Model Materials: Uses and Materials in the Construction of Scale Models

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Abstract

Scale models have been an integral part of architectural activity from its origins and continue to be so today, despite significant advancements in digital graphics. There are several reasons for the enduring presence of these small architectural objects, which have adapted to various conditions of creation and different historical moments.
Despite the rapid advancements in infographic media and even virtual reality related to architecture, the model remains an object of interest in major architectural offices around the world. Thus, models continue to captivate the public with their unique magic and characteristics in architecture exhibitions, whether related to contemporary architects [1] or ancient ones [2].
The intention now is to consider the factor of the material with which they are built, a crucial issue from various aspects inherent to the model: the scale relationship, the reference to the real or projected object, the artisanal relationship with other trades, the presumed formal or sculptural autonomy, and ultimately, the very spirit of the times or Zeitgeist in which each model is framed.

Keywords: architectural model, scale model, celoplasty, model materials.

Introduction

At the end of the astonishing neorealist film about the tumultuous life of Michelangelo Buonarroti [3], a disquieting scene is presented in which the brilliant artist walks among cypress trees as he flees from Florence to Rome seeking the protection of Pope Leo X, who had summoned him to lead the construction of Saint Peter's Basilica. For all his luggage, Michelangelo carries in his hands a wooden model of his centralized design for the great basilica of Christendom (fig. 1). A wooden model [4] that is certainly not comfortable to carry during a long journey on foot.
Is it possible to claim that the wooden model became the essential element of his project? What interactions did the model present, as a substitute for the architecture itself, compared to convenient and unequivocal paper plans?

In some previous research, we have highlighted various issues about these small architectural objects, especially their capacity for adaptation and transformation to survive as an effective method of support for the architectural project in its multiple facets [Carazo 2011], including naturally the learning and teaching of architecture itself [Carazo, Galván 2014; Campo Baeza 2013]. We have also explained how their inherent playful component [Carazo 2018b] has, in many cases, prevented them from receiving due attention in the theory and historiography of both ancient and modern architecture, having finally attracted the interest of some specialized publications in the final decades of the 20th century and up to the present [Carazo 2018a].

The consideration of their material quality now leads us from the idea of the model as a true built essay of the future building to the well-known mechanical tests of the inverted catenaries by Antonio Gaudí. But it will also allow us to recognize the wooden models of the sculptural tradition of the Renaissance [Millon, Lampugnani 1994], or the models of Le Corbusier for the church of Notre Dame du Haut in Ronchamp, related respectively to the representation of form and space, having for this a plaster model and another of wire and paper –in the manner of model aircraft– and which we know through the photographs taken by Lucien Hervé [5] (fig. 2).
From a historical perspective, models have accompanied architecture since immemorial time, with well-known models found in Egyptian tombs, not always considered architectural objects but rather understood as mere symbolic elements. However, for an object to become a symbol, it must first have been of everyday use, then become a paradigm and be sacralised [Gentil Baldrich 1998, pp. 15, 16]. But from the point of view of architectural theory, these curious architectural objects have never been given the importance they deserve, although since the last decades of the 20th century, more rigorous studies on the matter have intensified [Mindrup 2019].
Addressing them from their multiple facets, one by one, can help gradually frame the problem and ultimately establish their true relevance in the history of architecture, not only from an instrumental viewpoint.

Fig. 1. Final scene of the movie "Il Peccato" (2019) by Andrei Konchalovsky. Alberto Testone (Michelangelo) with the model of St. Peter's Basilica on his way to Rome.

