ARTEFAKTE DES ENTWERFENS

Skizzieren, Zeichnen, Skripten, Modellieren

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On the Translation of Architectural Media

The Model Drawings for Liebman House

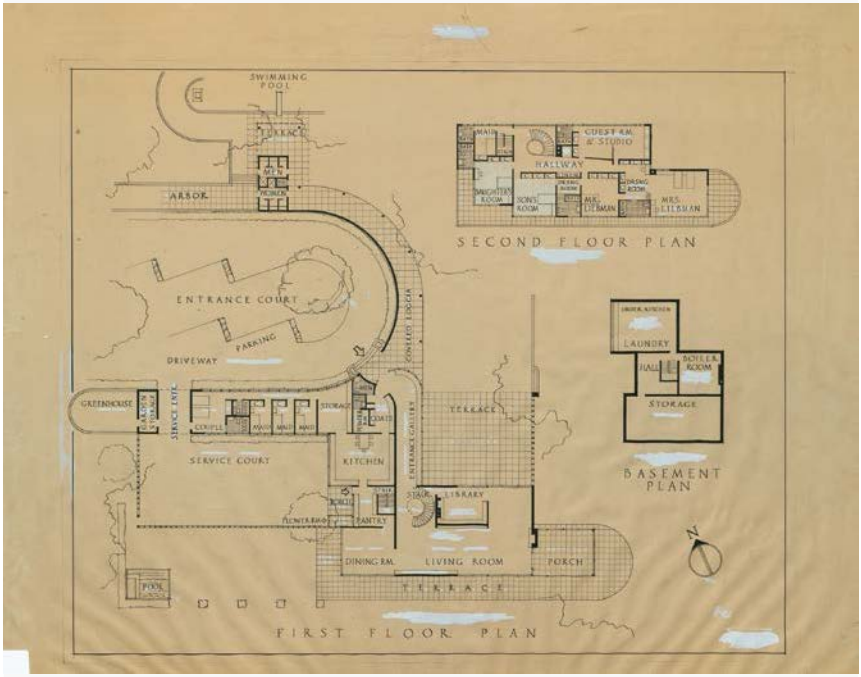
"On the Translation of Architectural Media: The Model Drawings for Liebman House" sketches out a brief history of architectural model drawings and their use in the translation of architectural media. The text is based on Teresa Fankhänel's research on model making in the New York metropolitan area in the 20th century, and especially on the work of model maker Theodore Conrad. Using the example of one of the earliest preserved sets of model drawings in Conrad's archive, the text analyzes their use in the making of the model for Liebman House by Edward Durell Stone.

Model drawings are perhaps the most elusive among the many kinds of architectural drawings. Their ephemeral nature is caused largely by the unfortunate circumstance that they are often used up or destroyed while serving their purpose during the production of architectural models. They are not intended as a medium in and of itself. There are neither exhibitions of model drawings nor are there collections that actively seek them out for their artistic value. They are not regarded as insight into an architect's thought process and they are equally not praised as a tool for invention. They are secondary resources whose technical nature equals the charm of working drawings rather than lavish renderings. Yet, if taken seriously, they can provide an abundance of information not just regarding the making of miniature objects but about the inner workings of translations between the architect's, the model maker's and photographer's output. They could be studied as valuable steps along the way in the conception of architecture.

Luckily, sometimes model drawings do survive their initial utility. When I started researching model maker Theodore Conrad's work in 2012, I was unaware of the abundance of material that had endured for decades in a crammed and dusty basement in Jersey City. Over the following four years I unearthed a veritable treasure trove that revealed a number of rolled up drawings in paper bags. Many of them were drawings made in Conrad's workshop which had miraculously survived not just the years in the basement but the hazardous conditions of a busy model studio with its liquids and paints, saw dust and power tools, and the need to subject drawings to all kinds of rough working conditions. They often bear the traces of their use: splashes of ink, sharp cuts and scribbled annotations. Dating as early as the 1930s, these drawings give testimony to the transformations that the craft of model making went through in the 20th century. They record designs, both built and unbuilt, by a number of well-known architects and document the shifting practices inside the model maker's studio. They provide significant insights both as an aid for model making as well as a means of communication between architects and model makers. Above all, they are an important tool in the translation of architectural media.

