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ARCHITECTURE AS A TRUE INTENTION. RELATIONS BETWEEN FUNCTION AND FORM IN CONTEMPORARY RESIDENTIAL ARCHITECTURE

ARCHITEKTURA JAKO ZAMIAŁ PRAWDZIWY. RELACJE MIĘDZY FUNKCJĄ I FORMĄ WE WSPÓŁCZESNEJ ARCHITEKTURZE MIESZKANIOWEJ

Abstract

Residential buildings reflect all important architectural features. The conditions complexity causes that the design outcome is the result of a compromise. Therefore, seeking the truth in this area requires ordering criteria. We will look at selected examples and try to answer the question of truth, understood as a balance of factors shaping the design. The analysis is based on five key issues that are important from the point of view of the housing specificity and case studies of the projects corresponding to them. As a result, we will strive to confirm the assumption that residential architecture is an emanation of balance between function and form.

Keywords: housing, dwelling, architecture, form, function

Streszczenie

Zabudowa mieszkaniowa odzwierciedla wszystkie istotne cechy architektury. Złożoność uwarunkowań sprawia, że rezultat projektowy jest wynikiem kompromisu. Dlatego poszukiwanie prawdy w tym obszarze wymaga określenia kryteriów. Przyjrzymy się wybranym przykładom, poszukując odpowiedzi na pytanie o prawdę, rozumianą jako równowagę czynników kształtujących dzieło. Analizy oprzemy na pięciu zagadnieniach najistotniejszych z punktu widzenia specyfiki architektury zamieszkania oraz case studies wybranych projektów. W rezultacie dążymy do potwierdzenia założenia, że architektura mieszkaniowa jest emanacją równowagi pomiędzy funkcją a formą.

Słowa kluczowe: zabudowa mieszkaniowa, mieszkanie, architektura, forma, funkcja

1. INTRODUCTION

Designing residential architecture is associated with the responsibility of exerting the most direct influence on people's living conditions. This type of building manifests all the important features of architecture. Emphasizes usability and durability. Is the least focused on aesthetization, the most multi-criteria. That is why in considering the truth in architecture we will take up threads related to multi-family housing, its characteristics resulting from specific design conditions and aesthetic solutions. Understanding the truth as a balance of

factors shaping the work, we will look at selected multi-family buildings, seeking an answer to the question about the conditions and limits of sincerity in residential architecture.

The background for further considerations will be a reflection on understanding the truth in architecture, constituting a review of selected views of architects and theoreticians. The approach to housing design has changed over time, including the improvement of functional solutions and the development of aesthetic concepts. It is difficult to talk about a contemporary housing without referring to sources. The second chapter is therefore entitled: *Dwelling* and concerns the evolution of multi-family housing architecture.

The impact of various conditions on the architectural form acquires particular importance in housing. Therefore, we will base the analyzes of five contemporary housing projects on the criteria related to the most important issues from the point of view of functional and spatial specificity of living: context, function, structure, form and material. The examples were selected to best highlight elements that affect the sincerity of solutions.

2. TRUTH

Colonization in the 16th century, industrialization in the 18th century and capitalism in the 19th century unleashed the consumption and fetishization of goods, affecting the face of architecture. European historicism reflected the commercialized world of goods, and the issue of “truth” in architecture gained in importance. Aesthetics served to hide the features of the structure without creating a clear relationship with the material and practical aspects of architecture. The questions about how to achieve internal consistency, regardless of the definition used, were getting stronger.

