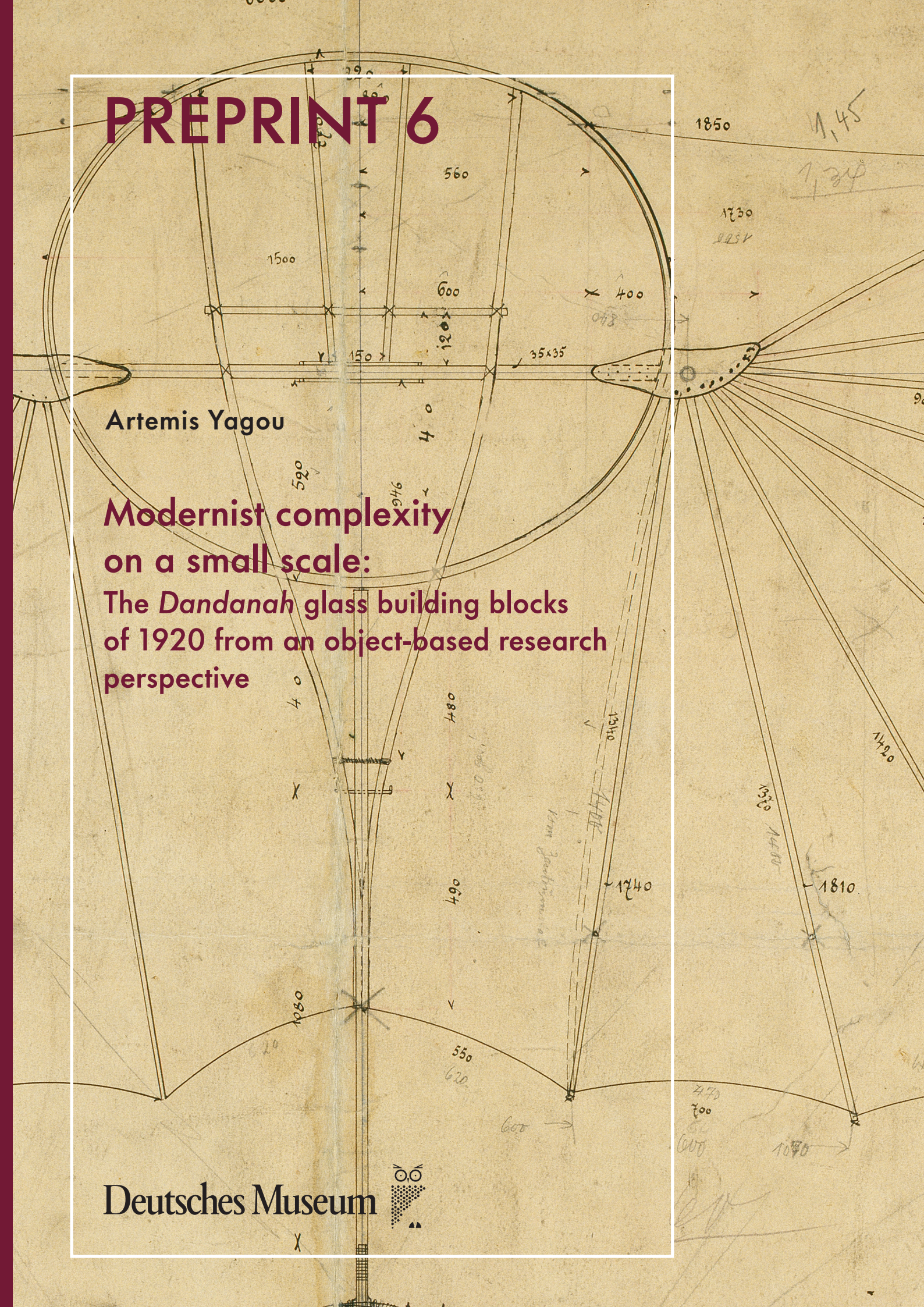

PREPRINT 6

Artemis Yagou

Modernist complexity on a small scale:

The *Dandanah* glass building blocks of 1920 from an object-based research perspective

Deutsches Museum

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2013

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Contents

Abstract

Diese Studie basiert auf Forschungen über die Sammlung von technischem Spielzeug im Deutschen Museum, München, die die Autorin als Scholar in Residence am Forschungsinstitut des Museums bearbeitet hat.

Technisches (oder Konstruktions-) Spielzeug stammt aus der Welt der Technik und Maschinen. Es wird zugleich aber auch vom zeitgenössischen architektonischen und kulturellen Umfeld inspiriert und entwickelt sich entlang dieser Prägung durch Kultur und Gesellschaft.

Konkreter Gegenstand der Untersuchung war ein seltenes und ebenso eigenwilliges wie spannendes Objekt aus dem Depot des Deutschen Museums: die um 1920 entworfenen *Dandanah*-Bausteine, die primär dem Architekten Bruno Taut zugeschrieben werden. Das *Dandanah*-Bauspiel besteht aus 62 farbigen Glasbausteinen und damit aus einem Material, das Taut und seinen Zeitgenossen als ein Ausdruck von Reinheit, Unschuld und Hoffnung galt. In der Architektur dieser Zeit diente die Raumgestaltung mit Glas als innovatives und symbolisch aufgeladenes Element geradezu programmatischen Zwecken.

Die Tatsache, dass das *Dandanah*-Bauspiel in den Sammlungsfundus des Deutschen Museums Eingang fand, unterstreicht neben dem spielerischen vor allem auch den technischen Charakter. Die Analyse des Artefakts und seines soziokulturellen Kontexts betont seine Komplexität und seine inhärenten Widersprüche und zeichnet ein komplexes Bild: Das *Dandanah* lässt sich an der Schnittstelle von technischen und utopischen, Bildungs- und Aneignungsdiskursen zugleich verorten.

Toys are not really as innocent as they look.
Toys and games are the preludes to serious ideas.

Charles Eames

Introduction

The short-term research project on which this paper is based started with the objective of studying the technical toys in the collection of the Deutsches Museum from a design-historical perspective and examining their role as agents of knowledge and innovation.[1] Analysis of the toys in their historical context illustrates the ways in which these toys have acted as expressions of novel ideas about technology and about users' interaction with technology in daily life. Although the starting point was the entire collection, the research was narrowed down following an initial, exploratory stage, to focus specifically on a highly unusual as well as fascinating object from the Museum's depot: the *Dandanah* set of glass building blocks (figure 1). As soon as the author realised that the *Dandanah* offered ample scope for exploring a range of ideas, she decided to make this forgotten but expedient object the centre of her research project.

The origin of building blocks dates back to the 18th century; they were later systematized through the pioneering work of educator Friedrich Fröbel (1782–1852) and subsequently developed as the result of experimentation in different countries and through the use of various materials.[2] Nowadays, building blocks can be found in many different types of museums, including museums that are dedicated to toys and play, technology and everyday life. The toy exhibit at the Deutsches Museum is a young one; it opened on 14 December 1984 and has remained relatively unchanged. It includes objects illustrating the history of building blocks, classified in four parts on the basis of material: wooden building blocks, ceramic building blocks, metal construction sets and plastic construction sets. The collection is based on the premise held by the museum's founder Oskar von Miller and his friend and pedagogic consultant Georg Kerschensteiner that play is a learning method and a way to develop children's imagination. The toy collection is also underpinned by the belief that construction toys belong in a technical museum thanks to their affinity to reality and contribution to understanding.[3]

Indeed, through play, children and teenagers learn about the world around them and acquire skills in the use of tools and materials. Technological toys in particular pave the way to understanding how technologies work, help children develop manual dexterity and inspire them to make creative use of what they learn. At the same time, such toys reflect the state of technological advancement and the public perception of technology at that time.[4] Despite the highly attractive nature of the subject, research on toys and especially

1 Three-month Scholar in Residence fellowship at the Deutsches Museum, September–December 2011.

2 For an outline of the history of technical toys in general see: Harley, *Constructional Toys*, 1990; *Spielen-Lernen-Erfinden*, 1990; an initial study on the history of the *Dandanah* in particular, which has been very useful to the present essay, is the unpublished article by Speidel, *Stadtkrone und Märchenpalast*, 2011, see http://www.deutsches-museum.de/verlag/aus-der-forschung/preprint/.

3 *Spielen, Bauen, Experimentieren*, 1985, pp. 22–24.

4 Heckl, *Technology in a Changing World*, 2010.

technical toys is rather limited.[5] In a 1997 article, Burton describes the development of the history of toys through a survey of the literature and observes that, »There is still room for the kind of material-based research that a museum is well qualified to conduct.«[6] This is certainly true for the Deutsches Museum, whose toy collection is worth further research based on the objects themselves. Object-based study offers great potential for understanding the past; it appears to be a particularly fruitful direction for researchers and promises great intellectual rewards. As the Director of the British Museum observes, »Most of us learn history from books, but physical objects often give us much more immediate access to the ideas and concerns of the people who made them, to how they lived and what they believed in.«[7]

Figure 1: The *Dandanah* box

Acquisition, description and patent

The *Dandanah* (inventory number 1997-104) was acquired on 28 May 1997 from a private owner.[8] Since its acquisition, the toy has remained primarily in the depot; it has left the museum on rare occasions, for example for an exhibition on colour in Ulm in the early 2000s.[9] As it is made of glass, the object does not fit into the current, rather outdated

5 As far as the Deutsches Museum is concerned, the 1986 publication by Noschka and Knerr explores the material and pedagogical aspects of building blocks in the Museum's collection but has not been followed by other relevant work. Noschka and Knerr, *Bauklötze staunen*, 1986.

6 Burton, *Design History and the History of Toys*, 1997.

7 MacGregor, *A History of the World*, 2012, p. 3.

8 The toy was bought by Deutsches Museum from its former owner, Dr Ria Schöter (Munich), for 1000 German marks, see documentation accompanying the object. This may be considered a donation on behalf of the former owner, as the true value of the object is estimated at 40000 German marks. However, according to toy collection curator Dr Dirk Bühler, this was a case of direct donation as the donor only received an honorary certificate, conversation with Dr Bühler, 21 October 2011.

9 The publication *Die Farbe Weiss*, 2003, is related to this exhibition; the label for the *Dandanah* from that exhibition is still kept in the carton where the toy is stored.

structure of the toy collection where the exhibits are presented in four rooms, classified on the basis of their material (wood, stone, metal and plastic). Indeed, the *Dandanah* appears to be a unique case of a toy made of glass, a *sui generis* moment in the history of design.[10]

The *Dandanah* was designed to have 62 glass pieces. The exemplar to be found in the Deutsches Museum consists of 60 pieces:

- 4 spheres (red, green, yellow, blue) of circa two cm diameter;
- 6 cubes (three red, one blue, one green, one yellow) of circa two cm side;
- 20 orthogonal pieces (eight blue, four green, two yellow, six semi-transparent) of circa five cm long dimension and two cm short dimension;
- 16 prismatic pieces (six red, four blue, three green, three yellow) of circa two cm side;
- 14 half octagons (four blue, four yellow, two green, four semi-transparent) of circa five cm long dimension and two cm short dimension.

Figure 2

Figure 3

10 One could argue that, through the use of marbles, glass has been used as a material for children's playthings for centuries. See for example: *Alles über Murmeln*, no date. However, marbles do not fit into the category of construction or technical games, therefore the *Dandanah* is unique as a technical toy made of glass.

Figure 4

Figures 2–5: The *Dandanah* box and its contents

The pieces are placed in an octagonal wooden box with a sliding door (figures 2–5). In order to facilitate their placement and ordering, the positioning of the pieces is shown on a pattern sheet placed on the base of the box (figure 6). This pattern sheet (»packing plan«) indicates that there were 62 pieces in the original toy set, and it thus becomes possible to identify the two missing pieces: 1 green prism and 1 yellow prism. The box includes six octagonal, colour-lithographed sheets depicting examples of possible designs that can be made with the glass pieces (figures 7–12). The colours of the glass pieces are bright and appealing and, depending on lighting conditions, may generate unusual and beautiful reflections. Their surface is smooth and they are pleasing to handle and play with (figures 13–14). However, many of the extant pieces are partially damaged with sharp and dangerous edges. Photographs kept in the carton where the *Dandanah* box is stored indicate that the condition of the toy was very bad when it was acquired – many of the pieces were broken and the box even included numerous tiny shards of glass (figures 15–17). According to documentation accompanying the object, the toy underwent a process of restoration by specialist glass restauratrice Elena Agnini. Agnini notes the poor state of the object in her original evaluation – only six of the pieces were undamaged.

Figure 6: The packing plan

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

Figures 7–12: The six pattern sheets

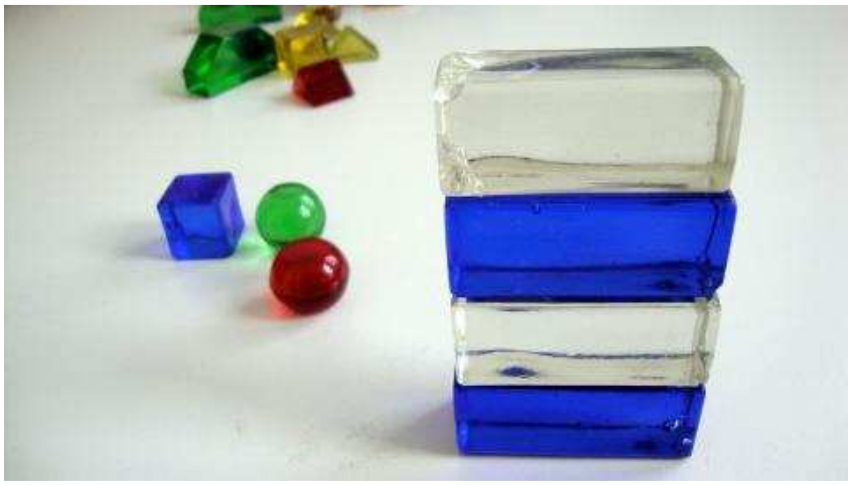
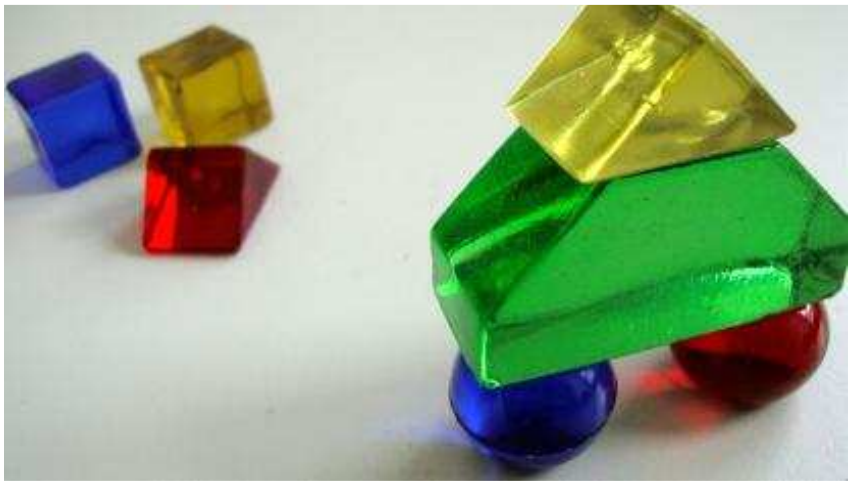


Figure 13



Figures 13–14: Using the glass blocks

Figure 15

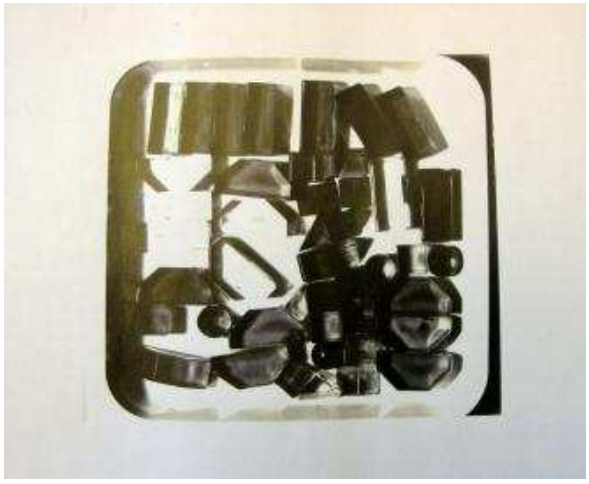
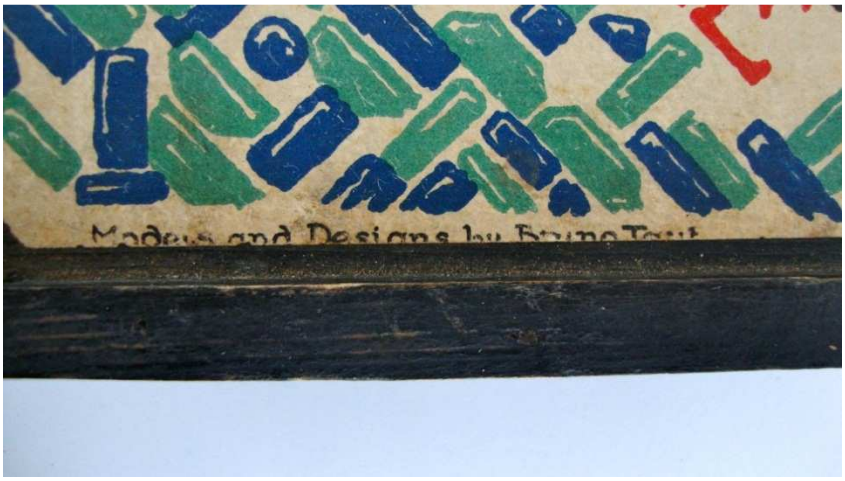


