

BAUHAUS AND THE BEGINNING OF MASS HOUSING: HOW RESIDENTIAL OPEN BUILDING REACTS TO CHANGES IN SOCIETY

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Abstract

In current realizations and research papers, we increasingly encounter designs of flexible dwelling houses. Topics such as *Residential Open Building*, *Infill Architecture*, or *Support / Infill* are also interesting due to changing demands of a population and a long period from planning permission to the end of a building process. The hitherto neglected aspect is the origin of thinking about an apartment building as a flexible structure. The question is whether we can already find this topic in the work of the leading Bauhaus representatives.

Using the direct research method, the study of historical sources and available literature, we realized that this topic can be found in the work of the Bauhaus architects. Especially because this progressive school saw an architect's position in a broader context. Its visionary representatives predicted the rapid development of society and they responded to this by developing a new typology of apartment buildings that allowed a change.

The theme of residential open building can be found in the early 20th century especially in the European context. The work of the Bauhaus representatives was ahead of their time and began to consider the apartment building as a variable structure.

Keywords: Residential Open Building; Bauhaus; Walter Gropius; Mies van der Rohe; Adolf Rading

INTRODUCTION

In recent years, architectural studies and realizations share the theme of infill architecture/ IA, flexible housing or residential open building/ ROB. [S. Kendall 2013; Y. Vašourková 2011; J. Till, Schneider T. 2005] Flexible housing is able to adapt to the rapidly changing needs of society. Thanks to the ROB/flexible design of the house, the interior layout allows considerable variability. After some time, dispositions may change according to residents' needs. The originally big one-room apartment for a young couple, together with a change of life situation, can become a standard disposition with several rooms for children. This idea already has a major impact on the beginning of the project. Andrea Kempe writes in his monograph that: "Houses must be flexible and they are attractive for different groups which equally increase their market value. ... The approval process of the building also records the theme of a neutral disposition." [A. Kempe, O. Thill 2004] The time from initial study to implementation is

very long. Due to the complicated administration, this process takes up to 10 years in the Czechia. Thus a strictly defined house develop into a completely different economic situation at the time of the final approval. The answer to this phenomenon is a house that is not strictly defined, i.e. a house that allows for a change.

One of the most comprehensive studies about Residential Open Building is the publication of the same name by Dr. Stephen Kendall. [S. Kendall, J. Teicher 2000] The flexible apartment building theme is presented here as a progressive approach based on the experience that is appropriate for contemporary office buildings. The whole concept of prefabrication and special systems and methods are already standard in the construction of office buildings. In the second part of the book, based on case studies, there are analysed fundamental realized projects of the ROB concept from the 1960s to 1990s are analysed. The ROB / IA topic has recently received considerable attention in

professional conferences and the building process. [R. Zuidema, 2015; J. Dale 2019; W. Nerdinger 2007]

The question is whether we can find the beginnings of thinking about an apartment building, which is flexible, already in the work of the Bauhaus representatives. That is, whether we can find these principles in the designs of architects at the beginning of the 20th century. Through the direct method of research, i.e. through the study of historical sources and available literature, this topic was researched at the beginning of the 20th century as a part of Bauhaus movement. The historical context and the beginning of ROB of this approach have been largely neglected to date. At the same time, historical archaeology within this theme can be a useful tool for designing apartment buildings at present.

The aim of this paper is to review the elements of ROB in the Bauhaus movement.

1. NEW WAY OF WORKING

The early 20th century Fordism allowed the transition from small-series atypical products to standardized types. Assembly line production and specialization carried out the same routine without their own inventiveness. As a result, a large number of products



Fig. 1. From the book *Bricklaying system*, chapter: Training Apprentices, Picking up stock with both hands at the same time; source: Frank B. Gillbreth (1911), *Bricklaying system*.

could be put on the market in a short time and at low cost. Industrialization has also had an impact on architecture. In civil engineering, prefabrication was emerging, which has reduced and accelerated the whole construction. For the first time the investor could buy a standardized product from the factory cheaper and without any/long waiting. Efficiency was also sought in building operations. Taylorization, i.e. rationalization of construction, was promoted by Frank B. Gillbreth, who taught masons to eliminate unnecessary work movements that caused slowness and tiredness. Efficiency was also sought in scaffolding and working tools. [F. Gillbreth, 2010]

