



WHAT IF? WHAT NEXT?

# **SPECULATIONS ON HISTORY'S FUTURES**

## **SESSION 4A**

### **THE COUNTERFACTUAL**

**What If? What Next? So What? Exploring the Historical Consequences of Choices**

TO CITE THIS PAPER | [Gevork Hartoonian](#). "Mies Contra Corb: Whatever Happened to the Frame?" In *Proceedings of the Society of Architectural Historians Australia and New Zealand: 37, What If? What Next? Speculations on History's Futures*, edited by Kate Hislop and Hannah Lewi, 563-570. Perth: SAHANZ, 2021. Accepted for publication December 11, 2020.

#### **PROCEEDINGS OF THE SOCIETY OF ARCHITECTURAL HISTORIANS AUSTRALIA AND NEW ZEALAND (SAHANZ) VOLUME 37**

Convened by The University of Western Australia School of Design,  
Perth, 18-25 November, 2020

Edited by Kate Hislop and Hannah Lewi

Published in Perth, Western Australia, by SAHANZ, 2021

ISBN: 978-0-646-83725-3

Copyright of this volume belongs to SAHANZ; authors retain the copyright of the content of their individual papers. All efforts have been undertaken to ensure the authors have secured appropriate permissions to reproduce the images illustrating individual contributions. Interested parties may contact the editors.

# **MIES CONTRA CORB: WHATEVER HAPPENED TO THE FRAME?**

**Gevork Hartoonian** | University of Canberra

*This paper explores the tectonic implications of the frame in selected works of Le Corbusier and Mies. The intention and main scholarly contribution of the paper is to explore the diachronism informing these two architects' progression towards what I would like to call "frameless" architecture. If the ethos of frameless architecture can be traced in the French architect's manifesto, Towards a New Architecture (1925), Mies's trajectory began with his experimentation with various materials, including glass, concrete, and brick, during his German tenure, and ended in his American tenure with work similar to what Le Corbusier had started doing in 1925. Plotting a diagonal axis connecting the early architecture of Mies to the sculpted tectonics of Le Corbusier's late work, on the one hand, and the Mies of steel and curtain wall architecture to the Le Corbusier of the Dom-ino frame, on the other, this paper intends to recode the early historiographies of modernism in architecture, which more often than not were based on the conviction that the Zeitgeist informs architecture homogeneously. My anachronistic reading of the historicity of Mies and Le Corbusier unpacks their ideological position against the discursive continuum of Humanism in architecture, in spite of their theoretical inclination towards a frameless architecture.*

Mario Carpo has correctly observed that most architects tend to resist accepting technological change.<sup>1</sup> However, turning his focus to digital techniques, he dismisses the idea that the transformation from mechanical to digital reproducibility in architecture is informed by the dialectics of the technical and ideological. My criticism involves a Marxian doxa that each major turn in technical development ensures the formation of a related subjectivity to be internalized across the everyday life of capitalism. For instance, the ethos of modernism in architecture was deeply rooted in the replacement of the masonry construction system with that of the frame, aided by the availability of materials such as steel, glass, and concrete. The aesthetic, spatial, and formal fruits of this transformation are discussed by Sigfried Giedion in *Building in France, Building in Iron, Building in Ferroconcrete* (1928). Giedion was one of the influential agents of early modernism, and, similar to Carpo today, he also failed to identify the *Zeitgeist* as the ideology of an emerging bourgeoisie that would hold on to the Promethean faith in technological progress. For Carpo, however, central to the regime of digital reproducibility is the reversal of the Renaissance notational system to be copied in the built form. In this reversal, two things happen: 1) through 3D printing, the gap between design and building is eliminated in favour of an artisanal state of making, wherein the architect's authority is mediated not through drawing, but through direct "control" of the process of construction in collaboration with other involved agencies; 2) in the expectation of overcoming its current limitation (reproduction of small objects), digital making is expected to bridge the gap between design and production. Paradoxically, what this entails is expediting the assimilation of architecture into the processes of the production and consumption system of late capitalism, and this in spite of the current turn to the fold, which is most often conceived and contemplated independent of the frame holding up its surface. The fold, writes Bernard Cache, "falls away from the supporting structure and hangs like an oversized piece of clothing."<sup>2</sup> The result, "objectile," provides an image of objectivity exemplified in architecture's "tilt toward the curve," and in the spectacular undulating surfaces of variable curvature, referred to as the Bilbao effect. This unfolding should not be discussed merely in terms of the "technical object,"<sup>3</sup> but as part of the aesthetic of commodity form permeating the cultural realm. This is evident not only from the postmodern simulation of historical tropes, but also the recent rise of parametric architecture.

