STUDY ON THE CHARACTERISTICS OF MIES VAN DER ROHE’S DESIGN PROCESS OF EARLY 1930’S HOUSES (2)
Relevance of Conceptual Sketches and Collaborated Perspective Drawings for the Creation of the Hubbe House Project

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The present research studies Mies van der Rohe’s design process for the Hubbe House (1935). The creative process was clarified through two stages. First, the study on the definition of the design concept where Mies created the basis of the final project out of the conditions of the site reflected over preliminary layouts. And second the production of the final space where the closer collaboration with his assistants was clarified through the study of preliminary and final renderings. We have found that Mies’s drawings were done after a large process starting on the visualization of preliminary space, and ending on the definition of a spatial atmosphere (presentation drawings) that could ease the communication with his client (Margarete Hubbe). Those final renderings were refined through the studio drawings of his collaborators, confirming that conceptual sketches alone would have never completed the final form of the house.

Keywords: Mies van der Rohe, Design Process, Studio Collaborations, Design concept, Spatial Atmosphere, Linear Drawings

I. Introduction

Hubbe House is one of the last designs of Mies’s European career. Some researchers have coincided that the formal solution of this house follows the Court House projects of early 1930’s; some has philosophically elaborated on Mies’s apparent theme for this house: “quiet seclusion and open expanse.” And some has considered that it is part of the results crystallized in the German Pavilion (Barcelona, 1929).

The House is located in Magdeburg (Germany) on an island along the Elbe River (Fig. 1). The building site is large and the house occupies a relatively small part of it. The rest of the plot of land is subdivided suggesting a further development. The building is composed of large public areas open mainly to the east (river view) through glass walls and wide terraces; Mies’s ideas are focused on these areas leaving the rest of rooms commonplace functional solutions (Fig. 3 project-F).

The present study is part of a thesis that studies the main houses designed by Mies during 1930’s (Gericke House, Mountain House, Court House). Our general aim is to analyze, through the CAD reconstruction of sketches or drawings, the characteristics of the design process of Mies that other researchers have not studied in their analyses. The second and specific purpose is to see how the studio collaborations between Mies and his assistants shaped the eventual results of the project.

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Though the trajectory of any design process is usually unknown, the present research organizes the results of Mies’s design process into two main stages: first, the definition of the design concept, and second, the production of final space. In the latter stage we will see how the cooperation of Mies’s assistants was crucial to produce the final image of the house.

II. Method of Analysis

Our method of analysis is based on the parallel study of the original drawings of Mies and their CAD three-dimensional reconstruction. This comparative analysis serves to visualize the hidden concepts within sketches, and leads to the understanding of the characteristics of Mies’s design process.6

II.1) Project Reconstruction

a) Sources available

The main graphic sources were obtained from The Mies van der Rohe Archive.7 We have also found related data published by Jean Louis Cohen and photographs of the original model in Ludwig Hilberseimer’s monograph on Mies.8 The Archive published 289 sheets of drawings including one floor plan and four views made for presentation purposes. We used three presentation drawings and eleven preliminary sketches to visualize the design process of Mies. Mies’s sketches only represent necessary things. Building materials were represented as surfaces: brickwork as horizontal lines, woodwork as vertical lines and glazed walls as shades or frames. Presentation drawings are freehand renderings following faint hard-line traced over illustration board. They are done on pencil—a flexible medium that permits clean corrections and final visual perfection.9 All drawings of the set were important to our analysis, even the hastiest ones, but we only reproduced here the ones that could better explain our findings.

b) Three-dimensional reconstruction

The final project and five preliminary proposals were reconstructed three-dimensionally. The sources for the reconstruction were the floor plan, elevations and perspective views of the final proposal rendered by Mies’s office. The height of the house was scaled from the preliminary elevations (3.00 meters). The size of some elements like the cruciform columns were obtained interpreting the drawings on the Barcelona Pavilion—supposing that he was thinking of using the same size for Hubbe House too.10

III. Stage 1: Definition of Design Concept

III.1) Hubbe House Design Concept

A “contrast of quiet seclusion and open expanse” was the leading idea for the Hubbe House project.11 Mies already built the combination of openness and intimacy in the Barcelona Pavilion (1929) and re-affirmed it in his house for the Berlin Building Exposition (1931).12 This was a theme that he proposed for all his modern European houses, reaching the inconclusive form of his court-houses projects. Though that could be an eventual concept, Mies used a combination of courtyards and large open spaces through the whole design process. Sometimes he was concentrated on the openness of spaces (Fig. 2a) or confined to the intimacy of courtyards (Fig. 2b). Both cases are eventually arranged as a single idea on preliminary layouts.

