Three Early Designs by Mies van der Rohe

Dietrich Neumann

Executed buildings almost always represent a compromise between the architect's vision and the constraints imposed by external forces, such as a client's expectations, local zoning ordinances, building laws, and the availability and cost of materials. An uncommissioned project, however, provides an opportunity for the architect to concentrate on a limited range of design issues and to express in a purer form his ideas, intentions, and abilities.

The contrast between such projects and executed structures is especially apparent in Mies van der Rohe's work of the early 1920s, when he built three rather conventional villas in Berlin[1] and created, during the same period, a set of five visionary designs: the entry for the Friedrichstrasse skyscraper competition, the curvilinear skyscraper, the concrete office building, and the two country houses in concrete and brick. Though idealized, the latter five designs were grounded in a complex set of preconditions that have made their analysis difficult and misleading. The regrettable loss of a considerable amount of recorded information (plans, models, and photographs), the brevity of Mies's accompanying texts, and finally, a general lack of thorough analysis of the projects themselves, have resulted in a mystification of the architect's intentions. The projects have been treated essentially as formal exercises,[2] despite Mies's clear statement of the year 1923, which seems to summarize his intentions: "We know no form problems, only building problems. The form is not the goal, but the result of our work. There is no form as such. The really formal is related, connected to the task, the most elementary expression of its solution. Form as a goal is formalism; and this we reject... "[3]

On June 14, 1923, Mies wrote in a letter to Walter Gropius about his participation in the Internationale Bauausstellung at the Bauhaus in the summer of 1923: "I would be delighted to be represented by the three projects [Mies refers to the second skyscraper design, the office building, and the concrete country house [4]], so that I could show how the same structural principle works out in three completely different assignments. Since I reject any and all formalism, and endeavor to develop the solution to an assignment out of its particular requirements, there will never be a formal relationship uniting the separate projects." [5]

The following essay represents an attempt to develop a better understanding of these three projects (which Mies obviously considered as a thematic entity) by exploring the degree to which, in each case, a combination of formal considerations and inherent constraints shaped the eventual result.

1 Kempner House, 1921–22; Feldmann House, 1921–22; Eichstaedt House, 1921–22; cf. Arthur Drexler, ed., *An Illustrated Catalogue of the Mies van der Rohe Drawings in the Museum of Modern Art, Part I* (New York, 1986), 54–61; 70–78.

2 Most recently by Wolf Tegethoff, "From Obscurity to Maturity: Mies van der Rohe's Breakthrough to Modernism," in Franz Schulze, ed., *Mies van der Rohe, Critical Essays* (New York 1989), 28 ff.

3 Mies van der Rohe, "Bauen," in *G* 2 (September 1923): 1.

4 The fact that Mies was referring to these projects is apparent in the first half of the letter: "Dear Herr Gropius, I received your letter and would like to say that I cannot remove the plaster model of the concrete residence [*Eisenbahnkragträgerkonstruktion*], so I can only place at your disposal a photograph of it and a charcoal drawing. The only models I could make available to you are the glass model of my tower and the wooden one of the large office building [concrete office building], and indeed I had thought of combining these two models, placing them next to each other so as to suggest a square. I tried it out, and the effect is wonderful; I believe that you too would understand then why the business building has only the horizontal articulation. I am sending you two photos of these two buildings, and ask that you return them to me sometime. I would be delighted to be

1 Old and New New York, *Alfred Stieglitz, 1910.*

represented by the three projects, so that I could show how the same structural principle works out in three completely different assignments." Quoted from Wolf Tegethoff, *Mies van der Rohe, The Villas and Country Houses* (New York, Museum of Modern Art, 1985), 32.

5 Quoted from Tegethoff, *The Villas and Country Houses,* 16, footnote 3.

6 Cf. "Frühlicht" (1922), quoted from Franz Schulze, *Mies van der Rohe, A Critical Biography,* (Chicago, 1986): 100

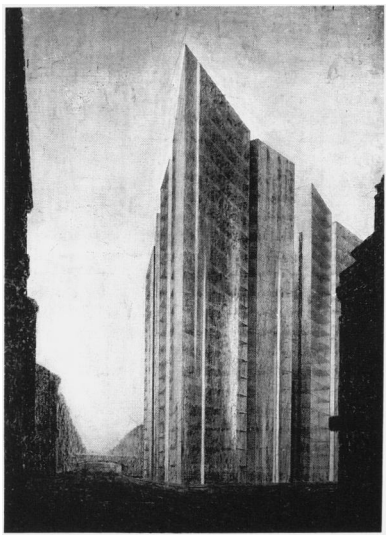
7 Cf., for instance, texts by two influential German art historians: Karl Scheffler, "Ein Weg zum Stil," *Berliner Architekturwelt* 5 (1903): 291–95; and Heinrich Pudor, "Gerüst-Architektur," *Bauwelt* 1, 36 (1910): 15.

The Curvilinear Skyscraper

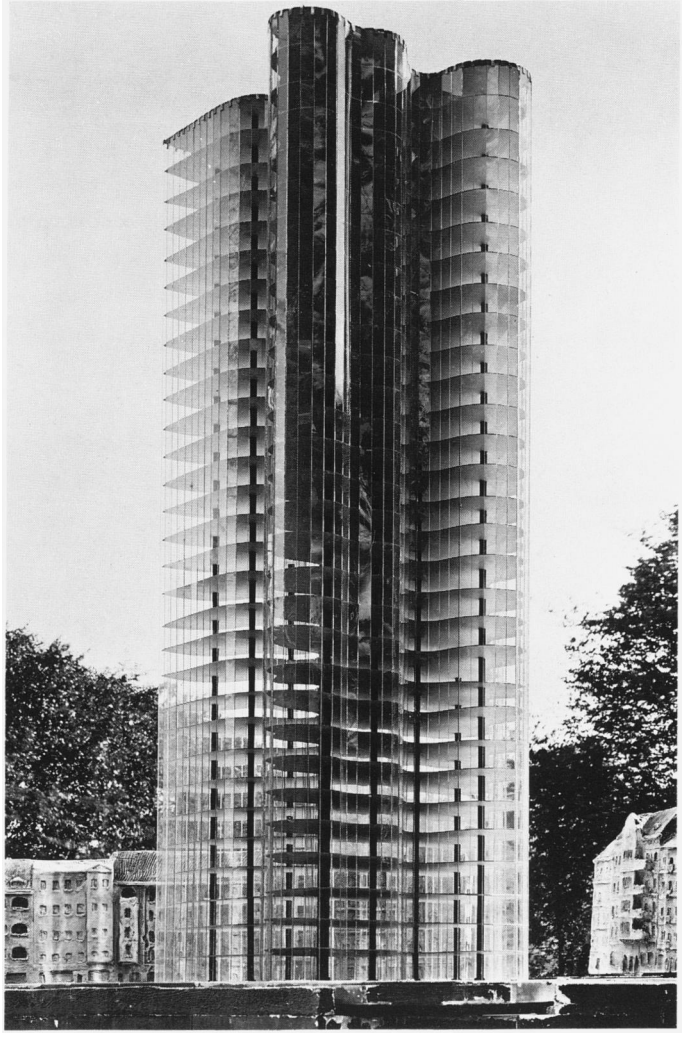
Mies's glass skyscraper of the year 1922 (3) was a development of his entry for the Friedrichstrasse Skyscraper competition in Berlin (2), which he had designed in the autumn of 1921. The two designs had several features in common: the buildings were completely sheathed in a homogeneous glass surface and lacked conventional building features, such as a base or cornice or an emphasized central axis. Their first publication in 1922 was accompanied by the following statement by Mies:

> Only in the course of their construction do skyscrapers show their bold, structural character, and then the impression made by their soaring skeletal frames is overwhelming. On the other hand, when the façades are later covered with masonry this impression is destroyed and the constructive character denied, along with the very principle fundamental to artistic conceptualization. These factors become overpowered by a senseless and trivial chaos of forms. The best that can be said for such buildings is that they have great size; yet they should be more than a manifestation of our technical ability. Above all we must try not to solve new problems with traditional forms; it is far better to derive new forms from the essence, the very nature of the new problem. The structural principle of these buildings becomes clear when one uses glass for the non-load-bearing walls. The use of glass forces us to new ways. [6]

In no way as original and innovative as Mies's skyscraper designs, the text repeats rather commonplace arguments among architects and critics of the time. His enthusiasm for the esthetic beauty of the visible steel skeleton and the scaffolding are ideas that can be traced to the turn of the century and further.[7] The photomontages of his projects



2 Friedrichstrasse Competition entry, Ludwig Mies van der Rohe, Berlin, 1921, photomontage.



3 Curvilinear glass skyscraper, Mies van der Rohe, 1922, model.

seem influenced by contemporary photographs of American skyscrapers under construction, such as Alfred Stieglitz' "Old and New New York" of 1910 [8] (1). Mies's suggestion to use glass for the non-load-bearing walls had already been executed at innumerable steel-frame structures for department stores, industrial buildings, and greenhouses in almost every major German city. And his critique of the historicist façades of American skyscrapers parroted the most common judgments by contemporary German critics of the skyscraper.

Although both designs were representative of a contemporary enthusiasm for the skyscraper in Germany,[9] they simultaneously denied the monumentality and nationalistic connotations that were evident in most projects of the period. The so-called skyscraper craze between 1920 and 1925 had triggered literally thousands of projects for almost every German city, designs that were widely published and enthusiastically discussed in the architectural periodicals of the day. The majority of these projects were developed by conservative architects who intended them as monuments to the German will to reemerge from the defeat of the war. However, because there was neither an actual need for office space nor the money to build any high-rise structures, most remained on paper. Although most architects criticized the American historicist skyscrapers and argued for a genuine German version, their formal language was clearly historicist and monumental, emphasizing central axiality and restrained neo-Gothic or neoclassical features (4, 5, 6, 7).

8 Published in *Camera Work* 36 (October 1911): 13.

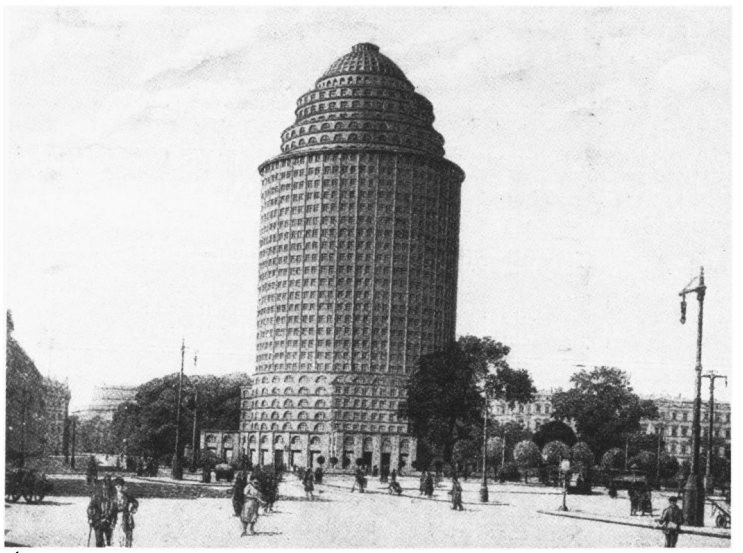
9 Cf. Dietrich Neumann, "Skyscraper Visions in Germany," *Arcade: The Northwest Journal for Architecture and Design* 10 (1990): 6–7, 12–14; Rainer Stommer, "Die Germanisierung des Wolkenkratzers," *Kritische Berichte* 10 (1982): 36–53; and for more detailed information about the German skyscraper movement see Dietrich Neumann, *Deutsche Hochhäuser der Zwanziger Jahre* (Berlin, 1989).

