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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

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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.

1.

Buildings invariably carry in their appearance signs of deliberate visual design. That is to say, they exhibit signs of care taken to organize or control their appearance, often with a seeming purpose that goes beyond constructional logic, or requirements of spatial organization. Extensive codified rules for visual articulation of buildings in different canons of architectural tradition are a manifestation of this phenomenon. And, of course, architectural history has for a long time been a matter of studying, organizing, or interpreting the visual appearance, or style, of building. Why should buildings have this quality? Pat answers to the question lead to discussions of general human tendencies—a need for order, or for harmony—which in more sophisticated treatments lead to the recognition of complex aesthetic propensities hard-wired in our mind, such as peak-shift towards certain formal qualities or proportions (Ramachandran and Herstein 1999), or the ability to focus independently on vertical and horizontal lines (Zeki 1999). The trouble in these answers lies in their assumption that visual design in buildings is oriented towards achieving certain describable physical properties in artifacts. If it were true, however, we would see all buildings converging towards key aesthetically normative forms, whereas in practice, we encounter phenomena such as stylistic change and development. An alternative approach, which we take up in this paper, is to give a functional account of visual design; in short, how does visual design function, and what qualities of visual design enable it to function as it does?

We argue that one critical, perhaps over-riding goal of visual articulation of buildings is to create in the observer a selective attention to the building, such that the observer engages in a sustained perceptual engagement with it. This goal of visual design, incidentally, is shared with other visual arts, which includes pictorial arts such as painting and photography, and what we might call plastic arts, such as sculpture. We mention this generalization in passing, noting just that the reason for it comes from our acceptance of a particular account of aesthetic functioning, which distinguishes the work of art from any other kind of artifact (Danto 1981). Here, however, we will focus on architectural works alone (which may be buildings, but possibly also drawings or models of possible buildings). We argue further that in perceptually engaging with the work, the observer is engaging in an act of imagination in which the work acts as a necessary prop and guide. This last statement needs some clarification; specifically, the sense in which we use the term imagination needs to be sharpened. We take our cue from Gregory Currie, and call the particular sense of imagination that we use here, 'recreative' imagination (Currie and Ravenscroft 2002, 9-10). Recreative imagination is involved when we put ourselves in the place of another (the other possibly being our own counterfactual self), and respond to the world as the other does. It can be distinguished from 'creative' imagination in which we might refer to a mistaken belief about something. Our claim, then, is that the visual articulation of buildings is designed to prompt such an activity of recreative imagination in the observer, and not only that, but to guide it in way that keeps it anchored perceptually on the work.

It can be objected that this account asks too much of visual articulation in buildings—that some, even most, buildings are articulated just to look right or to look proper, aimed at satisfying some conventionally normative criteria of order, and not to evoke such imaginative engagement. What our account then may be addressing is a narrow range of buildings, which lay claim to being works of art, and to do something more than look right. We are content in this paper to accept that position, at least provisionally. But we do want to note that it is difficult in practice to draw a strict line between the types of buildings which just look right and those which can be claimed to

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function as works of art. A better position would be to claim that there exists a continuum of visual functioning, the term defining a particular kind of activity by which an observer interacts with a building, which is grounded in basic operations shared by all observers, and that in some cases, dependent not only the design of the building, but also the ability, knowledge, and inclination of the observer, works might give rise to the kind of imaginatively sustained perceptual engagement that we have described. We feel this position is better if for nothing else than for pure economy of explanation; it provides us with a single theory to explain for visual articulation in all buildings, or for that matter, architectural works at large.

2.

If our account of visual functioning is accepted, then there follow necessary consequences for the designer. How to ensure that visual articulation will have the necessary effect, or lead to imaginative perceptual engagement? One immediate problem here is to use the visual articulation to bring about a mental activity, but not dictate it; visual engagement with a building, while it lasts, has to be self-motivated and self-sustaining. There is a seeming paradox in this requirement, for 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, 70), we learn that this paradox actually rests on 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. The problem that remains then is a practical one. What is required of visual articulation in buildings to ensure imaginative engagement? To understand how the visual articulation of buildings responds to such a demand, we believe it has to meet two conditions upon which visual functioning of architectural works rests.