![Fig 2. PRELIMINARY CONCEPTUAL SKETCHES](image)

The design concept was explicitly transcribed to the form of the house (Fig. 3 Project-F). A continuous exterior brickwork wall and freestanding interior partitions defined the main form of the building. The exterior wall contains privacy complemented to the openness which interior partitions provide. Therefore, living areas expand toward courtyards in one side and to the landscape on the other, and bedrooms and service areas are self-contained as ordinary rooms. Those design considerations can be found in any of the preliminary proposals, confirming that they were already established before 1935 and were refined in the residential form of the Hubbe House.

III.2) Design Evolution: Layout Formation

Mies said in his description of the Hubbe House: “it was an uncommonly beautiful building site. The lovely view lay to the east, whereas to the south the view was utterly without charm... it was necessary to balance this flaw by the layout of the structure.”13 The search for that balance was a primary design problem, and it justifies the large number of existing floor plans in the Archive. The analysis on significant layouts could reveal the evolution of the design concept.

We have selected the only six floor plans with clear distribution of the space. Though Mies drew them on freehand, they are carefully proportioned as if he was sketching over a squared paper.14 Mies clearly differentiate openings from walls in his sketches—the walls are thicker whereas openings are faint lines. We have scaled all selected plans and found they are of similar sizes as if they were actually drawn at a determined scale. As these layouts also present a careful furniture distribution, there is no doubt they were important to Mies in some moments of the design process.

We have also organized the layouts in a sequence following their formal similarities (Fig. 3). There is a version excluded from our sequence for lacking design data, but we consider it part of Project-A for the solution of the living room is similar and both
Fig. 3. HUBBE HOUSE PRELIMINARY PROJECTS

PERSPECTIVE-PLAN VIEW
(CAD Reconstruction)

ORIGINAL LAYOUTS

3a. PROJECT-A

3b. PROJECT-B

3c. PROJECT-C

3d. PROJECT-D

3e. PROJECT-E

3f. PROJECT-F

CAD EYE LEVEL PERSPECTIVE
(Living Room East Views)

PROJECT-A

PROJECT-B

PROJECT-C

PROJECT-D

PROJECT-E

PROJECT-F
have spread volumes, and part of Project-B because of the curved courtyard. This stage is mainly working the site plan rather than the specific design of the house (Fig. 4).

![Fig 4. EARLY SITE PLAN SCHEME](image)

The sequence is analyzed following the three basic design considerations: first, layout formation, second, predominance of the east over south views, and third, the contrast of "quiet seclusion and open expanse". The layouts are reconstructed using CAD, and projected the living room east view in order to provide a spatial dimension of the design concept (Fig. 3).

a) Overall Formal Arrangement

As the final proposal is contained within a surrounding wall, the first stage of our sequence is the one where external walls slide forming large openings and spreading volumes onto the landscape. Project-A revolves the form with center in the living room, and only the walls of the courtyard unite the volumes. In Project-B the service area is detached from the main structure, and three courtyards create the main tension. Project-C compact interior spaces using courtyards and the surrounding walls is closing as if forming a square shaped house. Project-D is completely closed within the exterior brickwork wall, and completes the square shaped of project-C. Project-E is still enclosing interior spaces but its rectangular outline provides the proportion of the final solution. Project-F conserves the shape of "E" but opens the interior spaces through the east-view terrace.

b) The Role of the East View Opening

The east view final impact depended on the way courtyards screened the south one. In Project-A the east view is partially blocked providing a wide south vista. We considered it one of the first stages, as long as we ponder that Mies was conceptually banning the south view. Project-B opens completely the dining and living rooms to east and a full-closed courtyard avoids the south view partially. Project-C fused courtyard with the south side of the living room open widely onto the northeast. In projects "D" and "E", interior spaces expand toward courtyards without accessing to the landscape visually, and only a relatively small opening in the living areas provides a straight view to the east. Project-F opens dining and living areas to the northeast through a large terrace garden.

c) The Level of Openness and Privacy

When Mies wrote on "quiet seclusion and open expanse" he was referring to the main bedroom (intimacy) and the living room (openness). Mies studied both concepts carefully, and developed an equal quality of spatial solutions for each preliminary project. The main bedroom is always facing a courtyard and provides a glimpse to the landscape through the glass walls of the living room–except in Project-A that it is straight open to east. In turn, the living room is opened to the surroundings and expanded to a garden terrace–except Project-D that is an inward solution. We can see in the CAD perspective (east view), that the intimacy of rooms was determined through the location and quality of walls (opaque or transparent) and the openness was obtained through the expansion of interior rooms toward courtyards and to the wide garden terraces.

