

*Landscapes of Repair: the Role of Photography and
Film in Documenting the Legacy of Modern and
Contemporary Architecture and Public Spaces*



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THEORETICAL PAPERS

Scaffolding Styles: Aesthetics of Iron Construction

Sol Diéguez Garcia

Abstract

The landscape that offers the city is unfinished and uncertain. It is full of temporary structures serving restorations, repairs, or new permanent and static works. The purpose of these construction elements is not their own aesthetic, theoretical, or functional value, but to evoke the value of something else — that which is to come. However, even though these elements are intended to be nothing more than a transient presence, they inevitably transform the city and its aesthetics. It is common to treat these elements with contempt and to devalue them because of their temporariness. This article aims to explore the aesthetic condition of temporary metal structures by examining the philosophical debate that took place during the nineteenth century on the use of steel in architecture. These discussions, together with photographs taken between the 1920s and 1930s of permanent industrial metal structures, were fundamental in establishing a new vision and aesthetic of industrial landscapes.

Keywords: Scaffolding, Temporary Structures, Iron Construction, Auxiliary Elements, Sigfried Giedion

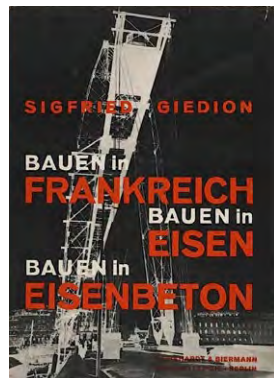
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Introduction

The Città Ideale imagined in the Renaissance is far from being a reality. The idea of a perfect, intact and static urban environment is not only utopic but inhuman. The real city has many layers beyond pavements and facades. It holds street furniture, vehicles, traffic lights, signals, signs, electric posters, sewage, noise, ruins, decay and works, among countless others. The actual city is full of layers of structures which facilitate different technical things, from safety to protection, from light to advertising, from construction to faking or hiding something (KOSMOS Architects 2025). Public space and buildings under construction or repair means a city inundated by scaffolding, cranes, pulleys, elevated platforms, or frames: temporary iron structures that are part of our landscape.

When I visited the Flatiron Building in 2024, I found its famous façade covered by scaffolding, one might have been disappointed, but the metal latticework actually had its charm. Depending on the vantage point from which you looked at the building, if you stood at a considerable distance and looked at it from the front, the light metal structure would let you see through it. Its body was discontinuous, it had a lot of presence, but when it disappeared it revealed the massive, stony façade of the building clad in limestone and glazed terracotta. The Flatiron had a new façade, but its aesthetic acceptance required a new eye.

In order to pursue the aesthetic condition of iron structures, the article takes as its starting point the theories on metal structures of industrial-era architecture presented in *Bauen in Frankreich: Bauen in Eisen, Bauen in Eisenbeton* (Building in France, Building in Iron, Building in Ferroconcrete) by Sigfried Giedion. The current expanded English edition incorporates an introduction by Sokratis Georgiadis that takes up crucial positions in the debate on the use of iron in architecture and opens the way for reflection on the acceptance of the aesthetics of scaffolding. (Giedion 1995)



[Fig. 1]

Original first edition cover of *Bauen in Frankreich, Bauen in Eisen, Bauen in Eisenbeton*, featuring an image of the Pont Transbordeur in Marseille. Font: Sigfried Giedion, *Bauen in Frankreich, Bauen in Eisen, Bauen in Eisenbeton* (Leipzig: Klinkhardt & Biermann, 1928)

Scaffold styles or mass styles

Flatiron scaffolding was a lightweight outer layer that rests subtly on the ground and transmits the structural load discontinuously. It was part of the tectonic world, while the inner layer, heavy and seemingly continuous in its structure, represented the stereotomic world. Both were very different from each other, but there was complicity: one depended on the other. These terms, which classify architecture from the earliest cave and hut constructions, were coined by the German architect and critic Gottfried Semper in the mid-19th century. (Campo Baeza 2020, 2–4)

