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IVOR SAMUELS*

"TOWARD AN URBAN DESIGN MANIFESTO" – REVISITED

„W KIERUNKU MANIFESTU URBANISTYCZNEGO" – PONOWNIE

A b s t r a c t

An urban design manifesto prepared in 1980 by two eminent US urban design practitioners and theoreticians s revisited to ascertain its relevance today. The original work was organised in three parts: 1) Problems for Modern Urban Design, 2) Goals for Urban Life and 3) An Urban Fabric for an Urban Life. This examination focuses on the first part to assess eh extent to which the problems are still relevant, how they need to be modified or augmented in the light of current problems.

The Manifesto identifies eight separate sets of problems and this study expands the first problem that of poor living environments so that it is discussed under five sub problems which were not identified by the original authors but proposed in this paper as being of growing concern. They are; Pollution, Extreme Weather Events, Demographic Change, Obesity and Security. The relevance of these to urban form is discussed.

The other seven of the Manifesto problems have been grouped for discussion in this paper under two headings. It is suggested that the first group of four are closely related to one another and have been exacerbated since the publication of the original Manifesto by ongoing processes of globalisation and deregulation. These are; Giantism and Loss of Control, Large-scale Privatisation and the Loss of Public Life, Rootless Professionalism and Injustice.

The final group of three problems consists of those which while being a consequent of the same political/economic processes have been and remain central concerns of urbanists. They are Destruction of Valued Places, Placelessness, and Centrifugal Fragmentation. While professional skills have been directed to seeking solutions to these problems their implementation has been less effective and unforeseen consequences have emerged such as Green Belts restricting urban growth but increasing the dispersal of populations and increasing traffic movements.

With respect to the problems it identified as being of concern for urban design, the Manifesto has proved remarkable resilient over the last 30 years. All the problems are still central and are even more severe than when the Manifesto was first drafted. Under the heading of Poor Living Environments it has been considered appropriate to outline in more detail some issues which have become even more acute. However a major concern, not covered in the original work, is the growing awareness of the importance of urban ecosystems and how human settlements are threatening natural habitats and even changing global systems to the extent that it is claimed a new geological age has been entered – the Anthropocene.

Keywords: reassessing urban design manifestos, urban problems

* AA diploma, M.Sc. (Soc. Sc.), Regd Arch. MRTPI, Ivor Samuels, Research Fellow, Urban Morphology Research Group, School of Geography, University of Birmingham, Visiting Fellow, Dept. of Architecture, Oxford Brookes University.

Streszczenie

Manifest projektowania urbanistycznego, sformułowany w roku 1980 przez dwóch uznanych amerykańskich praktyków i teoretyków, jest dziś przywoływany na nowo w celu potwierdzenia jego trafności w czasach współczesnych. Ówczesna praca była podzielona na trzy części: 1) Problemy nowoczesnego projektowania urbanistycznego, 2) Cele miejskiego życia oraz 3) Materiał urbanistyczny miejskiego życia. Niniejsze badanie skupia się na pierwszej części pracy i ma na celu ocenę, w jakim stopniu przedstawione w niej problemy są nadal aktualne, a w jaki sposób należy je zmodyfikować lub poprawić w świetle dzisiejszych wyzwań.

Manifest wskazuje osiem odrębnych grup problemów, natomiast niniejszy artykuł szerzej omawia pierwszy z nich, jakim jest słaba jakość środowiska mieszkaniowego. Autor podchodzi do tematu z perspektywy pięciu kwestii pomocniczych, które nie były wzięte pod uwagę przez autorów Manifestu, niemniej jednak w niniejszym artykule stanowią tematy, które mogą powodować coraz większą troskę. Są to: zanieczyszczenie, ekstremalne warunki pogodowe, zmiany demograficzne, otyłość i bezpieczeństwo. Autor omawia ich znaczenie dla formy urbanistycznej.

Pozostałych siedem problemów wskazanych w treści Manifestu zostało pogrupowanych w niniejszym artykule i poddanych pod dyskusję pod dwoma nagłówkami. Według autora pierwsze cztery z nich są ze sobą ściśle powiązane i od czasu publikacji Manifestu ulegają ciągłemu zaostrzeniu spowodowanemu zachodzącymi procesami globalizacji i deregulacji. Są to: gigantyzm i utrata kontroli, prywatyzacja realizowana na wielką skalę oraz utrata życia publicznego, profesjonalizm pozbawiony korzeni i niesprawiedliwość.

Na ostatnią grupę ww. trzech problemów głównych składają się kwestie, które – będąc konsekwencją tych samych procesów politycznych/gospodarczych – były i wciąż pozostają przedmiotem troski urbanistów. Są to: niszczenie wartościowych miejsc, brak identyfikacji z miejscem oraz fragmentacja odśrodkowa. Pomimo faktu że profesjonaliści dokładają wszelkich starań w celu znalezienia rozwiązań dla tych problemów, skuteczność wdrażania takich rozwiązań nie jest bardzo wysoka. Ponadto pojawiają się nieprzewidziane wcześniej skutki, takie jak np. pasy zieleni, ograniczające rozrost miast, lecz również zwiększające rozproszenie ludności oraz wzmożony ruch uliczny.

Przez ostatnie 30 lat Manifest okazał się niezwykle odporny względem problemów, które wskazał jako przedmiot troski dla projektowania urbanistycznego. Wszystkie te problemy nadal są bardzo aktualne, a nawet uległy zaostrzeniu od czasu publikacji Manifestu. Pod nagłówkiem słabej jakości środowiska mieszkaniowego za celowe uznano bardziej szczegółowe przedstawienie pewnych kwestii, które stały się jeszcze bardziej palące. Natomiast głównym zmartwieniem, zupełnie pominiętym w Manifeście, jest rosnąca świadomość istotności ekosystemów miejskich oraz stopnia, w jakim osiedla ludzkie zagrażają naturalnym siedliskom, a nawet zmieniają systemy globalne do tego stopnia, że istnieją głosy, według których weszliśmy w nową epokę geologiczną – antropocen.

Słowa kluczowe: ponowna ocena manifestów projektowania urbanistycznego, problemy urbanistyczne

1. Introduction

Toward an urban design manifesto was first presented in 1980 by Alan Jacobs and Donald Appleyard, two notable United States urban design practitioners and academics. The former is perhaps best known for his *Great Streets* (1995), *The Boulevard Book* (2003) and *The Good City: Reflections and Imaginations* (2011) and the latter for his important work *Liveable Streets* (1981).

The Manifesto is organised in three sections. The first part discusses *Problems for modern urban design.* This is followed by a section setting out six *Goals for urban life* which they consider "essential for the future of a good urban environment" and the final section covers their proposals for *An urban fabric for an urban life.* This paper concentrates on the first part.

The document was presented at an American Planning Association conference in 1980 but only published in 1987. A generation later, this review examines its continuing relevance in response to changed circumstances and whether this document has any value in the European context in general and, in particular, to the United Kingdom. Jacobs, in a prologue to the publication of 1987, writes of "the need for a lot more work and research on all the terribly important pieces that make up good urban living environments" [10, p. 112]. This paper represents a small contribution to this process.

2. Problems for modern urban design

The manifesto is introduced by a discussion of what the authors describe as eight *Problems of modern urban design*. These will be considered for their relevance to current problems:

Poor living environments:

- Giantism and loss of control,
- Large-scale privatisation and the loss of public life,
- Centrifugal fragmentation,
- Destruction of valued places,
- Placelessness,
- Injustice,
- Rootless professionalism.

2.1. Poor living environments

These are considered to be the problems of the external conditions of urban life since the authors suggest that internal "housing conditions in most advanced countries have improved in terms of such fundamentals as light, air and space". In a British context this assertion can be questioned as discussed below. In order to understand the current problems of poor urban living environments in more detail the following sub problems are proposed in this paper as a basis for discussion. They are all interrelated and all have implications for the future form of our towns and cities.

- Pollution,
- Extreme weather events,
- Demographic change,
- Obesity,
- Security.

2.1.1. Pollution

The principle source of the most dangerous form of air pollution is the burning of fossil fuels. In *The Mortality Effects of Long-Term Exposure to Particulate Air Pollution* [21], the United Kingdom Health Protection Agency reported that this pollution was responsible for 29,000 deaths in 2008. Other sources suggest this figure may be higher. In a 2016 report *Air pollution causes early deaths,* the BBC quoted European figures which indicated that the worst affected countries are the Benelux, North Italy, Poland and Hungary. Another form of pollution is that of noise, in particular from traffic which it is claimed bothers over 40% of the population of the UK as well as impacting on human health generally [21].

2.1.2. Extreme weather events

Even rich, well organised countries have been afflicted with flooding in the last few months with lives lost in Germany and France. It is arguable that these events are no more frequent than in the past [14] but there is no doubt that they have impacts on urban areas and, therefore, precautions must be taken to minimise future impacts. This has to be undertaken on a collective basis which means urban planning is needed to coordinate private developments.

2.1.3. Demographic change

Population ageing is a global problem but it is most acute in Europe with profound future economic, social and cultural implications. The World Bank [24] forecasts that Poland is expected to increase the ratio of the country's population over 65 from 29% in 2010 to 58% in 2050 and 70.7% in 2060.

Some attention has been given to the implications of these changes for the internal layout of dwellings. In the UK the Life Time Homes [15] protocol was applied to all new dwellings to make them usable by people with reduced mobility. However, little attention has been given to the impact of urban form on ageing populations and it is suggested that this is another task for urban designers.

2.1.4. Obesity

While it may seem out of place to cite this issue it is suggested that it is an urban design problem. Obesity is a major epidemic; Ng et al [17] record that the worldwide proportion of overweight or obese men rose from 28.8% in 1980 to 36.9% in 2013 and the proportion of women increased from 29.8% to 38% over the same period. In developed countries, 16.9% of boys and 16.2% of girls were overweight or obese in 1980. By 2013, those figures were 23.8% and 22.6% respectively.

As a response some countries have imposed taxes on sugar and large sums are spent on bariatric surgical interventions. However, one of the generators of obesity is physical inactivity and, by making active transport (walking and cycling) easy, safe and relevant to everyday activities, urban form can make a contribution to alleviating this problem. In spite of the dangers of accidents and pollution, the health benefits and increased life expectancy of active transport have been convincingly documented [4].

It is not argued that making provision for walking and cycling will automatically make people use these modes of transport, but it gives them the possibility of benefitting from a more active life style. There is evidence that by increasing investment in providing for these modes of transport a greater proportion of the population will take advantage of them.

Table 1

Mode share by country [16]

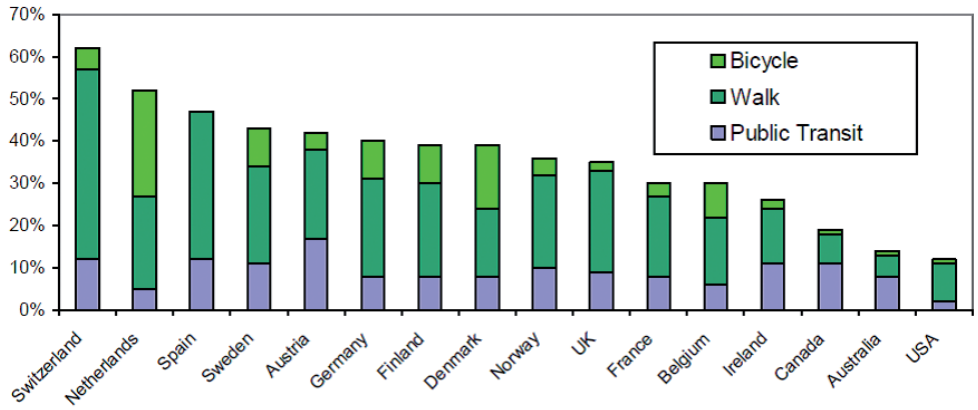

Table 1 shows the proportions of journeys made according to different travel modes including public transport in 16 developed countries. Increased bicycle use correlates with increased investment in infrastructure. Excluding London, the UK spends £1.38 per person on cycling infrastructure and only 1.2% of all trips are made by bike. The Netherlands spends £20 per person with 25% of all trips made by bike [16].

2.1.5. Security

Safety in residential areas is of great public concern. An article in the London Times [9] noted that according to a UK Government Home Office report "two thirds of people in England and Wales feel unsafe walking alone in their neighbourhood at night". The prevalence of gated communities as a response to insecurity will be discussed below under privatisation. While the form of our towns impacts on security there is debate on the relative safety of different arrangement. For example, the argument between the advocates of cul-de-sacs and those of connected streets is still unresolved [23].

The UK Police have responded to public concerns for urban security by publishing their own design guide entitled *Secured by Design* [20]. This sets out commonsense suggestions for housing designers such as inserting windows to overlook corners and to avoid planning routes without houses opening onto them, as well as measures to secure doors and windows.

3. Global problems: Giantism and loss of control, Large scale privatisation and the loss of public life , Injustice and Rootless professionalism

Following the consideration of some aspects of the general problem of poor living environments, it is suggested that the other seven problems identified in the Manifesto could be considered in two groups. The three above problems are discussed in this section form a closely interlinked group whose significance has been exacerbated by deregulation and globalisation since the Manifesto was first drafted.

Housing is of great political and social concern and is central to the shape of our cities. In the UK housing development is increasingly dominated by a few large operators whose main responsibility is to grow their profits for their shareholders. These corporations operate through regional offices where the lead role is taken by land buyers. They have accumulated large land banks and make it difficult for smaller house builders to compete in the market [13]. This has resulted in a rise in house prices, a fall in ownership and an increase in private sector renting with lower space standards and problems of tenure insecurity [5]. This situation has been exacerbated by the withdrawal from housing of the public sector so that in the 1970s almost one-third of Britons lived in social housing in contrast to the one-fifth who now do [6].

The developer domination of the market is paralleled by the growth of multinational consultants, for example Savills employs 30,000 people in 700 associated offices worldwide offering a range of services covering all aspects of property design, development and management. On the Savills website [18] the most prominent graphic is the company's current share price.

The introduction of systems of control, the smart city, is driven by large corporations. such as Siemens which has built the Crystal in London's Dockland as a "a global hub for debate on sustainable living and development" The question is whether these initiatives will result in more local control or be an opportunity for large global firms to control the smart city technologies. The struggle for control between national states and international corporations for the internet and the new media is a continuing saga.

As an aside it should be noted that the visualizations that these firms produce of future cities are often illustrated by aerial views which portray an urban environment under strict top- down control and which demonstrate little concern for any qualities of place like Cisco's *Infographic; the city of the future* [2].

"Starchitects" also operate on an international scale. Whether the client is an international corporation or an ancient university the main concern is to deliver buildings which brand their international clients rather than respond to their contexts. An example is the University of Oxford's Blavatnik School of Government inserted into a nineteenth century street by the architects Herzog and de Meuron. It is a building without front or back which makes no acknowledgment of its neighbours on the street (Ill. 1).

Ill. 1. The Blavatnik School of Government, University of Oxford

Ill. 2. Residenze Hadid and Libeskind, Milan

While starchitects are rarely involved in housing, an exception from Milan are Residenze Hadid and Residenze Liebeskind. These large gated communities inserted into a nineteenth century tissue of blocks and streets completely ignore the logic of the established street system (Ill. 2). Of note is the way in which the architects' names are used for branding and marketing purposes- not dissimilar to the way fashion houses use their designers' names.

In addition to the prevalence of gated communities the insertion of shopping malls on central and peripheral sites is a common form of development. These have the effect of moving retail uses away from streets and reducing their diversity and mix of uses. Another result is the presentation of blank walls and inactive edges to the streets as in Krakow's Galeria Kazimierz (Ill. 3). A UK example of the privatisation of public space was the sale of the centre of Milton Keynes by the New Town Development Corporation. The result is that the internal pedestrian routes crossing it now close at 8.00pm and even earlier at weekends thus obliging the public to make long detours around the 700 metres long building.

Ill. 3. An external wall of Galeria Kazimierz, Krakow

One expression in the UK of the widely noted growing inequalities in developed countries [10] is the way younger people are excluded from the housing market because house prices are rising much faster than incomes. Housing is regarded as an asset to be invested in rather than a home. In London it is reported that 70% of new homes are purchased by foreign investors. This results in the workers who are needed to support the economy of the city

being forced to live long commuting journeys from their places of work. The housing crisis is so acute in London that Local Authorities, with a reduced stock of social housing, are offering tenants bribes to relocate to other towns [12].

Injustice or inequality is represented by a reduction in the size of new homes because of deregulation . A decade ago Evans and Hartwich [8] revealed that the average size of new homes in the UK was the smallest of 15 European countries – 70 square meters as compared with 139 square metres of the average new Danish home. In the UK there are no minimum space requirements for new homes with a result that, today, within the same development, houses sold on the open market may be smaller and of a lower standard generally than those few units which are still built for housing associations for social renting. which are designed to older, more generous public housing standards.

4. "Professional" problems; Centrifugal fragmentation, Destruction of valued places and Placelessness

The remaining three problems, while to a great extent being consequences of the same political and economic forces as the four discussed previously, have been and remain a central concern of urbanists who are able to contribute more effectively to their resolution. Policies to restrain the extent of urban sprawl have been a preoccupation of British urbanism for the last century. These have resulted in Green Belts around many British cities. However these barriers to expansion have resulted in a new set of problems.

Oxford has a Greenbelt tightly drawn around its built up area and local authority boundary, with little room for further expansion without intruding on the territory of the adjoining District Councils. These insist on retaining the Greenbelt intact so that new development is forced to locate in small towns some distance from Oxford. Since this city is a major employment centre, the resulting commuter traffic overloads existing rail and road capacity at peak times. People no longer live, work and play within the same built up areas and boundaries of planning authorities and the plans they make must correspond more closely to the areas within which people live their everyday lives. This more extensive scale of urban design was being developed until 2011 by the Commission for Architecture and the Built Environment (CABE)as Strategic Urban Design (STRUD) [2].

Planners have developed sophisticated instruments to protect historic buildings and groups of buildings. In the UK these include the listing of buildings according to their historic and architectural importance and the designation of 8,000 Conservation Areas which ensures that changes to the physical fabric are made in a way which does not detract from the overall quality of the area. However, today there is also a well established awareness that natural habitats and their sustainability, particularly within built up areas, have also to be valued and conserved [1].

A concern for the qualities which make localities distinct from others is a reaction to the quest for universal qualities of the Modern Movement. This has been traduced in the design of the placeless housing estates of much modern development. In the UK the reaction to these circumstances dates from the 1970s, initiated by public agencies through the Essex Design Guide [7] which attempted to reintroduce those qualities of settlements characteristic of a specific part of Southern England. This guide was frequently misinterpreted with the

solutions appropriate for the County of Essex adopted in other parts of the country with different building traditions. This movement has been reinforced in recent years through the renewed interest in vernacular architecture and in the UK the transfer of the concepts of the US New Urbanism and Form Based Codes have realised in such developments as Poundbury.

5. Conclusion

This short examination of the relevance of the Jacobs and Appleyard perception of urban design problems suggests that they all are still central and are even more severe than when the Manifesto was first drafted. However, under the heading of poor living environments it has been considered appropriate to outline in more detail some issues which have become more acute. A major concern, which is not covered in the work, is the growing awareness of the importance of urban ecosystems and how our urban environments can be designed to respond to the range of issues which these pose. Whether the whole of the Manifesto is as resilient as the first part must await a detailed discussion of its goals for urban life and its proposals for an urban fabric which would meet these goals.

Finally, the publishing history of this Manifesto deserves attention The authors report that the Journal of the American Planning Association refused at first to publish it on the grounds that the assertions it made were not supported by research. Its editors only relented six years later because, in the words of the authors, initially they did not acknowledge that "professional experience had the value of research" (Jacobs and Appleyard 1987, p. 112). That this divide between practice and research has become even wider is witnessed by the introduction of research assessments which allocate funding according to the quantity of published works which, in their quest for originality, are ever more divorced from the world of practice. Perhaps Schon's reflective practitioner [19] is becoming extinct.

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SŁAWOMIR GZELL*

URBAN DESIGN AND THE SENSE OF THE CITY

PROJEKTOWANIE URBANISTYCZNE I SENS MIASTA

Abstract

What exactly means the term 'the sense of the city'? How can we answer this question precisely if we are not sure what a city is? Is it an accident on a map or form of art? Is it a symbol of culture or symbol of power? We could multiply questions but there is no simple answer. But we are professionals and people living around are waiting for our reasoning; therefore, we have to verify visible trends in the 21st century city that apply to all, both new and old, approaches to city planning. Ultimately, we have to try to build the model of the City of Harmonious Development meaning.

Keywords: urban design, new planning, harmonious development

Streszczenie

Co dokładnie oznacza termin „sens miasta"? Jak odpowiedzieć precyzyjnie na to pytanie, skoro nie jesteśmy w stanie powiedzieć, czym jest miasto? Czy jest przypadkowym znakiem na mapie czy formą sztuki? Czy jest symbolem kultury czy symbolem władzy? Takie pytania można mnożyć, ale nie znajdziemy na nie prostej odpowiedzi. Ale jesteśmy profesjonalistami i ludzie żyjący wokół nas oczekują naszych wypowiedzi. Nie mamy więc wyjścia i musimy weryfikować trendy widoczne w XXI-wiecznym mieście, które biorą się z dawnego i nowego podejścia do planowania miast. W końcu musimy próbować zbudować model Miasta Harmonijnego Rozwoju.

Słowa kluczowe: projektowanie urbanistyczne, nowe planowanie, rozwój harmonijny

* Prof. Ph.D. D.Sc. Eng. Arch. Sławomir Gzell, Architect and Town Planner, Faculty of Architecture, Warsaw University of Technology.

Visible trends in the 21st century city

1. Cities within our part of Europe are distinguished by their history of development, reflecting the characteristics of the political, social and economic structures of nations. However, today there are features that are common across all European cities.
2. Firstly, they have a certain specific image, and because of this, the phrase ‘European City’ (EC) means something to us. This image is a kind of identification mark. It is not only rhetoric figure, it is true: EC is kind of mark in economic sense.
3. Each of those different image*s* of EC it is a spatial expression of a city’s self-identity. ‘It is hoped that city residents feel that they can identify with the city in which they live; moreover, that they can identify with any European city. The synthetic image of an average EC keeps helping Europe in rivalry with other continent*s*, but EC has as well features which do not help in anytime.
4. One of the unwanted features of our regional cities is that, as is the case with other European cities, they are far from ideal – nowadays, despite cultural diversity, they are becoming more difficult to physically distinguish. Natural areas within and around cities tend to disappear under economic pressure. Reductions in the amount of open and public space (including agriculture land) and less biodiversity in cities pose a threat to the quality of city life. The state of the urban fringe around most cities is declining. One can observe: increasing internationalisation of metropolitan regions as regards both capital and labour; changes in the distribution of responsibilities between the public and the private sectors; a stronger role for a few major cities within a country; social and economic polarisation within cities; intensifying competition among cities, especially the large metropolises.
5. One of the most characteristic features of modern cities is sprawl. In many cities, the original compact cores have become surrounded by a kind of ‘parallel city’. Transportation and other infrastructure networks that serve and connect these dispersed activities degrade city neighbourhoods and landscapes – the major non-renewable natural resource.
6. The networks of small and large cities create an urban continuum – this is already evident in many parts of Europe. The classical cities become just a component of such networks. Within this urban continuum, both spatial and social fragmentation occurs, each as a consequence of the other. If nothing is done to stop this shift from integration to segregation, cities will break up into separate sectors: on the one hand, overprotected areas and on the other, dangerous ghettos and ‘outlaw zones’.
7. From the other side we have to remember, that cities are not just territories where social transformations take place, they are an active part of the transformation process. Cities can be driving forces that play the role of incubators of innovation and an alternative to any crisis, hopefully.. The development of such cities should be, first and foremost, sustainable – they should be “based on the principle of fulfilment of present needs without compromising the possibilities for development of future generations. Therefore, balances must be found between economically based urban development and healthy conditions for living.
8. Capitalising on the cultural and natural attributes of cities and regions, managing their historical character, and promoting their uniqueness and diversity with regard to their character and identity can be a significant advantage for cities in our region.

9. It means there is a need to control the outward expansion of urban areas (urban sprawl) and limit trends towards suburbanisation. This requires increasing the supply of building land in towns and cities. **Therefore, 21st century city development is unthinkable without effective land-use planning and proper planning instruments, at all levels.**
10. **The revival of urban design will be a key element of the renaissance of cities.** This should improve social communication and interaction and facilitate the integration of facilities of any type. Urban regeneration is essential for promoting and enriching the quality of the urban environment for the benefit of those who live and work in towns and cities. Apart from the regeneration of inner cities/historical cores, the regeneration of large housing estates, former industrial sites (now left derelict) and deprived/degraded or inhumanly planned pieces of the urban fabric should be enhanced.
11. **The public realm should be recreated, to be used again as the place where the sense of community is developed**. However, even in cities that are able to play an eminent role in the processes of the globalisation of the economy, poverty, fragmentation and insecurity can persist. This can be a consequence of paying too much attention to the economic role of cities instead of balancing it with the social, cultural, psychological and spatial dimensions of development. **Thus, the progressive 'vision' or 'ideology' of the city development can also serve as the driving force.**
12. What are the other prerequisites for cities to become the driving force for development? Except of the items mentioned above we understand as crucial "new approach to planning" and "new urban design".

New approach to planning

13. Sometimes, cities are victims of routine practices and myths. Sometimes, plans place more emphasis on the plan as a product rather than on setting in motion a dynamic process. Sometimes, they tend to remain physical in nature, attempting to cover every square meter with an ideal pattern.
14. **Lack of inspiration is another planning handicap – inspiration is rarely used in relation to urban planning.** However, it can be a powerful force when it comes to trying to achieve an outcome. Visioning through graphic and verbal descriptions of the future have been developed for centuries and are popular tools in urban planning. Focusing first on the outcome – what the world will look like – and then on actions, **visions are a participatory inspiring technique. They help to reframe problems by changing beliefs into new activity patterns.**

> *What are some methodological innovations that can contribute to new approaches to planning? What other creative inspiring techniques can be used in a participatory planning process to inspire action? What are some criteria to assess whether the plan is a good?*
> *How can millions of inhabitants be invited to participate in the planning of their cities and what kind of systems and processes should be in place to create an all-inclusive atmosphere? How can we achieve the city that we want?*

15. Historic centres of EC are in danger, because life is moving from them to distant suburbs. These historic places are where the city image is born and where it is transferred from the past to the future, places copied in Californian malls and Las Vegas hotels. All is on move and growth dynamics of peripheral centers (as volumes, number, diversity and distance from old downtown are involved) is still bigger.

    The question to ask is whether or not it is possible to stop or to reverse the trend mentioned above as massive suburbanisation and/or urban sprawl? If not, there is necessary to look for tools to civilize.

16. **One of answers to the sprawl is the organisation of a polycentric network of settlements.** It is necessary to help each settlement (city, town) and the network to have a chance to be dense enough and to have open, green spaces and morphologically defined public space. Experiences of traditional, historic 'polycentric concepts' could help – as a result, new "connected city" could appear.
17. **The second answer to fighting sprawl is urban design**. Today, city suburbs are some kind of landscape nightmare. Only traces of harmonious, regular forms can be found outside of city centres in small old towns. The chaos and ugliness of suburbs derive from the lack of care for spatial, urban composition, and the lack of thought given to aesthetics – the word 'beauty' is forgotten. In character, it reflects and anticipates changes of civilisation and culture. However, if we treat the human environment as a three-dimensional work of art which is bringing us peace, happiness and the development of human intellect, this must be changed, mostly through urban design. It is one of the most attractive tools of creativity, exerting an important influence on all relevant parties (inhabitants, authorities, developers, planners, architects) involved in city development. In such a sense urban design strategies are to create more livable city.
18. In this context, **urban design strategies should be part of urban policies that address the social exclusion of urban peripheries.** Depending on the contexts, these are related to the consideration of the urban structure as a whole. Urban design strategies focus the city on two levels – from within and from without – this is related to their immediate and wider surroundings. This implies that urban design strategies from one side can shape and influence the 'grain of the city' and systems of public spaces, green areas, meeting places, squares, streets etc.; and from the other side, the elements of the region – centres, districts, transport corridors etc.
19. It is important that urban design strategies at the regional level balance highway and road network with 'human – scale corridors'. Streets lined with trees and building entries, tramways, reuse of historic boulevards, pedestrian friendly origin and destination of each trip, serve as catalysts to transform new settlements into mixed use areas. However, mixed use is not the only panacea, and it happens when social, economic and market conditions are sound enough. All of these can give us the City of Harmonious Development (CHD).

20. **Particularly important in constructing a CHD is the creation of a cityscape (spatial order) and thus, the composition of space**. It is believed that a crisis within the area right now is created by procedures which only favour small-scale design. Larger fragments of the city 'crystallise' the layout of a city and proved that they have a 'gravitation field', i.e. a zone where space becomes integrated around them.
21. Sadly, implementing these seemingly simple rules on urban order is not easy, and not only because of economic issues or property ownership issues, although these constitute considerable obstacles. It is worth attempting to identify more obstacles. The reason (one of) is that instead of stimulating urban development we only make attempts to recompense the results of the city's self – (organic) development, results of sprawl in the matter of fact.
22. One thing should be kept in mind: **if all the space-creating factors are reduced to maximising profits, then in the competitive world, this profit would depend upon the standard of the goods offered.** Standards are judged via the quality of living which we will be able to offer at the developed location. Quality of living is again determined by the comfort of habitation, and work and travel between one and the other. These shall cause our negative or positive responses and as we know well enough, social life will put emotions before facts. This is why real facts are worth investing in. The outlay will bring in multiplied profits in the future.

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ESTANISLAO ROCA, MIQUEL MARTÍ, MELISA PESOA*

CONTEMPORARY URBANISATION IN CHINA: AN OVERVIEW AND THE PROJECT FOR SHANGHAI

WSPÓŁCZESNA URBANIZACJA W CHINACH: OMÓWIENIE TEMATU I PROJEKT DLA SZANGHAJU

Abstract

The major metropolises of the world face several problems due to their rapid growth. From among these, it is considered that Chinese cities in particular deserve special attention due to the diversity of challenges they face. Out of the 1,367,820,000 population of China in 2014, 54.77% constituted the urban population[1] – this figure takes on more relevance when we consider that only sixty-five years ago, just 10.64% of the population was urban. From the total population of the country, about 17% live in the ten most major cities and their metropolitan areas[2]. Taking into account the relevance of the metropolis in the Chinese context, we propose a set of topics, challenges and trends in contemporary urbanization in China.

Keywords: urban design, contemporary urbanization, Asian metropolises, urban competitions

Streszczenie

Główne metropolie świata stają przed szeregiem problemów spowodowanych ich gwałtownym wzrostem. Spośród nich uważa się, że chińskie miasta zasługują na szczególną uwagę ze względu na różnorodność wyzwań, jakim muszą stawić czoła. 54,77% ogółu społeczeństwa chińskiego liczącego sobie 1 367 820 000 mieszkańców w roku 2014 stanowiło populację miejską – ta liczba nabiera szczególnego znaczenia, gdy weźmiemy pod uwagę fakt, że sześćdziesiąt pięć lat temu tylko 10,64% ludności Chin zamieszkiwało miasta. Z całej populacja kraju, ok. 17% ludności mieszka w dziesięciu największych miastach i na terenie otaczających ich obszarów metropolitarnych. Pamiętając o tym, że rozpatrywanie problemu metropolii w kontekście Chin ma swoje głębokie uzasadnienie, proponujemy omówienie zestawu tematów, wyzwań i trendów zachodzących we współczesnej urbanizacji Chiń.

Słowa kluczowe: projekt urbanistyczny, urbanizacja współczesna, metropolie azjatyckie, konkursy urbanistyczne

* Prof. Arch. Ph.D. Estanislao Roca, Miquel Martí, Melisa Pesoa, Department of Urbanism and Regional Planning, Polytechnic University of Catalonia (UPC), Barcelona-TECH.

[1] National Bureau of Statistics of China: http://www.stats.gov.cn/tjsj/ndsj/2015/indexeh.htm (accesss: 28.11.2016).

[2] The ten major cities (including its metropolitan areas) in China are: Guangzhou, Shanghai, Chongqing, Beijing, Hangzhou, Wuhan, Chengdu, Tianjin, Xi'an and Jinan, totalling around 233 million inhabitants, which is around one third of the total European population, according to the National Census, 2010.

1. Trends in contemporary urbanisation in China

Big cities with high densities and rapid development tend to create huge mega-city regions. Three such regions are emerging – Beijing-Tianjin, the Yangtze Delta (Shanghai-Nanjing-Hangzhou) and the Pearl River (Guangzhou-Shenzhen-Hong Kong). The high-speed railway network plays a major role in structuring the megacities as well as the system of main urban hubs in the interior of the country (Wuhan, Xian, Chengdu, Chongqing, Changsha).

The national urban plans for the next decade are trying to drive the rural migration towards cities in the interior of the country instead of to the coastal regions. For this reason, the government has taken the strategy of 'townification' in order to house the future migration of the rural population into urban environments; however, this strategy has created the phenomenon of ghost cities – entire cities or urban developments which remain empty and unfinished.

In these giant urban concentrations, environmental problems arise and reach crucial levels. The main issue is air and water pollution. Food security is also a concern for most of the urban Chinese population. Achieving sustainable mobility becomes a key challenge when attempting to reduce pollution, increase the efficiency of transportation and make possible policies to improve the quality of public space. The extension of transit systems, particularly metro networks, in the main cities is absolutely crucial. At the same time, the necessary networks of expressways raise the issue of the architectural design of infrastructure in order to integrate them with their urban surroundings. The future role of bicycles, which have been decreasing in the major cities, and motorcycles, which are present everywhere, should also be considered.

Chinese cities also set out important issues concerning urban policies and management. A big problem to tackle is that of the floating population. Because of the *hukou* system (in which authorities issue members of the population with official permission to settle in the cities), there are many urban immigrants not considered in the official accounts of population – they become urban dwellers without rights. Secondly, because of singular laws on land property (the total land is public owned), the land policies in China become a particular and complex world in themselves with regard to the purchase, expropriation, rental or development of lands. At the same time, it is very difficult (because of very rigid sectoral rules) to coordinate different landlords, who always look for separate properties that are easy to manage in autonomous ways. Therefore, this makes it difficult to implement hybrid complex urban programs. Finally, the decision making processes at the urban level lacks transparency and this favours corruption.

Identity is another great concern not only for scholars interested in China but also for many Chinese people. In the rapid current urbanisation, many urban developments look similar to each other and they are lacking in their *genius loci*. The preservation of heritage (from singular monuments to the renewal of the historic urban fabric such as *hutongs* or *lilongs*) is not always enough. In this sense, we must take into account the fact that Chinese culture has a different sense of authenticity. It is used to rebuild its architectural monuments many times over the centuries and to find in literature and other arts, a key element of continuity and tradition. Then, beside heritage, urban identity in Chinese cities can be found in other aspects such as the intense urban life, the natural landscape features, the urban structure or the artistic evocations.

A singularity of Chinese urban landscape is the fact that many developments are walled, enclosed into themselves; in such situations, the relationship between the built complexes and the public streets is not direct, but through different forms of gates and walls. It is a long urban tradition coming from the classic cities of the Tang dynasty (in the second half of the first millennium) and preserved during Maoist China, through the *danwei* system (mixed units of production and residence). At the end of 2015, a national directive encouraged cities to remove many of these urban walls. Such a process could deeply change Chinese urban landscape.

2. Infrastructural Nature: an urbanisation project in inner Shanghai

We present a project that won a second prize in an international student competition held by Shanghai International Tendering Co. Ltd. We were finalists alongside Harvard University, the Massachusetts Institute of Techonology, Tongji University, Cardiff University and the Southeast University of Nanjing. The team consisted of students and teachers from the undergraduate and postgraduate research programs of the Department of Urban and Regional Planning at the Universitat Politècnica de Catalunya.

For many years, we devoted much of our research to study and understand the urban culture of China and we also created the Observatory on Urban China to hold different academic experiences around this topic, such as courses, lectures, international workshops and exhibitions.

Like Shanghai, our city, Barcelona, has experienced one of the most significant urban transformations in the world. Both cities have a significant importance in the global trading system, sharing a certain port tradition. In this sense, a number of teachers from our Department at the University contributed to the elaboration of the plans and projects that allowed great changes in our city. For example, the transformation of the waterfront, which both opened up the city to the sea and integrated the infrastructural transport network – creating new transversal connections which previously did not exist.

The requirements of the competition consisted in the transformation of an area to the east of Shanghai Railway Station. This sector is currently occupied by railway tracks at the end of the line and represents a barrier for the urban fabric and the connections in the area. The proposal that we present, intends to actively contribute to the improvement of the urban conditions of Zhabei district, creating an important newly equipped park. The project also aims to resolve the district's major problem of connections, which would substantially improve the life of its citizens and achieve a more harmonious, sustainable and prosperous city.

Although the competition required an intervention in the Zhabei district, located north of Suzhou creek, our project starts from a metropolitan perspective, analysing and understanding the whole city. Its proximity to watercourses should be a key issue throughout the intervention process.

Framed into the 2020–2040 Master Plan, the intention is to enhance the existing green areas and intensify the green network around Shanghai, closing the unfinished green rings. The proposal is to also strengthen this metropolitan green structure with a new equipped park, connecting the new park with other urban open spaces to stimulate ecological continuity.

Ill. 1. The intervention area, aerial view

Ill. 2. The intervention area, view from the street

The completion of the green ring could potentiate the green vectors that cut through the ring, expanding them both inwards and outwards. In this sense, the Huangpu river and Suzhou creek help to connect the green corridors with the water network.

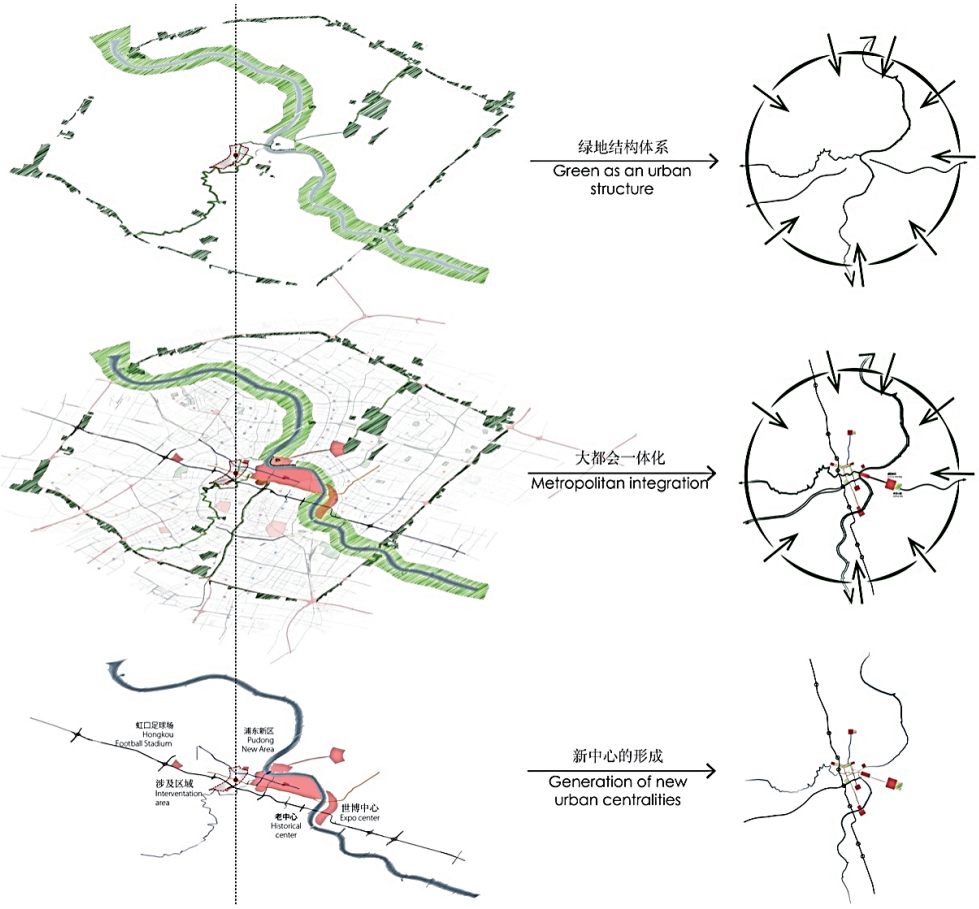
Considering this, the core idea of the project is to build an open park with amenities of around forty hectares and more than 2 km in length. This park would cover the railway tracks, which we propose to be partially underground, to create a transversal permeability that is non-existent today.

Concerning the urban structure, the North-South Elevated Road and Xizang North Road are two main urban arteries that connect and cross the intervention area. In addition, Baoshan Rd. represents an extra connection to the site. Thanks to this urban structure, our area has all the possibilities to become a new centrality and be a part of the set of Shanghai centralities.

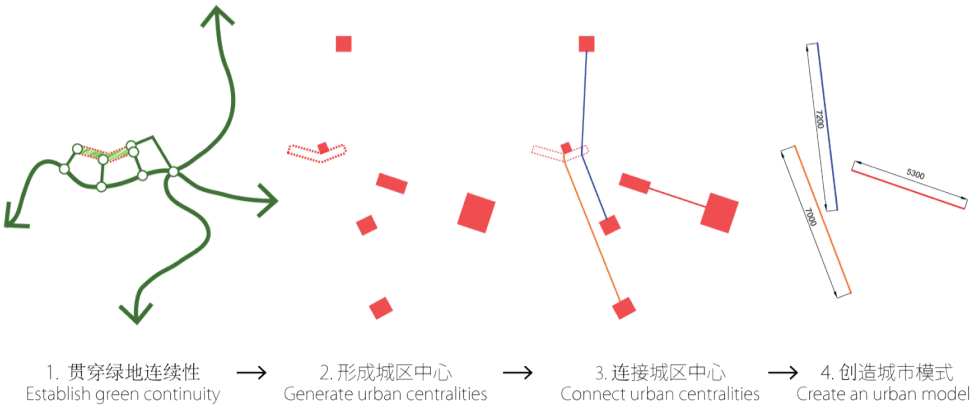
Taking into account the barrier that currently represents the railway tracks, our idea is to generate new pedestrian continuities across the park to improve the accessibility and movement in Zhabei. For this reason, we seek to ensure the crossing and permeability on the ground level. The idea is to create an urban zipper that would solve connectivity issues existing in the area.

The link between the city centre and the Shanghai Railway Station would be possible thanks to the covering of the railway tracks – this would create and area that would have intense and diverse usage.

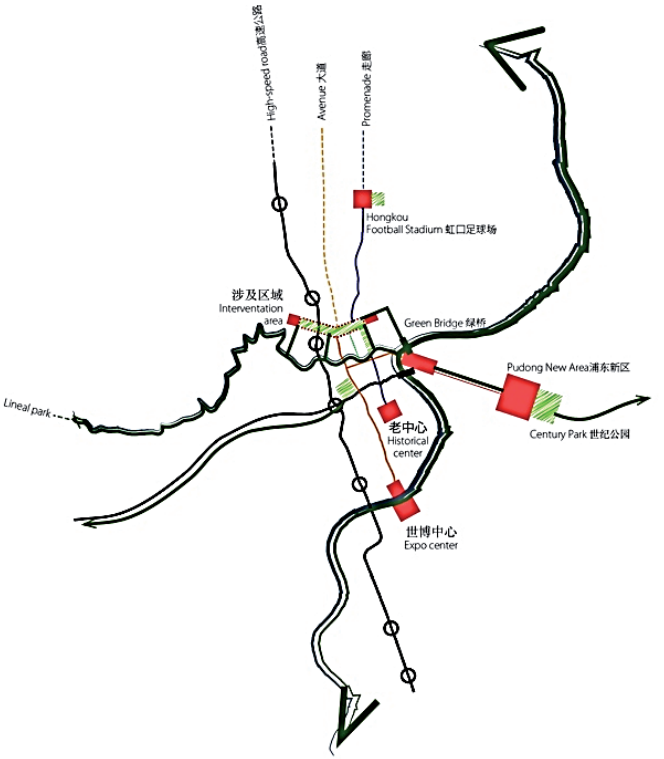
The proposal develops three urban nodes along the park. A new downtown centre is located above a slab covering the train tracks on the western side and filled with multiple mixed-use buildings and metropolitan activities. The Hub (intermodal centre) area, a place where metro lines 3, 4 and 8, connect, is the essential action of the project to relate the area with the whole city. Eventually, a third new centrality around the north of Baoshan Road, links the metro station and the existing market together with the adjoining *lilong* – a set of traditional houses.



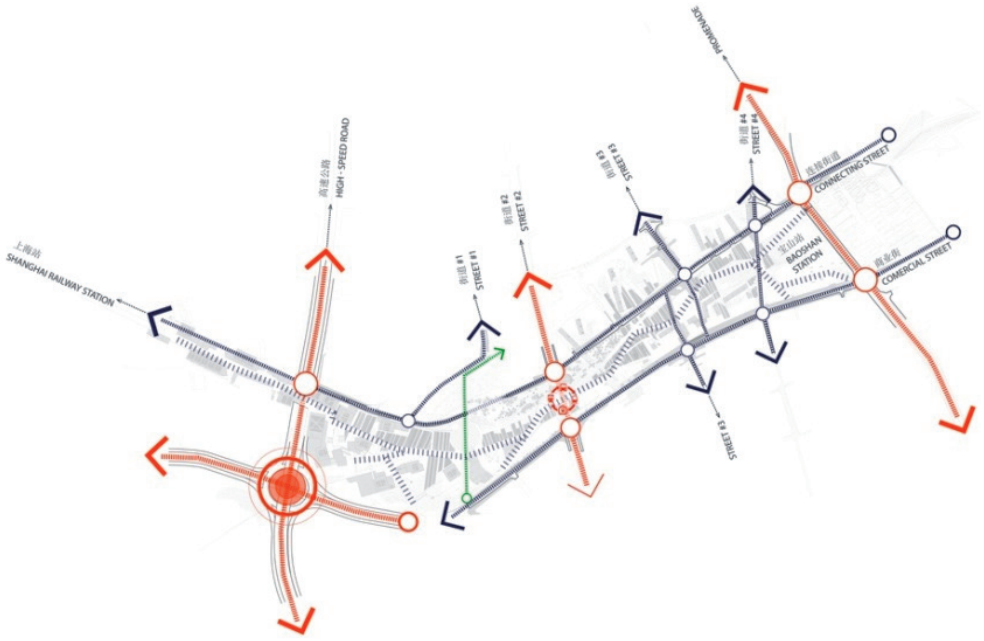
Ill. 3. Metropolitan strategies I



Ill. 4. Metropolitan strategies II



Ill. 5. Urban strategies



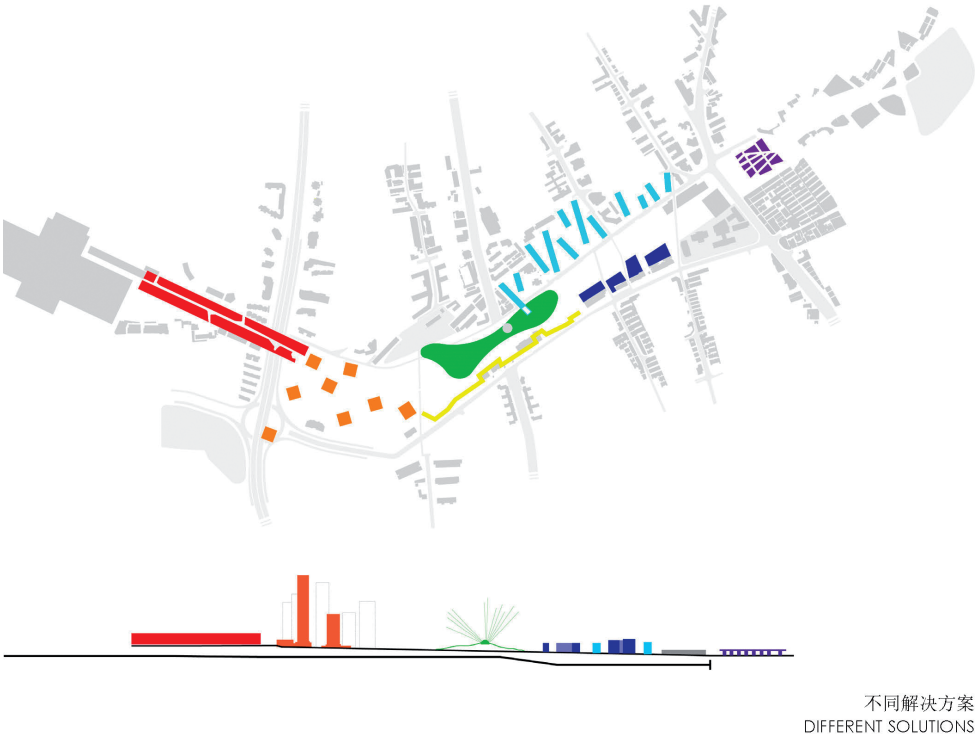
Ill. 6. Connectivity and transversality

Broadly speaking, we can identify seven different areas (project units) involved in the whole transformation: a market area, with a proposal for global remodelling; the demolition of degraded buildings combined with the construction of new housing stock and a technological park; the creation of an artificial hill formed by the accumulated material from digging and demolitions; a new linear park giving urban identity to the whole plan and creating a space of opportunity to host major cultural and leisure events; the completion of the housing grid in Haining Road; a commercial axis located above the train tracks, providing intense activity; eight skyscrapers, combining offices and public usage, hotels and residences, located at the intersection of the major roads. These towers, due to their associative condition, are conceived as a group, a part of a bigger unit, not as individual elements.

In the project, we combine five kinds of uses – nature, transportation, leisure and sport, culture and technology. The combination of these elements constitutes a hybrid park. The facilities for these five different uses located along the linear green space are: a natural green carpet or 'the green corridor'; an entertainment and sports infrastructure, including a sports centre and a skate park; a culture and technology network, comprised of, for example, a convention centre and a theatre, with the intention of consolidating a cultural district; a commercial string that links the market with the *boulevard* and the shopping mall; an intensive and efficient transport network.

The lack of transversal continuity is an important point that we should take into account. There is an opportunity to increase the connectivity and mobility of the area, not only from the metropolitan perspective but also from the pedestrian point of view. From this pedestrian vision, the idea is to ensure permeability to the park and all the streets surrounding it.

Ill. 7. General view of the proposal



Ill. 8. Project units

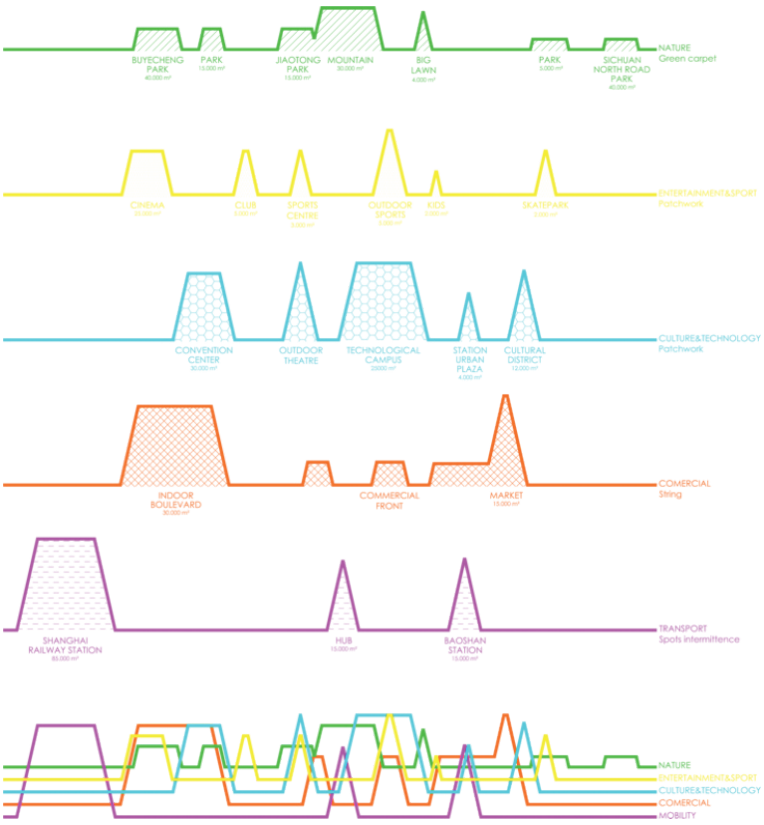
The creation of the transportation hub and parking areas is associated with major road and rail infrastructures. Several connecting points are proposed to articulate the great metropolitan access (encouraging public transport) with a permeable pedestrian and bicycle network that structures the project.

In the whole project, it has been essential to work with sections to define continuities at different levels and approach the urban complexity.

If the entire project has its climax in the downtown towers, the linear park has its own climax on the mountain. The hillside oriented to the park has a series of 'grandstands' able to accommodate a large number of people as if it were a Greek Theatre. Thus, the cultural mountain, the magic mountain or the mountain as a spiritual symbol would become one of the icons of the park, a stage for all kinds of shows and events and a privileged point of view from which we could observe the park and its surroundings.

Given the nature and complexity of Zhabei, the area to be transformed, the proposed urban development is planned in three phases in order to contribute to the technical and economic viability of the project. In other words, each phase must be self-sufficient and must generate a positive economical balance.

Considering that the initial land is 100% public, the expected economic return for the public stakeholders could be through administrative concessions, ground rights, taxes and other possible means of value capture; for private stakeholders, the economic returns would be through the sales or renting of the final real state products.

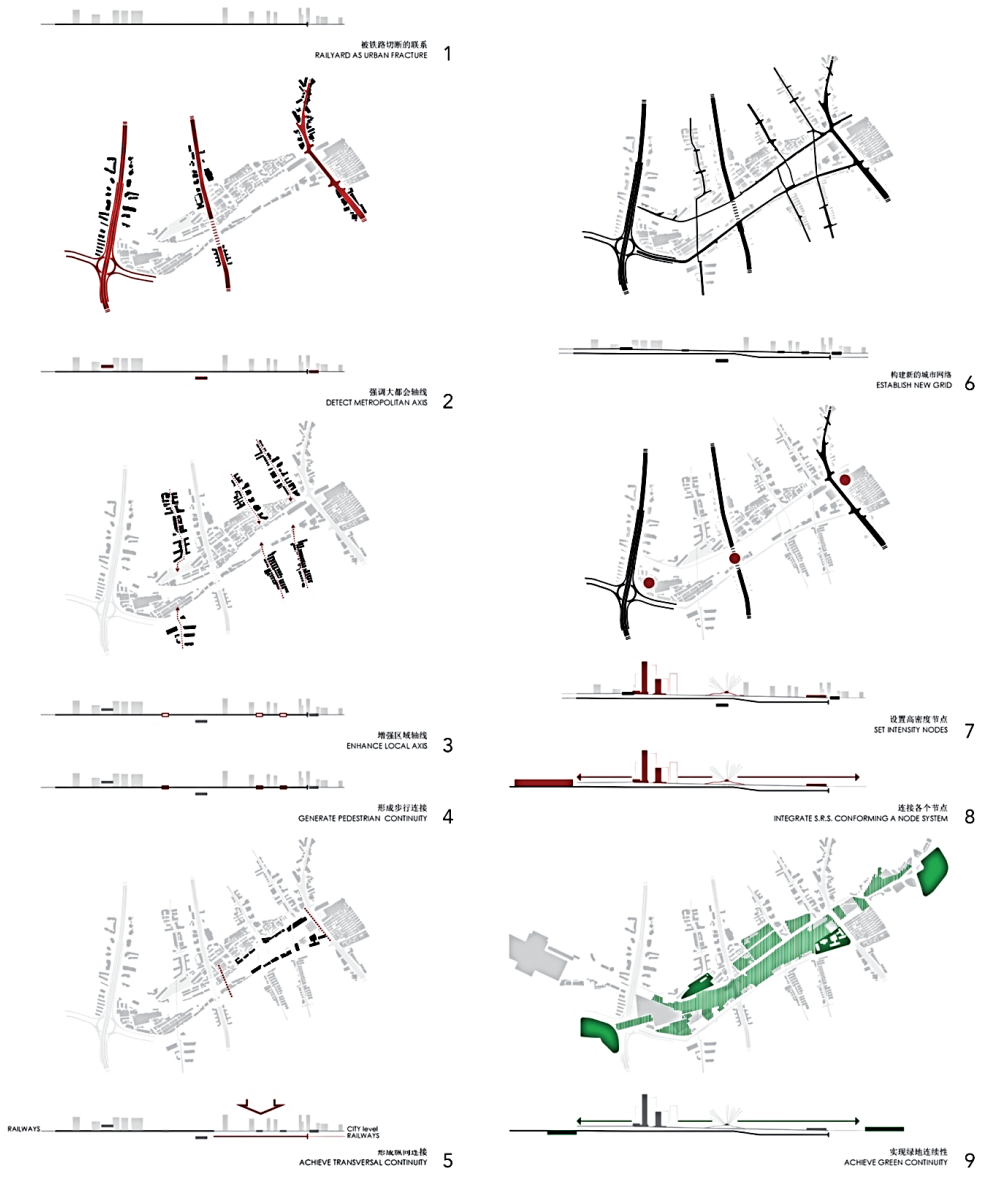


Ill. 9. Program's hybridisation diagram

The first phase would be the development of the downtown proposed in the central part of the considered area. This part of the project implies to cover the train tracks with a slab. Over it, the eight towers dedicated to tertiary activities concentrate much of the urban uses of the operation. This phase of the project would produce economic benefits that would enable the generation of resources that would contribute to funding the second phase.

The second phase involves the excavation of the final stretch of the railways to allow maximum permeability at the ground level of the city[3]. It includes the topographical transformation of the area in order to create the hill (located mostly in the area of the first phase) with the remains of demolished buildings from the neighbourhood located north of the railways. This development phase involves the construction of large open spaces with public facilities and residential and technological buildings which contribute to the shape of the urban facades of the area. Besides, it also considers the renewal of the existing *lilong* south of the market.

[3] As an example, Tolbiac's development, in Paris, is a clear reference of how to use prefabricated systems in platform construction.



Ill. 10. Project steps

The new volumes allow cross-permeability and they shape the urban façades of the southern boundary of the area. Furthermore, the shape of the buildings permits the sun to reach every dwelling.

The green continuity is the main *leitmotiv* of the park and the whole urban area. The intention is to select vegetation for landscaping and roadside trees adaptable to new climatic conditions, with a special preference for Shanghai's own species.

Ill. 11. General view from the park

The mountain covers the metro line while the new buildings, a closed block system that absorbs some of the pre-existing buildings, generates a new façade for the park.

The third phase consists of a commercial mall and facilities linking the future downtown area with Zhabei railway station. This part is located outside the given area of intervention, but we think it is a key aspect for the urban project to be perfectly embedded in its metropolitan context.

To sum up, our proposal tries to condense these following concepts:

- NETWORK CITY, interconnected through transportation infrastructures and new technologies.
- INCLUSIVE CITY. Designed for all kinds of users, integrating a social approach and taking care of accessibility, avoiding architectural barriers.
- SMART CITY. Able to apply innovative solutions in the management of its services and resources in order to improve the quality of life for all citizens.
- SUSTAINABLE CITY. Ecologically, economically and socially.

We hope that this proposal may be able to become a reality. For this to happen, two essential conditions are required. Firstly, the people of Shanghai must believe wholeheartedly in the proposal. Secondly, the stakeholders, both public and private, must make the project their own. We have complete confidence that the people of Shanghai will be able to take advantage of a unique opportunity for creating a new high quality green and public space in a city of more than 20 million inhabitants. This would contribute to a better city, for a better life, following the main idea of the International Exhibition of Shanghai 2010.

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MARIO CERASOLI*

CITIES OF THE WORLD, A WORLD OF SUBURBS. TRANSFORMATIONS OF 'SETTLEMENTS RULES' AND 'FORMS OF LIVING' IN CONTEMPORARY LATIN AMERICA (AMONG GLOBALIZATION, CARS AND TELEVISION)

MIASTA ŚWIATA, ŚWIAT PRZEDMIEŚĆ. TRANSFORMACJA „ZASAD OSIEDLANIA SIĘ" I „FORM ZAMIESZKANIA" WE WSPÓŁCZESNEJ AMERYCE ŁACIŃSKIEJ (WŚRÓD GLOBALIZACJI, SAMOCHODÓW I TELEWIZJI)

Abstract

Beginning with definitions of the terms 'city' and 'suburbs', this article discusses the transformation of the urban settlement patterns, identifying the changes in the 'forms of living' and the cultural factors that have produced them, with particular reference to Latin America. Factors that are shared – also chronologically – with the Countries of the Mediterranean Europe (but not only) and involve cultural, social and economic globalized issues.

Keywords: city suburb forms of living

Streszczenie

Wychodząc od definicji terminów „miast" i „przedmieścia", niniejszy artykuł omawia przemiany w zakresie wzorców osiedlania się, identyfikując zmiany „form zamieszkania" oraz czynniki kulturowe, które je spowodowały, ze szczególnym uwzględnieniem Ameryki Łacińskiej; czynniki, które obszary te mają wspólne – również w ujęciu chronologicznym – z państwami basenu Morza Śródziemnego (choć nie tylko) i obejmują kwestie natury kulturowej, społecznej i ekonomicznej w rzeczywistości globalnej.

Słowa kluczowe: formy zamieszkania na przedmieściach miast

* Prof. Mario Cerasoli, Researcher and professor of urban planning, Department of Architecture, 'Roma Tre' University.

1. Introduction (A world of cities)

It is said that, during last decades and accentuating a process in fact began with the Industrial Revolution, the world has changed (and still is changing) and the population is concentrating more and more in the cities while the one that living in rural areas is decreasing.

According to the United Nations, in 2014, the proportion of the global population living in urban areas was 54%; breaking this down onto different continents and countries, the percentage of urban population is the following:

Europe → 74%
- Poland → 61%
- Germany → 75%
  - Southern Europe → 70%
- Italy → 69%
- Spain → 80%
- Greece → 78%

North America → 82%
- USA → 82%

Central America → 74%

Latin America → 84%
- Argentina → 92%
- Brazil → 86%
- Chile → 90%
- Paraguay → 60%

In 1950, the global rural population was 1.8 billion and the urban figure was 0.7 billion. In 2006, this proportion reached equilibrium (50%/50%).

If this trend continues, it is estimated that in 2050, the world population will 3.2 billion people in rural areas and 6.3 billion in urban areas.

30% of these will be living in the 600 largest urban centers and will produce more than 60% of world GDP (Source: UN).

However, why do statistics refer to ‘urban areas’ and not ‘cities’?

2. City. What is it?

This is the most important question in the context of this research. What exactly are we referring to when we speak of cities?

Observing an aerial photo of the city center of Rome, we can all agree on whether or not this is a city. Or not?

Of course, I think so that we all agree that this is a city. Yet, to quote a great Italian urban planner, Marcello Vittorini, the city is a ‘complex fact’ [3]. This is true even more if we read its definitions.

Ill. 1. Rome city center from satellite (source: Google Maps)

According to the Collins on-line dictionary, a 'city' is:

1. any large town or populous place.

