

Small Glimpses. Photography and the Representation of Architectural Models

Nicolò Sardo

Abstract

This contribution highlights how the photography of architectural models was an important tool for representing architecture, often leading to emblematic images of a project. This study also presents a revealing series of artistic experiences in which the architectural model becomes a primary subject of photography. While traditional photography of architectural models often looked for realism that could anticipate the constructed building, this task has, for years now, often been assigned to digital representation. The model is therefore represented photographically in a decidedly more abstract manner, allowing it to enunciate particular aspects of the project. It is interesting to note how still today, important architects are particularly interested in taking photographs of project models, developing important collaborations with photographers. In recent decades, photography and some of its trends have often caused problems for its relationship to reality: by manipulating images, some authors completely detach themselves from any material nature, even producing entirely synthetic images. Instead, through the use of models, one still operates on a material plane, but implements a true artificial reality, and what is real becomes rebuilt through scale models with different degrees of realism or abstraction, presenting a virtual reality expressly conceived by the authors.

Keywords: photography, architectural models, representation, art and architecture.

Introduction

The photography of scale models has played a key role in the history of architecture, contributing to the representation and spread of projects and architectural concepts. Over the years, this *medium* has evolved significantly, shifting from a simple tool for documentation to a true artistic form and means of communication capable of conditioning perception and the understanding of the architecture itself. When taking photographs of architectural models, two devices of representation intersect and overlap to present the observer with a *mise en scène* of different realities.

Architectural models continue to play a fundamental role in representing architecture and, through a common thread that ties them to what was established in

the Renaissance, they occasionally prove to be a tool used for previewing, communication, documentation, and assistance for the project. While “models are tools that allow us to explore the world” [Noë 2022, p. 178], photography as a “device for seeing” allows us to select the point of view, making the investigation more specific. The history of architectural model photography overlaps chronologically with the history of photography itself. Two examples worth mentioning are the daguerrotype by an unknown photographer probably dating to 1850 showing a front view of a residential building [1], and the photograph –dating to about 1855– by Ludwig Belitski of the cork model of the Roman arch of Septimius Severus made by Carl May [2].

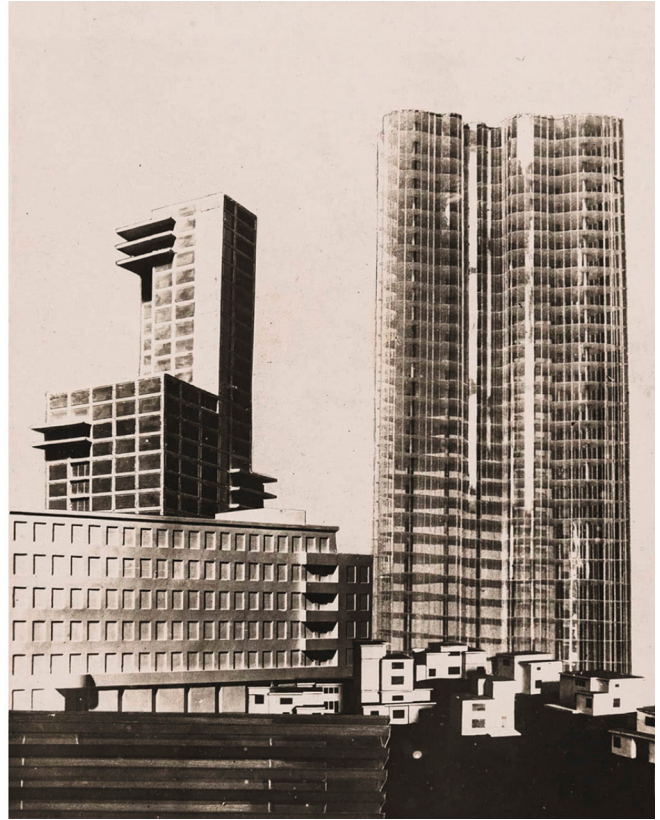
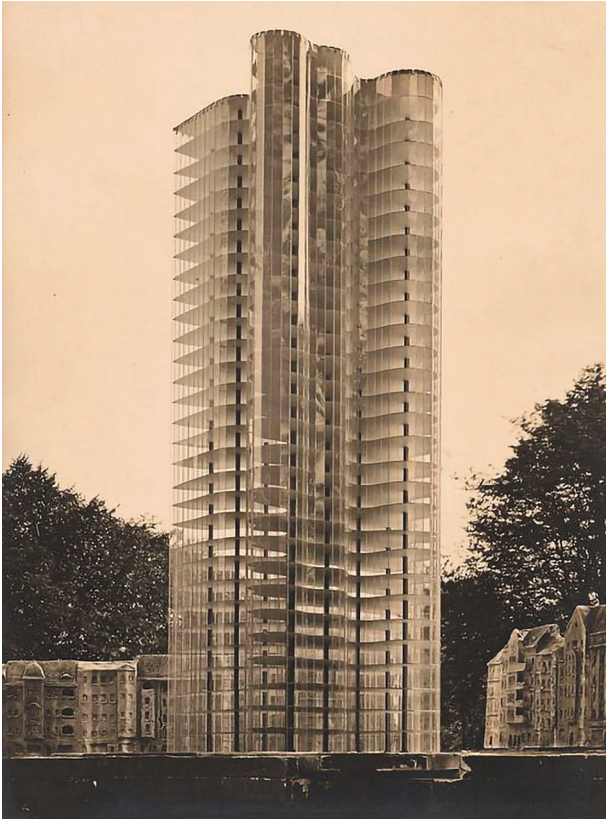


