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Reconstruction, modeling, animation and digital fabrication of 'architectures on paper'. Two ideal houses by Carlo Mollino

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RECONSTRUCTION, MODELING, ANIMATION AND DIGITAL FABRICATION OF 'ARCHITECTURES ON PAPER'. TWO IDEAL HOUSES BY CARLO MOLLINO

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Abstract

This paper develops some consideration about the issues raised by the reconstruction of 'architectures on paper' of contemporary masters.
Generally archival drawings are patchy and fragmented and refer to different ideative moments and paths of inspiration that lend themselves to numerous and different interpretative readings. Moreover it's necessary a careful analysis of the author's poetics and significance of his work. Digital methods and techniques of representation, ranging from 3D modeling, video producing and digital fabrication, should be carefully selected and adapted to the characteristics identified through the interpretation of the project and what it is intended to communicate. In the cases studies of Mollino's 'ideal houses' were tested the capabilities of BIM modeling for this aims.

Keywords

Digital reconstruction, modeling, animation, digital fabrication, unbuilt architectures, Mollino.

"I must also add that almost I never know how all the things come from me; often, like that, they are born from the dream of sleep; then I get busy with utmost care and intransigence to coincide with an empirical possibility, constructible, usable, visible" (Mollino, 1944, p. 2).

1. *From the archival drawings to the model, both digital and physical*

The archival drawings of contemporary masters are currently the subject of renewed attention, involving scholars in different disciplines and making use of the tools provided by digital world and convergence of its products, for different purposes, among which emerges the three-dimensional re-construction of 'architecture on paper', i.e. those that have not found their necessary and inevitable realization by the act of building.

The interest in them opens new prospects for multi-disciplinary research, as has been observed with respect to the very numerous 'unrealized visions' of Alvar Aalto. "As a rule, the architect takes a programmatic approach to design, whether it is a matter of building, a complete community, or a detail for one of his buildings, usually with the aim and expectation that what he has drawn becomes reality. [...] Designs that are drawn up for a genuine purpose but are not built often give us a more interesting and accurate view of the designer's range of ideas than completed works. Because they are unfinished, the architectural ideas in them are often clearer than in works that are eventually built after compromises have been made and financial decisions taken" (Laaksoonen, 2002, p. 3).

Among the buildings remained on paper, it must immediately distinguish those that have not been realized due to no more sustainable costs, disagreements with the client, or other contingencies, also historical, or because they are submissions for competitions not won; and others programmatically ascribed to the ideal ambit.

In the latter case, the project can be completely free from restrictions, from the choice of the site, the imposition of building codes and local laws, the costs, the demands of clients etc. and fully expresses the architect's poetics and visions. Even graphic materials that represent it are enjoying this freedom: not all aspects of the design need to be analyzed and developed with the same attention and the drawings' definition can be stopped before the final drawings, leaving open the way to possible alternative choices.

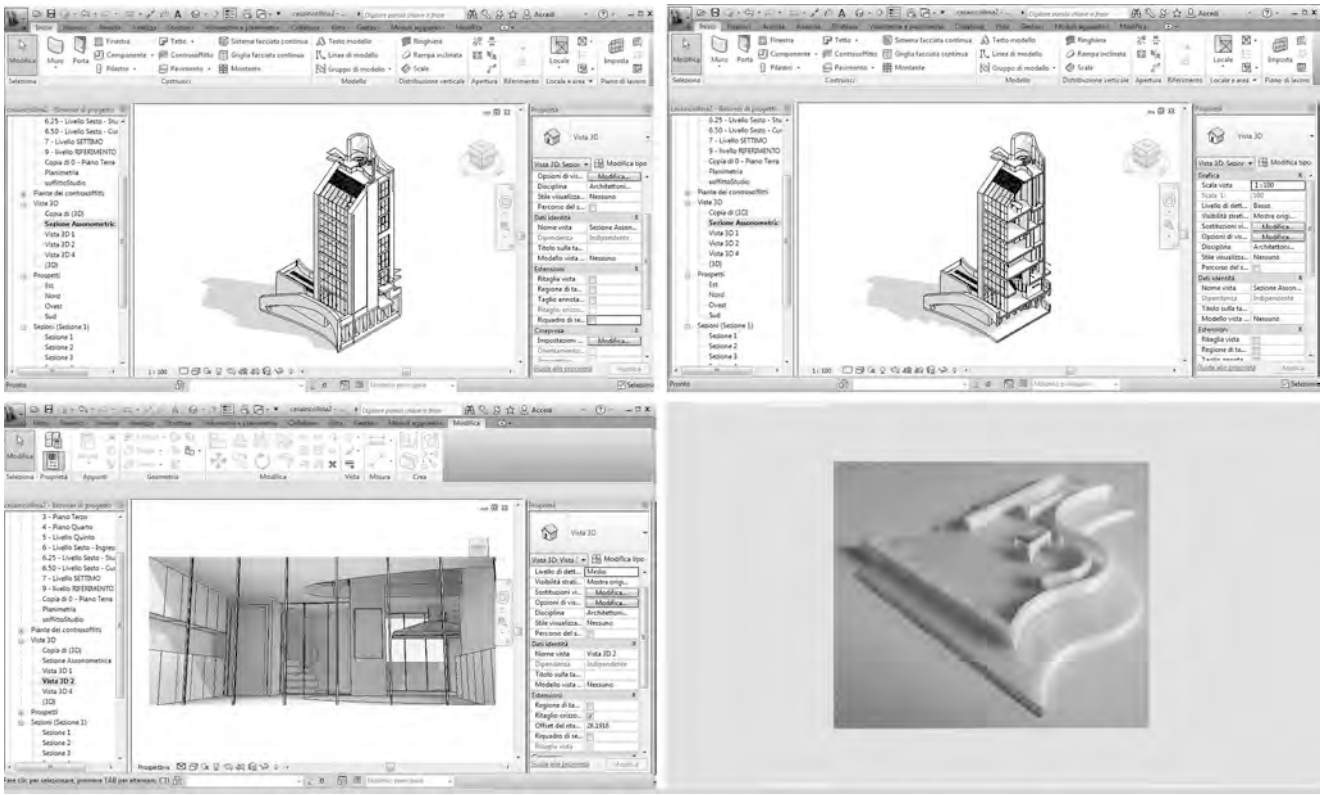

Fig. 1: Screen-shots from BIM model of the Casa in collina. Scale material model of the first level. Preparatory work for the master's thesis of Antonio Laudani.

As Sdegno observes, investigating on those unbuilt architectures that take shape as 'possible architectures', you could discover that unrealized masterworks generally far exceed in amount those built in spite of the materials produced by these projects are equal in number, or higher than, those developed for a work done (Sdegno, 2007, pp. 541-542).

So all the attention have to be focused on the analysis phase of the available documentary sources, also through the re-drawing (or/and the re-modeling) in order to develop a useful level of knowledge, by verifying the feasibility of the artefact, and interrogating drawings for rebuild the morphing geometry used by architect to give shape to that content.

In the case of unrealized projects the graphic documentation, generally patchy and fragmented, often does not reach a homogeneous level of detailed drawings.

In any case, are put in relation drawings referring to different ideative moments and often following different paths of inspiration, that lend themselves to numerous different interpretative readings. In this case, can be followed different hypotheses and integrated the missing elements by comparison with other existing works or other design concepts. Digital tools, methods and techniques of representation should be carefully selected and adapted to the characteristics identified through the interpretation of the project and that is intended to communicate.

