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Thinking Architecture

Guest Editor: Lisa Landrum

Co-Editors-in-Chief:
Olaf Recktenwald and Athena Christina Syrakoy

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Introduction: *Thinking Architecture*

Lisa Landrum
University of Manitoba

In *Thinking in an Emergency*, Elaine Scarry exposes a fallacy: that in emergency situations thinking must cease for quick action to prevail.[1] She returns to this false opposition of thinking and acting in the closing chapter of *Thermonuclear Monarchy: Choosing Between Democracy and Doom*.[2] While the thrust of Scarry's argument is that weapons of mass destruction are incompatible with democracy, her underlying premise – that thinking does not oppose action but orients action – is also significant for the democratic art of architecture. Deliberative thinking enables action in the best direction. This capacity for deliberation, which Aristotle called *bouleusis* and aligned with *phronēsis* (prudence or practical wisdom), is essential for good decision-making, where the goal is not simply to act, but to act well in the midst of particular situations replete with complexities and uncertainties.

Scarry's call for thinking resonates with Hannah Arendt's insights on action and judgment, as presented in *The Human Condition*,[3] *The Life of the Mind*,[4] and a recent set of essays based on Arendt's "Thinking Journal" (*Denktagebuch*).[5] While architecture is not the target of Arendt's political thinking,

her insights on the public realm, social cohesion and plurality, and the power of collective speech and action to renew social relations and engender viable societies are instructive for architects (and anyone) concerned with the common good.

At a time of urgency, when architects are calling for less talk/more action in response to global crises ranging from a climate emergency to related crises of social and economic injustice, it is timely to reflect on the role of careful and imaginative thinking and to recover thoughtful speech and discourse as productive forms of architectural agency.

The "Call for Thinking" for this sixth volume of the *Montreal Architectural Review* invited papers, book reviews and discursive experiments exploring crucial manifestations, modalities and milieus of architectural thinking. Authors were encouraged to probe any one or combination of the following themes: embodied, situated and material modes of architectural thinking; places for thinking, which enable wonder, truth, justice, happiness and a beautiful life, as Marco Frascari advocated;[6] ensemble thinking, or thinking in concert (and tension) with plural agents in dramatic situations; philosophical models for architectural thinking, or what Aristotle called in *Nicomachean Ethics* "architectonic *phronēsis*";[7] and habits of thinking fostered via architectural education.

The contributions assembled in this journal intersect many of these themes. The first essay by **Rebecca Williamson**, "Thinking Through Building," situates key questions of this call via historical analysis, framed by contemporaneous concerns. Interpreting definitive statements by Étienne-Louis Boullée and Marc-Antoine Laugier in relation to aspects of twentieth-century discourse, Williams reveals how theoretical distinctions between building and thinking give way to a *praxis* of creative interdependence. This essay argues that the practice of architecture enacts its own distinctly hybrid form of thoughtfulness: through agencies of time, reciprocities of reflective and projective thought, and the polyphonic nature of communication necessary for constructing and construing any socially meaningful work.

The second essay by **Marcia Feuerstein** considers a particular wall of a single building via personal encounter, contemplative musing and hard facts. "In the sky with diamonds" describes the constellation of thoughts and events leading to the uniquely mysterious, yet surprisingly understudied, star-like array of apertures within the East wall of Notre-Dame-du-Haut in Ronchamp. Through scholarship infused with material imagination, this essay and its original montages exemplify the revelatory potential of situated thinking and patient (re)search, while showing how typical construction methods and marks may metamorphose to cosmological significance via serendipitous *in situ* encounters.

Mathew Mindrup's essay, "Thinking and Imagining Architecture at a Distance with Models," explores the gap between physical models and buildings as a crucial distance not to be overcome or eliminated, but to be thoughtfully engaged as a space of imagination, anticipation and memory. Indeed, it was precisely this space between representation and reality, Mindrup argues, that was embraced as a profound

opportunity for invention for eighteenth and nineteenth century designers. Grounded in textual sources and tangible testimony from a variety of treatises, archives and *kunstkammers* (cabinets of curiosity), Mindrup shows how architects have continued to seize the fictive agency of models (and building fragments) to think and rethink, assemble and reassemble built and desired realities.

In "Paper Architecture as a Site for Thinking, Writing and Spatial Agency," **Tordis Berstrand** turns from prose to poetry to experiment with language, metaphoric image and the space of the page as media and milieu for architectural thought. In a way that recalls Hannah Arendt's proposition that thinking is an unending dialogue "between me and myself,"[8] Berstrand engages a dialectic of question and response to explore the resonance and interchangeability between building, writing and thinking.

The final contribution, by **Jonathan Foote**, provides a probing review of Paul Emmons' 2019 book entitled *Drawing* Imagining *Building: Embodiment in Architectural Design Practices*. This timely and provocative work celebrates hand drawing as not only inseparable from architectural thinking but also imperative for fostering the ethical imagination of architects. Emphasizing the book's significance to our understanding of *embodied* drawing, building and imagining, Foote highlights Emmons' method of narrating the corporeal and phenomenal bases for typical drawing marks, methods, tools and gestures. As Foote makes clear, these insights into embodied drawing are all the more important in this post-digital era, reminding architects of the persistent role of corporeal imagination in projecting multi-sensorial environments for our human world.

An additional project contribution (Figure 1) represents a schematic design proposal for a **"Think-Tank"** by graduate student Eliezer Perez, devised with support of faculty at the Virginia Tech Washington Alexandria Architecture Center. This project explores how architectural thinking is intertwined with the spaces we occupy and inhabit via dreams. Perez's drawings, themselves demonstrative of multi-modal reverie, synthesize different drawing conventions with a desire to delve deep into thought through spaces for personal and social contemplation. Framed by a comprehensive design studio, with interdependent explorations in drawing, history and theory, this contribution also offers a pedagogical strategy for cultivating thoughtfully synthetic design strategies among students. As Alberto Pérez-Gómez has argued, architecture schools should leverage their relative autonomy to focus not simply on crafting plausible solutions, but on nurturing "tactics for thought" through creative dialogue, critical debate and personal imagination.[9] Building on this pedagogical provocation, all the contributions in this issue may be read as raising questions for how we prepare emerging architects to think and act wisely – even in the midst of emergency.

As readers of these essays will (re)discover, architectural thinking fundamentally entails language, writing, reading and discursive exchange. While architecture in some ways transcends verbal expression, verbalization is how its meaning becomes articulated, evaluated, shared, and deepened. As Swiss architect Peter Zumthor writes at the start of his own book entitled *Thinking Architecture*, "There was a time when

I experienced architecture without thinking about it."[10] Yet, his decision to assemble his thoughts through writing represents an attempt to bring awareness to those sensuous and seemingly inexpressible encounters, and to move others to consider the interplay of feeling and reason in the design and experience of architecture.

These essays participate in the perpetual project of understanding how we think through, with, about, against, in and for architecture – not solely for the sake of architecture but, as Hannah Arendt suggested, for the "love of the world" (*amor mundi*).

Images

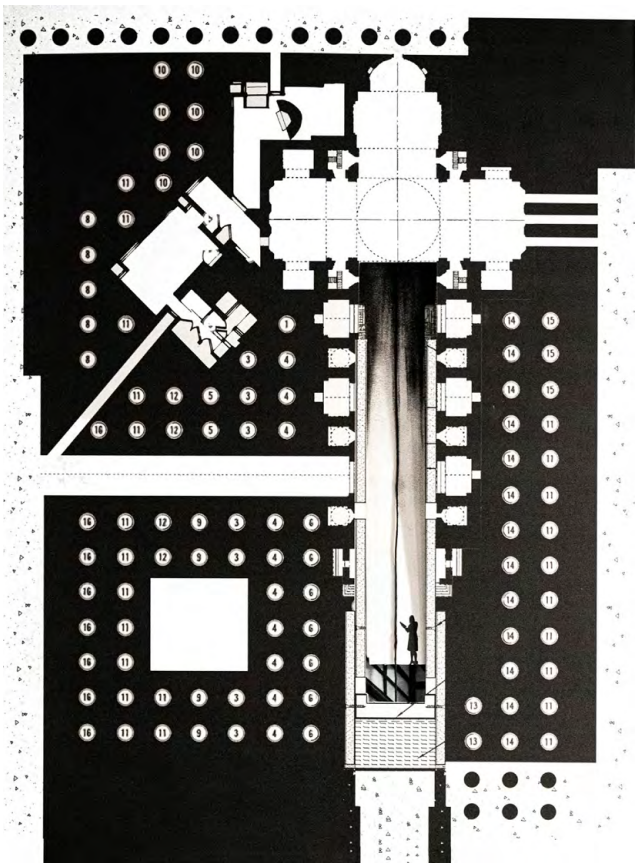

Figure 1. What makes a place conducive to thought? Inaugural drawing toward the design of an urban Think-Tank, imagining embodied thinking as immured within architecture. Prepared by graduate student Eliezer Perez at Virginia Tech, Washington Alexandria Architecture Center, Fall 2019.

Notes

1 Elaine Scarry, *Thinking in an Emergency* (New York: W.W. Norton & Company, 2011).

2 Elaine Scarry, *Thermonuclear Monarchy: Choosing Between Democracy and Doom* (New York: W.W. Norton & Company, 2016).

3 Hannah Arendt, *The Human Condition* (Chicago: Chicago University Press, 1958).

4 Hannah Arendt, *The Life of Mind*, vol. I *Thinking,* vol. II *Willing,* ed. Mary McCarthy (New York: Harcourt, Inc., 1977). In this posthumously published incomplete work, Arendt famously asks: "What are we 'doing' when we do nothing but think?" (I, 8). The third volume was to have treated *Judging*.

5 Roger Berkowitz and Ian Storey, eds., *Artifacts of Thinking: Reading Hannah Arendt's Denktagebuch* (New York: Fordham University Press, 2017).

6 Marco Frascari, "*De Beata Architectura: Places for Thinking*" in *The Cultural Role of Architecture*: *Contemporary and Historical Perspectives*, eds. Paul Emmons, Jane Lomholt and John Hendrix (London and New York: Routledge, 2012), 83-92.

7 Lisa Landrum, "Before Architecture: *Archai*, Architects and Architectonics in Plato and Aristotle," *Montreal Architectural Review,* vol. 2 (2015): 5-25.

8 Arendt, *Life of Mind*, vol. I, 185.

9 Alberto Pérez-Gómez, "Early Debates in Modern Architectural Education: Between Instrumentality and Historical Phronesis" in *Phenomenologies of the City: Studies in the History and Philosophy of Architecture,* ed. Henriette Steiner and Maximilian Sternberg (Abingdon/New York: Ashgate/Routledge, 2015), 167-179.

10 Peter Zumthor, *Thinking Architecture* (Basel: Birkhäuser, 1998), 9.

About the Author

Lisa Landrum is Associate Professor and Associate Dean Research in the Faculty of Architecture at the University of Manitoba in Winnipeg, Canada. She is a registered architect in New York State and Manitoba. She holds a Bachelor of Architecture from Carleton University, and a post-professional Master of Architecture and Ph.D. in the History and Theory of Architecture from McGill University. Her research on dramatic agencies of architecture and architectural theory has been published in a number of journals and edited books, including *Architecture as a Performing Art* (2013), *Architecture and Justice* (2013), *Architecture's Appeal* (2015), *Economy and Architecture* (2015), *Chora 7* (2016), *Confabulations: Storytelling in Architecture* (2017), and *Reading Architecture, Literary Imagination and Architectural Experience* (2018).

Montreal Architectural Review

Thinking Through Building

Rebecca Williamson
University of Cincinnati

> What is architecture? Shall I join Vitruvius in defining it as the art of building? Indeed, no, for there is a flagrant error in this definition. Vitruvius mistakes the effect for the cause. In order to execute, it is first necessary to conceive. Our earliest ancestors built their huts only when they had a picture of them in their minds. It is this product of the mind, this process of creation, that constitutes architecture and which can consequently be defined as the art of designing and bringing to perfection any building whatsoever. Thus, the art of construction is merely an auxiliary art which, in our opinion, could appropriately be called the scientific side of architecture.
>
> —Étienne-Louis Boullée, *Architecture, Essay on Art*[1]

Thinking Architecture

Among the disciplines and professions, architecture has always held an ambiguous status, functioning at various times and in diverse combinations as an art, a craft, a trade, a set of doctrines, or a mode of inquiry, depending on the facet most in view at the time. Each of these identities bears with it a mode of thought and a body of knowledge. This collection of types of knowledge makes for a persistent set of tensions within the larger field: between an elevated perch among the fine arts and the "mere" craft of building, between the competing desires for speculation and certainty, between innovation and habit, and between ideals and facts, to name just a few.

In the passage cited above, Boullée argues that the building is an effect, and architecture itself a cause. Furthermore, he argues, architecture is a "product of the mind," distinguished from the execution of the building through the art of construction. The purpose of the present text is to assert the thoughtfulness of building construction in its own right despite its traditional placement among the vast range of human pursuits as a lower order occupation than architecture would claim to be. It also considers how thinking relates to the physical experience of (the) building, both as an act and as an object.

For Boullée, the terms "art" and "science" do not have the same oppositional relationship that they would acquire later. For him and his contemporaries, the term "art" would indicate a craft acquired through practice, and "science" a form of knowledge acquired through study. The "art of designing," he seems to say, is the higher aim of architecture, and the art of building a lower, if necessary, function, an "auxiliary art" that is the "scientific side" of architecture, although he stops short of calling it a science.[2]

The arts, for Boullée, would include the actions and products of artifice, both those of a higher order, the fine, beautiful *beaux arts*, and a lower order, the crafts. Architecture is of the highest order, among the fine arts. The early 19th century architect, chef, and culinary author Marie-Antoine Carême's purported statement that "the fine arts are five: painting, sculpture, poetry, music, and architecture, of which pastry is the principal branch" reflects, with some whimsy, this higher order.[3] The lower order of arts would include many forms of artisanry as it relates to crafts and trades, including those associated with the construction of buildings. In Carême's terms, the building trades are perhaps more like stew than pastry.

In the passage cited earlier, which marks the beginning of Boullée's introduction, Vitruvius stands in for those who would equate architecture with the art of building. In the rest of Boullée's text, a certain "Pérault" bears the brunt of the criticism, as does "Vitruvius's Commentator." Both are, of course, labels for Claude Perrault, whose edition of Vitruvius would, in Boullée's time, still have been a key text and a relatively rare example of an illustrated set of detailed descriptions of construction practices, in contrast to the many texts depicting the completed building rather than the processes of its coming into being.[4]

Boullée states that the builder of the original hut had to have an image in the mind. In so doing he transforms the "savages" of so many prior accounts of the origins of architecture into "savants" in that their capacity to form a mental concept indicates the presence of thought and ultimately knowledge *(savoir)*.

The words "savage" and "savant," neither of which Boullée uses in this passage, but which other authors known to him would have tied to a primitive state and a knowing state, respectively, are false cognates. Savages in the texts with which Boullée would have been familiar would be forest dwellers (from the adjective *sauvage,* from the Latin *silva*, or forest), with the implication that they would be rustic, rough, and primitive. Savants, in contrast, are knowledgeable (from the verb *savoir,* related both the knowledge and taste). Boullée chooses a different term, *premiers pères*, or "first fathers." His ascription of the capacity for forethought elevates the primal architectural act, the pursuit of shelter, from a primitive reflex to a conscious intention. [5]

The roles of mind and hand in the making of buildings is arguably more central to Vitruvius's text than the oft-cited "triad." He is clear about his debt to prior writers in setting out his observations. Alberti's description of *lineamenta* goes on to posit an aspect of architecture that can exist as an image in the mind that is perfect, uncorrupted by matter and mistakes.[6] For Boullée, as for his predecessor Marc-Antoine Laugier, and many others, this is the preferred state of architecture: residing in the intellect as its true environment. The mess of the construction site occurs in a lesser, distasteful "other place."[7]

Despite the hierarchical devaluation of the art of building, and even in the face of increasing automation and the proliferation of communication modes, the physical actions of the construction and occupation of buildings continue to exert their presence in architectural thinking. The complete untethering of architecture from these physical realities has been merely a periodic flirtation. Even in cases of theoretical distancing, those physical realities remain today at the core of architecture.