Fig. 1. a) L. Mies van der Rohe, Project model for the glass skyscraper, Berlin, 1922. Photograph by Curt Rehbein. <<https://www.design-is-fine.org/post/152911811844/ludwig-mies-van-der-rohe-glass-skyscraper-model>> (accessed 12 June 2024); b) L. Mies van der Rohe e W. Gropius, Models presented at the Bauhausausstellung held in Weimar in 1923, photomontage. <<https://drawingmatter.org/mies-van-der-rohe/>> (accessed 12 June 2024).

While traditional model photography often made skillful use of backgrounds, lighting, and a chosen point of view to look for realism that could anticipate the constructed building, this task has, for years now, often been assigned to digital representation. The model is therefore represented photographically in a decidedly more abstract manner, giving it the task of enunciating particular aspects of the project.

A photograph of a model often became the emblematic image of a project, especially if it was never realized, thus providing valuable historical evidence and contributing significantly to knowledge about the artistic avant-garde of the 1900s.

Some of the most interesting examples are the snapshots by Curt Rehbein of the model of the glass skyscraper (1922) designed by Ludwig Mies van der Rohe for Berlin (fig. 1a). The use of photomontage, in which images of the models are assembled in real contexts, was rather common for this German architect, who ultimately built a true 'city of models' together with Walter Gropius [3] (fig. 1b). Likewise important are the images from the series of *Arkhitekton* buildings that Kazimir Malevič developed in the 1920s.

In the most virtuous cases, the relationship between architect, model maker, and photographer lead to fundamental results for the development of the project, and these three spirits interact in a particularly fruitful way. An essential relationship also develops among the ways in which the model is photographed and graphical representations of the project.

A specific aspect of architectural model photography is its ability to spread knowledge about the specific products at a distance, as occurs more in general with constructed buildings. Likewise, the teaching aspects are of essential importance, and photography can also serve as a key tool for communication or to freeze the construction stage of a model.

The latter is a key element, traces of which are also found in some emblematic historical examples such as the images of the construction of the model for the constructivist tower dedicated to the Communist International designed by Vladimir Tatlin in 1920 [4] (fig. 2).

This aspect of photography as a means for spreading information about a model continues a tradition already present in centuries past, which was implemented through graphical depictions [see Sardo 2004, pp. 155-

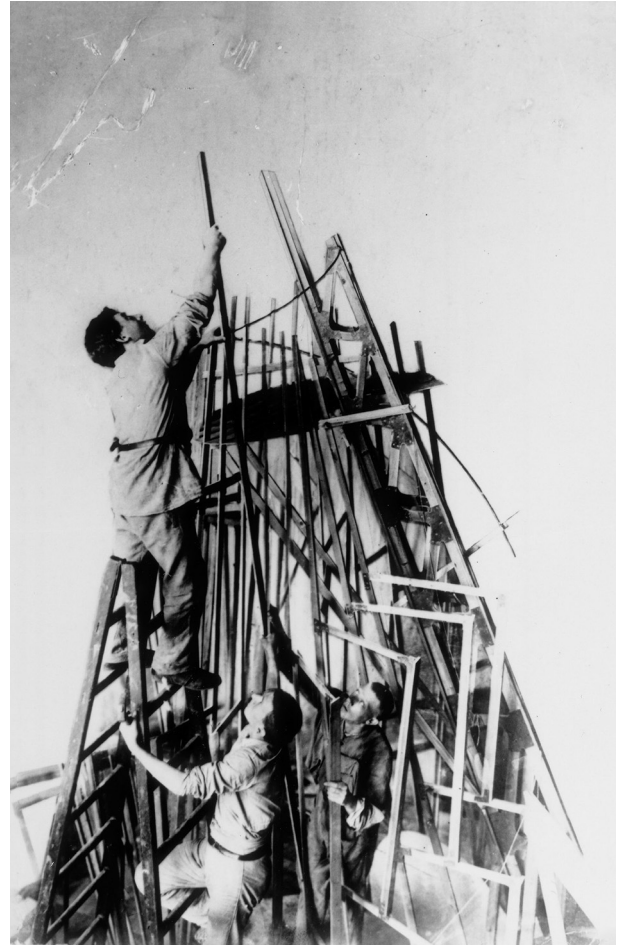


Fig. 2. V. Tatlin (with I. A. Meerzon and T. M. Shapiro) during the construction of the model for the Monument to the Third International, Petrograd (now St. Petersburg, Russia), 1920. <<https://www.cca.qc.ca/fr/recherche/details/collection/object/7584>> (accessed 12 June 2024).