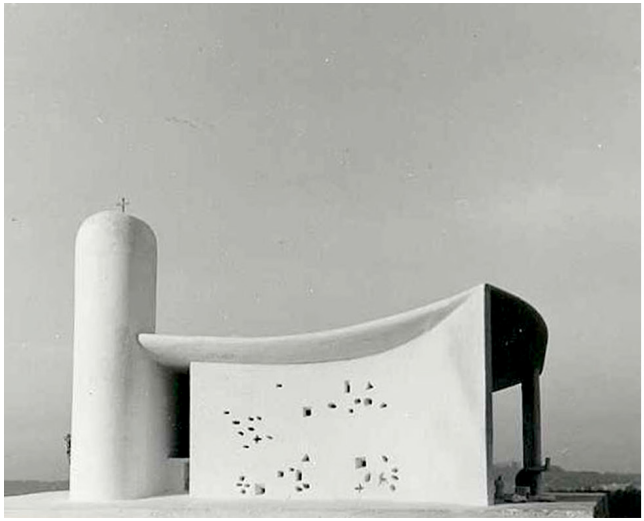
Discussion

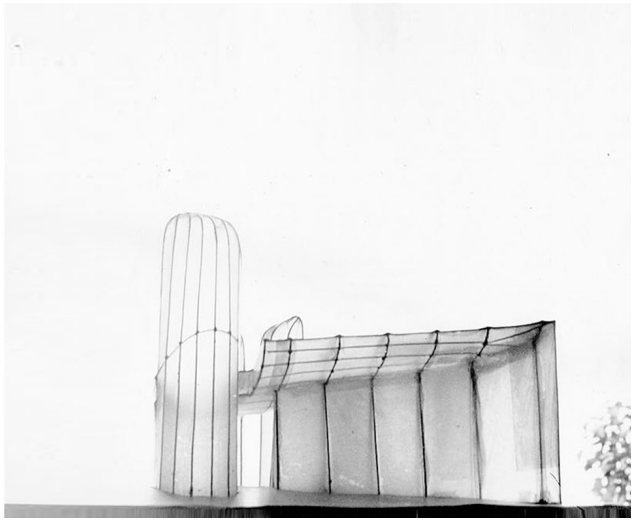
The methodological approach we propose here aims to address one of the characteristics that define any three-dimensional physical object made by human hands, namely the physical matter of which it is composed: The material of the model.
As we will try to demonstrate, the material is not merely a casual physical support chosen for simple reasons of proximity or craft tradition; it sometimes acquires the quality of a medium [Seelow 2017], in which ideas can be combined with icons, ideas that convey proposals, concepts, or ideologies to various recipients, among whom the client –models as propaganda and final product– and the architect himself –models as sketches, as a means of ideation– stand out.
In any case, one of the difficulties in following the history and theory of architecture through the model is precisely its material quality, and consequently, its fragility. If we add to this the difficulty of its conservation due to its size, and the playful component that invites touching and handling, we understand the scarce number of models that have reached us relative to the infinite number of them that could have been produced over time.
The initial materials of architectural models were related to the familiarity that the model maker –perhaps also in his capacity as an architect– had with their use, always under their mechanical capabilities that influenced their relationship with the architectural reality they represented; as demonstrated, for example, by the small Egyptian limestone capitals for a model that would later be built in sandstone in the royal temple [Mindrup 2019, p. 79].
Although the Egyptian models preserved in tombs as ritual objects were made of polychrome wood, a material close to the craftsmen –not architects– who made them [6], we have also received an architectural model from antiquity constructed of stone, representing the base of a Phoenician temple and today preserved in the Beirut Museum in Lebanon (fig. 3) and called the Model of Niha [7] [Franco Taboada 2018]. The model is carved in the same stone as the temple; it probably represented as a project, a material quite unsuitable for such a small-scale model due to its difficulty of carving. Nevertheless, this stony quality is probably the reason why this valuable testimony of antiquity has reached us.
However, this naive relationship between the material of the model and that of the future building it represents

does not seem to be a constant until the Renaissance, when many models ignored this biunivocal relationship.
In the grand exhibition of Renaissance models that I had the opportunity to visit at Palazzo Grassi in Venice in 1994 [8] [Millon, Lampugnani 1994], the models made to conceive and construct the great Italian Renaissance buildings from Brunelleschi to Michelangelo were displayed. All the models in that exhibition, without intending to, were characterized by a double material homogeneity; they were all made of wood, and their manufacture is attributed to the workshop of the architect who authored the building in each case (fig. 4).
This dual condition, being made of a material different from the one it represents and with its authorship from the very conception of the project, highlights how, in this case, the wooden material constituted itself as a malleable mechanism but very precise in its details of concrete definition of the projected architecture. Here, the model, by virtue of its faithful representation, is constituted as a rehearsal of reality and at the same time as propaganda to the client and patron, who would undoubtedly be captivated by its capacity to transmit the future coveted building.