4 Skyscraper project for Leipzig, Tschammer, Caroli, Haimovici, 1920.

5 Skyscraper for Berlin, Otto Kohtz, 1920.

6 Skyscraper for Breslau, Max Berg, 1921.

7 Skyscraper for Munich, Otto Orlando Kurz, 1921.



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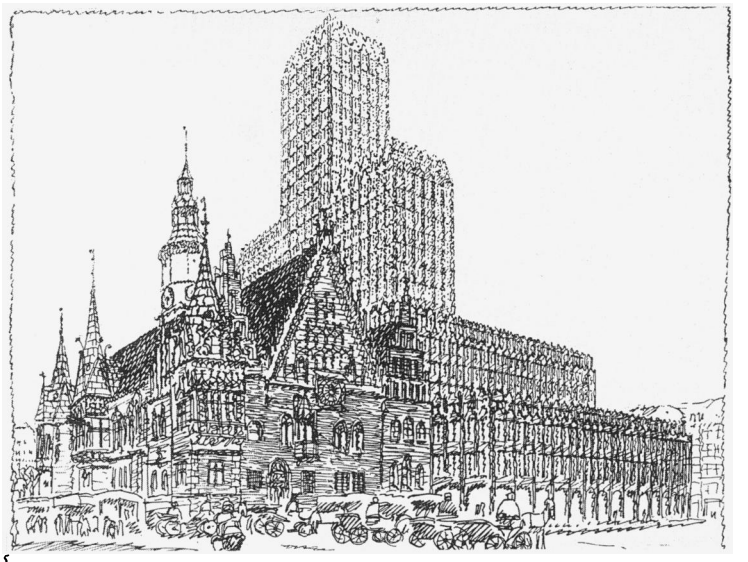

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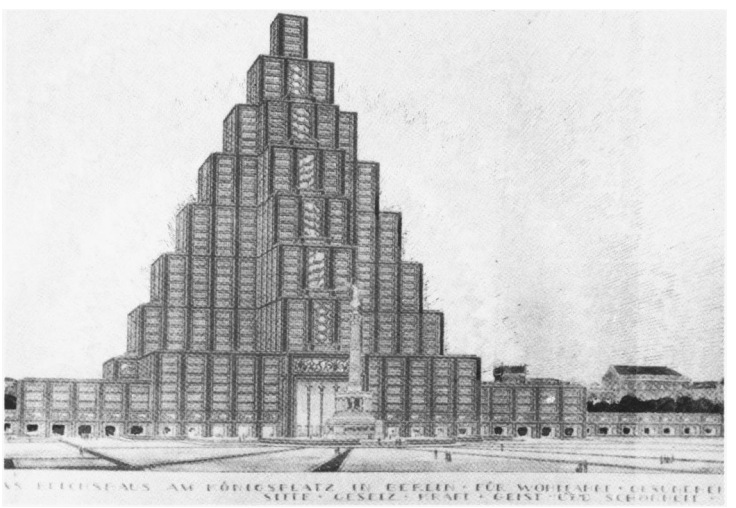

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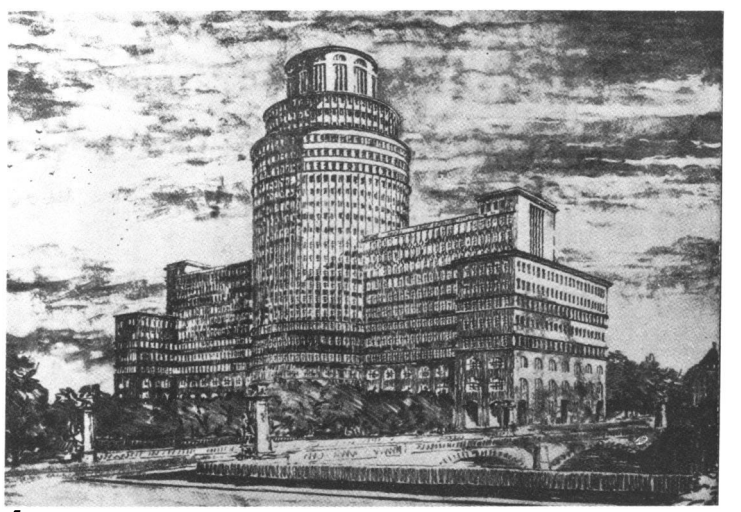

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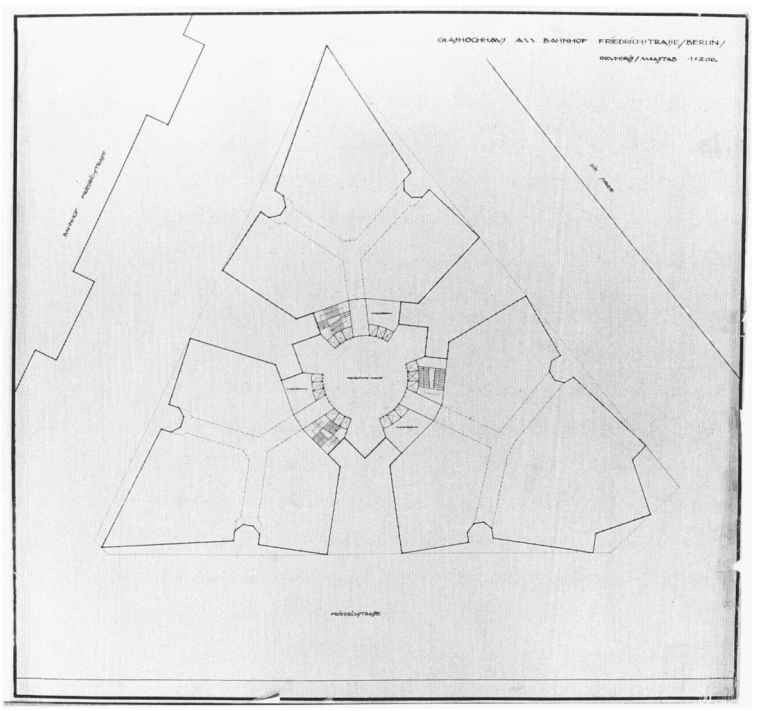
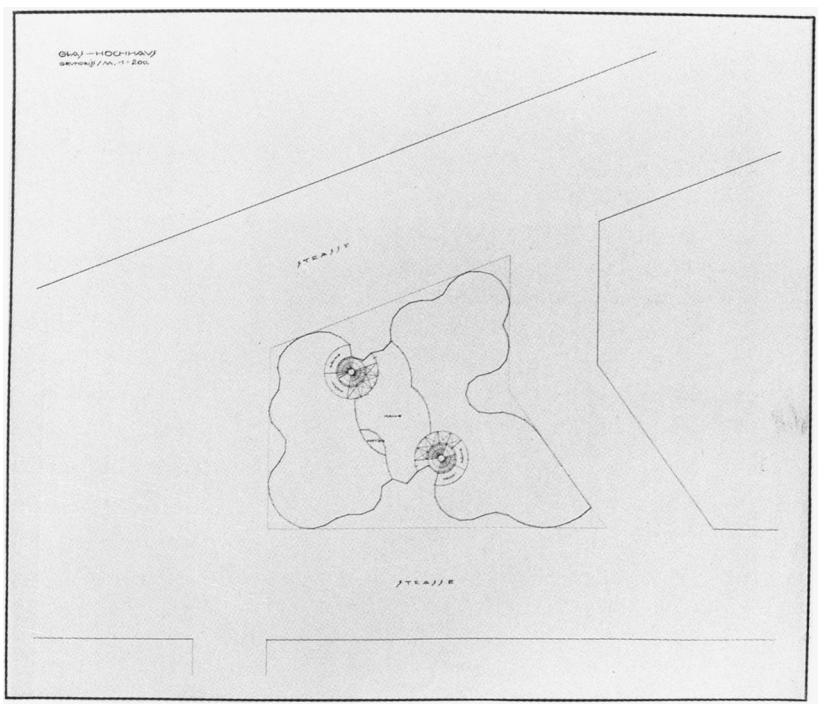
(Note: The two plans are printed here at the same scale.)

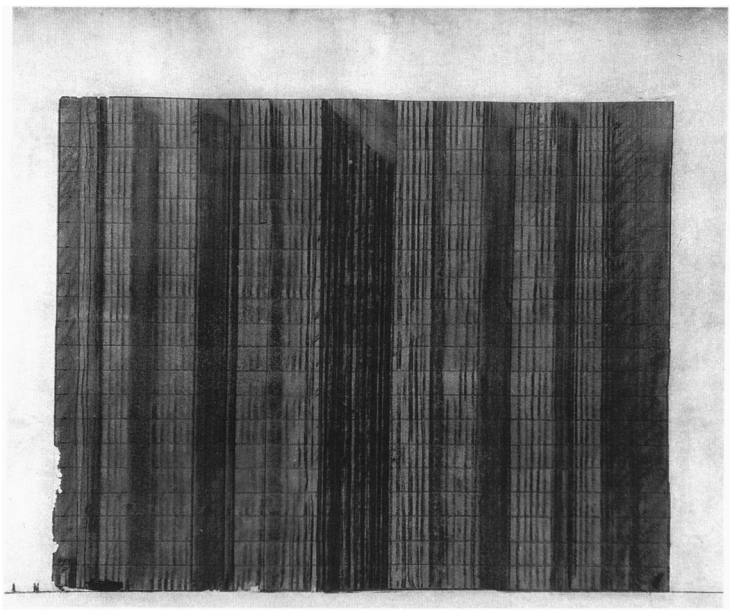


8 Friedrichstrasse competition entry, Mies van der Rohe, floor plan .

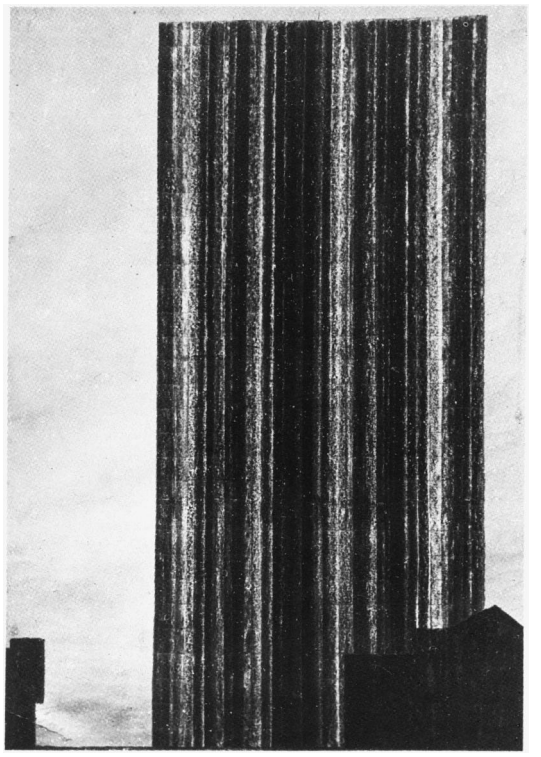


9 Curvilinear glass skyscraper, Mies van der Rohe, floor plan

10 Friedrichstrasse competition entry, Mies van der Rohe, elevation.



11 Curvilinear glass skyscraper, Mies van der Rohe, elevation



This "misunderstood monumentality" was rejected by the architects of the modern movement. Adolf Behne, the prominent critic, articulated this opinion: "It is really not a building that represents anything special in particular. To make it into a symbol with seriousness, rigor and dignity has to be rejected. It is a building for offices and businesses, an accumulation of shops, cafes, restaurants, a movie theater and an arcade, elevators, staircases and storage rooms—therefore there is no reason for any pathos." [10] The complete absence of elements of conventional monumentality in Mies's two skyscraper projects reflected this attitude. But his designs went even further: by covering the entire structure with glass and by taking both reflection and transparency into account, Mies aimed to overcome and negate the building as such.

In order to understand the curvilinear skyscraper, we must analyze the features that this design inherited from its predecessor as well as their obvious differences. Mies's famous contribution to the Friedrichstrasse competition has generally been considered "expressionistic,"[11] a demonstration of the "materialized demateriality or a dematerialized materiality"[12] of glass, and "as a manifesto [rather] than as a practical piece of architecture."[13] There is, however, evidence that Mies's design was generated by more than formal concerns.

The competition for the Friedrichstrasse office building was announced at a time when work for architects was scarce due to the general economic hardship in postwar Germany.[14] One should therefore consider the possibility that while Mies did want to publish an architectural statement (for which there might have been better opportunities), he was also seriously trying to win one of the prizes of up to 33,000 Reichsmark, and therefore attempted to comply with the conditions of the competition. Required of all entries was a calculated list of the usable floor space of the proposed building. It was obvious that it was in this aspect of the program that the Berlin businessmen of the Turmhaus AG who sat on the jury would be most interested. In general, the competitors found two major ways to place their building on the triangular site in front of the Friedrichstrasse railroad station: either in a monumental triangular or round form with an internal courtyard, or as a star shape with three arms stretching toward the three corners of the site.