A 'town' is:

1. a densely populated urban area, typically smaller than a city and larger than a village, having some local powers of government and a fixed boundary.

But we are sure that the majority of the world population lives in cities (or town)?

3. A World of Suburbs

3.1. Definitions, birth and evolution of the suburbs

The majority of the World's population now lives in urban areas with between 4,000 and 10,000 people per square kilometre [5]. An increasing proportion of this population lives in the so-called 'urban sprawl'.

So, what is 'the suburb' – this strange form of settlement that has spread from the second half of the twentieth century?

Studies of suburbs are very numerous and the academic and geographical contexts in which they are explored are highly diverse. For the sake of simplicity, we should start from the definition of this word.

According to the Collins online dictionary, a 'suburb' is:

1. a residential district situated on the outskirts of a city or town[1].

When does the process of 'mass suburbanisation' begin and what causes it?

The suburbs and, more generally their peripheries, are in a broad sense, an invention of the modern city that was born with post-industrial urbanism.

The increase in wealth per head of population involves a global tendency to live in larger or more exclusive spaces. The greater or lesser availability of financial resources is strongly correlated with the availability of space for living. To summarise, simplifying greatly some social behaviors related to settlement models, we can now be considered 'classic' (and highly globalized) the following:

– the social class that has the resources (the 'rich') always chooses the more favourable living environment (according to their needs and tastes) – exclusive buildings in the city centers or large (or very large) suburban extensions where they build or buy their residences;
– the 'middle class' aspires to imitate the behaviors of the 'rich' and, when possible, chooses the environment in which to live apartments in the city centers or small or very small suburban extensions where buy its medium-sized houses;

[1] Also the definitions of 'suburb' in other languages are very interesting.
According to the dictionary of the Real Academia de Espana (RAE), in Spanish „*suburbio*' is:
"Neighbourhood or population center located on the outskirts of a city and, generally, constitutes a depressed area".
In the Italian language, according to the Treccani Dictionary, 'suburbio' is: "In urbanism, it is the complex of the built-up areas that surround an inhabited area, namely the area where the new buildings, which are the gradual expansion of the center itself, are spreading (usually it is synonym of the most popular „periphery')".

– the lower class can never freely choose the environment in which to live (but would obviously like to do so) and tends to live where it can – building complexes for social housing, informal settlements etc.

Among these classes, there is definitely a (not cultural) 'permeability' of information (by the contemporaneous mass media, television, internet etc.), but much less a 'social mobility' – that there is always, but is increasingly from top to bottom and much less towards the top[2].

Simply repeating what happened in the aftermath of the Industrial Revolution, when the newborn 'middle class' went on to establish itself in the new outlying neighbourhoods of the existing (historic) city, in the second half of the twentieth century, both in Latin America and in Mediterranean Europe, for a 'emulative' process, the middle class abandoned the city center to go to live in the low-density suburbs, chasing a 'myth' that, largely through the medium of television, began to spread in that period and was characterised by single-family houses with gardens, or, in urban areas of more recent demographic development, in exclusive buildings (towers, gated communities etc.).

Since the end of Second World War, cities have suffered profound transformation processes both in order to the morphological 'rules' of settlements and, especially, in 'living' models.

A transformation process that has transversely affected the whole world and that marks, with appropriate distinctions, the beginning a (one way) path towards the globalization.

So we can discuss the Suburb as place where the sense of community was lost?

Or, more simply, the Suburb as a lifestyle?

3.2. Suburbanisation dynamics: Latin America and Mediterranean Europe

Latin America presents the most extreme urban and cultural phenomena in terms of the concentration of wealth and the increase of poverty.

Since the end of Second World War, the big cities of Latin America have been characterised by the seriously high extent of social imbalances (extreme poverty versus extreme wealth), this has led to a downward spiral of physical and social degradation.

While in Europe the countryside is gradually becoming emptier, due the destruction of communications networks networks and hence the difficulty of reaching the work and consumption centers, in Latin America, the same process was motivated by the need to survive the severe economic crisis that affected practically the whole continent as a result of the profound changes in global political and socio-economic equilibriums – the non entry of almost all Latin American states into the war was the main cause of this.

Consequently, the most important Latin American cities - grew enormously – were (more or less) capable of accommodating these internal migratory waves. People who, as in many other parts of the world, was chasing the same dream: a decent home and a job.

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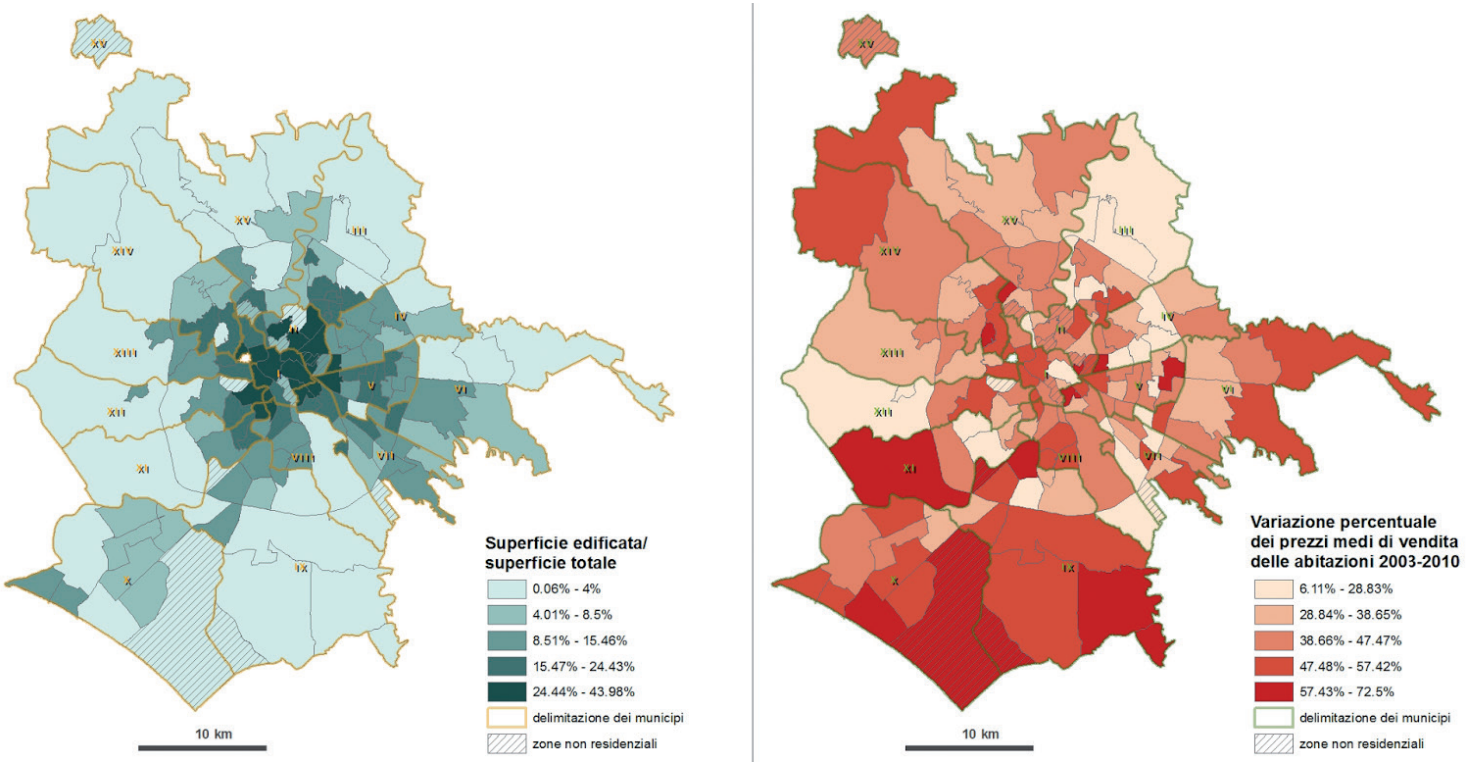
[2] Local or globalized economic crises affecting the economic level of the people in a negative way (respectively as the one in Argentina in 2002 or as the last that dating back to 2008, but that still is not completely outdated) are historically more frequent rather than large economic 'booms', that rarely go to involve the entire population but usually only a part of it – which is already normally capable of catalyze more financial resources.

Ill. 2a. Western suburbs of Buenos Aires Metropolitan Area. Barrio privado ‘Santa Barbara’, Partido del Tigre, Buenos Aires (source: www.guiacountry.com – access: 11.10.2016)

Ill. 2b. Western suburbs of Buenos Aires Metropolitan Area. Barrio privado ‘Santa Barbara’, Partido del Tigre, Buenos Aires (aereal view, source: Google Maps)



Ill. 3. Rome – building density and real estate values (source: mapparoma.blogspot.com – access: 11.10.2016)

The distribution of work and wealth has become increasingly complicated and is the main cause of the exponential growth of social exclusion and poverty levels – that still affect practically all the states of Latin America, where the proportion of the population that is in poverty or even of indigence increases with the same proportion of the spread of crime.

Ill. 4. San Salvador (El Salvador). Violence in the historic centre

From the urban studies perspective, historical centers and popular neighbourhoods of cities – which suffered (and in some cases, are still suffering) processes of physical and, therefore, social degradation – are the urban areas that are most involved in transformation of settlement patterns.

Historical centers, by their nature, are composed of a prevalence of 'poor' buildings, which, apparently, do not guarantee modern living comfort standards.

The main dynamics that affected historic city centers in the second half of the XX century, both in Latin America like in Europe, are as follows:

- abandonment by traditional inhabitants and economic activities;
- reduction of public service facilities (directly resulting from the decreasing population living in the historical center);
- degradation of buildings and public space;
- replacement of traditional inhabitants with new inhabitants (these are often immigrants who are attracted by the availability of low-cost housing);
- social degradation and lack of the sense of belonging (direct consequence of the substitution of traditional with new inhabitants that were in fact 'forced' to establish

themselves in the historical center, degraded, due to the lower cost of living. New inhabitants which, however, do not recognize themselves in the place which they live and which not cure as their own, up to turn it into a scenario for possible tensions between different national groups.

Ill. 5. Palermo (Italy), historic centre

Ill. 6. Montevideo (Uruguay), historic centre

Ill. 7. Rome (Italy), 'Corviale' social housing complex (1970)

On the other hand, social housing neighbourhoods (usually located in – popular – suburbs and created as arrogant 'architectural experiments') are characterised by: low quality constructions; frequent scarcity of public services; difficulty of access to and shortage of public transport.

The abandonment of the historical centers, the birth (and degradation) of the 'modern' popular neighborhoods and the spread of the suburbs are three closely linked aspects of the same, unsustainable, settlement culture.

From a socio-anthropological perspective, it may be concluded that this cultural transformation came just after the spread of television[3].

The massive suburbanisation process (of North American tradition) just occurs when the television becomes (right away) the uncritical carrier of that precisely globalized cultural model. An historical phase of sensitive and progressive weakening of traditional cultural patterns but in the absence of new and just as powerful ones.

Over the same years, in fact, the public policies have decisively oriented to encourage the mass motorization and consequently the construction of roads and highways to the detriment of public transport, which since then has begun a slow decline – in the last twenty-five years

[3] Television began its regular broadcasts in 1950 in Brazil (Rede Tupi), 1954 in Argentina (Channel 7), in 1956 in Uruguay (Canal 10), in, in 1957 in Chile (UCV Television), and so on for the other states of South America.
In Italy, television began in 1954, with the start of the regular broadcasts of RAI-TV.

favorite by the policies of liberalization which in fact have thrown into crisis or completely suppressed transport by rail, whether it be passenger or freight.

It is remarkable that the neo-liberal policies in the rail transport sector adopted by almost all the Latin American nations derive from the English model launched by the then British Prime Minister, Margaret Thatcher, in the 1980s and that they are behind the directives of the European Union on the liberalisation of the rail market.

In a similar context, this 'new' cultural living model finds fertile ground thanks to the gradual loss of importance of traditional agriculture, due to a short-sighted, and often simultaneously grandiloquent process of industrialization, which favoured the progressive abandonment of the countryside, which was already economically unprofitable, or, when possible, transforming the same in urbanisable area.

Phenomenon that is, unfortunately, still enduring in Latin America.

3.3. Comparisons: Buenos Aires and Rome

Comparing two big cities such as Buenos Aires and Rome – so far apart geographically, and, apparently, so different from each other – might seem like daring. However, this is not true.

Buenos Aires, capital of the Republic of Argentina, has just under three million inhabitants and a population density of 14,000 persons per square km.

Its metropolitan area has just under 13 million inhabitants, with a density which drops to just under 5,000 people per square km.

Rome, capital of the Italian Republic, has just under three million inhabitants and a population density of just over 2,000 inhabitants per square km.

Its metropolitan area has just under four an a half million inhabitants, with a density which drops to just over 800 inhabitants per square km[4].

The parallel between these two great cities are founded in the strong connection due to the Italian emigration to Argentina and the obvious cultural correspondence that is established between them (as if more than the money the Italians emigrants had sent home even the 'new' settlement traditions and therefore the 'how' to do home and also cities, result of a exchange with other immigrant cultures).

In both capital cities, the earliest suburbs, far beyond the urban borders of the time, were born in order to provide housing for people who could not access houses in the central areas of the city.

Despite the two cities having very different stories, the last hundred years has seen them gradually share some of the same urban, social and economic phenomena.

Subsequently, since the 1960s in Italy and by the end of the 1970s in Argentina, settlement models totally breaking with the past, based on isolationism and indifference to public space – which is no more a 'necessary' exchange place for interpersonal relationships – begin to spread.

In that period thus we witness a massive, uncontrolled suburbanisation process that led over the years to register the same consequences: congested traffic, inefficient public transport, air pollution, reduction of green areas, difficulties in access to public services.

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[4] Source: ISTAT Istituto Nazionale di Statistica, Italia (2011); INDEC Instituto Nacional de Estadística y Censos, Argentina (2011).

Table 1

Buenos Aires and Rome, comparative chronology

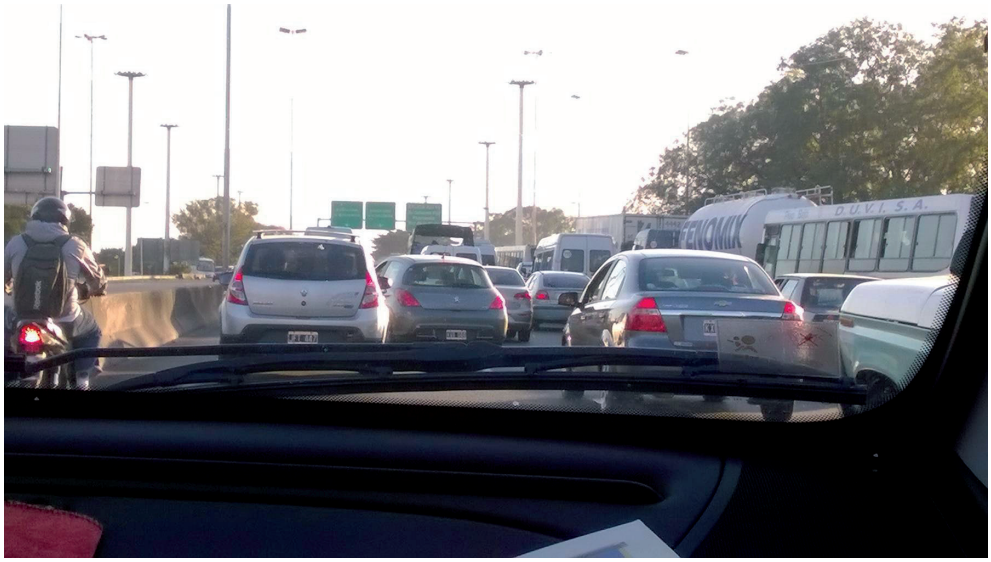
Buenos Aires		Roma
Independence	1810–1816	
Mass immigration (1850–1900: large industries installation, refrigerating and metallurgica, in the south, and first workers periphery) Born peripheries (area Barracas – southeast) 1850. Plan of Adolfo Sourdeaux 1853. Argentine Constitution 1853. First tramways 1857–1865. Western Railways, North and South 1869. First Census: 187,126 inhabitants 1869. Bateman directed the first construction of sewers and water supply 1880. Federalization of Buenos Aires, capital of the Republic 1894. Avenida de Mayo is inaugurated 1895. Second Census: 663,854 inhabitants 1897. Tramways were electrified	1852	Emigration
	1861–1870	Unit of Italy – Rome Capital
	1865	First Civil Code
	1873–1883	1873-1883 First Regulatory Plans (Viviani)
	1870–1909	New quarters for employees (Esquilino y Prati) 1871 Census: 212.386 inhabitants
	1900–1931	New neighborhood for workers (Testaccio)
Neutrality – Role of Argentina in the two wars mondiales (“granary of the world”) 1903. Circulate the first taxis 1910. The city celebrates the centenary of the May Revolution. Five exhibitions 1912. Universal Suffrage Act 1914. Third National Census: 1,575,814 inhabitants 1914. First subway line (line A) between Plaza de Mayo and Primera Junta 1915. National Commission of Economic Houses 1915. Guemes Gallery, first “skyscraper” of Buenos Aires 1928. Circulate the first buses 1930. Military coup 1932. First slum, “Villa Esperanza” 1932. Establishment of the Office of Urbanisation	1915–1918	First World War
		Crisis (second emigration)
	1922–1943	Fascism
	1931	1931 Regulatory Plan (M. Piacentini) 1931 census: 930,723 inhabitants
	1940–1945	Second World War

continue Table 1

Buenos Aires		Roma
1935. Edificio Kavanagh. 1936. The Obelisk is built for the Celebration of the fourth centenary of the first foundation of Buenos Aires. 1938 River Plate Stadium. 1944. Building Code. 1946. Juan Domingo Peron, president of Argentina. 1947. Nationalization of the railways. 1947. Fourth National Census: about three million people live in Buenos Aires (this number remains today). 1947. Opening of Airport "Aeroparque Jorge Newbery". 1949. Opening Ezeiza International Airport.	1942	New Civil Code (still in force)
	1942	National urban planning law
Horizontal property law	1949	
	1945–1960	Born the "modern" peripheries (legal and illegal)
First National television (Canal 7)	1954	First National television (RAI-TV)
1955 military coup. Peron's overthrow. Bombing of Plaza de Mayo. 1958. Call for elections. Arturo Frondizi, president of the Nation. 1958. Establishment of the Office of Regulatory Plan.	1955	Fiat produces the model "600" (the first Italian car of the era of mass mobility) http://www.youtube.com/watch?v=udhejTTiW0I
	1958–1962	Economic Boom http://www.youtube.com/watch?v=PpcZl3OUJyk&feature=related 1960. Rome Olympic Games 1961. Census: 2,187,682 inhabitants
Regulatory Plan for the City of Buenos Aires.	1962	Prg 1962 General Regulatory Plan (emergency housing, first plan for economic and popular Housing)
1966 military coup. Arturo Illia overthrow. 1968. Plan to eradicate slums. New models of asientamento ("country club") 1968. Master Plan "Buenos Aires 2000".	1975–1995	Nuevos modelos de asientamento (nuevas periferias, ilegales y legales)
Military dictatorship 1983. Call for elections. Raul Alfonsin, president of the Nation.	1976–1983	

continue Table 1

Buenos Aires		Roma
1990–1991. Privatization of public services 1997. Environmental Urban Plan of the City of Buenos Aires	1990–2000	1990. World Cup UEFA (infrastructure works, refurbishment of the Olympic Stadium) 2000. Jubilee (infrastructure works and for the reception of pilgrims)
2002. New Urban Environmental Plan of the City of Buenos Aires	2002–2008	Prg General Regulatory Plan 2003–2008: new metropolitan centralities and urban growth projections (> 600,000 inhabitants)



Ill. 8. Buenos Aires, Autopista Teniente General Pablo Riccheri

The analogies in policy-making and cultures have certainly influenced the recent development of the two cities – which recorded from that period the more and more increase of the suburban population. In both cases, if at the beginning the process of suburbanization was in fact favored by real estate values, significantly lower than the compact city, in a short time this process became favored by the desire to live in the suburbs – imitating, as mentioned earlier, North American lifestyles that spread since the 1960s mainly through the new media of that time: the television.

And thereby causing the loss of the sense of city.

4. Globalisation?

Between the 1950s and 1960s, there occurred a singular and apparently inexplicable globalised transformation of the forms of urban settlements that led to the spread of suburbs.

The contemporary suburbs identify the vast area low density built that has inexorably surrounded the big cities around the world and has produced an urban-suburban-metaurban mosaic with many missing pieces, urban fragments which in turn produce fragmentation with a higher land consumption.

Suburbs is now an unsolved and unfinished place, characterized by a lack of community services, central places and identities that leads to do appear similar the periphery of Santiago de Chile or Buenos Aires or Rio de Janeiro with those of Miami or Rome or Athens.

Unfortunately, sprawl and suburbanisation rely upon individual vehicular mobility which is unsustainable due to higher and higher environmental costs.

As discussed, the television seen as a sounding board of the North American myth, starts to spread the germs of the globalization after Second World War.

Subsequently, neoliberal policies (transport privatisation in, for example, Argentina, Brazil, Chile, El Salvador, and also in Europe) and some large urban projects (Olympics, world sports events and so on) with their load of speculation, corruption etc. (as occurred in Brazil, Italy, and Greece, for example) have aggravated the situation and have had a detrimental effect on the condition of the big cities.

Yet we are faced with many contradictions.

While in one part of the world, the suburbs are dying (such as in San Bernardino, California) due to the 2008 economic crisis (but, when the crisis will end, they will return to grow?), in other parts of the world (fewer developed?) the people continue to dream of living in a villa in the suburbs.

It is not easy task to convince this people that this dream is unsustainable.

To rediscover the sense of the city, we must first rediscover the sense of community.

The perspectives towards which to orient ourselves then are those of the “smart” city but even more towards the just and inclusive city. A city where “right to the city” means accessibility and is guaranteed to all (and not just a few).

In this way we will be able rediscover the sense of belonging to the places and overcome the individualism, having care and improving the local specificities in a global system of (world) cities.

Only then can we transform the city suburbs.

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ANNA AGATA KANTAREK*

THE URBAN VILLA PLOT AS A STRUCTURAL ELEMENT OF AN URBAN BLOCK. *VILLA URBAN BLOCK*

DZIAŁKA WILLI MIEJSKIEJ JAKO STRUKTURALNY ELEMENT KWARTAŁU MIEJSKIEGO. *KWARTAŁ WILLI MIEJSKICH*

Abstract

The paper presents the particular form of an urban block, divided into plots and built up with detached buildings. This form is derived from the single-family housing and has been adapted for multifamily housing purpose.

Keywords: Urban Block, Urban Villa, Rome, Urban Villa Block, Urban Morphology

Streszczenie

Artykuł przedstawia szczególną formę kwartału miejskiego, podzielonego na działki i zabudowanego wolnostojącymi budynkami. Forma ta wywodzi się z willowej zabudowy jednorodzinnej i została zaadaptowana dla celów zabudowy wielorodzinnej.

Słowa kluczowe: kwartał miejski, willa miejska, Rzym, kwartał willi miejskich, morfologia urbanistyczna

* Assoc. Prof. D.Sc. Ph.D. Arch. Anna Agata Kantarek, Division of Urban Spaces, Institute of Urban Design, Faculty of Architecutre, Cracow University of Technology.

1. Introduction

The analysis of an urban block as a fundamental form of the urban tissue can be carried out in many different ways. Attempts at summarising numerous efforts made in the field of urban morphology which focus on detailed case descriptions lead to the demonstration of rules governing the process of shaping of the tissue in different conditions.

This paper deals with a particular form of the urban block, which consists of detached buildings located on separate plots of land. It seeks to outline its evolution, as well as demonstrating its usefulness for shaping of the contemporary urban tissue[1].

2. Definition of an urban block

Mangin and Panerai, [18] define an urban block as a cluster of houses surrounded by streets[2], whereas Merlin and Choay, [19] define it as the smallest unit of the urban space, which is completely limited by roads[3]. Some authors narrow the definition of an urban block to the orthogonal subdivision[4].

The definition of an urban block with reference to Parisian examples erected in the period 1977–1997 is provided in Kantarek, [9, p. 59]. It contains some more detailed information pertaining to the characteristics of solutions that came into being at that time. From the perspective of the relation between buildings and the open space of the urban block, it points out to the essential relations between them, which are: the location of the body of the building at the edge of the space of the street and the interior of the plot, the degree of separation and accessibility, and the type of the open space within the block, as well as the possibilities for determining the activity on the edge of the urban block and its functional characteristics.

The properties of the form described in this definition refer to an urban block designed in Paris in the period 1977–1997; we could, however, adopt them with reference to numerous examples of urban block development. This definition does not address the issue of dividing the block into individual plots, nor does it focus on the principles governing the development of a block subdivision grid – the diversification of these conditions resulted from the character of the revitalisation measures described.

It seems that in the most general classification in seeking the features of an urban block one should consider its size, the character of the routes that limit it, the type of division of the space into plots, the forms of the development of the plots, as well as the character of the

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[1] A.V. Moudon [20, p. 8] specifies 3 types of research devoted to urban form: descriptive, prescriptive for urban design, and historical – directed towards historical theories of the building of cities; the studies referred to below definitely belong to the second type, although they concentrate on the genesis of this type of urban block.

[2] p. 175.

[3] p. 409.

[4] S. Kostof [11] considers an urban block as the basic unit of the orthogonal allotment, lending character to the entire structure and the third dimension and H. Saylor [23] by an urban block means the space and buildings contained within a non-intersected perimeter of streets in the orthogonal subdivision.

open spaces (internal, external, linking spaces). Functions and their intensity, as well as the extent to which buildings and open spaces are open to the public – these are the next essential elements of such a description.

A. Borie and F. Danieul [2, p. 4, 5] propose a classification pertaining to a traditional urban tissue and present four systems for organising the urban tissue. These are: the system of roads and lots (distribution), and the system of buildings and open space (land occupancy). It is an important methodological distinction, offering broader opportunities of analyses than the model proposed by M. R. G. Conzen consisting in the division into 3 systems: roads, plots of land, and buildings.

3. Non-urban block forms

One of important questions concerning the scope of the definition of the urban tissue as an urban block is the issue of differentiation between the form of an urban block and a superblock.

Le Corbusier proposed a solution which operated with spacious urban blocks, and form resembling rescaled solutions modelled on stepped boulevard (*boulevard à redans*) developed by Eugène Hénard[5] and clusters of detached skyscrapers. The spaces defined by routes were no longer traditional urban blocks; moreover, they were to constitute a total break with the street as a corridor which strictly determined and filled the frontage of development of streets.

This gave rise to the growth of superblock developments, with the most famous examples such as Chandighar (Le Corbusier, 1950), Brasilia (Costa, 1955) and Milton Keynes (Webber, Walker, 1967), and in Poland Nowe Tychy (Teodorowicz-Todorowski, Wejchert, Adamczewska-Wejchert, 1950). Along with complexes of the *grand ensemble* type and modernist housing estates, they implement the concepts of the modernist division into functional zones (residence, work, leisure, transport) and they are executed according to *the negative space* formula (term according to Ch. Alexander).

The sizes of these complexes require that an internal hierarchy is formulated with service and access roads designed according to different concepts and exhibiting different ways of separating pedestrian and car traffic. In some solutions urban blocks can constitute elements of the tissue defined in this fashion.

Another essential distinction pertains to an urban block and a maze-like, organic development, usually associated with forms of cities known from the past, and characteristic of the Islamic world.

Çatal Hüyük (Anatolia, 7400 B.C. – a city without streets, Sotira, Cyprus (4500 B.C.) – a city of partially 'agglutinated' houses, or Gournia, Crete (1600 B.C.) – these are just a couple of examples of urban organisms which were formed by the process of houses agglutination.

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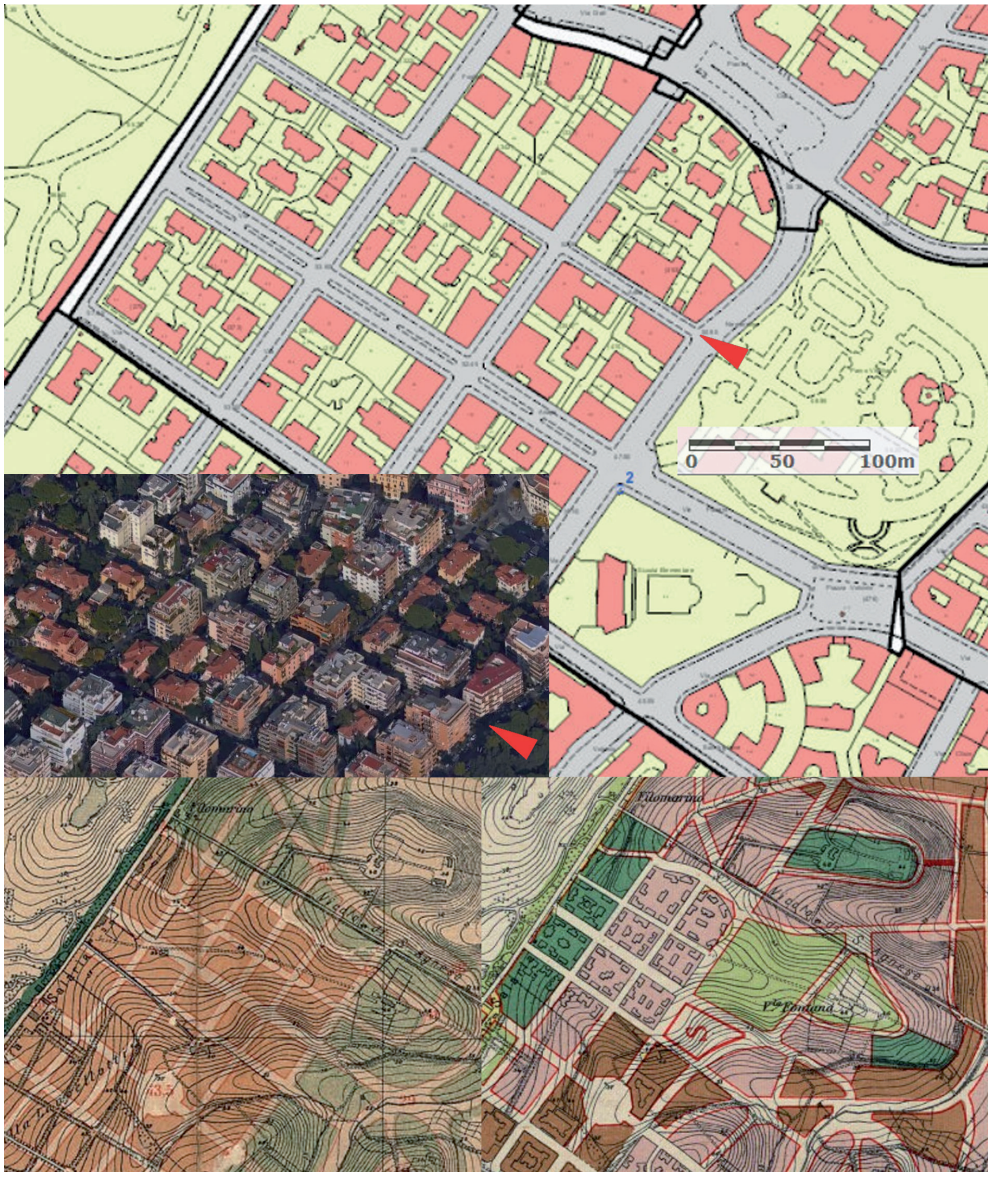
[5] Except that Le Corbusier intersected the urban blocks with transit traffic routes, intermingling private and public spaces.



Ill. 1. Via Arabia and *Villa Urban Blocks*: a – as today, plan [33], b – as today, bird eye view [31], c – as in PRG Roma 1909 [34], d – as in PRG Roma 1931 [35]

The next question refers to the organic way in which the block form comes into being. An urban block brings associations with planned activities of man and allotment systems known already from Khorsabad (700 B.C.) or Borsippa (600 B.C.), but it can also constitute an effect of densification and growth of buildings. This is observed by Ph. Panerai,

Ill. 2. *Villa Urban Blocks* – Via Arabia (photos by author)

J. Castex and I. Samuels [21, p. 158–167] demonstrating a row of buildings and a street as the fundamental ways in which a development complex is created.

R. Allain [1, p. 96n] writes that the two forms, the urban block and plot subdivision[6] are comprehensive and complex, and they define a group of buildings in relation to the concept of the city, its plot ratio, as well as relations between buildings and the open space of the street and the interior – but they have a different logic. Allain understands allotment as creating defined systems which have given rise to numerous urban organisms, as well as interventions in a smaller scale, pertaining to the new development of a small area[7].

We are also interested in the relation between the urban block and the way in which its surface area is divided into plots. An essential quality of an urban block is the fact that it constitutes a comprehensive form, a sum of smaller, often similar, structures. They in turn are a manifestation of the logic in which the plots are developed.

Eixample by I. Cerdà in Barcelona constitutes a peculiar breakthrough in thinking about the urban block. In the Author's approach, urban blocks were spaces fully composed based on buildings which were predominantly linear and which filled two street frontages, leaving the remaining two open. The interior of the urban block and the street intermingled, offering a multitude of opportunities for spatial arrangement. The concept favouring function over ownership-related division into plots of land was not implemented.

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[6] *Îlot, lotissement.*

[7] What is important an urban tissue are made of old allotments [1, p. 97].

Ill. 3. Via Acqui *Villa Urban Blocks*: a – as today, bird eye view [31], b – as today, plan [33], c – as in PRG Roma 1909 [34], d – as in PRG Roma 1931 [35]

In France a form of transition from a block divided into plots towards a uniform type of ownership and use were HBM social housing complexes (private or public).

Allain presents mutual relations between the urban block form and the division into plots [1, p. 97–99, Fig. 30]:

Ill. 4. *Villa Urban Block* between streets Albenga/Cividale del Friuli/Ivrea/Acqui (photo by author)

Ill. 5. *Villa Urban Block* between streets Albenga/Acqui/Stabia/Mondovi (photo by author)

- *Lotissement* – spontaneous completion of the development by subsequent allotments,
- *Hygiène et circulation* – a block as an element that organises the urban tissue (with the example of Cerdà's Barcelona),
- *Immobilier et réseau* – also referred to as *l'îlot hybride* – resulting from the existing system of streets, hybrid in nature, but with intentional development of individual plots,
- *Hygiène, immobilier et réseau* – a semi-open block – comprehensive development of the space between existing streets, taking into account different functions, and without the division into allotment plots (and here an example is the HBM development in Paris),
- functionalistic system (*Fonctionnaliste*) – disappearance of the formula of a block and a proprietary plot for the benefit of functional urban planning[8].

4. Plot and urban block

A plot is one of elements of the structure of an urban block, and its the development is yet another approximation that demonstrates the multitude of solutions. The basis is constituted by large-size structures located at the edge of the street and their continuity. The tenement system of the main building and outbuildings added one by one, at the back, at the sides, in the middle, form a dense structure of many central parts of cities. Extreme cases of the plot ratio, obtained e.g. in *Mietskaserne*, Berlin, were built on the basis of more and more concentrated filled spaces of plots, with gradual limitation of surface areas of courtyards and internal open spaces.

The architecture of the centre of New York demonstrates another degree of intensity of development – in plot subdivision system a tower buildings, multiplying the use of floor area appears.

Seeking here a rule for a block consisting of buildings modelled on urban villas and divided into separate plots which does not exhibit such intense forms of development, but is based on a balance maintained between the developed and open space.

Sources of such a definition of an urban block should be looked for amongst solutions of the villa development type , characteristic of extraurban or suburban structures, and how it is adapted to downtown development.

5. Rome

Besides Genoa, [14–16], [5, p. 34–48] it is Rome that is the place where an interesting form of block development with urban villas came into being. It was based on regulatory plans and their implementation under the pressure of investors aiming at the maximisation of opportunities for intense development of plots.

[8] In this research it is not considerd as an urban block but as a superblock.

The process of Italian unification in the mid-19th century resulted in a sequence of regulatory plans (after 1865). They were developed e.g. for Florence (piano Poggi, 1865), Milan (piano Beruto, 1884), Naples (piano di risanamento, 1885), and Bologna (piano regolatore, 1889) [30].

The plan for Rome from 1909 (Piano Sanjust) [25] introduces two types of buildings: *fabbricati* and *villini*. The *villa* development remains and is classified in the area of parks and gardens.

The introduction of different types of development enables to diversify the shape of the plan.

And the specification of the development types is as follows:

– *fabbricati* – maximum height 24 m (over subsequent years this permissible height grows to 28 m in 1914 and 30 m in 1923),
– *villini* – a two-floor building with a ground floor, which maintains the distance of 4 m from the plot limits, with the maximum plot ratio of 1.4 of the total area of the plot.

General regulations were resolved in 1912. In the relation to the street, the height of the buildings can reach 1.5 of its width within the walls and 1.2 of this width beyond the walls. It was also permitted to erect houses with the height of 14 m at 8m-wide streets.

Due to the housing crisis caused by the war, a document *Regio Decreto di modifica del Regolamento edilisio del 1912* was announced, which changed the conditions pertaining to the plot ratio [26].

It was permitted to replace the type of *villini* by a new building type – *palazzine.* From then on, areas which according to the plan were allocated to *villini* could be developed more intensely. It was permitted to cover 1/4 of the plot area, maintaining the distance of 5.8 m from the plot limits. In practice, this distance did not pertain to the street frontage line and in this respect it was permitted to place buildings within the limits of the plot.

The height is 3 floors above the ground floor, the height of which must not exceed 3 m and which is designed as space for workshops. In practice, this height reached 5 floors, including a usable (also commercial) ground floor.

The width of the front is 25 m, but it was possible to obtain a permit for additional 10 m to the depth of 4 m. This form of development became very popular and constituted the basis for the development of the city.

Forms of buildings with a usable ground floor and 4 residential floors became widespread. The landscape of the city became greener due to the fact that not an entire plot was built-up.

The Fascist government and new visions for Rome sustained *palazzine* as the basic form of development, leaving *villini* as a less intense solution.

The permissible building was prescribed to be 30 m tall, until 1934, when the construction code enabled to increase it to 35 m along wider streets.

Mussolini's plan from 1931 introduced three new types of buildings, intended predominantly for residents with high incomes – *villini signorili* with the possibility of building up 1/6 of the plot, *ville signorili* with the possibility of building up 1/15 or the plot, and terraced houses – *case a schiera*.

The plan provided for a ground reserve for individual types of development, with 1260 ha assigned to *palazzine* and 1140 ha to *villini*. The plot ratio for intense development was

determined to be 500/600 residents/ha, for *palazzine* – 350/450 residents/ha, and for *villini* 100 residents/ha.

Intensification of plot development does not refer exclusively to taking full advantage of the opportunity to erect buildings, but to develop the plot itself. The minimum surface area of the plot around the building is used for a driveway, utility structures, terraces, greenery. The edge of the plot in contact with the street is also developed by placing trade and service functions there. Intensification fosters economic functional solutions, and the form of a pavilion enables to maintain greenery within the limits of the plot.

The typology established this way was confirmed by subsequent documents and implementations. The decree *Decreto interministeriale 2 aprile 1968, n. 144* [32] determined areas of intensity in relations to individual development types.

An extensive use area stands for one-family detached buildings, terraced houses, atrial and external corridor houses; a semi-intense development area stands for *palazzine* buildings, and an intense use area – tall tower buildings.

Palazzine is a 3-6-floor building with 2–6 apartments on the first floor, often with an internal courtyard. After the World War II this type of development became widespread in the suburbs and it gave rise to development complexes with closely arranged point buildings.

Another form resulting from the *palazzine* is *casa un linea*, which is a combination of at least two one-family *palazzino* with the height of 3–6 floors.

Consequence in the extension of zones of the city with a set spatial typology found its expression in the term *Città Consolidata*[9], which covers grounds developed according to the provisions of the plans from 1931 and 1962. Undoubtedly, areas built up with villini and *palazzine* created a new landscape of the city. It has a high plot ratio, maintaining a functionally and spatially attractive line of development, maximising the use of the plot and allowing to provide the building with light from 4 directions.

Art. 46 of Piano Regolatore Generale from 2008 pertaining to the development of the urban tissue in the 20th century with the typology for medium-intensity development complexes recognised the traditional type of *villini* and *palazzini* as consistent with the provisions from 1931.

For *villini* the distance of 4 m from the plot limits is accepted, and they can be built within the plot limits facing the street.

Palazzine can be located within the frontage line, with the ground floors holding service outlets.

Today, *Città Consolidata* is a huge part of the city located between the heart of the Old Rome and its modernist suburbs. Despite such strict assumptions referring to the development of the plot, as well as to the small number of possibilities pertaining to buildings, the landscape of the city is extremely diverse. The hierarchy of scales and intensities is maintained. The balance between the built-up and open space within the plot and the block enables to maintain good proportions in the perception of architecture (and its advantages), but also of greenery (and its natural values in different scales), as well as of the spatial and functional attractiveness of ground floors in the contact line between the plot and public spaces (the active edge).

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[9] Next to the zones – Città Storica, Città da Ristrutturare and Città della Trasformazione [31].

Since the 1980s Ch. de Portzamparc propagates the idea of an open urban block[10]. His concept of such a block has lived to see several implementations (e.g. in Paris in the district of Masséna since 1995). Composing an urban block out of detached forms, simultaneously maintaining the frontage and regulation of the accessibility of the internal open space of the block – these are the rules which have governed the development of *Villa Urban Block* described above, and which were at the heart of the definitions and regulatory plans of Rome at the end of the 19th century and the beginning of the 20th century.

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ELŻBIETA WĘCŁAWOWICZ-BILSKA*

THE ROLE AND IMPORTANCE OF SMALL AND MEDIUM-SIZED CITIES IN THE REVITALISATION OF THE POLISH CARPATHIAN REGION

ROLA I ZNACZENIE MAŁYCH I ŚREDNIEJ WIELKOŚCI MIAST W ODNOWIE REGIONU POLSKICH KARPAT

Abstract

Network of settlements in the Carpathians was formed during the Middle Ages for most of the area. In the process of its creation, the most important factor was the presence of transit routes connecting northern and southern routes as well as the piedmont extending from east to west. Cities were invested in along all of these routes. In most planning documents, prepared at the national and provincial level, tradition was based on the development of tourism, leisure and spa treatment, in the southern Polish. Today, this development directs the main focus primarily on the towns and areas with high natural resources and cultural values. Therefore, this tendency becomes the source of conflict. Finally, the potential of the social resources, intellectual and business people of the region has not yet been fully utilised.

Keywords: Regional planning, Carpathian region, economic development, environmental protection

Streszczenie

Sieć osadnictwa na większości obszaru Karpat była formowana w okresie średniowiecza. W procesie jej tworzenia najważniejszym czynnikiem była obecność szlaków tranzytowych łączących północne i południowe strony gór oraz trasy podgórskie biegnące ze wschodu na zachód. Miasta zostały lokalizowane w wzdłuż wszystkich tych traktów. W większości obecnie przygotowanych dokumentów planistycznych na poziomie krajowym i wojewódzkim, w terenach południowej części Polski rozwój tradycyjnie oparto na turystyce, rekreacji i lecznictwie uzdrowiskowym. W rzeczywistości dzisiaj ten rozwój kieruje główny nacisk na miasta i na obszary o wysokich zasobach naturalnych i kulturowych wartości. Ta tendencja staje się źródłem konfliktu, bowiem potencjał zasobów społecznych, intelektualnych i biznesu w regionie nie został jeszcze w pełni wykorzystany.

Słowa kluczowe: planowanie regionalne, region karpacki , rozwój gospodarczy, ochrona środowiska

* Prof. D.Sc. Ph.D. Arch. Elżbieta Węcławowicz-Bilska, Institute of Regions and Cities Design, Faculty of Architecture, Cracow University of Technology.

1. Introduction

The mountain areas of Poland occupy a small area, around 3%, of the country. In the south is a fragment of the Carpathian mountain range and a small section of the Sudetenland in the west.

The whole country is low-lying.

Today, the area of the Carpathian mountains in Poland covers three provinces – Podkarpackie, Malopolska and Silesia.

In the Carpathian region still have high values of preserved natural environment that are protected. In Malopolska alone there are six national parks, eighty-four nature reserves, eleven landscape parks, ten protected landscape areas, three nature and landscape parks, and seventeen ecological special protection areas named Natura 2000.

Carpathian areas have been inhabited since prehistoric times; however, the existing network of settlements was predominantly determined in the Middle Ages when it was the location of many cities under Magdeburg law. Today, many of these cities have retained their original layout, historical buildings have been renovated in recent years and there are a number of medieval buildings as places of worship, fortified castles, town halls etc. In rural areas, cultural heritage refers to the remaining elements of folklore, residential buildings, farmyards, and above all, wooden and brick sacred objects such as palacessmall wooden Catholic churches and Orthodox churches retained mainly in rural centres. Some of the sites were placed on the UNESCO World Heritage List.

Also found in the area of the Carpathian Mountains are a number of important historical and traditional spas created during the nineteenth-century.

The demographic situation in the South of Poland is better than anywhere else in the country. Especially in smaller towns and rural areas in the southern region, this increase is still higher than in large cities in central and northern regions.

Importantly, a notable factor is the steady increase in the proportion of the population having received higher education – the proportion in the Carpathian small towns was 6% in 1995 rising to 10% in 2003 and is at present approaching 15%.

Taking into account the aspirations of people in improving their education it is important in higher education network. In the Carpathian region, there are 55 colleges operating of which 25 are located in the medium-sized cities and small towns. As regards the economic activity in the small southern Polish cities, a greater number of private companies can be observed other than in centers of similar size in Poland. Spontaneous economic development realised in this area can sometimes be in conflict against established, legal protection of natural and cultural values of the region.

Regarding the economic activity in the small southern Polish cities, a greater number of private companies exist than in other centres of a similar size in Poland. The spontaneous omni-economic development achieved in this area can sometimes be in conflict with the established legislation for the protection of the natural and cultural values of the region. This conflict occurs between the requirements of legislation for the protection of the environment and the needs of local residents together with local authorities to reduce unemployment. They also stem from the fact that the establishment of rules to protect the environment on the basis of scientific findings is not always mindful of the needs and aspirations of the inhabitants of these areas.

Ill. 1. Traditional view on Tatra's Mountains with a new landscape element of a pair of wind turbines

2. Spatial characteristics of built-up mountainous areas based on the example of the Polish Carpathian region

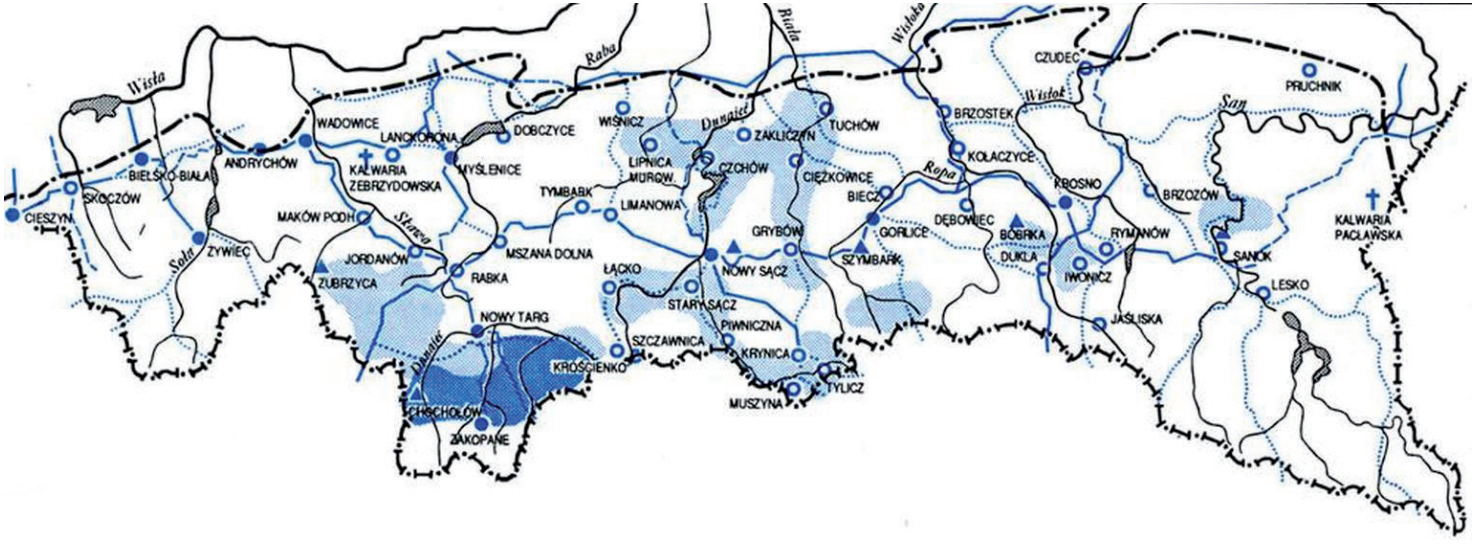
Considering the spatial conditions in the Polish mountain areas focuses on the Carpathian region. This area is in the Polish Carpathian overthrust from the coast to the southern border of the country and is around 330 km long and 100 km wide.

These areas are rich in environmental resources, there are major areas of land rich in drinking water headwaters, dense forest complexes which are legally protected and numerous mineral springs form the basis for the development of the spa region.

Nowadays, the settlement network in the Polish Carpathians consists of over fifty cities and more than 1700 villages with highly diverse population sizes. The largest city of the region is Bielsko Biała, currently with a population of 175 000 people, and the smallest towns, like Świątniki Górne, Ryglice and Błażowa, have a population of less than 2000 people. The largest villages have a population of almost 10 000 people (Kozy, near Bielsko-Biała) and the smallest are inhabited by less than 100 people (e.g. Smerek, in Bieszczady).

The main settlement network is strictly related to the natural topography. As the mountains rise laterally to the south, they are accompanied by subsequent strips of urbanisation. Further north, on the edge of the Carpathian overthrust, are highly urbanised areas, including the metropolitan area of Kraków and the agglomerations of Tarnów and Rzeszów.

At the foot of the Beskid Mountains, a parallel intra-Carpathian strip of urbanisation can be observed. This strip is arranged in the form of a band and includes small and medium-sized cities, such as: Kęty, Wadowice, Sucha Beskidzka, Myślenice, Mszana Dolna, Tymbark, Limanowa, Nowy Sącz, Gorlice, Jasło, Krosno, Sanok and Przemyśl.



Ill. 2. Value of cultural environment in Carpathian region. The historic city and town systems, historic palaces and castles, historic single objects, historic urban of religious foundations, traditional building regions, culture's sub-regions – UNESCO List of World Cultural and Nature Heritage. Source: authors' study

Further south are the typical recreational areas with health, and summer resorts. Some of these are centred around small and medium cities. Most of the health resorts are concentrated in the area of Poprad Valley[1].

The historic heritage of the Carpathian region is rich and varied and there are plenty of monuments and beautiful, preserved traditional folk architecture buildings. Numerous historic and traditional small towns and villages with historic buildings; many wooden churches, most from the seventeenth and eighteenth centuries or earlier; a large number of historic ruins of castles; a lot of assumptions of park court. Here are also unique class of sacred assumptions pilgrimage routes such as in Kalwaria Zebrzydowska and in Kalwaria Pacławska. At the turn of the century they came here interesting sacred buildings in towns and villages, designed by the Krakow;s and Lviv.s architects. The area also boasts exceptional spas facilities are also – these retain much of the nineteenth century charm.

All these foundations and building structures are strongly linked with the landscape of fields, meadows, river valleys and forests.

Most of the monuments in the Carpathians are considered to be modest and provincial. Their shape is unique; however, as occurs preserved folk buildings in the unique landscape in the context.

It important is that protections systems are in place to protect the natural resources over large areas. In the Carpathians there are six national parks, eight landscape parks, protected landscape areas and more than eighty nature reserves. In addition, all the forests in the mountain areas are protected as water protection forests. The forestation rate in the Carpathians is high, reaching on average 40% [2] of the territory – this is essential for the protection of the springs of the main rivers in the countryside [3].

The land transport system in the Carpathians is highly determined by the natural topography. Both roads and railway lines are routed mainly in river valleys and they cross mountain ranges through their passes[4]. The road transport system is a grid based on two almost parallel running latitudinal communication corridors crossed by eight longitudinal routes of various means of transport and different categories of transit routes.

The Carpathian air transport system is based on one international airport in Kraków. It would be significantly improved by the introduction of air transport and use of the sport and glider airfields in Bielsko-Biała, Nowy Targ, Łososina, Krosno and Sanok, along with a planned airport in the vicinity of Nowy Sącz. Indeed, there are still areas that are poorly accessible in the Carpathian region[5].

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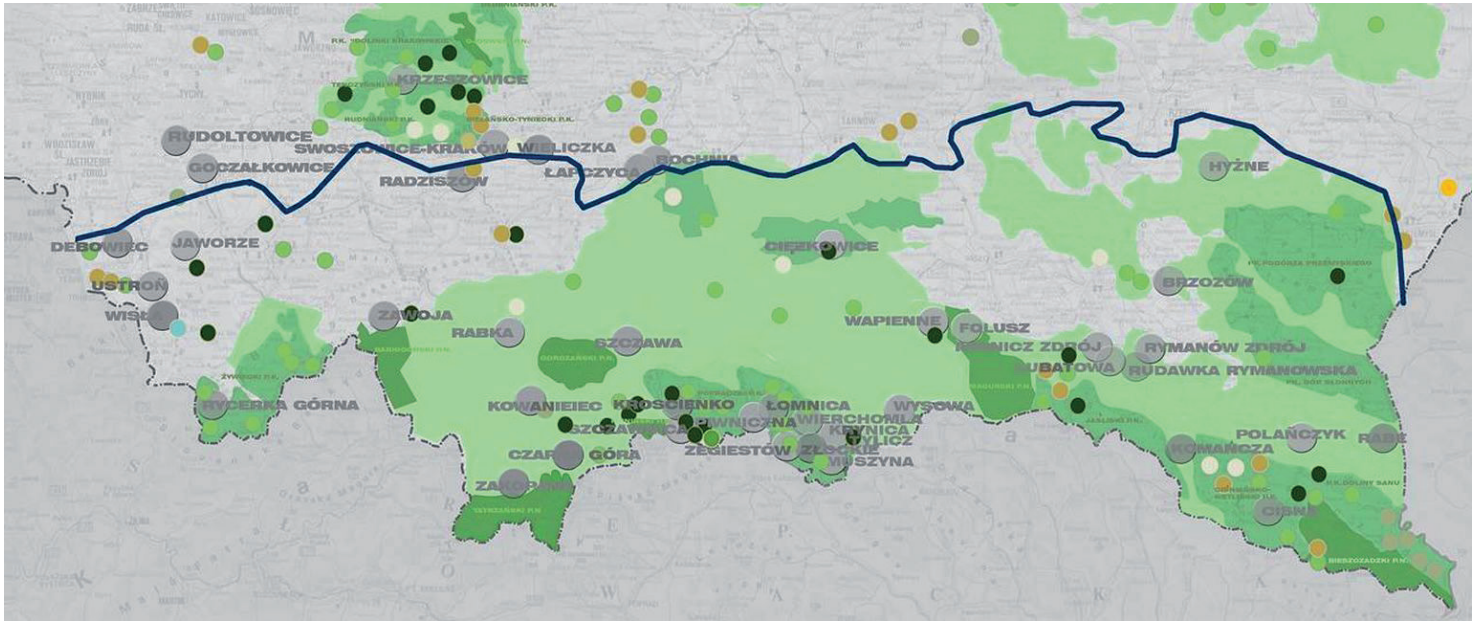
[1] Like Krynica, Muszyna, Piwniczna, Złockie, Żegiestów, next in Beskid Niski (Wysowa, Iwonicz Zdrój, Rymanów), in Bieszczady (Polańczyk) and in Beskid Śląski (Ustroń).

[2] The total forestation of the Carpathians is 41.4%. In some areas, forestation is very diverse: 18.2% in the Podhale region and 73.5% in Tatra mountains.

[3] They especially include right-bank tributaries of the Vistula and tributaries of the San.

[4] There are no road tunnels in the Carpathians, only two railway tunnels: one in Żegiestów and a closed one in Łupków.

[5] This applies primarily to Bieszczady and Beskid Niski and partially to Beskid Sądecki situated in the south east corner of Poland, far from most major towns and cities. Similarly, the adverse conditions of the availability resulting from the extensive low category road network occur in the areas of the foothills Ciężkowickie, Wieliczka, Dynowskie and Przemyśl, Beskid Wyspowy and Gorce.



Ill. 3. Nature conservation and landscape protection in the Carpathian region. Protection of natural features: national parks, nature reserves; Protection of landscape features: landscape parks, protected landscape areas, culture-landscape parks; Protection of the spa areas, Rola i znaczenie małych i średniej wielkości miast w odnowie regionu Polskich Karpat. Source: authors' study

An increasingly urgent matter is the generation of energy from renewable sources.

Mountainous areas have favourable conditions for wind farms. However, their installation should not impair the quality of life of inhabitants and must fulfil the requirements for protected areas[6].

Recently, in the cities of the region one can observe accelerated demographic changes in the form of a growing number of high schools, small businesses and modern, sometimes technologically advanced, companies.

It seems that these cities can form a local centre of growth in the Carpathian region, irrespective of the big cities located on the edge of the Carpathian overthrust. Many planning documents underestimate the role and intentions meaning of such centres [5]. The region's main industries remain as tourism, recreation and, to a lesser extent, agriculture [6].

3. Social aspirations

3.1. Demographic situation

The Carpathians are inhabited by approximately 2.5 million people, which in 1988 was 6.2% of the Polish population. At the end of the 20th century rural areas were inhabited by 65% of the Carpathian population, the remaining 35% lived in the cities (corresponding values on national scale were 38.8% and 61.2%). Some of the villages (e.g. Ryglice, Ciężkowice, Czchów, Nowy Wiśnicz, Świątniki) have recently been granted city rights. In the whole Carpathian region, either growth or stabilisation of the population level can be observed[7]. The dynamics of population growth from 1988 to 2007, especially in small- and medium-sized cities, reached even up to 20%, e.g. 19% in the case of Dobczyce and 20.4% in Mszana Dolna. The highest population growth was noted in the eastern and western part of the Carpathians. A decrease occurred in some of the resorts, e.g. in Rabka and Krynica, which are the largest centres of this region[8].

3.2. Conditions of economic activity

The main economic activity growth factors include new industrial investments, foreign capital inflow and local initiatives. The higher education level, which in 1988 in Małopolska

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[6] This applied both to providing proper conditions for the permanent residence areas, as well as aesthetic conditions for the location of engineering devices in the areas which are attractive in term of landscape.

[7] The biggest population decrease occurred in Bielsko Biała, this was from 184 000 in 1991 to 175 000 in 2007.
The demographic prognosis predicts that the number will continue to drop to 163 000 in 2020 and 145 000 in 2030.

[8] In Szczawnica, on the other hand, population growth occurred from 6709 in 1988 to 7340 in 2002 and 7380 in 2007 – this can be related to the development of tourism [8].

towns equalled on average 6% and currently is over 10%, has an indirect yet substantial influence[9].

The larger cities, where the higher education level has been noted. this cities can play the role of the centres of growth. Similarly, the changes related to the transformation of the political system are the most visible in larger cities [8, 41 ff.].

In the Carpathian regions, especially in the southern districts, the unemployment rate has been growing for years. In 2013, the unemployment rate in Podkarpacie equalled 15.1%, 11.4% in Małopolska and 12% in Silesia. In some municipalities, it differed significantly from the average unemployment level in each voivodeship[10].

The development opportunities arising from the change of the economic functions are highly diverse. The differences result from geographic conditions and the state of the technical infrastructure as well as the effectiveness of local governments. The changes in job opportunities related to higher employment in private companies were diverse among Carpathian towns and cities[11].

The economic situation of the district and medium-sized cities is much better than that of mall towns because the former have more infrastructural and transport investments, stable employment in local administration, public services (health care, transport, education etc.) and the observed growth of employment in the private sector[12].

Investments in Special Economic Zones (SEZ), located in a few Carpathian cities, play a significant role in the economic development of medium-sized cities in the Carpathian region.

The next locations are either under consideration or already exist . The increasing number of industrial complexes in mountains areas can improve the job market situation. However, this also increases the competition between them. On arbitrary decisions made by investors, industrial areas were established in smaller towns of the region [1]. In addition, the random location of large warehouses among low-rise residential buildings reduced the spatial attractiveness of certain towns or their districts.

Positive examples of such activity undertaken in accordance with spatial development plans include Myślenice, with its industrial and technological park, investment zones in Jawornik and Jedlcze and the establishment of a technological incubator in Krosno.

Locating large industrial facilities in Polish mountain areas is difficult because any investment in this area can be simultaneously viewed from many different levels and heights, and because of the extremely low-density housing, this means that to achieve the principal goal of maintaining spatial order, detailed guidelines for such location have to be prepared, and this can be accomplished in a local spatial development plan. In fact, investments not

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[9] The biggest percentage of higher education can be observed in the towns of the metropolitan area of Kraków: Krzeszowice (13.5%), Wieliczka (14.6%), Myślenice (14.1%) but also in Rabka Zdrój (12.4% and Limanowa (12.3%).

[10] For example, in districts: Bieszczady – 20.3%, Lesko – 19.2%, Sanok – 12%, Nowy Sącz – 14%, Limanowa – 17.3%, Gorlice – 13.5%, Żywiec – 17.4 (data gathered in June and July 2013).

[11] With regard to changes in the number of business entities in 1994–2002, the highest increase was observed in Dobczyce (16.9%), in Myślenice, Piwniczna and Sucha Beskidzka (all 7.7%), then in Wadowice and Maków Podhalański (both 6.5%) [8, p. 48–49].

[12] The research has proved that people with a university degree are much more likely to start their own business [8].

closely based on the master development plan led to the degradation of space – this was even worse after the closure of companies[13].

