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Gottfied Semper and Mies Van Der Rohe: A new concept of Interpreting Structures through Weaving

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Abstract

For Semper the origins of each element can be found in the traditional crafts. 1] Hearth – metallurgy, ceramics, 2] Roof – carpentry, 3] Enclosure – textile, weaving earthwork –4] Mound. Semper, stating that the hearth was the first element created in architecture, around it was grouped the other three elements: the roof, the enclosure, and the mound. The Four Elements of Architecture was not the classification of a specific typology but rather was more universal in its attempt to offer a more general theory of architecture of Architecture. He was searching for a new style and a new epoch in architecture based on the dynamic relation among materials, structure, and space. Thus, a new style is born. Style for him was a manifestation of an idea based on a principle. In this the argument is presented based on the relation between the concept of building as revealed by Semper and experiment by Mies Van der Rohe especially in the field of weaving structures and the idea of the knot.

This will end by the concept of lightness versus heaviness as the new language in architectural design and composition.

Keywords: Semper, Mies Van Der Rohe, Knot, Primitive Hut.

1. Introduction

Semper wrote extensively on the origins of architecture, especially in his book The Four Elements of Architecture (1851) and was one of the major figures in the controversy surrounding the polychrome architectural style of ancient Greece. The book was an attempt to explain the origins of architecture through the lens of anthropology. Can we trace the analogy between Semper's writings and Mies's structures? yet what is the difference in understanding of what is architecture for both?

2. Gottfried Semper's Expression of Architectural Style

Gottfried Semper, a German architect (Figure l) and theorist of the high Victorian period, remains a controversial figure in modern times. This is partially due to his incomplete works of the Der Stijl (Practical Aesthetics), of which two volumes were published in Germany in 1860—1863, and partially due to a lack of an English translation of his work which is why not much attention is given to his architectural theories. Semper's theories and writings [1] have been interpreted in several controversial ways. He was considered a utilitarian materialist and functionalist. Semper relied heavily on experiences and ideas taken from history, such as those taken from ancient Egyptians and Greek civilizations. 'For what we should learn from nations who lack European culture is the art of catching the simple melodies in form and colour, which appear in the work of man in his primitive combinations' Function, materials, and processes are the vehicles that Semper saw crucial in obtaining the form of our work. Only the Greeks for him were successful in enlivening their architectural elements (columns) through their forms rather than applying an organic form of ornamentation (the Egyptian application to the columns) as a method of decoration. He divided all built forms, whether simple or complex, into four different types. He defined type as a primitive form described by necessity but modified after the first materials which were used for its embodiment. This division was inspired by the model of a Primitive Hut (Figure 2) from the island of Trinidad, which Semper saw in London's great exhibition in 1851[2]:
1.The hearth.
2.The substructure platform (platform).
3.The roof and the framework.
4.The enclosure (non-load-bearing walls).

Depending on the building and its circumstances, this model may be developed on occasions or represented symbolically. As for historical system classifications, Semper named three different systems: historical, ethnological, and materialistic. He also grouped the practical art into four different classes:

1.Composes of all the things that have their types in the industry of coating or weaving.
2.Things that have their paragons in the ceramic art.
3.Manufacturers which have their types in timber construction: joinery and carpentry.
4.Manufacturers which have their types in stone construction: stereotomy.

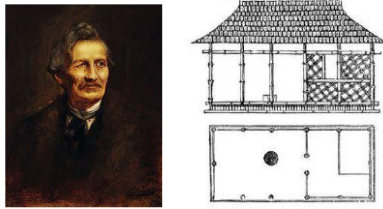Fig. 1. Gottfried Semper (left) - Fig. 2. A Typical Primitive Hut Structure.

(Rykwert, J. 'Semper and the Concept of Style,' in Necessity of Artifice. New York: Rizzoli Publications, 1982.)