John Ruskin in the *Seven Lamps of Architecture* (1849) formulated a new definition of architectural truth, which he understood as the correspondence of external appearance with function and structure. He drew attention to the importance of honest use of material and personalized detail, defining architecture as an art that influences human mental health, promotes progress and brings satisfaction.¹

Otto Wagner thought that impractical could not be beautiful. He wrote two complementary Latin sentences on the facades of his villa in Vienna: *Sine arte sine amore non est vita* (There is no life without art and love) and *Artis sola domina requiritur* (The only lover of art is necessity).² In this way, the architect and theoretician presented a concept that he consistently implemented in practice: a combination of utility and beauty. Wagner’s idea of the internal artistic truth suggested a connection between construction and material. Because design determines the functional concept, and the art form should result from usability, Wagner’s theoretical system was based on the assumption that truth in architecture inevitably comes from function. Thanks to the idea of a successful combination of idealism and realism, he raised the antagonism to synthesis, hence the concept of modern architecture. Wagner based his severe denial of historicism on the dichotomy of function and aesthetics, anticipating the basic assumptions of classical modernism.

Adolf Loos went a step further in defining architectural truth, going beyond design on the plane in the sense of floor plans and contrasting it with *Raumplan* (spatial plan), a new

¹ J. Ruskin, *The seven lamps of architecture*, Smith, Elder and Co, London 1849, p. 7.

² A. Sarnitz, *Relations in Architecture: Writings and Buildings*, Birkhäuser, Basel 2020, p. 13.

design principle corresponding to modernity.³ Here, not only surfaces, but also spaces are to be optimally used. Loos sought the truth where necessity and reality meet.

Mies van der Rohe described the truth as the essence of expert knowledge, as defined by Thomas Aquinas' *adaequatio intellectus et rei*. In addition, he always valued construction more than form, for him the spatial coating always remained in relation to the structure.⁴ Frampton argued that Mies van der Rohe embedded his architecture in technology and construction, assuming that flexibility would provide sufficient freedom of use and oppose pure functionalism. Space is a product of constructive possibilities.

Theodor Adorno, more than a century after Ruskin, associated functionalism with the purposefulness of art. There was neither an aesthetic object nor pure purpose.⁵ In architecture, the starting point for him was the content of the design task and the basic question: how can a specific intention occur in space, and what forms and materials does it require?

3. DWELLING

The rapid increase of interest in housing typology coincides with the liberation of the art of shaping space. Earlier evolution of human settlements was mainly based on artisanal improvement of utility solutions. Compositional and purely aesthetic conditions penetrated the sphere of housing from the area of monumental architecture. This continued until the nineteenth century, when the town tenement house reached its peak of development. When architecture acquired the rights of a separate scientific discipline and built the foundations of theory, the process of housing was studied as one of the important premises of creativity.

In antiquity, housing developed mainly in the single-family domain. It adapted modular solutions of monumental buildings, adding to them elements resulting from the comfortable living. The flexible, compact layout of the Greek house allowed stacking up and arranging, as well as the construction of stalls and warehouses accessible from the street. The pattern of the peristyle house was adapted by the Romans and developed into dwellings for rent. This is how multi-story buildings were created, with a transformed courtyard, stalls and workshops on the ground floor. The internal layout was reflected in a simple architecture, almost devoid of decoration, with a small number of windows from the outside, which allowed protection against overheating.

In the late Gothic and Renaissance, thanks to the partial democratization of life and the dispersion of private property, the housing needs of the middle-income population of the cities became important. A new type of house was created – a residential house, which developed into a multi-storey, multi-room building located on the street front with a clearly separated general and private part. At the end of the Middle Ages, a house for rent appeared. It was used by officials, notaries or doctors. Architecture was influenced by threads and details taken from residential aesthetics but used in moderation. In the city palaces of Italian Renaissance, the spatial structure was ordered by introducing the principle of separating parts for specific functions. The new method concerned both the divisions in the plan and

³ P.J. da Sousa Cruz, *Structures & Architecture*, CRC Press, Boca Raton 2010, p. 433.

⁴ A. Sarnitz, *op.cit.*, p. 100.

⁵ T. Adorno, *Functionalism today* [in:] N. Leach, *Rethinking Architecture: A Reader in Cultural Theory*, Routledge, London 2005, pp. 5–18.

the shape of the facade, on which levels for different purposes have received a different development additionally highlighted by the lines of cornices. At that time, a piano nobile developed – a representative, high floor with the living space and owner's rooms, accessible through the ceremonial staircase. Regular spacings and sizes of windows corresponding to the function of storeys were introduced.