2. NEW FAMILY

The rapid development of technology, new ways of working and accelerating transport have had a direct impact on the role of the family and the form of the family at the beginning of the 20th century. The leading figure of the Czechoslovak avant-garde Karel Teige, who lectured at Bauhaus, talks about a modern *nomad* in his book *The Smallest Apartment*. This is the person who lives everywhere but not in the apartment. We can find there also new relationships between people, i.e. couples who live without marriage, couples without

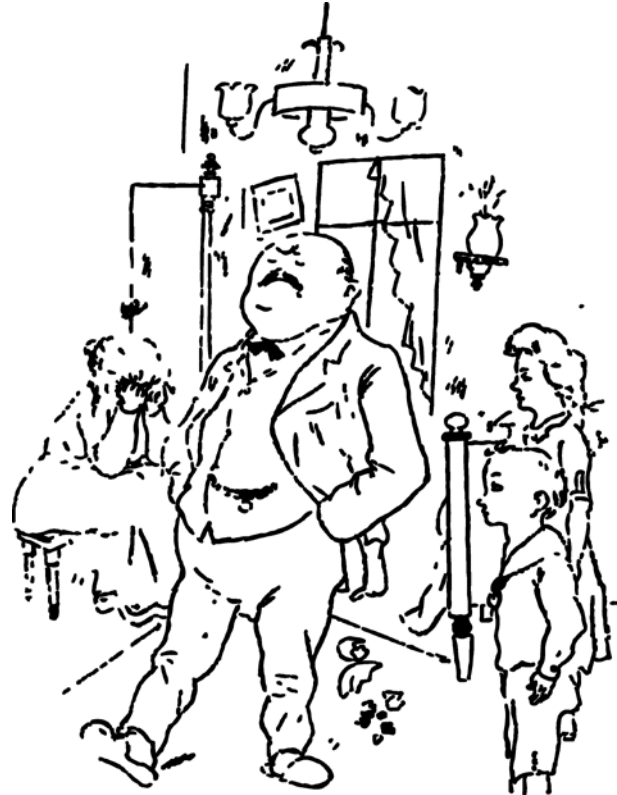


Fig. 2. George Grosz: caricature "warm of the family fireplace"; source: Karel Teige (1932), *The Smallest Apartment*.

children or increasing demand for temporary housing for modern nomads. There is a direct criticism of the traditional family, which is considered as the basis of the state. According to Teige, this traditional model of family is built on the enslavement of the woman.

George Grosz's caricature of the name "warmth of the family fireplace" faithfully illustrates Teige's view of the family's fate. In the middle, we see a proudly looking, well-dressed man who is the head of the family. Stepping symbolizes all the expected arrival in the apartment. In the background, sits unhappy wife and on the right side, there are two children standing to attention.

According to Teige, the family has changed in history and this model will not continue. There should be some change to a higher, new form. The housewife is also freed. A new woman, just like a man, goes to work. Compared to an earlier way of life, the apartment becomes especially a place of sleep. [K. Teige, 1932] The change in the way of work, the new relationship of people than the traditional family, is also reflected in architecture. There is a type of flexible housing, i.e. a flat that is open for a change. The collective house, where the apartment should only serve for sleeping. It was supposed to completely free the woman from housework, through the equipment of the house. Also in this period there are flats for temporary housing, for childless couples or experimental construction at world exhibitions. [H. Guzik, 2019]

3. ARCHITECT AS A SCIENTIST

Bauhaus representatives also have a different view on the profession of the architect. The main focus was on the scientific side as an important prerequisite for creation. Thus, the architect should be no longer perceived as an artist or profession that combines technical and artistic aspects. The architect should have a reliance on a scientific knowledge.

