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Town of Zhovkva (Żółkiew) in western Ukraine – an example of urban complex built at the end of the 16th century on the concept of the renaissance "ideal town"

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Abstract: The town of Zhovkva (Żółkiew) belongs to the late Renaissance foundations of private resident cities in Halychyna in the late 16th century. Urban-spatial structure of the town was designed according to the Renaissance ideal city. The city consisted of two conjugated parts: the owner's castle and the fortified downtown. The combination of these two parts was of a specific nature – when the central square of the town is combined with the facade of the castle complex.

On the base of the historical and urban studies presented the hypothesis that town of Zhovkva (Żółkiew) is an unique example of late Renaissance urbanism. The start of town build was in 1594 according to a project based on the concept of "ideal town". We are thinking, that the author of the project and plan of town was Paolo Clamensi – Italian architect, worked in Lviv at the end of 16th century. The towns have a well-preserved original Renaissance planning structure and a number of architectural monuments that are connected with it. Reconstruction of the original historical town plan allows us to express the hypothesis of its similarity to the projects of cities published in the treatise of the Italian architect of the 16th century Pietro Cataneo.

Keywords: town of Zhovkva (Żółkiew), town planning structure, Renaissance, "ideal city" model, urban composition, development of a town, Pietro Cataneo.

Introduction

In recent years, interest in historic cities has grown significantly in connection with the intensification of international scientific cooperation in the Eastern Europe related to studying and popularizing the architectural and urban heritage. This interest is also related to the identification of applicants for inclusion in the UNESCO World Heritage List [1]. In the list of historic cities of Ukraine, the attention is first of all drawn to the well-known large objects – Lviv, Kyiv, Kharkiv, Kamianets-Podilskyi and Chernihiv. The ensemble of the historic center of Lviv has been in the list of UNESCO heritage sites since 1998. A part of the town center of Chernivtsi (anensemble of sacred and administrative buildings of the Residence of Bukovinian and Dalmatian Metropolitan of the 19th century) was listed in 2011. There are very valuable urban complexes in the structure of small Ukrainian towns as well. Even today, the value of such cities or towns in Ukraine is often not very noticeable either because of insufficient scientific study of their architectural history or due to insufficient coverage in leading scientific journals. To a large extent, this situation can be explained by the fact that in 1950–1980 no thorough research was carried out in the field of historic urban planning. That is why, one of the small historic towns in the Western Ukraine was selected for study and present its urban and architectural values.

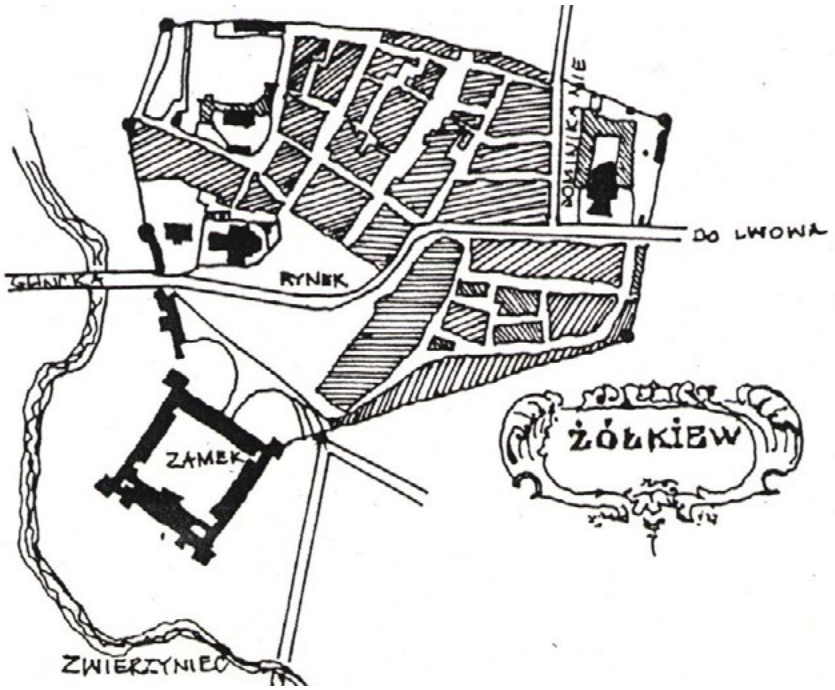

Fig. 1. The reconstruction of planning structure of town of Żółkiew (Zhovkva) by Jan S. Zubrzycki [J.S. Zubrzycki, 1901]. The defensive towers author located in western and eastern parts of townn walls only.

Analysis of urban development of town of Zhovkva

Zhovkva belongs to one of the insufficiently studied, but highly important urban-planning formations in the Halychyna region (Western Ukraine). The town is located 23 km north-west of Lviv. Zhovkva is the modern title of the town. In the historical documents, it is named Zholkiev (or Żółkiew, pol.) – this was also the name the family town of Żółkiewski in the Lublin region [2]. Next to the official name, Ukrainian casual "Zhovkva" was also used, which was established as a modern name. During the times of the Soviet Union, for a short period, it was inappropriately called "Nesterov" [3].

Fig. 2. Photo of central square of town of Zhovkva at the beginning of 20th century. The blocks of late Renaissance buildings with loggias-arcades in parter (northern part of square) [http//:www.polona.pl].

Scientific and academic works which have appeared in the recent years state that Zhovkva is an example of late Renaissance urbanism and was built in late 16th century according to a project based on the concept of "ideal town" [4, 5, 6]. In accordance with historical sources, this town was founded by Stanisław Żółkiewski (Zholkevski) [7] in 1594 on the territory which was part of the village Vynnyky [8]. Wysocki's family owned the village at that time. Foundation of the town took place on the eastern bank of the Svynia River, near the old castle of the Wysockis. It is interesting that in the middle of the 19th century, the bridge over the river which led to the western gate of the town did not belong to the town, but to the territory of the village. That is to say, the agreement between Stanisław Żółkiewski and Michał Wysocki on the transfer of the part of the settlement territory, gave the old owner control over the bridge and, of course, over the bridging tax collection. Unfortunately, only archeological traces remain from the castle of Wysockis.

Fig. 3. Today photo of central square of town of Zhovkva, M. Bevz, 2018.

Nowadays, Zhovkva has become the object of broader studies by historians and architects [9,10, 11]. In particular, in 2016 was published the so-called "atlas of the town" [12] in which the general stages of its development are reconstructed. In 1995, according to the decree of the Government of Ukraine, the historical part of the town received the status of the State Historical and Architectural Conservation Area. The Conservation Area is still functioning, managing the restoration works in the castle and in the central part of the town.

Today one of the architectural objects of Zhovkva is included to the UNESCO list of world cultural heritage from Ukraine. In 2013, the wooden church of the Holy Trinity, located in the Zhovkva suburb at the road from Lviv, was added to this list. The church is one of the 16 shrines of the joint Ukrainian-Polish nomination "Wooden churches of the Carpathian region of Poland and Ukraine" [13]. This church, which was built in 1720, has a unique, renaissance iconostasis of high art value. It is characteristic that the iconostasis was created by masters of the local Zhovkva painting guild. It was probably transferred to the Church of the Holy Trinity from an older church. It is evidenced by the very architecture and design of the iconostasis, showing the rebuilt parts of it, "fitted" to the size of the church interior.

According to the characteristics of its historical architectural and urban structure, Zhovkva complies with the main requirements of the "List of historical settlements of Ukraine" regarding to the uniqueness, authentic town and consistency of the heritage. The town has a well-preserved original Renaissance planning structure and a number of architectural monuments that are associated with it. The existence of a Renaissance plan makes the town to some extent unique both in Ukraine and in the Eastern Europe as a whole. The wooden church of the Holy Trinity is one of the reference objects of the Renaissance town planning. It is located in the place where a defensive gate at the entrance to the fortified suburbs on the road from Lviv was [14].