Time in Architectural Thought

Thinking in architecture, as in other domains, can be both reflective and projective. Architects assess past and present and project toward the future. We glean knowledge of the past and present from our own experience, accounts of others, and extant evidence. We prefigure yet unbuilt conditions through drawings, models, text, or other modes. We anticipate problems and try to forestall decay, decline, assault, and failure.

Knowing is a fruit of reflective thought. In the eighteenth century, discourse on aesthetics in architecture and other arts distinguished between the knowledge (*savoir faire*, imperfectly translated as know-how) that comes through practice and the knowledge (*connaissance*, related to connoisseurship) that derives from an understanding of rules and principles. The latter type of knowing would require no direct experience in the production of the work, indeed a connoisseur could "master" such knowledge of many domains, Laugier argued in the midst of his rapid production of critical essays on architecture, music, and painting.[8]

The actions required to bring a building into existence, like many other kinds of actions, have their basis in a combination of different kinds of thought. The notion that an architect must be informed about many disciplines is at least as old as the oldest extant writing about architecture in the Western tradition, as well as some outside that tradition, such as the Asian, Arabic, and Persian texts that address aspects of architecture and urban design from standpoints such as ritual, medicine, and social structure.

At the same time, the tradition recognizes and, at times, contests, the role of "the art of building" as a practical concern proper to the larger domain of architecture. Those who embrace the identification of the art of building with architecture see the physical production of buildings as central to architecture itself. Those who reject it do so not by affirming that the production of buildings is irrelevant, rather that it is not the highest aim of architecture.

Building Thinking

Leon Battista Alberti's "veil," the screen of projection and the mediating layer, functions as threshold not only between matter and mind, but also between past and future. In Alberti's triangular interpretation of the triadic structures he inherited from Vitruvius, the mind-eye is the apex, matter is the base, and the plane of representation as the mediator. Similarly, as his *Dinner Pieces* show, society and buildings both have layers in a clear hierarchical relationship, with the heavy, lower layers bearing the lighter, more "noble" parts, mediated by a middle layer of action (negotiation or *neg-otium*, not-leisure).

The relationship between past, present, and future maps onto this structure. When Alberti refers to the past as a shipwreck (*naufragium*), it implies that it is a pile of rubble as heavy as the foundation stones of his story in his Dinner Pieces about the temple dedicated to the goddess *Tussis* (the Latin word for cough).[9] The future, in that it is projective, aligns with the mind's-eye. The fleeting, active present mediates between the vast, heavy, inert accumulation of the past and the brilliant possibility of the future.

Alberti seems, however, to view the future with anxiety, aware of the possibility that today's and tomorrow's constructions will one day become part of the rubble of the past. He ends his *De Re Aedificatoria* with a description of ways that buildings fail. Not unlike the parallel between construction site and ruin that Louis Kahn would famously popularize centuries later, for Alberti the fruit of the act of building contains the seeds of the demise of the building as an object.[10] That part of architecture that is not attached to the physical building, on the other hand, eludes the fate common to tangible objects.

The cognates edifice and edification (*aedificare,* for Alberti) are testament to the connection between thought and building in European languages with a debt to Latin. This is distinct from the connection of the German *bauen* with dwelling, and ultimately with being, a separate argument that we will skirt here.

For the purposes of this examination, the term "building" refers to the edifice itself and to the actions connected with its production and not to dwelling, nor home, nor to judgements about "being" as it relates to human inhabitation and the social importance of grounding.[11]

Kahn's parallel of the construction site and the ruin implies that the forward gaze of the act of building holds within it the inevitability of the decline, with the birth and death of the building as an object bundled into the same thought. Decisions about how to construct a building are, inevitably, decisions about how it will fall apart. In the face of budget limitations, an increase in complexity of the forms could mean a decrease in the quality of the cladding. That same complexity might mean a proliferation of vulnerable surfaces that further hasten the demise of the building, or costly efforts to rehabilitate it with a facelift aimed at forestalling further signs of decline and preserving the external appearance of freshness.

Thinking Together

Thoughts related to building include both the recognition of past and present circumstances and the pre-cognition of possible futures. In the production of a building, architectural thought does not function alone, but is instead part of a network of different kinds of thought. The architect enters into a series of conversations with communities, clients, and tradespeople. All of these bring to the building process thoughts connected to their roles, with attention to a range of scales and types of information, including detail to urban scale, and quantitative, visual, and verbal communication. Alongside the specialized knowledge of the architect, the ability to bridge these other kinds of knowledge is essential to construction.

The mere fact of its physical bulk and imposition on the landscape ensures that a building will involve thought in its production and reception in ways that another artifact, say a park bench or a table, might not. The bench or table, most of the time, finds its place and does its job without a lot of decision-making or questions of meaning. Under ordinary circumstances it is just there, available and unremarked. Seen as objects subject to the same rules and constraints of fabrication and use as buildings, the bench and table need to be stable, indeed, most of the time they employ construction similar to the much-evoked "primitive hut" to which various authors from Vitruvius to Le Corbusier attribute the origins and model of architecture: materials assembled so as to withstand loads and persist in their environment.[12]

The building that is stable, present, and usable, like the table and bench, is a subset of architectural thought, and the relative importance a thinker about architecture will ascribe to it might vary according to positioning with regard to a style, movement, ideology, or school of thought. For the purposes of this essay, building (the action) and the building (the object), understood in the most basic manner, are the focus, separate from any debates about the merits of any individual building or set of processes in bringing it into being.

The kinds of thought that go into a particular building will depend on its situation. Sometimes the thought may manifest itself in gestures that largely elude language, image, and number. This has been the case throughout history, as the vast majority of buildings have come into existence through a reliance on this kind of know-how. Architect-designed buildings have always been a relatively small portion of the building stock.

Other times the thought that goes into building could involve one or more modes borrowed from a range of specialized practices such as mathematics, science, or philosophy. Architecture owes a debt to these other vocabularies for their help in articulating the tacit and tactile thinking that remains the vast majority of the thought that brings a building into being. At the same time, there is a thought proper to building as a process. This is distinct from the thought or thoughtlessness that occurs in, through, about, and around buildings as objects.

Those who receive the building – critics, occupants, and members of the broad category of "public" - may find it lacking in innovation or decry perceived recklessness, or they may admire it, but most of the time people pass through buildings, and think about matters other than the building that they are occupying at the time. A lesson of Walter Benjamin's evocation of the "state of distraction" is that a building does not, in fact, need to be a thing to think about.[13] It can, instead, be a place to think about other things. This has, at times, been something of a contentious issue, as, Benjamin's comments notwithstanding, architects and the public appreciate the role the building plays as an art object to be studied, sometimes to the chagrin of those who seek to place art within it.[14]

Many instances of architecture, including some of the most provocative and influential ones, "exist" outside of the realm of physical buildings, as image or description. Examples include Piranesi's prisons and Mies van der Rohe's Friedrichstrasse tower.[15] Some architectural images test the boundaries between an image that evokes a space that has some plausibility as a building, however unexpected, and one that provides the viewer no obvious way to imagine an occupiable space.[16] (Figure 1)

Just as speculative drawing is a way of thinking through building, so, too, is the physical act of building an act of thinking, however humble that thinking might be at times during the process. Each gesture of the process, whether dramatic and collective, such as assembling structural elements, or modest and private, such as caulking around a bathtub, requires thought. The ability to do each task well demands knowledge, including awareness of conditions and materials and a sense of how details relate to the whole. It also requires self-awareness such as proprioception (sense of placement of the body and its parts in space), pacing, balance, and assessment of the relationship between one's own strength and that required for the task. Thinking, knowledge, and judgement thus tie together in the building site even in the absence of architectural intention. Architectural intention then layers upon the thoughts and knowledge embodied in the building process another set of thoughts and knowledge. These have to do with anticipation.

Quips such as "architecture is what is left after the building burns down"[17] illustrate the degree to which the notion that architecture is, or should be, an elevated mental practice that transcends material conditions. Counter-quips, such as "architecture gets it theories from the dumpster behind the philosophy department,"[18] seek, on the other hand, to dismiss or at least downgrade the intellectual ambitions of the field, presumably in favor of the construction materials in the dumpster outside the building site. Some form of this split has persisted in the field at most times and in most places, to the extent that the tug-of-war between ideas and matter would seem to be a defining characteristic.

The label of "architecture" appears in association with entities and constructs that are not physical buildings or their representations. These include policies, systems, programs, and organizations. Philosophy, too, relies on spatial and constructive terms such as grounding, foundation, framework, structure, distinctions between up and down, in and out, and entrances and exits. Architecture itself, whether in the guise of a discipline or a profession, partakes of such conceptual "architecture."[19]

Stubborn Building

Conceptual architectures notwithstanding, building in its non-metaphorical and most basic sense is a physical rather than verbal act, a sequence of gestures, whether by hand, tool, or machine, that manipulate matter. Many if not most buildings have come into existence with little in the way of a written account, and often even without much visual documentation, leaving the traces of the thought that went into them in the physical structure itself, to the extent that these traces are legible.

Although architecture has a long-standing relationship with philosophical discourse, borrowing back the building metaphors, and finding inspiration in its forays into ungrounded structures and warped or folded spaces, the realities of building remain stubbornly constrained by the way gravity and geometry work within the scale of the body. Although extreme conditions such as outer space or the deep sea provide some unique challenges, buildings on earth generally need some attachment to a ground, not an abyss. In the words of Henry Wotton, "First then concerning the Foundation, which requireth the exactest care; For if that happens to dance, it will marre all the mirth in the House."[20] To make a building appear to defy our basic understanding of gravity or geometry requires deft deployment of that very understanding. The thinking that occurs within and through "the art of building" thus may or may not be informed by articulated philosophical arguments.

This is also not the place to delve deeply into "design thinking" as it has emerged to describe the application of models of decision-making that occur in the design of objects and information (industrial, graphic, and related design, often for commercial, medical, or other applied purposes) toward other domains such as business, organizations, military operations, and vice versa. Design thinking, understood broadly, benefits from and fosters such cross-fertilization.

"Design thinking" in its current guise, as it relates to commercial object and information design, bears strong connections to the burgeoning fields of branding and marketing, endeavors tied to increasing consumption. These are not entirely new nor alien ideas in architecture. Le Corbusier's interest in advertising bordered on obsession.[21] Architecture's role in developing, implementing, and promoting products and lifestyles, fruit of affinities with industrial, graphic, and fashion design, came into full flower during the twentieth century and continues apace.

At the same time, architectural thinking has long had a resistive streak, pushing back against consumer culture. Whether in the Renaissance embodiment of a cosmic order or in the critical theories that emerged during the twentieth century, there was usually a sense of resistance to the popular marketplace in favor of the elite position of the architect as the first or highest (*arché*) of the arts (*techné*) or, in modern terms, the master-planner. Exceptions, such as Denise Scott-Brown's "deferred judgement," found in the embrace of the landscape and imagery of popular culture, form of resistance to that elitism.[22]

Building as Cultivation

In his essay "Composers as Gardeners," the artist and musician Brian Eno contrasts the architect, whom he compares to the traditional composer, as "someone who carries a full picture of the work before it is made" with the "gardener," whom he compares to a new type of composer, as "someone who plants seeds and waits to see exactly what will come up."[23] He argues that "the 'composer as architect' metaphor is a transitory historical blip."

The "full picture" that Eno evokes resembles the "picture in their minds" described by Boullée. This mental picture that Boullée describes, and Durand develops further, is central to the process and product that architects would, in fact, label "composition": a planned arrangement, developed as a "full picture" before implementation, according to a framework or set of principles, or the process of coming up with that arrangement.

This notion of composition contrasts with the incremental process, analogous to plant growth, that Eno describes. Although it is not clear that the parallel is intentional, Eno's evocation of the planting of seeds relates to Heidegger's description of building as cultivation. In a passage of his "Building Dwelling Thinking," Heidegger compares cultivation to the building and care of dwelling places, as opposed to the aspect of edification mentioned earlier, which he compares to the building of ships and temples:

> Building in the sense of preserving and nurturing is not making anything. Shipbuilding and temple-building, on the other hand, do in a certain way make their own works. Here building, in contrast with cultivating, is a constructing. Both modes of building - building as cultivating, Latin *colere, cultura*, and building as the raising up of edifices, *aedificare* -are comprised within genuine building, that is, dwelling.[24]

Eno's argument about musical composition notwithstanding, one might debate whether all architects do indeed start with a "full picture of the work," or if the architect, too, experiences moments analogous to providing a nurturing environment for a seed and waiting, however impatiently, to see what emerges. In a passage in his manuscript treatise, Antonio Averlino, known as Filarete gives the architect such a nurturing role when he describes how the patron or client "inseminates" the architect with the seeds of an idea so that the architect may carry it, as if in a pregnant belly, for months before birthing the building:

> The building is conceived in this manner. Since no one can conceive by himself without a woman, by another simile, the building cannot be conceived by one man alone. As it cannot be done without a woman, so he who wishes to build needs an architect. He conceives it with him and then the architect carries it. When the architect has given birth, he becomes the mother of the building. Before the architect gives birth, he should dream about his conception, think about it, and turn it over in his mind in many ways for seven to nine months, just as a woman carries her child in her body for seven to nine months. He should also make various drawings of this conception that he has made with the patron, according to his own desires. [25]

Marco Frascari, in an unpublished lecture in the late 1990's, discussed a similar contrast between pre-conceived "framework" thinking, which he associated with wood and metal and other constructions of linear elements (similar to Heidegger's "ships and temples), and the "incremental" thinking typified by bricklaying. The "problem" of the Tower of Babel (Figure 2) that necessitated its destruction, he argued, was that it demonstrated the power of the accumulation of small moves, in contrast to the preconceived framework.[26] More recently, the members of Interboro Partners have articulated an "endogenous" approach to urban design based in gathering the stories of the people in a place, assessing emerging characteristics, and working to bring these to light rather than imposing a "Master" plan.[27]

The games existed, the Circus not yet

A building's durability in place and its ability to be occupied enable it to persist into a future. Non-building structures described as architectural, such as a plan or government or institution, bear that analogy out of hope that their structures, too, will be durable. In projecting a physical space to accommodate a desired social or political condition that does not exist, the architect supports aspirations of those who hope to achieve this change. In some cases, this involves evocation of past forms, and in others, a search for previously unseen forms.

Much thinking in and about architecture is a projective act (anticipating the act of building, anticipating decline and decay). Knowing, on the other hand, is reflective, upon what has happened or is happening. The thoughts that go into bringing a building into existence are distinct from those of its "users" or "occupants." Both words imply that these bodies have a temporary and even exploitative relationship with the space. Their "state of distraction" it is not due to a lack of thought, rather to thinking about something else while passing through architecture, a condition that the architect ought not begrudge. This is neither a connoisseur's nor a critic's thinking, but the know-how of "spatial practices" and habitual uses, including transit, resting, tending, mending, and cleaning.

Thinking and knowing as they relate to building both exist in relationships with time: reflective thinking looks backward to individual and collective histories, and projective looks "toward an architecture" (*vers une architecture*, in the original words of Le Corbusier's title, translated into English as *Towards a New Architecture*) to a potential future implied by a plan or concept. Knowing about buildings, likewise, divides between know-how that accrues through experience, and critique that aims toward influencing subsequent reception and practice. The latter echoes the aforementioned distinction between the *savant*, whose knowledge of the craft is direct, and the *connoisseur,* whose judgement derives from understanding of the principles off the arts, including architecture.

As a form of knowing, know-how involves correlating past, in-progress, and projective thoughts as well as a network of communications among different participants in the building process. Connoisseurship, on the other hand, involves re-cognition, an assessment often (and increasingly) based on a graphic image only, not the sound or smell or social dynamics of a place. To use an idiom often associated with politics, the connoisseur assesses the sausage (the finished product in the form of law, rule, image, completed building, or other end result) while the savant engages in the unaesthetic process of sausage-making.

