materials also become systemically locked within linear economic flows. Chemical adhesives and sealants contaminate materials, preventing immediate reintegration into circular systems.

Valuable wooden flooring — now impossible to source due to deforestation regulations — loses its resource value through construction methods that preclude reuse. CO2 reductions up to 78 percent are being missed when not being able to reuse wooden boards. [41]

Conclusion

Context and Prerequisites are Essential

The conclusion suggests that transforming the existing fabric into something useful and meaningful must necessarily relate very closely to the already existing conditions and the material reality that exists on site. The building's use-driven program does hold challenges when searching for new purposes, but the main obstacle to tackle and handle is the very rigid construction technique, which is difficult and costly to alter, and a barrier to successful circular reuse. Lack of contextual connection makes it difficult to anchor a reused building in a place and local community, yet this anchoring is crucial for successful transformation. Relating to the site and embracing the original design intent helps to create relevance in adaptive reuse, supporting the change of mindset.

Market and Legislation Must Change Focus

Today's financial reality makes demolishing buildings and profiting from new construction advantageous. New economic incentives are essential to make preserving and transforming buildings the norm. Existing buildings should not meet the same requirements and standards as contemporary new construction. This pressures processes, creates focus on responsibility allocation, and ultimately hinders transformations—and thus preservation. Authorities need new rules to lean on. Separate regulations that don't largely equate old with new, but tailor requirements to specific situations and help support each building's potential.

Buildings Should Dictate Future Use

Forcing new programs into buildings not designed for them becomes unnecessarily extensive and expensive. Instead, aligning programs with existing buildings' tectonic language minimizes necessary extensive alterations. This reduced intervention scope—particularly for structural systems—is essential for minimizing environmental impact, waste generation, and virgin material consumption. Understanding a building's history, fundamental concept, and building system should guide future programming. This approach limits interventions and costs while continuing the architectural legacy. Deeper understanding of a building's history, design intent, and construction principles enables more appropriate functional adaptations. Creating new relevance in existing structures is critical for preserving building resources in place—without it, buildings lose meaning, deteriorate, and face demolition.

A Critical Reflection on Tectonic Barriers and Opportunities

Today, the Nauticon building appears as a contextless and introspective result, not designed to fit its surroundings, but from a formalistic, object-oriented idea of the universal optimum. The building was conceived as the 'construction of the future', but it quickly became outdated, not corresponding to society's changing needs, and not adaptable to functional or aesthetic expectations. The building's rigid construction creates clear tectonic and systemic barriers to transformations generated by new programs. The building itself seems to suggest it should remain an office building. And perhaps limiting the expectations to the profit could open up for other user groups, embracing the specific architectural appearance of the building.

Economy-thinking and Legislation Obstructs

It is evident how market thinking runs the development of buildings and tends to overrule other priorities. This creates 'safe', generic architectural results rather than unique, relevant, and intriguing ones. Also, it promotes demolition because the economic value of the site must be utilised to the maximum for the owner. However, this presents an obvious opportunity for regulations and requirements to support an alternative approach that favors building reuse, and by that limiting the costs, instead of hindering it. Life Cycle Assessment (LCA) legislation for new buildings in Denmark, which became a regulatory requirement on January 1st, 2023, is already affecting our mindset and design approach, signaling a shift toward more sustainable construction practices that could eventually rebalance these economic

priorities. These regulations have already been tightened by July 1st, 2025, demonstrating the increasing focus on environmental accountability.

Today's reality of existing buildings having to abide by legislation designed for new construction expands the scope of interventions and puts significant financial pressure on the project, and in many cases, making it unfeasible for the owner to preserve the building. This systemic problem becomes a barrier to the preservation and reuse of buildings in general. In the long term, one can expect that LCA demands will also extend to existing buildings, potentially creating new frameworks that better recognize the environmental benefits of building reuse and align economic incentives with sustainability goals.

Sufficiency Over Efficiency

When dealing with obsolete buildings like Nauticon that generally are in good condition, they should be adaptable to changing needs and present a fully attractive appearance for potential inhabitants. But how can buildings stay relevant and be saved from demolition? This perspective also points to how the buildings we construct today should incorporate a flexible design strategy to safeguard continuously use of resource and adaptation.

As such this article has addressed crucial issues on the topic of maintaining obsolete architecture specially concerning the relational and determining character of tectonics and program when transforming an existing building.

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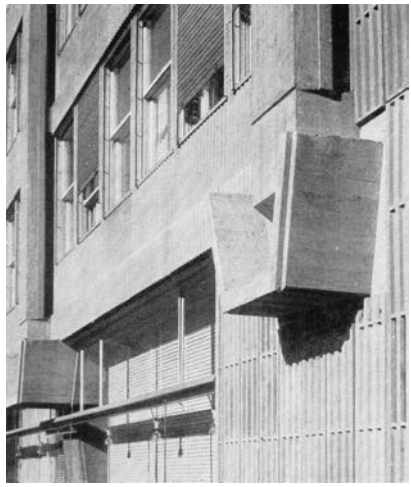
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Edvard Ravnikar
The search for Architectural Authenticity

Aleš Vodopivec





1





2

1 [ab] National Bank Celje, photo Dušan Škerlep

2 [ab] National Bank Kranj, photo Dušan Škerlep

1 Edo Ravnikar, "Dve podružnici Narodne banke SRS, Kranj in Celje", Sinteza 1 (1964): 27.

2 Ibid.

3 All Ravnikar citations not otherwise quoted are from his personal notes and diaries kept by his heirs.

4 Kenneth Frampton, "Towards a Critical Regionalism: Six Points for an Architecture of Resistance", in *Labour, Work and Architecture* by Kenneth Frampton (London, New York: Phaidon, 2002), 88 (first published in 1983).

> "Whereas man is by nature able to immediately understand how forces are transmitted in wood or stone, for example, and to a much lesser degree in roll-formed steel profiles, concrete with its hidden rebar core, an essential component of a structure, remains illegible to a lay person. Our aim was to make expressionless concrete comprehensible, so we had to … invest special effort into its design. And although this required much more intellectual work, we on the other hand gave (back) to architecture that source of design ingenuity that is inherent in the structural component of the architectural concept."[1]

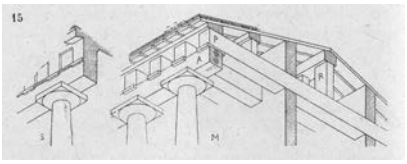
This brief explanation that the Slovene Architect Edvard Ravnikar (1907 – 1993) offered for his two buildings for the Celje and Kranj bank branches, completed in 1962, reveals that he considered the structural design, or more precisely the transmission of the force of gravity, as the essence of architecture, in both concept and form. He further explained that "in terms of the structural solution, both projects somehow ignore the principle of the shortest and the most direct force path to the ground, which in a routine, standard skeletal structure usually appears as an awkward forest of columns between two ceilings… In the case of the Celje branch, this can be seen in the harnessing system, where the upper lattice sits on a hefty beam above the ground floor, which in turn transfers loads onto two strong piers **[1ab]**; in the Kranj branch building, on the other hand, the same can be seen in the line of columns that moves from the plane of the exterior wall of the into the plane of the exterior walls of the upper **[2ab]**. In both cases, the solution reflects the functional need to provide a single unified space on the ground floor."[2]

As he wrote in his personal notebook, architecture is not "an aesthetic figment of imagination"[3], a result of an a priori image or an abstract artistic composition, but something entirely concrete and tangible. It is a result of the construction method, techniques and procedures used, its structural design, selected materials and their treatment, along with the underlying logic of the way the elements combine and connect—always hand in hand with its function—which for Ravnikar was a prerequisite of for good architecture. The idea that a "comprehensible" structure might give architecture back the "source of design ingenuity" can be read as Ravnikar's critique of modernist architecture, which he felt began to lose the foundation of its authenticity when it began to hide skeletal structures and other structural elements within a building's interior. Similarly, Kenneth Frampton in his seminal essay on critical regionalism pointed out two decades later that the primary principle of architectural autonomy resides in the tectonic rather than the scenographic.[4]











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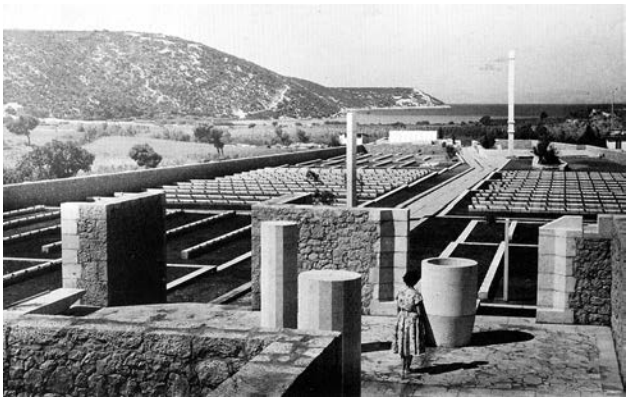
3 [a] The Municipality Building, Kranj, Miran Kambič
[b] The Municipality Building, under construction
[c] The Municipality Building, detail, photo Miran Kambič
[d] From Auguste Choisy. *Historie de l' architecture.* p. 280
[e] The Municipality Building, photo Janez Kališnik

5 Aleš Vodopivec, "Pogovor z Edvardom Ravnikarjem", Nova revija 35–36 (1985): 295
6 Ibid., 297
7 Edvard Ravnikar, "Razmišljanje ob Omahnovi knjigi", AB – Arhitektov bilten 30/31 (1976): 7.

In this sense, Ravnikar frequently stressed the importance of classical architecture and the universality of its discipline. In an interview in 1985, he explained that for him, the discipline of classical architecture was foundational if one wanted to "move towards the higher spheres of architectural knowledge[5] … An educated architect is an architect with classical education. There are no others… If we look back to the early modern, there's Paul Cezanne, and we know that after him, everything that Mondrian went on to create was in his shadow. And this means the geometrically ordered vision that derives from classicism."[6] According to Ravnikar the pioneers of modernism, Adolf Loos, Ludwig Mies van der Rohe, Walter Gropius, Alvar Aalto, and others, were in essence classicists, and even Le Corbusier "cannot be imagined without a very extensive and thorough knowledge of the laws and rules of the classical ideal, even though he employs them like a revolutionary, innovator, and avant-gardist."[7]

As demonstrated with his municipality building in Kranj (1960), Ravnikar's understanding of the classical discipline had nothing to do with traditionalism, but with the quest for an identity and authenticity in architecture **[3a]**. The photograph from the construction site reveals that when the reinforced concrete structure was completed, the building's exterior already began to reveal itself **[3b]**. The basic volume of the building is supported by mushroom columns on the ground floor, and the side walls. Hovering above the complex is a massive, tent-like gable roof in the form of a folded self-supporting slab. The weight of the roof is distributed lengthwise down two V-shaped supports onto four piers; two are visible on the main façade and mark the division into three halls on the upper floor. The ceiling structure of the halls is suspended from the exposed roof truss via steel rods, leaving the entire floor free of interior support columns. The only façade element—subsequently added—consists of large panoramic windows inserted between the structural elements, which gives the raised volume of the halls a sense of lightness, characteristic of modern architecture. The duality of lightness and weight is the common thread that runs through Ravnikar's architecture. The original, distinctly sculptural structure follows the straightforward logic of the transmission of forces, weight, and support. Its design dictates the proportions, the rhythm, and the scale of individual parts as well as of the whole of the building, which bears no historical motifs of classical architecture. All structural elements are designed in accordance with modernist principles and contemporary structural engineering practices. Ravnikar was clearly interested in the poetics of tectonic form. **[3cd]**

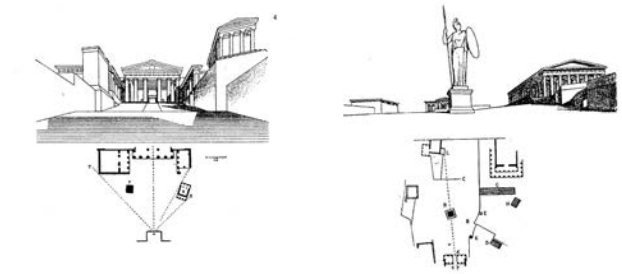
At the same time, the municipality building's modern design concept carries traces of vernacular architecture, which according to Ravnikar is elementary and as such "surprisingly close to what contemporary architecture is











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4 [a] The Rab Memorial Complex, Kampor, photo Vladimir Braco Mušič
[b] The Rab Memorial Complex, model
[cd] The Rab Memorial Complex, Kampor, photo Vladimir Braco Mušič
[ef] from Auguste Choisy. *Historie de l' architecture.* pp. 414- 415

8 Edo Ravnikar, "Sedem naglavnih grehov naše arhitekture", Sodobnost, 10 (1963): 924.

9 Edvard Ravnikar, "Zgradba Okrajnega ljudskega odbora v Kranju", *Arhitekt* 2 (1960): 17–18.

10 Nace Šumi, "Dve razstavi slovenske moderne arhitekture", Sinteza 10–11 (1968): 10; Stane Bernik. "Oris sodobne arhitekture v Kranju", Sinteza 17 (1970): 14

11 Thomas Stearns Eliot, "Tradition and Individual Talent", in *Selected Essays by T. S. Eliot* (New York: Harcourt, Brace and Comp., 1950), 4.

seeking to achieve."[8] In both buildings he recognized adherence to tectonics. Ravnikar did not look at local building traditions for formal models, but to find the relevance of traditional construction for the present day; he admired structural and spatial rationality and sincerity. The massive gable roof with exposed roof beams has long eaves to withstand the weather conditions. The building with its solid side walls stands firmly on the ground in keeping with the traditional construction practice. Ravnikar used local materials and introduced discreet, carefully thought-out details, characteristic of our built heritage, keeping the interior rational and simple. The result is a building that appears restrained in its setting, yet elegant and impressive. **[3e]**

Completely transformed historical elements and motifs, such as columns, walls, piers, and exposed roof trusses, as well as structural precepts, were designed in accordance with modernist principles. With his original interpretation of the fundamental principles of classical architecture combined with structural principles and spatial designs derived from the vernacular tradition, Ravnikar created a modern architecture with a unique cultural identity. In his words: "… at the core of it all is the hall with its interior visible from the square; the roof is accentuated the way one's good hat rounds off Sunday's best clothes, the front door is heavy, etc. – in short, practical, usable forms with a symbolic value."[9]

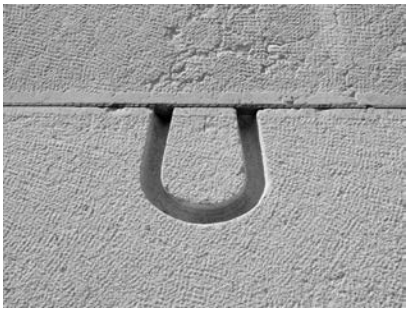
The building with its abstract, geometrically ordered exterior, free of ornamentation, is evidently modern, but at the same time strikingly classical, axially symmetrical, and tripartite. It is only the ground floor column on the axis of the building and the asymmetrically situated main entrance to the building that defy the principles of classical rigour. On the one hand, the strict symmetry of the façade can be interpreted as an original paraphrasing of the classical temple, and on the other of the most modest works of Slovenian vernacular architecture.