With the above introductory remarks, this paper would like to claim that criticism of contemporary architecture should focus on the historicity of the tectonics of skin and frame. Since Le Corbusier's conceptualization of the frame as the *Dom-ino object*, a distinction was made between the use of the frame in architecture and engineering. It also facilitated the re-territorialization of the ethos of Renaissance Humanism, particularly the turn away from the Gothic emphasis on the artistry of the constructed form in favour of *surface*, the articulation of which was expected to secure the authority of the architect against that of the engineer. The dichotomy between these two competing figures of the late nineteenth century is suggested in Giedion's aforementioned book, and cautiously elaborated in the opening pages of Le Corbusier's manifesto, *Towards a New Architecture*, 1925. He wrote, "The Engineer's aesthetic, and Architecture, are two things that march together and follow one from the other: the one being now at its full height, the other in an unhappy state of retrogression."<sup>4</sup> Accordingly, the architect's task was to close the gap between these two professions once personified in the work of *architekton*. In addition to the pragmatic dimension of the frame in the work of engineering, and Le Corbusier's conceptualization of the *Dom-ino*, Modernism also witnessed Mies van der Rohe's take on the frame. This German architect's early experimentation with various materials culminated in the tectonics of column and wall exemplified in the Barcelona Pavilion (1929). However, evident in Mies' architecture of the American period is a turn to recoding the classical understanding of column and its tectonic connection with the entablature, the beam. Having briefly established the different approaches of these two giants of modernism to the tectonics of frame, the remainder of this paper plots the diachronic temporality informing their architecture. In spite of or because of the suggested differences, I would also like to claim that, in an attempt to secure the autonomy of architecture, the work of Mies and Le Corbusier tilted toward frame-less architecture. Paradoxically, and this in reference to this paper's opening paragraph, frame-less-ness is the hallmark of objectile architecture, aspects of which I will briefly explore in Zaha Hadid's Heydar

Aliyev Cultural Center, Baku. My historiographic contribution here includes a tacit criticism of the Corbusian re-territorialization of the ethos of the architecture of Humanism in contradistinction to the Miesian strategy of deterritorialization. The difference between them is essential for demonstrating the homogeneous time underwriting the early historiographies of the modern architecture movement, discussed elsewhere.<sup>5</sup>

### The Technification of Architecture

Theodor Adorno coined the term “technification” to critique the use of electronic devices in music. Similar to other arts, the technical know-how of music changed after the nineteenth century, when *technique* came to be understood and used as part of scientific knowledge, potentially propelling the work of art beyond the Classical state of artistic creativity. The technification of the work of art, Adorno wrote, “matures along with the inclusion of techniques that had developed outside music in the course of the general growth of technology.”<sup>6</sup> The awareness that a composer could exceed the classical compositional notations and exaggerate the so-to-speak natural sound of an instrument, opened a horizon wherein what was originally a non-aesthetic element (the inherent sound of an instrument) was now considered an aesthetic phenomenon, first in musical terms, and then exceeding the boundaries of the musical to become part of the aesthetic of reception. The implied excess is important because its visibility coincided with the aesthetic of commodity form permeating the “culture industry,” a term Adorno used to characterize American post-war culture. The crisis induced by the introduction of techniques of mechanical reproducibility into the work of art also initiated new expressive themes at the expense of suspended traditional expectations. This is the case with Richard Strauss’s music, for example, for whom “technification goes together with the technique of surprise.”<sup>7</sup> Still, the technification of artwork enabled the artist to “objectify subjectivity” on a new scale that would overwhelm the public, similar to bourgeoisie interiors and the nineteenth-century exhibition halls.<sup>8</sup> On this, Walter Benjamin wrote:

World exhibitions glorify the exchange value of the commodity. They create a framework in which its use value recedes into the background. They open a phantasmagoria which a person enters in order to be distracted. The entertainment industry makes this easier by elevating the person to the level of commodity. He surrenders to its manipulations while enjoying his alienation from himself and others.<sup>9</sup>

