



Article

## **Experiment in Architecture and Bauhaus-Weimar.**

“Building Blocks at Large” of the 1920s and 90s

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### **Abstract**

Experimentation as a method of design was announced in Bauhaus Weimar in the early twentieth century. In 1920, Gropius developed the concept of “Baukasten im großen” (Building Blocks at Large) – a building set of six elements in scale 1:1. Based on this principle, only one experimental building was realized – “Haus am Horn.” In the late 1990s, Bauhaus-University Weimar initiated the project “Neues Bauen am Horn” – an experiment of building Bauhaus style dwellings adapted to the new socio-economic situation.

**Keywords:** Bauhaus-Weimar, Walter Gropius, Experiment 1:1, Haus am Horn, Building Blocks at Large, Neues Bauen Am Horn

### **1 - Introduction**

Walter Gropius’s “Staatliches Bauhaus Weimar” forged a new path in art and architecture emphasizing experimentations, as the main research and design method. Experiment 1:1 – building at large – is used to explore building materials, technologies, and theories. It demonstrates that a building can be an effective means to test and implement ideas and have a broader effect beyond the artistic field.

Bauhaus’s avant-garde laboratory of the 1920s has created “Haus am Horn” - the first experimental model of the planned but unrealized Bauhaussiedlung as a crystallization of the industrial epoch. This experiment finds a realization in the 90s as a model for a new settlement - “Neues Bauen Am Horn.”

The article defines experimentation as a core of the early Bauhaus Weimar, studies a phenomenon of experiment in architecture, explores Bauhaus experimental concept of “Baukasten im großen” (Building Blocks at Large), and Bauhaus laboratory’s artifacts – pioneering “Haus am Horn” of the 1920s, and reflexive “Neues Bauen Am Horn” of the 1990s.

### **2 - Experiment and its Definition at the “Staatliches Bauhaus Weimar”**

Bauhaus school combined theoretical and practical education. An *Experiment*, meaning an approach based on research and aimed at gaining experience through practice, had a central position since the origin of the school.



Fig. 1. The main building of the Bauhaus-Universität (built 1904–1911, designed by Henry van de Velde, 1904–1911. Photograph, 2020.

## 2.1 - Experimental Bauhaus

Founded in 1919, the State Bauhaus Weimar (Ger.: Staatliches Bauhaus Weimar) united Henry van de Velde's Großherzogliche-Sächsische Kunstgewerbeschule Weimar (1908–1915) and Großherzoglich Sächsische Hochschule für bildende Kunst in Weimar (1910–1919). Experimental Bauhaus succeeded in nontraditional, provocative, and international van de Velde's Art-Nouveau school that rejected standardization and imitation of the styles of the past and emphasized arts' synthesis - a creation of Gesamtkunstwerk. Belgian Art-Nouveau or German Jugendstil (or Austrian Sezessionstil, Italian Stile Floreale, Spanish Modernismo, Russian Modern, etc.) can be characterized by the words of Johannes Otzen (1904, p. 18) - professor at The Royal School of Art in Berlin: "Away with all styles of the past! Away with any tradition! Long live the new, the natural, the personal art!" Bauhaus architectural faculty is to date occupies Henry van de Velde's building designed for the Großherzogliche-Sächsische Kunstgewerbeschule (see Fig.1).

Gropius's Bauhaus Manifest of 1919 declared integration of art and craft, a totality of art, where architecture - a "great building" (Droste, 2002, p. 40) - played a role of culmination. The first phrase in the Program of the Staatliche Bauhaus Weimar of 1919 proposed "The ultimate aim of all visual arts is the complete building!" (Wingler, 1981, p. 31). The unity of all disciplines became the main vector for Bauhaus to form "Einheitskunstwerk" (Landesarchiv Thüringen - Hauptstaatsarchiv Weimar, 1919, p. 4) - a total work of art, a big building as a collective and multidisciplinary art. Architects, painters, and sculptors like craftsmen worked together in "experimental and practical sites" (Gropius cited in Wingler, 1981, p. 32) - "Probier- und Werkplätzen" (Landesarchiv Thüringen - Hauptstaatsarchiv Weimar, 1919, p. 3).

