

## *Bauspiel* as immaterial investigation

### Avant-garde experiments with generative architectural models

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## Introduction

Over the millennia, physical models have served as important tools for the architect to imagine new designs. Yet over time, modelling practices undergo significant changes. The long-dominant use of a physical model as a material reflection of an architect's prior conception has its theoretical basis in understanding how architects give their immaterial ideas form in nature. In *The Physics* from the fourth century BCE, Aristotle already formulated this connection between idea and matter in architecture, arguing that a house could not exist unless material has received the *eidos* (idea) from the architect.<sup>1</sup> Only in the fifteenth century CE had Leon Battista Alberti applied this theory of architectural design to the use of scale models. Similar to Aristotle, Alberti proposed in his treatise *De Re Aedificatoria* (On the Art of Building), that architecture was an idea originating in the mind of the architect before it appeared in physical form, making the model an important tool for the architect to study and give definition to architectural ideas before constructing them at full size.<sup>2</sup>

The physical illustration of architecture is, however, only one history of the model. Less often noted, although enjoying similar longevity, is the use of models to inspire new architectural ideas. In these instances, architects not only transformed materials into a model of architecture but also found and interpreted new architectural ideas from them. One significant source of inspiration for this sort of architectural model was nature. As Vitruvius asserts in his treatise on architecture, it was when the "men of ancient times" gathered around a fire for warmth that they developed language and invented architecture by imitating what they encountered in nature.<sup>3</sup> In his *Essai sur l'architecture* (Essay on Architecture) written in 1753, Marc-Antoine Laugier provided an alternative account for the beginnings of architecture in the imitation of nature.<sup>4</sup> For Laugier, the first builders were devoid of any innate ideas and responded directly to the hostile elements of nature by reproducing "constructions" which nature offered as models. These stories about the primitive hut aside, Vitruvius' account for the invention of the Corinthian column capital is an important example for the use of

assemblage as a model of architecture. As Vitruvius relates, while strolling past the tomb of a young maiden from Corinth, the architect Callimachus happened upon a basket standing over her grave which was covered by a roof tile and an acanthus plant growing up along its sides. Impressed by the novel arrangement, Callimachus “began to fashion columns for the Corinthians on this *exemplar* [model], and he set up symmetries, and thus he drew up the principles for completing works of the Corinthian type.”<sup>5</sup> In Vitruvius’ story, the design of the first Corinthian capital, like that for the primitive hut, was not the result of reflection or intellectual ideation, but an assemblage of everyday objects that were found and interpreted as a physical model for architecture.

Callimachus’ adaptation of an assemblage as a model of architecture became a design approach cultivated by a handful of architects shortly after the end of the First World War. Of these individuals, Kurt Schwitters and Hermann Finsterlin are significant for their rigorous promotion of experiments with the assemblage of found objects or simple-shaped building blocks as an architectural modelling method. Yet, as a design method for architects, the abstract compositions Schwitters and Finsterlin presented as examples were devoid of scale and lacked the forms and attributes of identifiable building parts. Rather, similar to the primitive hut and Corinthian capital, Schwitters and Finsterlin’s models were used to inspire architectural ideas in the imagination of their user. For contemporary architects in the search for new form, Schwitters and Finsterlin’s modelling methods are important contributions to the use of the architectural model not as a mere illustration of an architect’s idea but an essential tool in its development. It is this generative architectural model, and specifically Schwitters and Finsterlin’s promotion of it that is examined here.

## New design models for a new German architecture

One of the most significant changes to the modelling practices of German architects occurred shortly after the end of the First World War amidst speculations about the creation of a new post-war architecture. Encouraged to experiment and challenge the conventions dominating German architectural practice, a handful of individuals also questioned a normative use of physical models to create illustrations of architectural designs.

Germany’s defeat in the war and the abdication of Kaiser Wilhelm II in 1918 brought together many artists and architects who were emboldened by a faith in architecture to create a better future. Initially forming as the *Novembergruppe* and later the *Arbeitsrat für Kunst*, their manifesto echoed the Expressionist architect Bruno Taut’s earlier call from 1914 for his peers to follow the Expressionist painters in creating a new architectural spirit by emulating the “construction” of a painting in the construction of architecture.<sup>6</sup> Holding up the Gothic cathedral as the favoured prototype, Taut encouraged architects to lead the other arts in creating a new crystalline architecture of glass that would unify architecture, painting, and sculpture into a single artistic form.<sup>7</sup> These ideas were sublimated into Taut’s “Architektur-Programm” (Program for Architecture) from 1918 and Walter Gropius’ Program for the

Weimar Bauhaus from the same year. In response to this call, architects began to experiment and created proposals of what this new architecture could be.

The earliest venues for new architectural ideas responding to the Arbeitsrat für Kunst's call to architects occurred between 1919 and 1923 and included the *Ausstellung für unbekannte Architekten* (Exhibition for Unknown Architects) during April of 1919, the 1923 *Bauhaus Ausstellung* (Bauhaus Exhibition) and the four issues of Taut's architectural journal *Frühlicht*, published from 1920 until 1922. One observes in these instances a dominant use of plaster and clay to illustrate what the new architecture should look like rather than the kinds of drawings or models an architect may use to conceive it. Of these a small group of architects challenged the use of *Entwurfsmodelle* (design models) as illustrations of planned or proposed constructions by experimenting with the assemblage of found objects or building blocks as a modelling method for inspiring new architectural designs in three dimensions.