By the time of foundation, Zhovkva is among the cities of the late Renaissance, which arose on the eastern borders of the Polish-Lithuanian Commonwealth, creating a system of fortified settlements to strengthen the defence capacity of territories which were often attacked by southern neighbours (Tatars and Turks). However, the architectural and planning features of this fortress town have not yet been the subject of special scientific

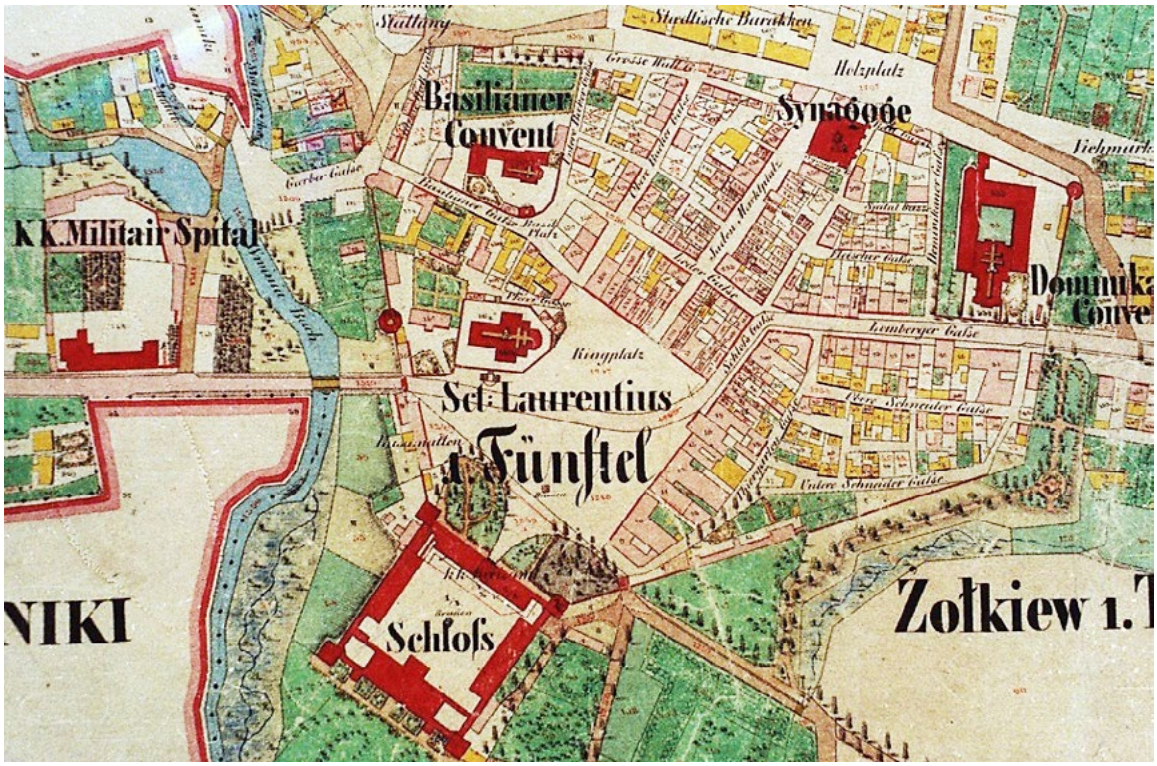

Fig. 4. Central part of town of Zhovkva (Żółkiew) on the cadastral map 1854 [12].

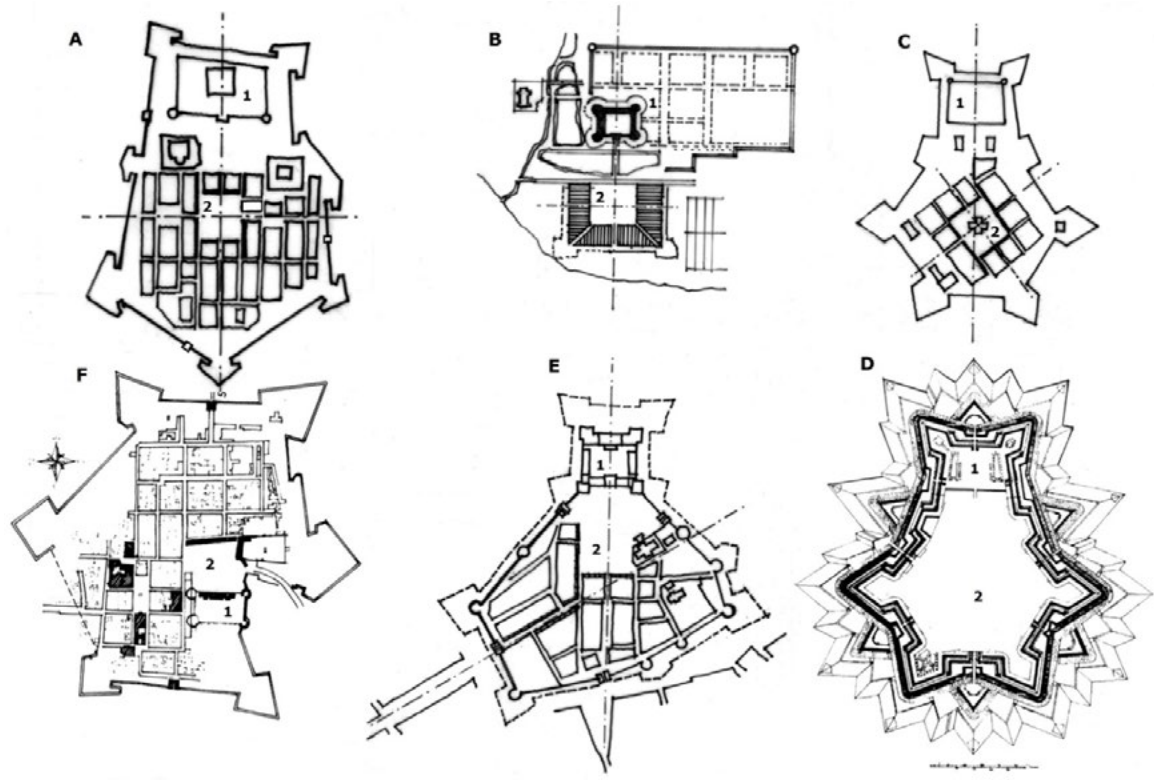

Fig. 5. Comparative analysis of town plans (towns located at 16–17 century): A – Zamość; B – Krasiczyn; C, D – Stanislav; F – Sabbioneta; E – Zhovkva; 1 – castle, 2 – inner town.

consideration in comparison with the defining examples of European Renaissance urbanism (fig. 2, 3). Today, the researchers have not yet elaborated on the genesis of the Zhovkva Planning Pattern; the specific characteristics of its Renaissance town-building composition have not been identified and compared with similar implementations in other parts of Europe, although in general, the identity of the town plan was emphasized in the work of architects-scientists O. Sosnowski [15], V. Chornovus [16], S. Kravtsov [17], A. Martyniuk-Medvetska [18], and I. Krypyakevych [19], M. Książek [20], K. Kuśnierz [21,22], H. Yaremych, Y. Kalika [23], and others. In our previous publications, we have already covered the issues of uniqueness of urban studies in Zhovkva [24, 25, 26], so now we are trying to develop this topic further. We believe that the immediate task of academics should be to explore the scheme of the planning structure of Zhovkva at the time of its foundation, to find out its prototypes and compare the architectural and urban composition of Zhovkva with other objects of European urbanism of the Renaissance age (fig. 3, 4, 5).

Fig. 6. Buildings with loggias-arcades in the central part of town of Zhovkva (drawing of beginning of the 19th century) [Zhovkva. Atlas ukrayinskych istorychnych mist. T. 3. Sc. Editor M. Kapral, Lviv, 2016, p. 32].

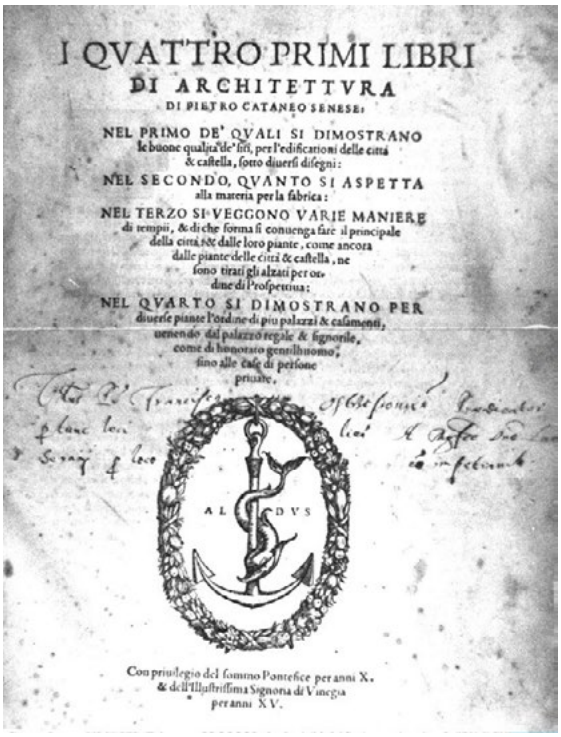
I QVATTRO PRIMI LIBRI
DI ARCHITETTVRA
DI PIETRO CATANEO SENESE.
NEL PRIMO DE' QVALI SI DIMOSTRANO
le buone qualità de' liti, per l'edificationi delle città
& castella, sotto diuersi disegni:
NEL SECONDO, QVANTO SI ASPETTA
alla materia per la fabrica:
NEL TERZO SI VEGGONO VARIE MANIERE
di tempii, & di che forma si conuenga fare il principale
della città & delle loro piante, come ancora
dalle piante delle città & castella, ne
sono tirati gli alzati per or-
dine di Prospettiua:
NEL QVARTO SI DIMOSTRANO PER
diuerse piante l'ordine di piu palazzi & casamenti,
uenendo dal palazzo regale & signorile,
come di honorato gentilhuomo,
fino alle case di persone
priuate.
AL DVS
Con priuilegio del sommo Pontefice per anni X.
& dell'Illustrissima Signoria di Vinegia
per anni XV.