161]. Models used as objects to represent architecture were key in the watercolor by Joseph Michael Gandy (1818), which shows some projects by John Soane in one area of the architect's home-studio.

As already mentioned, photographs of architectural models also played a decisive role in presenting and spreading modern architecture. Photographs of architectural models were used to promote new projects, through both specialized journals and shows and public exhibitions contributing to familiarization with new formal approaches. Attention for these aspects also led some great photographers to deal with architectural models: Julius Shulman, Ezra Stoller, and the Hendrich-Blessing studio are just a few important examples of this interest.

What occurred in recent decades is the transformation of this representation into a means of artistic expression where the model acquires special strength because it is no longer an 'occasional' object, but is specifically arranged by the artist/photographer as a founding subject of the image.

Narratives

The creation of a model assumes, above all else, direct observation with an important 'interactive' relationship on behalf of the observer. Mediation by the photograph imposes a 'filter': the choice of specific points of view –if not even particular visual effects– transforms the model, as seen below, into an artificial reality.

The selection of the gaze through the photograph becomes a way to encourage understanding of the model, guiding the observer to pay attention to some particular aspects. In addition, it is important to underline how the photograph deconstructs the usual relationship between the observer and scale reproduction of the object [5]. Distance is established between the spectator and model, creating a disconnect that questions the relationships that normally exist in direct observation. Despite the realism underlying the image, the photographs ensure that many elements typical of direct observation of the model are absent –or nevertheless altered.

To photograph the models, the arrangement of photographic sets has particular features similar to photography of other objects: particular attention is placed

on lighting [6] and background [7]. On the other hand, there are specific points of view that overcome the 'still life' tradition, instead simulating visions tied more to the tradition of architectural representation: bird's-eye and zenith views, simulation of 'axonometric views', even proposing realistic points of view using optical tools deriving from other disciplines [8]. Publications that address architectural photography also make room for photographs of models [9].

Photographs of architectural models was of fundamental importance in spreading the ideas developed by the avant-garde. At the Bauhaus, Lucia Moholy often depicted the results produced by students at the school. While materials play a key role in various exhibitions, the publishing industry regularly welcomes images of materials as an essential opportunity to present new architecture. On the other hand, we can clearly distinguish László Moholy-Nagy's interest in models in the ample room dedicated to them in his publications [see Moholy-Nagy 1929, 1947]. In the short film *Things to Come* (1936) Moholy-Nagy also used models made of different materials, showing them dynamically through interactions with lighting effects and overlaps.

The use of model photographs in publishing, even with a teaching scope, is evident in the images of 'interior spaces' published by Luigi Moretti to accompany an important essay of his [si veda Moretti 1952-1953].

Photographs of models may help in defining the architectural project itself.

After moving to the United States, Mies van der Rohe used models as a vital tool to develop his his projects and he considered photographs of the models –taken by the Hendrich-Blessing studio– to be fundamental. Ideas for modifications to the project itself often arose precisely from the images [10].

Another great figure in modern architecture that assigned great value to conveying his projects through photographs of models was certainly Le Corbusier. Just think of the volumes in his *Œuvre complète* or his many publications, which the Swiss architect always saw to in the finest detail [11]. Lucien Hervé, the photographer whom Le Corbusier developed an important collaboration with starting in the 1950s and lasting to his death, often photographed models of his most important works from that period [12] (fig. 3).

Even authors that reconsidered the principles of modern architecture and developed a utopian vision of the

city between the late 1950s and early 1970s made intense use of models and their communication through photographs with the goal of clearly conveying unusual project ideas [13].

For Peter Eisenman, photography allowed him to select the 'correct' view for observing the 'axonometric' model of House X, made specifically through deformation, leading to the isometric projection: "Usually a photograph of a building is a narrative record of a fact – a representation of reality. Here the photograph is the reality of the model because it is the view which reveals its conceptual essence as an axonometric drawing. But while the conceptual essence of the model is a drawing, that of the photograph is not. For it is not a photograph of a drawing but of a model... Yet the black and white photograph depicted in this catalogue and the drawing are one and the same. Here the circle is closed, and the true reality of the house remains suspended. The model serves as the final heuristic approximation, the last act of what I call a process of decomposition. The model exists as one reality and simultaneously another" [Eisenman, in Frampton, Kolbowski 1981, pp. 82, 83].

Enric Miralles used photography to analyse the model for the project of the Pabellón de meditación in Unazuki (1991), and, playing with light and projected shadows, he followed a procedure that seemed to derive from historical avant-garde experimentation [see Esquinas Dessy, Zaragoza de Pedro 2016, p. 118].

