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Outline of a Possible General Theory
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Abstract
Buildings engage us visually in ways that seem to be deliberately designed. This is particularly true of architecturally significant examples, of course, but is broadly true of all buildings. We outline a methodological approach, synthesized through a series of independent studies of visual form of buildings over the past two years, that is aimed at understanding how buildings seek and maintain visual attention. The primary motivation in developing this line of inquiry is morphological, driven by the premise that buildings are shaped as much from this demand of visual functioning in buildings, as from demands of generic function. A theory of visual functioning of buildings is therefore an integral aspect of the morphology of buildings.

We propose that visual engagement with buildings can be understood at two levels. The pre-conditions for visual engagement are set by our general perceptual tendencies according to which we parse the world in a rule-bound, constructive, manner, using selective cues to organize the flux of received visual information into configurations of stable entities. Riding on top of this mechanism for visual perception is our capacity for imaginative viewing, whose functioning is still not well understood. We argue that architects create visual interest in buildings (and if successful, an imaginative engagement) by systematically suppressing or enhancing cues which we use in order to parse the world and draw upon four case-studies in order to illustrate a few critical points of our argument.

The first study looks at how Le Corbusier systematically controlled types of shadows, and modeled the interiors of his villas of 1920s to enhance our early vision mechanism of detecting contours, in order to create the characteristic layered space of modernist free-plan. The second one shows how Herzog and De Meuron, in their De Young museum in San Fransico, deliberately counteract various cues that we normally use to judge depth in scenes, thwarting our attempt to organize the space of the museum in a representational form. A third study, of El Mastil, an historically significant Art Deco apartment building in Montevideo, Uruguay, illustrates how the systematic variation of cues directly explains stylistic moves and so may be a critical feature of the definition of styles. And a final study, of Louis Kahn's Salk Institute at La Jolla, attempts to show how the visual form created by systematic manipulation of cues is invariably tied up with the distribution of viewing conditions through the building. The final case suggests ways in which the analysis of the stylistic features of buildings may be linked to spatial analysis of the distribution of visual fields in buildings which have so far dominated space syntax research.

Keywords: space syntax; architectural theory; visual perception; representation; aesthetics; visual form
Buildings almost invariably carry an appearance of deliberate visual design. That is to say, they exhibit signs of care taken to organize their appearance, often with an apparent purpose that goes beyond constructional logic, or requirements of spatial organization. Extensive codified rules for visual articulation of buildings in almost all traditional architectural canons are a manifestation of this phenomenon. And, of course, architectural history, in the primacy it gives to stylistic classification and analysis, has for a long time been concerned with studying, organizing, or interpreting the visual appearance of buildings.

Why is the look of the buildings significant? Pat answers to the question lead to discussions of general human aesthetic tendencies—a need for order, or for harmony. But despite much systematic work done in the psychology of formal aesthetics over the last few decades (Pickford, 1972), it has been rather difficult to find hard evidence for universal preferences for certain shapes, colors, or forms that hold across cultures, periods, or even across gender or age differences. The argument has grown increasingly sophisticated in the past few years, inspired particularly by work in neuroscience, where this approach lends itself to finding neural correlates for specific perceptual properties of artworks. For Ramachandran and Herenstein (1999), for instance, complex aesthetic propensities, such as peak-shift towards certain formal qualities or particular proportions, are hard-wired in our mind, which, to them explains cases like the predominance of extremely narrow-waisted and wide-hipped female form in the art of certain cultures. It is also possible to find neural correlates for specific forms or styles, as Zeki (1999) so intriguingly manages to show in the case of visual art. Zeki's contention is that artists select different forms in order to make available to us perceptual knowledge of specific aspects of our visual system. Mondrian's characteristic geometrical paintings can thus be understood as bringing into play cells in the visual cortex that are selectively tuned to detect vertical and horizontal lines, (Zeki, 1999, pp. 118-125). But all these arguments are difficult to extend to the kind of questions that interest us. Seeking neural correlates for specific forms, styles, or genres of artistic products, is aimed at understanding, not so much the variation of artistic form, but rather to gain insights about the functioning of the human mind. Our interest, however, is in the former. Given not only the wide variety of visual form, but its extraordinary variety (such that one is likely to find buildings flaunting a formal quality directly opposed to any generic one would deign to think essential to buildings), and intriguing visual phenomena like style, an approach that focuses on finding a neurological or even a broader biological basis for specific formal qualities or elements is not very likely to be successful. Understanding the significance of the look of buildings is likely to be more fruitful, we believe, if it approaches the question in a functional spirit. Form, in other words, is to be seen as being meaningful in response to some functional issue, not as something that carries inherent meaning.