The pre-condition for visual functioning is set by universal and innate perceptual tendencies that we possess, and 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. It makes sense for the designer to rely on such innate tendencies because, first, this would ensure a consistent and predictable response from a suitably primed and co-operative observer, irrespective of individual, or often even cultural differences, and second, because, it allows the designer to cast himself, interactively during the design process, in the role of the spectator and so directly judge the implications of design decisions. This reciprocity has been noted by Wollheim (for instance, Wollheim 1999) and is widely supported from different accounts of designers at work, both systematic and anecdotal.

In addition to this, there is a second condition that visual articulation has to meet, needed because our innate perceptual tendencies do not lead naturally to the imaginatively driven perceptual engagement that is demanded by our account. This second condition is that the visual articulation must offer some friction to our perceptual activity, counteracting some of the innate tendencies of our perceptual system. This may appear as a contradictory requirement, but the reasoning behind it is that the purpose of visual articulation cannot merely be to help the observer reconstruct the actual shape of the building—indeed if that were the case, the whole issue of visual articulation would be moot, since our visual system would reconstruct some stable visual forms irrespective of the designer's decisions, much as it does in an non-designed environment. If visual engagement with the building is to achieve an imaginative interaction with it, it should lead the observer to see more in the building than the building itself. In the following sections we will attempt to clarify this further; we begin with first proposing how such a friction or resistance to our visual system may be obtained.

3.

It is a central problem of our visual system that information arriving to it is fundamentally ambiguous—it essentially consists of information regarding areas of relative intensity on different parts of the retina (for the classical statement of the problem of form perception, Marr 1973; for a more recent

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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 description, Hoffman 1998). Several characteristics of the visual system are significant for our account of visual articulation:

1. That our visual system is constructive in nature—in other words, it actively constructs, using rules that can be recreated, the objects and scenes that we see.
2. That 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. That 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.
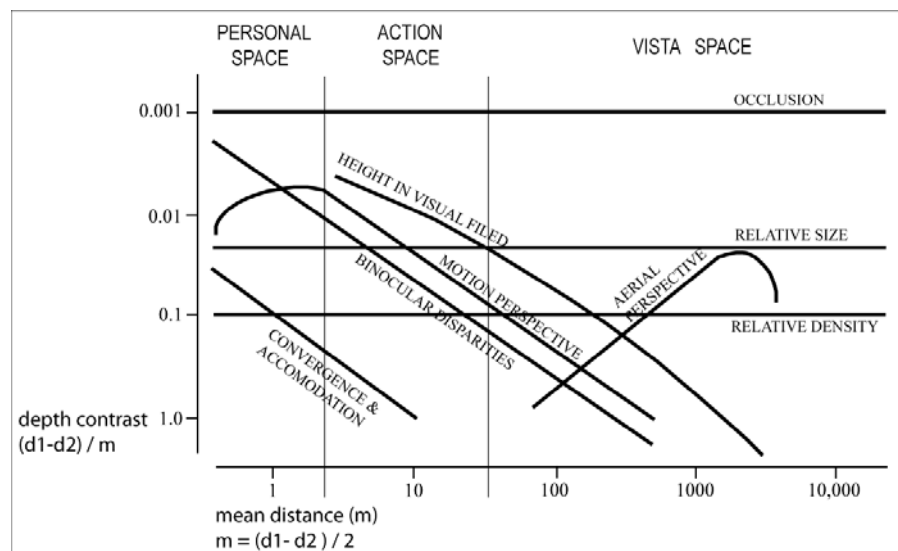

Figure 1
Plots of minimum perceivable thresholds for nine major sources of visual information about depth. Along the x-axis is plotted the mean distance from a pair of target objects (in meters on a log scale), and along the y-axis, the minimum discernible difference in depth per unit mean distance. A depth contrast of 0.1 or 10%, is taken as an acceptable practical threshold. Redrawn from Cutting and Vishton (1995).