Fig. 7. Title page of the book of Pietro Cataneo Senese [Quattro primi Libri di Architettura di Pietro Cataneo Senese. – Venetia: 1567. – P. 1. Photo by M.Bevz].

The history of the appearance of Zhovkva on the historical map of Halychyna is special. This town was founded in the last years of the 16th century as a private fortified residence town. The times of the town's foundation were marked by a constant threat of military actions in the territory of the Western Ukraine and, in particular, in Halychyna. Poland, Ukraine (which strived for autonomy), Turkey, Austria, Tataria, Wallachia and Transylvania confronted each other here. Constant wars made our territory to one of the most active new fortress-town construction areas in Europe in the 16th-17th centuries. Almost all these new cities were private, that is, they were founded by the rich owners of large land latifundia [27].

The development of the construction of private cities in Ukraine in the 16th and 17th centuries, unfortunately, has not yet been studied. The causes and geography of such cities are also not highlighted. However, citing the article of K. Kuśnierz can be argued that urbanization processes in Halychyna at this time occurred in much larger scale than in the rest of Poland [28]. This era left extremely valuable examples of urban planning, most of which, unfortunately, have been reconstructed or completely destroyed in later times (for example,

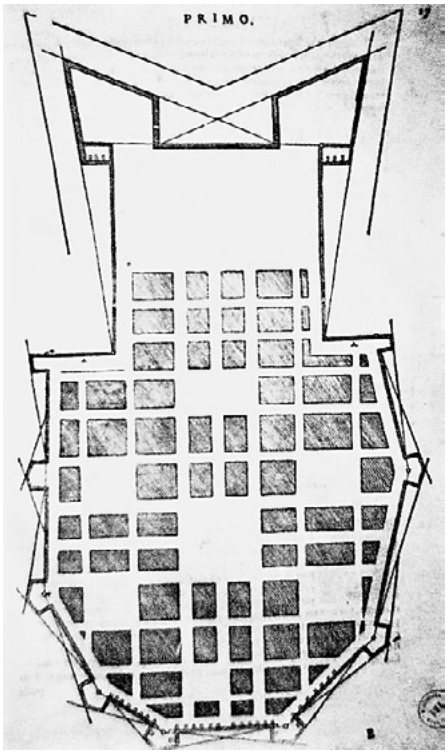

Fig. 8. The planning model of town plan with aunregular perimeter in the book of Pietro CataneoSenese [I Quattro primiLibri di Architettura di Pietro Cataneo Senese. – Venetia: 1567, p. 19. Photo by M. Bevz].

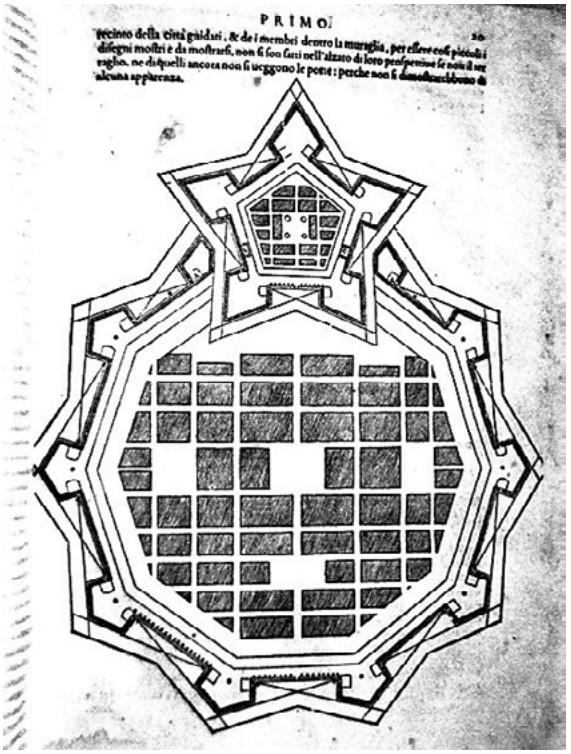

Fig. 9. The planning model of town plan with a regular perimeter in the book of Pietro CataneoSenese [I Quattro primiLibri di Architettura di Pietro Cataneo Senese. – Venetia: 1567, p. 20. Photo by M. Bevz].

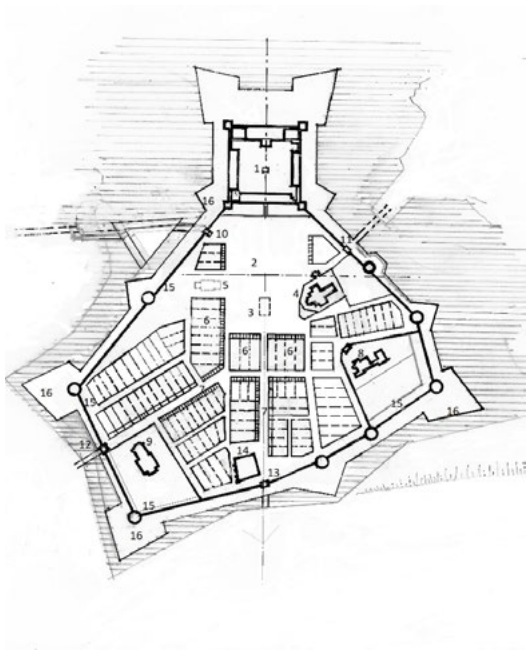

Fig. 10. The planning scheme of town of Zhovkva; on the time of 17 century [by M.Bevz].

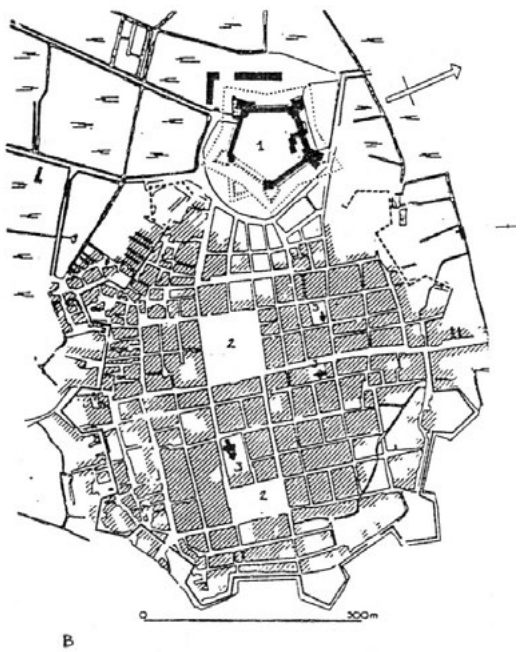

Fig. 11. The planning scheme of town of Brody; on the time of 17 century [by M.Kalinowski].

the planning structures and fortifications of the cities of Berezhany, Rohatyn, Uhniv, Kukeziv, Vasiuchyn, Kniahynychi, Burshtyn, Svirzh and many others [29].

Another characteristic feature of urban planning at the end of the 15th century is the emergence and expansion of new concepts of the town planning in Halychyna and Ukraine, based on the imitation of Italian planning structures for the construction of the "ideal town" of the Renaissance. Italian architects, many of whom worked at the princely or noble courts, at monastic orders (for example: Pietro Sperendio, Bernardo Morando, Aurelio Passaroti, Giacomo Briano, Paolo Clamensi etc.), or those who settled as practicing architects in larger cities, encouraged this. For example, about ten architects of Italian origin practiced in Lviv at the turn of the 16th and 17th centuries – Paolo Dominici, Pietro di Barbona, Ambrosio Nutklaus and other [30].