An example of the evocation of the past to project a future condition is Boullée's discussion of the Coliseum. He argues for national celebrations as public entertainment as a supplement to punishment to "reinstate morality through the lure of pleasure." In describing the social and political role of the coliseum as a site for sporting events and other national celebrations, he describes the presence of the crowd in the vast structure he proposes:

> Imagine three hundred thousand people gathered in an amphitheatre where none could escape the eyes of the crowd... The spectators would be the elements of this surprising spectacle and they alone would be responsible for its beauty.[28]

Here Boullée proposes not only a physical structure but also a mode of interaction among people unlike anything existing at the time in France, but both of which, together, reflect a projection of a social and political future that the projected architecture intends to both accommodate and enact. To find a precedent for such a structure, he evokes a speech by the Abbé Brotier that describes Rome, and specifically,

the transition of Rome from the notorious Tarquins[29] through the Republic and on to the Imperial phase, with the physical space expanding in scale in tandem with the ambitions of Roman political domination. When Brotier states that "The games existed, the Circus not yet," he succinctly ties political intentions to architecture. [30] The games, as an activity, find their place in the Circus, a physical space that comes into being as a result of a political and social need, then, once in existence, conditions further political and social functions.

Thinking Back

Critique stands in opposition to know-how, as a judgement of ends rather than means. Laugier, as a connoisseur, is a critic in the sense that he assesses a work of art, music, or architecture according to his understanding of the system of rules that he has acquired not through practice, but through study.[31] By the mid-twentieth century, however, architects had embraced expanded notions of critique. For Manfredo Tafuri, for example, critique is "resolutely negative, the vigilant denunciation of existent or historical architectural ideologies."[32] In this interpretation, critique looks backward, indeed Tafuri's historical studies contributed to a political understanding of architecture during the second half of the twentieth century. Inversely, in the invocation of Utopia, or in contemporary, seemingly ubiquitous exhortations to "create change," critique takes on a projective and activist role.

This complicated relationship between reflection and projection, between theory and praxis, and between critique and action, is not by any means exclusive to architecture. It is rather a problem that attaches itself to architecture by virtue of architecture's inescapable connections to political structures. The embrace of praxis entangles the practitioner in the messiness of things-as-they are, risking accusations of resignation.[33]

Laugier's exhortation that we "never lose sight of our little rustic hut," despite its charming promise of simplicity, stands alongside his denunciation of the "chaotic mess" of the construction as call to the same higher order of architecture as a "picture in the mind" evoked in the passage by Boullée at the beginning. The "primitive" hut is not messy, because it is not a building. Instead it is a mental model, hygienic in its avoidance of compromise, intended to advance architecture toward a more perfect future.

Meanwhile, here in the present day, wherever we find ourselves, however distant or proximate Utopia might seem, (the) building persists as an activity and as an object in which our bodies and minds participate. This participation is in the choreographies of construction and maintenance, in the wandering and rest within, and in the decay engendered by physical contact through wear and by lack of such contact through weathering, neglect, and disrepair.

The mind and body alike occupy the building through drawings and other representations both projective and reflective and through physical encounters of construction, use, and occupation. The conceptual aspects of architectural thinking contribute to the ability to project, assess, and remember even buildings that never existed. The embodied thinking through buildings is, however, the necessary, active thought that erects and maintains buildings, inhabits or neglects them, and participates in their wear, decline and decay, until we mend, amend, and rebuild them, demolish them, or wander their ruins.

Images

Figure 1. Mies van der Rohe, "Hochhaus aus Eisen und Glas, (Skyscraper in Steel and Glass),"1921

The photomontage showing the model for a skyscraper on Berlin's Friedrichstrasse set among rough sculptures of older buildings against a backdrop of trees appeared in Hannes Meyer's article, "Die Neue Welt" in *Das Werk* – volume 13 (1926), number 7, 205-23.

In the accompanying article, mirroring the original Babel project, Hannes Meyer evokes Esperanto as the "construction of a supra-national language" (*übernationale Sprache*) (Meyer, 222). It subsequently appeared in the short-lived Ukrainian journal *Nova generacija: žurnal revoljucijnoï formaciï mystectv* (Kharkiv, 1928), Number 10.

Figure 2. Athanasius Kircher, *Turris Babel sive Archontologia…* (Amsterdam: Jansson-Waesberge, 1679) Public Domain. Source: Universitätsbibliothek Heidelber https://digi.ub.uni-heidelberg.de/diglit/kircher1679/0059/image.

"…when Nimrod had selected and summoned architects from everywhere… he disclosed his entire plan to them, instructed them as carefully as possible in pursuing everything that concerned said construction, prescribed the measurements of the whole, showed a model or prototype made of wood or clay…" (p. 41. trans. P. Van Minnen).

Notes

1 Étienne-Louis Boullée, *Architecture, Essay on Art*, trans. Sheila de Vallée, ed. Helen Rosenau (London: Academy Editions, 1976), 83.

2 At the time Boullée produced his manuscript, the educational and professional pathways of architecture, located among the fine arts, and engineering, which would include the expanding sciences of construction, had begun to separate. The distinction would, however, remain contested for some time.

3 The widely repeated phrase is attributed to Marie-Antoine Carême, author of *La Pâtissier Pittoresque* and other early 19th c. works on culinary and architectural arts. See Lawrence Gasquet, "Gastronomie & Maniérisme :L'Art de Manger avec les Yeux en France à partir du XVIIIème siècle" in *transtext(e)s transcultures 10 | 2015 : Manger, Représenter: Approches transculturelles des pratiques alimentaires* http://journals.openedition.org/transtexts/607. This scholarly article also contains a discussion of the relationship between taste and cognition.

4 Boullée alters the spelling of Perrault's name in a way that would result in a different pronunciation, reminiscent of *pér os* (the medical term for "by mouth," describing oral ingestion of a remedy, perhaps a jab at Perrault's primary role as a medical doctor). A comparable modification of Boullée's name would result in the word "*boule*," or ball, a connotation perhaps not lost on Boullée himself given his attachment to spherical forms.

5 Boullée, *Essaie sur l'Art* in Papers of Étienne-Louis Boullée, *Bibliothèque Nationale de France*, Id. ark:/12148/btv1b9061529g https://gallica.bnf.fr/ark:/12148/btv1b9061529g/f1.item.

6 Leon Battista Alberti, *On the Art of Building in Ten Books*, trans. Rykwert, N.Leach, and R.Tavernor (Cambridge, MA: MITPress, 1988), 5-7.

7 Michel Foucault, "Of Other Spaces: Utopias and Heterotopias" (March 1967 lecture originally published as "Des Espace Autres" in *Architecture /Mouvement/ Continuité*, October 1984) in *Rethinking Architecture: A Reader in Cultural Theory*, ed. Neil Leach (New York: Routledge, 1997), 330-336.

8 Marc-Antoine Laugier, *An Essay on Architecture*, trans. Wolfgang and Anni Herman (Santa Monica: Hennessey & Ingalls, 1985).

9 Leon Battista Alberti, "The Temple" [Templum] in *Intercenales*, in *Dinner Pieces*, trans. David Marsh (Binghamton: Center for Medieval and Early Renaissance Studies, 1987), 175-6.

10 William JR Curtis, "Louis Kahn: The Space of Ideas," *The Architectural Review* 23 (October 2012) https://www.architectural-review.com/louis-kahn-the-space-of-ideas/8637503.article

11 Martin Heidegger, "Building Dwelling Thinking" in *Poetry, Language, Thought,* trans. Albert Hofstadter (New York: Harper and Row, 1975), 143-62.

12 Under some circumstances within architectural thought, though, the status of the desk or the bench can present itself as more complicated, as in Peter Eisenman's complaint concerning Jacques Derrida's comments about the design of a space at Parc de la Villette in Paris: "He wants architecture to stand still… in order that philosophy can be free to move and speculate… he wants architecture to be real, to be grounded, to be solid, not to move around … he said things to me that filled me with horror: "How can it be a garden without plants?" "Where are the trees?" Where are the benches for people to sit on?" This is what philosophers want, they want

to know where the benches are." Jacques Derrida, cited by Peter Eisenman, cited by Jeffrey Kipnis in *Architecture Theory since 1968*, ed. K. Michael Hays (Cambridge, MA: MIT Press: 2000), 713. Graham Harmon, on the other hand, uses the table as an example as he seeks to contribute to the identification of alternative descriptions of the modes of existence of objects. Graham Harmon, "The Third Table," in *100 Notes, 100 Thoughts: Documenta Series 085* (Hatje Cantz, 2012).

13 Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction" in *Illuminations,* ed. Hannah Arendt, trans. Harry Zohn (New York: Schocken Books, 1969), 217-220.

14 During a screening of a precise and meditative film by the Canadian film installation artist Mark Lewis for an exhibition at the Kunsthaus, in Graz, Austria, in 2004, a mechanical malfunction caused several moving elements of the room to operate simultaneously in a frenzy of activity. During informal comments afterward, Lewis spoke about his sense that the building was competing for attention with the art held within it. For information on Lewis, see: http://marklewisstudio.com/

15 For examples of the Friedrichstrasse drawings by Mies van der Rohe, see: https://www.moma.org/collection/works/787 and https://www.phaidon.com/resource/mies-p66.jpg

16 See, for example, certain compositions by Lebbeus Woods UTOPX series (2008) by Lebbeus Woods https://www.architectural-review.com/marginalia/rendering-speculations-london-uk/8600510.article and https://lebbeuswoods.wordpress.com/2010/07/15/rendering-speculations/

17 Recollection of conversation with unidentified architecture professor, mid-1980's.

18 Recollection of conversation with Richard J. Betts, citing another unidentified architecture professor, late 1990's.

19 Catherine Ingraham, "The Faults of Architecture: Troping the Proper," *Assemblage*, No. 7 (Oct. 1988): 6-13.

20 Henry Wotton, *The Elements of Architecture* (London: John Bill, 1624), 22-23.

21 Beatriz Colomina, "*L'Esprit Nouveau*: Architecture and *Publicité*" from *Architectureproduction*, (*Revisions*, Volume 2) ed. Beatriz Colomina and Joan Ockman (New York: Princeton Architectural Press, 1988) in Hays, *Architecture Theory,* 626-40.

22 See Andreea Mihalache "On 'Deferred Judgment:' Historical and Contemporary Perspectives" Unpublished paper presented at *Architectural Theory Now?* conference, April 5, 2019, University of Pennsylvania. Citation courtesy of the author.

23 Brian Eno, "Composers as Gardeners" interview in *Edge*, *Conversation: Culture,* November 10, 2011. https://www.edge.org/conversation/brian_eno-composers-as-gardeners

24 Heidegger, *Poetry, Language, Thought,* 147-8.

25 Antonio Averlino (Filarete) in *Filarete's Treatise on Architecture: Being the Treatise by Antonio Di Piero Averlino, Known as Filarete,* trans. John R. Spencer (New Haven: Yale University Press, 1965), 15

26 Marco Frascari, Unpublished lecture, University of Illinois at Urbana-Champaign, late 1990's.

27 See, for example, Tobias Armborst, Georgeen Theodore, and Daniel D'Oca, "NORCS in New York" in. *Socio-,* ed. Jonathan Crisman (Thresholds 40, 2012), 189-208. https://www.mitpressjournals.org/doi/pdf/10.1162/thld_a_00145

28 Boullée, *Architecture, Essay on Art,* 101.

29 Architects in 18th century Europe, such as Francesco Milizia, admired the Tarquins for their development of the physical infrastructure of Rome. See Rebecca Williamson, "The Breath of Cities" *Aeolian Winds and the Spirit in Renaissance Architecture,* ed. Barbara Kenda (New York: Routledge 2006), 162-3. The Tarquins are also famous for the rape of the Sabine women, which Brotier paints in a positive light as a way to eliminate conflicts through the mixing of tribal stock.

30 Abbé Brotier cited in Boullée, *Architecture, Essay on Art,* 102.

31 Laugier, *An Essay on Architecture*, 7-9. For Laugier's activities as a musical critic, see Benjamin C. Young, "Eloquence and Music: the Querelle des Bouffons in Rhetorical Context," Unpublished PhD Dissertation, Columbia University, 2013.

32 Manfredo Tafuri, cited in Jameson, cited in Hays (ed.) *Architecture Theory since* 1968, 444.

33 Theodor W. Adorno, *Critical Models: Interventions and Catchwords*, trans. Henry Pickford (New York: Columbia University Press, 1998), 289-93.

About the Author

Rebecca Williamson is an architect with experience in practice in Europe and the US. Her research explores the roots of contemporary problems in architectural and urban design practice. Since March 2016, following many years of focus on design studio teaching, she has coordinated the MS and PhD Programs in Architecture at the University of Cincinnati.

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'In the sky with diamonds' of Ronchamp's East Wall: Constellations of Thought[*]

Marcia F. Feuerstein
Virginia Tech (Virginia Polytechnic Institute and State University)

Abstract

The Chapelle Notre-Dame-du-Haut in Ronchamp designed by Charles-Edouard Jeanneret, also known as Le Corbusier, has been studied, analyzed and explored by architects, theorists and historians ever since it was completed. Despite these studies, scholars have paid little attention to the east wall of the chapel as a unique architectural element. An important and iconic element within this project, it is distinguished by the turning statue of the Virgin Mary set in a cabinet within the wall and surrounded by small openings allowing light into the chapel. While the moving statue had always been part of the original design, the small openings -- the stars -- were not. Somehow and sometime the eastern wall became a sky when, at the beginning of construction, it was a wall. The story began with Le Corbusier's slow design process, which allowed him to develop an evolving vision even after a design was finalized. His creative process allowed him to envision the building as a full scale model, which provided him with freedom to take advantage of new opportunities of designing during construction. This occurred with the east wall. A serendipitous

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moment transformed the project as the scaffolding was removed and about to be finished. The resulting 'as built' changes embedded a unique sacred threshold into the chapel and its east wall. This narrative considers this curious story of how Mary moved from being situated in the wall to becoming part of, and central to, a night sky with diamonds. It also reveals a seemingly lost art of slower building and design.

Preface

My first visit to the Chapelle Notre-Dame-du-Haut in Ronchamp (hereafter identified as "Ronchamp") designed by Charles-Edouard Jeanneret, also known as Le Corbusier, was on a rainy and overcast day. The Chapel, a pilgrimage church, was designed to host services for small gatherings inside, and for large groups of pilgrims outside.[1] After discovering the main entry closed I dodged the rain, taking refuge under trees, making my way to the other side. I entered the north entrance to find myself facing the southern window wall, glowing despite the rainy, overcast sky. Its deeply recessed colored glass dimly lit the interior with Le Corbusier's own painted-on images and script: a raven flying across the glass, a howling man in the moon, the sun, and Mary, and words 'étoile' (star), 'la mer' (sea) and others.

I turned toward the chapel's front, facing the statue of Mary set high on the east wall. I had been curious about this statue, which sits within a glass cabinet and rotates into the chapel or outward, depending if a service is inside or outside. I had hoped to see, even make, her turn. Yet when I faced this east wall, I was surprised. In addition to the statue of Mary, the front wall of the chapel had been transformed from a wall into a perpetual starry night with the statue of Mary situated high in the sky surrounded by 15 tiny stars of light – like diamonds. This star-studded night, which never appeared in Le Corbusier's sketches, drawings, or models, was in the building, obscuring day and creating a perpetual night. My astonishment was not due to what I thought I would see, but rather by what I had never expected to see: a night sky with a constellation of stars surrounding the statue of Mary. So, I wondered, when did the eastern wall transform into an eastern sky? What did it signify?(Figure 1)

Very little has been written about the east wall as a unique architectural element in Le Corbusier's chapel in Ronchamp. Yet, the story about this wall becoming a sky is particularly curious. It began with Le Corbusier's slow design process, which allowed a project to evolve, change, and transform. José Oubrerie, his assistant, described this design process as an "Open Work", the idea borrowed from philosopher Umberto Eco.