Table 1

Higher education in the Carpathian band and its development from 2007 to 2013

City name	Population	College number in 2007	College number in 2013	Number of secondary schools in 2007
Cieszyn	36 120	2	5	17
Gorlice	28 250	0	4	6
Jasło	36 600	1	3	6
Kęty	19 080	0	1	4
Krosno	46 900	3	3	9
Limanowa	15 130	0	2	4
Myślenice	18 380	0	1	5
Nowy Sącz	84 590	3	5	25
Nowy Targ	33 493	2	3	10
Przemyśl	66 700	5	1	14
Sanok	38 800	1	1	4
Sucha Beskidzka	9500	1	3	5
Wadowice	19 270	0	1	4
Zakopane	27 440	0	4	4
Żywiec	32 400	0	3	13

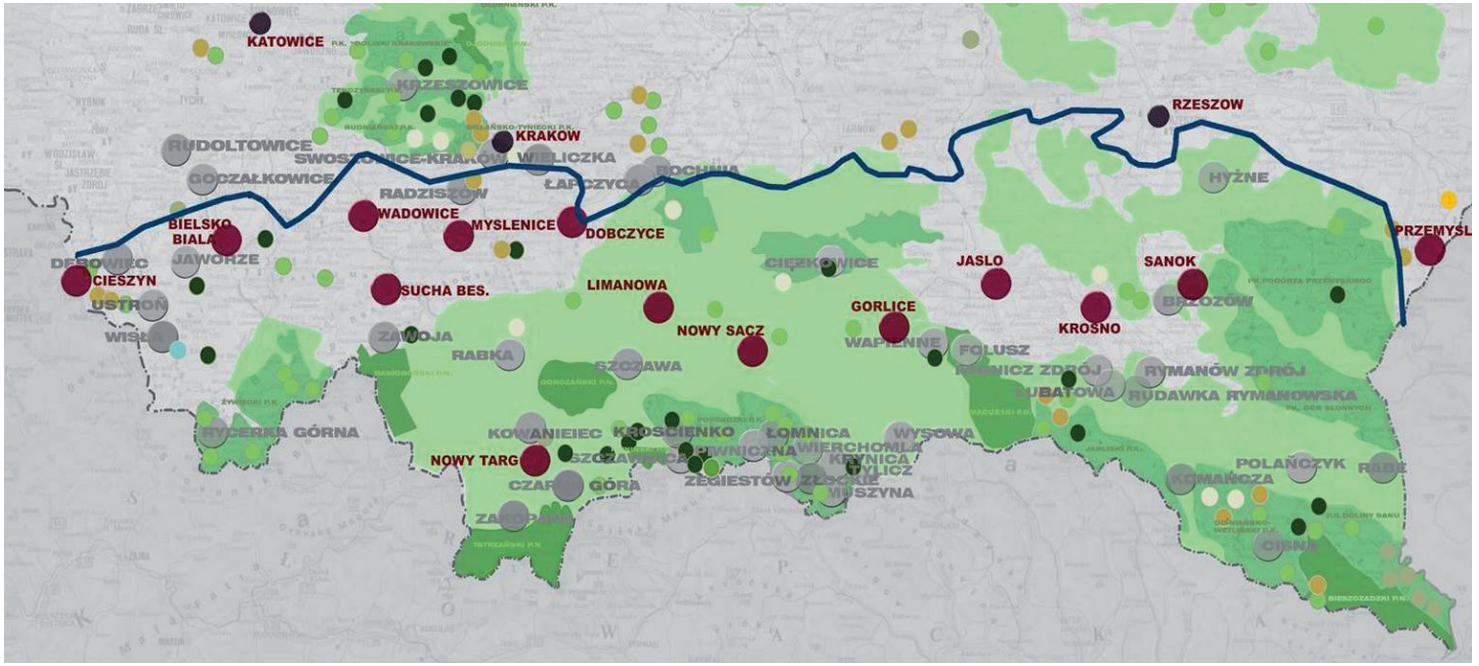
Source: authors' study

Among new functions developed in recent years mainly in medium cities is higher education, this is implemented by professors from large academic centres in region.

The level of economic activity in small cities is very diverse. It depends on the location with respect to large- and medium-sized cities, the main functions of these cities and the number of investments made in the last two decades. Today, the dominating functions of most of these centres include: agriculture, tourism, recreation, administration and health resorts. In most of these leisure and spa resorts, similar equipment is installed and used – this leads to unnecessary competition instead of cooperation (seen in neighbouring European countries).

In Carpathian villages and small- and medium-sized towns, population levels are stable or sometimes even show growth.

[13] A worthwhile example is Wałbrzych, where a whole hill was levelled in order to meet the needs of the companies about to settle in a SEZ.



Ill. 4. Social aspirations and development needs (like colleges, high schools, universities) the values of the natural and cultural environment background. The brown circle – localisation of high schools and universities in Carpathian towns. Source: authors' study

Table 2

Increase of the SEZ location number in Carpathian cities in 2007–2012

City name			Population	Name of Special Economic Zone
Year 2007	Year 2012	Year 2015		
Jasło	Jasło	Jasło	36 600	SEZ Tarnobrzeg – Europark – Wisła – San
Przemyśl	Jedlicze	Jedlicze	5800	
	Przemyśl	Przemyśl	66 700	
	Rymanów	Rymanów	3700	
Gorlice	Gorlice	Gorlice	28 250	SEZ Mielec Europark
Sanok – industrial area	Krosno	Krosno	46 900	
	Sanok – industrial area	Sanok – industrial area	38 800	
	Zagórz	Zagórz	4990	
	Krosno	Bochnia	29 370	Kraków Technology Park
	Limanowa	Czorsztyn	360	
	Nowy Sącz	Dobczyce	6250	
	Dobczyce	Gdów	4500	
	Gdów	Krosno	46 900	
		Limanowa	15 130	
		Myślenice Jawornik – investment area	3060	
		Niepołomice	10 500	
		Nowy Sącz	84 590	
		Nowy Targ	33 493	
		Pcim – industrial area	4900	
		Siepraw – klaster	4600	
		Sucha Beskidzka	9500	
		Sułkowice – klaster	6300	
		Szczurowa	1720	
		Tuchów	6700	
		Zakliczn	1600	
		Zator	3700	
	Myślenice		18 380	SEZ Katowice

Source: authors' study

In villages with a large number of holiday cottages, guesthouses or agritourism farms available in summer months, long weekends and other holidays, a significant increase in the number of people is observable. They include both summer visitors and year-round tenants who are not registered in the statistics. This kind of settlement occurs mostly in areas which are the most attractive in terms of natural landscape: in Beskid Śląski and Beskid Żywiecki; around the Gorce Mountains; in the Podhale region; in the Pieniny Mountains; in Poprad Valley; to the south of Rzeszów.

More than a half of the Carpathian area is used as agricultural land, less than 37% of which are arable lands, 1.5% are used as orchards and 13% as permanent grasslands.

Forests make up 41% of the area of the Carpathians, it is reported, by Cz. Guzik [3, p. 239–252].

Most scientific publications opt for limiting the area of arable lands in favour of permanent grasslands and forests, especially above five-hundred meters above mean sea level. It is important to reduce the amount of forest and agriculture lands in order to stop the ongoing degradation of mountain habitats, to

protect the areas from erosion, improve the micro-climatic conditions and create more favourable conditions for tourism and recreation[14].

4. Basic problems and conflicts in mountains areas; a case study of the Polish Carpathians

In the Carpathian region, there are many problematic issues and areas of conflict. The conflicts are caused by the natural and cultural conditions of the regions, and most significantly, by the current land use and management. A few basic functional and spatial conflicts in this area are listed below.

• Conflict of the priority to protect the existing natural and cultural values versus the development possibilities and the needs of tourism and recreation. This situation is almost inevitable because the most valuable natural and cultural areas are equally the most attractive for tourism, recreation and investments (such as individual housing and recreation centres, e.g. areas surrounding of the Czorsztyńskie Lake – Pieniny National Park – Szczawnica – Grajcarek Valley; reserves: Homole, Black Water and White Water; Zakopane – Tatra National Park; area surroundings of the Solina reservoir, and 'small and large ring roads' of Bieszczady National Park).

• Conflict resulting from the need to build new infrastructure for clean generation of energy and water retention with the landscape values and the existing spatial management of the river valleys. Wind farms require well areas which are typically exposed to sufficient levels of wind however, because of the landscape and nature protection requirements, their location should also take into account the parameters characteristic of protected areas. The resignation from several pre-designated areas of artificial reservoirs, when there is a great demand for energy (and for electricity generated from water), means that new localities for hydro investments are chosen to the detriment of other kinds of activities.

• Conflict between the need to designate new terrains for environmental and landscape protection versus the public opposition of the local community afraid of limitations and inconveniences that may have a detrimental effect upon economic activity.

• Conflict between the need for housing and economic space versus the necessity to protect against landslides[15] and floods.

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[14] Above 500 m a.s.l. arable lands make up about 20% of the total area, while permanent grasslands make up over 12% between 600 and 800 m a.s.l. [3].

[15] More than 90% of Polish landslide areas occur in the Carpathians.

• Conflict between the need to create artificial water reservoirs, along with all necessary industrial infrastructure for electricity production purposes versus the need to increase the area's attractiveness for water-orientated recreation and tourism.

• Transit and transport related conflicts, resulting from:

– the development of recreational resorts through which the transit routes run (e.g. Bukowina Tatrzańska, Białka);
– the necessity to modernise the existing road infrastructure and the protests of local residents[16];
– the organisation of mass motor events in protected areas.

5. Conclusions

Carpathian towns of small and medium-size are interesting places of residence for contemporary, educated people as is the case for the whole of Europe. The area has many features that are important: the preserved cultural heritage; human scale assumptions relationships with the landscape; easy and direct contact with recreation areas such as forests, rivers, walking paths and hiking, ski area etc. There are also better environmental conditions due to the generally limited traffic. The possibility of remote working at a distance is an additional argument for the choice. Like the existence of a large number of people with higher education, high aspirations for economic development in areas unfavorable to conduct farming activities.. However, it is necessary to maintain a focus on the quality of the public spaces of towns and to preserve their most attractive assumptions. The analysis of the conditions of the mountain areas and their present spatial management state carried out from the point of view of the needs and aspirations of the citizens points to the following basic problems. These can be solved, in part, through spatial planning:

– The need and the possibility to create regional parks in order to ensure the protection of environmental values as well as to stimulate the local economy.
– Protected areas require clear and precise regulations determining types of activities allowed and adequate forms of protection.
– More diversity is needed in developing tourist, recreational and health resort areas and better standard differentiation of the areas.
– When taking actions in favour of increasing the area's water retention ratio, it is necessary to include in the development plans the principles regarding the spatial management of the vicinity of the reservoirs.
– Ensuring flood and landslide safety by setting strict limits to building houses in the areas of the so-called 1% and 0.1% water and in the landslide areas.
– The need to intensify local government engagement in the creation of modern economic activities and the necessity of including these programs into more fundamental plans.
– Implementation of local planning solutions should increase the attractiveness of public spaces (not only in historic parts and centres) of cities and towns of the region and

[16] E.g. protests of the business owners in Stróża against poor access to the expressway, protests against modernization and widening of the road in Szaflary.

improve their competitiveness, especially in areas with potential for technology-based economic activities.

– Planning studies for functional, problematic and conflicted areas on a local and regional scale should be mutually agreed upon by the communes.

Mountain areas, owing to their specifications, require planning that is prepared not only on a local scale but primarily, on a regional level. These works are preceded by detailed studies and can provide vital information for the improvement of the economic development of these areas while maintaining their natural and cultural environment values. Furthermore, they raise the possibilities of the spatial transformation of the whole region.

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JACEK GYURKOVICH*

CRACOW OF THE FUTURE – WILL IT BE A CITY WHERE EVERYBODY WOULD LIKE TO LIVE?

CZY KRAKÓW PRZYSZŁOŚCI BĘDZIE MIASTEM, W KTÓRYM KAŻDY CHCIAŁBY MIESZKAĆ?

Abstract

We are surrounded by architecture on an everyday basis, we all encounter it; therefore, we should make sure it is useful, beautiful, and harmonious. Architecture is created for man, for people, for society. For this reason, it has to exhibit appropriate practical and artistic values. It should create a beautiful, harmonious space. It is imperative to provide residents with good contact with nature in the urban living environment, and attractive public spaces of an urban character. Architecture created lately in Cracow consists of new city landmarks, as well as of growing number of residential developments of different scale, which has been built in vacant (sometimes green) areas. Are they all fulfilling the needs of the contemporary society? Over recent years, the attitudes and awareness of Cracow residents have changed, most of all in the subject of the cleanness of air, noise, and ecology. Today, we all wish to live in a city which is healthy, hence the efforts to make sure that both contemporary architecture and public transport are ecological and do not emit pollution and noise. Is this possible to achieve in a city in which the planning policy is dependent on the insufficient legal documents (study of development, instead of master plan)? The examples presented in this paper shows that, at least in Cracow, the situation is slowly changing for better.

Keywords: *new architectural investments in Cracow, the future of the city, landmarks, residential estates, urban growth*

Streszczenie

Architektura otacza nas na co dzień, wszyscy się z nią spotykamy, zatem powinniśmy dbać o to, aby była użyteczna piękna i harmonijna. Architektura jest tworzona dla człowieka, dla ludzi, dla społeczeństwa. I wobec tego musi mieć odpowiednie walory użytkowe oraz artystyczne. Powinna tworzyć piękną, harmonijną przestrzeń. Niezbędne jest zapewnienie mieszkańcom dobrego kontaktu z naturą w miejskim środowisku życia oraz atrakcyjnych przestrzeni publicznych o miejskim klimacie. W ostatnich latach przede wszystkim zmienia się podejście i świadomość mieszkańców Krakowa, gdy chodzi o czystość powietrza, hałas, sprawy ekologii. Dziś wszyscy chcemy żyć w mieście, które jest zdrowe. Dlatego widać dążenia do tego, żeby zarówno współczesna zabudowa, jak i komunikacja w mieście były ekologiczne, nie emitowały zanieczyszczeń ani hałasu.

Słowa kluczowe: nowe inwestycje w Krakowie, przyszłość miasta, osiedla mieszkaniowe, rozrost miasta

* Prof. D.Sc. Ph.D. Arch. Jacek Gyurkovich, Institute of Urban Design, Faculty of Architecture, Cracow University of Technology.

1. Introduction

Why does quality of architecture more and more frequently attract the attention of not only specialists but also entire societies? Architecture decides about the space in which we live, it creates – particularly in towns and cities – the living environment. Cities are a natural living environment of contemporary man. We are surrounded by architecture, it is impossible for us not to see it. If one is not interested in art, one does not have to go to an exhibition of paintings of sculptures, or to a concert, or one can just turn off the radio if one does not intend to listen to music –although, of course, one may be missing out in choosing to avoid such things. But we encounter architecture every single day; it is a part of an open exhibition, available incessantly, and everybody who gets around the city is surrounded by it; this is why everybody should make efforts in order to make the space around them beautiful, harmonious, and capable of providing comfortable living conditions.

Invariably, Cracow attracts with the output of its material culture – unique monuments of architecture, as well as the equally unique, historic urban layout of the Old Town, surrounded by the green ring of Planty Park – the urban complex of the city centre along with the Royal Castle on Wawel hill, Kazimierz and Stradom which were entered on the first UNESCO World Heritage List in 1978. With great interest tourists also visit the old part of Nowa Huta. The oldest historic part of the town of Nowa Huta[1] constitutes a legibly defined urban complex, referring to baroque multiaxial compositions, ahead of the contemporary concepts of New Urbanism by several decades. This urban complex has regained recognition as a good urban living environment, with a large number of lines of greenery along wide streets and inside urban blocks, and a good 'human' scale of development.

There is quite a lot of good contemporary architecture in other parts of Cracow; it has already begun to evoke interest and attract attention, some of the examples have become new landmarks of the city. Certainly, we should not be ashamed of our new architecture, we have many edifices that are truly of a high level.

2. Contemporary examples of housing estates in Cracow

The promotion of good examples of contemporary architecture well serves the broadly understood artistic and cultural education of society. Through promotion, we can contribute to making our city a better place, to making our space better arranged and more friendly. It is particularly worth demonstrating good models in the field of housing – regrettably, it still stirs certain fears and is far from perfect. In contemporary times, housing estates – usually 'developer estates' – have emerged. These estates were built by the private sector of the construction market. Although their architecture is usually much more interesting than before[2] and the forms of buildings exhibit interesting aesthetic, technical and material-related solutions, the estates often do not satisfy the requirements relating to usability,

[1] Nowa Huta was built just after the Second World War as 'model socrealist city', satellite to the 'reactionist' Cracow. Since the early 1960s one of the districts of Cracow. Cf. [2, 13].

[2] During the times of central planned economy and prefabricated housing estates, until the late 1980s.

they do not provide a suitable living environment. The area of building plots is used to the maximum extent due to the investors' target of obtaining the best economic effect possible. The development is often too dense, leaving no social spaces necessary for recreation and rest purposes. Such housing estates lack fundamental elements that should accompany houses for residential purposes – kindergartens, schools, basic services[3]. Hence, this is an area where social input in urban design is most necessary; inhabitants of *the Smart City* that Cracow wishes to be, should be able to influence the way in which their living environment is formed. Cracow residents, like the inhabitants of most contemporary cities, seek a friendly residential environment. They dream about apartments filled with sunlight, furnished with large terraces and balconies, opening up onto green areas and making good connections with nature. Flora and recreation greenery of a variety of different heights is necessary most of all in places of residence. Here, a huge role is played by a proper design and by equipping emerging housing estates with sufficient greenery. Residents of such housing complexes should have access to commonly used spaces addressed to a determined group of the local community, which would enable them to rest in contact with nature every single day, furnished with playgrounds for children. Nearby, there should be easily accessible park greenery, arranged for a larger housing cluster, where one could rest, jog, do sports.

Undoubtedly, such a housing estate has been recently built. It is rather small development enclave – four urban villas-located at 14–20 Czartoryska street, winners of the first award in the competition organised by 'Dziennik Polski' daily in Cracow entitled 'Cracow – My Home' in 2016[4] in the category 'Multi-family Housing Complexes'. Put into use in May 2015, these four-floor buildings, inspired by modernist architecture of the interwar Cracow [2, 19], altogether hold 26 air-conditioned apartments with floor areas from 37 m^2 to 209 m^2. Each of the buildings is equipped with lifts, and the basements hold an underground garage with 44 parking spaces for each of the buildings[5]. Elevations have been finished with natural limestone and plaster. Large glass expanses of windows and doors leading to balconies and spacious terraces on the top floors are open towards the surrounding greenery. The complex is situated by Dębnicki Park, and its residents can additionally use a large garden with an irrigation system that makes use of rainwater collected in underground containers; most probably, many inhabitants of Cracow would like to live there. This complex of residential buildings, surrounded by one-family houses, fits in with neighbouring buildings in terms of scale, inscribing itself in the local context in a perfect way. The feature which is worth promoting is the creation of a desirable quality of housing environment, with space of shared use – a spacious garden, allowing children and adult residents to rest and enjoy active forms of recreation. This small complex is fenced, just like all the villas in the area, thanks to which it forms a safe, shared, semi-private space for its residents; and with this solution, it also inscribes itself in the local context.

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[3] The insufficient planning policies are especially visible here, just like in other big cities in Poland.

[4] The author was one of the jurors of this competition and the entire paper is built partly on his reflections after this event.

[5] Designers of the housing complex of the total floor area of 2,826 m^2 are Ludomir Książek and architects from LJK Architekci; the author of the final design is BAZUKASTUDIO, and architectural details were entrusted to Dominik Dousa (DUO Design), *Dziennik Polski*, 'Mój dom' supplement, 19 May 2016, p. 6.

Ill. 1–3. The urban villas Czarodziejskia St. 14–20 (photo by author)

What are the errors in designing an urban spatial environment referred to above connected with? An appropriate city development strategy, guaranteeing a logically consistent, functionally and spatially interrelated urban tissue, can be provided by local development plans, implementing the terms and conditions of the planning document 'Study on the Conditions and Directions of Development for the City of Cracow' [17]. Today, in 2016, the city is covered by the local development plans only in 50%. Undoubtedly, the progress in this respect is enormous, if we consider that in 2003, only 2% of the territory of the city had such a documents. Nevertheless, in many areas, buildings and entire housing estates are still erected under a decision on conditions for construction, which are established according to the principle of the so-called 'good neighbourhood'. This leaves a lot of room for irregularities, as such a procedure does not secure the continuity and cohesion of the development of the city with the adopted strategy. Regrettably, the law does not require the obtaining of a decision on the conditions for construction which would be consistent with the provisions of the quasi-legal document [17]. In the absence of the plan, all that comes into being is architecture itself, sometimes exhibiting very high architectural values, but houses are not accompanied by public spaces which are necessary for shaping of the living environment: parks, squares, playgrounds for children, buildings and yards related to services, as well as schools, kindergartens, healthcare services. There is a lack of properly organised access – very often, due to the separate ownership of construction plots, access roads are unnecessarily doubled, increasing the share of hardened surface and limiting the space for greenery, scarce as it already is.

Most of all, however, there is a lack of public transport that would secure access to housing estates. It could protect the urban environment against problems relating to individual car traffic. Cracow is considering plans to construct an underground metro system. Cracow, along with its suburban areas, is a centre with a population of one million, and additionally, it is visited by 10 million tourists every year – this constitutes a great burden on the public transport system. The underground is a collision-free and ecological means of transport, providing good and quick connections and the possibility of transporting large masses of passengers. If we do not have the necessary funds for such a system at the moment, we need to make sure that the development plans allow such an investment to be implemented in the future. The necessary reservation of land for the underground and the equipment that accompanies it can be guaranteed in local development plans consistent with the provisions of the document [17]. It would be also a good idea to repeat in Cracow the concept of architect Gil Peñalos, currently based in Canada, who for 16 years now has been proposing that in large cities (e.g. in Bogota), in order to protect city residents from car exhaust fumes, some streets should be closed to car traffic at least on Sundays between 7:00 a.m. and 3:00 p.m. and temporarily reserved for pedestrian traffic only[6].

A problem in the development of suburban areas – besides the lack of public transport and the lack of public services and space – is the compatibility of any new development with the existing architecture, which is very often one-family buildings realised in a different scale; this is where glaring contrasts appear. Additionally, the city sprawls in an absolutely uncoordinated manner and its external limit is actually invisible[7].

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[6] Also see concepts of Jan Gehl widely presented in his books and websites devoted to the issue.

[7] Which refers to the problems of regional planning in Poland and is an interesting subject for another paper.

3. Problems of new developments within UNESCO protected city centre

In the city centre one of the most composed urban areas of Cracow, on the other hand, there are still missing parts in the urban tissue there are also degraded buildings, exhibiting very low technical and practical values, and often with no considerable architectural values, either. An example of such a situation is the corner of Straszewskiego and Józefa Piłsudskiego streets opposite Collegium Novum of Jagiellonian University, still undeveloped after the demolition of a two-floor building that used to house the 'Barcelona' bar. For the sake of harmony and spatial order, this place should be used in an appropriate way, furnished with architecture fulfilling a relevant function, having a relevant form and size consistent with its nearest surroundings. Another example of such a spatial situation is the undeveloped plot of land along the western side of Straszewskiego street at the intersection with Podzamcze street, at the foot of Wawel which has for years now been occupied by quasi-tourist services and kiosks selling beer and snacks – there are quite a lot of such places in Cracow.

What definitely requires considerable work are the Vistula boulevards on both banks of the river. The river is a wonderful element of the city, a dissection which offers us the opportunity to admire the panorama of individual parts of Cracow from both sides of the river[8]. These areas should be occupied by beaches, there should be a lot of greenery, walking paths, cycle paths, and along the borders of such areas, there should be coffee shops, restaurants, art galleries, bookshops aimed for pedestrians using the boulevards, city residents and tourists, where they could stop by, get together, rest, or browse books. It would be a perfect place for every-day, easily accessible recreation, which – if properly arranged – would change the appearance of the city. The Vistula boulevards should become the prestigious public space of Cracow, with attractively arranged public spaces, where one could spend some time for pleasure, rest, or admiring the changing landscapes while taking a stroll.

4. New public use buildings devoted to culture in Cracow

Cracow is a city of culture[9], which predominantly promotes historic sites. Despite numerous attempts to transfer the city centre to some other location, the Main Market Square in Cracow still constitutes the heart of the city, and this will probably never change. The enormous scale of the Market Square and the sites focused around it attract visitors like a magnet. This is the very place where, under the eastern surface of the market square along Cloth Hall in 2010, a new Historical Museum of the City of Cracow was opened. Designed

[8] The importance of this space is very strongly underlined in the [17], mentioned above, and its inner-city part (between St. Norbert Monastery on Salwator and an artificial dam at Dąbie) is named as 'Innercity Vistula Park' with many strict rules for developing the future local plan, as well as future architectural development in the area (Cf. [17, p. 29–33]). Entire Vistula Valley within the administrative borders of the city of Cracow is provisioned to become one of the strategic projects of the City of Cracow in the very same legal document [17].

[9] Which is one of the main elements of the strategy of the development of the city of Cracow, underlined in the abovementioned '*Zmiana Studium*' [17].

by Prof. Andrzej Kadłuczka with the team from Studio Archecon[10], this extremely attractive museum exhibits historic relics of the oldest times of our city from the 10th and 11th centuries, operating with contemporary architectural details. Metal and glass stairs and platforms, holographic and multimedia images demonstrate how the latest achievements in the field of technology and advanced construction materials can lead the viewer into the mysterious underground world of the distant past. The author of the design writes, "Descending to the basements of the Market Square in Cracow is... a psychological act of teleportation to the past. The educational dimension..., besides the direct public contact with the relics of the past, is the opportunity to pass the knowledge about Cracow, the life of its inhabitants, erected buildings and everyday items, activities and habits, work and play, in an attractive way" [10].

Until recently, one of the most attractive implemented designs of public utility buildings connected with culture was the Manggha Museum of Japanese Art and Technology. The architectural concept of the structure was developed by the famous Japanese architect, Arata Isozaki, who cooperated with Krzysztof Ingarten and JET Atelier[11]. The facility, located opposite Wawel on the other bank of the Vistula river, is perfectly inscribed in this area of Cracow with its small scale and soft forms corresponding to the meander of the Vistula river and a wave on the water[12]. In the main hall, an enormous glazed area opens towards the view of Wawel hill. After 15 years next new museum structures important for Cracow, although located far from the city centre, were put into use. These are: the Polish Aviation Museum, opened in 2010, located at a former airport, combining crude concrete with large panes of glass in its new form, and from a bird's eye view, resembling a three-bladed aeroplane propeller[13]; the MOCAK Museum of Contemporary Art, which presents art from the last 20 years, located in the district of Podgórze, opened in 2011. The museum, which clearly reflects the fascination with Italian neo-rationalism, occupies six formerly existing industrial buildings of the old Schindler factory, with one additional edifice which distinctly refers to the existing forms and highlights the sawtooth roofs[14].

Although the idea to build the Małopolska Garden of Arts was emerging as early as in 2002, it was only realised in 2012. Located very close to the historic city centre, it is hidden in the backstreet of Rajska. By shifting the body of the building made

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[10] The museum occupies a floor area of 6,000 m², with 4,000 m² of an archaeological reserve. Architectural design of the Underground Museum of the Main Market Square in Cracow: Andrzej Kadłuczka; graphic design of the exposition programme: Mieczysław Bielawski, Marcin Pietuch, Tomasz Salwierz; content-related development of the exposition programme: Cezary Buśko, Sławomir Dryja, Wojciech Głowa, Stanisław Sławiński; technology and multimedia: Agata Sitko and Tomasz Zalewski with the team of TRIAS.

[11] The Museum came into being upon the initiative of Andrzej Wajda, who was granted a prestigious movie award in Japan, Kyoto Prize, founded by the Inamori foundation, and he assigned this award to be part of the exposition of the collection of Feliks Jasieński in the Manggha Centre of Art. Additionally, the trade union of the Eastern Railway in Japan allocated one million dollars to support this investment.

[12] This wave is not only a reference made to the river that flows nearby but also a motif from a Japanese print which is one of the most valuable exhibits in Jasieński's collection – it is presented inside the building.

[13] The museum of the floor area of 4,000 m² was designed by a German-Polish team of architects, consisting of: Justus Pysall, Peter Ruge and Bartłomiej Kisielewski.

[14] The authors of the design are the Italian architects Claudio Nardi and Leonardo Maria Proli; www.claudionardi.it

Ill. 4–5. Malopolski Garden of Art (photo by author)

of hundred-year-old brick, the architects wished to create an oasis of peace and quiet. It is a wonderful example of inscribing a new form into the historic urban tissue using modern materials. An openwork glass and metal umbrella roof invites pedestrians to go inside, where a theatre, a multimedia library, exhibition halls, and a coffee shop can be found. The external glass walls reflect the surrounding trees and tall grass like a mirror.

The building, hidden within in the rhythm of 19th-century tenements of Cracow , thanks to its small scale and interesting events, was accepted by city inhabitants right away. The crowning of the building with smooth inclinations, which according to its authors correspond to the roofs of the adjacent tenements, is definitely worthy of attention[15].

Two important cultural venues, long anticipated by city inhabitants, were put into use in 2014. One of these the new seat of Cricoteka – Centre for Documentation of the Art of Tadeusz Kantor. Designed in 2006, this was the adaptation of a small 19th-century power plant, enveloping it in a bold simple form, continuing the concept of emballage, i.e. enveloping different everyday items in order to attract attention and discover their internal secrets[16]. Concrete posts support a huge form enveloped in openwork Corten steel sheets above the buildings of the power plant, making a reference to Kantor's drawing of a man carrying a table on his back. One of the authors of the building, Stanisław Deńko, explains this concept in the following way: "The Art Centre is a mirror – a reflection of the active part of the city at the bank of the Vistula, which becomes 'a prop' and in an abstract way participates in the pedestrians' awareness, even if they cannot see it directly from the street"[17]. In autumn 2014, residents of Cracow were also given the ICE Congress Centre, located at the intersection of Marii Konopnickiej and Monte Cassino streets. This is an enormous form, housing three large conference and theatre halls for 2100, 600 and 300 viewers, it opens towards the view of Wawel Castle and Skałka Church on the other side of the Vistula with its entire glazed wall of the three-storey foyer[18]. Over recent years Cracow – the city of culture and art- have opened few important museums. In May 2016, the laureate in the category of public utility buildings in the competition 'Cracow – My Home', organised for several years now by the 'Dziennik Polski' daily newspaper, was a small pavilion devoted to Józef Czapski at 12 Piłsudskiego street. Located in the complex of buildings of the Emeryk Hutten-Czapski Museum, the new pavilion attracts attention with a light, white wall with the painter's autograph, on which films and presentations can be displayed. The materials applied for the finish of this modest, minimalist architecture are Corian, metal, glass and concrete. In front of a cosy café, detached from the hustle and bustle of the street and opening towards a small backyard, there is a path paved with stone slabs and glass light balls of different sizes, freely arranged on the green grass[19]. Next museums are planned, soon a competition for the Museum of the People's Republic of Poland will be awarded; however, prior to this the municipal authorities should surely think of a new philharmonic hall. Cracow is Poland's only major city which does not have a genuine philharmonic hall. Certainly, a new philharmonic hall is what Cracow needs much more than two stadiums.

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[15] The building erected as a result of a competition designed by Krzysztof Ingarden and Jacek Ewý has won a number of prestigious awards.

[16] The complex is located at 2–4 Nadwiślańka Street, right behind the Vistula river in the district of Podgórze, the covered area is 1,640 m², designers: IQ2 Konsorcjum – Moon Studio – Sławomir Zieliński, Piotr Nawara, Agnieszka Szultk and Stanisław Deńko – Wizja.

[17] architektura.muratorplus.pl/kolekcja-architektury/nowa-siedziba-cricoteki-i-muzeum-tadeusza-kantora-w-krakowie_3718.html (access: 09/2016).

[18] The authors of the design (competition in 2007) are Krzysztof Ingarden and Jacek Ewý with Japanese consultants Arata Isozaki & Associate from Tokyo.

[19] Authors of the design of a small museum with a floor area of 610 m²: Danuta Fredowicz and Andrzej Gliwiński, Dziennik Polski, 'Mój dom' supplement, 19 May 2016, p. 7.

Ill. 6–8. ‘Cricoteka’ – Tadeusz Kantor Art Documentation Centre (photo by author)

Ill. 9–10. Emeryk Hutten – Czapski Museum (photo by author)

5. Summary

There are a lot of renovation works currently in progress in Cracow and these revitalisation activities are completely different from those carried out years ago, when only elevations were painted anew if the First Secretary of the Communist Party or some other political activist was to visit the city. Today, thorough renovations, adaptations are conducted – many buildings are perfectly restored. In this way, the landscape of the city improves; obviously, these works are extremely costly. Some of them are supported by the Social Committee for the Renovation of Cracow Historical Monuments; nevertheless, usually around half of the costs must be incurred by the owners themselves. What is definitely needed is a system of encouraging owners of historical monuments to undertake revitalisation actions which would offer them specific benefits, e.g. tax exemptions, other types of subsidies, support from the city. While walking along the streets of Cracow, we can admire many renovated buildings; however, once in a while we encounter buildings with peeling plaster, which are in a poor technical condition and quite unattractive to look at. There are still vacant houses or abandoned post-industrial structures from the end of the 19th century and the beginning of the 20th century. In recent years, the area of a former slaughter house close to the city centre was converted into the Galeria Kazimierz shopping centre and the former brewery located in the vicinity of the Railway Station has become a new housing complex. Nevertheless, structures of the former Peterseim's factory[20] or the historical Salt Warehouse in Podgórze have still not lived to see their adaptation to new functions[21].

Large-panel multi-family residential buildings actually lose their technical capacity to survive[22] – this has been evoking certain fears for some time now. Obviously, these buildings undergo diversified renovation measures; however, in wealthy countries there is a tendency to replace this urban substance with a new one, which offers better living conditions. Additionally, this provides an opportunity to introduce some more interesting architecture. Numerous housing complexes built using large-panel technologies are located a relatively small distance from the city centre and maintaining such blocks of flats in their original condition is not justified. We do need to remember, however, that such housing estates have their local communities which have formed certain relationships over years of living in close proximity. These people would have to be relocated. Residents should be given the opportunity to remain through successive replacement of such buildings with new ones.

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[20] The buildings of the Imperial Royal Factory of Machines and Foundry located in the district of Grzegórzki date back to 1899–2005; they belonged to Marcin Peterseim, who produced agricultural equipment here. Before World War I, the plant had 200 workers and it was one of the then largest factories in Cracow. The buildings are included in the list of historical monuments of Cracow.

[21] The building was erected in 1787 in Zabłocie at 8 Na Zjeździe street and it initially served as a warehouse of the Kazimierz port on the Vistula river for the salt excavated in Wieliczka, because at that time, one third of all salt sold in Poland was transported via rivers. Later on, up until the second half of the 19th century, the building housed army barracks, and today, after revitalisation, it is planned to house a museum of the district of Podgórze there.

[22] Many books have been written on this issue. Some are devoted to the Cracovian examples, Cf. [8], which presents not only the wide scope of international research but also the proposals of the urban renewal of the three estates built in the Czyżyny district of Cracow (as a result of international student workshops tutored by the international team of the authors of the book).

It will be necessary to demolish large-panel concrete blocks of flats, because the time when they will be no longer capable of fulfilling relevant technical requirements is approaching. Such decisions should be made and such measures undertaken within the next twenty years. I am positive that an additional argument for such demolition would be our willingness to prevent the urban sprawl by reducing new territories devoted to housing investments as much as possible. New apartments can be built in the place of old blocks of flats within the city limits. I do think such decisions need to be made.

Recent years have seen a shift in the approach and awareness of city residents as far as the air condition, noise and ecology are concerned. Today, we all wish to live in a city which is healthy; therefore, efforts are directed at making traffic ecological, to make it stop emitting pollution and excessive noise, hence the efforts to develop public transport. Lyon has restored trolleybuses in the city, and thanks to considerable EU funds, incentives to use public transport have been introduced, alongside with discouragements – in the form of relevant fees – from using private cars. The future of cities lies in the development of cycle paths, because this is the most ecological means of transport, and at the same time, it is beneficial to residents' fitness, which is equally important. Greenery should be organised in cities in different available locations; it could especially be introduced in places where there are degraded structures and unused spaces. When designing and erecting office or public utility buildings, we should aim to protect the air, to not pollute it, and at the same time, to obtain energy from unconventional sources, causing no increase in the emission of greenhouse gases. There are many solutions of this kind in the world, they have also been emerging in Poland. We have to secure good living conditions for the future generations.

In compliance with the ecological approach to the process of shaping the city, this process should also be connected with limiting the expansion of the city to new territories. It is necessary to appropriately develop what is already urbanised and to protect areas which are not yet urbanised in order to prevent urban sprawl. If an area is built up once, it is difficult to regain its initial values later on.

I think that at this very moment, the ecological aspect is the most important for the development of cities. Nevertheless, there are different concepts in the world, e.g. ones that aim at the reduction of the emission of exhaust fumes from heavy transport connected with providing city residents with food. City farms are organised on roofs or even in multi-storey buildings where food can be produced and delivered to recipients without the need to transport it from distant places.

I believe architecture is the art and skill of shaping space for the needs of man. The duty of architecture is usefulness, and its inherent attribute is beauty. It is not true that beauty has died, as some people claim. We all desire beauty; one definitely prefers to have a park and flowers in front of their windows than chaos and degraded space. Beauty is necessary. This definition encompasses everything, as architecture is created for man, for people, for society; therefore, it needs to exhibit relevant practical and artistic values. It should create beautiful, harmonious space. The city is a natural living environment for contemporary man – this is why via revitalisation and investment projects relating to the transformation of urban built-up space are undertaken in new urban complexes connected with the territorial expansion of the city – we should aim for the return of the 'urbanism of the city'.

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KINGA RACOŃ-LEJA*

TRZECH WIESZCZÓW AVENUE IN KRAKOW – SPATIAL REINTERPRETATION IN LIGHT OF PREDICTED TRANSPORT CHANGES

ALEJE TRZECH WIESZCZÓW W KRAKOWIE – REINTERPRETACJA PRZESTRZENI WOBEC PROGNOZOWANYCH ZMIAN KOMUNIKACYJNYCH

Abstract

The space of the Trzech Wieszczów Avenues, which has opened up the development of Krakow in a Poland that had become united after World War I, has presently become dominated by transport functions. It is one of the most recognisable urban spaces, along which many outstanding works of architecture and important public forms of use are located. The forecasted traffic calming along the avenue, which is to happen after the completion of Krakow's third ring road, could lead to spatial transformations, as an improvement in the quality of residential areas and the reintegration of public spaces. The detailed variants which present *The Green Gardens of the Avenues* and *the Woonerf Along the Avenues* were developed at the *ATW 2.0* 2016 workshop by a Cracow University of Technology team under the supervision of Andrzej Szarata.

Keywords: city avenues, Trzech Wieszczów Avenues - Krakow, traffic calming, ATW 2.0 workshop

Streszczenie

Przestrzeń Alei Trzech Wieszczów, która symbolicznie otworzyła rozwój Krakowa w zjednoczonej po I wojnie światowej Polsce, zdominowana została współcześnie przez funkcje komunikacyjne. To jedna z bardziej rozpoznawalnych przestrzeni miejskich, przy której znajduje się wiele wybitnych realizacji architektonicznych i ważnych funkcji publicznych. Prognozowane uspokojenie ruchu na Alejach, które ma nastąpić w momencie domykania trzeciej obwodnicy Krakowa, może przyczynić się do transformacji przestrzennych – w tym poprawy jakości obszarów mieszkalnych i reintegracji przestrzeni publicznych. Szczegółowe warianty prezentujące *Zielone Ogrody Alei* i *Woonerf przy Alejach* opracowane zostały w ramach warsztatów *ATW 2.0* 2016 przez zespół z Politechniki Krakowskiej pod kierunkiem Andrzeja Szaraty.

Słowa kluczowe: aleje miejskie, Aleje Trzech Wieszczów – Kraków, uspokajanie ruchu, Warsztaty ATW 2.0

* Ph.D. Eng. Arch. Kinga Racoń-Leja, Institute of Urban Design, Faculty of Architecture, Cracow University of Technology.

1. Current conditions

It would be very difficult to imagine modern Krakow without its Trzech Wieszczów Avenues, which have maintained their position as a distinctive space within the city. The avenues are currently one of the most significant transport routes in Krakow. They have, in a certain manner, become an important way of experiencing the city for the travellers who use them. The Trzech Wieszczów Avenues are also a key feature in understanding the development of Krakow over the last century. During this period, they have reflected the changing image of the city – its spatial and transport development, the influx of new residents and students, as well as tourists.

The reduction in the volume of traffic that is anticipated following the completion of the Krakow's third ring road will alter not only the character of the avenues themselves but, equally importantly, that of the city that surrounds them. The forecasted changes raise many questions regarding vehicular traffic, as well as about the mode of public transport that would be the most adequate for this location. In addition, there are also questions regarding the quality of public spaces and the accompanying residential spaces in this part of the city.

1.1. The Delimitation of the City

Delimitation is the moment of freeing the development of a city, this came somewhat late in the case of Krakow. The placement of important for the Austro-Hungarian Empire fortifications around Krakow[1] had weighed on the maintaining of a disciplined structure of the city for the next years. In the context of the imposed urban rigour of a military fortress, we can risk making the statement that Emperor Franz Joseph saved Krakow from the rampant processes of industrialisation and preserved the character and beauty of the historical city. The rigidity of the borders was conducive to the balanced increase of the density of urbanised areas. Whilst these days, the limitation of cities would be an ideal that could allow us to tame the all-encompassing process of urban sprawl, to our ancestors, borders meant that the development opportunities of the city were limited.

At the start of the XX century, Krakow was confined to the rigorous framework of a fortress; around 100 thousand inhabitants resided inside the dense fortified area. Attempts were made to search for urban conceptual designs that could allow the development to go beyond the barriers of the fortress-city – thus the organisation of the competition that attempted to deal with the problem of planned growth. The winning proposal for the regulation plan of Grand Krakow (1909) by Józef Czajkowski, Władysław Ekielski, Tadeusz Stryjeński, Ludwik Wojtyczko and Kazimierz Wyczyński was to have a considerable influence on future designs, including the plan by Kazimierz Stolecki (1912). These designs initiated the process of the planned growth of the city, the implementation of which were dragged out over time. The decommissioning of the peripheral railway line in 1911 opened the way to new spaces designed in the form of city avenues. The Dębnicki Bridge, after the dismantling of the railway tracks, was converted into a road bridge. The areas of the villages located to the north-west that had until then been separated from the main body of the city by the railway

[1] Emperor Franz Joseph announced his decision to build a fortress in Krakow in 1850.

line, including Półwsie Zwierzynieckie, Krowodrza, a part of Prądnik Biały and Prądnik Czerwony, were incorporated into the city.

The changes connected with increasing the size of Krakow, which were planned and slowly implemented by the city, would coincide with the end of World War I and with Poland regaining its independence in 1918. The avenues along the line of the fortifications would become a key element of this process – located between the old and the new city, they would cement its subsequent changes.

1.2. The Architecture of the Avenues

Symbolically the location of the avenues would also begin a new era for Krakow in the free Poland of the twenty years of the interwar period. The city required places to show the signs of its newly gained independence, the avenues became such a place. In addition to the houses which proudly rose along the street, important public service buildings also came to be located here. The regaining of independence would outline the framework of the assigned to the avenues important edifices including Jagiellonian Library, or the main building of the National Museum. Both buildings would later be redeveloped – of particular importance is the fact that the redevelopment would be kept in the spirit of previous conceptual designs. The Jagiellonian Library, the work of Wacław Krzyżanowski, would obtain an outstanding expansion (constructed 1995–2001) designed by Romuald Loegler. The new National Museum building[2], the construction of which started before the war and was only completed in the years 1978–1989, is still undergoing changes. The architectural competition that has recently been concluded was won by the bold conceptual design of the Stelmach & Partners architectural practice – this design features a public space in the form of a garden on top of the roof of the museum.

The academic buildings that would firmly anchor themselves in the avenues became an important element of the structure that was created during the 1920s. There is quite a number of examples of these types of buildings, starting with the somewhat less recognisable edifice of the Silesian Seminar[3] (constructed 1926–1928) also the AGH University of Science and Technology[4] (constructed 1921–1936), to the currently erected Collegium Paderevianum II[5] (2015). The avenues document the stylistic changes that have occurred in architecture. Here, we can find works of modernism, examples of which include the complex of the Kijów Cinema and the Cracovia Hotel designed by Witold Cęckiewicz in 1967, as well as works of postmodernism which is represented by the Radio Krakow Building by Tomasz Mańkowski & Piotr Wróbel (1999).

The ability to incorporate monumental buildings into the landscape of the city is a distinct quality of the Trzech Wieszczów Avenues. We can even state that the ability to change and absorb new structures while at the same time respect the character of the interior of the street is an important quality of this place. What is even more important, is that this occurs regardless of the period during which such buildings were built. It would be appropriate

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[2] Design by: Bolesław Schmidt, Czesław Boratyński and Edward Kreisler.

[3] The architects: Franciszek Mączyński and Zygmunt Gawlik.

[4] Authors: Sławomir Odrzywolski (competition design) and Wacław Krzyżanowski (implementation).

[5] Author: Bożena Bończa-Tomaszewska, Bończa Studio in cooperation with her team.

to mention the competition guidelines of the 1929 architectural competition for the construction of the Jagiellonian Library, in the hope that modern projects can have such a noble and monumental character and, just like it was then, become "an expression of modern culture and the spirit of the times"[6].

1.3. From a Distinctive Urban Avenue to an Overgrown Transport Function

The construction of the avenues was, without doubt, an expression of the beautification of the city and of the search to reference grand European examples, with the Viennese Ring or the Parisian Boulevards of Hausmann at the fore. Krakow also took pride in its Dietla Avenue[7], built during the period of the Austrian partition – this was a consequence of filling up the old riverbed of the Vistula.

Initially, the space of the avenues was constituted by a green lawn, along which, rows of poplar trees were planted. The promenade was then called the 'Boulevards of Freedom', although the name stopped being used. The volume of vehicular traffic was very low before the Second World War, with transport provided with narrow strips of road visible in archive photographs [Ill. 1, 2]. After the war, the number of cars was still negligible. Older residents of Krakow will still remember the times when football used to be played on the avenues. The increase in vehicular traffic was, however, inevitable and the widening of the road lanes took priority over all other uses of the avenues over the span of a couple of decades. One of a few factors opposing the ongoing pressures relating to the needs of transportation was the greenery, which was fiercely defended by Janusz Bogdanowski for many years.

Today, the avenues of Krakow are some of the more important and recognisable urban spaces, they are also very heavily affected by traffic. Recent decades, which have seen the excessive development of personal transport, have led to the spatial degradation of both the street and its neighbourhood. The transit of heavy vehicles, partially limited by the gradual completion of the outside ring road, remains an issue. The unavoidable consequence of the high volume of traffic is an enormous amount of air pollution, which is visible in the record-breaking results of measurements of smog levels – one consequence of this being the grey facades of the surrounding buildings which are gradually being abandoned by their residents.

The avenues are currently a barrier, which makes it difficult to connect public areas around the edifices of undisputable importance to the heritage of Krakow. We are also observing the troubling phenomenon that the entrances of buildings are starting to face away from the streets, the main entrances are being relocated towards the back of the structure. The external outline of a façade seems barely a recording of the representativeness of a building, made poorer by the insufficient breadth of the pavement. This erodes their monumental character, which is already experienced almost exclusively from the perspective of the stressed occupants of vehicles – regardless of whether they are in cars or standing on a crowded bus. Pedestrians have practically been eliminated from the avenues, while the central path no longer plays the role of a comfortable green space, not only due to the noise and the air pollution but also due to the quality of the green interior itself.

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[6] www.szlakmodernizmu.pl (access: 1.10.2016).

[7] Also called Planty Dietlowskie.

Ill. 1. View of Słowackiego Avenue (1930–1935). The rows of trees are a monument in remembrance of the 11th anniversary of the regaining of Polish independence; Source: NDA National Digital Archives, signature 1-U-2626

Ill. 2. A view of 60-66 Słowackiego Avenue (1934); Source: NDA National Digital Archives, signature 1-U-2624

Il. 3. Trzech Wieszczów Avenues – an urban avenue, a green park or a space for transport?
Photo by – Marek Leja (2016)

Currently, the Trzech Wieszczów Avenues are sadly not the wonderful urban space that our predecessors dreamed of. The functional approach to the city which delegated the responsibility for our streets to transport engineering has led to the conversion of avenues, boulevards or representative promenades into elements of the transportation infrastructure. For several decades, or perhaps even forever, we have lost control over the city.

2. Concepts of the Forecasted Changes in Traffic – *ATW 2,0* Workshop

In April 2016, a team from the Faculty of Civil Engineering of Cracow University of Technology[8] organised the *ATW 2,0* multidisciplinary workshop. The end product of the workshop was a report entitled: 'Conceptual Design of the Urban Space Along the Trzech Wieszczów Avenue', commissioned by the Department of Municipal Economy of the Office of the City of Krakow[9]. The team of authors from the Cracow University of Technology, under the supervision of Andrzej Szarata, included the members of the Chair of Transport Systems of the Faculty of Civil Engineering: Marek Bauer, Maciej Berendt, Arkadiusz Drabicki, Urszula Duda, Mariusz Dudek, Wiesław Dźwigoń, Aleksandra Faron, Rafał

[8] WIL PK – Polish abbreviation, transl. note.

[9] The workshop took place between 7 – 10.04.2016, Andrzej Szarata, the director of the Chair of Transport Systems of the Faculty of Civil Engineering of Cracow University of Technology was the supervisor and author of thematic guidelines.

Kucharski, Marian Kurowski, Vitalii Naumov, Katarzyna Nosal, as well as representatives of the Faculty of Architecture of Cracow University of Technology[10] from the Chair of Public Spaces for Movement: Kinga Racoń – Leja and Bartłomiej Homiński. A group of students from the Transport Systems Scientific Club of the Faculty of Civil Engineering, the Road Designers' Scientific Club 'Virage', as well as students of the Faculty of Architecture of Cracow University of Technology also participated in the workshop. The fact that the work had a multidisciplinary character was crucial – the students represented branches of engineering associated with transport, spatial management, and urban and architectural design across all three levels of higher education (Bachelor, Master, PhD). Their work was supported by a panel of experts represented by Krzysztof Bieda, Andrzej Rudnicki and Zbigniew K. Zuziak.

The overall goal of the workshop was an attempt to analyse changes in the flow of vehicular traffic at the forecasted reduction of the number of lanes along the avenues. The documentation featured an optimal variant of traffic calming possible after the future completion of the third ring road – consisting of Łagiewnicka, Pychowicka and Zwierzyniecka routes. A variant featuring the complete banning of individual traffic was not analysed.

2.1. Urban Design Laboratory

The assumption that we cannot separate transport and spatial aspects was the foundation of establishing a team that would work on problems associated with urban and architectural issues. The team was supervised by A. Faron, K. Racoń-Leja & B. Homiński. The remaining teams in charge of mobility and transport were consulted about the solutions that were being developed. Four conceptual variants, differing in terms of the scale of the limiting of vehicular traffic, were selected – these which were characterised by different solutions in street cross-section and the number of lanes. The variants were assigned different, implementable forms of public transport, including an overground tram, an underground tram and bus rapid transit.

In light of the forecasted limitation in the traffic of individual vehicles, it is seen as necessary to improve the functioning of public transport by allocating it separate lanes. The city of Krakow is currently leaning towards the proposal of providing a bus rapid transit along the avenues. This solution, in light of the current inability to delineate a tram route across the Vistula, seems to be the most effective. Bus rapid transit introduction within the historical city context, however, is a source of much controversy. Wrocław, which is close to finalising such a project, is facing the necessity of having to convince its residents to accept it[11]. In the case of Krakow, the tram is, without a doubt, a form of transport that would be more integrated with urban space. The comfort of use, the aesthetics, the efficiency, the carrying capacity and the manner in which the residents of Krakow are used to trams have mobilised the workshop groups to present detailed visions that featured this mode of transport. Of course, the introduction of the tram would require the redevelopment of Dębnicki Bridge or the construction of a tunnel under the Vistula, assuming that it would have to be extended even as far as Grunwaldzkie Roundabout.

[10] WA PK – Polish abbreviation, transl. note.

[11] The residents of Wrocław demand a referendum regarding the development of public transport and the introduction of a rapid bus transport.

2.2. Spatial Variants

The modern specifics of the Trzech Wieszczów Avenues is based on their uneven distribution of functions. The initial sections, near Dębnicki Bridge and around Nowy Kleparz are framed by residential buildings. The dense built environment of the avenues is systematically undergoing the process of architectural revitalisation. This process is, however, being carried out far too slowly and numerous structures with grey and neglected facades still negatively influence the perception of this space. The central part of the avenues houses many representative public buildings, which are not properly connected to the network of public spaces. The implementation of the variety of solutions that have been adopted – both in residential, as well as in public areas – has been one of the more important challenges.

The basic assumption for the variants that were being prepared was to test how traffic calming is going to influence the quality of public spaces. Spaces that were important to the whole of the city, as well as those of a semi-public nature, intended for the use of the local residents, were analysed. Due to the nature of the work carried out during the workshop, its results were limited to the simplified record of an urban design strategy and the rough draft of a conceptual architectural design. The strategies that were developed form a record of an urban concept that shows new or newly discovered relationships between the avenues and the city. An important design task was the creation of a common public space and the integration of the nearby pedestrian walkways. Such an approach is designed to reintroduce an important function of the avenues – that of a public space.

The cross-section of the avenues has a relatively high capacity, even in light of compact adjacent urban structure. A reduction in the amount of lanes for driving could allow the quality of pedestrian traffic to increase in the future, as well as enable the introduction of bicycle lanes and the widening of green zones. However, maintaining the of the current amount of trees remains a significant problem, as their condition currently requires additional assessment. The greenery of the avenues has undergone serious degradation, caused by the successive widening of lanes, as well as due to air pollution. It seems that the city has, to a large degree, squandered the efforts of previous generations, which created a compositional framework for a green park. We addressed the problem of the preservation and adaptation of greenery within the solutions that were developed as this was one of the most important problems to be taken into account during the design process.

The variant which features the reintroduction of green areas into the space of the avenues is the *Green Gardens of the Avenues*[12] conceptual design [Ill. 4, 5]. In this solution, the removal of the external road lanes was intended to widen the pavements and introduce trees near the buildings. The tramline, which was laid in the middle of the green belt, took up the space of the currently under-used footpath. The concept assumed the revitalisation of the green zone and an introduction of a green pergola that would shield and dampen the noise resulted from the tramline. The greenery would also protect the passengers waiting at tram stops. A part of the roof of the pergola is planned to be converted into a public garden space, isolated from obtrusive traffic. Greenery was also meant to be introduced onto the walls of the neglected, grey houses – this would not only improve the aesthetic but also the environmental qualities of the location.

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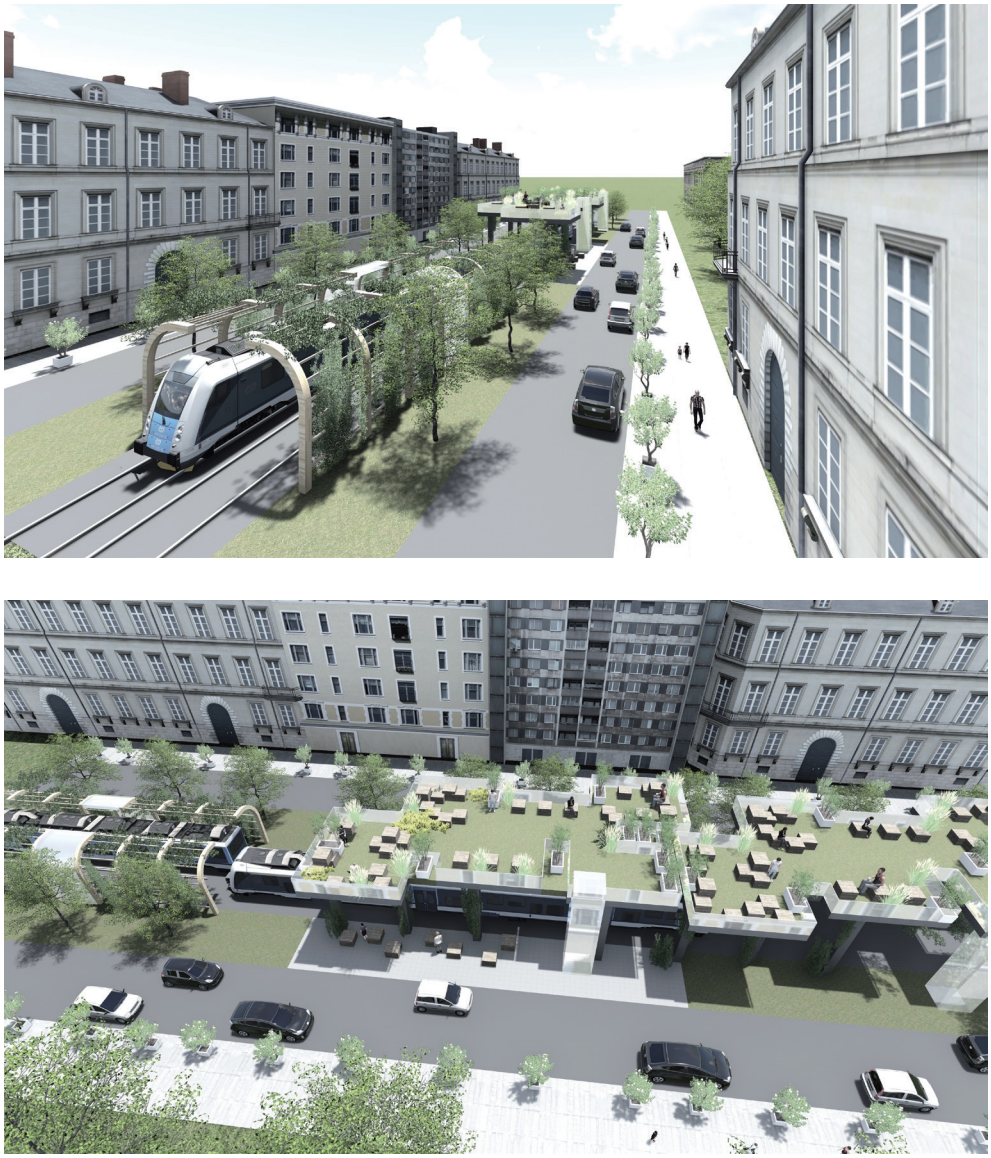
[12] Authors: Magdalena Jawień, Katarzyna Grzych, Katarzyna Ner, Ewelina Stypułkowska, Monika Trzaska; under the supervision of A. Faron, B. Homiński and K. Racoń-Leja.



Ill. 4, 5. The *Green Gardens of the Avenues* – design concept developed as a part of the *ATW 2,0* workshop. Authors: Magdalena Jawień, Katarzyna Grzych, Katarzyna Ner, Ewelina Stypułkowska, Monika Trzaska; under the supervision of Aleksandra Faron, Bartłomiej Homiński and Kinga Racoń-Leja

Ill. 6, 7. The *Woonerf Along the Avenues* – project developed as a part of the *ATW 2,0* workshop. Authors: Monika Binkowska, Marianna Marszałkowska, Edyta Ptasznik, Kinga Stafin, Magdalena Wegrzyn; under the supervision of Aleksandra Faron, Bartłomiej Homiński and Kinga Racoń-Leja

The conceptual design of the *Woonerf Along the Avenues*[13] [Ill. 6, 7] seems to be an interesting proposition for the city. For some time, proposals of introducing of living streets[14] have been appearing in Poland and have been met with much interest from residents. One example is Łódź, where, due to the initiative of citizens, the process of revitalising urban spaces is to be carried out by the introduction of a concept of shared space streets. In the case of the avenues, we can attempt to create service streets placed next to the buildings in residential sections. Their character should lean towards the living street, a friendly public space for the residents. A woonerf could also separate residential areas from the busy street. Theoretically, this approach could cause the residents to return to the avenues.

Work intended to calm the traffic in the area of the Trzech Wieszczów Avenues will improve residential spaces, it is anticipated that this will lead to the return of small businesses on the ground floors of buildings and will also improve the desirability of pedestrian zones. It is also important to consider opportunities to use space in new forms – this should also take into account the needs of students. Thus, we have the proposals of various academic activities near University of Agriculture and AGH University of Science and Technology, or an area with summer cafes that would be an extension of Park Krakowski[15]. Less formal solutions could allow some sections of the avenues to become spaces for young people. The key problem here is the necessity to reinforce the connections between each side of the street by widening its crosswalks as well as the inclusion of pedestrian crossings in the wider pedestrian network in order to improve the comfort of people walking in the city.

3. Discussion and Conclusions

Initiating public consultation is an important part of reshaping public spaces; a couple of such discussions have already been organised in Krakow, for example, in the Krzysztofory Palace and at the Faculty of Architecture at Cracow University of Technology[16]. Discussions on the results of the ATW 2,0 workshop have highlighted the divisions among the residents of Krakow. The citizens expressed many different attitudes towards the subject of transport. Critical comments by proponents of individual transport were focused on the overall idea of traffic calming, showing just how much needs to be done in connection with the attitudes of residents in terms of mobility.

The more extreme opinions included accusations of conceptual designs not considering the complete elimination of individual transport from the avenues. This variant was rejected during the course of the workshop due to its current improbability; such solutions could lead to a significant growth of traffic within the surrounding urban structures. This would also require an immense transformation in the chosen transport modes of residents – forcing

[13] Authors: Monika Binkowska, Marianna Marszałkowska, Edyta Ptasznik, Kinga Stafin, Magdalena Wegrzyn; under the supervision of A. Faron, B. Homiński and K. Racoń-Leja.

[14] Woonerf – living street or shared space street (authors' note).

[15] Park Krakowski – a park adjacent to the Trzech Wieszczów Avenue (authors' note).

[16] A public discussion of the results of the *ATW 2,0* workshop took place as a part of the Mobility Forum at the Krzysztofory Palace, with the participation of the local press and the media (15.06.2016) as well as of the Open Urban Planners' Discussion Forum entitled 'Traffic Calming in Krakow' (22.06.2016).

them to abandon cars in favour of public transport. On the other hand, the quality and size of the public and green spaces in the centre would, without doubt, be the largest. Instead of selecting this solution as one of the variants, the possibility of introducing an independent, underground tram line that would free up the public space at ground level was proposed.

Mostly positive reaction of the listeners to the forecasted changes, leading to an improvement in the quality of public spaces, was a surprise to everyone. There were also rationalising ideas, proposing to start planting trees by the municipality which could grow and await being replanted in the future at the regained green areas along avenues.

Avenues, boulevards and promenades have always introduced unique and timeless values into city environments. Discussion on the history of Trzech Wieszczów Avenue inspire numerous questions about the surroundings of the transport areas of the city. One can get the impression that the architecture of the street is a topic which has been completely ignored in modern planning in Poland. The façades of streets, the accentuation of corners, the rows of trees, arcades and commercial passages, even wide pavements have disappeared from our urban planning. Does the modern alphabet of urban design allow us to make use of an urban avenue, a boulevard or a promenade? The rich typology of streets that has been reduced over multiple decades has been replaced with a classification of roads, with its functional language limited to such terms as: artery, collective, local or access road. The plentiful structure of the city that was built over the centuries, especially in the XIX century, has been simplified.

The current economic approach adopted in spatial planning seems to be indifferent to efforts leading to the beautification of cities. In light of the simplified form of architectural recording, we should cease to be amazed at the fact that projects designed by architects who are members of the New Urbanism movement are so successful. The term ‘new’, in this case, means a return to forgotten architectural motifs and their implantation in urban design.

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MATEUSZ GYURKOVICH*

MEMORY OF THE CITY – LAYERS OF THE CITY. SPANISH EXAMPLES

PAMIĘĆ MIASTA – WARSTWY MIASTA. PRZYKŁADY HISZPAŃSKIE

Abstract

Some cities have incessantly teemed with life for centuries, even for millennia. Currently, the oldest inhabited urban settlements are deemed to be those located in the *Old World.* Their contemporary layouts are very different to how they were originally, this is very often hidden in relics which attest to the older layers. Searching for such layers is a fascinating task. Sometimes, they can be found in the layout of public spaces, or in the architecture of historic buildings and complexes. Others remain deeply concealed underneath the surface of streets, squares, pavements, and parks. Most frequently, the exposure of larger parts of the remains of old architectural and urban structures is not easy due to the need to secure efficient functioning of the contemporary urban tissue. Architectural and archaeological reserves established especially in Europe, help to restore the lost memory of the city by exhibiting its historic layers.