Figure 16

Figures 15–17: Documentation related to the initial state and restoration of the object

Figure 18



Figures 18–19: Attribution of invention and design on the box cover

The lid of the octagonal wooden box bears a multi-coloured illustration of a glass palace radiating light, an imaginary design that cannot be constructed with the contents of the box. The text of the illustration reads: »DANDANAH – THE FAIRY PALACE, Building blocks of solid GLASS, Invented by Blanche Mahlberg, Models and Designs by Bruno Taut« (figures 18–19). This introduces the question of who actually created the *Dandanah*, which is often attributed to the celebrated German architect Bruno Taut (1880–1938).[11]

11 A note of caution on the complexities of terminology: Some authors classify Taut as an expressionist, for example Haag Bletter, *The Interpretation*, 1981; Whitford, *Bauhaus*, 1988, p. 26; Woodham, *Twentieth Century Design*, 1997, p. 23; Benton, *Fantasy and Functionality*, 2006, pp. 148–173 and 167–168. On the other hand, Iain Boyd Whyte is quite sceptical of this terminology, which he claims has been used to describe anything and everything that falls outside the rationalist histories of architecture as originally defined by Pevsner and Giedion. He argues that the term does not adequately describe Taut and his circle and that the conceptual framework of Expressionism in architecture is too ill-defined to throw any light on the specific workings and dynamics of the Taut group. He calls for a new nomenclature and a more specific frame of reference; this, he believes, is

Although there is a tremendous amount of literature on Taut and his multifarious work, less is known about Paul and Blanche Mahlberg. According to one source, Paul Mahlberg, born in 1889 in Düsseldorf, was an art historian and architect who was involved in the 1914 Werkbund exhibition in Cologne, where he also served as member of the jury.[12] This was the exhibition where Taut presented one of his first major works, the famous *Glashaus*, which will be discussed later in greater detail. Paul Mahlberg was active as an architect and exhibition curator well into the post-war years.[13] Information on Blanche, Mahlberg's wife, is scarce; other than her maiden name (Solomonica) and birthplace (Berlin-Lichterfelde), it seems that nothing is known.[14] However, she appears to be the translator of H.G. Wells' *The Open Conspiracy*.[15] This is one of Wells' essays about working towards a utopian society; he describes how everyone in the world could take part in an »open conspiracy« which would »adjust our dislocated world«. Wells attempts to show how political, social and religious differences could be reconciled, resulting in a more unified, inter-cooperative human race.[16] Although the connection between Taut and the Mahlbergs remains unclear and undocumented, it may be inferred from the previous hints. We can assume that they all belonged to progressive, intellectual circles of inter-war Berlin sharing common beliefs; for example, utopian themes such as those in Wells' book, as we shall see, played a central role in the conception and design of the *Dandanah*. The fact that Blanche Mahlberg is credited with »inventing« the object whereas Taut is responsible for »Models and Designs« adds a layer of complexity. Over the years, Blanche Mahlberg was largely forgotten and, as we shall see, in future instances the *Dandanah* tends to be attributed to Taut only.

Trying to figure out the contribution made by the Mahlbergs leads us to an examination of the *Dandanah* patent. There are actually two patents filed for this object, one from the German Patent Office and the other from the Austrian Patent Office. The German patent, number 340301, is entitled »Building blocks for the construction of play buildings« (Bausteine zur Herstellung von Spielbauten); the application was filed on 27 October 1920 and the patent was granted on 7 September 1921 to »Dr. Paul Mahlberg and Blanche Mahlberg, née Solomonica in Berlin-Lichterfelde« (figure 20). The Austrian

offered by the concept of Activism. Iain Boyd Whyte, *Bruno Taut*, 2010. The matter of terminology and taxonomy is of secondary importance in this paper; I will therefore avoid classification or labelling of Taut and his work as it does not contribute to my own focus and arguments. See also note 17.

12 Speidel et al., *Wege*, 2000, p. 114.

13 Speidel, *Stadtkrone und Märchenpalast*, 2011.

14 Patentschrift 340301, Deutsches Patentamt, 7 September 1921; Patentschrift 91213, Österreichisches Patentamt, 10 February 1923; Speidel et al., *Wege*, 2000, p. 114.

15 Published in Berlin by P. Zsolnay in 1928 under the German title *Die offene Verschwörung: Vorlage für eine Weltrevolution* and republished as *Die offene Verschwörung: Aufruf zur Weltrevolution* in Frankfurt by Ullstein in 1986, as well as in Vienna by Zsolnay in 1983. *The Open Conspiracy* was published in English in 1928, a revised and expanded version published in 1930, and a further revised edition in 1931 titled *What are we to do with our Lives?* A final version appeared in 1933 under its original title. http://www.worldcat.org/identities/np-mahlberg,%20blanche (accessed 5 March 2013).

16 http://en.wikipedia.org/wiki/The_Open_Conspiracy (accessed 5 March 2013).

patent, number 91213, entitled simply »Construction toy« (Bauspiel) was applied for on 26 October 1921 and was granted to the same individuals on 10 February 1923 but is valid retrospectively from 15 July 1922 (figures 21–22). The main texts of the German and Austrian patents are practically identical and are accompanied by the same illustration (figure 23). The patent text describes the object in question as a children's toy made of blocks of transparent material, specifically coloured glass, whose forms are based on the regular octagon. A large part of the patent text is devoted to the geometrical attributes and relative dimensions of the blocks.[17] The patent text claims that these octagon-derived shapes make it possible to create special and unique constructions, such as bridge-like structures, which were not feasible with previous types of building blocks; examples of such constructions are given in Figures 3, 4 and 5 of the patent illustration. The claim appears rather presumptuous and quite unconvincing; observation of older wood or stone building blocks, for example from the Deutsches Museum collection, shows that such roof and bridge shapes had been realised with pre-existing building blocks, for example those made of ceramic material (figures 24–25).

DEUTSCHES REICH

AUSGEGEBEN AM 7. SEPTEMBER 1921

REICHSPATENTAMT

PATENTSCHRIFT

— № 340301 —

KLASSE 77f GRUPPE 23

Dr. Paul Mahlberg und Blanche Mahlberg geb. Solomonica in Berlin-Lichterfelde.

Bausteine zur Herstellung von Spielbauten.

Patentiert im Deutschen Reiche vom 27. Oktober 1920 ab.

Die Erfindung bezieht sich auf ein Kinderspielzeug und betrifft Baukästen zur Herstellung von Spielbauten. Die Bausteine werden aus durchsichtigen oder durchscheinenden Stoffen, insbesondere aus farbiger Glasmasse hergestellt, und sie werden in Formen zu Baukästen vereinigt, die sich aus den Abmessungen des regelmäßigen Achtecks ableiten.

Gemäß der Erfindung werden Steine in der Gestalt eines halben Achtecks, Steine in Säulenform von der Länge des Abstandes der Parallelseiten des Achtecks, Steine mit einer quadratischen Stirnfläche von der Seitenlänge des Achtecks und Säulen von einer Länge gleich dem 3,4fachen der Achteckseitenlänge zu Baukästen vereinigt. Die Vereinigung dieser Formen, insbesondere in Verbindung mit den an sich für diese Zwecke bereits bekannten farbigen Glasstoffen, ermöglicht die Aufführung von eigenartigen, den Formensinn anregenden Bauformen; es können strebenden, dachstuhl- und brückenartige Gebilde mit einfachsten Mitteln errichtet werden, die sich mit den bekannten Steinformen nicht ausführen lassen.

Die Erfindung wird durch die Zeichnung beispielsweise veranschaulicht. Fig. 1 und 2 zeigen schaubildlich die wichtigsten Grundformen der Steine in ihrem Zusammenhange mit dem regelmäßigen Achteck; Fig. 3 und 4 zeigen in Ansicht einige Möglichkeiten der Zusammensetzung von Bausteinen zu neuartigen Gebilden (Dachstuhlformen) mit einigen Hilfssteinformen, die gleichfalls aus dem Achteck abgeleitet sind; Fig. 5 zeigt schaubildlich einen Teil eines aus den Grundformen aufgebauten Spielbaues.

Die Steinform 1 (Fig. 1) hat als Steinfläche eine Hälfte eines regelmäßigen Achtecks von der Seitenlänge a; die Teillinie verbindet dabei die Mitten zweier gegenüberliegender Parallelseiten.

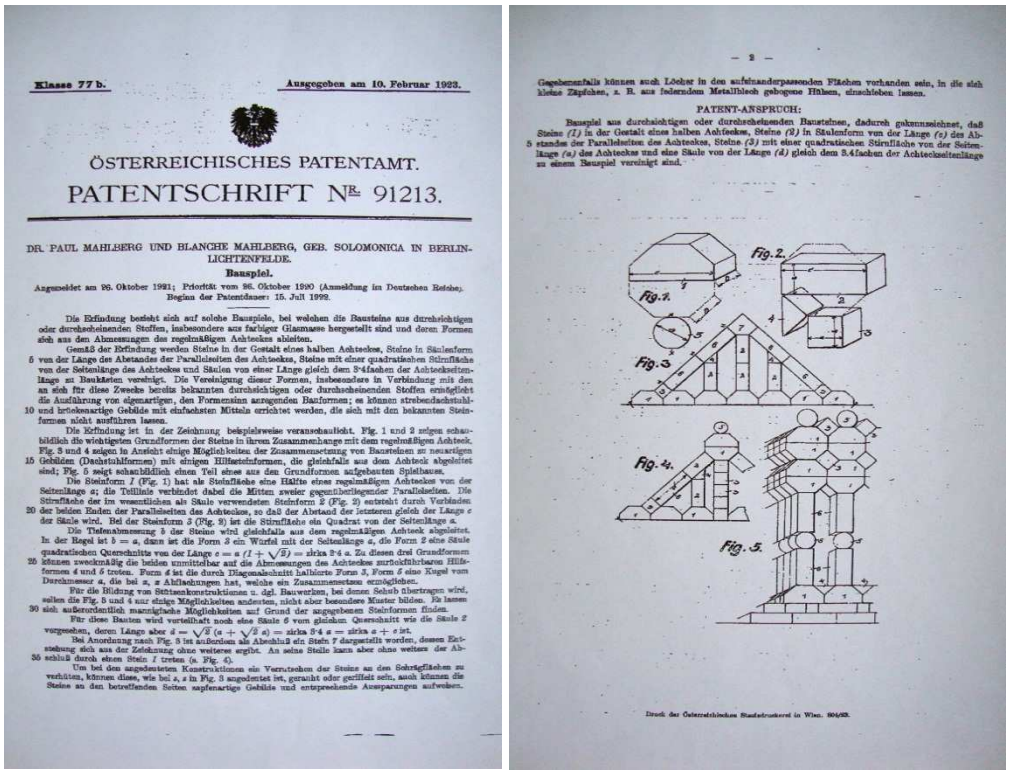
Die Stirnfläche der im wesentlichen als Säule verwendeten Steinform 2 (Fig. 2) entsteht durch Verbinden der beiden Enden der Parallelseiten des Achtecks, so daß der Abstand der letzteren gleich der Länge c der Säule wird. Bei der Steinform 3 (Fig. 2) ist die Stirnfläche ein Quadrat von der Seitenlänge a.

Die Tiefenabmessung b der Steine wird gleichfalls aus dem regelmäßigen Achteck abgeleitet. In der Regel ist $b = a$, dann ist die Form 3 ein Würfel mit der Seitenlänge a, die Form 2 eine Säule quadratischen Querschnitts von der Länge $c = a\,(1+\sqrt{2})$ $= c \approx 2{,}4 \cdot a$. Zu diesen drei Grundformen können zweckmäßig die beiden unmittelbar auf die Abmessungen des Achtecks zurückführbaren Hilfsformen 4 und 5 treten. Form 4 ist die durch Diagonalschnitt halbierte Form 3, Form 5 eine Kugel vom Durchmesser a, die bei x, x Abflachungen hat, welche ein Zusammensetzen ermöglichen.

Für die Bildung von Stützenkonstruktionen und dergleichen Bauwerken, bei denen Schub übertragen wird, sollen die Fig. 3 und 4 nur einige Möglichkeiten andeuten, nicht aber besondere Muster bilden. Es lassen sich außerordentlich mannigfache Möglichkeiten auf Grund der angegebenen Steinformen finden.

Figure 20: The first page of the German patent

17 Again, one should be wary of conventional classifications and assumptions. In expressionist design, the basic orthogonal system that underlies most of Western Architecture is mainly ignored, see Haag Bletter, *The Interpretation of the Glass Dream*, p. 20. This is of course untrue for the *Dandanah*, whose geometric properties deriving from the octagonal are laid out in great detail and described with a number of mathematical equations in the patent. Therefore, the expressionist label would be inappropriate for the object, although it may seem fit because of the object's strong emotional appeal. This, as we shall see, is not the only contradiction that emerges from the study of this unusual object and is an indication of the fascination it generates. See also note 11 on terminology.



Klasse 77 b. Ausgegeben am 10. Februar 1923.

ÖSTERREICHISCHES PATENTAMT.

PATENTSCHRIFT Nr. 91213.

DR. PAUL MAHLBERG UND BLANCHE MAHLBERG, GEB. SOLOMONICA IN BERLIN-LICHTENFELDE.

Bauspiel.

Angemeldet am 26. Oktober 1921; Priorität vom 26. Oktober 1920 (Anmeldung im Deutschen Reiche). Beginn der Patentdauer: 15. Juli 1922.

Die Erfindung besteht sich auf solche Bauspiele, bei welchen die Bausteine aus durchsichtigen oder durchscheinenden Stoffen, insbesondere aus farbigem Glasmasse hergestellt sind und deren Formen sich aus den Abmessungen des regelmäßigen Achteckes ableiten.

Gemäß der Erfindung werden Steine in der Gestalt eines halben Achteckes, Steine in Säulenform von der Länge des Abstandes der Parallelseiten des Achteckes, Steine mit einer quadratischen Stirnfläche von der Seitenlänge des Achteckes und Säulen von einer Länge gleich dem 3·4fachen der Achteckseitenlänge zu Bausteinen vereinigt. Die Vereinigung dieser Formen, insbesondere in Verbindung mit den an sich für diese Zwecke bereits bekannten durchsichtigen oder durchscheinenden Stoffen ermöglicht die Ausführung von eigenartigen, den Formensinn anregenden Bauformen; es können strebendachstuhl- und türmeartige Gebilde mit einfachsten Mitteln errichtet werden, die sich mit den bekannten Steinformen nicht ausführen lassen.

Die Erfindung ist in der Zeichnung beispielsweise veranschaulicht. Fig. 1 und 2 zeigen schaubildlich die wichtigsten Grundformen der Steine in ihrem Zusammenhange mit dem regelmäßigen Achteck. Fig. 3 und 4 zeigen in Ansicht einige Möglichkeiten der Zusammensetzung von Bausteinen zu neuartigen Gebilden (Dachstuhlformen) mit einigen Hilfssteinformen, die gleichfalls aus dem Achteck abgeleitet sind; Fig. 5 zeigt schaubildlich einen Teil eines aus den Grundformen aufgebauten Spielhauses.

Die Steinform *1* (Fig. 1) hat als Stoßfläche eine Hälfte eines regelmäßigen Achteckes von der Seitenlänge *a*; die Teillinie verbindet dabei die Mitten zweier gegenüberliegender Parallelseiten. Die Stirnfläche der im wesentlichen als Säule verwendeten Steinform *2* (Fig. 2) entsteht durch Verbinden der beiden Enden der Parallelseiten des Achteckes, so daß der Abstand der letzteren gleich der Länge *c* der Säule wird. Bei der Steinform *3* (Fig. 3) ist die Stirnfläche ein Quadrat von der Seitenlänge *a*.

Die Tiefenabmessung *b* der Steine wird gleichfalls aus dem regelmäßigen Achteck abgeleitet. In der Regel ist $b = a$, dann ist die Form *3* ein Würfel mit der Seitenlänge *a*, die Form *2* eine Säule quadratischen Querschnitts von der Länge $c = a\,(1 + \sqrt{2}) =$ zirka $2{\cdot}4\ a$. Zu diesen drei Grundformen können zweckmäßig die beiden unmittelbar auf die Abmessungen des Achteckes zurückführbaren Hilfsformen *4* und *5* treten. Form *4* ist die durch Diagonalschnitt halbierte Form *3*, Form *5* eine Kugel vom Durchmesser *a*, die bei *a*, *z* Abflachungen hat, welche ein Zusammensetzen ermöglichen.

