

Inside the Architectural Box: Space and Relief in the Pergamon-Room

SPACE, *n*¹: 1. a. Without article: Lapse or extent of time between two definite points, events, etc. Chiefly with adjs., as *little, long, short, small*.

RELIEF³: 1. a. In the plastic arts, the elevation or projection of a design, or parts of a design, from a plane surface in order to give a natural and solid appearance; also, the degree of such projection; the part which so projects. (Oxford English Dictionary, Second Edition 1989).

I (Prologue)

The conference “Retrospective: Aesthetics and Art in the 20th Century” seems a particularly good occasion to reconsider theories of space and of pictorial representation, and their conflation into a distinctly modern *idea of architectural space* within the last century. After decades of scrutiny, one claim of architectural modernism remains largely intact today, if not completely unchallenged: the modernist style in architecture is thought to reflect a new “conception of space,” one that is the product of a structural change in human vision. It has been repeatedly argued that architecture of the 20th century had to be different from those of the preceding epochs since a new “man” perceived, experienced and conceived space differently. A number of authors, above all, Siegfried Giedion (1888-1968) diagnosed the revolution in the conception of space around 1910, particularly in Cubist painting.¹

In *Space, Time and Architecture* (1941), Giedion argues that the discovery of perspective in Renaissance epitomized a world-view that remained valid for four centuries, until the first decade of the 20th century. By breaking with Renaissance perspective, and by showing the object from several points of view simultaneously, Cubism inaugurated the modern conception of space. The new conception does not construe space as a three-dimensional static void, but introduces the fourth dimension, which Giedion called “space-time.”² Unlike the central and static interiors of Renaissance, modern architecture should reflect the dynamic nature and interdependence of space and time. Although Giedion finds Albert Einstein’s theory of relativity and the futurist “research into movement” as the pioneers of the new age alongside Cubism, he offers only a vague idea about how exactly the new concept of time is different from the classical models of temporality.³

Hence *Space, Time and Architecture* translates a particular interpretation of analytical Cubism into architecture, one that does not see fragmentation of the picture plane as a negation of the totality of composition as such. For Giedion, Cubism does not threaten to fracture homogeneous space. Quite on the contrary, it enables a more truthful presentation of the whole with the superimposition of multiple viewpoints. In his space-time we might detect a Neoplatonic bias against appearance (Giedion dismisses perspective since it is an imitation of appearances), and a quest for the “quiddity of things.”⁴

¹ 1. Siegfried Giedion, *Space, Time and Architecture* (Cambridge Mass.: The Harvard University Press, 1941), 355-63.

² 2. *Ibid.*, 357.

³ 3. According to Giedion “previously time had been regarded in one of two ways: either realistically, as something going on and existing without an observer... or subjectively, as something having no existence apart from an observer and present only in sense experience.” He does not specify, however, how the new concept of time will transcend this objective versus subjective dualism except for repeating several times that modern space and modern time are interdependent. His dualism of “realistic” versus “subjective” time seems a very simplified (mis)reading of Henri Bergson’s “durée.” *Ibid.*, 364.

⁴ 4. See the recent critique of Giedion’s “space-time” by Robin Evans, *The Projective Cast: Architecture and Its Three Geometries* (Cambridge Mass.: The MIT Press, 1995).

The Cubist discovery of a new space conception, according to Giedion, found its expression across fields and artistic genres. It was soon to take root in architecture, through Le Corbusier in France, De Stijl in the Netherlands, the Bauhaus in Germany, not to forget the achievements of Futurism in Italy and Constructivism in Russia, which were contemporaneous with Cubism in France. This interpretation, which eventually became orthodoxy, locates modern architecture as a consistent and integral part of a general aesthetic modernism. The “modern style” in architecture is presented as identical with the modern “conception of space.”

Not surprisingly, such literal translation of Cubism into architecture is not without consequences. One problem in Giedion’s “space-time,” for example, is apparent in his equivocal theory of “transparency.” In an often-quoted comparison of Walter Gropius’s Bauhaus building (1926) to Picasso’s painting *L’Arlésienne* (1911-12), Giedion argues that both Cubism and modernist architecture are guided by the principle of transparency. About Gropius’s Bauhaus, Giedion wrote: “it is the interior and the exterior of a building that are presented simultaneously. The extensive transparent areas, by dematerializing the corners, permit the hovering relations of planes and the kind of ‘overlapping’ which appears in contemporary painting.”⁵ In *The Projective Cast* (1995) Robin Evans effectively questions Giedion’s translation of Cubist “transparency” into architecture. In contrast to Giedion, he notes that architecture offers a case exceptionally different from the visual arts since “substantial yet representational, it is more equivocally of the world, and at the same time *about* the world than any other art form.”⁶ Therefore the question is whether a radical reformulation in the pictorial *representation of space* be directly translated into a new *idea of space* in the building-art? By equating the transparency of the glass curtain wall of the Bauhaus with the “simultaneity” and “overlap” of viewpoints on Picasso’s canvas, Giedion collapses the difference between pictorial and physical space.⁷ Paradoxically, the “transparent” architectural box of the Bauhaus, which Giedion takes as a literal translation of cubist fragmentation of the picture plane, offers not a fragmented, but a homogeneous, unified and isotropic space in architecture. (Figures 1, 2).