Semper's expression of style is used for the notification of certain achievements in works of art arising from using the available means artistically and from observing the limits that are contained in (and defined by) the problem in question. He considered art and architecture a result of a mathematical equation composed of different variables and coefficients. Semper saw two different classes of architecture: The first class comprises constant factors that are based on certain laws of nature, such as the early form of an idea. While the second class comprises outward influences that act upon the work of art. This may be local (like climate or religion) or personal (like the artist's skill and the individual expression). Hence, style is a work of art developed to a certain level of significance and influenced by different factors such as materials, tools, location, and social conditions. Semper then realized the problem that arises when adopting new methods and rules of production: how will it affect our basic idea? He realized that new materials and new means of construction have exceeded man's traditional skills and invention. For him, advances in technology have provided the builder with new materials and more efficient methods which were often in contrast to our traditional conception of architecture. It was his growing conviction that there could be no architecture of our own time without the prior acceptance of these new scientific and technical development. [3]

3. The Miesian Style and Semper's writings

If we attempt to apply Semper's theory of architecture to Mies Van der Rohe's (Figure 3) buildings, can we go further to call the latter's work a Miesian Style? In 1939, Mies Van der Rohe was commissioned to build the new campus of the Illinois Institute of Technology, IIT (Figure 4 & 5), over an eight-block site in Chicago. The architect's work revealed a three-dimensional lattice grid super-imposed on the site plan. This methodology allowed a high system organization in the relationship between the various spaces of the building elements and the buildings on the site in general. The result was the creation of an 'optical rhythm' and 'unity' that reflected itself both within the play of buildings and open spaces in the site and within the play of solids and voids on the facade. [4]

Fig. 3. Mies Van der Rohe (left) - Fig. 4. Crown Hall, IIT Campus, Chicago.
Mies Van Der Rohe

(Blaser, W.Mies Van der Rohe: Art And Structures, New York: Praeger Publications, 1965)

The choice of the volume was generated from the volumetric size of a classroom, which represented the basic structural unit that was repeated through the whole project. Even so, the expected monotony is not evident since each building is designed with different measurements, by using multiples of the basic structural unit. The structural grid was then sub-divided to create the planning grid on which all partitions, columns, and beams were positioned. A higher hierarchy of modular space was further established to allow the location of smaller elements (door, lights, etc.). Solutions were worked out for grids and joints that did not coincide with original planning grids. Tiles, for example, were recessed from all edges of the room to avoid any indirect alignment of grids. Similar systems and solutions were applied on the facades both in terms of glass/brick positioning, and the continuity of structural lines. This intricate synthesis is what Mies was aiming at, the creation of simplistic ornament structures. A strong expression of *'beinahe nichte' (almost nothing)* is experienced through his reduction of constructional elements to a bare minimum. For him, that is beauty in its profound sense. It is his way of practicing the art of a building. As he once said that nothing can express the aim and meaning of our work better than the profound words of St. Augustine, that 'beauty is the splendour of truth'. Truth for Mies Van der Rohe is the bringing forward of the nature of materials, thus amplifying its character.
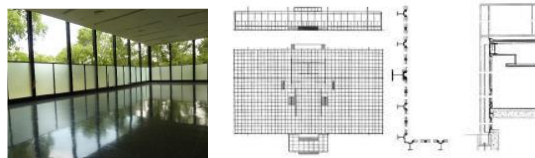

Fig. 5. Crown Hall, IIT Campus, Chicago. Mies Van Der Rohe

(Blaser, W.Mies Van der Rohe: Art And Structures, New York: Praeger Publications, 1965)

Mies Van der Rohe was related to the De Stijl movement, through the production of the magazine 'G' (G stood for the German word Gestaltung, meaning the Creative Art). He was influenced by their inter-locking lines, squares, and rectangles. Architectural theorists think it may be possible that the movement's name is adopted from the title of Semper's Der Stijl. Assuming this to be true, can we find an analogy between Semper's writings and Mies's structures? One here may pause and reflect upon the issue of Practical Aesthetics.
We may analyse it in the sense of 'practical' being an analogy to technology and 'aesthetics' to arts. Semper considered practical aesthetics and investigated the elementary methods of

fabrication and their transformation into formal devices through social and historical adaptations. Going back to history of societies and cultures, Semper trailed the origins of space division to matting and carpets that were either woven or embroidered. This, for him, was the first hanging decorative partition that was followed by the arts of ceramics and stained glass. The four elements of construction mentioned earlier are clear in Mies's architecture and structures. He talks of skin and bone construction, his glass skin, steel, and concrete bones. His skeleton: none other than Semper's 'Roof and Framework' so delicately draped over the glass panels. Their lightness reveals the nature of their function as a non-load-bearing element for space separation.

