DOI: 10.24427/978-83-65596-71-0_2

2. MODERN ARCHITECTURE – RESIDENTIAL BUILDINGS

2.1. Introduction

Residential buildings have been the most popular form of architecture since the earliest times. Because of their commonness, they shape the image of cities and give them general character. We are talking about white, grey or blue cities, where roofs are black or red – such reception of space is only available through homogeneous mass of housing substance. In the past, residential houses were used as counterpoints and complementary composition of assumptions in which palaces and public buildings "were gleaming". It changed a hundred years ago (Basista, 2006; Giedion, 1968). Residential houses fit in well-established architectural fashion (Kosiński, 2011). Their stylistics copies the patterns taken from the current fashionable design of public buildings. Inspired by this trend, they create their own ideas for the architecture of today (Basista, 2016; Gyurkovich, 2010). These activities, however, are subject to specific conditions resulting from the functional purpose and use of facilities. A house is not a public building, a temple or a supermarket. The ergonomics of the apartment enforces its spatial parameters and first of all lighting conditions (French, 2008; Giedion, 1968).

2.2. Housing development. Problems and social tasks

The realization of an architectural structure as a work exposed to public viewing has always given testimony to its owner. An investor's building is a testament to his affluence, but also his taste. With regard to housing development we can talk about two groups of investors. The first includes private individuals who by erecting their tenements build their social position while providing themselves a source of their income. Their designs must be safe in terms of current standards and maintain the current style (Fig. 2.1A) (Pevsner, 1980). The other group are public institutions. Their primary purpose is to meet the social needs of future residents. These investments are often building experiments. New functional, spatial and material solutions are tested.

The aesthetics of these buildings repeatedly sets new trends, but at the same time it is a visualization of the aesthetic views of decision-makers. The architecture realized in this way is becoming a materialization of economic determinants and political views. Private investments are built in prestigious locations. Most often these are detached structures. On the other hand, social activities are conducted on a large scale and they concern the realization of large housing complexes in which residential buildings are accompanied by service and education facilities. Public housing investments are inseparably linked to workers' flats. They are a natural consequence of the 19th century patronage and farm flats. Their development occurred at the beginning of the 20th century and was directly connected with the desire to improve the living conditions of urban working families (Fig. 2.1B). The purpose of the activities of the then socialists and hygienists was to lead the inhabitants of cellars and crowded chambers into bright and spacious flats (Giedion, 1968).

A B

Fig. 2.1. Housing Industry in the early 20th century. A) An expensive tenement house – La Casa Gallardo at the Plaza de España in Madrid, Spain (1914, architect: Federico Arias Rej), the most important architectural work of the last stage of Madrid Modernism; B) A model of a working-class flat of the second decade of the 20th century which used to be common in the neighbourhood of the Het Schip housing complex in Amsterdam, the Netherlands (Source: photos by M. Kłopotowski)

These measures were implemented by manufacturers, city authorities and architects themselves. It is significant that many residential social services were provided to residential homes which were intended for working families. Bakeries, shops and canteens, kindergartens and laundries were erected in residential buildings or in their neighborhood. The architecture of residential homes for workers in the 1920s began to adopt specific characteristics. Buildings grew bigger and bigger. They filled all urban quarters – as they did in the Valencian Finca Roja (Fig. 2.2A) – or they reached impressive dimensions, for example the 1100-metre long Viennese settlement Karl-Marks-Hof (Fig. 2.2B) (Villgratter, 2014). These buildings were composed of small, usually three-room flats, and their facades became more and more simplified. Over

time, fashionable red brick coming from Amsterdam was replaced by wall plaster. The aesthetics of these buildings submitted to rational economic conditions.

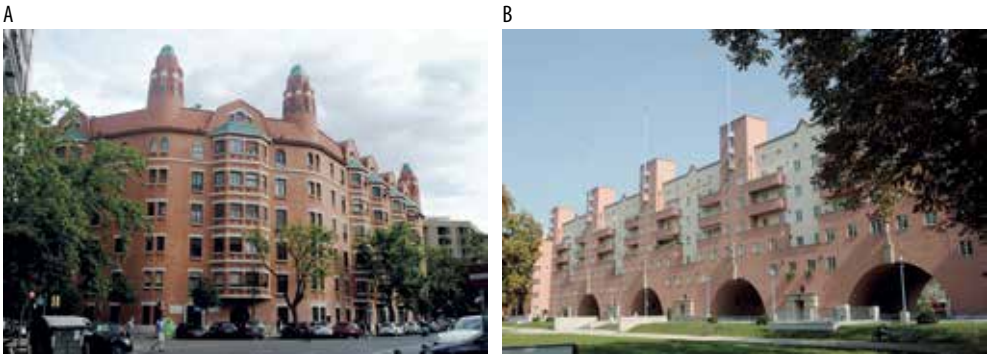

Fig. 2.2. Workers' houses from the 1930s. A) A building modelled on Amsterdam school of architecture Finca Roja in Valencia, Spain, (1929-1933, architect: Enrique Viedma Videl), B) Karl-Marks-Hof – the most famous Viennese realization from the so-called Red Vienna period, associated with the Socialist government (1927-1930, architect: Karl Ehn) (Source: photos by M. Kłopotowski)

Housing environment has been included in the above-mentioned range till the present day. It fulfills the aspirations of the wealthy and the decision-makers and gives the conditions of social existence for the poor.