Für die Bildung von Stützkonstruktionen u. dgl. Bauwerken, bei denen Schub übertragen wird, sollen die Fig. 3 und 4 nur einige Möglichkeiten andeuten, nicht aber besondere Muster bilden. Es lassen sich außerordentlich mannigfache Möglichkeiten auf Grund der angegebenen Steinformen finden.

Für diese Bauten wird vorteilhaft noch eine Säule *6* von gleichem Querschnitt wie die Säule *2* vorgesehen, deren Länge aber $d = \sqrt{2}\,(a + \sqrt{2}\,a) =$ zirka $3{\cdot}4\ a = $ zirka $a + c$ ist.

Bei Anordnung nach Fig. 3 ist außerdem als Abschluß ein Stein *7* dargestellt worden, dessen Entstehung sich aus der Zeichnung ohne weiteres ergibt. An seine Stelle kann aber ohne weiteres der Abschluß durch einen Stein *1* treten (s. Fig. 4).

Um bei den angedeuteten Konstruktionen ein Verrutschen der Steine an den Schrägflächen zu verhüten, können diese, wie bei *z* in Fig. 3 angedeutet ist, gerauht oder gerifft sein, auch können die Steine an den betreffenden Seiten zapfenartige Gebilde und entsprechende Aussparungen aufweisen.

— 2 —

Gegebenenfalls können auch Löcher in den aufeinanderpassenden Flächen vorhanden sein, in die sich kleine Zapfchen, z. B. aus federndem Metallblech gebogene Hülsen, einschieben lassen.

PATENT-ANSPRUCH:

Bauspiel aus durchsichtigen oder durchscheinenden Bausteinen, dadurch gekennzeichnet, daß Steine *(1)* in der Gestalt eines halben Achteckes, Steine *(2)* in Säulenform von der Länge *(c)* des Abstandes der Parallelseiten des Achteckes, Steine *(3)* mit einer quadratischen Stirnfläche von der Seitenlänge *(a)* des Achteckes und eine Säule von der Länge *(d)* gleich dem 3.4fachen der Achteckseitenlänge zu einem Bauspiel vereinigt sind.

Fig. 1. Fig. 2. Fig. 3 Fig. 4. Fig. 5.

Druck der Österreichischen Staatsdruckerei in Wien. 804/23.

Figures 21–22: The Austrian Patent

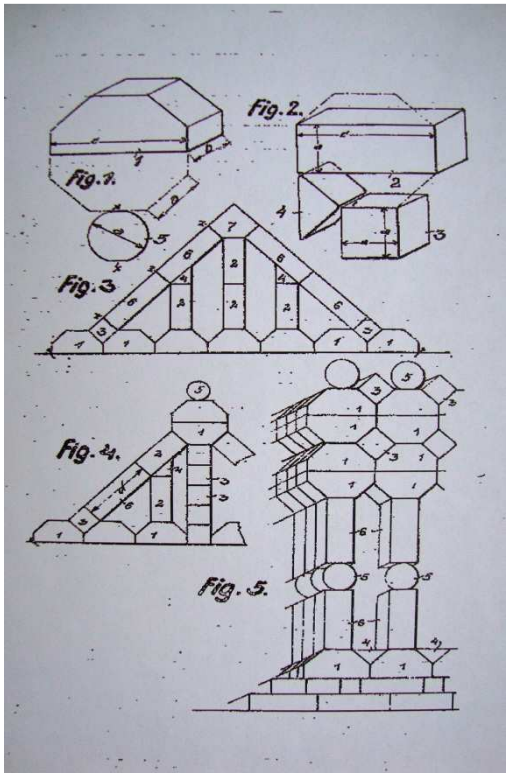


Figure 23: Detail of the patent drawing

Figure 24

Figures 24–25: Construction toys from the Deutsches Museum collection

Additionally, the examples given, especially in Figures 3 and 4 of the patents, appear to be simply »paper-exercises« rather than practical, tested and feasible constructions. From these figures it is obvious that the constructions depicted are unrealistic simply due to the application of gravity (note especially piece no. 6 in Figures 3 and 4, whose position seems to defy the laws of nature!).

In order to test the validity of the above observations, the author decided to follow a hands-on approach in studying the glass blocks and perform simple experiments or »play exercises«. In these experiments the author tried to reconstruct details of the structures depicted on the pattern sheets. A reconstruction of the complete designs was not attempted, because it was judged to be unsafe for the fragile glass pieces. The experiments indeed confirmed the unrealistic character of the patent figures. Attempts to create some of the forms pictured in the six example sheets proved that these are impossible or difficult tasks. A detail of one of the proposed patterns collapsed, primarily due to the weight of the pieces and the slippery nature of their surfaces; two other constructions were only just possible, albeit with difficulty (figures 26–31). Apparently, some of the geometrically perfect constructions on the pattern sheets do not take into account properties of friction and the weight of glass, which render such constructions more difficult than their idealistic representations. Arguably, the patent illustrations and the examples on the six sheets were chosen for their aesthetic appeal and had not been tested by the Mahlbergs or by Taut. Perhaps sensing the weaknesses of their proposed patterns, the Mahlbergs also suggest in the patent text that a way of securely connecting the blocks could be devised, possibly with the use of metallic inserts. This is an indirect admission of the non-feasibility or impracticality of the proposed structures and, in fact, undermines the whole concept and the value of the patent itself. An additional question about the value of the design addresses the appropriateness of glass as a material for children's toys, a concern which is underpinned by the splintered and dangerously sharp pieces of surviving *Dandanah* glass blocks. Nevertheless, the patent was granted in both Germany and Austria despite these drawbacks.

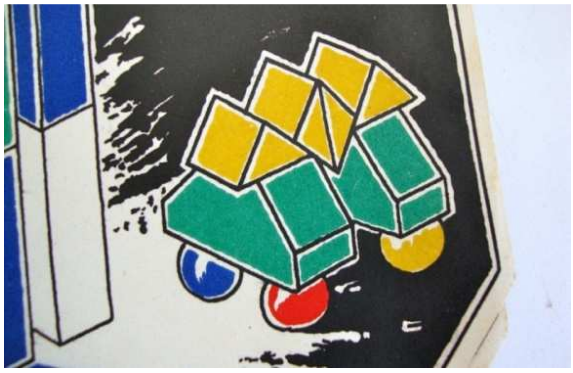


Figure 26

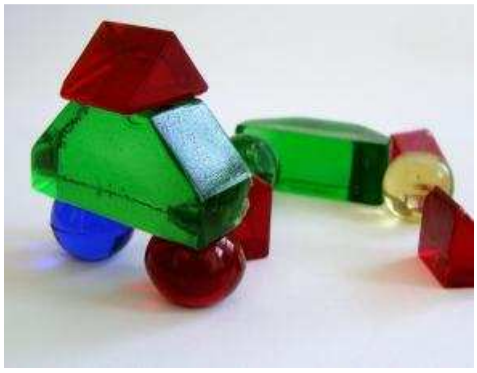


Figure 27

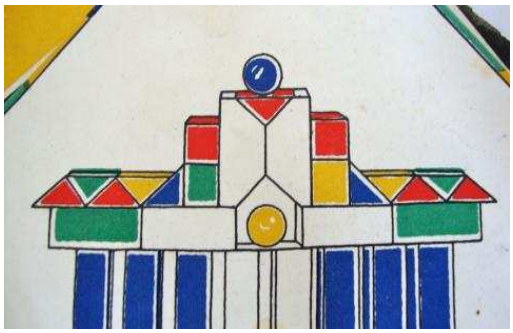


Figure 28

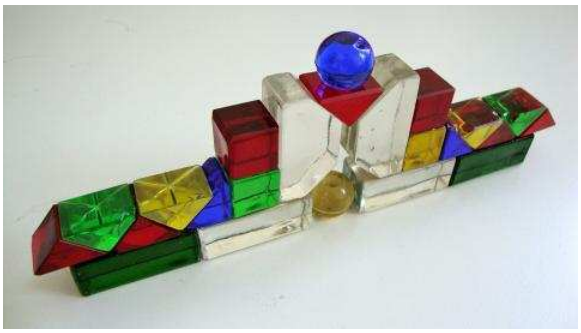


Figure 29

Figures 26–31: Experimenting with the *Dandanah*

Other exemplars, manufacturing and name

According to architect Manfred Speidel, who has published extensively on Taut, there are currently nine surviving exemplars of the *Dandanah* worldwide:[18]

– one belonging to the Taut family was shown at the exhibition to mark the occasion of the 100th anniversary of Taut's birth (Akademie der Künste in Berlin, 29 June–3 August 1980).[19] This exemplar, dated arbitrarily 1919, is different from the other surviving sets in that it contains a different plan for the arrangement of pieces (»packing plan«) and does not bear the name *Dandanah*.[20]

18 Information on the surviving *Dandanah* sets comes primarily from unpublished documents: Speidel, *Der Glasbaukasten*, 1997; Speidel, *Stadtkrone und Märchenpalast*, 2011, and from e-mail communication with Manfred Speidel, 14 June 2012.

19 Volkmann, *Bruno Taut*, 1980.

20 This may have been the very first prototype created by the architect, whereas the other sets belonged to the first, small production run. This exemplar was shown in the exhibition held at Sezon Museum of Art, Tokyo, 9 June–1 August 1994, and at the National Museum of Modern Art, Kyoto, 30 August–2 October 1994. About a hundred copies were made by a Japanese glassmaker; one of the copies was bought by the Japanese Imperial Family. The Taut set turned out to be incomplete and without the design sheets while the wooden case was not completely filled; perhaps it was just what was left over from Taut's children. It was also shown in the exhibition Bruno Taut– The role of Art in Society, 3 February–27 May 2007, Watari-um, The Watari Museum of Contemporary Art, Tokyo, http://www.watarium.co.jp/exhibition/0702_taut_en.html (accessed 5 March 2013), information provided by Manfred Speidel through e-mail communication, 14 June 2012.

- one in the collection of the Deutsches Museum, Munich.
- two in the collection of the Toy Museum (Deutsches Spielzeugmuseum), Sonneberg (Thuringia, Germany).
- one in the collection of the Badisches Landesmuseum, Karlsruhe.
- one in the collection of the Museum für Angewandte Kunst, Cologne.[21]
- one in the collection of the Canadian Centre for Architecture, Montreal (collection of CCA founder Phyllis Lambert).[22]
- one in the private collection of Isi Fischer, daughter of Franz Hoffman, who collaborated with Taut.
- one in the private collection of Allan Coffman, Santa Monica, California.[23]

Another exemplar was given to the Landesgewerbemuseum, Stuttgart, in the early 1920s by its producer, the glass manufacturer Luxfer-Prismen, but it appears that this object has been lost.[24] The director of the museum at that time, Gustav E. Pazaurek, a glass specialist, included a colour image of the *Dandanah* in an article on modern toys without, however, mentioning the object in his text (figure 32).[25] The image shows a temple-like construction made with the glass blocks and the caption »Glass blocks of Luxfer-Prismen Ltd, Berlin-Weissensee, Design by Bruno Taut, Magdeburg«. In another publication, Pazaurek wrote:

21 Acquired through purchase from Galerie Fricke, Berlin, e-mail communication with Manfred Speidel, 14 June 2012.

22 This exemplar has been exhibited on numerous occasions: L'architecture et son image: quatre siècles de répresentation architecturale: œuvres tirées des collections du Centre canadien d'architecture / Architecture and its image: four centuries of architectural representation: works from the collection of the Canadian Centre for Architecture, Canadian Centre for Architecture, Montreal, 7 May–7 August 1989; Dallas Museum of Art, spring 1990; Les jouets et la tradition moderniste / Toys and the modernist tradition, Canadian Centre for Architecture, Montreal, 15 December 1993 –1 May 1994; Cosmos: du romantisme à l'avant-garde / Cosmos: from romanticism to the avant-garde, Musée des beaux-arts de Montréal, 17 June–17 October 1999; Los juguetes de las vanguardias / Toys of the Avant-Garde, Museo Picasso Malaga, 4 October 2010–30 January 2011; 404 Error: the object is not online / Erreure 404: l'objet n'est pas en ligne, Canadian Centre for Architecture, 11 November 2010–13 February 2011; it was also included in the exhibition Century of the child : Growing by design 1900–2000, Museum of Modern Art, New York, 24 July–5 November 2012.

23 A *Dandanah* (it is unclear which one) was exhibited in a 2006 exhibition Glass: Material Matters, at the Los Angeles County Museum of Art, an exhibition celebrating the versatility and representational power of glass, 30 April–10 December 2006, http://www.lacma.org/art/exhibition/glass-material-matters (accessed 5 March 2013).

24 Report by the Landesgewerbemuseum Stuttgart for the years 1922–1924, Speidel, *Der Glasbaukasten*, 1997, and Speidel, *Stadtkrone und Märchenpalast*, 2011.

25 Pazaurek, *Modernes Spielzeug*, 1924, p. 440. Pazaurek was an art historian with a great interest in design http://de.wikisource.org/wiki/Gustav_Edmund_Pazaurek (accessed 5 March 2013).

> One of our most imaginative architects, Bruno Taut, who wants glass and coloured glass to occupy a very large space in architecture, recently created very nice building blocks for children and introduced them to the market through the Luxfer-Prismen firm of Weissensee, Berlin.[26]

Figure 32: *Dandanah* illustration in 1924 publication on toys

The search for more information on the *Dandanah* led me to the Toy Museum (Deutsches Spielzeugmuseum) in the town of Sonneberg, Thuringia.[27] Sonneberg was an important centre of toy production in the eighteenth and nineteenth centuries and lies on the commercial route of German toy production that links the toy producing areas of the Ore Mountains (Erzgebirge) in Saxony and Thuringia to Italy through Nuremberg and Munich. The museum possesses the oldest specialized collection of toys in Germany, including wooden and papier mâché toys, as well as playthings from ancient Egypt, ancient Greece and East Asia.[28] The Sonneberg Toy Museum holds two copies of the *Dandanah*, recorded in the catalogue in September 1927 following a tidying-up process at the museum (inventory number 5914-49). The provenance of the items is unknown, but it is assumed that they reached the museum through a private donation. The *Dandanah* is described in the catalogue as »Mosaikspiel«, made of colourful glass, designed by Bruno Taut, architect, and produced by Deutsche Luxfer-Prismen GmbH.[29]

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26 Pazaurek, *Kunstgläser der Gegenwart*, 1925, p. 246; quoted in Speidel, 2011 (my translation).

27 The museum's website page dedicated to this item is http://www.spielzeugmuseum-sonneberg.de/sammlungen/online-exponat/2004/bruno-taut-glasbaukasten (accessed 5 March 2013). I am grateful to Sonja Gürtler, curator, for her assistance during my visit to the museum on 10 November 2011.

28 See Fritzsch and Bachmann, *Deutsches Spielzeug*, 1965, p. 25, for a map of the production and commercial routes of German toys in the 18th and 19th centuries. On the history of the Sonneberg Museum itself, which developed from an Industry and Trade Museum to a Toy Museum, see: *Vom Industrie und Gewerbemuseum*, 2001.

29 Sonneberg Museum curators used the data found in Pazaurek, *Modernes Spielzeug*, 1924.

The two *Dandanahs* at the Sonneberg museum are considered to be »treasures« as well as very sensitive objects; they have undergone conservation and are normally kept in the depot. However, they leave the museum occasionally as loans to various exhibitions, for example the exhibition »Kristallisationen, Splitterungen«, Werkbund-Archiv, Martin-Gropius-Bau, Berlin, October 1993–January 1994.[30] One of the *Dandanahs* was also on loan to the Victoria & Albert Museum, London, for the major exhibition on Modernism (Modernism: Designing a New World, 1914–1939, 6 April–23 July 2006).[31] At the time of my visit, one of the *Dandanahs* was on loan to the Nationalgalerie at Hamburger Bahnhof, Berlin, for the exhibition Architektonika (15 September 2011–3 April 2012).[32] I was, however, able to see the other set, which is in poorer condition than the set on loan (figures 33–36). Similarly to the Deutsches Museum set, the box contains six pattern sheets and, attached to the bottom of the box, a pattern for the correct positioning of the glass blocks (»packing plan«). Some of the glass blocks are damaged and seven of them are missing (one yellow, one red and one blue cube; one yellow, one red, one blue and one green sphere), but the remaining ones are in good condition. There is no documentation related to the *Dandanahs* in the museum's catalogues or other publications and, with the exception of occasional loans, these objects have not attracted much interest by researchers or others. It is expected that they will eventually be exhibited following the renovation of the museum, which is scheduled for the near future.

30 Sack, *Ohne einen Glaspalast*, 1993, p. 68. A catalogue was published for this exhibition: Thiekötter, Schirren and Pehnt, *Kristallisationen, Splitterungen*, 1993.

31 See the catalogue of the exhibition: Wilk, *Modernism*, 2006, pp. 58–59. The text in this catalogue mistakenly states that the set consists of 51 glass blocks and was manufactured in 1927; in fact the full set consists of 62 blocks and was possibly manufactured in 1922.