In his magnum opus fragments, *The Arcades Project*, Benjamin investigates various aspects of the everyday life of nineteenth-century European culture, demonstrating the scope of the commodification of *things*. His project showcased not only technological transformation, but its infusion into the cultural realm experienced as “dialectical image,” a historiographic notion central to his philosophy of history. In exploring the world of commodities, Benjamin was equally interested in the seeds of resistance nested in the ruins left behind by history’s progress. Interestingly enough, to plot the extension of commodification, Benjamin recalls Gottfried Semper’s remarks on gas lighting: the German architect wrote, “What a splendid invention this gas lighting is! In how many different ways has it not enriched the festive occasion of life (not to mention its infinite importance for our practical needs!)”<sup>10</sup> These dialectical images, dangling between practical needs and expression, between construction and its architectonic articulation, are central to Semper’s theory of the tectonics of theatricality. Semper was indeed one of the pioneers in theorizing architecture beyond the limits inherent in classical theories. Apropos, and throughout the long history of modernity, architecture found itself in the emerging expanded field, what Benjamin called the “exhibition value” of the work of art. To get to the bottom of this claim, I should briefly map the differences between *techne*, *technique*, and *tectonics*.<sup>11</sup>

Before the advent of mechanical reproducibility, there were no discourses on technology as it is understood today. In contrast to the excessiveness injected into digitally reproduced architecture, essential to the classical aesthetic was the expected integrity between the Vitruvian triad of *venustus*, *utilitas*, and *firmitas*, in conjunction with the rules of gravity and the properties of materials. In the classical understanding of architecture, *techne* did not signify a means but the unity of means and end. As the *logos* of making, *techne* was critical to the planimetric and

sectional organization, and the aesthetic, of architecture until the seventeenth century. Since then, *techne* has been replaced by “technique,” or the manner in which an artist or an artisan uses the technical elements of an art or a craft. With the advent of mechanization in the late eighteenth century, the ontological rapport between art and science disappeared, and technique provided solutions to problems without necessarily evincing any particular concern for the disciplinarity of architecture, the culture of building.

Consider this: whereas symbolic and representational variations of classical architecture were inseparable from the architectonic potentialities of the masonry construction system, modern scientific knowledge, freed from the metaphysics of both Humanism and Christian eschatology, further expanded its operative horizon in the twentieth century. It offered solutions that transformed most of what was then associated with the term “industries,” and prepared the conditions under which technical inventions and products would be used across the world of manufacturing, to the point that, after WWII, the cultural realm would be transformed into an industry in its own right. If the I-beam, for example, was first cut and used in the construction of railways and bridges, it soon became the prime element in construction sites, under the rubric of the steel-frame system conceptualized in Le Corbusier’s Dom-ino frame. In addition to changing construction techniques, technical products introduced aesthetic norms into architecture that had no historical precedent. I am reminded of Le Corbusier’s fascination with the beauty of liners, and the comparison he made between the precision of the Parthenon and a 1920s car.<sup>12</sup>

If this was the case at a time when technical reproducibility “was considered a way for art to imagine a free, equal, and progressive society,”<sup>13</sup> in the age of digital reproducibility, technique has turned out to be the agent of the commodification of culture in general, and architecture in particular. Publicizing a photograph of a car taken next to the Villa Stein (1927), Le Corbusier’s proclamation that “a house is a machine for living in,” was also a confirmation that his work looked more advanced and “contemporary” than the car. Today the situation has changed drastically: both architecture and cars are designed and fabricated under the regime of digital reproducibility. Both have moved from semi-rectilinear to curvilinear shapes, simulating images that direct the spectator’s attention to surface, foregrounding a perceptive image of the *substance*. One major reason for this turn of events, I would argue, is the different distance cars and architecture maintained from the regime of mechanical reproducibility. Whereas a car was and still is closer, if not directly connected, to the prevailing skills and tools of the production process, architecture draws mostly from the pre-modern traditions of the culture of building. Even though architecture in modernity had already entered into the production and consumption cycles of the rising capitalism, because of this distance, it could still hold onto its disciplinary autonomy. If Villa Stein looked by all accounts more advanced than a car, in the era of digital reproducibility, both products enjoy a general sense of “design” that is primarily focused on “image building.”<sup>14</sup>

Having made these dense historical observations, I would now like to posit that in Modernity there is a double function to the frame: 1) to renew the premises of construction according to technological transformations; and 2) to mediate between the disciplinarity of architecture and the aesthetic of commodity form.