Clearly attempting to surpass every other participant in the amount of office space that he offered, Mies chose the latter solution, but the three arms of his star were so large that they nearly filled the site (8). He introduced only three small external light wells, providing daylight for the emergency staircases and the sanitary rooms, as required by the Prussian building code.[15] Mies himself wrote about this process in 1924: "The building site was triangular; I have tried to make full use of it. The depth of the site compelled me to split the fronts, so that the inner core received light."[16] As a result, the rooms were up to 15 meters deep, two times the depth of 7.5 meters, which was normally considered the maximum possible distance from a window for office work in daylight.[17]

Mies tried to compensate for this by introducing rather tall floor-to-ceiling dimensions (4 meters) and by opening up the entire façade and sheathing it with glass. He then stacked twenty of these floors on top of one another, thereby reaching the maximum height of 80 meters, a limit that had been set for this site by the building department as a response to the poor load-bearing capacity of the site's soil. The result was a floor area of roughly 70,000 square meters, almost twice the amount offered by any of the winning entries (W.G. Koch, third prize, 37,000 square meters).[18]

10 Cf. Adolf Behne, "Der Wettbewerb der Turmhaus-Gesellschaft," *Wasmuths Monatshefte für Baukunst* 7 (1922–23): 59.

11 Cf. Julius Posener, "Vorlesungen zur Geschichte der neuen Architektur II," *Arch+* 53 (September 1980): 75.

12 Cf. John Zukowsky, *Mies Reconsidered,* exhibition catalogue (Chicago, 1986), 37.

13 Cf. Schulze, *A Critical Biography,* 103.

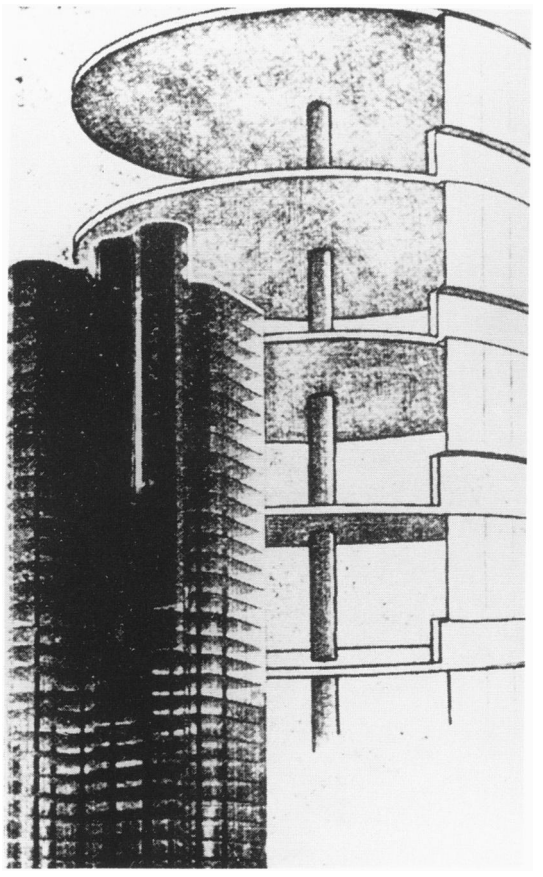
14 For information about the Friedrichstrasse competition, cf. Florian Zimmermann, *Der Schrei nach dem Turmhaus* (Berlin, 1988), and D. Neumann, *Deutsche Hochhäuser,* 61–112.

15 See Walter Koeppen, *Bauordnung für die Stadt Berlin vom 3. November 1925,* 2nd rev. ed. (Berlin, 1927), 29, 35.

16 From a lecture manuscript of the year 1924; cf. Fritz Neumeyer, *Mies van der Rohe, Das kunstlose Wort* (Berlin, 1986), 308.

17 Cf. H. Seeger, *Bürohäuser der privaten Wirtschaft* (Leipzig, 1933), 14.

18 This attempt to relate Mies van der Rohe's design more to the realities of the competition's conditions and the building regulations does not deny other possible intentions behind the project. The triangular site with its sharp edges offered, of course, a welcome opportunity for expressive forms and for a general demonstration of the purity and clarity of a future architecture in comparison with the "senseless and trivial chaos of forms" of the historicism around it. But these ideas were not necessarily the only force behind the design. If it had been Mies's main intention to produce an expressionist crystalline image, he could have done that much more successfully with an accentuated star-shaped plan and some sort of set-back design, instead of the unmodified, heavily proportioned mass that the building represented from most vantage points. Cf. Drexler, *Catalogue of Drawings, Part I,* 50.



12 Analysis of Mies van der Rohe's curvilinear glass skyscraper, Mart Stam, published in ABC Beiträge zum Bauen, *1925.*

The idea of sheathing the entire façade in glass, inherited by the curvilinear skyscraper, had thus originally been created as a response to the special conditions of the Friedrichstrasse competition. Mies, however, obviously realized that even a 4 meter high window could not sufficiently light a room 15 meters deep, and therefore drastically reduced the size of the floor space and the depth of the rooms in his new design (9). Accordingly, he was able to reduce the number of elevators from eighteen to nine and the number of emergency staircases from three to two. The height of the rooms remained 4 meters.[19] In both designs the staircases have twenty-six steps, with each riser a comfortable 15 centimeters in height. Without the limitations set by competition requirements, he was able to increase the building to thirty stories, which, coupled with the reduced floor plan, resulted in a much more soaring appearance.

The curving outline of this design is, at first, difficult to categorize. It seems to move arbitrarily within the borders of a trapezoidal plot of land. At one point it follows the straight edge of the borderline, but soon falls back into its smoothly swinging rhythm. Mies wrote about this design and the development from its predecessor in 1922:

> I placed the glass walls at slight angles to each other to avoid the monotony of over-large glass surfaces. I discovered by working with actual glass models that the important thing is the play of reflections and not the effect of light and shadow as in ordinary buildings... At first glance the curved outline of the plan seems arbitrary. These curves, however, were determined by three factors: sufficient illumination of the interior, the massing of the building viewed from the street, and lastly the play of reflections [20]

Critics have never been satisfied with Mies's straightforward explanation. They have suggested possible influences from Hermann Finsterlin, Hans Arp,[21] and Hugo Haering, who at that time shared an office with Mies and had designed his Friedrichstrasse skyscraper with rounded corners.[22] The design has been compared to "a pool of spilled milk"[23] and has even been related to classical architecture.[24] Was it perhaps, as the drawings seem to suggest, a literal illustration of the concept of the curtain wall?

19 All of the surviving drawings in the Museum of Modern Art in New York were drawn to scale, the elevation in 1:100, the floor plans in 1:200. The plans are published here to the the same scale, to allow for a comparison of the buildings' relative sizes.

20 Quoted from Kenneth Frampton, "Modernism and Tradition in the Work of Mies van der Rohe, 1920-1968," in *Mies Reconsidered,* 37.

21 See, for example, Schulze, *A Critical Biography,* 107. But Mies later rejected this assumption.

22 Schulze, *A Critical Biography,* 103.

23 Schulze, *A Critical Biography,* 101.

24 Cf. Fritz Neumeyer's hint at the "dental friezelike upper edge of the building" in the model of the glass skyscraper in *Das Kunstlose Wort,* 199, footnote 29. (I believe that this is in fact the connection of the slender glass plates with the upper slab, entirely related to problems of model-making, and without any symbolic meaning. Notably, no such "dental frieze" appears in Mies's drawing.)

When American critics were confronted with the design in 1923, they reacted with utter amazement: "The plan... is so fantastic and impractical and so impossible to divide into any kind of usable or desirable offices or apartments that it is not likely that it would ever be executed," [25] wrote one critic, while another one characterized the design as: "a picture of a nude building falling down stairs,"[26] referring to Marcel Duchamp's famous painting.

Both Mies's text and the rather individual forms of the adjacent buildings in the model photograph (3) support the argument that Mies must have had a specific site in mind when he designed the building. The reference to the "sufficient illumination of the interior, the massing of the building viewed from the street, and lastly the play of reflections" makes sense only if there was a clearly defined site with a calculable direction of sunlight.[27]

Neither the published floor plan nor Mies's text gives a hint as to the intended method of construction. Thus far this question has been discussed only rarely,[28] and the building has been generally considered to be of steel-frame construction.[29] From the letter to Walter Gropius regarding the three projects (see note 4), however, one can assume that some sort of cantilevered reinforced concrete structure was intended, since such a construction is clearly visible in the drawings of the concrete office building and was also explicitly mentioned in Mies's text about the concrete country house.

Mies's friends and colleagues seem to have known more about the intended structure. Mart Stam, who knew Mies well, analyzed the design in 1925 in his magazine *ABC*, in an issue devoted entirely to concrete as a building material. There, he clearly described the central construction principle: "A circular plate, supported in its center, offers a maximum of floor area combined with a minimum of surface. Both—the stanchion as the vertical, the floor slab as the horizontal, produce an element that through addition creates a system." [30] In an explanatory illustration he showed the glass skyscraper together with a diagrammatic mushroom slab (12). Bruno Taut, in whose magazine the design had first been published, in 1927 declared Mies "the first one to use the mushroom construction architecturally."[31] The only building he could have referred to is, in fact, the curvilinear skyscraper.

In the years preceding Mies's design, architects' and engineers' magazines in Germany had enthusiastically praised the potential of this new method of reinforced concrete construction, the "mushroom column."[32] This technique employed a concrete column connected through reinforcement rods to the floor slab it carried in such a way that the shearing forces were absorbed by the capital like head of the column rather than by a downstand beam. The advantage of this new method was, according to the widely read *Deutsche Bauzeitung*, "that the abolition of the normally necessary groined slab makes a better dissemination of air and light possible." [33] Though the calculation, placement, and connection of the reinforcing rods was more complicated, the formwork became much simpler and could be assembled with a small number of prefabricated parts. All of this must have fascinated Mies.

The most efficient form of a floor slab to be carried by a central stanchion is a circle. The photographs of the skyscraper model show that the stanchions carrying the amorphous floor slabs were in fact placed mainly in the center of circles, the arcs of which constituted the undulating borderline. The necessary capitals of the columns, however, have been left out. The idea of a cluster of mushroom slabs of different sizes might well represent the structural underpinnings for Mies's work with the "play of reflections" during the design process. It would thus give at least some support to Mies's claim of the "structural concept as the essential foundation of the artist's design," an explanation of the architect's work that critics have always rejected, especially regarding this project.[34]

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25 Cf. George C. Nimmons, "Skyscrapers in America," *Journal of the American Institute of Architects* (1923), 370–72.

26 Cf. William Stanley Parker, "Skyscrapers Anywhere," *ibid.*, 372.

27 This opinion seems to be confirmed by contemporary statements of Werner Graeff and Carl Gotfried; see W. Tegethoff, in Schulze, ed. *Critical Essays*, 42–43. A photomontage of unidentified origin in the drawings collection of the Technische Universität Berlin shows the model at the site of the Friedrichstrasse competition. This site, however, seemed to be unsuited for a building of thirty stories, since the buildings department allowed only about twenty storys there. Mies knew this fact from the conditions of the Friedrichstrasse competition. Mies published the design for the curvilinear skyscraper once, however, in a version with twenty-one storys. Drexler, *Catalogue of Drawings, Part I*, 62.

28 For a more recent hint, see K. H. Hüter, *Architektur in Berlin 1900–1933*, (Dresden,1988), 300.

29 See, for example, Walter C. Behrendt, "Skyscrapers in Germany," *Journal of the American Institute of Architects*, (1923), 368; most recently by W. Tegethoff, "From Obscurity to Maturity," 43, footnote 25.

30 Cf. *ABC-Beiträge zum Bauen* 3/4. (1925), 4.

31 Cf. Bruno Taut, *Die neue Baukunst in Europa und Amerika* (1927; 2nd ed. Stuttgart, 1979), 111.

32 The Swiss engineer Robert Maillart claimed responsibility for the development of this system as late as 1926, citing his experiments of 1908 and 1910. Until then only the American experiments were known. R. Maillart, "Zur Entwicklung der unterzugslosen Decke in der Schweiz und in Amerika," *Schweizerische Bauzeitung, 87.* (1926): 263–65, 19–21.