Keywords: city lifespan, urban tissue, archaeological and architectural reserve, excavations, museum

Streszczenie

Niektóre miasta nieprzerwanie tętnią życiem od wieków, nawet od tysiącleci. Obecnie za najstarsze wciąż zamieszkiwane miasta uważa się te położone w *Starym Świecie*. Ich współczesna struktura przestrzenna daleko odbiega od pierwotnych układów. Bardzo często ukrywa w sobie relikty świadczące o dawniejszych nawarstwieniach. Poszukiwanie tych warstw jest zajęciem fascynującym. Niekiedy można je odnaleźć w układzie przestrzeni publicznych czy w architekturze zabytkowych budynków i zespołów. Inne pozostają głęboko ukryte pod powierzchnią ulic, placów, chodników i parków. Najczęściej ekspozycja większych fragmentów pozostałości dawnych struktur architektoniczno-urbanistycznych nie jest łatwa ze względu na prawidłowe funkcjonowanie współczesnej tkanki miejskiej. Tworzone, zwłaszcza w Europie, rezerwaty architektoniczno-archeologiczne pomagają w przywróceniu utraconej pamięci miasta poprzez ekspozycję jego historycznych warstw.

Słowa kluczowe: trwanie miasta, tkanka urbanistyczna, rezerwat archeologiczno-architektoniczny, wykopaliska, muzeum

* D.Sc. Ph.D. Arch. Mateusz Gyurkovich, Institute of Urban Design, Faculty of Architecture, Cracow University of Technology.

1. Introduction

We do not know for certain when the oldest towns came into being. In many sources[1] the prevailing opinion is that urban settlements that have been inhabited for the longest period of time are located mostly in the Middle East and are connected by the Mediterranean basin, and can be linked with the ancient civilisations of Mesopotamia and Egypt. This is supported by data contained in the holy books of the Torah, the Bible, and the Quran. A relatively large number of documents attesting to this have also been preserved, especially in the form of newer extracts and copies or accounts written down sometimes even after centuries. These were stored and disseminated in different forms over subsequent millennia in the circles of Judeo-Christian culture, as well as from Asian and North African sources. Numerous relics of architecture and urban planning dating back to past epochs are still discernible in the landscape of cities of this region. Others have been discovered and popularised over the last three centuries during military campaigns[2] and more and more professional large-scale archaeological studies conducted in this region of the world[3]. The history of Jericho, documented by such research, undoubtedly dates back to 7800 BC, and it is Jericho that is believed to be one of the cities which have been inhabited for the longest period of time[4]. Perhaps a bit younger is Aleppo, recently severely damaged, where the oldest ruins discovered so far date back 'only' to 3000 BC[5]. Nevertheless, many other cities, also located in, more remote regions of Europe than the Mediterranean[6], can be proud of shorter, but also centuries-long development, which has had its effect on their present spatial structure. Roman or medieval urban layouts determined the subsequent development of numerous towns and cities on the continent, and they constitute the heart of urban structures of different sizes to this day.

Using the example of two cities whose lineage is definitely shorter than that of Jericho, although still quite impressing, Zaragoza and Barcelona, this paper shall illustrate the problem of recovering the *memory of the city* lost due to subsequent accumulations of the urban tissue. Currently, thanks to archaeological research, part of this memory is being discovered anew.

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[1] Such as numerous encyclopaedias, as well as history books or books devoted to the history of architecture and urban planning popular in the countries of western civilisation (some of which are included in the references and further footnotes), which also constitute the foundation for the education of architects and town planners. The views presented in these, although supported by centuries-long literary, empirical or eventually archaeological studies may, or may not, be fully accurate, and in the world facing the reality of globalisation, they may be regarded as too Europocentric.

[2] Starting from the expedition of Napoleon Bonaparte to Egypt in 1798, symbolic in this respect (e.g. www.britannica.com – access: 8.09.2016).

[3] Nevertheless, many towns and cities in India and the Far East can most probably boast a similarly long history. The destructions caused by conquistadors in pre-Columbian cities forfeited the opportunity to get to know the earliest history of this part of the globe, perhaps forever. In spite of this, we can still find traces of ancient civilisations on the American continent, as well. Perhaps some of these are still hidden underneath the streets of the contemporary metropolises of this region.

[4] Jericho is also mentioned in the Bible as a city besieged by Israelites in 1250 BC – cf. www.encyklopedia.pwn.pl – access: 01.03.2016; Whereas according to www.britannica.com (access: 05.03.2016) – the city could have been founded as early as ca 9000 BC

[5] www.britannica.com – access: 25.06.2016.

[6] On which the Author wishes to focus in this paper.

Most often, the exposition of larger parts of the remains of former architectural and urban structures is not easy due to the need to secure the efficient functioning of contemporary urban fabric. Over recent decades, several European cities have organised exhibitions of the kind of *architectural and archaeological reserves*[7]. Thanks to these, the preserved relics of the old urban tissue help us to understand the *sense of the city* which may have been lost or misunderstood for centuries, and the logic of the urban form with which the contemporary users and explorers of towns contact on a daily basis.

2. *Caesaraugusta* vs. contemporary Zaragoza

Contemporary Zaragoza[8] is situated in a green valley of the middle course of the Ebro river, surrounded by desert mountains. Today, it is the capital of the autonomous province of Aragon – once a kingdom, which due to a King's marriage was incorporated into the Kingdom of Castile and León in the 15th century, giving rise to modern-day Spain. In the spatial structure and the architecture of the city, one may discover traces of the rich and turbulent history of the Iberian Peninsula. Around 25 BC, the Iberian settlement of Salduba, which was located on the banks of Ebro river, was conquered by the armies of Caesar Augustus. The camp established on its ruins, whose importance as a crucial town in this part of the Empire grew very soon, was one of a few that were named after the conqueror – *Caesaraugusta*[9], which in its modified form, has survived to this day. After the fall of the Roman Empire, the town frequently changed rulers to finally become the capital of the local Muslim state in 1039[10], conquered by Alfonso I the Battler as soon as in 1118, when it became the capital of the Catholic Aragon[11].

The urban layout of the centre of Zaragoza is obviously very different to its Roman prototype. Nevertheless the historic part of the city that constitutes the heart of the metropolis is situated on the southern bank of the river, fortified by Romans, and then by Moors and Catholic kings. It's shape was determined long ago by the fortification lines[12], which

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[7] A term popularised in Polish scientific literature devoted to architecture and urban planning, especially by Professors: Andrzej Kadłuczka and Klaudia Stala – Cf. References.

[8] Zaragoza is Spain's sixth largest urban agglomeration; the population of the city along with the adjacent areas amounts to ca 730,000 inhabitants (2011). It is also an important centre of industry, business, university education and culture; it administers a complex traffic hub of international importance. Thanks to the world exhibition held in Zaragoza in 2008 (ExpoAqua Zaragoza) many large-scale revitalisation projects were implemented in the city, Cf. [10, 29], www.encyklopedia.pwn.pl; www.zaragoza.es – access: 10.09.2016.

[9] The founding of the city and the privilege of granting it with a complete name of the Emperor dates back to 23.12.14 BC www.britannica.com; www.zaragoza.es – access: on 24.04.2016.

[10] The most splendid relic of that period is Palacio de Aljaferia, soaring over the western part of the historic centre, surrounded by gardens, reduced to minimum after implementation of the contemporary traffic system – e.g. www.encyklopedia.pwn.pl; www.zaragoza.es – access: 10.09.2016.

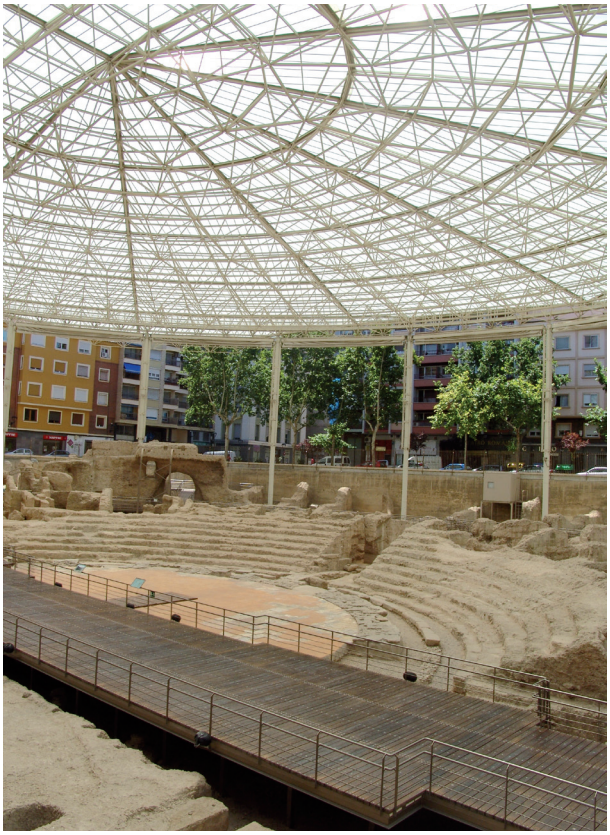
[11] Ibid.

[12] Initially Roman (currently preserved only in small fragments) but also medieval, and this line was not crossed by the urban city until the beginnings of the 20th century – http://planosymapasdearagon.blogspot.com – access: 7.09.2016.

were absorbed by later development and repeated in the road system. Some monuments of antiquity are still visible today, both inside edifices reconstructed many times over the ages, and outside, in public space, embedded in the walls of numerous buildings, or left as ruins.

Ill. 1, 2. Contemporary exposition of the remains of Roman defense system, Saragossa (photo by M. Gyurkovich)

After the demolition of the fortifications in the 19th century, the city was developing predominantly towards the south-west, and also[13] on the northern bank of the Ebro, based on subsequent extension plans[14], of which the plan from 1934 should be recognised as the most important. Although its implementation was interrupted by the Spanish civil war, the later plans introduced in the late 1930s and the early 1940s reflected partly the provisions of the abovementioned plan from 1934. The most painful change in the urban layout of the historic city centre, full of narrow winding backstreets and small piazzas which were a record of the memory of the city's history, was brought about by the planning of the first years of the fascist dictatorship. The large numbers of bombastic monumental public facilities and spaces that was desired by the authorities for ideological reasons entailed providing cars and public transport with access to the historic city centre[15].



Ill. 3. Theatre Museum, Saragossa (photo by A. Matusik)

The element of the plan from 1942 that was the most visible in the dense historic tissue was the monumental square, Plaza del Pilar, in the foreground of Europe's oldest shrine to Our Lady, Basilica Santa Maria del Pilar[16]. Actually, it is an extension of a piazza bearing the

[13] Apart from a rather small stronghold of the city existing in the vicinity of the oldest bridge on the Ebro (today it is Puente de Piedra from the 15th century) since the Middle Ages – this area was urbanised predominantly in the second half of the 20th century and in modern times.

[14] Such plans, following the example of Barcelona and Madrid, have been developed since the beginning of the 20th century, and one of the first crucial stimuli to the change of the existing state was the organisation of the French-Spanish exhibition in Zaragoza in 1908. Due to this event, many new buildings were erected and many green areas were organised – www.zaragoza.es; www.perso.wanadoo.es/zaragozaantigua/sigloxx.html – access 8.09.2016; [25].

[15] Plan de Reforma Interior from 1942 – ibid.

[16] The basilica is located on the bank of the Ebro in a place where, according to legend, Our Lady appeared to St. James the Apostle on 12.10.0040 – the current form of the temple with dimensions of 130 m × 67 m crowned with 4 towers and 11 domes, was erected in the period 1681–1754, in the place of former churches erected around a small shrine with a statue of Our Lady on a jasper column – http://www.basilicadelpilar.es, also – www.zaragoza.es – access: 10.02.2016.

Ill. 4. Plaza del Pilar, Saragossa, view towards Plaza de la Seo (photo by M. Gyurkovich)

same name, situated there since the 17th century, orientated parallel to the longer, southern side of the basilica. By the demolition of the city quarters this space was linked to Plaza de Cezar Augustó from the west near the church of San Juan de los Panetes, and from the east with Plaza de la Seo, closed with a beautiful cathedral[17]. The sequence of urban interiors open to each other spanning nearly 0.5 km from the side of the river is encased predominantly by monumental historic structures, including churches, the city hall, and the archbishop's palace and the southern frontage is composed mostly of buildings from the 1940s, emphasised with a pompous geometric colonnade. Today, it is the largest hardened representational public square of Zaragoza, rich in statues and fountains[18], hiding relics of the previous epochs underneath its surface.

Paradoxically, the demolitions carried out in the 20th century created new opportunities for the modern exhibition of the oldest Roman relics of Caesaraaugusta. In the 1990s, the local municipal authorities decided to restore parts of the still accessible remains of the Roman city and organise a tourist route dubbed *Ruta de Ceasaraugusta.* This was to enable

[17] La Catedral San Salvador o *la Seo* – erected and extended since the 12th century, a largely Gothic temple, with a tall belfry from the west, very richly furnished, which at the same time is a necropolis of the rulers of Aragon – www.zaragoza.es – access: 10.02.2016.

[18] With the fountain designed by arch. Ricardo Ursón Garcia within the scheme of the revitalisation of this space in the period 1989–1992 [9], called *la Fuente de la Hispanidad (The Source of Spanishness)* – a monumental composition of stone and water, depicting a geometric outline of Latin America – Our Lady of the Pillar from the local cathedral is regarded as the patron saint of not only Spain, but also the entire Spanish speaking world – http://www.basilicadelpilar.es – access: 12.06.2016.

visitors to get familiar with the functioning of the Roman city that had been located at the site of Zaragoza in a possibly legible way through the interesting exhibition of the ruins dispersed around the historic city centre, constituting the remains of the fortification system, trade and public facility buildings, as well as buildings connected with the transportation system – this includes relics of the river port which was extremely important for the development of the city at that time[19]. The route encompasses two rather small preserved fragments of Roman walls, located on opposite sides of the city centre, more or less at the height of Plaza del Pilar, and four museums, or rather *architectural and archaeological reserves* with parts of the ruins carefully displayed. The first facility to open was the Forum Museum (*Museo del Foro)* (1995), the next were the Museum of Public Baths (1999), the River Port Museum (2000), and the Theatre Museum (2003), which is mostly an enormous roof over the partly preserved ruins of a Roman theatre. This exhibition formula enjoys great interest on the part of visitors, thanks to which, *Ruta de Caesaraugusta* is visited by ca 2 million people per year[20].

The Forum Museum combines properties of a contemporary top quality architectural creation along with preservation and *in situ* exposition of relicts of the urban layout from the times of the greatest splendour of *Caesaraugusta*, during the 1st and 2nd century A.D. Thus, it is extremely interesting from the point of view of the considerations of this paper. Under the surface of Plaza de la Seo, the museum exhibits relics of the Roman forum – the heart of the then city – discovered during excavations carried out in 1988–1991. As the results of the archaeological research were not known in advance, the design of the exhibition and its architectural frame[21] constantly evolved. Finally, two underground halls were built, where, in comparison to the initial project, small parts of the preserved structures of the forum planned at the time of Augustus and completed during the reign of Tiberius were exhibited. The remaining part, which is presented on a model displayed in one of the exhibition halls and in the plans displayed in the museum, is either located underneath the later, still standing, structures, or was destroyed during their erection. A small part of the forum[22], along with the waterfront of the Roman port, was also displayed in a similar way in the small River Port Museum on the Ebro. It demonstrates the special location of the forum in *Caesaraugusta* – it was not situated at the crossing point of *Cardo* and *Decumanus*, as was the case in other Roman cities, but it was closer to the river due to the enormous significance of the port for the city. Perhaps this sort of location was also dictated by other reasons which are thus far unknown.

The structure of the new architectural setting of the museum differs significantly in terms of material from the preserved and exhibited relics. The dominating materials still remain crude, reinforced concrete[23], steel and glass. The exhibition halls, although designed tastefully

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19 http://www.zaragoza.es/ciudad/museos/ruta-caesaraugusta.html – access: 12.06.2016.

20 Ibid.

21 *Developed in the local design studio, the owner and main designer of which is arch. José Manuel Pérez Latorre. The website of this studio still displays photographs from the construction works on the structure which was then dubbed Museo de la Historia de la Ciudad – Foro Romano Hall*. http://www.jmplatorre.es (access: April – September 2016).

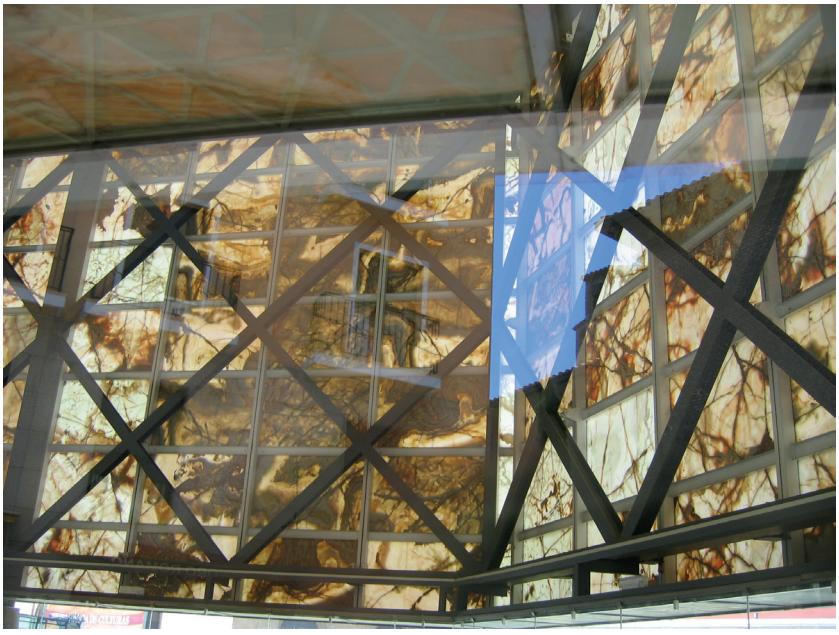
22 The corner of the rectangular structure opposite the one displayed in the Forum Museum.

23 Due to the proper protection of the excavations and the nearby monuments, the cathedral and the palace of archbishops, and also owing to the pressure and penetration of water from the nearby river, very large cross-sections of reinforced concrete structural elements were used, which is visible inside the museum and is somewhat overwhelming for the exhibition.

Ill. 5. Plaza de la Seo with Forum Museum as seen from Plaza del Pilar
(photo by M. Gyurkovich)

Ill. 6. Forum Museum at Plaza de La Seo
(photo by M. Gyurkovich)

Ill. 7–8. Stone wall of the museum frames the views towards the cathedral (7) and Basilica del Pilar (8) (photo by M. Gyurkovich)



Ill. 9. The detail of the steel structure supporting the alabaster wall of the Forum Museum in Saragossa (photo by M. Gyurkovich)

and with great respect for the heritage that is preserved in them, are actually nothing really special. What is unique, however, is the entrance pavilion to the underground museum premises, built at Plaza de la Seo, right in front of the elevation of the cathedral[24]. Maintained in the minimalist aesthetics cube shaped and rhomboidal in its projection, it reaches a little higher than the second floor of the nearby tenements. Due to such a considerable size, the structure seems to be an important volume in the space of the piazza in front of the cathedral[25]. Despite that, since Plaza de la Seo is merely an annex to the monumental Plaza del Pilar, the building is regarded just as a feature, and not a dominant, thanks to the larger perspective. The walls of the building at the ground floor level are glazed across their entire surface, displaying its interior. The taller portion, completely empty and opened towards the space of the ground floor is lined[26] with enormous slabs of alabaster, suspended on a steel structure supported by four monumental reinforced concrete posts. Orange and brown veins in the semi-transparent white alabaster correspond to the colours of the historic edifices that surround the facility. At the same time, alabaster as a material irresistibly evokes associations with the art and architecture of ancient Rome.

The memory and the sense of the city has been restored on multiple layers in the centre of Zaragoza. The modern shape of the entrance pavilion is their creative continuation, being a characteristic form which strongly stands out against the historic urban tissue. The alabaster cube builds interesting tension between what used to be, what is, and what perhaps will happen – at the same time, it addresses the most valuable monuments of Zaragoza located around it, and underneath it, with great respect.

3. Revitalisation of Mercat del Born in Barcelona

Barcelona[27], most probably founded by the Phoenicians or the Carthaginians in a natural harbour ,in a similar manner to Zaragoza, in the 1st century BC found itself under Roman rule and called Barcino. The traces of this stage of the city's development can still be seen in its urban structure and the form of some public spaces in the oldest part of Ciudad Vella, as well as in parts of Roman walls and buildings embedded in the later architectural structures and complexes[28]. However, it is not the traces of the earliest urban history of the capital of Catalonia[29] that is the subject matter of the considerations contained in this paper.

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[24] Cf. also Ph.D. dissertation on the history of arts by [21].

[25] Rather small Plaza de la Seo.

[26] On its the sides as well as on the top.

[27] Barcelona, the capital of Catalonia, Spain's second largest city (the agglomeration is inhabited by ca 4.5 million – 4.8 million people, depending on the adopted delimitation). The currently operating administrative structure that administers the metropolitan area (or at least its central part, if metropolis is to be understood in a broader context) is the Area Metropolitana de Barcelona, established in 2011, which apart from Barcelona, includes 35 other smaller and larger towns. The continuity of urban and traffic structures is nearly totally uninterrupted over this entire area. www.bcn.cat; www.enciclopedia.cat; web.gencat.cat – access: 14.03.2016, as well as many titles quoted in the references.

[28] Very good sources of knowledge on the early history of Barcelona are numerous publications. From quoted in the references, e.g.: [1, 6] and most of all [26].

[29] The contemporary transformations of which the author has tackled in his research for years now and to which he has devoted many publications, [12, 13]; The Roman traces themselves are excellently

What is equally important for the preservation of the identity and continuity of the memory of the city are subsequent modern accumulations which then became obliterated by buildings and public spaces that came into being over the following epochs.

The bloody war of the Spanish Succession that was waged in the period 1701–1714, and in which many European states were also engaged[30], was in fact a war of dominance not only on the Iberian Peninsula, but on the entire continent, and also worldwide via vast Spanish colonies. The destruction resulting from the war affected many cities, including Barcelona. The battle for the city ended after a thirteen-month siege. The Catalan defenders, favouring the Habsburgs, were defeated and the country found itself under the occupation of the army of the French Bourbons. So as to emphasise their power, the conquerors strengthened the existing fortifications and erected a monumental star-shaped citadel in the vicinity of the port, at the base of the Barceloneta peninsula. The troops settled there along with the garrison maintained in the former castle (also reconstructed) on the top of Montjuic were to control the strategically important port of Barcelona, as well as the revolting inhabitants of Barcelona confined within the city walls[31]. For the purposes of the construction of the new fortress, the occupants, who were now the new rulers of Spain by way of a royal decree of King Phillip V Bourbon[32] in 1714, razed to the ground a considerable part of the exiting urban tissue. Over 1200 buildings were demolished, 40 streets in the district of La Ribera were liquidated[33]. The citadel was completed in 1727 and for a long time, it became a symbol of oppression and repressions. In the period 1854–1859 work connected with the extension plan commenced[34]. The plan assumed the demolition of defensive walls and increasing the area covered by the city ten times. The citadel, however, started to be demolished only ten years later, in 1869. Slowly, its site was taken over by new urban tissue, technical and traffic infrastructure (roads and a railway line), and a considerable part of the area was allocated to greenery, which became the scene for the World Exhibition in 1888[35]. To the west of the park complex[36], several quarters of the district of La Ribera were revived, and among them, in 1876 a building of one of the great municipal market halls was erected, Mercat del Born.

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exposed in the city [16], also currently available in a digital form thanks to the project developed by CPSV UPC Barcelona-Tech – http://www.upc.edu/cpsv – access: 27.02.2015.

30 England, France, Austria, Holland, Prussia, Spain, Bavaria, and even the Papal State and their allies, less important in the great European politics. It can be easily stated that as for those times, it was truly a world war – cf. www.encyklopedia.pwn.pl – access: 11.09.2016.

31 Cf. [26].

32 Who took over the throne in Madrid under the treaty in Utrecht in 1714.

33 The port district of Barcelona, La Ribera, prospered most of all in the Middle Ages, before the period when Barcelona and the Mediterranean trade carried out in the ports of the city lost its significance. Later there were Cádiz and Seville, which has built their growth on the trade with Spanish colonies in the New World – Cf. e.g.: [24]; [1].

34 The orthogonal plan of *Eixample* from 1859, the designer of which was Ildefonso Cerdà, was the prototype for similar solutions in other Spanish towns. Besides a bulky theoretical study of Cerdà himself, the plan has been the subject matter of numerous scientific studies and has been discussed in detail in many publications. References to it are made in many titles included in the list of references here, also by the author.

35 Today it is Parc de La Ciutadella.

36 Designed by Josep Fontsere Mestres and Josep Mª Cornet y Mas in the years 1873–1888 – [24]; also www.caceresarquitectes.com – access: 22.07.2016.

Ill. 10. Barcelona, Passeig del Born – view towards Santa Maria del Mar cathedral (photo by M. Gyurkovich)

Ill. 11. Barcelona, Mercat del Born converted into the Cultural Centre as seen from the Passeig del Born (photo by M. Gyurkovich)

The market was played a role of compositional enclosure and the culmination of the promenade running from the church of Santa Maria del Mar[37] – Passeig del Born[38]. This monumental edifice made of cast iron and glass[39], similar to many other buildings of the type that came into being in metropolises at the time, was one of the first such structures in Spain. It probably remains the largest facility of the type erected in the 19th century in Barcelona which has been preserved to the present day. The market hall fulfilled its commercial functions until 1971 when it was planned that it should be closed and demolished. Eventually, due to large number of social protests, it was decided to reconstruct it as a library.

The preparatory and designing works took many years – this was caused by the socio-political situation and economic conditions on one hand, and the progressing archaeological research on the other. The competition organised in 1998 was won by a team of Catalan architects: Rafael de Cáceres Zurita and Enric Sória Badia. The original version of the design, developed by the end of 2002, planned the adaptation of the market hall to premises of the national library[40] with spacious storage rooms, large reading rooms and common spaces, as well as private multifunctional rooms, together with the administration and technical premises necessary for the operation of such an institution. The first version of the design assumed the erection of a structure, independent from the existing hall, which would house this fairly complex functional programme, part of which was to be placed on underground floors.

During the construction works in 2002, extremely valuable foundations of the medieval development of La Ribera were discovered underneath a cast iron structure of the market hall. For reasons relating to their preservation, the initial concept had to be abandoned and an appropriate method of exhibiting this important archaeological discovery had to be developed. Due to these circumstances, the design of the functional project of the library had to be limited accordingly. Therefore, the architects from *Cáceres Arquitectes* prepared another design – a study of the compatibility of the functions of a regional library with the preserved parts of archaeological excavations, displaying the layout of the urban tissue from before 1714. It turned out that the preserved structure of the ground floors of the former city blocks[41] illustrated the evolution of the Barcelona medieval city much better than the still standing tissue of other districts, developed over the centuries[42], contaminated with later layers. Thus, it turned out to be a true revelation in the scale of the entire city. Therefore the study of compatibility proposed independent entrances to the zone of exhibition of the excavations and to the zone of the library. It became necessary to find a new location for the storage rooms of books and documents, which initially had been planned to be predominantly located on the underground floor and the ground floor. The functions of the library were

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37 Gothic church, erected upon the initiative of King Jaume II in the period 1324–1379 as a cathedral – a symbol of the maritime and trade power of Catalonia – ibid.

38 Quite a wide square, today with lines of trees in the middle, formerly a place of medieval equestrian tournaments.

39 The author of the design was also Josep Fontsere Mestres – ibid.

40 Of the total floor area of 18532 m^2, the investor was the Catalan Ministry of Education www.caceresarquitectes.com – access: 22.07.2016.

41 In 1714, the city inhabitants had to deconstruct their houses themselves and carry the material to the construction site of the Citadel, so as to leave the area empty, what then remained were the underground levels and the low portions of walls of the ground floors – [24, 26].

42 Districts within the perimeter of the old city walls – Ciutat Vella, from before the reform of *Eixample.*

Ill. 12. Plan of the destroyed part of La Ribera district on the background of old Barcelona (left). The position of Mercat del Born shows how little of the former urban tissue is presented in the exhibition (right) (photo by M. Gyurkovich)

designed to be across several floors – platforms suspended on a structure which did not interfere with the newly discovered ruins and the delicate cast iron structure of the hall of Mercat del Born. Nevertheless, eventually this version, very costly and controversial[43], did not become realised.

After subsequent concerns over the next few years, the building was finally taken over by the city[44] and the third stage of the design of the rehabilitation of Mercat del Born commenced. The concept based on the adaptation of the building for the needs of a library was abandoned as it was considered to be both excessively complicated in the current situation, and too expensive. In the final version[45], a hybrid cultural centre was organised in the old market hall, in which the unique architectural setting was given priority over the complicated functional programme. On one hand, the setting is provided by a glazed cast iron hall, which is a true masterpiece of its epoch, and on the other, the carefully preserved and excellently displayed ruins of the old Barcelona. Nearly the entire ground floor along the main axis of the hall has been completely released from any functions and devoted to the exhibition of the architectural

[43] As far as the clarity of the exhibition of archaeological relics and the nineteenth-century hall is concerned.

[44] Instead of the provincial authorities, the municipality became the investor in this project.

[45] Developed in the years 2006–2012 by a designing team managed by the authors of the previous concepts, within the scheme of the same design studio. The progress of the works and the constant changes of the concept resulting from the discoveries made on an ongoing basis and decisions taken on the spot are described in detail on the website of the office – www.caceresarquitectes.com – access: 22.07.2016.

Ill. 13–16. Archeological site within the Mercat del Born as the prolongation of the public space of the city of Barcelona (photo by M. Gyurkovich)

and archaeological relics. Multifunctional halls and a coffee shop with a reading room, as well as administration facilities, are housed in glass boxes in four corners of the market hall. This corresponds to the spatial structure of the initial market hall. The total integration of the internal covered space accessible to the public with the public spaces of the city corresponds to the latest tendencies in this respect[46].

[46] Discussed in numerous publications, also by the author: [12]; *The Born Cultural Centre is a civic space and a covered plaza that connects the La Ribera district and Ciutadella Park, through a continuous passage from Passeig del Born and the Plaça Comerç until it opens to Passeig Picasso* – www.mercatdelborn.org/el-born-cultural-center – access: 1.08.2016.

Ill. 17. El Born Cultural Center seen from the site of Parc de La Ciutadella (photo by M. Gyurkovich)

This structure received an award of the city of Barcelona for the year 2013; it also housed historic celebrations commemorating the 300th anniversary of the defeat from the year 1714. Over thirty years of work on the revitalisation of the edifice of the nineteenth-century market hall Mercat del Born, were combined with large-scale archaeological and architectural studies; all the design-related decisions were largely dictated by these studies. At the end of the day, the building, put into use in 2014, serves as a reminder of the traumatic history of the city, and at the same time, it introduces new life to the historic architectural structure, which was abandoned for decades and is of unique historic value.

4. Summary

The examples presented in this paper are an illustration of a broader tendency which can be observed in numerous European cities over previous decades[47]. They demonstrate the evolution of the approach to the problem of exhibiting architectural relics and preserving ruins in a relatively efficient manner. Aforetime, next to open air exhibitions, parts of the excavations could be covered with roofing[48] or surrounded by new museum buildings. Today, visitors have access to preserved fragments of the old urban tissue more and more often – these fragments had been long hidden underneath the surface of streets and squares, as well as under existing buildings. Archaeological excavations can reveal the previously unknown history of cities (and not necessarily the earliest periods, as the example of Barcelona shows); therefore, they are indispensable for getting to know the evolution of urban structures [27].

[47] To the author of this paper, the example that is most dear is of course that of the *Market Square Underground Museum in Cracow* (designed by A. Kadłuczka with his team), extensively discussed in the source literature, e.g.: [11, 12, 18].

[48] This principle is also adopted in the Theatre Museum within *Ruta de Caesaraugusta referred to above.*

Exhibitions with the characteristics of *architectural and archaeological reserves* help us to understand the logic of the current urban form and its identity; to discover and disseminate the lost memory of the city. It happens with no detriment to the functioning of the city, moreover, it is extremely beneficial for the city.

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BEATA MALINOWSKA-PETELENZ*

TEMPLES OF EUROPE AND THEIR CULTURAL CONTEXTS

ŚWIĄTYNIE EUROPY I ICH KULTUROWE KONTEKSTY

Abstract

European cathedrals and churches are not only a testament to faith but are also masterpieces of architecture and generators of the highest order of intellectual, emotional and aesthetic values. They are also important components of cultural contexts. The image of a temple often plays a part in the cultural space of a city – apart from the commonly understood religious function – it creates cities, it is a part of national memory, it strengthens social identity, in addition to fulfilling an aesthetic and marketing function. By remaining bound to each other, temples are a part of the multi-layered heritage of past generations.

Keywords: cathedral, literary references, aesthetic experience, historical memory, artistic manifesto

Streszczenie

Europejskie katedry i kościoły to nie tylko świadectwa wiary i hymny dla Stwórcy. To także fascynujące zabytki, arcydzieła sztuki architektonicznej, generatory najwyższej próby wartości intelektualnych, emocjonalnych i estetycznych, strażnicy poczucia tożsamości oraz istotne komponenty kontekstów kulturowych. Obraz świątyni nierzadko pełni – oprócz zrozumiałej dla wszystkich funkcji sakralnej – funkcje w przestrzeni kulturowej miasta: funkcję miastotwórczą, funkcję pamięci narodowej, funkcję wzmacniania społecznej tożsamości, funkcję estetyczną lub marketingową. Wszystkie te funkcje niewątpliwie są ze sobą w mniejszym lub większym stopniu sprzężone, składając się na wielowarstwowy spadek po poprzednich pokoleniach.

Słowa kluczowe: katedra, literackie odniesienia, przeżycie estetyczne, pamięć historyczna, manifest artystyczny

* Ph.D. Arch. Beata Malinowska-Petelenz, Institute of Urban Design, Faculty of Architecture, Cracow University of Technology.

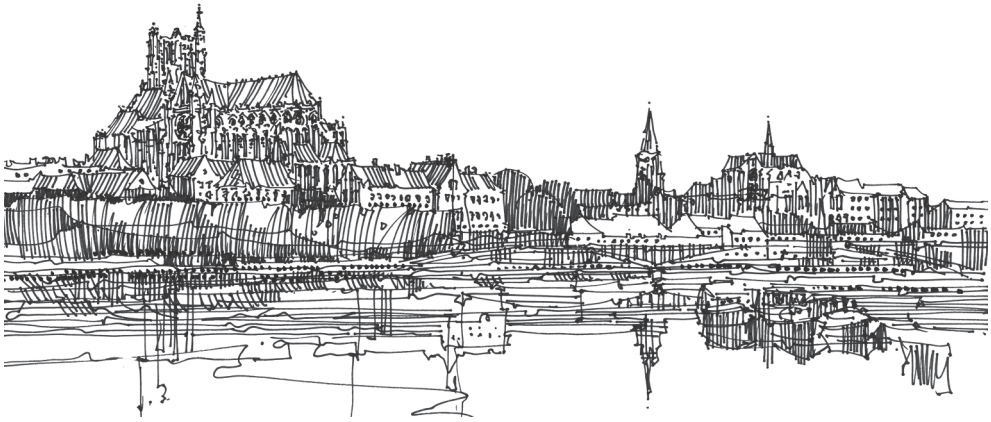
The Myth of the Cathedral in Western European Culture

> "I walked straight ahead along the Sevastopol Boulevard, amazed by the movement of people, vehicles and lights. (...) It started to rain. I passed the Concergierie, a dour building as if from an illustration to Victor Hugo and found myself at the square, face to face with the illuminated cathedral of Notre-Dame. And then it happened"
>
> Z. Herbert, *Kamień z katedry* in *Barbarzyńca w ogrodzie*

To European culture, the gothic cathedral is an emblem, being an original spiritual and material entity that is representative of this part of the world. By asking the question about European identity, we irrevocably stand in the face of the phenomenon of gothic cathedrals.

To this day, the gothic cathedral constitutes an archetype of the Christian temple, its image appears in literature and art, sparking unfading emotions and interest in both visitors and the faithful. The madness of the form of gothic temples: the dynamism, slenderness and stone ornamentation often cause the so-called Stendahl syndrome in the more sensitive onlookers. Perhaps this is why the secretive expression of the tall pointed arch was, and still is, an inspiration to scientists, philosophers and scholars of culture, while in the dimension of myth and as multiplanar symbols still fascinate artists – painters, writers and poets, filmmakers and graphic artists.

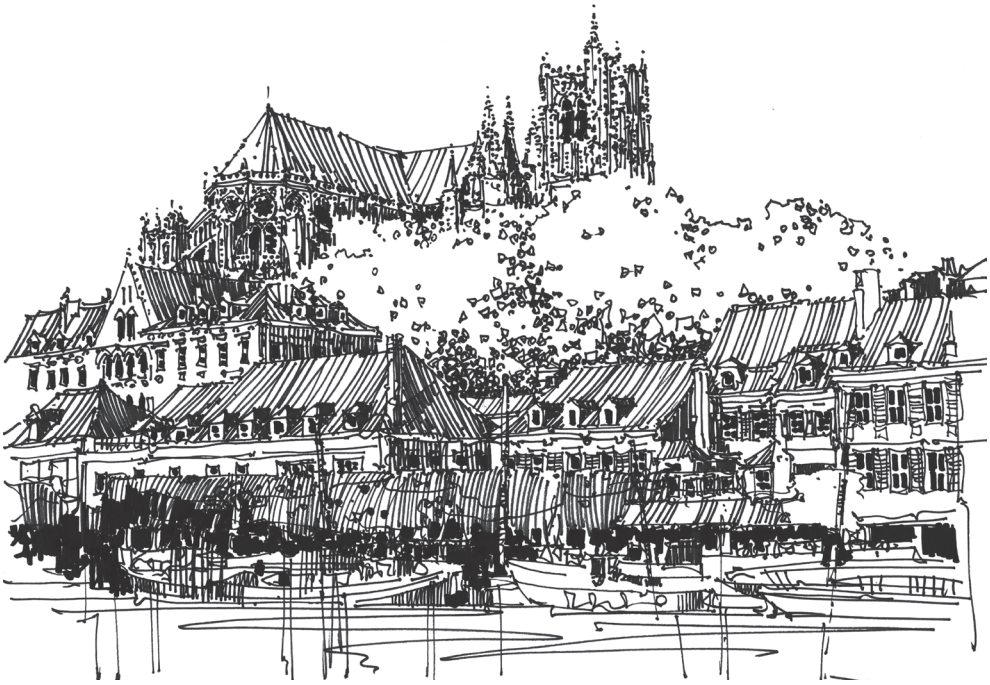
Józef Tarnowski, when defining beauty in the context of architecture, writes: "Aesthetic value – beauty – stands at the top of the hierarchy that constitutes the aesthetic paradigm. It is a part of the beauty of form and the natural beauty of the employed material" [31, p. 370]. The pearls of gothic architecture endure not only simply as 'perfect shells' but also as pearls of religious art, that provide onlookers with space for their own spiritual joy. Roman Ingarden wrote that an aesthetic experience is not only the perception of the item itself, but also placing the onlooker into "a state of distinct emotion" [12]. In order to elicit such emotion, as Ingarden put it, "special qualities" are required. Andrzej Banach rounds out this



Ill. 1. Auxerre, panorama of the city (drawing by the author)

thought by stating that it is “immersing oneself fully in the feeling of fascination, to which we give ourselves in the present, for the feeling itself, without explanation and without a goal beside it” [1, p. 69].

It was the period of Romanticism that rehabilitated and became fascinated with the art of the Middle Ages. After all, it was Vasari who stated that the term ‘gothic’ meant nothing other than the style of the barbarian hordes that destroyed the Roman Empire. It was Viollet-le-Duc who published the ten-volume ‘Dictionary of French Architecture from the XI to the XVI century’ between 1854 and 1868. It was he who contributed so considerably to the study of the ‘pointed arch style’. “In gothic architecture [...] the aesthetic properties of a building become ennobled to a degree that was unknown before and has not been known since” [33, p. 29]. On the other hand, the gothic cathedral is, in Panofsky’s view, an image of scholastic dispute. The mature scholars of the XIII century developed a model of the logical justification of religious truths, typical of Medieval philosophy, which was based on the precise use of a predetermined procedure of intellectual discussion and the solving of disputes; Panofsky saw in the structure of the cathedral – in the ribs, pillars and vaults – the equivalent of a scholastic summa [24].



Ill. 2. The cathedral in Auxerre (drawing by the author)

The cathedral thus became an inspiration. A large number of various texts were written in this manner, indicating the numerous common qualities in the manner in which cathedrals were described – this became a part of the overall heritage of European humanities.

Goethe – to whom discovering the massive, unfinished form of the Strasbourg Cathedral was a shock – wrote about his fascination with the church. The text 'Von deutscher Baukunst' (first published anonymously in the year 1772, only to be republished a year later in the manifesto of the Sturm und Drang movement – 'Von deutscher Art und Kunst') became a record of that experience. Goethe elevated the gothic style to the rank of a national style, claiming that it was distinctly German and underscoring its independency from classical tradition. The aesthetic of the poet, strongly rooted and formed on the basis of cold classicism, would evolve in the face of the Cathedral of Cologne into a ceaseless and enthusiastic romantic fascination. Goethe not only discovered the beauty of gothic cathedrals for the romantics but also showed a new manner of recording an aesthetic experience, converting its image into a symbol and a literary metaphor [8, p. 196].

The rich traditions of depicting the gothic temple, the history of its literary ecphrases and, at the same time, the unending cultural context for 'cathedral' literature could be found not only in international literature but also in that of Poland. The sources of inspiration were numerous, among these were the fashionable *Grand Tours* – voyages undertaken under the influence of a fascination with architecture – which resulted in profuse amounts of memoirs and essays. Literary references to gothic cathedrals can be found in the most famous epic panorama of Paris by Victor Hugo – which is "The Hunchback of Notre Dame" – a tribute to cathedrals and the emotions that dwell within, whilst at the same time being the mother novel of all other stories with gothic churches in the background. Among these, we can also count the canonical works of Marcel Proust – "In search of lost time" and Joris-Karl Huysmans – "En route".

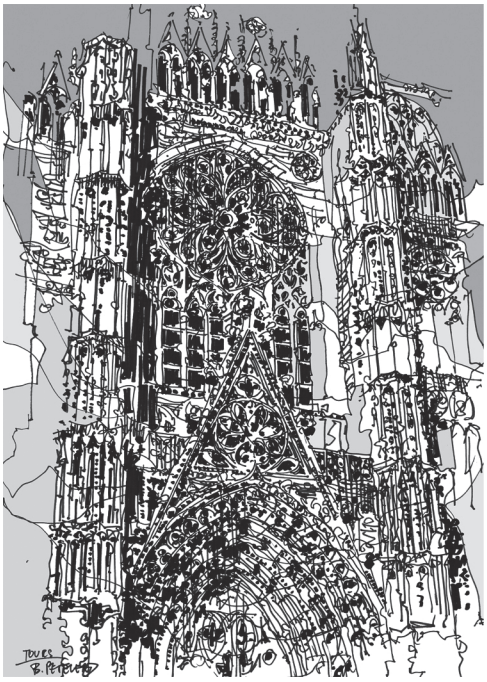
In Polish literature, the topos of the cathedral was particularly present in the fevered letters that Stanisław Wyspiański wrote during his travels when he happened to visit French cathedrals in 1890, in the letters of Zygmunt Krasiński (*Letters to father*), in the poems of Julian Przyboś (*Równanie serca* or *Narzędzie ze światła*), Tadeusz Śliwiak (*Katedra w Chartres*), Mieczysław Jastrun (*Chartres, Notre Dame*), as well as Adam Zagajewski (*Gotyk*). "...I sat in Paris for a month. I walked there under the black and silver Notre-Dame cathedral, looked at the maws of Medieval chimeras, which bent their necks to get a sip of heaven. I said to myself: 'I am not going to write a poem about it...' – I was afraid of this cathedral, that it might mock me, crush me" wrote Tadeusz Różewicz (*Zostanie po mnie pusty pokój*), to whom the cathedral had an altogether different meaning. It was included by the poet in the post-war world that lay in the rubble of values. The temple is not seen as an existing building but as one which needs to be rebuilt inside oneself, regaining values[1]. In the case of Zbigniew Herbert, his passion was born when he visited the temple in Chartres. It was then that he came upon the idea to see all of the most important French cathedrals and transcend their metaphysics and symbolism, which he describes in the sketch 'A Stone from a Cathedral'. "The greatness of these buildings had a psychological effect – these grand, overpowering giants reduced us to the size of a grain of sand, of minuscule dust attached to the robes of the Lord", wrote Ryszard Kapuściński in *Lapidarium III*.

The romantic depictions of cathedrals by Schinkel ('Gothic Cathedral and the Imperial Palace') [23, p. 265] tied in with the landscape are widely known, as are the works of Caspar David Friedrich, whose gothic cathedrals are depicted as majestic buildings, standing far away and eliciting a feeling of being unreachable, dreamy visions[2]. Cathedrals were depicted by the

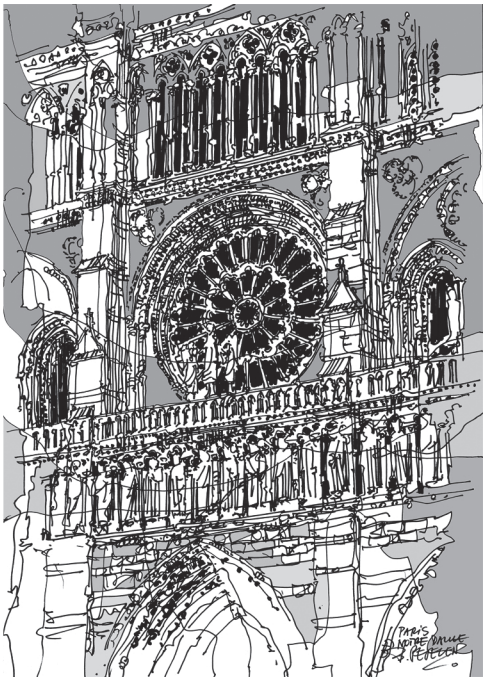
[1] Look further: A. Manecka, *Bliski gotyk*, http://rcin.org.pl/Content/51703/WA248_68055_P-I-2524_manecka-bliski.pdf (access: 13.12.2015, p. 107).

[2] Gothicism developed in Europe during the period of pre-romanticism, exhibiting a dark mood and a fascination with passing. The aesthetics of death, fear and melancholy that was typical of Gothicism

greatest artists – John Constable and William Turner. Camille Corot made a painting of the cathedral in Chartres, while Gustav Courbet painted the cathedral in Frankfurt. Cathedrals were also the subject of paintings by impressionists and postimpressionists. To Monet, the Rouen cathedral served as a subject of studying light, shadow and their effect on colour thirty times. The Viennese Stephansdom was depicted many times in the watercolours of Rudolf von Alt, whose works now fill the walls of the Belvedere; the same cathedral also features in the works of the Venetian-born Antonio de Pian.



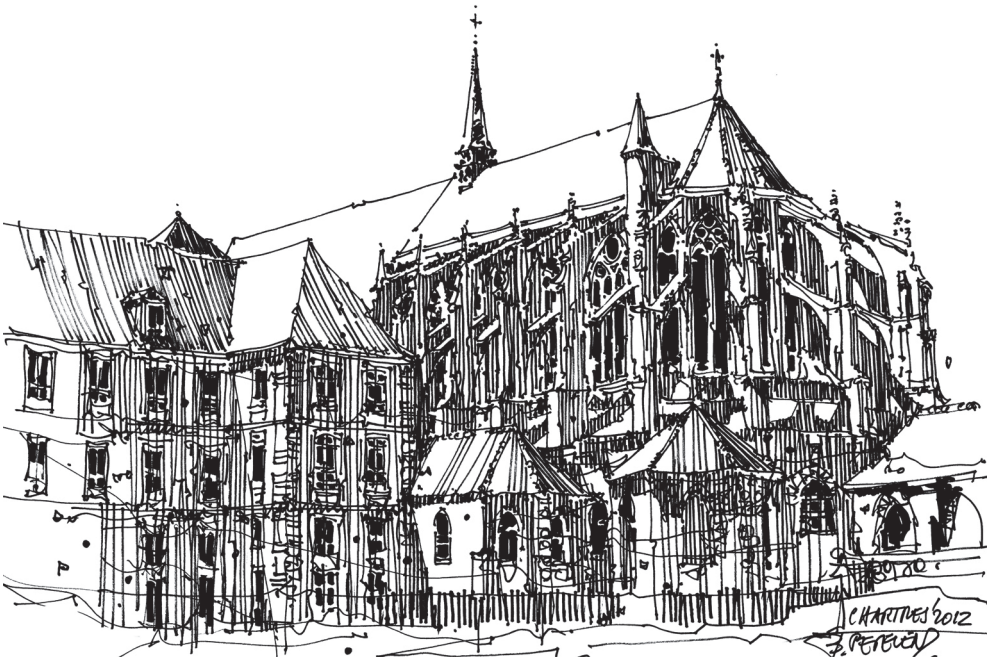
Ill. 3. The facade of the Tours cathedral (drawings by the author)



Ill. 4. The facade of the Notre-Dame cathedral in Paris (drawings by the author)

The most often painted Parisian temple is Notre-Dame cathedral – it was systematically depicted by Albert Lebourg, Paul Signac and Georges Stein, as well as by Henri Matisse. It was also painted by the Polish artists Józef Pankiewicz, Stanisław Kamocki and Jan Szancenbach in the "Landscape by night". It was also painted by Vincent van Gogh, in a gloomy sketch along with Parisian roofs. Zdzisław Beksiński made paintings of modern cathedrals – twin-towered monstrosities with groups of buttresses, a gothic style level division and detail in the form of a rosette window – overflowing with unreal elements, pried from nightmarish dreams, they die, bringing sadness and a primal fear. Painted with thin streaks of paint, delicate strokes of the brush, woven from venous structural strands, at times barely visible through the fog and the clouds, they crumble and perish in the air.

strongly inspired the imaginations of the initiators of the Sturm und Drang period, as well as those of Romanticism later on [in:] *Klasycy sztuki*, vol. 13 *Friedrich*, ed. M. Pietkiewicz, Warszawa 2006.



Ill. 5. The apse of the Saint-Pierre church in Chartres (drawing by the author)

The Polish filmmaker and digital artist Tomasz Bagiński created a seven-minute animated short film called The Cathedral on the basis of a short story "Cathedral" by Jacek Dukaj – it is teeming with metaphors and was nominated in the American Academy Awards in 2002. His cathedral – similar to the churches from the turpistic paintings of Beksiński – grown into its environment, cruel and hungering, devours everyone who dares to come close to it. When a human life ends, the life of the temple becomes extended. "The phenomenon of Bagiński's work lies in the skilful combination of the poetics of science fiction with a religious, cultural and civilizational symbol (as this architectural monument can bring to mind associations with some fort of totalitarianism) that is rooted in European culture" [15]. Bagiński deliberately uses and exploits the visual archetype of the cathedral – we do not know which exact cathedral it might be, but its visual elements cannot be mistaken with anything else.

Symbols of Cities – Symbols of Beauty – Symbols of Domination

It is the factor of beauty which usually causes a building to become a symbol of a location. In Europe, we can find wondrous and monumental temples, which, due to the wide spectrum of their aesthetic impact and their social functions, have become the symbols of the cities in which they are located. It is enough to mention the grand French and Italian cathedrals,

Ill. 6. Venice – the square and basilica of St. Mark (drawing by the author)

the churches of Venice, Rome, Prague, Regensburg, Vienna and numerous other cities – these buildings, which strongly affect our emotions, strongly define public spaces at the same time – squares and streets – places which concentrate upon themselves the attention of tourists.

The cathedral of Cologne can serve as a model example of this (Ill. 8, 9) its construction took over 600 years, including periods of inactivity. The temple, along with the building of the train station and the Hohenzollern bridge, creates a distinct symbol of the city, printed on the covers of guides, postcards and souvenirs. It is one of the most recognisable symbols of Cologne and of Germany itself. Wojciech Kosiński writes "cathedral in Cologne on the Rhine, powerful and important in the sense of urban design, has become an example of building over entire centuries while upholding of the gothic aesthetic trend despite the surrounding stylistic evolution [17, p. 131]. "The cathedral had been under construction for a couple of centuries, yet when the romanticism of the XIX century brought with it a love of gothic, the call to finish the cathedral was made. During the Second World War, the entirety of Cologne was levelled by Allied bombers. The bombing raid lasted only 90 minutes – the cathedral survived with only slight damage, thus becoming a witness of history and a "link between the city that was and the city that is" [26, p. 102–118][3].

[3] A city with 800 thousand residents, inhabited by only 5% of its inhabitants directly after the war.

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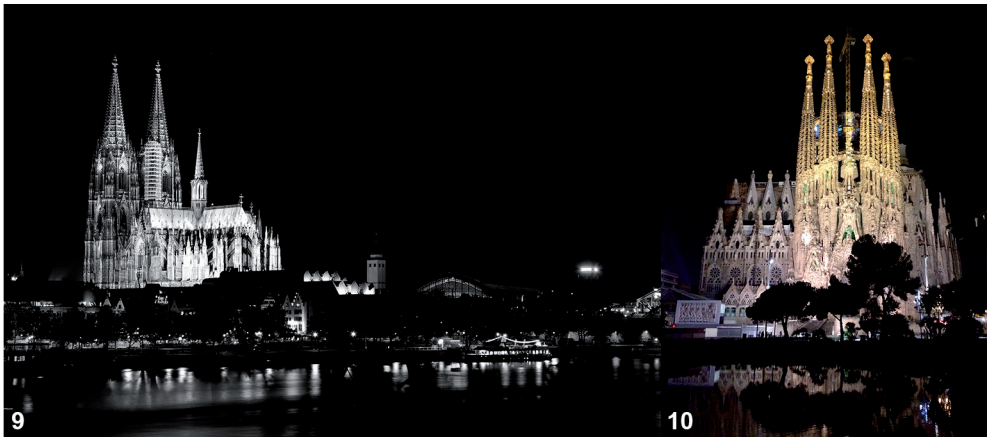

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Ill. 7. Beauvais, the Saint-Pierre cathedral (phot. by the author)

Ill. 8. Cologne, panorama of the city (phot. by Gustav Schmidt)

Ill. 9. Cologne, cathedral (phot. by Gustav Schmidt)

Ill. 10. Barcelona, Sagrada Familia (phot. by Gustav Schmidt)

At the foot of the great temple that is the keystone of the urban structure of the city is the famous Ludwig Museum[4] of modern art, as well as the archaeological Roman and Germanic museum. Those, along with the building of the train station and the famous bridge, connected by the sequences of public spaces that flow between them, have rounded out this extraordinary mix of structures and styles, making it a true heart of the city – a teeming, living, new and dynamic urban entity [35, p. 191–243].

The phenomenal Sagrada Familia (Ill. 10) is both a symbol and an important city-forming element. Until the beginning of the construction of this temple, Barcelona had been dominated by monumental, calm buildings, strongly defined by the balanced shapes of houses and the dominant forms of church towers. Gaudi, while picking the site in the centre of the city for the 'white giant' that was to be over 100 metres high, re-evaluated the panorama of the city. The concept of the colour scheme of the building is based on the principle of intense contrast. The artist used bright sandstone and limestone, with concrete elements appearing over time. The panorama of the city ceased to resemble the harmonious silhouettes of Tuscan cities, balanced in terms of colour and material, and started to resemble the panorama of French cities with the even, small-scale structure of their buildings contrasted by the vertical, aesthetically different cathedral giants [17, p. 138]. The clash between the horizontality of the urban tissue of the profane with the vertical structure of the sacrum results in an astounding contrast.

Monuments of historical memory

Today, cathedrals are also historical monuments – artefacts of a past culture, carriers of historical knowledge and skill. As Maurice Halbwachs writes, in order to return to the past by the means of an experience or memory "we need to bring back all of the voices that influenced us at that time" [10, p. 137], however, due to the fact that social conditions change – the signs of remembrance, traces, exhibits, archives – remain. It is this part of the social context that endures, transcends personal reflection, and which is a subjective memory – it forms a permanent trace, a proof of the existence of a number of facts of the past [20, p. 26].

Temples – Martyrs and Symbols of Reconciliation

The consequences of the Second World War have introduced a new term to architectural and urban discourse, that of the 'martyr cathedral'. Father Janusz Pasierb describes the dramatic fates of cathedrals – the unspeaking witnesses of the sacrifice of war. He mentions,

[4] The building was designed by the architects Peter Busmann and Godfried Haberer, 1986.


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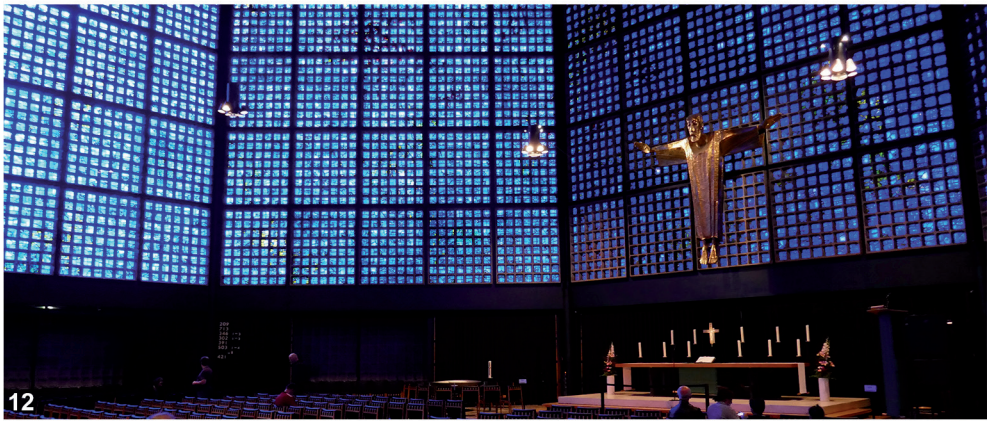
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Ill. 11. Dresden, view towards the Frauenkirche (phot. by author)

Ill. 12. Berlin, Gedenkkirche, interior o the new chapel (phot. by Marcin Petelenz)

Ill. 13. Warsaw, the cathedral of St. John (source: Wikipedia)

Ill. 14. Coventry, cathedral (source: Wikipedia)

among others, Coventry cathedral and some cathedrals in Poland: the arch cathedral of St. John in Warszawa and cathedrals in Gniezno and Poznań. All of these three churches were redeveloped in the gothic style, "as if searching deeper, under the surface, in the past, for roots which are so dearly needed in a situation when all aspects of the old order were to crumble" [25, p. 24].

A model example is the cathedral of St. John in Warszawa (Ill. 13), which had been destroyed multiple times. During the years 1948–1956, the temple was rebuilt in accordance with a design by Jan Zachwatowicz [36, p. 119], a student of Oskar Sosnowski and a professor of the Faculty of Architecture of Warszawa University of Technology, who was one of the founders of the Office of the Reconstruction of the Capital and, within the Office itself, the Department of Historical Architecture.

The works of Jan Zachwatowicz still remain a source of controversy among architects and arts historians – with the reconstruction of the cathedral of St. John [21, p. 281][5] in a form that it probably never previously had being a prime example. While preparing for its reconstruction, the designer adhered to the principle of 'regothicisation' – building forms recreated on the remaining foundations and Medieval walls, based on preserved remains [37, p. 103].

The fate of the cathedral of St. Michael in Coventry (Ill. 14) was equally dramatic, although in the end, it turned out to have taken on an entirely different turn. The structure was built at the turn of the XV century and was counted among the most outstanding works of the gothic period in England. The cathedral – which was destroyed in 1940 as a result of a carpet bombing raid by the Luftwaffe – became a symbol of German attacks on Great Britain during the Second World War. The only things that remained of this towering temple were its external walls, the crypt and a ninety-metre tall tower. In 1950, a competition was organised with the primary idea of solving the problem of whether to rebuild it or erect a new building. The design by Sir Basil Spence was selected from amongst over 200 entries. As a result of the competition, the gothic ruins were preserved, while at their edge a new, modern temple was built [28].

The relationship between the ruin and the new structure is strictly physical – the newly designed, tall arcade in the form of a vertical corridor connects both structures, from which we can enter both the old and the new building. The relationship between the ruin and the new structure was sealed in accordance with the law of good continuation: both in terms of size and material, the architect connected both buildings and while designing the new section, he exercised restraint, as well a great degree of design and construction courtesy. The new cathedral does not replicate the historical language of form and remains thoroughly modern, but it also interplays with the ruin. A monument to memory was erected, made up of two parts, simultaneously fulfilling the role of a metaphorical bridge between tradition and modernity.

[5] The pre-war form of the church had a rich neogothic decor designed by Adam Idźkowski (1836–1940).

Dresden and its history is also associated with a bombing raid – that of the British and US forces on the night/early hours of the 14th/15th of February 1945, which was to be a response to the bombing of Coventry. That night, the city centre ceased to exist, and the lives of thirty-five thousand people were lost. The dome of the most important protestant temple – the Frauenkirche, called 'the stone bell' (Ill. 11) – collapsed during the Allied raid.

The reconstruction efforts in Dresden remind us of the post-war reconstruction of Elbląg, where a new old-town was built in the spirit of so-called retroversion [38][6], which is defined as the rebuilding of the structure of a ruined city with the use of modern architectural means. A new space was created, which is not a reconstruction of historical forms, and which also does not bear the mark of aggressive modernity. In 2006, Dresden celebrated the fact that it has existed for 800 years, which became the impulse to modernise and create new public spaces, which, along with new structures, currently form an attractive new frame of the city [9, p. 2018].

The church of St. Mary, also called the Frauenkirche, is a canonical example of a Baroque, or even a Rococo structure, which was built during the period when Saxon architecture flourished during the reign of August II the Strong. The builder of this beautiful, monumental temple was Georg Bähr, who did not live to see its completion [32, p. 218]. After the war, the political and architectural conservation authorities of the DDR decided to preserve and safeguard the historical ruins and turn them into a permanent monument [28]. For 60 years from the end of the War, this utterly destroyed structure remained a charred reminder, a monument to war. The new temple was opened in 2005 – its tall, monumental dome dominates the left bank of the Elbe against a backdrop of the partially rebuilt Altstadt. The meticulously reconstructed temple creates an impressive public space along with the surrounding New Market – Neumarkt.

During the reconstruction, stone elements that were suitable for identification and placement within the new structure of the building were selected from the rubble. The original apse was similarly included in the reconstructed church, with the dark colour of the charred elements preserved in order to tell the old elements apart from the new ones. The result is the distinctive and varied, bright and black decor of the temple.