On the other hand, if the free-flowing and transparent space of modern architecture is not necessarily a direct translation of Cubism, and if the general revolution in the “space conception” is a fiction of modernist theory, a series of questions will emerge. Can we still determine common aesthetic principles that would explain modernism in art and architecture? What exactly makes the transparent curtain wall and the integration of the inside and the outside in the “*plan libre*,” the true expression of the modern age? Is there a rationale for “transparency” in modern architecture beyond stylistic preference? Did the early 20th century experiments with space, time and motion transform the architectural box? Questions of that sort can be multiplied.

The present essay is a work-in-progress that was originally conceived as a fragment of a longer piece on the question of representation in the 20th century architecture. It starts with the proposition that the modernist translation of pictorial to architectural space—Giedion’s “space-time” in particular—can no longer be taken for granted. Instead, we shall inquire into other ways to engage the representative-content of the architectural box in the 20th century and negotiate its boundaries with the ‘virtual space’ of the picture plane.

The following pages focus on an architectural gallery, the Pergamon-Room of the Berlin Museum (1930), an interior that was designed specifically to reproduce the “space conception” of another time and another place. The fact that the Pergamon-Room was conceived as a part of a “museum of architecture” certainly complicates the relation between “pictorial” and “real” spaces. Nevertheless it is my intention to discuss the Pergamon-Room as a heuristic model of a museum interior where the 20th century aesthetics of space came to the foreground. Along the course of the study we shall engage theories of *appearance*, *idea*, *form*

⁵ Giedion, op. cit., 403.

⁶ Evans, op. cit., 65.

⁷ Cf. Colin Rowe and Robert Slutzky’s seminal essay “Transparency: Literal and Phenomenal,” in Rowe, *The Mathematics of the Ideal Villa and Other Essays* (Cambridge Mass.: The MIT Press, 1976).

and *representation* of space in the German aesthetics, and reconsider a theory of “kinesthetic” perception, from which the modernist “space-time” seems to have departed.

II

Let me begin by noting the difficulty to describe the object. The truth is that we do not know exactly what the object is, or what it stands for. Some earlier accounts call it the “Zeus Altar of Pergamon,” others simply the “Great Altar,” referring to a modern presentation of a lost monument. This semantic difficulty, that is, the collapse of the difference between the referent and the reference, did not trouble many who undertook a description before, and their descriptions are often brilliant. Take for example the museum guides, those wonderful annunciations of the object as an original work of art. Most visitors would also agree that there in the museum we stand in the presence of one of the *opera nobile* of the history of architecture. The object reached a wide audience, and became a familiar image to people, many of who did not even visit Berlin to see it with their own eyes. A wide range of photographs, reproduced in all possible forms and in most unlikely places constructed a large field of reception. Yet, what sort of cognate is this monument? Is it a thing? Can it be displaced and replaced? And what about the modern space of the gallery, the architecture of display, the optical reality-effects, the discursive and aesthetic parameters that sustain the authenticity of experience?

From a strictly architectural point of view the object of experience is a modern interior. The observer enters the room from a gate off the center, facing the main exhibit with a sharp perspective angle. The Pergamon Hall, or the “*Pergamonsaal*” as it is called in German, is a rectangular prism of approximately 20m high, 51m wide and 32m deep. On all sides, the hall is surrounded with light-colored walls with no window to the outside with the exception of its translucent ceiling. Filtered through the double layers of the glass roof, daylight gives the room its peculiarly austere character. The exhibited objects are arranged alongside the inner walls of the room. The space that the giant prism defines is mostly left empty in the form of a large void. (Figures 3, 4).

The moment of entrance was no doubt conceived as one of the most important aspects of the Pergamonsaal, leaving a permanent impression on the viewer. The visitor’s attention is immediately directed at the façade of an ancient monument from the Hellenistic city of Pergamon, reconstructed on the opposite side of the room. Two wings of this façade extend from the rear wall of the Pergamonsaal towards the observer. As sculptural objects in space, these two wings give the impression that the reconstructed altar is a freestanding monument. They also frame the overall composition as seen from the entrance.

The other three walls, which remain on two sides and at the back of the observer at the moment of entry, are mostly left unoccupied. They raise 20m from the ground and meet the glass ceiling with a simple ornamental moulding, a classicizing cornice. The flat and mostly unarticulated surfaces of these walls give the impression that the altar is exhibited inside a giant Platonic prism.