33 Cf. H. Marcus, "Die Tragfähigkeit und die Wirtschaftlichkeit trägerloser Pilzdecken," *Deutsche Bauzeitung 53.* (1919): 149–52, 155–59.

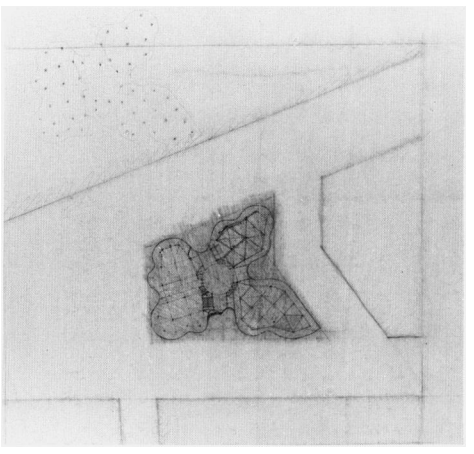
34 Cf. Tegethoff, in Schulze *Critical Essays*, 43.

35 Cf. J. Vischer L. Hilberseimer, *Beton als Gestalter,* (Stuttgart, 1928), 49–50.

36 Cf. O. Freud, "Die trägerlose Pilzdecke, eine neuartige Eisenbetondecke für Industriebauten," *Industriebau 17* (1926): 166– 270.

37 Cf. Reyner Banham, *Theory and Design in the First Machine Age,* (London, 1978), 295.

38 Schulze, *Mies van der Rohe, Biography,* 101.



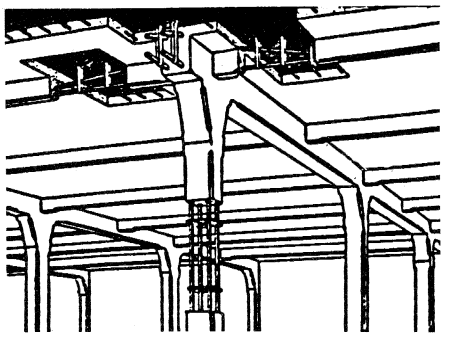
13 Curvilinear glass skyscraper, Mies van der Rohe, 1922, plan study.

Within a few years, the mushroom slab was accepted by the modern architects as "the most proper area of the reinforced concrete construction…The rooms that are covered with mushroom slabs are, if good proportions are applied, of such great beauty that eventually all embellishing additions can be shunned,"[35] wrote Ludwig Hilberseimer in 1928 comparing examples from America, Switzerland, and Germany to demonstrate the heaviness of the German solutions that had resulted from the country's strict building laws. (In September 1925 mushroom-column constructions had, with newly developed calculation methods, for the first time been included in the German building code.[36]) Hilberseimer's enthusiasm was largely caused by the building of the Van Nelle Tobacco Factory in Rotterdam (1926–30), in which, for the first time, the product of this construction method had been made visible from the outside through a glass screen. Mart Stam, who then worked with Brinkman and van der Vlugt, contributed extensively to its design.[37]

A second sketch by Mies for the floor plan of the curvilinear skyscraper shows an attempt at another structural solution (13), one that would have been possible in both steel and reinforced concrete, although the economic constraints of the time would only have allowed the latter. The structural grid consists of fifty-two columns, interconnected by downstand beams. The outermost line of columns stands well inside the outer surface of glass through the apparent use of a cantilevered floor slab.

This plan also shows an interesting internal division which stems from the layout of the earlier competition entry: a circular foyer serves four groups of elevators, two emergency staircases, and the entrances into the office areas. Such a scheme makes far better sense than the published floor plan, in which several features were unconvincing: the rather arbitrary form of the lobby, the accessibility of the lavatories and elevators from the office spaces, and the circular emergency stairs, which were prohibited by the building codes. The improvements in the sketched floor plan suggest that it was developed after the first plan had already been published. The fifty-two columns, however, clearly would have spoiled the envisioned transparency of the building. In any case, it is not just an unsuccessful attempt to match a structural grid with an amorphous floor plan,[38] as Franz Schulze has suggested in his biography of Mies.

Mies's early interest in the architectural potential of the mushroom column is akin to that of Le Corbusier, who, in the same year, 1922, developed his design for an artist's studio house, a building with an overall cubic appearance in which the ceiling was carried by one central stanchion. If the curvilinear skyscraper can be considered a reinforced concrete cantilever structure with mushroom columns, it then becomes part and, in fact, the starting point of a strand of tradition that leads to Frank Lloyd Wright's designs for several tall structures based on this system. Commencing in 1929 with the tower for St. Marks in the Bowery and culminating in 1943 with the tower for Johnson Wax, Wright provided more successful and convincing solutions for the technical problems encountered in Mies's earlier attempts.



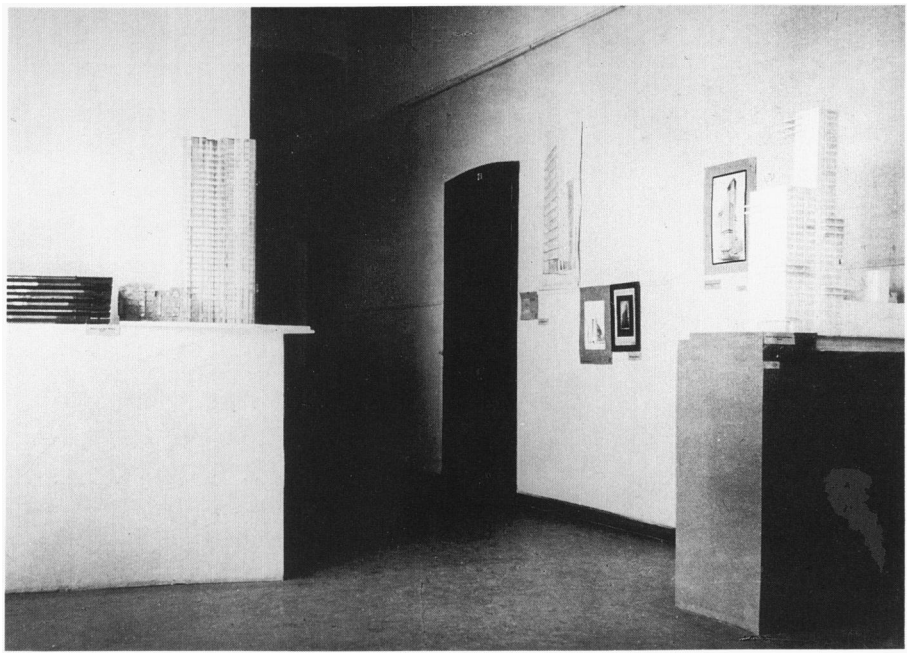
14 Schematic view of a reinforced concrete structure, François Hennebique, c. 1902.

The Concrete Office Building

Mies produced his project for an office building for the Grosse Berliner Kunstausstellung (Great Berlin Art Exhibition) in May 1923. Only his large perspective drawing (16) and one model photograph (15) have survived.

Again, the building cannot be fully understood without direct reference to the contemporary architectural debate in Germany, which was dominated by an enthusiasm for skyscrapers. As a clear counterproposal to innumerable conservative verticalist skyscraper designs, [39] Mies's design emphasized not only the horizontality of the façade through its succession of continuous ribbon windows and concrete parapets, but also suggested the potential for an endless horizontal continuation of the building.[40]

It appears that Mies wanted to gain as much floor area as possible without creating a skyscraper. Skyscrapers had just been defined in the Prussian building code as buildings having more than six stories.[41] Classification as a skyscraper would have meant that special permission would have to be obtained from the ministry of public welfare and many other official commissions, a procedure that would have been tedious and time-consuming.[42] Additional conditions concerning fire escapes, for example, had to be fulfilled. So there was a good reason to challenge the limits of how much office space could be gained without erecting a high-rise structure. Mies's proposed building has, in fact, eight stories, but one is sunken into the ground and the top floor is so low that it resembles an attic, since its small ribbon window would not have been sufficient to light the room. In the interior a groined slab with haunched beams is visible, a system that bears a striking resemblance to François Hennebique's well-known construction drawing for reinforced concrete of circa 1902 (14).



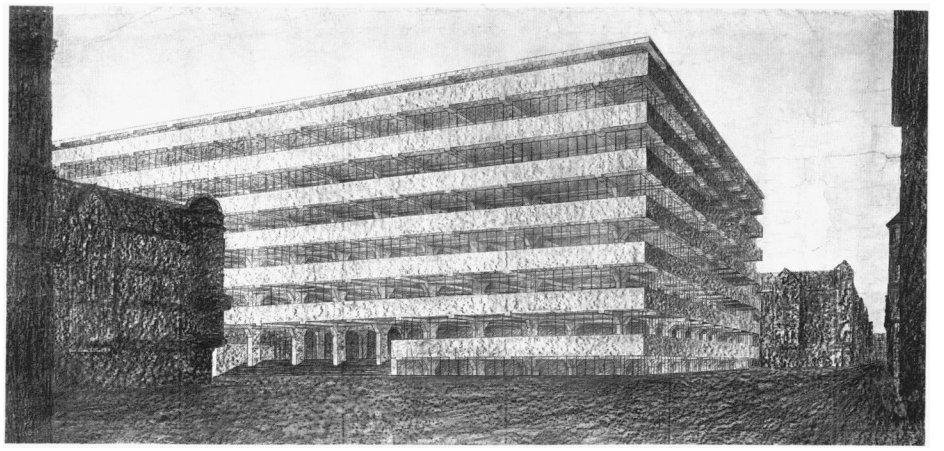
15 Installation view of the Internationale Architekturausstellung, Bauhaus Weimar, 1923. Models of Mies's concrete office building and the glass skyscraper, left; Walter Gropius's Chicago Tribune competition entry, right.

39 Le Corbusier was probably thinking not only of Messel's Wertheim department store but also of the typical contemporary German skyscraper designs when he wrote in *L'Espirit Nouveau 9* in 1921: "One simple fact condemns the lot; in a building one lives floor by floor horizontally, not vertically. The German palaces are just lift cages.... The Louvre and Bon Marché shops are in horizontals and they are right and the German architects are wrong. Quoted from Banham, *Theory and Design in the First Machine Age*, 255.

40 In the drawing the left end of the building is screened off by an adjacent building in the foreground. In the photograph showing the model in the 1923 Bauhaus exhibition, where it was placed as a counterpart to the curvilinear glass skyscraper (see note 4), the building is shown as extremely long, and the left end is again cut off and invisible.

41 Cf. "Vielgeschossige Häuser," in *Zentralblatt der Bauverwaltung 41* (1921): 48.

42 The still unusual high-rise building required a much greater number of consultations with and applications to different branches of the municipal government, since no sections regarding high-rise buildings had been introduced into the building code and each case had to be treated individually. (Neumann, *Deutsche Hochhäuser...*, 199.)



16 Concrete office building, Mies van der Rohe, 1922–23, perspective drawing.

The 1923 publication of this project in *G*, the magazine that was edited by Hans Richter, El Lissitzky, and Theo van Doesburg, was accompanied by Mies van der Rohe's famous text:

> We flatly reject all aesthetic speculation, all doctrine, and any kind of formalism. Architecture is the will of the time in its spatial manifestation—animated, changing, new.
>
> Not the past nor the future, only the present can be shaped. Only if this has been accepted, will there be creative building.
>
> Create the form out of the nature of the problem, with the means of our time: This is our task.
>
> The office building is a house of work, of organization, of clarity, of economy. Bright, wide workrooms, easy to oversee, undivided except as the organism of the undertaking is divided. The maximum effect with the minimum expenditure of means.
>
> The materials are concrete iron glass.
>
> Buildings of reinforced concrete are by their very nature skeletal structures; to be treated neither as "gingerbread" [*Teigwaren*] nor as armored turrets; load-bearing girder construction allows nonsupporting walls; skin-and-bone construction is the consequence.
>
> The most practical division of the working spaces provided the depth of the room, which is 16 meters. A two-stanchion frame of 8m width with a cantilever on both sides of 4m is the result of calculating the most economical structural system. The distance between the downstand beams is 5m. This system carries the floor slab, which at the end is bent upwards and becomes the outer skin and the wall behind the shelves, which were removed from the interior of the room and placed at the outer walls for the sake of openness. Above the 2 meter-high shelves there is an uninterrupted ribbon window up to the ceiling.[43]

In this dry explanation, as in his short text accompanying his design for the glass skyscraper, Mies does not explicitly mention the subtleties within the building. But the large perspective in combination with the numbers given by Mies contain all the clues one needs to understand the building in its entity. Thus far, however, these clues have been widely overlooked.