32 A copy of relevant e-mail communication between the Sonneberg Museum and the Nationalgalerie im Hamburger Bahnhof, Berlin, dated 20 July 2011, is kept in the Sonneberg Museum archive. This exhibition focused on the diverse ways in which artists have been working at the crossroads between art and architecture since the 1960s, but also included works by visionary architects active during the twentieth century; these included Bruno Taut and Wenzel Hablik with their designs for crystal and domed buildings dating from the early modernist period. This parallel display was meant to illustrate the importance of visionary architecture in the dialogue between art and architecture over the course of the 20th century. As the exhibition website notes, »The sculptures, pictorial spaces and spatial constructions created in the art on display here borrow from architectural forms and reflect and comment on common practices in the design of buildings and urban spaces. They primarily focus on the plastic and sculptural qualities of architectural structures, without losing sight of the social and economic implications of the constructed world we inhabit. The works unlock the door on imaginary spaces, stir memories of well-known buildings or revive various visions of the future that may now seem dated«, http://www.hamburgerbahnhof.de/exhibition.-php?id=34328&lang=de (accessed 5 March 2013).

Figure 33

Figure 34

Figure 35

Figures 33–36: The *Dandanah* set of the Sonneberg Toy Museum

Another copy of the *Dandanah* is kept in the Badisches Landesmuseum in Karlsruhe (inventory number 87/85).[33] It is normally exhibited in the Museum beim Markt, the building in central Karlsruhe that has housed the collection of applied arts since 1900, and is one of the prized items in the collection of modernist objects.[34] It has been occasionally on loan, for example for the exhibition Der Bau einer neuen Welt: Architektonische Visionen des Expressionismus, 16 July–15 September 2003, Bauhaus-Archiv Museum für Gestaltung.[35] The Karlsruhe *Dandanah* was bought in 1987 from the family of the artist Hermann Finsterlin, Taut's close friend.[36] It is exhibited alongside wooden toys designed by Finsterlin himself and other glass items (figure 37). All 62 pieces have survived, most of them, however, partially damaged. The box and pattern sheets are identical to those of the Deutsches Museum and Sonneberg Museum sets. There is a »BT« scribble on one of the pattern sheets (presumably Bruno Taut's initials) (figure 38) as well as a small drawing on the back of a pattern sheet showing a small construction that could be made with the glass blocks (figure 39). This drawing gives us a rare glimpse into the actual experience of playing with the glass blocks, a glimpse that excites the imagination of the historian.

33 I am grateful to Heidrun Jecht, MA, curator of the museum, for her time and assistance during my visit on 28 November 2011.

34 Interest in the uses of glass in the Modernist school of thought was also explored by the exhibition Glasmalerei der Moderne – Faszination Farbe im Gegenlicht, 9 July–9 October 2011; a catalogue of the exhibition was published: Dresch, *Glasmalerei der Moderne*, 2011.

35 http://www.bauhaus.de/museum/archiv_02.html (accessed 5 March 2013).

36 Speidel et al., *Wege*, p. 111.

Figure 37: The *Dandanah* and other toys exhibited at the Museum beim Markt (branch of the Badisches Landesmuseum), Karlsruhe

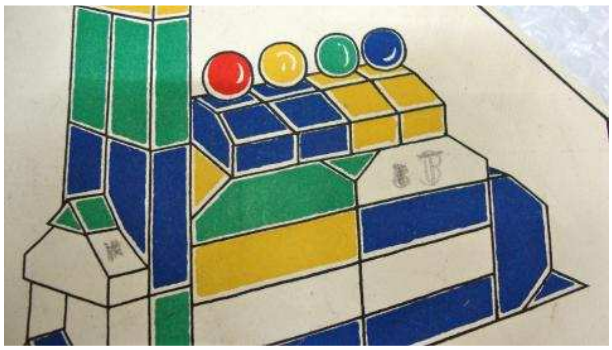


Figure 38: »TB« scribble on pattern sheet of the *Dandanah* kept at the Museum beim Markt

Figure 39: Small drawing on pattern sheet of the *Dandanah* kept at the Museum beim Markt

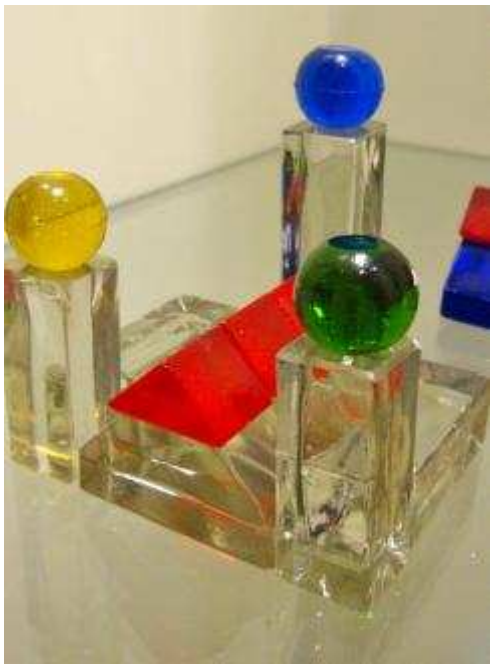
The *Dandanah* blocks from the various museums are all made of transparent or coloured glass.[37] The type of glass used does not seem to be of a special kind; it may be described as soda glass or »common« glass (figures 40–41).[38] The pieces were produced through casting, the production method made apparent by the remaining marks (for example the slightly protruding diameters of the spherical pieces). Pieces of different colours must have been produced in separate melting pots. There are no signs on the surface of the pieces of grinding or polishing by hand or by mechanical means after their removal from the casts. Although untreated, the pieces are smooth and pleasant to touch and handle unless they are broken, in which case their edges are extremely sharp and dangerous. Small bubbles may be observed in some of the pieces, which is a common occurrence in the manufacturing process of glassmaking.[39] It is unclear whether the surviving sets of *Dandanah* were manufactured in the same place or around the same time, but it is logical to assume that they belonged to the same production batch, possibly a prototype stage in which only a few pieces were made. The three sets that I was able to see in Munich, Sonneberg and Karlsruhe have minor, almost imperceptible differences in terms of colour and brightness. These may be attributed to small irregularities introduced accidentally during the production process, to the wear and tear resulting from various types of use, to the way the objects were conserved or to the different lighting conditions under which they were viewed.

Figure 40

37 I am very grateful to Dr Margareta Benz-Zauner, curator of the Glass Technology section at the Deutsches Museum, for sharing information on the object's material and technical properties.

38 Soda glass is created by combining sodium carbonate with silicon dioxide (silica) and calcium carbonate (lime), heating the substance to high temperatures and then cooling it rapidly. This type of glass accounts for about 90% of manufactured glass.

39 Glass bubbles are tolerated in many everyday products, but glass needs to be refined and homogenised if the material is intended for certain uses, e.g. for optical glass. Schaeffer, Langfeld and Benz-Zauner, *Glastechnik*, 2012, pp. 241–255.



Figures 40–41: Impressions from the toy material

As already mentioned, surviving exemplars of the *Dandanah* are considered to be products of Luxfer-Prismen. There is no evidence that the glass building-set went into systematic production; perhaps only several prototypes were made in the early 1920s.[40] The object was expected to be available for sale at Bing, the large Nuremberg manufacturer and toy distributor, for the 1922 Christmas season; it appears that only a few sets were sold.[41] Taut had planned a mass (serial) production, but the Bohemian Bankhaus Fitzgerald in Aussig that was going to finance the production went bankrupt at the end of 1922 or beginning of 1923.[42] Taut was also going to include an article on the *Dandanah* in his magazine *Frühlicht*, which appeared in four editions in Berlin (1921-1922).[43] The fifth issue with the article on the *Dandanah* was planned for the end of 1922; this issue never appeared because of the rising economic crisis. The »reconstruction« of this journal in 2000 gives us a good idea of the possible result.[44]

In the end, the object appears to be a synthesis between the Mahlberg patent and Taut's ideas. Although the box proposed by the Mahlbergs in the patent is a regular octagon (all sides being equal), the actual wooden box has sides of unequal lengths. This may attributed to Taut's influence; it has been observed that there are close geometrical affinities with Taut's *Monument des Eisens* of 1913 as well as with Indian temples; the India-

40 Kinchin claims that the *Dandanah* blocks used slack factory capacity but does not provide any supporting evidence, Kinchin, *The Crystal Chain and Architectural Play*, 2012, p. 61.
41 Heckl, *Technology in a Changing World,* p. 216; Speidel, *Der Glasbaukasten*, 1997, p. 1; Speidel, *Stadtkrone und Märchenpalast*, 2011, p. 3.
42 Speidel, *Stadtkrone und Märchenpalast*, 2011, p. 3.
43 Taut, *Frühlicht,* 2000.
44 Speidel et al., *Wege*, 2000.

inspired name and cover illustration and the six pattern sheets are also considered to be Taut's input.[45] Although the toy was unnamed in the Mahlberg patent, the name *Dandanah – The Fairy Palace* (in English) is prominent on the box illustration and may be attributed to Taut. The use of the English language on the box cover is considered to be an indication that Taut wanted to promote the object internationally, possibly in the United States.[46] *Dandanah* is an Indian word for a bundle of rods or pillars – in harmony with the box cover illustration of »colourful palace designs reminiscent of India and exotic places«.[47] Apart from the obvious Oriental connotations, *Dandanah* might also be a pun on Dada, the artistic and intellectual movement of the early twentieth century.[48] This appears more likely when one considers Taut's connections to and intellectual affinities with Dada.[49] The impressive name and cover signify a clear move away from the attempted rationality of the patent descriptions and suggest a more complex picture; this paves the way for an exploration of the elaborate ideas and beliefs behind the toy.

Technology, progress, hygiene

Our attention shifts to the technical background of the *Dandanah* and the connotations of its material and manufacturing. Toys in general provide evidence of the social and economic life of their period; architectural toys, more specifically, ranging from wooden building blocks to iron and steel construction sets, reflect distinct stylistic predilections and technological advances. New materials and novel industrial techniques were used to create the new building types transforming the cities as well as in the manufacture and

45 Speidel et al., *Wege*, 2000, pp. 46–47.
46 Speidel, *Der Glasbaukasten,* 1997; Speidel, *Stadtkrone und Märchenpalast*, 2011.
47 Speidel, *Der Glasbaukasten,* 1997; Speidel, *Stadtkrone und Märchenpalast*, 2011; Heckl, *Technology in a Changing World,* p. 216.
48 Dada or Dadaism was a cultural movement that began in Zurich, Switzerland, during First World War and peaked between 1916 and 1922. To quote Dona Budd's *The Language of Art Knowledge*, »Dada was born out of negative reaction to the horrors of World War I. This international movement was begun by a group of artists and poets associated with the Cabaret Voltaire in Zurich. Dada rejected reason and logic, prizing nonsense, irrationality and intuition. The origin of the name Dada is unclear; some believe that it is a nonsensical word. Others maintain that it originates from the Romanian artists Tristan Tzara and Marcel Janco's frequent use of the words da, da, meaning yes, yes, in the Romanian language. Another theory says that the name Dada came during a meeting of the group when a paper knife stuck into a French-German dictionary happened to point to dada, a French word for hobbyhorse.« The movement primarily involved visual arts, literature, poetry, art manifestoes, art theory, theatre and graphic design and concentrated its anti-war politics through a rejection of the prevailing standards in art through anti-art cultural works. Its purpose was to ridicule the meaninglessness of the modern world as its participants saw it. In addition to being anti-war, Dada was also anti-bourgeois and socialist in nature, http://en.wikipedia.org/wiki/Dada (accessed 5 March 2013).
49 Boyd Whyte, *Bruno Taut*, 2010, pp. 178–198 and 138–141. It is also suggested elsewhere that the playful aspect may be linked tangentially with Dada and its cultural iconoclasm: Lodder, *Searching for Utopia,* 1993, pp. 43–44.

assembly of toys.[50] This was also the case with glass and the *Dandanah*; alongside steel and concrete, glass was a material greatly favoured by modernists and deemed expressive of the new era.[51] Glass is by far the oldest of the »modern« materials; preserved everyday items from Egypt and Syria have been dated to be at least 5000 years old. Phoenicians and later Romans brought glassmaking to their empires and from the Renaissance onward Venice was renowned as a centre for fine glassmaking. By the 18th century, Bohemia and Germany had become leading producers of window glass. Glass was an enormously useful material, the manufacturing of which required much fuel and many hours of skilled labour and the application of which was limited by its high cost. Gradually, through a series of mechanical inventions that began in the 1890s, glassmaking was transformed into a highly mechanized, mass production industry. By the 1920s, modernists had found in glass a material expressive of their fascination with machine production and continuous flow.[52]

Taut himself had great interest in glass and the light effects it produced.[53] In fact, this interest can be traced back quite early. During his first visit to Berlin as a young man, Taut was impressed by the Wertheim store on Leipziger Platz, a store that captivated him with its »clarity and dignity«. Light played an essential part in the building's architecture as the store was built around a central well that extended up to the third level. The iron frame and the ironwork of the stairs and galleries were exposed in the interior and glass walls were used to subdivide the internal spaces. To complete the picture of modernity, the interior was lit by electricity. In his breathless account of the building, Taut described the clarity of the plan and the articulation of the three floors as »brilliant«.[54] Indeed, in the beginning of the twentieth century, the design of department stores was praised for employing new construction methods and materials such as iron, concrete and glass to develop a modern form of decoration; department stores became iconic spaces since they gave opportunities for distraction, combining consumption with phantasmagoria.[55] They also provided a privileged space for glass products; impressive walls made of glass bricks were to be seen in many office buildings and department stores in the United States during the second half of the 19th century, for example.[56]

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50 See the Canadian Centre for Architecture exhibition (with accompanying bi-lingual catalogue): *L'Architecture en Jeux*, 1991, http://www.cca.qc.ca/en/exhibitions/107-buildings-in-boxes-architectural-toys-from-the-cca (accessed 5 March 2013).

51 Misa, *Leonardo to the Internet*, 2004, p. 160.

52 Ibid., pp. 162–163.

53 Shubert, *Toys and the Modernist Tradition*, 1993, pp. 18–19.

54 Boyd Whyte, *Bruno Taut*, 2010, pp. 17–19.

55 Aynsley, *Designing Modern Germany*, 2009, pp. 57–62.

56 Architectural historian Dietrich Neumann traces the origins and influence of 20th century commercial glass architecture back to the Great Exhibition of London in 1851 and the success of the Crystal Palace. The U.S. Luxfer company was aware of the poetic applications of modern, machine-made materials and acknowledged the numerous accounts of utopian glass architecture common among architects and writers in the late 19th century in the United States and Europe. A growing number of structural glass products contributed to a renewed interest in the age-old dream of glass architecture. Neumann, *The Century's Triumph in Lighting*, 1995, pp. 24-53; Neumann, *Translucent vs.*

Surviving exemplars of the *Dandanah* are considered to be products of Luxfer-Prismen. The Luxfer Prism Company, based in the United States, emerged as the market leader and most successful producer of prismatic glass between the end of the 19th century and the 1930s. The *Dandanah* set was manufactured by one of its most successful foreign branches, the Deutsches Luxfer Prismen Syndicat in Berlin, which was established in 1899 by Olin H. Basquin, one of the founders of the parent company in Chicago.[57] Bruno Taut had a close relationship to this firm, especially through his *Glashaus*, the famous exhibition pavilion at the Werkbund Ausstellung in Cologne of 1914, where all the Luxfer-Prismen products were exhibited. The German Luxfer Prismen Syndikat was, in fact, the main sponsor of the building, donating the building materials and providing many of the exhibits; it can be assumed that Luxfer also initiated the project. The domed-shaped pavilion resembled a large, polished diamond, symbolizing the quality of the advertised product while also illustrating the name of *Diamant*, the leading periodical in the German glass industry.[58] The small, jewel-like pavilion, crystalline in its structure and made of faceted glass, manifested Taut's desire to find an expressive architectural form.[59] Taut's 1914 pavilion enjoyed enormous and well-orchestrated publicity and has been celebrated as a prime example of expressionist architecture and a brilliant formal manifesto; but the building was also an exhibition pavilion at a trade show with the explicit purpose of displaying a firm's products.[60] Architectural critic Reyner Banham has noted that the pavilion was devoted to the glory of glass and has been extremely influential, although it does not fit comfortably into the history of the modernist movement.[61] Editor Alexander Koch, who reviewed the exhibition for *Deutsche Kunst und Dekoration*, concluded that the exhibition was testimony to the influence of the engineer on the contemporary urban environment and also on works of art. In his review, he also wrote of a modern city »with all the achievements of technology, of hygiene, of architecture, of administration and transport, a construction in which the sites of education, of leisure, of entertainment should be just as much represented as those for the provision of water, light and food«.[62]

Transparent, 2010, p. 50. In Germany, an iconic building that connected the technological with utopian strands of thought was the *Glaspalast* (Glass Palace), a glass and iron exhibition building in Munich modelled after the Crystal Palace of London. The *Glaspalast* opened for the First General German Industrial Exhibition (Erste Allgemeine Deutsche Industrieausstellung) in the summer of 1854. In 1882, the first electrically lit international electrotechnical exhibition took place there, following the efforts of engineer and Deutsches Museum director Oskar von Miller. The building was destroyed in a fire in the summer of 1931, http://de.wikipedia.org/wiki/Glaspalast_%28M%C3%BCnchen%29 (accessed 5 March 2013).