2.3. Paths to contemporary times

European residential architecture of the 20th century developed along different lines. Aesthetic views were constantly evolving. The developing technology of raising buildings often influenced its aesthetic beauty. The political and economic divisions introduced in Europe after the Second World War divided the housing developments of 1945-1989 on both sides of the "Iron Curtain". Nowadays in the period of blurring economic differences housing architecture is also being standardized. Globalization in this area is not just a fashion style but also the unification of building materials and technology of building construction.

Functional architecture was popularized in the 1929s. Buildings erected at that time, in contrast to the earlier ones, were deprived of ornaments. The external form (body of the building) was the result of functional solutions. Elevations were a natural representation of the needs for lighting individual rooms. The size of the window openings was due to needs rather than aesthetic reasons. Modernist aesthetic views, in line with contemporary philosophical views, were accepted by all social circles

and groups. A good example of this trend was the Berlin Weiße Stadt residential complex (Fig. 2.3A) which was entirely occupied by workers (Knofel, 2009), as well as the luxury townhouse in Prague – Skleněný palác (Fig. 2.3B) which was considered the most prestigious address in the Czechoslovak capital. Both projects represent an international style. In their construction, simple forms of elementary solids complement one another. The structures feature large glazing, mostly metal balustrades and ornamental masts. The element that distinguishes the standard of these houses is finishing materials. In the interwar period this became the norm. Similarly looking buildings were finished with cheap wall plaster or expensive ceramic and stone lining. The prestige of the owners and residents was also realized through the expensive finishing of interiors of common parts and particularly interiors of the apartments. Almost all apartments completed at that time were already equipped with modern amenities such as: a kitchen with a stove and sink, a bathroom with a toilet and running water, central heating, and in expensive flats a servant's room for domestic help.

Fig. 2.3. Uniformization of architectural forms of residential buildings constructed in the first half of the 20th century. A) The Weiße Stadt housing complex in Berlin, Germany (1929-1931, architect Bruno Ahrends, Wilhelm Bünning, Otto Salvisberg), B) Skleněný palác in Prague, Czechoslovakia (1936-1939, architect Richard Podzemnéh) (Source: photos by M. Kłopotowski)

The workers' houses that were created in Vienna distinguished themselves against the background of these projects. A lot of new residential complexes, which by their architecture and furnishings fulfilled the aesthetic aspirations of the contemporary decision-makers, were erected in the socialist-run capital of Austria. In the so-called Red Vienna, in the 1920s through 1940s, a number of large residential urban areas were built, with commercial and service facilities (including nurseries). The apartments located in them, in spite of their tiny floor space, were equipped with kitchens and bathrooms, and the estates had common laundry facilities. Their architecture in no way resembled the modest implementation of German functionalists. On the contrary, it is approaching the style of art deco which was born at that time (Villgratter, 2014).

A

B

Fig. 2.4. Vienna Workers' Houses from the turn of the twenties and thirties of the 20th century. A) Reumannhof in Vienna, Austria (1924-1926, architect Hubert Gesner) B) Wohnhausanlage Friedrich – Engels – Platz, Vienna (1930-1933, architect Rudolf Perco) (Source: photos by M. Kłopotowski)

The interwar period is also the time of technical and technological experiments. In almost all European countries there were attempts to construct residential buildings using steel structures and prefabricated elements. One of the first buildings erected in such way was built in 1932 in Rotterdam (Fig. 2.5A-B). In the Bergpolderflat building a steel support structure and prefabricated slabs and walls were used. The house designed by architect Willem van Tijen, was erected in the quarter full of traditional tenement houses grouped in district. The building was in contrast to the context. A deck-access nine-storey-block with glass staircases was placed in the middle of the lot. This realization has inspired many later urban and architectural activities.

The fascination of prefabrication in the mid-twentieth century was so great that it dominated housing industry in almost all European countries. A lot of high-rise and large-panel construction systems were introduced in Europe. The quality of prefabricated elements and consequently of the buildings was very different and the operation of such buildings was often troublesome. Structures built with this technology were leaky, with low thermal standards. Generally, positive French experiences should be mentioned (Fig. 2.7A, 2.8A-B, 2.9A-B) and the negative ones from Central and Eastern European countries (Fig. 2.5C, 2.5A-B) (Reklaite & Leitanaite, 2013; Reikate, 2015). The criticism of this way of building caused the return to traditional technology. In Western Europe it was at the turn of the seventies and eighties, and in Eastern Europe in the nineties. We are currently seeing a return to the prefabricated technology, which is due to the desired rapid pace of construction and the resulting cost-effectiveness.

Fig. 2.5. Residential architecture and prefabrication. A, B) The experimental prefabricated apartment building Bergpolderflat in Rotterdam, Netherlands (1932-1934, architect Willem van Tijen), C) Pašilaičiai residential area in Vilnius, Lithuania (architect K. Balenas, St. Garuckas, 1987) (Source: photos by M. Kłopotowski)

Particular diversity of forms of housing construction in particular parts of Europe took place immediately after the Second World War. In the Eastern European countries, which were damaged by the war, the style of socialist realism was realized. It came from the USSR and related to the historical architecture. In many cities at that time buildings were modeled on the 17th and 18th century tenement houses (Fig. 2.6A). In the Scandinavian countries, which were not destroyed during the war, local variation of modernism was promoted at that time. Social houses that duplicated functional cuboidal forms were covered with steep high roofs. Rich Western European countries were fascinated by new technological achievements. Unité d'Habitation by Corbusier created a new aesthetics, promoting a healthy, green environment of living according to the resolutions of the Athenian Charter (Fig. 2.6B) (Knofel, 2009).