The Prague Club of Architects Publishes *Our Opinion on New Architecture*. Here, in addition to reference to the already modified analogy of industrial production, the emphasis is on the social issue of architecture, the suppression of self-serving aesthetics, the emphasis on hygiene requirements, we will find the following: "New demands must be understood scientifically: mathematically, empirically, statistically, and sociologically." (journal Stavba 1924/9) That is, the architect was not supposed to be an artist waiting for a moth, but a scientist. Hannes Mayer, former Bauhaus school director, after exile to the USSR in his unpublished theoretical text *Thirteen Marxist Architecture Themes*, goes further in his reflections: "Architecture is

no longer an art. Building has become a science, architecture is a science of building. Building is not a matter of emotion but knowledge. - The architect is the organizer of building sciences." [F. Haas, 1933] However, this view is extreme and focuses mainly on the material, i.e. measurable, scientific needs of man. Walter Gropius continues and further develops the work of the sociologist Franz Carl Müller Layer in his book *Die Familie* (1921). In 1929, he published a text entitled *The Sociological Foundations of the Minimum Apartment for the Urban Population*. Gropius, as well as Teige, observes the changing structures of society, which will gradually reach the rise of individuals. He transforms sociological knowledge into thinking about architecture.

4. CHANGING OF THE APARTMENT BUILDING AT THE TURN OF THE 19TH AND 20TH CENTURIES

Related to the housing needs after WW 1., prefabrication and typing of the whole building began. This led to the industrialization of the whole building industry and the development of new approaches to housing. Teige said about this process: "The construction industry can create a dwelling house as an advanced industrial product - goods. The skeleton system allows floor plan variability, component typing, fast construction, dry assembly and easy transport." [K. Teige, 1932] It was the exhibition of modern living which was an excellent condition for finding new methods of construction and experimentation.

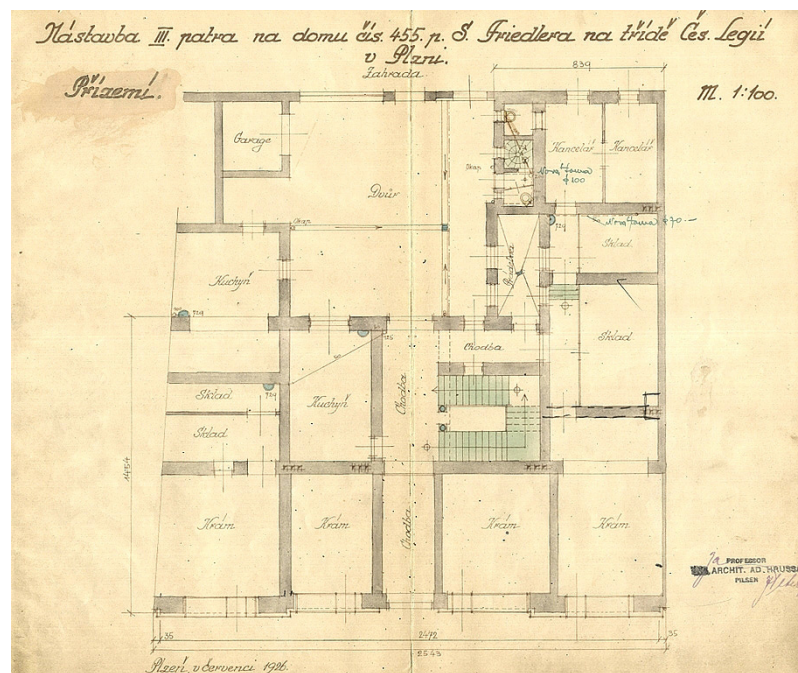


Fig. 3. Residential building no. 455 in Pilsen from the 1926; source: Pilsen Architecture Manual.