In the 17th and 18th centuries, the development of cities and the related growing land deficit generated accumulation of buildings and the creation of new residential districts. The tenement house was a modern city house model with premises for rent. Elements for shared and individual use formed separate zones: common and private.

The contemporary multi-family building developed as an independent type in the second half of the 19th century. It was a modernized version of a residential building, inspired by elements of hotel buildings, especially in terms of quality of common spaces. Two to several apartments were located on one floor. The dissemination of new technologies and material solutions, including reinforced concrete structures, as well as plumbing and elevators enabled to increase the height of buildings to 5 and more stories.

The Stuyvesant Building, designed by Richard Hunt in New York in 1869 as a prototype of a multi-family building, became a symbol of the change in the paradigm of residential architecture.⁶ It undertook a polemic with the model of the previous era, the Paris tenement house, which was the perfect culmination of the typological trail leading from terraced house, through middle-class tenement houses, to modern solutions of nineteenth-century rental housing. Since its inception, the multi-family building has no longer sought to emphasize stratification of the status of residents. As part of a coherent construction and aesthetic structure, it met the diverse needs of potential users who bought apartments more often than rented them.

In 1925, Le Corbusier questioned the advantages of the street and protested against existing schemes by creating a concept of buildings surrounded by greenery. He presented the Voisin Plan – the idea of a radical reconstruction of the center of Paris. Instead of a frontage, he proposed a spatial arrangement of repetitive high-rise buildings on a cruciform plan spaced every 400 m in open green spaces. The high blocks housed identical two-storey flats, equipped with deep loggias serving as home gardens. The external form was devoid of decoration, revealing the layout and repeatability of the internal structure.

The development of construction technologies in the nineteenth century and especially the improvement of the skeletal structure enabled the construction of a residential tower. New constructions were able to carry more weight, so the role of the walls was limited to the function of insulating and decorating the building. The first modern residential tower, 165 m high, was the Ritz Tower built in New York in 1926, designed by Emery Roth.⁷ The building housed studios for rent and has become a prototype of a new building reflecting the dynamic lifestyle of that time. With the development of modernism, the typical layout of modern apartments has changed. The comfort of residents became more important and separate living spaces and dining rooms were replaced by the interpenetrating spaces. The excess of decorations was replaced by simple architectural details.

⁶ E.C. Cromley, *Alone Together: A History of New York's Early Apartments*, Cornell University Press, Ithaca-London 1990, p. 97.

⁷ P. Goldberger, *On the Rise: Architecture and Design in a Post Modern Age*, Penguin Books, New York 1985, p. 211.

The Lake Shore Drive Apartments in Chicago (1950–51) designed by Mies van der Rohe was one of the first post-war projects of a modern multi-storey apartment building.⁸ It consisted of two towers, in which the layout with a centrally located corridor was used. The symmetrical plan was reflected in simple, regular architecture. They were the first residential skyscrapers with a facade made entirely of glass, which was a radical reinterpretation of typical brick residential buildings. The towers were simple boxes with a regular, non-hierarchical facade rising above the closed glass atrium. The use of receding perimeter poles helped create the impression of light, openness and freedom. After the construction of the Le Corbusier's Unité in Marseille in 1952, the concept of a residential tower block became popular in the 1950s and 1960s.

In the postmodern city, the most important has become the diversity and variety of units, which was the basis of the postmodern paradigm. Space was subordinated to individuality. The creators rejected the traditions and canons of historical and modernist cities, proposing aesthetics full of quotes and various meanings. Eclectic threads, references to geometric and historical elements appeared in residential architecture.