4. A comparison

How well does this fit into Semper's experience with the Primitive Hut, with its evident clarity and elegance of structural elements? A close look at the Hut's facade and that of a typical facade of one of ITT's, shows an analogy between the use of bamboo sticks and that of steel I-beams, and the patterns created by the plaited matting and brick panels. Yet Semper uses this hut as an example of an original building type. He tended to generate architectural patterns based on the concept of weaving and the use of different colours through the process. In the Der Stijl, several illustrations are selected to emphasis this story, such as Assyrian Robes, Egyptian ornaments on the wall and ceilings of graves, Greek mosaic floor patterns, and Scandinavian embroidery patterns [5]. This is a far cry from Mies' philosophy. Mies saw beauty in simplicity. He stressed such point in words and deeds, 'I like simplicity, probably because I like clarity'. While for Semper, the work of art and the product of a craft were always the same thing.

Both Semper and Mies saw the external covering of a building an essentiality the former does it with ornament [6]., while the latter with transparent or translucent skin. Even though their forms may be similar, yet their understanding of what is architecture is in opposite directions. In Pevesner's writings on Semper he talks of Semper's understanding of architecture that 'does not evolve from the structural skeleton but from the surface in between'. On the other hand, Mies simply believed that structure is the fundamental element of architecture, and he was interested in clear structure. He wanted a structural architecture because he believes that this is the only way by which one can have a communion with the essentials of our civilization. Association with weaving is what Semper believed was the first form of joining, namely the knot (Figure 6- 7- 8). Semper's fascination with knots is almost equivalent to that of Mies with architectural details. The former describes in some length the basic notion of knots as the bringing together of two planes of similar or dissimilar materials: the symbol of connection. The knot, for Semper, was man's first answer to need. It led to Semper's two essential rules on man's fabrication. Namely, to take a virtue of necessity, and that fabrication is influenced by the material used and the process applied.
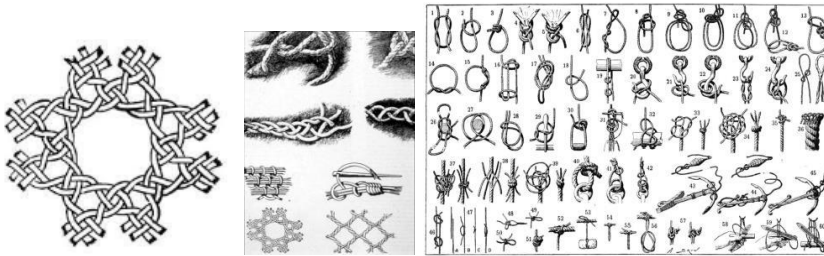
Fig. 6. Different Types of Knots and Their applications

(Rykwert, J. 'Semper and the Concept of Style,' in Necessity of Artifice. New York: Rizzoli Publications, 1982.)
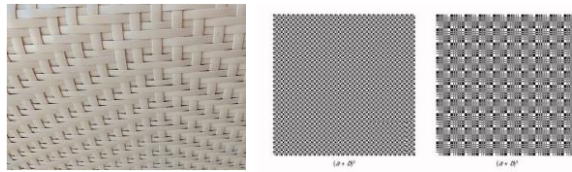

Fig. 7. Weaving of Structures as prepared by Semper- Fig. 8. Gottfried Semper Details in The Final Architectural Composition.

(Rykwert, J. 'Semper and the Concept of Style,' in Necessity of Artifice. New York: Rizzoli Publications, 1982.)
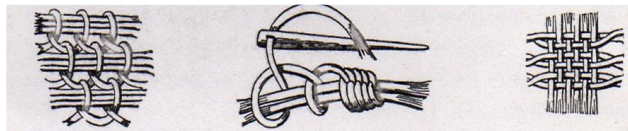

Fig.8 The Idea of Weaving

(Rykwert, J. 'Semper and the Concept of Style,' in Necessity of Artifice. New York: Rizzoli Publications, 1982.)
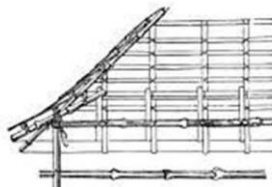

Fig. 9. Gottfried Semper Details in The Final Architectural Composition.

(Rykwert, J. 'Semper and the Concept of Style,' in Necessity of Artifice. New York: Rizzoli Publications, 1982.)