These types of models stem from the principles stated by Leon Battista Alberti, in which models should be characterized by their simplicity and their unique capacity to convey the volumetric idea of the projected building [Alberti 1991, book 1, chapters 3-9], and also by another Renaissance theorist, Vincenzo Scamozzi [9] [Gentil Baldrich 2021, pp. 1671-1673]. This approach also ties back to the well-known controversy over Renaissance drawing implicit in the so-called Letter to Leo X [Gentil Baldrich 1993], which ended up attributing the drawing to the architect and the model to the sculptor, thus defining a new intellectual status of the former over the latter. In the tradition of the workshops of Spanish architects of the time, they were called, not coincidentally, 'modelos de bulto' (volume models), thus indicating their massiveness and simplicity.
Among the Baroque architects, the work of Borromini stands out, whose dual role as architect and sculptor distances him from those intellectual controversies and leads him to materialize his architectural ideas in the same way he did with his sculptures, that is, through volume models carved in soft materials, of which the 'red wax', already used by his predecessors as Vasari recounts

Fig. 2. Plaster model and wire model of the Chapel of N. D. de Ronchamp. Le Corbusier Foundation. Photographs by Lucien Hervé.





[Vasari 1945], is noteworthy. This type of soft and perishable materials –there is also talk of turnips as raw material– implies in turn a change in the function of the model, more linked to the sketch or the creative phase of the project than to a final idea of a finished building to present to the builder or the client.
Despite these controversies, many architects continued working with models thereafter, although their use extended to other areas, such as the representation of the territory and the city. In this sense, it is worth highlighting the grand commission by King Charles III of Spain to create a set of models of all the fortified cities of the kingdom. Although this ambitious project only materialized in the 1799 model of the strategic city of Cadiz, at the southern edge of Spain, it is noteworthy for the rich materials with which it was made [Granado, Barrera, Aguilar 2016], including silver sheets in the representation of the sea surface surrounding the city. These types of models no longer have a creative or architectural function, in fact becoming known as 'relief maps' and acquiring an essentially military function [10]; that is, they are models that represent an already existing reality, not an idea or project, and moreover, due to their material richness, they are also an object of contemplation and luxury.

The model (fig. 5), which represents the city and its maritime and terrestrial surroundings, was made under the auspices of the royal architect Francisco Sabatini, but was specifically commissioned to a particularly skilled military engineer. The execution was carried out by a large team of craftsmen, using top-quality and expensive materials, among which holly wood stands out for the facades and cedar for the rooftops and the sea, with ivory being used for ornaments. However, in a final whim of its creator, the sea was ultimately covered with a thin layer of silver sheets, which were later removed for their monetary value and have now been restored. The model ended up functioning like the construction of a real building, with costs so burdensome for the Crown that the project ended where it began: exclusively in the model of Cádiz. This is a clear example of how the material can ruin the enterprise.
During the 18th century, the model adapted to a new use, which in turn led to a new choice of materials for their construction: within the new artistic tradition of the Grand Tour, which awakened in the European art academies in relation to the admiration for classical antiquities, the fashion of fetishist collecting of models of Greek and Roman buildings emerged as a souvenir and desire for

Fig. 3. Stone model of the Phoenician temple of Niha in the National Museum of Archaeology in Beirut (Lebanon) and the current state of the same temple.

