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Drawing Theory. An Introduction

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Art would express a perception, whether it was an intuitive thought or a sensation, and transform this non-objective sensation into knowing.
Kazimir Malevich

The field of drawing has been, at least during the last fifty years, increasingly extended and intensified to include drawing production and drawing reflection. Both the production of drawings and the critical assessment of their inherent meanings have become part of an intense disciplinary debate involving architects, artists, scholars, and philosophers. Within the architectural discipline, precisely the understanding that drawing and theory are intrinsically related has resulted in the continuous reflection on the relationship between thinking and drawing, or, more abstractly, on how the specific means of representation relate to specific conceptions of space. In his groundbreaking project *Mémoires d'aveugle. L'autoportrait et autres ruines* (Louvre, Paris, 1990/91), Jacques Derrida extensively clarified this aspect of drawing, focusing on the relationship between the mind's eye and the hand. Derrida compared drawing to writing and regarded 'anticipation' as a 'projected grasping', i.e. a touching that is oriented forward into an unknown, as the most fundamental act of drawing. Taking this reasoning to the extreme, led Derrida to regard both the drawing itself and the act of drawing as being 'blind'. The drawing becomes a tracing leading into an abyss, where it is not a summarizing interpretation by means of an external representation, but a reasonably subjective expression of an inner vision.

Nowadays, drawing practices seem to operate in a rather uncertain field that is typical of an in-between phase of disciplinary development and that needs to be addressed, if an 'anticipated projection' of the development of drawing is to be attempted. The field of drawing, as practice and discourse, seems to have entered an end-condition, where the celebration of the extensive production of drawings is combined with a certain fatigue in both its understanding and reflection. Drawing nowadays seems to be suspended in this in-between condition of objectivity and instrumentality, as image and information, as communication and science, whereas the theoretical field generated between these polarities seems to have lost its theoretical poignancy.

The observation that drawing is caught in the suspended field of an end-condition emerges out of the sustained questioning of drawing's relevance, which is combined, in a schizophrenic balancing act, with the simultaneous celebration of its inexhaustible power. Both aspects result in a historical phase of the contemporary reception of drawing that lies between mourning and appreciation, as drawing is raising both praise and suspicion. Recent drawing exhibitions, such as *Borderline Architecture* organized by the Hungarian Pavilion at the 2010 Venice Architecture Biennale, *Notations* at the ZKM, and *On Line; Drawing Through the Twentieth Century* at the MoMA, once again called attention to the relevance of drawing. In *On Line*, for instance, curators Catherine de Zegher and Cornelia Butler organized the exhibition according to three main themes

(surface tension, line extension, and confluence), thus juxtaposing drawing's means and techniques with a supposed field of operation. The curators emphasize the reductionist approach with which drawing is nowadays mostly conceived. The limitations in techniques and means of drawing are, in their view, related to the fact that 'lucidity of thought is exactly the aspect of drawing that is most valued'[1] yet becomes a delicate point in the celebration of the limitations caused by the perceived 'grandeur' of drawing. In other words, the relationship between drawing and thinking is located in the fact that both words and lines are cognitive representational instruments allowing for the construction of knowledge and communication, rather than 'simply' being the instruments that initiate an aesthetic pleasure via a visual appreciation.

The seventh issue of *Footprint* attempts to address this contemporary state of affairs within a disciplinary understanding of the drawn theory of architecture. The premise of raising this issue originates from the critical exploration of a field within architectural theory that in the last decades has seen a progressive 'de-problematization'. Even though the role of drawing is nowadays still regarded as the most common act of architecture, this understanding of drawing is hardly subject to critical inquiries, and, unfortunately, mostly limited to its instrumental role within the representation of the project.

The relationship between drawing and theory belongs instead to a long and well-established tradition, according to which drawing is seen as a 'doubly significant instrument of representation: as a moment of knowledge (therefore adjusting the idea to fit the object), and as an act of creative construction, capable of modifying the passive perception of the real and refocusing it within the dimension of theoretical and practical construction, often with a pronounced ideological content'.[2] In the early part of the twentieth century, after the radical experiments of the historical avant-gardes within the wider context of the Modern Movement, the theoretical interest in drawing underwent a radical reduction in favour of an instrumental role, functional to the ideology of the modernist project. It was only at the beginning of the 1960s that architecture rediscovered a specific field of elaboration of its content within drawing. Influenced by the development of the science of language and by a renewed formalism, a new architectural 'mentality' elaborated a series of alternatives to the functionalism of the International Style. The phenomenon of *paper architecture* emerged within a highly heterogeneous context that included experiences such as Archigram, Superstudio, Archizoom, The New York Five, Tendenza, Architecture Principe, etc.

During the sixties, the architectural drawing essentially '[becomes a] critique of the existent and wishes to be a forerunner of a different future full of planning and of social promises, [but] it is in the seventies that it acquired a specific theoretical dimension'.[3] Drawing once again reflected upon its own specificity as an autonomous instrument of architectural knowledge and beyond the specificity of privileged representational techniques, only to discover that this autonomy was actually a project that needed to be reformulated as well. Drawing deliberately reduced and classified the 'things' of architecture to their own particular field, each of which 'undertakes to constitute an autonomous theoretical unit within the complex system of the project'.[4]

To outline this particular theoretical dimension of the project and the amplitude of themes and research studies that converge thematically around a similar theoretical position, we should recall the phenomenon of the *Architettura Disegnata* that emerged at the beginning of the 1970s in Italy. According to architect and theorist Franco Purini, who thoroughly analysed (often very critically) this phenomenon, 'at the bases of the *Architettura Disegnata* experiences were the re-foundations

of the idea of "construction", both in its specific architectural character and in its wider meanings. In this context, architecture attempted to define its own language, taking the field of representation as its point of departure. Moreover, the *architectural drawing* defines with great exemplariness not only the idea of construction, but this construction within the representation represents the architecture more than the *real construction*, unfolding at the same time the meaning of the *project of the self*.' Purini continues: 'The *Architettura Disegnata* also returns to the origins of the modern city. The representation of it, the city, is intercepted as well in a moment of renaissance. This operation also expresses the beginning of the end of the theoretical purity of drawing, because the idea of city indicated in the works of the *Architettura Disegnata* is the historic city, namely the very opposite of the native moment of the origin. Thus, by accepting to represent its opposite, the *Architettura Disegnata* renounces its potential for theoretical purity in favour of the persuasion that will lead to the first translations into real construction in the middle of the eighties, hence rejecting its very nature and producing a theoretical emptiness that still has to be filled.'[5]

Moreover, and on top of this debate, the exhilarating period of architectural experimentation on and via the drawing of the 1970s and 1980s - a period after which Hadid, Libeskind, Tschumi and Eisenman became the celebrated protagonists of the recent era of architectural 'superstars' - still lingers on. The architectural discourse apparently continues to recuperate from, and has difficulty 'transcending', the long shadows cast by the research conducted during this period, probably precisely because of the conceptual advancement that had been introduced. Libeskind's *Chamber Works* is perhaps the clearest expression of the fundamental instability at the basis of the architectural discourse during this period. In retrospect, Evans formulated one of the more thorough critiques on *Chamber Works*, focusing the speculative discussion on the specific nature of the project.[6] *Chamber Works* opened up a space in which the meaning of architecture is in need of rethinking and redefinition, as the set of drawings tests and questions the very notion of architecture itself. In the end, Libeskind claimed to have looked for, but was unable to find, any fixed instruments, elements, or strategies with which either to 'ground' the discipline of architecture or, at least, 'determine' the temporary boundaries that might circumscribe it.[7] Nowadays, while drawing still receives unrelenting attention as a field of artistic and architectural expression, the theoretical reflection on drawing still seems to be caught in this vicious circle of clarification and reiteration, perhaps especially because of the absence or acknowledgement of 'new' publications that could confront the relevance of the works from the aforementioned period.

There is an undeniably disturbing dimension to this analysis, which positions the current practices of drawing in an apparent state of paralysis. The conclusion of Purini's above-mentioned text, which articulates the relevance and decay of the theoretical poignancy experienced by the drawing during the 1970s, constitutes one of the facets of a 'theoretical emptiness' that was the premise of this issue. In recent years, 'drawing' has suffered a general 'de-problematization', which probably started at the end of the 1980s, a period in which the experiences that had begun in the 1960s and 1970s started to fade, including the flourishing series of scholarly contributions and the development of a highly sophisticated rhetoric of the architectural representation with dedicated journals, such as *AA Files*, *Daidalos*, *Controspazio*, *XY*, and, to some extent, *Oppositions*. At the same time, new experimentations guided by the infatuation with new technological resources, further widened the field with new theoretical questions, thus making it more complex to structure a unifying theoretical question in relation to a cultural tradition of reference. In fact, nowadays, drawing appears to have dissolved into a visual culture that is fundamentally guided by the

opening of a seemingly infinite amount of possibilities, offered by new technologies and software, which only seems to enhance and deepen the end-condition.

The amazing power of expression of dynamic drawings (see, for instance, superDraw and Aubo Lessi), as well as the theorizations of architectural fluency (Kwinter and De Landa, to mention the main protagonists) and, for instance, the recent manifestation *Emerging Territories of Movement* in Storefront for Art and Architecture (organized by *Draw-Think-Tank*), during which collective drawings were produced via a smartphone app, are all exemplary of the submergence of drawing into a realm of seemingly unlimited possibilities. Under these circumstances, the slippery territory of production and reflection can no longer be discussed by using the more traditional conceptional frameworks and knowledge of drawing. The acknowledgement that the means of representation is framed by the specific content or intent of the drawing thus becomes an inconclusive statement, to say the least.

However, and notwithstanding the difficulty of spotting elements of a unifying theoretical theme and the absence of contributions that attempts to tackle the problem from 'within the drawing', we could identify a common characteristic in all of the papers in this issue of *Footprint*. We could argue that a specific character of the theoretical field generated by drawing is the elaboration of the correlation between two epistemic regions: in Hartoonian, between the vertical and horizontal point of view, and between the painterly and the abstract; in Fitzsimons, between the knowledge and the desire; in Bovelet, between the analogue and the digital; in Bordeleau, between the epistemic and the phenomenon; and in Wortham-Galvin, between 'the woof' and 'the warp'. This singular character probably belongs to drawing's structural duality of being simultaneously a simulacrum of a reality and reality itself, memory and anticipation, subject and object, by being in essence the measure of two different facets inherent to architectural thinking. Drawing not only gives consistency to the poles, rendering them architectural matter, but also literally (re)constructs them. At the same time, drawing formalizes the theoretical distance between the two.

Kent Fitzsimons offers a theoretical framework for addressing the relationship between drawing and body, and, more generally, elaborates a way through which drawing conveys an external reality of knowledge and desire. Desire's touch and knowledge's grasp are both discussed as bodily engagements that are the literal and figural subject of drawing. Drawing is an act of opening up towards the other, as well as a caring appreciation of the other. Fitzsimons exemplifies this point with Loos's design for the house of Josephine Baker, where the dancer's body becomes the central core of the ritual engagement within the house. Here, the author shows how architectural drawings always contain two bodily moments, one related to knowledge, the other to desire, insofar as they embody a will to give form to a lived world. These aspects of drawing would 'correspond to the difference between *touching* the body and *grasping* it; between an architect pursuing the desire to affect others through their senses, and an architectural discipline extending its knowledge of human existence'.

Drawing is not only determined by or limited to the bodily engagement of the draughtsman, but Fitzsimons argues that the act of producing a drawing is also a contemplation of the limitations of the other's body, within the spatial framework of architecture itself. Drawing is a 'holding on' to an absence and thus introduces a distance within the drawing itself. The author develops this reference to the human body, claiming that the body remains the major point of reference of the architectural drawing and structures the relationship between drawing, knowledge, and desire by extensively discussing sources ranging from Pliny the Elder's *Origin of*

Painting, the fountainhead of every speculation on drawing, Robin Evans, Michel Foucault, Michel de Certeau, William T. Mitchell, and Jean-Luc Nancy, among others. Fitzsimons shows that although the body might be absent in a drawing, it is nevertheless strongly present as the premise of the drawing itself, both as the means through which a drawing is produced and as an object the proposed spaces are projected to contain. In Foucault's terms, the 'holding onto the body' in drawing is set in a field of power relations, which Agamben redirected to the organization of the household. This longing embedded in drawing is intrinsically linked to the reflection on life, namely through the formal organization of the holding of the house.

With reference to the current age of digital production, Gevork Hartoonian analyses the transformative change the act of drawing has undergone when the horizontality of drawing was replaced with the verticality of painting. The perception of the architectural object, as it is processed via the act of drawing, has led to a reassessment towards the 'painterly', due to the digitalization of the architectural image. In order to construct a viable argument within a complex and multiform thematic framework, which necessarily involves the age-old intrinsic relationship between drawing technique and architectural conception, the author elaborates an argumentative structure, intertwining a critical reflection on Bernard Tschumi's work with traces of the historical influence of technique on the relationship between drawing and body.[8] Heinrich Wölfflin's theorization of the 'line', as an index for stylistic differentiation between the Renaissance and Baroque, forms the historical background of this discussion. However, the transformation of architectural drawing into the realm of the painterly was, according to the author, 'not a stylistic choice'. Hartoonian sees the shift in drawing towards a painterly orientation already in previous historical periods. In Le Corbusier's façades - for instance in Villa Savoye or Villa Stein, where the surface becomes a painterly surface and both the structural function of the wall and the organization of the house no longer have any influence on the specific character of the surface - it is argued that the painterly 'was induced by technology'. Hartoonian emphasizes the importance of the grid as a system of drawing that unites body and spatial experience in a 'non-totalized form understood in terms of either the temptation to express the spirit of a digital age, or the humanist notion of the architecture and the body'.

By referring to the contemporary question of the digital and by actualizing Martin Heidegger's discourse on the 'world picture', the essay's argument prompts from a reading of two drawings by Bernard Tschumi prepared for the *Museu de Arte Contemporânea*. In this investigation, the horizontality and verticality are assumed as an inherently structural character of drawing, both with respect to the body and the gaze. It may be a tautology to affirm that the digital means of production and reproduction used in architecture constituted a turn to the painterly and to the 'superficial', but what emerges from the reading of Tschumi's drawings and the persistence on the 'classical' vertical and horizontal coordinates within the organization of his images is a substantial indication of the possibility of structuring this not-yet-theorized condition. The author, in fact, generalizes his hypothesis on Tschumi's critical use of technique through a further analysis of *The Manhattan Transcripts*. The sequence of images conceived by Tschumi in this 1981 theoretical work consistently offers the opportunity to see how different techniques of production and conception of the image are structured within a unified pictorial character. The filmic sequence of images, including photography and line drawing, montage, and diagrammatic organization techniques, are qualitatively enhancing the architectural conception in the context of the progressive technification (digitalization) of architecture.

The observation that drawing produces a tracing that gathers summarized knowledge from the past and a projection towards the unknown future, is expanded upon by Bordeleau and Bresler in their discussion of mapping and representation. The authors start with a reiteration of the contemporary critique of the controversial objectifying tendency of maps, and develop their argument through the understanding of mapping as the representational technique that allows time to become part of the architectural design process. With reference to Doreen Massey's articulation of mapping as 'representation' and 'agent' within spatial conceptions, and her critique of the tendency of maps to disregard the impact that 'objective recording' of the world actually projects onto the world, the authors single out a semantic distinction between 'map' and 'drawing' as two different modes within the intended process of the architect's intervention. Comparing Carlo Scarpa's material practice through drawing with Peter Eisenman's textual practice through diagrammatics within their respective projects for the Castelvecchio Museum in Verona, Bordeleau and Bresler make a distinction between the use of the drawing and the map. The map is the 'epistemological positioning' of architecture, while the drawing 'phenomenologically grounds' architecture. Both architects aim to address the historical traces of the site, and both use specific representational means to confront these historical characteristics with the present conditions found on site.

Using these two distinctive frameworks underpinning architecture and its representation, while anchoring the analysis to a common 'ground', the authors discuss both the fragmented drawings of Scarpa, which constitute a reading of the site and are informative for the built project, and juxtapose them with Eisenman's drawings, which offers mainly plan views aiming to reveal the site's complexity from a distant point, and where the 'construction' occurs within the realm of the representation. This comparison enables the authors to formulate the hypothesis of a type of mapping in which the epistemological dimension opens the possibility of a relationship with the inherent phenomenological aspects of the site and its temporal dimension within a unifying concept of drawing/mapping. In this type of drawing, time is present in (at least) three different ways, namely through recording, action, and projection: firstly, drawing/mapping constitutes a representation of a found condition; secondly, it records the constructive process in which the project establishes its legitimacy; and, thirdly, it should index multiple perceptions and untapped possibilities. This threefold role, expressed in the three concepts of Documenting, Documentation, Documentator, is able to unify the indexical dimension of the project.

In the fourth essay, B.D. Wortham-Galvin elaborates on the specific theoretical function of drawing, informing the process of urban design during the mid- to late-twentieth century. Paraphrasing Hegel's metaphor adopted in the *Philosophy of History* to describe historical processes, the author states that 'architecture should be understood as a series of complex threads wherein one recognizes the physical forms as the warp, and the temporal, socio-political, natural, and aural contexts as the woof'. More specifically, the author applies this assumption to an extensive concept of urban fabric that exceeds the immediate physical and tangible situation in which individual buildings are located, and enables a grasping of the complexity of the built environment and lived experience. Central to this argument is the analysis and the critique of the figure-ground as a privileged methodological tool of urban design. According to the author, the figure-ground can reinvigorate contemporary urban design praxis (once more) by reasserting drawing as more than mere illustration, and as a means of conceptualizing design methodologies that support a holistic notion of fabric.

After recalling the origins of Giovanni Battista Nolli's plan for Rome (1748), the author analyses

its ‘rediscovery’ during the 1970s, and how figure-ground became integral to design methodology and a primary tool in the formulation of an urban design theory through Colin Rowe’s work at the Cornell School of Architecture. By drawing a critical trajectory within the transformation of the figure-ground as a design tool and a narrative, this analysis also explicates the process that led to its conceptual decay and reduction into a mere formal exercise in pattern making, thus becoming a generative code of binary black-and-white design decision (pre-) determining the ‘res publica’ and the ‘res privata’ of the urban context. In order to grasp the complexity of the built environment and the different milieu of the condition determining it, ‘figure-grounds’ cannot be conceived as pure theory only, as the case of Cornell might suggest, but should, according to Wortham-Galvin, necessarily be ‘reformulated’ in a continuous relation with practice. In conclusion, the text provides a series of references that could help to conceptualize a holistic notion of the urban fabric and the possible ways of engaging it. Among the references used, the work on ‘map overlays’ by Ian McHarg is among the most promising theories needing further elaboration.

Returning to the original questioning of the relationship between drawing and theory, Jan Bovelet’s essay properly concludes this *Footprint* issue by investigating the epistemic dimension of drawing, intended as a pure form of architectural knowledge. This argument confronts the extensive digital habitat, involving contemporary architectural practices and the consequent algebraization of drawing by means of digital computation. Organized in three parts, the text first offers a philosophical excursus of general examples in order to position the epistemic of drawing and the relationships between text/writing and pictures/painting. From this investigation, drawing emerges as a sort of ‘visual thinking’, a ‘third thing’ with a specific epistemic autonomy, in contrast to the realm of concept and language. This part also identifies four aspects of drawing to be addressed. Drawings are epistemically effective by way of their use; they are generative, aiming at operational relationships, and always including some sort of non-conceptual reasoning.

Departing from Sybille Krämer’s classification of diagrammatic thinking, the second part of the text develops a heuristic of the epistemic properties of drawing, where relationships and differences between the modus operandi of texts, pictures and drawings, and the significance of their specific epistemic environments are discussed. With particular consideration to the digital habitat, the author envisions a set of criteria and theoretical limitations for the digitalization of drawing, which is further discussed in the last part of the text: the specific knowledge embedded within the drawing is analysed from a symbol-theoretical perspective and investigated following Nelson Goodman’s theory and his differentiation of the semantic and syntactic properties within analogue and digital symbol systems. The author then elaborates the criteria by which, in theory, drawings can critically oscillate (and thus produce knowledge) between the extremes of a continuous spectrum identified by the analogue and the digital symbol system. The epistemic capacity of drawing lies precisely in the spaces of manipulation, observation, and practice: through its way of representing objects or processes, drawing produces genuine epistemic objects that can become the target of arguments and, eventually, objects of knowledge. The observation of the epistemic role of drawings in the development of architectural design suggests that the production of knowledge is always internally entangled with the representation of the to-be-known.

Acknowledgement

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Notes

1. Catherine de Zegher, 'A Century under the Sign of Line; Drawing and its Extension (1910-2010)', in: Cornelia H. Butler and Catherine de Zegher, *On Line; Drawing Through the Twentieth Century* (New York: The Museum of Modern Art, 2010), p. 23.
2. Francesco Moschini, 'Sign', in: Franco Purini, Livio Sacchi, Nicola Marzot (eds.), *The New City. Italia-Y-26. Venice Biennale. The Italian Pavilion at the 10th International Exhibition* (Bologna: ed. Compositori, 2006), p. 414.
3. See: Francesco Moschini, 'Disegno, Teoria, Progetto/ Drawing, Theory, Project', in: *Domus*, no. 603, 1980, p. 10.
4. Ibid., p. 11.
5. See: Franco Purini, *Proclamandone l'isolamento*, in: *XY, Dimensioni del disegno*, no.10, 1989. Republished in: Francesco Moschini, Gianfranco Neri (eds.), *Dal Progetto. Scritti teorici di Franco Purini, 1966-1991*, (Rome: Edizioni Kappa, 1999), pp. 358-62. My translation.
6. Robin Evans, 'Traces that Leave Nothing Behind', in: K. Michael Hays (ed.), *Architecture Theory since 1968*, The MIT Press, Cambridge, MA/London, 1998, pp. 482-89.
7. Daniel Libeskind, *Chamber Works; Architectural Meditations on Themes from Heraclitus* (London: Architectural Association, 1983), and Jeffrey Kipnis, *Perfect Acts of Architecture* (New York: MoMA & Columbus: Wexner Center for the Arts, 2001), p. 5.
8. In this text, the 'body' is assumed as a given, as a positional reference to the production and reading of a drawing, as well as a determining factor of orientation and a limitation of movement.

The Body Drawn Between Knowledge and Desire

J. Kent Fitzsimons

'Refer to the drawing!' This is in essence how the architect in Adolf Loos's parable 'The Story of the Poor Rich Man' reacts when his wealthy client forgets the proper location for one of the carefully designed objects in his house.[1] Loos's fictional Art Nouveau architect has designed everything at every scale, coordinating vases with staircases and slippers with wood floors. The drawing is such a powerful record that even he relies on it to ensure his intentions for the client's aesthetic delight. Here, drawing architecture is a kind of labour of love that delineates how the architect would touch others through their senses. At the same time, the drawing mobilizes general knowledge about perception and spatial occupation. Its relationship to the world that it describes depends on the body's normal capacities to see and feel, to move or stay still. Drawing architecture thus associates two forces: the desire to touch another body through precise material configurations, and the power to sustain and transmit knowledge about the human body in general. The body is thus drawn between desire's touch and knowledge's grasp. This article will discuss how knowledge and desire are ineluctably joined in architectural drawing, as well as the ethical considerations raised by this coupling.[2]

Commentators on 'The Story of the Poor Rich Man' tend to adopt Loos's perspective that there is something inherently wrong with the designer's attempt to conceive every aspect of an environment or experience. Indeed, Loos's moral tale lends itself more readily to sympathizing with the client, who is left with no room for play (*Spielraum*) in his life. Loos argues that a wealthy client with every reason to be content may be driven to despair by the overbearing presence of design intentions in his house. There is clearly no place for the unpredictability of gifts or whims. Realizing that he is 'complete' by virtue of the architect's total work of art, the poor rich man concludes: 'Now I must live with my own corpse.'

Loos sketches a rather unflattering picture of the architect as a snide authoritarian: 'Those two spots of colour destroy the atmosphere. Don't you understand that?' 'Did I not consider *everything*? You need nothing else.' It is nevertheless possible to give the architect the benefit of the doubt and to postulate that perhaps his efforts, while clumsy on the level of interpersonal relations, stem at least in part from a sincere intention to improve his client's life rather than impoverish it. Through a scorn that those familiar with the profession may recognize as frustration, perhaps this architect is also expressing the desire to affect a man who seemed so eager to enjoy a beautiful house. He works not only for material gain or public recognition (although he clearly considers these); his design is also a labour of love. It is perhaps not passionate love, but the architect's concern for the well-being of another person, or for others in general, partakes of an economy of desire with complex mechanisms and manifestations.

This architect is of course a fictional character (although it is tempting to imagine that Loos based his architect-client exchanges on anecdotes over-

heard in Vienna Secession circles), yet Loos's cautionary tale was part of a very real debate around 1900 regarding the way that design should enter people's lives.[3] That debate has echoes reaching as far as contemporary manifestations of avant-garde design practices.[4] It opposes a nostalgic or reactionary attempt to adorn daily life with authentic art and a modernist ethos that promotes sobriety and reproducibility in the interest of the greatest comfort and freedom for all. In Loos's argument, the distinction between art and use is important: the first should not invade the sphere of the second. However, there are some problems with construing the opposition this way. On the one hand, casting the excessively involved architect against the overwhelmed occupant too easily resorts to a simplistic schema with an offender and a victim, a 'strategist' and a 'tactician' (to borrow Michel de Certeau's formulation, which I will discuss below), or, conversely, a misunderstood artist and an uncultured commoner. Here, architectural drawing would be reserved for an elite that imposes its values through design. On the other hand, the restrained position, whereby design intervenes in a minimal but still fundamental way, risks defining architecture as a technical intervention dominated by standards, norms, and generalizations about how people live. Drawing would therefore be a mere disincarnate tool. Overall, this debate tends to position aesthetics and function as polar opposites, a schema that fails when applied to real circumstances.

If we focus on the status of drawing in the relationship between design and life, the debate takes an interesting turn. Drawing architecture harbours a concern for the human body. Regardless of its degree of detail, the architectural drawing has a hold on the world because its contents relate to bodily experience. Design and life are linked through the conventions that allow us, for example, to make sense of plans and sections. This relationship raises two considerations. The first involves the force that drives architects to design for others. Does the need for survival or for public recognition fully explain the effort to draw environments that, if built, will affect others through physical sensation? A multifaceted desire may also be involved when we draw relationships between design and life. The second consideration is the nature of design's effect on human experience. Do the notions that design thinking deploys about what people think and feel in architecture become reality, and, if so, how does this happen? Given that architects tend to express only good intentions, this may not seem to be a concern. However, in so far as drawing carries knowledge about the body such as its average size and abilities, it participates in the power relations through which different bodily capacities and experiences are given relative value. We will see that negative effects can insinuate themselves into the passage from design to life independently of ideology or doctrine, and that drawing therefore involves a degree of risk.

From this perspective, the ethical question is not, as Loos's tale suggests, to what degree of detail architects should design environments destined for others. It is rather how drawing might harness the architect's desire to affect others without inadvertently impoverishing our idea of the body and its relation to architecture. This essay attempts to elaborate a theoretical framework within which that question may be explored.

Knowledge and Desire

Architectural drawing's ability to evoke the body associates knowledge and desire in a complex web whose threads are difficult to untangle. Because a drawing has a degree of autonomy with respect to the intentions at its origin, it is possible that an architectural project drawn from a longing for a specific person also contributes to circulating and reinforcing suppositions about the human body in general. Conversely, an apparently staid architectural drawing that evokes nobody in particular may also be marked with very human desire.