The above design process clarifies that the final proposal (Project-F in our sequence) is clearly the result of the careful design of views (either to courtyards or to the landscape). The control of views was Mies's answer to the conditions of the site and to the client's program for the house.15 Floor plans alone did not produce the whole project, for they were defined spatially. Obviously, layouts and views are simultaneously thought, and this characteristic is evident in the production of the final space.

IV. Stage 2: Production of the Final Space

IV.1) Visualization of Preliminary Space

The visualization of preliminary space was a collaborative process: it depended on the closer communication between the Mies and his assistants. It could have been a verbal discussion only, but we have found that the process involved a more complex set of drawings where two and three-dimensional projections were complementing each other (Fig. 5). Each line of the plan could be clearly identified in the perspective sketch (Fig. 5b) suggesting that plan and views together complete the architectural idea. Therefore, the visualization of concepts now became an interactive activity so that Mies and his assistants could easily see any transformation in any graphic dimension. Though there are several transformations in floor plan, the discussions were focused on the entrance area because it is the only one represented three-dimensionally. The act of entering the house is seen from three different viewpoints (Fig. 5c). As CAD drawings represent the final proposal, we will see that the version represented in figure 5a belongs to one of the final design stages.

View-1 represents the access to the house. It is similar to the final proposal except for the pavement that in the final version is larger. Transformations on this part of the project (entrance) were rare, and it seems that this view existed more as a confirmation of its idea than the correction of its formal elements.

View-2 describes an alternative for the connection between the vestibule and service areas. The access to the kitchen is elaborated in the preliminary sketch in a manner that the vestibule
is partially divided into two corridors. But Mies decided that the final proposal must present a simpler vestibule that tends to contain visitors within a rectangular space instead of motivating them to explore the private areas of the house. In other sketches Mies explored further this space but everything was following the final proposal solution.\textsuperscript{17} The vestibule in Mies's houses was always important, and it seems that in the Hubbe House case it was designed in consultation with his assistants because its sketches always exist next to studio drawings.\textsuperscript{18}

View-3 is facing the glazed wall of the vestibule suggesting the exit onto the main entrance porch. This view is impossible to see without omitting the wall facing the entry—the one we have drawn in hidden lines in the CAD drawing following the actual position the viewer. As the existence of this wall is only in floor plan, it is necessary to relate view and plan in order to get a complete image of the spatial situation here. Therefore, we need to read the whole sheet of paper as a single drawing to see what possibilities have spatial ideas and floor plans.

The study of the above views has suggested that interior design and the general form of the house were simultaneously created; Mies could eventually change the form of the house if interior spaces did not fit within the general scheme. This phenomenon explains why he and his assistants needed to evaluate concepts three-dimensionally, and why they projected floor plan and perspective views as complementary drawings in the same sheet of paper.\textsuperscript{19}

**IV.2) Projection of Final Proposal**

Once the preliminary space was visualized, it was necessary to project the final space of the house. During this process, the space is reduced to its elemental form (lines and volumes) resulting in an abstract visualization.\textsuperscript{20} Because of the abstract content of this part of the process, this stage is not meant for the understanding of the client but for the internal communication in the office.

After selecting the final proposal floor plan, the second step was to project the basis of the final space (hard-line drawings). These drawings (Fig. 7a-b) are usually executed by assistants with the input of the architect. They are useful to visualize the location and visual proportion of objects, so that the spatial dimension of the house could be clearly grasped. Therefore, the conceptual part of the design creation was processed through a minimal image of space.\textsuperscript{21} Though this process projects the final scheme of the house it cannot clearly materialize the vision of the architect. Therefore, the final image had to be closer to the domestic atmosphere of a residence, so that Mies could determine the real impact of the house over the client's expectations.\textsuperscript{22}

**IV.3) Creation of Spatial Atmosphere**

After projecting the final space, the execution of more figurative realms was essential to the communication between client and architect. Therefore, the rendering of sculptures, trees, ivies, the river and other commonplace objects endow the final space with an especial atmosphere.\textsuperscript{23}

We have found that during this stage the spatial atmosphere was obtained through two phases: first, transcribed from conceptual ideas, and second, derived directly from the final space.
Phase ‘A’ (Fig. 6)

Though commonplace objects were already thought during the conceptual stage, it was in the final spatial composition that their importance increased. Conceptual spaces contain the essence of the final image of the house, so that objects like furniture, building materials and landscape transformed the virtual idea of the architect into a possible actual environment. For the definition of the living room, Mies executed two main views that he followed until the final decision. In view 6a two rows of columns split the space into two zones. It is a view composed mainly by architectural elements but the intention to complete it with commonplace objects like trees framed by glass walls at background avoid this view to become an abstract visualization. View 6b is more explicit in its contents, for the presence of furniture and obvious large trees beyond the courtyard makes it closer to the final image obtained in view 6c. In this latter view, the final space is defined so that architecture becomes a “neutral frame in which life could take place”, that is, commonplace objects are highlighted to bring a spatial atmosphere to the mind of the client.