The ends of the cantilevered downstand beams are clearly visible in the façade. The distance between them is 5 meters. The second to the last bay is much wider than the others, the final field at the corner is shorter. This important fact is rarely noticed. Kenneth Frampton has called it "a subtle classical coda within an otherwise uninflected grid of supports." [44]

43 Tegethoff, "From Obscurity to Maturity," 48.

44 Cf. Kenneth Frampton, ed. *The Unknown Mies van der Rohe,* (Chicago: Art Institute of Chicago, 1986), 37.

In reality the reason for this is quite different. It is the precisely planned (and indeed the only possible) solution for the problem encountered at the building's corner. Mies had to turn the gridded system by 90 degrees in order to continue it along the shorter side of the building. As a result, the 8 meter distance between the two internal columns is expressed in the façade and, so the width of the last bays differs at the end (5, 8, and 4 meters).[45]

This turn of the grid becomes clearly readable not only through the different distances between support and beams, but also through the form of the haunched beams: the four stanchions in the corner, where the main beams of the two directions meet, are clearly cruciform, as is readily visible in Mies's precise drawing.

By counting the bays at the shorter façade of the building, the length of that side we can calculate to be 49 meters (5 x 5 meters + 2 x 8 meters + 2 x 4 meters). Since we know that the depth of the rooms is 16 meters (the distance between the columns plus the cantilevers on both sides: 8 + 2 x 4), we can also deduce that Mies had planned an interior courtyard that was 17 meters wide. We can thus reconstruct the entire floor plan for the visible part of the building (23).[46]

Another subtlety in this design is the consistent increase with each story in the length of the cantilevered floor slabs. It is almost invisible in the drawing, but recognizable from the growing width of the windowpanes closest to the corner. The few critics who have noticed it have either attributed it to some "secret classicism"[47] or called it an "expressionist gesture."[48]

There are two less formal and more rational explanations for this feature of Mies's design. The load for the vertical stanchions in a building decreases with each story. If these columns' diameter remains unchanged (which allows for an economical reuse of the formwork), they are increasingly oversized, which makes it possible to take on additional load in the higher stories. This could be easily achieved by simply enlarging the cantilevered floor at both sides, thereby providing a perfect exterior expression of the statical conditions within. The greater depth of the rooms in the upper stories could be justified with the additional sunlight that they would receive due to the lack of shadow from adjacent buildings.

An easier and equally probable rationale for the growing length of the cantilevers was given by Frank Lloyd Wright for the same feature in his project for the St. Marks tower in 1938: "The building increases substantially in area from floor to floor as the structure rises in order that the glass frontage of each story may drip clear of the one below, the building thus cleaning itself, and, also because areas become more valuable the higher (within limits) the structure goes."[49]

Using both the given numbers and the drawing we are able to deduce the average size of the windowpanes, which is 83.3 centimeters and 80 centimeters respectively,[50] as well as the average additional length of the cantilever, which is approximately 20 centimeters in each story. This of course calls into question the accuracy of some of the numbers that Mies gave in his accompanying text; they can only be correct for one story. The drawing suggests that the third story comes closest to Mies's description. Accordingly, the depth of the building varies from 15.2 meters on ground level to 18 meters at the roof slab. The size of the floor slab that each column has to carry, which is 40 square meters according to Mies's description, varies, in fact, from 38 square meters to 44 square meters.

The design of the top story of the building is rather enigmatic. The ribbon window above the 2 meters high windowsill is only about one-third as high as the ribbon windows below it. Normally, one would plan for natural light from an average office building window to reach 7 or 7.5 meters into the depth of a room. In the case of the narrow

45 Thanks to Dr. Ing. Bernhard Behringer, Munich.

46 Ludwig Glaeser had already developed a very similar floor plan in 1969, which I discovered only after developing my own conclusions, and it thus served to confirm my results. He deserves credit for being the first to deduce a floor plan from the visible structure and thus discovering the necessary existence of a courtyard in the design. Cf. Ludwig Glaeser, *Mies van der Rohe. Drawings in the Collection of the Museum of Modern Art* (New York, 1969).

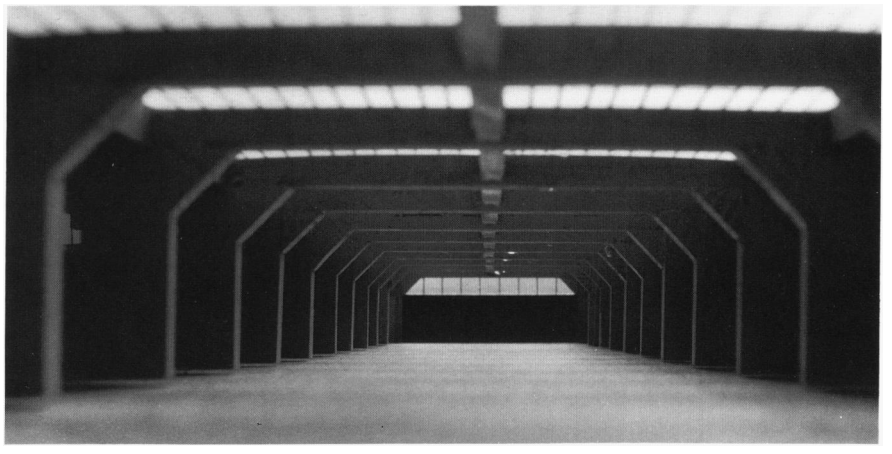
47 Fritz Neumeyer calls the steadily growing length of the cantilever a "slight curvature" and a "subversive classical gesture," *Das Kunstlose Wort,* 198, 199.

48 Banham, *Theory and Design in the First Machine Age,* 291.

49 *The Architectural Forum,* (January 1938): 54. (I would like to thank Peter Barkan, to whom I owe credit for suggesting this quote.) The seductive parallels to the work of Frank Lloyd Wright go further. The 2-meter-high shelves, the open office spaces in the interior, and the courtyard all seem to make reference to Wright's well-known Larkin Building. Wright, on the other hand, produced in several instances buildings that seemed to comment upon Mies's attempts to solve certain structural problems. The office building in glass and copper of 1924, for instance, deals with the problems of a glass curtain wall.

50 6 panes in the 5 m bay = 83.3 cm; 10 panes in the 8 m bay = 80 cm.

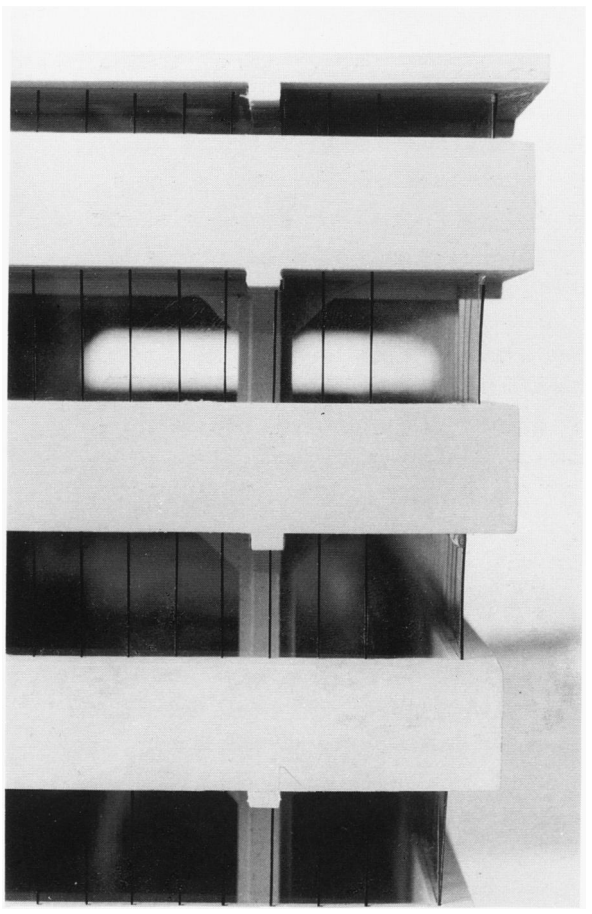
17 Concrete office building, Mies van der Rohe, 1922–23, model (reconstructed), interior.



18 Model, interior, top floor.

19 Model, exterior corner.

20 Model, courtyard.

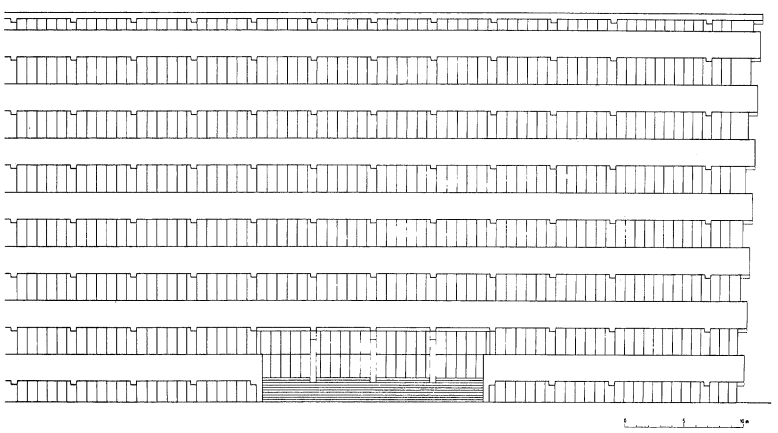


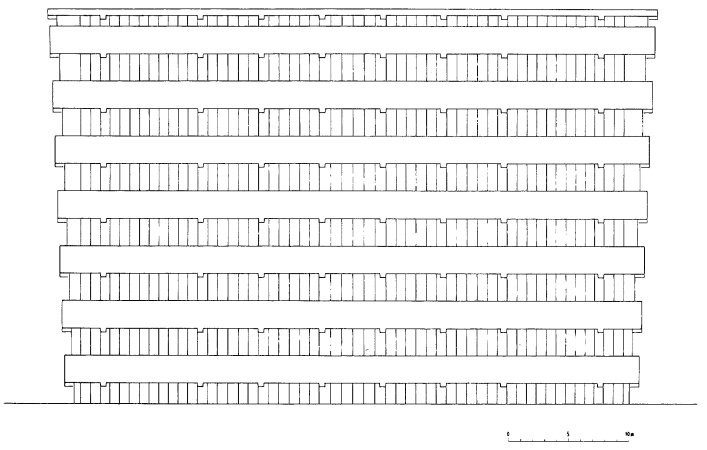
21 Concrete office building, drawings (reconstructed), entrance elevation.

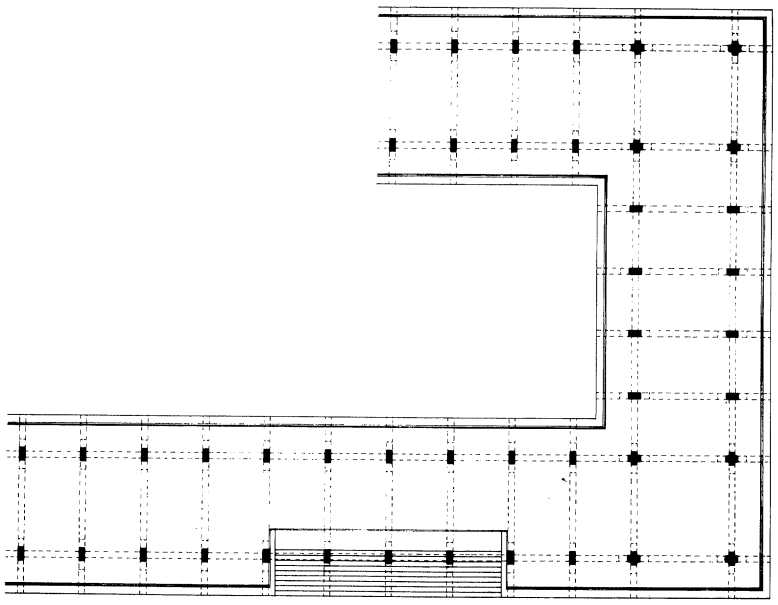
22 Side elevation.