After 1922, when Johannes Itten - Bauhaus teacher and expressionism prophet - left Bauhaus, the next - constructivist - phase (or experimentation) came, inspired

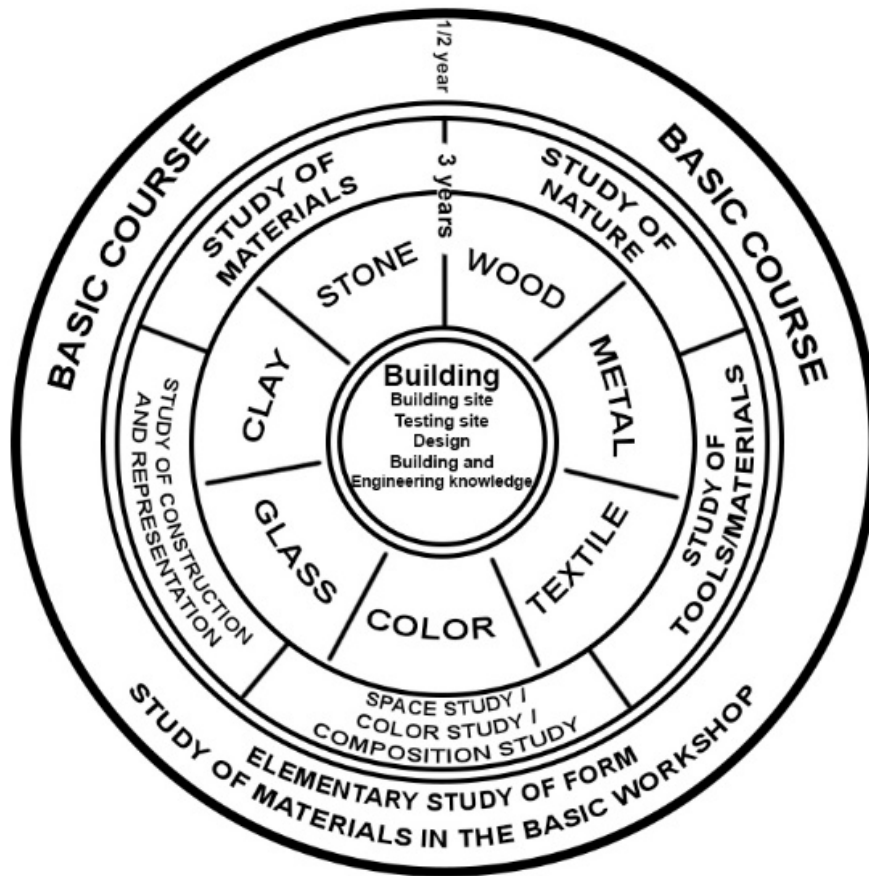


Fig. 2. Graph of the educational process at the Bauhaus (translation, 2019). Original: Walter Gropius. Graph of the educational process at the Bauhaus, *Idee und Aufbau des Staatlichen Bauhauses Weimar*, 1923.

by Dada, the New Objectivity (Ger.: Neue Sachlichkeit), Neoplasticism, and Russian Constructivism. Gropius re-wrote the program in 1923, emphasizing a *form* meaning the new unity of art and technology, and conjunction with industry (Gropius et al., 1923, p. 13). A graphic (see Fig.2) in the *Idea and Construction of the State Bauhaus (Idee und Aufbau des Staatlichen Bauhauses)* demonstrates the central circle with a "Building: Building site, Testing site, Design, Building and Engineering knowledge" (Landesarchiv Thüringen – Hauptstaatsarchiv Weimar, 1916, p. 60). Building and experiment received a fixed central place.