The inspiration and the implementation behind the state-of-the-art urban planning ideas were the princely or noble ranks of the Polish state [31], which included Halychyna at that time. Halychyna and then all of Ukraine, through hereditary law, passed under the control of the Polish king at the end of the 14th century. Accordingly, all the Ukrainian (Ruthenian) gentry or prince's families were in the service of the Polish king and occupied some of the high posts in the Polish state. Particular efforts in such activity were shown by the ancient Ukrainian noble families who owned huge estates in the east of the Polish state i.e. in Halychyna, Podillya, Kyiv region, and belonged to the cohort of the richest people in the kingdom (for example, the Ostrogskis, the Vyshnevetskys, the Sieniawskis, and others as well as the Żółkiewskis). At the time of the founding of Zhovkva, Stanislav Żółkiewski had a high state office and title of crown hetman and had significant estates in the Ruthenian, Belz, Lublin and other voivodeships [32].

The creation of well-fortified private residential cities in Ukraine, as we see, was a well-prepared and characteristic phenomenon for that time. In addition to military factors, the construction of such cities was determined by the presence of relevant customers and by their financial capacity, by the corresponding development of engineering and architectural thought; there was economic reasonability of building new cities (fig. 4, 5, 14).

Zhovkva was one of the earliest realizations of the concept of "ideal town" on Ukrainian lands. There are not many Ukrainian cities that have preserved the Renaissance structure to this day. A part of the specialists include Sharhorod in Vinnytsia region which was founded in 1580 by the Chancellor of the royal court Zamojski with the participation of architect Bernardo Morando to such objects. However, the detailed study of the building system which was conducted in 1988 (Yu. Nelhovskyi) and in 1994 (T. Trehubova) [33] did not find traces at the site that would sufficiently confirm the Renaissance planning and fortification which were characteristic of that time. According to T. Trehubova, the structure of the central part of Sharhorod, which is preserved to our time in rather full historical form, does not confirm the Renaissance principles of its planning layout [34]. Therefore, the planning model of the town and the nature of its lost fortifications from the 15th century remain the subject of theoretical scientific discussions and hypotheses.

To the later implementations of the ideal town concept belongs Stanislav (Ivano-Frankivsk; fig. 5). Until the 1970's, this town still retained the remains of its bastion fortifications, but they were destroyed during the reconstruction of the town center for the construction of a Soviet administrative building. This construction destroyed the unique layout of the town center, which distinguished this town from other historic cities of Ukraine.

Experts estimate that there are many more cities in Halychyna, which, at the time of foundation, did not receive a purely Renaissance but a transitional architectural and planning style with elements of a medieval and of a Renaissance town. These include Berezhany, Ternopil, Nemyriv, Novi Strilyshcha [35] and other cities.

Brody also belonged to one of the earliest Renaissance cities in Ukraine. Interesting is that this town, which in the beginning was called Lubycz, also belonged to the possessions of Żółkiewskis. The founding of the town, like in the case with Zhovkva, was carried out at the initiative of hetman Stanislav Żółkiewski, but 14 years earlier, i.e. in 1580 (S. Kravtsov presents another date of the laying of Brody – 1584 year) [36]. The town is located relatively not far away from Zhovkva, 70–80 km to the north-east. It consisted of a castle and a town located on an island in the middle of a large pond. The original planning of the town has not survived to the fullest. In 1630, Stanisław Koniecpolski, the new owner of the town, carried out a radical reconstruction, enlarging its territory and transforming its planning structure [37].

Discussion and main achievements

Based on the stated before, we can assert that in this way Zhovkva remained the oldest preserved example of the Renaissance ideal town in Ukraine. And, what is important, the state of preservation of the town's building and planning system is relatively good and allows us to rely on its fruitful studies in various fields – archeology, history, study of architectural and art monuments, study of Renaissance urbanism and architecture [38].

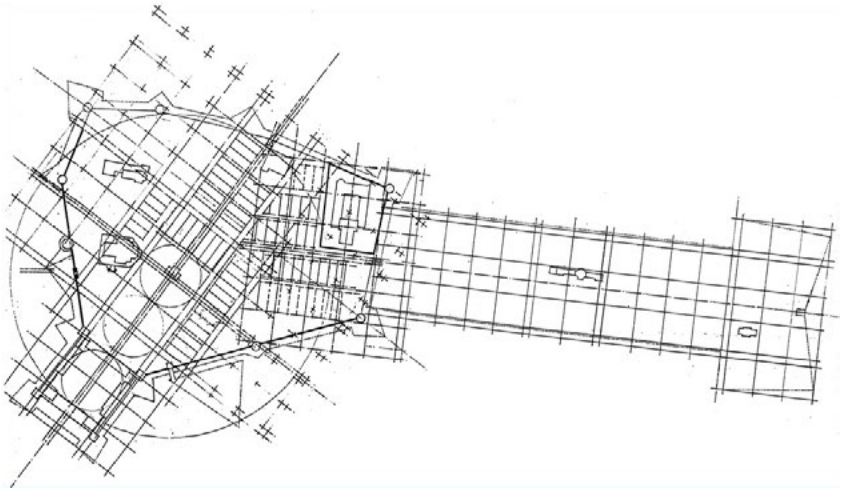

Fig. 12. The reconstruction of planning model of of town of Zhovkva (at the time of 16–17 century);by M.Bevz. Basic module – 43.2×43.2 m; left part – middle town (founded 1594; right part – Lviv suburb (founded – 1609).

Fig. 13. Drawing of Rynok square in Zhovkva with the church and town hall building at the last years of the 18th century [https://polona.pl/item/zolkiew-w-koncu-18-wieku,NDAyMTgyMTY/0/]

The analysis shows that the general spatial composition, the layout of the town, the nature of its development, the original planning structure of functional zoning is fully consistent with the principles of Italian Renaissance urbanism. In support of this, it should be said that there has been a common main planning axis of the town and the castle that has run from the Turynetska Gate through the modern Zaporizka Street, divided in half the Market Square, run through the main gate to the castle complex, and after having entered inside its courtyard, it ended at the main entrance and facade of the palace. The characteristic techniques of Renaissance urbanism and architecture used in Zhovkva include:

- "framing" of public spaces of the town (central square and main streets) houses with loggias-arcades (fig. 2, 3, 4, 6, 14, 15);
- application of Renaissance attic completions in decorating of the top of facades of houses (fig. 6, 13);
- location of the temple on a characteristic platform and with elevation above the square (fig. 2, 3, 10, 13);

- application of a democratic multi-ethnic scheme of settlement with the location of the temple in each national district (fig. 12, 14);
- presence in the town of an educational academic institution (functions of which could be hypothetically attributed in the beginning to the so-called Zhovkva fraternity and its school, which operated from 1612, and later to the Basylian Monastery, well-known for its educational activities [39; Bevz, 2000]);
- typical Renaissance planning composition of the central square with the presence of streets or alleys in the middle of the framing quarter (fig. 3, 4, 12, 14).

A special feature of the Renaissance cities was the rule of planning a special square in front of the residence of the owner of the town. Most often, these squares were planned separately from the rest of the more utilitarian squares of the town and formed a special front space in front of the owner's palace (for example, here can be mentioned the cities of Zamość, Quastalla, Sabbioneta etc.) [40]. One of the most important features of Zhovkva is that this square was combined here with the main public and commercial square of the town. That is, on the one hand, Zhovkva belongs to the so-called classical planning type of the Renaissance town, when the ring or square of the defensive walls of the castle touches the town ring of fortifications with one side, and on the other, it is an example of the so-called "compositional combination" of the owner's castle and the main square of the town [41] (fig. 14). This type of layout was not very common. Two similar cities from this list can be mentioned here (except for Zhovkva) – Krasiczyn in Poland and Sabbioneta in Italy [42] (fig. 5).

In the early Italian version, the residential square in front of the castle was formed at the entrance to the prince's palace through the expansion of the street (along the entire length of the palace facade). The example for this is thee square-street in front of the Palazzo Pitti in Florence. Therefore, it can be argued that the planning of the square used in Zhovkva has certain associations with early urban building experiments in Italy. On the other hand, the combination of ceremonial (castle) and public town functions in the Zhovkva's main square is very interesting for contemporary urban planning practices. Especially, since the final assignment of the solemnly-representative functions (ceremonial places near the palace) to main squares of the residential cities took place only in the middle and second half of the 17th century, mainly in the French projects of ideal cities, in particular in the projects of Jean Errard Bar-le-Duc [43, 44], also in the project of ideal town by Adam Freytag (1631) [45].