possession, just as it still happens today with modern tourists and models of the Tower of Pisa, the Eiffel Tower, or Le Mont Saint Michel, in resin, metal, etc. In several European countries, these collections were then treasured, which in turn led to the appearance of various workshops of significant professional model makers who manufactured them [Kockel 1998].
One of the examples was undoubtedly the collection of Sir John Soane in his London house, today the Soane Museum, where we can find the two characteristic types of models of the time: models that used cork –Phelloplastica [11]– to simulate ancient ruins in their realistic state of breakage and fragmentation, and, on the contrary, perfectly polished and finished plaster models that represented classical buildings in their ideal state, in the same way that pensioners at the academies in Rome drew the admired antiquities.
In both cases, the models are no longer architectural project objects *per se*, but rather collector's souvenirs, manufactured in various specialized workshops as consumer products, and then purchased and transported to collections in emerging museums. The cork models were, in particular, especially easy to transport due to their low weight and their resistance and flexibility.
The Soane Museum in London has two models that represent the same building, the Temple of Vesta in Tivoli, constructed respectively in two different materials with their corresponding versions, of ruin and ideal model. The first one of cork, finished with artistic colorations painted to give it a dramatic realism that represented very well the deterioration of time on stone, made in Naples in the well-known workshop of the artisan Giovanni Altieri (active between 1766 and 1790) [12]; and the second one executed in clean and white plaster that represented the temple in its ideal state, newly built, white and exquisitely polished. Its realization is based on a certain system of 'reinforced talc' as it contains a substructure of metal rods that gives resistance and stiffness to the model against the vicissitudes of long-distance transport from the Paris workshop to the various clients' destinations around the world (fig. 6) [13].
However, although the production of these models at the end of the 18th century was encouraged by the high tourist demand from the cultured travellers of the Grand Tour, in the case of Soane, their use as teaching material is also documented. As a professor of Architecture at the Royal Academy from 1806 to 1837, Soane used these models to teach his students the scientific and artistic principles of construction from classical Antiquity and used the models to illustrate the history of architectural development in a tangible and especially visual manner. The ambivalence of these pairs of cork and plaster models, with their different perceptual effects, served, based on their specific material qualities, to illustrate the passage of time on the great buildings in the history of architecture.
Despite the decline in the use of models among architects in the 19th century, motivated by the great development of perspective drawing in European and American academies, the advent of the Avant-Garde in the 20th century heralds a resurgence of the model as a mechanism for architectural

Fig. 4. Painted wooden model for the Church of Santa Maria della Consolazione in Todi. Todi, Municipal Museum.

creation. The *tabula rasa* that modern architects sought in all areas also reached architectural representation, and axonometry largely replaced conical perspective, thereby valuing the model again, whose visualization is closer to axonometry given its small size and its propensity to be viewed from above.
On the other hand, the modern era takes up the model "as a prototype to shape new ideas, but above all, to re-establish the physical, material, manual, and artisanal relationship of artistic creation; with concepts as relevant as the new objectivity –*Neue Sachlichkeit*–, the total work of art –*Gesamtkunstwerk*– and, in short, the artistic trends returning to craftsmanship, which contradicted that intellectual status conquered by the architect in previous centuries. And the model again dirties the hands of the new artist-artisan-architect with plaster and clay" [Carazo 2018b, pp. 825]. It is in this context that

Fig. 5. Model of the city of Cádiz, 1799. Museum of the Cortes of Cádiz.

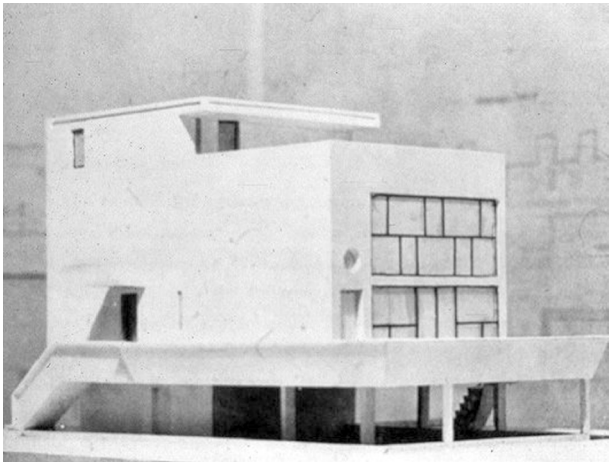
Fig. 6. Models of the Temple of Vesta in Tivoli, made of painted cork (Photo: © Sir John Soane's Museum, London) and in reinforced plaster (talc) (National Heritage of Spain Inventory number 10011717).