Somewhere near their lower edge, these three walls exhibit a long frieze in sculptural relief. The eye of the observer scans horizontally on the frieze, although it is placed significantly higher than the eye level. Approximately 130 feet in length, the “Gigantomachy frieze” once decorated the four sides of a freestanding altar in Pergamon. It represents a scene from the mythic battle of the Olympian gods with the giants. The frieze, which depicts the extremely expressive forms of bodies in motion, inspired modern artists and writers alike since Carl Humann shipped its fragments to Berlin during the excavations of Bergama in 1878-1886. Given its cultural and art historical importance we may assume that the display of the Gigantomachy is the primary concern that shaped the Pergamonsaal of the Berlin Museum. Here in the hall we may observe two different strategies of display. Most of the marble panels of the frieze are exhibited on the walls of the room, independently from the reconstructed altar. They are not exactly hanged on the wall in the way a picture canvas is displayed in a gallery, rather are incorporated into the plaster finishing of the modern walls. Only a small portion of the frieze, which actually corresponds to two wings of the altar beside the great stairway, is exhibited with its architectural context, as incorporated into the reconstructed façade. (Figure 5).

As the observer proceeds towards the façade, and reaches the broad flight of the great stairway, the experience takes a different form. The viewer no longer contemplates the altar as a tableau from distance, rather walks through the scenery. The large steps, somewhere in the middle of the Pergamonsaal, define the boundary that demarcates the space of the museum *in front* of the altar, from the space of the altar proper. Judging from its white marble finish, we may conclude that the stairway is a part of the original altar, more than a modern architectural element. Yet the visitors are not only allowed to step on it, they are encouraged to ascend the stairs. This is in sharp contrast, for example, to the columns, base and entablature of the altar, which are apparently protected against tactile perception. Just like in any other museum, security officers watch the crowd that might feel compelled to actually touch the monument.

The stairs take the viewer through the altar, presenting the sculptural frieze on both sides. Particularly the sculptural figures that are kneeled on these very steps powerfully integrate the exhibit with its frame. At the end of the stairs the viewer reaches a higher platform, which across a row of Ionic columns leads first to a vestibule overlooking the Pergamonsaal, and then, through a gate, to a separate exhibition room of the museum. This room is named after Telephos a separate frieze that narrates the legend of foundation of the city of Pergamon. Here, we shall observe a series of complimentary impressions. The gallery, which runs parallel to the reconstructed façade, provides the visitor with a view of the Pergamonsaal from above, and through the columns of the peristyle. The impression is certainly that of looking at the Pergamonsaal from inside the monument: a view from inside out. The Telephos Room constitutes an architectural interior, which is curiously experienced as distinct from the overall interior of the Pergamonsaal. This architectural boundary between the Pergamonsaal and the Telephos Room is perceived as the threshold between the outside and the inside. Even though the observer physically leaves an exhibition hall and enters another, a masterful treatment of enclosures gives the visitor the impression of entering inside of a Greek temple. Hence the modern Pergamonsaal is translated into an *impression* of the antique Pergamon Altar, as seen both from outside and inside.

A closer look suggests that the Pergamonsaal consists of critical spots, which unfold the optical construction of its reality-effect. Characteristically, these points are located at the very sites where the reconstructed altar meets the museum's wall. If we ignore for a moment the two freestanding wings, and just focus on the central colonnade of the Zeus Altar, we will see that this central section is a sculptural articulation of the modern partition wall between the Pergamonsaal and the Telephos room. From a distant perspective, however, the central colonnade looks like the peristyle of an ancient monument, while the section of the wall immediately above the colonnade is dematerialized. In order to give the Pergamon Altar its discernible "façade," the eye erases the modern partition wall in the background, as if it is simply the sky. This effect that brings the Pergamonaltar in the foreground while defacing the architectural frame, is the result of a simple contrast between highly articulated façade, attributed to antique Pergamon, and the "neutral" surface of the modern museum. Yet, the aesthetic aspect of this contrast is nevertheless remarkable: The Pergamon Altar is read as a work of art against the background of a non-ground. (Figure 6).

So far, we have observed that the Pergamonsaal consists of carefully chosen visual effects which translates a modern interior into an antique building, and that this translation occurs in two distinct, yet, complementary spheres of perception. The first sphere is analogous to the contemplation of a picture. At the moment of entrance, the observer sees the Pergamon Altar as an "ensemble" at a glance. The aesthetic distance between the observer and the object of perception lends the reconstructed altar an effect of completeness, which it physically lacks. The large void in front of the altar magnifies the effect of depth and compels the observer to read the sculptural relief as the image of a building. It is also important to note that this effect is not necessarily a *trompe l'oeil* in the limited definition of the term. It does not construe the third dimension out of a two-dimensional picture. Yet the reconstruction of a *representative part*—which is technically speaking a combination of freestanding sculptural forms and sculptural relief, conveys the *effect* of the whole monument. In analogy to rhetoric I shall call this communicative strategy an architectural synecdoche, the part that stands for the whole.

Secondly, the architectural promenade through the altar gives the visitor the impression of occupying the original space of a Hellenistic building. More specifically it gives an impression of crossing the boundary between inside and outside. It evokes a sense of enclosure and exposure in the face of an imaginary

landscape. The distant perception of the altar as a picture and the subsequent experience of an enclosure do not conflict one another due to, what we may call, a scenario of experience, or rather, a mnemonic sequence. In other words, the observer is overwhelmed by the *vision of an ensemble*, prior to examining the reconstructed altar with close-ups in profile. The vision proceeds from the general to the particular and constitutes a visual field that restores an architectural continuum. Even though the wall of the gallery cuts through the altar as a picture plane, the impressions of a moving eye restores the third dimension beyond this plane. The space of the Pergamon Altar extends in front of the viewer as a virtual space that is perhaps comparable to the 19th century stereoscope.