Loos himself offers a case to consider, this time as architect rather than cultural critic. When he designed a never-built (and probably never-commissioned) house for Josephine Baker (1928), his drawings mobilized and transmitted knowledge of the human body in general [fig. 1]. The slope of a stairway, the width of passage, and the height of a window all refer to accepted corporal dimensions and abilities. These are encoded in the drawings, available for retrieval by anyone with a means to measure. Despite all the difference Loos would place between himself and his fictional architect, they both mobilize knowledge about how people perceive their surroundings, about the extent of their reach, about the way they occupy a chair. And this knowledge precedes, is refined or generated, and is retrieved in their drawings, with the difference that, in the fictional case, it is simply more dressed up.

At the same time, Loos deployed architecture to express his desire for the dancer's body. The sections and plans suggest that the Viennese architect imagined Baker swimming in a pool whose submerged walls include large windows looking into the watery stage, enveloping the dancer's body while putting it on display for guests - a group in which Loos probably hoped to count. In this design, Loos both reproduces disciplinary knowledge about what a body is and should be able to do, and, as Farès el-Dahdah argues, 'instrumentalizes a building as a tactile extension of his senses in order to covet the exoticized body of an absent Josephine Baker'.[5]

Interestingly, Pliny the Elder's (23 - 79 CE) widely cited story situates the origin of drawing in love. Pliny describes how Diboutades traced the shadow of her departing lover by lamplight. This story has been a popular subject of painting in Western art, eliciting the interest of William Mitchell, among others. For Mitchell, the erotic circumstances of drawing's ostensible invention are clear: 'So the image is born of desire, is (we might say) a symptom of desire, a phantasmatic, spectral trace of the desire to hold on to the loved one, to keep some trace of his life during his absence.'[6] Drawing would be, according to Mitchell, mixed up with emotions including love and control ('to hold on'). It would also harbour a fear that may give way to denial: 'The silhouette drawing ... expresses the wish to deny death or departure, to hold on to the loved one, to keep him present and permanently "alive".'[7] The story attributes drawing to the imposed distance between human beings that are otherwise drawn together. Leonard Cohen expresses the corollary of this idea in lyrics: 'True love leaves no traces / If you and I are one / They're lost in our embraces / Like stars against the sun.'[8] In the absence of an embrace, Loos thus plans a house for Josephine Baker. But is this also true for the rich man's snide architect? Probably to a lesser personal degree and more clearly with regards to psychological factors that link one human being to human beings in general, but before developing that idea, a few more aspects of drawing need be elaborated.

Robin Evans also discusses the significance of Pliny's myth, although he offers a twist by evoking architect and painter Karl Freidrich Schinkel's version of 'The Origin of Painting' (1830) [fig. 2].[9] As Evans points out, Schinkel sets the scene outdoors and depicts the subject's shadow projected onto a rocky outcrop rather than on a wall of dressed stone. This differs from the interior architectural space portrayed in other versions, themselves faithful to Pliny's textual description. For Evans, Schinkel's departure from the conventional story suggests in an oblique way that architecture originates in drawing and therefore cannot be the setting of its invention: 'Without drawing there could be no architecture, at least no classical architecture constructed on the lines of geometrical definition.'[10] Evans also observes that the light source that produces the shadow is not a lamp, but the sun. The former constitutes a point that is analogous to the principles of naturalistic perspective represen-

tation, while the latter's practically parallel lines correspond to the abstraction of the orthographic projections that characterize architectural representation.[11] Schinkel's version of the origin of drawing would therefore suggest that conceiving architectural space requires drawing, and that such drawing objectifies the world that it represents.

Together, these two aspects define rather well the notion of knowledge in drawing that I would like to develop parallel to that of desire. Architectural drawing organizes knowledge so that it can act on the world. Evans notes that unlike drawing in the visual arts, drawing in architecture 'is not so much produced by reflection on the reality outside the drawing, as productive of a reality that will end up outside the drawing'.[12] It is oriented toward altering existing conditions, hence Schinkel's apparent concern with a chronology in which tracing lines precedes raising edifices. Complementing that orientation, architectural drawing consists of a formalized system 'capable of transmitting information', as Stan Allen puts it.[13] In Schinkel's painting, that capacity is represented (but not exhausted) by the sun's parallel lines casting an undistorted image of the model. The Josephine Baker house may be taken as a concrete example of these characteristics of architectural drawing: Loos's orthographic projections define precise spatial dimensions and proportions that portray a transformed world in which Josephine Baker could swim amidst her guests. At the same time, these objective plans and sections carry Loos's desire for Josephine Baker like a stowaway, to be read between the lines. Knowledge and desire cohabitate in Loos's project.

The Body of Knowledge

The link between applied knowledge and the body in architectural drawing is complex. It would be misleading to infer from Schinkel's version of Pliny's myth that, since tracing a person's shadow precedes building, figure drawing is the origin of architecture. Indeed, one could argue that Pliny's body-centred example of projection is tenuously related to architecture, as it deals with figural representation rather than buildings. For example, in his own discussion of the story of Diboutades, Stan Allen distinguishes architecture's situation from that of painting: 'In architecture there is no preexisting object to imitate: no body to cast a shadow.'[14] It may be true that the lines traced in architectural drawings usually correspond to the inert matter that constitutes buildings rather than to the body's fleshy envelope. However, insofar as an architectural drawing derives sense by evoking the body's scale and perceptual capacities, one cannot conclude that it does not reproduce the body in its own way. It is an imitation of the body not as form, but rather as an ensemble of sensing and motile capacities.[15] (For that matter, figure painting is not only a matter of imitating people's shapes.) In other words, the drawing appears architectural precisely because it makes reference to a corporal dimension. As soon as a drawing is recognized as the configuration of the built environment, it swells with evocations of the body's characteristics. Even the driest plan contains the matter necessary for its author or reader to imagine what might be felt - in and through all the senses - by a body occupying 'the reality that will end up outside the drawing'. The very notion that there is reality beyond the drawing only makes sense if that real world is understood to possess qualities that lend themselves to perception. While Allen's observation that 'architecture tends to imitate pre-existing architectures' may be accurate, it does not necessarily exclude the body's role in architectural drawing. The body is a strong source of imitation in architecture. The imitation is simply not usually figural, and occurs more like a generous negative cast of movement and sensation.

This is where the matter of body knowledge arises. The hand that draws a plan is coextensive with a body that, from birth, has felt the cold radiate from a massive wall, seen distant fields framed by a window, heard footsteps descending a

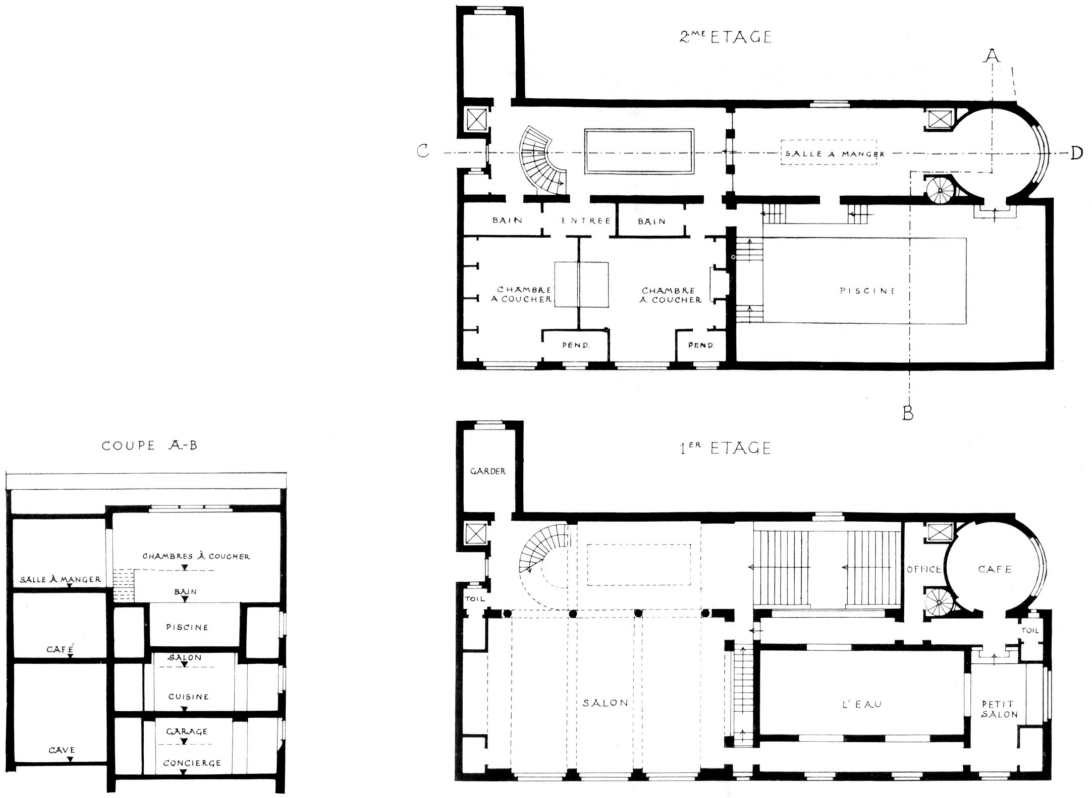

Fig. 1: The Josephine Baker House, Paris, by Adolf Loos, 1928. Plans and sections.
Image courtesy Thames and Hudson. Source: Ludwig Munz and Gustav Kunstler, *Adolf Loos: Pioneer of Modern Architecture* (London: Thames and Hudson, 1966).

wooden staircase, or crossed countless thresholds. That kind of inductive body knowledge informs the drawing and can be stirred up by it. Simultaneously, knowledge about the body's size, movement, and sensation deduced and formalized through more objective methods is also at play. The most obvious examples of this deductive knowledge are the dimensions found in Architectural Graphic Standards or Neufert's Architect's Data, but it also resides in rules of thumb and norms related for example to air temperature and humidity.[16] Notwithstanding the many other sciences at play in architecture, much of the knowledge mobilized in architectural drawing pertains to the human body: how it perceives, how it moves, what it requires for comfort and even for survival.

Evans's observations about architectural drawing find resonance in a broader field. Michel de Certeau defines the combination of code and action as a general phenomenon of knowledge production in modernity:

[F]*or the last four centuries all scientific enterprise has included among its traits the production of autonomous linguistic artifacts (its own specific languages and discourses) with an ability to transform the things and bodies from which they had been distinguished.*[17]

We need not construe architecture as a purely scientific undertaking to recognize that architectural drawing functions like one of these 'linguistic artifacts'. Nor need we drift into a debate about the similarities and differences between architecture and language to admit that, more specifically, architectural drawing has linguistic properties insofar as its conventions allow us to share ideas. For the issues at hand, let us retain that de Certeau's definition corroborates the idea that the body is a site where architectural drawing's twin qualities of system and transformation intervene. This stems no doubt in part from de Certeau's careful reading and commentary on Michel Foucault's writings (notably *Discipline and Punish*). But it is also corresponds to a central concern in much of de Certeau's research, found in his most-cited book in architectural discourse, *The Practice of Everyday Life*, as well as in his work on historiography, mystics, cartography, and sociology. That concern, which he calls of the 'erotics of knowledge',[18] will help to identify some meeting points between architectural drawing's moments of desire and knowledge.

Elaborating that point requires explaining why we should be concerned with body knowledge in architectural drawings. Why, in other words, does Loos's story of an architect who, through good intentions, impoverishes his client's life not seem entirely farfetched? Why should we be wary of progressively refined knowledge of how one sees one's surroundings and ascends stairs, of what forms, colours, and textures can be associated and to what ends, how an object is held, how a chair is occupied? Much good stems from this body knowledge, not the least of which is that we can walk through doors without twisting our shoulders. However, a more pessimistic assessment is also possible, in particular in light of Foucault's genealogy of disciplinary and regulatory societies.[19]

Discussing architectural drawing is a good opportunity to shift focus from the spatial aspects of Foucault's ideas to what he called a 'power of writing'. While strong insights about architecture and power have come from the focus on Foucault's spatial metaphors, their relevance tends to be constrained to historical conditions that no longer exist. As a result, they distract from how writing, understood broadly, still constitutes a relationship between the body, knowledge, and power with significant social consequences.

For Foucault's description of the body's ensnarement in power relations, the ability to document is fundamental: 'A "power of writing" was constituted

Fig. 2: The Origin of Painting, by Karl Friedrich Schinkel, 1830. Image courtesy of the Von de Heydt Museum in Wuppertal.

as an essential part of the mechanisms of discipline.'[20] Tabulating information about bodies is the prerequisite for prescribing the movements, imposing the exercises, and creating the body-based mechanisms that multiply the forces that go into them.[21] For Foucault, a variety of graphic and textual representations of the body - what it is and could be, what it does and could do - are critical components of anatomo-politics, the power that invests the body as a machine. Writing is the medium by which a discipline's knowledge of the human body circulates in the absence of bodies, in particular those bodies that were observed in the 'drawing up of tables' and those for which the written prescriptions are intended.

Architectural drawing is a form of body knowledge that operates as one such 'power of writing'. The corporal dimension of 'power/knowledge' grows not only through a spatial choreography in which real bodies see and are seen (as in a panopticon), but also through media that record information about the body, including architectural drawing. In a disciplinary or regulating mechanism involving the built environment, drawing provides the continuity of knowledge when the body is a memory or an anticipated return. Here, it is not a matter of how the architectural object's physical structure makes vision both coercive and informative. Where a ring of cells around a central tower is understood to have power effects when there are bodies in the cells (but not necessarily in the tower), the writing hypothesis suggests that architectural drawing sustains the penetration of knowledge/power into human experience, even when there are no bodies to observe.

The Body Conceived in Drawing

The critique underlying Foucault's argument is that the body is taken up into the micro-techniques of power towards utilitarian ends. Giorgio Agamben highlights this aspect in his elaboration of Foucault's notion of the 'apparatus'. Agamben traces the French *dispositif* through its Latin usages back to the Ancient Greek *oikonomia*, the *nomos* of the *oikos* or organization of the household. Thus it carries the trace of 'a set of practices, bodies of knowledge, measures, institutions that aim to manage, govern, control, and orient in a way that purports to be useful for the behaviours, gestures, and thoughts of human beings'.[22] The apparatus is that which models, contaminates, or controls individual lives in the spirit of utility. That spirit is what is at stake when the body is grasped by the apparatuses that extend the reach of disciplines and regulation.

For Agamben, the most ancient of apparatuses is perhaps language itself, 'one in which thousands and thousands of years ago a primate inadvertently let himself be captured'. I prefer 'to grasp' over Agamben's 'to capture'. The concern is not that the law enforcement agents or renegade machines (as in the film *The Matrix*) will physically seize individual bodies and place them where they are needed. The body is grasped by power relations because it is conceptualized in certain ways and not in others. Thinking the body in terms of how it should move, what it should perceive, what it should be able to do is an efficient way of coordinating it as a means to an end. The panopticon is no longer the appropriate architectural figure for Foucault's model of disciplinary and regulatory societies. Architecture's ability to implement the social programmes once served by circular prisons and hospitals has been superseded by other techniques. However, architectural drawing, as a critical tool in the science that studies the body in its natural and artificial environments, maintains an ever-expanding reach over the body.

Bill Hillier's investigations of space syntax and the social logic of space provide an interesting example.[23] Hillier's analytical process evaluates the nature of sight lines in plan drawings of spatial configurations in order to articulate conclusions about the space's relative 'integration' and 'intelligibility'.[24] The drawing supports the projection of imaginary bodies into the represented space and

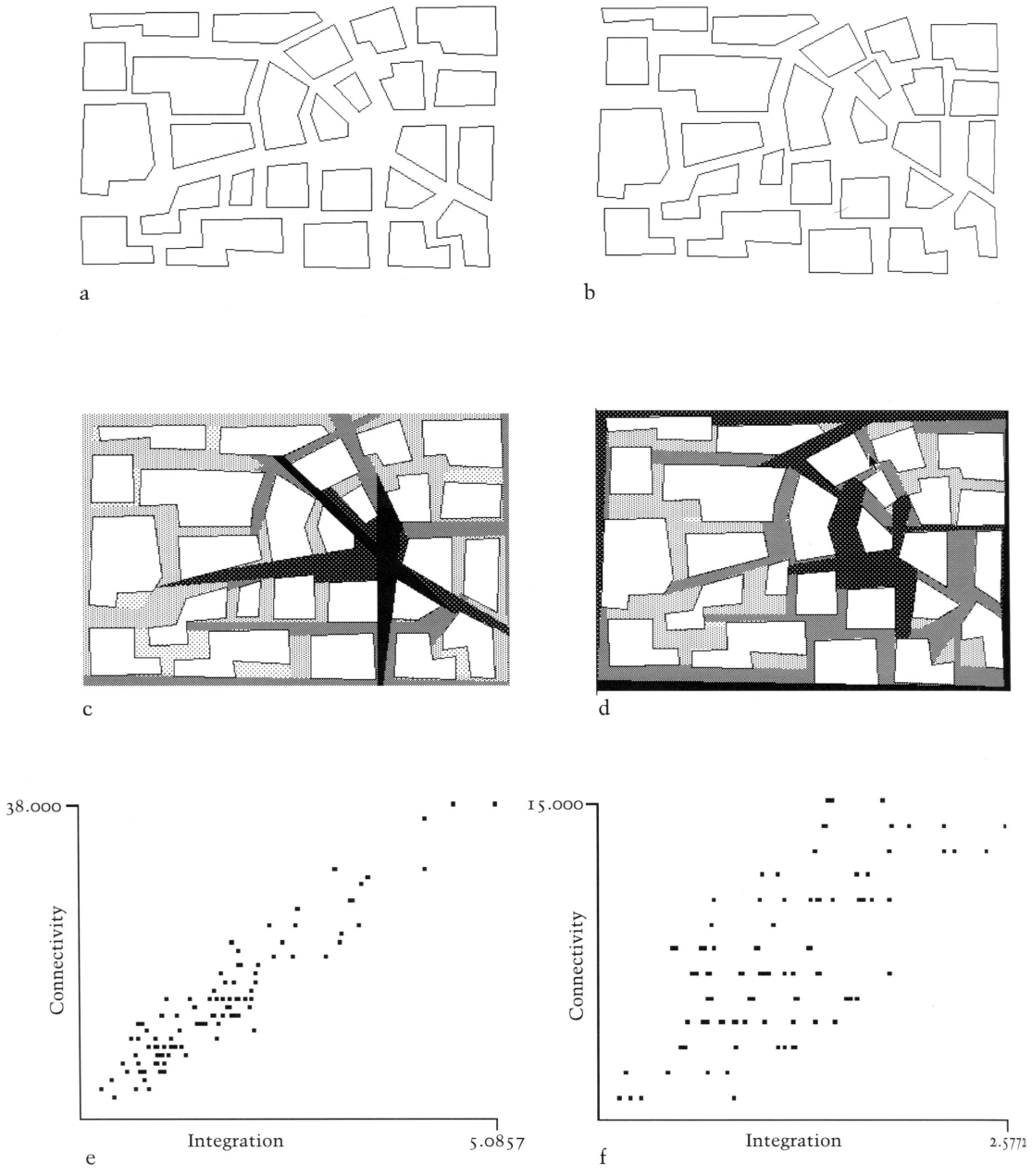

Fig. 3: Space Syntax Diagrams, by Bill Hillier, 1996.
Image courtesy Bill Hillier. Source: *Space is the Machine: A Configurational Theory of Architecture* (Cambridge: Cambridge University Press, 1996), p. 126.

returns information about what can or cannot be seen from any given point. [Fig. 3] Plotted onto a scatter chart, that information gives a visual representation of the configuration's properties. In this case, the analysis results in assertions about how intelligible a plan of urban blocks is for the fictional people that are projected into the drawing - people that any architect can imagine there.

For Hillier, the link between a graphic-based analytical method and lived experience is clear:

[S]*tudies have shown that the choices that people make in selecting urban spaces for informal activities, such as eating, drinking, talking and sitting, reflect proximity or adjacency to areas with strong visual fields that are well integrated into the system as a whole. Such spaces are ideally suited to what seems to be the favourite occupation of those using urban space informally: watching other people.*[25]

Hillier's argument expresses the belief that architectural drawing can be used in association with analytical methods to determine the spatial configuration necessary to achieve specific ends, in this case a certain form of urban sociability. Here, the spirit of utility is double and mutually reinforcing: physical space is useful for individuals, who are themselves useful for a social project.

Applied during the design process (as Hillier and his team did for Norman Foster Associates' King's Cross redevelopment master plan in London), this drawing method may well help to create urban environments with 'an intelligible pattern to the space structure', where the 'integration core' is strongly defined, in short, in which one easily finds one's way. But it also produces and perpetuates a few ideas about lived experience: that spatial orientation is primarily a matter of vision; that seeing things in a certain way corresponds to a specific way of understanding them; that vision may be used to get people to behave certain ways. Pulled into a network of elements oriented toward acting on the world - that is, an apparatus confident of its usefulness, which here takes the form of architectural discourse - this drawing privileges vision to the detriment of other senses, associates things seen to specific ways of thinking, and grasps the body-as-seeing-device towards anticipated results. It participates in reducing the conception of the body's relationship to experience in terms of usefulness. The body is grasped by power because the drawing's knowledge of lived experience is part of an apparatus that can alter the world outside it. As a consequence, architectural drawing helps to define which body attributes are important, what their parameters are, and how they can be harnessed towards specific ends.

Hillier's space-syntax method seems remote from more familiar design practices. However, the conviction about the relationship between architecture, bodily capacities and drawing that underpins it is very common. In the *El Croquis* presentation of the 'Bordeaux House', designed by Rem Koolhaas and the Office for Metropolitan Architecture (Floirac, France, 1995-98), a very compelling drawing reproduces the bedroom floor plan three times in order to articulate how the porthole windows correspond to visual effects for different positions and states of motion [fig. 4]. The accompanying text distinguishes a variety of situations - moving, sitting, washing, lying down, standing adult, standing children, wheelchair position - and relates them to horizon views ('dynamic holes'), remarkable views ('revealing holes'), and 'anti-claustrophobic' views ('relative views').[26] The sight lines in the drawing help to determine not only each window's position and height, but also the nature of its cut through the wall: as perpendicular cylinder, oblique cylinder, or cone. I will not address the house's status as a work designed for a disabled client, despite its undeniable relevance for a discussion of architecture and the body. It must suffice to note that the drawing records in a very precise way the spatial

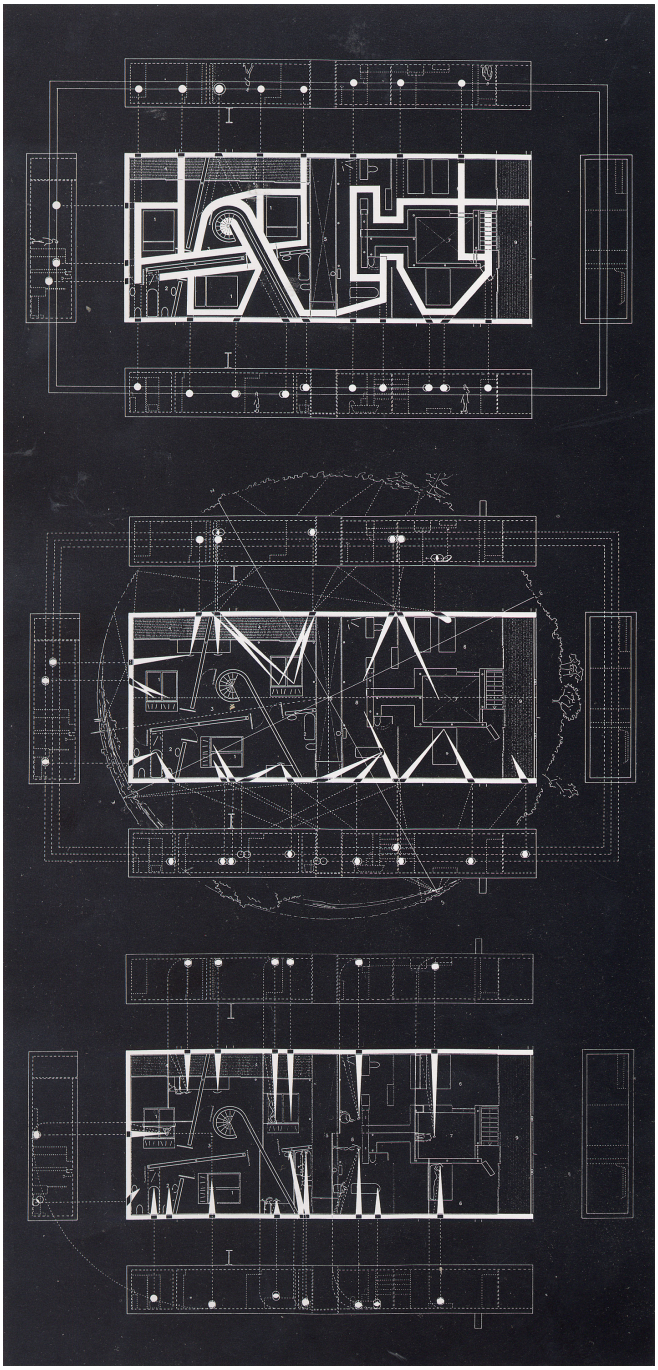

Fig. 4: The Bordeaux House, Floirac, France, by Rem Koolhaas and OMA, 1995-98. Plans of upper floor. Image courtesy OMA. Source: *El Croquis* 79, 1996, p. 174.

correspondence between a variety of bodily states and specific visual stimulants. It associates specific forms and locations with positions and movements, emphasizing visual perception and literally framing how experience in the house should be conceived. It furthermore applies and generates a more refined knowledge of the body than in Hillier's example, regrettably echoing Foucault's argument that the power of normalization does not so much homogenize as introduce 'all the shading of individual differences' in order to render these differences useful.[27]

The danger is neither the desired effect of clarity and sociability (in Hillier's case) or of visual pleasure and orientation (in that of Koolhaas); it is rather the side effect of perpetuating a utilitarian way of imaging the body's movement and sensation that is pernicious for everyday life. My reference to Foucault's arguments does not stem from a fear of secret forces seizing unwitting bodies, but rather from a preoccupation with how architectural drawing is tied to ways of thinking about the body - what he called *epistémè*. In that light, it is interesting to recall John Dewey's century-old observation of the inadequacies of conceptualizing the relationship between sensation and action as a mechanical cause and effect arrow. With reference to the 'child-candle' example of perception and movement in psychology, Dewey challenged the ordinary interpretation that 'the sensation of light is a stimulus to the grasping as a response, the burn resulting is a stimulus to withdrawing the hand as a response and so on'. In a turn of phrase that seems like a precursor of deconstruction, Dewey counters that, in fact, to understand the child's experience of the candle, one must realize that that 'the burn is the original seeing'.[28] When architectural drawing is understood as the application of body knowledge to produce specific results, it follows the cause and effect model of human perception and action, and neglects the nuance that Dewey attempted to bring to the matter. Regarding Hillier's use of drawing to apply knowledge about lived experience in the built environment to proper ends, we might argue that getting lost is the original mode of perceiving space.

Drawing and Desire

The debate about design and life, which occupied European architects around 1900, seems to have been unaware of the contemporaneous debate regarding the psychology of experience in which Dewey participated. If the two debates had been brought together, one might have observed that the problem in Loos's anecdote is not that the architect designed too much and left no room for others to 'furnish' the rich man's life, but that the thinking involved in furnishing the rich man's life - whether the architect's thinking or that of the loved ones that offer him gifts - conveys ideas about use, comfort and beauty that limit interpretations of experience. The rich man is perhaps not unhappy because everything in his life has been designed once and for all, but rather because he cannot imagine that wearing the bedroom slippers in the living room is a relevant experience. It is not surprising, then, that Dewey's formula foreshadows such alternative paths to spatial knowledge as the situationist psychogeography and *dérive*.