Liebman House

One of the earliest sets of drawings that were preserved by Theodore Conrad are for Liebman House in Mount Kisco; an unbuilt design in an affluent town in Westchester County, New York. Aline Meyer Liebman was a wealthy art collector and painter who together with her husband Charles J. Liebman commissioned the design by Edward Durell Stone in 1937. Mrs. Liebman was one of the founders of the Museum of Modern Art and the couple was heavily involved in the modern art scene in New York. Both had been patrons of the famous 1932 *International Style* exhibition and supported modern architecture. Their Upper East Side apartment had been designed by art deco specialists Kahn & Jacobs around ten years prior to their plans for the new home. Architect Edward Durell Stone also had ties to the Museum of



● Fig. 1: Edward Durell Stone's office, Liebman House, copy of floor plan, 1937. Source: private collection

Modern Art as he was the lead designer for the museum's new building on 53rd Street together with Philip Goodwin. He had just recently emerged as a young architect with an office at Rockefeller Plaza and was building suburban houses for wealthy clients. Prior to venturing out on his own he had been employed in Wallace Harrison's office which is where he had first met a fellow young architecture graduate who was making models for Harrison's Rockefeller Apartments – Theodore Conrad – and with whom he would continue to work for decades.

The 1930s depression was a difficult time for architects that especially hit young graduates without a full rolodex of clients hard. Architectural and lifestyle magazines tried to alleviate some of the pressures created by the slump in construction by giving talented designers exposure through commissions for fictitious schemes for suburban houses of which readers could buy floor plans for as little as one dollar. Liebman House was of a comparable size

and program yet developed for a private client. The surviving set of model drawings includes twelve sheets of varying planning stages and purposes. The earliest is a copy of a floor plan from Edward Durell Stone's office (Fig. 1). It shows the layout of the house and its adjoining facilities without much detail except for labels indicating the function of each room. Since Stone was not the only contender for the job – the Liebmans had reportedly considered several other architects to design the house, among them Raymond Hood, Harry Allen Jacobs and even Le Corbusier – the drawing was probably meant to give the clients a basic idea of what the house would look like so as to get the commission to build a model. Its presence in the archive suggests that it might have also been the basis for model maker Theodore Conrad's cost estimate for Stone.

Communicating Architectural Ideas

In the 20th century, a multitude of specialized architectural drawings emerged[1] – from sketches to elaborate working drawings – which formed the basis of different kinds of architectural models: for a quick massing model, a model maker could work from an architect's rough sketch with measurements whereas for a highly elaborate model more detailed drawings were necessary. Still, most models were based on a well-prepared variety of drawings. The detailed presentation model, which would become the most common and elaborate object to be created by a professional model maker from the 1930s onwards, depended on a standard set of drawings including floor plans, elevations, sections, landscaping and site plans as well as details that were often prepared by the architect. When Theodore Conrad started his practice in the late 1920s, these drawings were either provided as blueprints of detailed working drawings for the building or as more simplified model drawings that omitted measurements and other

1 A brilliant collection and analysis of 20th century working drawings was published in: Annette Spiro, David Ganzoni (Eds.): Der Bauplan. Werkzeug des Architekten. Zurich 2013.