Fig. 2.6. Diversification of architectural forms of buildings realized in various European countries, after World War II. A) Buildings of Mariensztat housing estate in Warsaw, Poland (1948-1949, architects Zygmunt Stępiński and Józef Sigalin), B) Unité d'Habitation in Berlin (Germany) – a German "copy" of realization from Marseilles, 1947-1952 (Le Corbusier, 1957) (Source: photos by M. Kłopotowski)

The differences in forms of residential architecture on both sides of the "iron curtain" increased in the 1950s. Cold war in spatial dimension resulted in an extremely different approach to urban planning and architecture. In the cities of Eastern Europe, workers' houses were kept on a large scale in the convention of the classicizing architecture (Fig. 2.7). The emerging spatial configurations referred to the rescaled originals taken from historical cities. Berlin's Karl-Marx-Allee and Warsaw's Marszałkowska Residential District (Fig. 2.7B) are the flagship examples of this period. Monumental forms and architectural details were also transferred to modern urban planning, as it took place in Czechoslovakian Kladno – Rozdevol (Fig. 2.7A), where the historic architectural costume was imposed on a series of modern skyscrapers. The employed construction method repeatedly forced the use of traditional techniques and involve a number of craftsmen (stonemasons, bricklayers, blacksmiths, tilers, etc.). In the vast majority of Western European cities, people were fascinated by new technological and material achievements at that time. Modern prefabricated blocks of flats were built with the use of concrete and plastics on a massive scale. Cities, which were rebuilt after the war damage (such as Rotterdam), adopted a whole new spatial dimension. In their systems, traditional squares and streets were lost. All over the space, began to dominate the ubiquitous car and associated with it communication arteries, flyovers, multi-level garages and also extensive green areas. The projected population density in residential areas was then achieved by the construction of high-rise buildings. They fulfilled both postulates: of modern technology and the spatial one. These ideas are well illustrated by the West Berlin Hansaviertel (Fig. 2.8).

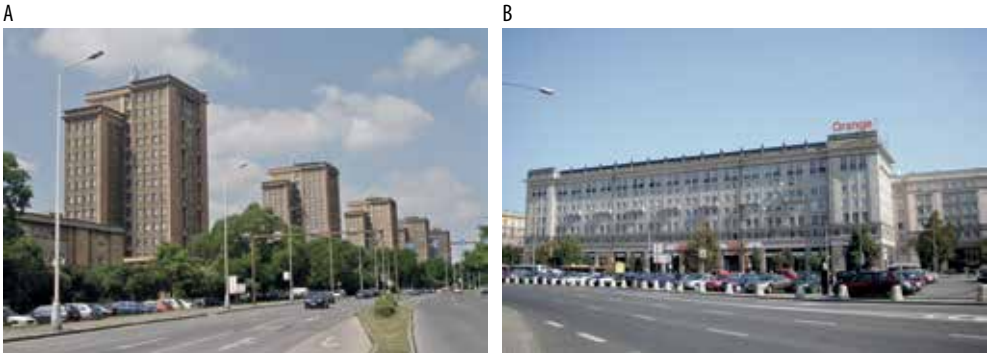

Fig. 2.7. Classicistic architectural forms in residential buildings were introduced obligatorily after the Second World War in the countries of the socialist bloc, as a new aesthetics. A) "Victorious People Settlement "housing complex in Kladno – Rozdevol (Czech Republic) (1952-1958, architects: Josef Havliček, Karel Filsak, Karel Bubeníček), B) Marszałkowska residential district in Warsaw (Poland) (1950-1952, group of architects under the direction of Józef Sigalin and Stanisław Jankowski) (Source: photos by M. Kłopotowski)

In a vast park, their works were realized by the most famous architects in the world. Residential blocks drown in green but they do not create a simple, easily characterized

layout. They are the forerunner of a space in which the backyard and a straight way to the house are lost. At the same time, they completely negate the private space near home and replace it by the so-called conjugated enclosures (where boundaries are impossible to define) and multifunctional interiors (with hard to define usage).

Fig. 2.8. Architectural response of the "Western World" to the Pro-Soviet Socialist Realism Architecture. Buildings built in 1957 in Berlin (Germany) on the premises of Hansaviertel Building Exhibition. A) A building designed by the architects Fritz Jaeneckean and Sten Samuelson, B) A building designed by architect Walter Gropius (Source: photos by M. Kłopotowski)

The fascination with the ideas of Le Corbusier and the volume of his designs implemented in the 60s and 70s of the 20th century resulted in the construction of huge housing complexes. In the suburbs of Paris were constructed: Les Courtillieres (housing estate with 1500 apartments), large housing complexes such as Sarcelles (located in the northern suburbs of Paris for 40,000 inhabitants) and La Grande Borne in Grigny (located in the southern suburbs of Paris for 13,000 inhabitants). In Amsterdam, the Bijlmermeer district was built for 100,000 people. Similar investments were made in other European countries. The Eastern Bloc countries adopted this way of shaping the housing environment in the second half of the 50s and maintained it until the early 90s. Many large settlements and residential areas were built in all the socialist countries at that time. In Poland, the most memorable are: the SuperUnit in Katowice (Fig. 2.9A), the Wave Building in the Przymorze housing estate in Gdańsk (Fig. 2.9B), or a deck-access block in Przyczółek Grochowski in Warsaw. The building, designed by Zofia and Oskar Hansen, is 1.5 km long and is considered to be the longest building in Europe.