Oubrerie, who worked with Le Corbusier on the design of Firminy Church, another slow building that took over 40 years to complete (1960 - 2006), includes a similar reciprocity between a vertical wall becoming a horizonal sky. In Firminy the reversal and reflection of wall/sky represents the constellation Orion; but in Ronchamp, which was the most likely source or model from which the Church at Firminy developed, there is no single or simple meaning.[2]

Both wall/skies recall Le Corbusier's *Poem of the Right Angle*, completed in 1953, the year construction of Ronchamp commenced. The iconography within this iconostasis, as well as the reciprocity between horizontal and vertical within an overall grid, suggests how Le Corbusier came to create his eastern sky in Ronchamp. Similarly, his *Taureau* series of paintings from 1952 share many images found in Ronchamp.[3] As G. Hendricks explains, Le Corbusier's inspiration often resulted when he changed his perspective of a work, viewing them upside-down or flipping them from horizontal to vertical.[4] This method gave Le Corbusier the ability to see his designs as ambiguous and without resolution, allowing projects to emerge yet change as ideas found their place within the overall design. Eco associated such open works to particular types of modern art, such as the music of Karlheinz Stockhausen's Klavierstiick XI and Luciano Berio's Sequence for Solo Flute; the literature by James Joyce, such as *Finnegans Wake*; and kinetic sculpture, such as Alexander Calder's mobiles, that change even after they are complete.[5] The architect's open-ended designing was slow, and demanded patience while moving from concept through construction. The projects were subject to change at any time (to the chagrin of his clients and contractors.) He built a series of unfinished physical models that Le Corbusier scholar Danièle Pauly called "successive approximations of [the] desired object," revealing his process as a "long and patient search" for the design.[6] While Le Corbusier created Ronchamp's basic form and character early, using a crab shell that "lies on the drawing board" that he "picked up" on Long Island" (New York), new ideas continued to emerge that transformed the work even as it was being built.[7]

The Starry Sky

Ronchamp's star filled wall invites multiple interpretations. The scattered openings around Mary suggest a halo. The number (15) and organization of the small openings might have mystical numerological meanings or be a specific constellation of stars. Le Corbusier wrote that "Notre Dame du Haut is a fruit of numbers."[8] If the openings on the wall are stars, one cannot help but wonder if they represent a constellation from a particular night, perhaps an astral pattern of Virgo, Capricorn, Corvus, even Libra at dusk, night, or in the morning?

Le Corbusier, a pseudonym that Charles-Édouard Jeanneret-Gris adopted in the 1920s, comes from the French word *corbeau* - the Raven. Perhaps Corbu referenced himself in the wall as the constellation Corvus, the Raven, with Mary as Virgo, the Virgin in this eastern sky. Images of a raven and Mary both appear in the southern window wall, yet neither constellation match the starry pattern on the wall.[9] Le Corbusier seems to have invented his own starry sky.(Figure 2)

Did Le Corbusier create other walls as starry nights? In 1929, twenty-five years before he began Ronchamp, Le Corbusier drew a starry night over Buenos Aires. Here, in a dark and expansive night sky, reflected in the Rio de la Plata, he depicted five many-storied lit buildings whose windows are a grid of bright dots grouped on a flat plain. Le Corbusier told a related story about this drawing, imagining himself "at the bow of a steamer with all its travelers, also with emigrants about to land at the Promised Land. With a stroke of yellow pastel, I draw the infinite line of lights I had already seen. With the same yellow pastel, I draw the five skyscrapers 200 meters high… streaming with light, surrounded by a vibration of yellow… In the waters of the Rio I draw the lighted beacons, and in the Argentine sky the Southern Cross preceding the millions of stars… all the places of leisure where, finally, the men of Rio have regained the right to see the sky and to see the Sea."[10] (Figure 3)

While the story Le Corbusier proposed to his audience in Buenos Aires differs from Ronchamp, its effect resonates with the starry night on Ronchamp's eastern wall. In Buenos Aires, he imagines occupants of skyscrapers regarding the glittering city and expansive sky reflected in the sea, with the horizontal reflection in the water creating a second city with its starry sky. In contrast, the chapel at Ronchamp, as a singular object atop a hill, presents a vertical reflection. It too is a mirrored and doubled image of a glittering sky embedded in the eastern wall: the inside of the chapel wall created a night sky, only lit by daylight through the pinhole openings, thus day (outside) becomes night (inside). There is an opposite phenomenon at night: when the interior is lit, light from the pinholes projects outside into the night.

Construction of Ronchamp began in 1953, the same year the "Cenotaph of Newton by Night," designed in 1784 by French architect Etienne-Louis Boullée, was first published and made broadly available in France. Boullée's drawings had been in the Cabinet des Estampes of the Bibliothèque Nationale, re-discovered and exhibited in 1939, of which Le Corbusier was familiar. In this speculative design, Boullée created a huge sphere for Isaac Newton's tomb. On the inside of the sphere, he added small openings, creating a dark night sky filled with stars. This vast starry night was only visible during the day, when sunlight passed in through the pinprick-like openings. Boullée explained that "The daylight outside filters through these apertures into the gloom of the interior and outlines all the objects in the vault with bright, sparkling light." He imagined that at night when the interior was lit, the light would project through the 'stars' in the sphere and out into the night sky. Newton's Cenotaph is similar to Ronchamp, which may have inspired Le Corbusier to create his own interior starry night in Ronchamp after studying Boullée's project.[11] (Figure 4)

Le Corbusier's façade to the sky, shaped sometime during the two-year process of construction, was also a re-presentation of a sky facing the congregants as they gathered, meeting Mary, who presided over worshippers. Whereas Boullée's monument was singular and simple in its extraordinary approach to modeling the universe, myriad meanings embedded in Notre-Dame-du-Haut in Ronchamp realized an indescribable and indefinable "ineffable space." Le Corbusier used this concept in 1946, to describe the chapel space as a "moment of limitless escape."[12]

Ronchamp's east façade has been interpreted as a symbol of the story of Mary surrounded by divine light, a constellation of stars, or mystical numerology. The roof of the building has been compared to a crab shell (via Le Corbusier) as well as, according to Robert Coombs, a "neo-Catherist shrine," who traced the Cathar heritage of Le Corbusier's family. Its cave-like form, significant to the Cathars, was part of the Jeanneret / Le Corbusier family heritage. This twinning of Cathar history with the church brings yet another doubled meaning to the project. Coombs shows the significance of a series of numbers, including 15, in a variety of sacred texts. His discussion reveals similarities between Ronchamp and Montsegur, the location of the Cathar martyrdom, and Bethlehem Cave, scene of neo-Cathar ceremonies.[13]

Another interpretation of Ronchamp's intertwining of light and dark might be considered by recalling a scene in Shakespeare's *Romeo and Juliet*, when Juliet, in Capulet's Orchard, cries:

> Come, night; come, Romeo; come, thou day in night;
> For thou wilt lie upon the wings of night
> Whiter than new snow on a raven's back.
> Come, gentle night, come, loving, black-brow'd night,
> Give me my Romeo; and, when he shall die,
> Take him and cut him out in little stars,
> And he will make the face of heaven so fine
> That all the world will be in love with night
> And pay no worship to the garish sun.
>
> Romeo and Juliet, Act III, Scene II, Capulet's Orchard[14]

Romeo describes Juliet through images of light, their love flourishing at night, under stars, the stars "cut out" from the sky as he is born away by the raven -- by Le Corbusier himself -- " [so] that all the world will be in love with night." The statue of the Virgin Mary holding her child, provides another reading of love in night, surrounded by the stars. Might Jeanneret/Le Corbusier refer to himself as night with his signature of the raven and Mary as Juliet and light? Virgin Mary with her child reveals ambiguous associations of love and night, described by Juliet resonate with the Chapel and Mary, who Flora Samuel discussed as an ambiguous figure who symbolized, for Le Corbusier, both virginal and erotic love, symbolized by the Virgin Mary and Mary Magdalene as "two sides of an all-encompassing feminine divinity..."[15] This ambiguity between the virginial and erotic might be interpreted by comparing the southern wall with the east wall, where the east sun cloaks the statue of Mary lovingly holding her child in a night sky while the south filters the "garish sun" through larger and colored openings, casting its light over the congregation. This cloak of light might refer to the Book of Revelation 12:1-2 of the bible, which will be discussed later in this paper.

Constellations of Thought: 'Look! Here are your stars!'

The instant the wall became a sky seems a particularly significant moment, akin to the idea of quickening, when, suddenly, something becomes alive, animated, creating 'fire' or 'heat' of life as well as inspired. In architecture we might refer to quickening as heat generated when concrete or plaster is set or cured. The word also identifies the moment a woman privately feels an imperceptible movement that signifies new life within her womb. German Historian Barbara Duden has described this instance in pregnancy as an exact point, a feeling, which Ivan Illich referred to as "coming alive in the womb."[16] It also recalls the relationship between architecture and birth with Renaissance architect Filarete's comparison of architectural design and construction as a form of birth.

The project took Le Corbusier three years to develop and two years to construct, from 1950 to 1955 when, in June 1955 it was dedicated. He described the design development through language that is similar to the idea of quickening, writing that after tossing "the elements of a problem any which way" he allowed them "to 'float', to 'simmer', to 'ferment'. Then one fine day there comes a spontaneous movement from within, the catch is sprung; …" when he "gave birth" to the idea as a "spontaneous birth" after an "incubation period."[17] Just before birth was movement – his own form of quickening.

But once construction began, the eastern wall remained blank save for the two openings for the statue of Mary with child and a door for the Priest. The tiny star openings were absent. A later interior perspective sketch indicates a scattering of dots around Mary and stars finally appeared in photographs taken just after completion. A photograph of the southeast exterior corner, which reveals both walls, is telling: south wall bright, east in shade: the stars disappear within the darkness of the interior but reappear as deep points set into the bright sunlit wall. In his own book on Ronchamp, two interior perspective sketches indicate openings or stars but disappear on the next sketch of the exterior façade.[18]

The story about the wall becoming a sky returns us to Le Corbusier's "long and patient search" for architecture, which recalls the similar yet different process described by architect Leon Battista Alberti. Alberti, a Renaissance polygot, wrote, in his seminal book on architecture that architects must be patient designers. This was especially important when building physical models. He warned about presenting unfinished building designs as if they were complete. Models, drawings, sketches were necessary to understand a project but they should be presented to clients as plain, simple and unfinished to represent the true nature of the design. Once reaching this stage of design, Alberti suggested that the architect wait, calm down, and spend time to think about the design "until your initial enthusiasm for the idea has mellowed … your judgment is governed by soberer thoughts … time brings to light many observations and considerations that might otherwise have escaped the notice of even the most capable of men."[19] But, for Alberti and subsequent generations of professional architects, once a design was deemed complete and imagined as a future building, all designing stopped so that the building could be quickly built following a carefully choreographed construction process.[20] This is not to say that changes do not occur during construction, but they are generally avoided.

Le Corbusier's "blurred, open process," characterized by the variety of unfinished models ended once the building was completed.[21] Unlike Alberti, Le Corbusier continued to design during construction and seized serendipitous opportunities that were informed by the construction process. We see this in the eastern wall of Ronchamp, where the "stars" materialized during construction.

Construction photographs of the eastern wall reveal that the stars originated from a grid of holes throughout the unfinished eastern wall - holes created by wooden scaffolding used to construct the wall. They were not "cut out" of the sky (recalling Juliet's words) but were part of the original construction process, recalling the previously mentioned grid within Le Corbusier's Iconostasis for his *Poem of the Right Angle*. This 'naked' wall, before covered by its coat of gunite, reveals each star in the 'constellation' lining up with a scaffolding hole. The holes, present in construction photos, show both interior and exterior views of the unfinished building built of rubble. The scaffolding was still intact in the photo of the interior elevation before it was covered.[22] While most of the holes disappeared under the final finish of the building, some remained and were transformed into stars as morning light penetrated the wall, locating Mary in a starry night, like diamonds. Morning becomes night. (Figure 5)

When did this occur? Le Corbusier and a visiting pastor, who was a member of the Commission d'Art Sacré, were at the site as the scaffolding was being removed. The clergyman wondered if the statue of Mary could be surrounded by stars (possibly referring to a crown of 12 stars in Revelations 12, 1, 2 and 5). Le Corbusier, looking at the remaining grid of openings, serendipitously seized this moment before the rubble wall was covered and made a quick interior sketch of the eastern wall. Pauly described this moment when Le Corbusier exclaimed " 'look! Here are your stars!' ... drawing several crosses on one of the pages in his sketchbook, signaling the orifices through which the sun's rays would filter to form a crown of light."[23] Not really a crown, but fifteen holes, sketched around the void built into the wall for the church's late seventeenth century wooden statue of Mary holding her child, became her stars with only a constellation of five stars above the cabinet holding Mary, which might be considered a crown. A crown of twelve stars around a pregnant woman is found in Revelations 12: 1-2 of the New Testament: "A great sign appeared in heaven: a woman clothed with the sun, with the moon under her feet and a crown of twelve stars on her head."[24] She appears in various images of Mary such as Carlo Dolci's Madonna in Glory (1670), with seven and a half stars while Diego Velázquez's *Immaculate Conception* (1618) includes twelve stars around the Madonna. Bible scholar Alice Camille writes that the stars signify Mary's immaculate conception and virginity but historic images that are based on the above passage suggest that the number of stars is always relevant: "... Mary may be embedded in a landscape of stars...her cloak may be covered with a cosmos' worth... A predominance of stars suggests her immaculate conception." [25]

This quick act transformed the wall as well as the statue, which was set high in the wall inside a window-cabinet and attached to a mechanism that allowed it to rotate and face either inside or outside. However, with the addition of the stars, the statue, shadowy and ghostly, became more than the figure who watched the dramatic arrival, gathering, and departure of pilgrims who, in turn, watched her. She

became a figure in a threshold, spinning to address both ways, east and west, being the perfect hostess, holding open her door, while revealing her place within a modern building as a moving icon. She spins in a voided niche, standing within the space of the wall: a gate-keeper, not unlike but certainly not a two-faced Janus-like outpost. An indistinct silhouette in a window, within a threshold, Mary is a measure and model of the past church, the Marian story, as well as the moon, sky, a figure and, at the same time, an apparition within the frame of the wall and, perhaps, the moon in a sky. Is she a balance between earth and sky?

Ronchamp is both in the sky – set on an overlook separated from the ground yet of the ground – and facing the sky. The starry wall allows streams of light to pierce into the sanctuary, in the morning, surrounding the opening that holds Mary. This opening, originally represented by Le Corbusier as a window and open niche high in the wall, is different from the priest's door – elevated yet below the statue of Mary. Mary's space was transformed into a door in a sky once the constellation of stars appeared from the openings built around the scaffolding as the eastern wall was constructed. The result of this intertwining of wall and scaffold holes was an underlying grid of openings.

Scaffolding

In Ronchamp stonemasons used scaffolding to build the east wall from reused stones from the previous church, which had been destroyed by fire. This rubble wall created the great mass of the wall within whose depth was two primary openings: a higher opening for Mary and a lower door opening for priests to walk from the inside to the outside. The depth provided a separate and discernable place neither inside nor outside but a true space between. The Mary statue stayed within this threshold space (made deeper by a frame that projected beyond the limits of the wall) while the priests passed through the wall. The rubble wall held the statue and gave passage to the priests, and held itself up. A separate structure of concrete columns is embedded within the wall to support the roof. Le Corbusier found the stone rubble at the site, which made up the previous church, destroyed in 1944 by the Nazis. Due to their questionable structural integrity, they were reused as infill.[26] The scaffolding, inserted into the rubble wall, built up and around the concrete superstructure, ended below the roof, creating an illusion of the floating roof.

This type of wood scaffolding, held by the wall that was being built, created a grid of holes within the walls. Other types of historic scaffolding were set onto projections built out from and integral to the wall. French architect Eugène-Emmanuel Viollet le Duc described the relationship of scaffolding and construction as codependent: both as scaffolding while acting as scaffolding.[27] Traces of construction processes that remained on buildings were well known, acting as a facade-in-waiting: an exterior surface that would be integrated into a finished building once the client could afford to add its finished face.[28] One such example of this historic practice are carved ornamental projections that, after being used to construct a final facade,

might remain evident on a finished building. But often these projections are removed or disappear once they are covered by the finished façade, keyed onto the body of the building: Pont du Gard and the front façade of San Lorenzo (in Florence) -- S. Lorenzo, still missing its facade which, designed by Michelangelo, only exists as a wooden model. Its unfinished wall remains exposed, including its scaffolding holes.