According to the Bauhaus educational schedule, after three and a half years, the most qualified journeymen could participate in real building and practice at the Bau-

haus experimental site. On the base of Bauhaus, Gropius intended to create a "building laboratory," a "large-scale experimental studio" to work collectively on different external commissions (Ascher, 2015, p. 31). Gropius employed some of the students to carry out architectural orders and to train in parallel (students Carl Fieger, Ernst Neufert, Fred Forbat, Farkas Molnár, Marcel Breuer, Joost Schmidt, Emil Lange, Erich Brendel, and Heinz Nösselt) (Siebenbrodt and Schöbe, 2012, p. 193). Bauhaus building laboratory created Gesamtkunstwerk projects, for instance, the famous Berlin Sommerfeld house (supervised by Fred Forbat) (Siebenbrodt and Schöbe, 2012, p. 189), and "Haus am Horn."

Teaching already at MIT University, Gropius (1970, p. 20) wrote about Bauhaus in the *Scope of Total Architecture* "We aimed at realizing standards of excellence, not

creating transient novelties. Experiment once more became the center of architecture”.

## 2.2 - Experiment and Architecture

Experimentalist Gropius emphasized the role of experimentation since the origin of the Bauhaus. *But what is an Experiment?*

Experiment (lat. *experimentum* “testing, experience, proof”) refers to an activity of searching for a new answer and testing the theory; it implies an interaction between the theoretical knowledge and empirical observations, scientists Prigogine and Stengers (1986, p. 44) explain. ‘Experiment’ is a heuristic method, a “process ... [to] test a new idea or method to see if it is useful or effective,” the dictionary determinates (Mayor, 2011, p. 593). The experiment is applied in various fields of study and production, and architecture is not an exclusion.

A challenge and curiosity call experimentation. Regarding art, German philosopher Theodor Adorno interprets ‘experiment’ as “the will, conscious of itself, tested unknown or unsanctioned technical procedures” (2002, p. 23), as a “gesture of experimentation” (2002, p. 24) that occurs in a situation of absence of any experience that impels to search and test, and that results in the newness creation. An avant-gardist work is of “laboratory” and “proving ground,” researcher of avant-garde Renato Poggioli (1968, p. 136) considers, it “differs radically from the classical, traditional, and academic one.” Designers, featured by “learning and the gift of invention” (Kostof, 1977, p. 3) since the times of ancient Egypt, “by trial and error, by switching from one hypothesis to another till one is found” (Gombrich, 2000, p. 327) experimentally create the new environment.

Experimentation in design can be defined as based on both insight and feeling, and on rational thinking, which is, however, also connected with an arbitrariness.

According to Finnish architect-phenomenologist Juhani Pallasmaa (2013), an architectural work implies an intuition, uncertainty, emotion but not a mechanism, or an “installation specification” (A. Erenzweig cited in Pallasmaa, 2013, p. 109). Pallasmaa (2013, p. 81) distinguishes two styles of creative work – one refers to risk, and bases

on an accident, whereas the second has certainty in its origin, and nothing unpredictable. Masterpieces are the result of the risk style, which is bound with diffidence, minimized only by the rise of experience and multiple tests.

Architectural historian Stanford Anderson (1984) characterizes design as a rational process that uses arbitrariness as a tool in a search, test, realization, and rejection of ideas. “Both the design process and its implementation” contain a risk due to arbitrariness bound with human activity, Anderson (1984, p. 147) suggests. Studying the methodology of scientific research programs by philosopher Imre Lakatos, Anderson (1984) infers that the experiment corroborates but not verifies a theory (or Lakatosian “research program”). Lakatos (1999, p. 48) introduces a term of a “research programme” – a scientific paradigm (or “series of conjectures and refutations”) that consists of a “hard core,” or a “negative heuristic,” and a “protective belt” of “auxiliary hypotheses,” or a “positive heuristic,” where heuristic works as an instrument to solve problems and generate new facts (1999, p. 4).