In the 1960s, new forms of housing were experimented with, abandoned tenements and houses in the unpopular nineteenth-century workers' districts were used. Criticism of power and disapproval of existing structures led to the emergence of alternative forms of democracy that created a new type of cooperative, such as Kraftwerk in Zurich. The new housing estates used a variety of layouts, different from the traditional block system. Inside the apartment, new space divisions were sought with more open plans connecting the living room with the kitchen and private rooms integrated with the common area. A cluster apartment was created, a hybrid form combining the advantages of a small studio and a large, well-equipped dwelling. The specificity of cohousing consists in the community profiling of the building's function and spatial arrangement. The flats are accompanied by common rooms, a garden and services, sometimes serving meals or work. The selection of location, living conditions and participation in the preparation of the project affects the personal treatment not only of the apartment itself, but also of the building and the neighborhood. New elements appear in the body and architecture, reflecting the heterogeneous internal arrangement.

4. COMPROMISES

A multi-family residential building has a specific internal structure most often made of partially repetitive units of various sizes and layouts. Based on the functional requirements for the rooms in the apartment and their mutual relations, model plans of units of different sizes and standards were developed in the 20th century, which, after minor modifications, can be used in almost every newly designed development unit. Experiments on adapting existing buildings with a different function or open or hybrid solutions also use these outlines.

The structure and types of apartments affect the architectural character of the building; thus, the function strongly influences the architectural form. This relationship in housing is gaining special importance, because a multi-family building is both an aggregation of constituent units of a much smaller size, i.e. individual apartments, as well as an object embedded in the urban context, shaped by location conditions and planning regulations. It is

⁸ B. Leupen, *Frame and Generic Space*, 010 Publishers, Rotterdam 2006, p. 65.

not designed only “from the inside out” or “from the outside to the inside” because a single flat is as important as the whole building complex. The complexity of the conditions means that the design outcome is always the result of a compromise. Therefore, seeking the truth in residential architecture requires ordering criteria. For the purposes of this article, we propose to base the analysis on key issues that are most important from the point of view of functional and spatial specificity of housing: 1. Context, 2. Function, 3. Structure, 4. Form 5. Material.

In each of the categories, we will analyze the residential development project, which features best meet the selected criterion.

4.1. CONTEXT

Creating a relation of housing to the context is a criterion related to decisions regarding both scale, general composition and detail. In the residential complex 79 & PARK built in Stockholm in 2018, according to the Bjarke Ingels Group project, the location defines the general form and shape of the object. The quarter was designed like a hill, gently sloping southwards with the highest point in the northeast corner. Thus, it opens to the park and sunlight. The “pixel” configuration of modular units characteristic for BIG ensures a unique architectural mood at various scales: as a sculptural composition from a distance and a structure of an intimate neighborhood – up close.



III. 1. **79 & PARK, Stockholm, Bjarke Ingels Group 2018**

Area: 6,500 m², area of the building: 25,000 m²

Function: residential with services on the ground floor

Number of apartments: 168

(photo K. Tulkowska-Słyk)

Each “pixel” is a cuboid unit measuring 3.6 x 3.6 meters, duplicated and arranged in seemingly irregular stacks. The whole reaches a height of 35 meters in the peak and 7 meters in the lowest places. Cedar cladding generates tonal diversity by eliminating the impression of a composition from heavy modules. The organic coating is warm in reception and corresponds to a human scale. Private terraces belonging to flats are planted with small trees and bushes, which emphasizes the pursuit of ecological neighborhood being an extension of the surrounding landscape.

An urban neighborhood is created in a way combining the advantages of private homes and shared organized space. Narrow arcades, the atmosphere of courtyards and city gardens, unobvious details and views resemble the traditional center of the city. The modular structure fits well with both the concept of the quarter and the house in greenery, creating an environment accessible to different groups of residents, unique and diverse, which enhances the impression of hominess.

4.2. FUNCTION

Public urban spaces: streets, squares and parks that shape the quality of city life and provide comfort thanks to the scale, sense of security and openness to various activities. Urban areas with diverse functions offer greater dynamics of use, which improves the efficiency and perception of these places’ attractiveness. Nowadays, we more and more often experiment with objects of a heterogeneous program. Traditional division into commercial, service, office and residential buildings is replaced by adaptation to the diversification of functions not only within a district or housing quarter, but single building.