Semper's emphasis on joints is equalled by Mies's attention towards details. During the design process, Mies interpreted the success of a building in the assembly of selected elements. His acceptance of technology was through the acceptance of the already existing products: I-beams, T- Sections, and angles. He did not contribute to a new product but to a new approach of joining and detailing in steel. mattered to him a great deal; 'we must have order out of the desperate confusion of our time, allocating to each thing its proper place and giving to each thing its due position according to its nature, this is our task'. When Mies came up with the designs of IIT, he surprised everyone with a new approach that was far away from his European architecture with an unexpected understanding of the American architecture existing at that time in Chicago, the architecture of steel and glass. Semper argued that the form of every building or piece of art is nothing but a direct result of the nature of its material, techniques, and function. Was this achieved in the IIT Building? The steel I-Beams were left pure and exposed in their linear and simplistic form. No effort was made to disguise their true nature using additive (super-imposing or ornamented) motives. 'Let materials have their own say'. This was in the sense that materials should be undisguised, in the shape, the proportions, most suited to them by experience and science. Wood should appear wood, and iron should appear iron. [7]

Mies's notion of 'less is more' (Figure 10) is evident in his project, whether in the planning of the site or the design of the building facades. His ornamentation is implicit with its elements. Yet Semper in his study of the evolution of the wall discussed at length the origin of the wall ornamentation, beginning with textile draperies, coating the wall with stucco, wooden panels, metal plates, and finally mentioned hard and precious stones: marble, granite, and alabaster. The origin of curtain walls is said to be linked with Semper's hanging partitions. If we try to search for these concepts in Mies's work, our search Would be in vain. Mies believed in simple surfaces, bricks that are represented naturally, leaving the ornamentation to the lines of joining and the play of shade and shadow from the surroundings on the facade (Figure 11).

Semper was first recognized for his work on Polychrome in Greek and Roman architecture (1834), writing on the process of dyeing, the use of different colours in weaving and the evolution of patternmaking. In other words, the decoration is integrated within the making of different elements. On the contrary to this concept, Mies's work was oriented towards Monochrome (Figure 12). He created his patterns from the bounding of the same material [6]. Whether it was their German background or something else, it is interesting to see the analogy that appears between Semper who did not build much and Mies who did not write much. They share a lot of ideas and notions. How close are Mies's words to those of Simper's?

Fig. 10. Mies' Notion- Fig. 11. The play of shade & shadow of the surrounding on façade.

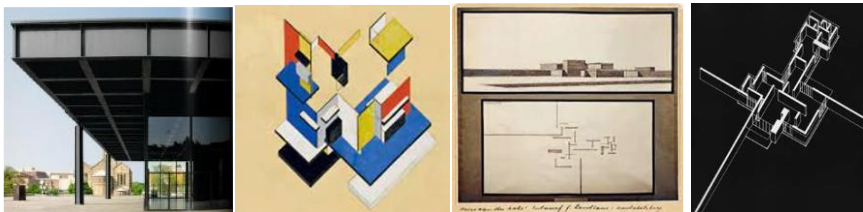(Frampton, K. Modern Architecture: A Critical History, Oxford University Press, 1980.)

Fig. 12. Monochrome & Mies Van Der Rohe Details.

(Frampton, K. Modern Architecture: A Critical History, Oxford University Press, 1980.)

Mies wanted the architectural faculty to lead the students into the healthy world of primitive building methods, where there was meaning in every stroke and an expression in every bite of a chisel [8]. Ettlinger in his essay on Semper considers him a traditionalist, since the latter talks of architecture history as a continuation of past periods; he was preaching for historically conscious architects [9]. Like Mies Van Der Rohe, Semper was in a position where he had to confront tradition with innovation. Mies accepted technology through its products. Semper preferred, in our opinion [10], reformation rather than revolution. Both were affected by their consciousness, Semper's bondage to history and Mies understanding of materials.

'We architects are often reproached with lack of inventiveness because we meet no new great idea. We are convinced that one or another of our younger men would prove he can invent the proper architectural cloths for such an idea. Until that time comes, we must try to exist with what we have'—G. Semper.

'The new architecture will come into its own. I am convinced that traditional methods of construction will disappear. Our building methods must be industrialized. This is progress, even though few are yet really convinced'—Mies Van der Rohe. In creating architectural style, the two grammarians used a similar language and vocabulary [11]. Semper did not see style as an external thing that architects go out and look for, but rather as much of materials and techniques, and that man's creative ability fused both items. [12]

5. Conclusion & discussion

In creating architecture style similarly, material, function, and creative ability were the words of Mies for the creation of architectural order. Finally, can we say that there existed a Miesian Style within the Semperian sense of architectural style? In our opinion, if we consider Mies's work with steel and glass a successful attempt to artistically bring forth their innate characteristics, then he is working with a style. If we observe his method of design and relate it to the process of creating art, then we are looking at a style. Style is 'the artistically treatment. of the fundamental idea in a work of art, and all inward and outward accessories which have modified the embodiment of it'. If we believe that Mies was conscious of his doings and adaptation of ideas, then his results are nothing but those of a Miesian Style. Architectural styles did not evolve unconsciously along different paths from some primeval types, following the laws of natural selection that describe the origin of species in the realm of organic creation.