Moreover, a careful analysis of the author's poetics and significance of his work, conducted through the reading of his writings, the investigation on his drawings and built architectures, and through the study of the contemporary and past critics, must steer the choice of modeling tools and the most appropriate representations.

Hence the need, for those who wish to recreate the artifact's three-dimensional nature, of making a series of interpretative choices, aimed at evoking its presumable original conception. Not only, you have to bring back to unit drawings often not consistent and to complete any blanks. The reconstructive three-dimensional model is therefore the first synthesis image of the conceived work and the first time the original drawings, through its mediation, stand as architectural construction. Finally, through the 3D printing process, the digital model can be reified, taking on a materic connotation and becoming prototype.

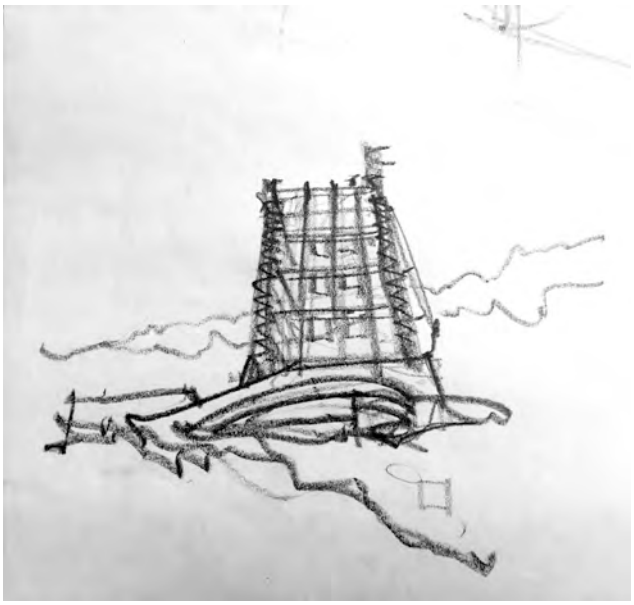

Fig. 2: Concept sketch of Casa in collina by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

The case studies considered are two ideal houses by Carlo Mollino, designed between 1942 and 1944, and published in *Domus* and *Stile*.

The issue of 'ideal houses' animated the Italian architectural debate, during the period of forced inactivity due to World War II, so that several architectural magazines became promoters of the initiative to request and publish projects of the contemporary top architects on this subject.

In both case studies, the publication of drawings is accompanied by a letter from Mollino to the editors, which describes the conception, its reasons and widens the speech stating its position with respect to contemporary architectural debate.

Carlo Mollino is an architect who combines the research of architectural quality to a strong knowledge and experience of building (Pace, 2006, p. 120), because he worked, from the beginning and for about twenty years, with his father Eugenio an engineer, particularly productive especially in Turin area.

For this reason in his designs emerge a relationship between drawings and construction similar to that identified by Francesco Dal Co in an interview in the late '80s. "In general, I believe that architecture is configured as a unitary process which necessarily tends to build up. [...] There is no doubt that any kind of architect's drawn expression contains within itself this tension to build, to the construction, construction of an artifact. So the drawing is placed, within this very schematic definition, as a step in a process. [...] this is the fundamental role of the drawing. The drawing is such picklock, that forces the things into the reality" (Dal Co, 1989, p. 6).

This relationship between the drawing and the constructive reality emerges also in Mollino's designs programmatically intended to remain on paper, of which also the technological details in large scale are graphically defined, the interior furnishings are designed as an integral part of the architecture and, even, the static schemes of some structural elements are traced.

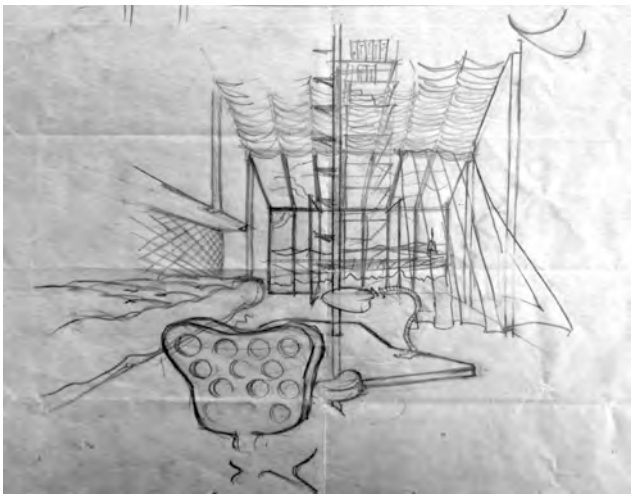

Fig. 3: Perspective view on the city from the top floor. Casa in collina by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

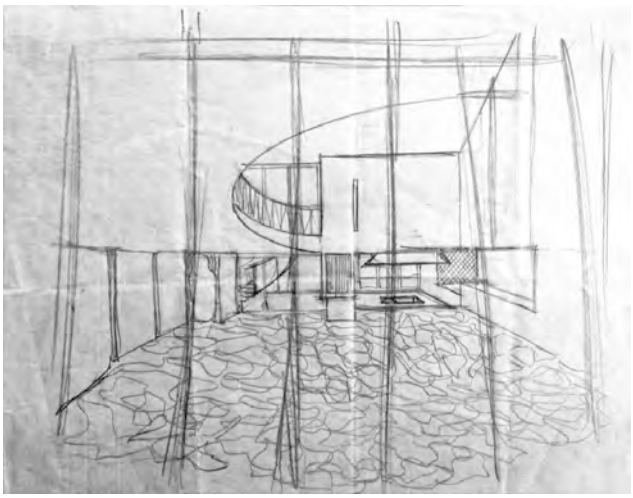

Fig. 4: Perspective view from the outside to the main hall. Casa in collina by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

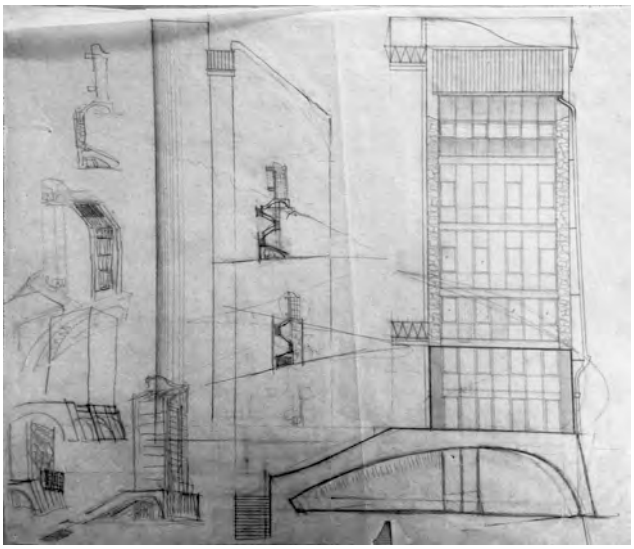

Fig. 5: Sketches of the glass façade and the spiral stair. Casa in collina by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

The particularity of Mollino's *modus operandi*, which is expressed, for each project, through hundreds of drawings, led me to propose the use of a parametric three-dimensional modeler like BIM, aimed to the three-dimensional reconstruction.

