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Artículo

On the Setting of the Inner Space in the Court-house Projects of Mies van der Rohe

Sobre la Definición del Espacio Interno en los Proyectos para Casa-patio de Mies van der Rohe

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Abstract: The purpose of this research is to reveal the setting of the inner space of Mies van der Rohe's court-houses of the 1930's, something that previous researchers have not written about yet. The method of analysis is based on the reconstruction of the collages and floor plans, revealing the latent design procedures of architectural creation, although hidden behind the intentional graphic distortions of Mies. The results explain how Mies refined the concept of court-house through incrementing the number of courts, thus working on a new idea on spatial dematerialization where perspective drawings were independent from layout plannings, achieving the ideal spatial atmosphere Mies had in mind. The discussion introduces three new spatial concepts rarely engaged by Mies' scholars but that place the court-house as an ideal vision for the 21st century: comfort, refinement and amazement.

Keywords: architecture, court-house, interior space, Mies van der Rohe

Resumen: El propósito de esta investigación es revelar la definición del espacio interno de los proyectos para Casa-patio de Mies van der Rohe, algo sobre lo que investigadores anteriores aún no han escrito. El método de análisis reconstruye los collages y plantas que revelan procedimientos de diseño latentes en la creación arquitectónica, aunque escondidos detrás de las distorsiones gráficas de Mies. Los resultados explican cómo Mies evolucionó la forma general de la casa-patio aumentando el número de patios, trabajando así una nueva idea sobre la desmaterialización del espacio, donde las perspectivas son independientes de las plantas para lograr la atmósfera ideal que Mies tenía en mente. La discusión introduce tres nuevos conceptos rara vez abordados en la investigación académica de Mies, pero que ubican a la casa-patio como una visión ideal para el siglo XXI: comodidad, refinamiento y asombro.

Palabras clave: arquitectura, casa-patio, espacio interior, Mies van der Rohe

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1. Introducción

Court-houses designed by Mies van der Rohe in the 1930's are single story structures roofed in "L", rectangular or T-shaped, containing free-standing interior partitions surrounded by glass walls and enclosed within brickwork walls. Though the use of courts is historical in domestic architecture,

these houses were not about a courtyard inside a house, but a house inside a courtyard: house and court became a singular unity. This was achieved by opening the interior onto patios through floor-to-ceiling height glass walls. There is no client or specific location identified for these projects yet, though they existed in various sizes and combinations that ranges from a single detached house to a combination of units forming urban blocks (Fig. 1). Likewise, this building type became the teaching method of Mies' advanced courses at the Bauhaus from 1930 to 1933 and then at the IIT from 1938 to 1965 (Blaser, 1977).

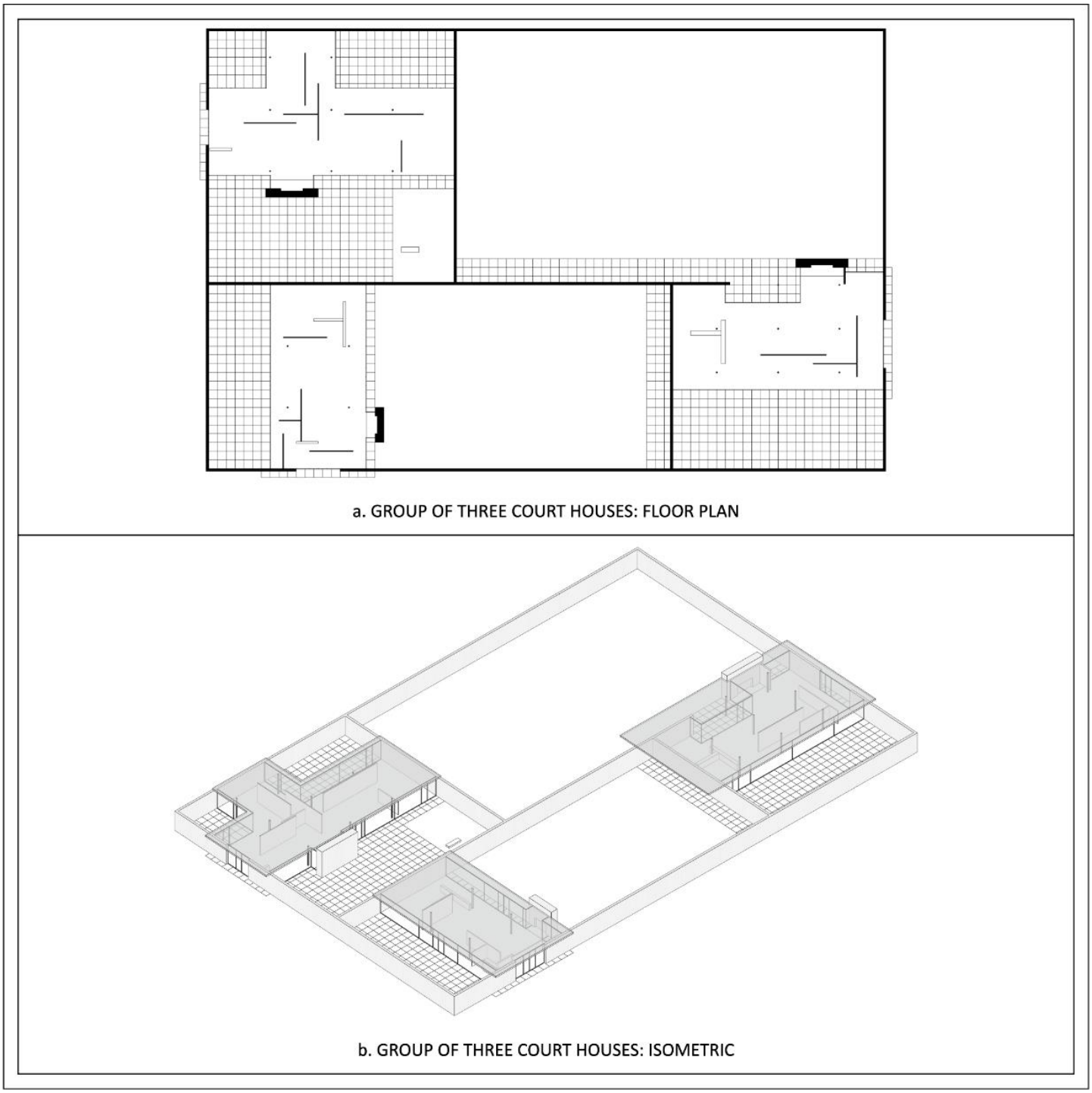

Figure 1. Group of Three Court Houses, C. 1945-46

The name court-house has different spellings all over the literature on Mies van der Rohe. Mies never used the term Hofhaus (Court House), instead he used the German words Flachbau mit Wohnhof (low structure with courtyard) as a teaching assignment (Riley, 2002). It was Phillip Johnson (1999), in the catalog of Mies' retrospective exhibition at MoMA, who named these houses "Court House". The present research prefers the spelling court-house (with a hyphen) as some early scholars did (Riley, 2002) for didactic reasons and to avoid getting confused with the English word courthouse.