It is important to highlight another prerequisite for the emergence of Zhovkva – the state of development of urban science at the time of laying the foundations of the town. In view of this, among the theoretical works of the architects who worked out the principles of the planning layout of the ideal town, we must highlight exactly those treatises which preceded our construction in the time of their appearance. Their list is not very long. These are the treatises of Francesco di Giorgio Martini (1501), Pietro Cataneo (1550, 1567), Daniele Barbaro (1567) and Bartolomeo Ammanati (1570) [46]. In particular, the works of these authors could have served as a model for the planning works in Zhovkva, since they were published and distributed among architects before 1580–1590s. In these works, we often find suggestions for the installation of defensive urban fortifications, mainly in the form of walls with semicircular bastions [47].

Fig. 14. Hypothetical view of town of Zhovkva in 17th century. Authors: Mykola Bevz, Olga Okonchenko, Ihor Okonchenko [54].

In view of this, it becomes clear to some extent why the old system of fortifications (defensive walls, towers and bastions) were used in Zhovkva, rather than a completely new bastion one. However, it should be noted that the entrance gates to the town are already implemented under the new system, as well as the fact that along with the defensive walls was implemented an additional line of earth bastions. However, the researchers do not have a unanimous opinion about the time of its occurrence. It is believed that it might have appeared somewhat later. Though, one should pay attention to the fact that documents from 1621 mention almost finished defence structures of the town and Zhovkva is named there as "complete fortress" [48]. It should be noted also that the documents of 1621 indicate the existence of builded four town gates – Lvivka, Zvirynetska, Glynska and Jewish. Thus, we can assume that they are also not products of later time. This fact makes it possible not to doubt that the town had already had a bastion defence line. That is, it is quite probable that the entire system of urban fortifications was built in a relatively short time – from 1594 to 1621. Such a combination of new and old defence construction systems in Zhovkva is very interesting and requires more detailed study and more precise dating. In particular, a comprehensive archaeological study of selected sections of the defensive walls and adjacent bastions could be very useful.

If we carefully analyse the plans of cities proposed by the aforementioned Italian theorists of urbanism, it is easy to notice the great similarity of Zhovkva's planning style to one of the theoretical projects of Pietro Cataneo [49, 53] (fig. 8–9, 10–11).

Even more interesting is the following fact: in the treatise by Pietro Cataneo two versions of the planning layout of the ideal town are worked out. The first has an irregular configuration of the outline of the plan and the second with a regular one (fig. 8–9, 10–11). Actually Zhovkva is similar according to the general compositional layout to the first irregular type. The second (regular) type is very similar to the planning of Brody. The planning structure of Brody was changed in the 1630s, when the town was enlarged and reconstructed. But there is enough evidence to suggest that this reconstruction was based on the previous planning pattern. This was particularly stressed in the studies by B. Chornovus [50]. And later, S. Kravtsov convincingly showed that the town consists of two parts – the Old and the New town, which have different planning basics and metric conformity [51] (fig. 11).

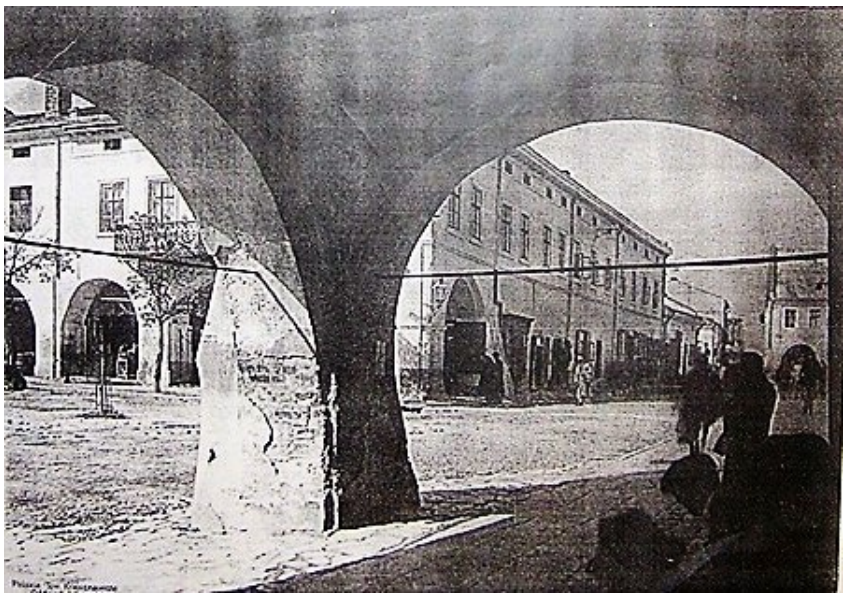

Fig. 15. Photo of the northern part of Rynok square and the beginning of Lvivska street, 1910. [55].

If we recall that both Zhovkva and Brody were founded almost simultaneously by the same owner – Stanislav Zholkevski (Żółkiewski) – and perhaps by the same architect Paolo de Dukato Clamensi (called also as Pavlo Shchaslyvyi, Pawel Szczęśliwy) [52, 56], then this resemblance appears to be not accidental. We can suggest that these Western Ukrainian cities are a unique realization of the theoretical project concepts of the ideal Renaissance town of Pietro Cataneo.

Of course, our hypothesis requires even more in-depth research, a serious sequential argument, and a meticulous comparison with the theoretical or realized models of Renaissance town-planning in Italy and in other countries. However, even the above facts suggest that Zhovkva and Brody should be regarded as worthy of more attention in the field of national and European urbanism in the late 16th – early 17th centuries.

Fig. 16. Building with loggias-arcades in town of Żółkiew. Drawing by O. Mann, 1923 [polona.pl]. This building was located on the corner of today Korotka street and Zaporizka street. On the cadastral map of 1854 p. in this place is marked wide building (fig. 4) with loggias-arcades from the side of the Juden Marktplatz.

Conclusions

1. The town of Zhovkva belongs to the late Renaissance foundations of private residential towns in the territory of the Polish state at the end of the16thcentury. The urban-spatial structure of the town was designed according to the scheme of the Renaissance "ideal town". In case of Zhovkva, the spatial structure of the town consisted of two conjugated parts: the castle and the fortified inner town. The combination of these two parts, when the central square of the town is combined with the main facade of the castle complex – was rare.
2. Zhovkva is one of the towns where the author is known – the Italian architect Paolo de Ducato Clamensi (known in Lviv under the name «Pavlo Shchaslyvyi», "the Happy Paul"), a member of Lviv craft masonry gild, who at the time was in service of hetman Stanislav Zholkevski. In 1601–1612 he was appointed by the owner of the town for the position of head of the town court. The construction of the castle and the town became an ambitious project and a life-long affair for the architect.
3. The materials of the analysis allow us to state the hypothesis, that the architect planning the town used theoretical treatises in its architecture. We believe that he implemented one of the schemes of an „ideal town", which was described in «Four Books on Architecture» by Pietro Cataneo (published in Venice in 1567). Thus, Zhovkva is one of the only Europian towns built on the base of the Cataneo's theoretical model.

Fig. 17. The corner of this building loggias-arcades from the side of Korotka street (Skorzana street in the past) on the post card of 1909. [polona.pl]. Basylian monastery on the second plan.

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Architect Max Zucker – regionalist or modernist? Designs from the Prut valley in the Hutsul region

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Abstract: The article presents the little-known but extremely interesting work of architect Max Zucker in the spa towns located in the Prut valley in the Hutsul region in the inter-war period. Research results allow us to call him an author of around 20 objects. His work was connected with various stylistic tendencies: historical, classicistic, regional, modernist forms. Projects connected with modernism are particularly important. He can be considered an informal creator and a consistent implementer of the phenomenon aimed at identifying the identity of Hutsul modernist architecture.

Keywords: Modernist architecture, regional architecture, Hutsul region, Max Zucker, Prut river, spa architecture.

Introduction

The architecture of the inter-war period in spa resorts in the Prut valley in the Hutsul region was characterised by a great diversity. The dominant tendency was regionalism in various forms: alpine, Zakopane, Hutsul and Galician styles and their compilations. Architecture was looking for a national style – from manor style to classicizing trends. At the end of the 20s modernism appeared in the international style with elements of naval style, functionalism and art déco motives [Czubiński 2008]. Many objects were destroyed during World War II and in the post-war period; the process of destruction still continues. Nevertheless, a representative group of buildings from this period has been preserved to this day. Max Zucker designed many of them. Research results allow us to call him an author of around 20 objects[1]. The aim of the article is to present a little-known but extremely interesting work of this architect[2]. Research results allow us to call him an author of around 20 objects[3]. The aim of the article is to present the works of this architect, which is not widely known but extremely interesting[4].