Many reflections have been made on these two very different ways of approaching the question of architectural form. The editor of the magazine "Deutsche Bauzeitung", K.E.O. Fritsch, refers to them as 'mass styles' and "scaffold styles", the first derives from masonry, representing the architecture of ancient Egypt and Mesopotamia, in Rome and in the Middle Ages, and also during the Renaissance and the Baroque. The second, which tries to despise iron by calling it scaffolding, derives from the craftsmanship of carpentry and came from Ancient Greece and Gothic architecture. It is striking how the nature of Gothic arches is closely related to iron: a stereotomic material such as stone adopts tectonic characters in a limit situation. (Giedion 1995, 17–19)

Whereas in mass styles the solid body is manipulated freely, as if sculpting a block of clay, scaffold styles are based on the assembly of pieces that have been previously designed or selected. Fritsch considered that scaffold styles, manifested by iron, could not represent a new architectural style because of its "poor soil of art". The debate on iron as an architectural style was officially launched. (Giedion 1995, 8)

The theories of Carl Gottlieb Wilhelm Bötticher, archaeologist and architect and author of "The tectonics of the Hellenes", served as a point of reference in this first phase of debate (Bötticher 1844). He argued that the system of monolithic stone had completely exhausted the constructional and architectural possibilities of stone; both classicism and neo-Gothic were merely evolutionary stages in a history that would certainly not end there. Iron represented a new, third way of building and, consequently, a new architecture.

Construction Becomes Form

The Crystal Palace, designed by Joseph Paxton for the World's Fair in 1851, was a clear representation of this period. The great iron and glass greenhouse provoked shock and fascination. The matter that defined its boundaries was so condensed that, to the eye of the beholder, it seemed to float. It was an architecture that freed itself from its own material, from its own body. Semper referred to it as "glass-covered vacuum". (Semper 1852)

Eight decades separate the construction of the Crystal Palace and the publication of *Bauen in Frankreich*. This is the period in which the debate on the use of iron in architecture took place.

A debate about a new architectural style. Exhibition buildings, market halls, railroad stations, factories and warehouses were the new demands of society. The aim was clear: to leave as much free space as possible while building with as little material as possible. The iron skeleton allows thin pillars within: freedom of circulation, clear layout, and it permits the best utilization of light.

Iron construction could not be a simple transfer of the way of building in stone, like Gothic architecture. Iron had its own characteristics, a new tensile elasticity, and its expression required a new way of building. "An iron skeleton is subject to changes; it cannot be rigidly bound together like a stone place. It lives with the temperature fluctuations" (Giedion 1995, 134). There is a new tensile elasticity. It is beginning to be recognised that the expression of the iron skeleton also represents something new that demands a balance of forces. It can be stretched and pulled together, it resists extension and pressure and thus, bending. It has the ability to condense large potential stress into most minimal dimensions. It creates transparency, therefore, airspace. To design a load-bearing wall becomes "an intolerable farce" which leads to new laws of design. (Giedion 1995, 101)

The exhibition of 1889 in Paris, with the construction of the Galerie des Machines, represented the conclusion of this development. The pillars disappear, a porticoed structure is presented where it is impossible to identify the point at which the support and the load are mutually integrated. Moreover, it is not rigidly connected to the ground, but accepts the free movement that the material requires. A new oscillating harmony is created. Giedion states it clearly: "The iron skeleton has found its true form. A play of enormous forces is held in equilibrium. But not rigidly, like support and load, rather, almost floating. It is the equilibrium of a balance beam daringly poised against continually varying forces" (Giedion 1995, 142). Here is when iron construction becomes expression and design, therefore form.

The Beauty of the Line

The four aspects of the aesthetics of iron construction are defined by Alfred Gotthold Meyer, an art historian and professor at the Königliche Technische Hochschule (Royal Technical Institute) in Berlin-Charlottenburg. The first is the "new spatial value" represented by the Crystal Palace, which he defines as a "piece with a sculptural atmosphere". Although he recognises its artistic value, he argues that its elements are insufficient for "space formation" and that its latticework was only capable of mere "spatial enclosure" and "spatial cover". The second aspect is the

"new width" represented by the Galerie des Machines, where the problem of the relationship between "support and load" is resolved. The third is the decisive power of the line, which means the "new height". Meyer investigates this aspect in the Eiffel Tower, which he characterises as "a milestone in the history of mankind". Its main characteristic, transparency, was the result of the reduction from mass to surface and from surface to line. (Meyer 1907)