These properties are of interest because they allow the designer some necessary openings 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 spectatorship. 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). But even more, the fact that our seeing essentially consists of construction of provisional, best-case, descriptions, offers the designer an opportunity to suggest alternative readings of the designed building. He or she can do this in different ways—either bluntly, by purposefully fooling our visual system, as psychologists do when designing impossible figures

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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.

The two conditions for visual functioning that we had discussed in the previous section can now be rearticulated as two aims for the designer. 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.

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 are a discrete and independent set, not intended to come together into a single theory. Their main use was intended to offer concrete cases with which to flesh out the schematic ideas that we have developed so far.

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 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, 47-70; Margenat and Schelotto 1987). But as Nelson Goodman (1978, 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, 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

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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 Uruguyan Art Deco had developed a pronounced nautical imagery (for instance, 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 streamlined 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.

Visual Articulation in EL Mastil, Montevideo, Uruguay creation of phenomenal figures (top) contemporary iconic forms (left)

Figure 2
El Mastil, 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, 179-205; also, Goodman 1988, 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

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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], 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.
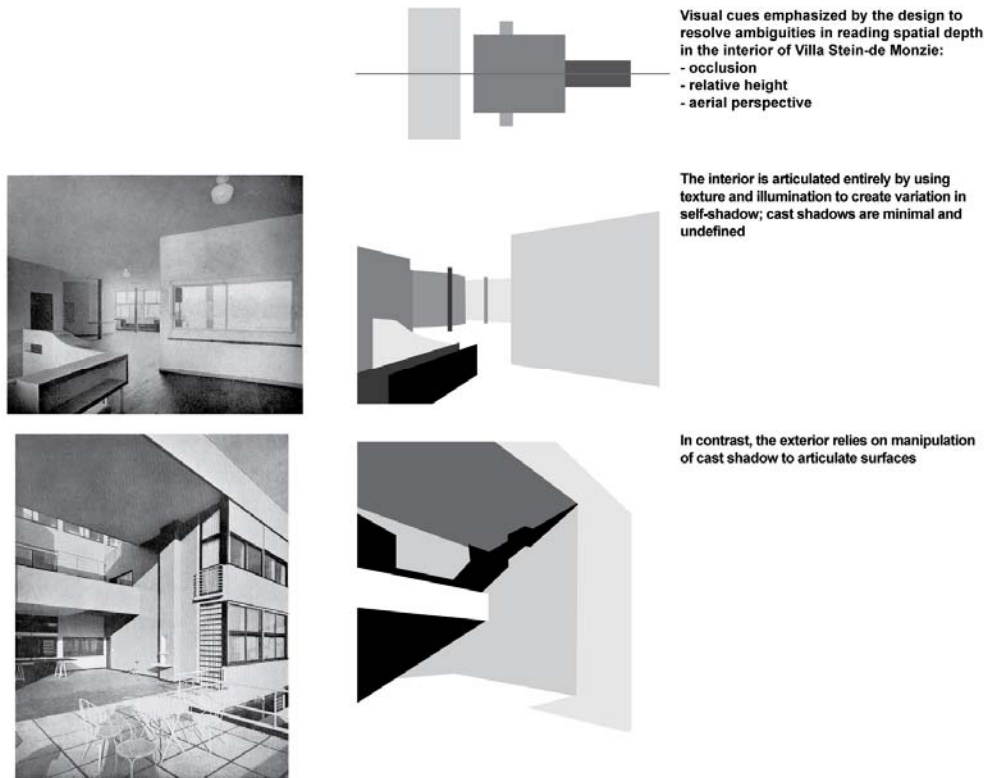

Visual cues emphasized by the design to resolve ambiguities in reading spatial depth in the interior of Villa Stein-de Monzie:
- occlusion
- relative height
- aerial perspective

The interior is articulated entirely by using texture and illumination to create variation in self-shadow; cast shadows are minimal and undefined

In contrast, the exterior relies on manipulation of cast shadow to articulate surfaces

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

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, 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).