57 Neumann, *Translucent vs. Transparent*, 2010, p. 19.

58 Neumann, *The Century's Triumph in Lighting*, 1995, pp. 43–44. The Cologne dome is also astoundingly similar to the mythical giant diamond from India, the Great Mogul, the depiction of which is certainly idealised, Hawlik and Manhartseder, *Farbenhäuser und Lichtgewächse*, 2006, pp. 112–113.

59 Aynsley, *Designing Modern Germany*, 2009, p. 65.

60 Neumann, *The Century's Triumph in Lighting*, 1995, pp. 43–46.

61 Banham, *The Glass Paradise*, 1959.

62 Aynsley, *Designing Modern Germany*, 2009, p. 65.

Taut, however, preferred to promote the thesis of functionlessness in relation to the building and emphasized its aesthetic rather than technical qualities: »The *Glashaus* has no function other than to be beautiful«.[63] Such a statement contradicts the nature of the building as a commission that clearly served to advertise Luxfer-Prismen and its products. It is perhaps more fitting to perceive it as a building synthesizing ideological and practical uses of glass. Architect and historian Detlef Mertins noted that

> Taut's pavilion was to be a symbol [...] for the renewal of an 'organic' society. It now became characteristic for progressive conceptions of architectural modernism to strive for the restoration of the premodern community order and harmony shattered by industrialization and metropolitanization, but *nevertheless using the material means of the age*.[64]

Curator and architectural historian Howard Shubert notes that modern toy designers introduced new materials and investigated new approaches to old materials;[65] we could argue that Taut did both in the case of the *Dandanah*, since [industrial] glass had never been used before for an architectural toy and, at the same time, glass is a very old material which the *Dandanah* tried to exploit in a new way.

On another level, glass in general represented a material that offered solutions to the problems of health in homes and workplaces. As Neumann argues, at the turn from the 19th to the 20th century a slow but foreseeable transition from gas light to electric light was under way alongside an increased desire for as much daylight as possible in order to save energy and create healthier working environments.[66] Parallel to the rapid development of artificial lighting devices in the second half of the 19th century, there was a flood of new inventions and applications aimed at bringing daylight into the dark interiors of factories and densely built urban centres. Larger windows became possible thanks to improved manufacturing methods and the rise of the steel-frame building.[67] The U.S. Luxfer company presented its prismatic glass products as a remedy to the effects of modern civilization, such as the disadvantages of gas lights or the darkening of the street through skyscrapers and elevated railroads: »...Heat, noxious vapours, dirt and disease, give way before the Creator's pure light of day... «. Prismatic glass was presented as more than just a way of saving expenses for artificial light and characterized as a sign of modernity, scientific progress, architectural sophistication and wealth. A key argument

63 Quoted in Boyd Whyte, *Bruno Taut*, 2010, p. 38. In an article for the popular journal *Technische Monatshefte*, Scheerbart did not link Taut's *Glashaus* with the new engineering achievements of steel and reinforced concrete, which it actually was, but with the architecture of the Orient, especially the rhomboid forms of the Mameluk graves near Cairo, see Hawlik and Manhartseder, *Farbenhäuser und Lichtgewächse*, 2006, p. 115.

64 Mertins, *Playing at Modernity*, 1994, pp. 7–16, 8 (my emphasis).

65 Shubert, *Toys and the Modernist Tradition*, 1993, p. 17.

66 Neumann, *Translucent vs. Transparent*, 2010, p. 11.

67 Ibid.

and the core of Luxfer's marketing strategy was that the entire system was thoroughly scientific.[68]

A number of leaflets from the German Luxfer Prismen company kept in the archive of the Deutsches Museum demonstrate that the company was actively promoting the use of glass building elements as a rational, aesthetic and hygienic choice (figure 42). A leaflet from the beginning of the 20th century reads: »Luxfer window and skylight prisms logically distribute available daylight throughout the room. Making use of the daylight that would normally get lost on the floor significantly increases general illumination.«[69] Replacing floor gratings in shop fronts with surfaces made out of glass blocks offers a combination of functional, aesthetic and hygienic advantages:

> Luxfer-Keller-Einfalllichte serve a dual purpose. They shed light into the basement and draw attention to goods exhibited in the shop window. In addition to hygienic inconveniences, open iron grills do not allow the public to get close to the windows even though the goods presented there are so attractive.[70]

Some of the company's publications are dedicated to explaining in great detail the technical and scientific aspects of its products (figure 43).[71] In the company's promotional material, glass is presented as an extremely versatile material that can satisfy a range of uses and requirements:

> Plastic Luxfer crystal ceilings let in a lot of light but still have the effect of »physicality and defining space«. When using artificial lighting, part of the received light is reflected back by the rounded and prismatic surfaces not only increasing overall brightness but also giving the ceiling a bright, tangible appearance. Electrolytic frames make the ceilings fireproof.[72]

68 Ibid., p. 12.

69 »Luxfer-Prismen in Fenstern und Oberlichten verteilen das vorhandene Tageslicht auf rationelle Weise. Durch Benützung des bei gewöhnlicher Konstruktion auf dem Fussboden verloren gehenden Tageslichtes wird eine bedeutende Verstärkung der allgemeinen Beleuchtung erzielt«, quoted in: Deutsches Luxfer Prismen Syndikat G.m.b.H. Berlin, S. 42, Konstructions-Zeichnungen, Einige ausgeführte Anlagen, Deutsches Museum, Archive (DMA), FS 891/4 (1901), p. 1 (my translation).

70 »Luxfer-Keller-Einfalllichte erfüllen einen doppelten Zweck. Sie werfen Tageslicht in den Keller und erleichtern die Besichtigung der im Schaufenster angestellten Waren. Ausser hygienischen Uebelständen haben die offenen eisernen Roste auch noch den Nachteil, dass es dem Publikum nicht möglich ist, nahe genug an die Schaufenster heranzutreten, wenn die darin ausgestellten Waren auch noch so anziehend sind«, quoted in: Deutsches Luxfer Prismen Syndikat G.m.b.H. Berlin, S. 42, Konstructions-Zeichnungen, Einige ausgeführte Anlagen, DMA, FS 891/4 (1901), p. 10 (my translation)

71 See for example the following articles in Luxfer-Prismen publications from the Archive of the Deutsches Museum: »Lichtwände« by permanent employee Konrad Werner Schulze, DMA, FS 891/12 (1930); »Zur Frage der Belichtung von Bauwerken«, by architect P. Liese of Berlin, DMA, FS 891/13 (early 1930s), »Bauen mit Glas und lenkbarem Licht«, DMA, FS 891/24 (1931).

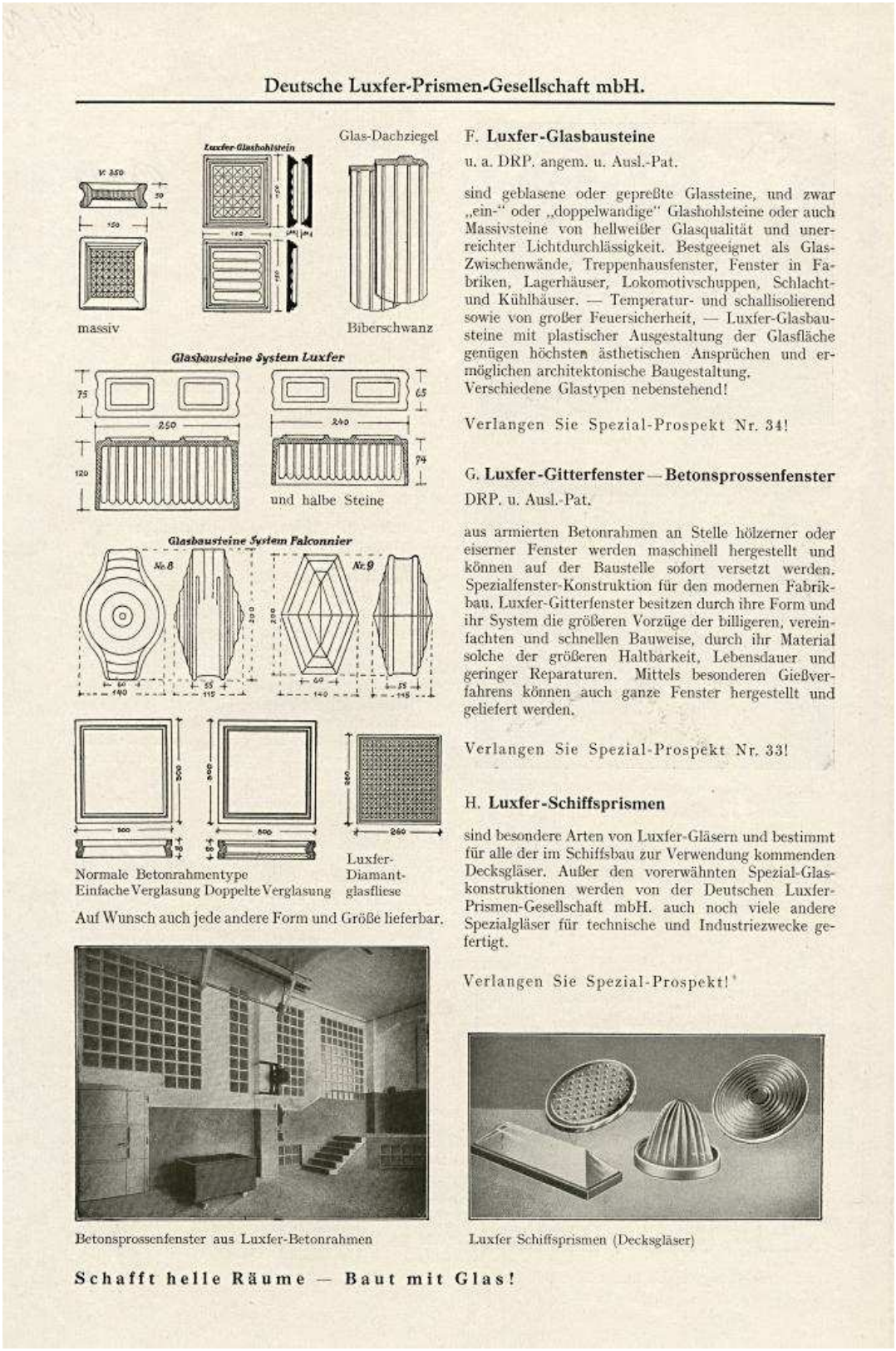
72 »Plastische Luxfer-Kristalldecken sind sehr lichtdurchlässig, wirken aber dennoch ›körperlich und raumbegrenzend‹. Bei künstlicher Beleuchtung wird ein Teil des empfangenen Lichtes durch die gerundeten und prismatischen Flächen zurückgeworfen, wodurch nicht nur die allgemeine Helligkeit vermehrt wird, sondern auch die Decke ein helles, stofflich wirkendes Aussehen erhällt. Infolge der elektrolytischen Fassung sind die Decken feuersicher«, DMA, FS 891/15 (early 20th century; my translation).

The practical and hygienic advantages are supported by technical/scientific data and directly translated into the resulting financial advantages:

> Luxfer prisms light basements evenly and significantly increase their value for your business. We guarantee the best possible utilization of existing light sources. »Luxfer prisms increase the brightness of sunlight that falls directly on them by 64%.« Hygienic Institute of the Ludwig-Maximilian University, Munich.[73]

Figure 42: Cover of Luxfer Prismen leaflet kept in the Deutsches Museum Archive, DMA, CD 65162.

73 »Kellerräume werden durch Luxfer-Prismen-Anlagen gleichmässig erhellt und der wirtschaftliche Wert derselben bedeutend erhöht. Wir garantieren bestmögliche Ausnützung der vorhandenen Lichtquellen. ›Die Luxfer-Prismen erhöhen die Helligkeit bei direkt auffallendem Tageslicht um 64%‹, Hygienisches Institut der Ludwig-Maximilian Universität, München«, Document 891/8 (1902), Archive of the Deutsches Museum, Munich (my translation).



Deutsche Luxfer-Prismen-Gesellschaft mbH.

Luxfer-Glashohlstein

massiv

Glas-Dachziegel

Biberschwanz

Glasbausteine System Luxfer

und halbe Steine

Glasbausteine System Falconnier

No. 8

No. 9

Normale Betonrahmentype
Einfache Verglasung Doppelte Verglasung

Luxfer-Diamant-glasfliese

Auf Wunsch auch jede andere Form und Größe lieferbar.

Betonsprossenfenster aus Luxfer-Betonrahmen

Luxfer Schiffsprismen (Decksgläser)

F. **Luxfer-Glasbausteine**

u. a. DRP. angem. u. Ausl.-Pat.

sind geblasene oder gepreßte Glassteine, und zwar „ein-" oder „doppelwandige" Glashohlsteine oder auch Massivsteine von hellweißer Glasqualität und unerreichter Lichtdurchlässigkeit. Bestgeeignet als Glas-Zwischenwände, Treppenhausfenster, Fenster in Fabriken, Lagerhäuser, Lokomotivschuppen, Schlacht- und Kühlhäuser. — Temperatur- und schallisolierend sowie von großer Feuersicherheit, — Luxfer-Glasbausteine mit plastischer Ausgestaltung der Glasfläche genügen höchsten ästhetischen Ansprüchen und ermöglichen architektonische Baugestaltung.
Verschiedene Glastypen nebenstehend!

Verlangen Sie Spezial-Prospekt Nr. 34!

G. **Luxfer-Gitterfenster — Betonsprossenfenster**

DRP. u. Ausl.-Pat.

aus armierten Betonrahmen an Stelle hölzerner oder eiserner Fenster werden maschinell hergestellt und können auf der Baustelle sofort versetzt werden. Spezialfenster-Konstruktion für den modernen Fabrikbau. Luxfer-Gitterfenster besitzen durch ihre Form und ihr System die größeren Vorzüge der billigeren, vereinfachten und schnellen Bauweise, durch ihr Material solche der größeren Haltbarkeit, Lebensdauer und geringer Reparaturen. Mittels besonderen Gießverfahrens können auch ganze Fenster hergestellt und geliefert werden.

Verlangen Sie Spezial-Prospekt Nr. 33!

H. **Luxfer-Schiffsprismen**

sind besondere Arten von Luxfer-Gläsern und bestimmt für alle der im Schiffsbau zur Verwendung kommenden Decksgläser. Außer den vorerwähnten Spezial-Glaskonstruktionen werden von der Deutschen Luxfer-Prismen-Gesellschaft mbH. auch noch viele andere Spezialgläser für technische und Industriezwecke gefertigt.

Verlangen Sie Spezial-Prospekt!

Schafft helle Räume — Baut mit Glas!

Figure 43: Page from Luxfer Prismen leaflet kept in the Deutsches Museum Archive, DMA, CD 65161.

Such promotion is compatible with Modernism's preoccupation with hygiene and the role of glass as an agent of change in construction and housing. Especially after the period of destruction that included the horrors of the First World War and the influenza pandemic of 1918-1919, there was »a burning desire for sunlight and clean air and clean thought«.[74] The belief in the importance of light in daily life was translated into design terms by architects. Designing buildings that allowed light to enter the interior became one of the fundamental tenets of Modernist architecture.[75] Historian Christopher Wilk emphasizes the often overlooked and inadequately analysed fact that the entire Modernist enterprise was permeated by a deep concern for health.[76] Indeed,

> health lay at the very core of Modernism. Health was discussed and written about in literal terms (for example, designing spaces filled with light and fresh air and furnishings that would not accumulate dirt and dust), but also as a metaphor (of a bright, utopian future), as an ideology (of social engineering) and as an idea that could (sometimes covertly) support aesthetic positions (such as a preference for the unornamented surface).[77]

It was »[...] social hygiene (in the broadest sense of the term) [that] ›legitimized the structuring of social behaviour‹ that was fundamental to the large-scale rehousing of the population that occurred during the 1920s«. Taut himself would have a central role in these social housing projects through his involvement as head architect for Martin Wagner and GEHAG, Berlin's building administration.[78] Therefore, alongside technical considerations, the metaphorical dimension of clarity and purity, of »a bright, utopian future« that Wilk notes, was also of crucial significance. For Walter Benjamin glass architecture served

> as an image in a dialectical technique that aimed at dissolving the mythology of the nineteenth century into the space of history, a space of awakening, where bad phantasmagoric dreams explode and genuine dreams enter consciousness, a space opened up by disrupting the opaque optics of architectural representation (the bourgeois imitation of historical styles) with the transparent reality of technical forms taken from the industrial factory. As such, modern architecture provided a surface on which to play at a modernity yet to come.[79]

Thus, for modernists, the technological discourse of glass use is intertwined with the visionary and utopian ideas that the next section discusses.

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74 Architect Raymond McGrath quoted by Wilk, *The Healthy Body Culture*, 2006.
75 Glass was used for residential schemes but also for schools, sanatoria, and factories.
76 Wilk argues that, with very few exceptions, »design and art historians tend to ignore the subject, as if it somehow lacks the dignity of weightier questions of (in the past) form and style or (more recently) production and consumption«, Wilk, *The Healthy Body Culture*, 2006.
77 Ibid.
78 *Onkel Toms Hütte* (Uncle Tom's Cabin) and *Hufeisensiedlung* (Horse Shoe Estate) are the most famous among these projects, see Aynsley, *Designing Modern Germany*, 2009, p. 90.
79 Quoted by Mertins, *Playing at Modernity*, 1994, p. 14.