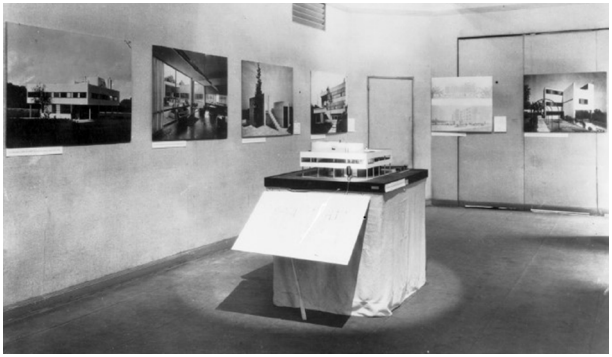
Le Corbusier presents the models of his revolutionary houses at the Autumn Salons in the innovative Paris of the 1920s (fig. 7) [De la Cova Morillo-Velarde 2016].
In De Stijl, the use of model-objects was reinaugurated, constructed with wood panels painted in primary colours, as seen in the preliminary model of the Rietveld's Schröder House. However, in these uses, the persistence of the idea of massive volume can still be perceived against the bold neoplastic proposal of architecture of plane and colour. The year before, Rietveld had used thin, flat cardboard to build architectural models for the *Maison Particulière* (Private House) of Vilmos Huszár and Theo van Doesburg, thus demonstrating his full knowledge of the material and its utility for modelling a volume [Mindrup 2019, p. 164].
From that moment on, the avant-gardes unleashed all their propagandistic potential through the intense use of models of their innovative architectural proposals. Here, the model was more capable of anticipating the new architecture than its future construction, which was still nascent for a building industry without sufficient development and for a society very reluctant to such radical changes.
Exhibitions were the main medium for this expansion and propaganda in the first half of the 20th century, especially in the interwar period. It should be considered that architecture exhibitions have a peculiarity: in other arts, such as painting or sculpture, the works exhibited are precisely paintings and sculptures, but it is not possible to 'bring' real buildings to an exhibition [14]. Therefore, in addition to plans and drawings, the most expressive and popular medium for an architecture exhibition is precisely the model [Montes Serrano, Carazo 2018].
Among those made in that period, the one organized by Philip Johnson and Henry-Russell Hitchcock at the Museum of Modern Art in New York in 1932 stands out as paradigmatic, where ten models by the ten European and American architects most involved with the avant-gardes were exhibited, commissioning each one a model made expressly for the exhibition (fig. 8). The first aim was to unify scales and sizes of the models to be exhibited and to achieve greater didactics in the public, specific instructions were given about their construction materials: "the models will be constructed in celon, wood, *papier-mâché*, glass, chrome, steel, and marble. Special care will be taken to provide each model with an attractive environment, with trees, grass, people,

and cars. As far as possible, the interior planning should be visible from the outside" [Montes Serrano, Alonso Rodríguez 2018].
The matter of models as the main subject of architectural exhibitions has become established worldwide, with the previously mentioned example of the Soane Museum in London and its model room. In some cases, these are temporary exhibitions that host original models from the time the projects or buildings were created, such as the one mentioned in Venice in 1994 [Millon, Lampugnani 1994], or monographic exhibitions of an architect [15]. However, some of these collections have also become established as architecture museums, like the German Architecture Museum (DAM) in Frankfurt, which uses models as the main content of its permanent collection and temporary exhibitions [Elser et al., 2012; Miller 2013].
However, the great boom in architectural models came in the second half of the 20th century, precisely through new industrially manufactured materials, and the emergence, primarily in the United States of America, of significant model-making workshops amid the development of American architecture in big cities [Jacobs 1958]. With the reference to the lost model of a skyscraper project by Mies for Berlin in 1922 [Mindrup 2019, p. 187, fig. 5.14], American architects in the 1950s fostered a large industry of models built with industrial materials, such as plastic and metal, which required for their manipulation and perfect assembly highly equipped industrial workshops with specialized staff and machinery. As Jane Jacobs points out, these models were not intended to captivate the public, but rather, to verify before construction the various effects of transparency and light reflection of the large curtain walls that would form the surface of the buildings, and even to check for possible errors in the model prior to actual construction.
The model workshop of Theodore Conrad (1910-1994), the most distinguished and prolific architectural modeler of the 20th century, whose private archive has been recently discovered, is perhaps the best example of this industrial production of architectural models, with scale reproductions of emblematic buildings of New York City from the Rockefeller Center to the Lever House (fig. 9) and the Seagram Building. These models competed with their almost fetishist realism with the finished buildings through photography –an essential medium of their dissemination, not covered in this work–, using materials

Fig. 7. Model of the Maison Citröhan, Le Corbusier, 1922, Salon d'Automne, Paris.