Architects would characterize their practice as anything but an impoverishment of daily life. Yet it seems that getting closer to the lived experience of others through drawing necessarily feeds the parallel process in which knowledge/power thrives off the drawing's science to better grasp the body in all its diversity. The challenge is therefore to imagine a drawing practice that acknowledges and fosters the architect's profound motivation to affect others without contributing to the impoverishment of experience. In other words, how can architectural drawing touch the body without grasping it?

Michel de Certeau's notion of an erotics of knowledge provides material for reflecting on the coincidence of moments of knowledge and desire in

writing practices. In the well-known chapter 'Walking in the City', which begins with us 'Seeing Manhattan from the 110th floor', the World Trade Center is a metaphor for the tools and techniques - including drawing - that would transform what they allow us to observe.[29] I will refrain from dwelling on de Certeau's 'tacticians' or 'walkers in the city' in order to explore how his rendition of 'the strategist' can help to understand better the architect's predicament.

For de Certeau, standing on the tower's viewing platform transforms the city 'into a text that lies before one's eyes'. 'It allows one to read it, to be a solar eye' - like Schinkel's sunbeams streaming past the posing figure. 'Looking down like a god' from on high, one sees 'the analogue of the facsimile produced, through a projection that is a way of keeping aloof, by the space planner urbanist, city planner or cartographer'.[30] One sees the 'texturology' of a 'concept city'.[31] As with Evans's view of architectural drawing and Foucault's power of writing, constructing such a text, for de Certeau, depends on being isolated from that which it would alter. Writing fashions 'on its own, blank space ... a text that has power over the exteriority from which it has first been isolated'.[32] That power serves the ambition 'to reform' the 'reality of things'.[33] The whole image of Manhattan is analogous to that of the planner not only through resemblance, but also because it places the viewer in the distant position from which its alteration can be projected.

This maligned aspect of the planning professions is joyfully attacked in references to de Certeau's celebration of the spatial practices that elude discipline. The temptation to oppose the 'theoretical' picture of the city with the 'reality' of lived space is indeed strong. However, where Foucault's description of the power of writing is disincarnate, de Certeau insinuates problems of the flesh into his model of applied knowledge. For de Certeau, seeing the city from this height gives way to an 'ecstasy of reading' tied to an 'erotics of knowledge'. He himself takes 'voluptuous pleasure in it', recognizing that 'the fiction of knowledge is related to this lust to be a viewpoint and nothing more'.[34] The vilified strategist is therefore also driven by a kind of desire. The planner's human condition is pushed even to mortality: 'The voyeur-god created by this fiction ... knows only cadavers.'[35] Just as the architect in Loos's moral tale now only has affairs with a client who lives with his own corpse.

Reflections on this coincidence of knowledge, desire and mortality appear in numerous places. For example, in Michel Houellebecq's recent novel *La Carte et le Territoire*, the artist protagonist has a moment of revelation in which disincarnated rationalization and human frailty coincide. Looking at a Michelin map in a roadside store, Jed Martin is stunned by its beauty:

He had never contemplated an object as magnificent, as rich with emotion and meaning as this 1/150 000 scale Michelin map of the Creuse in Haute-Vienne. The essence of modernity, of a scientific and technical apprehension of the world, was mixed with the essence of animal life. The drawing was complex and beautiful, of absolute clarity, using only a restrained colour code. But in each hamlet, in each village represented according to its size, one felt the palpitation, the call of dozens of lives, of dozens or hundreds of souls - some destined to damnation, some to immortality.[36]

Houellebecq captures here the paradox whereby the abstraction of a cartographic drawing can elicit emotion. He echoes de Certeau, for whom the inseparability of writing's impassioned motivations and rationalizing tendencies dates from the first hints of modernity. On the one hand, as we mentioned earlier, de Certeau attributes to four centuries of scientific enterprise 'the production of autonomous linguistic artifacts' that 'transform the things and bodies from which they had been distin-

guished'.[37] On the other hand, in *The Mystic Fable* de Certeau characterizes modernity as a slow but inexorable transformation of faith into eroticism. In the passage from the medieval period to the Renaissance, religious demythification is mirrored by the mythification of erotic love. The object of love is less and less God, while the body of the Other is increasingly evoked in expressions of longing. That 'adored body' is 'as elusive as the vanishing god': 'It haunts writing, which sings its loss without being able to accept it.'[38] It is also a motor: 'Despite the change of scene, the One does not cease organizing by its absence a "Western" productivity.'[39] That drive to produce advances in the form of 'proliferating conquests destined to fill an original lack'.[40] In the place of religion, modern historiography continues the task of producing 'the relationship that a society maintains with its dead',[41] while an explicitly erotic literature continues this 'work of mourning', exemplified in Don Juan's adventures, which only 'repeat the absence of the unique, inaccessible "woman"'.[42]

Georges Vigarello has gone so far as to suggest that this 'nostalgia' drives the human sciences' production of knowledge about the human body. That dynamic would have the body become 'the site of potential completeness and totalization' for the actors of science, sustaining 'an illusion of "recovered" plenitude, as though the lack could finally be neutralized'.[43] For Vigarello, the operations at work in ostensibly objective pursuits are homologous to those at work in the mind that suffers its inaugural split, as though individual longing had amplified itself to the scale of scientific production.[44]

In *Built Upon Love: Architectural Longing After Ethics and Aesthetics*, Alberto Pérez-Gómez, who would perhaps not characterize architecture as a human science in Vigarello's sense, also argues that the human being's inherent lack is a drive: 'Throughout our lives we constantly look for "something", something that is missing and that might complete us - be it the physical presence of another, the acquisition of knowledge, or the experience of art and architecture.'[45] Unlike Vigarello, however, Pérez-Gómez holds out the promise of reconciliation through poetic making. The lack 'does not disappear with the fulfilment of practical needs or with the possession of goods', but it may be reconciled 'only within the cultural realm of *poïesis* and its metaphorical imagination'.[46] Like literature for de Certeau, architectural drawing would be a site where a human being can cope with his or her existential condition. Unlike literature, however, it also carries what Houellebecq appropriately calls the 'scientific and technical apprehension of the world', concerning in particular the body and its functions. Loos's project for Josephine Baker might again illustrate one such coincidence of knowledge and desire, where standard norms regarding human perception and motion are carried by (or carry) one person's longing for another.

Before concluding with the prospect for a drawing practice that acknowledges desire without ignoring its dangers, we should note that drawing's desiring facet may be understood other than in terms of lack. Mitchell explains the contrast between 'the Freudian picture of desire as lack and longing for an object', and the Deleuzian idea of 'a "desiring machine" characterized by a joy founded in (but not disciplined by) ascesis'.[47] Where Freud's model has desire seeking pleasure, the 'anti-Freudian, Deleuzian picture of desire is interrupted by pleasure, not driven by it'.[48] Mitchell finds an early example in William Blake's notion of the dialectic of binding and unbinding, which is figured in 'the drawn line that leaps across a boundary at the same time that it defines it, producing a "living form"'.[49] Blake provides a specifically architectural example of this movement in his drawing of the creator-god Urizen [fig. 5]. The drawing shows the compass-wielding demiurge reaching beyond a circle in which he has inscribed himself, only to begin drawing another circle. As Mitchell observes: 'One could hardly ask

Fig. 5: The Ancient Days, by William Blake. Frontispiece to *Europe: A Prophecy*, 1794. Copyright British Library Board.

for a more vivid depiction of what Blake calls the "bounding line", the line that binds, confines, and determines a boundary, and the line that leaps over a boundary, like a gazelle "bounding" over a fence.'[50] It shows the architect's 'infinite desire for orderly, rational boundedness reproducing itself'. The '"binding" and "unbinding" of desire are fused in a single image': a picture of the architect drawing his own body between knowledge and desire.

Lost-Body Drawing

Whether we take desire as lack or desire as binding and unbinding, architectural drawing plays a role, either as the phantasm of an absent body or as one piece of the assemblage that sustains the pleasure of deferred satisfaction. Neither mode can separate itself from the rational dimension of knowledge that the drawing also carries. To formulate an ethic of writing that assumes this double status, de Certeau returns to Montaigne's essay 'Of Cannibals' (first published in 1580).[51] He finds in Montaigne's travel account a contrast between Western knowledge and savage speech, between the writing technology of a conquering culture and a society organized around acts (the savage has 'no knowledge of letters', but his practice of cannibalism and polygamy corresponds to an economy of speech acts). The European tries to represent the other, that is, to give the other a place, a tradition prefigured in Herodotus's attempt to define the nomadic Scythians in opposition to the Athenian city-dweller. This cartography of bodies in space - drawing, writing - both produces an image of the other and establishes its own status as knowledge of the other. Like Herodotus's *Histories*, Montaigne's 'linguistic artifact' builds its science on a constantly receding subject. But the text is haunted by another absence: Montaigne's dearest friend Étienne de la Boétie (1530-63), 'the only true listener' who 'is no longer'. For de Certeau, 'Of Cannibals' demonstrates how writing production in modernity occurs between two absences: the 'speech acts' it reports but which remain radically other to the fixity of text, and the reception it anticipates. One folds into the other: 'The cannibal (who speaks) and La Boétie (who listens) are metaphors for each other.' And both are present in the text as an inaccessible other.[52]

If speech is not only verbal 'sayings', but also wanderings, uses of space, or tactics whereby individuals appropriate the planned environment, architectural drawing is analogous to Montaigne's essay. 'The place of the other' is literally what architectural drawing articulates. Speech is nothing other than the life that drawing tries to grasp as knowledge, and reception is the touch anticipated at the drawing's destination. Under the conditions of modernity, authentic presence as exemplified by the cannibal's 'speech acts' is no longer possible. For de Certeau, 'if one cannot be a cannibal, there is still the option of lost-body writing',[53] a practice he attributes to Montaigne. He situates his own work in that tradition. If we consider the dedication at the beginning of *The Practice of Everyday Life*, the book appears less as an argument in favour of users over designers than as a conflicted work of knowledge and desire:

To the ordinary man.
... In invoking here at the outset of my narratives the absent figure who provides both their beginning and their necessity, I inquire into the desire whose impossible object he represents. What are we asking this oracle whose voice is almost indistinguishable from the rumble of history to license us, to authorize us to say, when we dedicate to him the writing that one formerly offered in praise of gods or the inspiring muses?[54]

Lost-body writing stems from an unquenchable desire and questions the authority through which it takes 'the place of the other'. It may be a model for a lost-body drawing that is a reflexive practice conscious of the 'ruins' that inhabit its lines: the ruins of the life that it can never quite seize but that disturbs its order, and those of the author him- or

herself, the 'I' of any text or drawing that appears as a 'multiple, iconoclastic passer-by' in a fragmented work.[55] Such drawing would not retreat from the objectification of lived experience through which it articulates architecture's potential effects. But its incorporation of the architect's longing for others - from the past and in the future - might disturb its grasp of the body, and perhaps prefigure an architecture that touches us in unexpected ways.

Postscript: An Ethics of Seduction

In the end, the drawing circulates freely. Mitchell observes that images 'both "express" desires that we already have, and teach us how to desire in the first place'.[56] If non-painters enjoy looking at portraits, perhaps non-architects can also learn about desire by looking at architectural drawings. A further possibility arises when we neutralize the directional line that points from the producer to the receiver, from the architect to the client or the anonymous user. We can imagine that the ethic of the architect who practices lost-body drawing is doubled by an ethic of the drawing's other, the absent body that haunts it. One whose presence is evoked in the drawing, who would be touched, may be wary of architecture's reach and hesitate giving oneself up to it.

Jean-Luc Nancy distinguishes between two ways that one can give oneself up to others. The first is as something to grasp (*empoigner*), 'an appropriable commodity'. In that case, 'I, "myself", remain behind that thing and behind the gift, I watch them and set myself apart from them' - like an unhappy man condemned to living with his own corpse. The second way is 'by averting the touch, thereby inviting to look further or elsewhere'. One cannot prevent another's lost-body drawing, but all is not lost: 'I do not control this gift, and he or she who touches me and withdraws, or who I stop before the touch, has truly drawn from me a shimmer of (my) presence.'[57] Pérez-Gómez argues that architecture's fundamental responsibility is to engage desire through seductive projects.[58] But who seduces whom? Are architects not seduced by the body whose place they articulate in drawing? I am tempted to say that Josephine Baker understood what Loos's poor rich man did not.

Acknowledgements

I would like to thank Marc Schoonderbeek, Stefano Milani and two anonymous reviewers at *Footprint* for their helpful comments on the first draft of this article.

Notes

1. Adolf Loos, 'The Story of the Poor Rich Man [1900]' in Ludwig Münz and Gustav Künstler, *Adolf Loos: Pioneer of Modern Architecture* (New York: Praeger Publishers, 1966), pp. 223-24.
2. I hasten to make reference to a recent book whose title suggests that the present topic may be related to it, but that in fact deals with a different aspect of desire in architecture. In *Architecture's Desire: Reading the Late Avant-Garde* (Cambridge, MA: The MIT Press, 2010), K. Michael Hays deploys a thorough reading of Lacan to personify architecture alternately as a project capable of desire and as desire itself, and considers specific manifestations in the work of Aldo Rossi, Peter Eisenman, John Hejduk, and Bernard Tschumi. While there are interesting links to establish between my topic and Hays's historical argument, the present study is not ready to undertake that task.
3. For a thorough discussion, see George Baird, 'Chapter 1: Life as a Work of Art' in *The Space of Appearance* (Cambridge, MA: The MIT Press, 1995). See also Hal Foster, 'Design and Crime' in *Design and Crime and other Diatribes* (New York: Verso, 2002).
4. Writing in the early 1990s, George Baird discerns 'astonishing evidence of the enduring lure of the total work of art. [...] Even the younger generation oriented so decisively to an architecture of critique seems not entirely able to resist the tendency to radically fetishize the objects of its own creation'. Op. cit. pp. 53-54. Many of today's vocal 'younger-generation' architects

eschew the relationship between design and critique, and I suspect that this is not unrelated to the increasingly strong allure of designing every scale of human experience.

5. Farès el-Dahdah, 'The Josephine Baker House: For Loos's Pleasure', *Assemblage* 26 (April 1995), p. 75.
6. William J. T. Mitchell, *What do Pictures Want? The Lives and Loves of Images* (Chicago: University of Chicago Press, 2005), p. 66.
7. Ibid.
8. Leonard Cohen, 'True Love Leaves No Traces', *Death of a Ladies' Man* (Sony Music Entertainment, 1977).
9. Robin Evans, 'Translations from Drawing to Building (1986)', in *Translations from Drawing to Building and Other Essays* (Cambridge MA: The MIT Press, 1997), pp. 163-66.
10. Ibid., p. 164.
11. We also note that Schinkel's rendition of the myth reverses the gender roles by casting a man as the person drawing and a women as his subject. Furthermore, another woman seems to be directing the scene, one hand positioning the model's head and the other gesturing to the artist. In light of architecture's constitution as a male-dominated profession and discipline, these aspects merit discussion that, aware as I am of their relevance for the subject of desire, space constraints prevent me from developing here.
12. Evans, p. 165.
13. Stan Allen, *Practice: Architecture, Technique and Representation* (London: Routledge, 2003), p. 5.
14. Ibid. Allen qualifies his remark with a comparison between the corrections that might be brought to a student's work in a painting studio and in an architecture studio. In the former case the teacher could point out that the arm is too long, in the latter that the window is too small. For Allen, these are completely different registers with different relationships to abstraction; but I am not certain that a teacher who corrects arm length is teaching painting.
15. The body has of course also figured as a more literal source for architectural form. For a discussion of such cases in late 20th-century architectural projects, see Anthony Vidler, 'The Building in Pain: The Body and Architecture in Post-Modern Culture', in *AA Files* 19 (1990), pp. 3-10.
16. Charles George Ramsey and Harold Reeve Sleeper, *Architectural Graphic Standards* 11th edition (New York: Wiley and Sons, 2007); Ernst Neufert et al., *Architect's Data* Third Edition (London: Wiley-Blackwell, 2002). In his sometimes humorous, sometimes thoughtful book *101 Things I Learned in Architecture School* (Cambridge, MA: The MIT Press, 2007), Matthew Frederick's ninety-sixth entry is a rule of thumb that sums up the argument about body norms rather well: 'Summer people are 22 inches wide, winter people are 24 inches wide.'
17. Michel de Certeau, *The Writing of History,* trans. by Tom Conley (New York : Columbia University Press, 1988), p. xxvi.
18. Michel de Certeau, *The Practice of Everyday Life*, trans. by Stephen Rendall (Berkeley and Los Angeles, CA: University of California Press, 1984), p. 92.
19. Michel Foucault, *Discipline and Punish: The Birth of the Prison*, trans. by Alan Sheridan (New York, NY: Vintage, 1995), and *The History of Sexuality Volume 1*, trans. by Robert Hurley (New York, NY: Vintage, 1978).
20. Foucault, *Discipline and Punish*, p. 189.
21. Ibid., 167.
22. Giorgio Agamben, *What is an Apparatus? and Other Essays*, trans. by David Kishik and Stefan Pedatella (Stanford: Stanford University Press, 2009), p. 12.
23. See Bill Hillier, *Space is the Machine: A Configurational Theory of Architecture* (Cambridge: Cambridge University Press, 1996); Bill Hillier, 'Specifically Architectural Theory: A Partial Account of the Ascent from Building as Cultural Transmission to Architecture as Theoretical Concretion', in *Harvard Architecture Review* 9 (1993) pp. 8-27; Bill Hillier and Julienne Hanson, *The Social Logic of Space* (Cambridge: Cambridge University Press, 1984).
24. See, for example, Hillier, 'Specifically', p. 16.
25. Ibid., p. 17.
26. 'Casa en Burdeos', in *El Croquis* 79 (1996), p. 174.
27. Foucault, *Discipline and Punish*, p. 184.
28. See John Dewey, 'The Reflex Arc Concept in Psychology', *The Psychological Review*, III (July 1896), pp.

357-70.

29. de Certeau, *Practice*, p. 91.
30. Ibid., 92-93.
31. Ibid., 95.
32. Ibid., 134.
33. Ibid., 153.
34. Ibid., 92.
35. Ibid., 93.
36. Michel Houellebecq, *La Carte et le Territoire* (Paris: Flammarion, 2010), p. 54. My translation.
37. de Certeau, *The Writing of History*, p. xxvi.
38. Michel de Certeau, *The Mystic Fable Volume One: The Sixteenth and Seventeenth Centuries*, transl. by Michael B. Smith (Chicago, IL and London: University of Chicago Press, 1995), p. 5.
39. Ibid., p. 4.
40. Ibid.
41. de Certeau, *Mystic Fable*, 11. For de Certeau, Christianity's missing body is both specific and general: that of Jesus and that lost in the break with the tradition of blood filiations in Judaism: 'Christianity takes place on the absence of a body, on an empty tomb. This absence is formed specifically in the loss of Jesus's body, which was supposed to have taken the place of all others. But it also has a general form in the detachment that separates Christianity from its ethnic origin and from the biological, familial and hereditary reality of the Jewish body. The Evangelical discourse, the *Logos*, is based on this loss and, in contrast to ancient Semitic speech, it must take on the production of bodies of ecclesiastical doctrine and sacrament that substitute for the "missing body".' With the wane of religion, modern historiography takes over the latter problem of a coherent social body: 'Scientific history is only a late variation of this work, which henceforth attempts to construct, through discourse, social bodies - nations, parties, groups.' Michel de Certeau, 'Histoires de corps', interview by Georges Vigarello and Olivier Mongin, *Esprit* 62 (February 1982): 179-85. My translation. Perhaps, then, the tradition of amorous or erotic literature took over the specific task that Christianity had addressed through Christ's incarnation of God, the One.
42. de Certeau, *Mystic Fable*, 4.
43. Georges Vigarello, 'Le Laboratoire des sciences humaines', *Esprit* 62 (February 1982): 90-106. My translation.
44. Juliet Flower MacCannell discusses a similar telescoping from the individual to the collective for the desire to become One in her book on what she call Lacan's 'cultural criticism'. Juliet Flower MacCannell, *Figuring Lacan: Criticism and the Cultural Unconscious* (Beckenham: Croom Helm, 1986).
45. Alberto Pérez-Gómez, *Built Upon Love: Architectural Longing After Ethics and Aesthetics* (Cambridge, MA: The MIT Press, 2008), p. 6. Interestingly, Pérez-Gómez's book does not contain a single image or drawing, aside from its cover.
46. Ibid., p. 42.
47. Mitchell, p. 61.
48. Ibid.
49. Ibid., p. 63.
50. Ibid.
51. Michel de Certeau, 'Montaigne's "Of Cannibals": The Savage "I"', in *Heterologies: Discourse on the Other*, trans. by Brian Massumi (Minneapolis: University of Minnesota Press, 1986), pp. 67-79.
52. Ibid., p. 79.
53. Ibid.
54. de Certeau, *Practice*, p. v.
55. de Certeau, 'Montaigne's "Of Cannibals"' p. 79.
56. Mitchell, p. 68.
57. Jean-Luc Nancy, *Noli me tangere : Essai sur le levé du corps* (Paris: Bayard, 2003), p. 82-83. My translation.
58. Pérez-Gómez, p. 5.

Biography

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Bernard Tschumi Draws Architecture!

Gevork Hartoonian

The level of drawing is horizontal: that of painting vertical.
Walter Benjamin, 1917[1]

Opening

Bernard Tschumi's drawing for the *Museu de Arte Contemporânea*, São Paulo, Brazil [fig. 1], will be taken as the point of reference to discuss the horizontal and the vertical as the *structure* of drawing. The fact that a freehand image has been positioned next to a digital one, points to a number of issues including the centrality of the body for structuring a drawing based on the grid system. To emphasize the body does not necessarily mean to subscribe to a humanist discourse on the subject. Throughout this essay the body is considered a given, which can be explained by the following: that the human gaze is perpendicular to the vertical posture of the body. This 'right angle' perception of the body, or the image of a person looking at something, is historical. It is exemplified in this author's posture as he sits in front of his laptop looking at the screen positioned parallel to his face, and in the posture of a person writing on a blackboard. This essay will discuss the role technique plays for a historical understanding of the suggested ontological dimension of the body.

The implied rapport between the body and technique is perhaps one reason Tschumi displayed two different images side by side. A closer inspection of the image, however, indicates how technique works in drawing. It also alludes to the historical transformation wherein a humanist perception of object, delivered through the Renaissance notion of *disegno*, gives way to the art-historical concept of 'the painterly', and to that of 'image building', a theme permeating the current age of digital reproduction. The discussion presented here works towards a critical understanding of Tschumi's theorization of architecture formulated in *The Manhattan Transcripts* (1981).

To address these issues, we need, first, to reflect on Tschumi's two drawings, neither of which says anything directly about the project, a museum. With its notation, the scribbled freehand drawing is less abstract than the digital one. The former entails certain aspects of the historicity of drawing, particularly its representational dimension, as will be discussed below. Still, in the freehand drawing, the upward circulation resembles the image of a suspension spring, or the form of a filament. In both analogies, one point is connected to another, facilitating the flow of energy: the gravity and/or an ascending body, the former in reference to the spring and the latter to the building's ramp. Neither of the suggested readings, however, is available in the digital image. This rather abstract drawing, which can be called 'digital diagram', ironically, comes closer to the image of a building. What structures both drawings, however, are the vertical and the horizontal, and this in reference to the standing position of the body and the body's back and forth movement. This is evident not only in the overall organization of both drawings, but also in the vertical volume of the elevator and the quasi-

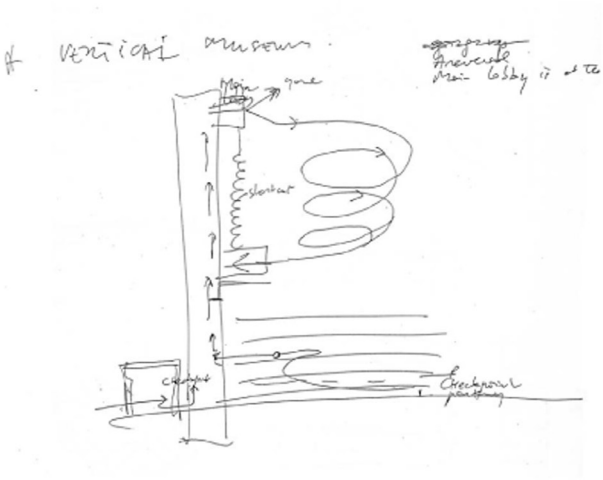
horizontality of the ramp in the hand-drawn sketch.

In retrospect, one can claim that what theoretically underpins the particular drawing prepared for the *Museu de Arte Contemporânea* was already formulated in *The Manhattan Transcripts*, the written pages of which are few compared to the pages covered by images and drawings. This comparison defines a specific regime of 'imageness' which is useful for differentiating drawing from a digitally reproduced image. Whereas in one the image is raw and naked, in the other, the image operates in the realm of art. The visibility delivered by drawing is inseparable from 'the image as discourse and history'.[2] And yet, the illustrations peppering Tschumi's book are not images as such. For page after page, the reader follows a montage-like placement of drawings next to a filmic image (picture?). Noteworthy is the *grid* informing both the organization of the written text and the illustrated pages of the book. It is also important to note that both the pictures and drawings of the book are *framed*. It seems that an absent narrative structures the organizational hierarchy of both the horizontal and the vertical, and the figural (pictorial) and the abstract (drawing) of each frame. What is involved here is the criticality of *technique*, in particular the filmic montage of events, explaining Tschumi's interest in drawing architecture. To support this claim, we need to take a detour and explore the historicity of the body, drawing, and technique.[3]

Why Draw?

Fundamental to the conventional unity shared by the three sister arts of architecture, painting, and sculpture was the Renaissance discourse on *disegno*. It required drawings to present 'a visible expression and declaration of the concept one has in one's mind and which others have formed in their minds and built on'. This statement of Giorgio Vasari defines the scope of artistic progress judged by the work's quality in imitating nature, and its 'capacity to form beautiful elements for the work of art in the mind, and then to execute them'.[4] To show the unifying nature of *disegno*, Vasari underlines the expected representational rapport between the work of art and the beholder. What this means is that recollection enables one to anticipate the whole image even through the partial representation of the object's essential features. Most Renaissance artists considered *disegno* as the technique bringing together artwork and craftwork. In the light of this, and similar to the characteristics of natural products, the work was expected to present a plausible unity between form and purpose. Like a flower or a carpenter's creation, architecture was expected to dispose of anything that in the closed and harmonious culture of the Renaissance would not have triggered delight in the beholder's mind. In Renaissance society, art was considered the agent of a broader cultural knowledge.