It is interesting to note how still today, important architects are particularly interested in taking photographs of project models. One particular instance is the collaboration between Thomas Ruff and the architects Herzog & de Meuron. In addition to depicting the completed works, the German photographer is also interested in models made by the Swiss firm [see Riley 1991].

In the collaboration between German photographer Thomas Demand and the British architectural firm Caruso St John, the project The Triple Folly (2022) is particularly emblematic. Here, the photographer starts with an 'extemporaneous model' and suggests the shape of the pavilion built in Ebeltoft in Denmark [14].

Simulations

Through photography, the scaled relationship between the object and observer is thrown into crisis:

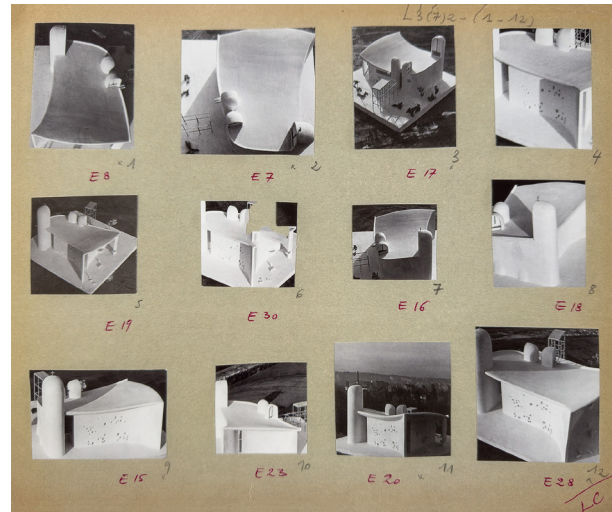


Fig. 3. L. Hervé, Study model for the church in Ronchamp, contact sheets, 1950. From: Sbriglio 2011, p. 89.

the 'distance' and point of view of the snapshot simulate a possible reality.

The model is conditioned by the photographic requirements. "Paraphrasing Walter Benjamin, we could say that to an ever greater degree the architectural model reproduced became the architectural model designed for reproducibility" [Deriu 2012, p. 175].

The use of models for experimentation, especially with respect to structural tests to analyse deformations, was often used in the past by important structural engineers in the 1900s [15]. Even in this respect, the use of photography as a means to 'record' the results seems advantageous. But the use of photographic documentation by Franz Max Osswald (fig. 5), a Swiss engineer, seems even more original. In the acoustics laboratory at ETH Zürich in the 1930s, he experimented with the use of photographic snapshots to analyse acoustic models [16].

Before the development of digital visualization systems, one of the objectives of models was to create a vision that could in some way anticipate real points of view of the future building. Even the large wooden model for St Peter's by Antonio da Sangallo was made and

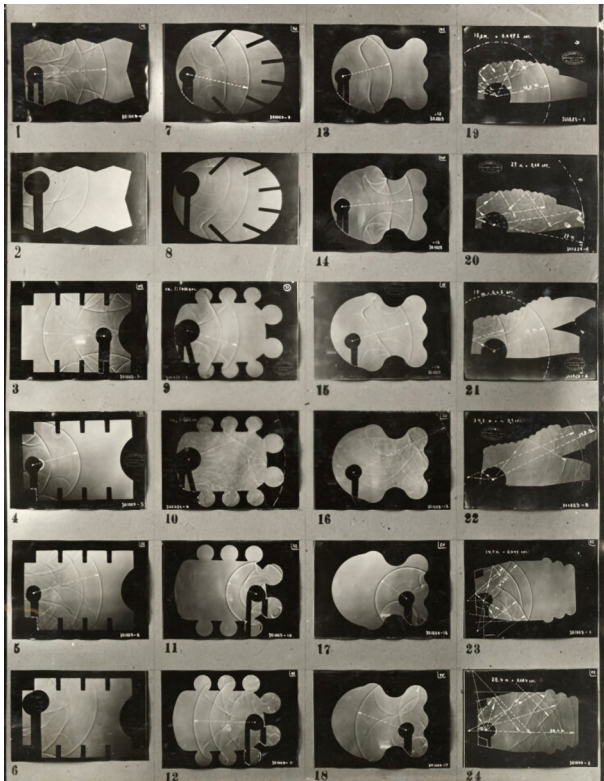


Fig. 4. F. Max Osswald, *Photographic studies of sound propagation in different rooms using models*, 1930. ETH-Bibliothek Zürich. <<https://soundandscience.net/collections/max-osswald-photographs/>> (accessed 12 June 2024).

arranged to create a realistic view of the interior of the basilica. Precisely to meet this need, models are often photographed to obtain previews that anticipate the reality of the completed building. For this purpose particular tools were developed, such as the 'upside down periscope' used by Gaston Bardet for the 1937 Exposition in Paris or the *maquettoscope*, developed by the architect Robert Auzelle in the 1950s [Pacot 2020, pp. 60-61]. The *relatoscope*, originally designed for medical purposes, was adapted by the German architect Martin Schulz Van Treeck in the late 1970s to take photographs of models [17].