The counter idea to mega spatial projects in housing developments in the mid-twentieth century became the buildings with single staircases, relatively small in the projection. The so-called tower blocks are characterized by an internal passageway that is surrounded by flats. These buildings perfectly fulfill modernist ideas of building houses in green space. Large areas of recreational areas were obtained in

these projects thanks to the construction of skyscrapers. Diversification of their height created a new landscape dimension of the housing environment. Projections of buildings, apart from square and rectangular ones, were given central or organic shapes (Fig. 2.10A-C) (Hevre, 2010). Diffused buildings and personalized details made this architecture more attractive than ever.

Fig. 2.9. Residential projects on a mega scale of the early seventies. A) The SuperUnit in Katowice, Poland – 762 flats, 15 floors, 3 entrances, 9 staircases (1967-1972, architect Mieczysław Król, B) Wave Building in Przymorze housing estate in Gdańsk, Poland – 860 – meter – long building, 1792 flats, 10 floors, 16 staircases (1970-1973, architects Tadeusz Różański, Danuta Olędzka, Janusz Morek) (Source: photos by M. Kłopotowski)

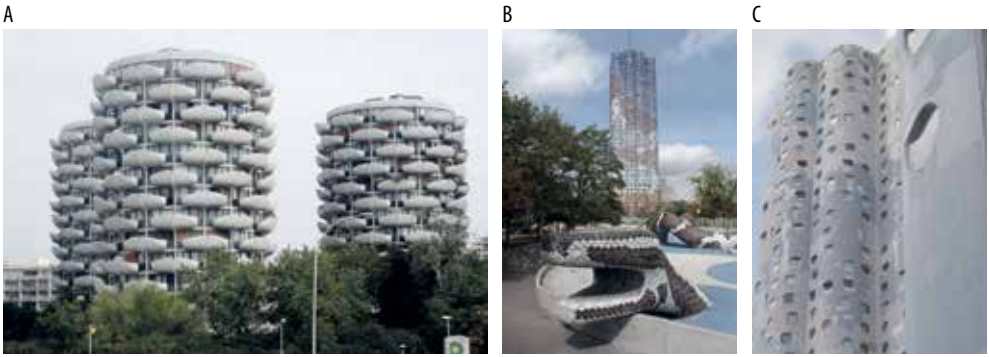

Fig. 2.10. Skyscrapers (tower blocks) of the seventies of the 20th century. A) Les Choux – Maisons-fleurs in Créteil, France (1969-1974, architect Gerard Grandval), B, C) Aillaud Tours in La Defense, Paris, France, the tallest buildings in the district have 39 floors each and are 105 m high (1977), architect Emile Aillaud) (Source: photos by M. Kłopotowski)

The desire to search for new forms of architectural expression is evident in the residential developments of the mid-1970s. The pyramid-like structures were erected without resigning from the size of the buildings. Buildings in which individual housing units overlapped each other were built in Evry near Paris. Green terraces were set up with connection to the apartments on the roofs of the piled-up solids (Fig. 2.11A).

A similar realization was made in Austria's Graz (Fig. 2.11B). Individual segments of the building are stacked one on top of the other, their layout is very different and the internal communication is at different levels. Both projects (like tower blocks) were supposed to be primarily a departure from rectangular boxes and repetitive storeys. Double-floor-flats were designed, the interior of which was supposed to resemble the solutions used in traditional single-family houses. Over time, this design has become known as organic – referring to the world of nature.

Fig. 2.11. Stacked housing forms from the seventies of the 20th century. A) Piramides Housing in Évry, France (1971-1976, architect M. Andrault with his team), B) Terrassenhaussiedlung St. in Peter Graz, Austria (1965-1978, architects Eugen Gross, Friedrich Gross Rannsbach, Werner Hollomey, Hermann Pichler – Workgroup Graz) (Source: photos by M. Kłopotowski)

Coming from the same period Paris's construction Orgues de Flandre (Fig. 2.12A), or Vienna's Wohnpark Alterlaa (Fig. 2.12B), surprise by the dynamics of their form. Buildings resemble ships and space stations and reflect the fascination with space flight and hope for colonization of the universe. Similar emotions of surprise accompany the view of Les Arènes de Picasso from the Noisy-le-Grand near Paris (Fig. 2.13A) (Hevre, 2010). In case of this realization, surprising is not only the oval body of the building, but also individually designed details of supports, cornices and window openings. The residential architecture of this time became a plastic experiment. Public-funded projects are a testament of the financial well-being and technological capabilities of the country in which they were implemented. The aesthetics of these buildings is completely different from classical modernism. Its purpose is to surprise the observer. The same premises led to the Viennese realization of the Hundertwasserhaus, a building which, for the first time in our days, was strewn with variety of colors and plants planted on terraces and roofs. This building and it's idea were a surprise not only for compositional and artistic solutions, but also for the pro-ecological message about the city of the future (Vidella, 2007).