There are mostly descriptions on the court-house projects, and their meaning has been discussed from "tectonic form" (Frampton, 1995, p. 182) to "political matters" (Hochman, 1990, p. 216). Schulze (2014, p. 190) briefly explains the formal evolution of the court-house; Cohen (1994, p. 73) believes that "courtyard houses might be construed as a metaphor for the shrinking of his [Mies] professional life". Tegethoff (1985, p. 124) proposes that Mies ``envisioned a development of court-houses" for the Hubbe House's land. As those researchers have not yet looked deeper into the intentions behind the drawings of Mies, the purpose of this research is to reveal the setting of the inner space of Mies' court-houses using the advantages of Computer-aided Design. It is possible to unravel the latent design procedures of architectural creation hidden behind the intentional graphic distortions of Mies. The collages and floor plans that Mies executed in Berlin and Chicago were the basis for interpreting the graphic reconstruction that eventually led to interpreting the creative design procedures of Mies.

This study is sequentially organized in order to provide a didactic view of Mies' design vision: first, the formal evolution of the court-house project will be revealed through analyzing the floor plans of the three most important court-houses (Row House, House with Three Courts and Court House with Garage). Second, the setting of the inner space will be analyzed through reconstructing Mies' original perspective drawings. Third, a thorough interpretation of the results will introduce three universal qualities inspired by Mies van der Rohe's graphic intentions: comfort, refinement and amazement.

2. CAD Reconstruction Method

CAD Reconstruction Method consists of the digital reproduction of the architects' original drawings in order to find the intentional discrepancies between representation media (floor plans against perspectives in the case of Mies). Those intentional disparities clarify the architectural design strategies reserved in the mind of architects. As results reveal latent design procedures and hidden stages, the unspoken vision of architects is unfolded.

The process to set the method of analysis of perspective drawings was divided into two phases: first, four views that could clearly represent the idea of the inner space were chosen (one perspective of the House with Three Courts, and three perspectives of the Row House). Second, these drawings were projected through CAD following the same viewpoint of each original view, which was accurately identified following the pavement grid of Mies' original floor plans. As CAD views follow the locations of walls and columns of the floor plans, the intentional changes in Mies' perspectives will be clarified. In the Row House case, the corresponding CAD view was not enough to clarify the hypothesis of this study, so it was necessary to represent additional perspectives.

The CAD Reconstruction Method sets the following phases:

- Project selection criteria
- Interpretation of the graphic material
- Reconstruction of floor plans
- Three-dimensional reconstruction
- Analysis on floor plans
- Analysis on perspective drawings

2.1. Project Selection Criteria

Preliminary and presentation drawings were selected for this study in order to visualize the process from concept to final form. After examining all the published material related to Mies' court-house on The Mies van der Rohe Archive, it was found that the Row House, the House with Three Courts and the Court House with Garage represent the evolution of the fundamental concepts of Mies' courtyard space. Moreover, these schemes were selected because they could clarify the formal evolution of the court-houses; these three projects are the most complete of the set, to the extent that some have explicit perspectives where the inner space could be clearly studied.

The Row House (Fig. 2.a) was part of the exercise on urban studies that Mies and Hilberseimer originally taught at the Bauhaus (Riley, 2000). This type of court-house was serially arranged to form a city block, which clarified how cities are planned from a dwelling to city scales (Fig. 1). The Row House was also selected because it represents the most compacted form a Mies' court-house could exist, and because it is dated to 1931, which is probably the first version of its type. Mies studied thoroughly the House of Three Courts (Fig. 2.c) when in 1934 he was planning a development of court-houses for the Hubbe's property (Tegethoff, 1985), and it was one of the few court-houses showcased in Mies' retrospective exhibition at MoMA in 1947. The Court House with Garage (Fig. 2.e) is selected for being a unique exploration on the controlled arrangement of seemingly freeform curvilinear interior spaces, something that was drafted by some of Mies' Bauhaus students, but which is undoubtedly explored in Mies' curved partitions at the Ulrich Lange House in 1934 (Riley, 2000).

The Row House and the House with Three Courts have the most comprehensive perspective drawings and collages of the whole set of court-houses, which is the basis to analyze the method for setting the inner space in the present research. This set also represents a bridge between Mies' presentation drawings techniques developed in Europe and those he refined in America: collages on line drawings with cut-outs of materials and artworks over plain white presentation board. This visualization method became an iconic representation of Mies van der Rohe's architecture in his extensive practice after 1938.

2.2. Interpretation of the Graphic Material

Most of the original drawings were reproduced from The Mies van der Rohe Archive, which has published three groups of representation on the court-house: 16 perspectives, one elevation and six floor plans. Seven of the perspectives are freehand on ink and three floor plans are executed as hardline drawings on pencil. Only some graphics were precisely identified: three perspectives of the Row House, two perspectives of the House with Three Courts, and the floor plans of the Row House, House with Three Courts and Court House with Garage.

There are two types of graphics: freehand sketches and presentation drawings. The latter was the main source to digitally reconstruct the court-house projects of Mies; photographs of the model for the Group of Court House were auxiliary data to confirm the scale of the floor plans only. In most of Mies' freehand layouts (not shown here) there is no difference between glazed or opaque walls, although the presentation drawings are clearly traced and easily interpreted. In the final floor plans, the projecting roof is traced on a continuous line, instead of the standard dotted line. Doors are usually represented as if they were closed, instead of the standard opened door symbol; in these cases, it was necessary to increase the scale of the original floor plan in order to see the difference between walls against doors. Perspectives were crucial to complete the composition of the plan.