But this does not mean that we promote exclusively contextual, or historical, explanations of form. The questions that we would like to ultimately address are still generic; what does visual design enable either the designers or the spectators to do, and what qualities of visual design enable it to function as it does? It is not difficult to see that our approach is philosophically aligned to the one that
underlies space syntax research—an approach aimed at developing a theory of building form which explains both generic structural qualities and relates their individual variations to specific circumstances. In fact, we think of it as being a natural extension of the work done in space syntax. Syntactical research has, for good reasons, so far focused almost exclusively on spatial form (Hillier, 1996, pp. 21-27). There is, of course, a fair amount of literature within the space syntax program that deals with visual properties of buildings, using concepts like visual fields, e- and s- partitions, but the intellectual thrust there is either in using visual aspects of buildings to sharpen our analytical understanding of spatial form, or reciprocally in understanding how spatial form can affect and structure visibility of defining surfaces or objects in spaces. Our interest is different since its main focus is what Paul Frankl called visual form (Frankl, 1968) in itself, answering the kind of questions that Bill Hillier raised almost in passing in his discussion of non-discursive technique in the Space is the Machine (1995, pp. 122-123). This kind of visual form is sometimes considered as being extraneous or inessential to morphology at large—a matter of architectural nicety rather than something that has deeper social inclinations. However, there is an increasing amount of recent research in space syntax is beginning to be concerned directly with issues of architecture, rather than building more generically. Sophia Psarra (2009), and Daniel Koch (2009), in papers republished in this volume, for instance, raise germane points about developing specific extensions to existing analytical methodology in syntax, in order to directly address specifically architectural issues, over and above the basic sociological analysis that has been the hallmark of syntactical research. Our work can be seen as complementing this line of inquiry, trying to construct a general structural theory to explain those aspects of the form of buildings that have to do with expressed meaning and visual aesthetics in buildings.

However, a theory intending to develop a general structural account of visual form cannot be a simple extension of the theory of spatial form. The main reason for this is methodological. Analytical strategies seeking descriptions of socially relevant spatial form have focused on selected perceptual aspects of buildings—lines of sight, discontinuities in vision, thresholds, occluding surfaces and edges, and so on. But similar strategies seeking aesthetically or symbolically relevant aspects of form will have to describe phenomenal aspects of form. This means that the relevant descriptive strategies cannot rely on a straightforward, mechanical, analysis of the geometry of a given form; instead, such strategies will need to address the way a given form is perceived. The principles behind an analytical or descriptive procedure would have to be grounded in a study of human perception, not basic optics.

What follows is our attempt to develop an outline for this theory. The outline is still very much in construction, and although grounded in both findings from literature on perception and human vision, on theoretical accounts from aesthetics, and on our own case studies, it is still very much schematic and quite provisional. We offer it in an experimental spirit, as material for further discussion and debate, not as established theory.

2.
We begin by presenting, very schematically, the main outlines of our theory: The visual form that a building possesses is, in part, a response of its designer/s to the natural tendency by which the human visual system organizes information that reaches it. The nature of the response, and the intent behind
it, can differ—we need to recognize this to avoid falling into the trap of explaining visual form in essentialist terms—but it is limited by the natural functioning of our visual system. As viewers we are primed to organize the visual environment in specific ways not entirely within our control, and we expect the information from natural visual environment to exhibit various kinds of regularities (Purves, et al., 2001; Hoffman, 1988; Hughes, et al., 1996). This natural functioning of the human visual system offers the designer a powerful opportunity to manipulate visual form not only to guide viewers' visual interest, but to imbue it with two additional phenomenal qualities. First, perceptual engagement with the building can take on an imaginative aspect. The designer, by appropriate modifications of the visual form can create allusions to other buildings, allowing the viewers to imagine themselves in alternative settings. The visual form can therefore act as a perceptual prop and guide for viewer's perception to develop a specific imaginative content. Second, careful modifications to visual forms can induce in the viewers' self-consciousness towards their act of parsing. As a result, the forms can develop specific propositional content. This happens because the viewers tend to find a specific logic in the way the building seems constituted into its parts, and as a consequence, end up ascribing this logic to specific intentions, embedded, so to speak, in the buildings.