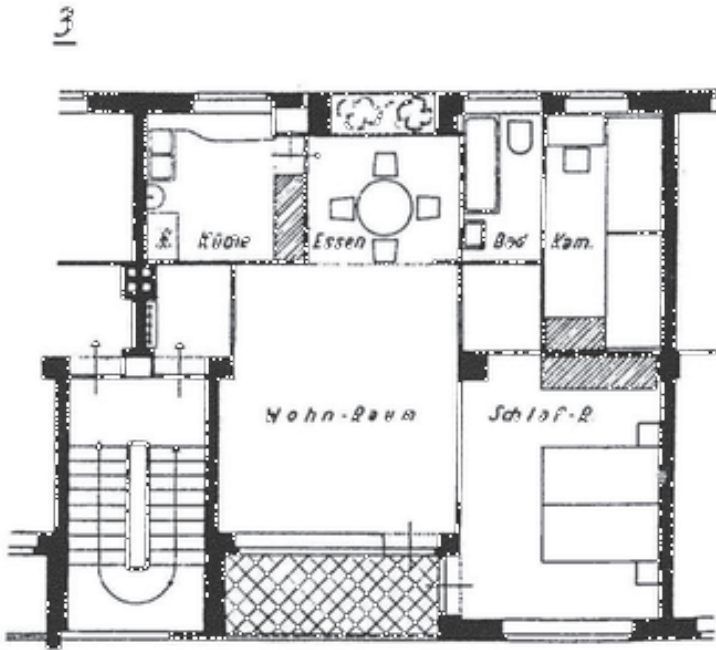


Fig. 4. Apartment in the district of Berlin-Siemensstadt by Hans Scharoun of 1929; source: Akademie-der-Kuenste-Berlin.

By comparing the standard apartment building from the late 19th century with the new apartment type, there is an obvious difference in the use of materials, the way of construction and their reflection in the form of housing production.

Historic apartment buildings often have considerable excavation work. There are large cellars. The masonry structure is characterized by a minimum of non-load bearing partitions. As a result, the floor plan makes disposition changes very difficult. Thanks to traditional truss systems, the roof can hardly be used without any radical intervention. The facade is richly decorated with stucco and with bossage. The flats have deep layout, large areas often without direct access to the terrace or balcony. The main building material is brick, wood and stone.

The aim of prefabrication was to reduce construction costs. Walter Gropius developed this idea in his industrialization program in construction in 1910.

Demanding excavation work and large cellars were not implemented in new types of apartment buildings. The skeleton construction allows a completely free floor plan. The internal partitions are non-loadbearing and therefore completely variable. The roof is flat. It allows to use it as a garden with a sun bath. The facade is free of costly stucco. Thus, the aesthetic effect is worked through a smooth facade. Great emphasis was placed on sunny apartments. New typological species were developed: apartments for childless couples, temporary accommodation, collective housing. Apart-

ments had also balconies, terraces or loggias very often. From the apartment there was a direct access to the exterior. The main building material was concrete, steel or reinforced concrete.

5. STUTTGART – WEISSENHOF

In 1919, Mies van der Rohe became a member of the Novembergruppe. This organization promoted modern art and organizes exhibitions. As a result, Mies could expose his unrealized projects and became well known. As a vice-chairman of the Deutscher Werkbund (Association of German Works), he organized the construction of the Weissenhof housing estate in Stuttgart in 1927.

Housing exhibitions represented the progress of housing culture and the possibility of free experimentation in residential buildings. Housing exhibitions in the form of whole residential houses were a novelty of the post-war era. Thus, in the construction industry, which were in the 19th century the world exhibitions in London and Paris for the machinery industry. The fact that the housing exhibitions did not represent just floor plans or mock-ups, but real, fully furnished buildings adapted to housing, was also a turning point.

The first major exhibition and major manifestation of modern architecture, which meant housing reform, was the Wekbund exhibition “Die Wohnung” with the Wiessenhofsiedlung colony. At the time when modern architecture was rather theoretical, this exhibition had a major impact and international character.

Mies van der Rohe, who was also the author of the urban plan, invited international architects of “international” style to cooperate. The industrialization of construction was already planned. Mies van der Rohe himself created a three-storey house 1-4 with 24 apartments. The concept creates a variable housing layout. Throughout the house, the advantage of the skeletal structure is applied to the maximum. The floor plan is completely free. Only the communication core and hardware is fixed for installations. The rest is completely free. Partitions are non-load-bearing, lightweight and easy to move. Partitions are made of wood, plywood, transparent or opaque colored glass. [K. Teige, 1932] To emphasize this manifestation of the new open building, Mies invited other designers/ architects for designing interior with inner walls. Each apartment can be quite different in layout. What remains is the installation and communication core. For example Lilly Reich and Franz Schuster participated in the layout of the apartments. [Ch. Simon, 2002]