The character of Max Zucker

At the current stage of research, little is known about the architect himself. He was born in Lviv, probably in the 90s in the Jewish family [Yad Vashem, Item ID 1246335]. His wife was Berta Zucker née Salzberg, born in 1893

1 The author has been conducting research on spa architecture in the villages located in the Upper Prut Valley in the Hutsul region for several years at the Institute of the History of Architecture and Conservation of Monuments of the Kraków University of Technology, together with the employees of the Institute of Tourist Architecture at the Ivano-Frankivsk National Technical University of Oil and Gas.

2 No scientific work related to this architect has been published so far.

3 The author has been conducting research on spa architecture in the villages located in the Upper Prut Valley in the Hutsul region for several years at the Institute of the History of Architecture and Conservation of Monuments of the Kraków University of Technology, together with the employees of the Institute of Tourist Architecture at the Ivano-Frankivsk National Technical University of Oil and Gas.

4 No scientific work related to this architect has been published so far.

also in Lviv, with whom he had several children [Yad Vashem, Item ID 1246293]. We believe that he graduated architecture at the Lviv Polytechnic in the 20s, he lived with his family in Jaremcze in his own house at ul. Liepkowa 1. He was murdered by the Nazis in Delatyn in 1941 or 1942[5].

Max Zucker was a certified architect. He signed his designs with stamps of various content, including *M. ZUCKER, government-authorised builder. Sworn court expert* or *M. ZUCKER, government-authorised architect, sworn court expert*. This may indicate successive acquisition of further powers. He was involved in designing but also performed the function of construction manager. His documented activity is connected with towns located in the upper Prut. The research carried out does not allow to determine whether he had projects realized in another area. His work was characterised by stylistic duality of regional and modernist forms.

Projects and realizations

Many of the objects designed by Max Zucker have not survived. They are only known thanks to archival designs. Fortunately, many buildings have survived to this day. Objects and designs will be presented in groups related to various stylistic tendencies occurring in the architect's works: historical, classicistic, regional, modernist forms, and compiling the last two tendencies. For this reason, the chronology of their creation will not always be preserved.

Fig. 1. Jaremcze. Bathing facility of dr Józef Matuszewski. Design: Max Zucker, 1935. Postcard from 1930s from the author's collection

Fig. 2. Jaremcze. The building of the former Hanusa hotel. Photo.: Jacek Czubiński 2010

The first known object designed by Max Zucker was the bathing building for dr Józef Matuszewski from 1927. It was a multi-storey stone building with a functional attic and roof covered with tiles. It was equipped with very modern installations. It had its own boiler room providing hot utility water and central heating as well as heated mud used for healing treatments. It is known only from the original technical description, which does not contain any information about its architectural expression [DAIFO, ref. no. 2450]. In 1935, the second project of the bathing facility of dr Józef Matuszewski was created in Jaremcze [DAIFO, ref. no. 2450]. It was a large wooden building, not preserved until today, covered with a high hip roof (Fig. 1). The two-storey object's body is flanked on the sides with single-storey annexes with terraces on the roofs. The symmetrical main façade with a simple composition had a central avant-corp with a classical columned entrance portico crowned with a triangular tympanum[6]. The building is a good example of the monumentalization of modernism through the introduction of classical elements. Forms based on historical styles also appeared on the expansion of the Hanusa hotel in Jaremcze [DAIFO, ref. no. 665]. The project from 1930 provided for the enlargement of the building with a new wing located along the main street. The dimensions and stylistics of the new part have

5 A group of over a dozen projects is stored in the State Archives of Ivano-Frankivsk Oblast in Ivano-Frankivsk, further DAIFO, various signatures.

6 The extension of the building with a new wing was designed in 1935 by architect Tadeusz Noskiewicz from Stanisławów. We now believe that this project has not been implemented.

been adapted to the existing eclectic character of the architecture of the old building (Fig. 2). Only a part of the project was realized, with two window axes in direct contact with the building being extended.

A large group of projects are wooden buildings with the features of regional architecture in the Hutsul style convention. The design of the extension of the guesthouse of Salamon and Zofia Langsner in Worochta comes from 1929 [DAIFO, ref. no. 406]. The volume of the existing building has been doubled. A large, two-storey building was built on a rectangular plan covered with a steep roof (Fig. 3). A central veranda avant-corp with a triangular tympanum appeared in the front façade. Details related to the regional style.

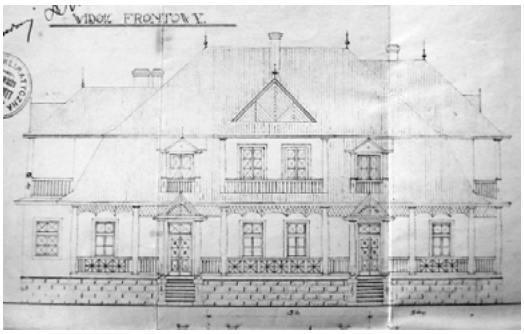

Fig. 3. Max Zucker. The design of the house of Salamon and Zofia Langsner in Worochta, 1929 [DAIFO, ref. no. 406)

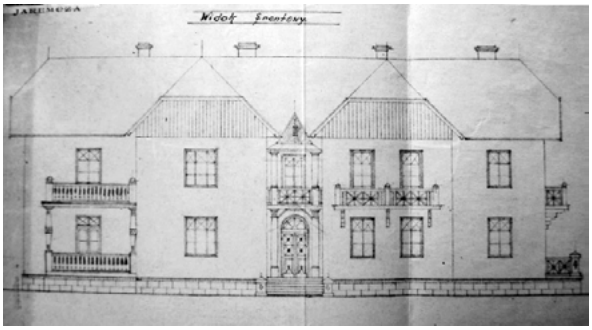

Fig. 4. Max Zucker. Project for extension of Edward Stenzel's villa in Jaremcze, 1929 (DAIFO, ref. no. 664)

In the same year we find the project of the extension of the one-storey villa – a guesthouse for dr Edward Stenzel in Jaremcze. The building permit was issued in 1930 [DAIFO, ref. no. 664]. An eastern part with an irregular projection has been designed for the existing building (Fig. 4). As a result, the front elevation obtained almost symmetrical character with respect to the two-storey entrance porch.

Fig. 5. Max Zucker. Project for extension of the guesthouse of Władysław and Ksawera Lankosz in Jaremcz-Jamna, 1935 (DAIFO, ref. no. 2385)

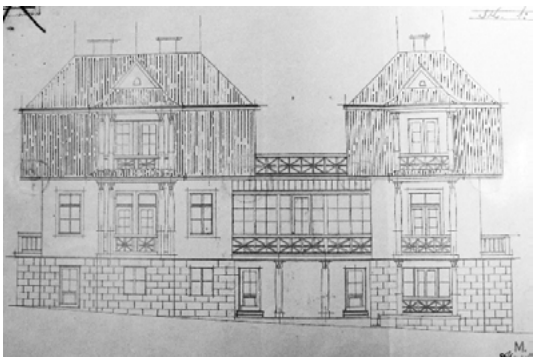

Fig. 6. Max Zucker. Project for extension of the former guesthouse "Marzenie": for Waleria Smólska in Tatarów, year unknown (DAIFO, ref. no. 2831)

Another project from 1930 is associated with the construction of a guest house with a restaurant for Władysław Lankosz in Jaremcze-Jamna. Designs of this building have not been preserved. Authorship can be attributed to Zucker based on the analysis of documents related to project approval and obtaining a construction permit in 1931 [DAIFO, ref. no. 2215]. He also designed the extension of this building in 1935, when Ksawera Lankosz decided to enlarge the guesthouse [DAIFO, ref. no. 2385]. The architect added a new part to the existing building, repeating the elevation composition from the 1930 project (Fig. 5).

Permission for the construction of the "Marzenie"[7] guesthouse in Jaremcze for Maria Żakowa née Karpowicz was obtained in 1931 [DAIFO, ref. no. 2281]. The construction was completed in 1933. The projection was based on a square shape. The one-storey building with a high stone pedestal is covered with a mansard roof.