A perspective view of the altar from distance was the initial idea that led the German architect, Alfred Messel to design the room in the form of a large, unoccupied void in 1907. Two perspective drawings by Messel, dating from this period, illustrate the Pergamonsaal both from inside and outside. Despite radical changes in its shape and program, the Pergamonsaal, maintained this basic idea. Yet, this said, we have to acknowledge that the interior designed by Messel in 1907 was not a “prisme pure” to use a modernist term. Indeed it was far from it. A false ceiling, which rounded the corners of the cubical space was to transform the space into a reinterpretation of the Pantheon-type volume with a distinctively Pergamene decoration.⁸ It was rather in the subsequent revisions from 1911 to 1928 by the architects Ludwig Hoffmann and Wilhelm Wille that the Pergamon Room lost its distinctive character as a style room. Hoffmann and Wille’s abstract-Neoclassicism modernized the space into a cube with citations of Greek architecture. It was through this process that the façade of the Pergamon Altar ceased to be read as an integrated part of the interior, an ornament, but is transformed into a self-contained rhetorical part, a synecdoche of antiquity, so to speak, which floats in an unfamiliar, modern space.⁹ (Figure 7).

For the modern viewer the prism of the Pergamonsaal seems to function solely as the frame of aesthetic experience in the Kantian sense of the word. The modern museum fulfills its function only when the exhibited object is aesthetically differentiated from its frame. The prism, which defines the Pergamonsaal, displaces the work from its original context and induces it to acquire the status of art-for-experience (*Erlebniskunst*). Just as this strategy depends on the material presence of a work of art in the interior, it defaces the architectural frame.

Paradoxically, through this very process, the original Altar became subordinate to its frame of display, the giant prism. In striking contrast to the historical altar a freestanding building, its reconstruction in Berlin is reduced into a sculptural relief inside the museum. The modern reconstruction created the atmosphere of experiencing the temple not by restoring it to its entire form, rather by translating its façades into four picture planes, and pasting them on the interior walls of the museum. To put it polemically, the modern presentation deprived the Great Altar of Pergamon from its *buildinghood*. The status of the altar as a freestanding tectonic corpus is compromised to achieve the visual effect of an artistic whole. To the contrary of the common impression, It is not that a historic altar is relocated and contained in a modern interior, but the prism functions as a giant optical apparatus that construe Pergamon as a modern *spectacle*.

In lieu of the Great Altar of Pergamon, we have in Berlin four picture-planes, each of which restore an image of the ancient monument in the form of a sculptural relief. Hence a total image of the altar is constituted only for an observer in motion, and only in the *event* of experience. For an understanding of this experience it may well be useful to survey briefly two theoretical problems that emerged in the aesthetics of the turn of the last century: *space as perceived by an observer in motion*; and *space as a representation of bodies in motion*.

III

⁸ 8. Alfred Messel, Project for the Museum Island, Antiken, Deutsches und Vorderasiatisches Museum, Berlin 22 August 1907, the Pergamon Museum, Zentral Archiv, Baudokumentation, I/BV 494.

⁹ 9. Ludwig Hoffman, Project for the State Museum, New Building (Hoffmann’s revision’s on Messel’s project), 1911 the Pergamon Museum, Zentral Archiv, Baudokumentation, I/BV 496.

Highly innovative, and already fully “modern,” a theory of space came into the foreground at the turn of the last century alongside the simultaneous rise of psychology, physiology and the Neo-Kantian aesthetics in Germany. Besides its far-fetched manifestations in the visual arts, the new theory of space eventually called the 19th century theory of “tectonics” in architecture into crisis. That which interested the theorists of these years was no longer the harmonious agreement between the “structural core” and the “artistic dress” of a building, as defined in Karl Bötticher’s analysis of the Greek tectonics in the 1850’s. The problem of architecture was increasingly posed as the sensory effects of architectural form on human mind and body. Developments in the theory of empathy and psychology particularly inspired a new generation of architectural historians. Heinrich Wölfflin’s dissertation, “Prolegomena to a Psychology of Architecture” (1886) and August Schmarsow’s inaugural lecture in Leipzig, “The Essence of Architectural Creation” (1893) are symptomatic of a landslide in architectural theory.¹⁰

Here, we will start with a question that was of great interest to theoreticians of German aesthetics in the late 19th and early 20th century: how is the appearance [*Erscheinung*] of an object in space translated into artistic representation [*Darstellung*]? And what does this translation teach us about the modern concept of space [*Raumvorstellung*]? Although the 20th century phenomenology made this question largely obsolete in philosophy by gradually freeing the space from the mental eye of the subject, the late 19th century aesthetics made a permanent imprint on the theories of space in modern architecture.¹¹

