CONTRADİCTİON BETWEEN TECHNİQUES AND AESTHETİCS İN EARLY MODERNİSM. THE CASE OF THE WEİSSENHOFSİEDLUNG

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Abstract

"Our work is experimental; but experiment is often more important than the safe way. We are well aware of the deficiencies in our work, and we can safely say that we have learned much from it."
Ludwig Mies van der Rohe in an address to members of the *Deutscher Werkbund*. Stuttgart, 20/09/1927 (Kirsch et al, 1989 p.7)

At the beginning of the 20th century, architects have been operating in a shifting context regarding technical and aesthetic conventions. In 1927, a group of seventeen international architects constituted and conducted by Ludwig Mies van der Rohe realised the *Weissenhofsiedlung* as a life-size experiment and a demonstration of a "new art of building".
This research sheds new light on one of the first modernist urban and architectural projects and it reveals the gap between its technical and aesthetic features. While the architects call on a multiplicity of constructive and structural solutions in order to realise the twenty-one buildings, they all obeyed to a radical choice of minimalist aesthetics.

In this case study, a comparative analysis of the projects was carried out. The re-drawing of all plans is the base of this research through drawing. Furthermore information from historical and contemporary sources on the projects was gathered, including their construction techniques and on the discussions among the architects.
In the analysis, comparisons were made between structural and spatial layout on the one hand, and construction materials and the overall architectural image on the other hand.
The buildings of Peter Behrens in masonry, of Ludwig Mies van der Rohe in steel, of Hans Poelzig in wood and of Jacobus JP Oud in not less than six different types of concrete, all of them showing only little variations of volumes in white cubes, bring to light the discrepancy between form and construction.
The comparison with other projects of this period, dealing with visible materials and even pitched roofs, demonstrates that the minimalist aesthetics were a deliberate and radical choice of the modernist architects.

The results of the research are twofold. First, it displays a surprising large gap between technics and aesthetics, in complete contradiction to the modernist dogma of the "constructional truth". Second, it exposes the experimental character of the projects largely silenced by the following review which was instead focused on celebrating the birth of the International Style, identified as a minimalist aesthetic of white cubes.
As such, the choice of reduction of aesthetic codes is identified as operating as a two sided medal of radicalisation in architecture: A priori, it generated a coherence among the different projects at Weissenhof. A posteriori, the same choice of reduction had been pursued to contribute to the mystery of a root- and timeless modernism.

Eventually, the research allows a renewed, which means more detailed and critical, look into one of the first modernist urban and architectural projects.
About 90 years after the Weissenhof exhibition, architects are again struggling with a shifting context. Various and simultaneous crises are again questioning the methods and conventions of our practice and once again, new technical and aesthetic solutions are to be tested.
The study of the example of the *Weissenhofsiedlung* reminds us that such solutions are generated in collective processes and that an experimental approach (including sometimes doubtable choices) is able to renew of technical and aesthetic conventions.