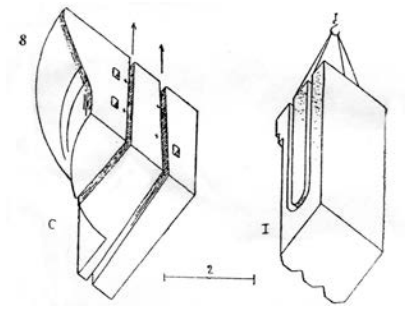
Soon after its completion, the municipality building in Kranj was hailed as the pinnacle of its time[10] and a unique milestone that showed a clear deflection from international canons, expressing instead the local tradition blended with the principles of modern architecture.

Ravnikar's understanding of architecture is an expression of the exceptional breadth of his intellectual horizons, and of his keen interest in history and tradition. Which is surprising, given a revolutionary time that did not look kindly on the past. His attitude towards tradition can be best described in the words of T. S. Eliot, who said that "the historical sense involves a perception, not only of the pastness of the past, but of its presence."[11] Like Eliot, Ravnikar maintained that "tradition is no sterile perseverance, but a certain nimble affinity that looks to the past, not for worn-out models, but for points of reference." Further, he noted that "tradition is an arrow pointing to the









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5 [a] The Rab Memorial Complex, Obelisk, photo Aleš Vodopivec
[b] The Rab Memorial Complex, Obelisk, photo Vladimir Braco Mušič
[c] The Rab Memorial Complex, Obelisk, photo Aleš Vodopivec
[d] From Auguste Choisy. *Historie de l' architecture.* p. 274

12 William J. R. Curtis. "Abstraction and Representation / The Memorial Complex at Kampor, on the Island of Rab (1952–3) by Edvard Ravnikar", in *Architect Edvard Ravnikar, Memorial Complex on the Island of Rab, 1953*, edited by Miha Dešman (Ljubljana: catalogue of Slovenia's exhibition at the 9th International Architectural Exhibition in Venice, 2004), 19.

13 Edo Ravnikar, "Spomenik NOB na Rabu", Arhitekt 11 (1954): 14–15.

14 Auguste Choisy. *Historie de l' architecture* (Paris: Librairie Georges Baranger, 1929), 414¬15.

15 Le Corbusier, *Vers une architecture* (Paris: Les éditions G. Crès, 1924), 151.

16 Choisy, p.274.

future … … Architectural thought needs to acknowledge tradition, something that was here before, but through its own eyes."

Similarly, William Curtis in his analysis of Ravnikar's Memorial Complex at Kampor on the island of Rab observed that "Ravnikar distilled and transformed an ancient ruin then recast it in terms of modern architecture."[12] Completed in 1953 to mark the tenth anniversary of the liberation of the Italian concentration camp, the cemetery was designed as a monumental contemplative route with architectural elements including platforms, building volumes, columns, walls, and openings, where carefully controlled views of balanced spatial compositions open up to the visitor via key vantage points **[4ab]** . Ravnikar noted that it was his intention to "translate architectonic qualities from decorative and structural elements to optical ones. The colour contrasts offered by the stone, the surrounding greenery and the blue of the sea, the relationships between the verticals of the architecture and the horizontals of the sea combined with composed views that connect the existing landscape elements with new ones, are the key means the architect uses to manipulate the observer."[13] He looked to ancient Greek architecture for a model, in particular to the design of building masses in the Acropolis of Athens and the Propylaeum in view of carefully framed vistas from vantage points on the procession route **[4cd]**. The method was introduced by Auguste Choisy in his *book Histoire de l'architecture* (1899)[14] **[4ef]**, and was referenced also by Le Corbusier in his seminal work *Vers une architecture*.[15]

The use of local stone, too, pays *homage* to classical architecture. It is a lesson in stone construction, in how stone blocks are stacked, arranged, and held in place. The tallest structure, a 12-metre-tall obelisk is composed of heavy stone blocks stacked one on top of the other using only lead joints held together by steel cables within. These emerge in a gutter-shaped form on the top of the obelisk, which appears heavy, yet light and slender **[5a]**.

The weight of the obelisk is additionally emphasised by a carved out groove for hoisting ropes **[5bcd]**. The motif, also featured in Choisy's book, is known from the temple of Agrigento. [16] Given the limited resources and the construction technology available in former Yugoslavia, the most likely method of lifting stone blocks on Rab was with a pulley system, similar to those used already by the ancient Greeks.

The central architectural accent of the complex, the building of the so-called "museum", is built in a similar fashion **[6ab]**. A simple curved shelter is composed of strong primary stone ribs visible both on the exterior and interior sides, and secondary infills in the form of thinner stone facets clipped together with lead clamps. The lateral stability of the vaulted structure is ensured by three steel cables, their ends exposed and covered by stone caps where they protrude at both ends of the ribs of the parabolic curve.











17 Curtis, p. 27.
18 Ibid.

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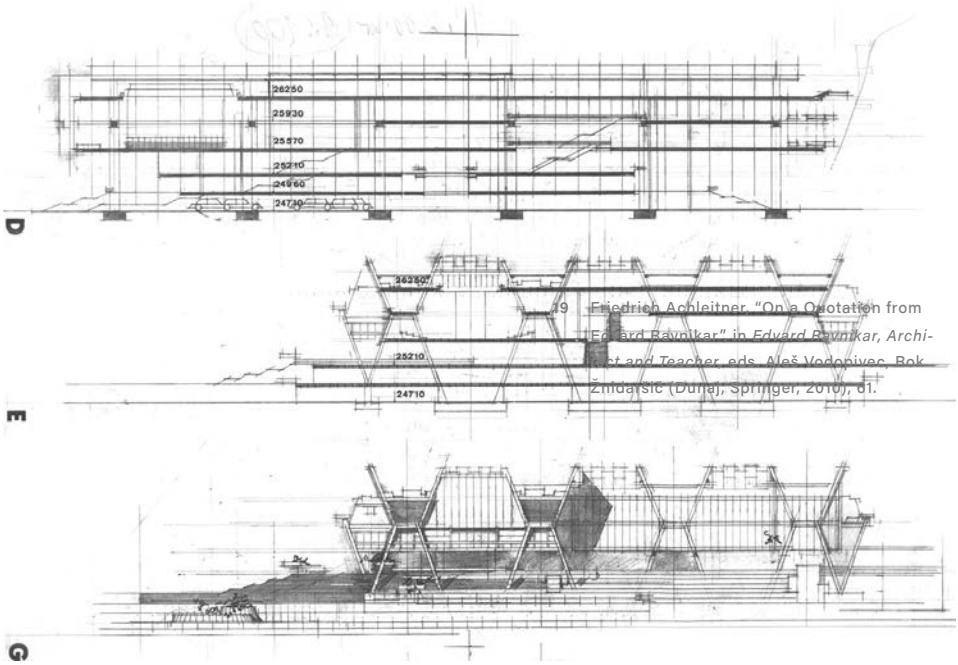
6 [a] The Rab Memorial Complex, Museum, photo Vladimir Braco Mušič
[b] The Rab Memorial Complex, Museum, photo Miran Kambič
[cd] The Rab Memorial Complex, Museum, photo Aleš Vodopivec
[e] The Rab Memorial Complex, Museum, photo Vladimir Braco Mušič

Again, we see a distinctly dual character of a stone structure that is heavy, yet seems to float, lifted off the ground and supported only by four 'legs' to allow daylight to flood the inside of the vault from beneath. **[6cd]**

With its timeless poetics, the memorial complex on Rab exudes restrained monumentality free of ideological connotations. William Curtis observes that Ravnikar inherited the "desire to transform the past and to fuse the forms of diverse civilizations in a new symbolic language"[17] from his teacher Jože Plečnik. "At Rab, Ravnikar uses 'basic elements' in a way that oscillates continually between common, vernacular usage, and monumental form. Great attention is given to joints, textures, and contrasts of stone finishes."[18]

In the 1960s, Ravnikar put forward a series of competition projects that stand out with their exceptionally bold and expressive structural designs: the winning design for the Skopje Town Hall (1967) **[7]**, the design for the Central Committee Building of the Communist Party of Macedonia (1966), the proposal for the international competition for the new city centre of Espoo, Finland (1968), and others, which regrettably were never realized.

His built projects, however, also show a distinctly sculptural structure that complies with the elementary logic of the difference between supporting and supported parts of a building, something that was obvious already with both aforenoted bank branches. While all Ravnikar's realizations are unequivocally modern, they are also classically tripartite with an accentuated ground floor structure that supports a lighter body of the upper floors and is completed on the top with a cornice. Typically, the ground floor has accentuated structural elements, massive columns that are often reinforced by mushroom heads to tackle large spans; these carry massive horizontal, usually V-shaped beams that support the lighter volume of the upper floors clad in the façade envelope, or coat. As a rule, the ground floor is glazed across the perimeter, but it is the materials and finishes on the façade envelope that reveal the function of a building. Contrary to modernist principles, the top floor is completed with a cornice as a vertical conclusion of the building, which only grows more distinctive with time until it takes on the role of the traditional eaves. Ravnikar frequently stressed the importance of eaves in our climate, namely because they protect the façade from the elements. On occasion a lighter structure appears on a flat roof as a very free interpretation of the traditional roof; this is often the most dynamically shaped element of a building. The exception is the roof over the bank branch in the old town of Celje, where to ensure consistency of the built fabric the modern building received a gable roof that follows the ridges of the historic buildings on the main square.



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19 Friedrich Achleitner, "On a Quotation from Edvard Ravnikar" in *Edvard Ravnikar, Architect and Teacher*, eds. Aleš Vodopivec, Bok Žnidaršič (Duna), Springer, 2010), 61.

7 The Skopje Town Hall, competition project

8 [ab] Ljudska pravica Print Works, photo Janez Kališnik

In the decades following WWII, the domestic construction industry was in poor health and with its lack of economic strength the country did not have access to the construction products available in more advanced countries. Such limitations forced architects to seek unconventional solutions, and sparked innovations unknown in more developed countries. At the time, every detail, every façade element, window frame, doorpost, door handle and such was an unequalled invention that Slovenian architecture had not seen before. This explains Ravnikar's claim that architecture is the domain of underdeveloped countries[19], and as for himself, he noted that "I still design as I did under Plečnik: a concept and separate designs for the important parts: the façade, foyers, stairways, doors, windows etc. My aim is to pay equal attention across the board to give the building a structure that would evolve naturally to the last detail."

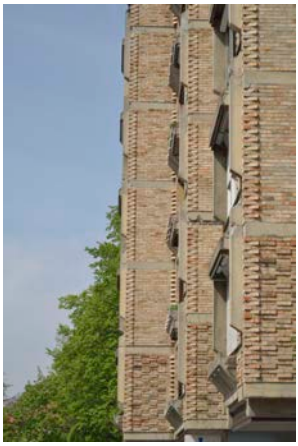
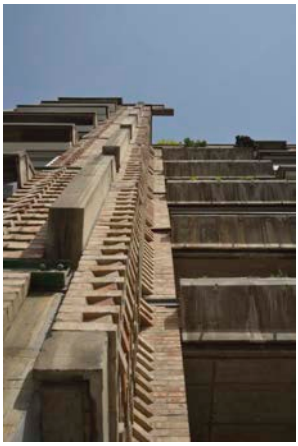
Ravnikar worked with technology that was modern but suited to his circumstances and context. He tested the properties and capacities of domestic building materials and explored different possibilities for the industrial treatment of traditional materials. He demonstrated the endless possibilities of using face bricks, prefabricated concrete panels, thin stone veneer, Corten steel, plastic, etc. Gradually, he abandoned the craft-based approach to building, even when he used traditional, local materials. He shaped, arranged and connected them in an entirely modern, more industrial-like manner, with accentuated edges, and exposed joints and fasteners. In this manner he articulated the exterior, and analogously, with cladding, also the interior of his buildings. The result was architecture distinctive for its striking complexity and unique poetical presence.

Ravnikar was excited about contemporary structural possibilities, but he also left his signature with a distinctive façade envelope. His work thus embodies a characteristic duality, or rather a synthesis of Plečnik's take on Gottfried Semper's theory of dressing (Bekleidungstheorie) on the one hand, and on the other the Anglo-French tradition, which focuses in the first place on the authenticity of the building material and the authority of the structure, something that was distinctive of work in Le Corbusier's studio, where Ravnikar spent several months before the outbreak of WWII.

While in his early works the façade cladding is still relatively strict, geometrically ordered, and two-dimensional, he gradually developed an increasingly sculptural approach when he began to accentuate how façade elements were combined and fastened. The front façades of office storeys on the Ljudska Pravica Office and Printworks building (1961), for example **[8a]**, are designed as alternating horizontal bands of plastic parapets and windows in exceptionally thin profiles, all of them on the same plane, with fasteners hidden out of sight **[8b]**. The exterior with its steady façade rhythm reveals the





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9 [abcdef] Ferant Garden Residential Complex, Ljubljana, photo Miran Kambič

10 [abc] Hotel Creina, Kranj, photo Damjan Gale

interior design concept, the distribution of offices of different sizes across floors.

The underlying logic of the brick façades for the Ferant Garden residential complex (1967–73) is that of the load-bearing skeleton and infills, i.e. the contrast between structural elements in exposed concrete and the façade brick cladding that envelops the building like a fabric, or a coat **[9abc]**. The façades are divided into storey-height strips marked by visible edges of horizontal, reinforced concrete slabs. While the concrete structure with its many brackets, balconies, piers, bay windows, built-in planters and cornices that extend far beyond the buildings adds to the sculptural presence of the building volume, the vertical connections, edges, and corners of the brick cladding on the storeys serve as decorative accents, hems in the form of elaborately shifted bricks that articulate the textile metaphor of the building's dress **[9def]**. A similar façade treatment was used also for Kranj's Hotel Creina (1970) **[10abc]**.