### **Towards a frameless architecture**

In addition to the prevailing general network of technical means and intellectual labour that glues architecture more than any other work of art to the present production and consumption system,<sup>15</sup> the challenge facing criticism and historiography is the recovery, “as far as possible, of the original functions and ideologies that, in the course of time, define and delimit the role and meaning of architecture.”<sup>16</sup> If we accept the advent of Modernity as a singular historical and structural event,<sup>17</sup> is it not convincing to say that architecture is divided between two long historical temporalities? One catalogues various manifestations of the historicity of modern movement architecture; the other concerns the Classical, including the baroque, which for a number of historians inaugurated mannerism in the style discourse. Central to the codification of the Classical tradition and its stylistic variations was the over-domination of artisanal techniques

exemplified in the masonry construction system. This tectonic consideration is important because it settles the differences between the Modern and the Classical in particular terms<sup>18</sup> – particular in the sense that it rejects the distinction between “art and non-artistic or historical pretexts.” The material of the work of architecture, to paraphrase Fredric Jameson, “has its own semi-autonomous history: but that history is itself part of the material.”<sup>19</sup> In tectonics, the aesthetic experience *includes* the matter of construction as well. Therefore, in Modernity, architecture’s rapport with History is centred, I would posit, on the agency of *frame*. I would go further, and, without elaborating the subject here, claim that the frame is a useful concept for differentiating the 1920s’ interest in “the international,” both in politics and architecture, from the globalization that has usurped the political regime of modernism.

If in western cultures the *Orders* define the universal dimension of the Classical, the universal in modern architecture draws mostly from three concepts of the frame formulated by Le Corbusier, Mies, and Wright.<sup>20</sup> Even though modern architecture was mostly seen as a rupture with history, from the position of the *longue duree* there is ample evidence of the abstract presence of pre-modern architectonic elements not only in Le Corbusier’s Five Points, but also in contemporary architecture – the return of surface for one.<sup>21</sup> What this means is that, in architecture, *frame* encapsulates the totality of Modernity, and any critical assessment of contemporary architecture should stand in dialectical rapport with the historicity of the frame. This is convincing if the history of modern architecture is reconsidered in the dialectics of synchronicity and diachronicity rather than in linear and homogenous temporality. To this end, I would like to present a diachronic mapping of four selected works of Mies and Le Corbusier, demonstrating these two architects’ non-simultaneous take on the frame and materiality.

Consider Villa Savoye and the Farnsworth House, one built in 1929 and the other in 1946. Le Corbusier’s villa takes full advantage of the Dom-ino frame, to the point of deconstructing the planimetric and volumetric organization of pre-modern architecture. At the outset, one should recognize that the Dom-ino was more than a frame; it was rather an *object*, a self-referential one, made out of four columns and two horizontal slabs connected together by a stair. In spite or because of the postmodernist simulation of historical forms, Le Corbusier’s idea of “free façade,” for example, is meaningful only in reference to the other four points discussed in his Five Points of Architecture. The tendency to make the frontal façade a representational surface has a long history in the architecture of Humanism. However, the Corbusian dictum of the free façade was tied into a particular metric relationship between slab, column, and the implied orthogonal extension of the edifice, discussed by a number of critics and historians, and most cohesively formulated by Peter Eisenman.<sup>22</sup>

Although the Farnsworth House is also made of two horizontal slabs, the design’s similarity with Villa Savoye goes no further. For one thing, Mies’s project has eight steel columns, four on each side, and hidden behind the glass facade. As an exposed monolithic element, each column is joined to the steel channel by plug welds on the concealed side so that no means of fastening are visible. These connections, writes Michael Cadwell, require “a sequence of operations that demand a high degree of craft, yet each operation disappears with the next.” In the sequential move from mechanical to industrial craft, and then to handcraft, Cadwell continues, there is no “glorification of technology ... as there is no remnant of the craft.”<sup>23</sup> This is indeed a significant observation as far as it concerns the differences between Mies and Richard Rogers and Renzo Piano of Centre Georges Pompidou, where technology attains what Frampton has described as the “product form.”<sup>24</sup> Apropos, the internal volume of the Farnsworth house looks as if hung from the frame structure, implying the possibility of extending the volume vertically rather than horizontally as is the case with the Dom-ino. Another difference relates to the notion of the free facade: in both buildings, the facade is free and plays no role in carrying the load of the building; however, in the Savoye the facade provides the opportunity to insert horizontal cuts into the surface of the building, whereas in Mies’s project the location of the mullions of the glass facade is determined by the distance separating the columns from each other. These tectonic differences support the aforementioned notion of frameless architecture I will discuss shortly.