Transparency, light, utopia

The longstanding fascination of architecture with the effects of light and the crystalline impressions created by reflections and refractions of light have been vividly captured by literary imagination:

> By some optical or electromagnetic freak, the intense focus of light within the stones simultaneously produced a compression of time, so that the discharge of light from the surfaces reversed the process of crystallization. Perhaps it was this gift of time which accounted for the eternal appeal of precious gems, as well as of all baroque painting and architecture. Their intricate crests and cartouches, occupying more than their own volume of space, so seemed to contain a greater ambient time, providing that unmistakable premonition of immortality sensed within St. Peter's or the palace at Nymphenburg. By contrast, the architecture of the twentieth century, characteristically one of rectangular unornamented façades, of simple Euclidean space and time, was that of the New World, confident of its firm footing in the future and indifferent to those pangs of mortality which haunted the mind of old Europe.[80]

This extract expresses a transition in architecture and serves as a starting point for a discussion of the utopian expressions of glass architecture within the modernist tradition and thus helps position the *Dandanah* within the ideological trajectory of Taut and his circle.[81]

As early as the 1890s, author Paul Scheerbart (1863–1915), a major influence on Taut's work, presented one of the most poignant cases of the uses of the crystal-glass iconography. In his *Glasarchitektur* of 1914, Scheerbart called for introducing »glass architecture, which lets in the light of the sun, the moon and the stars, not merely a few windows but through every possible wall«.[82] For Scheerbart, crystalline architecture functioned as a metaphor of individual transcendence; it gradually stood for the metamorphosis of the whole society, which, through its exposure to this new architecture, could be lifted from dull awareness to a higher mode of sensory experience and from political dependence to liberation from all institutions.[83] Another early example of the crystal metaphor in a modernist context is provided by the symbol designed for the opening festivities and exhibition of the Artists' Colony in Darmstadt in 1901 by the architect Peter Behrens, later famous for his involvement in AEG and for his pioneering work on corporate identity; this symbol consists of a radiating crystal standing for the metamorphosis of everyday life into a heightened artistic experience, in essence an escape from reality into a

80 Ballard, *The Crystal World*, 2011, p. 148.

81 For an overview of Taut's utopian spiritual search and other modernist utopias see: Lodder, *Searching for Utopia*, 2006; Nerdinger, *L'Architecture Engagée*, 2012.

82 Wilk, *The Healthy Body Culture*, 2006, pp. 254–255. Note that Scheerbart dedicated his book *Glass Architecture* from 1914 to Taut and that same year Taut dedicated his Glass House, the pavilion at the German Werkbund Exhibition in Cologne, to Scheerbart, Haag Bletter, *The Interpretation*, 1981, p. 33. Also: Olsson, *Paul Scheerbart's Utopia*, 2004, http://www.fadu.uba.ar/sitios/sicyt/color/aic2004/194-197.pdf (accessed 5 March 2013). For the Taut/Scheerbart relationship see also: Margolin, *The Gray Cloth*, 2003.

83 Haag Bletter, *The Interpretation*, 1981, p. 32. See also: Haag Bletter, *Paul Scheerbart's Architectural Fantasies*, 1975.

world of the artist's own making above the squalor of common life.[84] And of course, there is Walter Gropius' famous appeal in the Bauhaus manifesto of 1919:

> Together let us desire, conceive and create the new structure of the future, which will embrace architecture and sculpture and painting in one unity and which will one day rise toward heaven from the hands of a million workers *like the crystal symbol of a new faith.*[85]

The great architectural tradition in relation to glass can be traced back to a mixture of influences including oriental philosophies and mysticism. Architectural historian Haag Bletter is keen to emphasize the long history and thoroughgoing interest in literary and architectural conventions associated with glass and crystal, as such iconographic themes stretch from King Solomon, Jewish and Arabic legends, medieval stories of the Holy Grail, through the mystical Rosicrucian and Symbolist tradition down to the 20th century avant-garde groups.[86] Taut was deeply interested in Oriental cultures and saw a harmonious relationship between the sacred and the profane in the cultures of the Orient, especially India. Critic Adolf Behne amplified this in an essay that Taut included in his publication *Die Stadtkrone* from 1919: »But isn't India even greater than the Gothic? At no time has Europe so nearly approached the Orient as during the Gothic age... Seen as a whole, however, the example of India stands high above all others as the purest oriental culture.« Taut included photographs of great oriental temples in *Die Stadtkrone* and returned to this theme enthusiastically in *Ex Oriente Lux*, an article published at the beginning of 1919.[87] Taut's attraction to the Orient may also be viewed in the wider context of the longstanding German fascination with an imagined East (figure 44). It has been suggested that, Germany being »the middle country«, »a land in the middle« or »the place that belonged to neither side completely«, ideas and perceptions of the East have fascinated the German mind. The political fragmentation of the country and the problems of unification have underpinned the need to understand and delineate »West« and »East«.

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84 Haag Bletter, *The Interpretation*, 1981, p. 31.

85 Gropius, *Manifest,* 1919 (my emphasis). Original text: »Wollen, erdenken, erschaffen wir gemeinsam den neuen Bau der Zukunft, der alles in einer Gestalt sein wird: Architektur und Plastik und Malerei, der aus Millionen Händen der Handwerker einst gen Himmel steigen wird als kristallenes Sinnbild eines neuen kommenden Glaubens«. English translation from http://www.thelearninglab.nl/resources/Bauhaus-manifesto.pdf (accessed 5 March 2013).

86 Haag Bletter, *The Interpretation*, 1981, p. 20. See also: Cheetham, *The Crystal Interface*, 2010, where the author attempts to historicize and theorize the remarkable fascination with crystals found in contemporary art theory and practice. In aesthetics, science and art production, the crystal embodies intimations of transparency, of vitalistic transformation or of a purist stability; it powerfully articulates a line or gradation between the organic and inorganic. The role of glass in modern science is also analyzed in: Espahangizi, *The Twofold History of Laboratory Glassware*; and Espahangizi, *Wissenschaft im Glas.*

87 Boyd Whyte, *Bruno Taut*, 2010, pp. 56–57. A comprehensive account and analysis of Taut's work may be found in Speidel, *Bruno Taut,* 1995. During the 1930s, Taut went to Japan where he produced three influential book-length appreciations of Japanese culture and architecture, comparing the historical simplicity of Japanese architecture with modernist discipline. Taut's preoccupation with the ideas of the East is specifically dealt with in the volume: Speidel, *Bruno Taut – Ex Oriente Lux,* 2007.

Additionally, Germany's obsession with modernization and progress is often juxtaposed to century-old eastern traditions and the perception of the East as a lost paradise. The complex and ambiguous process of Germany's adaptation to its own modernization and nation-building has nourished the appeal and study of the distant Other.[88]

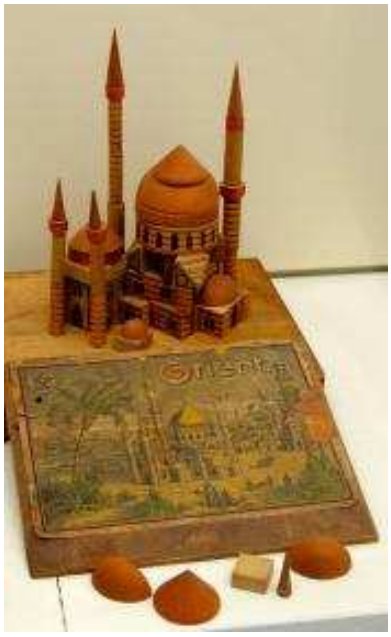

Figure 44: Construction toy inspired by oriental architecture, Deutsches Museum Collection

Furthermore, the glass projects that Taut and his circle developed are seen as expressions of the utopian expectations of a new society after the German Revolution of 1918. Glass technology was not only presented as a potential agent of change in construction and architecture but also considered by Taut and others to be a metaphor for purity, innocence and hope. Often the call for light in buildings represented a symbolic dimension of a spiritualized, utopian architecture, less pragmatic and less concerned with the specifics of physical health.[89] The utopian search for a physical and spiritual unity gave the culture of the body a special meaning and much more universal appeal than had previously been the case.[90] Taut believed in architecture as a regenerative force in society at large and that, through its power to dematerialise, glass lifted architecture above materialism to a higher, spiritual level. He proposed a new city in *Die Stadtkrone*; glass and iron were presented as the architectural materials to replace the stone and bricks of the nineteenth century. The central building of this imaginary city was the Kristallhaus, elevated above all the other buildings and with no practical function beyond simply being.[91] It is of course no coincidence that the epistolary, activist group created by Taut in 1919 was named *Gläserne*

88 Roberts, *Germany and the Imagined East*, 2004.
89 Wilk, *The Healthy Body Culture*, 2006, pp. 254–255.
90 Architect Raymond McGrath quoted in Wilk, *The Healthy Body Culture,* 2006, pp. 248–267.
91 Boyd Whyte, *Bruno Taut,* 2010, pp. 77–78.

Kette, namely Glass Chain. Like Scheerbart's writings, the correspondence of the *Gläserne Kette* is anything but a pragmatic discussion or a guide on how building should be undertaken, it is rather about an imaginary architecture without the necessity or demand for feasibility.[92]

Thus, a »new, crystal-clear architecture«[93] could make the move away from materialism towards a higher objective entity – Geist; architecture would be the physical realization of Geist. The concept of a total and unifying Geist, expressed by the Gothic cathedral or the Indian temple, had the power to reconcile diverse and opposing tendencies into a unity. ›Higher‹ ideals of architecture were granted an autonomous existence, whereas practicality alone was worthless. Taut's *Die Stadtkrone* is littered with polemics against mere functionalism. The will of the true architect, said Taut, should extend far beyond the simplistic parameters of function. He declares that »the will of the architect is determined by factors quite other than the restraints of function« [...] »this will is located above and beyond the essentially practical. The highest ideal for which the architect strives is to be found in buildings in which practical purpose is of little or no importance.« Such ideas complement Taut's declaration that the Cologne *Glashaus* had no function beyond being beautiful.[94] These beliefs represented not only the rejection of function as an end in itself as well as the Werkbund orthodoxies of practicality and *Typisierung*, but also the rejection of rationalism.[95]

Taut's rejection of rationalism, functionalism and the warring materialist civilization of Europe found its most rigorous expression in *Alpine Architektur*, a large-format illustrated folio from 1919. In this work on paper, Taut could approach design with absolute freedom, as any limitations imposed by site, materials, or economic factors were irrelevant.[96] The illustrations stem from an orgiastic imagination: pyramids and asymmetrical prisms, some with cut diamonds and irregularly set with grown-in crystals and aggregates of columns whose grooves or ridges are set with crystals (figure 45).[97] The massive reconstruction of nature out of glass in *Alpine Architektur* has no utilitarian purpose. Glass and transparency signify the hope for a purified society, an attitude that was without doubt a reaction to the devastation of war.[98] Viewed in its historical context, *Alpine Architektur* is an attempt to reply by means of art to the incomprehensible slaughter of the First World War, that mass surrender of individual lives to a war machine on a scale previously unknown in European history.[99] In his notes on the drawings of *Alpine Architektur*, Taut repeatedly damned technology and functionalism. The glass buildings were to be non-functional except in the most ethereal sense. Technology was scorned as leading to

92 Hawlik and Manhartseder, *Farbenhäuser und Lichtgewächse*, 2006.
93 Boyd Whyte, *Bruno Taut,* 2010, p. 98.
94 Ibid., pp. 61–66.
95 Ibid., p. 66.
96 Haag Bletter, *The Interpretation*, 1981, p. 34.
97 Hawlik and Manhartseder, *Farbenhäuser und Lichtgewächse*, 2006, p. 118.
98 Haag Bletter, *The Interpretation*, 1981, pp. 35–36.
99 Schirren, *Bruno Taut*, 2004, p. 22.

conflict and war: »Yes, non-practical and useless. But has utility made us any happier? Always utility and utility: comfort, ease, good food, education, knife, fork, railways, water closets... and also cannons, bombs, machines of war.«[100] Both technology and the concept of function were reduced to subservient roles, to serve the higher needs of Geist: »Technology is always only a servant«.[101]

Surprisingly enough, the means to break away from the tyranny of rationalism suggested by Taut was a futurist utopia, a super-technology that was to be the discreet servant of Geist. This super-technology would transcend and thus render obsolete the discredited rationalism and materialism, which, according to Taut, had led to the war. The glass and steel architecture, the searchlights, airships and aeroplanes depicted in *Alpine Architektur* were seen by him as a way to break away from materialism, not as materialist artefacts in and of themselves.[102] It is perhaps difficult to understand these deliberations with their strong messianic and mystical flavour when taken out of the context of First World War and post war disillusionment and the collapse of all the certainties and hopes that technological progress had generated.[103] It is also ironic that a copy of *Alpine Architektur* is currently kept in the archive of the Deutsches Museum, that secular temple dedicated to technology, functionality and efficiency. That copy of *Alpine Architektur* includes a handwritten, personal dedication to the museum by Taut:
»To the Deutsches Museum, [I dedicate] this torn-down gate of the prison, Bruno Taut Berlin, 11 July 1926«[104] (Figure 46).

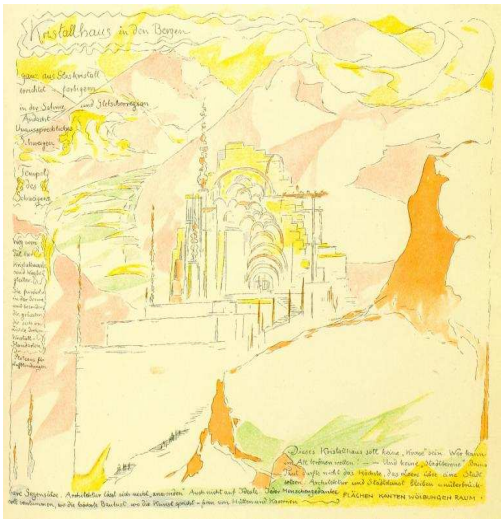

Figure 45: Illustration from Bruno Taut's *Alpine Architektur,* Deutsches Museum Archive

100 Boyd Whyte, *Bruno Taut,* 2010, p. 67; Taut, *Alpine Architektur*, 1919, p.16.
101 »Die Technik ist immer nur Dienerin«, Taut, *Alpine Architektur*, 1919, p.16.
102 Boyd Whyte, *Bruno Taut,* 2010, pp. 68–69.
103 Ibid., pp. 69, 138 and 178.
104 »Dem Deutschen Museum, dieses aufgerissene Tor des Gefängnisses, Bruno Taut, 11 Juli 1926«, Taut, *Alpine Architektur*, 1919 (my translation). There is a slight ambiguity in this dedication: Does »this torn-down gate of the prison« refer to the book or to the museum? I choose the former interpretation, thus assuming the dedication was Taut's praise of his own work.

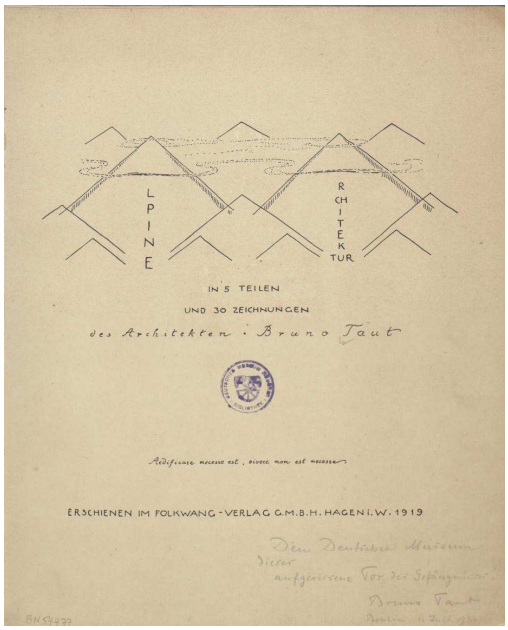

Figure 46: Title page of Bruno Taut's *Alpine Architektur,* Deutsches Museum Archive

Taut seems to suggest here that his views presented in the book constitute a means to liberate man from intellectual or material shackles. However, at the time he wrote this dedication in 1926 he was already quite distanced from his visionary phase and, as we shall see in more detail, was systematically working on down-to-earth social housing projects.

In addition to the use of glass, many of the visionary architectural proposals of the interwar years emphasized the physical and plastic qualities of buildings through colour: Taut writes that »the glowing light of purity and transcendence shimmer over the carnival of unrefracted, radiant colours. The city spreads out like a sea of colour, as proof of the happiness in the new life«.[105] Thus colour would support the luminosity and radiance of the city although the line drawings of *Die Stadtkrone* left a lot unanswered as far as the specific nature of colour was concerned. In his impressions of a visit to Kowno (now Kaunas, in Lithuania), Taut wrote in awe of the »brilliant ultramarine blue, red, brown, green and yellow painted shutters on the doors and windows« and of the »childlike charm« of everything »brightly and prettily painted in a naive, childlike manner«.[106] He further emphasized the advantages of colour in a 1919 publication:

> We do not want to build any more joyless houses, or see them built... Colour is not expensive like moulded decorations and sculptures, but colour means a joyful existence. As it can be provided with limited resources, we should, in the present time of need, particularly urge its use on all buildings which must now be constructed.