We shall cite only one text among a wide range of Neo-Kantian work: “The Problem of Form in the Visual Arts” by Adolf Hildebrand (1847-1921), written in Germany in 1893. Unlike other figures of the German Aesthetics that held university posts, Hildebrand was a practicing sculptor who made a name by reviving the classical genre of bas-relief. “The Problem of Form” is his unique contribution to theory, and apparently written under the supervision of Conrad Fiedler (1841-1895). His treatise nevertheless has the virtue of clarity: in searching the laws of perception of pictorial and real space, Hildebrand draws his most striking examples from the representation of the third dimension in the genre of bas-relief.¹²

Having posed the question of appearance, form and artistic representation, Hildebrand suggests that nature does not offer forms as such, yet form is a projection of the human mind, a synthetic idea. There is of course nothing innovative in such statement, for it rehearses a well-known preposition of the idealist aesthetics. Despite his idealism, Hildebrand nevertheless seeks to employ the findings of perceptual psychology in order to discover the objective and universal laws of artistic representation in the visual arts.

In *The Problem of Form*, the author starts with the question of how the third dimensional space is perceived from a single viewpoint. His initial assumption is that a single eye sees the object as flat, and two dimensional, which he calls “surface image” [*Flächenbild*] that leads to “visual ideas” [*Gesichtsvorstellungen*]. The second type of vision is construed by the impressions of the eye in movement: “the mobility of the eye scans three dimensional object and transforms perception into temporal sequence of images.”¹³ This, Hildebrand calls literally “motion-ideas” [*Bewegungsvorstellungen*], translated into English as “kinesthetic.” The author’s use of “motion” or “kinesthetic ideas,” could in fact be misleading. In his theory Hildebrand does not refer to a continuous flow of movement—like for example in Henri Bergson’s contemporaneous conception of the “durée.”¹⁴ “Motion-ideas,” for Hildebrand, is nothing else than the impressions of an eye registered from successive, but nevertheless fixed positions.

¹⁰10. For a recent anthology of German aesthetics, see Harry Francis Mallgrave and Eleftherios Ikononou, *Empathy, Form, and Space: Problems in German Aesthetics, 1873-1898* (Santa Monica: The Getty Center for the History of Art and the Humanities, 1994).

¹¹ 11. The essential difference between the way this question was posed in the late 19th century, and my attempt to revise it, lies in the fact that I see the modern concept of space less as a set of structural rules that explain the essence of artistic creation, and more as a discursive and historical phenomenon.

¹² 12. Adolf Hildebrand (1893), *Das Problem der Form in der Bildenden Kunst*, 3rd revised edition (Strasbourg: Heitz & Mündel, 1901). Citations and page numbers are from the revised English translation published in Mallgrave and Ikononou, op. cit.

¹³13. Hildebrand, op. cit. 229.

¹⁴14. Henri Bergson, *L'Évolution créatrice* (Paris: Félix Alcan, 1907). English translation: *Creative Evolution*. Arthur Mitchel, transl. (1911). (New York: Random House, 1944).

This actually explains why the superimposition of images registered simultaneously by two human eyes is already a “motion-idea,” even though the observer might be at a standstill. Hildebrand takes the principle of stereoscopic vision—which was well known since English physicist Charles Wheatstone’s discovery of stereography in 1832—as the basis of his theory of perception: the superimposition of two surface impressions by two eyes, each of which looking at the same object from a slightly different viewpoint mentally constructs the space as three-dimensional.

Yet, “The Problems of Form” does not only limit itself to an explanation of how space is perceived, but also goes on to systematize the very *idea of space* according to the same optical principle. According to Hildebrand, the human mind perceives objects in space by reducing them into their most-revealing contours, as well as by means of a general idea of depth. In the 5th chapter of his treatise, “The Concept of Relief,” he argues that the genre of sculptural relief offers the best example to demonstrate this point. Working on a relief, the sculptor achieves a representation of space by carving surfaces that gradually recesses towards the background. As the figures on the foreground are given form, the sculptor starts to carve the surface on the subsequent stratum. This provides Hildebrand with a metaphor to explain the rules that govern human perception of the third dimension:

One can illustrate this principle by imagining a figure placed between two parallel panes of glass, positioned in such a way that the figure’s outermost points touch the glass. The figure then occupies and describes a space of uniform depth, within which its component parts are arranged... The figure lives, so to speak, in a planar stratum of uniform depth, and each form tends to spread out along the surface, that is to make itself recognizable. Its outermost points, touching the panes, continue to lie on a single plane, even if the panes are taken away.¹⁵

Hildebrand’s generalization of the metaphor of bas-relief into a theory of space has two interesting implications. First, the author visualizes the idea of depth with a series of planes running at right angles to the line of sight.¹⁶ This space, we may conclude, is literally transparent to the extent it is conceptualized as a recession of transparent or imaginary picture planes.