It is not necessary of course that all designers take-up this opportunity, nor that all buildings betray such an attempt. Many of the buildings that we encounter in our day to day life seem to be designed just to look right or to look proper, aimed at satisfying some conventionally normative criteria of order. But it is difficult in practice to draw a strict line between the types of buildings which just look right and those which offer us sustained imaginative engagement and relate to an embedded propositional content. We feel it much better to argue that there exists a common base of visual encounter for all buildings, and that in some cases, dependent not only the design of the building, but also the on the ability, knowledge, and inclination of the observer, certain buildings might give rise to an imaginatively sustained and meaningful perceptual engagement. This position is better, if for nothing else, than for the pure economy of explanations it offers: it provides us with a single theory to explain for visual articulation in all buildings, or for that matter, for all architectural works. What makes a building appear right or appropriate or pleasant is the same kind of visual functioning that underlies an imaginatively more ambitious building, so that the designers of either kind of buildings are behaving in much the same way. The difference, we feel, is marked in the depth and nature of engagement that the latter kind of building can provide, and that seems to us to be a matter of the quality of thought embedded in the building (the thought, it should be remembered, not just in the designers mind at the time of designing, but very much perceptually available to the interested and vested viewer). This position thus brings us in accord with the kind of arguments that philosophers like Arthur Danto have put forward, claiming that the difference between an ordinary object and work of art cannot be found at the level of pure physical constitution, but rather lies in the specific ways in which the viewer engages with the object (Danto, 1981).

It is important to offer a point of clarification. When we talk of imaginative engagement, we are talking specifically of what Gregory Currie has termed 'recreative' imagination (Currie and Ravenscroft 2002, pp. 9-10). Recreative imagination is involved when we put ourselves in an alter-
native setting, or in the place of another (the other possibly being our own counterfactual self), and respond appropriately in our mind. It can be distinguished from other uses of the word imagination such as when we refer to a belief about something (as in “In 1960, he could not have imagined that a black man being elected president of the United States during his life-time”); it is also to be distinguished from ‘creative’ imagination which we use in solving problems or finding novel ways of doing things. The significance of recreative imagination is that it offers a path to developing a theory of how buildings might visually help construct a sense of self within their viewers. But this is far too involved a topic to go into detail in the context of this paper.

Our account is admittedly tentative, still in development, and in crucial places lacks suitable empirical backing. But even so, it allows us to address the requirements we thought a good theory of visual form in architecture should provide. The critical aspect of our account is that we explain the concern with visual form as a by-product of a natural tendency. This means that while it can be grounded in empirical findings about how our perceptual and cognitive systems work, it leaves the actual emergence of form an open-ended exercise. Our account, in other words, avoids essentialism with respect to form. Nor does it enjoin designers to a necessary kind of design activity; the visual form of buildings in this account appears as a result of opportunities explored by the designers rather than as a result of biological imperatives followed.

To some there might appear to be a somewhat paradoxical quality to our account. We expect the visual articulation to bring about a mental activity, but not dictate it; imaginative engagement with a building, while it lasts, has to be self-motivated and self-sustaining. The seeming paradox in this requirement is that we want the imaginative engagement to be conscious, but still controlled by the visual artifact. But from a classic essay by Richard Wollheim, “Imagination and Identification,” (Wollheim, 1973, pp. 70), we learn that this paradox actually rests on a misconceived assumption, which is that if we initiate any mental activity, then any part of it is necessarily completely determined by us. Using a simple instance of mental recitation of a poem, where our activity is necessarily guided by the actual poem, Wollheim shows this assumption to be false, and argues that imagination guided by an artifact would follow cues from the artifact.

In what follows, our attempt is to try to flesh out this very schematic outline. We will first add some more detail to our understanding of the functioning of our visual system. The review of scientific literature will be limited, by and large, to the results that we will use in the following sections. A more fully-fledged theory of visual function would naturally add to this basic account, but discussing that here would add too much extraneous in the context of this paper. The following sections will show how these results can help in some exercises of inferential criticism. Our discussion will favor the second of the phenomenal characteristics of visual form mentioned above—that containing some kind of imaginative content. We’ll not explicitly discuss the how visual forms may also engender propositional content, although it should be recognized that in practice, the distinction between the two is not as sharp.
3.