Until now, we have only described Mies’ participation in this process, but the final drawing of this phase was impossible without his assistants’ aid. That is, we have discovered the existence of a linear drawing on ruler below the freehand traces of Mies that clarify why his renderings are so proportionate. His assistants executed those faint lines, and he followed it closely to get an actual image of the view. If we compare 6c against the CAD model in 6d, we will see slight differences, so that Mies followed studio drawings to get an adequate spatial proportion.

It is possible that for the production of the living room final space Mies’s office made the necessary final study, but the corresponding hard-line drawing is nonexistent in the Archive. In any case, phase ‘A’ describes how clear was the spatial image in Mies’s mind and how conceptual sketches affected the final form of the house.

Phase ‘B’ (Fig. 7)

The collaboration of Mies’s assistants is obvious in phase ‘B’, for the use of hard-line perspectives framed the final atmosphere. When we reconstructed the views of the final proposal in CAD (Fig. 7d) we found no relevant differences, and we could figure out how close final renderings followed the solutions explored in hard-line perspectives.

The first sign of a possible evolution from final space to an atmosphere is represented in Fig. 7a. We could see that Mies inserted a missing column in the drawing suggesting he wanted this element to be seen in the final view. See that in view 7b and 7c the column is drawn as was clearly placed on the floor plan (Fig. 7e). The second sign occur in the depth of the background wall: 7a looks very far, but in 7b it became closer to the final

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Fig. 6. SPATIAL ATMOSPHERE CREATION: PHASE ‘A’

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version 7c, that is, he explored the visual proportions through the final space and then he fit the spatial atmosphere within this frame. This also explains why there is more than one linear drawing for each view 7a. After Mies set the final space he proceeded to render the spatial atmosphere. Contrary to phase 'A', phase 'B' highlighted the architectural aspect of the view, but the insertion of landscape elements and sculptures relate beholders and views to any ordinary atmosphere.

It seems that Mies was mainly concentrated on interior spaces during the design process, for there are frontal and backyard perspective-elevations executed as linear drawings corresponding to the final version but omitted as presentation perspectives. The whole process suggests that the inter-collaboration in the studio was crucial to define the final image of the house. Mies could have drawn creative sketches, but without the support of his assistants those conceptual drawings alone would never complete the final proposal of the house.

V. Conclusion

The present research is the first attempt to visualize the design process on Hubbe House graphically (there have been only theoretical researches on this house). Our results were possible reconstructing the original views through CAD, for they helped us to see the design characteristics of Mies.

The design process was clearly understood through two main stages of design. The first is the study on the definition of the design concept where Mies originated his spatial vision out of the conditions of the site and developed it through the layout formation of the preliminary projects evolving from spread to compact volumetric compositions. The second process is on the production of the final space, where we visualized how the creative process evolved from preliminary space to the creation of a final spatial atmosphere. During this process, Mies had first to visualize the house as a complete architectural composition (conceptual sketches) and then, he had to reduce it to its essences in order to set the spatial dimension of the house. As a consequence, he had to define a spatial atmosphere that could ease the communication between he and his client. The participation of his assistants is evident in the most important stages of design but mostly at the end when he needed to produce the concrete architectural image of the house.