Hildebrand’s conception of space sounds, at first, quite mechanistic so much so that it reminds the reader of the technique of photogrammetry, an optical apparatus that maps third dimensional space based on the principle of stereo-photography. As Herta Wolf shows in her recent study, Albrecht Meydenbauer of the Prussian Royal Metric Institute is credited for using photogrammetry for the first time in the 1860’s in order to survey of architectural monuments.¹⁷ Architectural photogrammetry—just like Hildebrand’s “kinesthetic” images—depends on the register of a building by two different cameras, and from slightly different angles. If the exposure details of two successive photographs, such as the focal length of each camera, their distance from one another, and their exact location vis-à-vis the monument are known, the third dimension of architectural space can be calculated and registered. The output of photogrammetry is a two dimensional map that represents depth in function of the recession of the building parts from the picture plane. This technique codifies architectural space as superimposition of transparent contours, and reconceptualizes it as a relief.¹⁸ Having started from the principle of stereoscopic vision, and by systematizing the third dimension as a series of planar strata, Hildebrand seems to use photogrammetry as a methodological postulate of his theory of space.

Secondly, Hildebrand’s theory refuses that *mimesis* is the basis of artistic representation. A picture is not an imitation of the exterior appearance of the object. Instead he redefines the pictorial space, and the real space as two parallel universes that are governed by the same rules of evoking psychological stimuli.

¹⁵15. Hildebrand, op. cit. 251.

¹⁶16. Michael Podro, *The Manifold in Perception: Theories of Kant from Kant to Hildebrand* (Oxford: The Clarendon Press, 1972), 82.

¹⁷17. For the origins of architectural photogrammetry in Germany see Herta Wolf, “Das Denkmälerarchiv Fotografie / Photography: An Archive of Monuments,” *Camera Austria* 51/52, 1995.

¹⁸18. Photogrammetry is primarily used today for survey of territory and production of cartographic maps out of aerial photographs.

The parallel between nature and the work of art, therefore, is not to be sought in the equality of their actual appearances but rather in the fact that they have the same capacity for evoking an idea of space. It is not because of an illusion that we believe the picture to be a piece of reality—as in a panorama—but because of the power of the stimulus contained in the image.¹⁹

Hence, Hildebrand intends a general theory of perception that reconciles the physiological theory of perception with psychology of artistic form. On one hand, he remedies the lacuna of science by bringing the question of representation into the foreground. On the other hand he intends to codify artistic representation by objective principles. When we think of this enterprise in the context of the late 19th century experiments with space, time and motion its importance will be clear.

It was French physiologist Étienne Jules Marey (1830-1904) who carried out the better-known experiments on human and animal motion in the late 19th century. Marey was inspired by the work of English-born photographer, Eadweard Muybridge in California. Having combined a battery of twelve to twenty-four distinct cameras, Muybridge recorded the successive stages of the walk, the trot and the gallop of a horse in a series of photographs. As the shutters of the instant-cameras were released successively, Muybridge attained the photographs of the movement, each of which shows a spatial position assumed by the horse at a given segment of time. Instant photography both gave access to a wider scopic field, and froze uniform sections of movement. Such images were previously inaccessible to the human eye due to the speed of the motion.²⁰ When published, Muybridge's photographs of the galloping horse arouse some enthusiasm, but mostly, incredulity. The instant photographs did not resemble any of the previous representation of galloping horse, a major theme in the history of Western art. In order to convince his audience and prove the authenticity of his photographs, Muybridge cast the images upon a screen successively thanks to a lantern slide-projector, which he invented for this purpose. The performance, which took place in the San Francisco Art Association in 1880 is well known in the history of cinema as the first presentation of motion-picture.²¹

Marey's invention of "chronophotography" further developed Muybridge's idea and applied it to the scientific study of animal-motion. Unlike Muybridge's installation of multiple cameras, Marey developed a single camera of magazine plates that could record several snapshots, which he used to photograph the movements of a flying bird in 1882.²² The indexical register of the photographic apparatus, Marey believed, mapped the human and the animal body in space with a mechanistic precision. The human eye, however, could easily be deceived. This, according to Marey, explained the discrepancy between Muybridge's serial photography and the representation of the galloping horse, for example in the ancient art of bas-relief. He went as far as claiming that artistic representation of movement in the past, particularly that of the galloping horse, was simply erroneous. For, chronophotography demonstrated that a horse does not assume the position depicted on bas-relief at any segment of time. The "error" of the sculptor, according to Marey, was caused by the inability of human eye to register fast movement. (Figure 8).

There is, in fact, a superficial resemblance between the ancient genre of bas-relief that represents figures in movement, and chronophotography that dissects movement at uniform segments of time and registers the appearance of the body in each moment as a linear sequence of images. This allowed Marey to ignore the difference between scientific appearance and artistic representation of movement. It must be, then, in response to the positivism of Marey, that Hildebrand conceived his chapter "Form as an Expression of Function." He wrote:

¹⁹ Hildebrand, op. cit., 242.

²⁰ Joseph Maria Eder, *La Photographie Instantanée, son application aux arts et aux sciences*, French translation of the 2nd revised German edition of 1886 (Paris: Gauthier-Villars et Fils, 1888), 165.

²¹ "Photography of Movement," *Encyclopædia Britannica Online*; see also Eadweard Muybridge, *Animal Locomotion: an Electro-photographic Investigation of Consecutive Phases of Animal Movements* (Philadelphia: J.B. Lippincott Co., 1887).