A similar pole is played by the symbol of West Berlin: the Church of the Memory of the Emperor Wilhelm – the Kaiser-Wilhelm-Gedächtniskirche (Ill. 12). The church was built as a protestant temple during the final quarter of the XIX century as a monument to fallen Prussian soldiers. In the 1940s, as a result of an immense Allied bombing raid, the church was destroyed. Its remains were turned into a permanent, stone ruin [28]. A new urban complex designed by Egon Eiermann was built out of its fragments, along with a nave on an octagonal base, a hexagonal belfry, a chapel and a vestibule.

Bieńczyce – Modern Historical Memory

Paul Rocoeur wrote about memorials and the fact that they function chiefly as reminders, indicators of remembering and support a failing memory, being a weapon in the fight against

[6] Among other things, the establishment of 'the new old-town' in the form of creating a set of values identified with the image and atmosphere of historical town complexes – Maria Lubocka-Hoffman writes about it in her work.

forgetting, and even a silent replacement in the case of dead memory. Such places 'remain' as inscriptions, monuments, potentially as documents, while memories that are passed on orally, with the voice, are as fleeting as words [27, p. 58].

The 'Ark of the Lord' (Ill. 15, 17, 18) is a canonical example of a church devoted to historical memory – it is the symbol of Nowa Huta and Polish post-war architecture, a structure, the importance of which isn't based solely on aesthetic factors. The church, designed by Wojciech Pietrzyk, is an example of a place 'overgrowing with meaning', the construction of which was sort of forced by the residents of Nowa Huta. It is that historical context, first and foremost, which has earned it its legendary image. It is also a 'citizen's church' – it had been deemed important even before it was built [22, p. 132]; after all, the residents of Nowa Huta, along with church dignitaries, fought for a building permit to be issued for a church to be located in this growing residential estate for over 20 years.

"The church designed by Zbigniew Solawa in Nowa Huta – awarded first prize in a competition in 1959 [17, p. 168] – would quite probably have been a global sensation" writes Wojciech Kosiński. The unbuilt church by Solawa in Nowa Huta is a structure that is important for historical, symbolic and, first and foremost, aesthetic reasons. This temple, with an attractive, fascinating and modern form, and eighty-meter tower, would strongly dominate the socialist modernist housing estates of the 1950s. The design that won the SARP competition was rejected by the authorities due to the size of the temple, under the pretext of high construction costs and building difficulties[7]. It needs to be mentioned that it is at this very spot, at Osiedle Teatralne, near a now historical 'thousand-year' school, that the Church of the Holiest Heart of Lord Jesus Christ was built in the 1990s (photo 16). The design of the temple resulted from a closed competition and the first religious project based on a design by the JET Architekci[8] design practice (along with Przemysław Gawor). The three-nave, small scale church with a square floor plan, topped with a latticework tower, is a rounding out of the local urban structure.

The 'Ark of the Lord' church is an example of late modernism – expressive, soft and lively. "Just like Le Corbusier's chapel in Ronchamp, it represents a unity of form, structure and function. As a building unbound by the normative, it could be designed with a flair and inventiveness, which was unthinkable for cooperative residential developments" [34, p. 98] The temple was built within the borders of the Bieńczyce housing estate, which was built on the basis of a competition design from 1959. The urban context of the surrounding multi-storey buildings, which was also historical and symbolic, influenced the expressive form of the mass of the church, which was to be open and accessible to the faithful from all sides. The interior is dominated by an expressive sculpture of Christ – an astounding piece of work by Bolesław Chromy.

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[7] The change in the stance of the communist authorities on the Church resulted in the tragic events of April 1960.

[8] Later *Ingarden*&Ewý Architekci.

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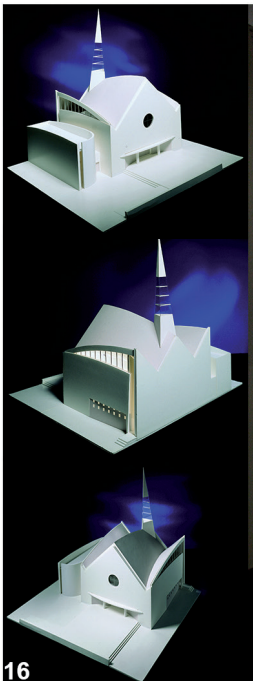

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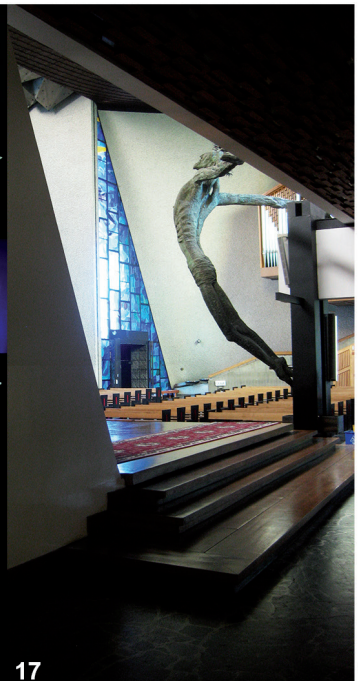

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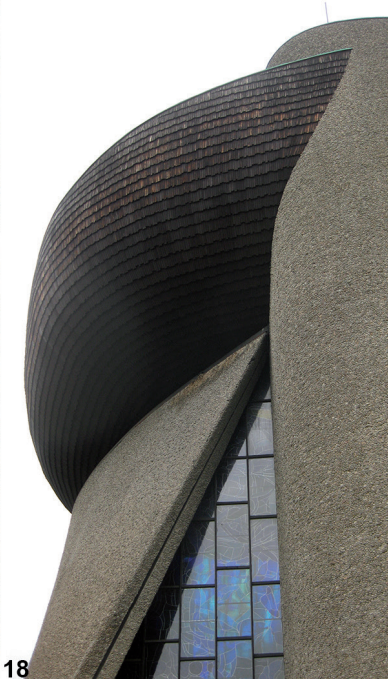

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Ill. 15. Nowa Huta, the Bieńczyce housing estate and the Ark of the Lord church (phot. by Adam Gryczyński)

Ill. 16. Nowa Huta, model of the Church of the Holiest Heart of Lord Jesus Christ (source: materials courtesy of the designers)

Ill. 17. Nowa Huta, The Ark of the Lord, interior (phot. by Marcin Włodarczyk)

Ill. 18. Nowa Huta, The Ark of the Lord (phot. by Marcin Włodarczyk)

Symbols of Post-war Avant-garde – A New Aesthetic and Metaphor

> "Its nature is that of a sculpture, timeless, supracultural, extremely artistic and scenic"
>
> [16, p. 14]

Charles Jencks calls such types of structures iconic [13]. The chapel in Ronchamp (Ill. 20, 21, 22) has had volumes of scientific studies written about it, its image becoming a staple of book covers, works on the post-war architecture of the XX century, historical guides and souvenirs. This 'reasoned sculpture' [14, p. 166], with a religious form of use, masterfully harmonious in the interior and exterior spaces which connect and collide; it is outstandingly precise and creates a structure in balance – removing a single element would cause the harmonious whole to collapse.

This work, so different and alien, was seen by the members of the avant-garde, the apologists of simplicity and the lightness of steel and glass that were Le Corbusier's contemporaries, as a work of some unfathomable race living outside of time, in lands that were ruled by different laws than those that they acknowledged [3, p. 252]. "It was soon 'domesticated', the mastery of the author acknowledged, imitators doomed to failure and its architecture proclaimed as the most outstanding work of modernism" [19, p. 57]. In Le Corbusier's work, we can find the final form of geometric abstraction and the end of the modernism of Bauhaus, while at the same time, its form forces the onlooker to carry out subjective analyses, comparisons and explications – the time of metaphors has arrived in architecture. "The structure, made out of concrete with a shape that is freely interpreted by the onlooker and built without any rational motivations on the part of the architect whatsoever, has become the source of an entire palette of architectural styles, expressing itself through a wealth of forms and comparisons" [6].

The construction of the chapel at Ronchamp, as well as the monastery in La Tourette, generated a new manner of thinking about the expression of concrete as a building material. The works of Giovanni Michelucci (Chiesa dell'Autostrada, 1964), Claude Parent and Paul Virillo(Sainte-Bernadette de Nevers, 1966), Gottfried Böhm or Fritz Wotruba are wonderful examples of a style called brutalism. 'Poured stone' became the material of such religious icons as the pilgrim's church in Neviges or the Viennese church of the Holy Trinity. The foundations of this style were formed by earlier temples: for instance, the famous Sainte-Thérèse in Metz (1954, arch. Roger-Henri Expert) (Ill. 23, 24) and Saint-Remy in Baccarat (1954–1957, arch. Nicolas Kazis) (Ill. 19), which stemmed from a movement that began in the 1920s and had been backed by such outstanding architects as Guillaume Gillet and August Perret.


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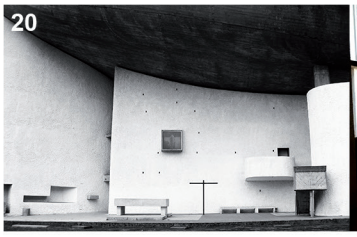
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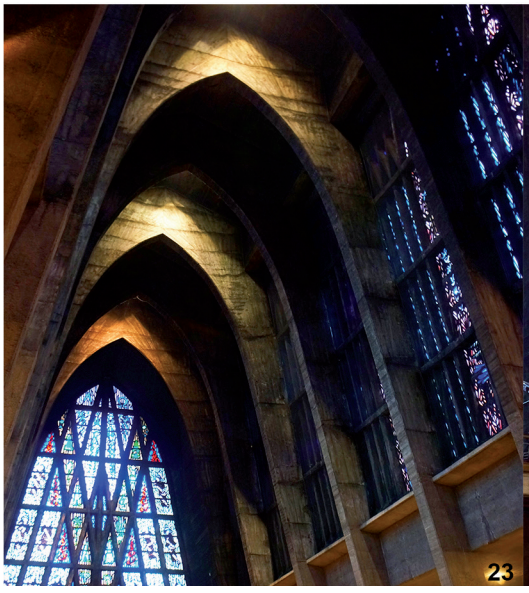
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Ill. 19. Baccarat, Saint-Remy church (phot. by the author)

Ill. 20. Ronchamp, chapel (phot. by the author)

Ill. 21. Ronchamp, chapel, interior (phot. by the author)

Ill. 22. Ronchamp, chapel, detail of the entrance (phot. by the author)

Ill. 23. Metz, the Sainte-Thérèse-de-l'Enfant-Jésus church, interior (phot. by the author)

Ill. 24. Metz, the Sainte-Thérèse-de-l'Enfant-Jésus church, interior (phot. by the author)

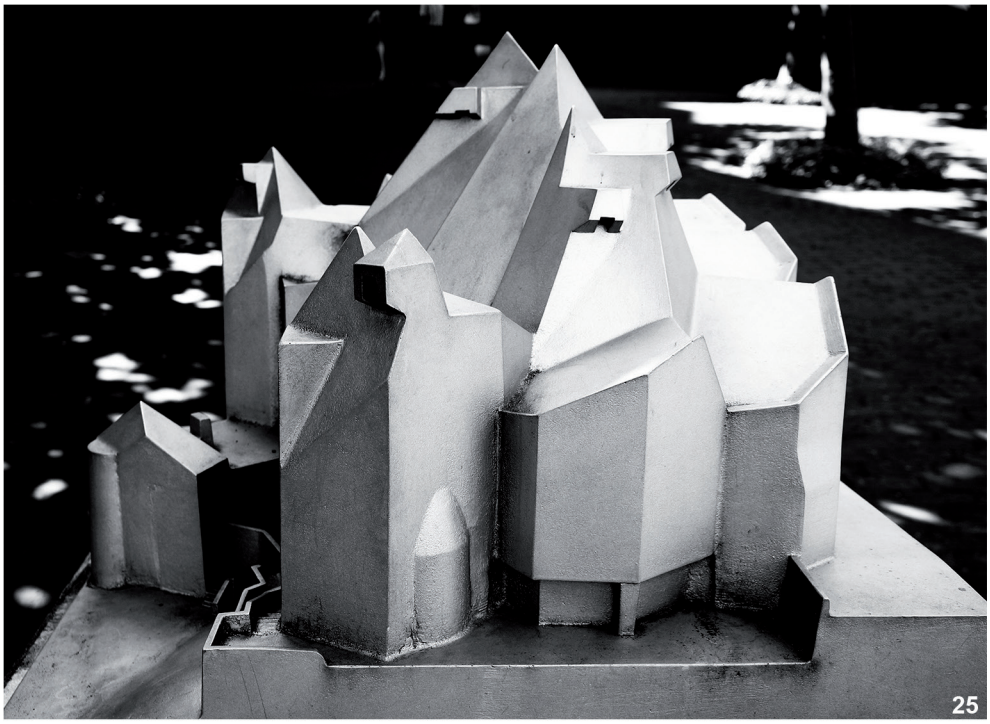
This period provided us with a concrete heritage with a wealth of stylistic and formal approaches, fitting the great aesthetic formation that was modernism. The French photographer, Fabrice Fouillet preserved this series of churches in his serially published project 'Corpus Christi'. It was a homage paid to the religious architecture of the 1950s and the 1960s, as well as a hymn of praise to the new aesthetic that broke away from the run-of-the-mill, stagnant and outmoded historicism. These churches, spread over the whole of Europe, strongly associated with the reconstruction of post-war ruins, show us a different concept, a sacrum, a spirituality filled with modernity – and even though many decades have passed since their construction, they are still misunderstood and criticised in many circles[9].

The Mariendom in Neviges (Ill. 25), a monolith designed by Gottfried Böhm, a master of concrete, a German architect and sculptor and a laureate of the Pritzker prize for the year 1986, is like a stamp, a logo – known and recognised, eliciting poetic associations with a mountain, a meteorite or a mountain crystal [18, p. 85], evidently referencing German expressionism. The temple was placed at the edge of the old town, in the near vicinity of a Franciscan monastery. The heart of the town is the small, oval Kirchplatz, at the centre of which stands an old church. At a distance of only around 100 metres to the north-west lies the new, grand structure with a length of almost 130 metres, placed upon a hill. A long, concrete passage with stairs leads to the church, whilst simultaneously playing the part of a square – a forum. The soft shapes, pleasant to the eye, shift into ones that are sharp, straight and pointy, as if carved from a rock. The temple is built upon a hill and visible from a considerable distance, becoming both an urban and an architectural dominant. Thanks to the decomposition and breaking up of the structure of the roof, the grand, irregular and dynamic form fits in with the loose layout and pointed roofs of historical houses.

The incredibility of this layout is based on the urban blending of the new structure into the Medieval urban layout – a structure that is larger than the centre of this layout, which has re-evaluated the panorama of the city and its views. The gigantic mass of the church in Neviges engages in a dialogue with the small scale urban environment, whilst simultaneously being in contrast with it in terms of material and size, providing it with an excellent background, as well as achieving a high level of emotional tension. Both structures play along excellently – there occurs a mutual form of support, by being contrasted with the raw, nearly windowless concrete mass, the small, richly detailed post and beam houses seem even finer.

Similarly, the Viennese icon – the church of the Holy Trinity by Fritz Wotruba (Ill. 26), erected on Geogenburg Hill amidst an elegant district of Vienna dominated by villas, the edge of the urban environment on one side, and the hills of the Viennese Forest on the other –

[9] For example, internet forums and webpages http://www.polityka.pl/tygodnikpolityka/architektura/galerie/1508566,11,koscioly-ostatnich-dekad.read (access: 30.03.2016).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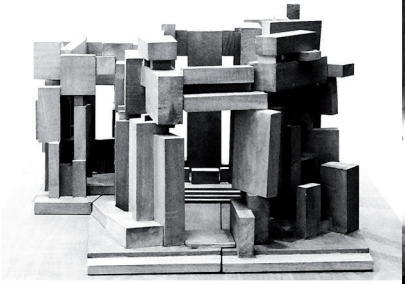
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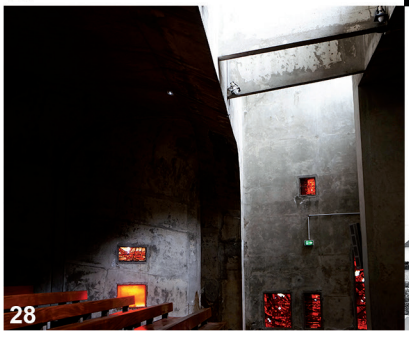
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Ill. 25. Neviges, Mariendom, model (phot. by the author)

Ill. 26. Model of the church of the Holy Trinity by Fritz Wotruba, Mumok, Vienna (phot. by the author)

Ill. 27. Florence, Chiesa dell'Autostrada – The Highway Church, interior (phot. by the author)

Ill. 28. Nevers, Sainte Bernadette church, fragment of the interior (phot. by the author)

Ill. 29. Nevers, Sainte Bernadette church (phot. by the author)

is an exemplification of the searches that symbolise the complex aesthetic, symbolic and metaphoric content. It is a distinct and unique form, deeply connected with archaic megaliths, which was shaped boldly and loosely, in an abstract manner. The incredible artistic idea which employs sculpturesqueness, asymmetry, a loose formal layout and, at the same time a 'dramatic physiognomy' [4] has resulted in an excellent composition made out of over 150 concrete blocks, amazingly homogenous and harmonious.

Both of these examples, as well as the church of Giovanni Michelucci near Florence (Ill. 27), or the concrete bunker in Nevers [7, p. 146] (Ill. 28, 29) are in the form of an artistic manifesto, a tale of a yearning for individualism – "a unique solution for a unique situation" [2, p. 72] – as well as a deep need for stepping outside of the bounds of reason and geometric order. Their concrete heritage is boldly continued in the works of Carl Scarpa, Tadao Ando, Massimiliano Fuksas, as well as the final great work of Corbu in Firminy, which "manifests the truth regarding pure matter and the purity of the sacrum of the XX and the beginning of the XXI century" [6].

Conclusion

> "Just as cathedrals once jutted over cities and provided waypoints for travellers as they towered above their surroundings, so do they now tower above history. We return to them seeking our roots"
>
> [25, p. 8]

The temples of Europe are not merely structures with a predetermined programme, the signs of the sacred within a space organised by man; they are also carriers of grand ideas, they make places distinct and become symbols of cities. Their form dominates panoramas and urban landscapes, as well as the open countryside, being a sign of cultural continuity within society. The French cathedrals, masterful creations of the highest possible aesthetic value in the cultural landscape, were one of the grandest revolutions in the history of architecture, while the development of civilisation that occurred thanks to their construction is being compared to that of the industrial revolution.

European temples have entered the sphere of interest of great artists and, at the same time, have entered such forms of art as literature, poetry, the graphical arts, film and digital art, as important elements of the cultural landscape. In places where they have blended in with natural elements, they have become the joint work of man and nature, becoming the entirety of cultural and natural heritage.

Religious buildings, by also operating through their artistic and architectural form, play the part of a recording of memory. They spur the imagination of various points in history, becoming one of the sources of social emotions. At the same time, they represent the results of efforts in building, crafts and the arts that were undertaken in ages past. Often preserved in a varying scale of damage and destruction, they turn into historical ruins [5].

The post-war period has brought with it avant-garde artistic manifestations – a number of iconic buildings that were a tribute to a new aesthetic which broke off all ties with historicism. These structures, while not always understood by society, have become permanently fixed into the European cultural landscape.

"Respect your acquired skills, o child of Europe, Heir of gothic cathedrals, baroque churches" – wrote Czesław Miłosz in *Daylight* (1993). It is, after all, still them – the churches, cathedrals and chapels, the forms and structures that constitute the beauty of European cities that are the living symbols of this part of the world, having been, in all aspects – regardless of religious views – the pride and reference point of the civilisation of Europe over the centuries.

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JANUSZ RĘBIELAK*

PROPOSALS FOR THE APPLICATION OF SPACE STRUCTURES IN THE DESIGN OF THE MAIN SUPPORT STRUCTURES OF TALL BUILDINGS

PROPOZYCJE ZASTOSOWANIA STRUKTUR PRZESTRZENNYCH W PROJEKTOWANIU GŁÓWNYCH SYSTEMÓW NOŚNYCH BUDYNKÓW WYSOKICH

Abstract

This paper contains several author's propositions for the shaping of structural systems for the design of high-rise buildings. The author has developed these structural systems as special types of space structures. The main goal in the processes of shaping these structures was to strive to enhance their rigidity by relatively simple means. Additionally, there was the aim to incorporate alternative evacuation routes in cases of emergency rather than only by vertical transportation means, which are usually located only in the central cores of tall buildings. The proposed structural systems of aboveground floors need to be highly resistant to the maximum values of horizontal, vertical, thermal and earthquake loads. These structures for high-rise buildings can be constructed from steel, reinforced concrete or they can be compound systems. Applications of these systems will considerably enrich the scope of the architectonic views of the tall buildings in which they are incorporated. The safety of tall buildings is to a large extent determined by the stability of their foundation structure particularly when they are located in areas with subsoil of small load capacity or areas that are at risk of earthquake. The paper also presents some proposals for the shaping of the foundation systems devised by the author and indented for heavily loaded objects including high-rise buildings.

Keywords: Space structure, High-rise building, Structural system, Foundation structure

Streszczenie

W pracy przedstawiono kilka autorskich propozycji kształtowania systemów konstrukcyjnych dla potrzeb projektowania budynków wysokich. Autor opracował te systemy konstrukcyjne jako specyficzne rodzaje struktur przestrzennych. Głównym celem procesu projektowania takich systemów było dążenie do nadania im większej sztywności za pomocą stosunkowo prostych zabiegów projektowych. Ponadto dążono do zapewnienia dodatkowych dróg ewakuacji nie tylko za pomocą środków komunikacji pionowej, które najczęściej są umieszczone w trzonach centralnych budynków wysokich. Proponowane systemy konstrukcyjne kondygnacji nadziemnych muszą bezpiecznie przejmować maksymalne wartości obciążeń poziomych, pionowych, termicznych oraz sejsmicznych. Takie systemy konstrukcyjne mogą być wykonane jako konstrukcje stalowe, żelbetowe bądź kompozytowe, a ich zastosowanie pozwoli na znaczące wzbogacenie zakresu form architektonicznych budynków wysokich, w których zostaną one zastosowane. Bezpieczeństwo budynków wysokich jest w przeważającej mierze uwarunkowane stabilną konstrukcją ich fundamentów, szczególnie wtedy gdy są one posadowione na gruntach o małej nośności lub na obszarach sejsmicznych. W pracy przedstawiono także autorskie propozycje kształtowania systemów fundamentowania i przeznaczonych dla posadowienia obiektów silnie obciążonych w tym także budynków wysokich.

Słowa kluczowe: struktura przestrzenna, budynek wysoki, system konstrukcyjny, konstrukcja fundamentu

* Prof. D.Sc. Ph.D. Eng. Arch. Janusz Rębielak, Institute of Engineering Design, Faculty of Architecture, Cracow University of Technology.

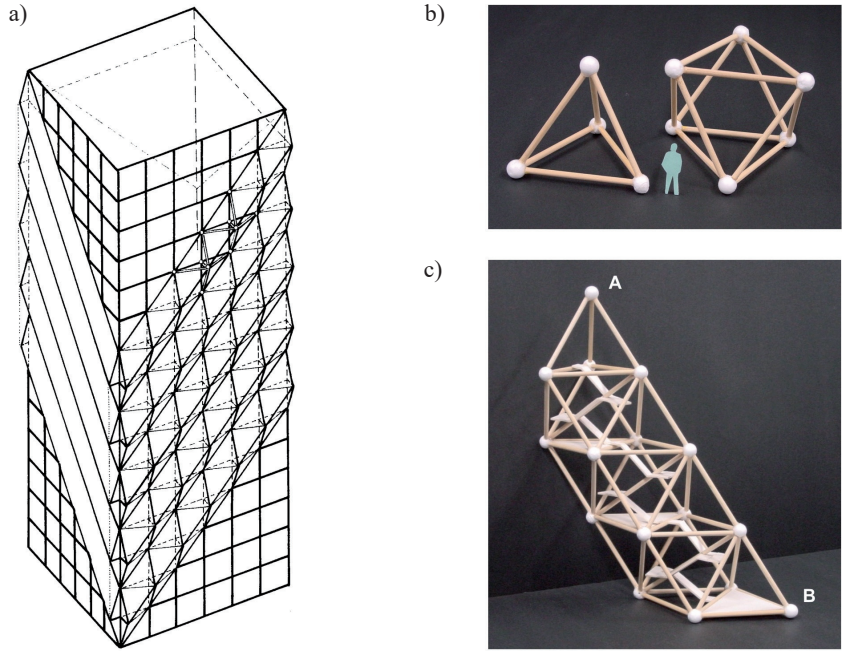
1. Introduction

Structural systems should provide tall buildings with a high degree of rigidity and with great stability even when under a very complex set of external loads. The bearing systems of tall buildings have to simultaneously provide two contradictory characteristics; on the one hand, they have to be very rigid but on the other hand, they have to offer some degree of flexibility [1, 2]. Both these features are characteristics for space structures defining as the bearing systems composed of members arranged in spatial way in their spaces where the force transmission is also done in a spatial way. The structural formula of these systems was formulated by Alexander Graham Bell and was later gradually developed by researches like Max Mengeringhausen, Zygmunt Stanisław Makowski and numerous others [3, 4]. Systems of space structures are applied mainly as the bearing structures of roof structures and can take various forms. Due to the advantageous features of space structures, many architects and engineers choose to apply them in the design of tall buildings. The bearing structures of high-rise buildings are designed and realised in certain structural systems such as framed tube, tube in tube, bundled tube, diagonal frame tube as well as in other types of systems [1]. These structural systems meet the satisfactory requirements of building safety, but in some extreme cases they turn out to be insufficient technical solutions. The terrorist attack against the USA on September 11th, 2001 and the collapse of the twin towers of the WTC in New York has led to the need for new considerations regarding the forms and structures of tall buildings. Of course, spatial rigidity, the resistance to all the types of possible, even the greatest values of various loads (horizontal, vertical, thermal or earthquake load) and the quick evacuation of people in cases of emergency remain the most basic requirements for the safety of high-rise building structures [5, 6]. The design of stable and safe foundation structures of heavily loaded objects remain a separate and very complex engineering task which is realised in various ways [7–13].

The structural formula of space structures has many promising features which encourage its application in the search for rigid and efficient types of structural systems for the aboveground parts of tall buildings as well as in the search for special shapes of foundation structures, the application of which make it possible to safely locate heavily loaded buildings on each type of subsoil. This paper presents some types of structural systems devised by the author as solutions to the above defined tasks.

2. Example of the basic form of structural configuration

Space frames, in the proposals previously provided by the author [14, 15], were vertically placed around the perimeter of the building. Their spatial rigidity is high, but this arrangement may cause the magnitudes of the force acting on some of its component parts to increase to an enormous degree. Even the subdivision of the perimeter space frame would be an insufficient solution to decrease the unjustified, excessive level of force acting on members of the space frame which are located in the boundary areas of that structure. On the other hand, the space of the perimeter frame could be used as the space



Ill. 1. Shapes of space structures proposed to be applied in multi-storey buildings

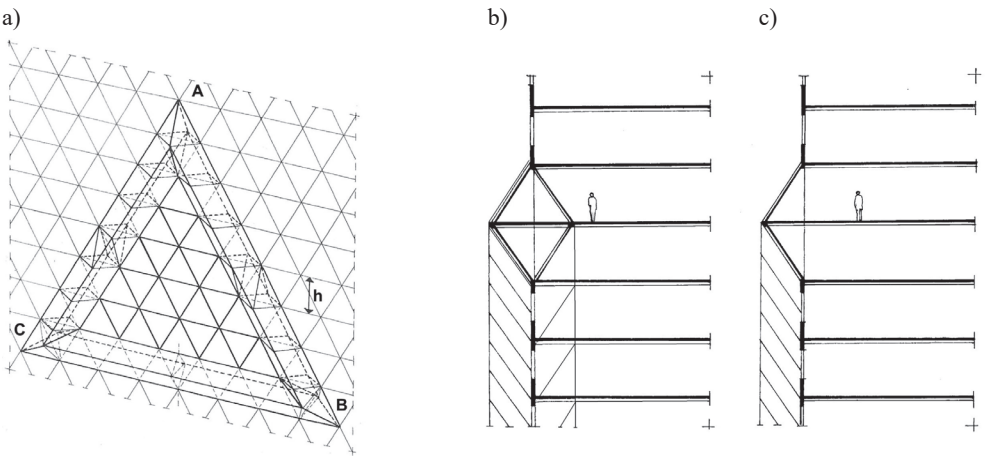
for another option for safe evacuation of people in emergency situations. Illustration 1a shows the result of the transformation of the space frame "square on square" being at the beginning the form of the circumferential space structure of a tall building. The number of structural members was reduced by the way in which the remainders of the initial arrangement created the skew spatial belts. The diagonal members, placed onto the main façade plane of the building, transfer the forces to all of the columns located along the perimeter of the building. The outer diagonal members transfer the horizontal forces in the same way except for the members located close to the corners. The spatial skew belts are not connected to the surfaces of the outer diagonals in order to focus the forces precisely along the corner columns. In the vertical cross-section of this part of the façade, one may notice the triangular, prismatic shapes of these belts. Of course, the space of all these skew belts and between them may belong to the inner space of the building due to appropriate arrangement of the curtain walls in the outer layer of the space structure, see the top left area of Illustration 1a. The geometrical dimensions of these skew belts should make it possible to design additional means of vertical transportation between particular storeys in these skew areas.

Inside the space of many spatial structures, one could easily distinguish the basic component parts that have tetrahedral and octahedral forms, see Illustration 1b. These are most often built by means of bars of equal lengths. When the bar length equals approximately four meters, the structure is habitable [16]. Both of these forms of bar units can create a very rigid space truss called a crystal space frame. If these bands are located along the edges of, for example, a huge octahedron then they will form a mega-

octahedron and other types of habitable mega structures. These spatial mega-structures have high levels of rigidity and their inner spaces can be used for the arrangement of staircases (see Illustration 1c) or other means of vertical transportation beside the inner core. These alternative methods of evacuation will increase the safety of habitants in the event of dangerous situations.

3. Proposal of simple forms using prismatic structures

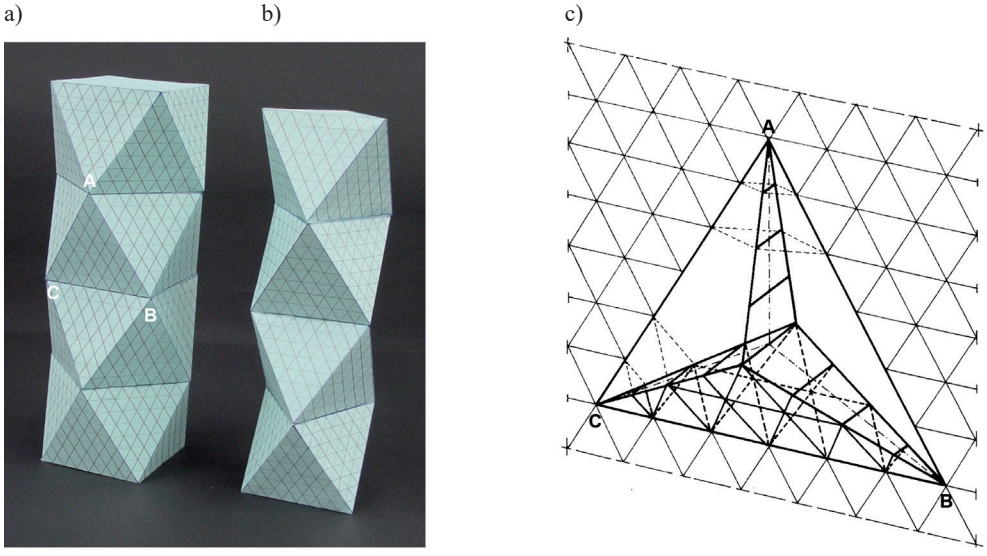
The localisation of these additional evacuation ways along the edges of the huge triangular fields of the façade will not unduly interfere with the functionality of space on each floor of tall buildings. In spite of these advantageous features the above presented arrangement may cause the appearing of the extremely big values of forces, which may act in some members of the space truss located in this way. Therefore, in order to keep the advantages and to display the jet forces along the main and single directions of edges of the huge triangular area of a façade and to avoid the disadvantage mentioned above, it is proposed to locate the band of that space truss in the manner shown in Illustration 2a. The other reason for such localisation is to endeavour to incorporate additional means of vertical transportation into the space. All of the mentioned reasons are of the equal importance. In order to include a staircase, the basic form of the space truss (see Illustration 1c) was supplemented by means of an additional number of the skew bars, see Illustration 2a. The bands, made as spatial trusses, may be located on the border between the inner and the outer space of a building (see Illustration 2b) or they can be put only onto the outer space of the façade, see Illustration 2c. In the vertical cross-section of the façade, one can notice the triangular, prismatic area of these space trusses [17] therefore it was assumed to call these types of the structural systems the prismatic space structures. It is supposed that the system can be applied relatively easily for the reinforcement of existing buildings of this type.



Ill. 2. Simple form of prismatic structure and its localisations into inner space of tall building

4. Star shapes of prismatic structures

The first of the proposed shapes for the prismatic structures is built my means of the space truss bands placed along the edges of a huge triangle. The basic form of the prismatic space structure may obtain various shapes of the huge triangular areas and they may be put, also in diversified manners in outer zones of the tall building. The proposed shape of the prismatic space structure can be placed onto every triangular side face of the forms of the buildings shown in Illustration 3 or it may be suitably arranged only for every second one of these triangular faces. The shape of the multi-storey building shown in Illustration 3a consists of vertically-orientated regular antiprisms with square bases and the shape presented in Illustration 3b is composed of regular antiprisms with triangular bases. This triangle can be the starting point for creating a gigantic prismatic space frame. Illustration 3c shows the basic shape of the huge prismatic structure. This shape consists of three tetrahedral solids, which are inscribed inside space bordered by outline form of e.g. the equilateral triangle. This can be described as a prismatic star-shaped structure. The general scheme of this form of prismatic space frame is presented in Illustration 3c, it is proposed for the design of tall buildings. Members are put onto all the faces of the prismatic structure which in this case creates triangular bar grids. The inner space of this gigantic module belongs to the inner space of the whole building. In these spaces, it is relatively easy to choose which areas are assigned to which functions with regard to the arrangement of additional evacuation routes. These areas can interpenetrate the space of the main building in the eliminated parts, what only in the limited degree can restrict the useful area of each floor [13]. With the example of this form of the prismatic space frame, it is easy to see that the resultant of the forces from its side faces will be concentrated along the side edges of this huge spatial structures.

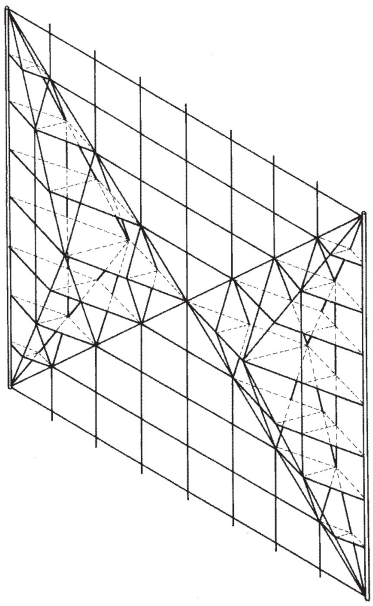


Ill. 3. Examples of shapes of tall buildings with triangular forms of façades together with example of the prismatic structure

The streams of forces are channelled along the designed lines which makes possible the simple and relatively easy transmission of force through the entire structural system.

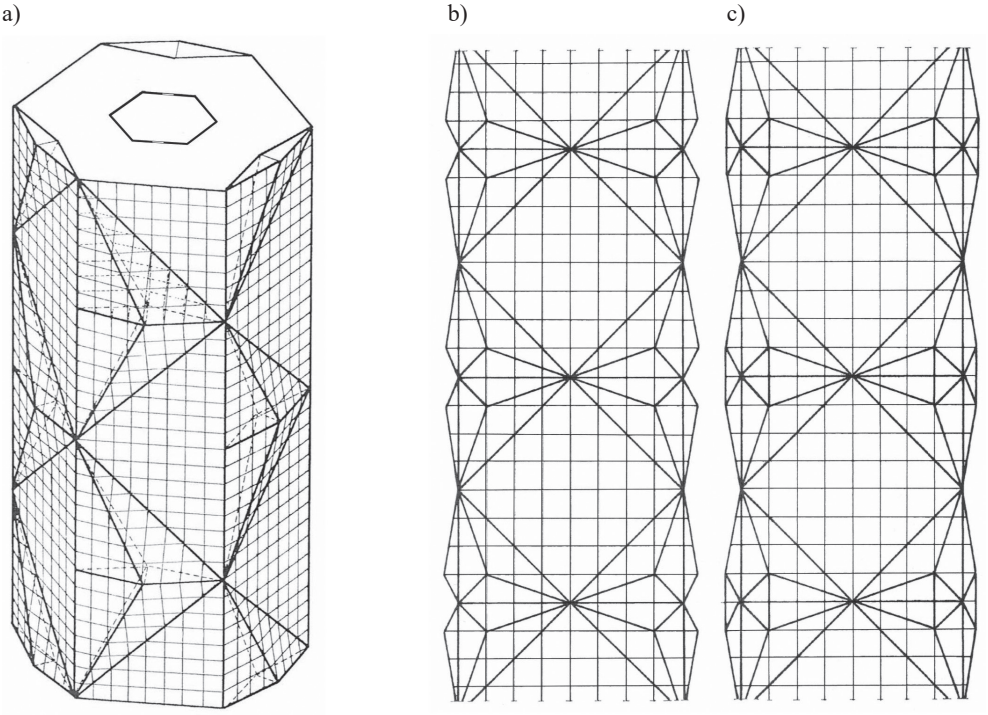
The proposed form of the prismatic space frame is very rigid and has enough inner space in order to contain the installations necessary to arrange the alternative methods of evacuation in the chosen parts of the perimeter spaces of the building. For example, the staircases can be bound by means of translucent glass walls, which have to be fireproof and which may provide almost the unobstructed daylight to inner space of the floor. It may be that this form proves to be the best method to fulfil the requirements of a very safe and rigid structural system for high-rise buildings. The triangular forms of the prismatic space frames may be positioned in various manners to the facades of tall buildings. They can be installed for example, onto each of the triangular faces of the tall building forms shown in Illustration 3a or in Illustration 3b – a more economical option would be to position them suitably onto the every second of these faces.

Another method of applying the proposed types of prismatic space frames into the structural systems of high-rise buildings is shown in Illustration 4. In this case, two prismatic frames are spaced between two main, corner columns of a high-rise building, they are opposite directed and joined in the central node, where two prismatic structures are connected together. In this way, a kind of the spatial girder of the structural system is built. A single unit of the star-shaped prismatic space frame can be arranged as previously on every second triangular field of the façade, see Illustration 5a. The basic form of the prismatic space frame can be adjusted to many various shapes. For instance, a single triangular form of the prismatic space frame can be located only in one of the corners of the basic square field of an elevation; the remaining three corners may be supplemented in the ways shown in Illustration 5b and in Illustration 5c, which show the only two examples of the architectonic views of the high-rise building façade possible to obtain by usage of this type of the proposed forms of the structural systems. The height of a single prismatic frame is in this particular case equal to the height of four floors.



Ill. 4. Double form of star-shape prismatic structure placed on vertical façade of tall buildings

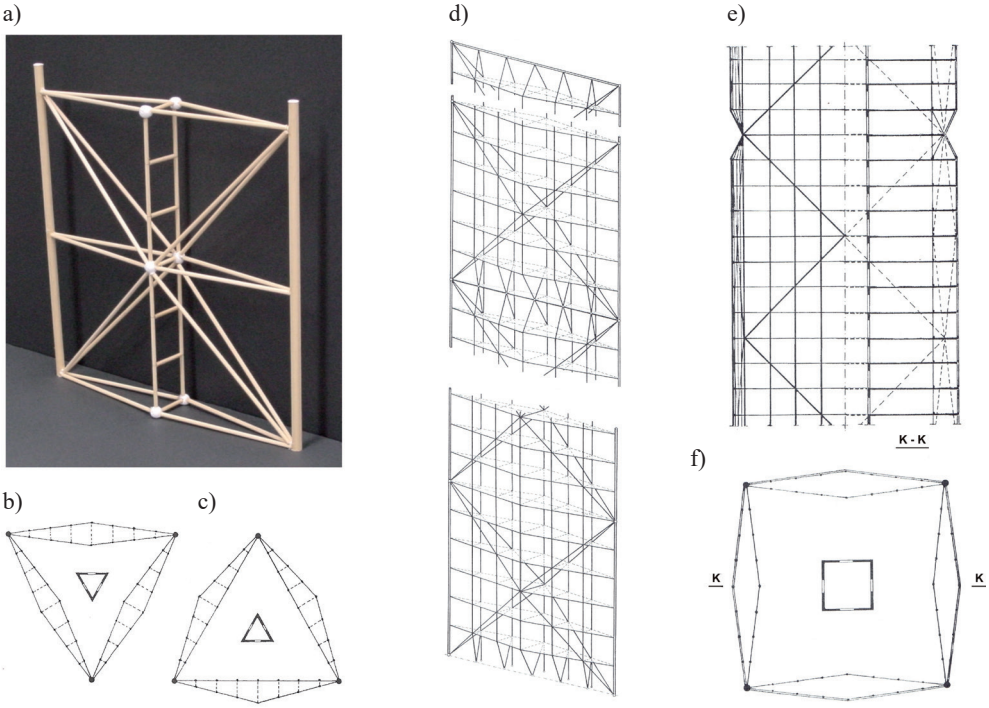
Prismatic star-shaped structures can take various forms; one of these is the structural system which resembles the pattern of a simple vertical located truss with an X-shaped bracing system. The general concept of the structural system presents the model of the single spatial unit of it, see Ill. 6a. The height of the unit equals the height of several storeys. The structure is made by means of vertically arranging these units along every side of the building; in this way, an elongated version of the prismatic space frame is formed. In the middle, between the main columns, a simple vertical frame is located. It is the intention to arrange additional means of vertical transportation for the purpose of emergency evacuation in the vicinity



Ill. 5. Proposals of arrangement of star-shape prismatic structures

of this frame. These facilities can be designed as foldable or retractable devices, for example, structures which may be hidden in the structures of floors. The spaces for these facilities can be separated by means of transparent glass walls and for everyday usage, they may serve as places of recreation. Striving to arrange there the alternative means of the vertical transportation, independent from space of the central core, is dictated by some reasons. One of the most important points is that the central areas of each side edge of the horizontal projection of the floors are usually the areas that are subjected to the smallest deformations of the structural system of the entire tall building.

In Illustration 6b and Illustration 6c, general schemes of two possible applications of the proposed solution are shown; the most basic and fundamental of these applications is shown in Illustration 6b, it is proposed that this design be applied to new buildings. The second scheme (see Illustration 6c) could be applied for the reinforcement of some types of tall buildings only on the condition that the structures of the floors would be able to take large magnitudes of horizontal forces which may appear in that structural system. This remark also refers to the structures of the floors in all the proposed systems, particularly in central areas of cross-bracing systems. The proper application of the proposed structure requires suitable arrangement of other component parts along the perimeter and the whole height of the tall building. Due to this arrangement, the system can be applied in the design of real buildings; however, the additional component parts make the structure somewhat complex.



Ill. 6. Another proposition of shape and possible application of star-shape prismatic structures

The necessity for the special arrangement of some areas of the system described above is caused by several factors such as the influence of the strains of the entire structure on the magnitudes of strains and forces appearing in its component parts. Thermal load, caused by the temperature differences between the outside and inner space of the building, is of importance to the structure of high-rise buildings. However, the most important factor in the case of this shape of support structure is the asymmetrical way of load of the intermediate columns, which are arranged between the main columns located in the corners areas of the tall building. The inner intermediate columns will be subjected to loads several times greater than the columns designed along the perimeter. In order to decrease the influence of all these elements on the levels of the strain values and on the force sizes acting on particular component parts of the whole system, it is proposed to the scheme which is presented in Illustration 6d. General schemes of an example form of a tall building designed with the incorporation of the proposed system are shown in Illustration 6e and in Illustration 6f. The entire structure is divided into some parts in the vertical direction. The height of a single segment is equal to, for example, the height of a set of three square units with an X-shaped bracing system. The two adjacent segments are connected together on levels where they have common nodes placed onto the central vertical plane of the elongated prismatic structure. Because the inner columns are subjected to greater loads than the perimeter columns, they run in the uninterrupted way to the foundation, being especially large along the perimeter of the building. The eccentric shape of the prismatic space structure causes increasing levels

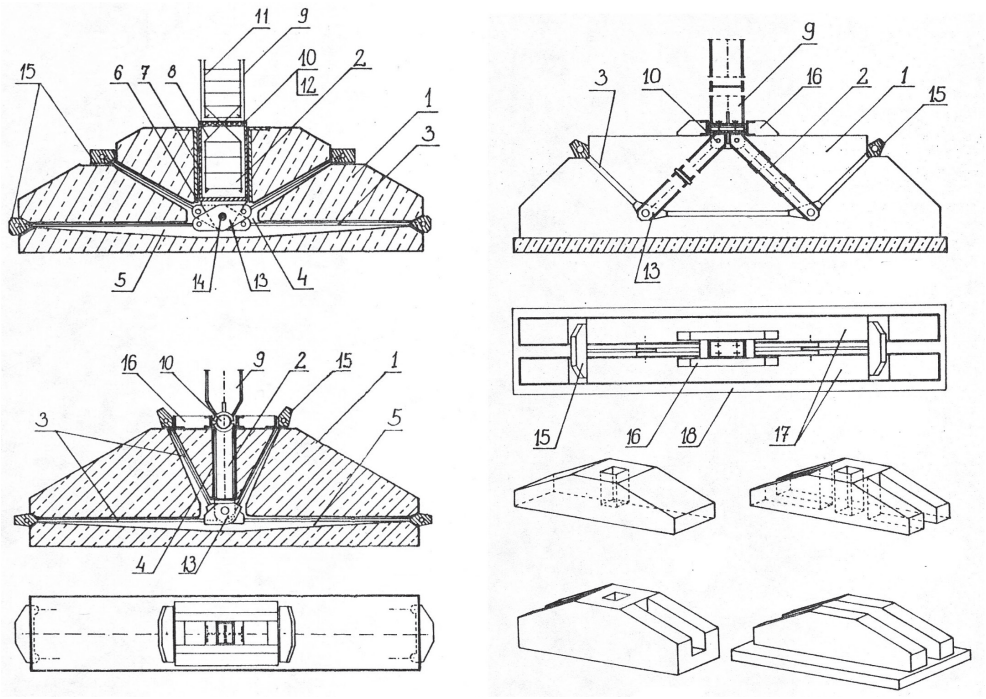
of force to act on the intermediate columns but it should allow to decrease values of force acting in many other component parts of the system, which may be caused by the bending of the whole building. It could be also a good enough technical solution regarding the influence of the thermal load. The huge X-shaped bracing system can also be located onto a single central and vertical plane of the prismatic structure, but in this case, it is necessary to arrange an additional system of short members in the chosen parts of its inner space in order to decrease buckling lengths of members creating the basic bracing system [17].

5. Required structural features of foundation systems

A safe and stable foundation structure is one of the crucial factors for all objects, including tall buildings. The significance of this statement is more crucial when the building is located on ground of a small carrying ability, for instance, in areas with mining damage or in areas subject to earthquakes. When the ground conditions are insufficient, the application of a lightweight support structure for high-rise building is advantageous, but on the other hand, lightweight structures are very sensitive to vibrations caused by wind loads or induced by earthquakes. It would be very favourable if the structural system was able to absorb energy caused by dynamic load and significantly reduce all vibrations. A satisfactory technical solution can be received by the suitable application of structural formula of the space structures. Two proposals for the solution of this complex problem are briefly presented below.

6. Basic form of combined foundations

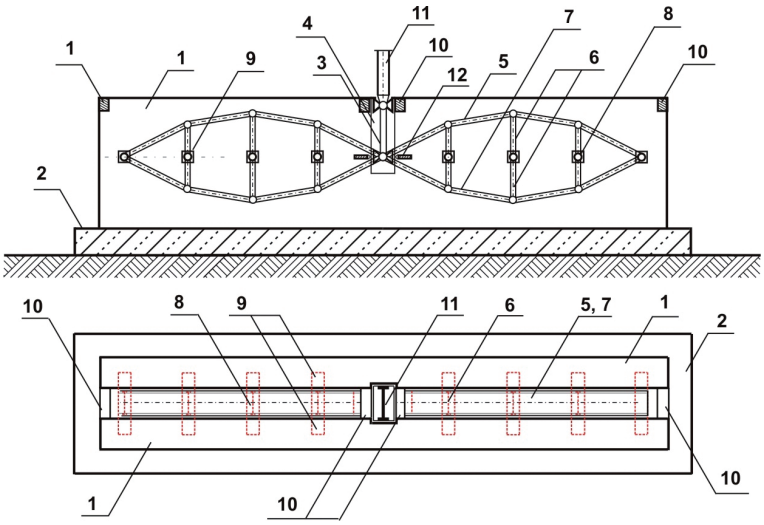
A large foundation surface area makes it possible to decrease the levels of stresses evoked by a heavy load. The tendency to increase the surface area of traditional foundation systems is restricted by the basic principles of the theory of structure. In order to significantly enlarge the foundation surface, the author decided to apply the formula of truss systems and later, the formula of space structures in the process of designing the foundation systems. Schemes of the first patented structural solution of combined foundations are presented together in Illustration 1 [18]. The point of structural concept of this system is to pre-stress long horizontal beams (1) by the own weight of the building transmitted by vertical columns (9) to the intermediate compression members (2), which transfer further the load forces to tension members (3) connected to the anchorage nodes (15). All the intermediate components are precisely arranged in the inner space of the designed foundation and their structure enables small strains independently to the deformation of the main beam elements (1) of the system. In other words, the intermediate component parts are suspended inside the space of the whole foundation and by means of the anchorage nodes, vertical force components are transmitted through the beam material to the ground, while horizontal components of these forces pre-stress the main beams. It is obvious that unobstructed small strains of component parts should be provided by their appropriate juxtaposition and by their stable, reliable and simple structure. There are several varied mutual arrangements and interconnections between components of other shapes within the basic structural configuration of the system.



Ill. 7. Examples of structural solutions defined in the first author's patent

7. Final structural configuration of combined foundation

The most important anchorage nodes of the basic form of the combined foundation are now placed in the extreme upper areas of the beams (1), where their displacements are the largest. Because the smallest dislocations are found in the neutral axis of a beam, the main nodes are distributed along the neutral axes of the main beams in the final structural solution of the combined foundation [19]. Moreover, these nodes have to be arranged uniformly along the possibly long beams. The structural concept of the final shape of the combined foundation system is presented in Illustration 8. The outer load force is transmitted to the two inner lenticular intermediate structures by means of a short strut, which has one degree of freedom of movement only along vertical guides, where it is precisely located. The uniform arrangement of the load forces is ensured by presence of a special intermediate structure, which consists of two sub-systems. The first sub-system consists of set of the rigid tension members located along the broken line of convexity directed up. Suitable nodes of this system are connected with the main foundation nodes by means of short vertical compression members. These main nodes are uniformly distributed along the neutral axes of the main beams (1). The second sub-system has a very similar form but the broken line having convexity directed down. If patterns of both sub-systems are symmetrical placed towards the neutral axis of the beam, the horizontal components of the reactions in the



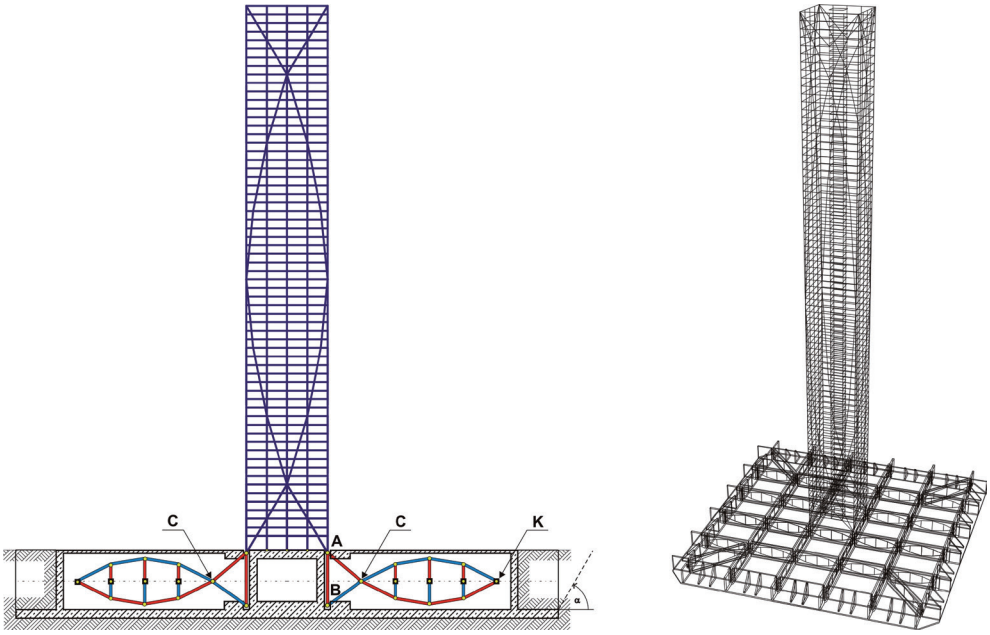
Ill. 8. Shape of one of the possible technical solutions defined in the second author's patent

extreme nodes are of the same value but they are directed in the opposite manner. Therefore, in the final shape of this structural system, only the vertical components of the reactions are applied to the main nodes (9) of the system. The shape presented in Illustration 8 consists of two lenticular modular units of the combined foundation. These units can be multiplied in various ways within the space of the designed foundation – this indicates that the surface of this type of foundation system is theoretically unlimited, which further implies that the very heavily loaded building can be located on subsoil with an extremely small load capacity.

8. Example of the application of a combined foundation

The effective length of the lenticular units of the foundation structure can be slightly enlarged by the application of a triangular set (ABC) presented in Illustration 9a. In this case, nodes of the type represented by node C have to be disconnected to the matter of the main beams – this is a key requirement of this technical solution. The number of instances of replication of the lenticular units in both directions is optional – this means that the horizontal surface of the foundation system is also optional, see Illustration 9b. When a multi-storey building is supported on the proposed type of foundation and a suitable type of the lenticular girder (see Illustration 9) is applied inside its aboveground structure, then the whole bearing structure is referred to as the combined structural system of the tall building [20–22]. In the boundary nodes of the combined foundation (K), are acting the vertical reactions having big values, which reactions are directed down, what is considered as disadvantageous of such forces. In order to stabilise these zones, it is proposed to form a kind of scoop, which is shaped by help of a suitable connection of the beam endings with the base slab.

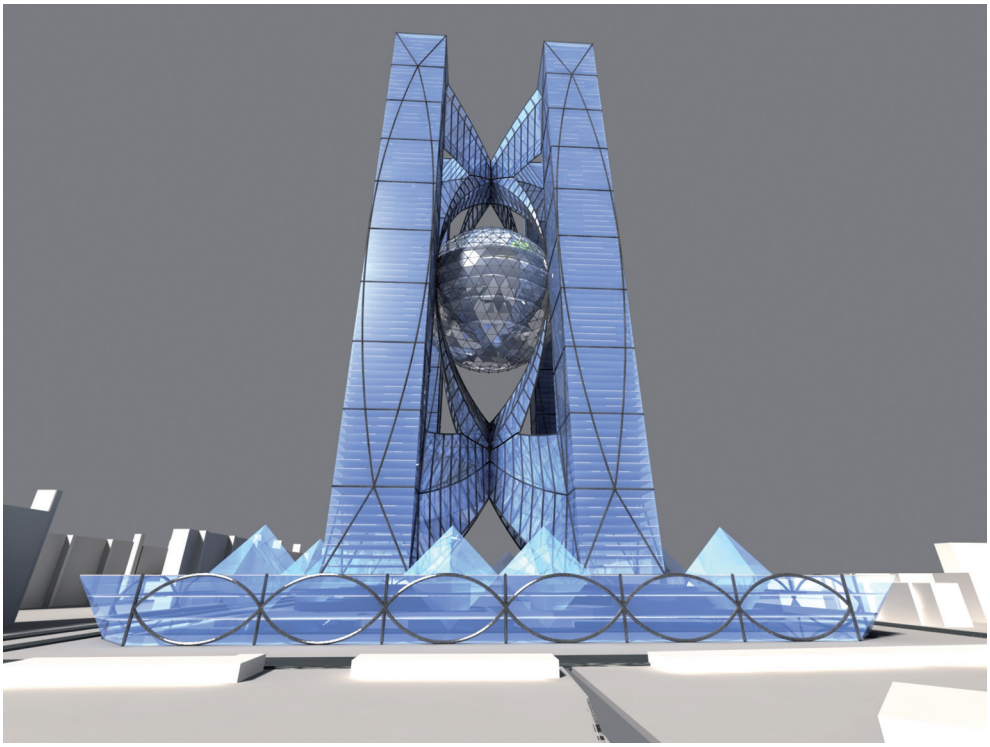
a) b)



Ill. 9. Scheme of vertical cross-section and general view of combined structural system of a tall building

As a result of this shaping, a certain part of the ground placed in the soil wedge would press down on this area of the foundation structure. Moreover, additional anchor piles can be placed directly underneath the boundary nodes. There are some other structural solutions to this problem. Due to the appropriate arrangement of components in the space of the proposed combined system, it is able to absorb a part of the energy vibration induced by dynamic loads. This ability can be enhanced by special technical devices such as electronically controlled hydraulic jacks purposely designed as integral parts of the intermediate foundation structure.

The proposed combined structural system was applied in the design of the building complex of GeoDome Sky Towers, see Illustration 10 [23]. The complex is situated in a typical urban area. It consists of four tower buildings which are rectangular prisms containing eighty storeys each. These towers have a square form of base projection and side lengths of thirty-six meters. These towers, each with a total height of around 382 meters, are put on a common broad base designed according to the rules of combined foundation, inner space of which contains three technical storeys The main four towers are connected by means of specific spatial structures in the form of huge arches running from halfway up the tower to suitably selected lower and upper parts of these towers. Moreover, these four main buildings are connected together by means of a central building having the form of a geodesic sphere which joints each tower halfway up.



Ill. 10. Perspective view of the GeoDome Sky Towers

9. Conclusions

The structural formula of space structures can be successfully applied in the process of designing tall building systems including those of their foundations. All the proposed types of the structural systems should be subjected to many comprehensive analyses in order to evaluate their practical suitability. The high-rise buildings, due to the application of the proposed structural system, can provide interesting and unique architectonic views.

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BEATA VOGT*

CREATING THEORETICAL MODELS OF VAULTS WITH THE USE OF AUTOCAD SOFTWARE, ON THE EXAMPLE OF BARREL VAULTS

TWORZENIE MODELI TEORETYCZNYCH SKLEPIEŃ PRZY POMOCY PROGRAMU AUTOCAD, NA PRZYKŁADZIE SKLEPIEŃ KOLEBKOWYCH

Abstract

The paper contains a short history of the evolution of vaults and the principles of creating digital models of barrel vaults with the use of AutoCAD software. It is also richly illustrated with drawings of digital models created in AutoCAD.

Keywords: AutoCAD, vault, barrel vault, digital model

Streszczenie

Praca obejmuje krótką historię rozwoju sklepień oraz zasady postępowania przy tworzeniu modeli komputerowych sklepień kolebkowych przy użyciu programu AutoCAD. Całość bogato ilustrowana rysunkami modeli komputerowych wykonanych w programie AutoCAD.

Słowa kluczowe: AutoCAD, sklepienie, sklepienie kolebkowe, model komputerowy

* Ph.D. Eng. Arch. Beata Vogt, university lecturer at the Department of Descriptive Geometry of Technical Drawing and Engineering Graphics, Faculty of Architecture of The Cracow University of Technology.

Introduction

Architecture has featured various types of vaults – structures with a curvilinear cross-section which serve to cover rooms within a building from the top, supported by columns, pillars and arcades – since ancient times. They are commonly made out of stone, bricks, concrete or reinforced concrete, as well as timber – for instance in the timber synagogue in Wołpa[1] [5], or even out of glass connected with metal, like in the case of the PSE-Operator Building in Konstancin-Bielawa, designed by Czesław Bielecki[2] [1]. They can have a profound influence on the appearance and architectural expression of an entire building, both in terms of its interior and exterior, like in the Funeral Home and crematorium at the Communal Cemetery in Słupsk, by Cezary Flis[3] [4].

Vaulted ceilings first appeared in Ancient Egypt, starting with corbel-vaulted ceilings, like the ones in the Bent Pyramid in Dahshur, the pyramid in Meidum or the Red Pyramid of Dahshur (Ill. 1a, 1b). Some of the oldest vaulted ceilings are corbel vaults, which can be found in the Chapel of Hatshepsut in her temple in Deir el-Bahari (Ill. 1c, 1d)[4] [10]. Corbel vaults were used in Mesopotamia and Persia, and were constructed using a similar principle to the one used in the corbel arch, covering square or circular rooms.

The first barrel vaults were employed by the Sumerians, and were used underneath the ziggurat in Nippur in Babylonia, constructed out of fired ceramic tiles bound with clay (Ill. 2) [8]. In Ancient Greece they can be encountered in the form of corbel domes (Mycenaean tombs, including the tombs of Agamemnon[5] and Clytemnestra (Ill. 1e, 1f) [3], while the only traces of the use of barrel vaults were found on the island of Keos.

The Etruscans introduced **stone voussoirs** into architecture, which were then adopted by the Romans in order to span gates, triumphal arches and construct aqueducts (Ill. 3). It was in Ancient Rome that vaults became used on a larger scale – with the introduction of the **cloister vault**, the **groin vault** and the **Roman dome**[6] (Ill. 4) [6].

Byzantine builders added their own type of dome, the so-called **byzantine dome**[7], e.g. the dome of the Hagia Sophia in Constantinople (Ill. 5). The Romanesque period most often employed **barrel and groin vaults** (Ill. 6), supported by walls and pillars, while the Gothic period brought with it the further development of vaults, especially of the groin type,

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[1] The prayer room was vaulted with a wonderful multi-level corbel dome (with an octagonal base), supported by four pillars, between which the bema was located. The synagogue was built at the turn of the XVIII century and was burned down by the Germans in June 1941. Currently it is being rebuilt in Biłgoraj, in the Borderland Town that is being built there.

[2] The entry hall at the edge has been built out of glass and steel and has the shape of an ellipsoid. The two wings of the building unfold from it, while its entirety forms a three-part composition: the beginning – the head, the middle – the body and the end – inspired by the shape of the tail of an airplane.