My comparative analysis is not complete without picturing Le Corbusier's Maison Jaoul (1955) next to Mies's Concrete Country House Project (1925). Despite the thirty years separating these two works from each other, both disclose a shift from the tectonics of lightness in favour of heaviness. Evident in Maison Jaoul is Le Corbusier's departure from the Purist forms of Villa Savoye prone to the tactile sensibilities of load-bearing crude brick walls with unstruck mortar joints, exposed concrete beams, and Catalan tiles, which, according to Frampton, were "an affront to those architects who had been nurtured on the myth that modern architecture was necessarily machinist and planar and above all sustained by an elegant and articulate structural frame."<sup>25</sup> Here Frampton expresses a Benjaminian passion for unearthing the past, contrasting the vernacular culture of building in modern conditions with the straitjacket modernism tailored by the technification of architecture. This is a strategy of resistance which, I argue, Mies also pursued, with the difference that Mies would try to deconstruct aspects of the Classical culture of building such as the tectonics of column and wall and/or the significance of terrace making and roofing in consideration to Semper's theorization of architecture, also central to my interpretation of Mies's work.<sup>26</sup>

The Concrete Country House was part of Mies's experimentation with various materials: glass in the Glass Tower, brick in the Brick Country House (1923), and concrete in the Concrete Office Building (1923). In these projects, Mies was experimenting with the limits of a material and materiality without pursuing a particular meaning, how to make openings in a brick wall that exceed the aesthetic implied in traditional masonry buildings. Thus, unlike Maison Jaoul, the Concrete Country House demonstrates the plastic qualities of concrete as both a structural and covering element. In doing so, the project departs from the abode as a historical analogue in favour of a radical exploration of materiality of concrete. Walter Benjamin wrote that concrete offers "the prospect of new plastic possibilities in architecture."<sup>27</sup> Beyond the Concrete Country House's dynamic form, which can be associated with some Constructivist compositions, the excessive fenestrations of this house depart from platonic geometries. The continuous ribbon of basement windows, on the other hand, separates the building from its site, following the cuts a sculptor would make into a bulk of organic material, mud or plaster. The entrance to this house displays the act of incision, rather than the "gesture" of invitation. In all these ways, Mies's intention was to deconstruct architectonic elements from their figurative and linguistic connotative dimensions except the matter-of-factness. Implementing two different strategies in two different historical moments, Mies and Le Corbusier yield their work to the historicity of the culture of building, at the expense of using extra "expressive" forms dictated by technology. Nothing is more effective than these two architects' mature work for disclosing their diachronic understandings of temporality. At one pole, to benefit from T. J. Clark's reading of Picasso's painting, "is substance; at another, structure. Heavy opacity; weightless translucence."<sup>28</sup>

While the Dom-ino frame was integral to the tectonics of Le Corbusier's later work, Mies in his American tenure repeatedly used a single tectonic frame structure for different purposes, from a house to a museum. For these two architects, and for Aldo Rossi as well, *history* is analogous to a "skeleton," which, according to Peter Eisenman, "serves as a measure of time, and in return, is measured by time."<sup>29</sup> Whereas the *skeleton* is the agency of architecture's endurance in modernity, its naked presence in Mies's later work paradoxically ensures the continuity of the "room," the fundamental measure of anthropomorphism in architecture. Such is the complex role the frame has played in architecture since the inception of Modernity. However, particular to Mies's conception of the frame is the tectonic rapport between the roof, the column, and the glass enclosure. If we agree with the proposition that the nineteenth century's obsessive search for style was ultimately focused on the formulation of the language of steel and glass architecture, then Mies derailed the early modernist interest in intertwining style with *Zeitgeist*. The fact that this development coincided with various claims for the end of Modernity and the beginning of postmodernism demands a discussion that should focus on the complex rapport between the cultural and the openings initiated by the socio-economic and technological advancements of post-war capitalism.

Instead, I would like here to make a final observation: what overdetermines the architecture of both postmodernism and parametrics is the emergence of surface as an autonomous aesthetic entity. Beneath the postmodernist esteem for the simulation of historical forms are design strategies abusing Le Corbusier's conceptualization of the Dom-ino frame. What this means is that the idea of free-façade should be differentiated from the Humanist notion of frontality as a representational surface, and that the excess informing most of Zaha Hadid's later projects, for example, dispenses with the Miesian tectonics of frame.