Still, *disegno* was not meant to impose any limit on the creativity of the artist and architect. Drawings were, rather, considered an open field where the artist could experiment with and expand the scope of his/her imagination, before producing an artifice of any cultural significance. It was, and perhaps still is, expected that a consumable idea had first to be tested on the drawing board, and then translated 'into dimensioned diagram'.[5] This is important because *imagining* involves the ontological act of leaving a mark on a blank surface. From the drawings on cave walls to the marking out of the ground for the erection of a building, various types of artists considered drawing as a means to facilitate the search for ideas. In the Renaissance, however, drawings were perceived as having the capacity to teach the architect how 'to make his edifice agreeable to the eye', and/or to guide the potter as to how to make various useful vases.[6] Drawings were understood as the primary means of making tangible the common ground implied in *techne*, the art of seeing and making.[7]



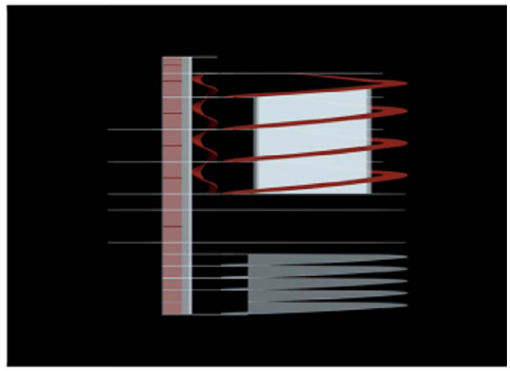


Fig. 1: *The Museu de Arte Contemporanea*. Image courtesy of Bernard Tschumi Architects, New York City.

Obviously, the painterly quality of architectural drawing, composed of lines and surfaces, projects image and imaging in a particular way. In the Renaissance, a painter's drawing was differentiated from that of the architect's. Here is how Leon Battista Alberti articulated the difference: the painter 'takes pains to emphasize the relief of objects in paintings with shading and diminishing lines and angles; the architect rejects shading but takes his projections from the ground plan and without altering the lines and by maintaining true angles, reveals the extent and shape of each elevation and side - he is one who desires his work to be judged not by deceptive appearances but according to certain calculated standards'.[8] Thus the two-dimensional drawing was able to assist the architect to imagine architecture independent of constraints imposed by materiality and techniques. The architect's engagement with the drawing, however, never achieves the phenomenological dimension theorized by Leonardo, for example. To this Renaissance master, 'every painter paints himself', and the work expresses the artist's physical and psychological makeup.[9] Nevertheless, particular to architectural drawing is the fact that from its inception the architect is fully aware that the lines and shapes drawn on paper are already conceived and imagined as architectural. In thinking and drawing the architectural, the physical and psychological mentioned in Leonardo's statement are weakened, if not debunked. However, training in the figural arts offered the Renaissance architects the 'ability to arrest imagination on paper through the mastery of the means of representation'.[10] Still, the architect's combination of lines and geometries operates, in most cases, like a sign rather than a series of marks. The specificity of a mark relates to its capacity to express what is hidden. Architectural drawing, instead, is self-referential and it is up to the judicious eye of the architect to facilitate its lawful transformation into construction in advance of the public judgement of the work's cultural validity.

Throughout Renaissance theories of architecture, it was consistently advocated that a structure should both look and stand stable. This rule was flouted by the idea of *trompes*, the most advanced theory of stonecutting developed in seventh-century France.[11] Used to facilitate additions to an existing building, the *trompe* was conceived as a structure in its own right. It was based on drawings called *traits*, where a matrix of geometric lines would define the stereotomic nature of the surface. As a drawing, *traits* dictated the shape of surfaces to be cut from the stones used as *trompes*.

Robin Evans's investigation of *trompe* shows an explicit contrast between the perception of lightness implied in the drawn geometries and the heaviness of the depicted stone [fig. 2]. For him there are two kinds of line in the drawings used for stonecutting: one light and the other heavy, one referring to 'the imaginary lines of geometrical construction' and the other indicating 'contours of the thing drawn'.[12] Furthermore, Evans reminds us of the fact that stereotomy offered a means to differentiate the tectonics at work in the classical and Gothic buildings. In most cathedrals, the ribs were built first and the surface between them was filled in later. Still, a few architects, according to him, used stereotomy to refer to forms that were considered 'ungothic and also unclassical'. Neither were these forms considered baroque. In the choir vault of Gloucester cathedral (1367), for example, the ribs look as if they are attached to a huge cambered sheet that covers the entire choir [fig. 3]. Gone in this cathedral is the emphatic distinction one could make between the column and the wall, where *decorum* hinged on the tectonic rapport between structure and ornament.[13] Implied in this development is a notion of surface that is marked by a language of geometry detectible in Philibert de l'Orme's stone interlacing.[14]

The historical shift from *disegno* to *trompe* involved the emergence of the scientific approach to nature and the disintegration of the classi-

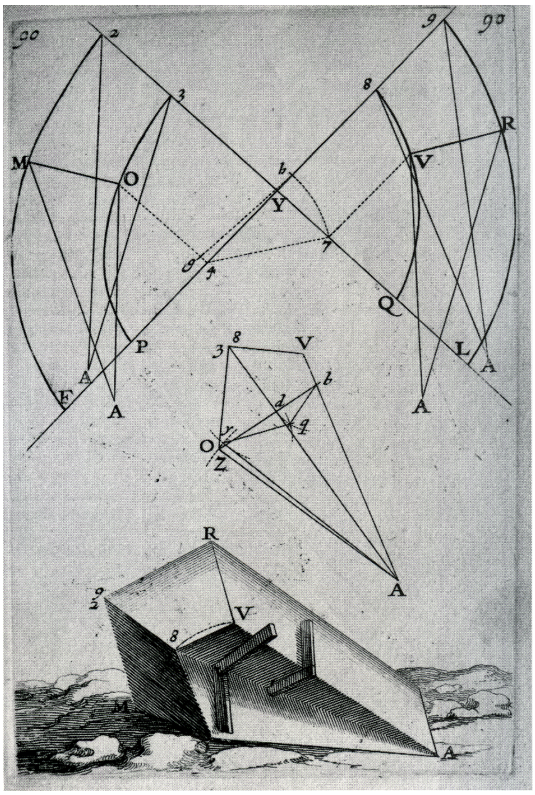


Fig. 2

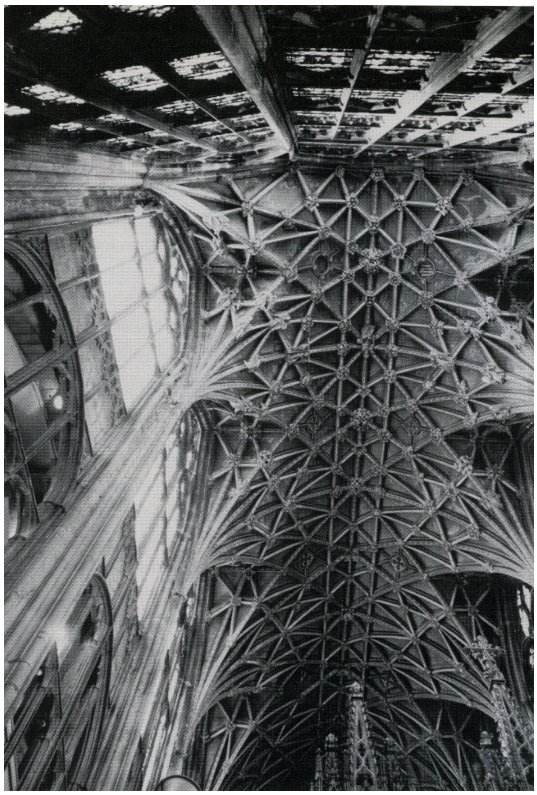


Fig. 3

Fig. 2: A Block of stone and its trait, from Abraham Boss, Le Patique du trait, 1643. From Robin Evans, *The Projective Cast*, the MIT Press, 1995.

Fig. 3: Gloucester Cathedral, view of choir vault. From Robin Evans, *The Projective Cast*, the MIT Press, 1995. Photo taken by R. Evans.

cal notion of humanism. The shift encompassed new approaches to biology and geometry. Of the latter, projective geometry offered a different way of depicting an object; it gave particular attention to the pragmatics of stonecutting, for example. In *disegno*, instead, what reigns between that which is drawn and the edifice to be realized has to do with imaging. The aforementioned shift had another dimension. In the drawing prepared for stonecutting, the drawing and the projected image of the object are viewed simultaneously. What this means is that a sitting position is required when one is drawing a plan, but a painterly posture is required for contemplating the projected image of an object. For the latter the face has to be positioned parallel to the image, looking at the image directly.

Drawing Painterly

Related to the dual weight of drawing used in stonecutting is Le Corbusier's depiction in light lines of a few basic Platonic geometries at the top of a picture of Roman ruins published in *Vers une Architecture* (1923). It seems that the heavy-looking classical language of architecture was to him nothing but a *mark*. To reveal what is hidden, he introduced the notion of modular, the configuration of which was based on the proportions of the human body. Furthermore, and during his search for a new meaning for architecture, he used the golden ratio as a lineament to decide the scope of openings and the placement of different elements in the façade. The idea of free façade was indeed a means to free architectural imagination from the structural, a formative tectonic element in both Gothic and Greek architecture. Inscribed over the whitewashed surfaces of Le Corbusier's early villas were the metaphysics involved in marking. This was perhaps his way of differentiating the nature of façade drawing from that of the plan; one perceived light, the other was charged with the gravitational forces of construction. One looked with inclined head, the other looked straight ahead.

Apropos of this, one might conclude that Le Corbusier's contribution to modern architecture included the Dom-ino frame - a construction system that allowed architects to reiterate certain aspects of the visual culture of humanism, albeit moulded with the abstract aesthetic of modernism. Of interest is the dialogue Le Corbusier established between the logic of plan and the techniques emulated in painting. Following the proposition that 'the artist proceeds like an architect at the drawing boards'[15], in *Nature morte à la cruche blanche sur fond bleu* (1920), Charles-Édouard Jeanneret's depiction of an open book confirms a one-to-one correspondence between the horizontal (plan) and the vertical views of the book. The association has its architectural correspondence: in both classical and Renaissance buildings, the masonry construction system necessitated a direct projective rapport between the constructive elements of the plan and the building's frontal façade.

To discuss the contemporary implication of the historicity of drawing, outlined thus far, we need to return to Tschumi's drawing. To start with, I would like to suggest that the juxtaposition of a freehand drawing with a digitally reproduced image of the same edifice speaks for architecture's turn to the painterly. What is involved in the flat, two-dimensional and vertically positioned drawing of Tschumi relates to the posture of the painter who more often than not paints while standing in front of and parallel to the canvas. The implied verticality is radicalized in abstract painting. In realist painting the image on canvas is usually perspectival, and an invisible horizontal line connects the three-dimensional image in the canvas to the vertical posture of the painter - to her/his eyes, to be more specific. In abstract painting, instead, the image on canvas does its best to nullify the suggested horizontality, the depth issue in painting, and this at the expense of the surface (the canvas) that is posted vertically. Something similar to the nature of the move from realism to abstract painting works through the shift from freehand to

digital drawing, as will be discussed at length below.

The dual nature of Tschumi's delineation also recalls the drawings used for *trompes*, described earlier in this essay. What makes this comparison relevant to the objectives of this essay is the following. In the case of *trompes*, a three-dimensional object is extrapolated from a two-dimensional drawing. It works from surface to a visualized massing, the stone. Absent in Tschumi's drawing is the depth: as noted earlier, both images are two dimensional, and evoke *surface*. This might relate to the return of the theme of surface in today's architecture.[16] It also says something about the structure of digital reproductivity. Even though the gridded network remains essential to the production of digital image, the latter's mechanism is smart enough to 'erase' its traces (the regulating lines), as the painter and the draughtsman of the past would do.[17] Hannah Higgins reminds us of the ontological rapport between the body and the grid: the proportions of Greek architecture, for example, involved 'harmonious geometrical relationships that, though not displaying the graphically gridded surface created by mortared brick, express a precisely proportional rectangle that is reminiscent of the brick itself'.[18] Thus, what we witness in digital architecture is the emergence of folded surfaces that stretch the building's gridded structure to cover non-orthogonal forms. What should be emphasized is that in spite, or because, of the return of organic forms, Tschumi draws architecture in the coordinate of the vertical and the horizontal. In this sense, his approach to surface is modernist and 'constructive' as far as one is concerned with the aesthetic of theatricalization permeating the work of most contemporary architects.[19] This is also why his freehand drawing is the closest to the project's organizational diagram. The dual nature of Tschumi's drawing reveals two modes of delineation, drawing and *picturing*. This is another dimension of his architectural theory that is explored below. For now we should focus on the concept of picturing and how it works in Tschumi's drawing.

Drawing Pictured

A drawing to be viewed is typically spread horizontally on a table. Painting, on the other hand, is usually placed vertically in front of the observer's face. These observations are made in reference to the distinction Walter Benjamin made between the metaphysics involved in contemplating painting and those of graphic arts. To him there are 'two sections through the substance of the world'[20], vertical and horizontal. Benjamin wrote these lines to support the idea that no matter how radical cubism looks, it still belongs to the realm of painting and not drawing.[21] The orthogonal implied in Benjamin's observation introduces a different dimension to the dialectics of the body and the position of drawing.

Easel paintings hang on a wall and face the viewers who, according to Michael Fried, 'typically stand facing them in a relationship only more perspicuous than it otherwise would be'.[22] The suggested matrix of positionality is based on the vertical posture of the body, and the body's back and forth movement, albeit perpendicular to the body's frontal verticality. This much is clear from Tschumi's free sketch drawing of the *Museu de Arte Contemporânea* where one's spatial experience of the project is anticipated in the depicted elevator and ramp, respectively. From a tectonic point of view, however, 'the vertical is imperative in that it defines and divides the forces of weight, weight being an invariant parameter of all constructive practice, par excellence'.[23] This observation can be taken to highlight the importance of section drawing, and to differentiate the vertical implied in the façade and section drawing from the horizontality implied in the plan.

Through section drawing, the architect examines details and controls architectural spaces in anticipation of construction. As far as the representational nature of drawing is concerned, the longitudinal section can be associated with painting. The cross-section, according to Benjamin, 'seems symbolic; it

contains signs'.[24] Thus, in order to read, write, or contemplate a drawing, we place the paper horizontally and look at it with head inclined. To look at a painting, or to make an engraving on a stone or wall, the surface is positioned vertically and parallel to the gravitational axis of the body. This phenomenon is also implied in section drawing even when the drawing is placed on the table.

Following Benjamin, we can argue that the plan drawing of a building is symbolic. It provides the designer with the means to explore the areas (enclosed spaces), points and lines drawn on the paper. A façade drawing, instead, is a picture to be viewed. As with the face, the façade displays marks that in most cases express something that is not visible, *character* of a building for one, or how the sur-face relates to the structure of a building, for another. Still it is useful to notice that while the façade lives through the life of an edifice, the plan drawings remain invisible. After its erection, and throughout a building's life, the plan drawing is used as a sign; it shows where the load-bearing elements are placed, for instance, or where the leak originates. Likewise, 'a sectional drawing shows the hidden parts of a wall or the settings concealed behind one'.[25] And yet the plan remains essential to the spatial experience of the body moving through the volume of a building. For an era such as the Renaissance, when the body simulated the divine forces on earth, the planimetric organization of architecture followed the orthogonal matrix implied in the horizontal dimension of the floor and the vertical posture of the body. Renaissance architecture was meaningful in its capacity to bring earth and sky together.

In modernity, and since Heinrich Wölfflin's theorization of 'line' as a major index for stylistic differentiation between the Renaissance and Baroque, the horizontal and vertical that structure the difference between plan, façade and section were perceived differently. Introducing the term *malerisch*, Wölfflin claimed that architecture had given up its 'characteristic nature and seeks effects that belong to another art: it becomes painterly'.[26] The transformation initiated a different relationship between architecture, painting, and sculpture established by *disegno*. In various planimetric organizations of his work, Le Corbusier utilized the Dom-ino frame freeing the walls from the orthogonal, or for that matter, any geometric logic ordering the structural system. The lines defining the spatial organization of Villa Savoye, for example, are dictated neither by structural needs nor by other external factors. In the open plan, lines work as markers differentiating one area (locale) from another. Departing from the classical wisdom of walls, the lines marking an open plan approach the painterly, as understood in abstract painting, even though space in depth and space enclosed remain essential for differentiating modern painting from architecture. Freed from the dictums of a masonry organization of the plan, the façades of Villa Savoye stand like a painterly surface.

Architecture's move into the realm of painterly was not a stylistic choice. It was induced by technology, one implication of which was of representational nature. Even computer graphics, according to Alberto Pérez-Gómez, is not 'the equivalent of a pencil or a chisel that could easily allow one to transcend reduction. It is the culmination of the objectifying mentality of modernity and it is, therefore, inherently perspectival'.[27] The scope and the implication of digitalization are better understood if one recalls Martin Heidegger's discourse on 'world picture'. According to this German thinker, the modern age is unique in its characteristic way of turning everything, both natural and cultural, into an 'object', set before a subject that is liberated from his/her own historical attributes. What is involved in this historical transformation, dating back roughly to the beginning of the eighteenth century, is the emergence of a structured rapport between subject, object, and technology, which projects the world as

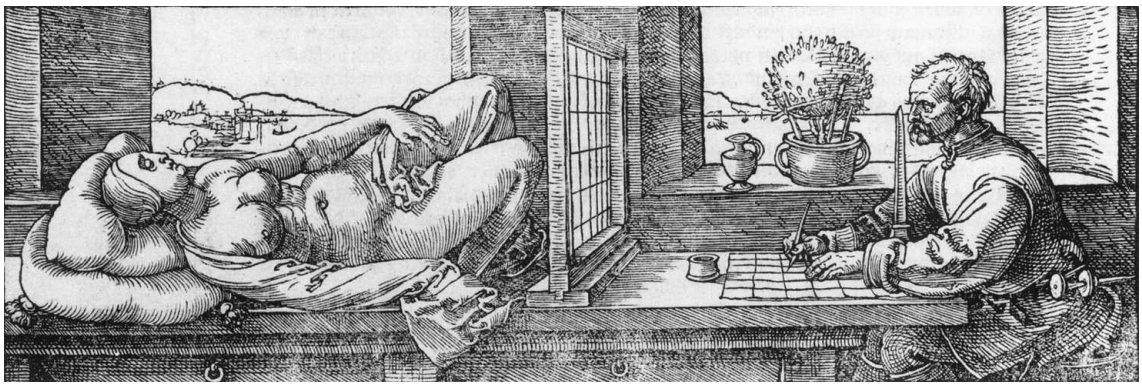


Fig. 4: Albert Durer, Draftsman drawing a reclining nude, c. 1527, woodcut.

picture. Thus, we arrive at Heidegger's conclusion that the 'fundamental event of the modern age is the conquest of the world as picture'. The latter alludes to 'the structured image [*Gebild*] that is the creature of man's producing which represents and sets before'.[28] The Heidegger of 1938, however, was not in a position to see how the subject would soon be internalized into the alleged 'structured image'. This was perhaps one reason why he took up the question concerning technology in the 1950s when technology had already moved into the realm of cultural, and the 'structured image' entered into the era of *spectacle*, and 'image building'.[29]

In order to show the operative nature of perspectival regime even when an architect is drawing in a seated position in front of a computer, it is useful to recall Albrecht Dürer's 1525 demonstration where a wooden frame is covered with a grid of black threads containing an eyepiece [fig. 4]. The ensemble allowed an artist to replicate the scene onto a drawing surface ruled with a matching grid. The association has a further connotation. The digital industry's inclination to reduce the volume of the magic box to a thin screen speaks for both an advanced state of programming and a degree of velocity that outdoes the architect's nostalgia for the slow process of freehand drawing. Of further interest is the disappearance of the subject matter, where one is seated opposite the artist as shown in Dürer's demonstration of the roles engaged in perspective drawing. Absent in the digital means of drawing is the visibility of the vanishing point, one task of which was/is to reduce the multidimensionality of an object to a geometrical image. Another task relates to the necessary coordination between the spectator's position and both the eye of the draughtsperson and the vanishing point. This demonstrates a shift away from the everyday life associated with the divine forces towards 'the experimental method associated with the Scientific Revolution'.[30] All these vanished material aspects of Dürer's machine are virtually reprogrammed in computer softwares, the depth of which is accessible at the touch of a button or two.

In the computer drawing, there is an uninterrupted visual dialogue which takes place between the eyes of the draughtsperson and the screen. Whilst in Dürer's demonstration the seated artist looks straight at the screen before him, to draw the image on paper laid horizontally on the table he has to incline his head. Such a dual movement in the position of the body is rectified in the realist painting, as suggested earlier, where the head of the painter more often than not remains erect, looking straight either at the image on the canvas, or at the subject posed in front of the painter. Whilst such a painterly position of the artist and the image depicted on canvas recalls the architect's seated position in front of a computer, one is reminded of a few contemporary painters, Jackson Pollock for one, whose technique of 'dripping' contested the structure of the painterly.

Now what should one make out of the discussion presented here? For one thing, the vertical and horizontal are essential to our very perception of an object, either drawn or painted. Secondly, even though technological changes influence our perceptual realm, these techniques are not yet able to dismantle the orthogonal built into the perspectival regime. And finally, using the filmic technique of montage, Tschumi is one of the few architects who have been able to produce a body of work that does not attend the visual spectacle permeating digital architecture. To support this last claim we need to turn once more to *The Manhattan Transcripts*.

Starting with four sequential scenarios, the filmic montage in *The Manhattan Transcripts* emerges through the book as the technique that protects architecture from the aesthetic consequences of the technification (digitalization) of architecture. Elsewhere I have discussed the criticality of *objectivity* for Tschumi's architecture.[31] What this means

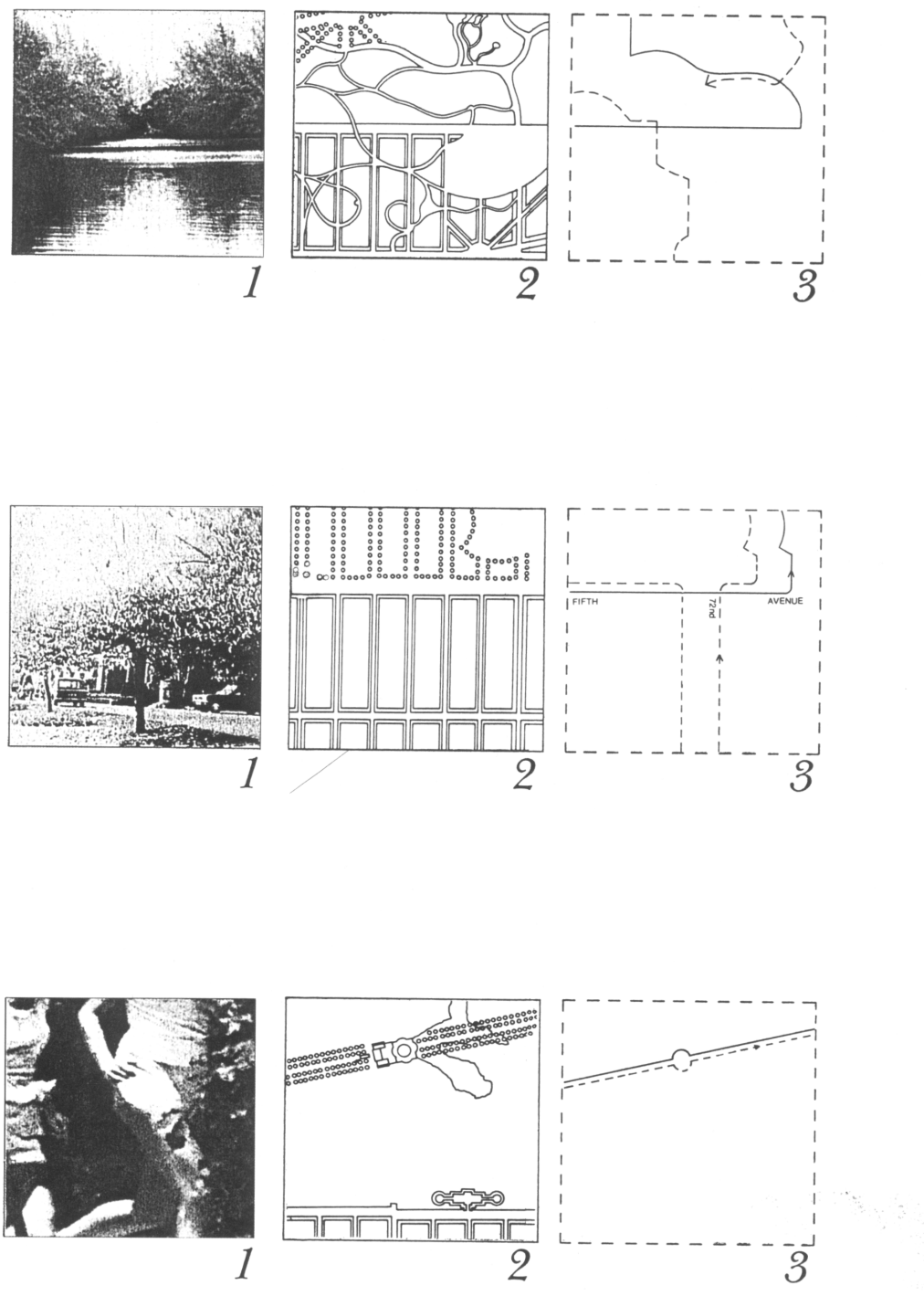


Fig. 5: Extract from *Manifesto*. Image courtesy of Bernard Tschumi Architects, New York City.

is that instead of following the fashionable path of deconstructing the vertical structure of architecture through folded planes, Tschumi tries to deconstruct that which is essential to the engagement of the body in and through architecture. This is evident from the aforementioned four scenarios denoting the park, the street, the tower, and the block. Speaking in terms of diagram, these four themes stand for *plane*, *line* (horizontal), *line* (vertical), and *orthogonal*. The idea is to challenge the presumed neutrality of the three themes of movement, programme, and event to the point that each becomes a constructive force for rethinking architecture and the city beyond strategies that are mainly focused on form either through abstraction or simulation.[32] What makes these three themes important is their ability to re-engage the body with a different tactile and spatial sensibility as one experiences the disjunctions grafted into the conventional performance of these themes.

In the same way as a film director, Tschumi plots architecture through transcripts, and with drawings that are not architectural. The role of *transcripts* 'is never to represent; they are not mimetic', and their ordering principle has little to do with reality, but more with 'the internal logic these sequences display'.[33] Following what he calls the 'three-square principle', each of the above-mentioned four scenarios is plotted in three successive frames, horizontally and vertically [fig. 5]. Each page covering the theme of the park, for example, displays nine squares, the narrative of which runs first horizontally and then vertically. To go beyond a formal investigation (Colin Rowe), or a deconstruction of architectural form (Peter Eisenman), Tschumi dispensed even with his own three-square principle, as the next set of transcripts involves the city directly. The final transcripts reveal a montage of *cuts*, each denoting experimental aspects of the four episodes. Again, in filmic analogy, the final meaning of each cut cannot be understood independently of its context. In MT 4 [fig. 6], for example, 'a horizontal, internal relation occurs within each level'. Tschumi writes: 'This relation may be continuous and logical; it can also jump from one frame to the adjacent and fully incompatible one, creating an integral disjunction.'[34] Furthermore, the vertical and the horizontal structures informing Tschumi's transcripts inevitably infiltrate the narrative of his text. The vertical notations that stand for the sequence of drawings interrupt the horizontal flow of the final pages of his introductory remarks. The disjunction suggests that drawing does not represent architecture. Rather does it expose its internal logic, which is also informed by programme, movement, and *event*.