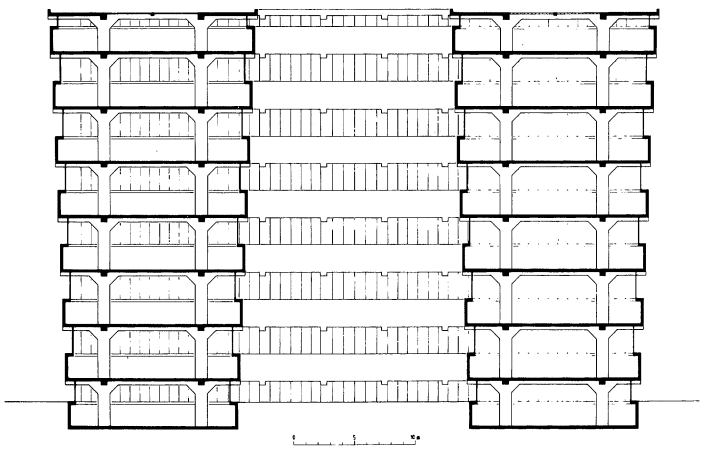
23 Entrance floor plan.

24 Section.









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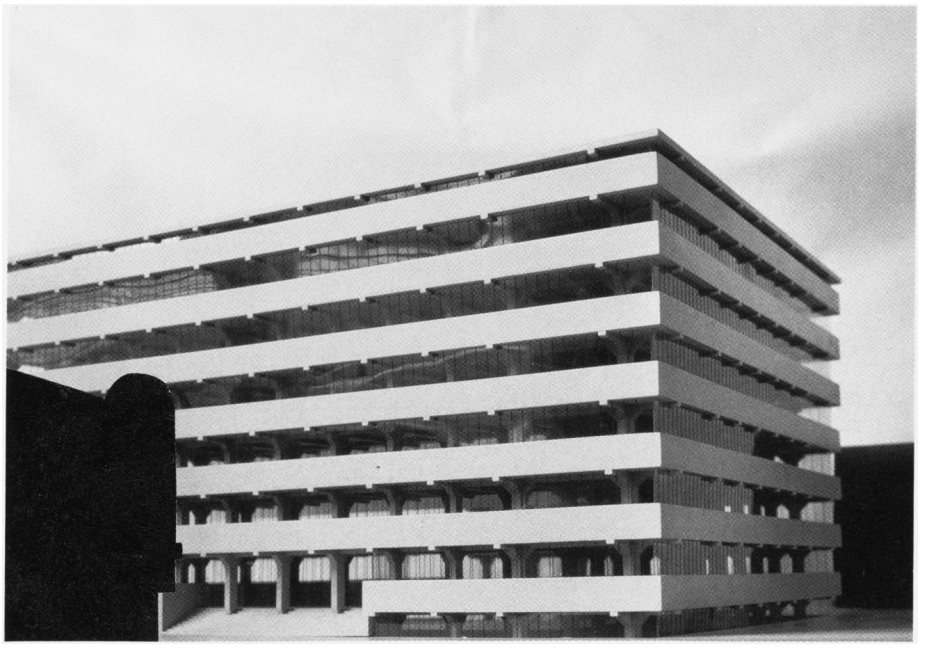
windows of the uppermost story, Mies, who was obviously concerned about lighting the entire depth of the rooms, could only have expected to naturally illuminate the offices to a maximum depth of 2.5 meters. Apart from the obvious esthetic function of this rather narrow window slit as an upper termination to the façade, there are two different possible explanations for the particular form of the top story. Both, unfortunately for lack of evidence, must remain speculation. Either Mies had planned the top story as an attic for storage use only, or he wanted to indicate that the top story could be lighted by other means and therefore did not need a ribbon window as high as the other stories. For the intended illumination of this floor, there are two possible alternatives. The first is that the rooms at the top floor were shallower than those in the floors below and provided a roof garden or terrace on the side of the courtyard, similar to the solution at the Weissenhof Settlement Apartment Block in Stuttgart (1927).[51] This, however, seems to be a solution more suited to an apartment building, where it was common to use open roof spaces. The more likely possibility is that the rooms were illuminated from above, following a suggestion that Louis Sullivan had made in his well-known 1896 article "The Tall Office Building Artistically Reconsidered."[52] This could have been achieved easily with glass blocks set into a reinforced concrete grid, a system that had come into use at the turn of the century and had been frequently applied since.[53]

The result of this analysis is a series of dimensions that can provide sufficient information to generate not only elevation drawings and a section, but a model that offers for the first time views into the interior spaces Mies must have envisioned for his concrete office building (17, 18, 20).

51 This has been suggested by Wolf Tegethoff during conversations with this author in 1989.

52 Cf. Louis H. Sullivan, *Kindergarten Chats and Other Writings* (New York, Dover Publications, 1979), 205.

53 This type of construction was called *Glaseisenbeton* or ferrovitreous concrete, and was among many others distributed by the German-American Luxfer Prismen Syndicat. To use it in an office building would have seemed an obvious idea.



25 Concrete office building, model/ photomontage (reconstructed).

The Concrete Country House

Mies exhibited this project for a country house for the first time at the Great Berlin Art Exhibition in May 1923, and had probably designed it shortly before.[54]

Two model photographs (27, 28) and two similar charcoal perspective drawings (26) are the only surviving sources of visual information. They show a one- to two-story building with wings extending in four directions and surrounding, on three sides, a raised courtyard. The most striking features of the house are the long ribbon windows that are cut into its façades, not only beneath the cantilevered, projecting roof above the entrance and living areas, but also in the basement, where the thin horizontal window slits wrap the corner and thereby subvert the conventional necessity for structural support. Historians have attributed the influences for Mies's design to a number of different sources: to El Lissitzky's abstract "Proun" compositions,[55] to Wright's Willits house,[56] and to the form of a swastika;[57] the project has even been interpreted as an echo of the spatial principles described in Spengler's *Decline of the West.*[58] Wolf Tegethoff has attempted to read it as a demonstration of intricately connected interior spaces.[59] There exists, however, in the September 1923 issue of *G* magazine, in an article entitled "Bauen" ("Building"), a rather detailed description in which Mies outlined his priorities in the design of the house: "The chief advantage in the use of reinforced concrete as I see it is the opportunity to save a great amount of material. In order to realize this in a dwelling it is necessary to concentrate the bearing and supporting forces on only a few points in the structure. "After discussing the way in which to avoid the disadvantages of reinforced concrete construction, namely poor insulation and sound conduct, Mies went on: "The main living area is supported by a four-post truss system. This structural system is enclosed in a thin skin of reinforced concrete, comprising both walls and roof. The roof slopes downward slightly from the exterior walls toward the center. The trough formed by the inclination of the two halves of the roof provides the simplest possible drainage for it. All sheet-metal work is thereby eliminated. I have cut openings in the walls wherever I required them for outside vistas and illumination of space." This description provides important clues to the building's structure.

In well-reproduced photographs of the model the inward pitches of the roof are clearly visible. Over the entrance and the main living area is an inwardly sloping roof with two parallel troughs on both sides of the centerline, where the roof planes rise again to a ridge. The roofs of the two bedroom wings each have only one central trough. The roof

54 Cf. Tegethoff, *The Villas and Country Houses,* 20.

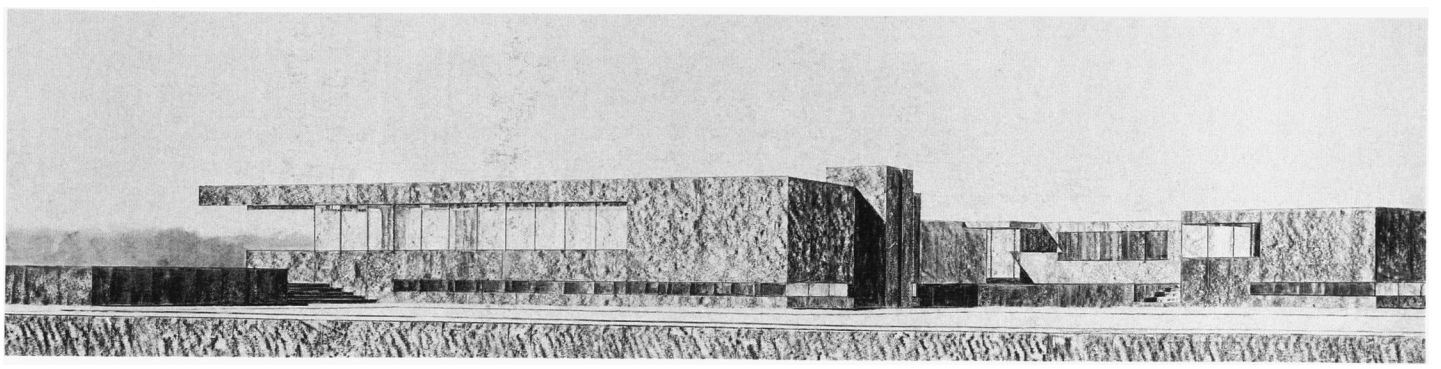
55 Schulze, *A Critical Biography,* 110.

56 Tegethoff, "From Obscurity to Maturity," 55.

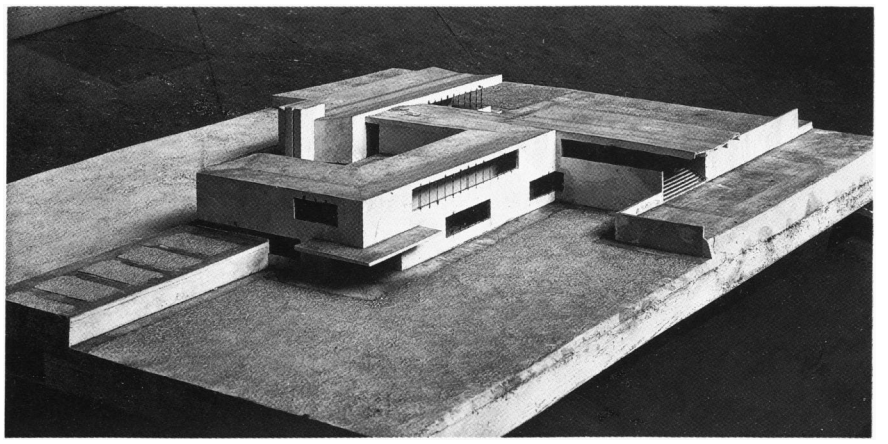
57 Philip Johnson, *Mies van der Rohe* (New York, 1947), 30.

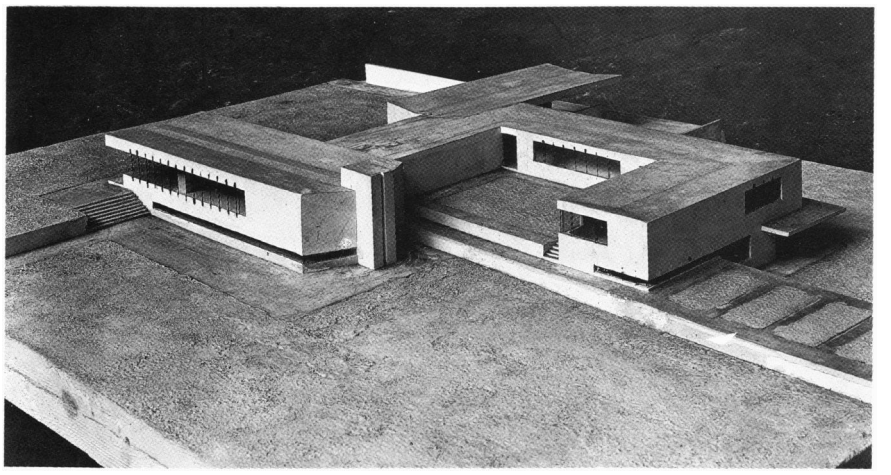
58 Schulze, *A Critical Biography,* 116.