It is a central problem of our visual system that information arriving to it is fundamentally ambiguous—it essentially consists of patterns of light falling with different degrees of intensity on different parts of the retina (for the classical statement of the problem of form perception, Marr, 1973; for a more recent account, Epstein, 1995). From this we construct a visually interpreted world made of specific elements in various relationships within a three-dimensional world (for an overall account of this process, Hoffman, 1998). We are able to do this because our visual system has some distinctive traits:

1. It is constructive in nature—in other words, it actively constructs not just reads the objects and scenes that we see, and it does so using rules that can be recreated.

2. Although constructive, the visual system is largely autonomous—we often cannot help how and what we see, even if we know that physical reality is different.

3. The constructive activity of our visual system is designed to handle critical ambiguities in the information provided to it; such ambiguities are concerned with aspects of vision such as color, motion, and illumination, but more importantly from the point of view of geometry, depth. Of these, much of the following discussion we will focus on the way our visual system handles ambiguities of depth and illumination.

4. In response to these ambiguities, the visual system does not construct completely accurate or complete representations, but provisional representations—useful descriptions that are not cluttered with irrelevant information, to paraphrase David Marr (1973)—that are dynamically modified in the face of changing information.

5. In doing so, the visual system relies on specific cues; information from such cues may overlap or be of different kind altogether, and may have different degrees of accuracy, so part of the job of the visual system is co-ordinate such information. Figure 1, from Cutting and Vishton (1995), illustrates the relative functioning of key depth cues.

Even a simple account as the one above shows how the natural functioning of our visual system provides the designer several opportunities in creating the desired visual engagement. The largely autonomous and innate functioning of our visual system makes it possible for the designer to predict specific behaviors of his viewers. A consequence of this predictive ability is that the designer assumes reciprocating roles as designer and observer while designing, making moves of visual articulation and testing them (by sight, so to speak). Richard Wollheim (1991) has identified such a reciprocal switching of roles as key to the aesthetic function in visual art, and the heavy reliance of architects on means of visual representation—models, drawings, and sketches—further attests to that. Further, the fact that our seeing essentially consists of construction of provisional, best-case, descriptions, such that these often override actual knowledge, means that the designer has particular power to alter our perceptual understanding of the designed object. He or she can do this in different ways—either bluntly, by purposefully fooling our visual system, as psychologists do when designing impos-
sible figures and other objects for their tests, or more subtly, by allowing allusions to develop and unexpected readings of designed objects to come about. In either case, the means at the designer's disposal consist essentially of visual cues that may be manipulated.

We can therefore see the visual design as essentially a matter of manipulation of visual cues. Such a manipulation has two aims. First, the visual design in any building has to bring into play the varied and large but still a limited number of cues that we depend upon in order to make sense of our visual environment, and secondly it has to do it selectively, systematically suppressing certain cues and enhancing others in order to create environments with a distinctive visual functioning. The important thing to remember is that the information from various cues is processed relatively independently and competitively.

In the following sections, we discuss four case-studies, showing how, in practice, the visual design of building brings into play specific cues, and more to the point, how the suppression or enhancement of cues, gives rise to readings in which the observer can actually see something other than the building itself, and so can engage with the building in a sustained imaginative activity. These studies form an internally discrete and independent set, and while they do not come together naturally to create a single theory, there is something to be gained from the few insights they provide.

4.

Our first case, discussing a building in Montevideo, Uruguay, from the early 1930s, shows how this account of visual functioning helps in addressing significant questions regarding style. The building in question—a residential tower called El Mastil located on a sea-front property—has long been recognized as a pioneering example of the Uruguayan Art Deco style (Margenat, 2001). We begin with a deceptively naïve but actually a consequential question on style. How do we attribute a style to a

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Figure 1. Plots of minimum perceivable thresholds for nine major sources of visual information about depth. Along the x-axis is plotted the mean distance from a pair of target objects (in meters on a log scale), and along the y-axis, the minimum discernible difference in depth per unit mean distance. A depth contrast of 0.1 or 10%, is taken as an acceptable practical threshold. Redrawn from Cutting and Vishton (1995).
building? Art historians normally do this with a list of features; in this case, such features include particular motifs (nautical imagery and winged medallions), decorative patterns (zig-zag patterns, stacked lines on cross-axes), compositional types (tripartite façade, symmetrical and pyramidal composition, stepped or rounded corners) and construction techniques (use of stucco decoration, reinforced concrete construction) (Arana and Mazzini, 1999, pp. 47-70; Margenat and Schelotto, 1987).