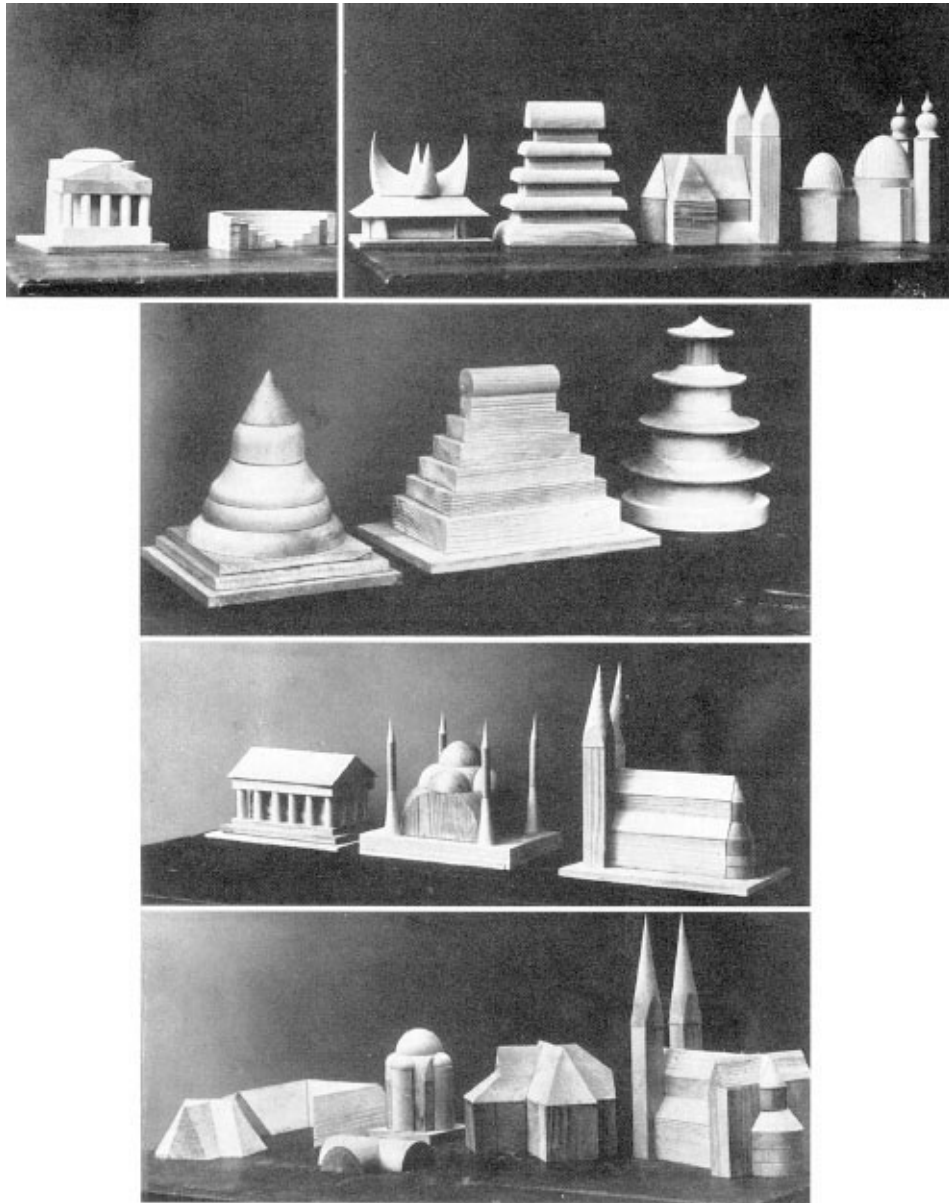
One of the earliest proponents of this new approach to modelling architecture emerged from the Expressionist architect, Hermann Finsterlin. Known for his colourful sketches and plaster models of abstract, free-form, biomorphic shapes, Finsterlin created a building block set in 1921 called *Stilspiel* (play with styles) as both a children's toy and design tool for architects, who he suggested would like to seize the impartiality of the child to rid themselves of their cultural inhibitions.<sup>8</sup>

The examples that Finsterlin selected for the publication of *Stilspiel* in the spring 1922 issue of *Frühlicht*, presented a number of identifiable building types for which the blocks had been created – a Gothic cathedral, pyramid, mosque and Greek temple (Figure 12.1).<sup>9</sup> As the subtitle to Finsterlin's article "Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel: Ein Lehr-, Spiel- und Versuchsbakasten" (The Genesis of World Architecture or the Evolution of the Cathedral as Stylistic Game: a Teaching-, Play- and Experimentation Building Blocks Set) clearly indicates, it had a function by which architects could use the set for playful experimentation and discovery of new architectural forms.<sup>10</sup>

In the same issue of *Frühlicht* the German artist, Kurt Schwitters also published an assemblage of found materials entitled *Schloss und Kathedrale mit Hofbrunnen* (Castle and Cathedral with Courtyard Well) as an example for the use of found objects in the design practices of architects (Figure 12.2). Shortly after his own experimentation with Expressionist painting, Schwitters set aside "oil paint, canvas, and brush" in 1918 and began to construct collages by assembling whatever material or medium he could find, nailing and gluing it together into new matrixes as an art called *Merz*.<sup>11</sup> Schwitters, who studied architecture for two semesters in 1918, applied *Merz* to architectural modelling.<sup>12</sup> In an article from 1922 titled after his assemblage *Schloss und Kathedrale mit Hofbrunnen*, Schwitters promoted the use of found objects to refresh an architect's imagination.<sup>13</sup> As Schwitters explained, *Schloss und Kathedrale mit Hofbrunnen* is a "Merzentwurf für die Architektur" (Merz-design for Architecture), that

[...] uses any material with architectural feeling, in order to obtain an effect, which architecture can copy/recreate. The use of arbitrarily selected materials means an enriching

of the imagination. The imagination works in this case rhythmically with rhythms already given. The transfer of the design onto representative material as well as onto constructive possibilities is a question of working through it. The design gives the stimulation.<sup>14</sup>