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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 movement, 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, for instance, 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 building, 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 information 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 information, to form a coherent representation of the phenomenal space. The much talked about surface treatment reinforces this

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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 personal 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.
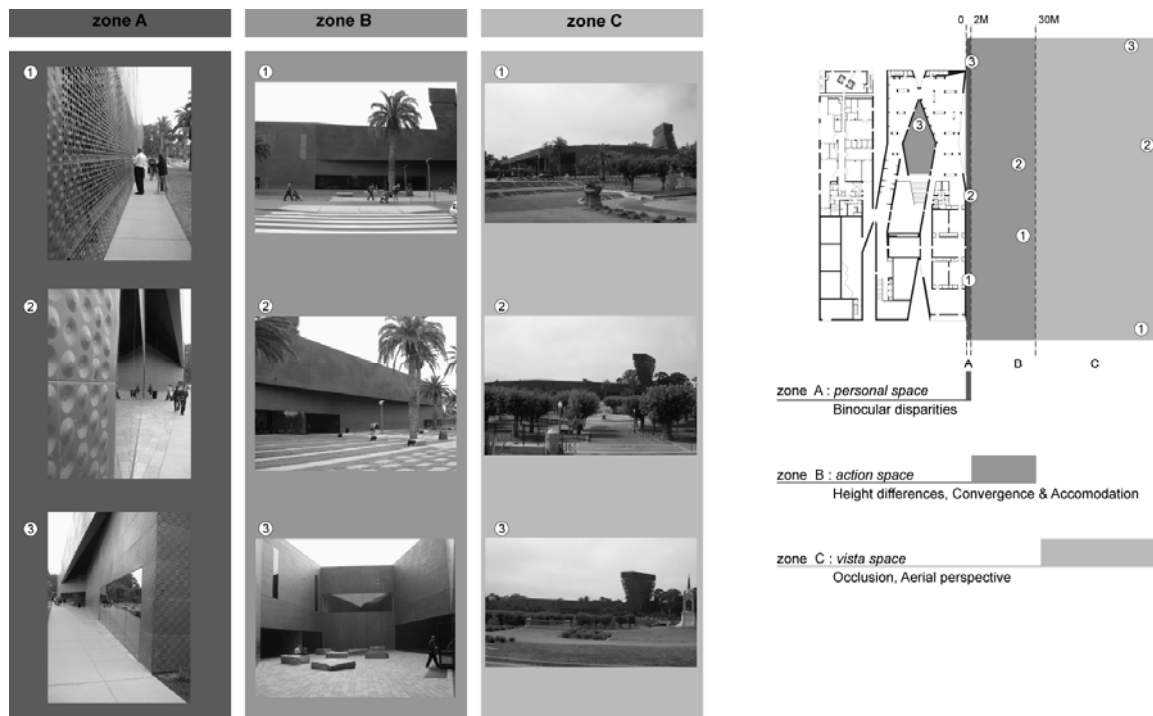

Figure 4.
Manipulation of visual cues in the De Young Museum, San Francisco. Illustration: Hyun Kyung Lee.

The use of visual articulation to prevent the observer from resolving the views of the building into stable and meaningful figural forms follows directly from the architects' aim to create buildings whose architectural qualities cannot be captured in photographs, drawings, or other representational 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 functioning. In other words, the building does invite and sustain perceptual engagement, although it remains 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.