But as Nelson Goodman (1978, pp.23-40) has pointed out, the definition of styles by listing features seems to be circular—we only identify the relevant visual features of a style if we have it defined; there is no way, before the style is defined, to tell if a feature is stylistically relevant or not. A practical answer to the issue might be that stylistic attributes are not made case by case, first defining a list of attributes and then finding examples that fit the criteria, but rather by finding visual similarities in a group of buildings and then listing features they have in common. But further reflection will show that this still leaves the problem unanswered, for, we still don’t know what guides our identification of specific features as being stylistically relevant, when other features shared by several of such buildings may not count as being stylistic.

Our answer, partly guided by Goodman (1978, pp. 33-34), is that it is only under a specific symbolic reading that one can discern the relevant stylistic elements, and that it is the job of visual articulation to make such a reading possible. The style of El Mastil is only partly produced by the features described. What is more crucial is the way its visual articulation guides our attention. First, rules of parsing create a specific reading of the building shape. We see it as made of a certain combination of intersecting slabs and panels, an assembly that is not subjective or personal but universal (Hoffman 1998). Second, relationships between these elements, mostly abstract here—the repetitive rhythm of the balcony lines for instance—establish patterns that our visual system is particularly tuned to, so that they appear as saliences in our reading of the building (Zeki, 1999). It is these saliences that guide stylistic attribution. But how are the saliences produced? It is true that at certain thresholds of resolution our eye picks-up certain forms, but there seems to be an additional element of visual functioning at play here. The horizontal lines established by the corner balconies continue into the inset balconies of the front, momentarily disappearing behind flat panels in between the two sets of balconies; the flat panels themselves counteract these horizontal lines by their vertical emphasis, which is echoed by another notional plane that connects together the inner faces of the inset balconies with the first recessed floor on top (Figure 2). Our parsing of the building, in other words, is dynamic and somewhat ambiguous—as one kind of motif is figured, another dissolves into the background, keeping the entire visual artifact as a unitary whole. The result is that the composition is prevented from settling down into a particular description and so keeps perceptual interest in the object active. Furthermore, the ambiguously parsed visual articulation begins to assume depictive qualities. Scholars have often noted that Uruguayan Art Deco had developed a pronounced nautical imagery (e.g., Margenat, 2001). But we see now that such an imagery is brought about not so much as a result of iconographical elements—the prow on the front fin, or the life-preservers decorating the façade—but more integrally through the compositional quality of the building itself. We begin to see in a full-bodied experiential mode some dominant visual motifs of the period—the towering ocean liner, the fast moving stream—
lined train, the house on stepped cliff. And particularly, we see these not represented on the building, but depicted within it. In other words, from certain positions, we experience the building metaphorically as a liner. Thus not only does the visual articulation of the building direct our attention to certain parts of the building, constructing a distinction between stylistically relevant and stylistically irrelevant features; it creates figural motifs giving the style its cultural significance by tapping into a reservoir of culturally recognizable and resonant experiences.

Figure 2. El Mastill, Montevideo, Uruguay. Diagrams showing how visual construction of phenomenal elements contributes to a stylistic attribution. Illustration: Carina Antunez

While our account of visual articulation help sort out a key puzzle in the way styles function, it also reciprocally sharpens our understanding of how visual articulation creates imaginative engagement. The key element of visual articulation in this case is the emergence of a visually representational, or depictive form—an interesting point because within analytical theories aesthetics, it has long been accepted that architecture, like music, differs from other visual arts in lacking a depictive modality to create meaning (for an extended argument, Scruton, 1979, pp. 179-205; also, Goodman, 1988, p. 31).

5.

All styles, or building traditions, however, do not involve creation of such representational figural elements that we have seen here; early 20th century modern architecture was explicitly aimed towards abstract, non-representational forms. Take, for instance, projects from Le Corbusier’s early period in which there is explicit programmatic intention to eschew visual references to any former building or style. What is the aim of visual articulation in this case?