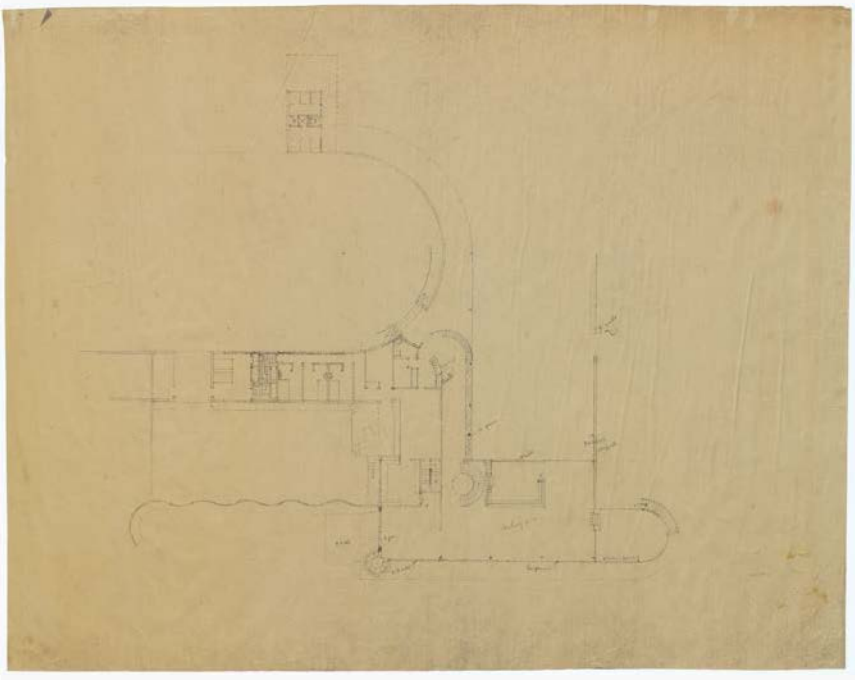
unnecessary information. However, offices often deviated from this practice based on their work load and the schedule of the project: whereas Wallace Harrison provided Conrad with blueprints of model drawings made in the architect's office, Edward Durell Stone did not hesitate to send detailed working drawings and blueprints for Conrad to make the model drawings himself. Stone even sent changes as original sketches to be adapted by the modeler.

The importance of the architect's drawing for model making is easy to underestimate. Modern architectural drawings are a comparatively young medium that was first mentioned by Leon Battista Alberti in his book *De Re Aedificatoria* in the mid-16th century as part of the growing split between the more academically minded profession of the architect and the building trades.[2] Since architects were no longer continually present at the building site, they needed a way of communicating their ideas to the workers. It was only in the 19th century, however, that the architectural drawing rose to become the most important tool for communication when descriptive geometry made it possible to translate three-dimensional objects into precise two-dimensional drawings through standardized representations and scales.[3] To communicate ideas, copies were made laboriously by hand until in the 1880s blueprints became more widely used, requiring fewer in-house copyists in architectural offices.[4] The advent

2 Matilda McQuaid: Envisioning Architecture. Drawings from the Museum of Modern Art. New York 2002, p. 11; Mario Carpo: Vom Handwerker zum Zeichner. Das Alberti'sche Paradigma und die Erfindung des Bauplans in der Moderne. In: Spiro, Ganzoni 2013 (note 1), p. 279.

3 In Germany this happened in the 1870s. See Winfried Nerdinger: Die Architekturzeichnung. Vom barocken Idealplan zur Axonometrie. Zeichnungen aus der Architektursammlung der Technischen Universität München. Munich 1985, p. 494; Alberto Pérez-Gómez: The Revelation of Order. Perspective and Architectural Representation. In: Kester Rattenbury (ed.): This is Not Architecture. Media Constructions. London 2002, p. 19; Paul Emmons: Drawn to Scale. The Imaginative Inhabitation of Architectural Drawings. In: Marco Frascari (ed.): From Models to Drawings. Imagination and Representation in Architecture. London 2007, pp. 64–67; Uta Hassler, Daniel Stockhammer: Aus der Entwicklungsgeschichte des Bauplans. Wissenstransfer, Demonstration einer Bauidee oder Anleitung zum Bauen? In: Spiro, Ganzoni 2013 (note 1), p. 287.

4 Joan Ockman: Architecture School. Three Centuries of Educating Architects in North America. Cambridge 2012, p. 76; Susan Piedmont-Palladino: Tools of the Imagination: Drawing Tools and Technologies from the Eighteenth Century to the Present. New York 2007, p. 81.



● Fig. 2: Edward Durell Stone's office, Liebman House, copy of floor plan, 1937. Source: private collection

of mass-reproduced drawings did not only contribute directly to a growing network of architectural professions at the turn of the century, but was a prerequisite for the collaboration between independent experts as they made reliable communication outside the architect's office possible. Drawing and the ability to translate drawings into three dimensions were quickly recognized as an essential skill for the profession of the model maker, as Robert Forman noted in 1946 in one of the few modeling manuals written in the first half of the 20th century: "The model maker should learn to draw to scale and be able to read scale drawings".[5] Especially for young architects like Theodore Conrad, who were struggling to find employment during the depression, familiarity with drawing techniques facilitated their transition