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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 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 from 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.
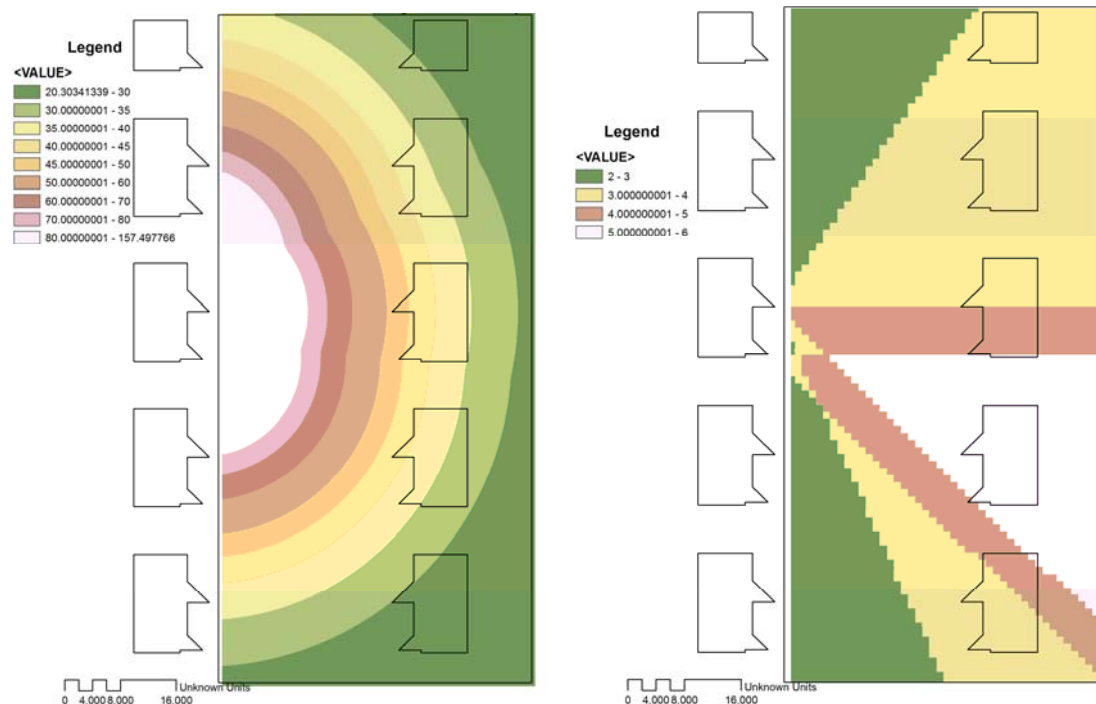

Figure 5

Studies of vantage points in the courtyard of the Salk Institute, La Jolla.

Left. Figure showing the field of view (ranging between 20°-150°) 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 otters 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.

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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 perspectively 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.

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 representation lies at the heart of such an exercise; that is, in manipulating the visual cues to create depictive forms (in Uruguyan 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 (again by manipulation of cues) 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). In either case, it is the deliberate manipulation of visual cues that creates an ostensibly distinctive environment and such an environment is necessary for an imaginative engagement to develop. Our final case shows how, at least in Louis 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. We are not in a position to generalize much more from this rather limited set, but at the very least, these studies offer a specific methodological approach to visual studies by directing attention to how articulation of form results in manipulation of cues. It is not in abstract properties of visual artifacts that their imaginative power lies, but rather in the choice and manipulation of the specific set of cues that are brought into play.

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. In recent years, with the provocative papers on aesthetics, especially of neuro-scientists such as Ramachandran (Ramachandran and Herstein 1999) and Zeki (1998), there is search for aesthetics properties of visual objects (or artifacts in some other media) that may be hard-wired in our brain. Such studies have been received with some amount of caution and disagreement within the philosophical community. Our account suggests that there may be neurological basis to aesthetic judgment, but that it would come into play indirectly, affecting our perceptual systems, on which any aesthetical functioning would be based. Finally, from the point of view of space syntax research, we are in a position to suggest one way in which visual design of physical form may be linked to the spatial organization of the building, in ways that are sensitive to the very different motivations and principles that may underlie both. 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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