Ronchamp is the exception where a few scaffolding holes were transformed into stars. Louis Kahn is considered to be the father of this technique, followed by Tadao Ando; both intentionally used marks of formwork within the design of their façades. However, for Le Corbusier this was the result of serendipity – a chance visit to the building during construction coupled with the interpretive in situ conversation with the clergyman was the impetus for change.

Scaffolding stands in for buildings until they stand on their own both literally and figuratively. This is obvious today, where scaffolding designers hide a project undergoing a face-lift by teasing a normally inattentive public to imagine what might be going on behind this mask. Scaffolding designed by Michael Graves covered the Washington Monument in Washington D.C. during two restorations while dressing it in an outer costume that surrounded and protected the monument during construction. It was a second space for workers, machines (hoists and elevators), allowed work to continue, maintained another view of the monument during restoration, yet never touched the Monument. It existed and then disappeared without leaving a trace.[29]

Today architects and designers spend most of their days at the computer, immediately confronted with "buildings" at full scale, whether they are ready or not to see the material implications of their work – when their lines are only lines rather than uneven edges composed of rubble, mortar, holes, marks, and inconsistencies. They are confronted with insubstantial, immaterial lines. Design contractually ends when the contractor begins, and the architect becomes a weekly or bi-monthly "visitor" to the site. It is highly unlikely they might participate in what Le Corbusier confronted daily, with his workers, on site, watching as the scaffolding was being removed. They would most certainly never experience the construction as a full scale model in the way that that Le Corbusier and the visiting pastor experienced the unfinished eastern wall. What is missing from practice today are these thoughtful moments that provide opportunities to pause during design -- when a building finally becomes situated within its own skin (and body) and begins to speak back to the architect who uses chance and serendipitous moments, as revelations of the building become apparent. Le Corbusier with the visiting pastor could identify the hollowed voids as full of sky, stars, or light taking the place of the lost scaffolding to situate Mary in a sky because of his openness. The project was an open work, only after the scaffold disappeared to reveal its own absence through a previously unimagined and unimaginable wall could Le Corbusier transform the two sides of the mirrored Mary wall into night and day.

Le Corbusier recognized traces that remained in the laborers' work and, while walking through the unfinished building one bright morning after the eastern wall was complete but not finished, saw something through the wall. But there is a different plausible scenario. Perhaps he took a late night walk – the

sky was clear and dark and filled with stars. He walked into his roofless building and saw a constellation through the openings – one of his own choosing or one that he recognized – and caught it to surround the opening that would eventually house Mary. It did not happen this way, there does not seem to be a doubled constellation of the sky, rather one of thought born from the eastern wall: an unfinished model constructed at full scale. And the sky and constellation appeared after it was constructed by the workers, requested by the pastor, and invented by Le Corbusier.

Images

Figure 1. Interior looking east and south, Chapelle Notre-Dame-du-Haut in Ronchamp. © Marcia F. Feuerstein , 1998 / 2019.

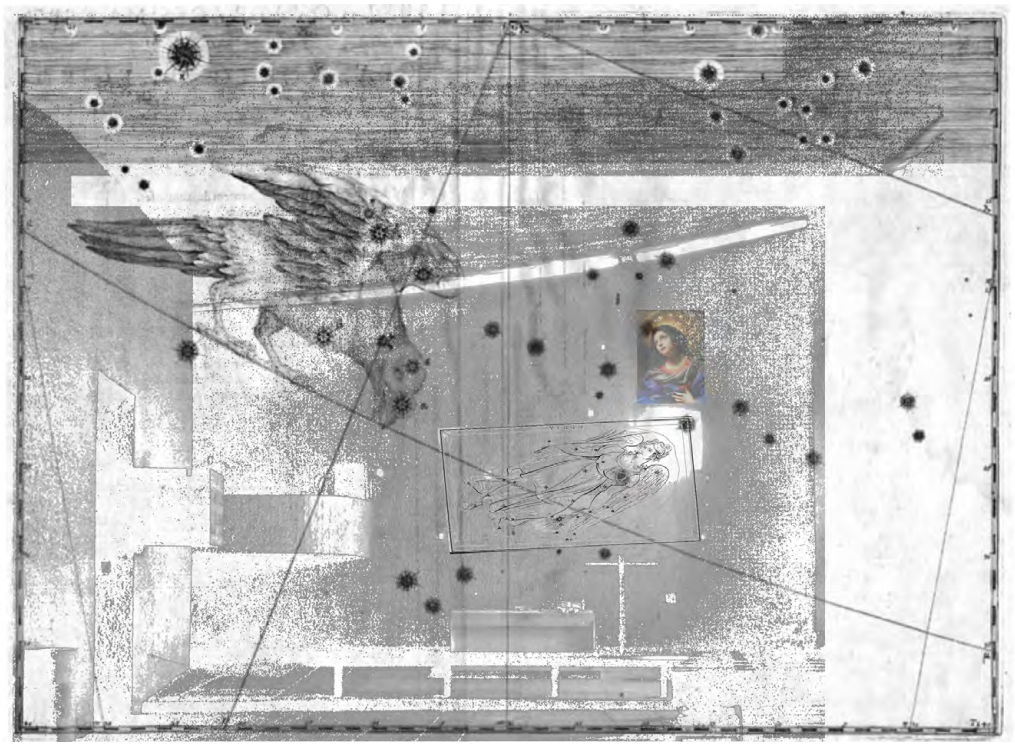

Figure 2. Montage: Eastern interior wall with its own starry sky with Corvus, Virgo and Madonna with a crown of stars. © Marcia F. Feuerstein, 2019 montage based on sampled images including Corvus, Virgo, and Madonna in Glory.

Figure 3. Montage: A starry night over Buenos Aires and the east wall.
Le Corbusier's drawing of Buenos Aires; Mary in Glory. © Marcia F. Feuerstein 2019.

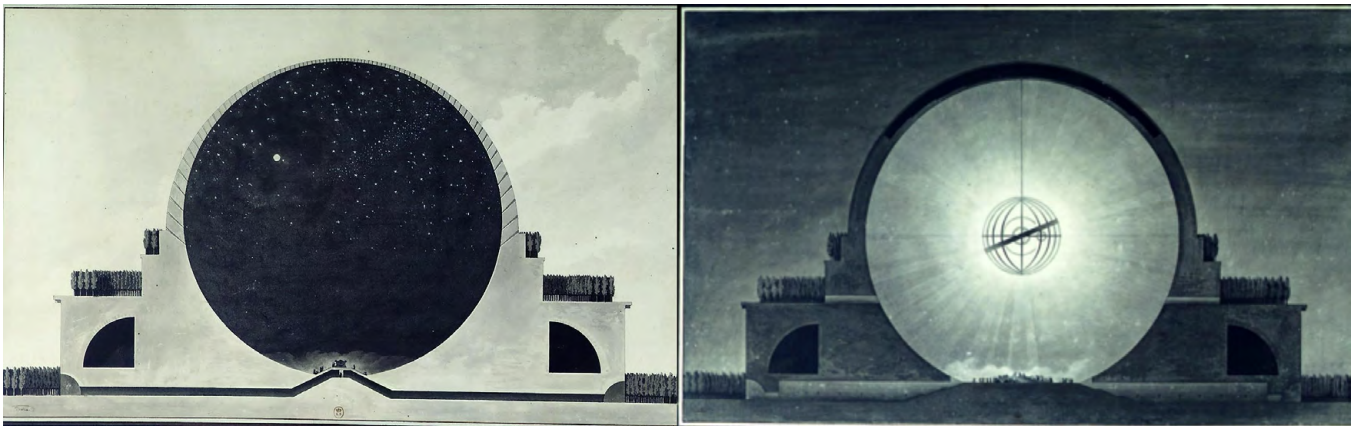

Figure 4. Étienne-Louis Boullée, Newton's Cenotaph day (left) and night (right)
(source of images: left https://gallica.bnf.fr/ark:/12148/btv1b7701015b/f4.item , right https://gallica.bnf.fr/ark:/12148/btv1b7701015b/f5.item , public domain).

Figure 5. Montage: " Look! Here are your stars!" Construction photos with Le Corbusier's sketches overlaid the grid of scaffolding holes. © Marcia F Feuerstein 2019.

Notes

1 Major pilgrimage services are on 15 August and 8 September.

2 Jose Oubrerie, "Architecture before Geometry, or the Primacy of Imagination," *Assemblage* 39 (Aug. 1999): 94-105. Recheck Firminy dates: https://sitelecorbusier.com/en/church/ https://www.archdaily.com/108054/ad-classics-church-at-firminy-le-corbusier

3 Peter Carl's generous comments to an early form of this paper discussed the importance of the taureau and *Le Poeme de L'Angle Droit*. See also Peter Carl, "The godless temple, 'organon of the infinite' ", *The Journal of Architecture*, Vol 10, No. 1 (2005): 63-90. 1360–2365 DOI: 10.1080/13602360500063147 and Peter Carl, "Architecture and Time: A Prolegomena"*, AA Files*, No. 22 (Autumn 1991): 48-65.

4 G. Hendricks, "Le Corbusier's Postwar Painterly Mythologies," in *Le Corbusier, 50 years later*, International Congress, Valencia 18th-20th November 2015, http://dx.doi.org/10.4995/LC2015.2015.828 http://ocs.editorial.upv.es/index.php/LC2015/LC2015/paper/viewFile/828/1312 accessed 10/29/19. See also Le Corbusier, "Sun and Moon," in *Ronchamp*, trans. Jacqueline Cullen, Oeuvre de Notre-Dame du Haut (Germany: Verlag Gerd Hatje, 1957/1991), 123.

5 Umberto Eco. *The Open Work*, trans. Anna Cancogni (Cambridge, MA: Harvard University Press, 1989), 1-23.

6 Daniéle Pauly. *Le Corbusier: La Chapelle de Ronchamp. The Chapel at Ronchamp* (Paris, Basel, Boston, Berlin: Foundation Le Corbusier, Birkhäuser Publishers, 1997), Author's note, fn3, 130.

7 Jean Petit, *Le Corbusier: Texts and Sketches for Ronchamp* (Geneva, Switzerland: René Bolle Reddat, Association Oeuvre de Notre-Dame du Haut, 1965). Fourth English edition, unpaginated.

8 Petit, 1st page. See also Robert Coomb. *Mystical Themes in Le Corbusier's Architecture in the Chapel Notre Dame du Haut at Ronchamp: the Ronchamp Riddle* (Lewiston, N.Y.: Edwin Mellen, 2000).

9 The raven is painted on the southern window and his sketch showing a constellation around the Mary statue is dated June 25, 1957, after the stars were added to the building. Le Corbusier, 1957/1991.

10 Le Corbusier. *Precisions* (Cambridge, MA & London: MIT Press, 1991), 206, 208, 209.

11 Etienne-Louis Boullée, "To Newton", *Architecture, Essay on Art*, Trans. Sheila de Vallée in Helen Rosenau, *Boulée & Visionary Architecture* (London, New York: Academy Editions, Harmony Books, 1976), 107.

12 'The Chapel of Ronchamp," *Architectural Design*,Vol 55, Issue 7/8 (1985): 31 – 40; Le Corbusier, "L'Espace Inducible", *L'Architecture d'Aujourd'hui* (January 1946): 9-10; Le Corbusier, *New World of Space* (New York 1948), 7-9. See also Daniel Joseph Naegle, "Le Corbusier's seeing things: Ambiguity and Illusion in the Representation of Modern Architecture" (January 1, 1996) http://repository.upenn.edu/dissertations/AAI9636188.

13 Coombs, *Mystical Themes in Le Corbusier's Architecture in the Chapel Notre Dame du Haut at Ronchamp: the Ronchamp Riddle,* 106,153. See also Groupe de Recherches Archeologiques de Montsegur et Environs (GRAME), *Montsegur* 13 ans de rechreche archeologique (Lavelanet, 1981), 76.

14 William Shakespeare. *Romeo and Juliet*, Act III, Scene II, Capulet's Orchard. accessed 1/3/2009, http://shakespeare.mit.edu/romeo_juliet/full.html.

15 Flora Samuel, *Le Corbusier: architect and feminist* (Great Britain: Wiley-Academy, 2004), 104-105.

16 Barbara Duden, *Disembodying Women: Perspectives on Pregnancy and the Unborn* (Cambridge: Harvard University Press, 1993); Ivan Illich, unpublished notes from a seminar led by Joseph Rykwert, for the PhD program in Architecture, University of Pennsylvania, 1995.

17 Petit, 5th page; Pauly, 87-88, 93 and foot notes 12, 25, 26.

18 Le Corbusier, 1957/1991. Sketches of east wall 106 (axonometric), 118, 132 and 135 do not include the stars while 133 does.

19 Leon Battista Alberti, *On the Art of Building in Ten Books*, tran. Joseph Rykwert, Neil Leach, Robert Tavernor (Cambridge, MA and London, England: The MIT Press,1988), 35.

20 Alberti, 36-37. Alberti wrote of projects built on time and within budget rewarded the architect when the building "contributes greatly to the dignity of the work and the esteem of its authors," citing two improbable building projects: an entire town built in a week and a temple in 15 days.

21 Oubrerie, "Architecture before Geometry, or the Primacy of Imagination", 94-95.

22 Le Corbusier, 1957/1991, photos, 91, 92. Gunite, the trade name for 'dry gunned' concrete, a mixture of cement and sand with water, then blown through a nozzle and sprayed onto a wall.

23 Pauly, fn. p. 58, 103, sketch p.95.

24 *Holy Bible*. (New International Version, NIV Biblica, Inc, 2011) accessed 10/23/19, https://www.biblegateway.com/passage/?search=Revelation+12%3A1-2&version=NIV.

25 Alice Camille, "In biblical fashion: Some of your favorite Bible characters wear their faith on their sleeves." *U.S. Catholic 83*, Issue 5 (May 1, 2018), https://go-gale-com.ezproxy.lib.vt.edu/ps/retrieve.do?tabID=T003&resultListType=RESULT_LIST&searchResultsType=SingleTab&searchType=AdvancedSearchForm&currentPosition=1&docId=GALE%7CA537031553&docType=Article&sort=Relevance&contentSegment=ZAHI-MOD1&prodId=PPRP&contentSet=GALE%7CA537031553&-searchId=R2&userGroupName=viva_vpi&inPS=true. Many other interpretations include a woman, about to give birth and the crown representing 12 tribes of Israel and the 12 disciples.

26 Pauly, *The Chapel at Ronchamp*, 98. The statue of Mary and child was saved from an earlier church, destroyed in 1913, and the second church.

27 Eugéne-Emmanuel Viollet-Le-Duc, *Lectures on Architecture*, trans. Benjamin Bucknall (New York: Dover Publications, 1987), 49. The newly constructed façade would be used, with light scaffolding designed with iron tie-bar trusses, to hoist materials rather than on heavy wooden timber construction.

28 L. Sprague de Camp, *The Ancient Engineers* (Garden City, NY: Doubleday & Co, Inc. 1963), 178. See also Hacque Heyman, *The Stone Skeleton: Structural engineering of masonry architecture* (Cambridge, UK; New York; Melbourne, Au: Cambridge University Press, 1995).

29 Michael Graves. "A Monumental Task" Interview by Margaret Warner." PBS NEWSHOUR, March 1, 1999, 12:00 AM EDT, http://www.pbs.org/newshour/bb/entertainment/jan-june99/graves_3-2.html accessed 3/10/1999. Michael Graves' scaffolding design, in 1999, for the Washington Monument, took 4 months to erect and cost 1/3 of the entire budget for the restoration. It was reused for a three-year restoration after an earthquake in 2011 caused extensive damage to the Mounument.

About the Author

Dr. Marcia F. Feuerstein, an Associate Professor at Virginia Tech, teaches theory and design. A scholar, architect and author, her images, writings, and photographs have been published in books and journals, including *Ceilings and Dreams* (2019/20), *Confabulations: Storytelling in Architecture* (2017), *Architecture as a Performing Art* (2013) and *Changing Places: ReMaking Institutional Buildings* (1992). Her work considers design through theories of the body, embodiment, performance, and theater. A graduate of University of Pennsylvania (Ph.D.), University at Buffalo (M.Arch.) and Tufts University, Feuerstein is a member of the AIA and a NYS registered architect.