The fourth and final aspect of the aesthetic tetraptychon iron construction was brought together under the title "new lines". Here the focus is on engineering works, such as bridge constructions, and the question is whether they should be classified as architecture. Meyer thinks that although the bridges did not shape space, they were undoubtedly an architectural work. The "power of the line", in Georgiadis' words, expressed itself here in the sense of the contour of the structure, and it was at the same time its most important aesthetic component. He was convinced that the use of iron was giving rise to a new architecture, which could be accepted even through a process of "habituation to form". However, he also believed that this new style of building could never completely replace monumental architecture, as some supporters of iron claimed. (Giedion 1995, 35)

It was a new architecture whose seeds lay in the technical field; its forms were born of a new aesthetics. The historian and philosopher Joseph August Lux, in his book *Ingenieur-Aesthetik* (Engineering aesthetics), writes that we had entered a new era, in which developed technology was the most important cultural driving force (Lux 1910). The paradigm to which architecture had to conform consisted of the products of modern technology, the machine: "Our culture is not reflected in the architecture but rather in the vehicles, in modern transportation technology. If we inquire about the style of our time, here we have it" (Lux 1910). Lux states that the engineer is the real architect of the modern age, and it is they who have discovered the language of iron.

Iron construction found acceptance, because it comes from a genuine expression of modern society. The composer Cornelius Gurlitt came up with an exact expression for this: "We have not artistically conquered the work-form of iron [...] rather, the work-form of iron has conquered us and forced us to see it as beautiful, for it is rational and the product of a creative idea" (Gurlitt 1900). Hermann Muthesius in his book *Stil-architektur und Baukunst* (Style-architecture and building art) says that modern architecture must cater for new economic and transport conditions, new materials and new construction principles. Modern creations have to meet the new needs of society, such as railway terminals, exhibition buildings, bridges, steamboats, railway carriages, bicycles, etc.



Everything is in transition, and this ongoing transition is at once economic, scientific, political and philosophical, according to the architect Albert Hofmann, "Can iron construction be beautiful?", "Can iron bridges be beautiful?" (Hofmann 1893) They could be, but this required a new aesthetic gaze, an understanding of raw, mechanical beauty rather than picturesque beauty. Lux argues that iron construction was a matter "of mere linear contours, of the fleshless skeleton or the open frame, in short, the support that transmits the energies and represents lines of force" (Lux 1910). The essential characteristic of the aesthetic value of iron lay in the linearity of its construction. This gave rise to new spatial images and therefore the perception of the beauty of iron construction demanded a "new eye".

The photographs taken between the 1920s and 1930s of permanent industrial metal structures were fundamental in establishing a new vision and aesthetic of industrial landscapes. "The lyricism of our time is inscribed in (...) cathedrals of steel (...). Forests of pylons replace centuries-old trees. Blast furnaces replace hills. Germaine Krull is the Desbordes-Valmore of this lyricism", writes the critic Florent Fels in the foreword to "Métal"

1. In 1928, Germaine Krull published a photo-book entitled *Métal*, featured tightly composed images of the Eiffel Tower and other modernist structures in Paris and Rotterdam.

[Fig. 2]

Pont Transbordeur (1905) and Harbor of Marseilles. Archiv S. Giedion, Institut für Geschichte und Theorie der Architektur, ETH - Honggerberg, Zurich.

(Krull 1928). A muse of the engineering works of the early 20th century was undoubtedly the Port Transbordeur in Marseille. This iron bridge was photographed by the likes of Charlotte Perriand, László Moholy-Nagy, Germain Krull and Gideon himself, who even chose it as the cover for "Bauen in Frankreich". Everything in Port Transbordeur is based on mobility; it is not an object, like the Eiffel Tower, but a mechanism. Its interaction with the city is neither "spatial" nor "plastic", its boundaries dissolve and merge with the streets. It creates fluid connections and mutual intertwining. In Giedion's words: "Fields overlap: walls no longer rigidly define streets. The street has been transformed into a stream of movement. Rail lines and trains, together with the railroad station, form a single whole. [...] The fluctuating element becomes a part of building" (Giedion 1995, 90).