2.3. Reconstruction of the floor plans

The Row House, House with Three Courts and Court House with Garage were reconstructed following the grid of the layout, which in the case of Mies it was usually 1.00 m x 1.00 m; this size correspond to the one built for Barcelona Pavilion, which eventually became the pattern for his 1930's houses (Drexler, 1986). The floor plans were clearly reconstructed following the grid points, locating each element of the layout as if they were following the equations of a perfect Cartesian coordinate

system. The analysis method is based on the original layout organization complemented by isometrics, and aims to clarify the formal evolution of the Court House projects.

2.4. Three-dimensional reconstruction

Reconstructed interior perspectives represent the space suggested in floor plans. The three selected layouts were three-dimensionally reconstructed through the following phases:

A. Extruding. After reconstructing the floor plans, each layout was extruded to the usual 3.00 m floor-to-ceiling height of Mies' houses (Drexler, 1986). This height is found in the Barcelona Pavilion built in 1929, in the Tugendhat House built in 1928, in the Wolf, Esters and Lange houses built in 1928 and in the Berlin Building Exhibition House built temporarily in 1931. This height was also found in the Gericke House competition entry of 1932 (Tegethoff, 1985).
B. Setting of textures and materials. Pavement grids are following the scale of Mies' line drawings. Though brickwork walls are represented as horizontal lines in Mies' original line drawings, the present research used brick mapping instead for upgrading the printing quality of this paper. Materials, texture and artworks follow original collages, where Mies' mapping scale was usually oversized (in the case of textures) or cropped (in the case of artworks).

The perspective line drawings were reconstructed through the identification and projection of the viewpoint; the precise standpoint of the original perspective was found through the following steps:

A. The opening of the perspective was set after locating the original elements at the left and right-hand sides of the original view over the floor plans; this step provided the preliminary angle of the view.
B. After many tests using the computer camera, the precise angle and orientation of the viewpoint was found.
C. The height of the viewpoint was set at the middle of the floor to ceiling height, as was customary to Mies (Drexler, 1986).
D. The original view was re-projected in CAD following the identified standpoint and angle of vision of Mies' original drawing.

Mies avoided realistic representations for the houses of the 1930's (Drexler, 1986), so that all CAD views in the present research are analytical data: they are represented here as linear drawings with only lines, volumes and textures in order to ease the visualization of Mies' spatial manipulations.

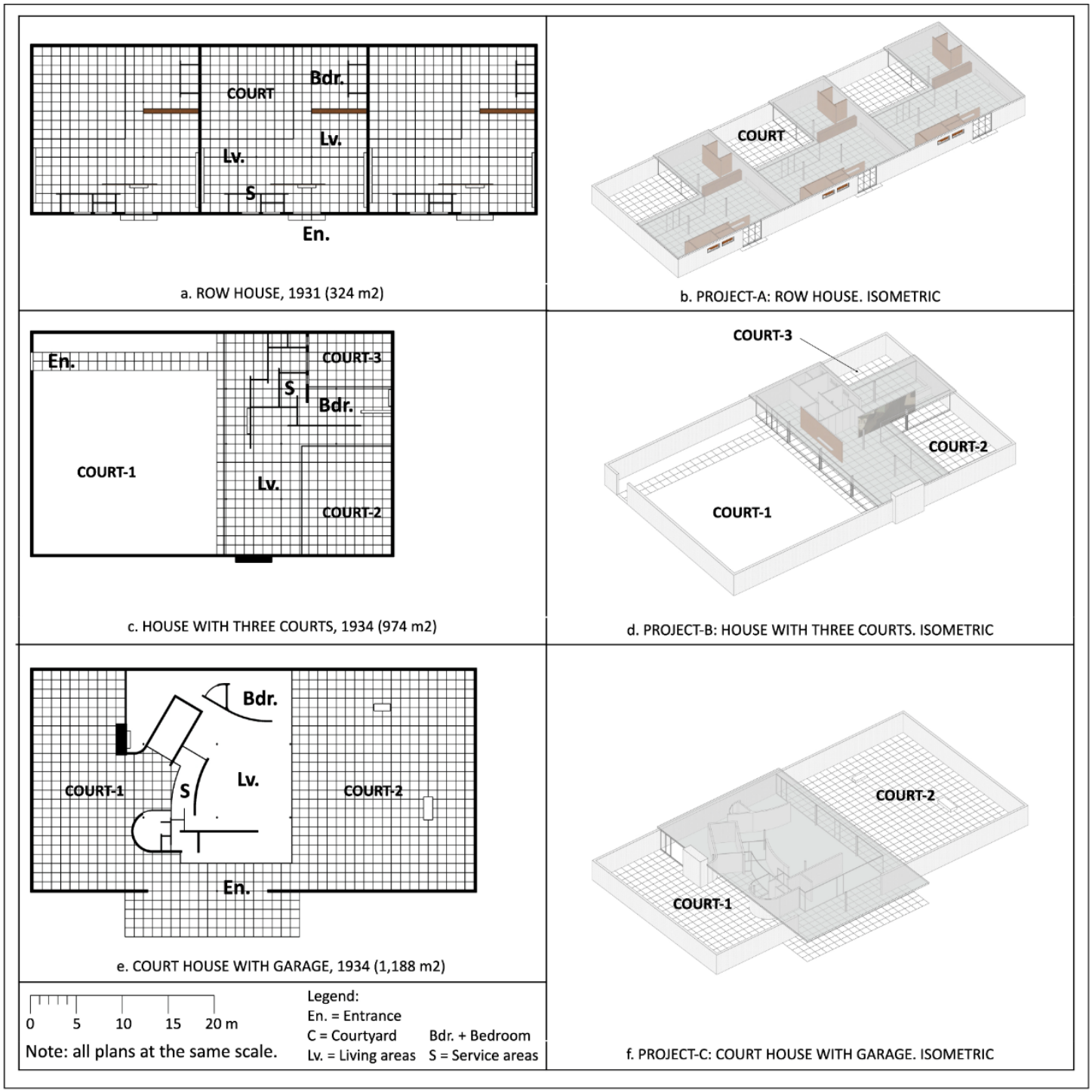

Figure 2. Analysis of floors plans.