5 Robert Forman: Architectural Models. New York 1946, p. 10.

into model making. Between architect and model maker, drawings were more than just a form of communication as Conrad pointed out in an interview in 1956: “Here we work directly from plans […] If we were in some handy spot in town, the architects would come in and watch us building a model and say ‘Do this. Do that’, instead of putting their changes down on paper, where they belong”.[6]

Drawings became a contract that recorded the architect’s specifications and clarified the modeler’s contribution. Since the plans for Liebman House were still in an early stage it is likely that no blueprints of working drawings existed at the time the model was designed and, hence, Conrad made his estimates with the help of the floor plan produced by Stone’s office. After the initial discussion with the clients, the architect altered the scheme to include their wishes and another drawing at the scale of 1/8 inch to the foot was used for planning the model (Fig. 2). Two versions of the same drawing survive as copies and indicate the thickness and color of the walls in the model. They are less presentable and polished than the previous drawing – the hallmarks of a working tool. Copies like these formed the basis for the communication between architects and model makers. Yet, the latter preferred to work from original scale drawings rather than blueprints because copies never aligned perfectly with the originals and were considered inaccurate.[7] One of the most important instruments in any modeler’s toolbox was the proportional compass which was used to produce a new set of drawings from the copies received from the architect’s office. This was done by taking a fixed line on the original drawing with the dividers and multiplying it with the ratio of the model’s scale. Another reason to prepare a separate set of model drawings was the importance of using the right papers and drawing utensils. Blueprints and other copies reproduced

6 Newspaper clipping, John Havas: The Talk of the Town. In: The New Yorker, July 6, 1956, pp. 13–14.

7 Murray’s account of model making is based on the Scottish model maker William McCallum’s practice. Robert Dennis Murray: Models and Scotch. In: Pencil Points, July 1939, p. 429; Paul Bonfilio: Fallingwater. The Model. New York 2000, p. 25.

drawings on heavy, opaque paper which were less flexible than model drawings that were made using tracing paper and pencils to facilitate the transfer of contours and shapes onto the model.
As research into the origins of model drawings is still in its infancy, it is unclear when exactly the first such model drawing was prepared. Currently available information suggests that it might have been introduced as an entirely new tool in the 1920s or early 1930s based on a number of seismic shifts that took place in architecture and model making at the time. With the introduction of new modeling materials such as Plexiglas and aluminum in the mid-1930s it became possible to build miniature buildings from hundreds or even thousands of prefabricated pieces that were assembled in the model maker's studio.[8] Leaving behind older techniques that often folded renderings of the façade into three dimensional boxes, the new materials made it necessary to create construction manuals for the models. At the same time, spurred by a lack of jobs during the depression, model making became an independent occupation that outgrew the confines of the architect's model room due to the high cost of power tools that were necessary to manipulate the new materials and an increased level of specialized knowledge necessary to operate them. This rise in professional specialization made reliable written and drawn communication a necessity.

Translations from Drawing to Model

As a general rule, most architectural projects utilize more than one medium to think through and communicate their ideas. Often following a meandering process that is more labyrinthine than linear, these media are subject to interpretations that influence and alter the architectural ideas. The architectural historian

8 Jane Jacobs: The Miniature Boom. In: The Architectural Forum, May 1957, pp. 106–111, 196.

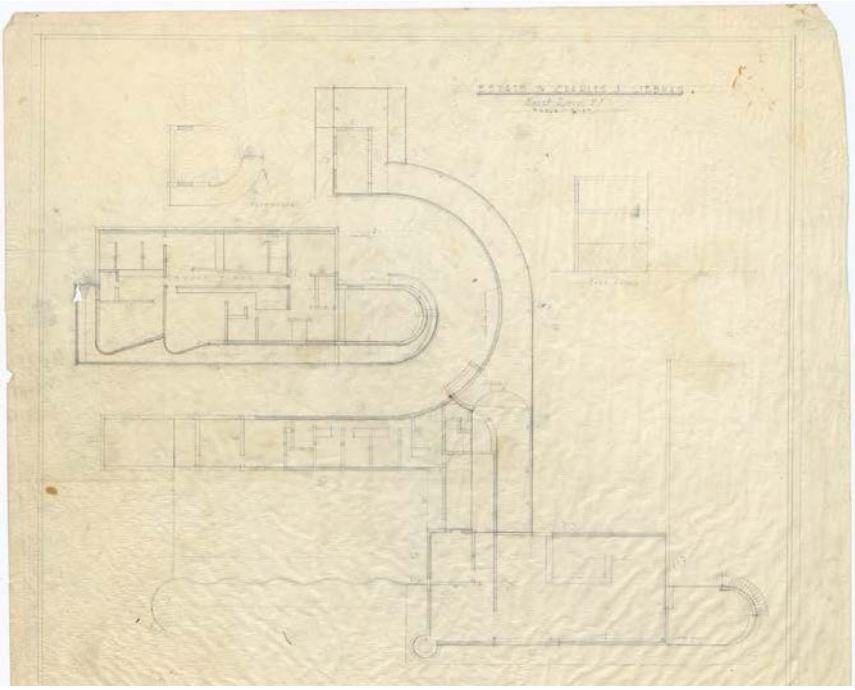
9 Robin Evans: Translations from Drawing to Building and Other Essays. London 1997.