Finally, what will be the language of Future Architecture? It's the Architecture of Movement, Flying, Defying Gravity and Lightness.

The Radiolarian
1) Dematerialization of Form (Figure 13)
They are one cell nucleus (diameter 0.1–0.2 mm) with an intricate fibrous lattice skeleton structure. They are divided into an inner and outer portion. They are found throughout the ocean. They have needle like supports called micro-tubes. They are characterized by their siliceous skeletons.
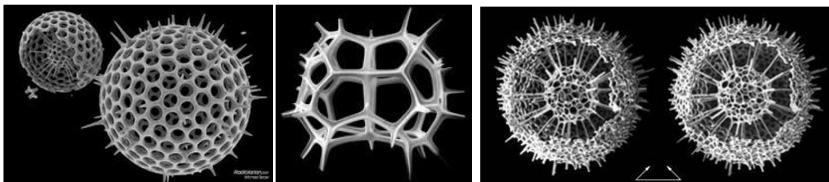

Fig. 13. Dematerialization of Form

(Abercrombie, S.' George Nelson: The Design of Modern Design'. MIT Press, 2000.)

2) Stiff Hollow Rope Structure System. (Figure 14)

Fig. 14. Stiff Hollow Rope Structure System

(Abercrombie, S.' George Nelson: The Design of Modern Design'. MIT Press, 2000.)

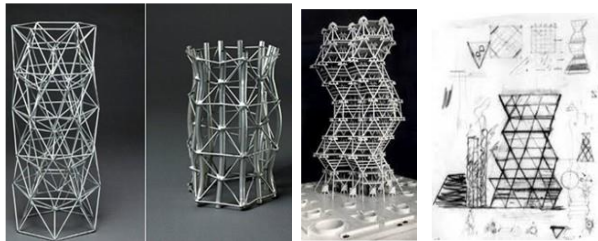3) Beauty of Failure Zig Zag or Spiral Forms. (Figure 15)

Fig. 15. Beauty of Failure Zig Zag or Spiral Forms

(Abercrombie, S.' George Nelson: The Design of Modern Design'. MIT Press, 2000.)

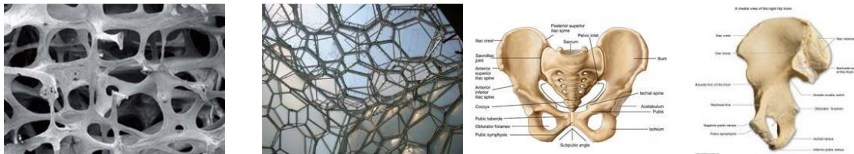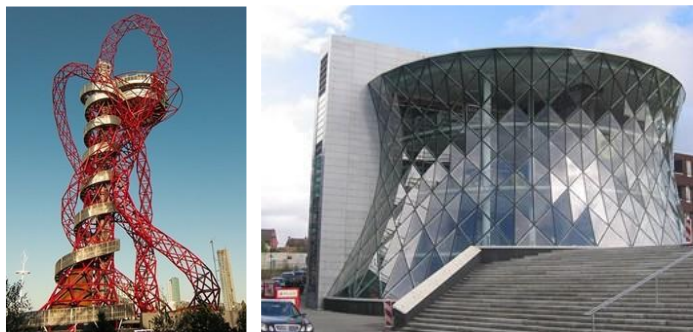4) The Art of Structure is Where to Put a Hole. (Figure 16)

Fig. 16. The Art of Structure is Where to Put a Hole

(Abercrombie, S.' George Nelson: The Design of Modern Design'. MIT Press, 2000.)

5) Triangulation Structure System (Figure 17)
The process of subdividing a plane into Triangles. Generally used to achieve build-able facets from a complex, curved form. (Figure 17)

(Abercrombie, S.' George Nelson: The Design of Modern Design'. MIT Press, 2000.)

Fig. 17. Triangulation Structure System

6) Concrete Interlaced Tree Columns (Figure 18)

The design principle is based on the idea that a structure under compression within a system of constant tension will create a stable shape. (Figure 18)

Fig. 18. Concrete Interlaced Tree Columns Herzog and De Meuron.

(Abercrombie, S.' George Nelson: The Design of Modern Design'. MIT Press, 2000.)

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