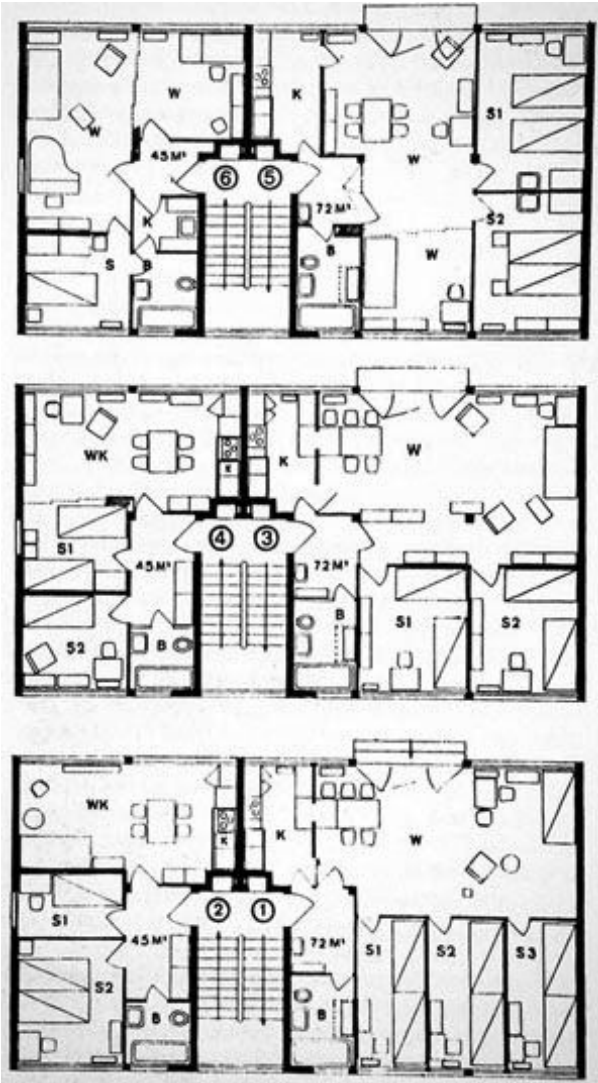


Fig. 5. Open apartment in house 1-4, designed by Mies van der Rohe, Weissenhofsiedlung colony; source: MoMA New York.

6. Breslau – WUWA

Werkbund continued the experiments with the Wohnung und Werkraum exhibition in Wrocław. The exhibition also included the building of houses in the Grüneiche district. Compared to Weissenhof, there is no longer such an international representation and new ideas of housing designs. The focus is on the small apartment *Kleinstwohnung*. Thanks to the heating of the whole settlement via heating plants, the houses do not have chimneys with soot smoke.

Rental houses connected with a staircase, designed by Adolf Rading, is another example of an open residential building. It is a five-storey apartment building. On a typical floor there are 8 apartments. Thanks to the sophisticated interconnection of houses there are savings on the communal core. The flats with a

floor area of sixty meters are a skeleton in a 4x3.5m grid. The internal partitions are non-load-bearing and sliding. The layout of the apartment follows the apartment building from Mies. This variability is also demonstrated in Rading's proposal. Everyone has a unique apartment here. Rading thus illustrates the possibility of using it both for families with children and for childless couples or singles. All apartments have a loggia and are sunny. [B. Störkuhl, J. Ilkosz, 2019]

7. BAUHAUS AND CZECHOSLOVAKIA

Architect Jan Gillar, born in 1904, studied architecture with Prof. Gočár at the Prague Academy. With his friend Karel Teige, he participated in Devětsil events, a left-wing art association. They also attended the Bauhaus School together. Gillar is the author of the French Schools in Prague 6. It is clearly possible to see Bauhaus's inspiration here. There was also an emphasis on maximum sun exposure without shadows being cast in the room. As a result, the arrangement of the desks could be variable. Another example of Gillar's work is the apartment buildings in Družstevní Ochoz street. It is also a skeletal structure of five-storey houses. Houses form a prototype of a functionalist response to the classic block. The houses are not closed, on the contrary they are open to the surroundings and each flat can be flexible in its layout. [Šlapeta V., 1998]

Several Czechs also studied at the Bauhaus. Unfortunately, none of them succeeded in the field of architecture. At the time of returning from the Bauhaus school, the economic crisis culminated, after which World War II came, and the Communist regime was not favourable to these free ideas of new architecture.