Robin Evans, in an attempt to explain these changes, borrowed the linguistic term ‘translation’ to capture the difficulties in the conversion of architectural media.[9] Like translating languages, architectural translations don’t always manage to carry an idea without losing bits of information contained in the previous medium. Evans developed his thoughts using the example of the inherent unlikeness of drawing and building and was the first to reveal poignantly the need to not look at each architectural medium independently but to see them in their referential relation to one another.[10] Translations cross the barriers between media, alter the ideas and adapt them to the new medium’s system of representation. The model occupies a unique place among these translations in opposition to all two-dimensional media as it converts an idea into three dimensions, often for the first time during a project. The gaps between these dimensions or, as Robin Evans called them, the “blind spots”,[11] become the main focus of both problem solving and of invention, making translations a unique part of architectural creativity. The translators in the case of models are often model makers who convert one medium, the drawing, into another, the model. They are the ones who inhabit the gap between two and three dimensions and can therefore be considered unique authors through their expertise in their field, their understanding of modeling materials and their knowledge of representative and structural characteristics. Model drawings in this system could be considered liminal or auxiliary tools that help guide the work of the translators in bridging the gaps. They are not independent as their sole purpose is to facilitate the translation. Through their properties, however, they influence the translation heavily.

At the same scale as the model, model drawings edit the information contained in the architect’s working drawings. They reduce it to what is necessary to build the model, including information about size, materials and model construction. They rarely indicate the dimensions of the model numerically as they are usually in the same scale as the model and dimensions can be

10 Ibid., p. 160.

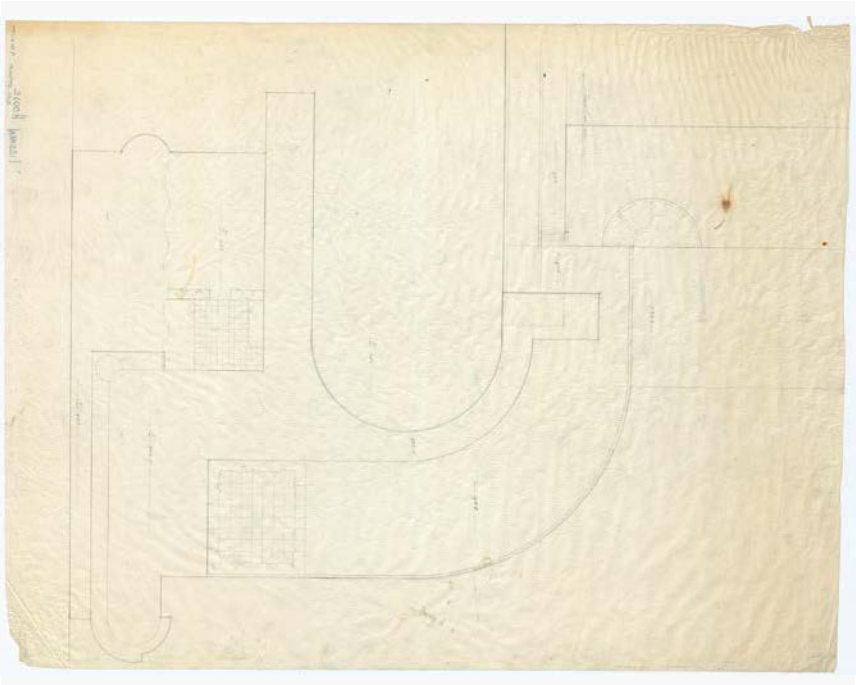
11 Ibid., p. 182.