**FIGURE 12.1** Hermann Finsterlin, *Stilspiel* (The Play with Styles), 1916



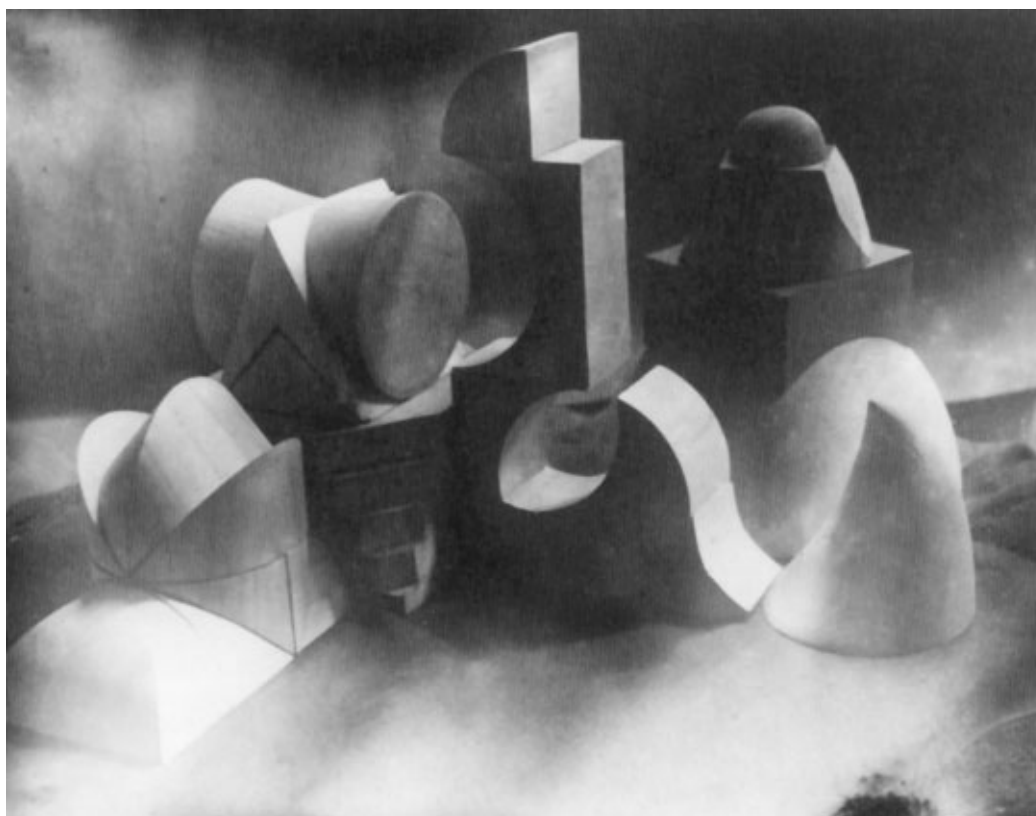
**FIGURE 12.2** Kurt Schwitters, *Schloss und Kathedrale mit Hofbrunnen* (Castle and Cathedral with Courtyard Well), 1922

*Schloss und Kathedrale mit Hofbrunnen* is missing today but judging from the photograph of the assemblage it consisted of three objects: a cylindrical piece of cork surrounded by a rough decaying organic mass set vertically next to a smooth horizontal object. Schwitters claimed in the opening paragraph of “Schloss und Kathedrale mit Hofbrunnen” that these items were “a medicine cork, a beech log and pine stump on a diagonal board so that the whole gives the impression of a castle-like arrangement at a mountain slope.”<sup>15</sup> A hole in the medicine cork and the general configuration of the assemblage make it easy to identify it as the courtyard well. Conversely, a visual similarity between the decaying pine stump and the image of a tall castle, which Schwitters collaged onto a postcard of *Das Kreisen* (The Circling) during the same year, seems to provide a clue to the stump’s identity. Schwitters provided an alternative explanation, acknowledging that it is “the points of the pine stump, which represent the Gothic cathedral.”<sup>16</sup>

The lack of visual correspondence between Schwitters’ *Schloss und Kathedrale mit Hofbrunnen* and a conventional castle, cathedral, and courtyard well in miniature suggest that for Schwitters, the use of a found object in the design of architecture was not necessarily based upon whether or not it resembled architecture in appearance. Rather, because his modelling materials were found medicine corks, beech logs or pine stumps, they hindered the architect from using them to illustrate preconceived architectural forms and would instead encourage what Schwitters described as the “enriching of the [architect’s] imagination” to discover new ones.<sup>17</sup> Unlike Finsterlin’s building blocks, Schwitters’ found objects were not made to represent parts of known architectural structures. As if acknowledging this limitation, Finsterlin introduced a second set of building blocks called *Formdomino* where he abandoned the reliance upon existing architectural forms.<sup>18</sup>

Like *Schloss und Kathedrale mit Hofbrunnen*, the examples Finsterlin chose for his *Formdomino* set possessed only a vague resemblance to conventional architectural structures (Figure 12.3). Finsterlin planned to promote his building set in the article “Formdomino und

Zukunftsarchitektur” (Formdomino and Future Architecture) for a fifth issue of *Frühlicht* that was never published.<sup>19</sup> As Finsterlin explained, his Formdomino building blocks were derived from basic geometric and irregular shaped masses that, like the *Stilspiel* before, were intended to enhance the imagination of the architect. The model itself was



**FIGURE 12.3** Hermann Finsterlin, *Formdomino*, 1922–23

above all the bridge from the imagination to the materially grown-up final form, corrected according to the visibilities of the scale; the counter examination of the spirit in material, a unique asylum of pre-formation.<sup>20</sup>

In “Schloss und Kathedrale mit Hofbrunnen,” Schwitters also claims that the use of found objects as architectural modelling material had the intent to enrich the imagination of the architect such that what is transposed “onto representative material as well as onto constructive possibilities” is dependent upon how the Merz design is interpreted as architecture.<sup>21</sup>

Compared to plaster or clay, Finsterlin’s building blocks and Schwitters’ found objects had very different implications for the design of architecture. In the case of clay, it has no inherent shape but can be formed and reformed into almost any architectural configuration. Similarly, plaster is a powder until it mixes with water, and through a chemical reaction, hardens as a mass. In this way, plaster is different from clay since its ultimate form must either be set up in a mould within which it can cure or it must be carved by removing the material from it in its

solid state. Conversely, the materials that Schwitters used to create *Schloss und Kathedrale mit Hofbrunnen* already had defined shapes as natural or man-made objects that he found. By assembling instead of carving or casting their modelling materials, Schwitters and Finsterlin's assemblages would not permit the architect to create illustrations of any preconceived configuration of architectural form and space, but only those that the materials would dictate. This meant that by assembling found materials or simple building blocks, a German architect would be invited to speculate upon the efficacy of the forms and spaces as architecture thus creating the potential for new unforeseen discoveries.

Even though neither Schwitters nor Finsterlin use the German word "Modell" to identify their building blocks sets or Merz designs as three-dimensional representations of buildings, they are architectural models. This attribution is confirmed by a broad application of the term in early twentieth century encyclopaedias on architecture: Günther Wasmuth's *Lexikon der Baukunst* (Encyclopedia of Architecture) from 1929 and the later encyclopaedia of art from Otto Schmidt, the 1937 *Reallexikon zur Deutschen Kunstgeschichte* (Encyclopedia of German Art History), which was not completed.<sup>22</sup> In Wasmuth's encyclopaedia a "Modell" in the building arts is defined as "a three-dimensional representation of a building" constructed out of a variety of materials.<sup>23</sup> Eight years later, Ludwig Heydenreich repeated almost verbatim the same definition in his "Architekturmodell" entry for Schmitt's *Reallexikon zur Deutschen Kunstgeschichte*, adding "plastic" as a description of the three-dimensional representation: "Ein Architekturmodell ist die plastisch-dreidimensionale Darstellung eines Bauwerkes" (An architectural model is a plastic three-dimensional representation of a building construction).<sup>24</sup> However, Heydenreich used the term "Architekturmodell" instead of "Modell" and separated Wasmuth's definition of the term into a historical classification of types including: a) Entwurfmodelle (design models); b) Modelle nach gebauten Architekturen (models after built architectures); and c) Idealmodelle (ideal models).<sup>25</sup> Even today, Heydenreich's classification is frequently referenced in literature on architectural models and is broad enough to include almost any model created during the early twentieth century. Nevertheless, as tools for inspiring new architectural ideas, Schwitters and Finsterlin's modelling methods challenge the completeness of the above categories and suggest another role for three-dimensional representations of architecture: models as generators of new architectural designs.