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Thinking and Imagining Architecture at a Distance with Models

Matthew Mindrup
University of Sydney

Abstract

For over 500 years, architects have continued to extoll the utility of scale architectural models for visualizing "the entire work in miniature right before their eyes." Yet, when the 37-year-old Johann Wolfgang von Goethe arrived in Rome in 1786, he was immediately surprised to find that the antique ruins he came to know from cork models at home had become "familiar objects in an unfamiliar world." The models which Goethe recalls were popular eighteenth and nineteenth century souvenirs of the European Grand Tour. Initially used as table settings to encourage erudite discussion about antiquity, these objects inevitably found their way into academic, private, and museum collections alongside full size plaster casts, actual building fragments and scale reconstructions. For the study of architecture however, using these models was not unlike trying to read a book with missing pages and one had to imaginatively fill-in the spaces between fragments. When the authority of classical antiquity was challenged by a new generation of modern German architects at the beginning of the twentieth century, the use of fragments and models of antique structures to inspire new designs did not completely disappear. Young architects were encouraged to find inspiration for new designs in the assemblage of broken objects and building blocks representing identifi-

able structures. As Hermann Finsterlin explained, the aim of these approaches is to seize the impartiality of the child to rid the architect of their cultural inhibitions. This paper explores how the ambiguity of scale, materiality and context in models creates a space for the imagination to wander.

Introduction

For over 500 years, architects have continued to extoll the utility of scale architectural models. The earliest and longest-enduring approach to an architect's use of the model as a design tool was inaugurated by the fifteenth-century Renaissance architect Leon Battista Alberti, who recommended that architects construct plain and simple scale models as tools to aid the thoughtful evaluation of architectural ideas in physical three-dimensional form. To argue this point, he notes simply, "[h]aving constructed these models, it will be possible to examine clearly and consider thoroughly the relationship between the site and the surrounding district, the shape of the area, the number and order of the parts of a building, the appearance of the walls, the strength of the covering, and in short, the design and construction of all the elements."[1] This was certainly the perception which eighteenth-century architects held regarding the use of models for visualizing "the entire work in miniature right before their eyes."[2] Yet, when the 37-year-old Johann Wolfgang von Goethe arrived in Rome on the first of November 1786 he was immediately surprised to find that the antique ruins he came to know from cork models at home had become "familiar objects in an unfamiliar world" (Figures 1 and 2).[3]

Initially acquired as souvenirs and used as table settings to encourage erudite discussion about antiquity, these objects found their way into academic, private, and museum collections as important pedagogical and design tools. To enhance their user's understanding of the scale and context of a distant structure, small scale models were included in collections of full-size plaster casts, actual building fragments and miniature scale reconstructions. In practice however, the study of architecture using these models was not unlike trying to read a book with missing pages and one must imagine the spaces between the fragments. In the absence of the model's maker to explain their intentions, the imagination of their user is forced to speculate. It is this space between model and original that was the source of Goethe's confusion, but for eighteenth- and nineteenth-century designers, an opportunity for invention. When the authority of classical antiquity was challenged by a new generation of modern German architects at the beginning of the twentieth century, the imaginative reverie of plaster fragments and scale models of antique structures did not entirely disappear. In the architectural publications that emerged during this time, the impartiality of a child at play was romanticised as an approach for finding new inspiration in found objects or building

block sets representing identifiable structures of antiquity. For these individuals, the modelling materials themselves or their assembly encouraged the imagination to shift back and forth between analytic and associative modes of thought, speculating upon their efficacy and assembly as depictions of architecture. This paper explores how the ambiguity of scale, materiality and context afforded by eighteenth century plaster casts and scale models of distant antique structures was exploited during the twentieth century as a fertile tool for encouraging imaginative thinking about new designs.

Architectural Models of the European Grand Tour

Beginning around the middle of the seventeenth century, young upper-class European gentleman and women began embarking on tours around the Mediterranean to perfect their language skills, visit ancient ruins and meet with local artists and dealers. The increasing popularity of these tours of Europe throughout the eighteenth century certainly owes a debt to the philosophy of John Locke who sought to rescue the veracity of empirical knowledge from Cartesian doubt.[4] The term 'Grand Tour' to describe this educational excursion was first used in the French translation of Richard Lassels' *Voyage or a Compleat Journey through Italy* from 1670 wherein he asserts that any serious student of architecture, antiquity and the arts must travel through France and Italy to understand the intellectual, social, political and ethical realities of the world.[5] Guided by published accounts a typical itinerary for a participant of a grand tour might begin as far north as the Netherlands and France before traveling to Italy by sea with stops in Genoa, Livorno, Naples and above all Rome that was replete with pagan and Christian relics. On this journey, travel was typically accompanied by a chaperone and a guide known as a 'bear-leader' responsible for their cultural, literary and artistic training.[6] Therein, the grand tourist would have an opportunity to acquire things unavailable at home, lending an air of accomplishment and prestige to the traveller including books, works of art, scientific instruments, cultural artefacts, measured drawings and cork models of architecture.

Before its use as a material for modelling the architectural ruins of classical antiquity, cork was employed in the creation of *presepi* (*nativity scenes*) in southern Italy. The sixteenth-century Italian Sculptor and architect, Giovanni da Nola is attributed with being the first artist to introduce "the manger and crib amongst the debris of a pagan temple."[7] One of the primary motivating factors for the appropriation of this classical setting was to demonstrate the triumph of Christianity over the ruins of paganism (Figure 3).[8] Because of its ability to render with great accuracy the porous surface structure of travertine and tufus-formed remnants of actual antique constructions, it quickly became an ideal modelling material for creating depictions of the structures visited by tourists of the European Grand Tour.

At home, cork model souvenirs were displayed in libraries, cabinets, and purpose-built galleries but also as table settings for formal banquets. So inspired was the eighteenth century Hofkonditor (court confectioner) Carl Joseph May by cork as a medium for establishing a scholarly alliance between material and spiritual foods in dinner conversations about cultural topics that he took up the profession of cork modeller and replaced the popular pastry architectural *pièces montées* (table settings) with the more durable and technically accurate cork models (Figure 4).[9] As the depiction of a ruin that could be interpreted simultaneously as under construction or demolition, these models exemplified the Romantic ideal of art that could encourage one to think about nature in a state of perpetual becoming. Regardless of their utility as a conversation piece, because of their artistic and technical quality, cork models inevitably found their way into private and academic collections as didactic tools.

Collections

Already during the seventeenth century, architects were amassing their own collections of technical models of construction methods and both actual fragments and plaster casts of architectural ornament from distant structures. The seventeenth-century German architect Joseph Furttenbach owned, among other objects, models of bridges, mills, and waterworks, and he installed his own *Kunstkammer* (curiosity cabinet) in his house.[10] As the drawings of the eighteenth-century Parisian aristocrat Joseph Bonnier de la Mosson's cabinet of curiosities demonstrates, it was also common for wealthy land owners to collect objects and devices for scientific study, including architectural models of existing, fantastic, or biblical structures and technical construction models such as cranes or bridges (Figure 5).[11] In 1774, sixteen models from Jean-François Blondel's own collection "concerning the theory of penetration of matter in view of cutting stone, the arch of a door from Marseille, models of *trompes*, volutes, roof trusses" were given to the *Académie Royale d'Architecture* as "teaching material."[12] It was at this time that private and academic "teaching" collections came to witness the introduction of the popular cork architectural models of the European Grand Tour.

Since the eighteenth century, the Grand Tour of cultural sites in Europe was not limited to the education of European gentleman and ladies but also became an essential task for the culmination of an architect's training. The primary destination for the architect was Italy—especially the archaeological sites surrounding Naples and the remains of ancient Rome. Unlike distracted contemporary tourists, architects on a Grand Tour preoccupied themselves with the measure and documentation of antique and modern monuments to retain as tools for further study and sources of inspiration (Figure 6).[13] One of the largest private collections of drawings and objects of antique monuments belonged to English architect

and educator Sir John Soane who amassed an assortment of plaster casts, architectural details, measured drawings, and models. Those in cork showed the structure in its extant state while a handful of plaster scale models by the Parisian architects, Jean Pierre and François Fouquet depicted fictional reconstructions.

Soane collected these models and drawings first at his country house in Ealing and later moved them to his house at Lincoln Inn Fields, London. Interspersed throughout the domestic spaces of Soane's house were an architectural office that later doubled as a studio for training apprentices, an archaeological museum, an archive of drawings, a professional and scholarly library, an art gallery of folding wall panels, and room-size displays of architectural models.[14] Soane's juxtaposition of full-scale casts and scale models throughout these spaces, highlights the importance of size (Figure 7). While the casts at full scale were supposed to immerse the visitor in a simulated experience of the real thing, the scale models contextualised the monuments from which the full-scale fragments were drawn and plaster reconstructions acted as a referent for the imagination which, not unlike reading a book with missing pages, must fill-in the gaps between them. So great must have been Soane's preference for this imaginative activity that he had his own Bank of England project represented as a ruin. Indeed, the study of designs using plaster models and measured drawings of classical antiquity was the task of a student enrolled at the Royal Academy in London and the Parisian *École des Beaux-Arts*. As Soane's contemporary Antoine-Chrysostome Quatremère de Quincy explained, the use of small plaster casts is certainly preferred to the actual structure arguing, "[i]n architecture, a fragment of a cornice and an entablature is enough to re-establish the whole," while the intact object *in situ* "offers the mind a determinant image: there is nothing further to see" and here we can certainly include thinking about the extant and imagined state of architecture.[15]

Throughout the second half of the nineteenth and early twentieth centuries, many private collections were acquired by larger institutions and small-scale models were used to supplement full-size plaster casts. Shortly after the inauguration of the first public museum devoted to the decorative arts at South Kensington during 1857, the architectural historian James Fergusson gave a lecture that foreshadows many of the ideas developed in museum collections for the next half century. Preferring a chronological organisation to Soane's personal one for the collection of architectural casts and models, Fergusson praised the ease with which a visitor untrained in how to read plans, sections, and diagrams could easily grasp the "beauties and defects" of full size plaster casts. Similar to the plaster models of the *Fouquet's*, many institutions began to compete for scale model reconstructions based upon the most recent archaeological evidence. In the galleries, photographs often appeared in combination with scale models, to more fully realise the monuments in time, space and scale (Figure 8). Together they presented distant monuments in a way that, as Viollet-le-Duc remarked, could be studied "without fatigue, distraction, or limitations of time, under the best conditions of light and approach, and confronted one with another."[16]

These efforts however, did little to overcome the surprise and disappointment many experienced when they discovered that the original for which the casts were created often tended to be different than expected. For the character Marcel in Marcel Proust's *The Search for Lost Time*, the effect was one of

disappointment in which the original church is neither in the same location nor does its portal measure up to the plaster reproduction he had seen in a Paris museum.[17] It was during this time which Proust was writing his book that many institutions were beginning to close their plaster cast collections and a new generation of artists and architects took up the ruin as an approach for architectural invention.

Employing architectural distance with models

The use of models representing distant structures to inspire the imagination to think about architectural designs had its most notable revival in Germany during the interwar years in the use of found objects and toy building block sets. Before the first world war, classical Greek and Roman architecture was taught in German architecture schools of which many had their own collections of models and plaster casts.[18] One notable collection was that assembled at the Neuen Polytechnischen Schule in Munich in 1868 and later moved in 1912 to a new building at the centre of the renamed Technische Hochschule München's faculty of architecture (Figure 9).[19] After the end of the first world war however, the value which these collections retained in the study of architecture began to wane. This most notable event foreshadowing their demise occurred when a handful of German architects led by Bruno Taut, Adolf Behne and Walter Gropius founded the short-lived *Arbeitsrat für Kunst* to work with a new socialist government to reform architectural education and especially the dominance of Greek and Roman antiquity in forging a new German architecture. Shortly thereafter, Gropius was invited to help found the Weimar *Staatliche Bauhaus'* (State Bauhaus) in 1919. In many of their early exercises, the source of inspiration relied not on models of the past but discarded objects and toy building blocks.

Gropius conceived the Bauhaus as a reconsideration of crafts-based training, calling for the unity of the creative arts under the primacy of architecture.[20] Beginning in 1920, all students enrolled at the Bauhaus were required to take a half-yearlong obligatory *Vorkurs* (basic course) whose aim was to liberate the pupil "from the dead weight of conventions" so that they could approach the practical application of different materials and form in thinking about new architectural designs.[21] Compared to the study of form and composition in antique models, students enrolled in the Bauhaus' *Vorkurs* were encouraged to explore the role which the visual and haptic qualities of discarded, broken, found objects could play in the composition of new designs. The resulting constructions often looked like they had been created by a child who holds the identity or purpose of an object in suspension, albeit at a distance, to take advantage of its material and formal qualities in a new context as a work of art or model of architecture.

In terms of professional practice, Gropius' friend and former collaborator, Bruno Taut pursued a different avenue in architectural reform by publishing an architectural journal named *Frühlicht* between 1920-22. Therein Taut included projects envisioning a new post-war German architecture and also included two articles from Kurt Schwitters and Herman Finsterlin which promoted the use of found objects and building blocks as modelling material for inspiring new architectural designs at a distance.[22] Schwitters, who was a frequent visitor to the Weimar Bauhaus, described his modelling materials and design propositions as ruins that are never complete but in constant states of becoming. To demonstrate his design method in practice, Schwitters included the photo of a model bearing the same name as the article, *Schloss und Kathedrale mit Hofbrunnen* and compared it to the play of a child with found objects. In the same issue of *Frühlicht* Taut also published Finsterlin's *Stilspiel* building block set (Figure 10). The blocks in Finsterlin's set modelled a number of historical structures from world architecture that its user could take apart and combine with others. As Finsterlin explained, the use of his set was ideally suited for architects whom he believed would like to seize the impartiality of the child to rid themselves of their cultural inhibitions.[23]

Similar to an eighteenth century student standing in the middle of an architectural collection of cork models and plaster casts, an architect assembling found objects or building blocks into new designs must imaginatively fill-in the spaces between the individual elements. Unlike the plaster models of the Fouquets who imagine the connection between the missing pieces of classical architecture for the user, in the play with found objects or building blocks the modeller themselves will speculate on new combinations of the elements and contemplate their efficacy as architecture at full scale. Here the aim is not to propose a resolution between the existing fragment and archaeological evidence of the original but to wilfully think about new combinations of the fragments at diverse scales and materiality.

Conclusion

Most architects can easily tell when a model presents a faithful or false rendition of structure at a larger scale. That is to say, when working on a scale architectural model, the architect knows that it represents a fiction since the depicted building does not (yet) exist; but they will still select and transform their modelling materials as if these were the real building materials at the prescribed scale. In this space between the real and its representation, early modern architects knew that even fragments of historical forms can invite thinking and engage their user to speculate upon different formal and spatial arrangements as a scale depiction of architecture. As for example the philosopher Walter Benjamin once observed about the use

of collage by Dada artists, this reorientation of fragments is compared to the allegorist who drains objects of life so that they may be re-presented with new meaning. Above all, what these examples demonstrate is how thinking about architecture at a distance with models creates a space for the imagination to wander about scale, materiality, purpose and site.