3. Results

3.1. Analysis on floor plans: formal Evolution of the court-house projects

Besides perspectives, floor plans were crucial to define the court-house form (Fig. 2). All Mies' original layouts used for this study were originally drawn by Mies in Chicago, although they followed the European originals. They are executed on ink or pencil on illustration board, presumably for Mies' exhibition in the 1947 retrospective in the Museum of Modern Art, New York, 1947. It seems that furniture was integral for these plans, for Mies was not only designing the space, but also how these houses could be lived, however, this study represents an empty floor plan to enhance the comparison between plans and furniture-less perspective drawings customary to Mies. One important thing is the floor grid, because it indicates whether the courts and interiors were thought as a spatial continuum (Fig. 2.a, 2.c), or are clearly differentiated (Fig. 2.e). It is assumed that boundary walls are made out of brick, and softscape is considered where there is no texture in the courtyards.

The three selected projects follow the same programme (single-bedroom house) evolved through three different arrangements. Though Mies projected these three cases separately, they perform an ideal continuous evolution, where the major changes occurred in the distribution of courtyards and inner spaces. The outward form changes slightly, and the rectangle seems to have been the most suitable shape to enclose this type of houses, since "the inward orientation of the court-house emphasized spatial flow more than an outward appearance" (Riley, 2000, p. 336).

3.1.1. Project-A: Row House planning (c. 1931)

Row House project is a succession of identical houses with a single living court. The overall form of each house follows the precision of the square shape, to the extent that the courtyard is exactly a quarter of the total floor area (Fig. 2. a). The access from the exterior is directly to the vestibule of the dwelling. The floor to ceiling partitions are placed against lateral walls, since interior areas are opened to the court (Fig. 2.b). As the courtyard is located at one corner of the square, the L-shaped slab sheds the inner space and organizes the sense of the interior fixed rooms (bathrooms and kitchen). It could be considered that Row House was the most primitive case of Mies' court-house projects. In this case, house and court seem to be continuously flowing within boundary walls, although the courtyard is not fully integrated to the whole idea of court-house: the inner arrangement does not impact the court because the latter remains somehow isolated, except for the glass walls that produce a visual connection between both rooms (Fig. 2.b, cf. Fig. 6. VP-2-M).

3.1.2. Project-B: House with Three Courts planning (c. 1934)

Compared to the Row House case, project-B (House with Three Courts) has evolved the Flachbau mit Wohnhof concept to another level: a single T-shaped roof sheds the interior spaces of this house increasing the total floor area, the entrance is though a courtyard garden, and the interior partitions are grouped at one side of the plan, screening one of the courtyards as if it was planned for the private use of the bedroom (a secluded area), something not envisioned for the Row House where the single courtyard was open to bedroom and living areas alike (Fig. 2.a, cf. Fig. 6. VP-2-M). As the number of courtyards increased from one to three (two patios and one entrance court with softscape), the interior space became more opened to the exterior and the house is unmistakably contained within the courtyard (Fig. 2.c, cf. Fig. 5. VP-1-R).

3.1.3. Project-C: Court House with Garage planning (c. 1934)

In project-C, the idea of the compact court-house is completed: two of the courtyards in project-B became one in project-C, and consequently, the surfaces of the house and courts increased (Fig. 2.e). In this case, the main entrance is through a verandah that communicates two courts: a small one

that provides the access to the garage and service zones (court-1) and a large one facing the living area. Interior partitions are arranged across the inner space, combining curved and straight walls below the same rectangular roof; these interior walls do not follow the grid lines or the cruciform columns arrangement, but a freer setting of freestanding partitions without strict proportions among the several areas of the house. Here, the court-house concept is finally achieved through the clear distinction of what is set free in the interior against what is omitted in the exterior: the house is unmistakably embedded within a single courtyard, which is remarked after contrasting the continuous pavement grid of the courts against the plain interior pavement (presumably linoleum as in the Tugendhat House of the 1930 or the Berlin Building Exhibition House of the 1931).

The study of the formal evolution of the court-house projects has clarified that the plan composition changed from an almost empty and isolated court (project-A) to a half occupied courtyard (project-B) to a fully inhabited interior court-house (project-C). Consequently, the court-house's overall form progressed from a 'house with a court' (project-A) to a 'house within a courtyard' (project-C), confirming the definition of court-house as Flachbau mit Wohnhof (low structure within a court). Through isometric projections, it was possible to visualize how boundary walls, pavement grid and partitions impacted the morphological transformations of the overall domestic aesthetic, and finally defined the idea of a freestanding architectural space.

1. FORMAL SETTING THROUGH FLOOR PLANS

	CHARACTERISTICS	PROJECTS (*cf*. Fig. 2) A	B	C
1	Square-shaped overall layout	●		
2	Rectangular-shaped overall layout		●	●
3	One courtyard facing living areas	●		●
4	Two courtyards facing living areas		●	
5	Courtyard facing bedroom	●	●	●
6	L-shaped roof	●		
7	T-shaped roof		●	
8	Rectangular shaped roof			●
9	Entrance directly from street	●		
10	Entrance through an intermediate space (garden or verandah)		●	●
11	Partitions grouped at one side of the inner space		●	
12	Partitions spread overall the inner space	●		●

2. SETTING OF INNER SPACE THROUGH PERSPECTIVES

	ARCHITECTURAL ELEMENTS Design Strategy: three-dimensional coordination of outer and inner spaces	PROJECTS (*cf*. Fig. 2) A	B	C
1	Boundary walls	●	●	●
2	Pavement grid	●	●	●
3	Freestanding partitions	●	●	●
4	Glass walls	●	●	●
5	Artworks (mural paintings)	●	●	

Figure 3. The method for setting the court-house space.

3.2. Analysis on perspective drawings: the formation of the inner space

The analysis on perspective drawings revealed that Mies used two design strategies to formulate the idea of court-house: the setting of the spatial framework and the definition of the atmosphere. In the present research, the concept of inner space stands for a space enclosed enough to provide spatial seclusion; a space that inspires an almost endless creative endeavor, even though it is set within strict limited architectonic elements.