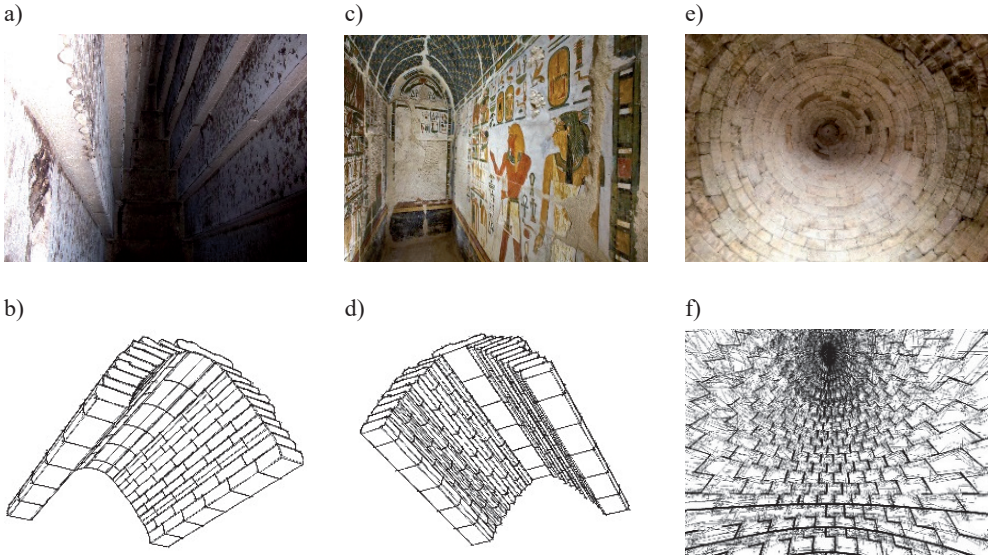
[3] The form of the entrance section is a cross vault with an elevated boss, with a hexagonal base.

[4] All of the sketches of the vaults were made using AutoCAD, on the basis of three-dimensional models of vaults that were built in it.

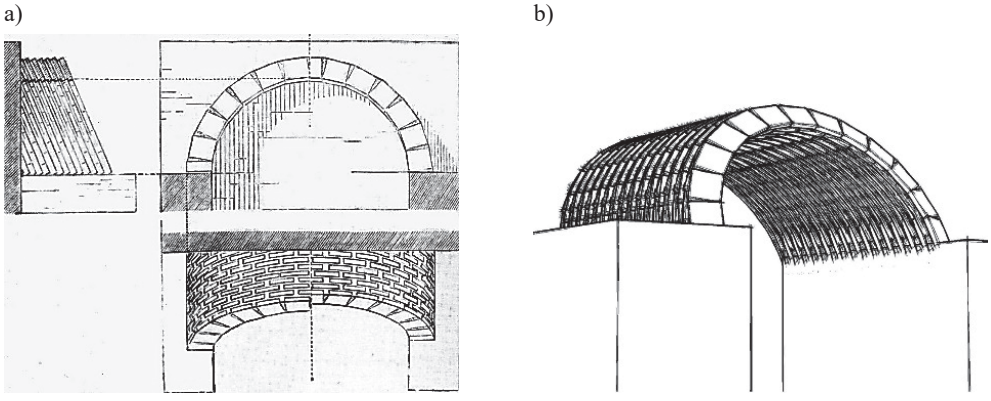
[5] Also called the Treasury of Atreus – the vault of the tomb (14,60 m in diameter, 13,30 m high) were built out of stones that were picked and shaped with great care.

[6] It is the upper part of a hollow sphere, often with an oculus – the most famous example is the Pantheon in Rome.

[7] Also called a compound dome or a dome resting on pendentives.



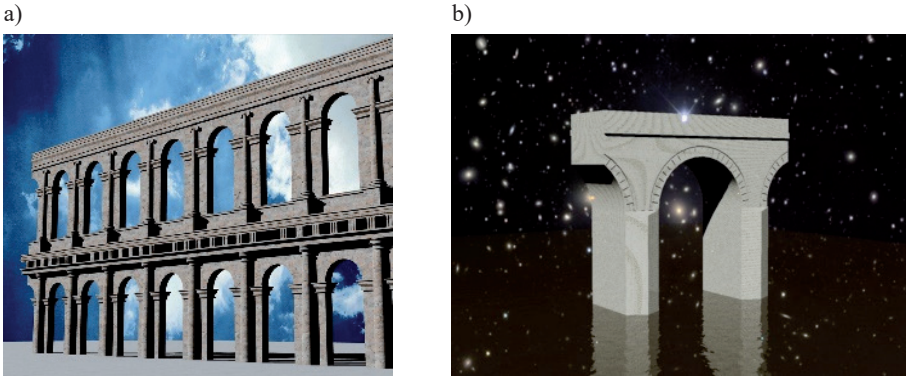
Ill. 1. Examples of corbel vaults: a) Corbel vault in the Red Pyramid in Dahshur, built for the pharaoh Sneferu of the IV dynasty, b) A digital sketch of a corbel vault, c) Corbel vault in the Chapel of Hatshepsut in her temple in Deir el-Bahari, d) A digital sketch of a corbel vault, e) The interior (dome) of the tomb of Clytemnestra (http://dzieckowdrodze.com/mykeny-najgorsi-rodzice-swiata (access: 02.12.2016), f) A digital sketch of a corbel dome



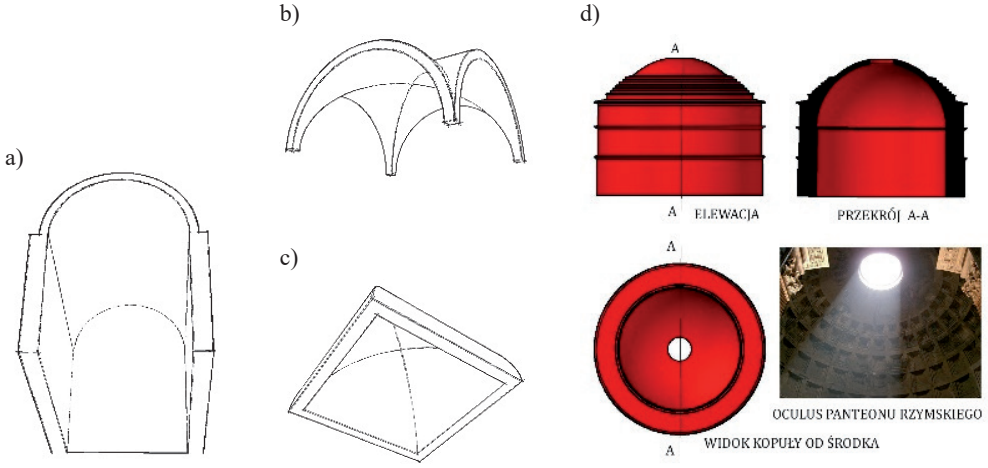
Ill. 2. A vault constructed out of fired ceramic tiles bound with clay: a) Three views of a barrel vault (source: https://en.wikipedia.org/wiki/Vault_(architecture), author: MOSSOT), b) Perspective drawing of the vault

by making them taller (and giving them the shape of a pointed arch). New variations of the groin and rib-groin vaults were introduced through the introduction of ribs and ever smaller divisions of the space between them, in the form of the **tripartite vault**[8], the **multipartite**

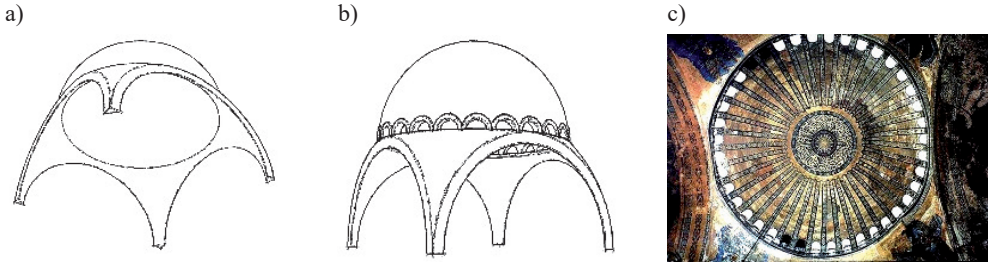
[8] Also called the "Piast" vault or the nine-part vault.



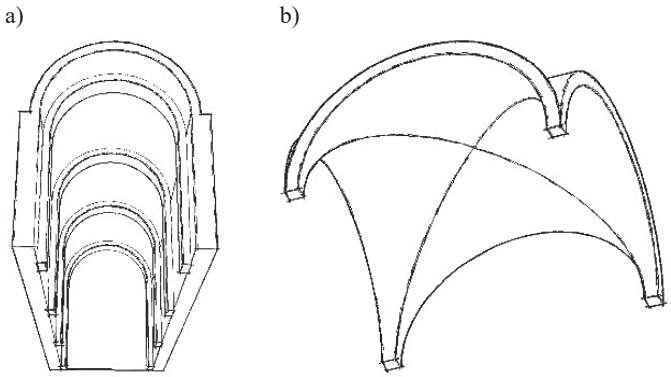
Ill. 3. Models of structures which employ arches



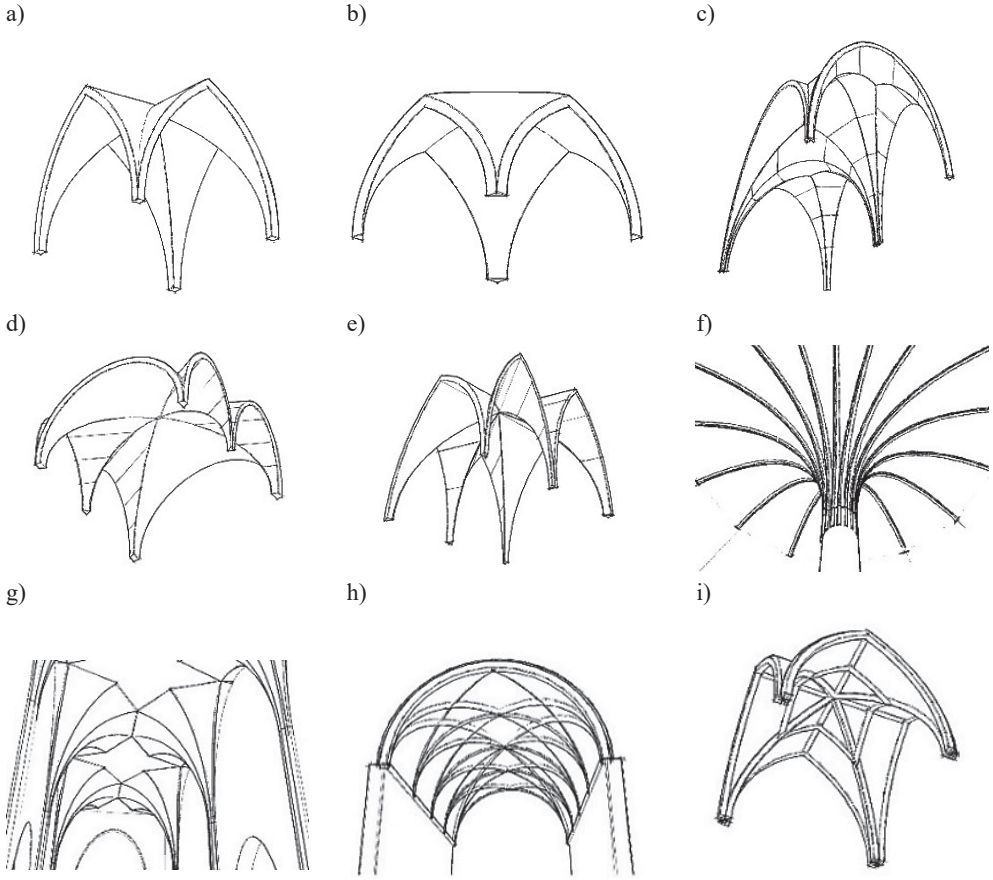
Ill. 4. The most common types of vaults used in Ancient Rome: a) barrel vault, b) groin vault, c) cloister-vault, d) Roman dome – floor plan and cross-section



Ill. 5. Byzantine compound dome: a) Digital sketches of a byzantine compound dome, b) Digital sketches of a byzantine compound dome with a ring of windows at its base, c) View of the interior of a byzantine compound dome – the dome of the Hagia Sophia (http://www.agiasofia.com/archit.html (access: 18.04.2016)



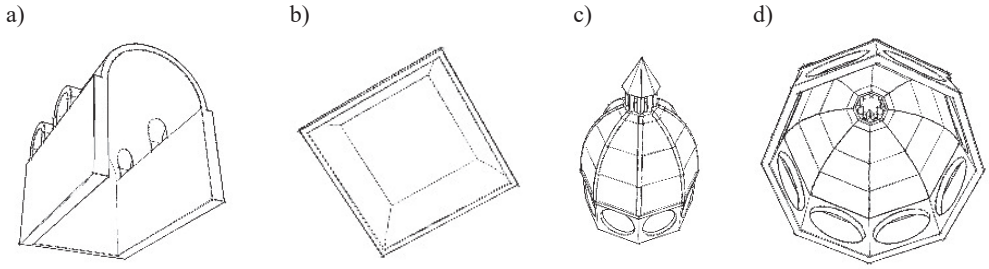
Ill. 6. Digital sketches depicting examples of vaults used during the Romanesque period: a) Barrel vault with transverse arches, b) Groin vault



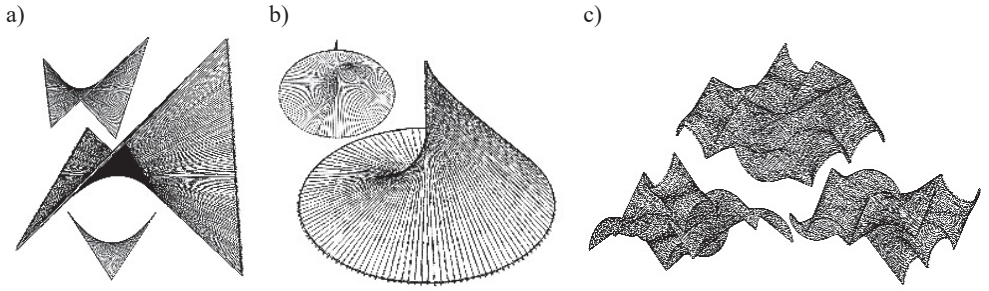
Ill. 7. Digital sketches of gothic vaults: a) groin vault with pointed arches, b) open cloister-vault, c) tripartite vault, d) sexpartite vault on a square base, e) cross sexpartite gothic vault on a square base, f) pillar fan vault, g) fan vault, h) net vault, i) stellar vault

vault[9], the **net vault**, the **stellar vault**, the **pillar-based fan vault** and the **fan vault** (Ill. 7). The introduction of very fine divisions and the replacement of lierns with curvilinear surfaces – saw the introduction of the **diamond vault**[10].

The Renaissance was a period when **barrel vaults with lunettes** and **tray ceilings** were most often used. It also saw the introduction of the **renaissance dome**[11], e.g. the dome of the Santa Maria del Fiore cathedral in Florence (Ill. 8) [7, 9].



Ill. 8. Digital sketches of renaissance vaults: a) Barrel vault with lunettes, b) Tray ceiling, c) Renaissance dome viewed from the outside, d) The interior of a Renaissance dome



Ill. 9. Digital sketches of thin-walled vaults

The following periods feature the use of vaults that were known in earlier times, with geodesic domes and various thin-walled shells based on circular, parabolic, hyperbolic and other curves being used from the XX century onwards(Ill. 9).

It is worth adding that the cultures which originated in the region of the Mediterranean Sea were not the only ones to use vaults. In Mesoamerica, for instance, **corbel vaults** were used as ceilings in burial crypts (The Temple of Inscriptions in Palenque) or rooms (Temple of Warriors – Templo de los Guerreros in Chichén Itzá) or arched passages – gateways (Ill. 10).

[9] For instance a sexpartite vault with a square base.

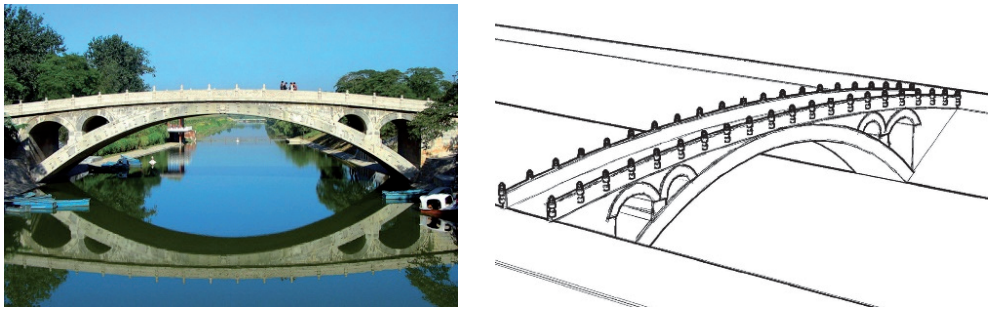
[10] Forming early examples of deep beams (thin-walled covers made out of flat elements – with the shape of a rectangle, trapeze or triangle, connected at a given angle).

[11] Which is based on the cloister-vault, which means it was based on cylinders rather than a sphere.

a) b) c)

Ill. 10. Corbel vaults in Mayan buildings: a) The tomb of K'inich Janahb Pakal I in the Temple of Inscriptions (http://przedkolumbem.blogspot.com/2013/01/miasta-majow-palenque-stan-chiapas_15.html (access: 18.04.2016) in Palenque, b) The Southern Temple, the so-called Nunnery in Uxmal http://www.mexicoentero.pl/pages/przewodnik_jukatan/strefy_archeologiczne/uxmal (access: 21.06.2015), c) Digital sketch of a corbel vault

a) b)



Ill. 11. The Zhaozhou stone arched bridge in Zhao Xian, from the year 605 (China): a) a photograph of the bridge, b) digital sketch

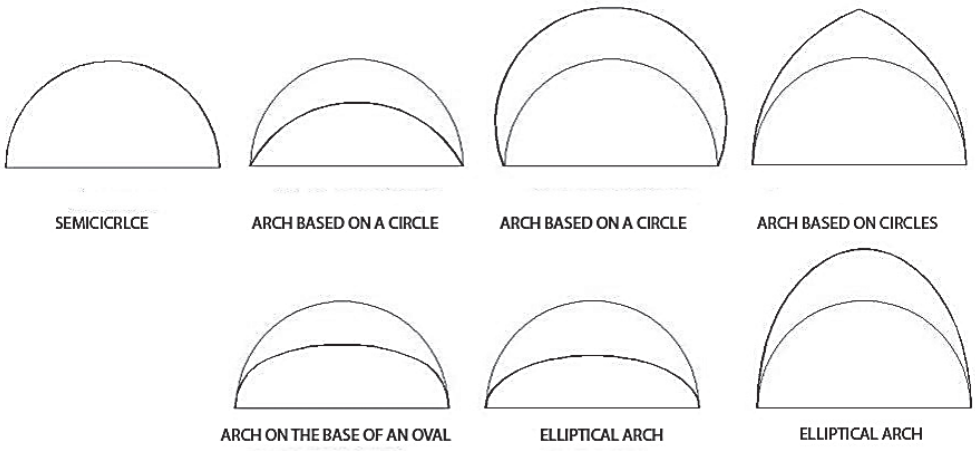
Vaults were also present in the Middle Kingdom. For instance, over ten tombs from the Han dynasty period (206 BCE – 220 BCE) have been found. Many of them feature arches, vaulted chambers and roofs in the form of domes [11]. Another example is the arched Zhaozhou stone bridge in Zhao Xian, Hebei province, built in the VII century AD – its vault is shaped in the form of a surbased arch (Ill. 11) [2]. This is not an isolated example.

The digital modelling of barrel vaults

When designing or studying buildings and structures, it was and still is common to build a model of them. In the past, these were realistic models made out of various materials, such as: wood, plywood, balsa wood, cardboard or gypsum. Currently, it is increasingly more common to build a digital model.

When building a model of a vault in AutoCAD, we need to remember that "there is no single path to our goal" in this program. Any object can be constructed in a multitude of ways, which means that we need to adopt the approach that is the fastest or the simplest in any given case. However, regardless of the approach that we are going to adopt, the first thing to do is to determine the structure of a vault, which is associated with its geometry. This paper is going to illustrate the stages of the construction of digital models of barrel vaults, which are a basis for the modelling of other types of vaults, such as cross vaults, pillar-based fan vaults or cloister vaults in all of their myriad variations.

A barrel vault is created when its head, in the form of an arch (Ill. 12) is extruded along a path (which forms the axis of the vault), with or without increasing its radius.



Ill. 12. The various types of arches which can serve as the shape of the head of a barrel vault

In the past, barrel vaults were usually made out of stones in the shape of a voussoir, bound in a running pattern, but they can also be made out of brick or concrete. Such a vault forms a single, continuous half-cylinder, or it can be divided into a series of smaller sections with the use of transverse arches.

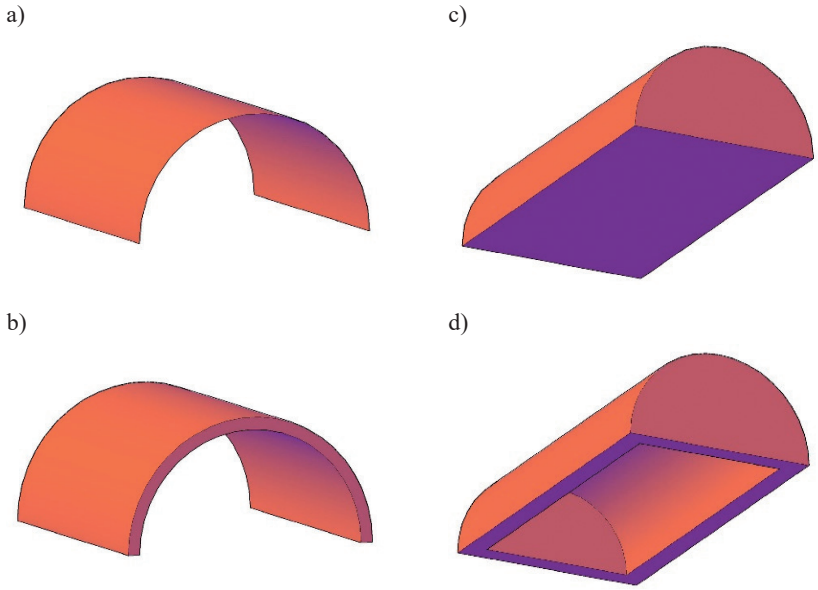
Vaults of this type can be categorised depending on the shape of the head of the barrel vault – the arch in their transverse cross-section (Ill. 12) – into: **surbased barrel vaults** (the shape of the transverse cross section is a fragment of a circle), **raised barrel vaults** (the shape of the transverse cross section is one side of an ellipse – standing on its shorter axis), **flattened barrel vaults** (the shape of the transverse cross section is one side of an ellipse – standing on its longer axis) or the **pointed barrel vault**s (the shape of the transverse cross section is composed out of two arches which cross each other, the diameter – in the case of a circle – or axis – in the case of an ellipse – of which is larger than the distance between the longitudinal walls of the room covered by the vault).

The creation of a model of a vault can involve the following steps:

– the extrusion of the line of the shape of the vault, providing us with a surface that has the desired shape – the shape of the vault is obtained by using such commands as: *Circle*, *Ellipse*, *Polyline*, *Trim*, *Join*, and then, using the *Extrude* command, using

a given length, we can obtain a surface with the desired shape which depicts our vault. Afterwards, we should give it an appropriate thickness – convert the surface into a solid using the commands *Modify → 3D operations → Thicken* (Ill. 13a, b).

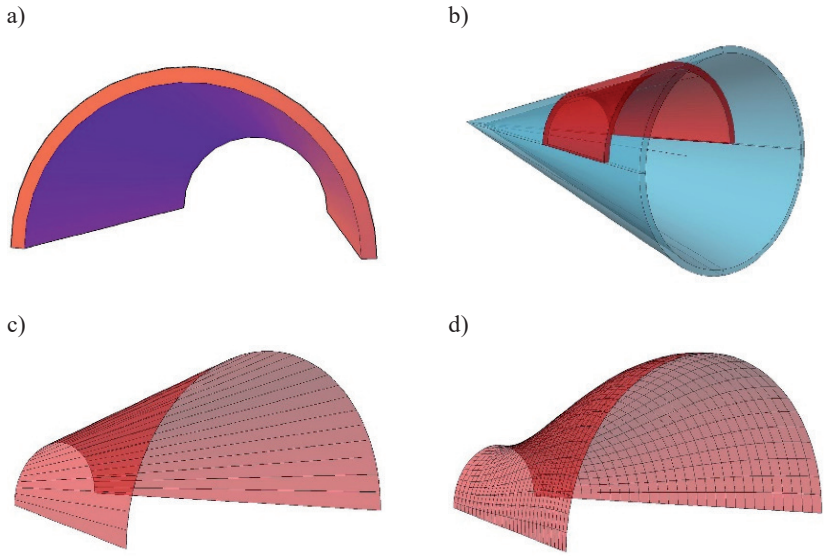
– the extrusion of a cross section created from a line which delineates the shape of the vault and its horizontal closure, creating a 3D solid, which has three walls that are surfaces, while the remaining part has the shape of the desired vault. Afterwards, we can convert the solid into an empty shell with a wall of a desired thickness by removing excess walls with the use of the *Shell* command (Ill. 13c, d).



Ill. 13. The creation barrel vault models in AutoCAD: a) A surface shaped like the desired shape of the vault, b) A barrel vault obtained by adding thickness to the surface, c) A 3D solid shaped like a vaulted room, d) The carving out of the barrel vault

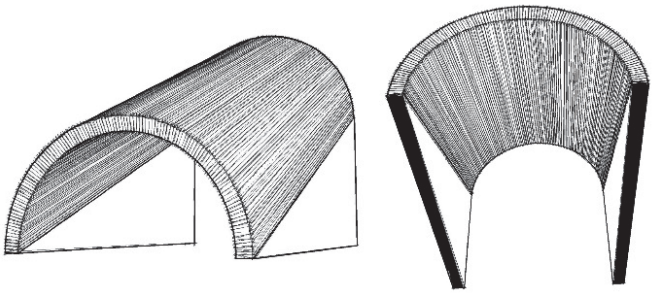
In addition, we can divide this type of vault into the following categories:

– **conical barrel vaults**, in which the vault covers a room with a trapezoid floor plan. We can create a model of such a vault using various approaches. For instance, we can create it by revolving the cross section of the floor plan of one of the walls placed at an acute angle to the axis of the room (*Revolve*) creating a 3D solid (Ill. 14a), or one of the arms of the trapeze of the floor plan of the room (*Revolved surface*) creating a mesh, which should then be converted into a sold by thickening it (*Thicken*). Another approach is the creation of a circular cone (*Cone*), with the floor plan of the room being a fragment of the cross section of the cone at its axis, and then carving the cone (using the *Shell* command) and cutting away its redundant parts (the parts located outside of the floor plan) (Ill. 14b). We can also use meshes to make the model, in the form of the *Ruled surface* command (Ill. 14c), *Edge surface* (Ill. 14d), and then assigning them with a thickness afterwards (*Thicken*) in order to convert them to solids;



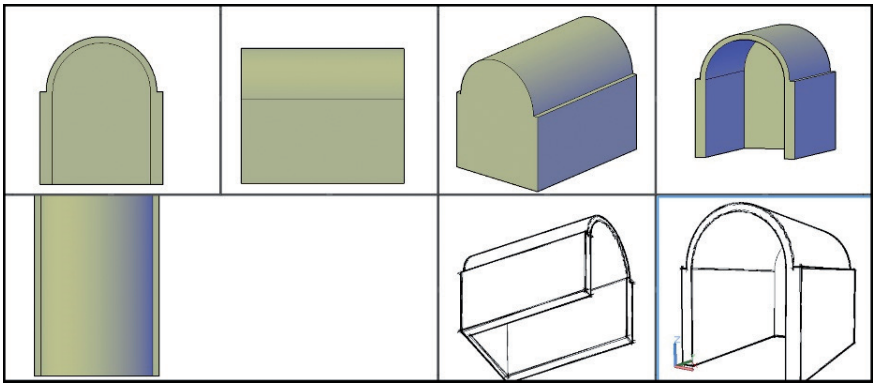
Ill. 14. Examples of methods of creating a model of a conical barrel vault in AutoCAD: a) The solid is created by revolving the cross section of a wall, b) The vault as a fragment of a carved out cone, c) The shape of the vault in the form of a ruled surface (mesh), d) The shape of the vault in the form of an edge surface (mesh) – in this case we have an example of a conical barrel vault with a deformed barrel

– **raised barrel vault**, in which the axis of the barrel is at an angle to the floor, which results in walls of variable height (Ill. 15). Such a vault is usually used in staircases. We can also construct a model of such a vault in a number of ways. For instance, we can build the model of our vault by drawing a shape of the outline of the cross section of the walls and the vault in their highest position by using the *Extrude* command along a path, which is a line placed at a given angle. All that we need to do afterwards is cut away the redundant fragments of the walls by using either the *Cut* or the *Subtract* command. Another approach is the creation of a surface in the shape of the desired vault by *Extruding* an arc along a path that is analogous to the one in the first example. We should then assign our vault with a thickness by using the *Thicken* command – thus turning a surface into a solid, extruding the walls and or perhaps the vault itself by using the *Extrude* surface command. Finally, we cut away the excess elements. We can also construct a model of this type of vault by making it a mesh (a ruled surface). In order to do this, we need two defining curves made from arches at each end of the vault, which enables us to use the *Ruled surface* command. After creating the mesh, we need to thicken it by turning it into a solid and model the walls. In order to do so, we can construct box-shaped solids (using the *Box* command) with bases of the same shape as the walls on the floor plan, and then cut them along the incline of the vault;



Ill. 15. A sketch of a raised barrel vault made in AutoCAD

– **straight barrel vaults** are constructed so that the axis of the vault is a straight line that is perpendicular to the head of the vault. A model of such a vault can be easily made by drawing its transverse cross section, and then extruding it along a desired length. Due to the fact that in barrel vaults (in the real world) the walls bear the vertical load (the weight of the vault) and the horizontal load (lateral forces), it is advised to make them thicker than the vault itself. Should this not be done during the drawing of the transverse cross section of the room, it can be performed after creating the solid by extruding it to a desired thickness (using the *Extrude surface* command), or by placing additional box-shaped solids and combining them with the existing model (Ill. 16);

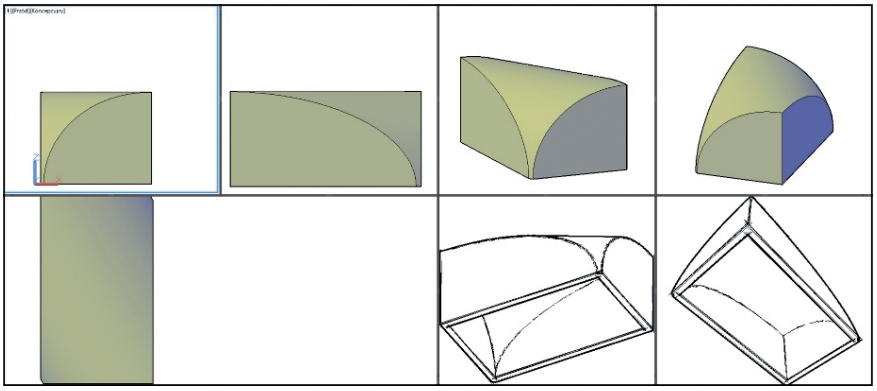


Ill. 16. Model of a straight barrel vault with widened walls absorbing the load from the vault, constructed in Autocad – to the left we can see the three basic views, while to the right there are axonometric and perspective views of the model of the vault

– **slanted barrel vaults** are vaults in which the axis of the vault is a straight line placed at an angle to the walls of the room. When creating a model, we need to begin by drawing the floor plan of the room, the axis of the vault[12] that is being modelled and

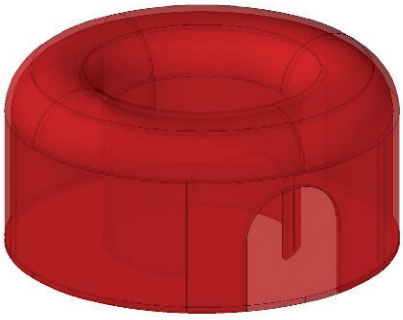
[12] The example features a vault axis that is diagonal to its floor plan, but it can be set at any angle.

the shape of the bay[13] (two circles that share the same centre – the internal outlines the shape of the vault while the external delineates its thickness). Afterwards, the circles are then rotated along the axis of rotation, which is perpendicular to the axis of the vault and which crosses their centrepoints. We define the thickness of the walls of the room and move both circles along with their diameter (the axis of rotation when rotating them into a vertical position) outside the room in the direction of the axis of the vault. By extruding the internal circle and the floor plan of the room we then obtain a cylinder and a box, which we then intersect. These operations are then repeated on the external circle and the rectangle that outlines the thickness of the walls. Finally, we should subtract the internal solid from the external solid in order to obtain a model of this vault (Ill. 17);

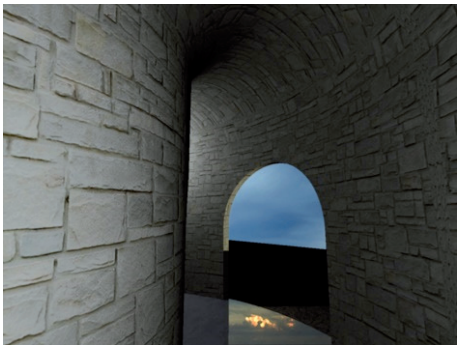


Ill. 17. A model of a slanted barrel vault arch made in AutoCAD – to the left we can see the three basic views, while to the right are axonometric and perspective views of the model of the vault

a)



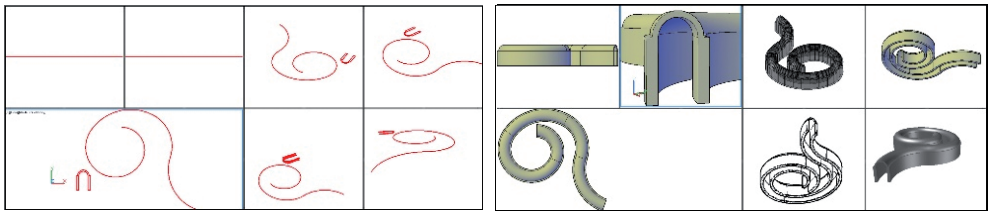
b)



Ill. 18. A torus-shaped barrel vault: a) Digital model of the vault, b) A rendering of the interior

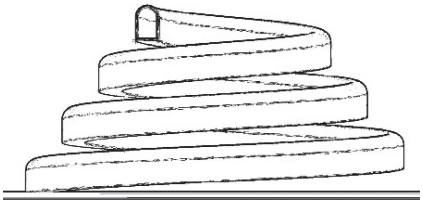
[13] The model in the example is going to be based on a cylinder, the axis of which is the same as the axis of the vault, so the transverse cross section is going to be a semicircle.

a) b)



Ill. 19. Creating a torus-shaped barrel vault with a freeflowing path: a) Using the outline of the transverse cross section as the element to be extruded and the axis of the vault as a flat, smooth line composed of a series of arcs which smoothly merge with each other, b) The model of the vault obtained by extruding the cross section of a normal vault along the given path

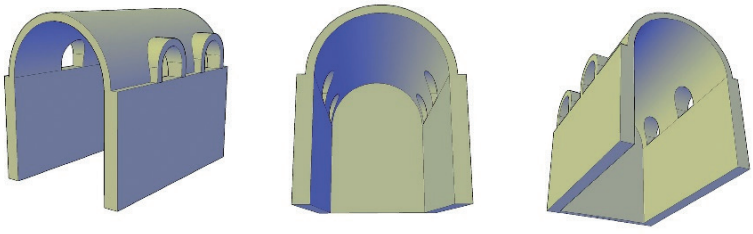
– a **torus-shaped barrel vault** is a type of vault in which the axis of the vault is a circle or a fragment of it. Such a room usually surrounds a courtyard or some other type of central room. In order to build a model of this vault, we need to use the *Torus* command and then cut away any excess fragments and sculpt the resultant solid into the desired shape (Ill. 18), or draw a path and a transverse cross section of the vault (or just the shape of the vault, although it will require assigning a thickness to the resulting surface), and then extrude it along a path (*Extrude*) (Ill. 19).



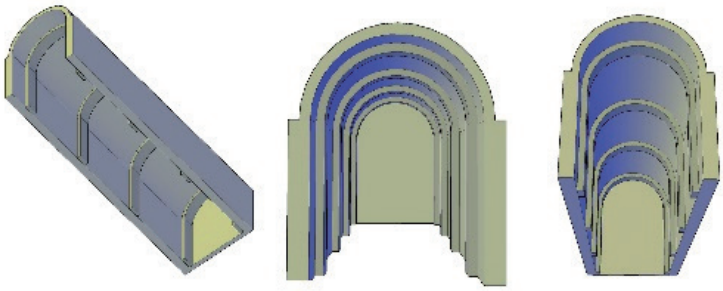
Ill. 20. A sketch of a spiral-shaped barrel vault

– **A spiral-shaped barrel vault**, when the axis of the vault is a line in the shape of a spiral. When creating a model of this type of vault we need to to draw a transverse cross section of a vault (which is its normal cross section), as well as a path, which is going to be a helix (using the Helix command), along which the cross section is then extruded (Ill. 20).

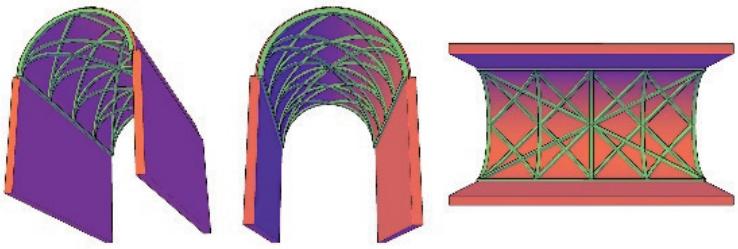
Other variants of the barrel vault include the **barrel vault with lunettes** (Ill. 21), the **barrel vault with transverse arches** (Ill. 22) as well as the **net vault** (Ill. 23).



Ill. 21. Barrel vault with lunettes



Ill. 22. Barrel vault with transverse arches



Ill. 23. Net vault

The first of these, **the barrel vault with lunettes**, is a long barrel vault with smaller barrel vaults[14] cutting into it from the sides, of a smaller diameter than the main vault itself. When creating a model of such a vault, we should first create a model of the main barrel vault and then model each lunette, so that they can be later combined into a single model. The lunettes are simply smaller barrel vaults, and the basic problem that needs to be solved here is their connection to the main vault.

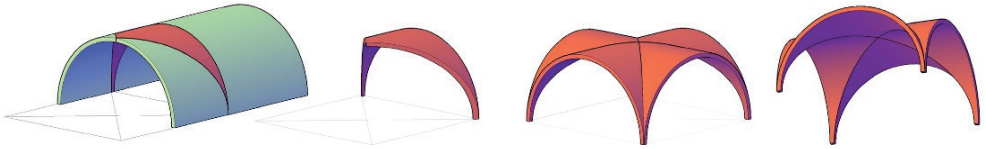
When creating a model of **a barrel vault with transverse arches**, we should begin by creating the barrel vault and then focus on modelling the vault belt, multiplying it, and thus dividing the main vault into sections.

When creating a model of the third type of vault, **the net vault**, we should also start by modelling the barrel vault, on which we will then place a pattern of criss-crossing ribs. In order to do so, we need to place lines on the barrel vault, which will form the desired pattern, and which will simultaneously form paths for the cross sections of the ribs that are going to be extruded along them. Combining the barrel vault with the resultant latticework will result in a net vault.

[14] It is then called a lunette vault.

Conclusion

Using barrel vaults as a base, we can create various other types of vaults, using cylinders, cones or tori (Ill. 24). The principles of creating them are analogous to the ones used in creating models of barrel vaults. This is why they will not be discussed in this paper.



Ill. 24. The use of a barrel vault in the modelling of a cross vault

The creation of various types of digital models is a very important in the professional life of architects and engineers. After creating a virtual model of, for instance, a vault, they can thoroughly analyse it. This allows them to see not only the solid, but also "enter" the interior of a structure and check how a given room is going to be perceived, for instance, from the perspective of a standing person. A model, once built, can be altered by changing such parameters like its material, colour, lighting etc. A designer can thus change its properties multiple times, obtaining comprehensive information about its surface area, volume and many other physical properties each time.

Ill. 25. An example of the changes in the appearance of an interior caused by materials, colour and lighting

It also pays to remember and reuse tried and tested structures which had been developed in the past, and even improve upon them.

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KATARZYNA HODOR, MAŁGORZATA SAWICKA*

THE ROLE OF LANDSCAPE ARCHITECTURE IN THE PROCESS OF REVITALISING RURAL AREAS

ROLA ARCHITEKTURY KRAJOBRAZU W PROCESIE REWITALIZACJI WSI

Abstract

The discussion contained in the paper highlights the relationship between the process of revitalisation and the specialisation of landscape architecture. This is an artistic, professional and scientific field that is focused on the theoretical foundations of shaping landscapes and the development of practical methods of designing them. Revitalisation, on the other hand, is defined as a process of the internal renewal of degraded urban or rural spaces. In order to develop a proper plan of action, it is necessary to perform various types of analyses with the aim of discovering the source of the crisis that has taken hold of a given area, as well as determining the natural and cultural values which define the identity of an area, on the basis of which, the right decisions regarding the composition of its space can be made. This paper also provides examples of rural areas in the west of Germany that have undergone multi-aspect renewal, as well as efforts that are being made in relation to rural areas located in Poland. These examples highlight the interdisciplinary nature of the process of revitalisation and its key issues: those of establishing spatial harmony and the preservation and highlighting of the heritage of the landscape.

Keywords: landscape architecture, revitalization, renewal of rural areas

Streszczenie

Niniejsze rozważania mają na celu wskazanie związków procesu rewitalizacji ze specjalizacją jaką stanowi architektura krajobrazu. Jest to dziedzina artystyczna, zawodowa oraz naukowa, zajmująca się tworzeniem teoretycznych podstaw oraz opracowywaniem praktycznych metod projektowych kształtowania krajobrazów. Rewitalizacja natomiast definiowana jest jako proces wewnętrznej odnowy zdegradowanych przestrzeni urbanistycznych bądź ruralistycznych. Do ustalenia prawidłowego programu działań niezbędne jest wykonanie różnego typu analiz mających na celu m.in. poznanie źródła kryzysu danego obszaru, jak również ustalenie wartości przyrodniczych i kulturowych, wyznaczających tożsamość terenu, na podstawie których podejmowane są właściwe decyzje dotyczące kompozycji przestrzeni. Artykuł przedstawia także funkcjonujące po przeprowadzeniu wieloaspektowej odnowy obszary ruralistyczne na terenie zachodnich Niemiec oraz działania na gruncie polskich wsi. Przykłady te podkreślają interdyscyplinarność procesu rewitalizacji, w którym szczególnie istotne są kwestie zaprowadzania ładu przestrzennego oraz zachowania i podkreślania dziedzictwa krajobrazu.

Słowa kluczowe: architektura krajobrazu, rewitalizacja, odnowa wsi

* Ph.D. Eng. Arch. Katarzyna Hodor, M.Sc. Eng. Arch. Małgorzata Sawicka, Institute of Landscape Architecture, Faculty of Architecture, Cracow University of Technology.

1. Introduction

Professional education in the field of landscape architecture has a short tradition in Poland. The term itself was first described in Poland by T. Tołwiński, by referencing it to the two-dimensional process of planning: "Landscape composition, by rounding out the two-dimensional plan with a detailed layout of space and the forms of the elements that make up the landscape, shapes the landscape architecture out of the natural background, out of the works of engineering, the buildings, the housing estates, the cities, gardens and farm fields". It became regarded as a separate artistic, professional and scientific field towards the end of the XIX and the beginning of the XX century in the United States of America [1, p. 5–6; 17, p. 192–193]. It was there that Charles William Elliot (1834––1926) defined it as an art, the most important function of which being "the creation and preservation of beauty in the surroundings of human dwellings and in the wider natural scenery of the country" [25, p. 27]. Ever since the period when the profession first began to be formalised, its field of interest greatly expanded [14, p. 27]. The specialisation that is being discussed can currently be described as interdisciplinary, which is also highlighted by the fact that landscape architecture at the Faculty of Architecture at Cracow University of Technology has been assigned to the educational areas: technical sciences, agricultural science and arts. The educational results refer to areas such as architectural and urban design, general design, construction, the shaping of the environment, gardening, the history of art, the science of cognition and social communication, as well as sociology [25, p. 36]. The development of the field of landscape architecture is visible in the rapidly expanding subject literature – this focuses on such issues as social participation, which is also an important element of the process of revitalisation.

By highlighting the interdisciplinary nature of landscape architecture, the specialisation seems to be the answer to the difficulties currently faced by modern rural areas. In the preamble to the *European Landscape Convention*, there is a passage that states that "the landscape contributes to the formation of local cultures and that it is a basic component of the European natural and cultural heritage, contributing to human well-being and consolidation of the European identity" [2, p. 564]. The problem tied to the exposition of the qualities of rural areas, which include their cultural value, is an important issue concerning the preservation of heritage and identity. Over the last five decades, there has been no emphasis on these types of efforts, and the changes that were introduced to spatial planning after the year 1989 have caused another wave of destruction of valuable rural structures. We are currently observing a state of chaos in rural areas, both in their architecture and planning, as well as the construction of new buildings that have no connection to the cultural context of their location – this leads to an irrevocable loss of cultural value. Around 70% of areas that are being built upon have no spatial plans in place, this worsens the problem of chaos [4, p. 44].

The destruction of the surroundings is accompanied by degradation on the social plane. It manifests itself through unemployment, crime and a lack of demographic balance; it is also tied to the phenomenon of depopulation, the cause of which lies in, among other causes, the population's flight to the cities and emigration abroad in search of better paid employment [3; 16].

The Opolskie Voivodship has become an important centre for promoting the revitalisation of rural areas, pointing to the need for urgent action, and has become the site of the

establishment of numerous organisations that support these processes, for instance: Fundacja Wspomagania Wsi (The Rural Development Foundation) and the Polish-American Freedom Foundation [5]. These operate on the basis of experience gained in regions of Western Europe. Among these, the Rhineland-Palatinate region is especially worthy of mention, as it is the location of the cases that are going to be discussed later in this paper.

2. The state of the research

The definition of revitalisation contains terms that relate to internal renewal [24, p. 21–29]. It can be based on efforts aimed at the repair of both the architectural and spatial structure. It is necessary for these efforts to be integrated with the re-establishment of social and economic ties. Otherwise, it is simply not a process of revitalisation in the modern sense, but rather a revalorisation or renovation. In this context, the definition of revitalisation is explained by W. Kłosowski in his publication: *Wymogi wobec Lokalnych Programów Rewitalizacji pod kątem ich zgodności z wymogami ZPORR*.

Among the many publications on the topic of the revitalisation of rural areas, there is a large amount of that have been written by landscape architects. The problems and definitions associated with revitalisation have been discussed in detail in the doctoral thesis by M. Wilkosz-Mamcarczyk [24]. The aspects of spatial planning of rural areas and landscape architecture were discussed by I. Niedźwiecka-Filipiak & Z. Kuriata [8;9], M. Rzeszotarska-Pałka [19; 20; 21]. The general topics regarding participation have been described by K. Pawłowska and her team [10; 11]. The work of A. Staniewska is an important publication that discusses the complementation of renewal efforts using public participation, in addition to broadening the research on Stary Paczków [16]. A revitalisation project was discussed as a case study in a paper by K. Hodor & J. Klimek [3].

a) b)

Ill. 1. *The revitalisation project of the village of Stary Paczków* in the commune of Paczków: a) Existent state, b) Visualisation: the state after the carrying out of the parts of the project meant to reintroduce harmony to the landscape (prepared by M. Sawicka 2013)

Furthermore, the course of revitalisation efforts undertaken in the Opolskie Voivodship were discussed by R. Wilczyński & W. Idziak [5; 23], as well as by I. Solisz [15], who explored the topic of conservation. These works also clearly illustrate the importance

of the landscape, even though their authors are not members of the landscape architect profession themselves.

The intensity with which new publications in the Polish language on the topic of revitalisation are being published has been especially evident in recent years, ever since the danger of the irrevocable loss of the substance of Polish rural areas has been made widely known. The conservation offices of all voivodships have provided information that only 3% of Polish villages have well-preserved rural structures.

The currently enforced acts of law that determine the regulations regarding the process of revitalisation are: The Revitalisation Act of the 9th of October 2015, the European Landscape Convention, and *Narodowy Plan Rewitalizacji 2022. Założenia, Wymogi wobec Lokalnych Programów Rewitalizacji pod kątem ich zgodności z wymogami ZPORR* (National Revitalisation Plan 2022. Premises, Requirements for Local Revitalisation Programmes regarding their compliance with the requirements of ZPORR).

The currently employed methods of the revitalisation of rural areas are based on the concept of 'rural renewal'. The experiences gained in Western Europe show us the manner in which this process has evolved. During the second half of the XX century, a model called 'modernisation' was being implemented – based on the joining together of farmland which destroyed the original rural character. This model was subsequently replaced by the 'facade renewal', popular until the year 1975, which concentrated on the establishment of a professional cadre that would help in spreading awareness about the desired patterns in architecture and ruralism. Another step in the search for the answer to the problems of rural areas (depopulation, unemployment, the ageing of society) was the process of 'social and spiritual renewal', based on a stronger cooperation with the residents, motivating them and stimulating their creativeness. Thus, the latest model of the evolution of the search for a means of preserving rural heritage became sustainable development, which has been implemented since the year 2000 [5, p. 17–24].

3. Theory and practice on the example of the area of rhineland-palatinate

The need for the revitalisation of the rural areas of Europe is the result of civilizational changes, tied with the gradual decline in the importance of agriculture, which in turn leads to changes within the spatial structure [8, p. 11]. The renewal of rural areas in the Rhineland-Palatinate area has been ongoing for 30 years – it has been introduced in stages and has a support system often based on the grassroots initiatives of its residents and the members of community councils and government offices. Its basis was the inventory of the existing substance and the development of spatial development plans. The evaluations were made taking into account the: determination of areas for housing and industry, the phases of the evolution of the built environment, the local materials, as well as an evaluation of the development of the population, based on an analysis of the age structure of the population. A community profile created in this manner made it possible to pinpoint problems and identify future repair programs. The outlining of the phases of the evolution of a community makes it possible to establish zones of high quality aesthetics, determine the number of abandoned buildings and those which are likely to become abandoned in the subsequent ten years. The monitoring of the built environment along with its accompanying structures is based on expertise regarding their

technical condition, demographic analyses and questionnaires which aid the identification of the ownership structure of an area, allowing negative changes to be avoided. Attention is focused on the centres of rural areas so that the bulk of the construction efforts would be in those locations. There are also optional changes of forms of use and the modernisation of road infrastructure. The quality of life of the population is also a part of the evaluation, for instance, in the form of an assessment of the amount of public spaces, the technical condition of infrastructure and other elements. In terms of social issues, depending on the age structure of the inhabitants and their needs, different forms of support become involved. Important efforts in this regard include specialist care for the elderly, organising access to basic products and occupational therapy. Apart from these efforts, numerous associations work on providing elderly persons with free meals, as well as initiating neighbourly help in the form of providing carers for senior citizens. Such a robust network of support has been developed in the village of Rumbach, located in the association community of Dahner Felsenland in the Südwestpfalz district of Rhineland-Palatinate, numbering around 480 inhabitants who are mainly employed in agricultural tourism. Historical buildings gain new importance after having their exteriors renovated, providing inhabitants with day care centres, kindergartens, schools and meeting places. Numerous efforts are based on public and private initiatives. Another example is the village of Heinhofen, in the Dudenhofen association community in the Rhein-Pfalz district, which stands out thanks to its well-developed support for families with children (day care centre, kindergarten, school) as well as for a group of immigrants who reside in the village (language learning, speech therapy). Senior citizens, on the other hand, convene once a week at a communal diner, for which there is only a symbolic fee. The organisation of community life is the responsibility of the office of the mayor. The villages that were outlined above receive financial support directed towards the most important projects, depending on the peculiarities of local conditions. Some of the rural communities of the area are focusing on the expansion and the receiving of new inhabitants. The connection between social problems and issues regarding the landscape is thus made visible. The connections include: meeting the needs of the inhabitants through the use of valuable buildings and providing them with new forms of use; the establishment of public spaces – the creation of places and opportunities for inhabitants to meet each other; the shaping of the residential environment in accordance with the principles of sustainable development – spatial planning in the context of a controlled expansion of the built environment, taking into account the *genius loci*.

4. Theory and practice on the example of the villages of the Opole region

The large amount of experience obtained in Western Europe constitutes an important complementation of the methods used in the revitalisation of Polish rural areas. The problem of depopulation and loss of value had earlier been identified there – this led to the development of various methods of approaching both reconstruction and preservation. For instance, the processes of rural renewal were already implemented in Germany, this occurred around the year 1950.

One difficulty in the introduction of foreign models of revitalisation on Polish ground is the processes of participation, which are key to the achievement of success. As mentioned in the introduction, this is a field which is also being explored by landscape architects.

The work of the Landscape Architecture Cultural Foundations Laboratory of the Institute of Landscape Architecture of the Cracow University of Technology deserves a mention here as the experience of its staff has led to the establishment of a social activity stimulation program focused on the historical renewal of rural areas, as well as a program of social participation for the protection and shaping of the landscape, devised under the supervision of Professor Krystyna Pawłowska [10; 16].

Another important publication on the topic that is being discussed is the Stary Paczków revitalisation project, developed at the Gardening and Green Area Design Laboratory of the Institute of Landscape Architecture of Cracow University of Technology [4]. A sizeable part of the text is comprised of a description of the natural, cultural, spatial and socio-economic conditions of the area, as well as analyses of the value of its built environment, its social sphere, the village's development plans, surveys designed to identify the problems of the community and landscape analyses. The rank of the landscape of this village, the historical layout of which has been evaluated as outstanding, is highlighted in the publication *Waloryzacja zabytkowego zasobu wsi województwa opolskiego. Cele, metody, praktyka*, developed in 2010 in order to increase the degree of protection of the cultural heritage of rural areas of the Opole region and improve the state of its preservation [12]. The revitalisation project is based on efforts leading to exposing the value of the area in question. It was important to highlight the details (for instance, those of road and pavement surfaces, spaces of front gardens, timber gates, chapels) which are the elements that define the perception of the landscape. As well as the guidelines for public spaces were established, and the propositions of actions that can be used to stimulate social activity within the community, at the same time leading to the preservation or reinstatement of the harmony of a place were important for the overall programme. A SWOT analysis has also been performed, which indicated that the strengths and opportunities of the area are derived from issues tied to the landscape. The weaknesses and threats included elements of infrastructure, the tourist attractions being offered, as well as issues regarding society and improper intervention in the field of landscape architecture. Thus, it is important that the processes of participation be conducted by specialists in the field of landscape architecture. In the case of Stary Paczków, a number of meetings with inhabitants have taken place – these were used to present the successive stages of the project and the end result in the form of catalogue cards for example of a selection of valuable farms.

Chapter 2, Article 7 of the Revitalisation Act underlines the need to establish a Revitalisation Committee which is to be a consulting body to a commune head, mayor or city president. Placing landscape architects in this role would be a sound choice of action.

5. Conclusions

The examples that have been provided indicate that the process of revitalisation demands the involvement of local governments, the inhabitants of a given space, non-government organisations, economists, historical monument protection authorities, as well as experts in the field of landscape architecture, whose role is the shaping of space and establishing its quality on many levels. The need to take action involving landscape architecture is particularly important for rural areas which are characterised by spatial chaos and the loss of value.

A landscape architect should meet the needs of the local society and the need to cultivate the character and individuality which define a given area against the backdrop of the continent. The wealth of regional diversity is imprinted on the landscape thanks to the protection of the cultural environment, including its natural counterpart. Furthermore, original creations in the process of revitalisation mostly regards giving old forms new functions, adequate to a given socio-economic situation, while at the same time preserving their rural character and halting the negative tendency of conformed rural to urban areas [8, p. 20]. The character of a rural area is contained within its landscape, which is without doubt, seen as attractive by residents of cities.

The requirement of conducting landscape and cultural value analyses has proven itself to be an effective tool in the process of revitalisation. The obligatory presentation of the visualisations of designed or planned solutions regarding landscape architecture during the course of environment impact assessment procedures would be an interesting proposition, underscoring the importance of specialization which is the landscape architecture. In addition, the role of the members of the specialisation that is landscape architecture should include the carrying out of promotional and educational events – transferring the knowledge about the value of the region and its space, and pointing to the use of good practices, so that the inhabitants can become aware of the importance of the surrounding landscape and be able to participate in the renewal of their villages [13].

The most basic component of approaches to the revitalisation of rural areas is the stimulation of the activity of the local community, making it involved in the design of the village. The German experiences show a liberal approach to the principles of conservation and numerous adaptations of farming buildings for residential purposes. Buildings with a more modern form were confined to the outskirts of villages. An important element of the project is the establishment of a rate of return on investments for the construction projects to be carried out in these areas. Revitalisation support programmes are quite robust and are, of course, based on local governments.

The processes that are ongoing in Poland have only just started to be built and are being conducted with minimum funding. The example of the rural areas of the region of Opole shows that the basis for these types of programmes is the striving towards the integration of their inhabitants, increasing their involvement and meeting their needs while at the same time, preserving the heritage of Polish rural areas in combination with rational land management.

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MAŁGORZATA SAWICKA*

MUNICIPAL PARKS IN BIELSKO-BIALA – CONCEPTS AND REALISATIONS FROM 1899 VS. TODAY

PARKI MIEJSKIE BIELSKA-BIAŁEJ – WIZJE I REALIZACJE Z 1899 R. A STAN OBECNY

A b s t r a c t

A regulation plan for the city of Bielsko procured in 1899 described ways of arranging the city landscape in the circumstances of a dynamic industrial growth. The following dissertation is focused on the matters concerning municipal parks. Documents from the 19th century are compared with modern planning documents as well as today's needs and expectations of residents of the city. It also presents the current condition of park greenery.

Keywords: municipal park, cultivated greenery, Bielsko-Biała, town renovation

S t r e s z c z e n i e

Sporządzony w 1899 roku plan regulacji miasta Bielska określał sposoby uporządkowania krajobrazu miejskiego w warunkach dynamicznego rozwoju przemysłu. Niniejsze rozważania skupiają się wokół kwestii dotyczących parków miejskich. Stanowią porównanie zapisów z XIX wieku z obecnymi dokumentami planistycznymi, a także współczesnymi potrzebami i oczekiwaniami mieszkańców miasta. Wskazują również aktualną kondycję zieleni parkowej.

Słowa kluczowe: park miejski, zieleń urządzona, Bielsko-Biała, odnowa miast

* M.Sc. Eng. Arch. Małgorzata Sawicka, Institute of Landscape Architecture, Faculty of Architecture, Cracow University of Technology.

1. Introduction

Municipal parks in landscape composition of the city of Bielsko-Biała gained special worth at the end of the 19th and beginning of the 20th century[1]. Similarly to many other cities of Europe and Poland, Bielsko and Biała were experiencing an era of intense industrialisation, whose aftermath was chaotic development of city planning [6, p. 20–21]. One of the most important requirements in the hygiene of towns was "establishing a healthier relation between people and nature, which was reflected in including green areas and gardens when building towns" [6, p. 54]. An expression of these layouts was the widely propagated idea of a *garden city*, an inspiration to European plans of putting urban structures in order[2].

Max Fabiani, the author of *The comprehensive urban regulation plan of Bielsko* (1899), indicated in the introduction to his work that "a modern urban regulation of cities is characterised by simultaneous grasping and including all possible utilitarian and esthetic aspects". Among them he enumerates e.g.: sanitary reasons, traffic aspects, taking into account market places, squares, waterworks, stately buildings of the city, the comfort of habitat, diversity of buildings as well as municipal gardens and playgrounds [5, p. 8].

Solutions proposed in the document mentioned above are visible in today's layout of the city, although the plan was not fulfilled in its entirety[3]. Providing the context for the plan of the urban regulation of Bielsko from 1899 and its regulations concerning green areas, particularly municipal parks, and presenting modern means and directions of city development in comparison with the users' needs of cultivated greenery will allow for a full understanding of the significance of municipal parks in landscape composition of the city of Bielsko-Biała.

2. Origin and selected layouts of the plan of urban regulation of Bielsko from 1899

The great industrialisation of European cities in 18th and 19th centuries allowed for fulfilling the growing market needs, but at the same time worsened living conditions of the locals, due to pollution and setting up buildings very tightly. Problems emerging within urban structures were researched and described by specialists from various fields (journalists, writers, hygienists, doctors, architects and builders), as well as social activists. Due to relatively late development of industry in Poland, postulates against awful council and housing conditions in expanding cities emerged at the end of the 19th century.

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[1] The city of Bielsko-Biała is located in the southern part of the Silesian voivodeship, in the Silesian Foothills, at the foot of Beskid Śląski and Little Beskids. It emerged on 1 January 1951 as a result of merging two entitities until then separate: Bielsko and Biała. The process of uniting these two in terms of economy and society was already visible in the 19th century [9, p. 7–12].

[2] Ebenezer Howard's (1850–1928) concept of *garden city* was an answer to social and economic problems of England of that era [8, p. 225].

[3] The plan from 1899 was not entirely fulfilled due to economic reasons as well as the protests of some locals, who feared demolitions. A part of the plan was realised after the end of WWI [4, p. 82–83].

Poland then joined the trend of renovation of towns spreading in Europe and lying at the base of the forming modern urban thought[4].

The necessity to create a plan mainly emerged from: "rapid expansion of the lower suburbs and expansion of the city among difficult landform features". Additionally the city administration saw the need for a "cohesive vision focused on the future of holistic regulation". Eventually the document was made in 1899 and its author was a Viennese architect and urbanist, Max Fabiani[5]. In terms of planning, the town of Bielsko outran other Polish cities, e.g. Cracow or Warsaw[6].

The main purpose of Fabiani's document was to solve transport problems between individual quarters and the city centre, and between Bielsko and Biała. The author clearly underlined the importance of proper connection between Bielsko and Biała, although the cities did not constitute a unity at that time [5, p. 11].

The plan also intended getting into order the existing buildings (division into functional zones) and creating a project for urban development of Bielsko in the 20th century, at the same time taking into account protection of historic substance [4, p. 79–80]. Fabiani stressed the importance of parks and city greenery. In a commentary to the regulation plan he proposed an increase in the number of public gardens, particularly important in an industrial city. He also postulated that in an industrial quarter there should be "singled out as many spots for resting and leisure activities as possible for people working there" [5, p. 27]. Some of the premises included in the said document touched upon matters of cultivated greenery in particular locations (Ill. 1). Among them there were:

1. Division of streets into existing ones – situated radially to the centre, and ring roads spreading from that point in concentric circles. Within the ring roads – a proposed compact buildings, outside houses surrounded by gardens, parks and loose buildings;
2. Organising gardens in lieu of cemeteries destined for demolition, accentuating regular division of park areas;
3. Suggestion to enlarge the municipal park near the shooting range (by playgrounds), as far as to the outer ring road – Piastowska street;
4. Preserving the treed promenade by the river Biała;
5. Creating park areas near today's Partyzantów, Młyńska and Batorego streets;
6. Closing the untended low-situated castle garden as well as reorganising the area – creating a residential quarter with central avenue [4, p. 80].