Two of Schwitters and Finsterlin's contemporaries, the German architects Wassili Luckhardt and Mies van der Rohe, also experimented with the utility that different modelling materials and methods could afford the development of innovative architectural designs. In "Vom Entwerfen" (On Design), Wassili Luckhardt expressed a similar interest in the role modelling materials play in the design of architecture:

One lays pencil and ruler aside, takes clay or plasteline and starts to knead right from the beginning, immediately and uninfluenced, and one will be astonished by the unformed clumps that are seen on the modelling table, and that have none of the nice proportions from the drawing table. But one will notice to their astonishment that the light plays in these forms and that an air space surrounds this form. One will see by continuing the work,

how these forms grow into the air space and on the other hand, surround and enclose it.<sup>26</sup>

During the same period, Mies van der Rohe claims that he hung a glass model for his Hochhaus project outside his studio window to study and adjust the effect of sunlight on its glass walls. As Mies van der Rohe explained in the summer 1922 issue of *Frühlicht*, the results of this study are evident in the amoeba-like shape of the plan and the adjustment of the model's glass walls to obtain the desired illumination of the interior:

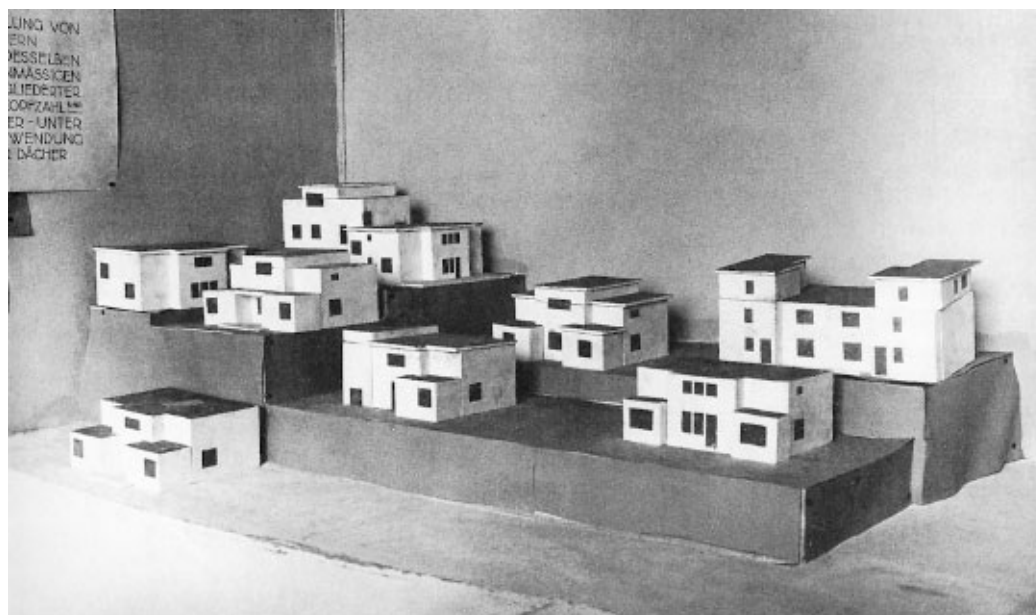
My experiments with a glass model showed me the way and I soon realized that with the use of glass, it does not depend upon the effect of light and shadow, but on the rich interplay of light reflections. That is what I have aimed for with the design published here. At first glance the contour of the ground plan appears arbitrary, but in reality it is the result of many experiments on the glass model. The curves were determined by the need to illuminate the interior, the effect of the building mass in the urban context, and finally the play of the desired light reflection.<sup>27</sup>

In these examples, like those presented by Schwitters and Finsterlin, the model is not created as an illustration of a preconceived design but is the result of a process by which the modelling material or its method of construction was a catalyst for its conception. Yet, the models resulting from Luckhardt and Mies' modelling methods were scaled illustrations of proposed designs. Conversely, for Schwitters and Finsterlin, the making of an architectural model are examples of a contemporary fascination amongst German architects with the construction and emulation of building block sets in architecture.

Walter Gropius' 1922 Bauhaus student and faculty housing project demonstrates one of the most familiar examples for the use of building blocks as a conceptual idea for the design of architecture.<sup>28</sup> Working together with the Hungarian architect Fréd Forbát, Gropius sought to plan the estate based upon "the standardization of individual components from which different types of buildings could be composed."<sup>29</sup> Gropius presented this project at the 1923 *Bauhaus Ausstellung* as an assembly of plaster blocks created by Forbát that he referred to as *Baukasten im Grossen* (Building Blocks in Large-Scale).<sup>30</sup> Forbát's model details the use of building blocks as a conceptual idea for a flexible modular design – each house is based on the selection and assembly of simple components reduced to basic forms and colours (Figure 12.4). Two years later, Gropius' former student Alma Siedhoff-Buscher, produced a toy ship, consisting of more than twenty multi-coloured wood blocks to explore fundamental relationships of form, colour, space and balance that were reminiscent of the Bauhaus *Vorlehre* (Basic Course).<sup>31</sup> Also during this time, Bruno Taut created a series of building designs with a set of coloured solid-glass children's building blocks called *Dandanah, The Fairy Palace*, invented by Blanche Mahlberg.<sup>32</sup> Although Finsterlin intended his set of building blocks as a toy, he also promoted it as a *Versuchbaukasten* for architects. Rather, compared to Gropius or Blanche Mahlberg in particular, it was the imaginative activity of a child engaged in *Bauspiel* that both Schwitters and Finsterlin sought to sublimate into the design practices of



architects.