In fact, I intended to take advantage of the following capabilities and prerogatives of BIM, not only specific of such software, but grouped inside it, with satisfactory results with respect to the purpose of the work:

- assess the three-dimensional consistency of the two-dimensional archival drawings, checking possible variants;
- obtain sections and orthographic views from the three-dimensional model, provided with the graphic standards of architectural technical drawing and settable at different scales, selected also in order to compare them to the sources;
- set perspective views, even with centre of projection similar to that of Mollino, for further comparisons;
- build 'families', i.e. classes of items within a category, customized for recurring items;
- impose layers of materials and construction characteristics, where individuated, to the different elements;
- generate motion paths outside and inside the building, to allow the virtual exploration;
- produce in scale material models, through digital fabrication processes.

Through these operations, for the first time, the design is freed from the two-dimensional support, through the transformation in three-dimensional digital model (though always accessible through the two-dimensional space of the screen), achieves the fourth dimension by the production of the video that allows to visit, offering new views, and finally truth imbued in a three-dimensional material object.

2. *Digital reconstruction of 'architectures on paper': overview on issues and international case studies*

Today quite a lot of the digital reconstructions concern unbuilt projects of contemporary masters. Each of these, brings with it a series of choices, related to the interests and sensitivities of different scholars, aimed to render images as faithful as possible to the poetics of the architect.

Unbuilt masterworks of Louis Kahn are the subject of numerous and different studies.

Larson, who published a book containing the reconstruction of six Kahn' s unrealized buildings (Larson, 2000), is wondering about some important issues related to the role of digital modeling for the reconstruction of unrealized projects, which can be extended to the subjects of the present study. He questions himself if it should consider the incomplete evidence left by Kahn to be the score of a performance, where personal interpretation and addition of details are permitted. He also discusses about the representation methods and rendering techniques to be used in the reconstructive process.

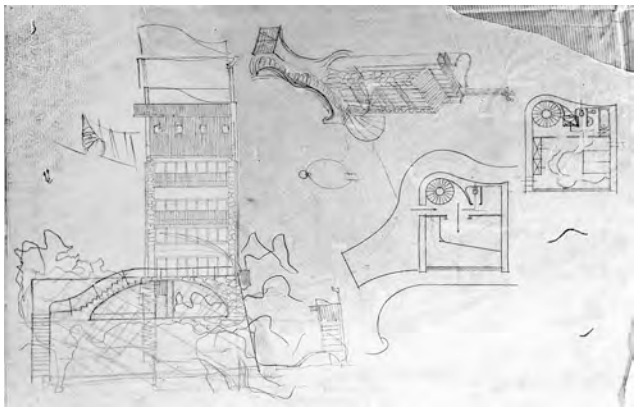

Fig. 6: Study drawing of the main façade and plans. Casa in collina by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

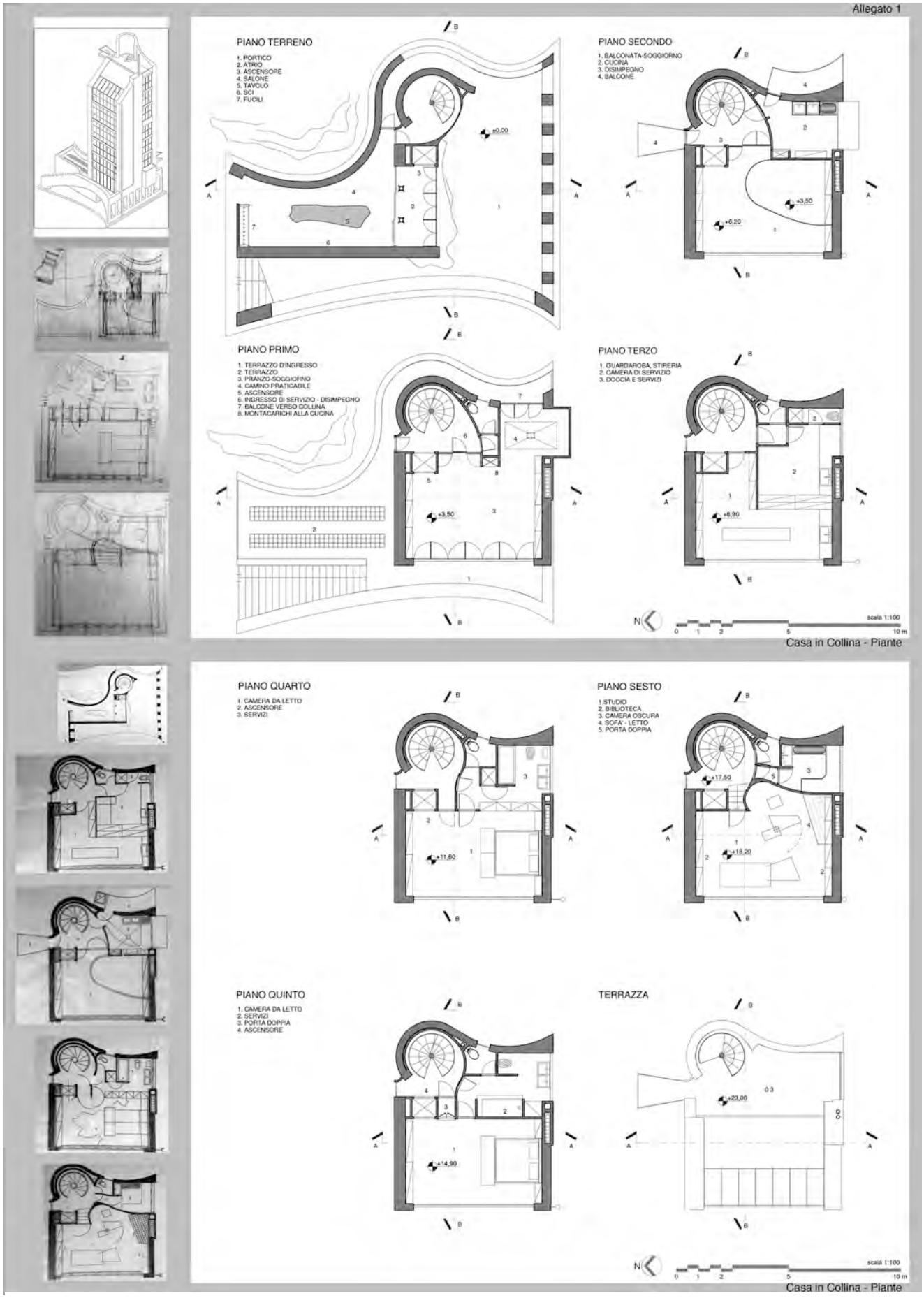

Fig. 7: Horizontal sections of BIM model. From the master's thesis of Antonio Laudani

The synthetic nature of the image could be established through orthographic sections and isometrics, or impossible views like the section-perspective.

Ambiguous imagery could be created, as Kahn did in his design process, with conceptual modeling rendered as grainy black-and-white photographs, highlighting essential elements and obscuring missing details.

Indeed, while the primary goal of Larson's research is to create new imagery, the results are hyper-realistic images that chasing perfection and sharpness of architectural photographs.