Folds in the façade envelope give depth to the architecture, the third dimension that is additionally emphasised by the interplay of light and shadow. This quality comes to the fore in the Republic Square complex (originally Revolution Square), where the textile metaphors are so explicit that they evoke pleated draperies **[11abc]**. The stone slabs of the façade protrude from the building like shades, forming oriels by the windows and where the light pauses, thus articulating the horizontal and vertical division of the façades. There is no contact where they cross paths; they often change direction, angle, and plane, as a rule reaching across corners as well as across contacts with the load-bearing structure. Despite its weight, the granite cladding appears light against the cast concrete of the supporting structure; this is additionally underlined by visible edges that reveal the thinness of the slabs. Unlike in his earlier works, where Ravnikar hid façade fasteners, the Republic Square buildings bare their façade fasteners open, showing them off like a unique architectural ornament – or stiches on a dress. The substructure also peeks out here and there, additionally enhancing the lightness of the façade envelope. **[11de]**

The construction of the Republic Square complex took more than two decades (1960–82). The political and economic crisis at the time meant that new investors took over the project and introduced new programmes. Instead of the planned political centre of the country, the complex became the city's commercial and cultural centre. This meant extensive changes to the original urban and architectural concept: both towers were lowered to half the envisaged height and received instead an articulated façade and dynamic finishes on the top, which together with the ground floor extensions contributes to the rich tapestry of the complex. **[11f]** Ravnikar tried to keep pace with



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11 [a] The Republic Square complex, photo Damjan Gale
[b] The Republic Square complex, photo Miran Kambič
[cde] The Republic Square complex, photo Damjan Gale
[f] The Republic Square complex, photo Miran Kambič

20 Edo Ravnikar, "Trg revolucije", Sinteza 30, 31, 32 (1974): 82.

always new programmatic and investment initiatives with a so-called "open design process", something he had not done before: "for years now, it has been clear that it is impossible to achieve the goals and satisfy the complex needs of today by 'designing every detail down to the last screw'. There is another way, where we have to keep in mind the fickleness of future situations, the always new constellation of partners, and shifting financial and technological capacities without losing control of the flow of events, so that we can ensure that our intentions grow into a reality."[20]

The most notable figure of the Ljubljana school of architecture after Jože Plečnik, Ravnikar was a charismatic teacher who left a profound mark on generations of architects with his projects, writings, and pedagogical work. It was largely owing to him that a special, regionally adapted modernist architecture began to emerge in Slovenia after the end of WWII. At the time when local characteristics of the built environment were already beginning to disappear across the world and when other Yugoslav republics embraced international modernism, Ravnikar advocated for architecture with a culturally specific character. He built the authenticity of Slovenian architecture on the foundations of tectonic principles of classical and vernacular architecture, as a dialogue between modernism and tradition, the universal and the local.

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Frank Lloyd Wright and the Nature of Concrete

Robert McCarter

1 Horatio Greenough, “Form and Function” (1852), reprinted in *Roots of Contemporary Architecture*, ed. Lewis Mumford (New York: Dover, 1972), p.33.

2 Louis Sullivan, “Characteristics and Tendencies of American Architecture” (1885) reprinted in *Kindergarten Chats and Other Writings* (New York: Dover, 1979), p.177.

3 Ibid., p179.

Critical events in architectural history are most often scripted in stylistic or purely formal terms. Yet for architects practicing in America in the latter decades of the 19th century, another definition of the discipline of architecture was foremost in their minds—a definition much less concerned with fashion and form, and much more concerned with the tradition of building and the making of places. To understand the work of Frank Lloyd Wright, I believe we must better understand this tradition in which he began his life work. The tradition of building, largely lost today in America, is concerned not with what a building looks like, but with how it is built and how this affects what is experienced.

Horatio Greenough, American transcendentalist philosopher, defined what he first called "organic architecture" in his influential 1852 essay entitled "Form and Function," written 15 years before Wright's birth. He also issued a challenge that was later taken up Sullivan and Wright: *"The mind of our country has never been seriously applied to the subject of building… We have been content to receive our notions of architecture as we have received the fashions of our garments and the forms of our entertainments, from Europe."*[1] Please note Greenough's use of terms such as "fashions," "forms," and "entertainment" to describe what is not involved in "the subject of building."

Louis Sullivan, from whom Wright received his training in architecture, keenly felt *"the absence of a style, distinctly American,"* yet warned against efforts to speed its arrival by *"grafting or transplanting"* historical styles from other cultures onto the American continent.[2] In this same article, written and delivered as a speech in 1885 (two years before Wright first arrived in Chicago), Sullivan characterized architectural education of his day, dominated by the Ecole des Beaux Arts, as not cultivating either the common sense of analytical thinking or the individual insight of each student. Rather, architectural education promoted the classical styles as fashionable form, not as a part of the tradition of building.

Sullivan characterized the teaching in American architecture schools as being *"dependent upon the verbal explanation and comment of its exponents. A knowledge of their vocabulary is often of assistance in disclosing softness and refinement in many primitive expedients, and revealing beauty in barren places. Familiarity with the phraseology of the applied arts is also useful in assisting the student to a comprehension of many things apparently incomprehensible. Metaphor and simile are rampant in this connection, a well-chosen word often serving to justify an architectural absurdity."*[3]

I should point out that this scathing criticism is equally applicable to much contemporary architectural education and design; that it is a frighteningly accurate description of recently fashionable forms documented and disseminated in the architectural media; and that it reminds us how, to this

4 Otto Graf, "The Art of the Square," *Frank Lloyd Wright: A Primer on Architectural Principles*, ed. Robert McCarter (New York: Princeton Architectural Press, 1989), p.219.

day, we Americans are still prone to believe that form alone is sufficient. And for this reason, I believe Frank Lloyd Wright's effort to arrive at an American architecture by different route, one altogether opposed to the trading in styles, forms and fashions, has important implications for architectural education and practice today.

What tradition, other than this still-dominant American obsession with form alone, did Wright engage in his search for an appropriate American architecture?—the tradition of building, for which Greenough had first called in 1852. Here it is important to remember that Wright's training to be an architect was not the academic training of the Ecole des Beaux Arts, but rather was apprenticeship training, largely in the office of Adler and Sullivan, and quite literally "on the job." This apprenticeship method of becoming an architect derived from the medieval guild tradition of craft training, which until only little more than 100 years ago was the only way one could become an architect.

Apprenticeship training in the craft of architecture, being literally "hands-on," required learning by making, and is in many ways the exact opposite of the distanced, objective methods of knowing architecture later developed in the American university. Based upon formal comparisons and universal systems of both signification and construction, academic training has in this century redefined the relation between students and their designs, resulting in an ever-increasing separation from the tradition of practice.

Today I would argue that this tradition of practice, of learning to be an architect by (as Greenough said) seriously applying one's mind to "the subject of building," has for all intents and purposes ceased to exist in American schools of architecture, and that is has therefore inevitably vanished from our professional practices, which are today made up entirely of architecture school graduates.

Due to this blind spot on our part, in order to discern the Frank Lloyd Wright whom Otto Graf has called the *"most traditional architect,"*[4] and the manner in which Wright's work exemplifies and extends the tradition of building into our time, we must look very carefully at aspects of Wright's work that have either been ignored altogether or "interpreted" into the dominant formal and stylistic logic that rules the discipline of architectural history.

While the field of architectural history has from its beginning (at the same moment as the founding of the Ecole des Beaux-Arts) been dominated by those trained in the formal and stylistic mechanisms of art history, the practicing profession has increasingly been effected by the writings of those trained as architects in the tradition of building—among whom I would note Reyner Banham, Aldo Van Eyck, Alvar Aalto, Louis Kahn, Jorn Utzon, Aldo



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5 Kenneth Frampton, *Studies in Tectonic Culture* (Cambridge, MA: MIT Press, 1995).

6 Louis Sullivan, "What is Just Subordination, in Architectural Detail, of Details to Mass?" reprinted in *Kindergarten Chats*, op. cit., p.182.

7 Henry Russell Hitchcock, *In the Nature of Materials* (New York: Hawthorn, 1942). Title given by Wright, who provided materials and guidance to Hitchcock in this first "authorized" monograph.

8 Frank Lloyd Wright, "The Princeton Lectures" (1930), *The Future of Architecture* (New York: Horizon, 1963), p.162.

1 Construction test of reinforced concrete "petal" column, Johnson Wax Building, Racine, Wisconsin, 1936, Frank Lloyd Wright, architect. Wright appears at right. Photo copyright FLW Archives.

Rossi, Vittorio Gregotti, Alvaro Siza, Colin St. John Wilson, David Chipperfield, and Juhani Pallasmaa.

Above all I would point to the enormous recent influence on practitioners of the writings of Kenneth Frampton, whose 1995 *Studies in Tectonic Culture* constitutes an entire "other" or alternative, making-based history of architecture, one based neither on stylistic definitions and symbolic interpretations, nor on the formal concerns of the theorist or historian, but instead on the tradition of building, the poetics of construction, and the matters of making with which architecture as a métier is inextricably intertwined in its practice in the lifeworld. [5]

In 1887, the year Wright arrived in Chicago at age 20, Sullivan gave a public lecture in which he defined—in terms strikingly similar to Frampton's "tectonic culture" and "critical regionalism"—what was needed for the development of an appropriate American architecture. According to Sullivan, such an architecture would only develop on a regional basis, with variations dependent not upon stylistic or formal preconceptions, but rather due to the influence of local climate, topography, available construction materials and methods of building. [6] Sullivan summarized this as a well-trained *"curiosity with regard to what may be done,"* and the young Wright took this definition as his personal charge.

Throughout his life as an architect, Frank Lloyd Wright attempted to relate the spaces and forms of his designs to the structures and materials with which they were made—as he said, he worked *"in the nature of materials."* [7] Wright believed this was essential if his buildings were to be edifying for those who inhabited them. *Aedificare*, the ancient word for building, means both to edify, to instruct, and to build, to construct—and both understood to be undertaken with ethical intention.

Wright engaged in a constant search for a comprehensive order that would encompass both composition and construction, an order similar to the fusion of structure, material, form and function that he had found in his studies of nature. Wright attempted to develop forms from the rhythm inherent in each particular system of construction he employed, so that the construction might in turn be integrated with and responsive to the spatial idea —achieving what he termed "simplicity:" *"There is only one way to get that simplicity. And that way is, on principle, by way of construction developed as architecture."* [8] **[1]**

Essential to Wright's architecture was his understanding that the way a space is made or constructed is directly related to the way it is experienced. Thus for Wright, construction was never simply a means to some end; it was an essential part of the final experience of life that took place within, and thus was required to be fully integrated in the process of design.

9 Frank Lloyd Wright, (1929), *Writings and Buildings*, ed. E. Kaufmann and B. Raeburn (New York: New American Library, 1960), p.101.

10 Frank Lloyd Wright, "The Life-Work of American Architect Frank Lloyd Wright" *Wendigen* (1925; reprint, New York: Horizon, 1965), p.57.

11 Frank Lloyd Wright, *An Autobiography* (New York: Horizon, 1932), p.270.

12 Walt Whitman, *Leaves of Grass* (1892; reprint, New York: Library of America, 1982), p.559.

13 David van Zanten, "Schooling the Prairie School," *The Nature of Frank Lloyd Wright*, ed. Bolon, et. al., (Chicago: Chicago University Press, 1988), p. 71.

From the very beginning of his career, Wright utilized what he called *"the unit system"* of square-grid planning, a *"highly developed expression of structure"* which provided the *"sympathetic frame for the life going on within."* [9] The square grid or unit system that underlay all of Wright's designs operated as both an essential compositional and scaling device, and as a measure and organizational method for construction—the formal and economic control required to achieve integral order and organic rhythm.

Early examples of this would include the wood board and batten houses of the Prairie Period, such as the Walter Gerts Cottage, Whitehall, Michigan, of 1902, where the plan is rigorously structured on a 2 foot square construction grid, and the elevations are structured on a 1 foot (board) and 1 inch (batten) horizontal grid. Less obvious is the square structural plan grid of balloon frame wood studs underlying the plastered facades of the Ward Willits House, Highland Park, Illinois, of 1901, where the 3 foot, 3 inch grid is revealed only in the banks of glass window and doors. As with most of Wright's larger houses of this period, the Willits House also has hidden steel beams at the first floor and roof, allowing their generous flow of spaces.

As Wright put it: *"All the buildings I have ever built, large and small, are fabricated upon a unit system—as the pile of a rug is stitched into the warp. Thus each structure is an ordered fabric. Rhythm, consistent scale of parts, and the economy of construction are greatly facilitated by this simple expedient—a mechanical one absorbed in the final result to which it has given more consistent texture."* [10] While it is typical to relate architecture first to sculpture among the other arts, it is of the utmost importance to note that Wright refers to himself not as a sculptor, but as *"the weaver."* [11]

Wright engaged geometry for both its poetic and practical capacities. In describing the square geometry underlying Unity Temple, Wright quoted Walt Whitman:

> *"Chanting the square deific,*
> *out of the One advancing, out of the sides,*
> *Out of the old and the new,*
> *out of the square entirely divine,*
> *Solid, four-sided, all sides needed"* [12]

Yet in his integrated design process, Wright employed the very same geometry in the most practical manner; as David van Zanten has noted, in the Chicago School in which Wright had apprenticed, *"the foremost issue was always how one put things together,"* and Wright's *"geometric purity was a means to expedite assembly, achieving a kind of mechanical self-generation in architectural composition."* [13]



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14 Frank Lloyd Wright, *An American Architecture* (New York: Horizon, 1955), p.84.

2 Robie House, Chicago, Illinois, 1908, Frank Lloyd Wright, architect. Photograph by author.

3 Interior of Larkin Building, Buffalo, New York, 1903, Frank Lloyd Wright, architect. Photo copyright FLW Archives.

Therefore, for Wright, the nature of architecture was closely related to the nature of its construction, and the nature of its materials. But we need to take care not to impose our own contemporary interpretations on Wright. Louis Kahn, in so many ways Wright's best disciple, was most definitely not in this case. Kahn called for the exposure of structure in buildings as an ethical imperative—concealing structure was, for Kahn, absolutely wrong. The hidden steel beams in the extraordinary roof cantilevers and brick balcony of Wright's 1909 Robie House would fail Kahn's test. Yet Wright received and addressed this same criticism in his own time: "*Why should you always expose structure? I call it indecent exposure.*" [14] **[2]**

Wright's understanding of "the nature of materials" was determined by the task at hand, rather than any rationale arising from outside the work. For Wright, materials and construction were to be ordered and detailed to characterize the spatial experience of inhabitation, and "the nature of materials" was profoundly inflected by the overall spatial and experiential intention of the design. Like geometry, for Wright, materials played their part in a design process that brought the poetic (sacred) and the practical (mundane) together without contradiction, creating a work that operated on several levels simultaneously to enrich the experience in a way that any single interpretation alone could not.