Adopting Lakatosian methodology to architectural design, Anderson (1984, p. 149) considers that the main architectural principles refer to the ‘hard core’, whereas the ‘auxiliary hypotheses’ – to formal issues, the artifact itself. This is combined in the architect’s work as “a conceptual programme” and “an artifactual programme” aimed at “the systematic exploration of physical models.” In an “artifactual state,” artifacts as physical objects embody theoretical propositions or a “research programme,” respond to criticism, can “proliferate,” and “thrive or falter according to their perceived fruitfulness,” Anderson (1984, p. 150) points out. Thus, artifacts work as experimentation progressing the concept.

Applying this explanation of an Experiment to the Bauhaus:

- firstly, regarding the absence of experience, the Bauhaus, as one of the pioneers (in parallel, for example, with Russian Constructivism), married architectural design and industry, invented not ever existed design and construction methods. “Our endeavors were to find a new approach which would promote a creative state of mind

in those taking part and which would finally lead to a new attitude toward life," Gropius (1970, p. 21) claims, - "the Bauhaus was the first institution in the world to dare to embody this principle in a definite curriculum. The conception of this curriculum was preceded by an analysis of the conditions of our industrial period and its compelling trends";

- secondly, regarding risk and intuition, Gropius felt the needs of modernity and guessed how to respond. "I saw that, first of all, a new scope for architecture had to be outlined," he (1970, p. 19) states, - "which would have to be achieved by training and preparing a new generation of architects in close contact with modern means of production in a pilot school." But even the establishment of the Bauhaus was a venture project, fortunately, approved in the time of revolutionary unrest after the First World War and formation of new authorities (Droste, 2002, p. 17);
- thirdly, Bauhaus as a "research programme," - its 'hard core' or "a conceptual programme" (Anderson, 1984, p. 150) is declared in its manifestoes corroborated by artifacts, experimental buildings and projects promoting and developing the theoretical program, for instance, "Haus am Horn" as a realization of "Building Blocks at Large."

*Experimentation* in architecture and art is dynamic and intensive search, an iterative process - a circulation from an idea to artifact and back, roaming around one 'hard core'. The experiment is an instrument of a "heuristic power" (Lakatos, 1999, p. 69) in knowledge and experience production, aimed to alter the world.

### 3 - Experimentation at the Bauhaus: Concept "Baukasten im großen"

Gropius's concept of "Baukasten im großen" or "Building Blocks at Large" (Siebenbrodt, 2008, p. 190) means an experimental building - model in scale one to one. As an 'auxiliary hypothesis', borrowing Lakatosian term, this concept works for the Bauhaus manifest of 1923 - manifest of Modernism, industrial epoch, a new class of proletariat, machine aesthetics, and rejection of decoration

and ornament - "the morphology of dead styles" (Gropius and Pick, 1965, p. 19).

The "center for experimentation" Bauhaus focused on multidisciplinary collaboration, implementation of new building materials and technological innovations to meet the crucial needs of the time, and serve the new class of workers (Bayer et al., 1938, p. 30). Gropius developed a standardization and rationalization as principles of architecture to solve the dwelling problem, as the most acute, by designing building types, easily combined in variations and adapted to different purposes (Gropius et al., 1923, p. 30). Later, in *The New Architecture*, the architect wrote "Rationalisation - just a purifying mechanism. ... Standardisation - less cost and effort" (Gropius and Pick, 1965, p. 29).

The concept of "Baukasten im großen" (Gropius et al., 1923, p. 16) - "Building Blocks at Large" (Siebenbrodt, 2008, p. 190), implied a unified building set of six elements, which composition gave several dwelling design types for various residents' groups: from loners to families. Gropius with his students Alfred (Fred) Forbat and Farkas Molnár planned to realize the idea in scale 1:1 for the Bauhaus community housing - an image of unity, egalitarian society, and equality - on the territory called am Horn. But due to the lack of investment, only one experimental model was constructed.

### 4 - Experimental Models of the 1920s and 90s

Below, two experimental models as a realization of "Baukasten im großen" are described. The "Haus am Horn" of the 1920s *corroborates* early Modernist Bauhaus Manifesto of 1923, whereas a settlement of the "Neues Bauen am Horn" *reflects* Bauhaus "research program," or refers to modern "research program" of "Reflexive Modernism," as Architectural theory professor Ullrich Schwarz (2002) diagnoses modern German architecture trend.