Despite the author's ability to create imperfections in materials, some patterns are visibly repeated and the atmosphere seems too thin. Also lacks an overall vision of the project that makes understanding the relationship between the building and the environment and its internal functioning. Larson affirms that his study is focused on what the archival document does not reveal: the complex play of form, light, and materials fundamental to all of Kahn's later built work, but all images, through shots of details, seem to focus on the reaction of the materials to light, without you can read in the high spatial quality of the architecture.

Dotto develops a monographic study on the unrealized project of Kahn's Hurva Synagogue, which is documented in three versions (Dotto, 2012).

He argues that it is possible to investigate and represent the shape of 'absent architectures' disclosing aspects partially hidden in the design drawings, right through new drawings making more accessible works that would not otherwise have been available for study and research.

The attempt to reconstruct the path of Kahn's project also trying to tidy up the chronological sequence of undated drawings, leads to plot a story that highlights the uncertainties of interpretation.

The construction of the digital model has the advantage of allowing a check of geometric, spatial and formal coherence of available representations.

About the display of the model, Dotto raises the question of the use of architectural drawing as a *medium*, different from the photograph, which triggers the processes of imagination and interpretation of spaces and shapes. For this reason he promotes the use of orthographic projections, isometric and perspective cut-away, and graphic overlays. Similarly, surface treatments and lightings rather than pursuing photorealism and truth-likeness should evoke the visible reality using the instruments of graphic abstraction.

Also Giuseppe Terragni's architectures are subject of many reconstructive studies. In particular the Danteum, conceived to be located in the hearth of historic Rome, near the ancient rests of Fori Romani, has been analyzed by Saggio in the Institute of Technology in Zurich (ETH). He proposed a modeling methodology based on hierarchical structures which allow having some dynamic relationships among the data that describe a project in 3D. The use of hierarchical structures requires the representation of a project, splitting it into its parts. Saggio affirms the necessity that whoever creates a model, by means of hierarchical structures, has developed an explanatory dissertation on the project, because the hierarchical structure and the interpretative key coincide within the same electronic chart. In the case of Danteum, the hierarchical organization of the model is based on the distinction among the different spaces (Hell, Purgatory and Paradise). This method allows the analysis and realistic simulation - including the walk through inside the reconstructed building - and the critical analysis - but also the documentation of stages of the process and the design alternatives - (Saggio, 1995, Saggio, 2004).

Fig. 8: Screen-shots from the video of Casa in collina. From the master's thesis of Antonio Laudani.

Fig. 9: Perspective view from the hill to the city by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

3. 'The house and the ideal'. Casa in collina (1943) and Casa sull'altura (1944) by Carlo Mollino

As said above, in the summer of 1942, at the height of the war, *Domus*, whose subtitle is L'arte nella casa, under the direction of Melchiorre Bega, Massimo Bontempelli and Giuseppe Pagano (Irace, 2006, p. 79), launched initiative to ask "some architects of recounting in these pages, with intimate confidence, the ideal design of their dream house [...] drawing the impossible, to push the vision, as if they should be realized, to the point where, just saw, it is born nostalgia, as something already lost, irretrievably" (*Domus*, 1942, p. 312).

The theme, strident than the historical moment, receives a dual reading: of representing a moment of escape, or developing an issue on which the Italian Rationalism had revealed its limits.

The call to rid themselves from rationalist orthodoxy (Irace, 2006, p. 79), to bring out the artistic dimension of architecture, leads to conclude the editorial with a proclamation: "we will discover our ideal house, we will expand the dream's horizon of our house only if the artist is left in the freedom of his creative imagination" (*Domus*, 1942, p. 312).

Top architects in the national architectural scene answer the call with fourteen projects, published between August 1942 and May 1943.

Among these, Carlo Mollino, who presents the Casa in collina.

The theme of ideal houses "often real projects, in which he transposes his most sincere suggestions and verifies his hypotheses in extreme situations" (Tamagno, 1996, p. 14), had interested him previously, from the literary point of view, publishing serialized in *La casa bella* the tale "Life of Oberon" (1933), illustrated by some drawings of ideal rooms (Irace, 2006, p. 82) and in the form of studies, as the Case in montagna (1935), again for the magazine *La casa bella*, and ideal designs, such as the Casa per l'ultimo dei Moicani (1940). After the design of the Casa in collina, his research related to this line will intensify, with the production of Disegni per Graffer, house and shelter for fighter aircraft (1943), the design of Casa sull'altura (1943-1944), required by Gio Ponti for *Stile*, which will be seen below, the design of Villa Stravinski (1954) and a substantial number of studies for houses, requested by various clients, but never realized.

The designs of the Casa in collina and Casa sull'altura are among those of Mollino's ideal houses, the best documented and offer the chance to relate the drawings with authentic description.

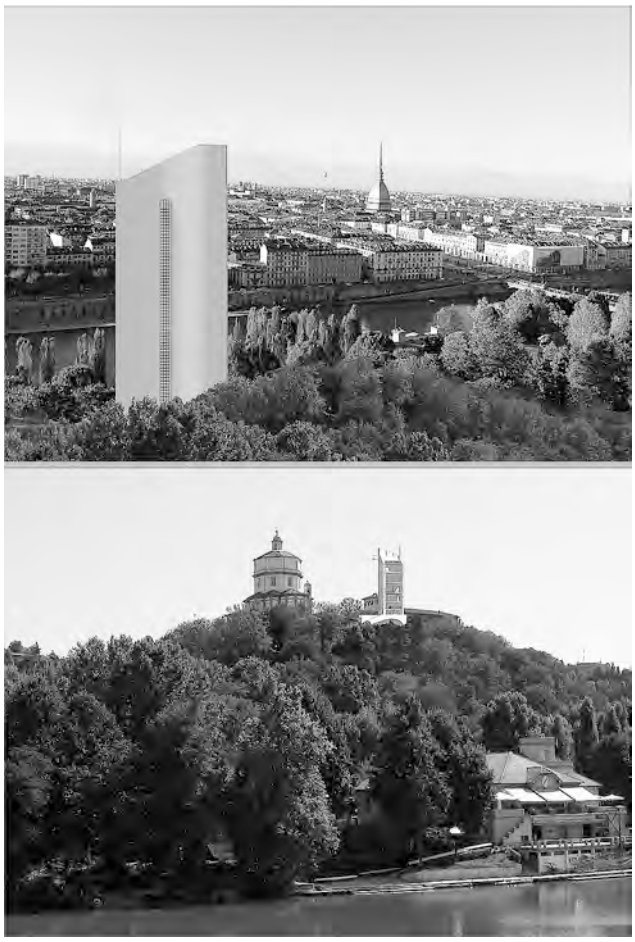

Fig. 10: Photo-montage of 3D digital model in the environment. From the master's thesis of Antonio Laudani.