A distinguishing feature of Le Corbusier’s architecture has always been its characteristic space. Colin Rowe (1999 [1976], pp. 167-168) has described Le Corbusier’s creation of modernist space: layered, collaged, and ambiguous with respect to figure-ground relationships. We can make a good case for the proposition that the space described here is phenomenally distinct from the actual space of the buildings themselves and that the job of visual articulation in Le Corbusier’s case is to create such an unprecedented space.
The visual mechanics for creating such a space remain similar to the one described for El Mastil. The physical articulation of forms—their detailing—ensures a specific parsing. It is in this initial parsing that typically Corbusian forms emerge (Figure 3) - the parsed elements are strongly figural, even of abstract, prismatic, and mostly keep their formal integrity, fulfilling Corbusier's own general intentions (Le Corbusier 1948, p. 37). What is further interesting is Le Corbusier's articulation of these parsed elements to emphasize specific cues for the perception of depth. These cues—occlusion of contours, height in visual field, relative size, and motion perspective—are exactly the ones that operate with finer discrimination in action space. Information related to binocular disparities, or relative density, which do not provide such fine discrimination of depth, is suppressed. The result is a heightened perception of depth as one moves about not only around, but even within the building; the Corbusian space is unusually clear of distracting forms or even details that may distract from perception of depth. This reading of depth is further enhanced by a careful control of shadow. Design elements such as horizontal windows, matt white walls, and implicit rules about the relationship of windows and reflective surfaces create an interior environment in which self-shadows are the dominant aid to visual perception; cast shadows, which can often complicate a reading of form, tend to be minimal and unfocused, and micro-shadows tend are submissive to the distribution of self-shadow (Figure 3). In contrast, in exterior spaces, in around the buildings, where strong sunlight can often create strong cast shadows, extended overhangs, elongated lintels, and vertical fins create cast shadows with long line that articulates rather than confuses the shape of the surface on which it falls (Figure 3 again).

Figure 3. Photographs illustrating strategic elements of visual articulation in the interior and exterior of the Villa Stein. Illustration: Myung Seok Hyun

The visual articulation of built elements in Le Corbusier's work, then, reflects the dual aims that we have described. On the one hand it is sensitive to the functioning of our visual system in eliciting a specific parsing of the designed building from a situated observer, and on the other, in doing so it reinforces some cues over others, in order to create a distinct space. The point to note is that purpose for this goes beyond just creating a functional or clear sense of perceived space. The space perceived in Le Corbusier's projects is a phenomenal space; phenomenal in the sense of being objectively available to any observer, but only in experience. It is a space that invites constant move-
ment, accompanied by a persistent sense of de-centered settings, coupled with as persistent a visual sense of simple curves and shapes. There are good grounds for calling such a space a depictive or representational space, for though not “real,” such a space can function as an object of propositional inquiry. In the Corbusian projects of the twenties, there is recurring allusion to images of specific settings-decks of ocean liners, Mediterranean villages, interiors of aircraft (widely noted, e.g., Colquhoun, 1972; reinforced by Le Corbusier, 2007 [1923]). However, this is not to say that the aim behind such allusions is to communicate specific propositions regarding such spaces, but rather that through representational means, by guiding the observer to a visualization of an alternative space, they are able to lead the observer into a state of perceptual imaginative engagement with the building.

In both cases that we have seen so far visual articulation leads to imaginative engagement through depictive means— the articulation controls the different cues and rules that our visual system uses in order to construct phenomenal objects or scenes, and these phenomenal objects or scenes work depictively allowing an imaginative engagement with the work to develop.

6. But it is also possible to engage visual attention and develop a subject matter, without creating representational space. In Jacques Herzog's and Pierre de Meuron's De Young museum, completed in San Francisco in 2004, this was an explicit demand, driven by an agenda of creating through architecture an authentically real experience of a building—an architectural work that, according to the architects own intent, could not be reduced to representations in different media (reported in Vischer, 2004, and Betsky, 2006). The building has attracted much comment on its elaborately designed skin, made from weathered copper panels, embossed, dimpled, and perforated in an irregularly varying patterns derived from images of foliage. Also of interest is the spatial organization of the building which takes the form of a parallel series of square tubes that overlap and intersect with each other, creating long slivers of open courts within the interior. The complexity of this plan was a stylistic departure for the architects, whose earlier buildings were particularly noted for their simple, almost schematic, planning. Other notable elements include an oddly twisted observation tower that overlooks the otherwise flat, hulking, mass of the building, and a massive cantilevered section of the roof, which, from certain angles, appears to sag awkwardly. It is possible to present these distinct characteristics either as elements of the architects' personal style, or as contemporary stylistic conventions, so treat the building as an example of minimalist, surface-oriented architecture, or post-critical phase of architecture featuring a Deleuzean striated space. But such commentary essentially names phenomena, rather than explaining them, and it does not address the expressed intention of the architects, which was to create forms that are deliberately non-represenational.