²² Eder, op. cit., 174-82; see also Etienne-Jules Marey, *Développement de la méthode graphique par l'emploi de la photographie* (Paris: G. Masson, 1885).

The example of a running dog demonstrates how exclusively the presentation of movement depends on capturing that which stimulates the imagination and not on the faithful rendering of the perceived image. We actually see the dog's legs only as rapidly moving steaks or shadows, whose form is vague and indefinite, whereas the head and trunk retain a clear form. If the reproduction were based on capturing one or several composite moments of movement, these legs would always be presented as indistinct streaks. It turns out, however, that we present only the idea and not the perception... Our perceptions of movement are thus first brought into relation with the image of the object that is stored in our imagination, and then we form an idea of rest from the body in motion. This is something very different from the image of one or more composite instants, such as the movement a camera shows us—the momentary perceptual image.²³

For Hildebrand, the representation of movement in sculpture does not literally replicate the image of the body in space in a given instant, rather conveys “a mental image that has to extract from the perception those specific signs that evoke the idea of movement.” In other words, when Marey cuts movement into uniform sections and determine the position of the body in space in a given instant, he achieves a series of “chance appearances,” but not “form” as such. Artistic “form” is one that evokes movement in a clear (and physically immobile) image. Hence “form,” according to Hildebrand, is a “functional sign.”²⁴

We may nevertheless detect a certain contradiction in Hildebrand's theory, especially towards the end of his essay where he shifts from a predominantly physiological explanation of perception to an essentially psychological theory of “form.” His analytic theory of perception, in fact, is not very different from Marey's understanding of time and motion. He equally conceives of perception as a succession of retinal impressions, each of which is associated with one—and only one—“surface image.” The perception is a linear process composed of a succession of “visual-ideas” and “motion-ideas.” He differs from Marey by acknowledging that the problem of representation is different from that of perception as such, and that it involves a synthetic process.

The problem of representation of movement had become a central issue in German aesthetics and art history by 1893 when Hildebrand published his treatise. Some of this discussion was literally formulated in the aftermath of Carl Humann's discovery of the Pergamon Altar, by a group of scholars who were inspired by the Hellenistic figures of the Gigantomachy. In striking contrast to restrained, static and canonical representation of human body in Classical Greek sculpture, the Pergamon frieze offers an intense, and exaggerated way of expressing movement. Such a style was long familiar in Europe due to the sculptural group Laocoön (1st century AD) in the Vatican Museum, whose history of reception since Renaissance is certainly closely related to the history of Western sculpture. Yet, only after the discovery of the Gigantomachy and other Pergamene sculpture, Laocoön was established as a late example (or copy) of a distinct style that flourished in the Hellenistic Anatolia. Furthermore, the discovery of the Gigantomachy called into question the Neoclassical scholarship that had ignored Hellenistic art as decadent or imitative of the classical age, and cast doubt on Johann Joachim Winckelmann's (1717-1768) famous dictum on the “noble simplicity and quiet grandeur” of Greek sculpture. Gigantomachy presents formal features that are almost altogether missing from classical Greek art. In *Art in the Hellenistic Age* J.J. Politt identifies some of these characteristics as “undulating surfaces; agonized facial expressions; extreme contrasts of texture created by deep carving of the sculptural surface with resultant areas of highlight and dark shadow; and the use of ‘open’ forms which deny boundaries and tectonic balance.”²⁵

It was not until the first years of the 20th century that the term “Hellenistic Baroque” came to describe the Pergamene architecture and sculpture. We owe this artistic category largely to the influence of German art historian Heinrich Wölfflin (1864-1945). In his *Renaissance and Baroque* (1889), a history of architecture of the period immediately after Renaissance in Italy, Wölfflin posits “baroque” as the diametrical opposite

²³ 23. Hildebrand, op. cit. 263.

²⁴ 24. Ibid.

²⁵ 25. J.J. Politt, *Art in the Hellenistic Age* (Cambridge: Cambridge University Press, 1986), 111.

of the classical idea in architecture. Baroque, then, besides referring to a specific historical style in 17th century Italy, is a general tendency that periodically surfaced in Western art, and usually as a reaction against a classical epoch. Therefore Wölfflin defines baroque in terms of a series of oppositions: Unlike the tectonic forms of classical architecture, baroque architecture imitates the effects of another art-form: painting; unlike clear contours and “linear” forms of the classical, the baroque is “painterly;” classical architecture depends on a harmonious system of proportions, baroque architecture is only concerned with the psychological effect of form; classical architecture is epitomized by central plan, baroque space is limitless and illusionistic; and finally, classical architecture is static and motionless, the baroque is essentially an “illusion of movement.” Baroque, for Wölfflin remains a predominantly architectural category. The art historical “principle” that is embedded in baroque is the concept of “painterly” [*Das Malerische*].