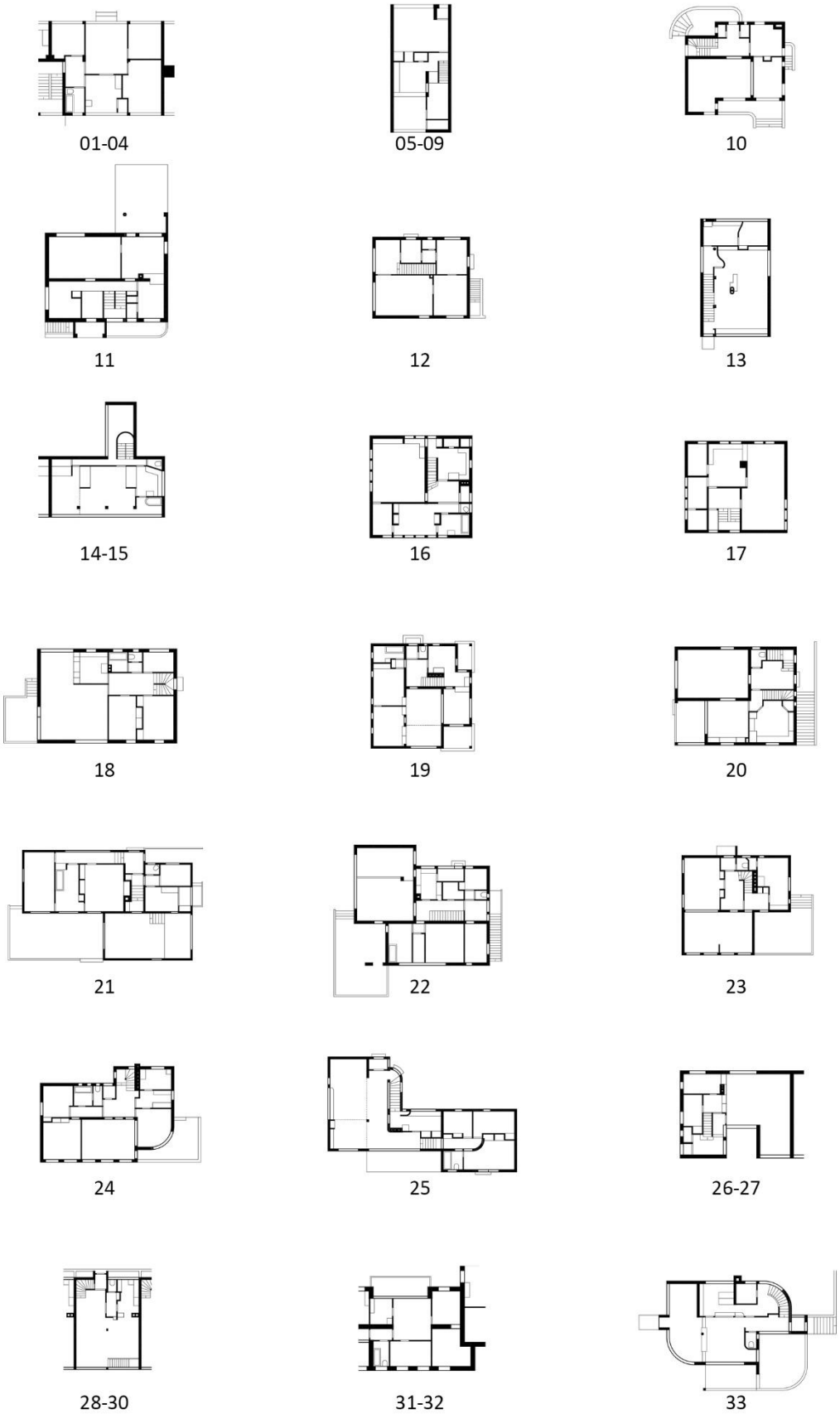

Figure 1. Main floor plan of each project:
1-4 Mies van der Rohe, 5-9 Oud, 10 Bourgeois, 11-12 Schneck, 13-15 Le Corbusier with Pierre Jeanneret, 16-17 Gropius, 18 Hilbersheimer, 19 B. Taut, 20 Poelzig, 21-22 Döcker, 23-24 M. Taut, 25 Rading, 26-27 Frank, 28-30 Stam, 31-32 Behrens, 33 Scharoun

Full Text

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Introduction

This paper aims to question the way architectural codes evolve in changing times.
There are periods of crisis in (human and) architectural history, where architects seem to evolve on shifting grounds because existing codes and dominating norms have been outdated by changes of reality. These changes can affect one or all of the three traditional characteristics of architecture: (1) social evolutions influence its functional aspects by changing behaviours on both large and small scale, (2) research namely on materials and construction techniques induces modifications on a technical level and (3) aesthetic aspects are questioned by social, political or other changes. All these changes tend to undermine the basis of architecture in those times and architects need to incorporate the consequences of the evolution of one or more of the aforementioned aspects.
Such radical changes occurred in the early 20th century. A group of architects throughout Europe embraced them with enthusiasm to create new paradigms, later known as early modernism. In this process, the *Weissenhofsiedlung* holds a key position in the concrete realisation as well as the theoretical debate about functional, technical and aesthetic changes.
This study of the *Weissenhofsiedlung* proceeds with a comparative analysis based on the redrawing of the floor plans and on the examination of historical and contemporary sources on their construction techniques. It focuses on the technical and aesthetic aspects of four projects realised as a part of the whole urban and exhibition project.
In order to enlighten the intellectual context of the project, this research includes an analysis of the relevant parts of the discussions among the participating architects, the disputes with their contemporaries and the reviews of the project after 1945.

Four Projects of the *Weissenhofsiedlung*

After introducing briefly the urban and the exhibition project of the *Weissenhofsiedlung*, this paper investigates a selection of four architectural projects which were realised by four different architects in four different materials. In spite of – or, precisely because of – these differences, they seem to be representative of the methods and results realised in this special framework.

Exhibition and urban project

As one of four parts of the exhibition – next to an experimentation field for construction machines and techniques, complemented by classical exhibitions on residential facilities and on international projects in plans and models – the *Weissenhofsiedlung* was conceived as a real scale experimentation and exhibition of "the new art of building". The housing units were completely furnished and were to be exhibited during three months in 1927. Afterwards they were rented out.
Commissioned by the city of Stuttgart and organized by the *Deutscher Werkbund*, a group of 16 international architects selected and conducted by Ludwig Mies van der Rohe was asked to realise a build statement on the "problem of new housing". Each project would address the functional, technical, aesthetic and economical dimensions of this issue. The exhibition poster "*Wie wohnen?*" designed by Willi Baumeister clearly resumes the intentions of the organisers to stamp out old living concepts and to seek out for possible futures.
In the introduction to the catalogue, Werner Gräff, a former student of the Bauhaus heading the exhibitions press-office, states that "the new art of building is constituted […] by its seeking a new way of living in the logical handling of new materials and new construction methods, but not by the purpose of a new form." (Deutscher Werkbund, 2011 [1927] p.8)
During the process of realisation, time was one of the major constraints. In fact, the final drawing of the masterplan was established in July 1926 and the final list of architects in November of the same year. The buildings construction officially began in February 1927, hardly five months before the opening of the exhibition. Furthermore, in order to reduce the budget of public investment and to promote new techniques, the buildings were partly sponsored by construction companies.