59 Tegethoff, *The Villas and Country Houses,* 15-31.



26 Concrete country house (project), Mies van der Rohe, 1923, perspective.





27, 28 Concrete country house, model photographs.

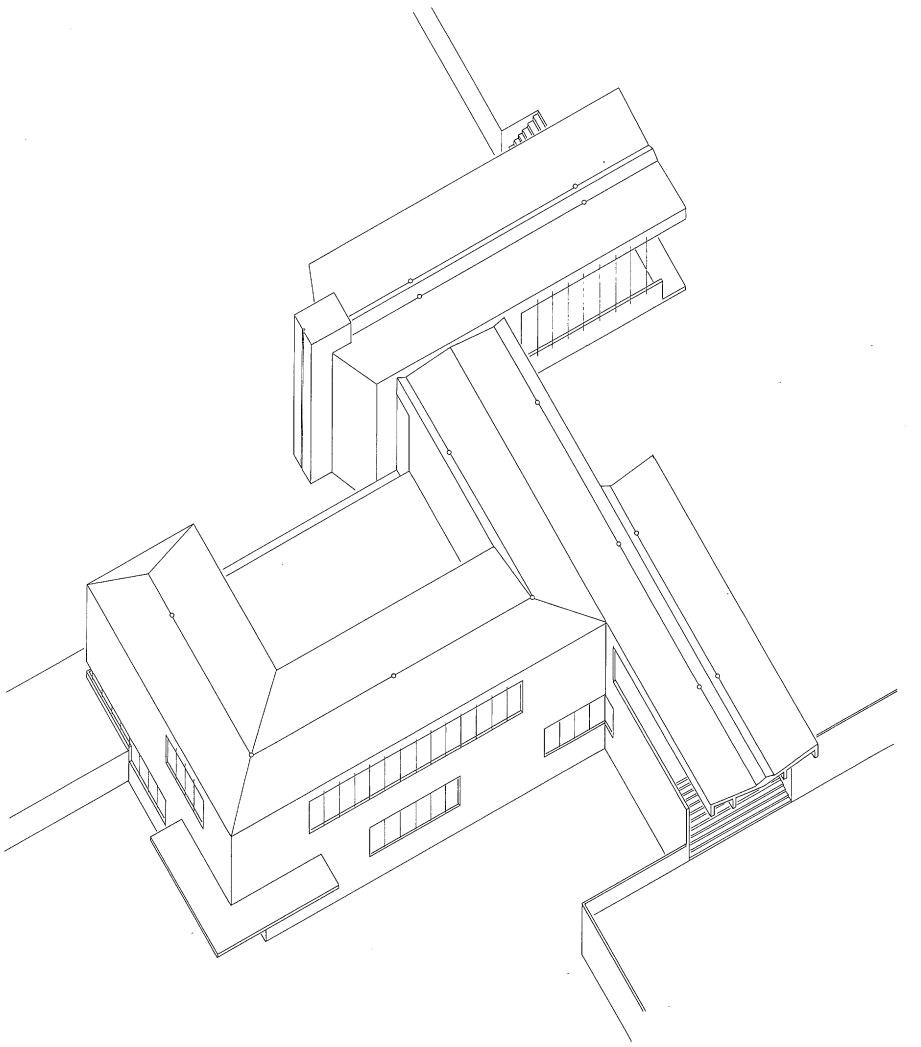
over the wing connecting the entrance area to the main living area has two troughs close to the outer walls and a ridge in the center. If one considers the necessity to configure the roof so that no area remained without drainage, it becomes clear that the arrangement of the pitches is one of the few possible solutions, and must have influenced the design itself (29). The most striking point is the continuation of the inwardly canted left half of the cantilevered roof above the entrance into the outwardly canted right half of the roof above the room connecting the entrance hall and main living area. Assuming the most likely solution, that the vertical drainage from these troughs was to be connected to the load-bearing posts, one can then determine their position with a high degree of probability (30).

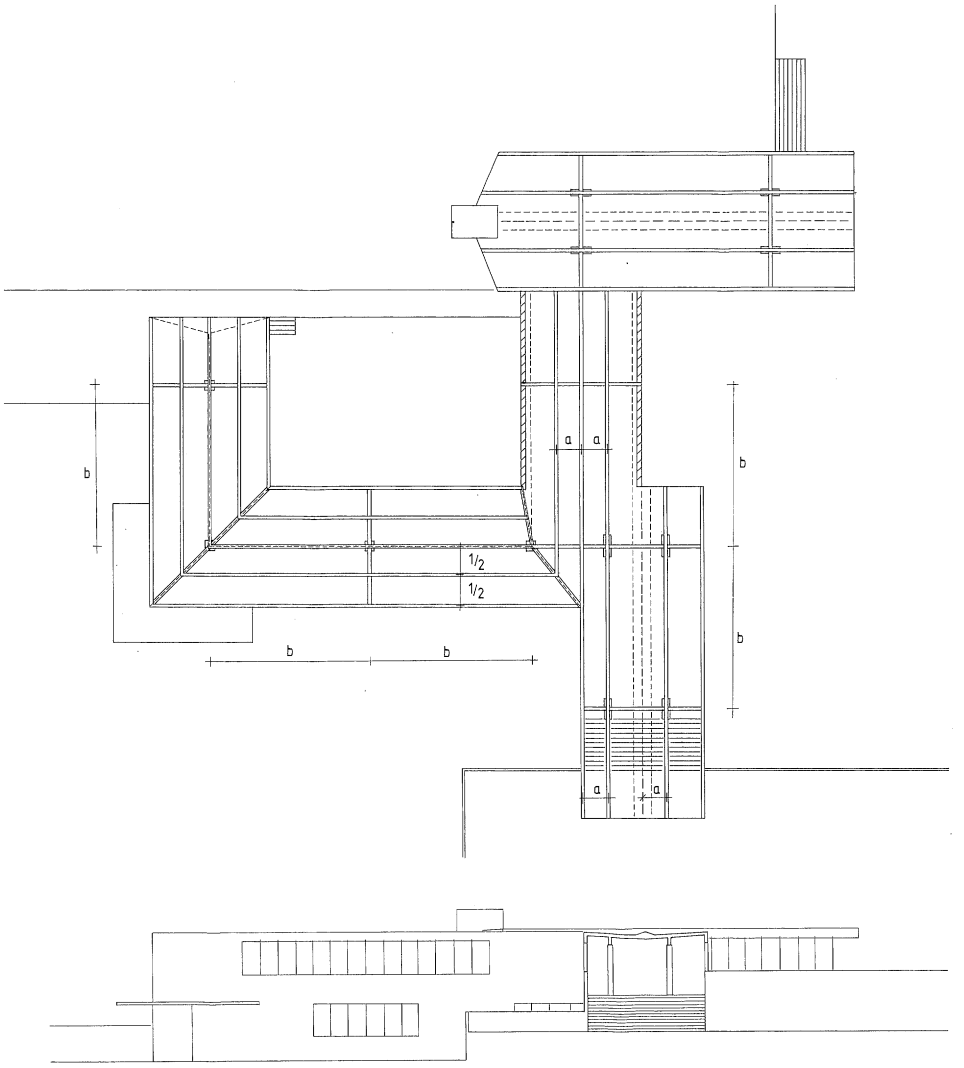
The pastel perspective drawings and the existing contemporary photographs give additional information regarding the positions of the columns in the entrance and main living room area. One can also clearly recognize the downstand beams that support the roof structure and the rectangular columns carrying it. As a result it appears that Mies demonstrated in this one building three different possibilities for a load-bearing reinforced concrete structure, all intimately connected to the solution of the drainage of the flat roof. In the similar structure of the entrance area and the main living room, one finds two pairs of columns, arranged longitudinally, and carrying transverse beams that give additional support to the roof slabs. The roof of each bedroom wing, with one central furrow, is supported by a single pair of columns. The transitional area between the entrance and the living room has a flat pitched roof, with its drainage furrows close to the outer walls, which suggests that there are no central columns in this room and that the two outer walls are load-bearing. This explains the fact that there are almost no windows in the visible western wall of this room and supposes a necessarily similar character in the eastern wall, which appears neither in photographs nor drawings. A ribbon window would not have been possible there.

29 Concrete country house, drawings (reconstructed), axonometric drawing.

30 Structural plan.

31 Entrance elevation.





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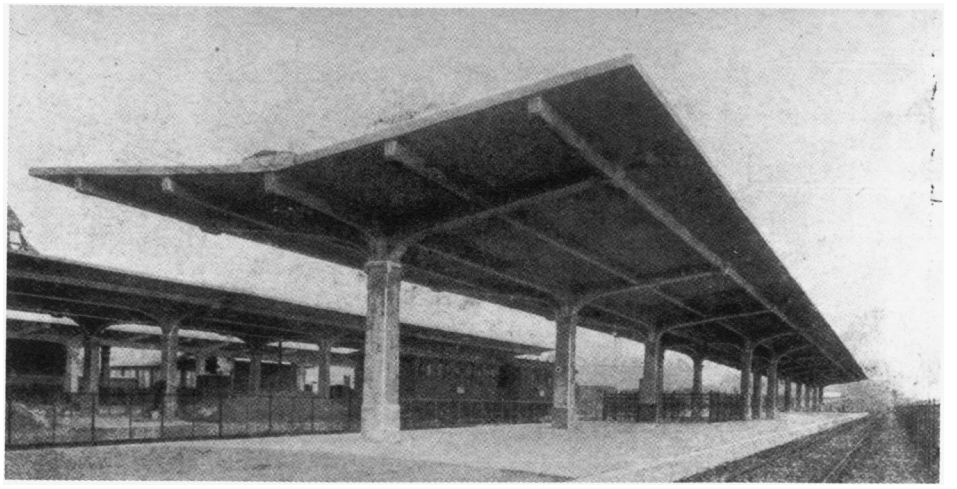
32 Concrete country house, model, entrance detail.

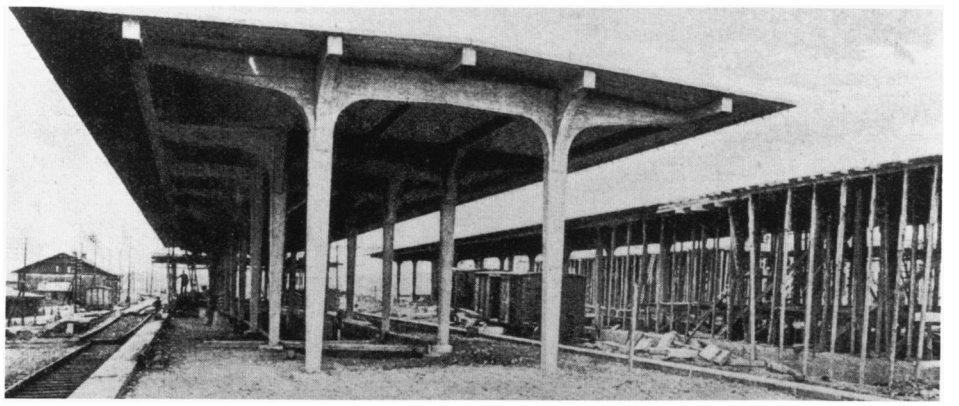
The degree to which Mies attempted to design as closely as possible to the structural demands of the building is clearly visible in the canopy over the entrance. The photographs of the model show that the visible ends of the supporting downstand beams are not placed symmetrically. (It is highly unlikely that this is due to bad modelmaking, since the piece is otherwise built with obvious care.) It seems possible that, to avoid complicated encounters between the different visible downstand beams, Mies might have developed a system of connecting beams that eventually resulted in the adoption of the distance "b" between the main columns and a distance "a" between the centerline of the projecting entrance canopy and the downstand beams to either side of it. The asymmetrical roof section above the entrance would thus display the interconnected nature of the whole structure (31).