Through Hubbe House's design process Mies started to dismiss the deep visual focus which he used in previous projects' perspectives and shift to images proportioned to the human eye. His careful control of the visual focus (no deep views) and the relevance of surfaces in his sketches could have been important to visualize his American Court Houses' collages in the 1940's.
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Notes and References
3) Peter Carter has suggested that the German Pavilion is a seminal project for Mies’s houses. See “Mies van der Rohe at Work”, London, 1999, p.20.
4) For a fair interpretation of Hubbe House’s space concept, see Peter Eisenman, op. cit., pp.100-102.
5) Sketches and drawings reveal the intentions of Mies’s design process.
6) This research is the first attempt to apply this kind of method of analysis to Mies’s Hubbe House design process drawings.
9) We could see some erased lines in the final renderings, so Mies could have manipulated the visual effect easily in drawings on pencil.
11) See Mies’s description on the House in Tegethoff, op. cit., p. 121.
13) Cf note 11.
14) Mies had previously used squared paper in the Krefeld Golf Club project of 1931. See The Mies van der Rohe Archive, op. cit., Vol. 3, p. 81.
15) Cf note 11.
16) This manner was an integral part of his design process because it is usually seen in other sheets of Hubbe House set. See The Mies van der Rohe Archive, op. cit., Vol. 4, pp. 242, 249 and 271.
17) See the Mies van der Rohe Archive, op. cit., Vol. 4, p. 242.
18) Ventibles were usual in the vision of Mies. See his sketch for Peter Behrens’ German Embassy (St. Petersburg) in Franz Schulze, op. cit., p.58.
19) Floor plans and views drafted in the same sheet was usual at the beginning of the twentieth century, and in the case of Mies, this process became a design technique as for the masters of the Renaissance. Cf Michelangelo’s sketches for the staircase of the Biblioteca Laurenziana in Rudolf Wittkower’s Idea and Image: Studies in The Italian Renaissance, London, 1978, p. 29.
20) Though we are referring to the graphic design process here, we do not discard the existence of study models during the design process. According to Sergius Ruenenberg models were usually done, but our conclusions are only relying on graphics for there is no surviving design process’ study model on this house. See Tegethoff, op. cit., p.75.
21) At the outset, this stage seemed to us to be only a drafting step until we discovered the soft changes linear drawings present among each other.
22) The usual situation is that linear drawings are very useful to communicate between architects, but no-architect clients may better understand the project through more explicit perspectives.
23) Though “atmosphere” is usually difficult to define in architectural literature in our case it means the spatial effect drawings exerts over beholders.
25) Though the building as object was very important to Mies, his concern for Nature and respect for Man’s activities were also part of his concept on “building art”. See A Talk with Mies van der Rohe by Christian Norberg-Schulz in Fritz Neumeyer, op. cit., p. 339.
26) It seems that these lines were traced by Mies’s assistants, and are so faint that it was impossible to notice them until we studied the actual drawings in the Museum of Modern Art, New York.
27) In the CAD drawings, the eye level is placed at the middle of the floor to ceiling height as was customary to Mies, and were carefully projected in order to avoid the usual distortions computer’s focus generates.
28) The sequence from 7a to 7b is the logical one, though we are aware that in the actual process it could have been different. We have arranged it in this way (from 7a to 7b) to provide a clear evolution of the design creation.
29) Mies used to draw deep views at the beginning of 1930’s but he then turned this tendency into a more proportionate space. Cf Gericke House (1932) The Mies van der Rohe Archive, op. cit., Vol. 3, p.356.
Illustration Credits (Original pages between parenthesis)
The Mies van der Rohe Archive, Vol.4: Fig.1 (234), 2a(284), 2b(285), 4(293), 3a(354), 3c(337), 3d(287), 3e(347), 3f(240), 5a(244), 5b(283), 6b(282), 6c(281), 7a(280), 7b(279), 7c(276). Jean Louis Cohen (cf. note 8): 3b(76).

和文要約
本論文はミース・ファン・デル・ローエのフペビル（1935年）の設計過程において残されたスケッチを分析することにより，その設計過程の特徴を明らかにしようとするものである。設計過程は大きく二段階に分けることができた。第一段階は平面図スケッチを通してのデザインコンセプトの決定過程であり，第二段階は透視図スケッチを通じての空間特性の詳細な決定過程である。

平面図スケッチにおいては各空間のレイアウトが検討されており，計6段階に整理できた。そこでは空間構成の大きな変化が考えられるが，開放的なレイアウトが次第に外壁の矩形の輪郭に収められていく過程が見出された。また東側面の開口部の配置に着目することにより，東方向への視野がデザイン上，重視されたことが推定された。その東方向の眺望をCAD透視図でシミュレーションすることにより，居間の開放性とプライバートな隠蔽空間が，眺望の微妙なコントロールによって調整されたことが明らかとなった。

観点位置の微妙な調整などの詳細な空間デザインは，ラフな透視図スケッチをいくつか描くことによって，三次元的に，また眺望の検討によって決定されていたことが，試行錯誤を示すスケッチの詳細な分析から確認された。最終段階の透視図スケッチの詳細な分析から，空間構成の枠組みが決定された後，設計助手が定規を用いた線の透視図を描き，ミースが面材の素材，家具，裁倒形，また環境をフリーハンドで描き込み，次第に厳密に決定されていくというプロセスを追ったことが明らかになった。

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