Ludwig Mies van der Rohe drew the masterplan of the urban project and fixed the guidelines for the architectural projects.
The plan included three typologies of housing from single houses, to row houses and multi-storey apartment blocks. After several modification, the final layout was composed of 21 projects comprising 63 housing units altogether.
Located on the slopes north to city centre, the masterplan presents a subtle work of orthogonal geometry linking the elements and their interstices and never the less embracing the natural topography.
Concerning the design of each building, only one instruction was formalised, which was the "absence of pitched roofs". According to the minutes of the construction committee of the city from October 1925, the urban design aimed for a "strong spatial and moving relation" between the buildings, the latter therefore had to be "an abstract volume, orientated to all sides, the form of a cube". (Kirsch, 1997 p.32)
Beyond that sole rule, architects had all creative freedom. However, in the different stages of the design process, layouts had to pass the validation process through the hands of Mies van der Rohe and the construction committee.

Figure 2. Final design of the masterplan with indication of the buildings architects:
1-4 Mies van der Rohe, 5-9 Oud, 10 Bourgeois, 11-12 Schneck, 13-15 Le Corbusier with Pierre Jeanneret, 16-17 Gropius, 18 Hilbersheimer, 19 B. Taut, 20 Poelzig, 21-22 Döcker, 23-24 M. Taut, 25 Rading, 26-27 Frank, 28-30 Stam, 31-32 Behrens, 33 Scharoun
(Deutscher Werkbund, 2011 [1927] p.14)

Behrens in masonry

The project of Peter Behrens is based on one of his former studies, a terraced housing block providing outdoor extensions to all apartments in order to provide excellent hygienic living conditions. For the version at Weissenhof, four main volumes of different height are nested offering terraces on different levels. Forming an L-shape with the highest part in the edge, the building marks the north-west side of the urban project.

For the walls construction, Behrens uses traditional solid masonry method but with a new type of stone, a porous hollow block made of pumice concrete. The interior floors and the balconies are made out of concrete slabs. Terraces and balconies are bounded by sturdy masonry balustrades. The entire masonry is covered by plaster so that all visible exterior surfaces of the buildings are homogeneously white. Behrens claims the construction to be “quite normal and economically pertinent” thanks to “the superposition of the walls in different levels and the use of lower volumes as terraces”. (Deutscher Werkbund, 2011 [1927] p.19)

The floor plans show the four main volumes surrounded by thick walls and each of them containing one or two apartments. Most of the apartments are traditionally organised around the main room which is connected to a considerable outdoor space. The terraces concept is extended to the exterior area and some of the south-west facing boundaries of the four main volumes are fragmented by additional voids to provide more exterior spaces.

The overall image of the building is dominated by the play of the large and small white volumes in the sunlight. Behrens affirms to create a “pictorial image” with those protrusions and recesses and regrets that there was no vegetation covering the volumes to enhance this impression.

Figure 3. Photo from exhibition catalogue, project after completion
(Deutscher Werkbund, 2011 [1927] p.22)

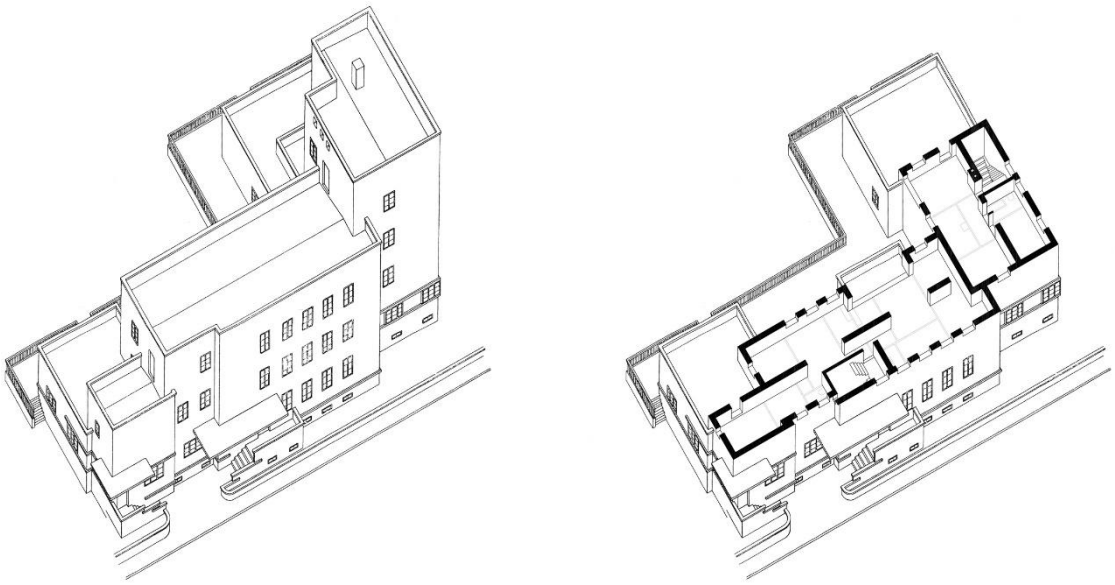


Figure 4. Isometric drawing from exhibition catalogue underlining the volumetric composition
(Deutscher Werkbund, 2011 [1927] p.16)
Figure 5. Modified drawing revealing the construction techniques

Mies van der Rohe in steel

Mies van der Rohe has identified two tendencies in contemporary housing which he addresses in his project, firstly the need for standardising the building process and secondly the growing differentiation of living habits.