Images

Figure 1. Giovanni Altieri, Model of the Roman circular Temple of Vesta at Tivoli, 1776. (©Sir John Soane's Museum, London)

Figure 2. Johann Heinrich Wilhelm Tischbein, *Goethe in the Roman Campagna*, 1787. (Städel Museum)

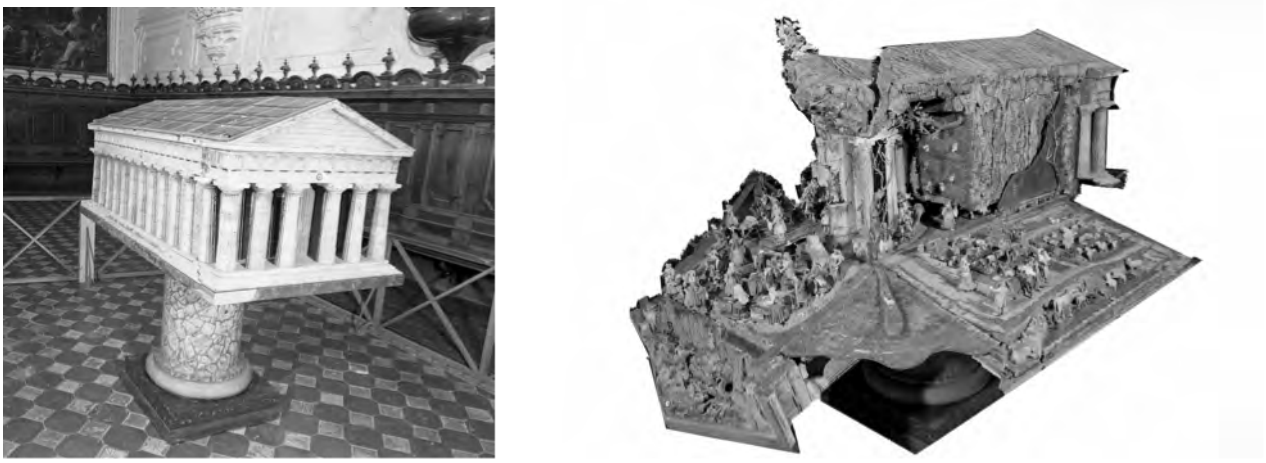

Figure 3. Lorenzo Taglioni, Presepe di sughero. Closed (left) and open in its ruined state (right), c. 1600. (Naples, Museo Nazionale di San Martino)

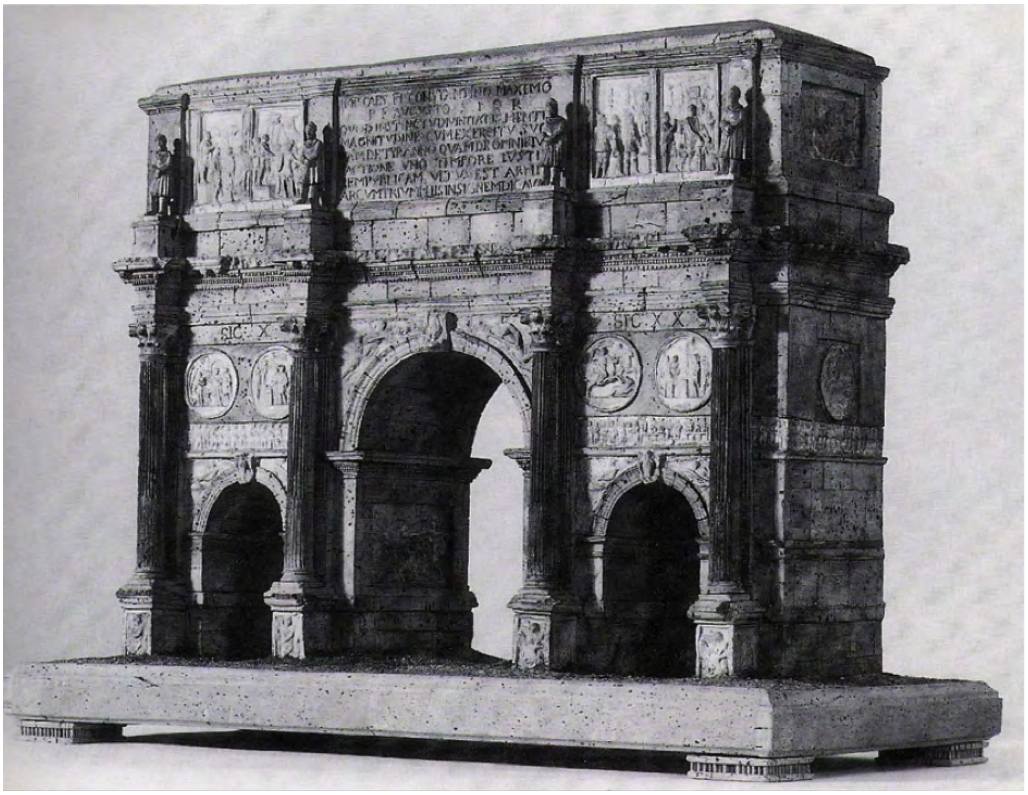

Figure 4. Carl Joseph May, cork model of the Arch of Constantine, ca. 1792–1814. (Bayerische Verwaltung der staatlichen Schlösser, Gärten und Seen)

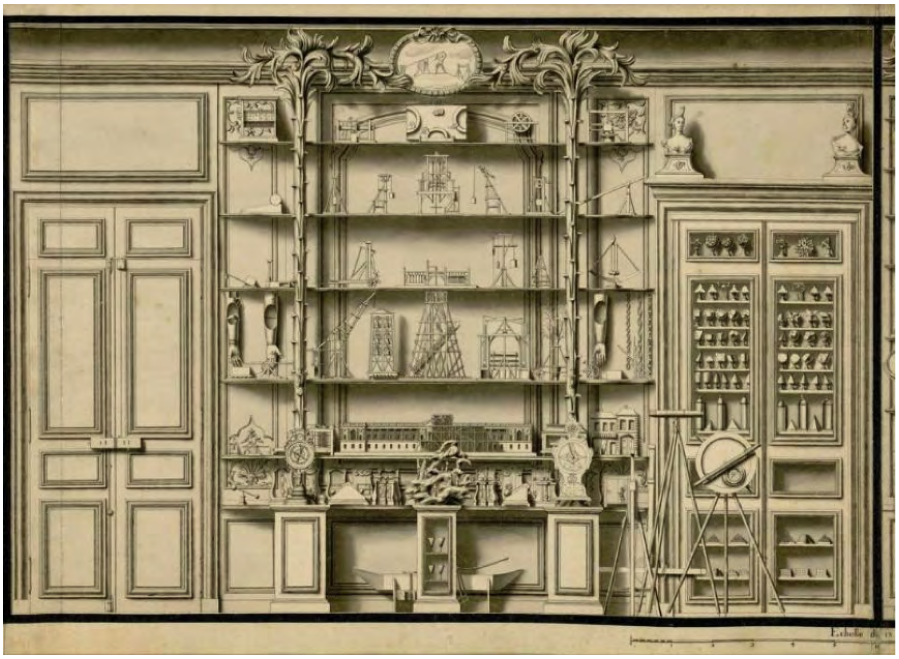

Figure 5. Collection of Bonnier de la Mosson, physical and mechanical objects, detail, drawing by Jean-Baptiste Courtonne, in *Recueil des dessins des cabinets de curiosités de Bonnier de la Mosson,* 1739/1740.

Figure 6. Henry Parke, Student surveying the Castor and Pollux temple in Rome, 1819. (Sir John Soane's Museum, London)

Figure 7. Sir John Soane Museum, Monk's Parlour. (Sir John Soane's Museum, London)

Figure 8. "La Cour vitrée dans le Palais des Etudes". École des Beaux Arts, Paris (1929). From P. F. J. Marcou, 'Album du Musée de Sculpture Comparée', vol. 2 (Paris, 1897).

Figure 9. Teaching collection of the Technische Hochschule in Munich, 1917.

Figure 10. Hermann Finsterlin: Das Stilspiel, 1921/22. Staatsgalerie Stuttgart. (© Copyright Agency, 2019)

Notes

1 Leon Battista Alberti, *On the Art of Building in Ten Books* 2.1, trans. Joseph Rykwert, Neil Leach, and Robert Tavenor (Cambridge, MA: MIT Press, 1996), 33–35.

2 The quote is from Joseph Furttenbach, *Architectura Civilis* (1628), vorrede.

3 Johann Wolfgang von Goethe, *Italian journey, 1786-1788*, trans. W H Auden (New York: Pantheon Books,196), 129.

4 John Locke, *Essay Concerning Human Understanding* (London: Thames Basset 1690). See also James Buzard, "The Grand Tour and after (1660-1840) in Pete Hulme & Tim Youngs, *The Cambridge Companion to Travel Writing* (Cambridge: Cambridge University Press, 2002), 37-41.

5 *Richard Lassels, The Voyage of Italy, or A Compleat Journey through Italy in Two Parts* (Paris: Vincent du Moutier, 1670).

6 *Grand tour: the lure of Italy in the eighteenth century*, ed. Andrew Wilton and Ilaria Bignamini (London: Tate Gallery Pub., 1996), 102-03. See also the humorous satire *The Bear-Leaders: or, Modern Travelling Stated in a Proper Light. In a Letter to the Right Honourable. The Earl of* *** (For S. Hooper and A. Morley, 1758).

7 Francesco Proto, Atti dell'Accademia Pontaniana (1889), cited in Franco Mancini, *Il presepe napoletano: scritti e testimonianze dal secolo XVIII al 1955* (Napoli: Società editrice napoletana, 1983), 62-70: "I presepi casalinghi moltiplicaronsi dopo quello che adorna l'altare di S. Giuseppe dei Falegnami, opera bellissima del nostro gran Marliano, Il quale, schifando dar nascere il Redentore in una cripta, in una stalla, mise la mangiatoia e la cuna fra le anticaglie di un tempio romano." Mancini (1983), 66; After Jessica Hughes, "A Brief History of Ruins in the Presepe Napoletano," in *Remembering Parthenope: The Reception of Classical Naples from Antiquity to the Present,* ed. Jessica Hughes & Claudio Buongiovanni (Oxford: Oxford University Press, 2015), 289.

8 Jessica Hughes, "No Retreat Even When Broken," in *Remembering Parthenope: the reception of classical Naples from antiquity to the present*, ed. Jessica Hughes and Claudio Buongiovanni (Oxford: Oxford University Press, 2015), 296-299.

9 At age of seventy, Carl May was honored as "Baurat" (building adviser) while working for Ludwig I of Bavaria. Françoise Lecocq, "Les premières maquettes de Rome: L'exemple des modèles réduits en liège de Carl et Georg May dans les collections européennes aux XVIIIe–XIXe siècles," in *Roma illustrata: Représentations de la ville*, comp. Philippe Fleury and Olivier Desbordes (Caen: Presses Universitaires de Caen, 2008), 237.

10 Joseph Furttenbach, *Architectura privata* (Augsburg: Johann Schultes, 1641), 37, 40.

11 Monique Mosser, "Französische Architekturmodelle im Zeitalter der Aufklärung," *Daidalos* 2 (1981): 83-97, 93.

12 Ibid. 92.

13 Helen Dorey, "Sir John Soane's Model Room," *Perspecta* 41, Grand Tour (2008): 46.

14 *A New Description of Sir John Soane's Museum*, 10th ed. (Marlborough: Libanus Press, 2001), 17–19.

15 Quatreme`re,Conside´rations morales...,'Deuxie`me lettre' (to Canova), This translation by Mari Lending, in Mari Lending, *Plaster Monuments: Architecture and the Power of Reproduction* (Princeton: Princeton University Press, 2017), 68, n. 130.

16 Eugène Viollet-le-Duc, Musée de Sculpture comparée appartenant aux divers Centres d'Art et aux diverses époques, Bastien et Brondeau, 1879.

17 Marcel Proust, *In the Shadow of Young Girls in Flower*, Vol. II of *In Search of Lost Time,* trans James Grieve (London: Penguin, 2005), 224-229 after Mari Lending, *Plaster Monuments: Architecture and the Power of Reproduction* (Princeton: Princeton University Press, 2018), 70-74.

18 *Herbert Baer, "The Course in Architecture at a German Technische Hochschule," American Architect and Building News*, 71 (March 1901): 83-85.

19 Werner Helmberger and Valetin Kockel, "Herkunft und Geschichte der Aschaffenburger Korkmodellsammlung," in *Rom* über *der Alpen Tragen*, ed. W. Helmberger and Valentin Kockel (Landshut, 1993), 119-26.

20 Frank Whitford, *The Bauhaus: Masters & Students by Themselves* (London: Conran Octopus Ltd., 1992), 38-41.

21 Walter Gropius, *The New Architecture and the Bauhaus*, trans. P. Morton Shand (London: Faber and Faber Limited, 1935), 47.

22 Kurt Schwitters, "Schloss und Kathedrale mit Hofbrunnen," *Frühlicht* 1, no. 3 (Magdenburg, 1922): 87. Hermann Finsterlin, "Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel: Ein Lehr-, Spiel- und Versuchsbaukasten," *Frühlicht* 1, no. 3 (Spring 1922).

23 Finsterlin's intention that his building block set could be used as a study tool for architects is suggested by the term "Versuchsbaukasten" (study building blocks) in the subtitle to his article "Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel: Ein Lehr-, Spiel- und Versuchsbaukasten." In the concluding paragraph of his article, Finsterlin described how the innocence of the child who sees the world without already formed cultural ideas of architecture is an ideal model for the people searching for the development of new architectural forms: "Von jeher war die Verwandschaft klar zwischen dem unverbildeten Kinde und Naturmenschen, dem Kulturhemmungen überwinden Narren und dem Genius." (Since ever was the relationship clear between the unspoiled child and the primitive human being, between the fool that overcame the cultural inhibition and to the genius). In: Finsterlin, 158.

About the Author

An architect by training, Matthew Mindrup is a Senior Lecturer at the University of Sydney. He completed a Ph.D. in Architecture and Design at Virginia Tech University on the physical and metaphysical coalition of two architectural models assembled by Kurt Schwitters in the early 1920s. Dr. Mindrup's ongoing research in the history and theory of architectural design locates and projects the implications that materials have in the design process. Dr. Mindrup has presented some of this research at conferences and published others in *The Journal of Architectural Education (JAE)*, *Interstices*, *Wolkenkuckucksheim* and his edited volume *The Material Imagination: Reveries on Architecture and Matter* (Routledge, 2015). In August of 2019, Matthew will welcome the publication of his new book: *The Architectural Model: Histories of the Miniature and the Prototype, the Exemplar and the Muse* (MIT Press, 2019).

Montreal Architectural Review

Poetic Discourse: *Paper Architecture as a Site for Thinking, Writing and Spatial Agency*

Tordis Berstrand
Xi'an Jiaotong-Liverpool University

Thinking along the lines of the paper on which I write
with its four sides lined up with words in an improvisational fashion
an argument builds while the pages turn – on the table if not yet the screen
This writing before writing is like the setting out of a house
a site for thinking and writing delineating the architecture of an argument to take form

what kind of argument will I design?

If paper arguments are manifestations of the endless ways that houses hold and paper folds
sheets with letters and lines in spatial formations of words and drawing
sentences that complement the structuring of houses that thinking undertakes
then the firm foundation on which reason seemingly *stands*, the edifices held by this *ground*,
are structures for thinking about structures for thinking, and possibly about building and writing too

what do architects have to say about the design of structures for thinking?

Architectural metaphors are integral to thinking, thinking needs a structure, a house
and this house requires a thinking, a theory – it seems
philosophical thinking as a structure of support, in words and writing, or the house will fall
architectural building as a structure of support, in stone or steel, or the argument will fall
intricately linked then, thinking and building, both with gravity, *gravitas*, a certain weight

proper articulation of the argument or collapse!

The building, which cannot stand on its own, requires support from thinking
The thinking, which cannot support itself, requires a structure to hold it

I am thinking along the walls of rooms and houses, then, to try to imagine this writing that holds
the edifice in and of paper, drawn and described by means of lines, letters, words, geometries
not hovering above the ground because too inflated, not buried in the basement because too loaded,
not simply a house as we think we know it, but rather *another* kind of house, an *argument*
and possibly in writing – a space for thinking about building an(d) architecture
a process of reasoning – *clearing*, *proving*, *accusing* – yes, but more creative

not an upside-down house where meaning will soon fall out
not a downside-up house with a too firmly paved foundation that just keeps sinking
perhaps not a house at all

To think from the other end, then, from outside down, inside up, across the boundary of my paper
where a point of return is approached once a knot has been tied
where weaving suspends a net across the gap in knowledge that cannot simply be paved over
where this hole is so wide that sentences become too short to stretch across
where the abyss is so deep that meaning cannot escape its darkness
here, I cast on a stitch, on either side, between which the knitting of a bridge begins
suspended in thin air without footing, nothing to stand on, no structure for support
here I hang while weaving across, traversing the void with my feet treading air

I keep going since if I stop, I could fall through
the spider web construction – tentative but also with determination
if not quite an emergency in the short term, then possibly in the long

Weaving a house becomes the weaving of a blanket before all four sides are connected
a soft, openly stitched fabric through which I can still look into the abyss below

and if Chinese reasoning weaves like a journey through parallel worlds unfolded over the duration of
a scroll-like mental landscape, then it makes me think of a thinking that extends in a network
of relations – like a blanket, relational, softer
where the notions of memory and experience are at work in an open constellation
where thinking speaks and reverberates within its own space for centuries
to explore the possibilities of what is being said, one is perhaps left to appraise and comment only
forever confirming the endless richness of the statement and thereby enhancing and extending it

thinking and writing is a convoluted affair – can/should I do one without the other?