105 Quoted in Boyd Whyte, *Bruno Taut,* 2010, p. 81.
106 Ibid., pp. 91–92.

Around the same time, architect Walter Gropius also wrote in favour of colour and especially stressed the cheapness of colour decoration and its appropriateness to the prevailing economic climate. He wrote this in relationship to furniture, but his message was equally applicable to architecture. For Gropius, colour did not only offer an opportunity to brighten up the greyness of everyday life but could also play a polemical role against the conditions of decline and poverty that prevailed in Germany at the time; architect Hans Poelzig also considered colour to be a pioneering and form-giving element.[107]

The *Dandanah* is therefore an object where technological and utopian discourses merge through the medium of coloured glass. Yet another level of the object's discourse is represented by educational theories and beliefs, which are examined in the next section.

Educational and play discourses

In attempting to understand the *Dandanah*, it is necessary to position it against the childhood, education and play discourses of its times; it is presented as a plaything after all. Where does the *Dandanah* fit within these discourses? To begin with, playthings based on geometrical and structural properties follow the long tradition of building blocks going back to the pioneering work of Friedrich Fröbel.[108] Fröbel's blocks were based on the use of geometry as a system of universal order, capable of bridging the gap between the natural and the man-made world by revealing the unified laws underlying such diverse phenomena as biology, physics, astronomy and even architecture. Although all subsequent building blocks may be viewed as descendants of Fröbel's blocks, it is argued that their difference lies in that the latter did not look outward to the surrounding world of buildings but inward to the elementary forms of geometry out of which all architecture is ultimately built.[109] In the late 19th century, the emphasis of building toys had shifted to less abstract and much more pragmatic ideas; technical toys are rather viewed as expressions of the period's infatuation with building and engineering, with the importance of structure and with the vision of a modern society where the engineer held a central position.[110] Historian Bryan Ganaway argues that the idealized image of the engineer as a masculine, bourgeois manipulator of machines showed impressive durability and even survived the catastrophe of First World War unscathed. He also admits that it is difficult to gauge the effect of this situation on girls and quotes a subsequent (1933) study by German pedagogue Maria Ziegler who found that both sexes enjoyed playing with

107 Ibid., pp. 166–167.
108 Brosterman, *Inventing Kindergarten*, 1997.
109 Lewis, *Toys that Teach*, 1992. For a review of the history of construction or architectural toys: Üstün Alsac, »An architectural toy: A Design Proposal for an Architectural Toy«, http://www.ustunalsac.com/lang/tr/mimarlik/an-architectural-toy (accessed 5 March 2013).
110 Again there is a link to glass-related technology and the 1851 Crystal Palace in London, Ganaway, *Engineers or Artists?*, 2008, p. 380.

building blocks and that the boys' higher propensity for technology as adults was due simply to the fact that girls received less exposure to technological playthings.[111]

Additionally, in the last decades of nineteenth century Imperial Germany, toys played a significant role in the social arena of consumption, where a large and rising middle class was negotiating the construction of identities. As Ganaway observes, in that society, »selling, buying and consuming allowed individuals to fashion themselves in a rapidly changing environment«.[112] He argues more specifically that toys became the material culture for a public debate over how technology related to middle-class values.[113] This debate oscillated between two poles: on one side there was

> the post-1850 mechanical solution to middle-class life with its emphasis on machines, progress, order and rationality. Toy producers disseminated a message which elevated the engineer as the ideal male citizen and assumed women would function as domestic managers.

In the alternative vision of technology stressed by the humanists, machines remained subordinate to aesthetic and cultural sensibilities and gender mattered less. For these reformers, all of whom came from university, artistic and pedagogical backgrounds, the ideal middle-class citizen could be male or female and sought harmony rather than dominance; he or she reconciled old and new in a balanced fashion.[114]

Complementary to Ganaway, Hamlin argues about toy consumption as a tool to construct and maintain the domestic ideal; this process was exemplified by the Christmas market, which held a central role in the social production and reproduction of middle-class domestic ideology. In its modern version, Christmas has not only been transformed from a much more communal festival into a family affair emphasizing children and an idealized vision of intimate domesticity, but also a much more commercialized affair.[115] Through decorating the home, family celebrations and, of course, gift-giving, a heavy burden was placed on Christmas to satisfy the »pedagogic double ideal« of bourgeois life, i.e. children were to be allowed to be children but simultaneously they were to be educated to be middle-class citizens.[116] Ganaway emphasizes that toys played a major role in the self-fashioning of German families and going to the toy store became a consciously political act in the same sense that buying a car today, i.e. choosing between a high energy-consuming and an electric car sends a clear message about where one stands in the middle-class and modernity debate.[117]

111 There is no indication that Taut himself had received a Fröbel-type or other special education. E-mail communication with Manfred Speidel, 1 October 2012.
112 Ganaway, *Engineers or Artists?*, 2008, pp. 371–401 and 371.
113 Ibid., p. 371.
114 Ibid., pp. 374 and 385.
115 It is indicative of the significance of Christmas for the toy market that the *Dandanah* was scheduled to go on sale during the 1922 Christmas season.
116 Hamlin, *The Structures*, 2003; Ganaway, *Engineers or Artists?*, 2008.
117 Ganaway, *Engineers or Artists?*, 2008.

It was against this background that new ideas about toys came to exist in the beginning of the twentieth century alongside new architectural ideals and modernist beliefs. It is recognized that »the earliest new approaches to the design of architectural toys came from Germany; by the first quarter of the twentieth century Germany was the acknowledged leader in developing new architectural ideas.«[118] Toys in the modernist tradition were non-gendered, inspired by formalist positions, social issues and new built forms.[119] Experimentation with the use of building blocks as an architectural modelling material can be seen as belonging to an early twentieth century fascination with the *Bauspiel* of children as a method for generating new architectural forms. Walter Gropius, Alma Siedhoff-Buscher, Bruno Taut and Hermann Finsterlin are considered to be characteristic representatives of this trend.[120] Architectural toys allowed imagination and creativity to flourish: »[...] each box contained not one building but dozens, hundreds, an entire imagination full – whole cities waiting to spring forth under the touch of an interested adult or curious child.«[121] The box, where the bricks could be arranged and stored following a specific packing plan, promotes the idea of order and structure and encourages young minds to recognize multiplicity in unity, a concept that was first systematically promoted by Fröbel's »gifts«.[122] At the same time, the box directs and constrains the user by suggesting desired or acceptable uses of its contents. The *Dandanah* box itself, with its packing plan and six proposed designs, is indeed a powerful statement that cannot be separated from the toy; on the other hand, the cover illustration with its oriental and mystical associations adds a totally different and somehow confusing dimension.

On a general note, the concept of play and playful activities were significant for modernism, Dada being perhaps the most characteristic example.[123] The same insistence on play and on infantilism can be seen in Taut's early contributions to the *Gläserne Kette*; in one of his earliest letters to the group, Taut, quoting Scheerbart, said that the aim of the group was the game, the game was the aim.[124] Many of the drawings that circulated around the group were characterised by naivety and infantilism: they combined an obsession with ornament and detail with the clumsy outlines and delight in colour of

118 Shubert, *Toys and the Modernist Tradition*, 1993, p. 18. For a celebration of the ingenuity and richness of such toys see Lebrero et al., *Toys of the Avant-garde*, 2010; http://museopicassomalaga.org/exposicion.cfm?id=65 (accessed 5 March 2013); http://mondoblogo.blogspot.de/2011/01/toys-of-avant-garde.html (accessed 5 March 2013).

119 Lambert, *Preface*, 1993, in: Shubert, *Toys and the Modernist Tradition*, 1993, pp. 5–6. Construction toys in the modernist tradition made no reference to gender, they did not distinguish between girls and boys. For an analysis of gender issues in the history of toys, see Schleinzer, *Die Freude der Kinder*, 2009, pp. 61–78.

120 Mindrup, *Assembling the Ineffable*, 2007, http://scholar.lib.vt.edu/theses/available/etd-03252008-191510/unrestricted/03_CHAPTER_ONE.pdf, pp. 41–51 (accessed 5 March 2013).

121 Norman Brosterman, supporting material for the Potential Architecture exhibition, Canadian Centre for Architecture, 4 December 1991–8 March 1992.

122 Noschka and Knerr, *Bauklötze staunen*, 1986, pp. 16–18; Brosterman, *Inventing Kindergarten*, 1997.

123 See Note 48.

124 Boyd Whyte, *Bruno Taut,* 2010, pp. 179–181.

children's painting.[125] As Mertins notes, Berlin Dadaists portrayed the new subjectivity of the age as *internalizing contradiction* (rationality vs. fantasy, order vs. disorder) and as living through the paradox of a technology born of nature but seemingly set against it.[126] The mentality of play and experimentation was of course going to be central to the Bauhaus, too, permeating many of the school's activities:

> Play, festivities and other extra-curricular activities were an important part of artistic and daily life at the Bauhaus. A number of the school's masters, including Feininger and Klee, were raising children and designed puppets and toys for them. In the tradition of nineteenth-century educational reformers such as Friedrich Fröbel, play was also seen as a way to tap into the creative imagination and as an important part of learning. Master Itten incorporated these ideas into his classroom activities: ›I suggested that we should make toys for the next few weeks. So I struck a powerful blow to the old academic tradition of the nude and drawing from nature and I am leading all creative activity back to its roots, to play‹.[127]

The *Bauspiel* designed by Bauhaus student Alma Siedhoff-Buscher in 1923 exemplifies this tradition of the colourful, constructionist, versatile toy-thing (figure 47).

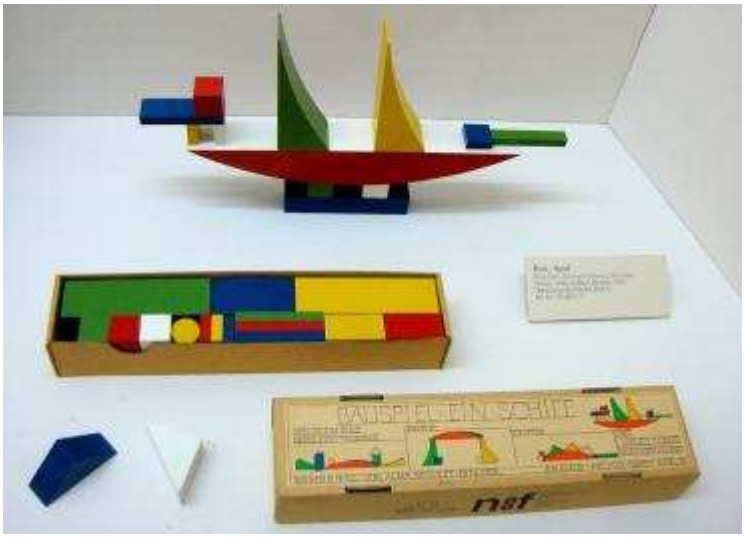

Figure 47: The Bauhaus *Bauspiel* by Alma Siedhoff-Buscher, Deutsches Museum Collection

The *Dandanah* operates within the same tradition; Sonja Gürtler, Sonneberg museum curator, stated during personal communication that she saw the *Dandanah* as an example of the time of reform toys (»Zeit des Reformspielzeugs«) in the first decades of the 20th century, when many architects sought to create pedagogical toys and experimented with quality materials, »good« form and appropriate content. Such initiatives emphasized issues

125 Boyd Whyte, *Bruno Taut*, 2010, p. 183.
126 Mertins, *Playing at Modernity*, 1993, p. 9 (my emphasis).
127 Caption from *Bauhaus: Art as Life* exhibition, A Barbican Art Gallery exhibition in co-operation with Bauhaus-Archiv Berlin/Museum für Gestaltung, Stiftung Bauhaus Dessau and Klassik Stiftung Weimar, London, 3 May–12 August 2012.

relating to the expression of feelings, to knowledge development and to new ways of playing. In her opinion, the *Dandanah*, of which few exemplars were made, was an *experiment* along these lines. Due to the sensitivity of glass and potential dangers resulting from its use, the usability of the *Dandanah* as a toy is questionable; it is however an expression of the high demand for educational toys and the resulting search for natural materials that could be used pedagogically so that children would have more direct experience of the environment. It has also been noted that the outstanding quality of many architectural modernist toys is their open-endedness, a characteristic shared by buildings of the modern era.[128] As far as the *Dandanah* is concerned, it was open-ended in a practical way, i.e. enabling a variety of constructions to be made, while at the same time expressing an ideological open-endedness since it incorporated a wide range of complex and often contradictory ideas. The pedagogical relevance of the toy is further explored in the next section, where its actual play value is discussed and the question of the user is problematized.

Selective re-edition and the emotional landscape

In the early 2000s, the Swiss company Vitra issued a reproduction of the *Dandanah*, presumably on a small scale (500 copies).[129] The production of the glass building blocks is now discontinued; the product has not been available since 2009; the company no longer has it in stock.[130] It appears that the item was marketed at the substantial price of 550 euros during the Christmas period of 2003 through the catalogue and website of Manufactum.[131] The item is no longer to be found in the Manufactum catalogue but can be bought on-line from other websites (for example for 738 euros and 950 dollars, respectively; figure 48).[132] An exemplar of this Vitra reproduction can be seen in the Badisches Landesmuseum collection (figures 49–50). The glass blocks are the same in number and colour as in the original; the box contains an octagonal leaflet with explanatory texts (in German and English) and reproductions of the six pattern sheets included in the original version.[133]

128 Shubert, *Toys and the Modernist Tradition*, 1993, p. 17.

129 An exemplar of the Vitra re-edition is kept in the depot of the Badisches Landesmuseum, Karlsruhe, where I had the chance to see it. There is another one at the Canadian Centre for Architecture. See http://vitra.com/de-de/home/products/glasbauspiel/overview (accessed 5 March 2013), and undated documentation, Badisches Landesmuseum, Karlsruhe.

130 E-mail communication with Vitra GmbH, November 2011. The company representative did not answer questions about how the product had been received, explain the reason why it was discontinued or offer any information on documentation related to this product, e.g. promotional leaflets or magazine articles.

131 Documentation in the Badisches Landesmuseum archive.

132 http://www.exquisit24.de; http://www.yliving.com/designer-bruno-taut.html (accessed 1 September 2012, product no longer available).

133 The Vitra leaflet mistakenly states that the game consists of 64 pieces (the correct number is 62).

Figure 48: Website through which the Vitra re-edition of the *Dandanah* is available for sale

Figure 49: The leaflet included in the Vitra re-edtioin of the toy

Figure 50: Detail of the Vitra re-edition

According to the leaflet texts, the Vitra glass building-set is based on the original prototypes found in the collections of the Stiftung Akademie der Künste in Berlin, the Deutsches Museum in Munich and the Badisches Landesmuseum in Karlsruhe, with the kind support of architects Winfried Brenne, Berlin, and Manfred Speidel, Aachen. The Vitra glass pieces are lighter, smoother and have sharper edges than the original, giving them a lustre of perfection that was missing from the original.[134] The box cover, however,

134 However, curator Heidrun Jecht observes that the glass used in the Vitra copy has a »cheaper« feel than the original and she thinks it is of much lower quality.

is a simplified version of the original, since the Indian glass palace illustration has been removed from the box cover and is shown on the cover of the enclosed leaflet, which also includes the six pattern sheets and a biography of Taut. The cover of the Vitra box is thus very plain; the »oriental« and mystical associations have been removed from the exterior, turning the box into a sleek item compatible with a fashionable and perhaps more marketable »minimalist« modernism. Also, the image of and biographical note about Taut are in line with the trend of presenting designers as heroic figures, a trend that is quite common in the contemporary world of design. One might argue that the Vitra re-edition expresses an attempt to control and modify the emotional content of the artefact and in a sense rationalize it. Thus, the *Dandanah* is rendered more appropriate to a clientele that is likely to be attracted by a minimalist, functionalist image of modernism rather than by its more mystical aspects. A selective modernism is being promoted, compatible with Vitra's strategy of reproducing and marketing modernist icons. The price makes the object clearly inaccessible to anyone but a minority of consumers; it also suggests that the object is not meant to be a toy for children but rather a decorative object or home accessory to be flaunted and appreciated by adults. What impression would the Vitra edition of *Dandanah* give when laid out on a contemporary living-room table? Arguably, it would suggest a lot about the owners' wealth, taste and ideological affinities. This observation leads us to a discussion of the intended users of the *Dandanah* and the related emotional landscape.