In *The Manhattan Transcripts*, Tschumi presents an alternative approach to the bodily experience of architecture against a conservative interpretation of architectural phenomenology. Using the technique of montage and photomontage, and taking advantage of a Benjaminian discussion of the role technology plays in human perception, Tschumi's drawings were indeed responding to the ambiguity internal to architectural phenomenology. Having explored the many facets of the subject during architecture's turn to the postmodern, Jorge Otero-Pailos concludes that, 'within architectural phenomenology, technology functioned as both the enabling element and the dividing rift between the matters of intellectualism and experience'.[35] Whereas in some circles of phenomenology a centrally placed body was sought as a remedy to the divide created by technology, Tschumi's theorization of architecture opted for a non-essentialist approach to the body and experience. Drawing conclusions from the work of Russian constructivists, Tschumi welcomed distraction and disjunction in analogy to the sensual experiences induced by filmic montage. In this, he was also benefiting from the traditions of the avant-garde of the 1920s. To challenge the meaning given to the picture of reality, photomontage is used to juxtapose 'image with image, or image with drawing, or image with text'.[36] If architecture once had to imitate the body and nature, the technification of

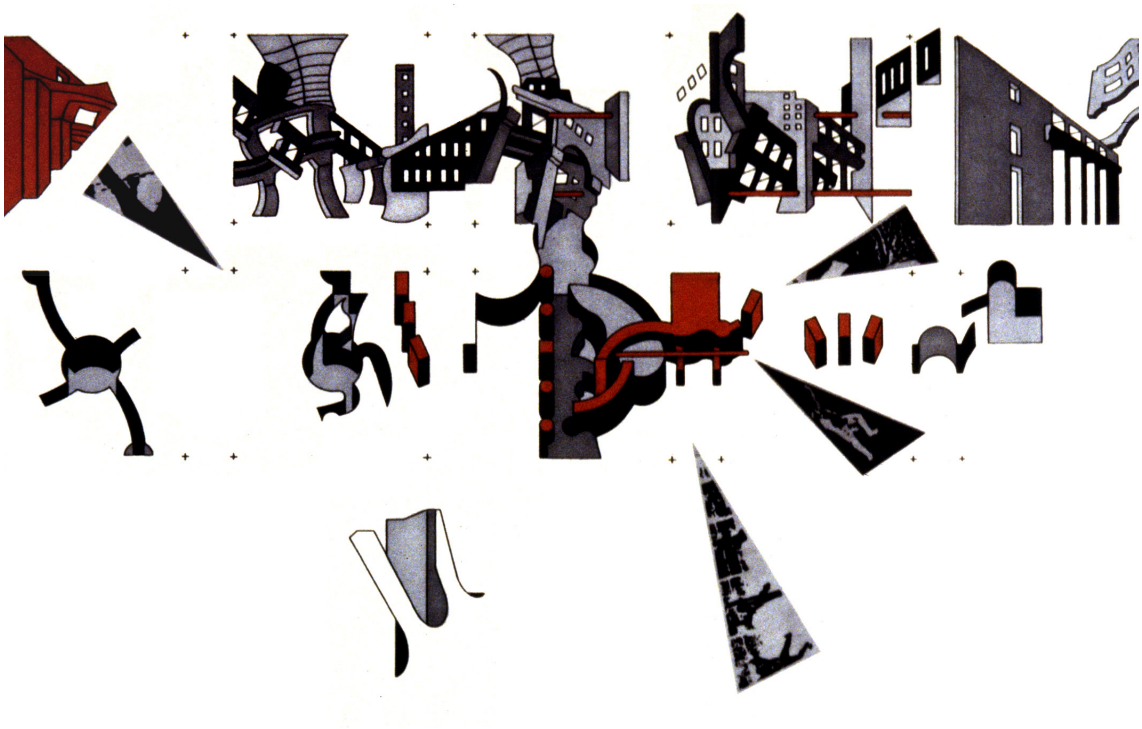


Fig. 6: Extract from MT 4, The Block. Image courtesy of Bernard Tschumi Architects, New York City.

everyday life has introduced a third nature (technique) to be assimilated into architecture. Gone in the old equation was the tactile aspect of architectural experience, a subject Benjamin highlighted at the end of his famous art essay work.[37]

Now, what conclusions should we draw from Tschumi's drawing prepared for the *Museu de Arte Contemporânea*? In the first place, the drawing speaks for the architect's departure from his theorization of architecture as discussed in *The Manhattan Transcripts*. We read on the final page of the book how important its themes were for the realization of two early projects, *Parc de la Villette* and *Le Fresnoy*.[38] The suggested departure, however, goes halfway towards the full implementation of the formal and aesthetic impact of the digitalization of architecture. This claim is based on a general observation that as of today Tschumi's architecture avoids following the organic forms and the aesthetic of theatricalization evident in most of today's architecture of folding surfaces. Tschumi shortcuts the architect's passive engagement with the available digitally programmed images. This is a struggle 'between the predilection of the architect and the inherent properties of the geometries encountered'[39] and what rests deep within major 3D modelling softwares. Tschumi sees no reason to smooth the conflict experienced between the sensual pleasure of space and that of order.[40]

Secondly, the aforementioned drawings suggest that the architect has not yet abandoned the formal and aesthetic implication of the 'right angle' for the visual and sensual experience of the body. In putting a freehand drawing next to a digital image, Tschumi reveals a temporal conflict. Pencil in hand and having no concern for time experienced through digital velocity, Tschumi recalls the slow processes of architectural creativity rooted in the *metier* of draughtsmanship. The juxtaposition also wants to balance the mental life and the perceptual horizon of an architect seated in front of a computer, whereby the machine frames the space/time involved in the drawing. Tschumi's freehand drawing resists the homogenization of form, at least at an aesthetic level, evident in diverse products of the present culture of spectacle. This might explain why Tschumi draws architecture and designs projects in which the coordinates of *grid*[41] bring together the body and architectural experience in a non-totalized form understood in terms of either the temptation to express the spirit of a digital age, or the humanist notion of the architecture and the body.

Notes

1. See footnote 20 here.
2. Here I am benefiting from Jacques Rancière, *The Future of the Image* (London: Verso, 2007), p. 11.
3. The following pages benefit from this author's 'The Drawing Position', *Architectural Theory Review*, 14:3 (2009), pp. 248-259.
4. James S. Ackerman, *Origins, Imitations, Conventions* (Cambridge: The MIT Press, 2002), p. 16.
5. David Leatherbarrow, 'Showing What Otherwise Hides Itself', *Harvard Design Magazine*, (Fall 1998), p. 51.
6. I am paraphrasing Leonardo da Vinci quoted in Robert Williams, *Art, Theory and Culture in Sixteenth Century Italy* (Cambridge: Cambridge University Press, 1997), p. 16.
7. On this subject, see Gevork Hartoonian, *Ontology of Construction* (Cambridge: Cambridge University Press, 1994).
8. Leon Battista Alberti, *On the Art of Building in Ten Books*, trans. by J. Rykwert, N. Leach and R. Tavernor (Cambridge, MA: The MIT Press, 1988), p. 34.
9. Robert Williams, 1997, p. 75.
10. Alina Payne, *The Architectural Treatises in the Italian Renaissance* (Cambridge: Cambridge University Press, 1999), p. 68.
11. Robin Evans, *The Projective Cast* (Cambridge: The MIT Press, 1995), p. 180.
12. Robin Evans, 1995, p. 206.
13. Robin Evans, 1995, pp. 220-39.
14. Bernard Cache, 'Gottfried Semper: Stereotomy,

Biology, and Geometry', *Perspecta* 33, 'Mining Autonomy', (2002), p. 86.

15. Stanislaus von Moos, *Album La Roche* (New York: The Mocacelli Press, 2008), p. 55.
16. On this subject, see Gevork Hartoonian, *Crisis of the Object* (London: Routledge, 2006).
17. Here I am benefiting from Hannah B. Higgins, *The Grid Book* (Cambridge: The MIT Press, 2009).
18. Higgins, 2009, p. 24.
19. On this subject see Gevork Hartoonian, 2004, in particular the chapter on Bernard Tschumi.
20. Walter Benjamin, 'Painting and Graphic Arts' in *Walter Benjamin, Selected Writings, Volume 1: 1913-1926*, ed. by M. Bullock & M. W. Jennings (Cambridge: Harvard University Press, 1996), p. 82.
21. Yve-Alain Bois, *Painting as a Model* (Cambridge, MA: The MIT Press, 1999), p. 179.
22. Michael Fried, *Why Photography Matters as Art as Never Before* (New Haven: Yale University Press, 2008), p. 148.
23. J. Guillerme, H. Vérin, and S. Sartarelli, 'The Archaeology of Section', *Perspecta* 25 (1989), p. 238.
24. Walter Benjamin, 1996, p. 82.
25. David Leatherbarrow, (Fall 1998), p. 52.
26. Quoted in Alina Payne, 'Architecture, Ornament and Pictorialism: Notes on the Relationship Between the Arts from Wölfflin to Le Corbusier' in *The Built Surface Volume 2*, ed. by Karen Koehler, (London: Ashgate Publishing Limited, 2002), p. 57.
27. Alberto Pérez-Gómez, 'Question of representation: the poetic origin of architecture' in *From Models to Drawings*, ed. by M. Frascari, J. Hale and B. Starkey, (London: Routledge, 2007), p. 21.
28. Martin Heidegger, 'The Age of the World Picture', trans. by W. Lovitt, *The Question Concerning Technology and Other Essays* (New York, Harper & Row Publishers, 1977), p. 134.
29. I am thinking of Guy Debord, *The Society of Spectacle*, trans. by D. Nicholson-Smith, (New York: Zone Books, 1995), and Hal Foster, 'Image Building', *Artforum* vol. 43, no. 2 (October 2004), republished in Anthony Vidler ed., *Architecture Between Spectacle and Use* (New Haven: Yale University Press, 2008), pp. 164-79.
30. Higgins, 2009, p. 169.
31. Gevork Hartoonian, *Crisis of the Object*, 2006, especially chapter 4. See also K. Michael Hays, 'Spacing' in *Architecture's Desire, Reading the Late Avant-Garde* (Cambridge: The MIT Press, 2010), pp. 135-69.
32. Bernard Tschumi, *The Manhattan Transcripts* (London: Academy Editions, 1981), p. 7.
33. Tschumi, 1981, p. 8.
34. Tschumi, 1981, p. 11.
35. Jorge Otero-Pailos, *Architecture's Historical Turn: Phenomenology and the Rise of the Postmodern* (Minneapolis: the University of Minnesota Press, 2010), p. 254.
36. Rosalind E. Krauss, *The Originality of the Avant-Garde and Other Modernist Myths* (Cambridge: The MIT Press, 1986), p 21.
37. Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction' in ed. by Hannah Arendt, *Illuminations* (New York: Schocken Books, 1969), pp. 217-64.
38. For this author's discussion of these two projects, see footnote 29 above.
39. Aranda/Lasch, *Tooling* (New York: Princeton Architectural Press, 2006), p. 9.
40. Tschumi, 1994, p. XXVIII.
41. Here I am using *grid* as discussed by Rosalind Krauss, 1986, pp. 9-22. Taking up the structuralist interpretation of the cultural, Krauss suggests that grids serve as myth if only to 'deal with contradictions', p. 13.

Biography

Gevork Hartoonian is Associate Professor of architectural history and theory at the University of Canberra, Australia. He is the author of several books and scholarly essays, including *The Mental Life of the Architectural Historian*, 2011; *Walter Benjamin and Architecture*, 2010, and 'Harry Seidler: Revisiting Modernism', *Fabrications*, 2011, among other publications.

Drawing the Map: Siting Architecture

Anne Bordeleau and Liana Bresler

In the past two decades, mapping has emerged as one of the favoured means of documentation for architects. Architects question the boundaries of their discipline, circling in on the nature and form of their projects through a series of maps of tangible and quantifiable elements, such as infrastructure, built form, growth, and typologies, sometimes even venturing to address qualitative or less tangible aspects, such as the multifaceted and layered histories of a site. The premise is often that if one can delaminate and map the conditions found on site, then one can achieve a more complex understanding of said site. Hence, like Peter Eisenman and Laurie Olin for their *University Art Museum* at Long Beach, California, mapping allows the architects to include elements ranging from the existing buildings and historic monuments on the site to its geological fault lines.[1] Data are collected, separated, coded, and illustrated in a series of sheets, the ultimate ambition being to embrace many latent characteristics and spatial dimensions of the studied area. If maps can successfully represent sets of complex interactions in an effective manner, they also have an objectifying tendency. While J. B. Harley looked at maps as tools of domination, the social geographer Doreen Massey discussed their propensity to stabilize space-time and 'take the life out of space'.[2] Blaming representation for a condition currently affecting conceptions of space, Massey points to the close connection between processes of representation and their built outcome, particularly as it pertains to the possibility for representation to embody time.

Massey's criticism points to two main issues. Relating 'the map as representation' to 'the map as an agent' in spatial conception, she points to the propensity to disregard the impact that our presumably objective recordings of the world actually project onto the world. Moreover, her comments highlight the ever problematic conception of the relation between time and space, and the shifting tendencies which, over the last two hundred years, have led to privileging first the one, then the other. Through the discussion of two iconic architects' approaches to the same site over the span of forty years, we will introduce some of the implications associated with, respectively, drawing or mapping the site of architecture. While maps, especially as they are used by architects, can be considered a specific type of drawing, for the purpose of this essay we would like to distinguish 'maps' from other forms of graphic expression, which we will classify as 'drawings'. Focusing on drawing and mapping as two modes adopted to delineate architectural interventions, we will approach them insofar as they operate in two distinctive realms. Drawing brings to the fore the phenomenological dimension of architectural graphic representation as it engages architects and viewers set in the thickness of time, an embodied time involving memory, experience, and imagination. Mapping foregrounds another dimension, pointing rather to the epistemology of the project. Maps reveal, construct, and project the *epistemé* against which the project builds itself. Hence, through drawing and mapping, architects do not merely represent an existing world but also

actively project a creative and cultural reading, thereby negotiating the line between representation and projection. In other words, the architect must consider both maps and drawings insofar as they compound past, present and future.

Representing Space, Representing Time

To illustrate the two poles underpinning architecture and its representation, we turn to the work of Carlo Scarpa and Peter Eisenman on the Castelvecchio Museum in Verona. The importance of representation in the practice of both Scarpa and Eisenman, who use drawings and diagrams, respectively, has been thoroughly discussed elsewhere.[3] Scarpa's unique and incremental working method, moving constantly between the physical construction site and the drawing board, could not be adequately considered without his drawings. As such, Scarpa's work is exemplary of what Stan Allen defines as a 'material practice', a type of architectural practice engaged mainly in the physical production of architecture, as opposed to a 'textual practice', which is 'devoted to interpretation and analysis of representation'.[4] Eisenman's work belongs to this theoretical end of architectural practice. Rather than drawings, Eisenman uses diagrams to analyze and 'reason' the project. These diagrams embody the thesis of the project, and, like a type of map, epistemologically position his textual projects.

Working forty years apart, the two architects approached the site from different viewpoints that involved different scales. Scarpa never settled on a privileged viewpoint: his rendered views are always fragmented and his position constantly shifting. He usually combines small sections or axonometric details that surround a central plan or elevation view. On his drawing sheets, elements are cut off or fade out before reaching the edge, leaving room for further development and offering a background to the ideas detailed in the margins. Conversely, Eisenman positions himself high above the site, most often choosing a complete plan view that allows him to reveal all layers and underlying geometries simultaneously in each drawing. He usually represents the entire project from above, offering the viewers a full understanding of how each piece relates to the other. These distinct viewpoints are associated with different scales. Scarpa's drawings are often drawn at a scale of 1:25 or even 1:1, reinforcing the notion of his inquisitive proximity to the various elements that together constitute the site. For Eisenman, the distance is unmistakably greater, even though the use of computer-generated drawings carries no specific scale. The larger scale is necessary to keep a constant view of the whole, and this privileged viewpoint prevails over a closer attention to details.

These differences in scale and viewpoint are revelatory of a different consideration of the role of architectural representation. Through their graphic representations, both architects offer a translation of the site upon which the project can be conceived, but Scarpa dwells in the tangible while Eisenman thrives in the abstract. For example, Eisenman chooses to extract abstract lines and axes to represent the overall composition of the Castelvecchio, but Scarpa includes the outline of individual stones or the grain of a piece of wood. Consequently, joints and details are of a different nature. For Eisenman, the main joint is that between his project and Scarpa's existing intervention; to Scarpa, they are the elucidation of the encounter of two materials, two walls or two rooms, the coming together of something new with something old, celebrated with materials. Eisenman's viewpoint on the project and its site is often 'outside', at the 'distance' of a plan or an axonometric. When compared to Scarpa's attention to the fragments, Eisenman's position also implies the objectivity of being removed, the reluctance to look at an object from a subjective 'interior'.

Could the different approaches to the site, and consequently to the design, be inherent to the type of representation adopted by the two architects? While

Scarpa draws, Eisenman maps. If Scarpa's decision to draw and Eisenman's interest in mapping arc back to their respective involvement in material and textual practices, they are also indicative of different attitudes to time. In Scarpa's project, the sensibility to time compounds the documentation of materials in their existing weathered condition as well as his movement about them. His aggregate approach alludes to a necessarily incomplete and fragmented view, never fully stabilized, always approximated. Scarpa's drawings are actions and extensions of thought, and as such they do not impose themselves as fully coherent or ever finished. This sense of incompleteness translates to the built project: 'His built projects are moments frozen in the process of refining ideas rather than triumphant conclusion to them.'[5] Scarpa's fragmented drawings are traces of a process that unfolds in an unfathomable time that stretches from historical times through daily visits and unknown futures. Similarly, the work evolves as much between the drawings as it does between the drawings and the constructed project, and his intervention at Castelvecchio continues to age and change even beyond construction. The significance for the viewer to phenomenologically experience the non-totalizing monumentality of the resulting project contrasts with the ephemerality of Eisenman's installation, which can be understood through documentation. Addressing history as an idea that exists outside of time, Eisenman produced a temporary insertion that now most poignantly exists in drawings and photographs. In Eisenman's maps and diagrams, from the first abstraction of the axes of Scarpa's intervention to the recorded series of transformations that he submits them too, time is self-reflexive, internal, and built into the different translations and rotations that make up the chronology of the project. Eisenman's project speaks to the possibility of a finite totality that carries its temporalities internally.

In 'Trace Elements', Stan Allen approaches Eisenman's work through the concept of the index, suggesting that rather than operating at a symbolic or iconic level, Eisenman implicitly works with the viewer's discovery of a reconstructed relation between a signifier and a signified that hinges on cues embedded in form. While Eisenman's plans are ichnographic traces of movements, they do not point to an actual material presence, but rather to abstract processes of transformations orchestrated by the architect. In this respect, the index points back to the movements of the creative process; an abstract movement in a timeless field that gains precedence over the very elements that initiated the various movements. As Allen argues: 'For Eisenman, design is the inscription of meaning into, or onto, the work by means of a series of more or less rigorous operations carried out by the designer.'[6] But, to echo Allen's question, what kind of meaning is then produced? The index here points back to itself, 'to the structure of representation', and we can only agree with Allen when he suggests that the deciphering work to be undertaken by the viewer locks the experience in a limited present.[7]

Although both architects consciously address the historical and actual context that extends beyond the building, their representations assume a different role in relation to the temporal location of the actual project. In Scarpa's drawings, the architect only developed specific materials, forms, texture, and light, providing moments of an overarching idea but never a synthesis of the overall project. Eisenman's thesis - his constructed fiction - can be read and understood through his maps or diagrams, where he suppressed details to favour the communication of a clear overall argument. Physical movement, that which really occurs in time and carries pasts and futures, is not the focus of his work. Life, the life of a material weathering or that of a viewer returning, is removed from the drawing as the depth of time is flattened out by an emphasis on the design process. Ultimately, Eisenman's representation of abstracted lines replaces the spatio-temporal complexity of the site and becomes the virtual site

of intervention, wherein the ocular and rational view from above prevails over the sensual and heuristic walk through the actual site.

Eisenman's approach to the temporality of a site, and the sensitivity to time that results from this approach, are paradigmatic of the ways in which maps are usually drawn into architectural conception and construction. Heir to the textual practices, architectural mapping is often associated with the possibility to index the 'designer's syntactical code', a possibility coupled with the idea that 'none of the notations take precedence over any other', so as to encourage 'more plural, open-ended "performances" of the project-in-time'.[8] These ambitions stem from a renewed emphasis on space as promoted, amongst others, by Michel Foucault and Edward Soja.[9] While the latter suggests that maps have the advantage of allowing simultaneities and the ability to disturb, reverse, and play with time's presumed chronology, the former questions the privileging of time that may have started with Bergson and puts forward his conception of heterotopias, of which 'heterotopias of time' only form one category. But the practice of architectural mapping that embraces this shift from time to space seems to be plagued with some of the scientific objectivity inherited from the tradition of map-making. While projects like Eisenman's avoid the objectifying timelessness of some maps, they become characterized by an idiosyncratic internal temporality. Likewise, though Eisenman's mapping at Castelvecchio or in Long Beach, California strives not to impose a single viewpoint, the ambition to let the space reveal its complexity, as though autonomously, fails. Despite a prevalent assumption, the designer's hand never disappears behind even the most random layering or scaling operations. Indeed, when mapping is brought into architecture owing - to refer to Corner's categories - to the automatism of its operation, because of its rhizomic character, or to grant the designer the ability to 'set up the game board', it prevents the architect from truly engaging the temporal aspects of the site. Rather than relying on rules, syntax, and random transformations, can we conceive of a form of epistemological mapping that would be more open to the phenomenology of drawing?

Drawing Architecture: Record, Action, Projection

If Eisenman and Scarpa demonstrate a polarity between material and textual practice, they also point to a common polarity between drawing and mapping, the first being more aligned with the phenomenological grounding of architecture, the second with its epistemological positioning. Hence, the decision to map often parallels the aspiration to replace the architect's direct engagement with the site - a phenomenological engagement that tends to characterize drawing - to approximate a less subjective contextualization of the project, situating it against a specific *epistemé*. If, as Corner has suggested, 'Mapping and contemporary spatial design techniques more generally have yet to find adequate ways to engage creatively with the dynamic and promiscuous character of time and space today',[10] our contention is that they can only acquire a 'new instrumental significance' by learning from the way in which drawings embody times.[11] Architectural drawings can address time in three fundamental ways. First, the representation of the condition found in the conception phase can reveal the multiple temporalities embedded in the site. Second, the manner in which the project is conceived can itself be recorded and gain temporal depth through a consciously accretive approach to drawing. Third, the drawings can constitute the first site in which to index multiple perceptions and untapped possibilities. In short, the drawing's potential to be open to different temporalities can emerge in its capacity to act as a record (or memory), an action, and a projection.

As a record, a drawing not only addresses the specific topography of a site to be built upon, but it is the implicit expression of a position on the

cultural, historical, and social contextual dimensions of that specific site. When recording through drawing, architects inevitably assume a certain perspective on time. This positioning may involve the communication of a sense of completeness or the acceptance of the ever unfinished, it may range from assuming the possibility of the whole to embracing the inevitability of the fragment, pursuing the belief in the universal or acknowledging an unavoidable plurality.

If the drawing, as a 'record', offers a perspective on the temporalities embedded in the site, as a 'projection' the drawing opens onto potential futures. As Robin Evans argued: 'Projections - the invisible lines that relate pictures to things - are always directional. Drawings arrest and freeze these vectors, but even in this fixed state, projected information can be mobilized by the imagination of the observer.'[12] The projective nature of drawings is in the imagination of the viewer, but also in the anticipation of a body moving in space, that is, the apprehension of the kinetic and embodied experience of architecture. In this respect, the drawing is not strictly projective in that it is a projection of a building yet to be constructed, but also projective in the sense that it is drawn in expectation of movements in time.

Drawing is also an action. Beyond the embodiment of the recorded site and the projection of a future building, each step in the drawing process carries its past and its future. In the words of Juhani Pallasmaa:

[...] *every act of sketching and drawing produces three different sets of images: the drawing that appears on the paper, the visual image recorded in my cerebral memory, and a muscular memory of the act of drawing itself. All three images are not mere momentary snapshots, as they are recordings of a temporal process of successive perception, measuring, evaluation, correction and re-evaluation. A drawing is an image that compresses an entire process fusing a distinct duration into that image. A sketch is in fact a temporal image, a piece of cinematic action recorded as a graphic image.*[13]

It is in this sense that the drawing is action, in its dialectical power to put into relation past and future, but also the haptic and the optic, and the dynamic and the static. In other words, the drawing as action puts in relation the image recorded in memory with the projection on paper, it summons both the memory of the body tracing the line and the visual perception of the world, momentarily arresting on paper the movement of a constantly shifting reality. Through drawings as action, architects can maintain the tension between the critical and the projective, resisting the categorical separation of two attitudes to design that may not, after all, be mutually exclusive.[14]The presence referred to by the projection is anachronic, belonging to a time yet to come - or maybe even already past. Hence, the act of drawing finds its strength in its anachronistic suspension as a piece that constantly arcs forward and backward.

In this triple consideration of the drawing as record, projection, and action, the emphasis is on the inherent quality of the drawing to summon phenomenological time. As a record, the drawing can be polarized between the expression of a deep, embodied spatiality on one end of the spectrum, or a flattened or frozen time at the other end. In this manner, the record implies a projection of its author's conception of the relation between architecture and time, and indexes the sensibility with which the architect is willing to engage with the temporal dimension of the architecture. As a projection, the drawing can call upon the phenomenological involvement of the viewer in the space of the drawing, engaging his or her willingness to actively travel it in time rather than passively receiving it as a fixed image. Inviting projection across, up and into the page, allows incursions into the fourth

dimension, where projection may be extended and new movements found. As an action, drawings operate dialectically, between recording and projecting, between the architect's perception and that of the viewer. As such, to acknowledge that drawing is an action is to accept the responsibility and intentionality of the architect, while remaining open to a multiplicity of readings. This consideration brings us back not only to the agency of mapping, but more importantly, to the architect as map-maker.

Mapping the Site: Documenting, Documentation, Documentor

Like drawings, maps can hold multiple temporalities. Yet, it is often their capacity to act as record and, more particularly, as a well-documented record that motivates their use in architecture. The word 'record' comes from the Anglo-Norman and Middle French *record* and referred to a piece of evidence about past events, whether in the form of a memory, an account, a story, or a discussion. To 'take record at' is to bear testimony of a fact or series of facts. To record is to preserve something as knowledge or information. While in extended use the record designates a memorial or a thing preserving the memory of a fact or event, a rare but nevertheless pertinent definition of the term indicates the account or reckoning of past time. From the sixth to the fourteenth century, the map was one of the prime means used to reckon time. For example, the geomancy that informed the location and layout of ancient Chinese cities was echoed in the layout of the temples and reciprocated in the organization of the house, and medieval *mappae mundi* such as the Ebstorf or Hereford maps not only approximated the geography of the known world, they summarized the scriptures from Genesis to the Apocalypse.[15] In short, these maps were far more than geographical orientation devices and situated individuals in a complex spatio-temporal world order. In the contemporary fragmented and plural world of accelerated time-space, everything is changing, and any universalizing or stabilizing representation is to be questioned, redrawn.[16] As populations, cultures, economies, and even climates and landscapes shift, a stable frame of reference for the conception of architecture needs to be defined by the architect, setting the limits of a project's context within a vast and fluctuating reality.