#### 4.1 - "Haus am Horn"

From the beginning, Bauhaus provided itself with food-stuff, keeping fruit and vegetable gardens to be more independent from the market and city (Gropius et al., 1923, p. 17). Gropius believed that collective work could not be fruitful without a well-organized living. To fulfill the needs, Bauhaus planned to build kitchen- and resi-



Fig. 3. Haus am Horn, 1923. Arch.: Georg Muche. Photograph, 2020.

dential- units (Ger.: Bauhaussiedlung) – townhouses and semi-detached houses. For construction, in 1922 the Bauhaus Housing Cooperative Ltd was established (Gropius et al., 1923, p. 17).

The first house of the Bauhaus settlement - a single-family house (Ger.: Einfamilienhaus) "*Haus am Horn*" (see Fig.3) represented the Bauhaus constructivist phase. Young Bauhaus teacher Georg Muche designed "*Haus am Horn*" as Gesamtkunstwerk for himself and his wife El, a student of Bauhaus. This experimental building - "*Versuchshaus am Horn*" (Escherich et al., 2008, p. 28) – presented a geometric archetype of a square in a square. The center part elevated forming a double-height hall of a living room surrounded by woman's, man's, and children's spaces, a dining room, kitchen, and a hallway with a stair to the cellar (Schädlich, 1989, p. 74).

The building experiment in scale 1:1 was constructed for the Bauhaus Exhibition 1923 as an illustration of the school tenets and results of the four years' work (Gro-

pius et al., 1923, p. 20). A one-week Exhibition – "Bauhauswoche" opened on 17 August 1923 under the motto "Art and technics, a new unity" (Bayer et al., 1938, p. 74); it included lectures, workshops, and exhibitions. The exhibition poster announced the Bauhaus architecture department's solution to the dwelling problem by the capacity of the German industry (Landesarchiv Thüringen – Hauptstaatsarchiv Weimar, 1922a, p. 3). The house was built using industrial prefabricated elements and building innovations such as a light insulation material "Torfoleum-leichtplatte" (Landesarchiv Thüringen – Hauptstaatsarchiv Weimar, 1922a, p. 6), and Jurko-wall (Landesarchiv Thüringen – Hauptstaatsarchiv Weimar, 1922a, p. 30) – a wall made from slag stone hollow blocks (Frick and Knöll, 1927, p. 68) – to minimize energy loss and costs.

Financial problems compelled to search for external investment for building, to ask Henry Ford, Willy Hearst, John Rockefeller, banker Paul Warburg, and some other wealthy men to help Bauhaus with a credit of 3000 dol-





Fig. 4. A residential house of Familie Baukowitz-Seeger. Architect: AFF Architekten 2001 - 2002. Photograph, 2020.

lars or 12-13000 Goldmarks for “building and furnishing ... [the] Model-House” (Landesarchiv Thüringen – Hauptstaatsarchiv Weimar, 1922b, p. 23). After multiple refusals, eventually, “Haus am Horn” was constructed in collaboration with Adolf Meyer’s office.

The building met both applause and criticism. One called “Haus am Horn” an inhumane cube (Ger.: “Würfel”) (Staatliche Hochschule für Baukunst und Bildende Künste, 1924, p. 20), or “Bonbon box” (Ger.: Bonbonschachtel) (Escherich et al., 2008, p. 29). The “General-Anzeiger Magdeburg” newspaper (Nr.104 on May 6, 1923) stated that Gropius not only conducted a reform but also brought a modern aspiration into Germany (Staatliche Hochschule für Baukunst und Bildende Künste, 1924, p. 16). One family had been living in this experimental building and presenting it to the visitors until 1998 when the refurbishment started (Escherich et al., 2008, p. 29).