It is important to note that Wright most typically engaged materials—including concrete—in hybrid systems of construction, employing two or more structural materials in any design. To conclude the example of the Robie House, Chicago, Illinois, 1909, I would point out how the steel that frames all the horizontal planes is never exposed; it is revealed through the spatial freedom it allows the inhabitants. Other examples from this period would include the two great hybrid constructions in Buffalo, New York, the Larkin Building of 1903, and the Darwin Martin House of 1904. The Larkin Building has interior columns of steel, clad in brick, and exterior columns of load-bearing brick, with cast concrete floors supported on steel beams, clad in cement plaster. The Martin House has load-bearing brick piers supporting steel beams, clad in cement plaster, and reinforced concrete lintel-beams, which in turn carry reinforced concrete floors. **[3]**

Yet the structural steel that made Wright's open, flowing spaces possible was never revealed to the eye—it could only be sensed as a fully integrated part of the larger experience. And while I have noted the differences in interpretation between Wright and Kahn on the issue of exposing structure, I should also point out that these great Prairie Period works of Wright's are experienced as places made of masonry and concrete—exactly the materials Kahn, at the age of 50, chose to engage exclusively in his architecture. Kahn's decision to abandon lightweight steel, and to employ only heavy concrete and

15 Frank Lloyd Wright, "The Village Bank Series," *Frank Lloyd Wright, Collected Writings*, 1894–1930, ed., B. B. Pfeiffer (New York: Rizzoli, 1992), p.72.

masonry, marked his emergence as a great architect, for all of his now-famous buildings came after this decision as to the nature of materials—a nature discovered by Kahn in the early works of Frank Lloyd Wright, and most tellingly in Unity Temple.

After this extended preamble, we now arrive to the topic of this essay: Frank Lloyd Wright and the nature of concrete. Why concrete? Wright considered reinforced concrete to be the one truly modern material—"modern" for Wright because concrete was entirely "plastic," able to be formed into any conceivable shape, fully fireproof and self-supporting. Reinforced concrete was also the construction material with which Wright had both his greatest difficulties and his greatest successes. An examination of Wright's efforts to appropriately employ reinforced concrete also illustrates the tradition of building as Wright redefined it in the 20th century.

Wright's Unity Temple is often cited as the first exposed concrete public building in the US, but technically this is not correct. More than 20 years before, Carrere and Hastings, along with their young on-site project architect Bernard Maybeck, built two extraordinary hotels in Saint Augustine, Florida for the railroad tycoon Henry Flagler; the Ponce de Leon and Alcazar Hotels of 1885. However, Wright's Unity Temple may rightly be considered the first exposed reinforced concrete public building in the US, for the Florida hotels were built of unreinforced mass concrete, the only steel being railroad ties cast in place over the window openings.

While he has often been reputed to be "ahead of his time," in both spatial composition and building construction, the fact is that Wright was rarely "the first" architect to engage any particular material or method of construction. What makes Wright's work an important precedent was his astonishing ability to discover new spatial and experiential potentialities in every material he engaged.

What is apparently Wright's first design to exclusively employ reinforced concrete was the Monolithic Concrete Bank project of 1894, ironically published in *Brickbuilder* magazine. This project, though small, could not be more monumental—its façade was directly related to Egyptian temple fronts, and its piers emerged from the wall *"in eminently plastic fashion,"* as Wright said.[15] Designed one year after Wright left the Sullivan office, the whole has a singularity of space, born of the fusion of form, structure, and material that is exactly the opposite of the Chicago steel frame skyscraper.

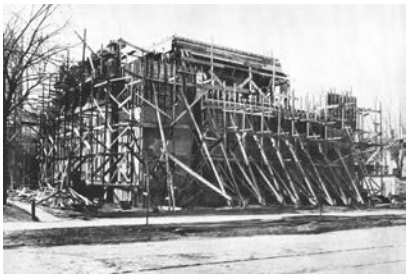
In Unity Temple, designed in late 1905 and completed construction in 1908 in Oak Park, Illinois, Wright employed reinforced concrete, inside and out, because of the manner in which its monolithic, homogenous nature matched the program of Unitarian worship. The uniquely synthetic conception of unity—the fusion of space, material and experience—which Wright



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4 Interior of Unity Temple, Oak Park, Illinois, 1906, Frank Lloyd Wright, architect. Photograph by author.

5 Exterior of Unity Temple, Oak Park, Illinois, 1906, Frank Lloyd Wright, architect. Period photograph from 1908, copyright by FLW Archives.

6 Construction photograph, late 1907, Unity Temple, Frank Lloyd Wright, architect. Photo copyright FLW Archives.

16 Wright, *An Autobiography*, op. cit., p. 212–213.
17 Ibid.

sought to embody in Unity Temple, required a similar fusion in its material: *"there was only one material to choose…concrete."* Reinforced concrete would be used throughout, for both vertical and horizontal surfaces and structures, *"nothing else if the building was to be thoroughbred, meaning built in character out of one material."*[16] **[4]**

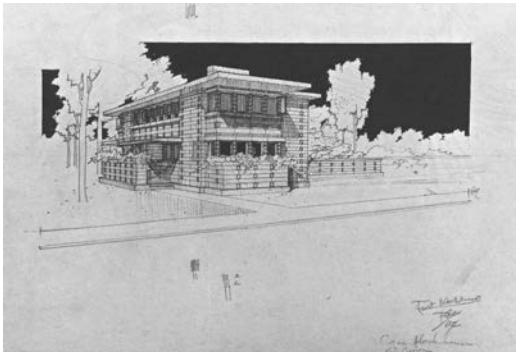
Intending a fusion of construction and composition, Wright wrote: "*Why not make the wooden boxes or forms so that the concrete could be cast in them as separate blocks and masses grouped about an interior space in some such way as to preserve this desired sense of the interior space in the appearance of the whole building. And the block-masses would be left as themselves with no facing. That would be cheap and permanent…" "Too monumental, all this? It would be nobly simple. The wooden forms or molds in which the concrete must at that time be cast were always the chief item of expense, so to repeat the use of a simple form as often as possible was necessary. Therefore a building, all four sides alike, looked like the thing. This, in simplest terms, meant a building square in plan. That would make their temple a cube—a noble form.*" [17] For Wright, there was no contradiction in noting in the same phrase both the poetic ("noble" and "permanent") and practical (reuse of "a single form as often as possible" so as to be "cheap") characteristics of concrete as a construction material. **[5]**

Wright cast the concrete in repeating formwork so that the 7 foot module of the square plan grid would be expressed in the "separate blocks and masses" of the finished building. Period photographs also reveal the fine horizontal texture that the wooden board forms originally imprinted on the surface of the concrete, leading some publications whose writers did not visit the building in person, but only saw photographs, to claim that Unity Temple was constructed of brick. In these ways we see how Unity Temple was both conceived and constructed as a woven fabric, "fabricated upon a unit system."

Here we might note, in the construction sequence of Unity Temple as documented in the period photograph taken in early 1907, the interesting premonition of Wright's Guggenheim Museum. Only one set of wood formwork was made for each of the four sides of Unity Temple, with the wall being cast first; the wall forms being moved around to the next side and the column forms being set up on top of the completed wall; the column forms being moved around to the next side and the roof forms being set up on top of the completed columns; and so on until the cubic volume of Unity Temple had been completed. I have described an upward spiraling sequence of construction—a sequence Wright reinterpreted fifty years later in the Guggenheim's upward spiraling sequence of movement in space. **[6]**



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7 Interior of Unity Temple, Frank Lloyd Wright, architect. Photograph by author.

8 Harry Brown House project, 1906, Frank Lloyd Wright, architect. Drawing copyright FLW Archives.

18 Rodney Johonnot, *Oak Leaves* (Oak Park: Unitarian Church, 24 February 1906), p.3.

19 Jenkin Lloyd Jones, *Unity* LXIV (Chicago: Unitarian Church, 30 September 1909), p.484.

20 Frank Lloyd Wright, "In the Cause of Architecture" (1908, *The Architectural Record*), reprinted *In the Cause of Architecture* (New York: Architectural Record Books, 1975), p.63.

Reinforced concrete's attributes appealed to Wright's client, the Reverend Rodney Johonnot, who wrote that the concrete of Unity Temple was to be *"poured and stamped in forms, making a structural monolith of the whole, thus in another way, typifying unity."* [18] Wright's uncle, the reverend Jenkin Lloyd Jones, the leading Unitarian in Chicago, praised Unity Temple as *"one solid monolith. It is not only built on a rock but it is a rock-built church."* [19] In this way, concrete allowed Wright to achieve both the most modern integrated construction and the most ancient sacred foundation.

Even Wright, perhaps the most gifted maker of form in modern times, was unable to foresee completely the liberative spatial potential of monolithic reinforced concrete construction. As can be seen in the difference between the final construction drawings and the building as realized, Wright's conception of the interior wood trim details of Unity Temple changed—from "framing" edges and corners to "folding" across and around them—remarkably late, in fact only occurring during construction itself. Today this "folding" effect is so important to our experience of Unity Temple that we can hardly imagine it was not part of Wright's original conception. Yet this is one of numerous examples of Wright continuing to design during construction, in this case seeking a way to express the almost limitless potential of reinforced concrete to shape space. **[7]**

Having achieved such a perfect synthesis in Unity Temple, it is interesting to note that Wright remained critical of concrete as a building material. While the walls of Unity Temple were cast in repetitively-used wooden forms, Wright noted the inherent lack of constructive order or "unit system" in cast-in-place concrete, and sought a more direct revelation of the construction module and the rhythm of the (necessarily) hidden steel reinforcing bars—the internal balance between the tensile (steel) and the compressive (concrete) components.

It is hardly coincidental that in 1906, the same year that construction began on Unity Temple, Wright designed the Harry Brown House project, which he would later title "the first block house"—the concrete block system of construction appears here fully articulated. In 1908, as Unity Temple was being completed, Wright wrote: *"As for the future—the work shall grow more truly simple; more expressive with fewer lines, fewer forms; more articulate with less labor; more plastic; more fluent, although more coherent; more organic. It shall grow not only to fit more perfectly the methods and processes that are called upon to produce it, but shall further find whatever is lovely or of good repute in method or process, and idealize it."* [20] **[8]**

Before Wright was able to employ his concrete block system, he would return to employing concrete in hybrid construction systems, in such buildings as the Midway Gardens, Chicago, Illinois of 1913, which had reinforced



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21 Ibid., p.201.

22 Wright, *An Autobiography*, op. cit., p.265.

9 Exterior of Midway Gardens, Chicago, Illinois, 1913, Frank Lloyd Wright, architect. Photo copyright FLW Archives.

10 Interior of Millard House, "La Miniatura," Los Angeles, California, 1923, Frank Lloyd Wright, architect. Photo by author.

concrete cast into hollow brick and concrete masonry piers and walls, reinforced concrete floors, and concealed steel trusses spanning the largest interior volume, the Winter Garden. At the Midway Gardens we also find Wright's first extensive use of patterned precast concrete masonry blocks. The Imperial Hotel, Tokyo, Japan, of 1917–21 employed reinforced concrete cast into hollow cut stone and brick walls, with reinforced concrete floors and beams. **[9]**

Yet Wright yearned to again engage reinforced concrete as a monolithic material. He employed reinforced concrete in the 1910 Universal Portland Cement Exhibit structure in New York's Madison Square Garden, and proposed it for the unbuilt 1912 project for the San Francisco Call Press building.

The Barnsdall "Hollyhock" House, Olive Hill, Los Angeles, California, of 1919 was intended by Wright to be built in cast reinforced concrete, like Unity Temple. Whether this was ever a real possibility, or simply Wright's hope, is not clear. In any event, the house was actually built using wood studs and stucco, wood roof beams, and precast concrete decorative elements. Wright's frustration in not being able to build this project in the material of his choice may be sensed in the caption he placed under a photograph of one of the wood and stucco Barnsdall buildings on Olive Hill, published in the July 1928 issue of *Architectural Record*, which misleadingly reads "*Glass and concrete*."[21]

Upon his return from Japan and the completion of the Imperial Hotel, Wright built four houses in Los Angeles, each constructed using his "concrete block system:" the Millard House, the Storer House, the Ennis House, and the Freeman House, all completed in 1923. "*We would take the despised outcast of the building industry—the concrete block—out from underfoot or from the gutter—find a hitherto unexpected soul in it—make it live as a thing of beauty —textured like the trees. All we would have to do would be to educate the concrete block, refine it and knit it together with steel in the joints and so construct the joints that they could be poured full of concrete after they were set up and steel strand laid in them. The walls would thus become thin but solid reinforced slabs and yield to any desire for form imaginable. And common labor could do it all. We would make the walls double, of course, one wall facing inward and the other facing outward, thus getting continuous hollow spaces between, so the house would be cool in summer, warm in winter, and dry always.*"[22] **[10]**

Wright did not mention the horizontal structure of floors and roofs in this description, for in these first concrete block houses they were constructed in wood, and thus constituted hybrid, not monolithic structures. Yet Wright had achieved his intent to give a "unit system," a construction module, to reinforced concrete, by turning it into an extraordinarily flexible



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23 Wright, *Writings and Buildings*, op. cit., p.225.