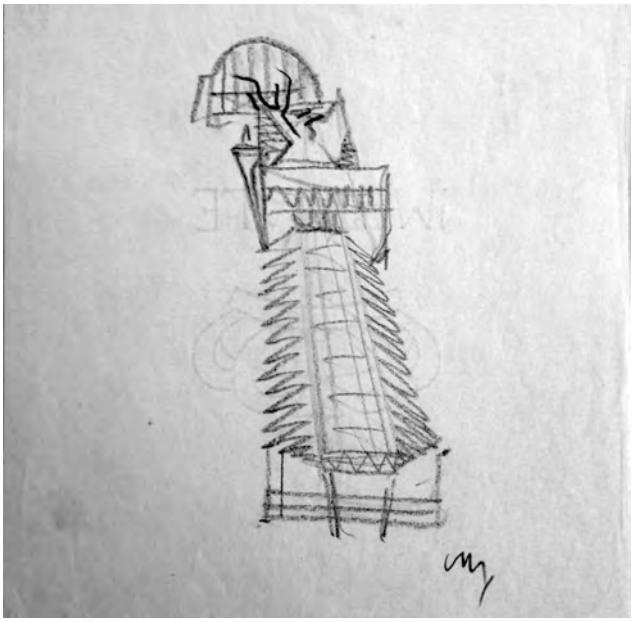

Fig. 11: Concept sketch of Casa sull'altura by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

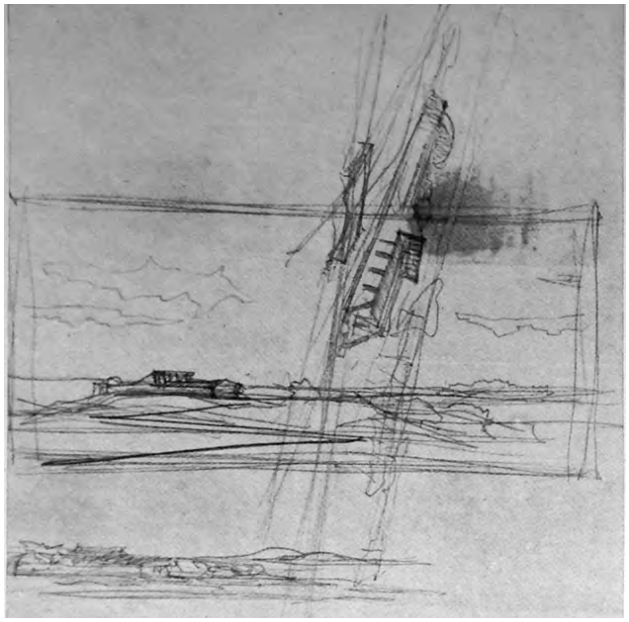

Fig. 13: Study for setting of Casa sull'altura by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

For these reasons were chosen as case studies to which apply the BIM three-dimensional reconstruction. From BIM models are drawn sections, built virtual paths and produced material models. The working set is part of the master thesis in Architecture of Antonio Laudani, under the guidance of me and Sergio Pace.

In February 1943, Mollino publishes on Domus the project of the Casa in collina "house for me on the hill" overlooking the city: a narrow eight-story tower with a room on each floor served by an elevator and a spiral service staircase, documented with seven plates and four perspectives, preceded by over eighty, between sketches and drawings, kept in the Mollino's Archives.

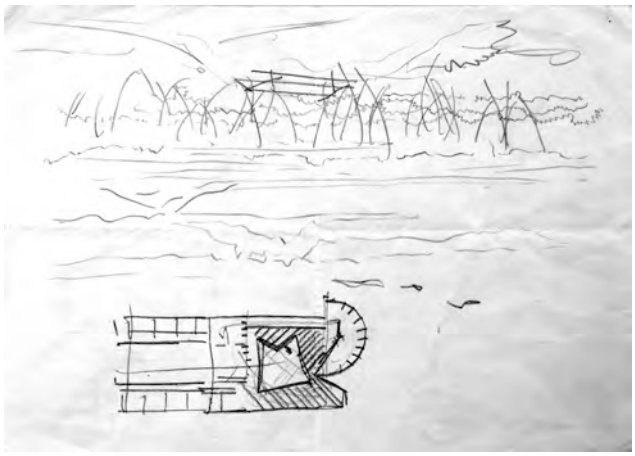

Fig. 12: Concept sketches of plan and elevation of Casa sull'altura by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

In the accompanying letter Mollino, who defines the building as 'house-trunk' characterized by a series of overlapping compartments, describes the motives and ideals that sustain the project, without affecting its constructability.

"Given my needs, it come off me the announced 'house-trunk', expensive, uncomfortable, in common parlance, narrow; live in the tower (not ivory) is a fact quite clear to us, at the end. [...] Well, I studied conscientiously and seriously a constructible house that I, tomorrow, being able, I would do making for me. For me, the house must have a character of closed, independent, but also temporary. [...] the only thing that has to worry me is placate in expression the obsession of these shapes that remain mysteries until you have finally closed as you want - and how you felt it was only right and inevitable. But I would not be misunderstood: premised the poetic reasons of this standing trunk, remains in me the belief that I haven't done an academic project - as it was easy to do -. In phase of realization this design will not go through variants - those variants that too much are seen in action between the purity of a smug graphic and the constructive need -. I always kept in mind that: architecture is already an

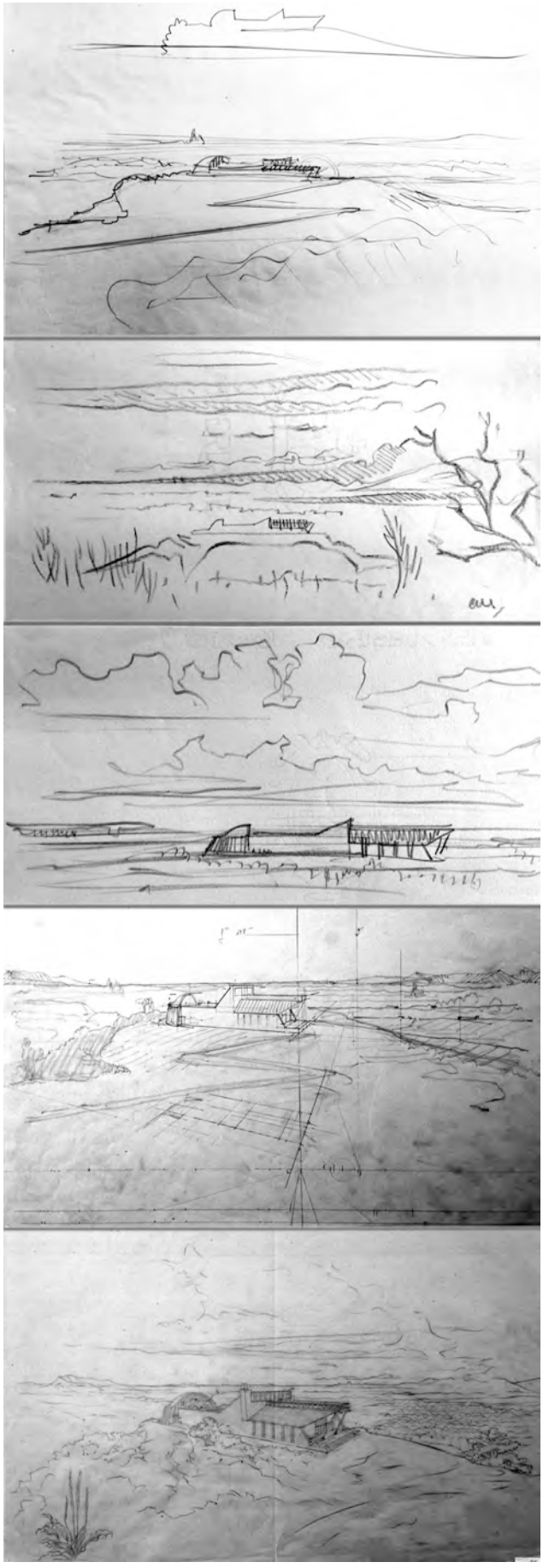

Fig. 14: Approach sequence to Casa sull'altura by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

indestructible reality in the graphics" (Mollino, 1943, pp. 51-53).