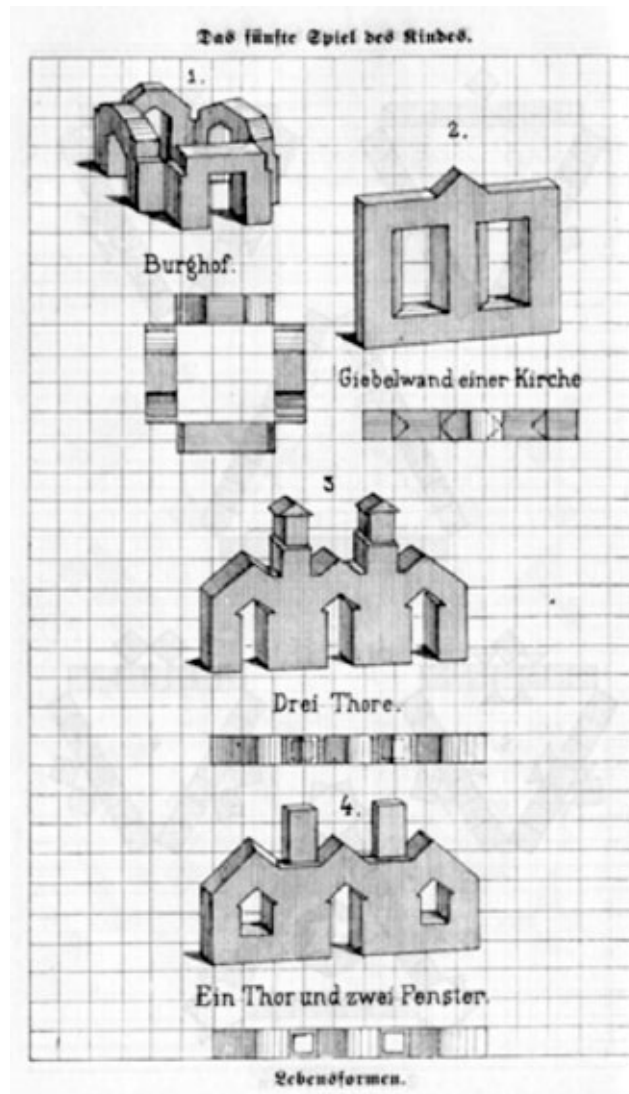


**FIGURE 12.4** Walter Gropius, *Bauhaus Siedlungshäuser* (Bauhaus Settlement Housing), 1921–23

## *Bauspiele* (building play)

Both Schwitters and Finsterlin openly identified the confluence between building play and building design in the descriptions of their modelling methods. As Finsterlin explained in “Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel,” his building block set was a study tool for architects that he claimed would like to seize the impartiality of the child to rid themselves of their cultural inhibitions.<sup>33</sup> This assembly of objects as architecture was also encouraged by the early twentieth century German *Baukasten* (toy building block set) produced out of artificial stone by Friedrich Adolf Richter. In a 1915 advertisement for the *Anker-Steinbaukasten* (Anker Stone Building Block Set) titled *Bauspiele* (building play), the play with small stone building blocks was promoted as a medium by which children could be endowed with the diverse opportunities for discovery (Figure 12.5): “Even for small children the solid, big building blocks are a welcome toy with which they can build imaginatively and again destroy the construct without fear of breaking something.”<sup>34</sup> In the poverty of a post-war urban environment, the likelihood German children were also playing with found objects had if anything increased. A writer of children’s books, Jean Fondin, along with a scholar on the history of toys, Jac Remise observe how “[c]hildren are no respecters of property ... costliness usually means nothing to them ... Favorite toys are often mere *objets trouvés* [found objects], fugitives from the trash-can.”<sup>35</sup> Schwitters associated his own design method with this same play of a child with found materials, recounting in the introduction to “*Schloss und*

*Kathedrale mit Hofbrunnen*” his wife’s journey home after collecting the model:



**FIGURE 12.5** Friedrich Fröbel, *Das fünfte Spiel des Kindes* (The Fifth Play of the Child), 1883

In the streetcar, the passengers were looking at the design curiously. Finally, the conductor emboldened himself to ask what that should actually be. My wife said evasively, it would be a castle, a church and a well, and her boy had nailed it together. Whereupon the conductor said, that it was very beautiful, that he had thought so, and it showed a very healthy imagination. If my wife had said that I, as an adult painter of art, had nailed a medicine cork, a beech and pine stump on a diagonal board so that the whole gives the impression of a castle-like arrangement at a mountain slope to refresh an architect’s imagination, the conductor would have probably said that is what he imagined, but that it looked like an imagination enhanced morbidly. What an injustice.<sup>36</sup>

In this article, Schwitters continues to demand that architects accept a child’s *Bauspiel* (building play) with found objects as castles, cathedrals or wells as a legitimate design method

for architects. By sublimating the building play of a child into the modelling practices of architects, Schwitters and Finsterlin's constructions promote a use for the architectural model that is fundamentally different to the scale illustration of an architectural idea. In its place, they imagine a method for freeing architects' imaginations through abstract representations of architecture.

In 1908, the German art historian Wilhelm Worringer proposed an aesthetic theory based upon a cyclical movement between abstract or empathetic representations of art that resonates with Schwitters and Finsterlin's modelling methods.<sup>37</sup> Meditating on an increased use of abstraction in pre-war European art and Expressionism in particular, Worringer reasoned in his doctoral dissertation, *Abstraction and Empathy* that a tendency towards the abstract occurred when a culture was unsure of the world around them and wished to escape the representation of the real world into an inner world.<sup>38</sup> Conversely, Worringer associated the drive to naturalistic (or realistic) representation as resulting from a feeling of control over nature accompanied by an urge to "empathize," or lose oneself in the outside natural "reality" and ultimately within the perspectival space.<sup>39</sup> Schwitters and Finsterlin's proposed use of found objects and building blocks to create models of architecture demonstrate Worringer's theory of abstraction. Schwitters and Finsterlin, who began their careers as Expressionist artists, each suggested in their own unique ways, that a new German architecture could be created by escaping the realistic representation of architecture to the immaterial inner world of a child engaged in *Bauspiel* (building play) with building blocks.