A B

Fig. 2.12. Forms of residential houses in the early 1980s, which were supposed to surprise the viewer. A) Orgues de Flandre in Paris, France (1974-1980, architect Martin van Treeck), B) Wohnpark Alterlaa housing complex in Vienna, Austria (1973-1985, architect Harry Glück with his team) (Source: photos by M. Kłopotowski)

A B

Fig. 2.13. A) Les Arènes de Picasso in Noisy-le-Grand, France (1985, architect Manuel Núñez Yanowsky), B) Hundertwasserhaus in Vienna, Austria (1983-1985, Friedensreich Hundertwasser) (Source: photos by M. Kłopotowski)

The eighties brought another phase of departure from modernist architecture. New housing assumptions, in their spatial arrangements, were based on the experiences of the twentieth century. They drew on both the layouts of the classical city and the ideas of the green estate. They returned to the traditional quarter development with the street and the square (Fig. 2.14A). At the same time, the house was set in a green environment, and the green courtyard was often designed inside. The scale of residential buildings was gradually decreasing. Individual buildings were designed individually. Their architectural details were stylized for historical purposes (Fig. 2.14A-B) (Herve, 2010). They returned to high roofs, unused for several decades (Fig. 2.14D). Pilasters and cornices appeared on the facades of the buildings. The window openings were surrounded by ornamental frames and at the top of the buildings appeared belvederes (Fig. 2.14C-D) (Knofel, 2009). At the end of the last century, residential architecture, maintained in postmodernist style, gained social

recognition. The return to the classic formal and material solutions gave the users a sense of their robustness and durability. Classical aesthetics of forms gave a sense of timelessness (Vidella, 2007).

Fig. 2.14. Postmodernist realizations of housing development from the 1980s. A) Les Arcades du lac le Viaduc in Saint – Quentin-en--Yvelines, France (1982, architect Ricardo Bofill), B) Les Espaces de'Abraksas in Noisy-le-Grand, France (1982, architect Ricardo Bofill) C) IBA Wohnanlage in Berlin, Germany (1985, architect Rob Krier), D) An apartment Development on the Tegel Waterfront in Berlin, Germany (1986-1986, Moore Ruble with the team) (Source: photos by M. Kłopotowski)

This architecture was associated with coming back of bourgeois patterns of residence, which was in contradiction with the emerging democratic civil society which wanted to participate actively in the formation of their place of residence. The achievements resulting from the process of social participation are characterized by a great diversity of applied forms and details. In many of them the individualization of dwellings and number of architectural details (taken from the idea of the Hundertwasserhaus where each dwelling is marked on the facade) leads to aesthetic chaos (Fig. 2.15A) The resulting plastic effect also gives the impression of randomness and temporality which is not eliminated by color or material unification (Fig. 2.15B).

A B

Fig. 2.15. Multi-family houses realized as a result of the process of social participation consisting in the cooperation of an architect with a particular user. A) A Bo 100 building in Malmö, Sweden (1987-1991, architect Ivo Waldhör with the team), B) Wohnbau Alte Poststraße (1982-1984, architects Michael Szyszkowitz and Karl Kowalski) (Source: photos by M. Kłopotowski)

At the same time, since the beginning of the 1980s, many significant architectural centers have undertaken work to revive the modernist architecture.

The roots of the new housing industry date back to the 20th century. Buildings again received rectangular forms. However, unlike their prototypes, they were developed based on complex projection systems consisting of interpenetrating rectangles and circles (Fig. 2.16A) (Herve, 2010). Unlike functional architecture, the new direction, which in the course of time was named neo-modernism, operated with a whole array of architectural details. The sculptural layout of the buildings was created by a series of verandas, balconies and openwork stairs. Similarly, the solids were differentiated by their height and partially covered with sloping roofs (Fig. 2.16B).

A B

Fig. 2.16. Neomodernist housing developments from the 1980s. A) Social Housing at La Villette, Paris, France (1981-1997, architect Gérard Thurauer), B) Wienerberger Gründe in Graz, Austria (1981-1997, architects Ralph Erskine and Hubert Rieß) (Source: photos by M. Kłopotowski)

So the architectural design seemed to be fresh and new. It was well suited to compare it with the perceptions of the Deconstructivists, who based on the experiences of the past (making new sets of existing details and elements). Architects completed value of the building's space, form and detail together. The building made of many elements, which can be implemented in the cooperation with the architect and the investor, became a symbol of the end of the last century. At the same time, this trend is the last precisely identifiable one before the time of globalization.

2.4. The housing industry of the 21st century

Housing construction of our times draws inspirations from the experience of the whole last century. Contemporary housing projects are built as single buildings (complemented on plots built-up already) or units that fit in the spatial arrangements of the so-called new urbanism. It is based on land parceling. Area is divided for plots dedicated for different investment tasks. Divisions based on the orthogonal grid of streets that were characteristic to the beginning of the present century are increasingly subject to various types of distortions. Often the neighbouring streets are laid out along curved lines. This distortion is evidently translated into the spatial form of buildings and in particular the shape of their projections. Nowadays, more than ever, we come across buildings, whose projections are based on irregular polygons. They are also varied vertically (individual floors have different areas and shapes). On the facades of these buildings there is a varied range of building materials (from the traditional to the latest ones). The architectural details are surprising in both the form of the space and the material used. This trend is accompanied by the desire to exhibit engineering achievements and to take advantage of complex construction solutions that affect the spatial reception of the whole building. Architects often strive for optical play with the recipient and try to realize a building that will be seen as "more crooked" than it is in reality. In addition, they constantly illustrate new ideas that create our reality. In particular, views on environmental and sustainable development are allowed to speak.

2.4.1. Buildings

Single housing projects often occur in heavily urbanized areas. Very often their formal task is to contribute to a change in the aesthetics of a revitalized district. New architectural objects shape the new (considered as positive) image of such places. This is illustrated by the Zaha-Hadid-Haus in Vienna (Fig. 2.17A) built over an old railway viaduct or by the Turning Torso in Malmö towering over a newly built residential

area (Fig. 2.17B) (Vidella, 2007; Gyurkovich, 2010). In both cases the "strangeness" of the form objects (in which borders of projections do not overlap each other and the walls are diagonal planes) is a magnet attracting further investment. The strong and surprising architectural form of these buildings seems to be necessary in order to succeed in the intended investment activities.