Consider Zaha Hadid's Heydar Aliyev Cultural Centre, Baku. Using the most advanced computational system, the building demonstrates an undulating and soft-looking skin supported by a concrete structure combined with a space frame system. Furthermore, the surface geometry "fosters unconventional structural solutions such as the introduction of curved 'boot columns' to achieve peel of surface from the ground to the West of the building, and the 'dovetail' tapering of the cantilever beams that support the building envelope to the East of the site."<sup>30</sup> To ensure the design's powerful plasticity (expressionism), and to cover various transitional zones, the architect used different cladding materials such as Glass Fibre Reinforced Concrete (GFRC) and Glass Reinforced Polyester (GFRP). The building's frame structure is compromised by a composite construction system wherein the tectonic of skin and bone gives way to a rising and falling structural envelope. With this gesture, "the building blurs the conventional differentiation between architectural object and urban landscape, building envelope and urban plaza, figure and ground, interior and exterior."<sup>31</sup> The project's delicate tectonic grounding of the earth-work and the frame-work (to use Semperian terminology), on the other hand, is a reminder of Jørn Utzon's Opera House, Sydney, with this difference: Utzon's original shell roof-work had to be edited and replaced by a semi-ribbed frame and shell system. This tectonic consideration necessitated a construction system that combined structural elements of steel, wood, and concrete. Instead of smothering material and structural differences, Utzon highlighted materiality, charging the work with sophisticated joint-work and detailing evident in the interior and exterior surfaces of the building. Still, and in contradistinction to most parametric work, what stands out in most of Utzon's public buildings is the tectonic articulation of roofing and terrace making. By contrast, nothing demonstrates the atectonic quality of Hadid's Heydar Alyev project better than the smooth undulating interior and exterior surfaces. Similar to the overwhelming presence of commodity form images, the surface in Hadid's project is seemingly conceived independent of its structure. In the interior of Heydar Alyev, detailing is dispensed with at the expense of a white hollow, as if wrapping the spectator's body.

The definitive stylistic feature of most digitally-reproduced architecture comprises excessive smooth surfaces, to the point where the final result looks like an estranged object, hiding the complexity of how things are put together.<sup>32</sup> Moreover, in digitally reproduced organic shapes (the *objectile*) the lines structuring the surface are seen as part of the skeleton, defying the modernist frame construction system. To this end, and to further underline my earlier claim that Le Corbusier's praxis was, among other things, centred on the legitimization of some aspects of the architecture of Humanism, I am reminded of Robin Evan's take on Ronchamp. According to him, beneath the plastic-looking body of this building is a high-tech geometrical construction system.<sup>33</sup> According to Carpo, computational products now embody an artificial logic that is counter to that of natural, organic intelligence—the mode of thinking of our mind, as expressed by the method of modern science (and many today do not like that idea).<sup>34</sup>

Apropos, if one feature of the technification of architecture is the Heideggerian "unhandiness" of the technical object, another relates to the idea of image building permeating the present culture of capitalism. In parametric design, image precedes the constellation where the past could *leap* into the present, as Benjamin would say, blasting the continuum of time measured by the onslaughts of technological maximization. If the return of surface is the architectonic manifestation of the continuity of the culture of Humanism practised since the Corbusien Five Points, the Miesian tectonics of roofing heralds the de-territorialization of the culture of building that admittedly has ontological rapport with the artistry of artisanal techniques.