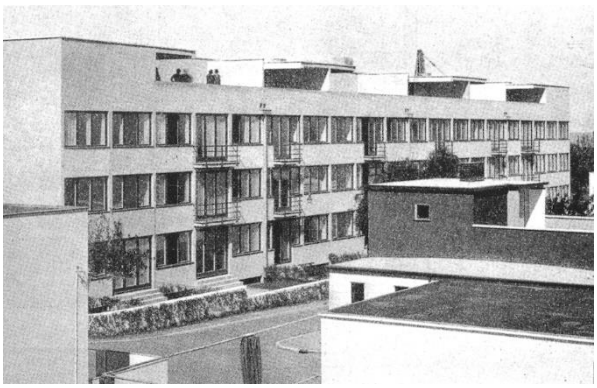
The building is a 70-meter long slab of three and a half stories, with four staircases leading to 24 apartments. This huge urban wall forms the northern barrier to the *Weissenhofsiedlung*.

The structure is constituted as a skeleton of steel beams and columns. The latter are positioned at a distance of about 3 to 4 meter on three axes: the two long facades and a middle range.

For Mies van der Rohe, the "skeleton construction is the most pertinent construction system because it allows a rational process and a free inner layout." (Deutscher Werkbund, 2011 [1927] p.77). The exterior walls are made out of masonry of perforated bricks and covered by turf insulation and white cement plaster. Inside, light partitions walls were laid out independently from the structure.

Since Mies van de Rohe invited other architects to design some of the apartments and variety is the main part of the building concept, it is difficult to summarize the floor plans to other characteristics than the building's structure and the unchanging positions of water installations for kitchens and bathrooms next to the staircases. Indeed Mies van der Rohe experimented here for the first time the separation of structure and functional building arrangement which would later on become one of his main principles.

The very simple volumetry of the project is underlined by almost coplanar windows with the outside walls and the small depth of the balconies. Only the roof gardens on the common upper floor make an exception in order to orientating the block downwards to the south.



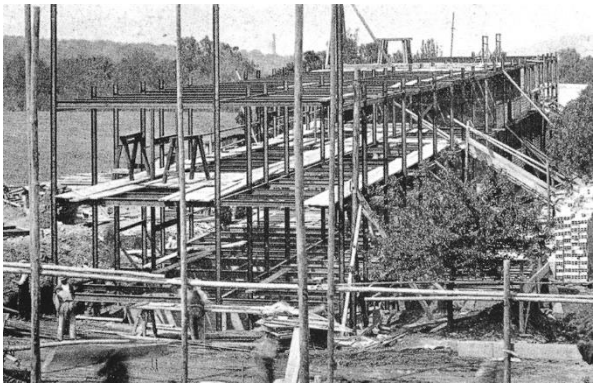
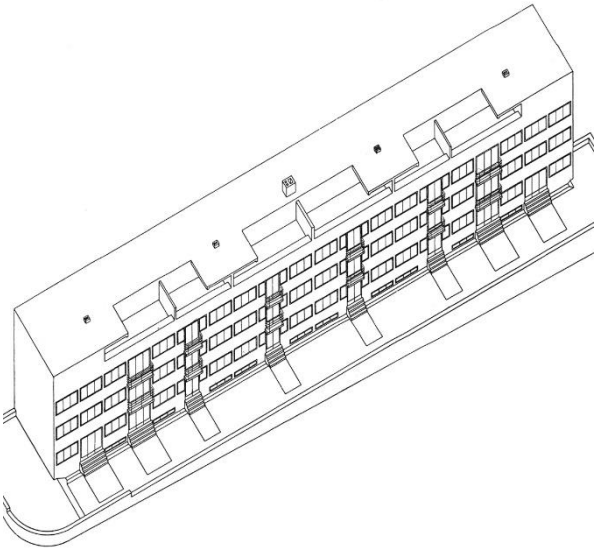


Figure 6 + 7. Photos from exhibition catalogue, project after completion and during construction (Deutscher Werkbund, 2011 [1927] p.81 + 84)



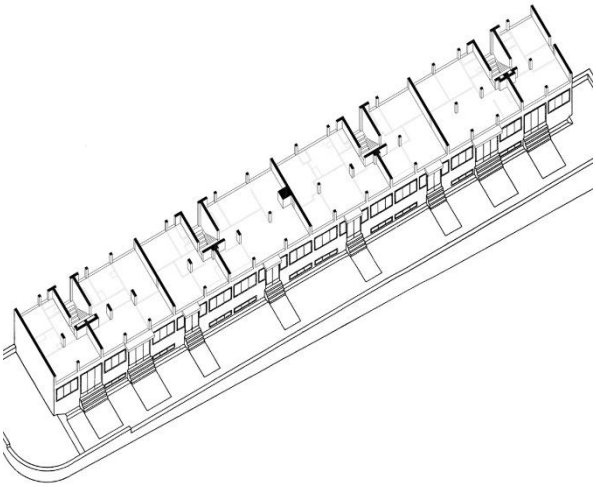


Figure 8. Isometric drawing from exhibition catalogue underlining the volumetric composition (Deutscher Werkbund, 2011 [1927] p.76)