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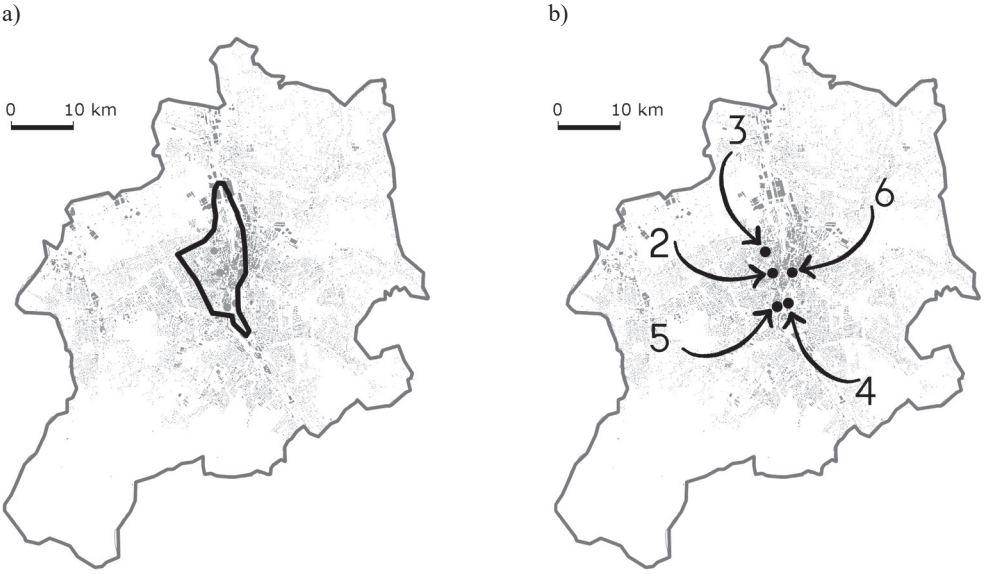
[4] "(...) the development of modern urban thought stemmed directly from the protest we observe in the 19th century against lack of plans and economic conflicts of a capitalist city" [11, p. 9].

[5] Due to the political situation of that time, the urban development of the Bielsko-Biała area grew from Viennese influences. Bielsko was under the Habsburg rule as early as 1526 [2, p. 267]. Biała was joined to Austria in 1772 [9, p. 28]. In this circle Camillo Sitte's conceptions – which treated the city as a work of art – were highly regarded (Sitte was an Italian high-rank official of national authorities, an eminent theoretician of the Viennese school of urban development) [11, p. 11]. Works on the study took over a year and a half. They were however preceded by geodetic measurements of Bielsko and Biała in 1893-4 and inviting foreign experts – e.g. Camillo Sitte and Rtter von Gruber – an Austrian royal counsellor, who in 1898 procured a sketch of the regulation [5, p. 9–10].

[6] In Cracow a contest for a regulation plan for the city was announced in 1909–1910. In case of Warsaw, the city regulation plan was made in 1916 [4, p. 83].



Ill. 1. Map of Bielsko-Biała – current city borders: a) with marked area included in the urban regulation plan of Bielsko (1899), b) with marked cultivated green areas, included in the aforementioned premises (adapt. By M. Sawicka, 2015)

3. Current condition

In current planning documents of Bielsko-Biała there are also passages indicating a widespread recognition of the value of municipal parks due to their aesthetic, hygienic and practical functions. City parks, constituting an important part of cultivated greenery of the city, influence the formation of spatial and health-related conditions in a city by modifying the local climate. They are a place for the locals to rest and exercise[7].

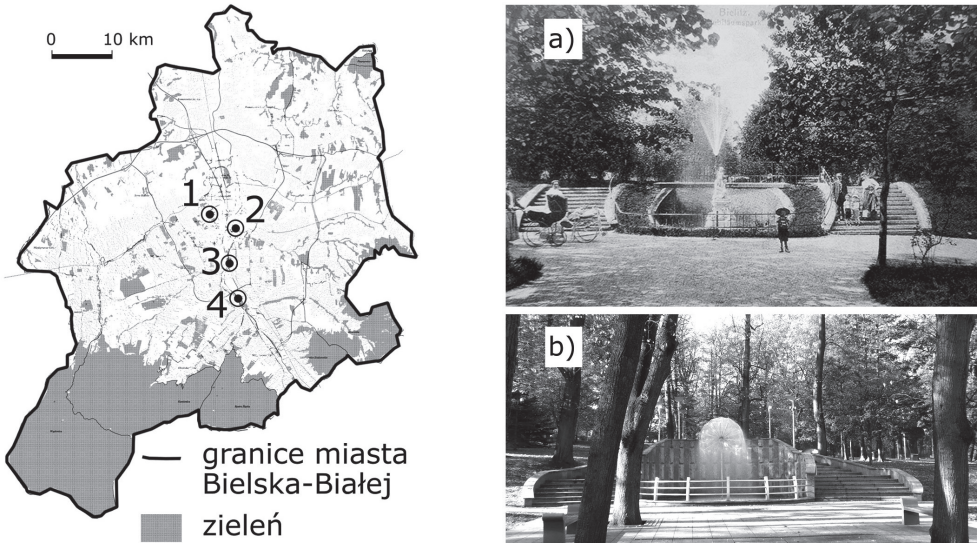
In the landscape composition of the city, the park areas are arranged in a mosaic-like way (Ill. 2). Mostly historic parks are included in this category: the Słowackiego Park, created in 1896, the "Ratuszowy" Park (The City Hall Park) (1898), The Włókniarzy Park (Park of Textile Workers) (first half of 19th century) and the Strzygowskiego Park (ca. 1900).

Although the city of Bielsko-Biała is surrounded by attractive areas of high natural values, the centre lacks an organised, uninterrupted system of cultivated greenery that would be based on historic layouts and would make use of the site of the river Biała[8].

Among tendencies shaping the composition of the city, tightening of buildings needs to be named. Moreover in the last several years there have been other activities having

[7] Examples of cultivated greenery are also greens, cemeteries, family allotments and house gardens, the greenery of sport facilities, housing estates and street greenery [12, p. 29].

[8] Bielsko-Biała directly neighbours mountain ranges reaching along almost the entire southern border of Poland and partly situated within the city area, together with forest areas of reach biodiversity. Such conditions are favourable to the development of tourism and leisure [12, p. 27].



Ill. 2. Current borders of the city of Bielsko-Biała with green areas marked (in grey), including historic municipal parks: 1. Słowackiego Park, 2. „Ratuszowy" Park, 3. Włókniarzy Park, 4. Strzygowskiego Park (Information accessed from the City Hall in Bielsko-Biała, 2012) (adapt. M. Sawicka, 2015). Photographs: Słowackiego Park, view on steps and fountain: 1a) from 1911 [3, p. 117]; 1b) current condition, post-revitalisation (fot. By M. Sawicka, 2015)

a negative impact on the condition of municipal parks, e.g. cutting down the trees shading the Włókniarzy Park. These situations are a proof of a discord between the rules from *Studium uwarunkowań i kierunków zagospodarowania przestrzennego Bielska-Białej* (*A study of the conditions and directions of spatial land management of Bielsko-Biała*) and the existing investment-building practice.

The most important goal presented in *Studium* is "preserving and cultivating natural and cultural values, including protection and efficient development, as well as using historic facilities (with special attention to places entered in the Register of Historic Monuments), historic places, as an ingredient of nature and landscape serving the development of tourist and leisurely functions" [12, p. 120]. The document also intends protection of all existing forms of park greenery, greens and squares against a change of the ways of its usage, and the necessity to create new places "that will enrich the city's system of green areas", especially in its centre [12, p. 123].

The presented rules are, however, quite general. The lack of a detailed plan of protection over Bielsko-Biała's municipal parks and future plans foreseeing their development, can lead valuable parks to negligence.

Not all cultivated green areas of the city are covered by the local plans of spatial development or preservation maintenance. Currently there are works being done over a plan for the area, whose part is the Słowackiego Park. In 2014 a local plan for spatial development was enacted – it introduced a ban on building and was concerned with protection of green areas in Bielsko-Biała. These are specific examples that are proof of a growing awareness about the importance of these areas in city structure.

Alas, there is nothing being done in terms of tending to the greenery and adjusting parks to users' needs. For many years there has been no update of data concerning the condition of greenery. The last stocktaking of plants in the city area took place in 1996. Updating the knowledge in this field would allow for taking proper actions aiming at preventing the greenery from degradation [1, p. 242]. *Expanding and making available the knowledge of natural resources of the city* is on the list of ecological priorities, included in the *Aktualizacja programu ochrony środowiska w mieście Bielsku-Białej do roku 2016 z perspektywą na lata 2017–2020 (Update of environmental protection plan in Bielsko-Biała up to 2016 with a prospect for 2017–2020)* [1, p. 263].

4. Importance of municipal parks in the contexts of users

From the time when Max Fabiani created his regulation plan of Bielsko, there have appeared many new ways of using municipal parks, although the essence of this form of greenery's destination has remained unchanged from the 18th century[9]. Also nowadays these places significantly influence the locals' quality of life.

For the numerous users parks are a zone for taking a break from the city hubbub. Within its administrative borders, the city may have numerous mountainous and forest terrains, but they are located on its southern side, hence they cannot replace green areas in the city centre.

Another group of users are tourists, including business tourists. Municipal parks (together with underslope and forest areas of Little Beskids) should constitute an appealing alternative for the region of Dębowiec, Szyndzielnia and Klimczok [12, p. 64–66].

Those who spend their spare time in an active way visit parks more and more often. Parks become a place where people exercise. Hence it is important that the areas they occupy allow people to take exercise in plain air. A good example of that is a growing number of young parents, practicing fitness while taking a walk with their prams and buggies (Ill. 3).

Another answer to current needs of park users are also very popular concerts organised in the Słowackiego Park.

Alas, many parks of Bielsko-Biała require renovation and replacement of basic equipment (e.g. the park on the Bystrzańska street)[10]. Such actions would increase the number of people making use of this form of cultivated greenery.

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[9] Public gardens established in city areas were designed for common recreational, play and health-related usage [10, p. 266].

[10] The mentioned issues of bad technical condition of parts of parks or landscape architecture are caused by negligence on the part of administration of municipal parks. Another problem is devastation, which is not a result of failure to notice the values presented by a park but constitutes a manifestation of social problems.

Ill. 3. “Buggy Race” – plain air event for families with little children, organised by the association BuggyGym in July 2015 in the Słowackiego Park (http://www.wyscigiwozkow.pl/#! (access: 01.12.2015)

5. Conclusions

Municipal parks of Bielsko-Biała are characterised by historic, natural, aesthetic and cultural values, which merge with functional features. The significance of this group of places in the city landscape are depicted by R. Feliński’s words: „even in cities one does not lose the longing for greenery and nature, created through long centuries of coexisting with nature” [6, p. 55].

Professor A. Mitkowska asserts that the city of Bielsko-Biała “in the sphere of city landscape is continuously being deprived of all manifestations of the charm of historic daily life” [7, p. 14].

In *Studium* the significance of park greenery, greens and squares is stressed and prevention against a change of the way of using these areas is presumed. Such a threat concerns especially the city centre, which lacks green areas constituting a place for everyday leisure activities for the locals [12, p. 123]. Max Fabiani saw the need to increase the number of parks in an industrial city. Current tendencies of tightening buildings seem to create a situation requiring „healing” in a way similar to those implemented in the plan from 1899.

The planning concepts from the end of the 19th century intended treating aesthetic aspects on a par with the practical ones [5, p. 12]. Such thinking was not without realistic vision, but it intended functionality of the city and its artistic aspect as intertwined matters[11].

In the current landscape of Bielsko-Biała municipal parks also constitute an important element of rational urban planning enabling its development and raising the quality of urban composition.

[11] Camillo Sitte was guided by these premises [4, p. 78].

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MARCIN JONAK*

A DIGITAL METHOD FOR THE GENERATION OF ANAMORPHIC IMAGES – VISUALISED IN CONICAL REFLECTIVE SURFACES

CYFROWA METODA GENEROWANIA ANAMORFICZNYCH OBRAZÓW RESTYTUOWANYCH ZA POMOCĄ STOŻKÓW REFLEKSYJNYCH

Abstract

In this paper, the author presents a practical method for the construction of anamorphic images based on their analytical properties that are characteristic of reflective conical anamorphic images. This study is a continuation of the earlier work in which the geometrical principles from a real-life image were described. In this paper, the author presents a set of analytical formulas that are used to describe the transformation together with their digital notation in the MS Excel software. The originally developed analytical model of transformation lets the author generate anamorphic images of any designed objects on the condition that they are represented by the parametric equations. These parametric formulas make the essential condition for enhancing the creation of the final form of an anamorphic image. Some exemplary anamorphic images have been presented here together with their visualisation that has been created with the aid of a prototype, conical-shaped mirror. The solutions presented in this work provide a tool for the precise design and development of anamorphic images within the urban space of a town and in the interiors of a public use.

Keywords: transformation, anamorphic image, visualisation of anamorphic images, reflective cone

Streszczenie

W niniejszym opracowaniu przedstawiono praktyczną metodę konstruowania obrazów anamorficznych na podstawie własności analitycznych dla anamorf refleksyjno-stożkowych. Niniejsza praca jest kontynuacją zagadnień [6] związanych z określeniem geometrycznych zasad powstawania obrazów anamorficznych na bazie obrazu rzeczywistego, natomiast prezentuje ona analityczne przekształcenie oraz cyfrowy zapis takich obrazów z wykorzystaniem modułu graficznego programu MS Excel. Tak więc opracowany model analityczny pozwala generować obrazy anamorficznie dowolnych projektowanych obiektów zapisanych w formie równań parametrycznych, wspomagających opracowanie ostatecznych anamorf. Przykładowe anamorfy zaprezentowano wraz z ich obrazami restytuowanymi za pomocą prototypowego zwierciadła stożkowego. Powyższe rozwiązania dają możliwość precyzyjnego projektowania obrazów anamorficznych w zurbanizowanej przestrzeni miejskiej oraz architektonicznych wnętrzach przestrzeni publicznej.

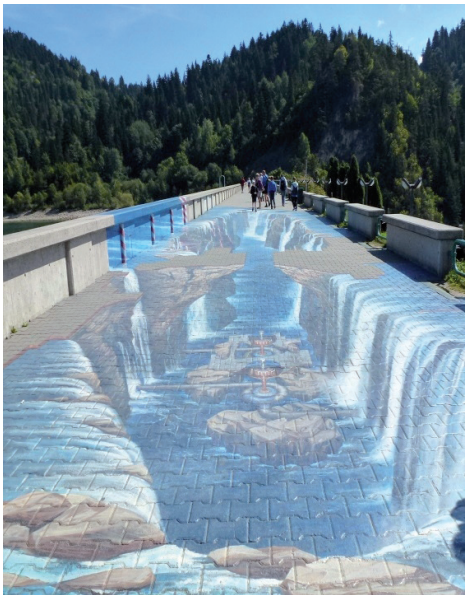
Słowa kluczowe: przekształcenie, restytucja, anamorfa, stożek refleksyjny

* Ph.D. Eng. Marcin Jonak, Division of Descriptive Geometry, Technical Drawing & Engineering Graphics, Faculty of Architecture, Cracow University of Technology.

1. Introduction

Perspective anamorphic images can be perceived as bigeneric illusions created in a process of image perception. These illusions are hidden in a double content of anamorphic images At first glance of an anamorphic image, we simply recognise the aesthetics of its original beauty that is exactly ruled by the geometric principles set up for their creation. These rules form fascinating deformations of drawn compositions. The other content of a drawing can be read by looking at it from a particular direction either directly or by looking at its reflection in a specific mirrored surface. Today, anamorphic images survive returns and revivals. They appear in a public space as planar, multi-coloured and surprising compositions that can be viewed from a specifically chosen point (Ill. 1, 2). For many years, numerous and consistentarticles have been published [1–8] in which the authors have analysed the geometry of anamorphic transformations, their creation and visualisation. The earlier studies define the complex rules governing the geometric transformation of real images into anamorphic images along with the methods used to record these transformations. They also provide the results of the analysis of the metric parameters that shape the anamorphic images constructed with the aid of a conical mirror. These publications also complement the basic publications with the simplified methods which can be used for the creation of more complex anamorphic images where complicated geometric deformations take place. These studies may prove to provide useful suggestions to focus architects' and artists' interest on this forgotten form of art.

Ill. 1. Planar anamorphic image in a closed municipal space: Main Market Square in Wieliczka; Author: Ryszard Paprocki



Ill. 2. Planar anamorphic image on a Czorsztyn dam: Author: Ryszard Paprocki

2. Ddescription of an anamorphic transformation

2.1. Elements of a transformation

The elements of a transformation contain (Ill. 3):
- an anamorphic picture plane which is a horizontal plane united with the base of a cone;
- a reflective cone of revolution with a base and height of specific dimensions; the axis of the cone is perpendicular to the anamorphic picture plane;
- a direction of projection that is parallel to the cone axis.

2.2. Principle of transformation

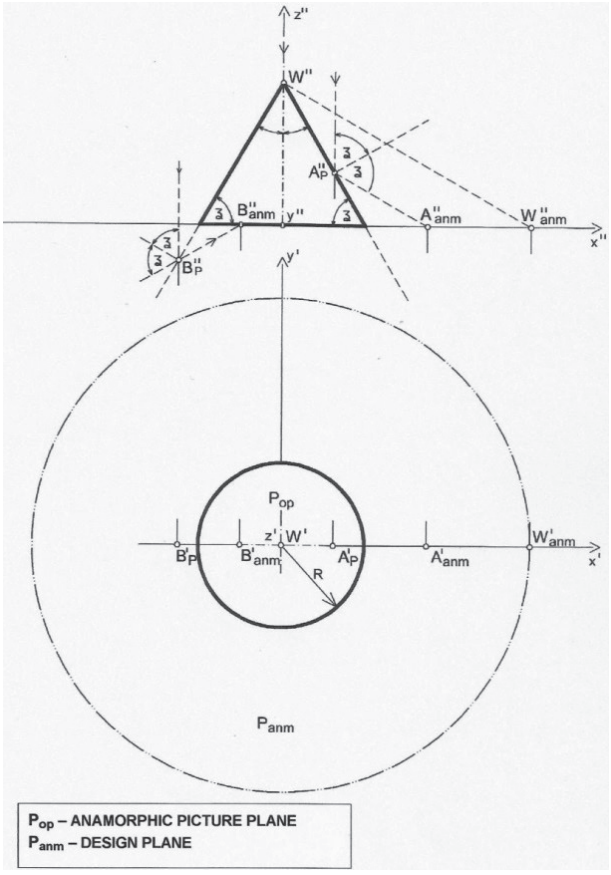
Even though both in literature [11] and in practice, the theory of anamorphic transformation is commonly discussed in terms of a central projection (theory of visual perception to be a perspective view), a simplification of the method by applying a parallel projection principle has been used in this particular piece of research. Thus, the centre of projection has been assumed to lie at infinity and to coincide with the infinite point on the axis of the reflective cone.

The assumed direction of transformation defines the **active part** P_{anm} of the cone surface in terms of its visibility from the perspective of the observer. This active part of the cone is limited with two rings of the diameters: R and (W', W'_{anm}). On the cone, we can also distinguish a **passive part** P_{op}. The field of a picture plane is similarly divided into two parts: the **passive part**, used for a design and the **active part,** upon which there will be created an anamorphic image of a designed object (Ill. 3).

Figure 3 presents a schematic diagram of the principle for the creation of an anamorphic image A_{anm} of any point A_p (taking into account the conditions described above). The basis for the creation of any anamorphic image is the well-known optical law of two angles equality: the angle of incidence equals the angle of reflection in geometric optics (angle ζ in Ill. 3). A randomly chosen point A_p is transferred along a direction described earlier onto the cone surface to receive point A_w as a mirroring point of its viewing ray. The point of intersection A_w is a point of incidence of a viewing ray that passes through A_p and lies on the active part of the cone. A normal to the cone surface is drawn at point A_w. According to the geometric optics, we can determine the angle ζ between the incident ray and a normal n and then construct the reflected ray making the same angle with n. A_{anm} will be an anamorphic image of the designed point A_p.

2.3. Analytical issues of transformation

The digital method has been elaborated with the use of some analytical equations which describe the relationships existing between a designed image and its anamorphic image. This whole process has been realised in the MS Excel software.



Ill. 3. Projecting apparatus of the discussed anamorphic transformation represented in two orthographic views

The set of analytic equations has been developed based on well-known theorem of trigonometry. Analysis of the geometric transformation that is presented in Ill. 3 lets us determine the relationships between two points: a designed point $A'_P(x_p, y_p)$ and an anamorphic point $A'_{anm}(x_{anm}, y_{anm})$ relative to it. These relationships can be notated with the following parametric formulas:

$$x_{anm} = (t_1 + r_p)*\cos(\varphi) \tag{1}$$

$$y_{anm} = (t_1 + r_p)*\sin(\varphi) \tag{2}$$

while:

$$r_p = \sqrt{x_p^2 + y_p^2}$$

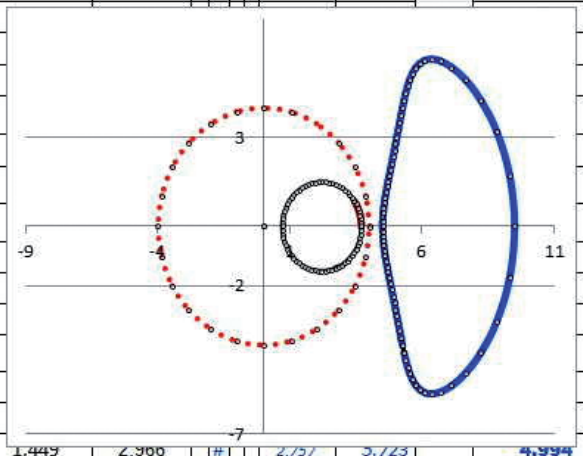
$$t_1 = \frac{\left(R - r_p\right)\mathrm{tg}\left(\zeta\right)}{2{*}\mathrm{tg}\left(2\zeta - \frac{\pi}{2}\right)}$$

$$\varphi = \arcsin\frac{x_p}{r_p}$$

where:

x_{anm} – abscissa of the anamorphic image of a designed point;
y_{anm} – ordinate of the anamorphic image of a designed point;
R – radius of the cone of revolution;
x_p – abscissa of a designed point;
y_p – ordinate of a designed point;
$\zeta = \arcsin\frac{y_p}{R}$.

	xAp	yAp	rp			t1	t1+rp		xAanm	yAanm
1	3,700	0,000	3,700	#		0,800	4,500		4,500	0,000
2	3,694	0,131	3,697	#		0,809	4,506		4,503	0,159
3	3,677									0,320
4	3,649									0,481
5	3,610									0,646
6	3,559									0,814
7	3,499									0,986
8	3,429									1,162
9	3,349									1,344
10	3,261									1,532
11	3,164									1,726
12	3,060									1,926
13	**2,950**									2,134
14	2,834									2,348
15	2,713									2,568
16	2,588	1,449	2,966	#		2,757	5,723		4,994	2,796
17	2,460	1,477	2,870	#		3,014	5,884		5,044	3,028
18	2,331	1,494	2,769	#		3,284	6,052		5,095	3,267



Ill. 4. A picture of MS Excel page with a semi-circle (design project) and its anamorphic image calculation

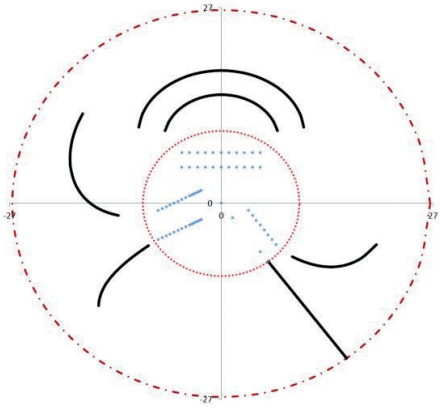
In this paper, the author presents individually elaborated method in the MS Excel [7] application. With the use of the application, it is possible to create an anamorphic image of a designed object. A default function of MS Excel, which creates what is called a 'dotted diagram with smoothing option', has been utilised in order to build a software. With the use of the described tool, it is possible to precisely define the contours of an image while visualisation may be executed by adopting various line weights, line types and colours. Ill. 4 presents a part of an Excel file in which a semi-circle of a defined radius has been designed in the passive part of a picture plane. Parametric equations of a semi-circle were inserted into the file. The anamorphic image of some specifically chosen points on the semi-circle were calculated with the application of the presented earlier equations. An anamorphic image of an object was generated with the use of the tool for 'dotted diagram with smoothing option'. Two uniquely specified points in the anamorphic image are the corresponding points A_p i A_{anm} of a transformation (compare to Ill. 3). All the examples provided below have been calculated for the specific parameters of the reflective cone of revolution dimensions (base radius $R = 3$ cm; cone height $h = 6$ cm). Let us add that the elaborated software enables its usage for calculations of any cone fulfilling the condition $h > r$, where h is the height and r is the base radius, as otherwise, the reflected ray does not pierce the active part P_{anm} of a picture plane.

In the reflection, when we look from the top onto a cone of revolution, we spot an image of a semi-circle respectively positioned on the right circular cone.

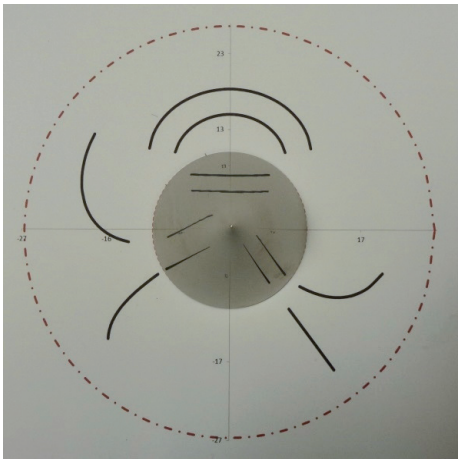
3. Examples

A designed image consists of respectively positioned parts of geometric figures that are notated with the aid of parametric equations. Any designed image is a composition of specifically designed segments of lines, circles or any planar curves which are described with aid of parametric equations. In the following examples, it has been assumed that we will obtain particular real-life images, while in some cases, the anamorphic images were enhanced with the aid of such values as colour or a graphical value.

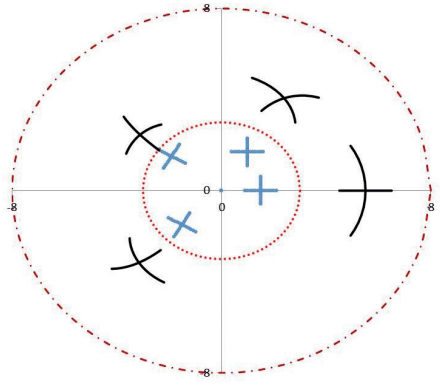
- Ill. 5 & 5a – pairs of parallel segments in various positions in the design field;
- Ill. 6 & 6a – pairs of mutually perpendicular and intersecting segments in various positions in the design field;
- Ill. 7 & 7a – squares in various positions in the design field;
- Ill. 8 & 8a – composition made of squares and triangles;
- Ill. 9 & 9a – circles and a single semi-circle in various positions in the design field;
- Ill. 10 & 10a – ellipses in various positions in the design field;
- Ill. 11 & 11a – parabolas in various positions in the design field;
- Ill. 12 & 12a – geometrical composition – a square, ellipses and arcs;
- Ill. 13 & 13a – geometrical composition – a square and some arcs inscribed into a circle;
- Ill. 14 & 14a – geometrical composition – a square and some arcs;
- Ill. 15 & 15a – geometrical composition – parabola arcs, circles and some straight segments;



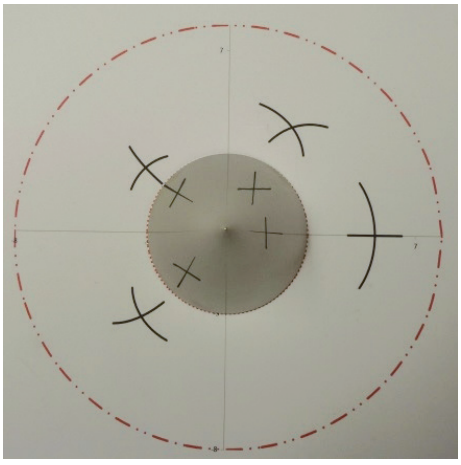
Ill. 5. Pairs of mutually parallel segments randomly positioned in a passive part of a picture plane and their anamorphic image in the active part



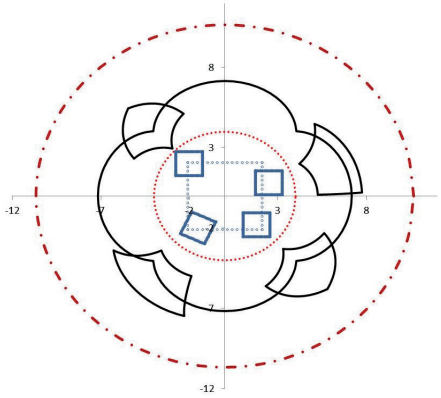
Ill. 5a. Visualisation of an anamorphic image of mutually parallel segments as a reflection obtained in the reflective cone of revolution



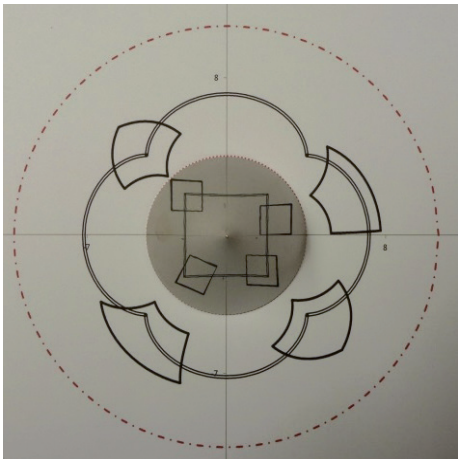
Ill. 6. Pairs of mutually perpendicular segments positioned in a passive part of a picture plane and their anamorphic image in the active part



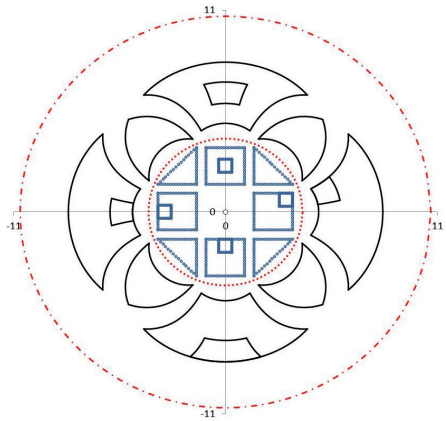
Ill. 6a. Visualisation of an anamorphic image of mutually perpendicular segments as a reflection obtained in the reflective cone of revolution



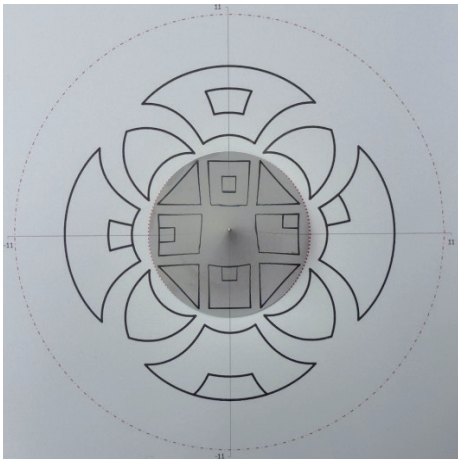
Ill. 7. Squares randomly positioned in a passive part of a picture plane and their anamorphic images in the active part



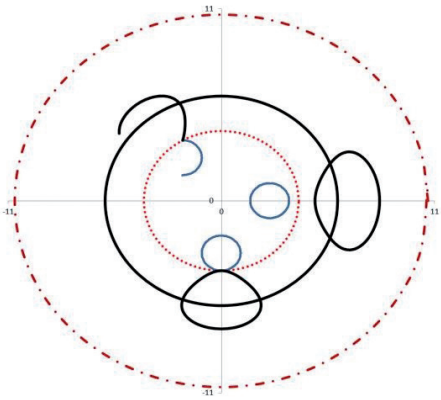
Ill. 7a. Visualisation of an anamorphic image as a reflection obtained in the reflective cone of revolution



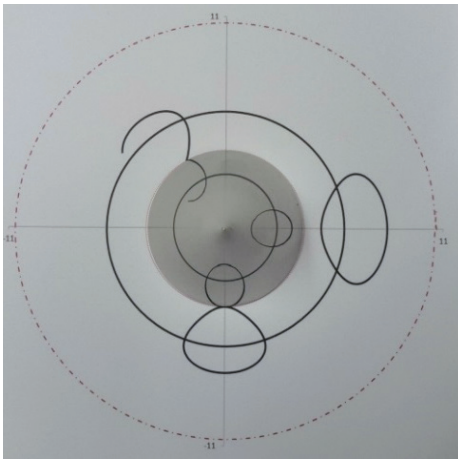
Ill. 8. Squares and triangles randomly positioned in a passive part of a picture plane and their anamorphic images in the active par



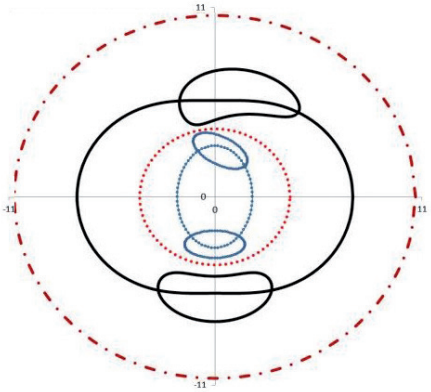
Ill. 8a. Visualisation of an anamorphic image as a reflection obtained in the reflective cone of revolution



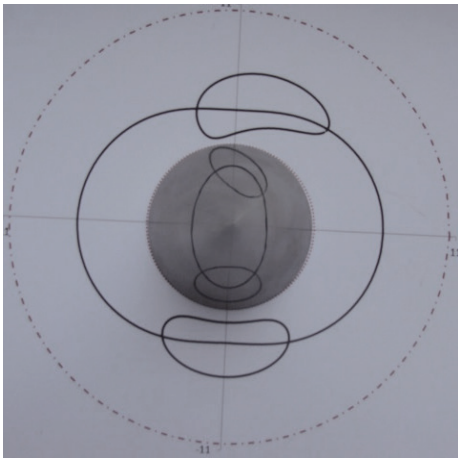
Ill. 9. Circles and semi-circles contained in a passive part of a picture plane and their anamorphic images in the active part



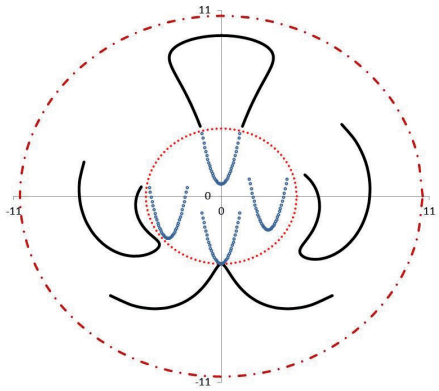
Ill. 9a. Visualisation of an anamorphic image of the circles at random positions – the image received in the reflective cone of revolution



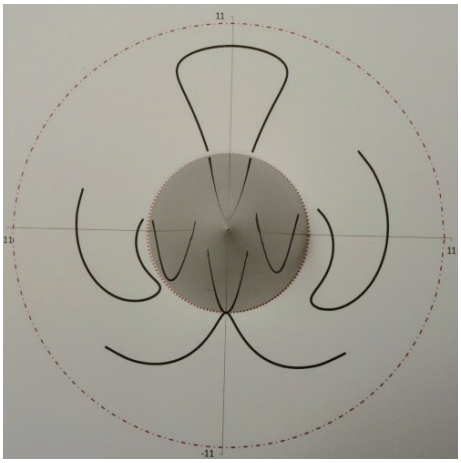
Ill. 10. Ellipses randomly positioned in a passive part of a picture plane and their anamorphic images in the active part



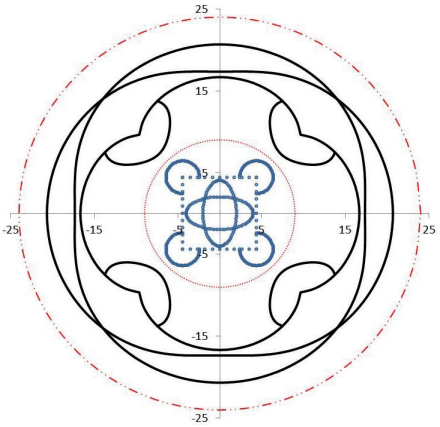
Ill. 10a. Visualisation of a designed composition containing ellipses at random positions within the contours of a reflective cone



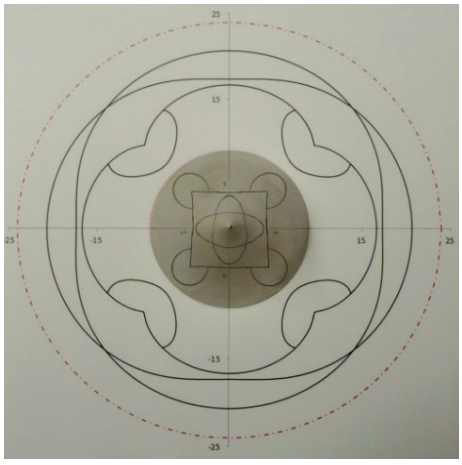
Ill. 11. Parabolas randomly positioned in a passive part of a picture plane and their anamorphic images in the active part



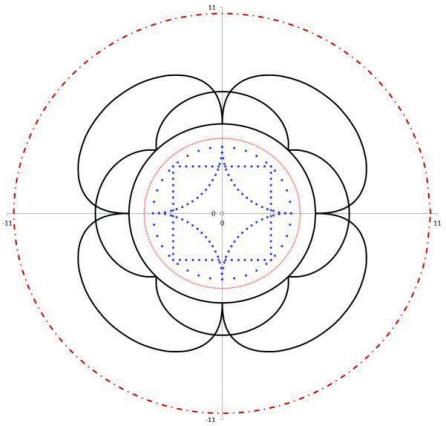
Ill. 11a. Visualisation of a designed composition containing parabolas at random positions within the contours of a reflective cone



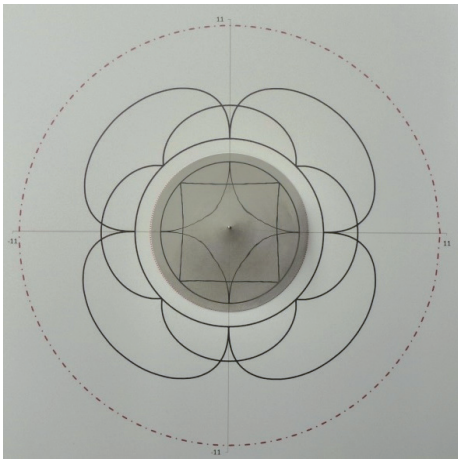
Ill. 12. Geometric composition – a design in a passive part of a picture plane and its anamorphic image in the active part



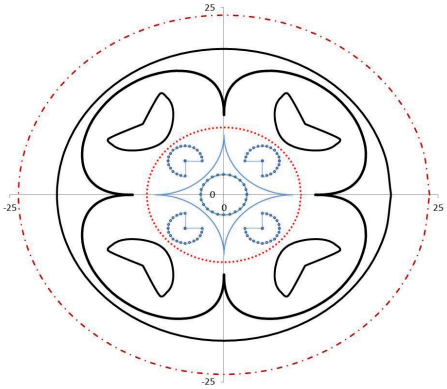
Ill. 12a. Visualisation of an anamorphic image containing a circle and an ellipse inscribed into a rectangle with the use of a reflective cone



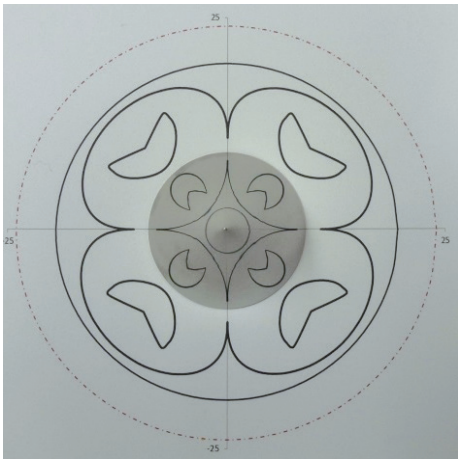
Ill. 13. Geometric composition – a design in a passive part of a picture plane and its anamorphic image in the active part



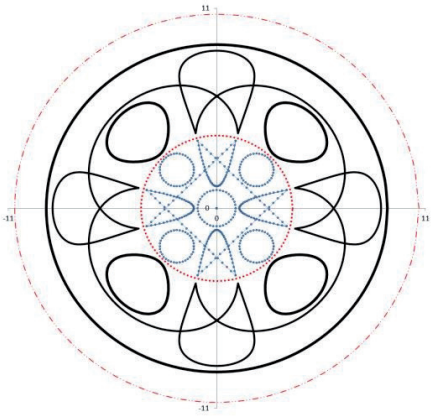
Ill. 13a. Geometric composition – its visualisation within the contours of a reflective cone



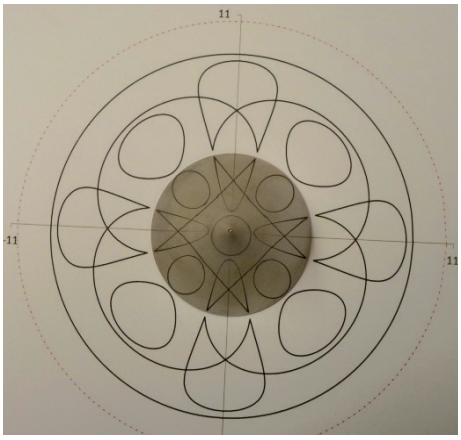
Ill. 14. Geometric composition – a design in a passive part of a picture plane and its anamorphic image in the active part



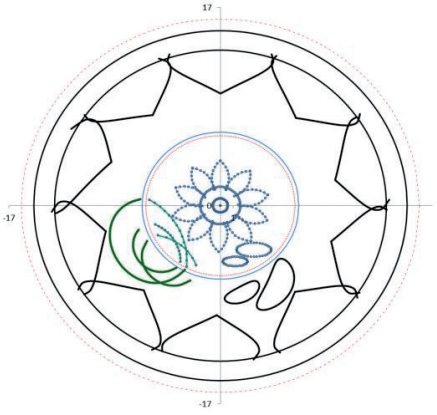
Ill. 14a. Visualisation of a designed composition within the contours of a reflective cone



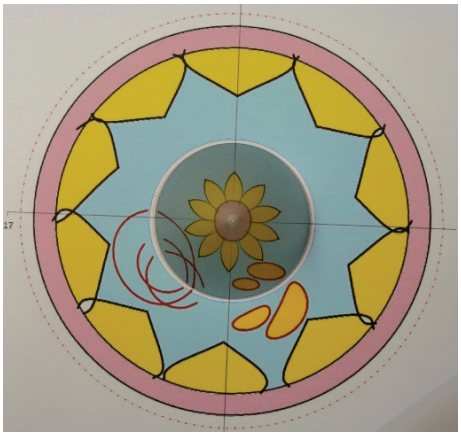
Ill. 15. Geometric composition – a design in a passive part of a picture plane and its anamorphic image in the active part



Ill. 15a. Visualisation of an anamorphic image within the contours of a reflective cone

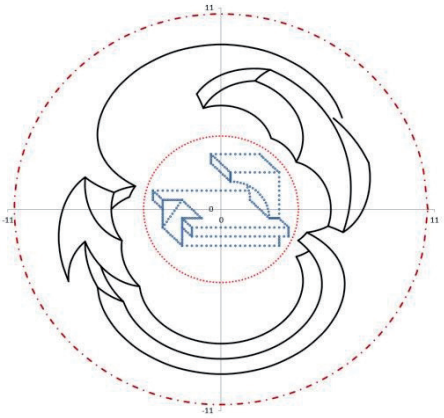


Ill. 16. Geometric composition – a design in a passive part of a picture plane and its anamorphic image in the active part

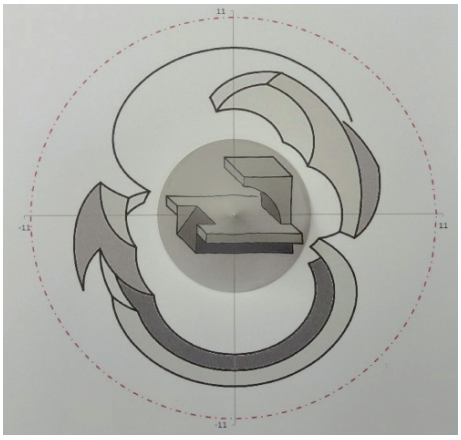


Ill. 16a. Visualisation of an anamorphic image within the contours of a reflective cone enhanced with colours

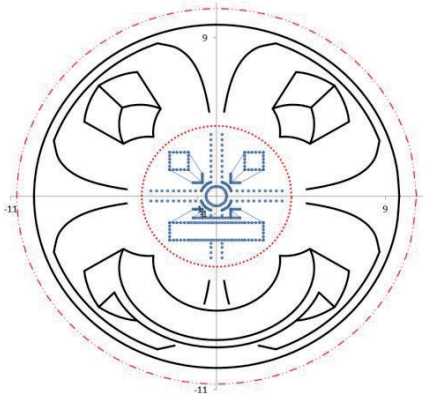
– Ill. 16 & 16a – geometrical composition with a sunflower;
– Ill. 17 & 17a – spatial object – axonometry;
– Ill. 18 & 18a – skyscrapers with a traffic circle – aerial perspective;
– Ill. 19 & 19a – spatial composition (axonometry) – a spatial frame and a cone.



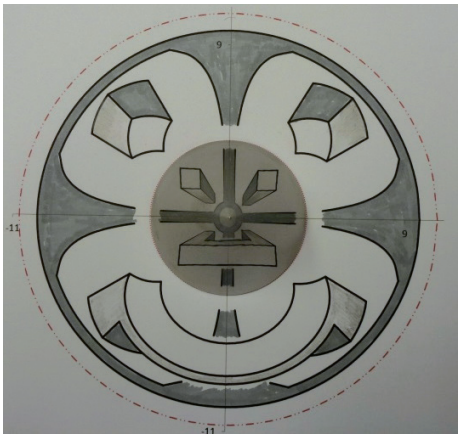
Ill. 17. Spatial object represented in axonometry – a design in a passive part of a picture plane and its anamorphic image in the active part



Ill. 17a. Visualisation of an anamorphic image within the contours of a reflective cone enhanced with a graphical value

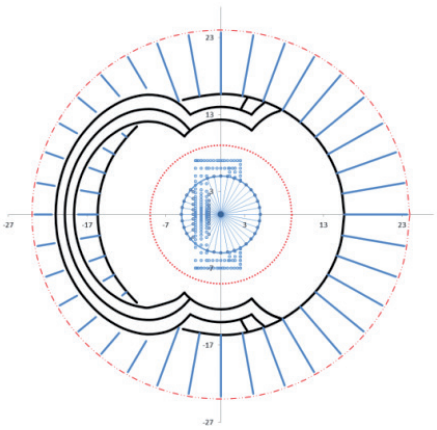


Ill. 18. Skyscrapers at the traffic circle represented in aerial perspective – a design in a passive part of a picture plane and its anamorphic image in the active part

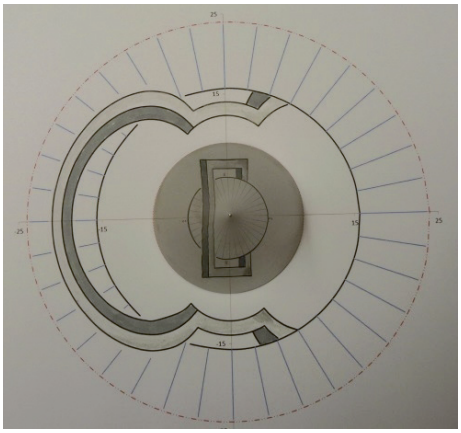


Ill. 18a. Visualisation of an anamorphic image within the contours of a reflective cone enhanced with a graphical value

The illustrations presented below include: a real-life image of each composition that has been composed in the passive part of a picture plane; its anamorphic image contained in the active part of a picture plane; in the additional place a visualisation of a composition that has been created through the use of a reflective cone.



Ill. 19. Spatial composition – cone of revolution and a frame – a design in a passive part of a picture plane and its anamorphic image in the active part



Ill. 19a. Visualisation of a spatial composition within the contours of a reflective cone enhanced with a graphical value

In practice, the generated images with aid of the developed method may serve as a starting point for further graphical elaboration by a designer. The quality of the designed image depends on the quality of the reflective mirror. The fact that we are able to correctly visualise a real-life spatial object and also that we can get rid of deformations that can commonly occur while creating intuitive anamorphic images are key advantages of visualised anamorphic images. Surprise at what is perceived is a common effect for the observer.

Ilustration sources: Marcin Jonak

Symbols

A_p	–	punkt projektowany
A_{anm}	–	anamorfa punkt projektowanego
x_{anm}	–	odcięta punktu anamorficznego
y_{anm}	–	rzędna punktu anamorficznego
R	–	promień stożka refleksyjnego
h	–	wysokość stożka refleksyjnego
x_p	–	odcięta punktu projektowego
y_p	–	rzędna punktu projektowego
ζ	–	kąt odbicia

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KAROLINA BIAŁOBŁOCKA*

HISTORICAL COLOUR SCHEMES OF ARCHITECTURE: SELECTED METHODS OF PRESENTATION

HISTORYCZNA KOLORYSTYKA ARCHITEKTURY: WYBRANE SPOSOBY EKSPOZYCJI

Abstract

Paint research aims to detect the colour schemes used in architecture whether they be the original colours from when the structure was new or schemes used for repainting and renovations. Discoveries, often partial, may result in making difficult decisions since we have to select polychromes worth preserving and to choose the best method to present them. In the following paper, selected examples of the presentation of original colour schemes from Silesia, Lower Austria, Saxony and Brandenburg are discussed.

Keywords: colour, elevation, conservation Silesia

Streszczenie

Badania stratygraficzne mają na celu określenie pierwotnej kolorystyki oraz wtórnych przemalowań. Dokonane odkrycia, nierzadko fragmentaryczne, mogą wymagać podjęcia niełatwych decyzji: co warto zachować, co i w jaki sposób eksponować. W artykule zaprezentowano wybrane sposoby ekspozycji historycznej kolorystyki elewacji ze Śląska, Dolnej Austrii, Saksonii i Brandenburgii.

Słowa kluczowe: barwa, elewacja, konserwacja, Śląsk

* M.Sc. Eng. Arch. Karolina Białobłocka, Faculty of Architecture, Wroclaw University of Technology.

1. Introduction

Examinations of original colours of architecture date back to the late 17th century, when colour schemes of ancient ruins were examined in Herculaneum and Pompeii. In Silesia, paint research probably took place in the 19th century and at the beginning of the 20th century[1]. After 1945, original colour schemes of exteriors were seldom investigated and it was not until the mid 1990s that paint research became an integral part of the examination of monuments especially when the aim is the preservation of monuments closer to their original state[2].

The value of historic colour schemes is obvious to some conservationists whereas others underestimate it[3]. As a result, the research and conservation of historical colour schemes remains under discussion, and little has been done to examine them despite paint loss and the deterioration of finishes. Nonetheless, due to decisions made by some public officials, numerous exteriors have been examined in the last twenty years in Silesia in order to both identify original colour schemes and those used during repainting – some of these schemes have been reused during renovations.

The successful determination of colour schemes from all eras depends on a few factors such as the amount and condition of remnants of the original coloured substance (e.g. paint) and also on the scope and methodology of examinations. It happens that an examination allows establishing the colour scheme of the first chronological phase of all parts of a building (usually from the time of construction), but it may also happen that these discoveries are partial; thus, different methods of the preservation and presentation of findings are used in practice.

The following article presents several cases illustrating different approaches towards presentation of the original colour schemes. Field studies were conducted in the years 2010–2013, mainly in Silesia, but also in Lower Austria, Brandenburg and Saxony[4].

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[1] The beginnings of paint research and attempts to preserve original colour schemes may vary from country to country. For example, research on historic colour schemes took place in Germany in the 19th century, but regular examinations of exteriors commenced in Austria and Germany in the late 1960s and mid 1970s, respectively [2]. More data on this subject is also available in the conference materials on paint research in architecture, including the volume: Line Bregnhoi, Helen Hughes, Jenni Lindbom, Tone Olstad and Edwin Verweij (eds), International Conference on *Architectural Paint Research in building Conservation*, Copenhagen 8–11 May 2005, London 2006.

[2] Research did not uncover documents from before 1945; however, there are sporadic comments on examinations conducted before 1945 in literature on Silesian architecture [8]. Data on post-war examinations was collected by the author in 2010–2013 during doctoral studies at Wroclaw University of Technology. Results were published in [2].

[3] The issue was discussed by conservationist, architects and artists, including Marian Arszyński [1], Edmund Małachowicz [9], Sławoj Dreszer [5] and Maria Wojtysiak [10].

[4] Case studies were collected during doctoral studies that focused on historic colour schemes of Wroclaw and Lower Silesia. Further research in other regions may reveal different methods of presenting original colour schemes. For example, examinations of entire rows of buildings could increase our knowledge on methods of treating whole streets and districts of the past in terms of colour and prove on what scale theoretical guidelines on colour by F C Schmidt and others were used in practice.

2. Presentation of historical colour schemes

Field studies revealed a few methods of presenting historical colour schemes:
- presentation of original colour schemes;
- presentation of partial colour schemes from the first chronological phase;
- presentation of later repainting;
- presentation of partial colour schemes from different chronological phases;
- presentation of small samples as evidence of original colours.

The preservation of historical colours also includes the recovery of lightness and saturation of a certain hue – this is discussed at the end of the article.

2.1. Presentation of original colour schemes

As previously mentioned, an examination may be successful and colours of all parts of a building from the first chronological phase may be identified. In such cases, we know what colours were applied to the wall surfaces and to the architectural details, window frames, doors and other items such as guttering, railings etc. Once the original colour scheme of a monument is discovered, the decision is often made in favour of restoring it; however, it is easier to make such a decision in cases where refurbishments and alterations do not require any rebuilding.

Such a restoration as that described above took place at the former Pokoyhof department store at 2-4 ulica Świętego Antoniego in Wroclaw. The building was erected in 1910 and since then, the only significant damage to have occurred was the destruction of the stone details of the entrance area – these were destroyed during the Night of Broken Glass in 1938. The examination of the exterior walls and courtyard was conducted in 2010[5]. It was revealed that originally, the ground floor of the façade was covered with travertine. Above the ground floor, the light grey plaster imitated stone with regard to both colour and texture. A grey hue was achieved by adding an organic black pigment, probably charcoal, to lime. The examination revealed that panels below windows were decorated with glazed green and gold mosaics made of 2 cm × 2 cm squares [2]. The discovered original colour scheme was resorted during recent refurbishment (Ill. 1).

2.2. Presentation of partial original colour scheme

Presentation of the partial colour scheme may occur in a few cases, this often happens if the examinations have revealed only partial findings; however, this approach to the presentation of colours has also been spotted on some buildings that have been rebuilt and have therefore lost their original form. In such cases, colours aimed to indicate the building's original form. This solution has also been spotted on buildings on which the discovered original colour scheme was mixed up with contemporary colour schemes.

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[5] Examiantions were conducted by Agnieszka Witkowska.

Ill. 1. Wroclaw, ulica Świętego Antoniego, 'Pokoyhof' – the former department store from 1910 after recent refurbishment to the original colour scheme

As mentioned above, it happens that the examination of original colours achieves partial success; often, either the colour of the wall surfaces or the colour of architectural details is detected In such cases, colours that were sometimes discovered were combined with colours that were considered by conservators, architects or public officials as the most suitable.

For instance, an examination of the Baroque Hochberg Chapel in Wroclaw revealed partial information about the original colours – the wall surfaces were painted red[6]. The conservator who conducted examinations suggested a two-coloured colour scheme (red and white) as the stone sculptures, according to written sources, were painted white [4, p. 119][7].

Furthermore, buildings are often rebuilt, expanded and allocated different functions throughout the centuries. As a result of this, an original form may no longer exist; therefore, the restoration of colour schemes from the time of the erection of such a building may be in question. However, it seems that the original colour scheme may also serve as the only witness to a building's origins.

A dwelling at the Market Square in Eggenburg, Lower Austria, is an example of a rebuilt building with the restored original colour scheme. The dwelling of medieval origins has probably been refurbished several times since the Middle Ages so the character of the late Gothic residence vanished. With time, the doors, windows, and window surrounds have been replaced with a newer design, the roof windows were also added. As a result, only the restored colour scheme, dating back to 1450, reminds us about the building's medieval origins (Ill. 2).

Despite the discovery of a complete, original colour scheme, it can happen that an original colour scheme is not restored, or at least not fully resorted – as a result of this, an executed colour scheme can be a mixture of both historic colours and colours that are the personal preferences of key individuals, usually architects, conservators, public officials or investors. The other factors that influence the choice of colours may be the price of paint or, for example, an attempt to match the building with its neighbourhood.

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[6] Examinations were conducted by Piotr Wanat.

[7] However, the chapel was painted yellow and white during its last refurbishment.

Ill. 2. The dwelling of medieval origin in the Market Square in Eggenburg, Lower Austria. Photo by the author

Ill. 3. Examples of colour schemes based partially on historic data and partially on other factors such as personal preferences of key individuals – the Baroque dwelling at 12 ulica Kuźnicza, Wroclaw (left) and the modernist observatory at 11 ulica Kopernika, Wroclaw (right). Photos by the author

A combination such as that described above is currently visible on a dwelling at 12 ulica Kuźnicza, and on the observatory at 11 ulica Kopernika, both in Wroclaw. According to the results of paint research, a monochromatic colour scheme was applied to the exterior at 12 ulica Kuźnicza in the first and second chronological phases, these were green and red, respectively[8]. The wall surfaces and the stucco works were originally painted light green, close to 9385/9369 in the KEIM colour chart. It was not possible to establish the original colour of stone components due to the poor condition of paint remains [2]. As previously mentioned, red was established as a colour of the second chronological phase. A two-coloured scheme of green and red that combined results from both phases was designed during the refurbishment and finally applied to the façade. In this way, a new composition was created which was unproven by paint research (Ill. 3).

[8] Examinations were conducted by Piotr Wanat.

A similar effect to that applied at 12 ulica Kuźnicza was achieved on the elevations of the observatory at 11 ulica Kopernika. The observatory was erected in the first half of the 20th century and its colour scheme, as presented on the original design, represents a colourful trend in Modernist Movement architecture[9]. Red and blue horizontal stripes were juxtaposed with white in between them. Blue was also intended to be on the observatory dome; however, blue was replace with green on the elevations and on the copper dome during recent refurbishment (Ill. 3).

2.3. Presentation of later repainting

Due to a lack of original substrates or poor methodology of paint research, it can happen that examinations only allow the identification of colours from later chronological phases which are not stylistically connected with the form of a given building or its original ornamentation. As a result, it may happen that repainting form later chronological phases is restored. For example, this happened at the dwelling at 2 Rynek in Wroclaw. The façade of medieval origin was rebuilt in the late Renaissance and it is a rare example of the Mannerism style in Wroclaw. Primary sources indicate that the façade has been repainted several times since then. In the 17th century, the walls were repainted and in the 18th century, they were whitewashed and repainted with, probably, black, green and ochre colours – this is assumed on the basis that such pigments were mentioned on a receipt [2]. During renovation in 1935, it was estimated that the façade originally was two-coloured in blue and yellow [8]. Examinations were conducted in 2011; however, due to very few remains, they did not yield complete results[10]. The conservator who conducted paint research discovered remains of pigmented plaster with charcoal, and traces of light blue and dark ochre paints; however, it was not possible to connect these findings with certain chronological phases. The first colour scheme which was possible to identify and put an approximate date to was the beige colour scheme from the 19th century. This colour scheme was applied to the Mannerism building during the last refurbishment (Ill. 4).

A similar situation to that presented above applies to remains of old polychrome that were detected on the medieval façade of Corpus Christi church at 26 ulica Świdnicka in Wroclaw[11]. However, the conservator who examined the building estimated that all the discovered plaster comes from later refurbishments. Light creamy, lime-sand plaster with paint on top was detected on the arch of the front lancet window. There were traces of black, blue and red stripes emphasising the form of the stone arch. Traces of blue were also detected on the upper part of the gable. The conservator suggested that these polychromes were introduced in 1927. During recent refurbishment, the Neo-Gothic polychromes were restored on the medieval church (Ill. 4).

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[9] Building Archive, Museum of Architecture, Wroclaw, call number 1535/31138.

[10] Examinations were conducted by Agnieszka Witkowska.

[11] Examinations were conducted by Piotr Wanat.

Ill. 4. Examples of presentations of later repainting – the Mannerism façade of a dwelling at 2 Rynek, Wroclaw and the 19th-century colour scheme (left); the medieval Corpus Christi Church at 26 ulica Świdnicka, Wroclaw and later polychrome, probably from 1927 (middle and right). Photos by the author

2.4. Presentation of partial colour schemes from different periods

Buildings are usually rebuilt and expanded in the architectural styles and painted colours popular at the time of refurbishment. It can happen that conservationists decide to simultaneously expose two or even more discovered colour compositions, all of them be the original colour schemes of particular extensions of the building. We can see such solutions on churches with porches that were added sometime after the initial construction such as the Franciscans church in Vienna City Centre and Corpus Christi church in Wroclaw. The Viennese church has a Renaissance façade covered with blue-grey imitation of stone, whereas the Baroque portico is painted ochre and white. Similarly, the medieval brick façade of Wroclaw church was differentiated from the 19th-century brick porch by the colours of the mortar joints. The conservator who examined the Wroclaw church estimated that the medieval joints of the first chronological phase were light cream, and of the second chronological phase, were yellow or ochre[12]. Added in 1875, the Neo-Gothic porch was decorated with cherry-red pigmented mortar joints. The colours of joints were reproduced to the original colours, in accordance with the style in which both the main building and the adjacent porch were originally erected (Ill. 5).

The above solution seems to be easier to identify and understand by a passer-by when different colour schemes are applied to the clearly separated, different parts of a building such as the churches with added porches discussed above. However, it may also transpire that two different historic colour schemes are applied to the building that is a one solid block. As a result, such a solid block with a flat surface is divided into smaller parts by means of colour. Such a solution was spotted on dwellings in the suburbs of Vienna and in Rust am See, Lower Austria. Two two-coloured schemes were restored on a rectangular building

[12] Examinations were conducted by Piotr Wanat.

Ill. 5. Examples of presentation of colour schemes form different periods – the Franciscan church, Old Town, Vienna (left); Corpus Christi Church, 26 ulica Świdnicka, Wroclaw (middle and right). Photos by the author

Ill. 6. The dwellings in south Vienna (above) and in Rust am See, Lower Austria (below). By introducing two different colour schemes to a flat surface at the same time, the building is divided into smaller parts. Photos by the author

in south Vienna. A 16th century colour scheme is restored on the east end of the building: grey plaster covers the surface of the wall and white is applied to the architectural details; whereas the west end of the building is painted ochre and white, imitating architectural details (Ill. 6). A similar presentation method with two different colour schemes on one flat elevation is visible on a dwelling in Rust am See; however, while standing at a distance from the building, we can notice a difference in the height of each end of the roof that somehow explains the change of colour scheme. The ground floor and part of the first floor above the entrance door is covered with an ochre block imitating stone. The remain part of the first floor is a light grey-yellow, additionally decorated with grey and white friezes. Brown is applied to all of the window frames. In both cases, the colour of the roof and the cornice somehow unify the whole building (Ill. 6).