Fig. 8. Photographs and model of the Villa Savoye at the Modern Architecture Exhibition at the MoMA in 1932, Le Corbusier.





almost identical to the constructed reality and with a technical perfection characteristic of this new industry. Never were material and construction so parallel in the real world and in the world of models [Fankhänel 2021]. These realistic and professional models, however, open a new field within the study of architectural modeling, as they are made almost in competition with the work of the architect themselves, or at least we could say in parallel to it, not being a product of the architect's own studio understood as a focus of architectural creation. Although we have seen this precedent in the Italian or Parisian workshops of the Alteris or the Fouquets in 18th century Europe, the industrial models of the 20th century already denote a singular intensity in the use of industrial materials and production.

The technical perfection and the use of new materials, characteristic of the architecture of the 'machine age', also encompass certain episodes of the post-avant-gardes of the 20th century, such as the models produced with plastics and metals by the Dutch group known as the 'Situationists', led by the artist Constant Nieuwenhuys [García Ríos 2023]. In the complex development of the utopian city of New Babylon and because of his training as a visual artist, the means of representation were drawings and models. And for this reason, the models were not formalized as architectural representations, but as autonomous artistic objects, with an intrinsic aesthetic value, a quality that is also inherent to models (fig. 10).

In contrast to these products of technical perfection or almost autonomous artistic overvaluation, we still find the use of other synthetic but malleable materials, such as the extreme case of the clay models made by the German architect Gottfried Böhm [Architekturmuseum

Fig. 9. Similar views of two different models of Lever House, 1949. Metal and plexiglass models by Theodore Conrad.

2006], who, following the tradition of the sculptor-architects of the Baroque, carries out 'soft' modelling to capture volumetric ideas that, due to the malleable quality of the clay, are susceptible to modification and constant corrections on the initial design, thus using the three-dimensional volumetric model as a sketch (fig. 11).
One last issue regarding the material as the essence of the model, and the different uses it implies in relation to the various functions it can adopt, which has allowed it to adapt to each moment and survive in the digital age, would be the models produced by three-dimensional printing through computer programs for the virtual construction of three-dimensional objects (fig.12). This issue, deserving its own development beyond the scope of this work, brings us closer to the question of the material of the model from within, being the limit case in which the material –plastics, synthetic powders, etc.– constitutes the model itself, forming from a numerical digital system into a physical and tangible volume in the world of things. Current architecture reflects, for the first time in history, on the real possibility of becoming, through this 3D mechanism, a representation of a model itself.

Fig. 10. Model for √2-Omgang, 1965, New Babylon, Constant Nieuwenhuys. Constant Fundation.

Fig. 11. Clay model by Gottfried Böhm for Ausstelllungs- und Tagungszentrum, Hannover, 1986. Courtesy of Deutsches Architekturmuseum.

Fig. 12. 3D printed model from the Renzo Piano Building Workshop (RPBW).

Conclusions

The creation of architectural models is a complex and deeply reflective process, where the choice of material is far from arbitrary and is intensely influenced by various factors. These range from the existing intention behind the model to the physical limitations of the materials used to construct it. The material then becomes one of the fundamental aspects to consider when determining the purpose of the model, so much so that it can even act as a symbolic object that encapsulates the essence of the project.
In addition, the ability of the material to adapt to the scale of the model and its limits of strength and modelling are crucial. A material may be ideal for representing certain details at a particular scale, but unsuitable at another, requiring careful deliberation by the creator of the model, whether it is the architect conceiving the project himself or a specialist or craftsman from outside the project. It is also essential to consider how the materials reflect or dialogue with the prevailing artistic and architectural currents of the time, as this can add an additional layer of meaning or critique to the work.
The evolution in the use of materials for scale models parallels the advance of contemporary industry, with modern industrial production capacity enabling the creation of exact replicas of architectural projects. This development has facilitated the incorporation of industrial production techniques in the creation of models, expanding the possibilities for precision, detail and technical perfection.
However, despite the rise of digital tools in architecture, physical models retain their prominent place in both large architectural offices and small studios around the world. They remain a vital medium for creative experimentation, where changing materials can reveal new dimensions of the project or idea. The physical manipulation of materials and direct interaction with form allow architects to explore design alternatives in a more intuitive and tangible way than digital media allow.