I am thinking about writing while writing about thinking, and I am already inside as I speak out
what writing means for thinking as a kind of site for something to be figured out, (un)tangled
literally, drawn out and into the open, illuminated, delineated, held, pinched, inhabited
writing as a means to transmit, structure, prepare thinking – for action, construction, support
paper – folded, printed, virtual – as a medium for thinking, writing, drawing, lining up futures
Another kind of *essay* then, closer perhaps to Montaigne's late sixteenth-century French *essai*
if not yet a Chinese landscape scroll

something less verifiable, measurable, conclusive, scientific
something more suggestive, tentative, speculative, flexible, open-ended
an attempt at writing the always incomplete thinking and a building that holds, if not stands
another kind of holding*, less tight, more inclusive*

The *essay* as a space to structure this thinking, to practice the structuring of thinking
like the design of a house, at the time of writing perhaps formless, groundless, open to the sky
spatialised thinking and practiced spatial imagination, at the time of writing delineated in words
informing the design process in a journey of spatial reasoning and blanket weaving

what can I say? how will I say it? what kind of saying is this?

If in architectural education, students are trained to think, write and design buildings
then how to teach them to weave this house? to structure writing as a house? to design *this* building?
with the architectural metaphor in play – in/on/of paper – construction is inevitable
so how to teach students of architecture to construct this built argument?
how to teach Chinese students to retrieve the spaces of their historical past?
to make use of writing as a space for thinking about architecture and related questions
to think through writing as a means to prepare for action, spatial agency and building in China

what house for thinking will they be thinking of?
what thinking for housing will they devise and design?

Will they think and write a Chinese courtyard house?
or which other structures and frameworks for thinking and argument might they retrieve/conceive?
places to dwell on architecture, ideas, relations, constructions of meaning and space
a tentative essay as an open form of configuration, constellation, articulation

I am thinking along the wall here, the walls of rooms and houses, like the framing of a courtyard
a framework for thinking with a central opening, if not an empty space
a framing of a space through the application of a lining of lined-up statements
an outline on a piece of paper, real or virtual, the white wall in front of me
ready for inscription, inhabitation, appropriation, a certain charge that makes it mine
mining it with meaning, purpose and argument in support of thinking as writing

A tentative constellation of words then, writing around notions of space, place and world
while framing what appears to be a central void already charged with potential
this openness that remains after inscription as a possibility for something else to take place
inexhaustible, never full, like another image placed in a passe-partout frame, replaceable
giving presence to something, making space for it, framing it, holding it, living it

Nota bene:

The text draws on the following sources for insights and references:

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About the Author

Tordis Berstrand is an architect and lecturer in the Department of Architecture and Design at Xi'an Jiaotong-Liverpool University, Suzhou, China. She teaches theory, criticism and aesthetics as well as design studio to students in the Bachelor and Master programmes. Tordis Berstrand studied in Copenhagen with further postgraduate and doctoral studies in London. Her Ph.D. on the construction of living spaces in works by Kurt Schwitters, Gordon Matta-Clark and Gregor Schneider forms the basis of current research on relations between artistic practice, dwelling and traditional Chinese thinking on space. Tordis Berstrand is particularly interested in writing as a critical spatial practice and tool in the design process and beyond.

Montreal Architectural Review

Book Review: Paul Emmons. *Drawing* Imagining *Building: Embodiment in Architectural Design Practices* Routledge, 2019

Jonathan Foote
Aarhus School of Architecture

What is *disegno*? The erudite Tuscan, Anton Francesco Doni, asked himself this question in 1549 and responded as follows: "I would say it is the industry of the intellect, enacting the execution of the work with its power … *Disegno* is not anything other than divine speculation."[1]

Doni's learned invocation of *disegno* to be a physical production as well as an immaterial idea, helps to establish the link, still with us today, between the inseparable processes of thinking and drawing. The power of *disegno*, for sixteenth-century commentators such as Doni, and later, Giorgio Vasari and Federico Zuccaro, was in theorizing the apparent ambiguity, inherited from Aristotle, between the changeable, material world of the senses and the eternal, unchanging realm of ideas, conceived in the mind. *Disegno* elevated the status of drawing beyond its origins in workshop usage, giving a basis for the evaluation of artistic practice as both a technical and intellectual pursuit.

The unstable translation of *disegno* into English as drawing or design is referenced directly in the title of Paul Emmons' *Drawing* Imagining *Building: Embodiment in Architectural Design Practices* (Routledge, 2019), enticing the reader to explore its double-sided potential in the architect's imagination.

The imminently connected acts of drawing and building, bound together through our imagination, organize the book and provide an underlying structure for a theory of architectural drawing practices before the digital age. Based on an immense range of historical sources and examples, Emmons' main argument is constructed around the concept of embodiment, which occurs in two ways: the physical body of the drafter in relation to the drawing and the imaginative act of projecting oneself into the drawing. This double-embodiment, Emmons argues, is cleverly captured in Claude Bragdon's delightful wooing of Sinbad, the architect's body imago, from the depths of the ink bottle (Fig. 1). The notion of the embodied drawing is set in contradistinction to the more predominant understanding of drawings as rationalist entities that merely convey predetermined, graphic information to an anonymous, rational mind.

Beyond the valuable contributions to our understanding of embodied practices, the book poses a deeply substantiated theory of architectural drawing, one that could provide a valuable reference for architects in the post-digital age. It offers a critical counterbalance to current discourse that views digital drawing as a break from the past and neglects the fundamental, historical conditions of how architects make and continue to imagine through their drawings. Promises from the early twenty-first century, such as the paperless studio or the abandonment of traditional orthographic drawings, simply have not materialized. Rather, many hand-drawing practices have quietly persisted, albeit in new ways and with new tools. While some may question the timeliness of a book on hand-drawing, perhaps it is precisely what is needed for inspiring the next generation of digitally savvy architects. In this way, the book provides a trove of nuances, references, and past practices that are ripe for reinvention. By outlining a theory of drawing embodiment, it presents a valuable index for future inquiries into new configurations and explorations of the digital body in architectural design.

Emmons's method relies on digging deeper into the clues left behind from ordinary, technical drawing practices in order to make visible undisclosed drawing rituals. The table of contents offers an immediate glimpse into this approach, establishing three chapters in three parts each. The organization progresses from the architect's initial imaginings through techniques of mark making and ends with the interrelation between drawing and building. Each chapter examines some area of technical drawing that normally escapes scrutiny, thus managing to unify what might be seen as quite disparate themes under a robust, almost cosmological world-view. The first part of the book traces historical assumptions about architectural drawing. 'Drawing genera' probes Vitruvius' three classic drawing types, *ichnographia*, *orthographia*, and *scaenographia*, what Emmons takes as 'Footprint plans', 'Upright elevations', and 'Immured sections', in respective chapters. The second part, 'Drawing marks', problematizes the architect's most common line types and symbols, looking at how different lines have been invented to represent actual but invisible projections, such as action and movement, materials, and spatial relations. The book closes with 'Drawing into building', where the gap between drawing and building is explored through architects' drawing tools, the criticality of scale and measure, and building site imaginings and conditions.

Throughout the text, abundant and riveting examples build a foundation from which the main theme of embodied drawing is explored in unambiguous and forthright language. Mining sources and texts normally overlooked, such as early twentieth century drafting room journals, Emmons liberates us from the burden of our inherited, Cartesian worldview of drawing terms and practices. Typical assumptions about rationalized drawing practice are systematically contextualized, prying open conventional thinking to help us see common terms and assumptions afresh. In his analysis of the upright elevation drawing, for example, Emmons rejects the common understanding that a fixed point perspective drawing recreates the experience of the building more closely than the face-to-face relationship of the right-angled eye. Inhabiting an elevation drawing through our roving eye, he asserts, allows us to imagine the architecture through the building's true size and shape. In a separate point, Emmons undermines the false opposition, inherited from rationalized practice, between poetics and instrumentality. By examining the premodern notion of the Thomists' instrumental cause, he effectively demonstrates how our drawing tools are intimately linked to the embodied imagination, and they are not simply the technical means of rendering what has been previously conceived in the mind.

What are typically seen as insignificant practices in the drawing room, such as the making of dashed lines or the representation of material symbols, are for Emmons significant indicators of tacit, embodied knowledge. Relying frequently on Charles Sanders Peirce and his taxonomy of signs (icon, index, symbol), he counters the prevailing understanding of technical drawing as a conventional language of arbitrary signs.[2] For example, in discussing plan drawings as a footprint rather than a horizontal section, which is an eighteenth-century understanding, Emmons shows how drawing the plan and plotting it on the building site were once closely linked, since drawing lines and dimension 'strings' were indexes of construction tools such as ropes and chains. Elsewhere, he reveals that the material symbol for glass, drawn in elevation as parallel diagonal lines, is not an arbitrary symbol but is in fact indexed to the act of imagining the light rays inside of a crystalline material.

Emmons repeatedly and convincingly demonstrates the critical role of such drawing practices for the architectural imagination. Ethically speaking, the embodied imagination can better resist external economic pressures on design, to see the betterment of the larger community. And, from a builder's point of view, embodied drawing strengthens architects' capacity to imagine in construction. This last point culminates in a particularly illuminating critique of the commonly repeated notion that drawings are 'translated' into building, a terminology inherited from Robin Evans' well-known essay from 1986.[3] For Emmons, the conceptual framework of translation excludes from consideration the creative task of interpreting drawings during construction, and it has thus encouraged architects to apply increasingly universal tools and sophisticated technologies to close the 'gap' between drawing and building. Emmons proposes the alternative act of 'adapting' drawings to building, where architects actively participate in both designing and building through the creative interpretation of their drawings across different modes of thinking.

The text could have been augmented by more emphasis on certain details in the publication. The eighty illustrations are generally rendered quite small and are offered only in black and white. Magnificent images such as Masolino da Panicale's *Miracle of the Snow* or Andrea Vesalius' frontispiece to *De Humani Corporis Fabrica* suffer greatly from the book format restrictions. In addition, in weaving a complex web of periods and contexts, often with unexpected or curious examples, a great number of sources are consulted. The endnotes, however, are generally restricted to minimum bibliographic information only, and the curious reader will wish for more copious supporting statements, expanded information, or original language text. This is especially the case when examining complex terms in languages other than English.

A recurring point throughout the book is that, unlike other types of drawings that imitate reality, architectural drawings imagine a future reality. They are therefore projective, not mimetic. It is why, Emmons argues, in Renaissance personifications of *disegno*, the figure holds a mirror, tilted away from him, reflecting the future. The projective drawing conjures a second meaning as well, where the imaginal body inhabits the drawing of the future building. Historically, this bodily feat was intrinsically linked through architects' drawing tools, which resembled builders' tools. If in the post-digital age these tools are fundamentally Cartesian and architects no longer construct drawings by hand, understanding the role of embodiment seems more important than ever. As tools continue to expand and develop, both for builders and architects, the opportunity to cultivate our capacity to imaginatively project ourselves into future constructions is exciting indeed.

Images

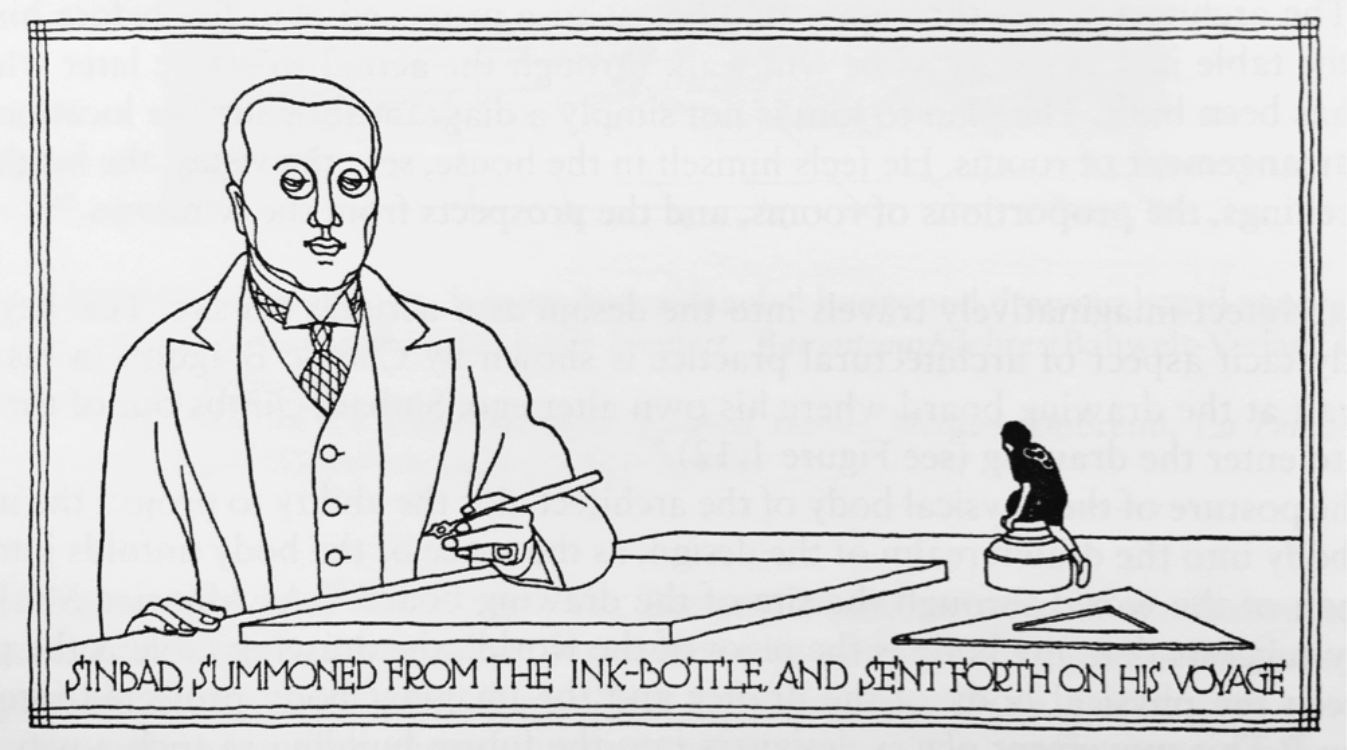

Figure 1. From: Claude Bragdon, *The Frozen Fountain: Being Essays on Architecture and the Art of Design in Space* (Knopf, 1932) 1.

Notes

1 Anton Francesco Doni, *Disegno del Doni, Partito in piv ragionamenti, ne' qvali si tratta della scoltvra et pittvra …*, 1549, fol. 8v.

2 Charles S. Peirce, *Collected Papers of Charles Sanders Peirce*, Charles Hartshorne and Paul Weiss, eds. (Harvard University Press, 1931-1958) 2: 303.

3 Robin Evans, 'Translations from Drawing to Building', *AA Files*, 12 (Summer, 1986), 3-18.

About the Author

Jonathan Foote, Ph.D., is an architect (MAA) and Associate Professor at Aarhus School of Architecture, Denmark. Previously, he taught at Cal Poly San Luis Obispo and Virginia Tech's Alexandria Campus (WAAC). His teaching and research concern the architectural translation between ideas and materials and the significance of the workshop as a site for imagination. He has published on the drawings and workshop practices of various architects, including Michelangelo Buonarroti, Francesco Borromini, and Sigurd Lewerentz. In addition to his teaching and academic work, Jonathan runs a design research studio, Atelier U:W, which partners locally and internationally on special projects in design and fabrication.