The steel tensors of the Port Transbordeur went a step further than the floating staircases of the Eiffel Tower. These iron nets suspended in the air where things flowed defined the basic building aesthetics of the time. There is no longer a defined style, no proper building style, but a collective design. A fluid transition of things. The buildings sought to blur the boundaries between inside and outside, to break with the idea of the hermetic object and to strengthen the connection with the city.

[Fig. 3]
Eiffel Tower photographed by Germaine Krull. Portfolio MÉTAL, 1928.

Temporary Auxiliary Elements

In this initial moment of transferring engineering principles to architecture, the crucial aspect was to recognise that the simple result of the precise calculation of material stresses was not enough to materialise the architectural body; a new building material alone was not capable of generating a new style. Thus, although the importance of technical reason was emphasised, the definition of space did not depend solely on constructive factors, but required an essential vision of beauty: an artistic form (Gastón Guirao and Labarta Aizpún 2025).

"Is construction something external?" Asks Giedion heading one of the chapters of "Bauen in Frankreich". He acknowledges that the artistic side of architecture in the 19th century has become musty; what remains intact in architecture are those rare cases in which construction makes its way. "Construction based entirely on provisional purposes, service, and change is the only part of building that shows an unerringly consistent development", these moments when construction appears intact are in the process of construction. Elements appear that only exist at that instant. These are temporary auxiliary elements. (Giedion 1995, 87)

Photography is the physical evidence that verifies the existence of these elements. Thanks to the constancy of this photographic material, we understand these buildings much better. It allows us to decipher the reasons for the design decisions that have been made and how they have led to this particular end result. The photographs of the construction of the Crystal Palace, the Galerie des Machines and the Eiffel Tower show us the existence of these temporary elements that took shape for a few moments.



[Fig.4]
The scaffolding on the first floor of the Eiffel Tower.
January 1888. © Tour Eiffel Collection.



[Fig.5]
Construction of the Grand Palais, Paris, photograph by
A. Chevojon, 1897–1900. *Le Grand Œuvre*, Photopoche.

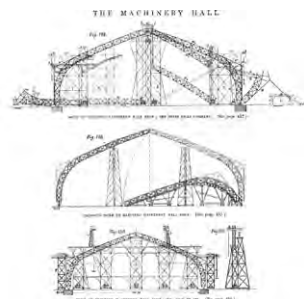
We are talking about auxiliary iron structures at the service of permanent iron structures, which means that the boundaries between what is one thing and what is another are dissolved. If we were not aware of the final result of the Eiffel Tower, we might think that this fifth central leg is part of the design as a final result. It would probably not make sense structurally because it would not be necessary, but I do not exclude the possibility that the technique could have been justified on the basis of the form.

Meyer, when talking about the Crystal Palace, invalidates its capacity to generate “space formation” because its mere “spatial cover” is insufficient to respond to certain needs of architectural comfort. In the case of the scaffolding, as with the Eiffel Tower or the Port Transbordeur, its iron skeleton does not need to be dressed, it already represents its maximum expression in terms of the meaning of its function. But there is a big difference, the body of the Eiffel Tower and the Port Transbordeur, although born of technology, have been designed with an aesthetic purpose. As Lux says, “many structures and machines owe their form not to mere mathematical calculation but to a certain kind of experience, which offers the design of certain parts to the sense of form” (Lux 1910). Scaffolding, on the other hand, are pure functional elements that have not been contaminated with an aesthetic purpose. In this case, their aesthetics are pure mathematical.

They are structures that adapt to change, to the constantly changing city. Their nature means that they can be assembled and disassembled in an optimal way, much more so than the early metal structures such as the Crystal Palace. They are meant to be stockpiled, transported and stored. The structure of the Galerie des Machines is not rigidly connected to the ground because it must allow free movement, whereas in the case of scaffolding, its joints must be able to separate from each other and, in some cases, be able to be lengthened or shortened. The nature of their shape is versatility. A single piece must be able to adapt to an endless number of formal possibilities as a whole.