Notes

[1] https://arquitecturaviva.com/articulos/las-maquetas-de-peter-zumthor-en-la-werkraum-haus (accessed 19 November 2023).

[2] https://prensa.fundacionlacaixa.org/es/2009/10/06/palladio-el-arquitecto-1508-1580/ (accessed 19 November 2023).

[3] *Il peccato: Il furore di Michelangelo*, Andrei Konchalovsky, Italy 2019.

[4] The term we will primarily use in this work will be 'model', as opposed to the also common 'mock-up'. Although these terminological nuances are very important, and we have already given them due attention, we do not intend to distract here with a debate on them [Carazo 2011].

[5] https://www.fondationlecorbusier.fr/ Photo library, Contacts L3-3-1001.jpg and L3-2-11001.TIF (accessed 19 November 2023).

[6] It' important to distinguish between models that represented parts or scenes of daily life, like those found in Deir el-Bahari (West Thebes) inside the tomb of the chief steward and royal seal bearer, Maketra, from the Middle Kingdom aedeweb (accessed 22 february 2024), and the so-called 'soul houses', terracotta pieces with house models for offerings. https://es.wikipedia.org/wiki/Casa_del_alma (accessed 22 February 2024).

[7] http://tochoocho.blogspot.com/2019/01/ (accessed 17 February 2024). This is about the only architectural model from antiquity still preserved, of a temple located in Niha, near Baalbeck, similar to the Temple of Bacchus in this city from the Roman-imperial era. The steps contain words and measurements in Greek that reveal the discussions between the temple's commissioner and the architect regarding the suitability and size of the steps, with requests for changes recorded on the model itself.

[8] http://efaidnbmnnnibpcajpcglclefindmkaj/https://archivio.unita.news/assets/main/1994/03/31/page_030.pdf. In *L'Unità newspaper*, 03/31/1994 (accessed 18 February 2024).

[9] As cited by Mindrup [Mindrup 2019], Scamozzi notes that architectural models can be made of "various materials, such as wood, stucco, and cardboard or similar, according to each one's mind or fantasy", though "for Scamozzi, however, a model must 'show the value and esteem of what it represents', and for this purpose, he warned against using a 'flimsy material' like cardboard, because 'such thinness' cannot properly represent the thickness of the walls".

[10] The issue of collections of scale models of fortified cities in Europe was developed in various nations, according to: Granado, Barrera, Aguilar 2016, note 3.

[11] The art of modelling with cork is also called feloplasty (from the Greek *φελλός* phellos, cork). Its tradition originates in Naples, as an art to recreate the Nativity scenes that still endure in the family tradition of southern Italy and the whole Spain. https://en.wikipedia.org/wiki/Architectural_model (accessed 17 February 2024).

[12] *Ibid*.

[13] These plaster models, of which there are also other examples in different European collections, come from the well-known workshop of the Fouquet family, Jean-Pierre Fouquet (1752-1829), François Fouquet (1787-1872), and Emile-Françoise Fouquet (1817-1879), father, son, and grandson respectively, established in Paris. A collection of these models can be seen in the Royal Collections of National Heritage, at the Royal Palace of Madrid, which has an exceptional series of ten architectural models from the Fouquet workshop. [Navascués et al. 2017]. https://www.juaneloturriano.com/noticias/2017/07/06/pieza-destacada-modelos-de-arquitectura-de-fouquet-en-el-palacio-real-de-madrid (accessed 10 February 2024).

[14] Except for exhibitions of pavilions or prototypes, such as the one by Mies at Pavilion II of the German Building Exhibition of 1931 in Berlin (Deutsche Bauausstellung in Berlin 1931) [Carazo, Moral 2020].

[15] Like the one held at Caixa Forum Madrid in 2009 titled *Palladio, the Architect (1508-1580)* with models of his villas at the same scale and constructed in lime and beech woods: or various exhibitions on the monographic work of contemporary architects, Herzog & De Meuron, Peter Zumthor: https://www.metalocus.es/en/news/architecture-born-craftsmanship-architectural-models-atelier-peter-zumthor (accessed 10 February 2024), Zaha Hadid, etc., in which models and their materials are protagonists.

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