Figure 9. Modified drawing revealing the construction techniques

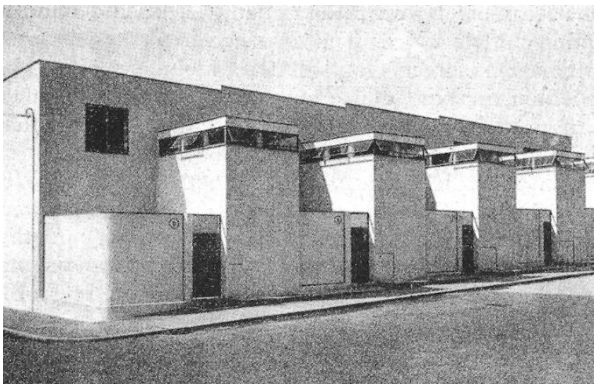
Oud in concrete

Based on his experimentation on low cost housing projects in Rotterdam where he acted as city architect, Jacobus JP Oud projected a line of five row houses as a *pars pro toto* for an urban project where spaces and circulation were to be strictly divided between representative and utilitarian functions. Each unit was two stories high, about 5.5 meter large and providing a double north-south orientation.

Oud uses no less than six different kinds of concrete (iron, gravel, lightweight, slag, pumice and gravel slag) in order to build each wall and floor according to its specific necessities. After detailing the functional advantages of his project on six pages of the catalogue, Oud insists on the use of "energy saving additions like gravel, sand, pumice and ashes to reduce the part of cement" and develops the idea of a "standardised formwork" which would overcome the waste of energy and material due to the "primitive" traditional method. (Deutscher Werkbund, 2011 [1927] p.94) All walls are covered with a homogeneous surface of white plaster, windows are placed on those surfaces and their glazing is aligned to them.

Inside the structural walls defining the units, the floor plan is composed according to the division of functions. On the ground floor, the living space is orientated to the south and accessible through an open garden, while the utility rooms are facing north with their own delivery entrance via a little courtyard. A staircase gives access to an additional volume with a drying room and to the second floor containing the chambers and a bathroom.

The linear addition of the units follows the ascending topography of the road by creating small steps between them. These steps in addition to the succession of staircases and courts surrounded by white walls are not only underlining the concept of receptivity but also the projects volumetric composition of white solids.



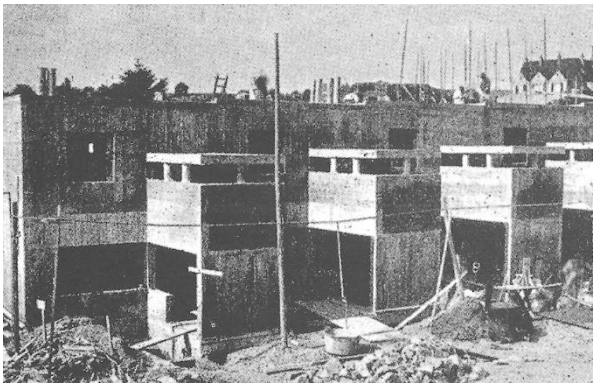


Figure 10 + 11. Photos from exhibition catalogue, project after completion and during construction (Deutscher Werkbund, 2011 [1927] p.91 + 85)

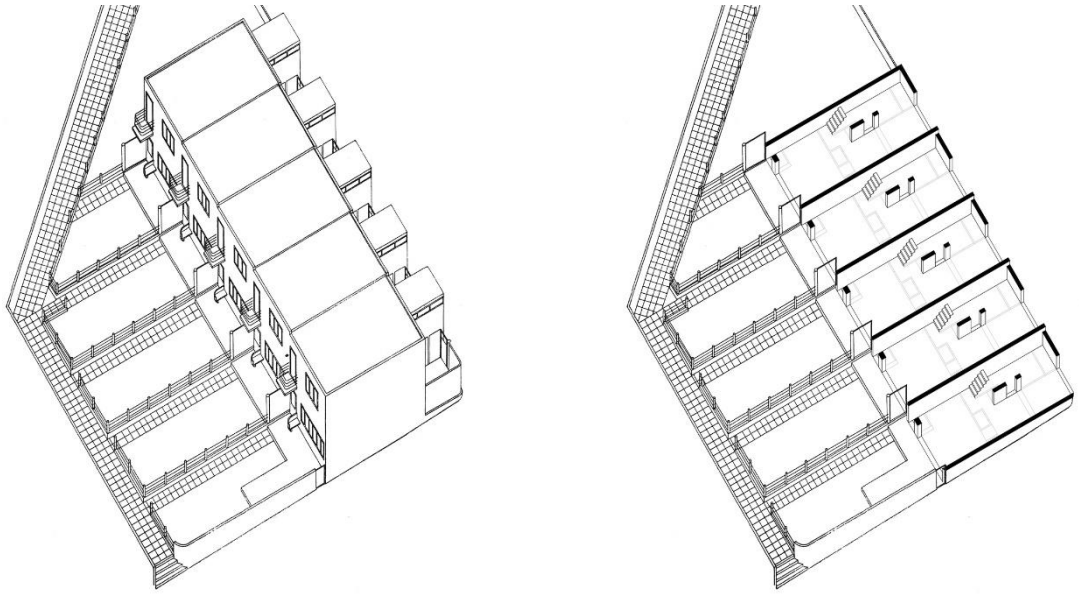


Figure 12. Isometric drawing from exhibition catalogue underlining the volumetric composition (Deutscher Werkbund, 2011 [1927] p.86)

Figure 13. Modified drawing revealing the construction techniques

Poelzig in wood

Hans Poelzig's contribution emerges from the statement of evolving living conditions adapting to the new necessities like modifications in working situations. He insists namely on the functional rationality and the flexibility of the spatial design.