The quirky, distorted geometry of the building, the attention paid to the skin, and even its seemingly awkward gestures, can all actually be interpreted as part of a systematic intent that guides the visual articulation of the building. This intent is to counteract the different cues that we normally
use to construct an understanding of depth in our visual landscape. Figure 4 shows how at each
distance, the appropriate depth cues are suppressed. At distance, in vista space, the flat bulk of build-
ing, along with its matt finish, and an oddly undulating profile very obviously prevent cues from
occlusion, aerial perspective, and movement from coming into play; within action space, similarly,
the absence of parallel lines, multiple reflections, and lack of normally scaled elements makes infor-
mation from height in visual field, and relative size either scarce, or mutually contradictory; even
occlusion, the otherwise reliable source of information about depth, produces misleading impressions
from some points of view. It is very difficult, with such consistently conflicting sources of informa-
tion, to form a coherent representation of the phenomenal space. The much talked about surface
treatment reinforces this difficulty since its matt finish and complex patterning often masks actual
folds and edges, much as camouflage does, and the dominant micro-shadow of the enlarged texture
often overrides the information from self-shadow. It is only at the extremely close distances of per-
sonal space that stable information about depth emerges, and that is not from visual sources, but
rather from the observer's haptic orientation to the building surfaces.

The use of visual articulation to prevent the observer from resolving the views of the build-
ing into stable and meaningful figural forms follows directly from the architects' aim to create build-
ings whose architectural qualities cannot be captured in photographs, drawings, or other representa-
tional media, the argument being that an architectural work which could be presented through such
media without significant loss of quality would somehow be inauthentic (Herzog and de Meuron,
1988). It is debatable whether their move actually creates the desired authenticity of experience-such
criteria rarely being tested in practice—but the critical success of the building (and others like it) has
shown that it is possible for the building to work visually without recourse to representational func-
tioning. In other words, the building does invite and sustain perceptual engagement, although it re-
mains to be decided if the perceptual interest is due to imaginative reading of the building or not. In the beginning of the paper, we defined imaginative engagement as one that involved recreative imagination-an activity that tasked the imagining agent with putting him- or her-self in another's shoes. We had then skipped over the question whether a medium such as architecture, in which the other is not directly defined, could elicit such an imagination. Given our discussion of the Art Deco and Corbusian buildings, we can now say that imaginative reading of an architectural work, even if not involving another person, is still of a perspective-shifting kind. Architectural settings provide visual material for the observer, in the act of inhabiting an environment, to put him- or her-self in an alternative environment or setting. Something similar does happen in the De Young Museum, even though in experiencing it, no specific phenomenal setting comes into play. One possible answer-coming from minimalist art theory to which Herzog and De Meuron are directly indebted (Fried, 1967; Wollheim, 1973)-is that in such cases, the imaginative engagement is with respect to a setting in which there is a heightened meta-perceptual awareness. But this explanation still remains to be tested.

7.
So far we have spoken of buildings in the same way we speak of other artifacts produced for seeing (paintings, sketches, sculptural elements), but of course buildings are different, in that they are seen not from a single viewing point but from within. We have already seen, in the examples above, that it is often integral to their visual success that they are perceived not in a setting where the viewer can detach themselves, however temporarily, from their real life, but where the viewer is typically a user, and engages with them while being immersed in his or her day-to-day activities within the physical space of the building. An immediate question then is if the organization of the actual space in the building has a role in creating imaginative engagement, over and above the visual articulation of its physical body. Are designers, while paying attention to spatial organization, much of which has to do with social outcomes, also sensitive to possible range of vantage points from which the visual articulation can be assessed? There is evidence for it in all the cases above, but an ongoing study by one of us provides a particularly instructive example. In Louis Kahn's Salk Institute, where the visual articulation, not only creates a highly controlled parsing, but there is an unusually controlled spatial organization as well. It is a very distinctive feature of the visual functioning of the building that the individual office towers around the main plaza are rarely seen in a heightened perspectival view. To observers in the building, they appear flat and undistorted, as if seen through a tele-photo lens with a very high depth of field. Such a condition is almost always lost in photographs of the building, and is particularly absent in the classic view that looks either up or down the plaza along its axis; but is uncannily almost consistently present to an observer moving within the plaza.