If the end goal is a vision that simulates reality, the use of mirrors is not uncommon. In the model for *Supersuperficie* (1972) by Superstudio, the limited space of the reproduction is expanded visually through reflection. Marcel Lods, on the other hand, integrated three mirrors into one of his models to simulate the insertion of the project in the real setting [see Pacot 2020, p. 62].

Close-up views of the model simulating real points of view were also used in the photographs accompanying the project by Bernard Tschumi for the competition for the National Library of France (1989), where the rather detailed and structurally accurate model was shown as a preview of the finished building.

Model and architect

An interesting photographic tradition also regards models photographed together with the project authors: Frank Lloyd Wright, Mies van der Rohe, and Le Corbusier are just some architects that were photographed together with models of their works.

Undoubtedly, the image of an architect posing next to a model of a building he or she designed is a common theme. Portraits of the architects are made with models of their projects rather than with the real buildings, following a practice that is deeply rooted in the iconographic tradition of donating the models.

The choice of the model is motivated not only by its greater visual strength compared to a drawing, but also compared to the building itself: the reduced size situates the product in a position of full control and authority. Models reflect the architects' design activity in their studies and during construction; however, architects are often presented with gestures that go beyond simple exhibition, assuming a role that is nearly paternal (or maternal) with respect to the work itself [18].

In addition to the more common images of architects 'posing' –as with the photographs of Mies van der Rohe taken by Irving Penn (fig. 6)– one particularly fascinating thread is stories showing the designers working on their models –as in the series with Eero Saarinen and the large model for the TWA Terminal (fig. 7)– or even in the action of photographing a model as in the series that shows Charles and Ray Eames studying the set-up for an exhibition (fig. 8).

The Hand of God

A topos present in architectural model photography is the *mise en scène* of the hands, symbolic evidence of the architect as a 'creator'. The hands point, support, and sometimes work, changing the shape of the model itself.

In one of the photographs of the model for the Unité d'habitation in Marseilles, the principle of the organism as a *casier à bouteilles* (bottle holder) is shown through the image of a hand inserting a small housing unit within the structure (fig. 9).

In the documentary *L'architecture d'aujourd'hui* (1930) by Pierre Chenal [19], –from which some well-known photos were taken– Le Corbusier's hands work and move over the model of the Plan Voisin for Paris (fig. 10).

In recent years, photographs of models by MVRDV [20] or Herzog & De Meuron [21] often show the hands working on the models.

Alberto Campo Baeza turns this iconography into an original design idea, suggesting –both to his students, but also to himself– to “build a model so small that it fits in the palm of your hand” [Campo Baeza 2013].

Other realities

In recent decades, photography and some of its trends have frequently caused problems for its relationship to reality: by manipulating images, some authors completely detach themselves from any material nature, even producing entirely synthetic images.

Instead, through the use of models, one still operates on a material plane, but implements a true artificial reality, and what is real becomes rebuilt through 'simulacra': actual scale models with different degrees of realism or abstraction, presenting a virtual reality expressly conceived by the authors. In these results, however, the model is no longer presented as a preview of a possible future reality, but is itself manifest as 'reality'. In this process, the evidentiary value of the image is not questioned [22], but it is the subject itself –abandoning its traditional worth as documentation– that questions the conventions of what was traditionally covered by photography. 'The photograph abandons its traditional documentary value as a tool used to capture the decisive moment, and introduces doubt about what one is seeing and naively accepts as being real' [Pemjean 2014,



Fig. 5. I. Penn, *Portrait of Ludwig Mies van der Rohe (with Philip Johnson in the background) with the model for the Seagram Building, New York, 1955.* <<https://www.cca.qc.ca/en/search/details/collection/object/11189>> (accessed 12 June 2024).

p. 35]. Thus, it is the 'original' that is redefined, and the model takes centre stage. 'The false truth of the copy forms a simulacrum that simulates the being itself, even replacing it (in the case of illusionism)' [Wunenburger 1999, p. 139]. The model, the replica, becomes the main feature: "Today abstraction is no longer that of the map, of the double, of the mirror or of the concept. Simulation is no longer that of a territory, of a referential being, of a substance. It is the generation by models of a real without origin or reality: the hyperreal" [Baudrillard 1981, p. 10] [23].