As the 'glass cabin' in the studio of Oberon, the house is especially an observatory on city, as documented by many perspective views from inside overlooking the city and its relative isolation doesn't compromise, indeed reinforces, its eminent urban nature. Each room acts like the lens of a telescope where it seems possible to recompose, in fragments, the internal spaces with the distant city but, as Mollino precises, the glass cabin on the top floor may be darkened and concealed since "we do not always want to have the city and the panorama at our feet" (Mollino, 1943, p. 54).

The compact tower building, which has three opaque façades and a transparent one (the one that faces on the city), offers a different and self-sufficient function in each of eight floors, with a disposition that goes upward from the services, down, to the functions typically residential, to the spaces for meditation, study, practice of the arts, including photography, one of the favorite activities from Mollino.

The spiral continuous stair, surrounded by a spiraling wall, allows what can be considered as a *promenade architecturale*. The movement, "an essential element of the Mollino's idea of living, intrinsic to his biography of speed's experimenter" (Irace, 2006, p. 82) can be effectively represented through the creation, starting from digital model, of a video which proposes paths and stop-image, also suggested by some of the internal perspectives drawn by Mollino.

The Disegno d'una casa sull'altura originates from a previous design by Mollino, for the engineer Stefano Caretta, in 1943. The site is uncertain: Mollino affirms in the letter to Gio Ponti, which accompanies the drawings for *Stile*, that he "have defined a little with those pen strokes" (Mollino, 1944, p. 2) in some bird's eye views and says that it is a modest remote house on a hill, designed for a very hot climate. Yet the inclusion of the building in the environment arouses in him great interest, as demonstrate the numerous sketches, which seem to define a sequence of progressive approach and formal definition of the house in relationship with the site.

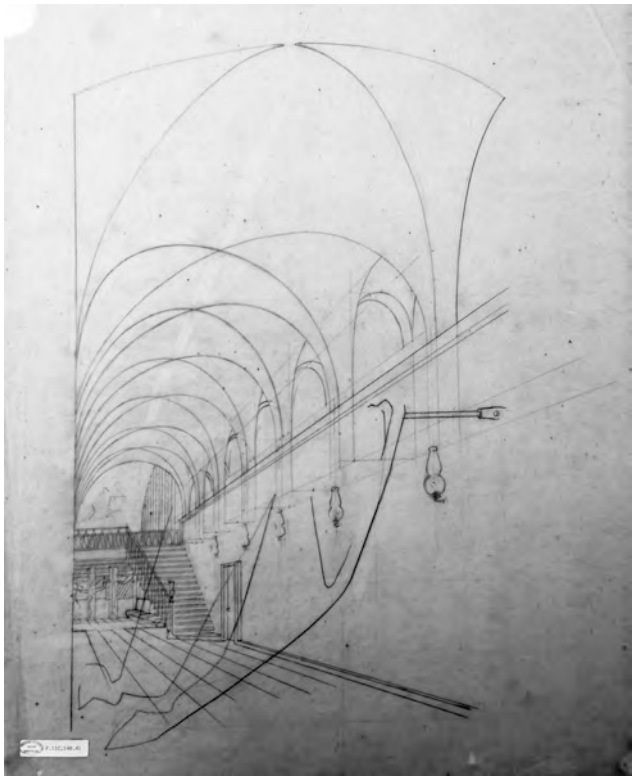

Fig. 15: Perspective view of the vaulted nave of basilican body by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

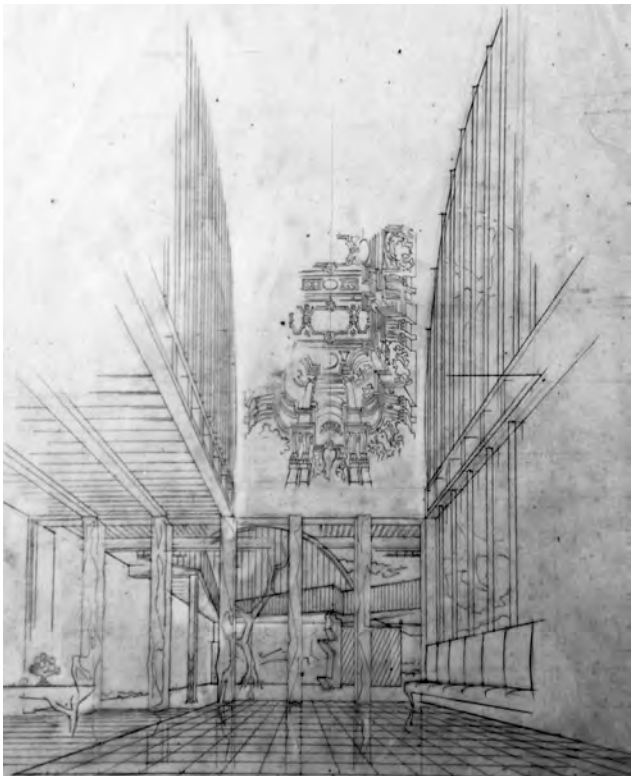

Fig. 16: Perspective view of the living room with the projected scenography by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

In the letter, Mollino, describing the setting of his design, refers to the landscape in the fragment of the Transfiguration (Gospel of Luke), which he comments in this way: "Think about that mountain, the silent ecstasy, which had to generate that grassy hilltop, between clouds. Maybe Peter thought, saying 'pavilion', precisely of those pavilions or tents of the Assyrian kings, with half-domes and courtyards, tie-rods, ropes, in other words almost houses. This 'house on the hilltop', which I sent you, was born a bit in this way: it's a proposal of pavilion in the landscape (see panoramic perspective). It's not necessary to say the site; I would have defined a little with those pen strokes. The house is a 'rigid tent', a pavilion and also other, beyond Assyrian's hunting tent, which I would try in vain to describe if I have not described, as I hope, making architecture. So here, among us, I let myself go to the paraphrase of what I would have already said, expressing myself through shapes. I would not add with words what is not said there. [...] Beside the work itself you cannot explain than using approximate analogies "(Mollino, 1944, p. 2)

Ponti, introducing the letter, presents it as a moment of Mollino's autobiography and

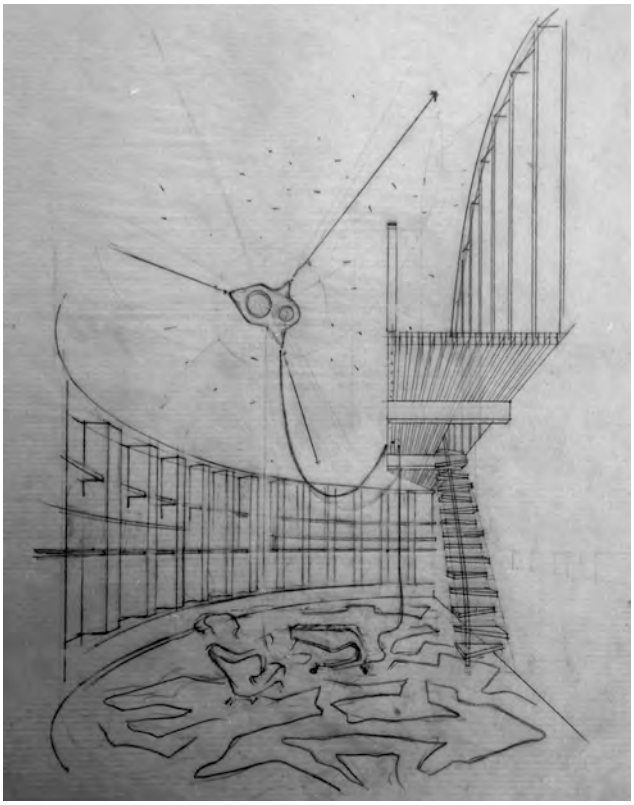

Fig. 17: Perspective view of the library by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