The project displays a compact quadrangular two-story volume containing a single large housing unit.

The construction of the building is carried out in traditional timber framework. The structural elements of beams and columns dispose large sections and bracings at the angles of the building. This structure is covered by wood-cement-plates and a layer of white plaster. The balustrades of the terrace are formed as solid elements with the same finish. The wood structure discretely reveals its presence in form of two pergolas, one on the terrace and the other at the buildings entrance.

The layout arranges six identical squares of 4 by 4 meter on the ground floor. Above, only three of them are indoor spaces, the others being used as a large south-facing terrace.

Poelzig indicates in the exhibition catalogue that the use of such a traditional wood construction method, which might be surprising in the exhibitions context, is due to the sponsorship of the plate's manufacturer. But even in this case, the promotion of this new material is prevented and once again, the surfaces of the volumes are homogenised in order to heighten their lecture.

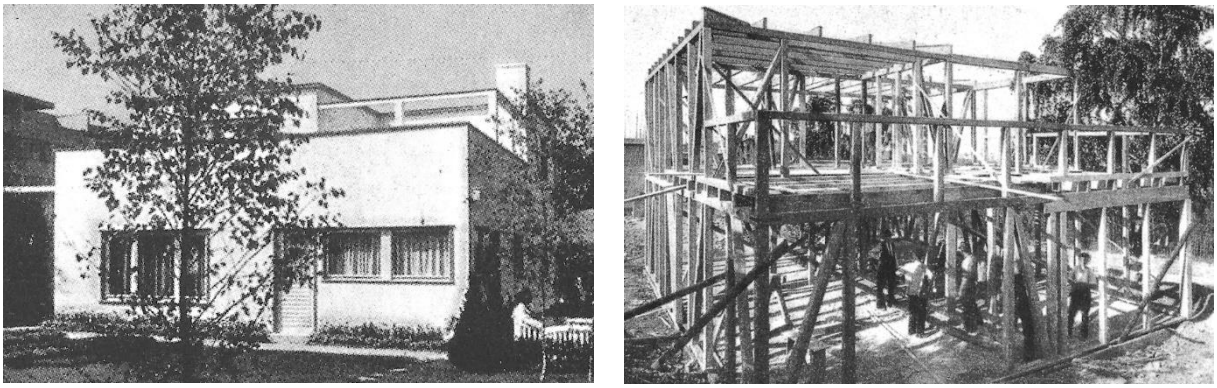


Figure 14 + 15. Photos from exhibition catalogue, project after completion and during construction
(Deutscher Werkbund, 2011 [1927] p.99 + 100)

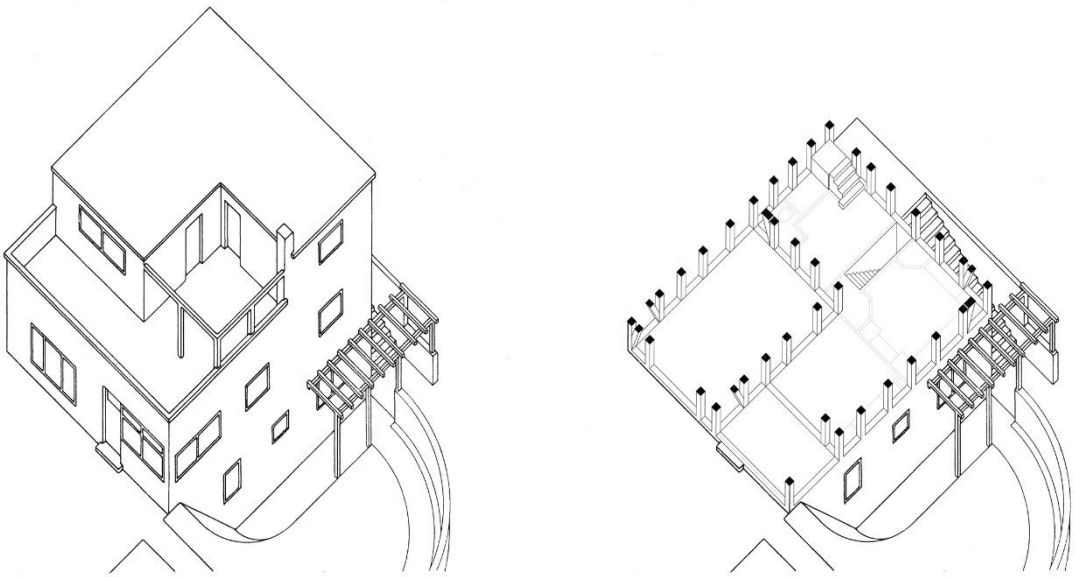


Figure 16. Isometric drawing from exhibition catalogue underlining the volumetric composition
(Deutscher Werkbund, 2011 [1927] p.96)
Figure 17. Modified drawing revealing the construction techniques

Synthesis: contradiction between techniques and aesthetics

Relating to work method and results, the four illustrated buildings are representative of the projects realised at the *Weissenhofsiedlung*. All of the architects are without any doubt proficient designers and have developed throughout their career their own specificities. Nevertheless, for the *Weissenhofsiedlung* projects, the exhibition framework was such that it directed the problems the architects addressed, it oriented the planning process and it centralised the construction of the projects. Therefore, the buildings must be analysed as a part of a group project rather than as isolated oeuvres.