A critical point of comparison between the play of a child with found objects and the assemblage of found objects as models of architecture is that both encourage the imagination of the participant to participate in a game of "make-believe." For two children, make-believe begins when an agreement is made that, for example, a pile of snow is a fort. Kendall Walton, a philosopher on the points of coincidence between toys and art, has argued that this fort is a found object, with which children play as a prop and that it prompts them to imagine what they might not otherwise be imaginative enough to invent on their own. By interpreting the pile of snow as a prop, they do not merely imagine a fort with turrets, a tower, and a moat. Rather, they imagine that the actual heap of snow is *itself* a fort.<sup>40</sup> Hence, when it is true in a game of make-believe that the pile of snow is a fort, it is fictional, and because it is fictional, it is a fictional truth.<sup>41</sup> For Walton, adults employ this same form of interpretation when they encounter, for example, Pablo Picasso's 1943 assemblage of a *Bull's Head* as art.<sup>42</sup> While the pile of snow is an ad hoc prop pressed into service for a game of make-believe, a child's doll and Picasso's *Bull's Head* were made to be a baby and a work of art respectively. Accordingly, Schwitters and Finsterlin's naming of an assemblage of found materials or building blocks as a model of architecture implied that we are to make-believe it is this thing as a fictional truth.

Yet, Schwitters, Finsterlin and Gropius' ideas about the interpretation of found objects or building blocks as architecture are not original but received their theoretical foundation during the first half of the nineteenth century in the lessons of Friedrich Fröbel's (1782–1852) kindergarten program. Fröbel's interest in the use of building blocks as an educational toy can

be traced to his studies at the University of Jena in 1799 when he became inspired by the philosophy of Johann Gottlieb Fichte, early German Romantic literature, art and the developing evolutionary theories in science.<sup>43</sup> As he recalled, at Jena, “I could already perceive the unity in diversity, the correlation of forces, the interconnection of all living things, life in matter, and the principles of physics and biology.”<sup>44</sup> It was during this time that Fröbel developed a desire to pursue a type of work that would allow him to “ennoble mankind” with these principles and he initially decided to study architecture before beginning a career in childhood education. Perhaps it was this experience that permitted him to recognize that supervised building play was a means of enabling children to see a divine unity permeating the universe.<sup>45</sup> As Fröbel explained in the introduction to his book *The Education of Man*:

To him whose mind, through disposition and faith, is filled, penetrated, and quickened with the necessity that this can not possibly be otherwise, as well as to him whose clear, calm mental vision beholds the inner in the outer and through the outer, and sees the outer proceeding with logical necessity from the essence of the inner, this law has been and is enounced with equal clearness and distinctness in nature (the external), in the spirit (the internal), and in life which unites the two.<sup>46</sup>

This concept of an inner unity to all physical things was the basis on which he developed a series of kindergarten lessons between 1835–50 for children aged three to seven. His pedagogy used geometrical objects, such as a ball, cylinder, and a cube, each called “gifts,” and the activities prompted by the engagement with these gifts, he called “occupations.”<sup>47</sup>

For Fröbel, the aim of his Kindergarten activities was to encourage the investigation of the relationship between the whole and part and provide them the opportunity to make their own use, application, or modification of what they had learned. As Fröbel explained in *Pedagogics of the Kindergarten*:

After comprehending the outside of the object, the child likes also to investigate its inside; after a perception of the whole, to see it separated into its parts; if he obtained a glimpse of the first, if he has attained the second, he would like from the parts again to create a whole.<sup>48</sup>

The goal of the part–whole exercise was to allow children to create their own original constructions since, “God created man in his own image; therefore, man should create and bring forth like God.”<sup>49</sup> This creative ability of the child to discover an inner unity between unrelated elements was the entire basis of Fröbel’s Kindergarten lessons and resonates in Schwitters and Finsterlin’s modelling methods.<sup>50</sup>

## Conclusion

By assembling found objects or building blocks into models of architecture, Schwitters and Finsterlin sought to extend assemblage to architects as a modelling method for inspiring new designs. Compared to the normative practices of early twentieth century architects to cast plaster or mould clay into illustrations of predetermined architectural designs, the materials Schwitters and Finsterlin proposed to assemble into architectural models announced a significant change in the design practices of architects still felt today. Recent examples of this practice include Frank Gehry's use of crumpled paper for his 1995 Samsung Museum of Modern Art, Allied Works 2011 split timber model for their Musée Cantonal des Beaux-Arts (MCBA) competition entry or the Swiss architect, Peter Zumthor's stone model of his 1996 completed Vals Thermal Bath project. By interpreting an assemblage of objects that are found as crumpled paper, split timber or quarried stone as a model of architecture, the architect is engendered to speculate by inserting their imaginations precisely between wondering at and asking what if.<sup>51</sup> In the hand of the architect, the translation of an inner unity amongst Schwitters and Finsterlin's found objects or building blocks "onto the representative material as well as onto constructive possibilities" of architecture, from immaterial to material, is as Schwitters explained, "a question of working through it. The draft gives the stimulation."<sup>52</sup>

## Notes

- 1 Aristotle, *The Physics*, trans. Philip H. Wicksteed and Francis M. Cornford (Cambridge, MA: Harvard University Press, 1980), 113, 123, and 129.
- 2 Leon Battista Alberti, *On the Art of Building in Ten Books*, trans. Joseph Rykwert, Neil Leach and Robert Tavenor (Cambridge, MA: The MIT Press, 1996), 7 and 317.
- 3 Vitruvius, *Ten Books on Architecture*, trans. Ingrid D. Rowland (Cambridge, MA: Cambridge University Press, 1999), 34.
- 4 Marc-Antoine Laugier, *An Essay on Architecture* (Los Angeles: Hennessey & Ignalls, 1977), 11–12.
- 5 I have exchanged the word "exemplar" for "model." See Vitruvius, 55.
- 6 Bruno Taut, "Eine Notwendigkeit," *Der Sturm* 4, nos. 196–97 (February 1914), 174–75.
- 7 Ibid.
- 8 Finsterlin's intention that his building block set could be used as a study tool for architects is suggested by the term "Versuchsbaukasten" (Experimentation Building Block Set) in the subtitle to his article "Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel: Ein Lehr-, Spiel- und Versuchsbaukasten." In the concluding paragraph of this article, Finsterlin described how the innocence of the child who sees the world without already formed cultural ideas of architecture is an ideal model for the people searching for the development a new architectural forms: "Von jeher war die Verwandtschaft klar zwischen dem unverbildeten Kinde und Naturmenschen, dem Kulturhemmungen überwinden Narren und dem Genius." (Since ever was the relationship clear between the unspoiled child and the primitive human being, between the fool that overcame the cultural inhibition and to the genius.) In: Finsterlin, "Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel," 158.
- 9 Hermann Finsterlin, "Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel," *Frühlicht* 1, no. 3 (Spring 1922); Reproduced in: Bruno Taut, *Frühlicht 1920–1922: eine Folge für die Verwirklichung des neuen Baugedankens* (Berlin: Ullstein, 1963), 149–58. See specifically 153.
- 10 Ibid., 158.
- 11 In both his article "Merz" and his autobiographical statement of 1930 titled "Kurt Schwitters," Schwitters is critical of academic painting for its creative limitations. See Luckhardt, "Vom Entwerfen," 5, 74–76 and 335.
- 12 Schwitters studied two semesters of Architecture at the Technische Hochschule Hannover. See: Universitätsarchiv Hannover Akz. 2000/05 Matrikelverzeichnis der Technischen Hochschule Hannover WS 1911/12 – SS 1920; and Kurt Schwitters, "Daten aus meinem Leben," typewritten manuscript reproduced in Luckhardt, "Vom Entwerfen," 5, 241.
- 13 See Kurt Schwitters, "Schloss und Kathedrale mit Hofbrunnen," *Frühlicht* 1, no. 3 (Spring, 1922): 87. Reproduced in Taut,

*Frühlicht 1920–1922*, 166–67.