One of the most important authors working along these lines is undoubtedly Thomas Demand. The German photographer uses paper and cardboard to create actual 'scenes' rich in detail, often drawing inspiration from real places and environments related to specific historical events (fig. 11a). His nearly obsessive reconstructions tend to simulate and deceive. His images



Fig. 6. B. Korab, Eero Saarinen and the model for the TWA Terminal, 1955 ca. <<https://www.hermanmiller.com/stories/why-magazine/myth-maker/>> (accessed 12 June 2024).

thus become a critique of the photographic representation of reality. What is depicted is just a simulation; and the models, after being rigorously photographed, are destroyed, further marking their creation solely for the purposes of taking pictures [see Bonami, Durand, Quintin 2000; Demand 2011].

James Casebere also addresses the particular realism of models, making characteristic use of colours while also embedding precise clues as to the 'scale'. The presence of water, which further increases the sense of disorientation in his depictions is also unique (fig. 11b). The activities of this American photographer began in the 1970s when he made cardboard models of domestic scenes that he shot in black and white. In the following years, his conceptual approach grew clearer and the reconstructed scenes become more complex: light became a fundamental element and highlighted greater realism, which was also combined with the use of mixed materials. Between 1998 and 2003, he began to photograph models depicting 'flooded' environments. He then began to concentrate on reconstructions of peripheral urban contexts, with images taken from an aerial point of view [see Casebere 2016; Enwezor 2011].

The work by Emilio Pemjean is also particularly original. The Spanish artist and architect identifies spaces extracted from uncompleted (or no longer existent) paintings or architectural works and makes laconic models of them (fig. 12). These simulacra also show

undefined or hidden aspects of the original works. The neutrality and conciseness of the surfaces of the models guides a perception of the essence of the spaces being represented. Even light, as a vital element of his structures, becomes a device used to characterize the environments reproduced in his models. In addition to taking snapshots, he also often makes videos that show how the spaces change as the lighting changes, thereby creating a true visual experience for the observer [24]. His project *Palimpsesto* "in a transmutation of languages ranging from architecture to painting to sculpture to photography [...] is a path through architectural works that no longer exist –destroyed or radically transformed– but which are still a point of reference and collective legend, perfectly identifiable due to some masterpiece paintings". These works are reconstructed in the form of models, even "completing and reinterpreting the spaces partly hidden by objects that the painter used for the scene" [Pemjean 2014, p. 34].

Oliver Boberg questions the act of representing reality through photography, building realistic models of common buildings and public spaces in a hypothetical urban periphery. The careful lighting helps to further increase the visual deception that makes the observer believe that they are actual buildings. The anonymity of the constructions evoked by Boberg's models somehow makes the simulation even more credible, which in the photograph tends conceptually towards 'objectivity'

borrowed from the results of Bernd and Hilla Becher [see Berg, Engler 2004].

In addition to the experiences examined here, in relevant series of experiences shows how models are configured as vital subjects of photography.

In 1973, the American photographer Duane Michals presented *Things are Queer*. In it, he uses a series of nine photographs and a space of the miniature house to move the observer through contradictory representations underlined by continuous jumps in scale [Michals 2023].

Luigi Ghirri often turned his gaze to 'reduced' realities. One important project from this point of view is the one dedicated to the park *Italia in Miniatura*, located near Rimini. The scale reproduction of the Italian landscape and monuments served as an opportunity for Ghirri to once again critically question the relationship between vision and reality in the work allusively entitled *In scala* [25].

One of the most interesting recent examples was developed by Lori Nix. The American photographer arranges models that underline extreme realism, which is also characterized by the rich details. The dioramas she creates and the photographs of them represent special situations of completed constructions, presenting an apocalyptic vision where the buildings are shown as abandoned ruins in which nature seems to want to take over the spaces [see Nix 2013].

With regard to experiences in art, one could mention results such as those by the photographer David LaChapelle, who, between 2012 and 2014 developed two projects –*Gas Stations* and *Refineries*– containing pictures of specifically made models of petrol stations and refineries. The models appear particularly realistic and are always photographed in their natural environments [see LaChapelle 2013].

In Italy, two important artists/photographers use specifically made models for their projects, although starting with different assumptions and goals: Paolo Ventura and Silvia Camporesi. Ventura's models serve as an essential background for his 'sets' in which he himself is the protagonist, playing different characters. Thus he creates particularly fascinating scenes with reconstructions that evoke cities such as Milan, Rome, and Venice [see Guadagnini 2020].

Camporesi has also often used models in her projects to reconstruct scenes that are then photographed, simulating apparently real situations. In *Le città del pensiero*



Fig. 7. C. and R. Eames with the study model for the exhibition *Mathematica: A World of Numbers... and Beyond*, California Museum of Science and Industry in Los Angeles, 1960. < <https://westernartandarchitecture.com/april-may-2019/the-eames-legacy/> (accessed 12 June 2024).

(2015), she made models to recreate urban glimpses of some metaphysical paintings by De Chirico and then took pictures of them [26]. In *Il paese sommerso* (2019), she rebuilt the abandoned village Fabbriche di Careggine in 1:20 scale. Since 1941 the town has lain within a dam, and she photographed it immersed in a basin of water, simulating real underground photos.