A B

Fig. 2.17. Buildings being individual housing developments. A) Zaha-Hadid-Haus in Vienna, Austria (1995-2005, architect Zaha Hadid), B) Turning Torso in Malmö, Sweden (2001-2005, architect Santiago Calatrava) (Source: photos by M. Kłopotowski)

2.4.2. Compositions of solids and spatial forms

Vast majority of residential multi-family buildings are currently built in housing estates. Their basic form remains a cuboid which in specific locations is defragmented and divided. The architects' aim is to "build" buildings with "big blocks". This effect can be achieved, inter alia, by the application of different color and material for individual elementary solids. In such designed houses, individual dwellings usually coincide vertically. Differences in projections result from the frequent use of maisonettes (Fig. 2.18A). The differention of projections of individual storeys is also a consequence of the adopted architectural composition. This is especially true in urban development. Projects in which buildings fill entire urban quarters are often divided into a number of differently-sized bodies. The aim of this action is to emphasize the individual parts of the building and to create a new varied landscape of the 21st century city (Fig. 2.18B).

The urban space is also made more attractive by the introduction of objects with "deformed" bodies. Architectural activities in this area are different than the traditional way of shaping in terms of roof, walls and socle. Traditional planes give way to slants, undercuts and curved surfaces (Fig. 2.19). The blocks formed in this manner are surrounded by a number of details forming a layer around it. Such actions do not substantially affect the projections of buildings and flats. Their task is to create an image of the object considered as contemporary. The aesthetics of plastic solutions ranges from sharp, straight line cuts and planes to gentle arches, delicate curves and curved planes (Fig. 2.20).

A B

Fig. 2.18. Compositions of solids of multi-family buildings, which are composed of cuboid elements. A) The Eko Park Residence "Cameratta" in Warsaw, Poland (1999-2004, architect Bulanda Mucha Architects, B) Edificio Vallecas 4 Madrid, Spain (2008, architects Hugo Araujo Lazare – Araujo and Brieva Arquitectos) (Source: photos by M. Kłopotowski)

A B

Fig. 2.19. Geometrically deformed blocks of contemporary residential buildings. A) A building in Het Funen in Amstardam, the Netherlands (2003-2009, architects Piter Bannenberg, Walter van Dijk, Kamiel Klaasse, Mark Linnemann – NL Architekci), B) Social Housing in Vallecas, Madrid, Spain (2010, Architect Rueda Pizarro Arquitectos) (Source: photos by M. Kłopotowski)

A B

Fig. 2.20. Contemporary residential buildings, surrounded by a layer of modern (non-ruled and curved) architectural details. A) The City Life Milano Libeskind Residential Complex in Milan, Italy (2004-2013, architect Daniel Libeskind), B) The City Life Milano Hadid Residential Complex in Milan, Italy (2004-2014, architect Zaha Hadid) (Source: photos by M. Kłopotowski)

Other modifications of facades and solids of residential buildings were inspired by the same premises. From the beginning of the 21st century, the tendency of formal play with window openings and numerous niches on the facades is clearly visible. The individual windows and loggias on the consecutive floors do not overlap vertically (Fig. 2.21) and their size varies. These compositions introduce a new plastic aesthetics which generates considerable complications of building solutions and internal systems. This problem concerns in particular the installation of central heating.

Quite often, the final reception of a building depends on the design of its balconies. They become the element that differentiates the outlines of individual floors. Their size and shape are often varied on each floor. They take shapes from rectangular and ruled, through polygonal to curved. The thickness of the balcony slabs, their balustrades and the openwork elements of shields create the final form of the building (Fig. 2.20, 2.21, 2.22). A new tendency in the shaping of architectural forms is the clear division of the building's body into vertical or horizontal sequences separated from one another (Fig. 2.23) (Regas & Lopez, 2010; Garcia Cassas, 2014). Formally, this kind of architects' work gives interesting artistic solutions, but actually it becomes another element that influences the complexity of the design and construction process of the building. The difficulties lie in both the building design and the installation solutions.

A

B

Fig. 2.21. Varied graphics of window openings and balcony niches on the elevations of contemporary multi-family buildings. A) 145 Housing Units + FAM + PMI – Clichy-Batignolles, Paris, France (2016, architect Avenier Cornejo Architectes, Gausa Raveau Actarquitectura), B) House in Ørestad, Copenhagen, Denmark (2006, architect Bjarke Ingels) (Source: photos by M. Kłopotowski)

Fig. 2.22. Balconies surrounding a building completely change its spatial reception – Bâtiment Home in Paris XIII, France (2012-2015, architect Hamonic + Masson & Associés) (Source: photos by M. Kłopotowski)

Fig. 2.23. Dividing a building into separate elements leads to the dynamics of the architectural form – Edificio Vallecas 5, Madrid, Spain (2006-2009, architects Luis Burriel Bielza, Pablo Fernandez Lewicki and Jose Antonio Tallon Iglesias – SOMOS Arquitectos) (Source: photos by M. Kłopotowski)

An interesting fact about contemporary buildings is that they seem to be a form of architect's "play" with observer. Often its shape is not only unexpected, but even strongly contrasted with the essential body of the structure. This is happening on the glass facade of VM Houses in Copenhagen, where pointed triangular openwork balconies slide out of one another (Fig. 2.24). In result, this almost entirely glazed cuboid (balanced in proportions and scale) is perceived as dynamic and even aggressively sharp. Another type of game is played with the viewer in Edificio Vallecas 16 in Madrid. All windows of the house are equipped with shutters made of the same material and in the same colors as the facade (Fig. 2.25) (Garcia Cassas, 2014). Their complete closure causes the building to be deprived of window openings. Opening them in different sequences is never the same.