Could our mapping of the site reveal fragmentary conditions, rich of a multiplicity of possible spaces, loaded with many potentialities of time, and hence create representation more telling of the complexities of an actual architectural project? In the face of the fragmentation of space and the acceleration of time, the potential layering inherent to mapping may allow architects to momentarily monumentalize a perspective on the site, constructing the present of the site out of many pasts and potential futures. The architectural site is never a clean slate; an architectural project is not an idea projected in a preset future but, as its documentation would attest, a process shaped as much by what was than by what is and what might be. While in the past two hundred years maps have often been equated with universalizing worldviews and tools of political domination, a conscious position on issues of scale, multiple viewpoints, and notions of empowerment can perhaps counteract the objectifying tendency of map-making. As Massey suggests: 'Not all views from above are problematic - they are just another way of looking at the world … The problem only comes if you fall into thinking that the vertical distance lends you truth.'[17]

Looking particularly at the role of mapping, we can consider again the relation between mapping and architecture in a threefold role, first as the action of *documenting* upon which the project builds itself, second as the *documentation* resulting from the process, and third as *documentor*, or index of the intentions of the project. Mapping as a way to actively *document* a search for architecture may allow the identification of what is specifically heuristic in drawings, a process oriented around

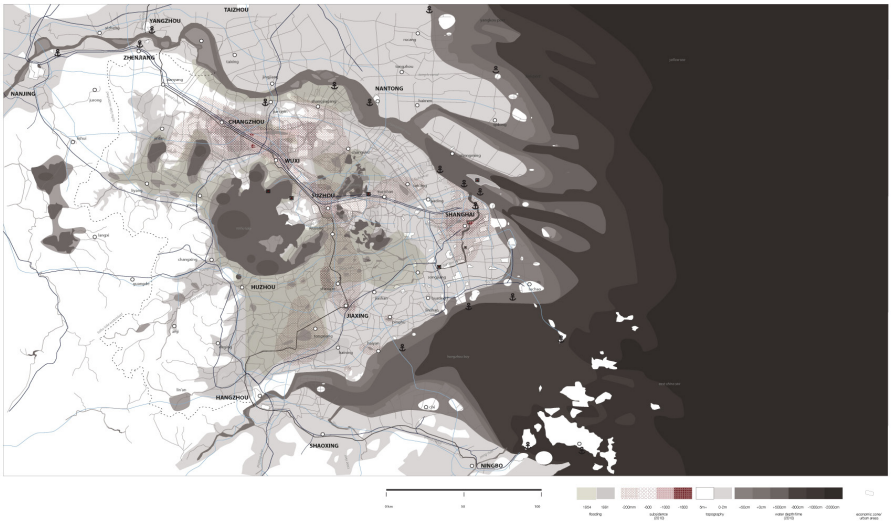


Fig. 1

Fig. 2

Fig. 1: *Geologic time*, a mapping in time of flooding, subsidence, topography and water depth. (Jeffrey Cheng, ongoing thesis project, 2010).
Fig. 2: *Temple texture, a section through time*. Temple of Earth at Fuciao Cun Temple, Suzhou (Photograph: Jeffrey Cheng).

questions rather than the illustration of a predetermined answer; mapping as *documentation* can reveal how the process of building a perspective on the site emerges from a careful consideration of the questions asked and documented; finally, the map as *documentor* hints at the indicative potential of drawings, as they index both a positioning with respect to the documented site and programme, as well as its materialization as a construction in space and time.

In a number of theses written at the University of Waterloo, mapping recovers its poetic and mythographic underpinnings and allows a multilayered reading of the sites. In an ongoing project, Jeffrey Cheng investigates the emerging mega-city of Jiangnan, which stretches from Suzhou to Shanghai and is affected by recurring flooding of the Yangtze River. In this instance, the focus of the project is temporal, and the series of maps produced strive to both arrest and render the incessant movement - from the quick displacement of people to the gradual subsiding of the land, the seasonal fluctuations of the river, and the unpredictable precipitations and ensuing floods. Between photographs and drawings, the project also involves a series of mappings, as though they were snapshots of a project too large to tackle [figs.1,2]. In this respect, the maps become the means to identify both the specific site and the specific approach, already embodying the seed of a sensibility to be carried from the scale of a temple to that of a mega-region.

In Cheng's thesis, the investigation and documentation of the specific geological and cultural conditions focused the projected architecture around temporal issues. The range of variables considered in the *documenting* phase translated to a broad interpretation of movements pertaining to landscape, population, transportation as well as culture. In this case, the *documentation* revealed an ability to operate with the same temporal sensibility at a variety of scales. As such, movements were allowed and encouraged between the reading of a map at the scale of the country, a city, or a village temple. A similar movement was possible between the reading of a map, a photograph, or a drawing. Carrying the seed of the question that the student asked, while also projecting his sensibility in the way the found answer was projected, the *documentation* both framed the expanded site and informed a specific intervention. Moving from the scale of the mega-region in the context of contemporary China, the project then focused on the reoccupation of an abandoned temple, wherein the temple became an index - or *documentor* - of both smaller and larger phenomena such as weathering, industrialization, urbanization, modernization, and the continuity or discontinuity of culture.

At another particularly challenging site, the Valley of Gei Ben Hinnom/Wadi Al-Rababa located just south of the Old City of Jerusalem, the inclusion of conflicting Israeli and Palestinian memories, the acknowledgement of continuing and aborted histories, and the admission of a dual symbolism became an architectural investigation to be tackled through mapping. Located between the desert to the east and the green mountains of Jerusalem to the west, the valley is in many ways a boundary. It is described in biblical texts as the Potter's Field bought with Judas's money and referred to as the Field of Blood, the Gehenna, a garbage dump, the purgatory. Not so much by delaminating the information as by accepting the somewhat contradictory layering, the site is documented through a series of maps, tiptoeing about this eternal landscape that has consistently been claimed and reclaimed.

The author's attempt to both maintain the inherent contradictions that exist within the site, and yet also create a spatio-temporal site upon which one could act, is reminiscent of the ground Doreen Massey tries to define between postmodern instantaneity and the modernist singular temporality: 'To take on board the coevality of space is [...] to stand amid

Fig. 3

Fig. 4

Fig. 3: *Documenting the site - accumulating, finding, revealing traces.* Accumulated layers of information pertaining to the boundaries - natural, religious, political, historical, etc. - documented on site, Valley of Gei Ben-Hinnom, Wadi Al-Rababa, Jerusalem. (Liana Bresler, “Embedded Boundaries”, Thesis project, 2010)

Fig. 4: *Site documentation - framing the space and time of the intervention.* Selective mapping of historical, mythical, geographical and archaeological features present in the Valley of Gei Ben-Hinnom/Wadi Al Rababa. (Liana Bresler, “Embedded Boundaries”, Thesis project, 2010)

contemporaneous multiple becomings. And that means, again, that space is not a surface. The map is not space. It is representation of space-time.'[18] It is precisely this representation of space-time that is sought through *documenting*. The mapping of the Valley of Gei Ben Hinnom/Wadi Al-Rababa is marked everywhere by a desire to represent the site as a complex space-time that would honour both its 'contemporary multiple becomings' and its contested pasts. To this end, the political, social, ecological, and geological elements are unwaveringly looked upon as temporal phenomena, deeply rooted in a mythological, religious, and historical past, changed every day by unpredictable interactions. Nearly everything that is brought to the surface has at least two sides - the olive trees, the tombs, the significance of a holy site are symbols claimed by both the Israelis and Palestinians. By registering the site through mapping, the architect chooses to embrace the plurality of histories, and yet, by projecting architecture upon it, she also must freeze one of its images in time. Poised between a situated action that is temporal and a monumentalization of the site in the form of a poetic synchronized map, the architect attempts to resist both the imposition of a normative narrative and the instantaneity of collapsed spaces.

In this project, the action of *documenting* takes the form of a series of parallel investigations into the hydrology, geology, mythology, and history of the site. The mapped site is marked with lines drawn in reference to events across time and space, sometimes blended, sometimes contrasted with the topography, and often suggestive of contested political boundaries [fig. 3]. While printed at a scale of 1:2500 and reduced to only include an area that extends slightly beyond the edges of the valley, the map is one of a series of maps that was scaled up to include the state of Israel and the Palestinian territories. As in any project, the extent of the map shown is a matter of positioning the project. In a successive map, i.e. the *document* [fig. 4], a perspective is assumed, informed by all the lines now present on the site, traces of tangible as well as intangible realities. The pre-eminence of the deep-red, scaled-up skeleton that lies in the depth of the valley speaks to the dark history of the site as the Field of Blood, a necropolis, a place of human sacrifice and a no-man's land born of a bloody war. Finally, this map becomes the site plan upon which the project is to be conceived. And yet, from the scale, the lines shown, and the foregrounded elements, a project is already half conceived. The last drawing [fig. 5], *documentor* - somewhere between a map and a plan - then traces the project to come, but within the series of maps already shown, it assumes its form only for a moment as a series of new lines, soon to be lost amongst all existing lines, soon to be erased, foregrounded, contested, or forgotten. The emerging form, born of the documented contradictions, proposes an architecture that embodies the layered site, and the tracing of lines translates into a new hybrid identity for the valley in question. In this consideration of a complex site, mapping is approached as a creative act, involving both a willingness to listen and a readiness to act. Through mapping, the architect mapmaker reads the site and allows stories to emerge, but also takes on the position of the narrator.

Mapping in Time

Maps will, as Harley reminds us, always 'represent more than a physical image of place', and if 'to read the map properly, the historian must always excavate the terrain of its surface geography', we argue that the same needs to be done to create the map sensibly.[19] When the architectural historian Marco Frascari discusses Alberti's concept of *lineamento*, he rejects the usual translation of *disegno* and suggests rather the expression 'denoting lines', referring to 'a facture of designation of the building's configurations and elements made by pulling lines and strings taking place on the construction site'.[20] The act of drawing a line on a sheet of paper is therefore an act of creation parallel to the act of

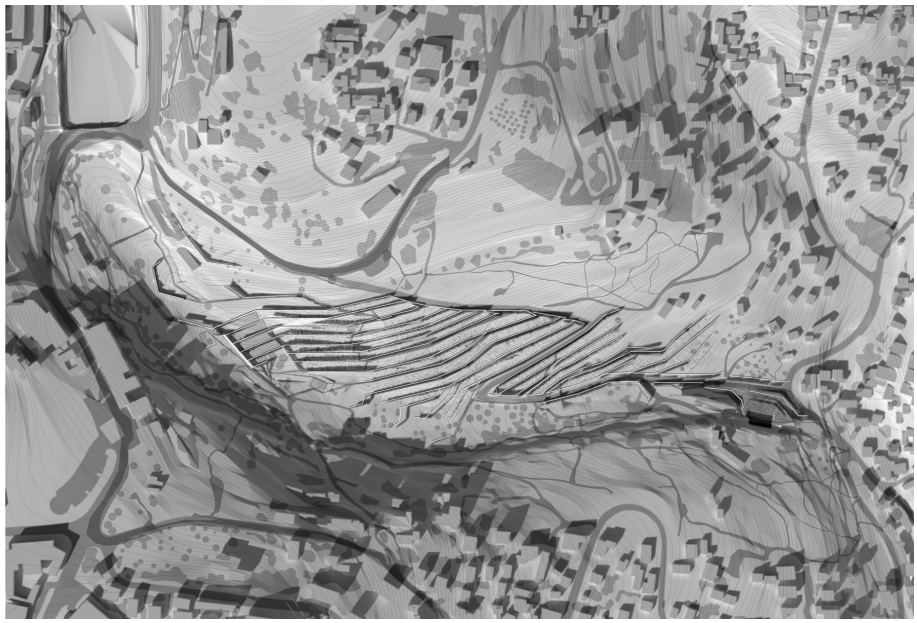


Fig. 5: *Plan as documentor - acting on the traces of layers accumulated.* Proposed intervention as it emerges from and reveals some of the documented spatio-temporal layers. (Liana Bresler, “Embedded Boundaries”, Thesis project, 2010) Proposed water treatment facility as an intervention emerging from and revealing some of the documented spatio-temporal layers.

construction. Even the drawing of an existing site plan is an act of creation. Although we can conceive of a site as an accumulation of events that occurred in the past, but by recording them it is as if we were recreating or reaffirming them. In this sense there is no difference between documenting the past or the future of a site, both are a form of construction. The drawing of a site plan or the mapping of a site relate a constructed past to a projected future.

If we fail to recognize the positioning inherent to any mapping, we risk falling in the trap of those cartographers who have assumed the objectivity of their 'scientific' method and equated it with accuracy and even truthfulness. As Harley suggests, this has led to a language of exclusion which opposes '"true and false"; "objective and subjective"; "literal and symbolic" and so on'.[21] To foreground the creative and artistic nature of maps is to accept and embrace their ability to open up humanistic perspectives not only for map-making, but for the way of seeing, which we inevitably project onto the representation of any given site. As James Corner asserts: 'Mapping is never neutral, passive or without consequence; on the contrary, mapping is perhaps the most formative and creative act of any design process, first disclosing and then staging the conditions for the emergence of new realities.'[22] Indeed, we can only agree with Harley's redefinition of mapping:

Could it be that what cartographers do, albeit unwittingly, is to transform by mapping the subject they seek to mirror so as to create not an image of reality, but a simulacrum that redescribes *the world? This alternative view of what a map is would allow us to embrace a much more open, self-critical, socially sensitive, politically street-wise approach to the practice of map-making and the objectives of cartographic activity.*[23]

Could mapping address temporality with an assumed depth that *re*-responsibilizes the architect map-maker and still remains open to the users' multiple readings in time? Drawing a map involves a search for the memories inherent in the site, wherein the map itself becomes the very translation of the conditions to which one was most sensitive. It is upon this translation, or monumentalization of a certain present of the site, that the design is projected, and - as documenting, documentation, and documentor - the map acts all at once as record, action, and projection. In this way, maps have the possibility to offer more than the impression of space as a surface, they offer not a complete and finished image, but 'a slice through time [...] full of holes, of disconnections, of tentative half-formed first encounters' where 'there are always connections yet to be made, juxtapositions yet to flower into interaction, or not, potential links which may never be established'.[24] If maps are needed today to approximate a representation of the fleeting and ever-expanding sites of architecture, we must disentangle them from a strictly scientific tradition and re-engage with their poetic, narrative, but also synchronizing potential, foregrounding not only the spatial intricacy but also the temporal complexity of the lived world.

Architects build *in* time. Building in time carries two separate connotations: the consideration of time as a site upon which one constructs a particular perspective - its epistemological dimension; and the consideration of the building that comes to life as different users experience it in time - in a phenomenological encounter. In other words, time is both the site and the medium through which one conceives of and experiences architecture. If we agree that history does not unfold along a singular line that starts at some unknown origin and ends at some unknown point, but that it is a complex multiplicity of temporalities that form constellations rather than one unidirectional line, then we can equally agree that inherent to the consideration of 'time' as a site is a certain perspective on what that time is. Through drawing and mapping, architects negotiate their

position in these two temporal frameworks. And at the fold between these two complex temporal sites of the architectural project, lie the pasts, presents, and futures of any project. While the buildings themselves eventually embody and orchestrate these times, it is really at the drawing board (to use a somewhat anachronistic expression) that architects may critically address architecture's relation to time.

Notes

1. James Corner, 'The Agency of Mapping', in *Mappings*, ed. by Dennis Cosgrove, Critical Views (London: Reaktion, 1999), p. 237.
2. 'It is not space that takes the life out of time, but representation. The real trouble is that the old equation of representation with spatialisation has taken the life out of space.' Doreen Massey, 'Some Times of Space', in *Olafur Eliasson: The Weather Project*, ed. by Susan May. Exhibition Catalogue (London: Tate Publishing, 2003), pp. 107-18; pp. 108-09.
3. For discussions on Scarpa's drawings see: Francesco Dal Co and Giuseppe Mazzariol, *Carlo Scarpa: The Complete Works* (New York: Electa/Rizzoli, 1985), Sergio Los, Carlo Scarpa, and Klaus Frahm, *Carlo Scarpa*. (Cologne: Taschen, 2002), as well as Richard Murphy, *Carlo Scarpa and the Castelvecchio*, Building Monographs (London: Butterworth Architecture, 1990). For discussions on Eisenman's use of the diagram see: Peter Eisenman, *Diagram Diaries* (New York, NY: Universe Pub., 1999); Peter Eisenman, *Feints.* (Milan, Italy: Skira Editore, 2006).
4. Stan Allen and Diana Agrest, *Practice: Architecture, Technique and Representation.* (Australia: G+B Arts International, 2000), p. xvii.
5. Richard Murphy, *Carlo Scarpa and the Castelvecchio*, Building Monographs (London: Butterworth Architecture, 1990), p. 12.
6. Stan Allen, 'Trace Elements' in *Tracing Eisenman*, ed. by Cynthia Davidson (New York: Rizzoli, 2006), pp. 49-65; p. 59.
7. Allen, 'Trace Elements,' p.62. Further on, Allen asks: 'If process is still important in architecture today, why not *understand* process as the unfolding life of the building and its site over time? [...] It is a process that unfolds in a complex interaction with the messy and unpredictable forces of life itself. Less narrative, less history; more atmosphere, more effect.' (p. 64).
8. Corner, p. 239.
9. Edward W. Soja, *Postmodern Geographies: The Reassertion of Space in Critical Social Theory*. (London: Verso, 1989), p. 4.
10. Corner, p. 226.
11. Corner, p. 228.
12. Robin Evans, 'Architectural Projection' in *Architecture and Its Image: Four Centuries of Architectural Representation*, ed. by E. Blau and E. Kaufman (Cambridge, MA: The MIT Press, 1989), pp. 18-35; p. 19.
13. Juhani Pallasmaa, *The Thinking Hand: Existential and Embodied Wisdom in Architecture*. (Chichester, U.K.: Wiley, 2009), pp. 89-90.
14. Michael Speaks, 'After Theory', *Architectural Record*, vol. 193, no. 3 (2005), pp. 72-75.
15. On Ancient Chinese maps see Wu Hung, *Monumentality in Early Chinese Art and Architecture* (Standford: Standford University Press, 1995). On Medieval maps, see Alessandro Scafi, *Mapping Paradise: A History of Heaven on Earth* (Chicago: University of Chicago Press, 2006) and P. D. A. Harvey, *The Hereford World Map: Medieval World Maps and their Context* (London: British Library, 2006).
16. This situation is well described by Marshall Berman, *All That Is Solid Melts Into Air: The Experience of Modernity* (New York: Simon & Schuster, 1982) and David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (London: Wiley Blackwell, 1992). It is also taken as a premise to Corner's reflection on maps and mapping.
17. Doreen B. Massey, *For Space* (London: Sage, 2005), p. 107.
18. Massey, 'Some Times of Space'.
19. J. B. Harley, *The New Nature of Maps*, ed. by Paul Laxton (Baltimore: The John Hopkins University Press, 2001), p. 48.
20. Marco Frascari, 'Lines as Architectural Thinking', *Architectural Theory Review*, vol. 14, no. 3 (2009), pp.

200-212.

21.Harley, *The New Nature of Maps*, p. 155.

22.Corner, p. 216.

23.Harley, *The New Nature of Maps*, pp. 203-4.

24.Massey, *For Space*, p. 107.

Biographies

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Liana Bresler, a recent graduate of the M.Arch program of the University of Waterloo, is currently practicing architecture in Toronto. Her master's thesis, 'Embedded Boundaries', was recently exhibited in Cambridge, Ontario, and London, UK as part of an ongoing collaboration entitled 'Jerusalem/Sarajevo: in-between cities'.

The Woof and the Warp of Architecture: The Figure-Ground in Urban Design

B.D. Wortham-Galvin

Introduction

To borrow a metaphor used by Georg W.F. Hegel in the *Philosophy of History* to describe historical processes, architecture should be understood as a series of complex threads wherein one understands the physical forms as the warp, and the temporal, socio-political, natural, and aural contexts as the woof.[1] Using the term fabric to describe the attributes of urban design is not new; it is now part of the designer's vernacular when describing the *physical form* of towns and cities. In fact, the analogy is usually further nuanced to include the grain of such fabric, in reference to distinctions about the physical pattern of streets, buildings, blocks, and open spaces and their relative size: with coarse-grain fabrics referring to large blocks, large footprint buildings, and fewer street intersections that are farther apart; and, fine-grain urban fabrics defined by smaller blocks, smaller building footprints, and more frequent and closely spaced street intersections.[2] These distinctions in grain (and, therefore fabric) also carry implied references to modern and contemporary design (coarse grain) and premodern modes of building (fine grain).

The commonplace use of the term fabric (and its concomitant reference to grain) narrowly delineates architecture and design as only an act of form making. It reduces the role of designer and designed to the mere *objet d'art* of singular genius divorced from the complexities of everyday human and environmental experiences. The employing of Hegel's terminology of woof and warp is meant to shift the current use of fabric so that the physicality of buildings is defined as a critical, but not singular, component in the design of the built environment. If the warp of the fabric represents the physical form of the built environment, then the other threads - the woof - are equally as critical in the construction of this (urban) fabric. The interdependence of these other threads - which include, but are not limited to, the temporal, socio-political, natural, and auditory - with each other *and* with physical form are what constitutes the (urban) fabric.[3] Thus redefined, fabric now implies a definition of architecture that does not emphasize a hierarchy between these threads, but their mutual reliance in the making of the whole, and, by further implication, that change in one type of thread impacts the fabric in its entirety.

Fabric is asserted as a concept broader than the immediate spatial and physical situation in which individual buildings are located; and, the threads of the fabric are all of those elements that aid in making the built environment both a designed and lived experience. The emphasis on the woof and warp of a fabric indicates a preference for the *process* of design over the product. In this way, built fabric is more than a physical entity, but a milieu of conditions (social, political, economic, ecological, visual, auditory, aesthetic, etc.) to both simultaneously produce and be produced by the architecture. In other words, a panoply of external circumstances creates the architecture or urbanism that goes beyond the formal manipulations of the designer. When so conceived, the woof and warp

together reveal the fabric of the built environment as a coherent, yet complex, set of variables that make a peculiar topography of place.

In order to discuss this proposed understanding of fabric, this paper will look at how drawings informed the process and theory of urban design in the mid- to late-twentieth-century. The discussion will focus on the origins of the Nolli plan and its 'rediscovery' by the Cornell School and their use of the figure-ground as a primary tool in the formulation of an urban design theory. The trajectory of the figure-ground can reinvigorate contemporary urban design praxis once more by reasserting drawing as more than mere illustration but as a means to conceptualize design methodologies that support a holistic notion of fabric.

The Figure and the Ground

Despite its clean and simple graphics, the figure-ground is not merely an exercise in pattern making. Nor is it neutral and merely illustrative. The trajectory of the figure-ground begins with an Italian, with papal commissioning, who sought to map eighteenth-century Rome.[4] At its most simplified, Giambattista Nolli's (1701-1756) plan of Rome (*La Pianta Grande di Roma*, 1748) shows the buildings of Rome in black and the streets and spaces in white.[5] The Nolli plan represented a significant change from previous depictions of cities as it was one of the first to represent the city ichnographically, rather than in quasi-bird's eye perspective [fig. 1].[6] Nolli's mapping technique displaced the graphics of the Middle Ages and the Renaissance, which either tried to include individual buildings drawn in a skewed axonometric style, as an elevation folded down onto the page, or as a perspectival vignette. Louis Marin writes about this change in the representation of the city in which a concern for geometry and rationality influenced drawing and surveying techniques and led to a desire to not distort the plan relationship and still provide a view of the whole.[7] Nolli benefited from this Enlightenment-influenced scientification of drawing techniques because his careful preparation of the base drawings and engravings allowed for an unprecedented and detailed depiction of Rome (to include an architectural scale and compass rose). Consisting of twelve engraved copper plates, the final plan measured approximately six feet by seven feet when assembled. The accuracy of Nolli's plan has been tested and confirmed via modern surveying techniques and satellite imagery as containing only small margins of error.[8] While the map may contain only small margins of error, it is more than the mere recording of the streets and squares in white and buildings in black. The black and white gradient also included the delineation of the interior plans of nearly 2,000 buildings, which would, in turn, prompt a twentieth-century discussion on the role of public space in urban design. Nolli's decision to draw the map at the ground plane was critical to stimulating this conceptualization of public space as a critical design tool almost two hundred years later. As Michael Graves points out:

Imagine for a moment one's regard for the plan if Nolli had elected to draw the city from the roof rather than taking section through the ground floor as he did. Nolli's description captures more accurately, I think, the relationship of piazza to threshold to internal public room with a sense of marche *or promenade that would be unimaginable using other graphic assumptions. Alternatively, if Nolli had included the private domain as other than a secondary condition of poche, one would have been unable to assess the legibility of public enclosure to the extent that his plan offers.*[9]

Graves would not be the only twentieth-century architect attuned to Nolli's graphic decisions in representing eighteenth-century Rome.

In reaction to the devastations wrought by a modernist-influenced urban renewal, a few designers turned back to drawing - and specifically Nolli's figure-ground - as a way to formulate a new theory

Fig. 1: A section of Giambattista Nolli's *La Pianta Grande di Roma*, 1748.

of urban design in the 1960s and 70s. Colin Rowe, Fred Koetter, Léon Krier, and Rob Krier argued that it was the role of the designer to make legible the distinctions between *res privata* and *res publica*, mostly through orchestrating a sequence of public forms and spaces that are identifiable, distinct, and memorable when set in contrast to a private realm.[10] They were able to make this argument because they drew the city as a mode of thinking, as a way to understand what to do next. They interpreted the figure-ground as a graphic technique capable of depicting a gestalt (whether it was one that was pre-existing or being designed) - with the black on white graphics allowing a pattern of elements to illuminate a larger whole [figs. 2,3]. Key to their interpretation of Nolli's figure-ground was the reduction of the black and white technique to the representation of buildings and 'not' buildings in order to show the patterns created by physical forms within the city. While this graphic distinction from Nolli may seem minor, it will provide a fundamental difference to thinking about designing a holistic fabric versus designing only physical objects.

As Wayne Copper and Thomas Schumacher have argued, the convention of the figure-ground renders the residential pattern of blocks as a normative and uniform background (the ground) and the public spaces as identifiable, unique voids (the figures) cut into this ground.[11] In other words, Nolli's graphic technique exposed a version of the city that allowed the public spaces of Rome to appear as if they were carved out of a solid mass. In doing so, they believed Nolli revealed the topographic and spatial structure of the city, instead of focusing on buildings as isolated objects free from context, which was how the medieval city was depicted and the modern city utopically designed. In addition, the ichnographic plan allowed for what the bird's eye perspectives could not, namely direct comparison of the size, shape, and position of the formal components of a city and their concomitant reading as a fabric.

The figure-ground proved to be the perfect intellectual and representational tool to deploy against the object-focused architecture of Le Corbusier and other modernists; with the graphic highlighting the perceived flaw of buildings designed only as figural objects, and space as only a *back*-ground to those figures [fig. 4]. The early postmodern urbanists used the figure-ground as a graphic revelation wherein the interplay between public and private, between solid and void could become a physical dialectic that was often ambiguous and ambivalent about what was a figure and what was the ground (in other words, buildings and spaces could be both). With this use of the figure-ground, the city became the complex and contingent spatial structure that postmodern ideology believed it was and should continue to be. It also elevated the (physical) context as the paramount design concern.

This mid-century, postmodern graphic re-evaluation of the city reached its apex in the competition, *Roma Interrotta*. Held in 1978, then-Mayor Giulio Carlo Argan invited twelve internationally prominent architects to re-imagine a sector of Nolli's Rome. Given Mayor Argan's background as a prolific art and architectural historian, the choices of architects was not arbitrary.[12] Concerned with the changes brought to Rome via industrialization, modernization, architectural modernism, and more, the historian–turned-politician invited architects - who were sympathetic to issues of contextualism - to imagine that time and history had been interrupted since Nolli's delineation of the city.[13] In a city already interrupted by the operations of the aforementioned multiple modernities, these twelve designers inserted their predilections into the historical context. Despite their sympathies for the Rome that once was, the twelve designers did not produce a homogenous guide to the future Rome. Alan Chimacoff would describe the differences in the twelve design conceptualizations of Rome as:

Fig. 2

Fig. 3

Fig. 2: Figure-ground of Wiesbaden, Germany. Drawn by Jordan Terry (in reference to the work of Wayne Copper).
Fig. 3: Figure-ground reversal of Wiesbaden, Germany. Drawn by Jordan Terry (in reference to the work of Wayne Copper).