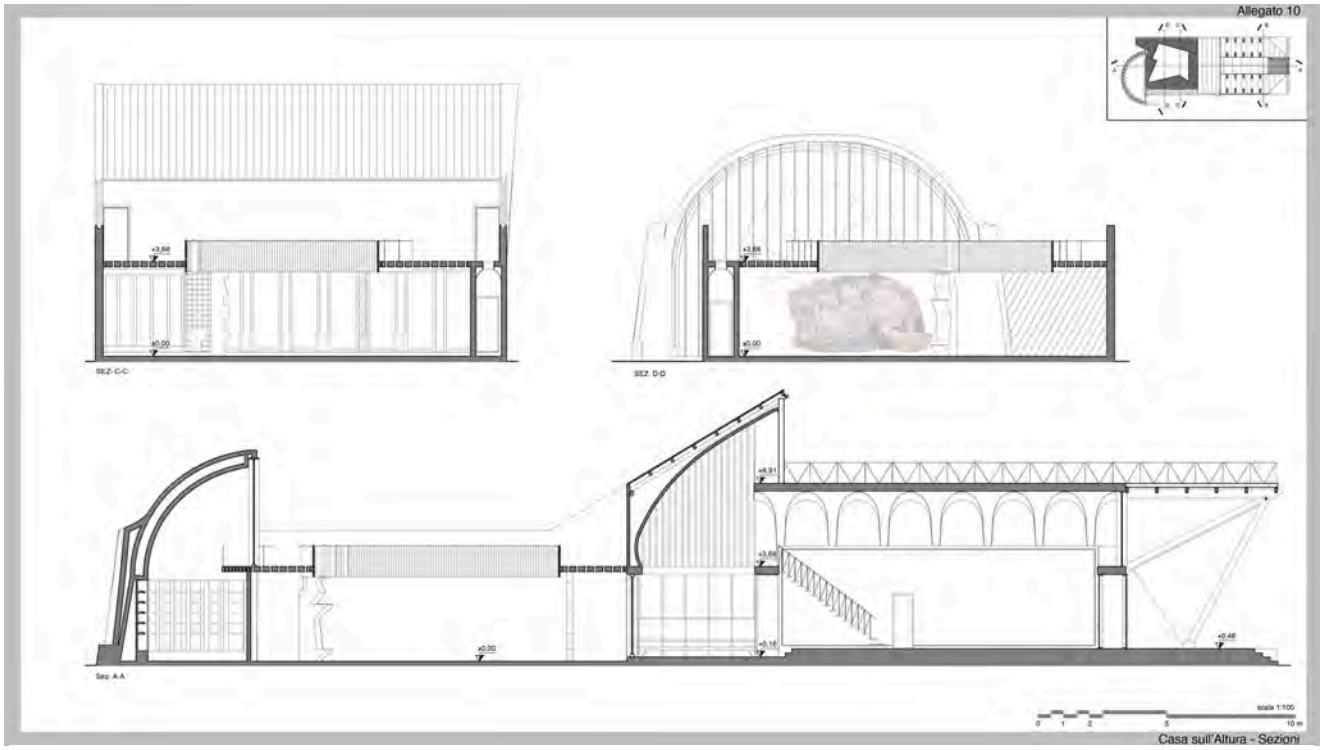

Fig. 18: Sections of BIM model. From the master's thesis of Antonio Laudani.

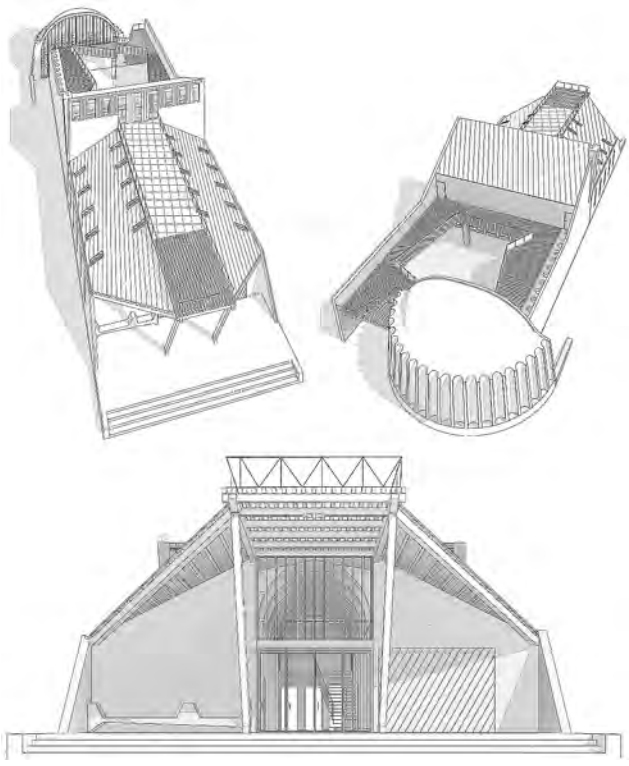

Fig. 19: Perspective views and elevation of BIM model. From the master's thesis of Antonio Laudani.

underlines the value of proof of a general existential condition that, among the disasters of war, proclaims the authenticity of the individuals and the possible veracity of art's experience (Irace, 2006, p. 88).

Describing the Casa sull'altura, Mollino states that the "plant's scheme is that classic of Mediterranean basin" (Mollino, 1944, p. 5), (a house with a courtyard like a cloister, with pillars of various shapes and willing asymmetrically), while "the section's scheme is that basilican" in reference to the main body, in which are placed the residential functions and service (Mollino, 1944, p. 5).

Beyond the courtyard, the house ends with an isolated hall, a sort of apse, the hall-music-library, with tall windows not to see out.

Great attention is devoted to the description of the structural system especially that vaulted of the basilican body, and the study of light in the interior. Again, digital simulation has been an important knowledge tool, allowing to rebuild new views and check the lighting effects inside the building. The ideated building establishes interesting relations with the decorative arts: an inlaid polychrome marble representing the battle of unicorns, designed by Italo Cremona and reproduced on *Stile*, decorates the wall of the

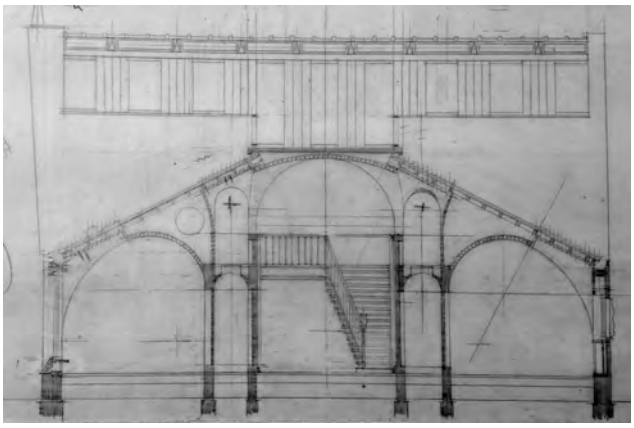

Fig. 20: Cross section of the basilican body by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

court, relating with a cut pillar coated by polychrome ceramic, while the living room is covered by a parabolic vault on which will be projected different decorations and illusory architectures. These elements have been inserted into the model by means of digital post-production.