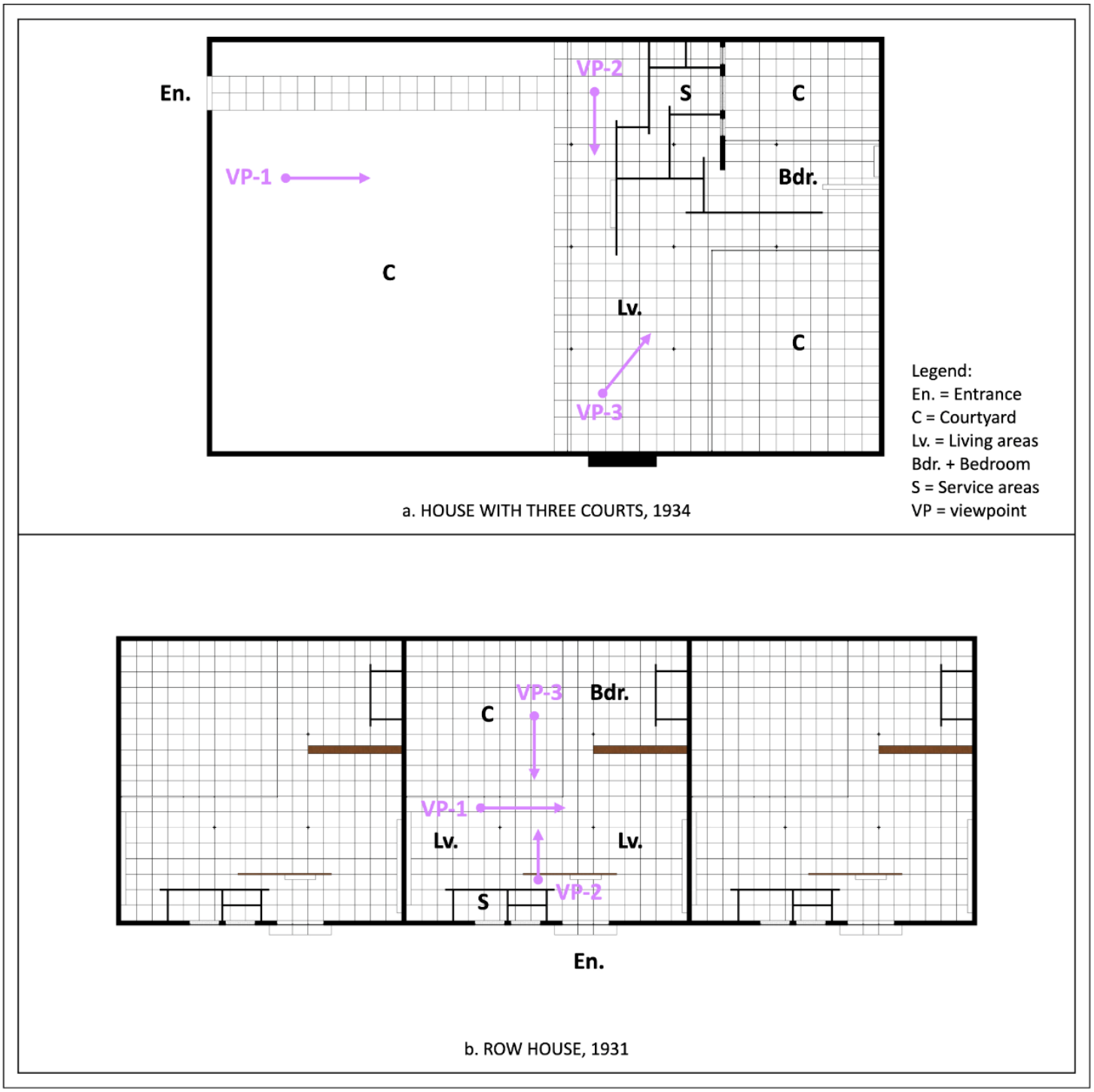

Figure 4. Analysis of perspective drawings: perspectives viewpoints location.

To deduce the viewpoints of Mies' original perspectives, it was necessary to locate them using the grid of the floor as a kind of cartesian system of points, so that it could project a perspective close enough to the original one (Fig. 4). In the next section, it will be explained how some of these viewpoints are located outside the houses, even though they are supposed to be taken from the interior of the house (Fig. 4.b, cf. Fig. 5. VP-3). The precise standpoint is irrelevant when architects are designing, because the main goal is to focus on the whole vision of the space and its impact on the viewer, rather than the accuracy of the perspective. But for research reasons, it is necessary to precisely identify these viewpoints to correct the spatial liberties of Mies' artistic mind.