Fig. 2.24. Balconies aggressive in their form in VM Houses in Ørestad, Copenhagen, Denmark (2005, architects Bjarke Ingels and Julien De Smedt) (Source: photo by M. Kłopotowski)

Fig. 2.25. Background shutters in Edificio Vallecas 16, Madrid, Spain (2007, architect Javier Camacho) (Source: photos by M. Kłopotowski)

Contemporary urban planning is also a kind of game with the space observer. It is increasingly based on a non-orthogonal grid of streets and pedestrian passages. The purpose of such a design is to provide directional corridors and closed views in public spaces. This action builds an intimate, man-sized character of urban interiors. It fosters their individualization and builds positive relations between the inhabitants and the environment. In architectural designs, however, it leads to the creation of buildings whose projections are based on the shape of rambling polygons (Fig. 2.26). Attractive urban space solutions lead to complications in the plans of buildings and flats. This is reflected in their functional systems, mainly in fitting furniture in the polygonal rooms (Villgratter, 2014).

Fig. 2.26. Residential buildings whose projections are based on rambling polygons. A) WAS – Wohnbau in Seestadt Aspern, Vienna, Austria (2015, architect AllesWirdGut), B) A house with verandas in Vienna, Austria (2008, architect RLP Rüdiger Lainer + Partner) (Source: photos by M. Kłopotowski)

2.4.3. Engineering achievements in residential construction

Residential housing increasingly draws on the achievements of engineering art. In modern residential buildings we find very large overhangs and cantilevers. The most spectacular developments in which contemporary design capabilities are used are Edificio Mirador in Las Tablas in Madrid (Fig. 2.27A) (Regas et al., 2010) and Parkrand in Amsterdam (Fig. 2.27B). In both of these projects, there were applied spatial frames suspended at high altitudes and filled with flats. The architects' aim was to create openwork forms and to distract the optical static of the building. Their size makes these compositions available on an urban scale. The examples are located in the open space and visible from a considerable distance, which is conducive to their perception. Slightly different is exposition of structures in linear spatial systems, along the communication routes. Almost always this solution is accompanied by the desire to suspend the building blocks in space. Architects and constructors implement such formal intentions by using optically slender, high and often non-vertical posts

(Fig. 2.28), and structural supports (Fig. 2.29). These elements are always correlated with their dynamic perception. Their size is a derivative of dynamic observation carried out from inside the car.

A

B

Fig. 2.27. Residential buildings with a number of dwellings inside, in which massive overhangs were built. A) Edificio Mirador in Las Tablas, Madrid, Spain (2005, architects MVRDV), B) Parkrand in Amsterdam, Netherlands (2006-2007, architects MVRDV) (Source: photos by M. Kłopotowski)

Fig. 2.28. A suspended in space structure of Wohnhausanlage Riverside in Vienna, Austria (2008, architects Coop-Himmelb (l) au) (Source: photos by M. Kłopotowski)

Fig. 2.29. Huge structural supports in the Doninpark building in Vienna, Austria (2013, architects LOVE architecture and urbanism) (Source: photos by M. Kłopotowski)

Similar formal solutions are used with regard to the scale of building. In Madrid, 102 whole flats and individual rooms were outthrust outside the main outline of building (Fig. 2.30A) (Regas & Lopez, 2010), and in the WoZoCo located in Amsterdam the entire apartments were pushed out (Fig. 2.30B). The facades of buildings are dynamic and mind-blowing. The authors of these structures evidently play with the statics of solids, human perception and even emotions.

All of the above examples are interesting architectural structures and deserve recognition for their constructional solutions. At the same time they are examples of

buildings in which complex sanitary systems were designed. In particular, it applies to sewage treatment solutions in overhanging and cantilever parts.

A B

Fig. 2.30. Residential buildings with rooms and flats in large cantilever.constructions. A) 102 outthrust social dwellings in a block of flats in Carabanchel, Madrid, Spain (2008, architects Ignacio Borrego, Néstor Montenegro and Lina Toro – Dosmasuno Arquitectos), B) The WoZoCo in Amsterdam, Netherlands (1994-1997, architects MVRDV) (Source: photos by M. Kłopotowski)

2.4.4. Contemporary building materials in the architecture of multi-family buildings

We are currently observing a strong unification of the techniques of erecting residential buildings. They are made by using concrete and ceramic materials. They serve as both structural and finishing materials – creating a specific aesthetics of buildings (Fig. 2.31) (Garcia Cassas, 2014).