8. EMIGRATION

Even though Mies van der Rohe tried to compromise, in 1936, he was insulted sharply by one of the New Germany ideologues in one of the exhibition installations. Subsequently, he accepted an invitation to the United States and became the Dean of the Illinois Institute of Technology (IIT) and built the campus. Walter Gropius, later a professor at Harvard University, and Marcel Breuer, also immigrated to the United States.

Also the world-famous exhibition with the Weissenhofsiedlung was not well received by the Nazis. So they liked to take the name Weissenhof as a "Moroccan village", which Hermann Muthesius commented with refusal. [F. Haas, 1983] In emigration, Mies had the opportunity to devote himself to developing the idea of open housing as part of the 849-880 Lake Shore Drive Apartments project of 1949. These are two high-rise

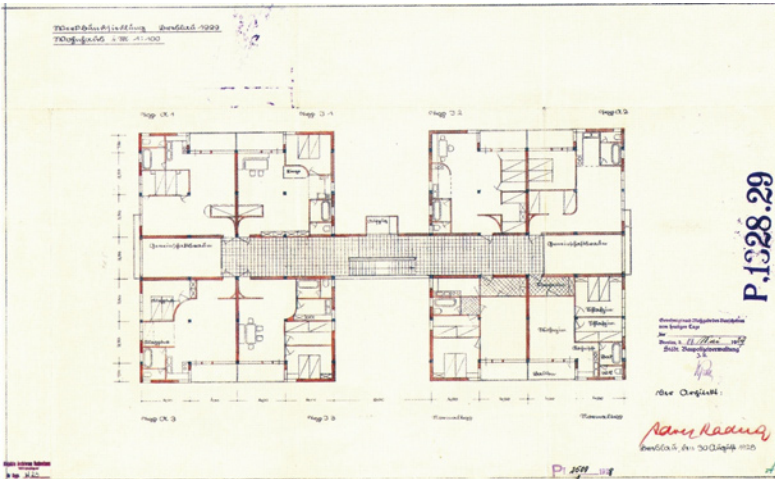


Fig. 6. House #7, designed by Adolf Rading, Wohnung und Werkraum exhibition; source: Adolf Rading in Breslau. Neues Bauen in der Weimarer Republik (2019).

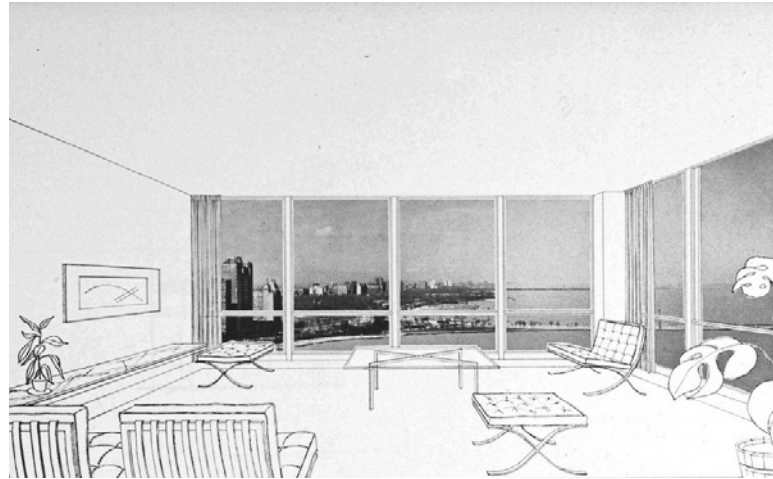


Fig. 8. Lake Shore Drive Apartment- interior, designed by Mies van der Rohe; source: Sales brochure, 860-880 lake shore drive, MoMA, New York.