The International Council on Monuments and Sites (ICOMOS, 1994, p. 26) characterized “Haus am Horn” as “the first practical architectural statement” of Bauhaus, “an experimental structure of the New Building Style ‘Neues Bauen’ for a planned Bauhaus settlement,” an “unusual as an experimental building that continues to serve fully functionally,” and as “a monument to experimentation with modern building technologies <concrete block construction>.” A “truly experimental structure” “Haus am Horn” combining “living, ... technological, ... ecological, ... social” experiments (Siebenbrodt and Schöbe, 2012, p. 191) is inscribed in the World Heritage List (1996 No 729) by UNESCO “on the basis of cultural criteria, ... the foundation of the Modern Movement which was to revolutionize artistic and architectural thinking and practice in the twentieth century” (World Heritage Committee, 1996, p. 66).



Fig. 5. A residential house of Familie Schmitz, Weimar. Architect: Karl-Heinz Schmitz, 2000-2001. Photograph, 2020.

This experiment of the 20s has inspired the next generation to continue the experiment, albeit under other experiment conditions.

#### 4.2 - "Neues Bauen Am Horn"

Modern Bauhaus-University Weimar continues to design and build experimental structures to test ideas and not only for educational purposes. Both teachers and students make practical and educational experiments in scale 1 to 1, for example, Experimental cellulose fiber (Ger.: Holzbeton) Green:House (energy-efficient Bauhaus building) by Professor Walter Stamm-Teske, steel construction Experimentalbau X.Stahl by Professor Bernd Rudolf (Hamann, 2011), or student mobile research station Raumexperiment. But one of the most large-scale experiments refers to the project of the 1990s "Neues Bauen am Horn" located close to the relic "Haus am Horn" (today museum).

Gropius's experiment of building a residential settlement am Horn was accomplished by Bauhaus professors and the city of Weimar in 1996-2014. Since the late 90s "reflexive, critical Modernism" (Ursula Zeller in Schwarz, 2002, p. 8), State Development Company Thuringia mbH (Ger.: Landesentwicklungsgesellschaft Thüringen mbH (LEG)), in collaboration with the President of Bauhaus-Universität Weimar, Gerd Zimmermann, and the Architecture faculty dean Walter Stamm-Teske initiated the project of building a new settlement on the site of unrealized Gropius's Siedlung (settlement). This territory worked as a military zone until German reunification (Format, 2006, p. 3), after which it required a redefinition. The project had to respond adequately to the context of the heritage "Haus am Horn" and modern socio-economic issues (Weckherlin, 2005, p. 28).





Fig. 6. A residential house and Atelie of Familie Hopp, Weimar. Architect: Max Dudler, 2000-2003. Photograph, 2020.

In the “Filet piece,” due to the prestige location of the old city, the proximity of the Ilm Park and Goethe’s Gartenhaus, new seventy-five plots of the site of the “Neues Bauen am Horn” (see Fig.4, Fig.5, Fig.6) conform to the rules of the urban redevelopment program or “The grammar of building” (Format, 2006, p. 3): heterogeneous architecture, individual housing, greenery, height limit, cube design, and no fencing walls (Weckherlin 2005, 24). The invited (Stamm-Teske, 2006) architects and bureaus (Max Dudler, Diener & Diener Architekten, Luigi Snozzi, Adolf Krischanitz, et al) designed the dwellings reflecting Bauhaus traditions articulated in the contemporary state of technology and economy (Weckherlin, 2005, p. 24). In addition to cubic villas, the student dormitory and nursing home are constructed and dilute the elite atmosphere of this new settlement nicknamed “Architects Hill” (Ger.: Architektenhügel) because many villas’ residents are architects (Weckherlin, 2005, p. 33). This Bauhaus experiment of the 90s articulates Gropius’s experimentation, adapting or using it under new economic conditions to attain multiple effects. Of course, an

intentional succession of Bauhaus cubic design works for the local identity, Weimar urban development, and depicts the city as the owner of Bauhaus as a brand and innovations’ center. The architectural experimentation within the Bauhaus tenets generated new Bauhaus-style artifacts corroborating “Reflexive Modernism,” which means, according to Schwarz (2002, p. 27), not a revolution but a new society; it is neither a radical change nor a style but rather a new approach, which is, probably, profit-oriented. Even in this sense, the “Neues Bauen am Horn” is an experimental project, to which the citizens were skeptical, Stamm-Teske (2006) states, and by 2006 two houses were not yet occupied.