“Painterly” art for Wölfflin has two major characteristics: If one were the collapse of the boundary between pictorial and architectural space, the other would be the representation of the animated. According to the author “The strict tectonic mode [of classical art] had demanded clear forms which were whole and therefore calm. But overlapping forms result in something intangible and are therefore stimulus to movement.”²⁶ Hence in baroque “all tectonic structural elements fell victim to a wild desire for movement, so that, for example, pediments piled up and were thrust outwards.”²⁷

Not surprisingly, Wölfflin’s generalization of “baroque” into a circular, world-historical phenomenon owes to the similarity he perceived between the Italian baroque and the Hellenistic art of Pergamon. In *Renaissance and Baroque* the author points at Gigantomachy as an example of “painterly” sculpture, and, contrasts it with the classical Parthenon marbles:

Whereas one could imagine the Pantheon frieze with a gold ground, which might form an effective foil to the beautiful contours of the figures, this would not be possible with a more painterly relief like the Pergamene Gigantomachia, which relies entirely on the effects of moving masses, and for which a gold ground would only create a wild and completely inappropriate confusion of color.²⁸

Given the actuality of the Gigantomachy by 1893, the conspicuous absence of any mention of the Pergamene frieze in Hildebrand’s text is rather remarkable, especially since this text attempts to explain “the problem of form” in the entire visual arts exclusively with the example of sculptural relief. This omission is perhaps due to Hildebrand’s belief in the stylistic superiority of archaic and classical bas-relief upon “baroque,” post-classical examples, and his distaste for the “painterly.”

Having argued that space in nature and the pictorial space are constructed in human mind through the same objective process, and obey the same universal laws, Hildebrand nevertheless warned against the contemporary practice of “realism” that is, the works that fail to discriminate the space of representation from the space of reality. He cites waxworks, panoramas, and sculptural groups that use architecture as a backdrop, as “realist,” and therefore “low art.” The waxworks are “popular art” because of their make-believe; they cannot be discerned from their model. Similarly the panoramas combine the pictorial *trompe-l’oeil* with the effect of a real interior. Finally Hildebrand criticizes a popular type of sculpture that uses architecture as its actual decor, hence collapsing the difference between virtuality and reality of the work.

In other words, “The Problems of Form” both collapses the boundary between “real” and “pictorial space” and in some other way seeks to preserve a clear distinction between them. To the extent both physical and pictorial space are construed synthetically in the human mind, the difference between truth and illusion is only a difference of degree. Yet, when it comes to dismiss some works—like Panoramas—as “low art,” Hildebrand seeks to restore a strict boundary between the picture plane and architectural space. (Figure 9).

²⁶ 26. Heinrich Wölfflin, *Renaissance and Baroque*, trans. Kathrin Simon (London, Collins, 1964), 63.

²⁷ 27. Wölfflin, 59.

²⁸ 28. *Ibid*, 36.

Therefore, just as the presentation of the Gigantomachy in the Pergamonsaal would be in agreement with Wölfflin's principle of "the painterly," it would fail Hildebrand's criteria of high art on all three accounts. Just like the 19th century panoramas, it does not differentiate between pictorial illusion and spatial experience; the modern walls of the museum provides a décor to the sculptural frieze; and finally, Pergamonsaal offers an effigy of the Pergamon-Altar, which, in the final analysis, cannot be discerned from its historic original. The experience of the Pergamon-Room depends on the transgression of the boundary between the space of reality and the space of pictorial illusion. Walking into the West façade and towards the peristyle feels like walking into the space of mirror.

Hence, Hildebrand's theory of "kinesthetic" perception explains the Pergamonsaal only to a certain extent. The Pergamonsaal literally construes a stereoscopic space out of a sculptural relief, and through the synthesis of multiple viewpoints. Yet the similarity ends there. Unlike Hildebrand's theory of bas-relief and his assumption of a detached viewer, the observer of the Pergamon Museum is no longer outside the pictorial space. Nor does the object of perception—the Pergamon Altar—preserves its corporeal integrity and visual opacity. The modern observer of Pergamon is one that both partakes the space of the object and sees it from outside. The guiding principle of this space is not so much stereoscopic overlap of viewpoints, rather total dissolution of the boundary between the pictorial and architectural space.

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Figure 1: Full-page illustration from Siegfried Giedion's *Space, Time and Architecture* (1941). The caption reads: "Walter Gropius, The Bauhaus, Dessau, 1926. Corner of the Workshop Wing. In this case it is the interior and the exterior of a building which are presented simultaneously. The extensive transparent areas, by dematerializing the corners, permit the hovering relations of planes and the kind of 'overlapping' which appears in contemporary painting."

Figure 2: Full-page illustration from *Space, Time and Architecture*; Picasso, *L'Arlésienne*, 1911-12, oil on canvas. In the caption Giedion explains Cubist "simultaneity" as the technique of showing multiple aspects of a single object at the same time, and emphasizes the "transparency of overlapping planes" in Picasso's painting.

Figure 3: Reconstruction of the Great Altar of Pergamon (1928-30) in Berlin State Museum (The Pergamon Museum).

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Figure 9: Antonio Canova, Funerary Monument to Maria Cristina of Austria, 1798-1805. Hildebrand criticizes Canova's work since the sculptor collapsed the boundary between architectural space and pictorial space and used architecture as the backdrop of sculptural composition.