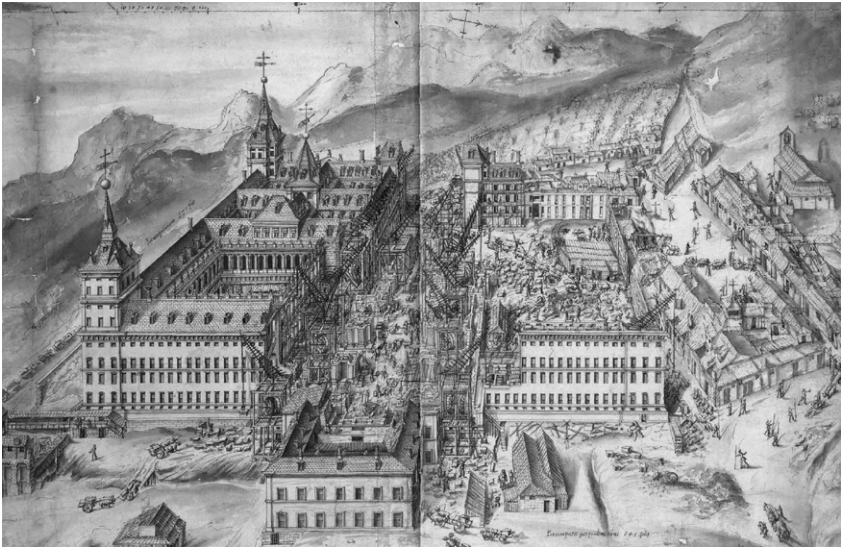
[Fig.6]
Construction of the Galerie des Machines, Paris, 1889.
Archiv S. Giedion, Institut für Geschichte und Theorie der
Architektur, ETH – Honggerberg, Zurich.



[Fig.7]
Galerie des Machines – Modes of Erecting the Roof,
Engineering, vol. 47 (1889).

Scaffolding as a Spectacle

Temporary auxiliary elements have the charm of the fleeting. They can only be contemplated, portrayed or captured at certain moments. This adds value to their existence. In fact, it is a cultural thing to contemplate the works, the process engages the spectator, the uncertainty of how it will proceed. But this is not something new, *La obra como espectáculo* (The Work as Spectacle) is the title used by Pedro Navascués Palacio to comment on a drawing from 1576 of the Escorial under construction, conserved in Hatfield House (Navascués Palacio 1986). The drawing shows cranes, scaffolding, pulleys and all kinds of elements at the service of construction. Value is being given to these elements and aesthetic value is being given to the construction process beyond the final result.



[Fig.8]
Drawing of El Escorial under Construction, ca. 1576,
unknown author. Held at Hatfield House.

[Fig.9]
A scaffold in the public space of Manhattan. Photograph
taken by the author, 2024.



A scaffolding is not only related to the building or work it is "assisting", it is also related to the body and to the city. Scaffolding is interactive. It is traversed, climbed, lowered, erected and dismantled. On the upper floors it is a narrow shelter from the abundant space of the city. They make it possible to see both the building itself and the landscape from unusual perspectives, they are intrinsic to the characteristic "new height" that Meyer describes. On the ground floor, they transform the city; the pavements become porticoed spaces, where metal structures rest, interfering with circulation. It generates movement, the user interacts with its structure. Regarding their interference in the cityscape, they are transparent because they build the "airspace", but in no case invisible. Just as Meyer corrects Semper by saying that the Eiffel Tower is not invisible, but transparent, since it is the most visible structure in Paris (Giedion 1995, 35). Scaffolding has a strong presence in the city, some might think it has too much.

The aim of the steel structure in the Flatiron Building was not to address an aesthetic concern but a functional one: to reach a height of 87 meters. The structure was intentionally concealed, as it was not meant to be seen. It is somewhat ironic that more than a hundred years later, a metal structure reappears on the façade. While its acceptance may vary, it is undeniably part of the building, the public space, and the city's landscape. Just as society's perception eventually came to accept industrial metal constructions, there remains potential for further refinement in the aesthetic appreciation of temporary auxiliary metal structures. Perhaps this 'new eye' advocated by Lux is not mandatory, but it is highly recommended.

[Fig.10]

Flatiron building under construction. 1901-1902 Fuente: New York Times - Library of Congress. [Up]

Flatiron Building 2024 façade repair. Photograph taken by the author, 2024. [Down]

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