- 14 Author's translation of the German original: "Der Merzentwurf für die Architektur verwendet jedes beliebige Material nach architektonischem Gefühl, um eine Wirkung zu erzielen, welche die Architektur nachbilden kann. Die Verwendung beliebiger Materialien bedeutet eine Bereicherung der Phantasie. Die Phantasie arbeitet in diesem Falle rhythmisch mit schon gegebenen Rhythmen. Das Transportieren des Entwurfs auf darstellendes Material sowie auf konstruktive Möglichkeiten ist Sache der Durcharbeitung. Der Entwurf gibt die Anregung." Ibid., 166.
- 15 The entire sentence reads: "Hätte meine Frau gesagt, dass ich als erwachsener Kunstmaler einen Arzneikork, einen Buchen- und einen Kiefernstumpf auf ein schräges Brett genagelt hätte, damit das Ganze den Eindruck einer schlossartigen Anlage am Bergabhang mache, und damit ein Architekt seine Phantasie auffrischen könnte, so würde der Schaffner wahrscheinlich gesagt haben, das hätte er sich auch gedacht, aber das zeuge von einer krankhaft gesteigerten Phantasie." (If my wife had said that I, as an adult painter of art, nailed a medicine cork, a beech log and pine stump on a diagonal board so that the whole gives the impression of a castle-like arrangement at a mountain slope to refresh an architect's imagination, the conductor would have probably said, that is what he imagined, but that it looked like an imagination enhanced morbidly.) Ibid.
- 16 Schwitters stated: "Als meine Frau den Entwurf vom Photographen abholte, musste sie ihn offen tragen, weil die Spitzen des Kiefernstumpfes, der den gotischen Dom darstellt, schon sehr mürbe sind." (When my wife fetched the design from the photographer, she had to carry it openly, because the points of the pine stump, which represents the Gothic cathedral, were already very rotten.) Ibid.
- 17 See note 15.
- 18 Hermann Finsterlin, "Formdomino und Zukunftsarchitektur," in Reinhard Döhl, *Hermann Finsterlin* (Stuttgart: Staatsgalerie Stuttgart, 1988), 323–29. Reproduced in Manfred Speidel, Karl Kegler and Peter Ritterbach, *Wege zu einer neuen Baukunst: Bruno Taut: Frühlicht: Konzeptionskritik* H. 1–4 and *Rekonstruktion* H. 5 (Berlin: Mann, 2000), 88–94. References to this work are hereafter made to this reproduction.
- 19 In the three examples given with the reproduction of the article, one shows a horn-shaped block of wood amongst other cut shapes deriving from cubes, spheres, cones and cylinders. See: Ibid., 89, 91 and 93.
- 20 The original German text states: "Das Modell ist uns vor allem die Brücke von der Vorstellung zur stofflich erwachsenen, nach den Sichtverhältnissen der Größe berichtigen Endformen; die Gegenprüfung des Geistes im Stoff, ein einzigartiges Asyl der Präformation." Ibid., 89.
- 21 See note 14.
- 22 *Wasmuth's Lexikon der Baukunst*, ed. Günther Wasmuth, Leo Adler, Georg Kowalczyk, vol. 3 (Berlin: Ernst Wasmuth, 1931), 628. s.v., "Modell"; Ludwig H. Heydenreich, "Architekturmodell," in Otto Schmitt, *Reallexikon zur Deutschen Kunstgeschichte* (Stuttgart: J.B. Metzlersche Verlagsbuchhandlung, 1937), 918–40.
- 23 "Modell, vom ital. modello = Vorbild, Musterbild, ist die dreidimensionale Darstellung eines Bauwerkes, Werk-oder Konstruktionsteiles usw. in Holz, Ton, Wachs, Kork, Papier oder Sondermassen." (Modell, from Italian modello = Vorbild, Musterbild, is a three-dimensional representation of a building, structure, or part of structure, etc. in wood, clay, cork, paper or special masses.) Ibid.
- 24 Heydenreich, 921. s.v. "Architekturmodell."
- 25 Ibid., 921–22.
- 26 "Man lege Bleistift und Lineal beiseite, nehme Ton oder Plastelin und fange an, ganz von vorn, ganz unvermittelt und unbeeinflusst zu kneten und man wird erstaunt sein über die ungefügten Klumpen, die da zunächst auf dem Modelliertisch zu sehen sind, und die nichts von den schönen Proportionen auf dem Reißbrett an sich haben. Aber man wird zu seinem Erstaunen bemerken, daß das Licht in diesen Formen spielt, daß ein Luftraum diese Form umgibt. Man wird beim Weiterschreiten der Arbeit sehen, wie diese Formen in den Luftraum hineinwachsen und ihn anderseits wieder umfassen und ihn einschließen." Wassili Luckhardt, "Vom Entwerfen," in *Stadtbaukunst alter und neuer Zeit*, vol. 11, (1921). Reproduced in: *Brüder Luckhardt und Alfons Anker: Berliner Architekten der Moderne* (Berlin: Akademie der Künste, 1990), 122.
- 27 "Meine Versuche an einem Glasmodell wiesen mir den Weg, und ich erkannte bald, dass es bei der Verwendung von Glas nicht auf eine Wirkung von Licht und Schätzen, sondern auf ein reiches Spiel von Lichtreflexen ankam. Das habe ich bei dem anderen hier veröffentlichten Entwurf angestrebt. Bei oberflächlicher Betrachtung erscheint die Umrisslinie des Grundrisses willkürlich, und doch ist sie das Ergebnis vieler Versuche an dem Glasmodell. Für Kurven waren bestimmend die Belichtung des Gebäudeinneren, die Wirkung der Baumasse im Strassenbild und zuletzt das Spiel der erstebten Lichtreflexe." Ludwig Mies van der Rohe, "Hochhäuser," *Frühlicht* 1, no. 4 (Summer 1922); Reproduced in: Taut, *Frühlicht 1920–1922*, 212–13.
- 28 See: Klaus-Jürgen Winkler, *Die Architektur am Bauhaus in Weimar* (Berlin: Verlag für Bauwesen, 1993), 85–86.