A B

Fig. 2.31. Multi-family buildings constructed with the use of traditional building materials: concrete and bricks. A) The Celosia complex in Las Tablas, Madrid, Spain (2001-2009, architects MVRDV), B) A building in Het Funen in Amstardam, Netherlands (2003-2007, architects DKV architecten) (Source: photos by M. Kłopotowski)

A

B

Fig. 2.32. Non-standard building materials used for the construction of multi-family buildings. A) Metal facade 82 Viviendas en Carabanchel, Madrid, Spain (2009, architects Atxu Amann, Andrés Cánovas and Nicolás Maruri – Architects of ACM), B) Façade of Edificio Vallecas 51 made from polymer, Madrid, Spain (2006-2009, architects Luis Burriel Bielza, Pablo Fernandez Lewicki and Jose Antonio Tallon Iglesias – SOMOS Arquitectos) (Source: photos by M. Kłopotowski)

A

B

C

D

Fig. 2.33. Wood as a "new" pro-ecological building material. A) Moving shutters over the balconies around the Carabanchel Social Housing, Madrid, Spain (2007, architects Farshid Moussavi and Alejandro Zaera-Polo – Foreign Office Architects), B) Wooden openwork elevations School Group and Student Housing – Clichy –Batignolles, Paris, C) Wood-finished facades of the Allegretto Housing Complex in Eko Park in Warsaw, Poland (1999-2003, architects Stefan Kuryłowicz, Paweł Gumuła, Maria Saloni-Sadowska), D) Wood-finished facades and floors in Holzwohnbau in Seestadt Aspern, Vienna, Austria (2011-2015, architects Alfred Berger, Tiina Parkkinen – Architekten Berger + Parkkinen Ziviltechniker GmbH) (Source: photos by M. Kłopotowski)

In addition to traditional ones such as concrete and brick, steel (Fig. 2.32A) and plastics (Fig. 2.32B) are increasingly used in new designs Because of that, the buildings get completely new, surprising texture of their surfaces and unmistakable colors (Garcia Cassas, 2014). At the same time, the trend of return to natural materials is very clear in modern realizations. Many of today's multifamily houses are decorated with wood (Fig. 2.33) (Gyurkovich, 2010). It is used as wall cladding or window shutter material. Wooden parts are often used for making balustrades and frame details. There are also projects in which wood is used as a finishing material for floors in external public spaces (Fig. 2.33D) (Villagratter et al., 2014). The widespread use of this material is associated with the development and popularization of the ecological architecture.

2.4.5. Ideas for sustainable development and green building in residential architecture

Special projects related to shaping the contemporary housing environment are projects based on the principles of sustainable development. In the realization of these issues ecology influences and even determines aesthetic solutions. As a consequence, plants are placed on terraces and roofs of residential buildings (Fig. 2.34). Their task is to clean the urban air and create a human-friendly microclimate of residential interiors. Trees, shrubs and vines planted in containers create a new aesthetics of multi-family buildings. In the future, these developments will become vertical parks. However, ecological solutions meet criticism because such gardens need complex irrigation and drainage systems.

A

B

Fig. 2.34. Contemporary vertical parks – multi-family buildings with terraces and gardens on the roofs. A) Bosco Verticale in Milan, Italy (2009-2014, architect Stefano Boeri), B) The M6B2 Tower of Biodiversity in Paris, XIII, France (2016, architect Edouard Francois) (Source: photos by M. Kłopotowski)

2.5. Summary

A review of European housing developments over the past 100 years shows that these buildings have consistently been in line with the current artistic, architectural and social trends. Their quality and standard always resulted from economic conditions. That is also true today. It should also be noted that the split and division of Europe to the east and west (existing in the 20th century) has almost completely disappeared. The tendencies of globalization lead to the emergence of buildings entirely outside the context of location. Their architectural forms are subject to unify and branch of from local traditions. This is supported by the global architecture market, with developers realizing their projects almost everywhere in the world. Today's multi-family residential buildings are expected to astound recipients. This leads to the formation of "strange" mind-blowing realizations. The next few years will bring more surprises. It is therefore impossible to point out one leading aesthetic tendency, because it is now replaced by impossible to define diversity.

References

Basista, A. (2006) *Composition of a work of architecture.* Kraków, Universitas

Basista, A. (2016) *Architektura jako sztuka.* Kraków, Universitas

French, H. K. (2008) *Urban Housing of the Twentith Century.* London, Laurence King

Garcia Cassas, I. (2014) *Arquitectura en Madrid.* Madrid, Ediciones la Libreria

Giedion, S. (1968) *Przestrzeń, czas i architektura. Narodziny nowej tradycji.* Warszawa, PWN

Gyurkovich, J. (2010) *Architektura w przestrzeni miasta.* Kraków, Politechnika Krakowska

Herve, M. (2010) *De L'architecture moderne a Paris.* Paris, Alternatives

Knofel, H. J. (2009) *Modern architecture in Berlin.* Stuttgart, Edition Axeel Menges

Kosiński, W. (2011) *Miasto. Piękno miasta.* Kraków, Politechnika Krakowska

Pevsner, N. (1980) *Historia architektury europejskiej.* Warszawa, Arkady

Regas, R. & Lopez, V. (2010) *Arquitectura enla Espana del siglo XX.* Madrid, Susaeta

Reklaite, J. (2015) *Kaunas 1918-2015.* Vilnius, Architekturos Fondas

Reklaite, J. & Leitanaite, R. (2013) *Vilnius 1900-2013.* Vilnius, Architekturos Fondas

Witruwiusz (1952) *O architekturze ksiąg dziesięć.* Warszawa, Arkady

Vidella, A. S. (2007) *Atlas der zeitgenossischen architektur.* Bonn, Dumont

Villgratter, S. Gelhaar, A., Madreiter, T., Sark, C., Kafner, R., Eggers, J. A., Pogade, D. & Meusner, N. (2014) *Architekturfhrer Wien.* Berlin, DOM Publisher