The Markthal in Rotterdam is an elongated, twelve-storey building, resembling a horseshoe in a section. In the form of a covered square located under a vast arch, the residential, gastronomic, leisure and parking functions were integrated. It is a non-obvious interpretation of the urban market combined with the surrounding buildings. The 70 by 117 m ground floor includes service facilities. On the long sides there are specialty stores with food, drinks and cooking products. Restaurants and pubs occupy the first floor. The apartments are located on floors 2–12, by the long sides of the building. They have a range of 80 to 300 m² and are equipped with balconies, and many of them have a view of the interior, the market hall. The building does not have a front or back, deliveries ensure collision-free entry from a nearby square. Residential part is available through six entries leading to staircases and elevators. Due to the curved characteristics, the location of the communication stems changes, on the ground level they are at the internal facade, on the top floor – at the external.

The characteristic free-standing block is not associated directly with residential building concept. The unambiguous form suggests a service or exhibition provenance. Sincerity of solutions shows up in the new model of structure integrating many functions.



Ill. 2. **Markthal, Rotterdam, MVRDV 2009–2014**
 Area: 9,450 m², area of the building: 95,000 m²
 Function: market hall, services, offices and apartments
 Number of apartments: 228
 (photo K. Tulkowska-Słyk)

4.3. STRUCTURE

The southwest corner of the intersection of Leonard Street and Church Street in New York is occupied by a residential building of the Herzog & de Meuron project, in which the subsequent floors have a different outline, giving the impression of separate, independent structures, stacked on top of each other. The whole is an attempt to create a composition of freely arranged residential units. In the innovative concept of vertical neighborhood, each owner chooses a unique place to live as a response to the need to have a unique house in an urban environment. The overall appearance of the tower is the result of aesthetic assumptions and a precisely designed structure. Outside, both the division into residential units and structural elements are revealed, not hidden under the layers of cladding. Exposed concrete slabs illustrate the levels of subsequent floors, and the columns visible on the facade allow to observe the distribution of structural forces.

The tower is 250 m high and three technical floors are located on 32, 46 and 56 floors. The 56th highest floor is occupied by a water tank, with adjustable content, ensuring adequate damping of the structure improving the comfort of living by reducing the deflection at high wind speeds. The building was made of reinforced concrete, pillar-slab, cast. Due to the different layouts of rooms on subsequent levels, which constitute the main architectural assumption, the columns were designed as “mobile”, and the loads take over one or two-story walls inside the building. The building has a large number of overhangs, the largest of which has an outreach of over 7.5 m.

The assumption of the internal differentiation of the building was fully reflected in the external appearance and the material and detail subordinate to the whole idea.



III. 3. **56 Leonard (Jenga Tower), New York, Herzog & de Meuron, 2007–2016**

Area: 3,810 m², surface of object: 44,500 m²

Function: housing + services

Number of apartments: 146

(photo Małgorzata Senatorska-Dobrowolska)

4.4. FORM

For Het Funen, a former industrial zone on the edge of the center of Amsterdam, near the railway and the eastern docks, van Dongen-Koschuch in 1999 developed the concept of a housing estate with approximately 550 apartments and 3,000 m² of offices. The interior of the complex is protected from the east and south by a multifunctional building along Keerwal (dike) and Cruquiuscade. Behind it extends a car-free park, where 16 original city villas with varied architecture were built. The buildings, carefully inscribed in the geometrical spatial arrangement, are characterized by a similar scale (height from 3 to 6 stories) and completely different design and material solutions.

The outer perimeter building protects the interior and serves as a shield against railroad noise. It contains flats for sale and rent, penthouses, studios, cooperative units, including those for the elderly or the disabled. In the ground floor there are commercial spaces. In the northern end, office space was designed. The railway neighborhood was an inspiration for the eastern facade of the Sporenboog, the interpretation of noise, speed and dynamics was built into the facade. Elements on the facade create a rhythmic strobe effect, reflecting a sense of speed. The southern facade of Cruquiuscade represents a typical urban development with a commercial basement.