It seems clear how this trend has developed, particularly in recent years, and artists/photographers have increasingly and meticulously designed and built models as real three-dimensional sculptures with the purpose of taking two-dimensional photographs [27].

It is also unique how other artists simulate them precisely to maintain an ambiguity that evokes images of the models. In addition to building some models, Gordon Matta-Clark presents photomontages of real spaces presented as models.

Olivio Barbieri instead overturns this idea: it is no longer a *mise en scène* in which the model is used to

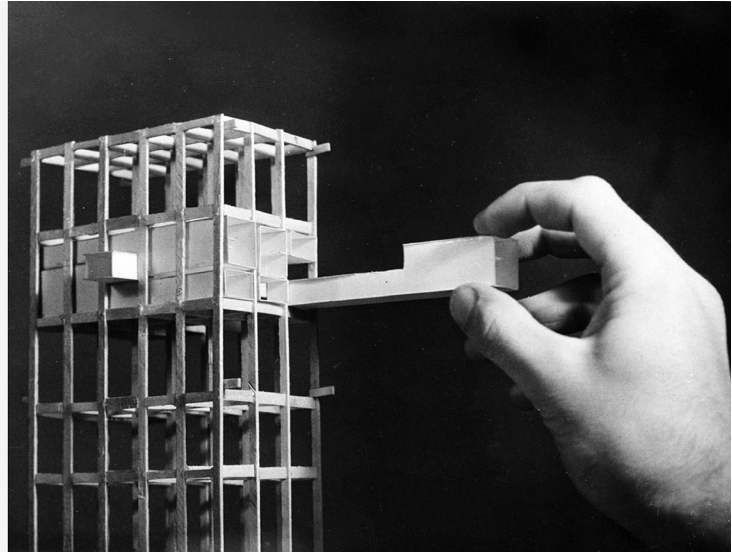


Fig. 8. N. Leen, Le Corbusier with the study model for the Unité d'Habitation in Marseille, 1946. <https://monoskop.org/Le_Corbusier>; <<https://www.mandua.com.py/estudio-sobre-le-corbusier-eleva-a-la-maqueta-arquitectonica-a-arte-plastico-n352>> (accessed 12 June 2024).

simulate an artificial 'reality', but reality that is exhibited as a 'model'. By selectively defocusing the image by tilting the objective lens of the camera, the aerial views of the city lead to disorienting images that show apparent artificial urban constructions [see Tognon 2001, pp. 182-187].

Conclusion

The photography of scale models has played a crucial role in the history of architecture, contributing to the representation and spread of architectural projects and concepts.

The importance of this specific form of representation remains fundamental, even in the digital era, continuing to play an essential role in promoting and spreading contemporary architecture.

Over the years, this medium has evolved significantly, shifting from a tool for documentation to an independent artistic form and means of communication capable of influencing perception and the understanding

Fig. 9. Le Corbusier illustrates the project for the Plan Voisin. Photograph from the documentary *L'architecture d'aujourd'hui*, directed by P. Chenal, France 1930.





Fig. 10. a) T. Demand, Diving Board (Sprungturm), 1994. <<https://artblart.com/tag/thomas-demand-brennerautobahn/>> (accessed 12 June 2024); b) James Casebere, Pink Staircase #2, 2000. <<https://www.jamescasebere.com/>> (accessed 12 June 2024).

Fig. 11. E. Pemjean, *Palimpsesto I*, 2013. The model reconstructs Diego Velázquez's studio; the view is the same as in the painting *Las Meninas*, 1656 ca. <<https://www.emiliopemjean.com/projects/Palimpsesto>> (accessed 12 June 2024).



Notes

[1] The daguerrotype is stored at the Canadian Centre for Architecture, Montreal. See <https://www.cca.qc.ca/fr/recherche/details/collection/object/6896> (accessed 14 February 2024). For more on the topic of model photography see also: Bergera 2016; Higgott-Wrany 2012; Moon 2005; Pacot 2020; Sachsse 2012; Stierli 2018; Wagner-Kajewski 2020.

[2] The image –salt print on glass with wet collodion– is part of the collection of Istitut Minutoli Liegnitz (now Legnica, Poland); see Sachsse 2012, p. 23.

[3] The photomontage was presented at the Internationalen Bauhaus Ausstellung in Weimar in 1923. Gropius's model for the Chicago Tribune competition can be seen; see Beitin, Eiermann, Franzen 2017, pp. 92-95.

[4] See Quilici, V. (1991). *Il Costruttivismo*. Roma-Bari: Laterza, pp. 91-99. See also the reconstruction of the tower in the place where it should have risen in Petrograd (today's Saint Petersburg) in the brief video made by the Japanese Takehiko Nagakura, instructor and researcher at MIT.

of the architecture itself. Photographs of architectural models continue to be essential today, serving as a tool for previewing, communication, and documentation, while shifting towards a more abstract representation, increasingly entrusting digital representation with the capacity to anticipate the completed building. The interaction between these two devices generates new and original visual codes. This analysis highlighted how model and photograph, in their increasingly particular relationship, provide a narrative that is always special from the point of view of representation and description of the architectural space.