● Fig. 3: Theodore Conrad, Liebman House, model drawing, pencil on tracing paper, 1/8" = 1'0" scale, 1937. Source: private collection

transferred directly from the drawing with dividers. In opposition to working drawings, they often include the building's surroundings. Materials are labeled and not drawn or hatched. The blind spots of the translation from working drawing to model are addressed: decisions about its detail, material representation, construction and the way it is assembled and disassembled.

A drawing on tracing paper that was made in Conrad's workshop after the updated copy from Stone's office arrived was the first to inhabit exactly this gap (Fig. 3). It contains instructions for materials to use for parts of the model and is of an exploratory nature. It breaks down the model into different sections with two alternate designs for the second floor. A small sketch shows a section of the model's interior as a wooden box. More drawings were prepared as part of the model making process for Liebman House to explain the making of the object. One was made at full model scale indicating the sections of the model (Fig. 4). Another



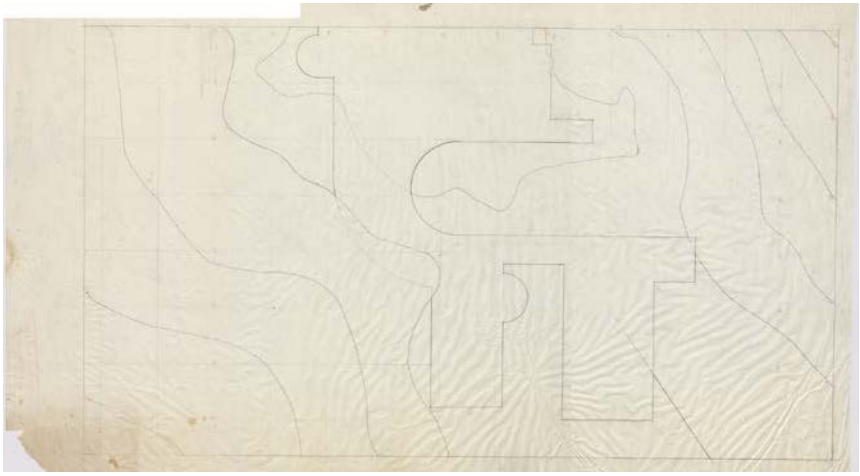
● Fig. 4: Theodore Conrad, Liebman House, model drawing, pencil on tracing paper, 1937. Source: private collection

detailed drawing explores two alternative solutions for the second floor bedroom for Mrs. Liebman. They indicate structural concerns and notes for the assembly of the pieces. As a set of technical drawings, they outline the model's base, substructure, assembly as well as topography. They were necessary since in models, whether built from cardboard, wood or Plexiglas, materials and structure are usually different from the actual building. A brick wall was not built with small bricks but with one large sheet of material. In opposition to buildings, models were often built in sections so as to make it possible to disassemble them for future changes or repairs, and allowing small tolerances for materials to expand due to changing climatic conditions. There are also several drawings for the landscape and larger setting of Liebman House. The basis for a model's site drawings were often aerial photos and topographical maps that were provided through the architect's office or photographic agencies such

as Fairchild Aerial Surveys. Still, establishing an accurate topographical map including vegetation could mean a considerable effort by the modeler who had to create a lifelike setting for the model house. For Liebman House, landscape architect Michael Rapuano handed in a copy with instructions for the lush vegetation that situated the model in a fictional summer time. Conrad drew the grated landscape on tracing paper to indicate the exact shapes of the base that was built up from wooden sheets. Another drawing outlined where the cut for the model building was to be made (Fig. 5). The survival of these drawings on tracing paper is an especially lucky case as they have score marks where the lines of the drawing were retraced with a sharp wheel to copy the shapes onto the wooden base. Eventually, the model of Liebman House was assembled on top of a full scale drawing and later inserted into the finished base.