III. 4. **Funenpark, Amsterdam, de Architecten Cie, de Architectengroep, Claus en Kaan Architecten Amsterdam, DKV Architecten bv, Geurts & Schultze, KuiperCompagnons, Lafour en Wijk, Van Sambeek & Van Veen, NL Architects, Dick van Gameren Architecten, Mecanoo, 1999–2013**

Area: 3.5 ha

Function: apartments + services + offices

Number of apartments: 565

(photo K. Tulkowska-Słyk)

In the central part, in the courtyard-park, rural values such as peace, greenery and spaciousness, harmoniously combine with the comfort and diversity of living and working conditions characteristic for the city. The result was a hybrid that materializes the modern philosophy of urban life. The richness and diversity of the design are the result of a multi-layered composition of elements borrowed from classic urban concepts and diverse architecture. The 16 free-standing residential buildings are situated in a courtyard of grass and mosaic “crazy” paths in various shades of gray. The density of housing is surprisingly low and amounts to less than 100 apartments per hectare (565 per 6 ha). In the plan, the villas are adapted to the park’s composition and have a rectangular or trapezoidal shape. They differ in architecture, materials, height and size (they contain from 10 to 24 apartments). They are all accessible from public garden spaces and all have flats on the ground floor, thanks to the parking lot for cars under the perimeter block. They are interpretations of the idea of Garden City implemented as a residential building placed freely in an idealized natural landscape. The climate of the park/garden is emphasized by roofs and some walls planted with greenery.

The varied form of the buildings reflects both the interior diversity and aesthetic freedom, as well as the assumptions of the open, landscape character of the entire complex.

4.5. MATERIAL

The Giesserei housing complex was created as a result of the transformation of the former Sulzer foundry in Oberwinterthur. The quarter is made up of two six-storey longitudinal buildings oriented with a longer axis in the north-south direction, which together with the lower perimeter buildings define the internal courtyard. Public functions have been designed in the ground floor, multi-generational apartments on eight higher floors served by eight staircases. The varied structure includes over forty different types of apartments ranging from 50 m² to 160 m². Deep loggias (2.6 m) extending along the entire length of the building serve as additional private spaces. The high ecological criteria of the housing financing program prompted the search for unusual construction solutions. The building was made of wooden skeletal structure. Only staircase divisions and the underground floor were made of reinforced concrete (recycled). The modular floor plan is based on a dense grid of rooms consistent with the spacing of columns (usually 3.2–3.7 m). Heating of apartments and hot water comes from waste incineration, electricity is obtained from the photovoltaic system on the roofs. The construction substance consists of non-toxic, sustainably produced and regional raw materials. Reinforced concrete communication stems are made of recycled concrete. The character of the facade and the architecture of the entire complex were shaped by the meandering loggia stripes, one- and two-level, arranged in a repetitive pattern. Colorful, horizontally arranged wooden railing slats together with vertical sliding elements create dynamic and variable outer layers.

In order to implement the ecological concept of the housing complex, dedicated to a diverse customer, Giesserei uses a wooden structure that is unusual for this function, which allowed to obtain original architectural solutions.



III. 5. **Giesserei, Rudolf Galli, 2009–2013**

Area: about 1.1 ha, surface of object: 30,300 m²

Function: multi-generational apartments, services, social areas

Number of apartments: 154

(photo K. Tulkowska-Słyk)

5. SUMMARY

Truth in architecture is an inspirational concept that allows to develop many threads about both the present and the past. The category of truth can refer to any architectural work and be considered on various levels, reflecting the conditions and design idea. Theoreticians dealt with the truth in art and architecture, formulating definitions regarding the consistency of external appearance with function and structure, and the balance of necessity and reality. The internal consistency of the work and the sincere use of the material are particularly important for residential architecture, in which the function strongly affects the form. Due to the complexity of the conditions, here the final implementation is always the result of a difficult compromise.

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