24 Wright, *In the Cause of Architecture*, op. cit., p.205–208.

25 Ibid., p.209–210.

11 Interior of Storer House, Los Angeles, California, 1923, Frank Lloyd Wright, architect. Photo by author.

masonry unit. *"I finally had found simple mechanical means to produce a complete building that looks the way the machine made it, as much as any fabric need look. Tough, light, but not thin; imperishable; plastic; no necessary lie about it anywhere and yet machine-made, mechanically perfect. Standardization as the soul of the machine here for the first time may be seen in the hand of the architect, put squarely up to imagination, the limits of imagination the only limits of building."*[23] **[11]**

Despite this second success, Wright remained critical of reinforced concrete as a monolithic building material, and he touched upon the reason in praising the material, above, noting that it will "yield to any desire for form imaginable." In 1928, 20 years after the completion of Unity Temple, 5 years after completion of the California concrete block houses, and during construction of the concrete block Lloyd Jones House in Tulsa, Oklahoma, Wright made the following scathing critique of reinforced concrete:

"Aesthetically [concrete] has neither song nor story. Nor is it easy to see in this conglomerate, this mud pie, a high aesthetic property, because, in itself it is an amalgam, aggregate, compound. And cement, the binding medium, is characterless." "Here in a conglomerate named concrete we find a plastic material that as yet has found no medium of expression that will allow it to take plastic form." "[Concrete's] form is a matter of this process of casting rather than a matter of anything at all derived from its own nature."[24]

Wright's design process, as we have seen, involved the engagement of the character—the nature—of the materials in the experience of space. Thus Wright's condemnation of reinforced concrete as being bereft of character, scale and rhythm—the essential aspects necessary for architectural design as he defined it—makes his continued efforts to employ concrete all the more illuminating. His reasons? *"I should say that in this plasticity of concrete lies its aesthetic value… And there remain to be developed those higher values—non-mechanical, plastic in method, treatment and mass."*[25]

Wright himself had indicated the danger that awaited him in using reinforced concrete in this entirely "plastic" way—without the benefit of the ordering systems he had developed in Unity Temple and the concrete block houses—when he noted above that, in using reinforced concrete, "the limits of imagination" are "the only limits of building."

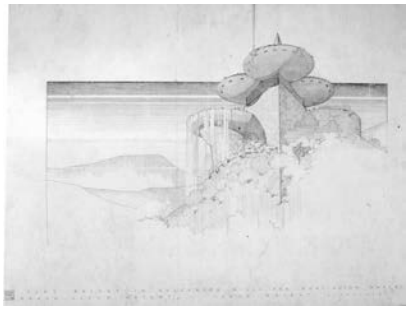
Wright experimented with a variety of geometries in his effort to harness the unlimited form-making potential of reinforced concrete as a construction material. In his 1924 design for the "Automobile Objective" on Sugarloaf Mountain, Maryland, he first employed the spiral to house a planetarium within an automobile ramp. In 1943, Wright began working on the commission for the Guggenheim Museum in New York City. Five years later, in 1948, his V. C. Morris Store was built on Maiden Lane in San Francisco, and



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12 Exterior of Guggenheim Museum, New York, New York, 1943-59, Frank Lloyd Wright, architect. Photo copyright FLW Archives.

13 Interior of Guggenheim Museum, New York, New York, 1943-59, Frank Lloyd Wright, architect. Photo copyright FLW Archives.

14 Huntington Hartford Resort project, Los Angeles, California, 1947, Frank Lloyd Wright, architect. Drawing copyright FLW Archives.

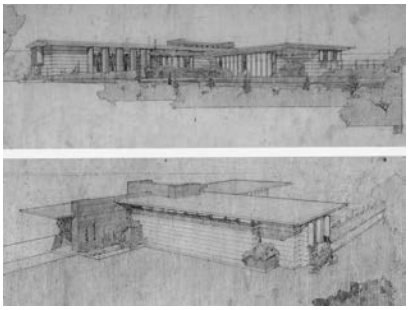
15 Marin County Civic Center, San Rafael, California, 1957, Frank Lloyd Wright, architect. Photograph by author.

this spiral concrete ramp contained in an urbane brick box is one of his most intriguing designs. While it is clearly a precursor for the Guggenheim, at least in its interior experience, it is also a hybrid construction, with the brick acting to scale and measure the concrete ramp.

After more than a dozen years of design, Wright's Guggenheim Museum began construction in 1956, and was not completed until after his death in 1959. During its design, Wright's struggles to find the appropriate form may be noted in a series of designs proposed to be built of concrete, but clad in either red or white marble, with the ramping volume contracting or expanding, octagonal or circular. The final design, a ramp that gently expands as one moves up it, culminating in a skylight, was conceived by Wright as a self-supporting reinforced concrete spiral—something like a spring. As built, the Guggenheim Museum employs a series of piers that are cleverly concealed on the exterior and from the initial view upwards upon entry. The ramps of the Guggenheim were built of reinforced concrete, but its walls were not cast in forms, rather concrete was sprayed onto a metal lath in the form of the spiraling exterior curve. **[12][13]**

A series of projects Wright proposed to be built in reinforced concrete show a steady deterioration of his own design principles, eroded by the limitless form-making capacity of concrete. The enormous foundations of the V. C. Morris House, designed for a cliff-side in San Francisco, make a mockery of the subtlety of the buttresses hidden in the shadow of Fallingwater's cantilevers. The series of drawings for the Huntington Hartford Resort, designed for the arid canyons beyond Hollywood, are among Wright's most beautiful. But the designs, when studied, are shockingly disengaged from their natural environment. The main clubhouse, where water from the pools is made to spill into the arid canyon below, is a particularly arrogant gesture, seeming to consist of a set of "flying saucers" only temporarily moored to the mountaintop—a location heretofore always avoided by Wright in preference for building into the hill, never on its top. **[14]**

The Arthur Miller House project of 1957, the Greek Orthodox Church in Wauwatosa of 1957, the Grady Auditorium at the University of Arizona of 1957, and the Ellis Island proposal of 1959 all exhibit Wright's unfettered imagination characteristic of his later work in reinforced concrete. Perhaps the most disappointing design of this period in Wright's career is the Marin County Civic Center of 1957. Begun with one of Wright's greatest site designs —to build the civic center as a bridge between the hill-tops, recalling the ancient Roman aqueducts—Wright inexplicably decorated, rather than constructed, the building's exterior, employing false arches that render the built work a parody of his own brilliant initial concept. **[15]**



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16 Hoult Usonian House project, 1936, Frank Lloyd Wright, architect. Drawing copyright FLW Archives.

17 Interior, Jacobs House, Madison, Wisconsin, 1936, Frank Lloyd Wright, architect. Photo by author.

18 Exterior of "Fallingwater," Kaufmann House, Mill Run, Pennsylvania, 1935, Frank Lloyd Wright, architect. Photograph by author.

19 Interior of Taliesin West, Scottsdale, Arizona, 1937, Frank Lloyd Wright, architect. Photograph copyright FLW Archives.

The conclusion I will draw from all this might best be titled, "limits and the imagination." The almost total lack of spatial order, human scale, and formal control, which characterizes Wright's late public buildings and more extravagant private commissions, is unquestionably related to the unlimited formal capacity and lack of modular order of the reinforced concrete used in their construction—characteristics he himself had identified as early as 1928. In many of these cases, Wright seemed unwilling or unable to impose his own limitations upon either his imagination or this inherently order-less method of construction.

Meanwhile, the balance of invention, order and scale maintained by Wright's Usonian Houses designed in the same period must be related to the modular order characteristic of their major materials: concrete block, brick, and wood. Only when he combined reinforced concrete with modular materials—or turned reinforced concrete into a modular material—was Wright able to attain the same balance in his larger buildings that he continually achieved in the Usonian Houses. **[16][17]**

The National Insurance Company, designed for a site on Michigan Avenue in 1923—the same year as the California concrete block houses were in construction—is perhaps the first true "curtain wall" high-rise, with reinforced concrete columns and floors cantilevering out from a central core to carry a copper and glass skin. This design was the basis for all of Wright's later high-rise designs, including St. Marks in New York of 1929, the Johnson Wax Research Tower in Racine of 1944, and the Price Tower in Bartlesville, Oklahoma of 1952.

A particularly elegant and effective use of reinforced concrete in a hybrid construction is the great Fallingwater, Edgar Kaufmann's house in Bear Run, Pennsylvania, designed in 1935 when Wright was age 68. The dialogue between the vertical rock walls and horizontal concrete slabs of the house, echoing that between the rocks and water of the falls, makes the whole experience of inhabitation perhaps the most powerful of modern times. **[18]**

At Taliesin West, begun by Wright outside Scottsdale, Arizona in 1937, Wright develops a completely different way of using concrete to engage the natural site. Deriving from a 1928 project for a small house Wright designed for himself in the Mojave Desert, Taliesin West is constructed massive "desert stone" walls, with boulders from the site were stacked in forms and cast in unreinforced concrete. These support the wooden framed folded roofs, clad in canvas that could originally be opened using sailing cords and pulleys, to be changed as a part of the annual migration from north to south of the Fellowship. **[19]**

Wright's 1938 Anne Pfeiffer Chapel, part of Florida Southern College, employs concrete blocks at the base, where pedestrians originally engaged



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26 Kenneth Frampton, "The Johnson Wax Buildings and the Angel of History," introduction to *Frank Lloyd Wright and the Johnson Wax Buildings*, Jonathan Lipman (New York" Rizzoli, 1986), p.xii.

27 Wright, *The Future of Architecture*, op. cit., p.62.

20 Interior of Johnson Wax Building, Racine, Wisconsin, 1936, Frank Lloyd Wright, architect. Photograph by author.

their delicately scaled patterns in the shadow of the citrus trees, while the smooth, rendered concrete walls rose above the trees to capture the sunlight and announce the campus within the grove. The chapel's two forms of reinforced concrete make the building something we might call a monolithic hybrid.

The Beth Sholom Synagogue, built in Elkins Park, Pennsylvania in 1954, develops a similar dialogue between base and top, but is experienced as a place made between the reinforced concrete base, set into the ground and containing the seating, and the plastic, glass and metal roof structure rising like a great tent above the congregation.

Finally, in addition to the use of brick and glass tubing "masonry," the excellence of the Johnson Wax Building, Racine, Wisconsin, of 1936, originates in the fact that its reinforced concrete columns are themselves cast as modular repetitive elements, rather than as part of a monolithic mass. This building, which Kenneth Frampton has rightly called the greatest work of American art of the 20th century,[26] epitomizes Wright's best work in reinforced concrete—work where concrete is engaged in a dialogue with other, modular materials, and where concrete itself becomes modular. **[20]**

In conclusion, we recognize the critical importance of limitations in Wright's work: the Usonian Houses' inherent economic, material and spatial limits are the reason they remain more true to Wright's own principles than did his larger later commissions. When monolithic reinforced concrete was employed, only Wright's self-imposed limitations could insure that his own fundamental principles would be honored. In 1937, while Fallingwater and the Johnson Wax Building were in construction, Wright spoke of the positive power of economy, the beauty of the minimal, the need for limits, and their relation to the imagination: "*The human race built most nobly when limitations were greatest and, therefore, when most was required of imagination in order to build at all. Limitations seem to have always been the best friends of architecture.*"[27]

Biographies

Christopher Bardt is an architect, theorist, artist, writer and professor of architecture.

He is a founding principal (with Kyna Leski) of 3sixØ Architecture, named by Architectural Record as one of 10 leading vanguard firms worldwide in 2002. His extensive professional experience includes residential, commercial and institutional commissions, furniture design, and planning studies ranging from small urban interventions to large-scale metropolitan development.

His research, drawings, writing and artifacts based on the geometry of sunlight, materials, materiality and tectonics as critical to architectural making and thinking has been widely published and exhibited worldwide. In 2019 MIT Press published his book, *Material and Mind*, a cross-disciplinary investigation of how our engagement with materials and physical surroundings are formative of thought and imagination. Chris's new book *The Feeling of Space,* released in 2024 by MIT Press, aims to recover the lived physicality of space from its default reductive isomorphic and Cartesian conceptualization.

Bardt has been a member of the Architecture faculty at RISD since 1988. His pedagogical innovations center on introducing architecture students to an artists' or material-based design process in the development of architectural thinking at the intersection of poetic sensibility and sensuous reasoning. He has taught upper-level studios, architectural history, the history and theory of projective geometry and foundation courses and has coordinated and authored the curriculum of the three core semesters. Notably he led the development of the celebrated drawing curriculum, which fuses digital and physical (hand) approaches to architectural drawing.

Chris has been a visiting professor at Cornell University, the National Academy of Design and Art, Slovakia and the China Academy of Art and an appointed member of the Board of Governors of the RISD Museum. He has served as an external examiner at the Chinese University of Hong Kong, and PHD dissertation panelist at McGill University, and the Aarhus School of Architecture. Bardt holds a BArch from RISD and a M.Arch from Harvard University. In 2017 Chris was honored with a lifetime achievement award for his design work and inducted into the RI Design Hall of Fame.

Anne Beim is Professor in Architecture at the Royal Danish Academy — School of Architecture.

She holds a M.Arch. and a Ph.D. in architecture from the Royal Danish Academy School of Architecture.

As a visiting research fellow 1995–96, she studied under late Professor Marco Frascari and Professor David Leatherbarrow at University of Pennsylvania.

Since 2004 she has led CINARK — Center for Industrialized Architecture at the Royal Danish Academy School of Architecture and since 2014, she has (co)chaired the graduate program: SET — Settlement, Ecology and Tectonics. Her research topics are — Ecology in architecture, tectonics, material studies, building culture, theories/ practices of building culture.

She has written books, essays, and scientific articles on the theme of tectonic ecologies, the history of building technology and visionary architecture. Her books include among the many published: Selected books (co)authored: *Biobased Materials Tectonics Architecture* (2025), *Innovation of Nothing* (2023), *Biogenic Construction: Materials, Architecture & Tectonics* (2023), *Circular Construction: Materials, Architecture & Tectonics* (2019), *Towards an Ecology of Tectonics* (2015), *Tectonic Visions in Architecture* (2004). Also, she has led research that has received awards for their originality: *Deserta EcoFolie* (with Curators Pedro Alonso & Pamela Prado), The Venice Biennale of Architecture, 2025. (Anne Beim et al.), *UIA's Jean Tschumi Prize for Architectural Writing and Critique,* 2023, AR Future Projects Awards 2023 – Research and design prize. (Anne Beim et al., *Trienal de Arquitectura de* Lisbon — Research University Award, 2022. (Anne Beim et al.)

Matej Blenkuš is a full professor at the Faculty of Architecture, University of Ljubljana. Since 2012, he has been teaching his own design studio. Until 2024, he taught the course *Structures 2*, and later the course *Building and Technology 2*. He leads the architectural office *studio abiro* in Ljubljana, has 25 years of experience in architectural design, and has received several national and international awards for his work. Through his teaching and creative practice, he explores the relationships between building structure, architectural space, and the articulation of meaning. Between 2017 and 2023, he served as dean of the faculty.