4. *' Digital reconstruction of Mollino's houses: sources, methodologies, techniques and achievements.*

As said, the iconographic sources kept at the Mollino Archive, consist of hundreds of original drawings.

From the rich graphic documentations that Mollino preserved among the papers in his archive, it is clear the uniqueness of his design approach to the issues of composition, a rough tour de force between solutions and variances, between intuitions and second thoughts, between in-depth of details and constructive final choices, also for drawings destined to remain on paper.

The archival drawings range from study sketches to technical drawings of the whole, to final drawings until those details, drawn at true scale, to the ink drawings prepared for the magazines.

Concept sketches in axonometric or perspective projections are drawn with soft pencil on rice-paper and, occasionally, on scrap papers, with different pressure and sharp fluid lines. These are drawings that do not reveal second thoughts, made with undeniable self-confidence and graphic skill.

Often the thought develops on a single sheet ranging between technical drawings, perspective views, details, revealing a continuous feedback between two-dimensional drawings and spatial check, between conception of the whole and control of the detail. Some notes written on the same paper used for sketches, reveal the preparation of the accompanying letters. Several perspectives are used to realize bird-eye views of the exterior or human-eye of the interior.

Sometimes to the drawings of concept overlap almost dreamlike images, a portrait, rather than the paws of a running horse, deliberately traced into the presentation drawing for *Stile*, to conceal part of the tie rod in the foreground.

Technical drawings in scale 1:100, or 1:50, also coming from the project for Stefano Caretta, are mostly those preparatory to the publication on *Domus* and *Stile*. They are drawn in pencil on rice-paper first, and then traced by ink on tracing paper or paper-butter (a vegetable parchment used in butcher shops, defatted by alum), not dimensioned, but showing materials in the elevations and sections.

The drawings, in which every detail has been studied and solved with great attention to the choice and the relationship between the materials, and each of the many elements to be custom worked - stairs, handrails, railings, curved diaphragms - is analyzed in the possible formal alternatives, range in a process of continuous

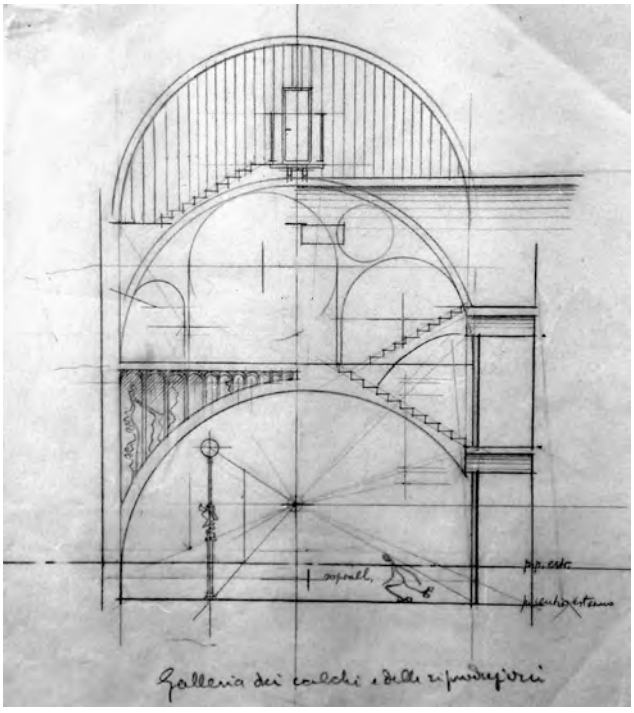

Fig. 21: Cross section of the art gallery by Mollino. (Archivi della Biblioteca Centrale di Architettura "Roberto Gabetti", Politecnico di Torino. Fondo Carlo Mollino)

feed-back between 1:50 and true. The digital reconstruction operations make use of the prerogatives of object-based parametric modeling, making it possible to avoid the preliminary drafting of two-dimensional drawings to be used as the basis for the application of blue-prints technique, dealing directly with three-dimensional modeling of the artifact.

This practice appears the most suitable to rebuild and bring to unity several project documents, remained at the stage of concept that, in the Mollino's drawings show a marked attention to two aspects of the design, investigated through isometric and perspective three-dimensional views: the inclusion in the environmental context and the study of interiors.

Similarly to what seems to happen in the design process of Mollino, orthographic views and sections of the digital model are generated only later. They are flanked by axonometric and perspective cut-away, which preserve, also with regard to the method of representation, the degree of abstraction, which triggers the processes of imagination and interpretation of spaces and shapes.

Then perspective views of the interior and exterior were set, even with the same projection centre of Mollino's prefigurations, aimed to assess the spatial and perceptual effects of the artifacts.

In addition, through some drawings of Mollino, which place the Casa in collina in relationship to the centre of Turin, it was possible to hypothesize its location, imagined by the architect on Monte dei Cappuccini, near the church transformed between 1623 and 1637 by Ascanio Vitozzi. The photo-montage in the photograph of the current environment highlights a shocking antagonistic relationship between the house and the seventeenth-century church for the conquest of the hill-top.

Of both models were made virtual tours conceptually visualized that allow you to understand the overall shapes and explore the interiors. During the paths, some stop-images present comparisons, overlaps and montages between the digital model and Mollino's drawings, in order to enrich the knowledge process.

Finally, a smontable material model of the Casa in collina was produced in scale 1: 100, made with a small 3D printer which extrudes fibres of polylactic acid, available in Computer labs of Politecnico di Torino.

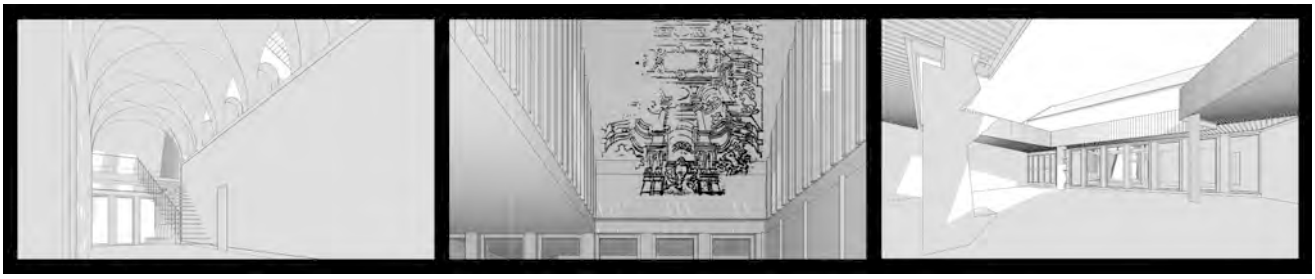

Fig. 22: Screen-shots from the video of Casa sull'altura. From the master's thesis of Antonio Laudani.

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