- 29 Fréd Forbát, *Erinnerungen eines Architekten aus vier Ländern*. Quoted from Nerding (1985), 58, n.3; Forbát, 66 after Magdalena Droste, *Bauhaus 1919–1933* (Köln: Taschen, 2002), 111–12.
- 30 Forbát identifies himself as the producer of the plaster model. See: *Ibid.*
- 31 Alma Seidhoff-Buscher produced her toy ship building blocks set while an architecture student at the Bauhaus. For Seidhoff-Buscher, “Unser Spielzeug: Die Form – einfach – unverwirrend klar und bestimmt – Vielfältigkeit und Reize schafft das Kind selbst durch Zusammenstellen, Bauen.” (Our toy: the form – simple – without confusion – clear and certain – variety and charm the child creates themselves through the putting together, by building.) Reproduced in Gunda Luyken, “Kunst ein Kinderspiel,” in: *Kunst ein Kinderspiel*, edited by Max Hollein (Frankfurt am Main: Revolver – Archiv für aktuelle Kunst, 2004), 37, n. 84. Seidhoff-Buscher’s principles recall those that Johannes Itten established for the Basic Course at the Bauhaus until 1923. Herbert Schubert, “Toys and the Modernist Tradition,” in *Toys and the Modernist Tradition* (Montréal: Centre Canadien d’architecture, 1993), 18.
- 32 Taut’s promotion of Blanche Mahlberg’s glass blocks is found in Blanche Mahlberg and Bruno Taut, “Dandanah der Märchenpalast: Baustein aus massiven Glas,” in Speidel, Kegler and Ritterbach, *Wege zu einer neuen Baukunst*, 86–87.
- 33 In the concluding paragraph of his article, Finsterlin explained: “Von jeher war die Verwandtschaft klar zwischen dem unverbildeten Kinde und Naturmenschen, dem Kulturhemmungen überwindenden Narren und dem Genius.” (Since ever was the relationship clear between the unspoiled child and the primitive human being, between the fool who overcame the cultural inhibition and to the genius.) In: Finsterlin, “Die Genesis der Weltarchitektur oder die Deszendenz der Dome als Stilspiel,” 158.
- 34 “Schon die kleinen Kinder erhalten durch die festen, grossen Bausteine ein willkommenes Spielzeug, mit dem Phantasie aufbauen und das Aufgebaute wieder einwerfen können.” Claude Jeanmaire, “Bauspiele,” *Deutsches Spielzeug zur Kriegszeit* (1915) (1915; repr. Verlag Eisenbahn, 1986), 25.
- 35 Jean Fondin and Jac Remise, *The Golden Age of Toys*, trans. D.B. Tubbs (Lausanne: Edita, 1967), 12.
- 36 “In der Straßenbahn wurde der Entwurf neugierig von den Fahrgästen betrachtet. Schließlich ermutigte sich der Schaffner, zu fragen, was denn das eigentlich sein sollte. Meine Frau sagte ausweichend, es wäre ein Schloss, eine Kirche und ein Brunnen, und ihr Junge hätte das zusammengenagelt. Darauf sagte der Schaffner, es wäre sehr schön, das hätte er sich wohl gedacht, und es zeigte eine sehr gesunde Phantasie. Hätte meine Frau gesagt, daß ich als erwachsener Kunstmaler einen Arzneikork, einen Buchen- und einen Kiefernstumpf auf ein schräges Brett genagelt hätte, damit das Ganze den Eindruck einer schlossartigen Anlage am Bergabhang mache, und damit ein Architekt seine Phantasie auffrischen könnte, so würde der Schaffner wahrscheinlich gesagt haben, das hätte er sich auch gedacht, aber das zeuge von einer krankhaft gesteigerten Phantasie. Mit Unrecht.” Schwitters, “Schloss und Kathedrale mit Hofbrunnen,” 166.
- 37 Wilhelm Worringer, *Abstraction and Empathy* (Chicago: Ivan R. Dee, 1997), 3–d4.
- 38 *Ibid.*, 15.
- 39 *Ibid.*, 4–5.
- 40 *Ibid.*, 25.
- 41 *Ibid.*, 35.
- 42 *Ibid.*, 276–77.
- 43 Klaus Giel, *Fichte und Fröbel: die Kluft zwischen konstruierender Vernunft und Gott und ihre Überbrückung in der Pädagogik* (Heidelberg: Quelle & Meyer, 1959).
- 44 Friedrich Fröbel, *Autobiography of Friedrich Fröbel*, trans. Emilie Michaelis and H. Keatly Moore (Syracuse: C.W. Bardeen, 1889), 31–32.
- 45 Ernest E. Bayles and Bruce L. Hood, *Growth of American Educational Thought and Practice* (New York: Harper & Row, 1966), 170; and Friedrich Fröbel, *The Education of Man* (Honolulu, Hawaii: University Press of the Pacific, 2004), 4–5.
- 46 Fröbel, *The Education of Man*, 1–2.
- 47 Robert B. Downs, *Friedrich Fröbel* (Boston: Twayne Publishers, 1978), 47; and Bayles and Hood, *Growth of American Educational Thought and Practice*, 175.
- 48 Friedrich Fröbel, *Pedagogics of the Kindergarten*, trans. Josephine Jarvis (New York: D. Appleton, 1896), 118, after Norman Brosterman, *Inventing Kindergarten* (New York: Harry N. Abrams, 1997), 50, n. 5.
- 49 Friedrich Fröbel, *The Education of Man*, 31 after Bayles and Hood, *Growth of American Educational Thought and Practice*, 176; See also Downs, *Friedrich Fröbel*, 48–49.
- 50 For example, see: Brosterman, *Inventing Kindergarten*.
- 51 Matthew Mindrup, “The Resistance of Factures in Drawing-out Architectural Constructions,” in *The Material Imagination: Reveries on Architecture and Matter*, edited by Matthew Mindrup (Farnham: Ashgate Publishing, 2015), 57–68.
- 52 *Ibid.*, 14.

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