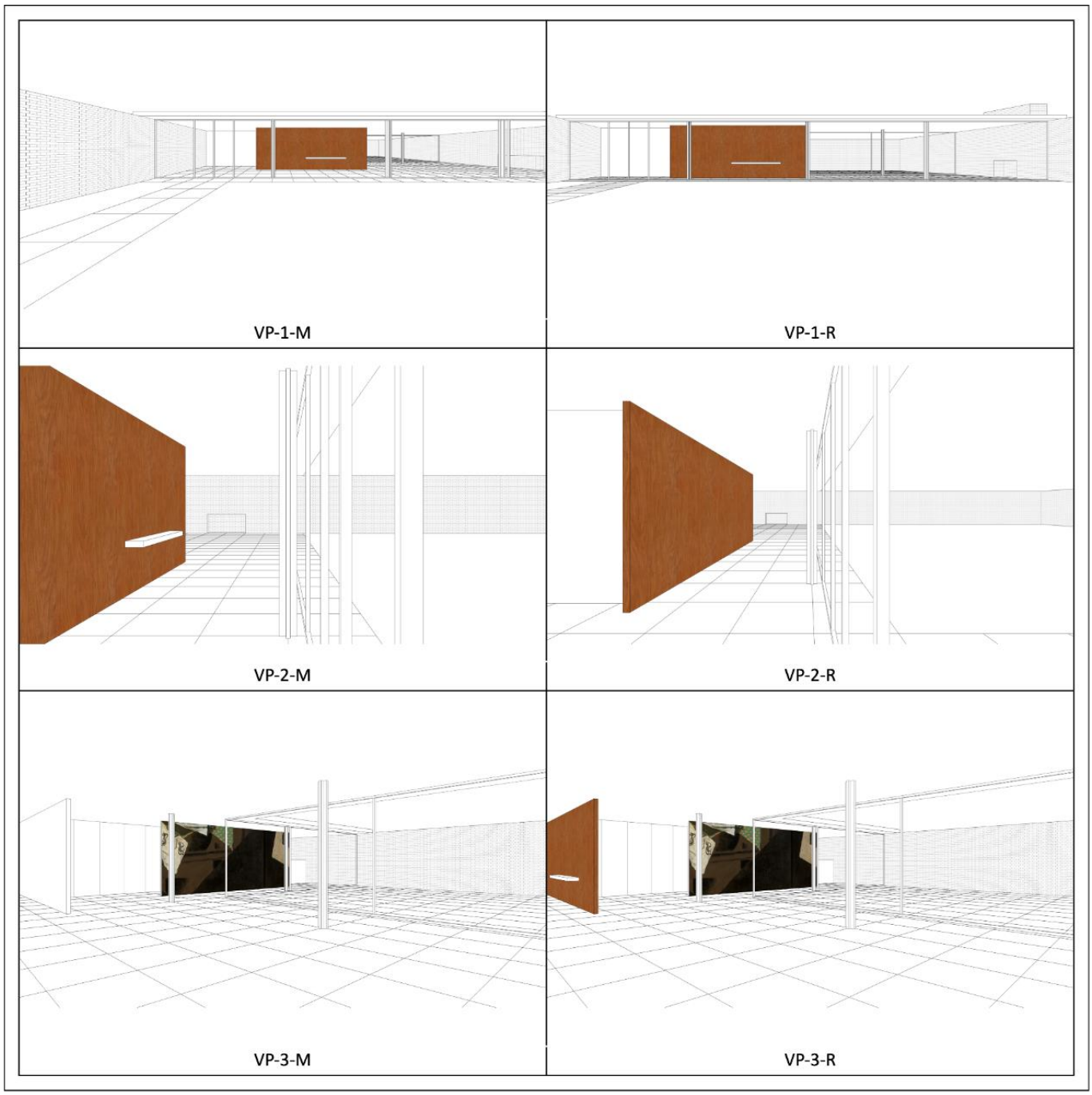

Figure 5. Analysis of perspective drawings: House with three courts. VP-M (Mies Original view); VP-R (Reconstructed view following the floor plan arrangement).

3.2.1.The setting the spatial framework of court-houses

From all the elements to arrange the space of court-houses (Fig. 3), boundary walls and pavement grid set the spatial framework:

A. Boundary walls (Fig. 5. VP-1-M). Enclosing walls are extended beyond the roof in order to demarcate the overall form and integrate courtyards to the interior space. The court is merely visible in the background (far right), enhancing the impact of the front courtyard over inner spaces. Formally, boundary walls function as dynamic spatial elements, projecting the garden at foreground into the interior areas of the house and courtyard at the rear end. This design feature could be found among other 1930's houses of Mies, like the Hubbe House, where courtyard and garden terrace are visually connected through the glass walls of the living areas (Drexler, 1986, p. 372). If the same view is taken axially, that is, centering the standpoint on the central axis of the whole space (Mies' usual viewpoint) the house would have looked closer and the depth of the front court would have been diminished (Fig. 5. VP-1-R).
B. Pavement grid (Fig. 6. VP-1). The floor tiling, arranged in a cartesian fashion, sets the precise location of freestanding partitions and columns following the 1.00m x 1.00m tile module, and reveals the original perspective of Mies (Fig. 6. VP-1-M) eliminates the elements closer to the viewpoint, as if projecting a high depth of field. If compared to the view that follows the precision of the floor plan grid (Fig. 6. VP-1-R, cf. Fig. 4. b) it is clear that the actual setting omitted would have shown the elements near the viewer, but Mies deleted them because they interfered with the panoramic sense of the architectural space. Panoramic views, either interior or exterior, were frequently used throughout the whole career of Mies, and the court-house projects were an opportunity to express the power of this type of projections over the domestic scale of architecture.

The spatial framework of court-houses is based on concrete building elements that are easy to move, remove and reinvent. As a design strategy, it is useful to reinvent the arrangement of interior spaces and to explore the functional opportunities the courtyard space offers to the modern architect. Their imaginative power was possible because of Mies' experience with modern building technology in the Barcelona Pavilion, and their didactic possibilities resulted in the ultimate teaching method he established at the Bauhaus and IIT; their almost endless combinations was crucial to project the imaginary lifestyle that could take place in the court-house space.

3.2.2. The atmosphere invention of court-houses

Freestanding partitions, glass walls and artworks are the elements that highlight the qualities of the interior architectural space of the court-house projects. The spatial impact of these three elements are represented in collage technique, through inserting cut-out of artworks and prints of wooden textures. The resulting images reveal how these elements were manipulated to achieve a tangible spatial impact, to the extent that collages do not usually correspond to the precision of the floor plans (Fig. 5, Fig. 6):

A. Freestanding partitions. Besides brickwork walls, interior partitions determine the level of enclosure through screening or opening the several areas of the house (Fig. 6). The real view is supposed to be (Fig. 6. VP-2-R) with a partition at foreground blocking the living area behind it, screening the vision from the entrance vestibule. Although it does not confine the space because it does not reach the roof, it was eliminated in Mies' original view (Fig. 6. VP-2-M) in order to show the overall sense of an uninterrupted deep space. Partitions also determine the texture of the open room, through combining different wood grains against the surrounding brickwork walls. Two different kinds of grains are tested: dark pigment at foreground (lower partition) and a brighter tone at

background in the bathroom unit (Fig. 6. VP-2-M). But this combination changes if the view follows the arrangement of the floor plan (Fig. 6. VP-2-R). Note that bathroom partition should have been perpendicular to the viewer, resulting in a set of elements grouped at one side of the collage and leaving unbalanced the left hand side of the space. This void is not characteristic of Mies, for there in his views there is always something to look at the background, therefore, the changes from floor plan to collage was intentional to express the vision he had in mind for this relatively small space.