Colour schemes that are composed of various elements from different chronological phases – pieces that were applied in different centuries and were attributed to different styles – may in fact create a new composition that is more or less clear to passers-by. This way, all the valuable remains are saved, preserved and exposed, but the completely new composition may in fact be slightly chaotic. Such a solution was spotted on the back wall of a dwelling in the Old Town in Vienna – the entire wall is covered with various elements from the Middle Ages and the Renaissance. Similarly, the façade of a dwelling in Perchtoldsdorf, Lower Austria was decorated with items from different phases: black and red window surrounds; black, yellow and white window surrounds; white window surrounds; a multi-coloured corner rustication, a multi-coloured cornice; a yellow and green wall surface – yellow imitating stone blocks and green imitating mortar joints (Ill. 7).

Ill. 7. The details of elevations of dwellings in central Vienna (the upper row) and Perchtoldsdorf, Lower Austria (the lower row) – the colour compositions are an effect of juxtaposing various remains of polychrome from different phases and styles. Photos by the author

Ill. 8. Samples of original substrates presented as evidence in Wroclaw, Berlin, Vienna and Wiener Neustadt. Photos by the author

Ill. 9. Traces of historical polychrome on dwelling in Heiligenstadt, Vienna and remains of Renaissance sgraffito in the Old Town in Prague. Photos by the author

2.5. Presentation of small samples as evidence of original colours

Small pieces of the original substrates, plaster or paint, are sometimes exposed on a very small surface, and since those samples are not part of the applied colour schemes, they are usually exposed in a less visible area, such as the back elevation or a corner of a façade (Ill. 8). However, it may happen that original polychrome survived only in a much more exposed place, such as the centre of the front elevation. Here, depending on the method of presentation of the survived remains, such presentation may make an impression as being rather accidental, especially in case the exposed sample does not follow the structure of a whole façade (Ill. 9). Such samples are only partial, yet, this way we are able to at least see on a very tiny area what the original colour may have looked like.

2.6. Restoration of colour, its lightness and saturation

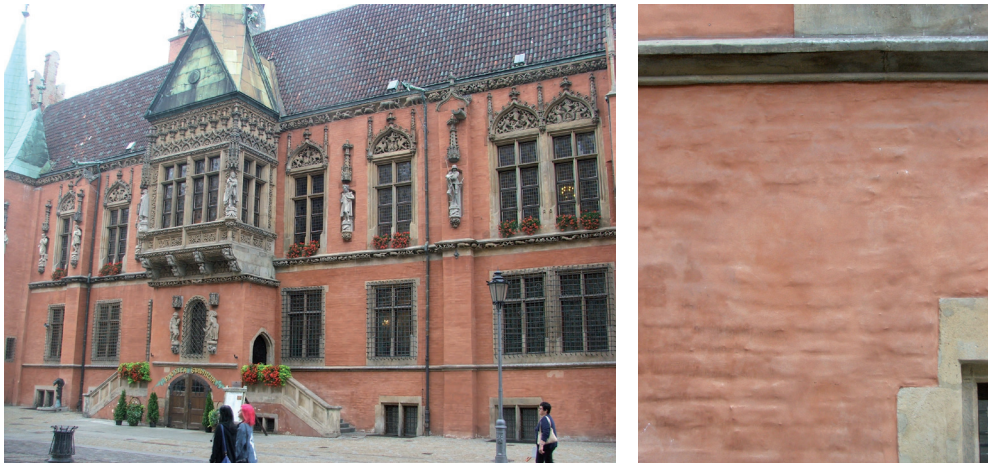
Apart from the composition, a restoration of the original colour scheme is also connected with the proper restoration of the original shade of a certain hue, its lightness and saturation, and finally, texture of the earliest finishing material.

Therefore, a restoration of the original colour scheme may consist of a sample of original coating. In this way, original and restored polychromes are usually differentiated by saturation and/or lightness of the same hue (Ill. 10).

Ill. 10. Original remains incorporated into restored colour schemes: dwellings in Wienier Neustadt (left) and in Görlitz (right). Photos by the author

Examinations of the exterior of Wroclaw Town Hall allowed the partial estimation of colour usage in the third and fourth chronological phase, dated to the late Middle Ages[13]. Although it was not possible to trace the original medieval wall painting, it was estimated that at that time, the wall surfaces were painted a red hue, close to iron red. During the last refurbishment of the south elevation in 2009, paint was applied the way the background layer could be see-through into a rough, wave-like surface, imitating a medieval polychrome as much as possible in every aspect (Ill. 11).

[13] Examinations were conducted by Katarzyna Polak.



Ill. 11. The partial reconstruction of medieval polychrome on the Town Hall in Wroclaw – the south elevation covered with wave-like whitewash and painted transparent iron red. Photos by the author

3. Summary

The above examples of presenting original colours of exteriors were discovered during field studies conducted in Silesia, Lower Austria, Brandenburg and Saxony in the years 2010–2013. The examined methods of presentation are highly varied and range from fully restored compositions and partial reconstructions, to tiny samples presented as evidences of original colours.

Numerous monuments were preserved closer to their original state while including a colour scheme; however, communication with conservationists revealed that, despite the fact that the preservation of the original colours was highly valued by seniors of the Polish post-war school of conservation, the reconstruction of historic colours invariably proves to be difficult because the personal preferences of all the parties involved in the refurbishment process of a monument still tend to dominate over historical discoveries.

To sum up, generally speaking, conservation serves a monument in two ways, either through the reconstruction of the original structure or by the preservation of the state of a monument at the time of refurbishment. However, the above discussed samples prove that consideration towards colour remains insufficient in the conservation process.

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WIESŁAWA GADOMSKA*

ART AND THE CITY: THE ISSUE OF THE DEVELOPMENT OF MUSEUMS IN THE LANDSCAPE OF NEW YORK CITY

SZTUKA I MIASTO – PROBLEMATYKA ROZWOJU OBIEKTÓW MUZEALNYCH W PRZESTRZENI NOWEGO JORKU

Abstract

Other than their basic mission to collect and promote art, museums serve the important culture-producing role of creating architectural landscape in cities. This article provides an analysis of characteristic examples of museums' spatial expansion (the Guggenheim Museum, the Metropolitan Museum of Art, the Museum of Modern Art, the Whitney Museum of American Art) characterised by specific urban, architectural and cultural conditions existing in Manhattan borough of New York City.

Keywords: museum expansion, Manhattan, urban landscape, genius loci

Streszczenie

Obiekty muzealne, poza podstawową misją kolekcjonerską i popularyzatorską, pełnią ważną funkcję kulturotwórczą związaną z kształtowaniem krajobrazu architektonicznego miasta. W artykule przeanalizowano charakterystyczne przykłady rozwoju przestrzennego obiektów muzealnych (Museum Guggenheima, Metropolitan Museum of Art, Museum of Modern Art, Whitney Museum of American Art) w specyficznych uwarunkowaniach urbanistycznych, architektonicznych i kulturowych jakie stwarza lokalizacja nowojorskiego Manhattanu.

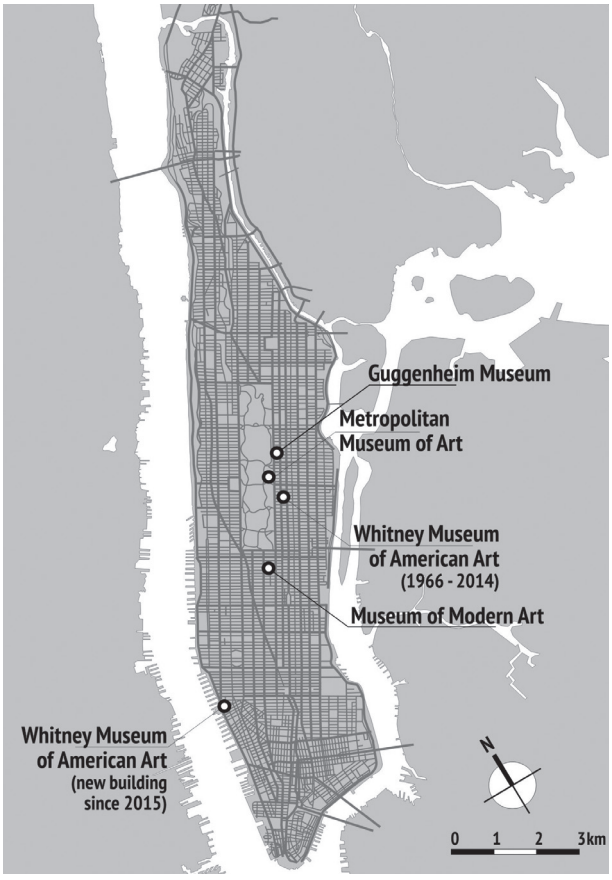
Słowa kluczowe: rozbudowa muzeum, Manhattan, krajobraz miejski, genius loci

* Ph.D. Arch. Wiesława Gadomska, Department of Landscape Architecture, University of Warmia and Mazury in Olsztyn.

1. Introduction

In May 2015, a new building for the Whitney Museum of American Art in Downtown Manhattan opened. After nearly 50 years in its previous setting in Upper East Side, marked by numerous trials of expanding the facility crucial for the city's architectural landscape, the museum's management made a critical decision to change its location and set up a new facility with a larger amount of functional space.

Searching for new opportunities of spatial development and the necessity to expand buildings has become an issue for nearly all of the renowned museums in New York, its basic reasons being: the expansion of collections and museum resources; searching for new ways to exhibit items; increasing visitor footfall. For many years, there has also been synergy between the above mentioned and the visible tendency to expand the basic functions of museums, likely to be accompanied by new, commercial functions [1, p. 113–118] e.g. highbrow gastronomy, specialist stores (art, books, designer shops etc.) as well as high-quality rental space. The phenomenon, inevitable as it is in the rampant commercialisation of art, requires additional, indispensable space of high quality in architectural sense.



Ill. 1. Manhattan – localisation of the analysed museums (the author's own work)

The complexity of expanding buildings, apart from basic formal conditions (the local law) and spatial conditions (limited property area, neighbourhood etc.), stems from a feature characteristic of museum facilities – they have often been unique architectural objects which, are themselves, sublime elements of art history. They have also determined the level of attractiveness and the beauty of their cities in the surrounding city landscape [2]. It is often this very aspect of culture that most determines the complexity of expansion (Ill. 1).

In the research we used the method of comparative analysis and the analysis of individual cases. The studies were based on research in situ.

2. Expansion of the Guggenheim Museum – architectural background of the unique body of the building

The Salomon R. Guggenheim Museum, erected in the years 1956–1959 according to the design by Frank Lloyd Wright, has been one of the most recognisable architectural objects in the world [3, p. 239–249]. The main building erected to house the exhibitions of modern art was the last object built while Wright was alive. It has been living proof of the artistic originality and maturity of this most outstanding American architect [4, p. 308–319]. The body of the building as viewed within the city landscape is a highly expressive composition, abstracted from its surrounding, of unchanging impact despite the passage of years and changing trends in architecture (Ill. 2).

Ill. 2. Expressive body of the Guggenheim Museum emphasized with off-white and deep chiaroscuro (photo by W. Gadomska)

The decision to locate the future museum on the prestigious Fifth Avenue at the very beginning also determined its future status, allowing the designer to create a unique object, standing out of the conventional Manhattan line of blocks. A huge, square plot with a wide front spreading between 88th and 89th Streets provided a unique placement of the building viewed from the perspective of Fifth Avenue and is additionally enriched by the view of the adjacent Central Park. The orientation of the plot also favoured the unique, picturesque positioning of the building in the south-west sunlight.

Different spatial concepts presented in preliminary designs of the future museum [4, p. 308–319] share a common feature for the body of the museum building – a dominating main exposition space contrasted with a sub-dominant ground floor area with an entrance hall and accompanying rooms. One of the concepts Wright took into account was based on an

attempt to reflect the fixed and dense development in Fifth Avenue's frontage through shaping the main body of the museum in the form of a geometric, regular polygon. However, what eventually prevailed was the author's uncompromising approach in his search of individual architectural expression – represented by a different design to those typical of Manhattan architecture, as well as by the organic form and colour of the building. The museum opened in 1956, and, due to its unprecedented design which blatantly ignored the context of the local architectural landscape, was interpreted by many as "Wright's slap in the city's face" [5, p. 142–147]. Despite extremely contradictory opinions on its architectural appearance, the building soon became an icon of New York's landscape [6].

For long years, the building faced much criticism as being inadequate for the function it served [5, p. 142–147]. As a result of the growing museum's resources and the adopted strategy of exhibiting, an alarming shortage of usable area for exhibition, administration, and storage occurred in the late 1980s. As a consequence of arbitrary and absurd decisions of the museum's management aimed at reorganising the space in the building; the upper level of the exhibition gallery was turned into improvised storage space, which ruined the primary assumption of the designer regarding the viewers' perception of the space and the way resources should be exhibited. Guggenheim Foundation executives faced a tough decision to expand the museum, against the risk of harsh criticism and opposition from those who found any interference into the unique body of the building unacceptably profane [4, p. 308–319]. Gwathmey Siegel & Associates Architects, the authors of the expansion project design, adopted an extremely moderate concept of museum enlargement, with clear attention to the unique cultural heritage the previous building had embodied. Rich programming assumed by the investor was to be housed in a rectangular, ten-storey building to be erected in the north-east part of the allotment at the back of the main building, which used to serve as access for external services (Ill. 3). In this way, the new cube became a background for the basic body of the museum and created a coherent architectural tissue with the surrounding dense development of Manhattan. Due to its sandstone façade, the colour of the new building is a bit darker than the original structure, this emphasis the fact that it is secondary to the warm white original building.

Ill. 3. The expansion in the form of a backstage quadratic building serves as a neutral background for the expressive main building of the museum (photo by W. Gadomska)

As a result of the expansion which terminated in 1992, the museum gained new exhibition space within four separate galleries, a technical floor, as well as additional facilities located underneath the pavement of Fifth Avenue. The old and the new buildings were connected with a terrace allowing exhibitions of sculptures. Commercial space for retail shops with books on architecture, designer objects and souvenirs was introduced on the existent first floor, below the smaller rotunda. The volume of the new building against the old one is enough to give a clear message of it serving as a background to emphasise the value of the outstanding original building**.**

3. Expansion of the Metropolitan Museum of Art – a record of a turning point in history

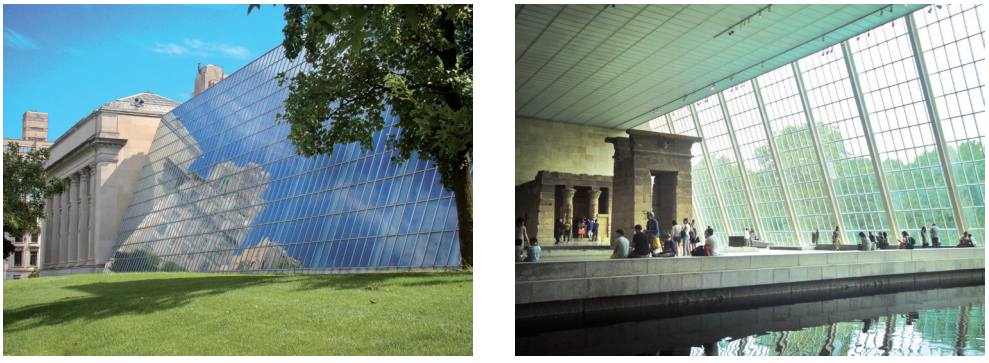
The unique spatial context of the largest museum in New York stems from its location: the classicistic building forms a huge part of a long line of prestigious Fifth Avenue's westward development (Ill. 4), whereas the whole body of the building, consequently expanded over the years, is located in the Central Park – an invaluable facility of the city [7, p. 97–108].

Ill. 4. Monumental entrance façade of the Metropolitan Museum of Art located along Fifth Avenue (photo by W. Gadomska)

In 1872, New York City Department of Parks indicated a new location for a museum – the area in the east side of a newly designed park. The decision was taken against the opinion of Frederick Law Olmsted, the author of the park's design, who was not in favour of interfering with the park's landscape, even if it would serve an important investment of public nature.

The primary neo-Gothic building was erected in 1880, according to the design by Calver Vaux and Jacob Wrey Mould. Further expansions in the neoclassical style reshaped the layout of the building into more regular form, as well as adding to its metropolitan scale and final architectural appearance.

The museum's management faced the necessity to expand the building in the late 1960's, provoked by the ancient Temple of Dendur which relocated from the banks of the Nile to become one of the museum's exhibits. It demanded space adequate for its size, as well as particular light and other conditions of exhibiting – this problem initiated strategic decisions on the further expansion of exhibition space for housing other elements of the museum's program. The long-term, long-sighted design of the museum's expansion was made in 1967 by Kevin Roche[1] & John Dinkeloo, to be completed stage by stage until the early 1990s. The basic restriction of the future expansion stemmed from the specific urban context providing limited construction space. In order to stay within Fifth Avenue's line of development with its characteristic, historic façade underlined by the monumental, axial entrance, the museum had to expand westwards and partly absorb Central Park. It expanded in such a direction that the spatial character of the building remained undisturbed. The modern wings implanted into the historic structure of the building were shaped in a less formal way [6]. Façade glass used as a basic architectural material made the elements of the extension seem similar to the development characteristic for parks*:* an orangery or a large-scale winter garden. Clear cultural stratification [6] created a new, capacious spatial context located between the historic walls of the building and the transparent walls of its newly-built extensions, with open views to the landscape of the park (Ill. 5). Despite critical voices over this juxtaposition, the exhibition space created within the whole museum is consistent and has thus far provided attractive, unique conditions to exhibit the still growing collections of the Metropolitan Museum.



Ill. 5. Museum wings extend into the space of Central Park (photo by W. Gadomska)

Lasting for almost 25 years, the expansion of the Metropolitan Museum of Art has been recognised as the largest expansion of a museum in the US [6] – it brought about a 20-fold increase of internal space reaching a final floor area of 120 thousand square meters. In spite of the large scale of the expansion, the modern interference was moderate enough to create an interesting architectural contrast and emphasise the historic turning point between the old and the modern phase of the museum's life.

[1] The Pritzker Architecture Prize in 1982 and the AIA Gold Medal in1993.

4. Expansion of the Museum of Modern Art (MoMA) – development inside the urban fabric

The spatial development of the Museum of Modern Art in New York has been an on-going process in parallel with MoMA's near 90-year-old mission to promote modern art. The museum's headquarters, erected in 1939 in Midtown Manhattan, triggered a new way of designing urban street frontage by implementing an individual character within it. The process, envisaged to continue through future decades, is expansive in its nature and leads to gradual use of the city's urban structure of blocks [8] in the rectangular area within Fifth and Sixth Avenues, and 53rd and 54th Streets of Manhattan for museum purposes.

Since the beginning of the museum's existence, its architectural design has accurately reflected its exhibitions' artistic profile. In 1939, not more than 6 years after purchasing a traditional urban house located at 54th Street, the museum moved to new premises designed according to a modern international architectural style. The design's authors, Philip L. Goodwin and Edward Durell Stone[2] [9, p. 154], innovative as they were in a formal sense, maintained the existent dense line of frontage middle-class development. Respect of the existent architectural scale was also a clear link with the architectural context: despite the new building being higher by two floors than the neighbouring traditional development, it was made optically lower through its horizontal orientation. However, the white façade of the new body, so skilfully introduced into the existent context, made it conspicuous in its surrounding – this way, the concept of 'modernity' introduced by the museum, combined with a huge dose of respect for the existent tradition, was likely to gain acceptance among a vast community of New Yorkers.

In the 1960s, the museum went through an important stage of its spatial development, Philip Johnson being the head of the project. The existent building with its closed exhibition space was surrounded by a vast sculpture garden, adjacent to 54th Street. The open space, framed within the dense development of blocks of Midtown Manhattan, created a new context of the urban fabric by making it less dense and giving it more natural light [9]. Johnson also designed the extension of the main building – the proportionate, black glass cube superseded another sequence of the old development from the frontage of 53rd Street enlarging the museum eastwards at the same time (Ill. 6).

Further expansion, modernisation and reconstruction obliterated the original, clear architectural concept of MoMA. Year 1984 was marked by a failed attempt to reshape the space of the building and develop a new character for it. The projected development of museum's western side comprised not only exhibition rooms, but also a 55-storey apartment building – a powerful landmark which disintegrated the existent original development, introducing into the low-scale building a component characteristic to the repeated, corporate architecture of Manhattan.

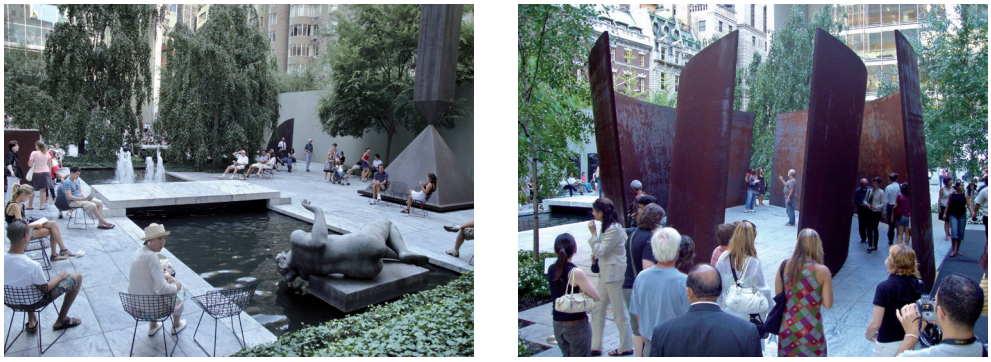
The architectural shape of the museum as it is today dates back to the radical reconstruction and expansion of exhibition space that took place in the years 2002–2005, after a mixture of individual ideas were proposed by different architects engaged in the process of MoMA's spatial development. The project's main issue, other than the functional layer that consisted

[2] The generation gap between the two architects is worth noting: Goodwin (born in 1885) was related to architectural historicism, while Ed Stone (born in 1902) is regarderd as a representative of the international style, of which the other examples are Eero Saarinen or Minoru Yamasaki.

Ill. 6. Southern façade of the museum with characteristic horizontal division (photo by W. Gadomska)

in the enlargement of the existing area by over 20 thousand square meters, was rooted deeper – it concerned regaining by the disintegrated museum building the spatial identity that was lost in the process of subsequent reconstructions [10, p. 324–327]. Yoshio Taniguchi, the Japanese architect and the author of the reconstruction, brilliantly used the open area of the existent sculpture garden by enclosing it with the glass walls of the new eastern and western wings of the museum, which gained an attractive view of the patio that was thus created (Ill. 7). Additionally, clear functional division consequently provided effective organisation of space – the eastern wing was designed for research and education, the western wing was used to house exhibitions. As a consequence of minimalist expansion, MoMA regained its original modernistic look, its clearly defined form, and characteristic façade from the 54th Street side. Interference into the constantly rebuilt façade from 53rd Street's side was made in style according to the westward expansion of the museum, clearly marking another phase of its spatial development.

As a result of the expansion of the museum's functions in urban space, from its beginnings in the 1930's, the building of the Museum of Modern Art has had its area enlarged by a factor of over twenty – this has had a substantial influence on the urban architectural landscape. The development of the institution envisaged for the future is limited by the natural boundaries of 53rd and 54th Streets (north to south), and Fifth and Sixth Avenues (east to west). The immediate vicinity of another museum, the American Folk Art Museum erected in 2001 [11, p. 199], an invaluable architectural gem to the west of MoMA, limits further expansion of MoMA in a cultural sense. Its authors, Tod Williams, Billie Tsien & Associates, designed an interesting museum with respect of the original scale of the development at 54th Street – the front width and the façade's height is in line with the surrounding buildings – the museum exhibits American vernacular art in its intimate, original interiors. Despite the purchase of the



Ill. 7. Interior patio serving as a sculpture garden (photo by W. Gadomska)

indebted property by the management of MoMA in 2011, the demolition of such a precious building characteristic of Midtown Manhattan in order to make further expansion of the Museum of Modern Art must imply challenging questions about what constitutes acceptable, non-financial expenses of further development of an institution that has, among other duties, a responsibility for the protection of modern architecture [12].

5. A new location of the Whitney Museum of American Art: identity and local genius loci issues

Founded in 1930s by the art collector Gertrude Vanderbilt Whitney, the Museum of American Art was first located in Greenwich Village of Southern Manhattan. After over 20 years of its growing importance among museum establishments, the museum moved to eastern Midtown Manhattan, and 10 years later, facing intensive growth of exhibition resources, the management board of the museum made a decision to purchase a plot at the crossing of Madison Avenue and 75th Street.

An exposed corner location near the prestigious Fifth Avenue was, on the one hand, bound by restrictions imposed by the traditional frontage development of neighbouring 'brownstone'[3] historic buildings; on the other hand, it allowed daring design ideas due to the vicinity of the outstanding 1959 Guggenheim Museum. The decision to entrust Marcel Breuer with the design of the future museum resulted in a building very characteristic of New York, which over time, gained the status of an icon of the city [9, p. 77]. Despite the Bauhaus school origins Breuer shared with major modernists of the 20th century [13, p. 194], the designed building is loaded with a big dose of expression, so exceptional among the 'international' development characteristic of the New York of the 60's [9, p. 155; 14, p. 27]. The characteristic body of the building (Ill. 8), aside from the sculpture-like tectonics and brutalist raw façade, modified the local spatial context by its deep cantilevered void on the ground floor which was designed to introduce more light into the lower part of the building.

[3] Residential development characteristic to expensive districts, made of red-brown sandstone, valued for its endurance as well as the high level of craftsmanship.

Ill. 8. The western façade makes part of the Madison Avenue frontage (photo by W. Gadomska)

Thus created illusive urban interior broke out of the scheme of typical for Manhattan repeated perpendicular crossroads of streets and avenues. The new building of the Whitney Museum became an important element of the architectural landscape of New York City.

The museum, gaining in prestige and popularity, soon faced strategic decisions of further development. The board, anticipating the imminent necessity to enlarge the exhibition space and enrich it with new functions, took a decision to purchase the plot adjacent to the existing museum in order to make feasible plans for future expansion.

The first project to enlarge the museum was made public in 1985. It consisted of a post-modernistic design by Michael Graveas, it was the proposal of a building that dominated over the body of the original one, which in the end would become a minor element of an unnaturally large-scale, arbitrary composition in the surrounding architectural context. What was worth noting in the design, though, was a clearly visible, almost by the book dualist modernistic idea and reflecting the post-modernistic philosophy of the time, generally visible in architecture of the 1980s [14, p. 5–8].

The beginning of the new century was marked by the further search for solutions to expand the space of the museum. The authors of the concepts that followed were Norman Foster in 2001, who took the risk of combining a luxurious block of apartments within the new body of the museum building, and Rem Koolhaas, who in 2003 presented a controversial project of a building with additional volume hanging atop and dominating the original building. Neither of the proposals was favoured by the city authorities, nor by the strongly represented local community.

Another concept of expanding the museum was presented by Renzo Piano in 2004. Unlike his predecessors, this architect reduced to a minimum interference into the existing building and into historic brownstones, flanking from the south. Instead, he designed an autonomous, high museum structure in the second row of the Madison Avenue development. He had applied a similar convincing solution to the same problem with the nearby Morgan Library

[15, p. 446-447], which he had expanded despite a troublesome historic and urban context. The expansion made between 2000 and 2006 introduced a neutral, modern architectural implant that complemented the space among the historic buildings of museums and libraries. The moderate, well-balanced design with clearly distinguished boundaries between the original and the extended part of the library buildings undoubtedly served as recommendation in Piano's future negotiations with the Whitney Museum board.

The negotiations took a new turn in 2006 when the museum board made a breakthrough decision to change the museum's location and move it to the south of Manhattan. The attitude to this decision may be ambivalent – on the one hand it served to protect the original iconic building of the existent museum, allowing the nearby Metropolitan Museum of Art to rent Whitney's space [16]. On the other hand, it resulted from a rational calculation of any future expansion's high costs and doubtful effects as to new exhibition space gained by way of expansion. Again, Renzo Piano was entrusted with making a design. The attractive new location next to the unique High Line Park opened in 2009 [17] made it possible for the architect to design a building that would comprise both a volume expected by the investor, capable of housing adequate programming, and an architectural modern style that would fit the revitalised, post-industrial district [18, p. 273–284] (Ill. 9, 10). The museum opened in May 2015, after nearly 85 years back to the location where it embarked on its primary mission in 1931.

Ill. 9. New premises of the museum located by the unique High Line Park (photo by W. Gadomska)

Nearly twenty years' quest of an idea how to expand the building, so deeply rooted in the city's modern history, made it clear how difficult and restricted expansion of museums has been in modern times. The public debate that arose over the radical change of the museum's

Ill. 10. Observation decks providing the experience of a big city landscape (photo by W. Gadomska)

location provoked, other than architectural issues, many equally crucial questions about museums being a productive element of urban development, creating a city's cultural potential and its characteristic genius loci in its surroundings.

6. Conclusion

Other than their basic mission of collecting and spreading knowledge of art, museums have an important culture-producing function of shaping the architectural landscape of the cities they are located in. The biggest museums of New York City located in the specific 'Culture of Congestion' [19, p. 10] of Manhattan have faced the necessity to expand their premises due to the growth of their resources and collections, the need of creating new conditions to exhibit them, and the need of enriching their programs. The possibilities of spatial expansion of the analysed institutions were, on the one hand, limited by the complex local cultural context – commitment to the architectural heritage of the original building or respectable neighbouring development; on the other hand, they were pragmatically bound by the necessity of enlarging the existent functional space. The quoted examples of museum expansion in practice show characteristic formal ways of incorporating buildings into urban fabric to co-exist as a part of the architectural landscape. This article also focuses on the extent of limits whose exceeding leads to breakthrough searches for new locations within the city borders[4] [20, p. 60-65] and developing new buildings for museums from scratch.

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MARGOT DUDKIEWICZ, ELŻBIETA POGROSZEWSKA,
WOJCIECH DURLAK, MARIUSZ SZMAGARA*

THE ROLE OF SCULPTURE IN SHAPING THE STYLE OF GARDEN OBJECTS

RANGA RZEŹBY W KSZTAŁTOWANIU CECH STYLOWYCH OBIEKTÓW OGRODOWYCH

Abstract

When designing a contemporary garden, be it private or public, it should be remembered that it has to be not only functional and aesthetic, but it should also have some theme and unique atmosphere – this can be achieved through, for example, artistic objects. Properly selected and placed to catch the eye, they arouse emotions and engage the intellect. Every historical epoch and all types of garden have their own distinctive sculptural themes and materials.

Keywords: sculpture, style of garden, private garden , public space

Streszczenie

Projektując współczesny ogród, zarówno rodzinny, jak też użyteczności publicznej, warto pamiętać o tym, że musi on być nie tylko funkcjonalny i estetyczny, ale powinien zawierać pewną treść i posiadać niepowtarzalny nastrój, które można uzyskać przez m.in. obiekty artystyczne. Odpowiednio dobrane i ustawione dzieła rzeźbiarskie przyciągają wzrok, budzą emocje, angażują intelekt zwiedzających. Każda epoka historyczna i różne typy ogrodów posiadały własne charakterystyczne dla siebie tematy i surowce rzeźbiarskie.

Słowa kluczowe: rzeźba, style ogrodowe, ogród prywatny, przestrzeń publiczna

* Ph.D. Margot Dudkiewicz, Prof. Ph.D. Elżbieta Pogroszewska, Ph.D. Wojciech Durlak, Ph.D. Mariusz Szmagara, Department of Ornamental Plants and Landscape Architecture, University of Life Sciences in Lublin.

1. Introduction

Sculpture is a feature of garden design that has the potential to be of particular impact. In historical gardens, it was a compositional element strengthening the style, spirit and the atmosphere of the garden. In modern private gardens, valuable sculptural objects are unfortunately quite a rare phenomenon. However, contemporary land art achievements are very interesting. With sculptures, designers trigger associations in the mind of the visitor, the need for contemplation, feelings of pleasure, relaxation, amusement, satisfaction, a sense of grandeur, power, authority or intimidation. Using the sculptures it is possible to create a new spirit of a place.

2. Material and methods

The aim of this work was to present the history and the role of the garden sculpture in past historical epochs and the present day, as well as to describe the materials used for creating artistic objects. This work includes a review of literature on the role of sculpture in the formation of stylish garden objects and our own observations made in the period 2011–2015 in the UK, France, Germany and Italy in addition to Poland.

3. Sculpture in historical gardens

Sculptures have been a common feature during all periods of civilisation and across all cultures in the world. Initially, they served religious and political purposes; the sculptures had to be impressive and serve to show the might of the ruling classes, e.g. the Great Sphinx or Moai statues on Easter Island. The human figure and animals were among the earliest sculptural themes. Animals were depicted realistically or in some cases, imaginary monsters were created, e.g. in China, where they were the traditional stone sculptural themes of tombs and temples. The creators of jewellery and reliefs, especially in the circle of Byzantine and Islamic art, found inspiration in the kingdom of plants – as a result of this, some motifs such as espalier and curving vines penetrated the art throughout Eurasia. Contemporary art has added a number of non-traditional forms of sculpture, e.g. light sculptures, kinetic sculptures (including aspects of physical movement), land art, and also small objects created specifically for the gardens of private homes, e.g. metal sculpture made of recycled objects.

The positioning of sculptures in the garden, their number, the material used and their themes have varied across different historical periods and they reflected the artistic trends fashionable at that time. In ancient Greece, statues of gods and kings were placed in some temples, on the lakes and in sacred groves. The Romans honoured their gods by placing sacrificial altars, temples, statues of deities, tombs and nimfea (a type of fountain decorated with columns and statues) in the gardens.

In medieval castles and monastic gardens, decorative pots and urns were used for the cultivation of flowering plants and herbs. In the monastic gardens were placed figurative sculptures of saints made of wood and stone. In the late Middle Ages, stone sculptures were combined with fountains [4].

In the Renaissance, sculptural elements were either combined with fountains, and various buildings or they were independent elements. Artists turned to the themes taken from Greek and Roman mythology. They also collected antique sculptures imported from Greece or Italy. Some figures could be found on the retaining walls, railings, staircases, terraces, caves, pools, fountains and cascades. The sculptures were of monarchs and princes, wealthy art patrons and the Medici family among others. The other themes of sculptures included nymphs, water and river gods, naiads, tritons, and animals.

The Monster Park is to be found in Bomarzo, Italy and is decorated in the Mannerist style; tuff rock was used in order to present an image of the terror and human struggle against the forces of nature. The sculptures in this park – giant monsters, gods, sphinxes, animals and mythical creatures tell the story of a man who must go through the pitfalls and passions of life [12].

There were also literal representations of the resident supernatural being of a given site, e.g. in the garden of the villa Colocci in Rome, there is a sleeping nymph – a supernatural guardian of this place [10].

A Baroque garden also expressed the idea of the subordination of nature to man. Baroque gardens showed the social status, power and wealth of their owners. Fountains and sculptures enhanced the prestige of their owners and manifested by social rank. The atmosphere of glamour and richess was achieved by the use of huge spectacular architectural elements and solutions, e.g. gardens in the Aldobrandini villa, Frascati and in Garzoni, Collodi were full of theatricality and illusory effects. The Aldobrandini villa became famous for its water theatre, with a statue of Atlas ejecting a high stream of water, a monster blowing strange sounds on the horn and the imitation of a storm with violent rain, wind and thunder [3].

The spirit of a place in the Baroque epoch was initiated in the gardens of Vaux-le-Vicomte, and continued in the Versallies garden of Louis XIV. Versailles showed dominance over nature and at the same time, illustrated the dominance of France in the contemporary world. Fountains and sculptures depicted a powerful monarchy, the same is found in the 16th-century Italian gardens that showed the power and wealth of cardinals and princes. The rich iconographic programme referred to classical mythology where in the centre was Apollo, the personified Sun King [12].

The Baroque epoch was similar to that of the Renaissance with regard to the garden being a place for contemplation and the home of a collection of works of art. Figures, putti, hermaphrodites, sundials and obelisks were set on the ground floor, in niches of tree rows and avenues; they were also used as elements of fountains. Building entrances, courtyards, entrance gates, lounges, main promenades, squares and crossroads were adorned with them. Vases were set on the abutments and parapets of palaces.

In the Baroque epoch, sculptures located in the main avenues of parks, geometric quarters and they often closed perspective. The main sculpture materials used for fountains and pools were bronze, lead, and copper, which were often gilded. Others were made of stone (marble, granite, sandstone), cast iron, terracotta (often gold-plated or painted white with oil paint) [4]. Topiary played a significant role in three-dimensional elements of design – this is an art form in which plants are pruned to human figures, animals and geometric shapes.

The landscape gardens of the first part 19th centuries there were almost no sculptures. They were only ever presented singularly and required compositional integration with the vegetation. Sculptures were set either on pedestals or directly on the ground and the basic sculpture material was stone. The equipment used in the gardens was lattice under vines, garden furniture, sundials, buckets, flower pots, decorative borders of flowerbeds and so on [4].

Works of sculpture, due to their emotional expression and themes referring to symbolism and history, created a mood of mystery. All kinds of monuments and memorial stones played this role. Decorations referred to ancient, medieval, Chinese and Islamic art. They were mainly set up in less visible places, giving the impression for a strolling person that he encountered them incidentally. Their unusual locations (e.g. in a thicket of plants) was designed to surprise and delight the viewer. And the natural environment was far from the rigidity of the Renaissance and the Baroque periods.

Characteristic of the romantic trend were ruins, hermitages and grottos. In the early 19th century, the main task was to create a garden atmosphere full of romantic undertones for their visitors. Special spiritual significance was places dedicated to the storage and display of accumulated architectural elements – statues, tombstones and monuments from the historic buildings. Duchess Helena Radziwiłł and Szymon Bogumił Zug managed to complete Arcadian topic in Arkadia Park [12]. Sculptors commissioned by prominent families include John George Plersch, Francis Pinck, and some international artists such as Guglielmo della Porta, André Le Brun and Giacomo Monaldi.

In the parks and gardens that are subject to revaluation, sculptures create the unique atmosphere and restore history. Today, there are opportunities to use modern materials without affecting the colour of the place [9]. A good solution is to use modern materials such as lightweight special concrete mortars on a frame with wire mesh and fibreglass for making copies of sculptures (Ill. 1, 2).

Ill. 1, 2. Lightweight and durable copies of sculptures of lions (the originals were made of stone) prepared for installation during the park restoration at the Wilanow Palace Museum (photo M. Dudkiewicz, 2011)

4. Sculpture in contemporary landscape architecture

According to Charles William Eliot, Snr (1834–1926): "landscape architecture is primarily the art, and its most important function is the creation and protection of beauty surrounding human settlements and more broadly – the natural scenery of the country" [1]. With the given definition, one of the tasks of landscape architecture is to create domestic, private space, as well as city parks, squares and streets. Contemporary landscape architecture, as in previous centuries, involves the achievements of arts and engineering. Decorative elements appear in various forms including free-standing sculptures or extensive installations of land art.

4.1. Private space

A garden is a reflection of its owner's personality, it is the owner who determines the feel of the space by means of the garden plants, stones, elements of sculpture and other objects – all signs of territorialit. Furnishing a space around the house, the owner is associated with the place [6, 11]. Often, a pair of 'guards' are located at the entrance to a building or property, these are decorative elements such as sculptures or pots of clipped evergreen shrubs [5]. Sometimes unfortunately, as a phenomenon highly negative in recent decades. Badly chosen sculptures such as dwarfs, animals, or characters from fairy tales can destroy the beauty of the garden and their excessive numbers can lead to an impression of kitsch.

Modern urban home gardens do not usually have the extensive compositional scheme. Due to the small plot sizes, most space is usually taken up by the residential building, which dominates and divides the space into individual zones. The area is clearly divided into the front and back garden of a house. The front garden of the house plays a representative role and marks the entrance to the house; its main compositional axis is the entrance path and the other axis is the entrance to the garage. The fence is usually openwork or it has appropriate holes to allow observation of the interior of the front garden. It is in these areas where there are mostly located sculptural objects – gnomes, animals or windmills, often accompanied by decorative plants, a rock garden or a pond.

Usually, the area located behind the house is designed for recreational purposes for the inhabitants – it is a lawn with some plants arranged around its edges. Sculptures tend to be set both along the walking path and the road leading to some buildings in the garden. Among the flowerbeds, garden figures also often appear which focuses the attention of visitors and closes the composition to create the character and mood of the interior garden. The owners often decide on an 'English' style of gardens surrounding the house – a relaxed garden composition style, full of diverse combinations of plants and scenic views, crowned with sculptural decorations and varied with gentle hills or valleys with a pond [8].

The choice of sculpture depends on the personal tastes of the owners, the character of the house and garden, and the aesthetic of its environment – sculptures are chosen with regard to subject, size and material. The character of the sculpture and its style should fit with the natural elements of the environment in which it is presented. The material of which it is made must be used in the whole garden. The type of background and its colour and texture determines that the composition is perceived in the right way. Openwork carving should have a clear background in order to make it visible – this may be, for example, a hedge. Similarly,

in the case of colour, dark sculpture is nicely presented on a light background, and of course it will be more visible if it is on a background of a strong, intense colour. A different effect is achieved in the summer, among the abundance of leaves and colourful flowers, and another in the harsh monochrome landscape of winter.

Emphasis should be placed on the size of sculptures and the space that is available. It would be a mistake to place a large sculpture on a small patch of green. In cases when it turns out that the sculpture dominates the whole environment too much, one should set it to one side of the garden and try to balance it with, for example, an impressive group of plants or put it opposite a large tree. Located on the side of the garden clearing, it would blend in with the garden, or if there was another distinctive element it would give an impression as if the garden space surrounded it. The proper size of the sculpture to its surroundings is very important as the right proportion creates a sense of harmony and order. Use of a pedestal would make the sculpture remote and inaccessible, and the lack of a plinth would make contact with the work of art more intimate and personal. Sculptures surrounded by water look particularly interesting. In addition, one should take into account the height of the sculpture and its location in relation to the world and the direction of the shadow, which may constitute the original element of the composition.

Kamiński's research carried out in 2009 in the city of Lublin shows that placing sculptured objects in home gardens is quite a rare phenomenon. Gardens with such elements can be considered as an interesting accent of the monotonous landscape of the city streets. Overall, there were surveyed approximately 1,500 gardens, and sculptural objects were found in only around forty gardens. The largest group were statues made of plastic which were dyed in diverse ways and can be bought in shops and horticultural fairs both in Poland and abroad (Ill. 3, 4). This group included not only dwarfs of different sizes and forms, but also figures of animals (deer, wild ducks, storks, swans, squirrels).

What was also found were extremely diverse objects made as a result of the imagination and the creative passion of the owners of the properties, which are often unique objects, eg. a life-sized statues of dinosaurs close to Łęczna. There are also some essentially utilitarian objects, or their fragments which, when moved into a new space, no longer fulfil their original function. These are often items associated with farming or animal husbandry, for example carts, cartwheels, buckets, agricultural tools or wheelbarrows. Losing their former function and placed in urban gardens, they are an expression of longing of their owners for the ideal rural and peaceful life.

Sometimes, the owner of a garden may choose to express their religious beliefs by placing objects of religious theme in the front garden, e.g. a statue of the Virgin Mary, stone angels, wooden saints, or a rock with the greeting "God Bless You" (Ill. 5, 6). Religious objects are decorated with plants, mostly in the form of flowerbeds, or edged with hedges or adorned with artificial flowers.

Cieślak (2014) reported that after several years of garden gnomes being the dominant 'aesthetic' addition, Polish gardens are now becoming places exhibiting true art. This trend is visible not only among private collectors of sculptures, but also among developers of modern residential complexes and architects of public institutions. One of the developers cooperated with the well-known Krakowian sculptor, Bronislaw Chromy. On over two-thousand square meters, four bronze and stone sheep will be placed and a bronze peacock will take pride of place on the patio. The most famous Polish sculptors are Mirosław Bałka, Bronisław Chromy, Igor Mitoraj, Tadeusza Łodziana and Tadeusz Kantor. Some private art

Ill. 3, 4. Garden sculptures in home gardens made of corten steel (a type of low alloy steel, the surface of which automatically turns to a protective coating which resembles rust upon exposure to the air and rain) at a horticultural fair in Zweibrucken, Germany (photo M. Dudkiewicz, 2013)

Ill. 5, 6. Religious ornaments in the private garden of Mr. Lucjan Kurowski in Końskowola (photo M. Dudkiewicz, 2012)

collectors exhibit their works of art in greenery, for example, in the garden of the private museum of Villa La Fleur, founded by Mark Roefler. The garden of this villa near Warsaw delights with a sculpture *Les Femmes de Carthage* by Xawery Dunikowski [2].

4.2. Public space

Sculptures located in urban green spaces can function as didactic, educational and decorative objects. Sometimes they have a particular religious or artistic significance. A special type of garden is the sculpture garden – works made of durable materials are exhibited in these in picturesque landscapes adorned with plants. Garden sculptures can be private, owned by a museum and viewable by paying an entrance fee, or the can be public and available to be enjoyed by everyone. In the list of the most important sculpture gardens is the National Gallery of the Art of Sculpture Garden in Washington, USA, the Luxembourg Gardens in Europe, and the Tuileries Gardens and the Garden of Auguste Rodin in Paris, where outdoor sculptures are set among two thousand roses (Ill. 7, 8).

Ill. 7. 'Three Shadows' (bronze, 1902–1904) fragment of 'Gates of Hell' – triple vision of Adam banished from paradise, the Rodin Museum, Paris (photo M. Dudkiewicz, 2013)

Ill. 8. The Rodin Museum is one of the most popular museums in France (after the Louvre, Versailles and the Musée d' Orsay). The museum holds the most significant works by Rodin. Many of the artist's sculptures are exhibited in the museum adjacent to the garden (photo M. Dudkiewicz, 2013)

Land art is artistic work which interferes with the natural environment by creating changes in the landscape. Land artists realise their creations on the ground, on the water and in the air, using a variety of biological, chemical and meteorological processes. This art involves creating temporary or permanent paintings or sculptures in the landscape. The most common works are created using rocks, sand, soil and terrain, for example, trenches or paths. The first works in this trend were created in the 1960s and the most famous is the work of Robert Smithson, who in 1970, created a 500 metre spiral causeway with 6,000 tons of earth and stone on the Great Salt Lake in Utah.

One of the world's leading contemporary artists creating outdoor art objects is Patrick Dougherty, the author of over 200 works of woven wicker. His most important projects include: *Call of the Wild*, Museum of Glass, Tacoma, 2002; *Close Ties*, Dingwall, Scotland 2006; *Monks' Cradle,* Collegeville, USA, 2012. His sculptures are composed mainly of willow shoots. Each sculpture takes around three weeks to make. The sculptures are made of biodegradable organic matter, which, after a few years, decay and becomes part of the environment. A completely different material is used by Patrick Chihuly – a sculptor who creates monumental works of glass art. Chihuly's sculptures also tend to be integrated into the natural environment, e.g. glass elements suspended in a real tree branches, purple glass canes, or glass flowers floating in a boat on a pond. Chihuly also creates sculptures for smaller and closed spaces. Chihuly's fixed museum installations include *Olympic Tower* Salt Lake City 2002; *DNA Tower* Indianapolis 2003; *Lime Green Icicle Tower* Boston, 2011.

The Polish Sculpture Centre is located in Orońsko, attractions include the works of Magdalena Abakanowicz, Władysław Hasior, Maria Jarema and Katarzyna Kobro. The works of here art are placed outdoors, in the old manor buildings and the new pavilion. Similarly, in the historic park of Królikarnia in Warsaw, history blends with modernity. Surrounded by trees and shrubs is the Sculpture Park – here, selected works from the collection of the National Museum in Warsaw are displayed (Ill. 9, 10).

Ill. 9. Marble 'Portrait of Marina Bakulewa' by Yekaterina Biełaszowa, 1965. Biełaszowa has been called 'the folk artist of the USSR' in the monographic exhibition catalogue from 1967, which was held at the Central Bureau of Art Exhibitions in Warsaw (photo M. Dudkiewicz, 2010)

Ill. 10. In the 19th century were popularity of images of animals in art. The marble sculpture of Eduardo Leon Perrault's 'Dog' 1887 belongs to a realistic sculpture of French (photo M. Dudkiewicz, 2010)

5. Carving materials

Popular materials which are used for sculptures in contemporary gardens are wood, stone and metal. In Poland, the wood most widely used in sculpture is lime. Sometimes, uses better and expensive species of trees, characterised by greater hardness and durability, e.g. oak, ash, walnut, chestnut (used for sculptures exhibited under a roof) are also used. Outdoor sculptures are mostly made of poplar; sculptures are not made of pear, locust and conifers. Stone sculpture gardens are formed mostly of marble, sandstone and more rarely, granite. Metal sculptures are made of bronze or brass by hollow casting.

A typical material for the modern industrial style is glass (Ill. 11, 12). Glass can be crafted with a wide variety of possible textures from smooth surfaces to satin and sandblasted finishes; furthermore, sandblasting can be applied selectively to create an infinite number of possible patterns. Glass is shaped and sculpted through heating it to high temperature so that it becomes flexible. The method of glass fusing makes the glass easy to bend and combine with other glass elements of different shapes, colours and types. Glass sculpture gardens include the desert Botanical Garden in Phoenix, where they are surrounded by rocks and cactuses, or in the Royal Botanic Gardens in Kew, London (glass forms like flowers fill the boats floating on the pond) [7].

Nowadays, access to new technology allows the creation of giant sculptures decorated with flowers and patches of turf. In the market, there are specialised companies constructing animals and logos using a similar technology to that which is used in green walls. The artists build their "living sculptures" around a wood and wire frame, inside which they place a plant that would grow quite large. Over time as the plants grew they are trimming and pruning.

Ill. 11, 12. Installations of metalwork and glass – London exhibition of gardening. Chelsea Flower Show (photo M. Dudkiewicz, 2011)

These sculptures, set on water and forming, for example, a flock of flying birds or jumping dolphins tend to be a huge attraction at horticultural exhibitions or temporary exhibitions in the botanical gardens around the world. The irrigation and manuring of such sculptures is hidden, for example, in the case of dolphins, in the columns of water springing up the fountains – this is located underneath each animal. Such objects leave lasting impressions on visitors.

It is worth pointing out that some modern photobioreactor installations designed by Charles Lee are good examples of how art can be utilitarian and at the same time, serve to protect the environment. In the structure of the sculpture there are algae which, when exposed to light and CO_2, produce bio-diesel used to power vehicles, lighting or air-conditioning.

6. Conclusions

Everything created by mankind originates in a specific historical period and is the product of the prevailing canons of art, architecture and culture. From the very beginning of sculpture, artists paid special attention to the realism of their work, with particular emphasis on the fact that they reflect reality. During the Renaissance, the ideal of the sculpture was one that reflected detailed elements of the human body. Stone and bronze were the main materials used in sculpture. In the 20th century, sculptors began to seek abstraction, building their works with glass, metal or organic materials. The essence of the design of various types

of garden is strengthening and enriching their impact on observers, or bestowing on them the characteristic features of a particular style. These objectives can be achieved by, among other strategies, the display of sculpture.

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KATARZYNA WITASIAK*

THE ARCHETYPE OF THE LABYRINTH IN THE ARCHITECTURE OF HOLOCAUST MEMORIALS

ARCHETYP LABIRYNTU W ARCHITEKTURZE MIEJSC PAMIĘCI HOLOKAUSTU

Abstract

This paper emphasises the restoration of labyrinths in the memorial architecture of the 20th century. Projects mentioned in the article evoke different interpretations of 'labyrinth'. There are examples of memorials in Berlin and in Israel designed by different architects. This paper concentrates on holocaust memorials and reveals the universal language of architecture which is based on archetypes. Thereby, young generations can comprehend values such as freedom and security.

Keywords: labyrinth, architecture, archetype, memorial, holocaust

Streszczenie

Artykuł podkreśla powrót archetypu labiryntu w architekturze miejsc pamięci w XX wieku. Przedstawione projekty ukazują interpretacje architektoniczne mitycznego symbolu z Berlina i Izraela. Przykłady memoriałów związanych z holokaustem podkreślają, jak ważna jest uniwersalność języka architektonicznego opierająca się na archetypach. Dzięki temu młodsze pokolenia mogą lepiej rozumieć wartości, bez których życie nie jest możliwe, jak wolność i bezpieczeństwo.

Słowa kluczowe: labirynt, architektura, archetyp, memoriał, holokaust

* M.Sc. Eng. Arch. Katarzyna Witasiak, Institute of Architecture and Urban Planning, Faculty of Civil Engineering, Architecture and Environmental Engineering, Lodz University of Technology.

1. Memorial Sites

Memorial sites belong to a category of space in which we return to a sacred atmosphere especially in places dedicated to the victims. Contemporary architects who create holocaust memorials are facing the task of commemoration and the education of universal values. Memorial spaces that commemorate extermination camps are very valuable as a way of preventing human failure. Contemporary school programs also devote their attention to the concept of such places. The analysis of memorial sites can be an opportunity for critical reflection on the image of the past and it can deter young people from making future mistakes. Messages provided by mass media are often more temporary than architectural experiences that can transmit the memory of generations.

Gabriela Świtek, in the book *Aporie architektury*, noticed that the art of memory reveals itself after a catastrophe [11, p. 128]. However, we can observe that architecture in general has always been a memorial of our emotions, lifestyle, thoughts and finally, culture. A book can be closed, a film can be turned off, but architecture is a vivid memorial that can have a great impact on our lives and identity.

2. The Value of Archetypes

The creation of museums, monuments and art projects is increasingly practiced by a generation that did not experience the events that are being commemorated. This memory is passed on by ancestors, contemporary accounts and novels. It could be obvious that contemporary designers would not be able to create this kind of architecture. However, there is a memory, which Carl Gustav Jung called the collective sub-consciousness which consists of codes defined as archetypes [4, p. 625]. This special memory connects generations, cultures and civilisations and we inherit it instinctually; thereby, architects strive to communicate with us through this ‘universal language’.

Jung acknowledges that archetypes symbolise mental energy [5, p. 187, 211–216]. We can find them in mythology, fairy tales, religion, and dreams. This is the reason why archetypes, like labyrinths, are commonly used by modern architects. This symbolism can provide universal messages and it can speak a language which people from different backgrounds understand. Moreover, labyrinths are very democratic structures which can be experienced by everyone regardless of origin or belief. The holocaust memorials which are presented in the article were inspired mostly by multicursural labyrinths that help to reflect on the choices we must face in our lives.

3. The Stone Labyrinth

The World Holocaust Remembrance Centre, Yad Vashem, is an interesting example of a memorial in Israel. The museum complex consists of place called ‘The Valley of the Communities’ built of large rocks that create a labyrinth of high walls.

Ill. 1. Valley of the Destroyed Communities, geographical organisation of the names of the communities (Source: [9])

This labyrinth is located at the western edge of the Yad Vashem complex – it was designed by Lipa Yahalom and Dan Tzur at the beginning of the 1980s. The structure is made up of over one hundred sections which are separated from each other by walls of Jerusalem stone. The aerial view shows an open maze depicting a world that has disappeared. The form commemorates the Jewish communities from Europe and North Africa – these communities were exterminated during the holocaust. The experience of wandering through the site evokes confusion, separation, solitude and brings reflections on life and death. The names of the communities are carved on the rocks and the labyrinth represents their location on the world map [9, p. 87]. Walking through the labyrinth of high walls makes the visitors feel small and surrounded by the enormity of the destroyed world. This structure both commemorates and awakens the history of a people who have lived in Europe for more than one thousand years and are trying to preserve their identity.

The labyrinthine structure was also inspired by Ezekiel's prophecy about the hand of the Lord, which had set him in the middle of a valley full of bones. The prophecy symbolises the resurrection of the Jewish people. The labyrinth was supposed to be reminiscent of a labyrinthine open grave dug into the ground. The lack of vegetation inside the labyrinth symbolises destruction but the plants on the top of the rocks symbolise new life [9, p. 86].

In this place, everyone feels the special need for silence – silence to remember and to capture the sense of memories that take us back to the past.

This place shows the scale of destruction of a world filled with outstanding culture, religion, politics, tradition and social life.

4. The Labyrinth of Exile

The interpretation of the labyrinth was used also in the Garden of Exile as a part of the Jewish Museum in Berlin created in 1989. The structure, designed by Daniel Liebeskind, lies at the end of the Axis of Emigration and it is composed of forty-nine concrete columns filled with vegetation. The similarity to the stalls in Yad Vashem creates the sense of a strong association with the Jewish Community.

Fig. 2. Jewish Museum in Berlin. New Wing. The Garden of Exile. Credit: Judisches Museum Berlin, photo: Jens Ziehe (Source: [12])

The geometry is based on forty-eight columns filled with soil from Berlin which symbolises the creation of the independent State of Israel in 1948. The middle column is filled with earth from Jerusalem. Vegetation and plants only grow on the top of the seven-meter-high columns and are irrigated by an underground system. In the garden, one loses a sense of confidence and stability. Moreover, the surface is inclined relative to the main building of the museum. According to the architect Daniel Libeskind, the sense of uncertainty and confusion relates to the concept of a Jew as an immigrant who had to leave his home and his life [8, p. 26].

According to Gabriela Świtek, the architect Daniel Libeskind referred to the short story entitled 'Piaskun' written by E.T.A. Hoffman. One of the main characters is Olympia, a girl who turns out to be a mechanical doll which is an object of desire and deceives a real boy by her perfection. Świtek writes about the concept of 'man as machine' inspired by the views of Descartes or Julien Offray de la Metrrie. Perhaps the artificial garden made of concrete refers to the maze where people get lost in the machinery of the dictatorship. Many people were misled by the cruel perfection of the dictator's vision at the beginning like the protagonist in the Hoffman's book. The structure symbolises a world where people cannot distinguish good from evil. Artur Kamczycki colligates the form with the Garden of Eden which, according to biblical tradition, is located in the land of Israel [6, p. 217].

5. The Victims

Another example of a labyrinth used in the idea of the memorial site in Berlin is the project 'Victims' created by John Hejduk in 1984. The project was entered into a competition for a memorial park on an old Gestapo site in Berlin. The Gestapo headquarters included a torture chamber during the Second World War. The labyrinth was one of sixty-seven structures created by Hejduk. The concept presented features typical of this architect's work – monumentality, symbolism and memory [2, p. 41].

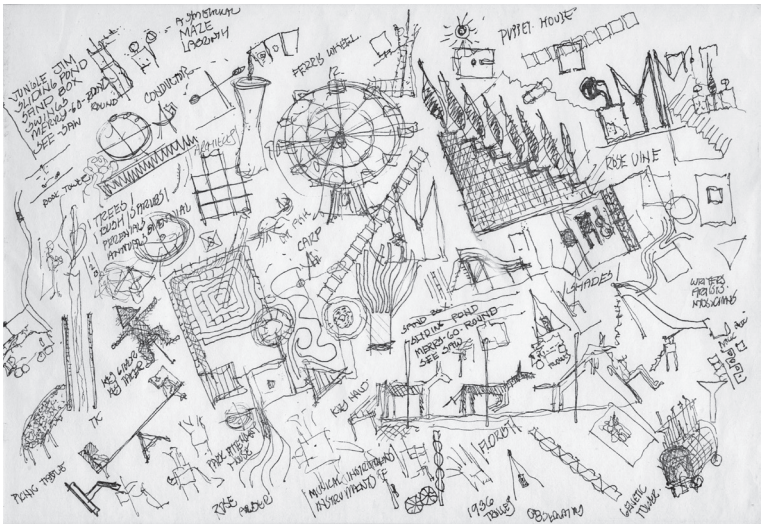

Fig. 3. John Hejduk, sketch for Victims, 1986 (Source: AA Archives, John Hejduk *Victims* Drawings)

The labyrinth appears through forms in Hejduk's Victims, known as 'The Inhabitants', and the structure, 'The Soloists' [3, p. 80] – the name of which is probably connected to the fact that every victim of the holocaust is a 'soloist' while facing the death. The project

‘Victims’ was a collection of architectural pieces and each of them is an ideological island. There were structures reminding us of images of loneliness, fear like labyrinths and other dominants like towers, chambers, pavilions made a construction of time. The dark past was supposed to meet with the joyful present, but it remains full of mysteries and labyrinthine questions.

6. The Memorial to The Murdered Jews of Europe

In 1998, the second competition for the Memorial to the Murdered Jews of Europe in Berlin was won by the American duo, Peter Eisenman and Richard Serra – their submission was selected during a public debate on the project. At the request of the German Chancellor, the project had to be modified, taking into account the creation of the underground museum, which eventually formed the information centre [10, p. 4]. Eventually, Peter Eisenman created a labyrinth of high stone blocks. It is reminiscent of the concept of Jewish cemeteries, where coffins were arranged one above the other because of the lack of space. However, the designer himself interpreted his concept differently, which did not show such clear Jewish symbols but more the approach to a multi-dimensional maze [7, p. 157]. The artist wanted to see a man entering the monument and losing his sense of security. He mentioned the feeling of loneliness which every human being faces in dangerous situations. The designer wanted to show the universal message which referred not only to the fate of the Jews.

Ill. 4. Peter Eisenman, Memorial to the Murdered Jews of Europe, Berlin
(Credit: Eisenman Architects’ Office)

The form of the labyrinth helped to express the loss of orientation and the feeling of suddenly interrupted history [7, p. 158].

7. Conclusion

Projects mentioned in the article evoke different interpretations of the labyrinth. The archetype appears as a concrete garden in Berlin or a valley which reminds us of an open grave in Yad Vashem or an external monument, which takes part in the practices of everyday life like the Memorial to the Murdered Jews of Europe in Berlin. These labyrinths may be different, but they refer to the same important values, without which our life is impossible. These values are freedom and security.

The architects of the holocaust memorials have discovered the profound meanings and ambiguity in the symbol of the labyrinth, which evokes feelings of entrapment and fear in a seemingly open form. This architecture reminds us of how crucial it is to put an effort into reaching for qualities like freedom and security and sharing them with other people; thereby, we can protect ourselves from tragic events.

Marek Czyński, in the article 'Labyrinths of Contemporary City', shows that cities are reminiscent of labyrinths – their spatial design influences our behaviour [1, p. 265]. Therefore, labyrinthine memorials may also symbolise cities and indicate the importance of urban design in stimulating good values. Labyrinths as memorials force us to see that nowadays, there is a fine line between asylum and enslavement, freedom and danger, in our cities [1, p. 262].

Labyrinthine projects intend to encourage radical debate over the shapes of contemporary memorials and try to develop a new idea of remembrance. This involves not only the aesthetic dimension of memory, but the question of how to reach the imagination of future generations nowadays, without contemporary witnesses of the holocaust. Memorials referring to labyrinths base on the symbolism of passage and allow to understand our inner nature. Usually, museums or information centres do not provide such a deep experience.

It is sometimes difficult to reconcile freedom and security, but we cannot stop searching for this balance in our everyday lives if we are to live them decently. The architecture of memory should be aimed at this universal message.

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