7 Names come from the inter-war period.

In each façade, two-storey avant-corp with verandas has been designed. Later (the exact date is unknown), the guesthouse was purchased by Valeria Smólska. The new owner asked Zucker to expand the building [DAIFO, ref. no. 2831]. As a result, an object consisting of two connected asymmetrical blocks was created (Fig. 6). The single-axis new part was designed in analogy to the previously existing one. Central, lower than the others, entrance part has a columnar portico on the ground floor. Above the portico there is a glazed veranda with a roof terrace.

In the regional forms, a small villa "Muszka" was designed in 1937 in Jaremcze for Raczyński (first name unknown) (Fig. 8) [DAIFO, ref. no. 2648][8].

The last example of this trend is the design of a villa – guesthouse for M. Rosner (first name unknown) in Tatarów (1939) [DAIFO, ref. no. 2704]. A one-storey building with a high roof is based on a rectangular plan with verandas in three elevations. Entrance to the building leads through a column portico that is designed in the axis of the front elevation and is highlighted with a dormer topped with a tympanum.

Fig. 7. Jaremcze. "Gena" guesthouse. Photo.: Jacek. Czubiński, 2013

Fig. 8. Jaremcze**.** Former guesthouse "Przystań", currently building of the court. Photo.: Jacek. Czubiński, 2012

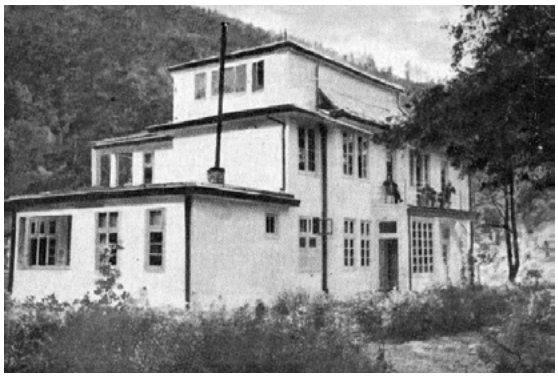

Fig. 9. Jaremcze**.** Former guesthouse of Maria Rawicka and Janina Friedmanowa, view from the North West. Postcard from 1960s from the author's collection

Fig. 10. Jaremcze**.** "Róż" guesthouse. Postcard from late 1930s from the author's collection

Modernist forms in the work of Max Zucker appeared in the early 30s. The earliest example of this is the design of the "Gena" guesthouse made in 1932 for Antoni Zapletal. The building, approved for implementation in March 1933, is covered with a high hip roof [DAIFO, ref. no. 334]. The whole object has a distinct modernist character. The main façade has a simple two-storey entrance portico. Metal balustrades of balconies and floors give the building a horizontal expression. Corner windows appeared. We can also notice the influences of the

8 Only the historical drawings of the object's projections have survived. The existing so-called "Raczyński's villa" in Jaremcze is kept in regional forms.

Art Deco architecture in the form of triangular peaks in the front and side elevations. The building exists to this day, the attic was removed in 2012 (Fig. 7).

The design of a villa for Judy Freund in Jaremcze from 1932 definitely shows a modernistic expression [DAIFO, ref. no. 2336]. After the construction was completed in 1934, the function was changed into a guesthouse named "Przystań" (Fig. 8). Projection of the building is based on a square plan with a two-storey veranda avant-corp in the front elevation and an entry avant-corp from the east. It is covered by a nearly flat roof. The block, symmetrical elevations and details have a clearly geometric character. Corner windows and terrace on the roof of the entrance avant-corps were designed.

The features of mature modernism ware evident in the design of guesthouse for Maria Rawicka and Janina Friedmanowa in Jaremcze from 1934, which no longer exists (Fig. 9). It was approved for realization in August 1935. [DAIFO, ref. no. 2333]. The cubic shape is characterized by the simplicity of the composition. The building has a clearly horizontal character consistently underlined by the horizontal arrangement of balconies and terraces located in the eastern elevation on the river side.

In 1937 the architect created the design of now non-existing "Róż" guesthouse for Ulman (first name unknown) in Jaremcze [DAIFO, ref. no. 2538]. The building is typical for the architect's modernist artwork. There are terraces on the ground floor, continuous balconies on the first floor and corner loggias (Fig. 8).

The next two examples perfectly illustrate the design duality of Max Zucker. We can admire the architect's efficiency in operating with both modernist and regional forms in the same building.

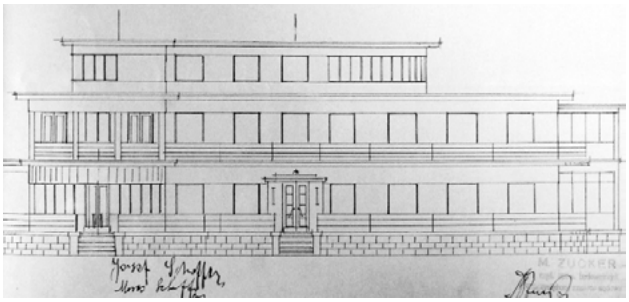

Fig. 11. Max Zucker. Project for extension of the guesthouse of Moros and Józef Schaffer in Tatarów – modernistic version, 1937 (DAIFO, ref. no. 2458)

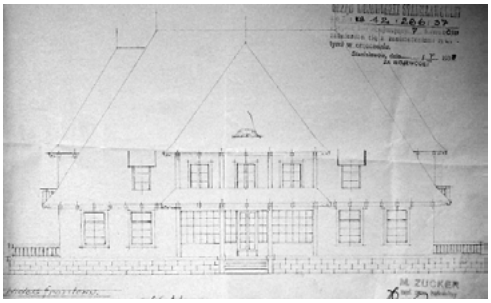

Fig. 12. Max Zucker. Project for extension of the guesthouse of Moros and Józef Schaffer in Tatarów – modernistic version, 1937 (DAIFO, ref. no. 2458)

In 1937, a guesthouse for Moros and Józef Schaffer in Tatarów was designed [DAIFO, ref. no. 2458]. The architect presented to the investors two versions of the building: with modernist and regional features. The first one represented forms of mature modernism with features of naval style in projection roundings (Fig. 11). Horizontal nature of the three-storey building was emphasised by the continuous arrangement of balustrades on terraces and balconies of the first floor. This design seems to be the most consistent implementation of the principles of international style in the architect's works. The investors, however, chose the second version with a high roof and architectural details maintained in regional stylistics (Fig. 12). The building exists to this day.

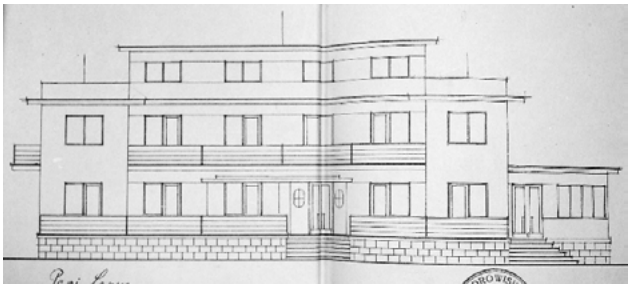

Fig. 13. Max Zucker. Project for extension of the guesthouse of Pepi Lappe in Jaremcze – modernistic version, 1937 (DAIFO, ref. no. 2536)

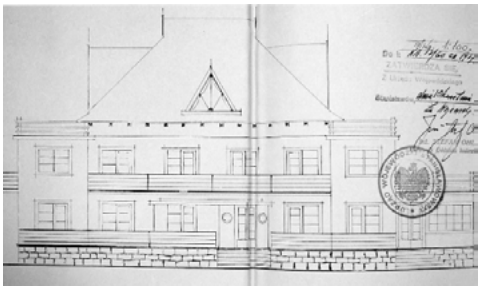

Fig. 14. Max Zucker. Project for extension of the guesthouse of Pepi Lappe in Jaremcze – regional version, 1937 (DAIFO, ref. no. 2536)

In the same year Max Zucker designed a guesthouse for Pepi Lappe in Jaremcze [DAIFO, ref. no. 2536). Again, two versions were created (Fig. 13, 14). A situation similar to the previous one occurred. The design with modernist features was rejected by the investor, who chose the regional version.

Designs from the late 30s are a manifestation of a stylistic compromise. We see an attempt to synthesize regional architecture with modernism. They were not realized due to the outbreak of war. A representative example of this tendency is the design of a guesthouse for Judy Schaffer in Tatarów from 1938 [DAIFO, ref. no. 2650]. The cubic, multi-storey block with a logical window arrangement is topped with a traditional high roof with dormers. Modest elevations with regular arrangement of window openings are composed symmetrically with respect to the axis.