The comparative study of the four buildings leads to a conclusion which applies to nearly all the other projects of the *Weissenhofsiedlung*. On the one hand, the architects called on a wide range of construction methods and materials. On the other hand, they forced their designs into a homogeneous architectural expression.

Hypothetically speaking, as the construction of projects was supervised by only one architect and commissioned by only one client, and given the pressure of time, it would not have been absurd for all the architects to use only one construction method or material. Yet, they enthusiastically chose and persisted to employ, experiment and even invent the use of different construction techniques.

But instead of displaying them, they chose to hide these various methods and materials behind homogeneous white surfaces. They even compelled the buildings details (e.g. the depth and the balustrades of balconies) to underline a common aesthetic expression of white cubes.

Hence, a strong and deliberate contradiction between building techniques and aesthetics has to be acknowledged.

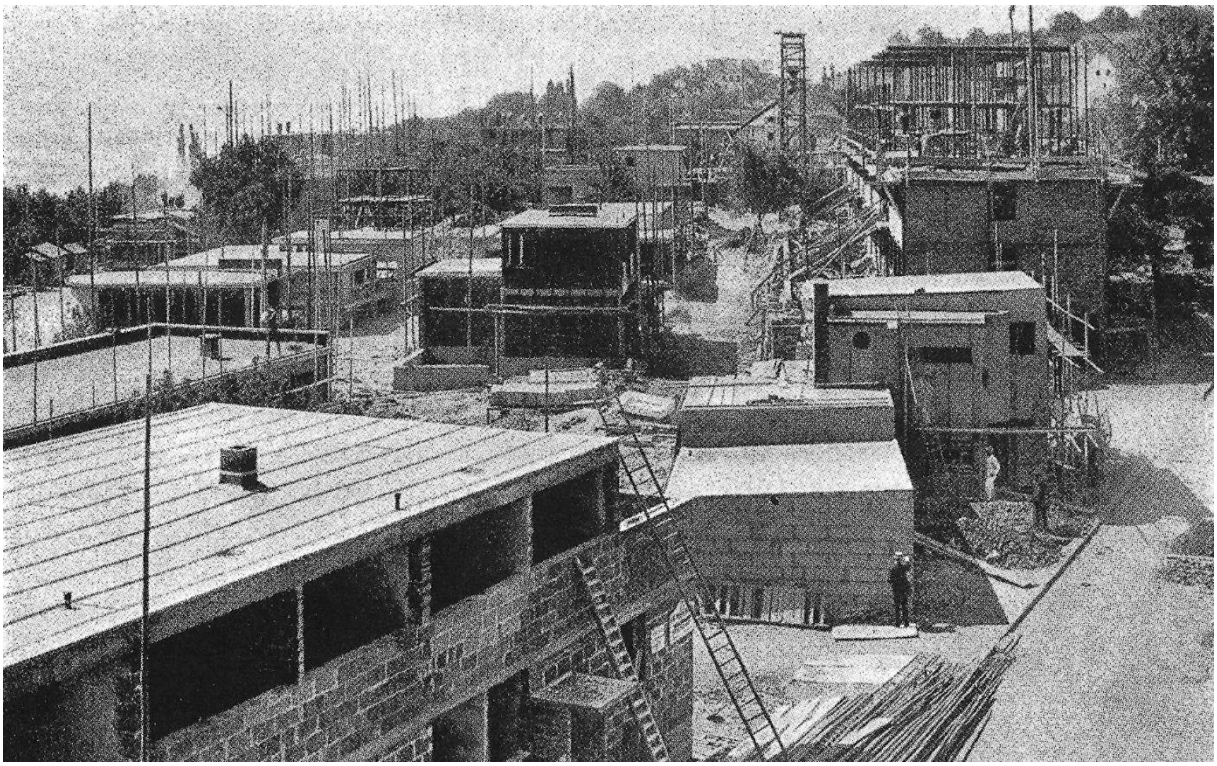


Figure 18. Photo from exhibition catalogue, *Weissenhofsiedlung* during construction
(Deutscher Werkbund, 2011 [1927] p.10)

Debates and review

In order to evaluate this contradiction the debates and reviews concerning the *Weissenhofsiedlung* at the time it was built and subsequently needs to be analysed.