In the year 1922 E. von Mecenseffy's book *Die künstlerische Gestaltung der Eisenbetonbauten (Artistic Design of Reinforced Concrete Buildings)* was reissued in Germany.[60] Mies must have been interested in this publication, as it became available at the moment at which he was experimenting with the potential of reinforced concrete. In the book, the author emphasized the beauty of the sturdier dimensions of concrete, comparing them favorably to the lighter proportions of the ironwork that was prevalent during the period. Included in the book were two illustrations of cantilevered roofs above the railroad platforms at Sonneberg and Langendreer of 1910 (33, 34, 35), which employed a system of central columns and longitudinal downstand beams that, in their section, are strikingly similar to the structure that appears in the model of Mies's concrete country house.[61] Mies used two off-center columns for the roofs above the entrance and the living room, probably to reduce the length of the cantilever, which in his building had to carry the additional weight of the concrete apron above the horizontal opening and ribbon window. Mies also appears to have solved the problem of drainage in those roofs in a manner similar to that of the platform roof with two parallel ridges along a central axis.

60 E. von Mecenseffy, *Die künstlerische Gestaltung der Eisenbetonbauten,* vol.10 of *Handbuch für Eisenbetonbau,* (1911; 2d ed., Berlin, 1922).

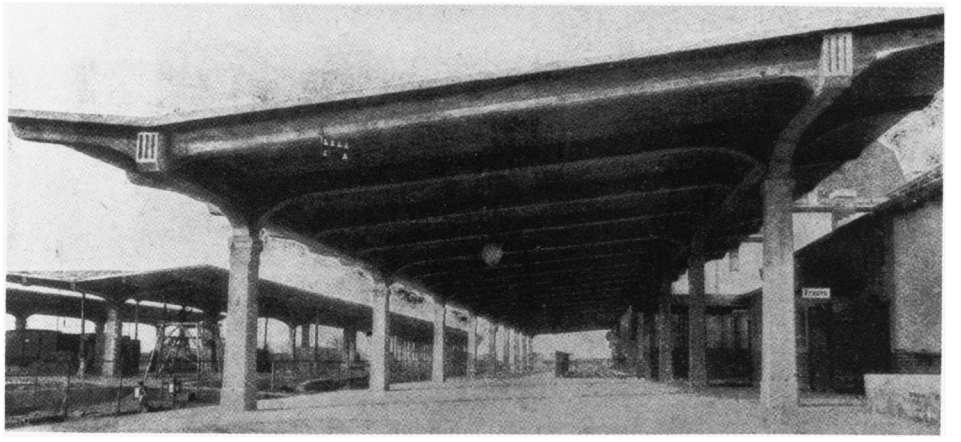
61 By introducing these roofs as possible models for Mies's design, we can also offer a possible explanation for the cryptic term *"Eisenbahnkragträgerkonstruktion"* ("railroad cantilever construction"), which Mies apparently used for the structural system, that Tegethoff discusses at length in his book. He attributes it either to a mistake in the reading of the word *Eisen*beton*kragträgerkonstruktion* meaning "reinforced concrete cantilever construction," which is, of course, possible, or to the interpretation of it as a beam in the form of a railroad track, or what modern usage would call an I-beam. (*The Villas and Country Houses,* 33, note 48).





33, 34 Railroad platform roofs, Sonneberg, Germany, c. 1910.

35 Railroad platform roof, Langendreer, Germany, c. 1910.



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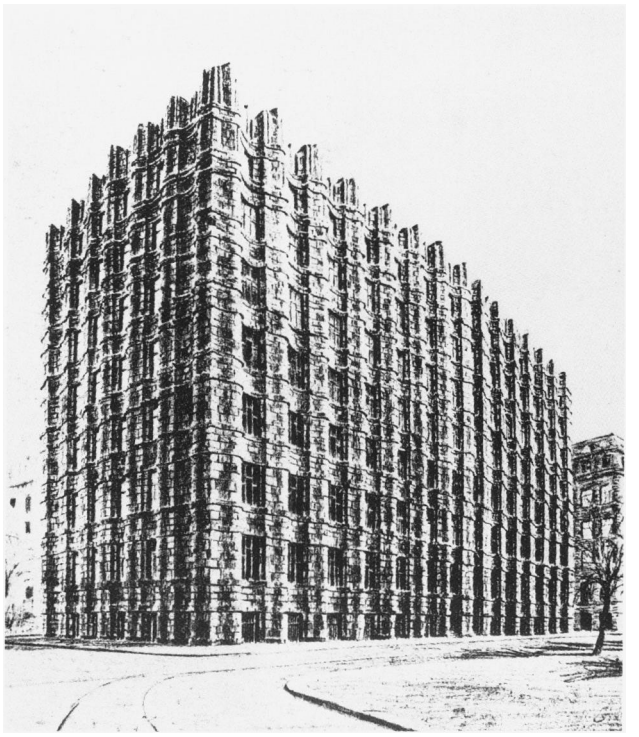
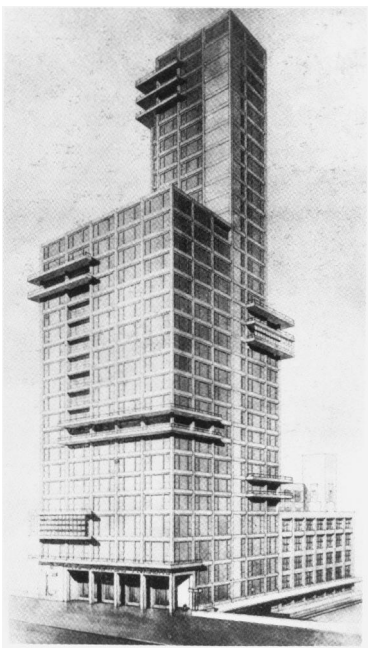
62 Mies's attempts to design as closely as possible according to the structural conditions were based on a somewhat limited knowledge of reinforced concrete structures, due to a lack of personal experience. Neither the 4m cantilever in the office building, which he described as the most economical solution, nor the cluster of differently sized mushroom columns, which apparently represented the basic idea for his curvilinear skyscraper, would have received approval from a civil engineer. The acceptable length of a cantilever would normally not extend beyond one-third of the length of the beam behind it, or 2.30m, instead of 4m, and the assemblage of mushroom slabs with different diameters that Mies seems to suggest for the curvilinear skyscraper would have led to enormously complicated structural calculations and connections for the reinforcing rods. In the country house the connection between the cantilevered ceiling slabs and the walls that were supported from beneath would have posed severe problems.

Poetry Beyond Structure

Mies van der Rohe's proclamations about structural expression often came closer to describing some contemporary projects by his colleagues than his own designs, which had moved beyond easy description: Walter Gropius's famous design for the Chicago Tribune competition of the year 1922 (37), which simply and clearly displayed the horizontal and vertical load-bearing components of the façade, appeared closer to what skyscrapers looked like "in the course of their construction" than the glass-sheathed structures that Mies created. Hans Poelzig's remarkable design of 1921 for a Dresden office building, which shared several features with Mies's design for the concrete office building (eight stories, one sunken into the ground, the top story lower than the others), emphasized the structural components behind its façade by expressing a kind of muscular swelling, an almost literal illustration of Mies's "skin and bone construction" (36). Those were images that Mies's own projects, with their columnar structure so distinctly dissociated from their exterior skin, failed to convey.



36 Office Building for Dresden, Hans Poelzig, 1921.



37 Chicago Tribune tower competition entry, Walter Gropius, 1922.

To understand the genesis of Mies's three projects and their strange incongruity with their accompanying texts, one must distinguish between two different steps in the process of their design. Whereas the details of the design were obviously the most rational possible responses (given Mies's knowledge) [62] to the conditions that he had established for the site, the program, the material, and the construction method, the initial decision to use the concrete cantilever lacked the justification of rationality. The use of reinforced concrete as a building material (not typical of Mies's later work) was undoubtedly well suited to the contemporary postwar economic crisis when steel and iron were in short supply. The decision to experiment with the cantilever, however, was made because of its potential for new formal solutions. And, in Mies's hands, those experiments and their resulting solutions transcended the established rational and functional dicta of contemporary architectural discourse. By placing the load-bearing stanchions well within the surface of the building, Mies made the structural components practically invisible from the outside: in the concrete country house, where the structure of the wall was subverted by the long horizontal ribbon windows; in the curvilinear skyscraper, where emphasis lay in transparency and reflection; even in the concrete office building where, although the structure was prominently displayed in the drawing, it is only visible due to an almost unreal gleaming from within the building.

Again, some of Mies's contemporaries were more precise in their descriptions and observations than Mies himself. In an article on the potential of reinforced concrete, J.J.P. Oud seemed to describe Mies's office building when he wrote in 1923:

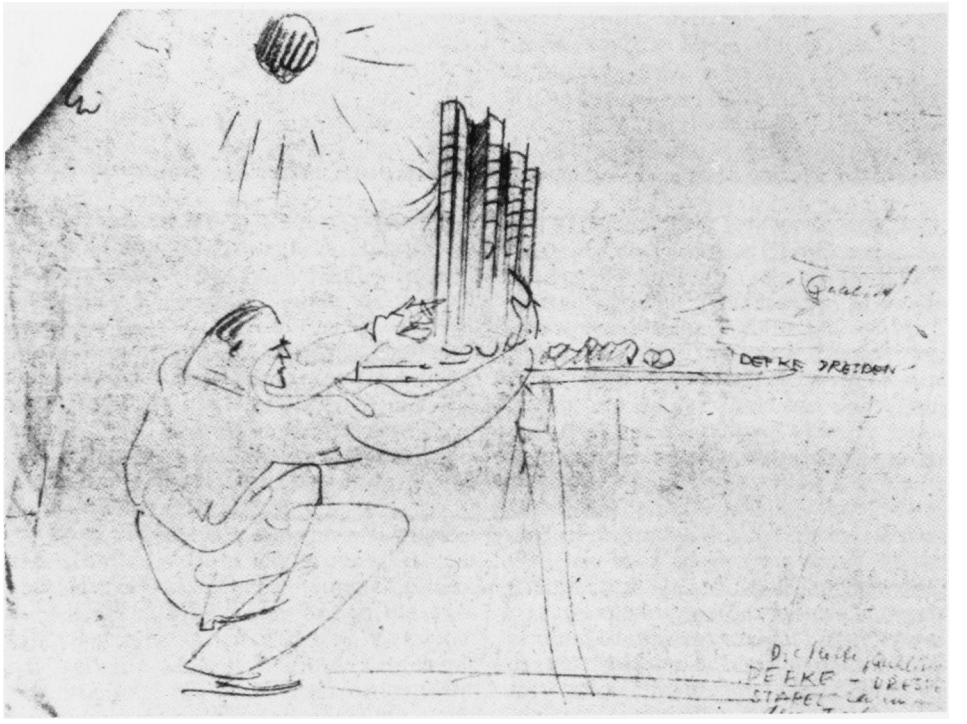
> Ferroconcrete, however, makes a homogeneous combination of load-bearing and carried parts possible, horizontal developments of enormous sizes and pure containment for space and mass. The old post-and-lintel system only allowed us to build from bottom to top with an inward slant; we can now go beyond that and build from the bottom to the top slanting outward. With the latter, a possibility for a new architectonical plasticity has been created, which can initiate through a collaboration with the esthetic potential of iron and mirrored glass the rise of an architecture of an optically immaterial, almost hovering character.[63]

Mies's friend Ludwig Hilberseimer described the office building in 1924 as follows: "Through the dominating horizontality combined with the lack of columns in the façade the structural character of the building is entirely changed, so that through the lack of supports a new architecture of hovering lightness arises."[64]

And that, in fact, was one of the pivotal modern moves away from nineteenth-century structural rationalism: to use the display of loadbearing structure for the creation of magical effects, optical illusions, and poetry.

63 Cf. J.J.P. Oud, "Über die zukünftige Baukunst und ihre architektonischen Möglichkeiten," in Frühlicht 1, (1921–22); quoted from Ulrich Conrads, ed., *Bruno Taut 1920–1922, Frühlicht, eine Folge für die Verwirklichung des neuen Baugedankens* (Berlin, 1963), 206.

64 Cf. Ludwig Hilberseimer, "Konstruktion und Form," *G Materialien zur elementaren Gestaltung 3* (1924): 24–25.



38 Mies at work in his office, sketch by his assistant, Sergius M. Ruegenberg, c. 1923.