Violence and destructive confusion (Sartogo); irrational rationality (Dardi); poetic mysticism (Grumbach); the triumph of modernism and self (Stirling); the last, hopeless, gasp of Team X (Portoghesi); the gridiron as ultimate urban paradigm (Giurgola); an a-cultural world of kitsch (Venturi); paradisiacal city of architectural garden (Graves); an unintelligible confusion of images (R. Krier); early industrial surrealism (Rossi).[14]

Whether one ascribes to Chimacoff's (often glib) delineation of the schemes, it is not contested that the resulting designs provided a key moment in the development of postmodernism and Italian rationalism to include Aldo Rossi's focus on historical typologies as memory forms, Romaldo Giurgola's mapping of the morphology of North Philadelphia blocks, a pop-kitsch scheme by Robert Venturi that represented a very different American urbanism, that of the sign of Las Vegas, and James Stirling's insertion of his unbuilt work into eighteenth-century Rome. Stirling would claim that his choice of unbuilt work is limited to those appropriate to aspects of context and association either to the circumstances of 1748 or to JS projects at the time they were designed […] This 'contextual-associational' way of planning is somewhat akin to the historic process (albeit timeless) by which the creation of built form is directly influenced by the visual setting and is a confirmation and a complement to that which exists. This process may be similar to that of 'Collage City' (and the teaching of Colin Rowe) […] and stands in comparison to the irrationality of most post-war planning - supposedly 'rational', but frequently achieving a reversal of natural priorities.[15]

Whether one believes that Stirling's insertion of a museum of his work into Rome represents a collagist or even contextual approach, his association with the entry by Rowe is significant to this discussion, for it was the urban collage scheme from Colin Rowe that codified the use of the figure-ground as a significant theoretical design tool. Rowe's team entry revealed a *Collage City* that slid seamlessly into the Roman urban fabric, a feat not posited or achieved by the other entrants. In other words, his form of interruption was to render the disruption invisible. The continuation of the existing physical grain became the proposed design agenda.

Rowe's Roman *Collage City* served as a codification of the Cornell School design methodology, which included a reliance upon figure-ground analysis, urban spatial typologies, an insistence that the designer's first responsibility was to the white space of the city, and the development of a discipline distinct from planning in its focus on physical form.[16] The Cornell School, under the intellectual (and administrative) direction of Rowe, embraced this representational technique because it freed the designer from the distortion and editing implicit in the perspectival pictorial representation. In addition, it allowed a conceptual framework for engaging the city that was measurable and comparable. As Steven Hurtt notes:

In the studio, figure/ground plans became a design shorthand that carried rich perceptual potential analogically […]. *In the early studio years, it was felt that the figure-ground plan carried the crucial information, the genetic code for future design decisions. Specific 3-D implications were explored primarily to make a case to planners and developers that the schemes could be realized with standard technology and building types.*[17]

By isolating and generalizing the patterns of buildings and spaces into fields and zones, the city became an urban ensemble made up of a physical fabric that contained both a public woof and a private warp, each of which had a distinctive morphology. The figure-ground, thus, was used to define a new scale at which architects would and should design: the city. Steven Peterson defined the 'new' discipline in the issue of *Architectural Design* devoted to the *Roma Interrotta* exhibition:

Fig. 4: Figure-ground of Le Corbusier's proposed design for St. Die, France (1945). (in reference to the work of Wayne Copper).

'Urban design is a synthetic, inventive mapping of physical conditions which establishes and explores whole areas of the city. In other words, it is architecture - but encompassing more in scale, intention, and technique.'[18] Rowe and the Cornell School embraced the figure-ground on these terms as the cornerstone to engage in this 'inventive mapping of physical conditions'.

Other academicians have spent time parsing the visual lineage of Rowe's thinking, linking both *Collage City* and his previous seminal essay 'The Mathematics of the Ideal Villa' to the formal and theoretical underpinnings behind cubism, with some noting a split and others seeing continuity. As Mark Linder extends:

In fact, pictorialism is deeply implicated within the history of modern architectural theories, criticism, and practices. Both the Cornell school and deconstructivism are made possible by a latent, enduring pictorialism, whether it is the realism that allows a whole city to be imagined in plan or the illusionism that feasts upon decorative pleasures of angular, complex, formal compositions. The consequential issue of Rowe's legacy is whether pictorialism in architecture is so habitual and irrepressible that collage techniques will continue to be crudely transformed, rather than creatively translated, into architectural practices.[19]

Linder asserts that pictorialism so influenced Rowe's thinking, that he reduced urban plans (and the architecture therein) to the status of a real fragment. In Linder's view, 'Rowe imagines that such realistic realism might engender an engaged, effective, and ethical architecture, one which eschews object fixation and operates contextually'.[20]

Cornell's *Collage City* (and its kindred spirits, Collision City and Contextualism) stressed a self-proclaimed architectonic and formal agenda which asserted that abstraction and a certain level of fiction must be introduced into the urban design process in order to achieve this ethical architecture. As understood internally, Contextualism looked at not just the physical, but also the 'psychocultural field' with an emphasis on 'history and culture and their preservation and extension as a generative base to form'.[21] Collision City's physical ordering of urbanism sought to recognize the process of 'competition among social, political, and economic institutions' within the physical form.[22] Finally, *Collage City* intended to be a physical contextualism 'that embraces culture through history'.[23] Despite these intents, *Collage City*/Collision City/Contextualism results in a flattened city, where difference and complexity (beyond the formal) are rendered invisible by the ubiquity of the black on white (or white on black). While Hurtt notes that the acknowledged limits of the figure-ground were meant to liberate and induce complexity, all too often in the end they did not reveal the protean nature of the city in its social, cultural, temporal, auditory, and ecological forms. The figure-ground became less tactically flexible and more a formally contextual-driven strategic plan.

Despite the internal proclamations to connect the physical with the historical, culture, social, political, and economic, the Cornell School was unable to use the figure-ground as a means to those ends. Instead, they reaffirmed Peterson's circumscription of urban design as an activity in mapping and manipulating the physical aspects of the city. Their fabric was solely morphological with an assumed definition of the public and private whose delineation remained a purely physical will to form. When Peterson asserts that, 'The Nolli map epitomises [sic] the basic condition of urbanism. The city of Rome is represented primarily as the interwoven relationship of spaces, incorporating the entire spectrum of sequences which connect the public and semi-public to the private,' he reaffirms the Cornell School's understanding of the public-private relationship as one rendered and sustained purely

by physical form.[24] While the Cornell School sought to achieve a warp and a woof that intertwined the physical with the non-physical aspects of the city, their fabric ultimately was only designed with one type of thread.

Toward a Warp and the Weft of Urban Design

Direct links between Rowe and the praxis of the New Urbanism (one of the most significant design and development processes to emerge in the late-twentieth century) are self-evident; as are those which Harrison Fraker terms the field of Transformative Urban Morphology.[25] Their concern with rational analysis of urban patterns as a key methodological component toward the goal of establishing a master plan means that the figure-ground remains critical to their pedagogy, practice, and emphasis on the role of the designer as expert analyst.

The legacy of the figure-ground is not merely in its successors, but also in its positioning of urban design discourse in its entirety at the turn of the twenty-first century. Whether one ascribes to Doug Kelbaugh's articulation of three urbanisms - Everyday Urbanism, New Urbanism, and Post Urbanism - or Harrison Fraker's six 'force fields' of urban thought - Everyday Urbanism, Generic Urbanism/ Hyper-Modernity, Hybrid Urbanism, New Urbanism, Transformative Urban Morphology, and Urban Ecological Restoration - the figure-ground abounds both in acceptance and rejection in its relevance to the urban design project.[26] It is not just that one has to have a position on the use of the figure-ground in delineating a postmodern urban design dialogue. It is that the figure-ground moved the issue of how to map the fabric of the city to the forefront of post-modern urban design discourse. The mid-century figure-ground proponents were establishing not just the figure-ground as their primary tool, but, as Peterson asserts, a broader definition of the discipline of urban design that put it squarely in the hands of architects and, as quoted above, engaging in 'synthetic, inventive mapping' as its core project or *raison d'être*. Twenty-first-century urban designers have not challenged Peterson and his colleague's premise for the project of urban design as a distinct discipline. What varies are the definitions of the type of fabric (from the socio-cultural to the global-political, economic, performative, and morphological) and the types of inventive mapping with which these designers engage this fabric.

These various contemporary urban practices both affirm and challenge the figure-ground based representations of the city set up by the mid-century designers. To borrow Fraker's classification system, Hybrid Urbanism, New Urbanism, and Transformative Urban Morphology all incorporate the figure-ground as either a primary or ancillary mode of representation without any major challenges or reinterpretations to its role. The three other urban design fields, Everyday Urbanism, Urban Ecological Reconstruction, and Hyper-Modernity reject the domination of morphological urban practices set up by the figure-ground in favour of human, environmental, economic, and political threads and modes of representation that capture everyday activities, ecological systems, fragmented realities, and a consumer-conscious built environment (to name just a few). Yet these later urban design practices need not reject the figure-ground in their quest to define a fabric for the city beyond the morphologically based master plan that reinforces a classical notion of the *polis*. As Hurtt asserts, regarding the Cornell School's use of the figure-ground, the 'theory was mutable, not fixed'.[27] It is possible to once again recoup the power of the figure-ground to serve the design of a fabric that incorporates more than the physical (as was intended, if not fully realized, by the Cornell School). One needs look no further, again, than the Nolli as the exemplar for the mutability of the figure-ground, as long as the plan is interpreted as more than just representing physical form.

The lack of neutrality of Nolli's plan, and its ability to convey power and politics, is embedded

in its origins. Nolli's cadastral map determined and defined land ownership in eighteenth-century Rome. This measurement of building mass allowed for 'a new reading of the power immanent in the city, not as the houses of the court and generals, but as the warehouses and manufactories of the bourgeoisie'.[28] John Macarthur notes that Nolli changed the conception of the city as no longer being controlled by the king by transferring power from his 'sovereign gaze […] to his agents of taxation'.[29] The black of the figure-ground is, thus, political in its origins. And by extension, the Nolli as a conduit into reading the public and private spaces of the city is only one *of many* readings it provides; another is that these buildings represent two classes of power - the taxable and the non-taxable, the merchants and the church/king. This graphic technique pulls Nolli's map from illustrative survey of Rome into one of narrative. The plan provides a code that allows a reader to understand a story. Thus, in this case, the Nolli's multiple readings are dependent on the reader and his/her preference for scale and measurement versus his/her knowledge of the socio-political climate of eighteenth-century Rome.

Perceiving the city as primarily a morphological phenomenon, gave the Cornell School a self-proclaimed ability to understand the complexity of the city in order to propose ethical, contextually based interventions therein, as Linder suggests. Nevertheless, its legacy has become an exercise in pure formal pattern-making. The socio-cultural and ecological specificity of the city has been rendered invisible. The Nolli, as critiqued, appears to remove the designer from the experience of the city and its messy humanity. The easy duality of the black and white seems to miss the rich ambiguity of walking the city, à la Michel de Certeau. The figure-ground is only a totalizing, neutral, utopian formal exercise if it is allowed to languish as such. But a slight modification of how the drawing is employed is all that is needed to reinvigorate the graphic and its concomitant ability to engage both the woof and warp as equal design components.

First, the figure-ground gives the opportunity to explore the tensions and elisions in what is meant by public and private in the contemporary, multi-national context. Instead of one figure-ground depicting the public/private spaces of the city, a layered series of them might start to reveal such cultural complexity. If Nolli showed the space of the church as white, what is the white space of today? A series of figure-grounds could begin to tease out the tensions of what is meant by public and for whom. In other words, one figure-ground alone cannot possibly represent the totality of how the public and the private in the twenty-first century (or early time periods for that matter) is and was performed and inhabited. The terms are socio-political and economic constructs that change with the historical context; and, while played out in physical space, are not solely defined by them. To represent the various public-private tensions embedded in urban form at any given moment requires a series of drawings that map the economic, cultural, gendered, and political aspects of what is meant by public and private in a given temporal and spatial location. For example, in present-day Dubai, one must pay to enter the 'public' park spaces. While the fee is not much for those who work in service or business jobs, it is exorbitant for the expatriate workers who are constructing this twenty-first-century city (and live at its periphery in slums). Rendering Dubai's parks as white in a figure-ground and calling it public does not achieve the nuances of who really has access to this space.

How one defines the public and private spheres is not merely a matter of either political or economic power, but also of how gender lends to both different definitions and spatial locations of publics. This is true in both the West and East, in the past and present. The radical step nineteenth-century French painters took in popularizing the method of taking their work out of the studio and into the streets, aka

Fig. 5: Cairo was planned so that each house would be in reach of the call to prayer. This Nolli-inspired diagram by Mahmoud Riad tests this claim and also reveals the acoustic space of historic Cairo as mapped onto its physical space.

painting *en plein air*, revolutionized modern painting and subjects, particularly when it came to the city. But female painters, like Berthe Morisot and Mary Cassatt, showed a very different Paris, both in subject and in point of view, as the publics accessible to females were often performed in gardens or from balconies or in domestic settings.[30] If one were to map via figure-ground the locations of their version of the Parisian public realm and then map the locations (and points of view) painted by their colleagues, like Edouard Manet and Camille Pissarro, the resulting drawings would differ to a great extent. They would both be Paris, but the whites and the blacks would reveal a Parisian public that is not static, but dynamic and shifting based on its social (in this case, in terms of gender) conditions. This gendered revelation of public space should be (and has been) applied more rigorously and more often to the conceptualization of urbanity via the figure-ground.

Rachel Kallus has already employed the figure-ground as a means to mapping a more complex differential urban fabric.[31] She asserts that the figure-ground can never provide an objective reading of the city, but offers its own subjective lens. She embraces that subjectivity by mapping how women encounter public space. This moves the figure-ground from the abstract to an integration of the abstract and the concrete (similar to the diagramming methods of Everyday Urbanisms, which seeks to understand how real people perform the city). Her graphic studies - conducted in Hadar, Israel adjacent to Haifa's major commercial business district - merge 'traditional' use of the figure-ground with observations of women's preferred walking routes and mapping public spaces where they feel unsafe. When combined with other formal studies, interviews, and demographics, a series of intertwined socio-morphological threads of the city are revealed.

As Kallus demonstrates, the socializing of the formal abstractions of the figure-ground could allow postmodern urbanism to move from pure theoretical speculation to a lived, social, temporal, *and* physical fabric. The figure-ground can be used to map not just form but also activity, sound and/or light within the spatio-visual consciousness of the city. Mahmoud Riad does just that in his Nolli-inspired diagrams that test the claim that Cairo was planned so that each house would be in reach of the call to prayer.[32] His explorations of the auditory nature of urban design reveal the acoustic space of historic Cairo as it is mapped onto its physical space [fig. 5]. The resulting representation demonstrates the possibility of rendering Cairo's holistic fabric beyond a mere physical mapping of its form.

Conclusion

At the same time that Rowe and his allied colleagues were working on their urban projects, another designer was using drawing to push landscape design praxis into another direction. Like his colleagues, landscape architect Ian McHarg exemplified a mid-twentieth-century design process free from the trappings of modernist thinking. It is not surprising that landscape architecture would more thoroughly embrace a broader conception of fabric before the building-object obsessed architects, as landscape architects have nature as their palette and, therefore, are attuned to issues of temporal and environmental change - be it the life cycle of a plant, the seasons of the year, or the geological shifting of the earth itself. Best known for his seminal work *Design with Nature* (1969), McHarg pioneered the field of ecological planning.[33] His work popularized the use of drawing various layers of the site as a critical mode of design process for understanding the qualitative notion of a place. The extension of his system almost 40 years later has been the quickly evolving contemporary digital drawing device, Geographic Information System (GIS). McHarg's desire to map every site layer - history, topography, vegetation, hydrology, social

values, land values, wildlife, recreation, scenic, dwelling, etc. - has now manifested as a sophisticated digital mapping tool that allows designers, planners, geographers, natural resource managers, foresters, and a whole host of others to examine the complex systems inherent in the built environment. *Design with Nature* and its layered system of thinking was, in part, a manifesto against modernist ideas that humans should dominate nature, in favour of an ecological sensibility that accepted the blurring of the boundaries between the human and natural worlds. His polemic sought to provide a design process that saw the human world as working in concert with setting, climate, and ecology in deference to, not in defiance of, not against, or in denial of it. Like McHarg, the Cornell School understood that drawing was more than a means of illustrative or instrumental representation, but a way to achieve a significant challenge to the thinking behind modernist design processes and products. And while the Cornell School intended to make drawings that represented the urban fabric as having forms dependent on historical, cultural, and/or economic processes, it is unfortunate that they were not able to leverage the figure-ground as a method to integrate all of the exigencies of urbanism into their desired design thinking.

While McHarg and the figure-ground enthusiasts achieved a fully realized design methodology, based on drawing that left a deep and broad impact on their disciplines, the urban designers never reached the same level of engagement with the multiple threads of the designed fabric. Design praxis enriches itself when it thinks about lateral contexts (or threads) concurrently. Nolli's figure-ground is the antecedent to the work that should be happening in the twenty-first-century built environment to achieve such simultaneity.

Notes

1. Hegel's *Philosophy of History* was based on a series of lectures delivered in 1822. They were compiled and published after his death in 1831. Georg W.F. Hegel, *The Philosophy of History*, trans. by J. Sibree (New York: Prometheus Books, 1991).
2. In 1954, Kevin Lynch wrote: 'A city is the characteristic physical and social unit of civilization. It possesses size, density, grain, outline and pattern.' His discussion of these elements predates the Cornell School and their use of the figure-ground, but his discussion of grain and pattern are often casually associated with them. In fact, in this article, only his definition of pattern allies with the Cornell School, physically based interpretation of the urban fabric. Lynch defined grain of the city as 'the texture of its functional differentiation' and in his examples referred to occupational and class organizations of the physical pattern. Nevertheless, it is the physical interpretation of grain as the size of blocks, buildings, and streets and their resulting pattern that is the implied definition in use today. Kevin Lynch, 'The Form of Cities', *Scientific American*, vol. 100, no. 4 (April 1954), pp. 1 & 11.
3. By aural, the author refers to hearing (or audition) as one of the five traditional senses. Sometimes the word auditory will be used instead as a synonym for aural in this paper.
4. Maria Giulia Aurigemma, 'Giovan Battista Nolli', *Architectural Design*, Profile 20, nos. 3-4 1979, pp. 27-29.
5. Giambattista Nolli, *Rome 1748: la Pianta grande di Roma di Giambattista Nolli* (Highmount, New York: J.H. Anonson, 1991). The University of Oregon hosts an excellent and interactive website on the Nolli plan. 'The Nolli Website', <http://nolli.uoregon.edu/preface.html> [accessed 15 July 2010].
6. The first ichnography was Leonardo da Vinci's map of Imola in 1502. Lucia Nuti, 'Mapping Places: Chorography and Vision in the Renaissance', in Mapping, ed. Denis Cosgrove (London: Reaktion Books, 1999) pp. 90-108. Giulia Aurigemma also asserts: 'In contrast to other bird's-eye or oblique perspective views of Rome, intended to render an overall and organic image, Nolli's plan is the first (after Bufalini's) to adopt the technique

of vertical projection […],' Aurigemma, ibid., p. 27. She cites 'A. P. Frutaz, *The Plans of Rome*, Rome 1962' as her source.

7. Louis Marin, *Utopics: Spatial Play* (New Jersey: Macmillan Humanities, 1984), see chapter 6, 'The City'.
8. 'The Nolli Website', ibid.
9. Michael Graves, 'Roman Interventions', *Architectural Design*, Profile 20, nos. 3-4 1979, p. 4.
10. Colin Rowe and Fred Koetter, *Collage City* (Cambridge, Mass.: The MIT Press, 1984). Rob Krier, *Urban space = Stadtraum* (New York: Rizzoli International Publications, 1979). Richard Economakis, ed. Leon Krier: Architecture and Urban Design, 1967-1992 (London: Academy Editions, 1992). See also B.D. Wortham-Galvin and Isaac Williams, 'Walking the City', in The Value of Design: design is at the core of what we teach and practice, Phoebe Crisman and Mark Gillem, eds. (Washington, D.C.: ACSA Press, 2009), pp. 240-248.
11. Thomas Schumacher, 'Contextualism: Urban Ideals and Deformations', *Theorizing a New Agenda for Architecture*, ed. Kate Nesbitt (New York: Princeton Architectural Press, 1996) pp. 294-307. Wayne Cooper, 'The Figure/Grounds', M.Arch Thesis, Cornell University, 1967. Wayne Copper, 'The Figure/Grounds', *Cornell Journal of Architecture*, no. 2 (1983), pp. 42-53.
12. Argan's most famous published work is: Giulio Carlo Argan, *Storia dell'Arte Italiana* (1968). The genesis of the exhibition itself came out of discussions between architect Piero Sartogo, Michael Graves, and Argan (this is described in part by Graves, ibid,, p. 4).
13. The twelve architects and their associated Nolli panels were as follows: I. Piero Sartogo, II. Constantino Dardi, III. Antoine Grumbach, IV. James Stirling, V. Paulo Portoghesi, VI. Romaldo Giurgola, VII. Venturi and Rauch, VIII. Colin Rowe, IX. Michael Graves, X. Rob Krier, XI. Aldo Rossi, XII. Leon Krier. The competition and all twelve entries are examined in detail in *Architectural Design*, Profile 20, nos. 3-4 1979, which was guest edited by Michael Graves.
14. Alan Chimacoff, 'Roma Interrotta Reviewed', *Architectural Design*, Profile 20, nos. 3-4 1979, p. 7.
15. James Stirling, 'Nolli Sector IV - James Stirling' *Architectural Design*, Profile 20, nos. 3-4 1979, p. 63.
16. Collage City first appeared in *Architectural Review* in 1975, three years prior to *Roma Interrotta*, and fortified the growing trends in historicism and postmodernism. As noted in endnote 6, Wayne Cooper's 1967 Cornell thesis on the figure-ground was subsequently published in 1983.
17. Steven Hurtt, 'Conjectures on Urban Form. The Cornell Design Studio 1963-1982', *Cornell Journal of Architecture*, no. 2 (1983), p. 56.
18. Steven Peterson, 'Urban Design Tactics', *Architectural Design*, Profile 20, nos. 3-4 1979, p. 76.
19. Mark Linder, 'From pictorial impropriety to seeming difference', *ANY: Architecture New York* 7-8 (1994), p. 27.
20. Ibid.
21. Hurtt, ibid., p. 67.
22. Ibid., p. 68.
23. Ibid., p. 71.
24. Peterson, ibid., p. 76.
25. Harrison Fraker, 'Where is the Urban Design Discourse?' *Places* 19.3 (2007), pp. 61-63.
26. Doug Kelbaugh, 'Toward an Integrated Paradigm: Further Thoughts on the Three Urbanism', *Places* 19:2 (2007).
27. Hurtt, ibid., p. 56.
28. John Macarthur, 'Doubts About Black and White: some thoughts about figure-ground drawings prompted by Brian Schutz' winning design for the competition *Companion City'*, Transition 35 (1991), p. 82.
29. Macarthur, ibid.
30. Griselda Pollock, *Vision and Difference: Feminism, Femininity and Histories of Art* (New York: Routledge, 1988), Chapter 3: 'Modernity and the spaces of femininity', pp. 70-127.
31. Rachel Kallus, 'From Abstract to Concrete: Subjective Reading of Urban Space', *Journal of Urban Design* 6:2 (2001), pp. 129-50.
32. Mahmoud Riad, *Architecture: Music, City and Culture* (University of Maryland, M.Arch Thesis, 2009).
33. Ian McHarg, *Design With Nature* (Garden City, NY: Natural History Press, 1969).

Biography

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Drawing as Epistemic Practice in Architectural Design

Jan Bovelet

Drawing plays a central role in architecture - not only in the critique and scientific examination of already existing architecture, but also in the conception and production of new architecture. As banal as this remark may seem, it is the correct starting point for a discussion of drawing from an epistemological perspective. There have always been works that dealt with the description of drawing techniques relative to the available contemporary practices and instruments, but something that has not frequently been selected as a central topic in architectural theory is the epistemic dimension of drawing as a genuine form of knowledge. Drawing is profoundly misunderstood if it is conceptualized as a mere illustrative instrument, and thus as a technique for representing ontologically predetermined - i.e. given - entities, with the relation between drawing and content being conceived of as one between a surface and an independent, deep structure, since, for example, different languages are only different expressions of one and the same universal grammar in Chomsky's conception of structural linguistics.[1] This conception of drawing as a tool to visualize architectural concepts completely ignores the a priori ordering capacity that lies within the epistemic dimension of drawing. Drawing is a specific epistemic practice for making architectural issues visible and thus allows for a critical examination and debate. Hans-Jörg Rheinberger described 'making visible' as central to scientific research[2] and provided a heuristic for its different modes of (a) 'compression and dilatation', (b) 'enhancement', and (c) 'schematization'.[3] All modes work by means of different symbolic practices and economies embedded in historically evolving material cultures. In order to investigate drawing as an epistemic practice in architectural design, this essay takes the viewpoint of analysing drawing from a symbol-theoretical perspective and to investigate it as a symbol system entangled with its own specific space of knowledge.

The investigation of the epistemic functioning of drawing is all the more important in the context of the digitalization of architectural drawing practices. This digitalization is intimately tied to the development of the logical analysis of language and the evolution of mathematical logic in the 20th century. In the line of Leibniz's conception of the *characteristica universalis*, the development of modern predicate logic fostered the idea of a binary logic as a basis for a universal language. This idea was particularly popular in the logical positivism of the Vienna circle. Its members aimed at mapping the natural language onto a precise, artificial language by way of substituting all meaningful sentences of the natural sentences with objective 'observation sentences'.[4] By using this method, they hoped to purge the natural language of all metaphysical sentences and thus arrive at an objective, universal language that could serve as a foundation for every science.

Digitalization led to an enormous success in what one could call the algebraization of drawing. The algebraization of drawing by means of digital

computation is based on the translation of graphical shapes into a numerical model that can be manipulated via the processing of the binary code. The digitalization of drawing into CAD, together with other digital tools such as CAM, BIM, GIS, mass customization, social design/co-design, smart houses, etc., had and has a massive impact on architecture and architectural design. In fact, the impact is so massive that it seems reasonable to not speak of singular digital techniques any more, but of an extensive digital habitat.

The idea of the construction of a universal language in the spirit of Leibniz's *characteristica universalis* gained momentum particularly through the construction of material computation machines, i.e. digital computers, in the second half of the 20th century; as, in turn, the practical availability of this technology had a huge impact on the development of theoretical logic. Notions such as, in particular, Alan Turing's concept of the universal machine 'as a model of any other machine'[5] from 1936 had an enormous influence on the conception of language in structural linguistics. With this setting as a background, Nelson Goodman aimed to develop a general symbol theory that would also include non-verbal symbol systems and allow for a comparison of all sorts of different symbol systems, such as verbal speaking, textual writing, numerical notation, musical notation, painting, technical drawing and others.[6] From this perspective, he developed a symbol-theoretical distinction between analogue and digital symbol systems that serves as a good starting point for exploring drawing as an epistemic practice.