During the preparation of the exhibition project, both the composition of the group of participating architects and the design of the masterplan were heavily disputed. As the *Werkbund* oriented its choices to international and mostly Berlin based architects, local professionals lead by Paul Bonatz and Paul Schmitthenner claimed that they were able to carry out the exhibition themselves. Meanwhile, different urban designs either based on traditional architecture or orientated to new codes were proposed and discussed. (Schwäbischer Merkur May 5, 1926. In: Ulmer & Kurz, 2009 p.220) Even if the two issues of group composition and urban design are not content-related, they became connected through the dispute because of the dividing line between the architects

involved. The “pitched roof” developed as the main issue of this dispute and focused the attention of many of its contributions. The group of progressives around Mies van der Rohe finally obtained gain to their cause by the majority of the city council’s vote in summer of 1926. (Kirsch et al., 1989 p.40)

This dispute and its focus on the pitched roof would resume in the 1930s with the National Socialists takeover of power: While Bonatz and Schmitthenner were commissioned to realise the exhibition “German wood for housing” next to the old site (*Kochenhofsiedlung*, 1933), most of the architects of the *Weissenhofsiedlung* were forced to emigrate. This traditionalists’ triumph went together with a systematic defamation of the Weissenhof projects and its planed destruction. In 1950, it culminated ironically when pitched roofs were added to Peter Behrens’ building.
Until today the reviews of the *Weissenhofsiedlung* seems to be largely influenced by this certainly explosive but rather tragic events and its focus on the roof question. Major publications on architectural and urban history still present the *Weissenhofsiedlung* as the quite perfect example and the immaculate birth of early modernism. Frampton, Lampugnani and others equally identify the *Weissenhofsiedlung* as a major pioneer project of *Neue Sachlichkeit*, literally meaning “new objectivity”. They are at the same time mostly silencing the aforementioned contradiction between techniques and aesthetics as well as the experimental character of the project and its buildings. (Frampton & Morel Journel, 2006 p.163. Magnago Lampugnani, 2010 p.339)

Figure 19. Postcard of the *Weissenhofsiedlung* with additional roofs sketched by Mies van der Rohe
(In: Kirsch, 1997 cover)

Conclusion
In order to draw a conclusion and interpret the results of this research, namely (1) the contradiction between building techniques and aesthetics and (2) the silencing of this fact by the following review, a glimpse into the architectural debate of the early 20th century is helpful.
At the time, “alternative facts” existed with respect to the minimal aesthetics of white cubes dissimulating technical characteristics. Examples of clear modernist architectural expressions combining without contradictions technical and aesthetic aspects were realised and largely published before, during and after the planning and realisation of the *Weissenhofsiedlung*.
For instance, the prairie houses realised by Frank Lloyd Wright during the first decade of the 20th century in Illinois illustrate how fluid modernist spaces, visible structural materials and pitched roofs can be compatible. These projects were celebrated in 1911 when his work was exhibited in Berlin, accompanied by a catalogue, the so-

called Wasmuth portfolio. Peter Behrens and his employees including young Mies van der Rohe, Gropius and Le Corbusier visited and largely discussed the exhibition.
Other examples can be found among the work the Weissenhof-architects realised elsewhere: Behrens' design for AEG in Berlin (1907-12), Gropius' Fagus-factory in Alfeld (1913) and Mies van der Rohe's brick-houses in Kreefeld (1928/30) all excel in giving an appropriate aesthetic expression to new construction techniques and materials.
But at the *Weissenhofsiedlung*, only two of the twenty-one projects do not completely adhere to the self-imposed restrictions of the aesthetic expression: In one of Gropius' houses, small joints on the facades reveal the plate covered structure of steel frames. Bruno Taut even dares to introduce colours on the simple volumes of his house. But as his project does not pursue any significant technical specificity, its aesthetics stand on their own and not for or contrary to any techniques.

The very fact that alternative choices were known and even produced by the Weissenhof-architects underlines the deliberate character of the aesthetic choice made for this special project.
Within the framework of the international exhibition project of the *Weissenhofsiedlung*, the architects opted for a reduction of architectural aesthetics to a minimalist code which provided a common and identifiable base for all projects. This radical formal agenda allowed practical choices on at least two levels: it became a rallying point for the group of progressives and it guided each architect in his individual work on his building.
The aesthetic choices were encouraged and strengthened by the exterior criticism. But, by this choice, not only did they exclude pitched roofs as largely discussed, also they eliminated any possible expression of technical and structural specificities.
As it is in complete contradiction with the modernist doctrine of "constructional truth", this choice reveals as truly radical. It seems to be due to a will and a necessity to generate coherence among the different projects of the *Weissenhofsiedlung*.
After the exhibition and until today, the radical choice of coherence and reduction has been amplified by architectural critics and historians, defending modernism against its criticism (attacks from Nazis and others) and contributing to the mystery of its root- and timelessness. Ultimately, this stance allows to identify and therefore to affirm the existence of an early modernist movement in architecture.

Opening
Eventually, the research allows a renewed, which means more detailed and critical, look into one of the first modernist urban and architectural projects.
About 90 years after the Weissenhof exhibition, architects are again struggling with a shifting context. Various and simultaneous crises are again questioning the methods and conventions of our practice and once again, new technical and aesthetic solutions are to be tested.
The study of the example of the *Weissenhofsiedlung* reminds us that such solutions are generated in collective processes and that an experimental approach (including sometimes doubtable choices) is able to renew of technical and aesthetic conventions.

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