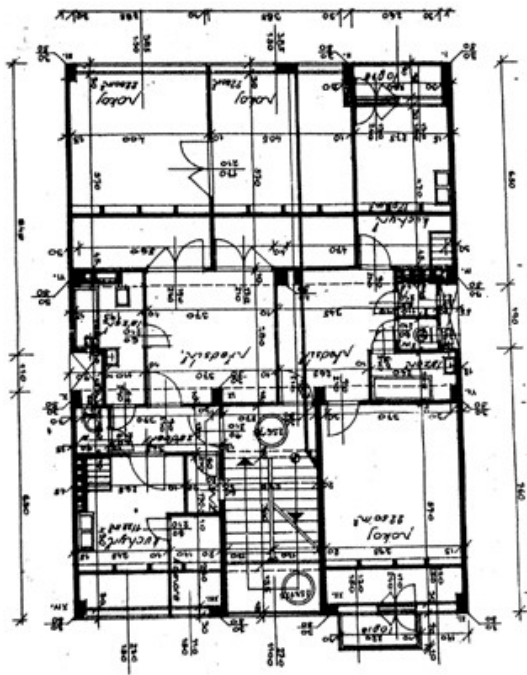


Fig. 7. Plan of apartment buildings in Družstevní Ochoz street, designed by Jan Gillar; source: Praha: Architektura XX. století (1998).

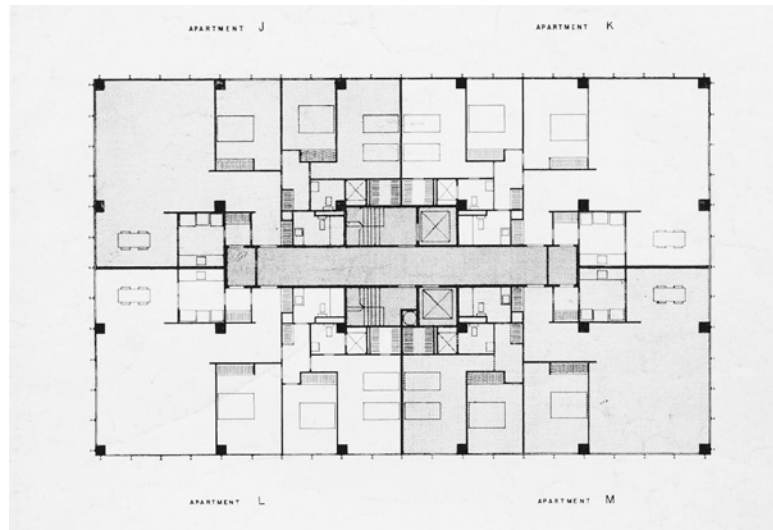


Fig. 9. Lake Shore Drive Apartments project – flexible plan, designed by Mies van der Rohe; source: Sales brochure, 860-880 lake shore drive, MoMA, New York.

apartment buildings in Chicago. First, the access floor is maximally open to the surroundings. Likewise, the apartments present the views of Lake Michigan as a painting.

Thanks to the layout of the communication core and the hygienic facilities around the staircase, the apartment can be easily changed in layout to combine rooms and a large living space. So Mies designed a Three-Bedroom Apartment (Typical apartment with enclosed kitchen), Two Bedroom Apartment (Living

room and master bedroom), One bedroom plus Living room, Kitchen open to living and dining room) or Open Apartment (apartment is open, space is organized by furniture placement and partial height cabinets), each with the same square meters in one flat.

DISCUSSION, CONCLUSION

The beginnings of thinking about changing mass housing go back to the Bauhaus period. The radical transformation of society is characteristic of the first half of the 20th century. The beginnings of prefabrication, Fordism, new building materials like glass, concrete and steel, and the “liberation” of the housewife

naturally implied completely new architectural concepts. The progressive environment of the Bauhaus school has generated creative answers to these rapid changes. The new way of working and the new structure of society, which was not just based on around the traditional family, was a challenge for mass housing concepts. In the works of prominent Bauhaus representatives such as Walter Gropius, Hanz Scharoun, Hanz Mayer, Mies van der Rohe or Adolf Rading, we find completely new approaches to mass housing at that time. Moreover, these are concepts that work with the theme of a collective house, i.e. a home where private and public activities blend, or just houses that their owners can customize. This is done with the help of sliding partitions or a completely free floor plan, where the interior partitions are intentionally non-load bearing. Even though the topic of open housing is now considered a new concept, the first experimental houses of the concept can be found a hundred years ago. An interesting piece of knowledge or continuation of this work could be proven in time; whether the flexibility that is a part of the DNA of these apartment buildings will be applied in the practice of its inhabitants.

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