Nicholas Boyarsky is an architect, teacher and writer. He studied at the Architectural Association School of Architecture in London and completed his practice-based PhD at RMIT University in 2016. He is Professor of Architecture at RMIT University where he supervises practice research PhD candidates in Europe and Asia. He is a partner of the London-based studio Boyarsky Murphy Architects. Before starting BMA he worked for Zaha Hadid, Michael Hopkins, and Rem Koolhaas and Stefano de Martino. He has lectured and taught at many European, North American and Asian schools of architecture and is the author of numerous articles and publications. He is a founding member of the Asian-based Urban Flashes network. Current areas of interest include visual urbanism, ephemera, inflatable architectures, and architectures of memorial. Through his involvement in the development of the Alvin Boyarsky Archive he has facilitated and organised seminars, events, publications and the travelling exhibition *Drawing Ambience: Alvin Boyarsky and the Architectural Association*, curated by Jan Howard and Igor Marjanovic.

Nathaniel Coleman, PhD, MSc, MUP/Urban Design, BARCH, BFA is a workshop facilitator, educational consultant, author, and architectural designer. He facilitates workshops using architectural frameworks to support individuals' developing capacities for managing structures and upwards management, so they can begin solving complex problems by thinking differently and more openly about them, achieved in settings encouraging organised play and open experimentation.

Working for over 30 years as an architecture academic, more than 22 of them at Newcastle University, UK, where he was Reader in History and Theory of Architecture, his Masters design studios were laboratories of continuous experimentation investigating the invention of anarchist spatial practices.

His books include *Recoding Architecture Pedagogy: Insurgency and Invention* (2025); *Materials and Meaning in Architecture: Essays on the Bodily Experience in Building* (2020); *Lefebvre for Architects* (2015), and *Utopias and Architecture* (2005). Other publications include numerous book chapters and journal articles. Nathaniel also presents his research internationally.

Patrick Doan is an Associate Professor at the School of Architecture at Virginia Tech. He holds a Master of Architecture from Virginia Tech and a Bachelor of Environmental Design from Texas A&M University.

His teaching and scholarship interests focus on architecture's constructive nature as it relates to the measure and play of detail, craft, poetics, and placemaking. This work has been presented and exhibited at national and international conferences and exhibitions. Selected publications include: 'Proximity Within Distance' in the book Lewerentz Fragments (ACTAR, 2021), "What Lies Beneath the Surface" in the Building Technology Educators' Society Conference Proceedings (2017), and "Construction Curtains" in the book Center 19: Curtains (University of Texas: Center for Architecture and Design, 2014.)

In 2016, Patrick received the Association of Collegiate Schools of Architecture Design Build Award along with colleagues William Galloway and Frank Weiner. He is the recipient of several awards at Virginia Tech including the University Certificate for Teaching Excellence (2017) and the J. Stoeckel Design Lab Teaching Excellence Award (2017.)

He is a registered architect in Virginia and Texas, holds an NCARB Certificate, and maintains an architectural practice, barker doan architects, with partner Meredith Doan.

Maja Dobnik graduated with a master's degree in architectural theory from the Faculty of Architecture, University of Ljubljana. She works in the field of architectural theory and criticism, focusing on social infrastructures in space. Her research explores the relationship between architecture and social practices and the role of architecture in shaping community spaces. She is based at the Centre for Creativity within the Museum of Architecture and Design in Ljubljana.

Orsolya Gáspár is an assistant professor of architecture at the Stuckeman School, Penn State University. She holds an MSc in architecture and a PhD in historical structures from the Budapest University of Technology and Economics (BME), Hungary. She was a Visiting Fellow at the Form Finding Lab, Princeton University in 2023. Her research focuses on structurally informed architectural design. Leveraging emerging technologies and methodologies, she endeavors to maintain a dynamic dialogue between historical precedents and contemporary approaches. Her work appeared in journals and edited volumes such as the *International Journal of Architectural Heritage, Architecture, Structures and Construction and Cold War Interactions* (Bloomsbury).

Mark Jarzombek (1954-) is professor of the history and theory of architecture at MIT, where he has been teaching since 1995. Before that (1987-

1994) he was teaching at Cornell University. He got his architectural diploma at the E.T.H. in Zurich (1980), where he also had a small practice for about a year. He is the author of numerous books on a wide range of topics ranging from modern architecture, digital philosophy to global history. His most recent book is *Architecture Constructed: Notes on a Discipline* (Bloomsbury, 2023) that studies the fraught history of the architecture / contractor divide. With Vikramaditya Prakash (professor at the University of Washington, Seattle) he founded the Global Architecture History Teaching Collaborative to help solve the crisis of teaching in the expanded field. In 2020, also with Prakash, he cofounded the Office of (Un)certainty Research. Their work has been featured in two Venice Architecture Biennales and elsewhere. O(U)R focuses on the unsteady relationships between humans and cosmos.

Line Kjær Frederiksen, born in Copenhagen in 1986, is an assistant professor, cand.arch. at the Royal Danish Academy, School of Architecture, from which she holds a PhD. Line currently teaches at the internationally recognized master program Extreme Environments and is affiliated with the research center Center for Material Studies. For the past ten years her research has focused on circular economy in architecture, biogenic and reused materials, ecology, and tectonics of disassembly in industrialized building systems as strategies for increasing sustainability in the built environment. Line has co-edited and contributed to several publications and books of which the latest is "Biogenic Materials, Tectonics and Architecture- Three perspectives on biogenic materials properties and their use in construction", 2025.

Robert McCarter is a practicing architect, author, and Ruth and Norman Moore Professor of Architecture at Washington University in St. Louis since 2007. He has also taught at the University of Florida, Columbia University, and at six other institutions in the US, Netherlands, Peru, and Italy. During his 38 years in academia, McCarter has taught at least one design studio every semester, and he has taught more than 2,000 students. He has had his own architectural practice since 1982, in New York, Florida and St. Louis, with twenty-five realized buildings. He is the author of twenty-five published books to date, including *A Moment in the Sun: Robert Ernest's Brief but Brilliant Life in Architecture* (2023); *Louis I. Kahn* (2nd edition 2022); *Place Matters: The Architecture of WG Clark* (2019); *Grafton Architects* (2018); *Marcel Breuer* (2016); *The Space Within: Interior Experience as the Origin of Architecture* (2016); *Steven Holl* (2015); Aldo van Eyck (2015); *Herman Hertzberger* (2015); *Alvar Aalto* (2014); *Carlo Scarpa* (2013); *Understanding Architecture: A Primer on Architecture as Experience* (2012, with Juhani Pallasmaa); *Louis I. Kahn* (2005), and *Frank Lloyd Wright* (1997). Among other awards and honors, the curators of the 2018 Venice Biennale of Architecture selected McCarter as an International Exhibitor, and his exhibit was entitled "Freespace in Place: Four Unrealized Modern Architectural Designs for Venice; Carlo Scarpa's *Quattro progetti per Venezia Revisited*;" and he was named one of the "Ten Best Architecture Teachers in the US" in December 2009.

Magnus Reffs Kramhøft, born 1981, is a trained architect, Cand. Arch, and current industrial PhD fellow at the architectural firm Henning Larsen and CINARK, Center for Industrialised Architecture at The Royal Danish Academy in Copenhagen. With a background as a lead design architect, Magnus has, over the past 15 years, focused on developing projects with a curious, exploratory, and value-based approach. Construction techniques, resources and sustainability have been a central theme in many of the projects Magnus has led. His research in the PhD-project stems from the same comprehensive interest in implementing increased awareness and ethics in architectural practice. This includes, among other things, investigations of existing buildings' diverse inherent values, and development of approaches to adapt and transform them for new purposes that can both create new relevance and anchoring to the place.

Anne-Catrin Schultz is a German-born architect, architectural historian, and author. Anne-Catrin writes about historic and contemporary tectonics, exploring the links between technology, performance, and culture. Her primary field of research is the work of the Italian architect Carlo Scarpa and the phenomenon of layering in architecture. Her book publications include "Carlo Scarpa–Layers" and "Time, Space and Material–The Mechanics of Layering in Architecture," exploring layering as a non-hierarchical framework for a continuously changing architectural environment. Tracing the boundaries between reality and imagination, the book "Real and Fake in Architecture–Close to the Original, Far from Authenticity" was published with Menges Editions in 2020. More recently, the impact of technology, politics, and social change on architectural production has been the focus of Anne-Catrin's research and writings. She is a member of the editorial board of

Technology|Architecture+Design (TAD) and a council member of the International Organization for Structures and Architecture (IASA).

Aleš Vodopivec, arhitekt. Poleg pedagoškega dela na Fakulteti za arhitekturo v Ljubljani, redno objavlja strokovne in znanstvene prispevke. Avtor ali urednik knjig: Arhitektura Ljubljane, Ab, 1974; Iz arhitekture (z J. Koželj) – Vprašanja umetnosti gradnje, Krt 48, 1987; Edvard Ravnikar, Umetnost in arhitektura, Zbornik esejev, Slovenska matica, 2007, ponatis 2021; Edvard Ravnikar – Architect and Teacher (z R. Žnidaršič), Springer, 2010. Priznanja za arhitekturna dela: nagrada Prešernovega sklada, nagrada Piranesi, Plečnikova nagrada, tri Plečnikove medalje, Platinasti svinčnik, Zlati svinčnik in Patinasti svinčnik ZAPS ter Ernst A. Plischke Preis.

James Williamson studied at Cranbrook Academy of Art and the Architectural Association. He has won numerous design and teaching awards, including a first place in the Shinkenchiku Competition, an ACSA design award, three Graham Foundation grants, the Martin Dominguez Distinguished Teaching Award from Cornell University, and the *Reconocimiento Escpeical por Excelencia Docente* from the Universidad de Puerto Rico.

Williamson has taught at Georgia Tech, Harvard, and at Cornell where he directed the Master and Bachelor of Architecture programs. He has held invited professorships at RISD, Cooper Union, Columbia, Rice, and Washington University among others. Between 2016–2021 he was Dean of College of Architecture at Texas Tech University.

Williamson worked with John Hejduk on *The House of The Suicide* and *The House of The Mother of the Suicide* constructing these projects on five different sites. He co-edited *The Religious Imagination in Modern and Contemporary Architecture* with Renata Hejduk, and is presently completing *The Ethical Mirror: Architecture, Dissidence and the Radical Imagination* with Renata Hejduk, Steven Hillyer and Kim Skapich.

Abstracts

Faber Tignarium:
Gravity Unleashed

Mark Jarzombek

Keywords: tectonics, baukunst, contractor, Gotfried Semper, Leon Battista Alberti, Marin County civic center, Mortensrud church, Oslo

The word tectonics is ubiquitous in the studio where it is deployed mostly with little theoretical resonance to point to the designer's commitment to careful detailing. It is usually evoked as a coded reference to the ethos of the carpenter. In this paper I am not going to engage these theoretical implications or historical resonances, but rather dig more deeply into the related concept, *faber tignarium,* a phrase introduced by Leon Battista Alberti in his treatise on architecture. *Faber tignarium* means 'maker of beams,' but got translated in the Joseph Rykwert edition as 'carpenter.' Alberti makes it clear that *faber tignarium* is not an architect, but little more than a glorified laborer. But to reclaim the space of the *faber tignarium* is also to reclaim its traditional locus, namely 'the roof.' There is, after all, a big diRerence between 'maker of beams' and a maker of furniture. In order to bring the issue of the roof out of hiding, I will discuss some well know structures like the Mies van der Rohe's National Gallery (1968) and Benedetta Tagliabue's Santa Caterina Market of Barcelona (2005) to less well-known projects like Cinthia Marcelle's installation at the Museum of Modern Art in San Francisco (2019) and Diane Simpson's fusion of roof structure and clothing design. Instead of seeing the roof as something that provides shelter or as something that simply spans a space that is dictated by walls, I want to celebrate the creative and conceptual space of the *faber tignarium* as a point of resistance to the hegemony of program, plan and wall. I will orient the conversation in particular to the something that could be thought of as an anti-gravity poetics, where the solution does not reside in utopian bubbles but rather in the craft of making gravity seem to disappear. The paper thus reimagines the tension not just between architect and engineer, but also between the visible and the invisible, given that the 'optics' of roofs are inevitably from below, and thus inevitably opposite from the optics of the architect which tends to be from above.

Steps Towards Negative Tectonics

Nathaniel Coleman

Keywords: Tectonics, Frampton, Negative Dialectics, Adorno

Reflecting on tectonics is impossible without thinking about its ideation by Kenneth Frampton, which, despite the quasi-mysticism of Frascari's 'Tell-the-Tale Detail,' or Peter Rice's structural expressionism (especially as manifested in Piano's best work), is how most architecture students, practitioners, and educators come to and deploy ideas of a poetics of

construction. If Frampton's conception of tectonics ostensibly resists architecture's dissolution by capitalist production, programming mostly speaks the language of that dissolution. Like function (or functionalism), modernity typically limits program by over systematization (even without informatics, algorithms, or parametric design). Likewise, despites its claims, Tschumi's 'disprogramming' falls within the systematizing orbit of programming, similarly Koolhaas' performative indeterminateness. At best, tectonics and programming suggest a negative dialectical tension, impossible to resolve but worth pursuing. At worst, tectonics and programming are two sides of architecture's systematizing habits paralleling the long erasure of its disciplinary status as a liberal profession.

As argued in the proposed paper, instead of liberating architecture, Frampton's attempt to precisely define the parameters of tectonic resistance, as prerequisite for architecture's redemption, disables the concept, and the architecture that follows, ensnaring both within the ambit of totalizing system, ensuring results more programmatic than de-systematizing. Mary McLeod offers a clue to the genetic defect of Frampton's coinage of tectonics, as commonly deployed in architecture: "Frampton seems to be searching for a logic (and, in his case, an aesthetic vision) that would embrace the paradoxes of two seemingly disparate worldviews [phenomenology and Marxism] in his search for reservoirs of resistance against the onslaught of 'commodity culture' and the 'imperatives of production.'"[1]

Accepting McLeod's reading, Frampton's search "for a logic", to construct "an aesthetic vision" resistant to architecture's capture by the culture and building industries depends on his embrace of the "seemingly disparate worldviews" of "phenomenology and Marxism."[2] However, generally, but especially as performed by architects (practitioners, teachers, students), the two are joined by totalizing visions. While Marxist tendencies toward absoluteness are familiar enough, phenomenology mostly evades such badging, perhaps because architectural phenomenology largely presumes the continuity of an unfallen golden age across every rupturing catastrophe, which sets it Right of center, in contrast to Marxism's Left of center positioning. However, as Foucault concludes, "the phenomenological method certainly wants to account for everything, whether it be to do with the cogito or with what precedes reflection, with what 'is already there' when the cogito is activated; in this sense, it is clearly a totalising method."[3] Arguably, Frampton's continuous desire to construct the logic of an aesthetic vision requires him to attempt to "account for everything" in totalizing fashion, akin to Marx, Marxism, and Marxists. In his effort to resist capitalist maximalization Frampton defaults to programming solutions too ensnared within the very constellations of thought and action he wishes to resist and overcome.