B. Glass walls. Glazed partitions remark the interior side of the space instead of the exterior one. What is supposed to be an interior view (Fig. 6. VP-3-M), it is actually an exterior perspective if the view follows the precise location of the viewpoint in the floor plan (Fig. 6. VP-3-R) note that glass walls and roof brim should have been projected at foreground. To match the original view of Mies, it was necessary to omit the glass walls and roof, confirming that in the mind of the architect these houses were a work in progress on the construction of inner spaces.

C. Artworks. There is the combination of wooden partitions and mural paintings into the inner space (Fig. 5. VP-3-R). The wooden partition of the entrance hall (Fig. 5. VP-2-M) is not represented in the intended view of Mies when projected from another angle (Fig. 5. VP-3-M), note that it is supposed to be seen at the left-hand side of the drawing if the perspective follows the precise location of the viewpoint in the floor plan (Fig. 5. VP-3-R). The inclusion of sculptures in modern design was a solution that Mies mastered in the Barcelona Pavilion (1929) and one that became a recurrent theme of his domestic projects in the 1930's, especially in the court-house series, where a combination of architecture and art humanized architectural spaces. In the original collages of Mies, there are sculptures represented in one view or another, but as they are not set in the planning of the layout, and as they are not represented in all drawings, this study did not include them because it considers them ultimate ornaments of the composition once the final projection was completed.

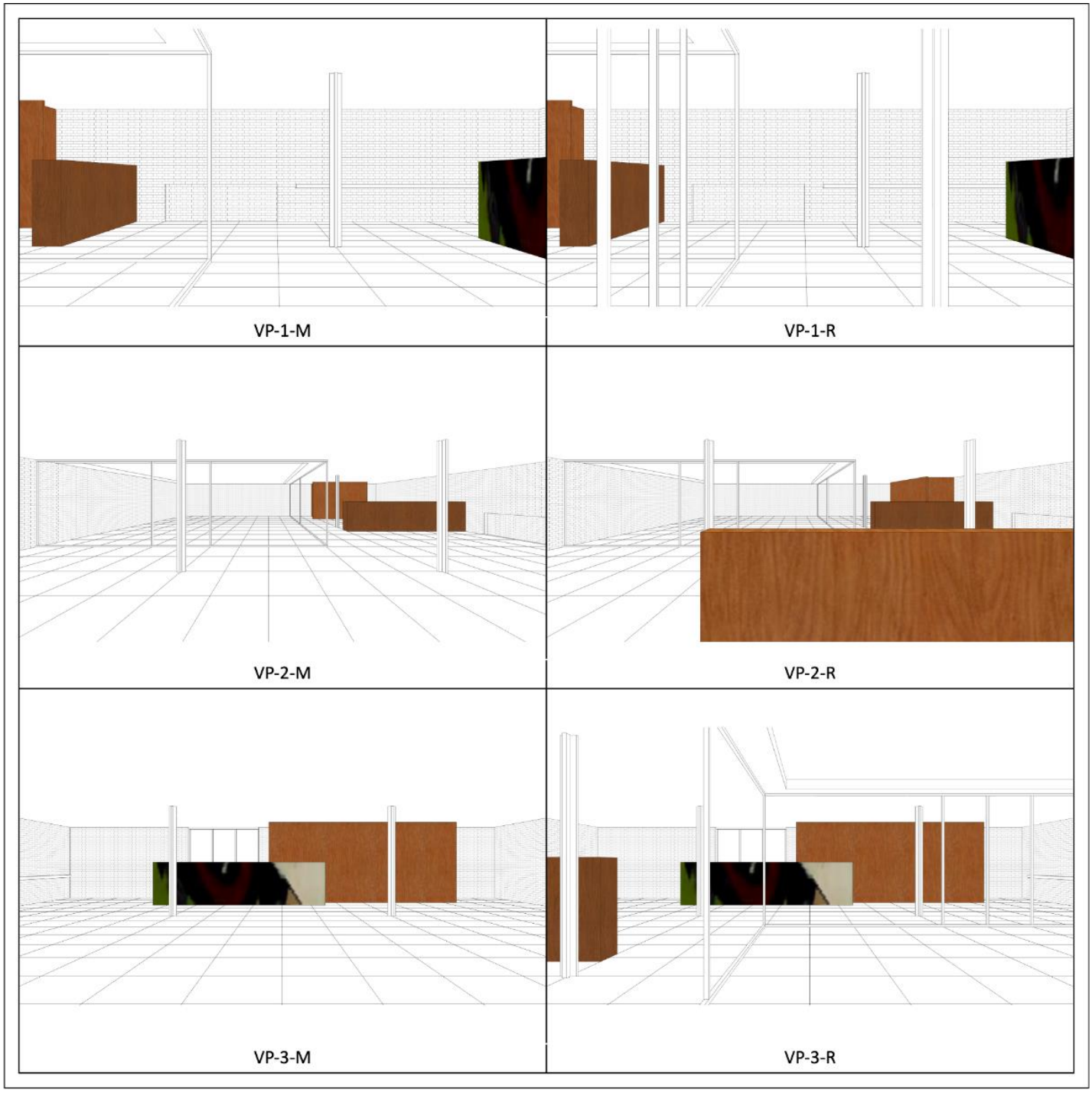

Figure 6. Analysis of perspective drawings: Row House. VP-M (Mies Original view); VP-R (Reconstructed view following the floor plan arrangement).

4. Discussion

4.1. The setting of the inner space

In Mies van der Rohe's times, the most advanced graphic resources were not those that simulates reality, but those that form the spatial atmosphere in the imagination of the observer, that is, those that created an off-field scene that was completed in the viewer's mind. One question comes to mind: how to compact the broad spatial vision of the architect to the limited framing of the drawing? In the case of Mies, it was possible through detaching layouts from perspective projections in the design process, as it was clarified in the court-house analysis (Fig. 6). Those discrepancies were intentional, and revealed the whole architect's vision cannot be met in a single projection type nor in a complete scheme, but through a combination of standpoints (some in the architect's imagination and some already determined in the line drawing) thus an intangible juxtaposition of spatial possibilities was raised.