## Endnotes

- 1 Mario Carpo, *The Second Digital Turn: Design Beyond Intelligence* (Cambridge: MIT Press, 2017), 1.
- 2 Bernard Cache, *Earth Moves: The Furnishing of Territories* (Cambridge: MIT Press, 1995), 70.
- 3 Mario Carpo, *The Alphabet and the Algorithm* (Cambridge: MIT Press, 2011), 40.
- 4 Le Corbusier, "The Engineer's Aesthetic and Architecture," in *Towards a New Architecture* (New York: Parager Publishers, 1960), 15-24.
- 5 Gevork Hartoonian, *The Mental Life of the Architectural Historian* (London: Cambridge Scholars Publishers, 2013).
- 6 Theodor Adorno, "Music and Technology," in *Sound of Figures* (Stanford: Stanford University Press, 1994), 199.
- 7 Theodor Adorno, *Sound of Figures*, 200.
- 8 I am benefiting from Max Paddison, *Adorno's Aesthetic of Music* (Cambridge: Cambridge University Press, 1993), 252.
- 9 Walter Benjamin, "Paris, the Capital of the Nineteenth Century," in *Walter Benjamin, Selected Writings Volume 3, 1935-1938* (Cambridge: Harvard University Press, 2002), 37.
- 10 Walter Benjamin, *The Arcades Project* (Cambridge: Harvard University Press, 1999), 569-570. Semper's quotation is from his *Wissenschaft: Industrie und Kunst*, 1852.
- 11 The following benefits from the first two chapters of my *Ontology of Construction: On Nihilism of Technology in Theories of Modern Architecture* (Cambridge: Cambridge University Press, 1994/97).
- 12 With Mario Carpo's account of the first digital style, circa roughly the 1990s, which was evident in the Autocar makers' interest in using 3-D modeling, it seems we have come back full circle to when Le Corbusier drew analogies between cars, airplanes, and the Parthenon. Carpo, *The Second Digital Turn*, 55-65.
- 13 For a discussion of these two levels of technical impact on architecture, see Vittorio Gregotti, "On Technique," in *Inside Architecture* (Cambridge: MIT Press, 1996), 51-60.
- 14 In an essay of the same title, Hal Foster coined the concept of "Image Building" to discuss the intrusion of pop culture into architecture. See Foster, "Image Building" *Artforum* (October 2004).
- 15 On this subject, see Alfred Sohn-Rethal, *Intellectual and Manual Labour: A Critique of Epistemology* (London: Macmillan Press, 1978). In the introduction to the book, the author raises questions such as whether "technology does widen or narrow the gulf between mental and manual labor," and suggests that the response to similar queries prevailing even today says something about our thinking, which "is not Marxist enough."
- 16 Manfredo Tafuri, *Theories and History of Architecture* (New York: Harper & Row Publishers, 1980), 228.
- 17 See footnote 34 below.
- 18 For a different classification, see Peter Eisenman, "The End of the Classical, the End of the Beginning, the End of the End," *Perspecta: The Yale Architectural Journal*, no. 21(1984).
- 19 Fredric Jameson, "Foreword: A Monument to Radical Instants," in Peter Weiss, *The Aesthetics of Resistance* (Durham: Duke University Press, 2005), xxvii.
- 20 See chapter 8 in Gevork Hartoonian, *Time, History, and Architecture: Essays on Critical Historiography* (London: Routledge, 2018).
- 21 I noted this "return" in my *Crisis of the Object: The Architecture of Theatricality* (London: Routledge, 2006), chapter 6, 133-156.
- 22 Peter Eisenman, "Aspects of Modernism: Maison Domino and the Self-Referential Sign," *Oppositions* 15-16 (winter-spring 1979): 119-29.
- 23 Michael Cadwell, *Strange Details* (Cambridge: MIT Press, 2007), 113.
- 24 Kenneth Frampton, *The Evolution of 20<sup>th</sup> Century Architecture: A Synoptic Account* (New York: Springer Wien, 2007), 123.
- 25 Kenneth Frampton, *Le Corbusier* (London: Thames & Hudson, 2001), 146.
- 26 Gevork Hartoonian, *Time, History, and Architecture*, Chapter 5.
- 27 Walter Benjamin, "Paris, Capital of the Nineteenth Century," in *Reflections* (New York: Harcourt Brace Jovanovich, 1978), 155.
- 28 T. J. Clark, *Picasso, and Truth* (Princeton: Princeton University Press, 2013), 39.
- 29 Peter Eisenman, "Introduction," Aldo Rossi, *The Architecture of the City* (Cambridge: MIT Press, 1982), 5.
- 30 <http://www.archdaily.com/448774/heydar-aliyev-center-zaha-hadid-architects/> accessed, Nov. 7, 2014.
- 31 See <http://www.archdaily.com/448774/heydar-aliyev-center-zaha-hadid-architects/> accessed, Nov. 7, 2014.
- 32 Carpo, *The Second Digital Turn*, 80-81.
- 33 Robin Evans, *The Projective Cast: Architecture and Its Three Geometries* (Cambridge: MIT Press, 1995).
- 34 Carpo, 81.