Foucault provides a route away from tectonics and program in his assertion "that from the moment one cannot describe everything, it is through the concealing the cogito, in a way putting aside that first illusion of the cogito, that we can see emerging entire systems of relation that otherwise would not be describable"; including for example the associability of phenomenology and Marxism as simultaneously conservative and totalizing in their nostalgic programmatic aspirations.[4]

If one aim of the proposed paper is to argue that rather than liberating architecture, Frampton's tectonics formulation ensnares it within totalizing system – inevitably disabling the concept and the architecture following from it, another is to recuperate tectonics by rescuing it from programmatic Marxism and phenomenology alike. The first steps towards a negative tectonics include admitting catastrophe and fragmentation rather than denying either, informed by Adorno's negative dialectics as a tactic for continuously thinking thought against itself (in theory and practice), to avoid the resolving tendencies of Frampton's tectonic ambition. Beginning with the complexities of Adorno's proposition that writing "poetry after Auschwitz is barbaric", the comforts of phenomenology and program in their tectonic and technocratic guises can be abandoned to begin working in the fallen world as it is, guided by desires for alternative relationships, anticipatorily illuminating elusive revolution.[5] A

negative tectonic foregoes illusions of continuity without renouncing use (bodies or gravity), while disavowing autonomy myths. The persisting political context of architecture's production implicates it in making and maintaining brutal inequalities, including despoiling the planet, confirming the persisting significance of Adorno's thinking for working in and through catastrophe by foregoing repetition in favor of reconstruction, while surrendering all prospects of resolution, if not desires for it.

1 Mary McLeod, "Frampton in Frame", *Architecture Today*, 16 Nov. 2020. Available online at: https://architecturetoday.co.uk/frampton-in-frame/

2 Ibid.

3 Michel Foucault, "Who are you, Professor Foucault?" (1967), Lucille Cairns (trans.), in *Religion and Culture*, New York: Routledge, 1999, p. 93.

4 Ibid.

5 Theodor W. Adorno, "Cultural Criticism and Society" (1949), Samuel and Shierry Weber (trans.) in *Prisms*, Cambridge, MA: MIT Press, 1967, p. 34.

The Thinning Space of Architecture

AI Image Generation and the Reversal of Design Logic

Anne-Catrin Schultz

Keywords: Tectonics Digital Design Process, Architecture Syntax, Architecture History/theory

Architectural production in the 21st century is facing a profound reversal of the role of tectonics in architecture. The architectural perspective and rendering used to be produced at the end of the design process to give clients a "view" of the project. With the arrival of generative AI models, these images are moving to the forefront, guiding the design process from the beginning. Starting with an image, the syntactic connection between structure and expression has to be constructed, developing the substance of the form of spaces and facades represented in the initial representations. A design concept's abstraction and the building's principles have to be deduced from a realistic or semi-realistic graphic.

This essay explores the changing relationship between the image and the notion of tectonics in architecture, highlighting the flattening of space and the resulting loss of spatial depth. The analysis concerns changes in the architectural design process and the impact the sequencing and representation of ideas through images have on the outcome. In parallel, it traces the increasing presence of pictures in the 20th- and 21st-century history of architecture, embedding more and more literal imagery into architecture.

The 19th-century discourse around tectonics in architecture operated on the assumption that form and expression emerged as a result of materiality and technology in conjunction with its related narrative. The architectural discourse of 19th-century Europe was characterized by the polychromy debate led (among others) by German-born French architect Jacob Ignatius Hittorff. The discovery of paint particles on Greek temples and the

subsequently created reconstruction drawings revealed a layered architecture, buildings that shared stories while also articulating their structural conditions. Architecture was already intimately connected to sculpted images situated on facades illustrating spiritual topics or historic events. At that same time, the separation of skin and skeleton was theoretically underpinned by Gottfried Semper's work, which linked architecture to its textile origins. In Semper's understanding, the knot connecting two pieces of yarn is ultimately the starting point of weaving. It represents the generative element of the architectural joint, transferring forces and visualizing them. In his writings, craftsmanship is the driver of architectural form even in the event of a material change. This overlapping potential of architecture referencing its history (actions or fabrication) and culture set the basis for numerous expanded interpretations of tectonics developing in the face of globalization and climate change. The initial meaning of the term tectonics (frequently linked to the Greek word "Tektonikós") anchored it to the act of building and joining. Eduard Sekler wrote the following definition of "tectonics" in 1965: "For these qualities which are expressive of a relation of form to force, the tectonic should be reserved [...]. Thus structure, the intangible concept, is realized through construction and given expression through tectonics." (Sekler 1965: 89) [1]

Over the following decades, this expression increasingly shifted to images carrying the message of not only construction but also of program or product. In the 20th century, an understanding of available products and structural requirements drove the design process for many architects in the Western world—working within an industrialized construction framework. Postmodern tendencies turned to the power of the image rather than the mechanics and expression of assembly as aesthetic drivers.

Counteracting modernism and its lack of ornament and narrative, postmodern architecture turned to various themes, also elevating the image to the scale of architecture. A rising consumerist culture left its imprint on architecture and the continuing search for appropriate forms. The 21st century is experiencing a reversal of how architectural syntax is developed. Digital images and their prompts processed by AI models stand at the beginning of the conception of buildings. The articulation of the building's structure, overall materiality, and fabrication follows a representation of the building's appearance, reversing the process of design and challenging the definition of tectonics. This essay traces the gradual thinning of architectural structures and skins over the last centuries. It illustrates a changing relationship between architecture and imagery evolving synchronously to the digitization of the design process, all of it leading to an overall thinning of architectural space.

1 Sekler. E. 1965. "Structure, Construction, Tectonics." In *Structure in Art and Science*, edited by G. Kepes.

Gravitivity
Architecture's Defiance in a Post-Structural Society

Matej Blenkuš, Maja Dobnik

Keywords: Gravitivity, Post-structuralism, Temporal Layers, Social Structures, Solid Structures, Architecture's Defiance

The paper deals with the relationship between architecture and contemporary socio-political structures, drawing from the concepts of *desiring machines* and *bodies without organs* as developed by Gilles Deleuze and Félix Guattari. The central premise derives from the fact that today, architecture

as a socially embedded practice operates in increasingly unstable and unpredictable conditions of global capitalism, where traditional hierarchies and institutional frameworks have been disintegrating. In such a context, architecture decreasingly relies on stable systems and increasingly operates in conditions of continuous flow, adaptation, and openness.

We introduce the concept of *temporal layers*, an analytical tool developed from the division of the architectural system into material and functional components with different lifespans. This six-layered structure based on the models proposed by Stewart Brand, Francis Duffy and Dietmar Eberle helps us understand both buildings as systems and their adaptability. This model is challenged in the case of Ljubljana's Cukrarna Gallery, where the classical hierarchy of layers is inverted: the programme dictates the structure, and the historical shell turns into an empty supporting surface. Architecture thus enters into a relationship of tension between the past and the present.

The paper works to expand the *temporal layers* to the broader urban context, where it addresses the phenomena of homelessness and consumerism as expressions of how *bodies without organs* function in a contemporary city. Rather than discuss them in terms of order versus chaos, the authors see them cohabiting as two spatial logics that transform urban space. Their shared characteristic is the dismantling of classical temporal and structural hierarchies: the central solid layers become improvised or displaced, while dynamic external and internal layers become the only vessels of content and meaning.

To allow architecture to maintain its identity, we introduce the concept *of gravitivity* – a spatial and temporal *re-grounding* that derives from structural frameworks as a vehicle of stability and continuity. Gravitivity is a physical as well as symbolic quality that allows architecture to move beyond its current uses and resist being dissolved into the flows of unpredictable changes in content and appearance, We illustrate this with two examples: the Concrete Tent project by DAAR collective, which transforms a tent – a symbol of temporariness – into a permanent concrete structure with a collective memory, and DARS office building with its exposed structural framework that defines the spatial logic of the building and its resistance to economic and organisational changes. The paper concludes by defining *gravitivity* as a means of one's *identification* with a space as an act of re-grounding and resilience against the dominance of temporal layers, as well as against dissolution, incorporeity, and dispersion of an existential space into *bodies without organs*.

The Anonymous Detail
The Imaginative Effacement of John Hejduk's Measured Drawings

James Williamson

This paper proposes to examine the architectural detailing and logics of fabrication of the late work of the American architect John Hejduk (1929-2000) as these particularly relate to his *Masque Projects*. It proposes that Hejduk's radical reconceptualization of the architectural program and his encompassing effort to give form to that program through drawing (entailing more than building descriptions, but also stories, poems, characters and visions) are reliant on an approachable, anonymous logic of assembly and detail employed to construct the imaginative world that Hejduk created.

The details and other 'technical' drawings are, therefore, to be seen as inseparable from the more provocative aspects that Hejduk's late oeuvre creates and provides an essential grounding for the projects in a reality that is ultimately transcended. The paper begins with a description of Hejduk's construction drawings as they provide this grounding. It will examine Hejduk's late work in general but focus on those projects that Hejduk brought forward for more elaboration in several series of precise measured that forward Hejduk's initial sketches to more complete and finished sets of drawing such as those for his *Berlin Masque* or his *Lancaster/Hanover Masque.*

The paper will subsequently compare Hejduk's methods of representation with the surrealist painter Rene Magritte. Magritte, like Hejduk, eschewed an overt display of painterly skill in favor of a more anonymous - and for this paper's intentions – more open engagement of the viewers imagination thereby inviting the viewer into a world filled with the paradoxical and uncertain. The paper will postulate that this anonymity is essential to both the artist's and Hejduk's work and their similar engagement of the viewer as a co-creator in their work and apprehension (or in Hejduk's case, the construction) of their created worlds.

Finally, two of Hejduk's projects will be closely interrogated in the light of this comparison: *The House of the Suicide and House of the Mother of the Suicide* (constructed in Atlanta, Prague, and New York by the author) and the *Museum for Some of the Works of Giacometti*. The projects, the former constructed of wood and steel and the latter to be constructed in steel, masonry, and concrete, will be examined in terms of their detailing and constructive assembly. An emphasis will be placed on the rather self-effacing ordinariness of these project's detailing: a representation in contrast to the imagery that characterized Hejduk's work at this time. As indicated above, this contrast is essential to their importance, meaning, and our understanding. The historical circumstances surrounding *The House of the Suicide and House of the Mother of the Suicide* lends even more merit to this argument.

The paper concludes by positioning Hejduk's *Masque Projects* within a notion of the tectonic as a clear symbolic organization of construction, material and space that Hejduk's work both adheres to and significantly avoids – His is an architecture that is ultimately not about clarity of construction as it aligns with meaning, but as a masked allegory of construction that destabilizes convention *vis a vis* the tectonic and creates an opening into his invented world of imagination.

To Err is Human

Orsolya Gaspar

Keywords: Tectonics, Materiality, Design Control, Scale, Shells

Upon entering on a bright summer day, it takes a couple of seconds to get used to the dim lighting of the Rotonda di San Tome and absorb the straightforward tectonic order of this marvel of Romanesque architecture north of Bergamo, Italy. The central domical space is defined by a two-level pyramidal stacking of an ambulatory, a gallery on top, and the central void, supported by the external walls and eight columns arranged concentrically on each level. Upon closer inspection, it becomes apparent that this neat overall tectonic order grows out of total disorder: Each column is different, some capitals are made of bases of columns from earlier building phases, the stereotomy of the arches is distinct in each bay, the layers of the stone masonry walls are uneven.

Even though we like to speak about "tectonic order," there is not one tectonic order for any construct. As in our example, whether we are discussing columns and arches or the stereotomy thereof matters. Its tectonics is zoomable once a structure is built, from building components to material scale. Today,

tectonics *feels* infinitely zoomable *before* construction, that is, during the design phase. The designer is entitled and somewhat expected to control tectonics down to the material. But this is a relatively new expectation, which has been amplified in the digital era. When San Tome was erected, multiple builders had a formative role in its tectonics, and "design" only controlled the crudest rules.

In this text, I am investigating through three historical case studies how the chosen level of control (or level of zooming in) in the design phase relates to the materiality and how it influences the perception of space and the constructability of the building over time. Below, I will refer to the scale of tectonics, which means a certain number of layers of complexity (from the building component down to the material unit). "Scale" is used interchangeably with "level": i.e., scale of material means on the level of the material unit in the tectonic layers. All examples discussed below are (loosely interpreted) domical spaces, which makes the highest level of tectonics extremely simple. A robust relationship exists between each program and the space (only a few functions require a domical space). Still, the program is less consequential for tectonics, and vice versa (as shown below, there are many ways to construct a domical space).

The Rotonda di San Tome is considered here, first and foremost, as a case study of the necessity for room for error on the material scale when using reclaimed materials. It also showcases how feasibility affects the scale of tectonics considered in the design phase. In the early 12th century, when the Rotonda was built, its designers not only reverted to defining the crudest rules because of the uncertain geometric and material properties of the available stone but also because recording or passing down anything more was not feasible.

For the Rotonda, the room of error was in the range of inches. In 1922, when designing the steel gridshell for the dome of the Schott glass factory in Jena, Germany, Walther Bauersfeld operated with a room of error of 1/6 mm down to the material (steel bar) unit. Bauersfeld, widely recognized as the designer of the world's first geodesic dome, gives an account in his notebook of an incident during the construction (an alarm caused by the misplacement of a single element) of the dome which proves that this extreme precision (and the associated high-level of control during the design phase) was justified in the then-emerging field of thin shells.

Bauersfeld, an engineer of optical devices, had an innate sense for extreme precision. He was fortunately biased to aim for such a high level of control and wondrously talented to overcome the limitations of his tools (i.e., pen and paper) deemed rudimentary at its best by today's standards. The last example, which focuses on the highest level of tectonics, the shape of the shell, describes a lesser-known thin concrete shell project built in 1967 in Hungary. It showcases how bias can also lead to a desire for control not innate to the tectonics, the material, or the construction process. The project was the extension of the KOFEM Factory, which marks a very early use of computers in the history of Hungarian construction. While the shells, to the naked eye, look the same as those built in the first phase five years prior, the addition relies on a more complex geometry and structural model, which necessitated the use of computers for calculations. The lead engineer, Lajos Kollar, was a brilliant academic and designer: it is hard to dismiss the speculation that the challenge itself was a big part of the motivation to divert from the original design, maybe more so than pragmatic considerations.