One wonders whose emotions are actually represented by the *Dandanah*. It is supposed to be a toy, therefore aimed at children. In the publication *Frühlicht*, Taut worked to create something that was against seriousness, full of laughter and happiness.[135] But did Taut really concern himself with the reactions to and emotions of children playing and interacting with his creation? There is no reliable indication that this was the case; documentation on this matter is insufficient. Some insight into his approach towards children is offered by a surviving manuscript where he presents some ideas on education:

> Every child must draw from his experience of practical activity and construct his abstract categories. The child will start on the farm, in the garden and in the workshop. Out of his own dexterity and craftsmanship, from observation of his own body as well as of the living essence of the external world, from men, animals and plants, the child will derive his self-awareness.[136]

But he was also interested in the world of children from another perspective, that of insistence on play and infantilism as the means for creating a sought-after tabula rasa, the starting point for the creation of a new world.[137] Emotions in general did play an important role in Taut's worldview; his ambition was to revive the intuitive, rather than scientific understanding of architecture:

135 Boyd Whyte, *Bruno Taut,* 2010, p. 187.
136 Bruno Taut, quoted ibid., p. 173.
137 Ibid., pp. 178–184 and 187–191.

> Architecture is an art and should be the highest of all arts. It derives only from strong emotions and speaks only to the senses. The head can, at best, work as a regulating influence. For the true essence of architecture can only spring from the heart: the heart alone must be allowed to speak.[138]

The role of the senses was emphasized as well. In 1919, he wrote about the significance of developing a collection of materials that would act as a guide for architects; additionally, he supported a »training of the visual and auditory faculties, the emancipation and opening up of the senses«.[139]

Evidence of children actually playing with the *Dandanah* and their impressions is practically non-existent; there appears to be minimal surviving testimony about the reactions of the children who played with it. The only reference is to Finsterlin who described how his daughter would build fairy palaces, playing with the glass blocks by candlelight in a darkened room.[140] It seems that, in October 1921, Taut promised an exemplar to Herman George Scheffauer, a journalist who wanted to make Taut's work known in America. Scheffauer wrote back on 6 November 1921: »What is happening with the coloured glass building blocks? My little Fiona Franzisca would be very happy if she could get the promised box!« On 25 November of the same year, Taut responded that nothing had happened yet.[141] The *Dandanah* exemplars at the Deutsches Museum, Badisches Landesmuseum and the Sonneberg Museum suggest intensive use of the items, since several pieces are missing from the sets, many of the extant pieces are damaged and the boxes are very worn. Such use can, however, not be confirmed; furthermore, one should take into account the highly sensitive nature and fragility of the objects, which perhaps partially explains their poor state.

Present day reactions to the object are positive, even enthusiastic, but most commentators agree that the object is not meant for children:

> Yes, it's glass; no it's not for kids and yes, it is really cool. It's the Glass Construction Kit created in 1920 by Bruno Taut. They are glass blocks in various shapes and colours (including some clear pieces); packaged in the original, wooden, octagonal box in which they originally came. The idea is that, because they are translucent glass, the buildings change colour and brightness as the light plays through the sides. It's truly fascinating to play with and beautiful to look at.[142]

According to Sonja Gürtler, curator of the Sonneberg Toy Museum, the *Dandanah* is a beautiful object but inappropriate for play. Similarly, curator Heidrun Jecht of the Badisches Landesmuseum in Karlsruhe considers the *Dandanah* a »playful thing« but not a toy, therefore an object that is perhaps meant to amuse and challenge but is not

138 Ibid., pp. 73–74.
139 Ibid., p. 162.
140 Kinchin, *The Crystal Chain and Architectural Play*, 2012, p. 61. However, Kinchin does not provide the source of this information.
141 Speidel, *Stadtkrone und Märchenpalast*, 2011, pp. 2–3.
142 http://www.giftsanddec.com/blog/Out_of_the_Toy_Box/41734-Great_Toy_Design_Glass_Construction_Set.php (accessed 5 March 2013).

appropriate as a child's plaything. Architect Manfred Speidel also notes that it is something for adults, not for children.[143]

The study of the object's history and background and the reactions quoted above suggests that potential users of the *Dandanah*, especially children, were rather peripheral to the object's conception and development. It appears unlikely that Taut would be seriously concerned with any concept of the recipient or end user of his designs. Intensely influenced by Nietzsche and his vision of the artist as superman, Taut considered the artist or architect to be a man elevated above normal humanity. His unique role was that of a spiritual guide and leader of society. He portrayed himself as a »pure« artist, oppressed by the mundane world and by the dirty and unpalatable realities of politics; glass appeared to be an ideal material to express his personal stance and help create a private utopia.[144] The *Dandanah* is a toy for children only nominally; we may even suggest that the *Dandanah* was in fact a response to the emotional needs of Taut himself and his circle, especially on the basis of changing political and social realities as will be further argued in the following paragraphs.

The *Dandanah* was created shortly after the end of the First World War, a war whose outbreak was received with widespread enthusiasm by the German public. Such an attitude, based on patriotic feelings and an idealistic desire for national unity, was also accompanied by an irrational anticipation that somehow the war would make a final break with the old order. Many Germans believed that, by supporting the war, they were supporting the spirit of progress and culture in the battle against the materialist civilization.[145] Taut's feelings about the war are difficult to deduce and perhaps also ambivalent, he did however contrast the gruesome reality of the war with the ideal world that existed in his mind.[146] At the end of 1918 he wrote in *Ex Oriente Lux*: »The light illuminates all things. Everything finds its correct place in the sequence of subordination. Once again there is truthfulness, and a ray of the eternal light falls on the smallest hut. Brightness and purity in all things!« However, this enthusiasm soon turned into bitterness and frustration, and he felt increasingly isolated. He entered a phase of disappointment and introspection; lack of work and enforced inactivity added to his sense of helplessness.[147] In late 1918 and early 1919, Taut was profoundly affected by the failure of the political revolution in Germany and his mood went from ecstatic to desperate.[148] As Haag Bletter suggests, around 1920, namely around the time when *Dandanah* was created,

143 Speidel, *Stadtkrone und Märchenpalast*, 2011, p. 7.
144 Boyd Whyte, *Bruno Taut,* 2010, p. 87.
145 Ibid., p. 43.
146 Ibid., pp. 44–45.
147 Ibid., pp. 115–119, 147–148, 169 and 174. It has also been noted that, »because few architectural commissions could be had during and immediately after the [First World] war, Taut turned to the publication of books, pictorial treatises about glass architecture as the ideal of a utopian, generally anarchist society« (Haag Bletter, *The Interpretation*, 1981, p. 34). The conception and development of the small-scale *Dandanah* around this period may also be interpreted as a response to the unfeasibility of building.
148 Boyd Whyte, *Bruno Taut,* 2010, pp. 115–116.

the intense, visionary, almost hallucinatory plans for glass architecture started to fade out. Germany was in a state of near civil war, with frequent street battles between various factions and a number of political murders. The political weakness of the young Weimar Republic became apparent during the immediate post-war years; along with political disillusionment came the gradual demystification of the crystal metaphor.[149] It was around this time when a gradual realization took place within the intellectual and artistic circles surrounding Taut, namely that the artist or intellectual should free himself from utopian dreams and reconcile himself with the reality and mundaneness of everyday life. This would perhaps be a way to start from scratch in order to create a new set of values for society.[150]

Indeed, a change of direction by Taut and members of his circle occurred during 1920 and made them abandon their visionary stance in favour of a new programme of objectivity.[151] Unemployment and disillusionment forced Taut and others to gradually turn from a utopian, theoretical standpoint towards down-to-earth activities; from the deadlock of unrealistic glass worlds to a systematic involvement in solving the problems of the present. In architecture, the progressives moved away from the idea of the artist receiving inspiration in a trance of creativity to the idea of architecture as social service.[152] In a letter he sent to members of the *Gläserne Kette* on 5 October 1920, in other words just months before the conception of the *Dandanah*, he states: »[...] I no longer want to design Utopias, Utopias in principio, but very palpable realities that stand with both feet on the ground.«[153] He also emphasizes the »need to build« and actually to »build with coloured glass«.[154] In his letter from 13 October 1920, he reveals to his friend Ludwig Berger: »Yes, to build! I am creating now a new building: on my desk [there are] the drawings for a set of building blocks made of glass«. He mentions them again enthusiastically in a letter to Berger written on New Year's Eve. Therefore the creation of the *Dandanah* by Taut may be dated at the end of 1920.[155]

In the context described above, the *Dandanah* could rather be considered a transitional object catering to the emotional needs of Taut himself. On the one hand, it realizes and epitomizes Taut's utopian and mystical beliefs on a condensed, small scale, at a time when »proper« architectural commissions were practically non-existent and the realization of glass architecture was becoming a very distant possibility. It is a distillation of many ideas, literally and metaphorically a »crystallization« of a range of beliefs. On the other

149 Haag Bletter, *The Interpretation*, 1981, p. 40.
150 Boyd Whyte, *Bruno Taut,* 2010, p. 141.
151 Ibid., p. 1.
152 Pehnt, quoted ibid.
153 » [...] Ich will jetzt nicht mehr Utopien zeichnen, Utopien in principio, sondern höchst handgreifliche, die mit beiden Füßen auf der Erde stehen«, Speidel, *Stadtkrone und Märchenpalast*, 2011, p. 1 (my translation).
154 »Das Bedürfnis zum Bauen mit farbigem Glas«, Speidel, *Stadtkrone und Märchenpalast*, 2011, p. 1 (my translation).
155 Speidel, *Stadtkrone und Märchenpalast*, 2011, p. 2. The exact relationship with the Mahlberg patent remains unclear.

hand, the *Dandanah* may be viewed as a practical object made to demonstrate the qualities of glass and colour and perhaps serve as a promotional piece in Taut's future professional portfolio. In this swan song of his utopian and messianic phase, the architect summarizes his beliefs in a tangible and easily accessible format but, at the same time, he moves on to a more practical and realistic direction. This can also be observed on a purely formal level, since the smooth pieces of *Dandanah* and its rational, geometric, formation replace the extreme forms and the dislocations of scale encountered in *Alpine Architektur* (figure 45). In the following period of his life, Taut made a complete break with the utopian phase and dedicated himself to down-to-earth, functional, social housing projects. After 1923, when Germany's rampant inflation was constrained and building resumed, he became one of the most important architects of large-scale social housing programs, being responsible for about 10000 workers' dwelling units in 1920s Berlin; the social ideals of his utopian phase took on a surprisingly pragmatic turn.[156]

It is therefore argued that the object primarily constitutes an amalgamation of adult emotions, especially those of Taut himself during a transitional phase of his career, rather than catering to or reflecting the emotions of the children who were the intended users of the object. It is the result of a whole period of creative, social and political turmoil and an osmosis between different aspects of personal and professional life. This is not the only case where an architectural toy offers valuable insights to an architect's work as well as to the sociotechnical and cultural context. It has been suggested, for example, that »the key to [architect's Charles] Eames' world is his toys«.[157] One can almost imagine [that the Eames house] was built using an oversized version of the toy.[158] A note of caution is however needed here regarding the relationship between the – often difficult to interpret – personal circumstances and the »bigger picture« of political and social events. As design historian Jeremy Aynsley asks, »What place do we give to the personal circumstances of individuals caught up in the events that surround them?«[159] The *Dandanah* should not be described simply as the result of a psychological phase in Taut's life, but as a balanced and meaningful combination of personal circumstances with the surrounding social context.

Conclusion: the *Dandanah* and object-based research

Since its acquisition by the Deutsches Museum in 1997, the *Dandanah* has been living a rather quiet life in the museum's depot, unexposed to the eyes of the public and in any case unclassifiable according to the current taxonomy of the museum's toy collection (wood, ceramic, metal and plastic). It remains a precious but mostly forgotten object, a small detail of 20th century modernism that concerns only specialist researchers. Through

156 Haag Bletter, *The Interpretation*, 1981, p. 42.
157 Alloway, *Eames' World*, 1956, p. 54, quoted in: Shubert, *Toys and the Modernist Tradition*, 1993, p. 28.
158 Shubert, *Toys and the Modernist Tradition*, 1993, p. 28.
159 Aynsley, *Designing Modern Germany*, 2009, p. 14.

a series of coincidences and conjunctures, the object resurfaces and is further invested with the additional value of the research presented in this paper.

The hands-on approach taken during this study and the analysis of the object's sociocultural context reveal a surprisingly complex picture that spans well beyond technology and play. The more the object is studied, the more it reveals different things; objects tend to surprise us and, in a sense, resist easy interpretation. The object seems so multifaceted that it is almost impossible to describe it or classify it in a monolithic way. Was the *Dandanah* Taut's way to shape young generations? A manifesto not in words but in glass? A promotional object for Taut's architectural theories and practice? The architect's utopia materialized on a small scale? Being unavoidably small, was it an admission of failure, an acceptance of the end of grand schemes and of utopian, visionary projects? Was it all of the above and more?

The *Dandanah* clearly acted as a turning point and a stepping-stone in Taut's life and career; it may be described as the swan song of his utopian phase and the entry point into a pragmatic, down-to-earth period, *a utopian object about the end of utopias*. In this sense, it expresses a fascinating human story, a moving trajectory within the troubled times of early 20th century. However, the *Dandanah* is not just about Taut or about the creativity of a single, gifted individual, a trap in which modernist narratives occasionally get caught. The present analysis has attempted to unravel this object as the result of wider, interconnected and often conflicting narratives.

A discussion of Taut's *Glashaus* emphasizes that this monument »was more theoretical and inspirational than practical«; we can see the analogies with the *Dandanah*.[160] Speidel describes the *Dandanah* not only as »a palpable Utopia«, but also as »an unfulfilled promise«.[161] When trying to understand this object, we need to avoid generalisations or simplistic labels; by studying it, we are rewarded by a panorama of its time. The object crystallizes, literally and metaphorically, a utopian strand of modern design and expresses the intricate and often self-contradictory nature of modernism. Situated at the intersection of several discourses, the *Dandanah* presents itself as an icon of the complexities and contradictions of Modernism.

What might then be the object's significance in the context of a contemporary technology museum? The unfolding of the object's history suggests that, in fact, technology constitutes only one aspect of its biography, aesthetic, ideological and other issues actually being much more dominant. The examination of its manifold and elaborate connotations triggers questions such as »What actually counts as technology?« and »What kinds of objects might or should be included in a technology museum?« These questions highlight the ambiguous position of this object in the context of a technical museum such as the Deutsches Museum and place special emphasis on the issue of its relevance.

160 Gutschow, *From Object to Installation*, 2006.

161 »Eine handgreifliche Utopie«, »ein unerfülltes Versprechen«, Speidel, *Stadtkrone und Märchenpalast*, 2011 (my translation)

A possible answer lies in the object's multidisciplinary potential and the opportunities for storytelling that it affords with respect to how social and cultural values are embedded in material manifestations. For example, the analysis of this object may contribute to a multi-layered and nuanced history of the interaction between technology, modernism and interwar society. Object-based research in general opens up possibilities for storytelling for a variety of museum audiences and suggests the benefits of intertextuality and interdisciplinarity. Exhibits like the *Dandanah* could even operate as showcases for the practices and uses of research in a museum context. Naturally, further questions emerge on how such objects can be best exhibited and used so that all of their complexity can unfold and be communicated to the wider public and so that user participation and involvement is encouraged.[162] It is clear that new, innovative approaches are necessary, in which design and design discourse could play a crucial role.

It would be highly relevant at this point to refer to communication theorist Klaus Krippendorff, who claims that those involved in design discourse need to design their own forms of inquiry in order to systematically ask critical questions. Design discourse deals with artefacts and indeed creates its own artefacts, for example objects in museums. The meanings of such objects, however, remain fluid and un-fixed, continuously arising in social interactions based on language. When objects of design are treated as language-like, interactive meanings and the practices they inform render materiality and technology subordinate to what people see.[163] Unravelling such meanings may be achieved by, among other things, expanding design spaces through the systematic reframing of existing artefacts, providing a view of the meanings that emerge or disappear in the process; new, unexpected and still unimagined meanings may thus be produced.

Object-based museum research can support this process by bringing to the fore the complex existence of objects, of playthings in this case, by highlighting their multiplicity and by demonstrating the ways in which they act as indicators of a whole range of sociocultural and technical issues. The museum could take advantage of object-based research outcomes by moving beyond preservation and static exhibition, by devising and implementing participatory and interactive activities to present such research and thus offer objects new life.[164] Such a path could be of major importance in a culture that depends on being perpetually renewed.[165] Object-based museum research adds value to the material repository and enables diverse stakeholders to reflect on technology and society, to ask new questions and to contribute to shaping desirable futures. Last but not

162 Bandelli, Andrea: Science Centers and Public Participation. Arbeitskreis »Forschung im Museum« presentation, Deutsches Museum, 22 May 2012.

163 Here I am attempting to apply Krippendorff's theories dealing with creative design reflection and with articulating realizable paths from the present to the future: Krippendorff, Klaus: Designing Design-forsch-ung; not Re-search. Keynote speech, Conference on Practice-Based Research in Art; Design & Media Art, Bauhaus University Weimar, 1–3 December; see also: Krippendorff, *The Semantic Turn*, 2006.

164 Bruno Girveau, *Que Reste-t-il,* 2011, p. 93.

165 Krippendorff, *Designing Design-forsch-ung*, 2011.

least, as much as research on the *Dandanah* illustrates the continuing allure of utopia, it also points to the power of small things to challenge, inspire and delight.

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