Such drawings for the base and internal structure functioned as construction manuals and often showed sections through the model indicating the location of screws, dowels and bracing elements. In addressing the blind spots between the architect's drawings and the model, they are a direct result of the developments in modeling materials in the 1920s and 1930s that had started out with a peculiar likeness of model drawing and modeling material: cardboard. Up until the early 1930s, untreated cardboard spoke for quick reactions in massing models in early design stages. As painted facades became a popular way of presenting the exterior of the many limestone buildings in the New York metropolitan area, the construction time for models increased since the white cardboard had to be transformed into elaborate renderings that were then folded into three dimensions. In his 1926 modeling manual, model maker Edward Hobbs explained what was needed for an accurate scale model of cardboard: drawings of the four elevations and a floor plan.[12] To transfer the drawing into a model, the outlines of the façade were drawn onto the cardboard, inked in with waterproof Indian ink and then bent

12 Edward Hobbs: Pictorial House Modelling. London 1926, p. 29.



● Fig. 5: Theodore Conrad, Liebman House, model drawing, pencil on tracing paper, 1937. Source: private collection

into shape. Whereas these early cardboard models were essentially three-dimensional renderings, the development of models towards miniature buildings of various materials called for a more complicated translation of architectural ideas. Thanks to an article in *Pencil Points* from 1939 a full list of materials is available for the model of Liebman House.[13] It was made using wood for the base and structural parts of the house, plaster and aluminum for the sheathing of the walls, celluloid for the windows, rubber for the floor, and various plant materials and wires for the landscape. As models like Liebman House were assembled from these individual parts of different materials, model drawings were no longer the material basis of the models. Instead of showing the finished exterior of a building they demonstrated how its parts were put together. The elevations that had formerly become the model's exterior were transformed into detailed instructions for assembly and painting. They translated the two-dimensional drawings into an object without being a part of it themselves.

In 1937, the drawings for the Liebman House model were a relatively novel yet indispensable tool that aided the translation of

13 Robert Hoyt: World's Fair Models. In: Pencil Points, July 1939, pp. 413–426.

Edward Durell Stone's drawings into Theodore Conrad's three-dimensional model. Yet, as a tool the drawings had their limits. Not all information could be relayed with their help: written annotations regarding building materials were often added and colors samples were provided through paint chips. Eventually, all these systems of notation could not substitute for the need for constant communication between model maker and architect to insure that the architect's drawings were translated into the model faithfully. Despite these shortcomings, the drawings provide a fascinating insight into the making of small scale objects and their use. Often, the same model drawings envisioned yet another translation, this time back from three into two dimensions. Especially for photo models they defined built-in openings for the relatively large view cameras of the time and, thus, established the views of interest for model photos. In the case of Liebman House it is unclear whether the model was ever presented to the client or whether the Liebmans only saw the photos that model photographer Louis Checkman took. His images indicate a certain familiarity with the design and geographic features of the property which seems to suggest that they were the primary way of showing the clients a preview of the building. Some of the surviving prints are mounted onto canvas which further points to their use in a private presentation. Ultimately, neither model nor model photos seem to have been successful in convincing the Liebmans. The model is long lost and the house was never built. The model drawings remain as one of the last documents of the translations in the conception of Liebman House.

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Der Tagungsband versammelt Beiträge des 4. Forums Architekturwissenschaft zum architektonischen Entwerfen und seinen Artefakten. Die vom Netzwerk Architekturwissenschaft ausgerichtete Konferenz hat im November 2017 an der TU Berlin stattgefunden.
Die Beitragenden zur vorliegenden Publikation fragen nach den epistemischen Potentialen von Skizzen, Renderings, Modellen, Fotografien und Zeichnungen beim Entwerfen von Architektur. Sie folgen allesamt der These, dass Medien im Entwurf nicht nur abbilden, sondern ihrerseits Grundlage weiterer Wissenshandlungen sind. Anhand von Fallbeispielen, die vom Mittelalter bis in die Gegenwart reichen, zeichnen die Texte den besonderen qualitativen Einfluss nach, den ‚das Machen' eines Entwurfs am und mit dem Artefakt für diesen Entwurf hat.
Strukturgebend sowohl für die Tagung als auch diese Publikation war der Versuch, theoretische Positionen und die Ergebnisse praktischen Arbeitens – Artefakte – zusammenzubringen: Die Tagung war verbunden mit einer Ausstellung am Architekturmuseum der TU Berlin, im vorliegenden Band wechseln sich Theoriebeiträge mit text-bildlichen Beschreibungen der gezeigten Artefakte ab.

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