Gropius’s Bauhaus experiment has inspired a modern experiment 1:1 responding to economic, political, urban, and new socio-cultural interests. Adopting Renato Poggioli’s (1968, p. 137) words to this situation, Gropius’s Bauhaus “experiment precedes creation” of the “Neues Bauen am Horn,” and this “creation annuls and absorbs experimentation within itself.”

## 5 - Conclusion

The experiment in many senses is a synonym of Bauhaus Weimar. Experimental school Bauhaus initiated Experiment 1:1 as a method of testing ideas, illustrated by "Haus am Horn" – an embodiment of the concept "Baukasten im großen" or "Building Blocks at Large," Sommerfeld house, or today's Bauhaus experiments.

The first Bauhaus experimental building "Haus am Horn" plays a role as a trigger for the next experimentation. It is a pathfinder and objectivation of a sober Modernism, predefines the Bauhaus brand, and motivates the propagation of architecturally alike artifacts that appeared in the modern luxury area am Horn – "Neues Bauen Am Horn."

The article defines an experiment in architecture as

- a primary design strategy formulated and followed since the early days of the Bauhaus Weimar
- a method of architecture – a creation of artifacts corroborating a certain architectural "research program" ("Haus am Horn": Modernism; "Neues Bauen Am Horn": Reflexive Modernism)
- an artifact designed to generate certain effects:
  - "Haus am Horn" – artistic and socio-cultural (social equality and progress)
  - "Neues Bauen Am Horn" – economic and socio-cultural (reflection and identity)

In general, experimentation means a never-ending, iterative procedure building and developing a certain world view, a certain theory, that Bauhaus Weimar experimentation has vividly demonstrated.

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## Figures

1. Tatiana Reshetnikova. The main building of the Bauhaus-Universität. Architect: Henry van de Velde, 1904-1911. Photograph, 2020.
2. Tatiana Reshetnikova. Graph of the educational process at the Bauhaus – translation from German into English, 2019. The original: Walter Gropius. Graph of the educational process at the Bauhaus, Idee und Aufbau des Staatlichen Bauhauses Weimar, 1923. Available from: Landesarchiv Thüringen – Hauptstaatsarchiv Weimar, Staatliches Bauhaus Weimar, Nr. 3. Aufgaben, Ziele und Entwicklung des Staatlichen Bauhauses. Weimar: Staatliches Bauhaus, 1916. 62 p. [https://archive.thulb.uni-jena.de/staatsarchive/rsc/viewer/ThHSt-AW\\_derivate\\_00000202/BH\\_Weimar\\_01\\_0577.jpg?x=-1791.5571353857335&y=868.483959897334&scale=0.2223279885220572&rotation=0&layout=singlePageLayout](https://archive.thulb.uni-jena.de/staatsarchive/rsc/viewer/ThHSt-AW_derivate_00000202/BH_Weimar_01_0577.jpg?x=-1791.5571353857335&y=868.483959897334&scale=0.2223279885220572&rotation=0&layout=singlePageLayout). Copyright: Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)
3. Tatiana Reshetnikova. Haus am Horn in Weimar. Architect: Georg Muche, 1923. Photograph, 2020.
4. Tatiana Reshetnikova. A residential house of Familie Baukrowitz-Seeger. Architect: AFF Architekten, 2001 - 2002. Photograph, 2020.
5. Tatiana Reshetnikova. A residential house of Familie Schmitz, Weimar. Architect: Karl-Heinz Schmitz, 2000-2001. Photograph, 2020.
6. Tatiana Reshetnikova. A residential house and Atelier of Familie Hopp, Weimar. Architect: Max Dudler, 2000-2003. Photograph, 2020.