To investigate drawing as epistemic practice in architectural design in the face of the dawn of the digital habitat, the essay has been organized into three parts. First, by way of historic examples, the epistemic autonomy of drawing and its main characteristics shall be exposed, especially its relation to text/writing and pictures/painting. Second, based on this brief historic survey, a tentative heuristic of the epistemic features of drawing shall be sketched. And third, based on Goodman's distinction between analogue and digital symbol systems, the essay closes with a critical review of the digitalization of drawing.

Historical positions on drawing as epistemic practice

The idea of conceptualizing drawing as a specific form of knowledge can be found throughout the history of epistemology, although it tended to be underestimated due to the connection of knowledge with language in the Western tradition of philosophy.[7] In the development of logic as a discipline, the declarative sentence was the paradigm of logical propositions. This paradigm has come under attack in response to the dogma of logical positivism with its programme of establishing a universal language for science. Especially Jacques Derrida has critically elaborated on the logocentrism of rational Western metaphysics in *Of Grammatology*, where he investigates the grammatical structure of writing as the beginning of all thought. Richard Rorty's proclamation of a *linguistic turn* in 1967[8] was followed by a *pictorial turn* and a *spatial turn*, both pointing to the epistemic autonomy of non-textual modes of making visible. The specific epistemic capacities of drawing will be illustrated by historic examples in the next section in order to prepare the tentative heuristic of the epistemic features of drawing.

Plato already referred to the use of a drawing for understanding universal geometric relations in his famous Meno's paradox. Aristotle also regarded drawing as a 'demonstrative description'.[9] It is remarkable that Plato was dependent on a drawing in order to make the *anamnesis* - the recovery of forgotten knowledge in the eternal soul - work: the actual material drawing is central to Socrates's maieutic instruction of the slave[10] and cannot be substituted by conceptual descriptions.

In Kant's philosophical system, a neuralgic question is how pure conceptions such as the geometric figure of the circle are related to empirical phenomena such as any drawn circle. This led Kant to the assertion that there must be some sort of mediating principle: 'Obviously there must be some third thing, which is homogeneous on the one hand with the category, and on the other hand with the appearance, and which thus makes the application of the former to the latter possible. This mediating representation must be pure, that is, void of all empirical content, and yet at the same time, while it must in one respect be *intellectual*, it must in another be *sensible*. Such a representation is the *transcendental schema*.'[11] Kant's notion of transcendental schemata is heavily inspired by the practice of drawing when he says that one 'cannot represent to [oneself] a line, however small, without drawing it in thought, that is, generating from a point all its parts one after another'.[12] For Kant, the epistemic signature of transcendental schemata lies in the figurative and in the process of their production, i.e. their status of being-in-the-making. This epistemic signature points to the fact that the epistemic function of transcendental schemata has to do with their relation to drawing and precedes the use of concepts and language.[13]

The status of being-in-the-making is also central to Charles Sanders Peirce's conception of the diagram. He sees the cognitive significance and the epistemic dimension of drawing in the interaction with the visualization, the demonstration, and the production of new insights by way of diagrams. Accordingly, for him, diagrams and diagrammatic reasoning are directly or indirectly involved in all thinking.[14]

In his *Tractatus Logico Philosophicus*, Wittgenstein formulated a distinction of showing and saying: 'What can be shown, cannot be said.'[15] He elaborated this distinction also in his later work in his exploration of reversible figures. One of his famous examples is the duck-rabbit image[16] with which he argues that seeing and thinking cannot be clearly distinguished from each other. Whether one sees a duck or a rabbit in the picture depends on which schemata are imposed upon it. He argues that we cannot see the aspect of change in the picture, but even though the image that is seen in the duck-rabbit picture is identical regardless of whether one sees a duck or a rabbit, there has to be a cognitive component in the seeing. To be able to realize this cognitive capacity, it is necessary to perceive and utilize the duck-rabbit picture. Wittgenstein uses a drawing in his *Philosophical Investigations* and asks the reader to look at it in order to show the aspect of the gestalt change. He is dependent on the use of a drawing to show the aspect of change.

These historic cases in point show that drawing comes with its own specific epistemic setting. It seems to be a kind of 'third thing', a sort of 'graphical reasoning' or 'visual thinking'.[17] But what is the specific epistemic profile of this iconic-discursive amalgam?

Following the historic examples, four aspects of drawings can be addressed: they are epistemically effective by way of their use, they are essentially generative, they mainly aim at making relations operational, and they always include some sort of non-conceptual reasoning. Reverting to the perspective of symbol theory, the question is how a symbol system must be constituted to allow for a drawing to function epistemically; just as writing, for example, has to comply with specific notational conditions, such as the syntactical identity of different instantiations of the character 'a'. In order to be able to play their role in the generation of knowledge, drawings also must follow rules that can be described in terms of symbol theory.

A tentative heuristic

Sybille Krämer sketched six basic properties of diagrammatic reasoning, on which the following heuristic of the epistemic properties of drawings is based.[18]

1 Two-dimensional flatness

Contrary to language, drawings do not rely on the temporal logic of succession but on the spatial logic of simultaneous order. Through the reduction of an extended two-dimensional plane, a drawing can reveal the relational order of different objects simultaneously, which enables the definition of differences.

2 Directionality

Also contrary to language, the representational space[19] of drawings is orientated in the sense that the topological relations of the parts of a drawing allow for orientation and are thus part of the epistemic function of the drawing. Conversely, language relies on the principle of linearity.

3 Graphism

In contrast to languages, drawings do not consist of elements, but are rooted in the act of drawing lines. Lines cannot be rendered as elements in the sense of discrete objects, as they rely on a medium that they can differentiate. This is mirrored in George Spencer-Brown's well-known opening statement regarding his calculus of form: 'Draw a distinction.'[20]

4 Syntacticity

On the other hand, a drawing is relative to language in that it works grammatically, i.e. with syntactical structuring. Although there is no finite alphabet of forms, there is always something like a relative alphabet of forms involved in the 'reading' of drawings. Re-identification of specific figurative constellations is necessary in order to use drawings to process propositional knowledge. Without this feature, drawings could not be wrong and thus could not function as arguments. Whether a composition of lines is used as a drawing is a matter of practical use: although there might be empirical differences between two hand-drawn lines in a drawing, it must be possible to read them as identical with regard to a specific end to make the composition function as a drawing and allow, for example, for arguments about proportion.

5 Referentiality

Other than pictures such as classical paintings, which present something real or fictional, a drawing aims to represent something by establishing an operational frame within which it can be subject to debate. A drawing typically refers to something external. The external reference is not necessarily something material; it can also be an immaterial quality like the openness of a figure ground plan, for example. The point being that a drawing's objective typically is to make something accessible for debate which transgresses the concrete drawing. Not always, but often, iconicity is involved in this referential quality; not in a strong logical sense of a symmetrical relation of resemblance, but in Peirce's wide sense of the word, so that, for example, a mathematical formula can represent a geometric figure.[21]

6 Operationality

Drawings do not objectively illustrate a given object or process, but they represent it in a way that opens up spaces - in the sense that Heidegger spoke of 'the opening up of […] a region'[22] - within which the represented can be handled, observed and explored. They have to be regarded as *epistemic* instruments that always also generate what they represent. It makes, for example, no sense to talk about the number Zero before there is a mathematical calculus that allows for operations with the digit '0'.[23] Likewise, it is hard - if not pointless - to talk about an architectural quality such as proportional relations without a drawing of one or the other sort as a base.

The tentative heuristic above shows relationships and differences between the epistemic *modus operandi* of texts, pictures, and drawings. Some aspects of drawings can be described verbally, whereas others cannot be substituted by conceptual descriptions. But the partial possibility to explicate a drawing by means of a text should not distract attention from the fact that this transformation consists of a translation between two different epistemic environments, which work around different epistemic objects.[24] Both environments cultivate different experimental systems. Experimental systems are the 'smallest complete working units'[25] in the generation of knowledge; in relation to their respective ends, they yield different assessments of the epistemic role of drawings and writings as regards knowledge. It is crucial to keep the translatory aspect of 'scriptualized drawings' in mind; for translations are bound to specific restraints as Willard v. O. Quine emphasized in his theses of indeterminacy, i.e. the indeterminacy of translation and the inscrutability of reference.[26] The question is what implications the rise of the digital habitat and the digitalization of drawing in architectural design have for drawing as an epistemic practice. If language and, more specifically, the declarative sentence is the paradigmatic model for the binary coding of digital data processing, and the symbol system within which drawing is embedded, is not completely commensurable with the symbol system of written language, then there are limitations to the digitalization of drawing. To tackle this issue, it is a good starting point to discuss Nelson Goodman's above-mentioned differentiation between analogue and digital symbol systems.

Drawing and Digitalization

In his attempt to develop a general symbol theory that covers both verbal and non-verbal use of symbols, Goodman formulated a distinct statement about the use of linguistic models for pictorial symbol systems such as drawings: 'The linguists' model plainly cannot be extended to pictorial comprehension. Lexicons and grammars are possible only for systems whose symbols are determinate and discriminable. For lexicons and grammars consist of generalizations that apply to symbols because they are tokens of specific syntactic types. Where it is impossible to determine the type a token belongs to, it is impossible to take it to be subject to lexical and grammatical rules. And where it is impossible to tell whether two symbols belong to the same type, it is impossible to treat them as syntactically interchangeable.'[27]

Nelson Goodman, together with Catherine Z. Elgin, drew here on the distinction of analogue and digital symbol systems Goodman developed in his epistemological centrepiece *Languages of Art*. Therein, he distinguished different symbol systems by way of their syntactic and semantic properties in order to mark their limitations in regard to different practical ends. A symbol system 'is analog if syntactically and semantically dense',[28] whereas it is digital if and only if it is 'differentiated throughout, syntactically and semantically'.[29] Only the latter can be described by means of lexical lists and the grammatical rules of valid combinations of items on that list. Analogue symbol systems, in contrast, cannot be conceptualized as consisting of a set of basic elements combined by a finite body of grammatical rules. The reason therefore lies in analogue symbol systems being defined precisely by the fact that they consist of infinitely many different symbols - which is what Goodman calls 'syntactic density' - and that there is no algorithmic way to decide whether a reference, e.g. an empirical object, complies with one and only one symbol used in the system. In a picture, for example, even the slightest nuance in the colouring can make a fundamental difference.

It is crucial to emphasize the mutual dependence of the definition of digital and analogue symbol systems in Goodman's conception. The properties of analogue symbol systems such as pictures are explicated and specified by their contrast to those

of digital symbol systems, such as written texts. Both are constituted in keeping with their different epistemic ends. Consequently, it makes no sense to ask the question of whether either digital symbol systems or analogue symbol systems have a privileged access to knowledge. Drawings possess features of both analogue and digital symbol systems. Following Kant's famous dictum according to which '[t]houghts without content are empty, intuitions without concepts are blind',[30] and Rudolf Arnheim's remark that 'the beginnings of concept formation' lie 'in the perception of shape',[31] we have to consider that concept and appearance are always already entangled from the very beginning. Drawings are situated in between the conceptual and pictorial making visible processes, with their focus sometimes more on the syntactic structuring and sometimes more on the pictorial depiction.

By drawing, traces are laid for a discourse by making a design idea visible and thus publicly debatable. The public discourse is the only scale against which a design can be judged. The notion of 'trace' has become particularly known through the work of Jacques Derrida. A trace in this sense is the marking of a difference.[32] This marking precedes writing and painting; it 'is a form of manifestation that has not yet become either writing or picture in their traditional forms. The trace precedes both of them'.[33] Digital and analogue symbol systems are sisters differentiated according to their respective ends.

Both analogue and digital symbol systems are essential to knowledge production and the organization of epistemic orientation, as long as they are used appropriately and with an adequate amount of criticality.[34] Whether the status of a symbol system is digital or analogue depends on its use; it is therefore futile to characterize digital symbol systems as precise in contrast to ambiguous analogue systems.[35] It is more appropriate to see the 'development and application of symbol systems [as] a dynamic process of analysis and organization'[36] within which digital symbol systems are being introduced, as a rule, 'once the maximum required fineness of discrimination has been settled'.[37] This shift is not an objective improvement in the sense of a cumulative progression. A digital symbol system can be discarded again in favour of an analogue one if its achievements are judged to be inadequate for the objects or processes to be examined. This oscillating shift is very common in the practices of architectural design; it can be seen in the back-and-forth movement between hand-drawn sketches and plans produced in digital CAD environments. Both design methods mutually inform each other and are developed in parallel within the design process. And to 'choose among them requires knowing how the several systems function'.[38]

To understand a digitally produced implementation plan as a purified and thus perfected sketch apparently does not make sense in this light. Both instruments aim at different ends and are constituted accordingly. From the point of view of symbol theory, digital methods are based on identical reproduction and 'chain[s] of true copies',[39] whereas analogue methods draw on the concept of difference as their guiding principle. Both aspects are needed in the design process; they mutually inform each other. Depending on the aim and the state of a design process, it can be crucial to be able to process ambiguity and thus to design in the framework of an analogue symbol system. Moreover, in another state of the same design process it can be central to being able to identify and inventorize the forms and properties of the designed objects and processes. In this perspective, the biggest threat to architectural design is the unreflected und thus uncritical application of technical methods and instruments without critical examination of whether, or to which degree, they match the properties of the designed architectural entities and processes. There is no formal solution to guarantee such matching; the appropriateness of a design tool

for a specific task can only be judged by its practical outcome. The necessity of dividing a whole into distinct units to match the requirements of a digital symbol system can never be an end in itself. CAD drawing instruments can only serve their purpose well in architectural design if they are understood and treated as means for relative, not final, ends. Establishing a design method always is committed to a cultural-critical revision of its relation to the objects and processes it makes visible; since this is something drawing in particular is concerned with.

As emphasized above, Goodman's conceptions of digital and analogue symbol systems rather need to be seen as the poles of a continuous spectrum of different symbol systems. These conceptions are crucial reference points for the investigation of drawing as an epistemic form of knowledge. Even though from an ontological point of view a definite border cannot be drawn between pictures produced in an analogue way and digitally generated drawings, they can be distinguished epistemologically by the former's tendency to always aim at presenting something without necessarily having to represent something for that cause, whereas the latter primarily aims at representing something, and in doing so, might contingently present something as well. This primacy of representation before presentation allows for a characterization of drawings as operational pictures, which stand in contrast to the denoting aspect of classical paintings. Drawings do not primarily present something through a resemblance to that which they are referring to, but rather represent something in order to take it into a discursive space through visual operationalization. They are the medium for visual thinking, to come back to Arnheim's above-mentioned notion. The epistemic capacity of drawing lies precisely in the spaces of manipulation, observation, and practice that open up by way of the operationality and performativity they establish through their way of representing objects or processes. Drawing does not consist of illustrating a genuine - and non-drawn - knowledge, but of producing genuine epistemic objects that can become the target of arguments and, eventually, objects of knowledge by way of conventional consolidation.

The observation of the epistemic role of drawings in the development of architectural design suggests that the production of knowledge is always internally entangled with the representation of the to-be-known. Dissenting from Alberti's 'new ways of design',[40] in which the design of an object or process is categorically detached from the production, drawing has to be seen as an epistemic technique 'through' and 'by' which the world is organized into entities that can be the objectives of architectonical arguments. The notion of 'argument' here must be taken literally: like textual propositions, drawings can be wrong. Therefore, like languages, operational drawings are bound to a differentiable symbol system; not necessarily to a full-blooded digital symbol system, but they need to be at least 'digitally applicable' in one respect, so that they can be read in a syntactically ruled way. This need for syntacticity suggests that parallel to the role grammar plays in language, there should be a *dia*grammatic[41] that rules the epistemic functioning of drawings. In architectural drawings, these rules are manifest in the - historically contingent - conventions of drawing practices, such as, for example, working in comparable scales or agreeing on a set of conventions over the specific use of line widths.

With this tentative heuristic of the epistemic properties of drawing in mind, what can be said about the digitalization of drawing techniques in architectural design? As an epistemic practice, drawing aims at making formerly invisible relations visible.[42] It is characterized by the possibility of shifting dynamically between analogue and digital readings, and can be judged only with regard to its practical outcome. To what extent can an unbound digitalization be a threat to architectural drawing? Sketching a figure ground plan, for example, cannot be reduced

to ordering geometric figures on a metricized two-dimensional plane. In fact, the early introduction of a metric can turn out to be counterproductive for the development of a design process. Grasping and representing a spatial relation sometimes requires a syntactically dense symbolic scheme. If a spatial relation is parametricized, it is restricted to a closed lexicon that might exclude possibilities that would have been better suited to practical needs. On the other hand, it is often necessary to restrain possibilities in order to be able to design and operate within a digital symbolic scheme where the possible configurations are limited due to the finite lexicon and the grammatical rules. A good drawing is able to make this tension operational. Following the insights developed by Goethe in his essay about the experiment as mediator between subject and object,[43] drawing has to be conceptualized not as a passive tool suitable for predetermined objects, but as an active mediating practice and genuine form of thought.

Notwithstanding all the advancements digital drawing techniques have made in recent years,[44] we have to bear in mind that different symbol systems lead to different symbolic economies tied to different epistemic conditions and 'ontological commitments'.[45] Imagine, for example, an architectural office where every member draws in the same CAD file, and this file (or printouts of it) is the only media by which a project can be discussed and developed - no pencil and paper allowed. This would undoubtedly be a profound obstacle for the design process because of the epistemological restrictions it imposes. The openness of design is essentially dependent on the shift between different epistemic practices and their related symbol systems. This openness is best cultivated by remembering that symbol systems can be addressed both as ontological and as operational.[46] To address the epistemic functioning of a symbol system, we have to understand it as being operational; to invest it with meaning, we have to take it as ontological. This is the never-ending task of critical design: to think synoptically and to be watchful about the ontological implications that operational, material procedures might have on the design.

Notes

1. See Noam Chomsky, *Syntactic Structures* (The Hague: Muton, 1957).
2. See Hans-Jörg Rheinberger, 'Making Visible. Visualizations in the Sciences - and in Exhibitions?' *MPG Preprint* 399 (2010), pp. 9-23.
3. Ibid., pp. 10-21.
4. See, for example, Moritz Schlick, 'Die Wende der Philosophie', *Erkenntnis* 1 (1930), pp. 4-11, Rudolf Carnap, 'Über Protokollsätze', *Erkenntnis* 3 (1932), pp. 215-228, and Otto Neurath, 'Protokollsätze', *Erkenntnis* 3 (1932), pp. 204-14.
5. Alan Turing, *Collected Works. Mechanical Intelligence* (Amsterdam, North-Holland, 1992), p. 112.
6. See Angela Lammert, 'Von der Bildlichkeit der Notation', in *Notation. Kalkül und Form in den Künsten*, ed. by Hubertus von Amelunxen, Dieter Appelt, and Peter Weibel (Berlin/Karlsruhe: Akademie der Künste/ZKM, 2008), p. 39.
7. Concerning the primacy of language, Frederik Stjernfelt spoke of a 'linguistic imperialism'. See Frederik Stjernfelt, *Diagrammatology: An Investigation on the Borderlines of Phenomenology, Ontology, and Semiotics* (Dordrecht/London: Springer, 2007), Chaps. 3 and 15. Another reason for the accentuation of language can be seen in the Judeo-Christian tradition of the word as being the expressive medium of divinity.
8. See Richard M. Rorty, *The Linguistic Turn: Essays in Philosophical Method* (Chicago: University of Chicago Press, 1992).
9. Here, he also speaks of diagrams; see Aristoteles, *Metaphysik*, ed. by Horst Seidl, trans. by Hermann Bonitz (Hamburg: Meiner Verlag, 1989), pp. 998a and 1014a.
10. See Platon, *Menon*, trans. by Margarita Kranz (Stuttgart: Reclam, 1994), p. 39 and the diagram in footnote 18.

11. Immanuel Kant, *Critique of Pure Reason*, trans. by Norman Kemp Smith (London: Macmillan, 1929), p. 181 (B177 / A138).
12. Ibid., p. 198 (B203 / A162).
13. This conception, which connects transcendental schemata with the drawing, is profoundly influenced by the conception of *disegno*. The latter was one of the centrepieces of the theoretical reflection about painting in the Renaissance, an aspect that has not yet been very prominent in Kant studies. A first detailed exploration of this connection is provided in Tassilo Eichberger, *Kants Architektur der Vernunft*, Fermenta philosophica (Freiburg/München: Alber, 1999).
14. See Charles Peirce, *Naturordnung und Zeichenprozeß. Schriften über Semiotik und Naturphilosophie*, trans. by Bertram Kienzle, 2nd edn (Frankfurt/Main: Suhrkamp, 1991), p. 316.
15. Ludwig Wittgenstein, *Tractatus logico-philosophicus* (Frankfurt/Main: Suhrkamp, 1963), no. 4.1212.
16. The picture can be found in Ludwig Wittgenstein, *Werkausgabe*, vol. 1 (Frankfurt/Main: Suhrkamp, 1984), p. 520.
17. Rudolf Arnheim, *Visual Thinking* (Berkeley/Los Angeles: University of California Press, 1969).
18. As this is an unpublished article, I do not quote it here, although I closely concur with her heuristic of 'Operative Bildlichkeit'. See Sybille Krämer, 'Operative Bildlichkeit. Von der "Grammatologie" zu einer "Diagrammatologie"? Reflexionen über erkennendes "Sehen"' (2009), http://userpage.fu-berlin.de/~sybkram/media/downloads/Operative_Bildlichkeit.pdf. [accessed 12 September 2010].
19. For the relation of representation and spaces of knowledge, see Hans-Jörg Rheinberger, Michael Hagner, and Bettina Wahrig-Schmidt, eds., *Räume des Wissens. Repräsentation, Codierung, Spur* (Berlin: Akademie Verlag, 1997).
20. George Spencer-Brown, *Laws of Form* (New York: Julian, 1977), p. 3.
21. Charles Peirce, *Collected Papers of Charles Sanders Peirce*, Charles Hartshorne, Paul Weiss, and Arthur W. Burke, eds., (Cambridge: Harvard University Press, 1931), CP 2.279.
22. Martin Heidegger, 'The Age of the World Picture' (1938), in *Off the Beaten Track*, trans. by Julian Young and Kenneth Haynes (Cambridge: Cambridge University Press, 2002), p. 59.
23. See Sybille Krämer, '"Leerstellen-Produktivität": Über die mathematische Null und den zentralperspektivischen Fluchtpunkt. Ein Beitrag zu Konvergenzen zwischen Wissenschaft und Kunst in der frühen Neuzeit', in *Instrumente in Wissenschaft und Kunst. Zur Architektonik kultureller Grenzen im 17. Jahrhundert*, Helmar Schramm, Ludger Schwarte, and Jan Lazardig, eds., (Berlin/New York: de Gruyter, 2006), pp. 502-27.
24. For the conception of epistemic objects see Uljana Feest, Hans-Jörg Rheinberger, and Günther Abel, eds., *Epistemic Objects*, MPIWG Preprint 374 (Berlin: MPG, 2009).
25. Hans-Jörg Rheinberger, *Experimentalsysteme und epistemische Dinge* (Frankfurt/Main: Suhrkamp, 2006), p. 25. Trans. from the German 'die kleinsten vollständigen Einheiten der Forschung'.
26. See Willard van Orman Quine, *Word and Object (*The MIT Press, 1964), Chap. Translation and Meaning; Willard van Orman Quine, 'On Empirically Equivalent Systems of the World', *Erkenntnis* 9, no. 3 (1975), pp. 313-28.
27. Nelson Goodman und Catherine Z. Elgin, *Reconceptions in Philosophy and Other Arts and Sciences* (Indianapolis/Cambridge: Hackett Publishing, 1988), p. 110.
28. Nelson Goodman, *Languages of Art*, 2nd edn (Indianapolis/Cambridge: Hackett Publishing, 1976), p. 160.
29. Ibid., p. 161.
30. Kant, *Critique of Pure Reason*, p. 93 (B74/A50).
31. Arnheim, *Visual Thinking*, p. 27.
32. See Jacques Derrida, *Grammatologie* (Frankfurt/Main: Suhrkamp, 1974), p. 109.
33. Rheinberger, 'Making Visible. Visualizations in the Sciences - and in Exhibitions?', p. 9.
34. The question of how to determine the right amount of criticality obviously has a strong ethical dimension. Although this ethical dimension is indispensable, the article focuses mainly on the logical-aesthetical dimen-

sion of drawing as epistemic practice.

35. See Jens Schröter, 'Analog/Digital - Opposition oder Kontinuum?', in *Analog/Digital - Opposition oder Kontinuum? Zur Theorie und Geschichte einer Unterscheidung*, ed. by Alexander Böhnke and Jens Schröter (Bielefeld: Transcript, 2004), pp. 7-30.
36. Goodman, *Languages of Art*, p. 163.
37. Ibid., p. 161.
38. Goodman and Elgin, *Reconceptions in Philosophy and Other Arts and Sciences*, p. 7.
39. Goodman, *Languages of Art*, p. 132.
40. Friedrich Kittler, Unsterbliche. *Nachrufe, Erinnerungen, Geistergespräche* (Stuttgart: Wilhelm Fink Verlag, 2004), p. 11.
41. See, for example, Stjernfelt, *Diagrammatology: An Investigation on the Borderlines of Phenomenology, Ontology, and Semiotics*.
42. See Hans-Jörg Rheinberger's article on the different strategies for making visible in the life sciences. He identifies compression/dilatation, enhancement, and schematization as main modes of making visible in the life sciences, and leaves open whether digital three-dimensional modelling should be counted as a fourth one. If so, it would be interesting to observe whether this would lead to a demand in architectural knowledge in the realm of natural sciences. Hans-Jörg Rheinberger, 'Sichtbar machen. Visualisierung in den Naturwissenschaften', in *Bildtheorien*, ed. by Klaus Sachs-Hombach (Frankfurt/Main: Suhrkamp, 2009), pp. 127-45.
43. Johann Wolfgang von Goethe, 'Der Versuch als Vermittler zwischen Subjekt und Objekt', in *Gedenkausgabe der Werke, Briefe und Gespräche*, ed. by Ernst Beutler, vol. 16 (Zürich: Artemis, 1949), pp. 844-55.
44. For an in-depth examination of digital drawing techniques, see, for example, Brian McGrath and Jean Gardner, *Cinemetrics: Architectural Drawing Today* (Chichester: Wiley-Academy, 2007).
45. Willard van Orman Quine, 'On What There Is', in *From a Logical Point of View* (Cambridge/London: Harvard University Press, 1953), p. 12.
46. This is Sybille Krämer's distinction. See Sybille Krämer, 'Kalküle als Repräsentation. Zur Genese des operativen Symbolismus der Neuzeit', in *Räume des Wissens. Repräsentation, Codierung, Spur*, ed. by Hans-Jörg Rheinberger, Michael Hagner, and Bettina Wahrig-Schmidt (Berlin: Akademie-Verlag, 1997), pp. 111-22 and Sybille Krämer, *Symbolische Maschinen. Die Idee der Formalisierung in geschichtlichem Abriss* (Darmstadt: Wissenschaftliche Buchgesellschaft, 1988).

Biography

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In this issue, the following papers were peer-reviewed: 'The Body Drawn Between Knowledge and Desire'; 'Bernard Tschumi Draws Architecture!'; 'Drawing the Map: Siting Architecture'; 'The Woof and the Warp of Architecture: The Figure-Ground in Urban Design'; 'Drawing as Epistemic Practice in Architectural Design'.

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