The hands of architects, artists, and photographers come together in a creative process that goes beyond mere documentation, giving rise to simulacra that challenge conventions and redefine reality itself. This artistic approach to photographing models presents a new perspective of architecture, creating images that go beyond mere representation to explore complex concepts and narratives. In addition, photographs of architectural models continue to be fundamental for spreading modern architecture, providing historical evidence and promoting new formal approaches. Finally, the artificiality of the model thus becomes an expedient that allows the photographer's creativity to maintain a strong relationship with the material reality without limiting it.

[5] For more information on this aspect, see Deriu 2021.

[6] The lighting, which can be natural or artificial, can be augmented by the use of reflecting panels.

[7] The backgrounds may be neutral or present photographs of real settings. But the models are commonly photographed outdoors.

[8] On the use of endoscopes, see below.

[9] For the most significant cases, see Shulman 2000, pp. 84-87.

[10] For more information, see Çoker Bilici 2020, pp. 79-85.

[11] Among the most emblematic photographs of Le Corbusier's models closely tied visually to the project are certainly the ones of the 'Citrohan' house (1922), Plan Voisin for Paris (1925), Centrosoyuz (1929), Soviet Palace in Moscow (1931), and the plan for Algiers (1930). See also Cova Morillo Velarde 2019.

[12] On the relationship between Hervé and Le Corbusier, see Sbriglio, J. (2011). *Le Corbusier & Lucien Hervé. The Architect & the Photographer: a Dialogue*. London: Thames & Hudson. The photographic reports focusing on models that can be seen in the books include: Notre-Dame du Haut (1950) p. 89, Secretariat in Chandigarh (1952) p. 169, Palace of Assembly in Chandigarh (1955) p. 189, and La Tourette (1953) p. 247.

[13] On models of this type, see Sardo 2021.

[14] For more information, see Demand, Caruso St John 2023. On the use of model photography within the studio see Engel 2013.

[15] The most important include Richard Buckminster Fuller, Frei Otto, Robert Le Ricolais, Eduardo Torroja, David Georges Emmerich, and Felix Candela; see Sardo 2004, pp. 175-179, Fabricius 2017.

[16] For more information, see von Fischer 2017.

[17] See Cornot, J. (2019). *Martin Schulz van Treeck (1928-1999). Architecture espace ou objet?* Paris: ENSAPB, pp. 39-63. In the early 1960s, the London-based company Optec marketed the *ModelScope*, an optical device with 18 miniature lenses, a sort of periscope that afforded a realistic vision of the interior of the models and used an adaptor to allow for photography. See also Deriu 2021, p. 100 and Pacot 2020, p. 62.

[18] For information on the iconography, see Frémy 2002 and Sardo 2014, pp. 185-187.

[19] The scenery of the documentary (about 18 minutes long) is by Chenal and Le Corbusier. The tests are by Le Corbusier himself and music (now lost) composed by his brother Albert Jeanneret was originally added to the film.

[20] Among others, see the studio models for the Leidschenveen Town Center (1997).

[21] One of the models for the De Young Memorial Museum (1999) is particularly interesting.

[22] This refers to Roland Barthes's concept "that the thing was there": see Barthes 2003 p. 78.

[23] «Aujourd'hui l'abstraction n'est plus celle de la carte, du double, du miroir ou du concept. La simulation n'est plus celle d'un territoire, d'un être référentiel, d'une substance. Elle est la génération par les modèles d'un réel sans origine ni réalité: hyperréel» (English translation by the author).

[24] See Pemjean 2014; 2016. See also the artist's website: <<https://www.emiliopemjean.com/>> (accessed 12 June 2024).

[25] Ghirri would photograph the park multiple times between the late 1970s and mid-1980s. An initial series of images was presented for the photography project *In scala* (1977-1978). The photographs dedicated to *Italia in Miniatura* were the subject of a recent exhibition held in Reggio Emilia in 2022 and 2023, entitled *In scala diversa*. Luigi Ghirri, *Italia in Miniatura e nuove prospettive*.

[26] See Camporesi 2018, pp. 82-85. In the 2011 project *La terza Venezia*, Camporesi mixes snapshots of the actual Venice with those taken of the scale reproduction at *Italia in Miniatura* in Rimini; see Camporesi 2018, pp. 56-61.

[27] Other artists following this trend include the Swiss Bernard Voïta and Dutchman Edwin Zwakman. See Zwakman 2008.

Author

Nicolò Sardo, Scuola di Ateneo Architettura e Design, Università degli Studi di Camerino, nicolo.sardo@unicam.it

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