It appears, that if one were to conduct a study to see how angles of viewing are restricted, one arrives at the striking finding that the distance between the two rows of towers across the plaza is the exact limit beyond which the views of the complete towers become perspectivally distorted, and that along the plaza level corridors that run through these towers, it is the locations between the towers at which the towers are seen in all completeness (Figure 5). Part of the unusually stable and
unmoving quality of the plaza, it can be plausibly argued, comes not just from its commanding view of the cliffs and the sea, but also from its carefully controlled dimensions and restrictions the spatial articulation imposes upon its vantage points.

Figure 5. Studies of vantage points in the courtyard of the Salk Institute, La Jolla. Left. Figure showing the field of view (ranging between 200-1500) needed to see the central office tower in the left bank at its full height. It is calculated in this way: 1) measure the nearest distance from a location to the study tower in the 2D floor plan. 2) using arctangent function to get the field of view. This function takes the ratio of two sides of a right triangle (number) and returns the corresponding angle. One side is the nearest distance, the other size is the difference between the height of study tower and height of a normal person's eye level.

Right. The number of facades of the target office tower (varying between 2 and 6) seen from each location. In a very limited area (pink) can all 6 facades be seen simultaneously. Illustration: Yi Lu.

8.

To sum up briefly, the two levels at which the designers engage with visual cues, first selecting them and then manipulating them, create imaginative engagement. At first it appears that depiction lies at the heart of such an exercise; that is, in manipulating the visual cues to create depictive forms (in Uruguayan Art Deco), or depictive space (in early Corbusian houses), the designers can develop powerful metaphorical readings of buildings. But we also saw that while predominant, visual representation or depiction, is not the only mode through which visual articulation may develop imaginative attention. It is also possible to do that by deliberately creating buildings that resist such depictive readings and so create an imaginative engagement that directs attention back at the activity of a perceiving subject (in Herzog and De Meuron's later work). Our final case shows how, as exemplified in Kahn's Salk Institute, the manipulation of visual cues can be not obtained not just by articulating the building structure, but also by articulating the spatial organization and controlling vantage points.
A few insights fall out quite naturally even from a short discussion of these cases. First, it is not in abstract properties of visual artifacts that their imaginative power can be found, but rather in the choice and manipulation of the specific set of cues that are brought into play. Second, in manipulating visual cues to create depictive forms, or to assert the non-representational nature of their work, the designers are seldom concerned with simple aesthetic tasks like making a building look good or conveying a specific idea. The concern with visual form—at least in the case of critically acclaimed buildings—is not a closed or teleological matter of discovering the right form, but rather it is the matter of an open-ended search towards meaningful and engaging form making. If we add to these insights the idea that corporeal form (the physical form from which the visual aspects of the form are grounded) is not so much a resultant, but rather a generator of spatial form (Bafna, 2003), then the role of visual form begins to take on a decidedly critical factor in our understanding of architecture.

For all this, these examples, while sharpening our understanding of the visual functioning of buildings, still leave several details sketchy. A very obvious next step is to conduct studies that are able to actually test whether the manipulation of visual cues in buildings like the Villa Stein, or the de Young museum, actually produces the effects that we assume, and perhaps even measure the size of such effects. If successful, such studies of perceptive reaction may have consequences broader than the understanding of visual functioning, for they may be point to a way to bridge the gap between philosophical and scientific studies of aesthetics. We have discussed earlier that there is an increasing interest in what research from neurosciences, studies of vision and perception, and psychology may have to offer research in aesthetics, art-history, and architecture. Although this work is becoming increasingly popular, these studies have also been received with some amount of caution and disagreement within the philosophical and scientific community (Bennett and Hacker, 2003; McGinn, 2003). Our account suggests that the use of findings from scientific studies of human perception and vision works best if it is approached with specific art-historical or art-critical problems in mind.

Finally, from the point of view of space syntax research, this approach adds to the many ways in which visual design of physical form may be linked to the spatial organization of the building. A full account of how built environment functions should include both organization of space and visual articulation for social ends as well as for imaginative engagement.

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