The three examples suggest a trend from less control during the design phase to more – and consequently, more precision but less autonomy for the builders. Indeed, such a trend exists. The engineering revolution in the eighteenth century changed our expectations of design: We require more certainty, which is generally good as it leads to safer construction. It does not mean, however, that we are not obliged to question the desired level of control case by case. In the digital era we can achieve more than ever: more detail, more complexity. However, it is vital to check whether the complexity generated at one tectonic scale is in reasonable balance with the whole – conceptually and pragmatically.

This text, at large, is about this complex relationship between tectonics and scale in architecture. To be more precise, it is a polemic about the right scale of tectonics, which seems to be highly relevant today. When feasibility-related or technological limitations rarely exist, how do we decide on the right amount of control in the design phase? If to err is human, is total control divine? The selected examples are fraud in many senses: they represent a unique architectural form and are all conveniently dated. Yet, I believe they illustrate the complexity of the problem well. They tell valuable stories of how less control can lead to more detail, yet certain tectonics depend on immaculate precision, i.e., total control. They shed light on how intertwined the problem of tectonics and the construction process is and how personal biases influence tectonics – both its conception and perception.

Drifting Plates
Tectonic Tools

Nicholas Boyarsky

Keywords: catastrophe, agency of architecture, modernology, ethnography, conviviality, tectonic plates

The constant grinding of tectonic plates heralds both transformation and catastrophe.

The awareness of inevitable destruction, often portrayed through the metaphor of ruin, is inbuilt in our building culture yet rarely acknowledged. Architecture negotiates the dialectic between construction and destruction, it is existential to this process yet elusive. It is manifest on the building site which is both a tectonic site of contestation, adversarial in nature, and a forum for collaboration, where finely balanced tolerances are quantified and determined. Architecture sits uneasily between our focus on the building as a discrete object and a search for a cultural consensus of how we might design and build in a broader societal context. Tectonics in relation to building practice and the pragmatics of construction challenges the role of the architect calling for a critical resistance to the forces of industrialisation and their ultimate destruction.

In the context of our contemporary drive to the digital it is instructive to draw distinctions between the production of architecture through the primacy of image that the all-encompassing lens of the computer screen empowers and the ethnographic means by which vernacular architectures have traditionally been realised, through what I call tectonic tools. The tool is an implement, an everyday object, but when it is fashioned, adapted and used it becomes individual and bespoke. Metaphorically it becomes a symbol of empowerment which embodies the totalising economic and political forces within building but also enables individual creativity and resistance. In this context it is noteworthy how depictions of tools and craft processes in Diderot's 18th century enlightenment project, the

Encylopedie, gave identity to and galvanized a new social power base 'ultimately contributing to the destruction of old values and the creation of new ones.'

This paper will explore how 'tectonic tools' that have developed as cultural artefacts imbued with the imprint of their individual makers came to be adopted in architectural discourse often as the means to resist the increasing impact of industrialised production, becoming symbols for an alternative future. I will consider this against the background of increasing digitalisation and the immense cultural experiment which John May has called 'imaging.'

This resistance can be seen in the writings of Ivan Illich who, in 1973, argued for tools for conviviality that would stand for the opposite of industrial productivity and foster 'autonomous and creative intercourse among persons and the intercourse of persons with their environment.' The Italian radicals' educational project 'Global Tools', inspired in part by the *Whole Earth Catalogue. Access to Tools*, sought to build an anti-disciplinarian space to consider arts and crafts in an anti-urban context. Superstudio's 'Project Zeno' and 'Extra-Urban Material Culture' focussed specifically on the agrarian and vernacular and the potential for tools and hand crafted objects in forming an alternative modus operandi. Other proponents for the liberating possibilities of tools for self building can be found in Enzo Mari's 'Proposta per un'Autoprogettazione' ('Self-design proposal'), and Mario Cresci's *Misurazioni, fotografia e territorio*. George Kubler's *Shape of Time: Remarks on the History of Things* of 1963 had, to some extent, set the context for these speculations by laying out a perspective where processes of innovation, replication and mutation are in continuous conversation over time. Alfred Wegener, who developed the continental drift theory in the early 20th century, had offered a global framing for these debates as his articulation of the underlying dynamics of tectonic plates offered an explanation for the disjunct biogeologic distribution of present-day life found on different continents but having similar ancestors.

Contrary to this, and marking a profound break with the ethnographic tradition, Vilem Flusser's reading of the photograph as a technical image generated by the functional apparatus of the camera accounted for a loss of human agency that tools embody. By exposing the programmed nature of the photograph Flusser revealed a tension between the photographer's creative goals and the camera's programming that characterises the dilemma of the tectonic tool. He describes the shift in code structures from historical thinking which he argues is linear and rooted in alphabetic writing to the condition of post-history where nonlinear, pixelated technical images predominate. In a world dominated by the apparatus a critical resistance offers 'the last form of meaningful revolution: reclaiming significance and freedom through conscious engagement with technology.'

What Lies Beneath the Surface

Patrick Doan

Because of the open porches, how the building is made is completely clear before you go into it. It is the same realization behind Renaissance buildings, which gave the arcade to the street, though the buildings themselves did not

need the arcade for their own purposes. So the porch sits there, made as the interior is made, without any obligation of paintings on its walls, a realization of what is architecture. When you look at the building and porch, it is as an offering. You know it wasn't programmed; it is something that emerged.
You know what's so wonderful about those porches? They're so unnecessary.
– Louis Kahn, Light is the Theme, p28

Comprising the west elevation of the Kimbell Art Museum (KAM) located in the museum district of Ft. Worth, Texas and designed by the late Estonian born American architect Louis Kahn are a series of three porches running north to south. Each porch is constructed of reinforced concrete with 2'x 2' columns located in each corner that supports a 23' wide x 100' clear span vaulted cycloid shell roof. These porches stand as a form of architectural introduction to the museum straddling a liminal space that is both interior and exterior. As porches (exterior rooms), they provide a backdrop to the lawn and are part of a carefully choregraphed sequence of architectural events that move the guest from the lawn to the museum. They sit in quiet repose animated by the movement of the sun, the sounds of the water, and echo of footsteps. They also reveal the constructive nature of the museum's gallery spaces (interior rooms). While elemental in their structural form, the structure foretells the story of the rooms to be formed within the museum.

For Kahn, the questions surrounding the relationship of tectonics to program was foundational and inseparable to his work. He approached architecture with the idea of the room with its proper proportion and purpose as the beginning of architecture and structure the giver of light. The role of architecture was to amplify and elevate the human condition. The KAM, arguable one of Kahn's finest buildings, in many ways best exemplifies his approach to the consequential relationship of architecture's constructive nature to inhabitation. Fundamental to this relationship at the KAM is the significant role the porches play in both the design and inhabitation of the museum.

This essay will use the porches of the KAM to provide a lens through which to study the importance of Kahn's complex and evolving relationship of tectonics to program and maturing architectural position.

An Argument for Maintaining Obsolete Architecture
A Case Study Into the Relational Character of Tectonics and Program When Transforming an Existing Building

Anne Beim, Magnus Reffs Kramhøft, Line Kjær Frederiksen

Keywords: Tectonics, Transformation, Reuse, Relevance, Longevity

Problem statement

What are the tectonic rules and principles that either hinder or underpin transformation of a building's program? Based on fundamental tectonic analysis this article critically discusses why/how a rather young office building - representative of a global commercial typology - now faces potential demolition. The building was once conceived as a prestigious 'architecturally designed headquarter',

symbolizing a multinational corporation’s future vision and market position, whereas today it is considered as an outdated building type that no longer serves its purpose or aligns with today’s functional and aesthetic preferences.

The objective of the article

Adaptive reuse and *transformation* of existing buildings are critical architectural strategies for reducing the building industry's environmental (GhG) impact by decreasing the demand for new construction (IPCC, 2023). Thus, reprogramming existing structures for reuse and to enable maintaining their relevance is arguably a less resource-intensive intervention than demolition for building new construction. (Eberhardt et al. 2022). However, existing structures hold inherent tectonic features based on their original programming that may challenge repurposing (Cramer & Breitling, 2007). This tension between *tectonics* and *program* forms the core of our case study examining *Nauticon*, a 1990s Copenhagen office building representing a typology often subjected to demolition. Nauticon was built between 1989-90, in the Southern part of the harbor of Copenhagen, Denmark. The building complex features four 5-story Y-shaped volumes connected by three transparent entrance halls. The eastern facades are dominated by blue-coated reflective glass, while the north/west facades feature load-bearing concrete elements. Modern office buildings with industrialized construction systems typically lack recognition as valuable architectural heritage, raising questions about preserving unloved/ unappreciated buildings of our recent past (Realdania, 2024). By identifying the *friction points* between Nauticon's original/ present programming and tectonics, this article aims to discuss less destructive and more meaningful building practices.

Analysis/discussion

This article analyses *friction points* between program and tectonics across three intersected levels, which also inform the discussion of how legislative framework impact Nauticon's architectural potential.

1. The context vs. the building body

This section points to the architectural visions and the state of industrialized construction in Denmark that have influenced Nauticon’s development. This includes the site and body of the building; *how are the material choices defining the composition of the building (heavy, flexible, durable, kit-of-parts, etc.), and its historical characteristics?* It also explores the legal requirements governing the building's reuse and its immediate context, noting how demands for recreational areas and supporting facilities have changed dramatically over the past three decades.

2. The building body vs. the floor plan

Nauticon's Y-shaped volumes were conceived as "universal building blocks" adaptable to any orientation and location. The Y-shaped floor plans with load-bearing facades - designed for maximum interior flexibility and office functionality - now represent the primary obstacles for reprogramming the building. This section studies the building principle; *how does the structural layout define the building’s program and vice versa, its usability, spatial qualities, flexibility and future adaptability?* Additionally, contemporary legislation regarding access, escape routes, and daylight requirements for spatial depths limits Nauticon's reprogramming potentials.

3. Floor plan vs. specific construction solutions

This section analyses specific design elements as window positioning in the load-bearing concrete facade. These windows were optimized for seated office workers rather than up-standing positions. Similarly, structural elements and joints were dimensioned and optimized for the functionality of the building, making substantial alterations both technically challenging and financially expensive. These design choices create both constructional and legal barriers to physical interventions and raises questions regarding design details and rhetoric; *how are the details generated, and which approaches are applied to enhance specific features? What are the functional or aesthetic role models?*

Conclusion

Analysis of Nauticon's tectonic language, current program, and potential future use, reveals significant design, construction, and legal barriers in the process of transforming the building for new use. The study concludes that aligning programs with existing building tectonics minimizes necessary extensive alterations. This reduced intervention scope—particularly for structural systems—is essential for minimizing environmental impact, waste generation, and virgin material consumption. Deeper understanding of a building's history, design intent, and construction principles enables more appropriate functional adaptations. Creating new relevance in existing structures is critical for preserving building resources in place—without it, buildings lose meaning, deteriorate, and face demolition.

Perspectives

How do we find the *potential-value* / *relevance-value* / *becoming-value* of a building?

Would more open interpretation of the legal framework be beneficial to preserve buildings and their relevance? Can market forces be challenged? Is it sustainable that financial incentives determine what a building's new program should be? Perhaps it's more appropriate to assess what is possible to create/achieve with the existing building at hand. Are modern buildings over-programmed and too purposely designed? How can we design for adaptability or for disassembly to prepare buildings for future changes and different needs?

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Edvard Ravnikar
The search for Architectural Authenticity
Aleš Vodopivec

Keywords: Edvard Ravnikar, Authenticity, Tectonics, Architectural Structure

Following the end of World War II, Slovenia saw the emergence of special, regionally adapted modernist architecture. The most credit for this development goes to Edvard Ravnikar, who advocated for the culturally specific character of architecture, even though at the time regional particularities of the built environment were beginning to lose their significance the world over. Ravnikar found the authenticity of Slovenian architecture in the sensitive dialogue between modernism and tradition.

His understanding of tradition draws both from the discipline of classical architecture and the elementary nature of vernacular architecture – the former as the lasting foundation and authority in the structural logic and method of construction, and the latter as an expression of utmost rationality and sincerity dictated by limited resources. Both of them, he found, are guided by the rules of tectonics. His architecture is therefore an indivisible whole of usability, structural design, and appearance. The emphasis is on the supporting structure, which defines spatial organisation, the module, the rhythm, the scale, and the outward expression of architecture. Ravnikar's designs are not inspired by an a priori image or an abstract artistic composition, but derive from selected construction techniques and methods, materials and their treatment, and the logic of combining and bringing elements together. This is what underpins the extraordinary complexity and unique poetics of his work.

Frank Lloyd Wright and the Nature of Concrete

Robert McCarter

Keywords: Frank Lloyd Wright, concrete, materials, tectonics

Critical events in architectural history are most often scripted in stylistic or purely formal terms. Yet architects practicing in America in the latter decades of the 19th century engaged another definition of the discipline of architecture, one that was much less concerned with fashion and form, and much more concerned with the tradition of building and the making of places. Throughout his life as an architect, Frank Lloyd Wright attempted to relate the spaces and forms of his designs to the structures and materials with which they were made —as he said, he worked "in the nature of materials." Wright believed this was essential if his buildings were to engage with the concept of *aedificare*, the ancient word for building, which means both to edify, to instruct, and to build, to construct—and both understood to be undertaken with ethical intention. Wright engaged in a constant search for a comprehensive order that would encompass both composition and construction, an order similar to the fusion of structure, material, form and function that he had found in his studies of nature. Wright attempted to develop forms from the rhythm inherent in each particular system of construction he employed, so that the construction might in turn be integrated with and responsive to the spatial idea. Of all building materials, Wright considered reinforced concrete to be the one truly modern material—"modern" for Wright because concrete was entirely "plastic," able to be formed into any conceivable shape, fully fireproof and self-supporting. Reinforced concrete was also the construction material with which Wright had both his greatest difficulties and his greatest successes. An examination

of Wright's efforts to appropriately employ reinforced concrete also illustrates the tradition of building as Wright redefined it in the 20th century.

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