In real space, people choose what to see, whereas in drawings, it is the architect who decides what the viewer will see. To achieve that, architects have to set a framing for the drawing in order to transform everyday reality into an architectural scene where observers are the protagonists. Mies' angle of framing is special, for it is not normal (viewer's eye height) but at the midpoint between floor to ceiling height (1.50 m). Mies manipulated the depth of field in his perspectives (distance between farthest and nearest objects) and used a high depth of field (focused on the farthest elements of the view) which in the case of the court-house the target were brickwork walls or mural paintings (Fig. 5. VP-2, VP-3). The precise standpoints seem irrelevant in Mies' perspectives and collages, preferring a subjective/internal point of view, ignoring the precision of line drawings but focused on an emotional atmosphere that may raise different meanings.

Since the Renaissance, architecture has been using perspective drawings to enrich the project narrative. In the court-house case, the action is narrated by interior collages that are intentionally inaccurate to how the viewer will perceive these spaces if built. Everything that is finally shown to the observer has been determined by the vision of the architect, who adjusts the reality of architecture to what he wants to explain. The language used in the court-house narrative is neither formal nor literary, but purely architectural in the sense that it could be engaged through three elements that are met in the built reality of this profession: comfort, refinement and amazement:

A. Comfort, a rarely discussed topic in the court-house projects, is one of the significant design purposes of buildings, for it is based on the climate control, lighting, furniture selection and noise control, and its success relies on light, texture and materials. These elements are impossible to analyze only through perspective drawings, but if court-house collages are carefully interpreted, they suggest that comfort was on Mies' imagination when he decided the type of wood grain and floor type (travertine), the location of courtyards to allow natural light and air into interior spaces, the location of service areas away from living and sleeping quarters and the raise of boundary brickwork walls. Due to his building experiences with the Barcelona Pavilion and Tugendhat House, he knew for sure that the selection of elements that might enhance comfort was beyond mere aesthetics in perspective drawings. Therefore, the atmosphere in the court-house projects is not in the eye of the beholder, but controlled by the visual precision of Mies' eye and hand.
B. Refinement, in Mies' projects, has nothing to do with banal luxury, but with the process of removing unwanted elements. The court-house project was a precise exercise on how to identify, select and locate building elements that will improve the lifestyle imagined for these houses; it makes sense that this building type was the focus of Mies' teaching assignments in the Bauhaus and IIT master courses. In the design process, all the elements were freestanding, even the cruciform columns (structure). This research has demonstrated how free was the location of each building element in the composition, where some are added or eliminated from the collages due to visual decisions, revealing that the insertion or elimination of objects was part of the search for refinement in architecture.

C. Amazement is a recurrent design aim in architecture due to its long-lasting effect on people. In Mies' court-house projects, boundary brickwork walls keep the almost immaterial interior hidden from the outside world (the city) preparing the visitor for an unforgettable experience. The only connection to the context is through the opening of courtyards, even though this building type was planned to be part of the urban scene (Fig. 1). But the element of surprise, the unexpected, the shocking contrast between secluded/delicate inner space against the rough/hectic urbanscape, is a central idea suggested in the collages and floor plans of the court-houses. This research has demonstrated how the formal evolution of the court-house type evolved from a single court to multiple courtyards, so that the interior experience could suffice the lack of openness urban spaces should provide. The unexpected interior is encountered just after passing the threshold onto courtyards, revealing a cultivated world of art among the most advanced building finishings ever experienced (onyx marble, Macassar ebony, rosewood, travertine, chrome-plated columns, modern mural paintings and classical sculptures) while looking onto the random order of trees and clouds.

Classicism goes beyond geometrical order to follow the beauty of the natural world, trying to seek the perfection of natural formations, replicating the forms found in the open landscape out there. Modernism, which tends to reduce nature to abstract ideas, is still trying to find the next step in the evolution of architecture: to reinstate the tradition of the new (Weston, 1996). It is useless to confront those two concepts because both are part of the lifestyle of the 21st century, both are constantly emerging and merging, frictionless, leaving the contemporary architect to decide what kind of architectural language is needed for each project. "It is difficult to create a new architecture every Monday morning", as Mies once said (Neumeyer, 1991) but these times encourage the experimentation of new ideas when conditions are favorable. It seems that Classical Architecture means to inhabit nature, whereas Modern Architecture means to inhabit the human mind, but in any case, Mies van der Rohe's court-house projects are opening the modern interior onto natural elements through courtyards, calling on the idea that abstraction (the mind) is also Nature.

5. Conclusions

This study has analyzed Mies van der Rohe's setting of court-houses of the 1930's through the CAD Reconstruction Method (CRM) of three projects: Row House (1931), House with Three Courts (1934) and Court House with Garage (1934). Three floor plans, three isometrics and 12 perspective drawings were analyzed through comparing the replicated original views of Mies to the respective projections that correspond to the layout planning. It was found that three projects were evolving the significance of courtyards according to the location of the living areas and the overall form of enclosing walls. Mies courtyard idea was a slow search that only became integral to the design in the most matured forms of court-houses (Court House with Garage). It was also found that Mies' setting for the framework of court-houses developed a three-dimensional coordination of boundary walls and pavement grid, where the inner space was constructed through arranging freestanding partitions, glass walls and artworks in perspective/collage technique. The result was a sharply defined space, where static views took any continuous movement through walls, thus explaining how Mies refined the concept of court-house through incrementing the number of courts, working on a new idea on spatial dematerialization where perspective drawings were independent from layout plannings, achieving the ideal spatial atmosphere he had in mind.

This research is important to scholars and practicing architects who would like to understand how architects are planning every project beyond the evident skills of drafting and building architecture, but through intentional visionary purposes based on cultural milieu. The agenda of architects who want to transform this profession into something new contemplates the practical side of things (the objective reality that will be impacted by the work), but that agenda also includes uncertainties and discoveries based on non-linear processes. The unbuilt work of Mies van der Rohe demonstrated the ways architecture has slowly evolved from the drafting board to built reality, but also raised the two following questions concerning to the future of the built environment: is it enough for architects to use the graphic (projection) media to change the perspective of this profession? And,

will they discover an alternative non-human partner, beyond artificial intelligence, that will lead the way to new forms of design processes?

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