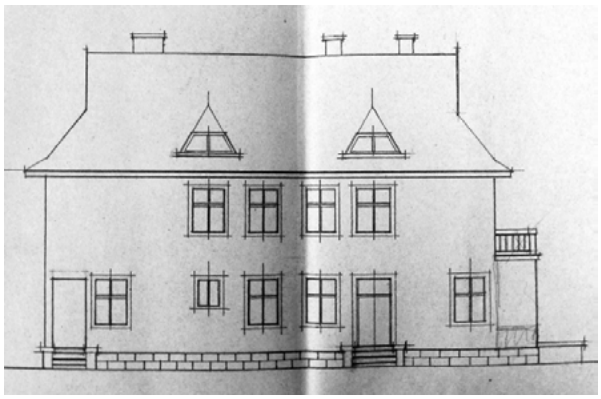

Fig. 15. Max Zucker. Project for extension of the guesthouse of Włodzimierz Uhryn in Jaremcz-Jamna, 1939 (DAIFO, ref. no. 2651)

Fig. 16. Jaremcze. House of Max Zucker at ul. Liepkowa 1. Photo.: Jacek. Czubiński, 2011

Similar features are found in a project for the extension of the villa for Włodzimierz Uhryn in Jaremcze-Jamna from 1939 [DAIFO, ref. no. 2651]. The building is covered with a high Dutch gable roof. The northern entrance façade is characterized by the simplicity of the composition (Fig. 15). On the other hand, in the south elevation, the horizontality of the ground floor part is emphasized by the horizontal line of the first-floor terrace. The design provided for a glass dining room on the ground floor with a semi-circular projection.

Also, several other designs can be attributed to Max Zucker. Most probably, he designed his own house in regional stylistics in Jaremcze (Fig. 16). It is a one-storey building with a steep roof with dormers. On the axis of the garden elevation, there is a semi-circular terrace. In the roof area there is a glazed veranda based on a trapezoidal projection. Its form is similar to the multi-storey verandas in the former guesthouse "Liliana" in Worochta. This feature, as well as other formal analogies, may indicate that the guesthouse was also designed by Zucker. Several objects with modernist features also show a formal connection with Zucker's work. For example: known only from the archival iconography, the "Palace" guesthouse in Jaremcze. and the existing building of the "Majestic" guesthouse is also located in this town. At the current stage of research, their authorship cannot be unambiguously determined.

Characteristics of the work of Max Zucker

Analysing the preserved archives, we notice distinct changes in the style of Max Zucker's work. In 1930, the historic formal extension of the Hanusa hotel took place. In the later period of professional activity, designs with regional characteristics were created, for example a guesthouse for Lankosz in Jaremcze-Jamna from 1930. The breakthrough in his works seems to be the designs of "Gena" and "Przystań" guesthouses from 1932. The architect employed elements from catalogue of modernist forms. This trend was developed most fully in the unrealized design of a guesthouse designed for Moros and Józef Schaffer in Tatarów in 1937. Regional forms were present throughout his professional life. He created, among others, designs in two versions, regional and modernist – guesthouse for Schaffers in Tatarów and house of Pepi Lappowa from 1937. The bathing facility building for dr Matuszewski in Jaremcze combines modernist forms with classicism [Pszczółkowski 2014, pp.

198–214]. The work from the late 30s was an attempt to reconcile regionalism with modernism and create a synthesis of these tendencies – the villa of Włodzimierz Uhryn in Jaremcze-Jamna from 1939.

Despite the great diversity, buildings with regional features represented a tendency generally referred to as the Hutsul style [Briulow 1996, pp. 55–56]. Its determinants included: axiality and symmetry of the composition, high, sometimes mansard roofs with dormers, entrance porticos, exterior multi-storey verandas, stone pedestals and traditional design of carpentry elements and architectural details. The architecture of regional features created by Zucker compiled different stylistic tendencies in an eclectic way. It cannot be unambiguously assigned to any trend. There are visible influences of both the Zakopane style and the Galician style (Zakopane method) created by Edgar Hovárt based on culture of Zakopane [Tondos 2004, pp. 85–92]. There are also features of the Hutsul – Zakopane style (Polish-Ukrainian) propagated by the Lviv architectural environment [Lewicki 2005, p. 233].

Designs and realizations related to modernism form a cohesive group with common features. The buildings were usually several-piece compositions of rectangular blocks. The most common type were two-storey buildings, sometimes with a small third storey in the form of a belvedere. They were distinguished by almost flat roof with large eaves. Stone walls with a bolt construction were erected on stone pedestals with a visible arrangement of cuts. Reinforced concrete was used in terrace tiles and stairwells. Elevations were characterized by symmetry and geometric arrangement of simple forms. There were verandas, sometimes two-storey with pillars, corner windows, loggias, and roof terraces. Outer walls were plastered white or creamy. Terraces and balconies were secured with simple balustrades made of horizontal steel bars painted in orange. We can see elements of the naval style in the form of rounding of terraces, balconies and whole parts of buildings. The sharp triangles of the attic gable of the "Gena" guesthouse coincide with the simplified "zig-zag" motif and may point to connection with the art déco architecture [Olszewski 2013, pp. 37–45].

One should not underestimate the regional trend in Max Zucker's designs. However, we should particularly emphasize the essence of his work related to modernism. He can be considered an informal creator and a consistent implementer of the phenomenon aimed at determining the identity of Hutsul modernist architecture.

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Tracking nature – the possibilities of introducing permaculture strategies into the historical city centre of Zamość. The Courtyards

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Abstract: The author focuses on the problem of water management in the selected areas and the most adequate, appropriate, relative SUDS solutions for the places in question. The spaces were chosen from the area which was regarded as the most problematic in 'The Local Revitalisation Program for Zamość for the period 2017 to 2023'. Justification for the chosen solutions is based on the geological conditions of the terrain, the existing stormwater management system , the extent of paved surfaces and the quality and quantity of plant cover. Proposed solutions were analysed in the spotlight of permaculture principles. The aim of the paper is to raise awareness of the concepts of SUDS and Permaculture as they complement each other and offer pro-ecological approach to water

Keywords: water, sustainability, rain garden, Zamość, revitalisation.

Introduction

What is permaculture?

Permaculture design aims at following creative, ethical approach to the environment. Key figures who coined the concept of 'permaculture' in 1970' were Bill Mollison and David Holmgren who first applied the term to characterize enduring and self-preserving species of plants and animals beneficial to men [13]. They described it as ,,an integrated, evolving system of perennial or self-perpetuating plant and animal species useful to man''[Mollison & Holmgren, 1978]. Permaculture actions oscillate around the notion of conscious mimicry of structures, processes found in nature itself and go hand in hand with a contemporary strive for sustainable development of cities, villages and farmlands. At the very beginning, the permaculture principles were exploited in connection with Land and Nature Stewardship [13]. Most recent perspective on permaculture is the one which presents it as a design system used not only in the domains of harvesting, soil or water management, farming or gardening but also sustainable living – 'human organization' [13]. One of the main prerequisites of permaculture is a constant strive for a homeostatic relation of men and nature. In his 'Essence of Permaculture A summary of permaculture concepts and principles taken from 'Permaculture Principles and Pathways Beyond Sustainability', David Holmgren observed that permaculture strategies used to be exploited in mostly agricultural environment, whereas they are applicable in different domains, including cultural. He sees it as a much broader term. The movement relies strongly on a cooperative practices of a community, strengthens the role of individuals as responsible participants and contributors to healthy, ecological lifestyles and ecosystems. The integrity of man and their surroundings is tightened by means of simple, not revolutionary but evolutionary actions inspired by nature. Permaculture is strongly community – oriented movement with a great

role of humans as strategic contributors to the sustainable development. It has been observed that people with a strong relation to their home place and community are more inclined to introduce permaculture ideas [18]. Permaculture principles revolve around seven major domains such as Land and Nature Stewardship, Built Environment, Tools & Technology, Culture & Education, Health & Spiritual Well-Being, Finances & Economics, Land Tenure & Community

(Based on '*Essence of Permaculture A summary of permaculture concepts and principles taken from 'Permaculture Principles and Pathways Beyond Sustainability', David Holmgren)*

Apart from these core domains there are also side issues falling under the notion of permaculture such as, for example: LETS – local exchange trading systems, Keyline water harvesting, bicycle transport, SUDS (Sustainable Urban Drainage System) [11]. One of the 'founding fathers' of the concept, David Holmgren, solidified twelve principles of permaculture design [Holmgren, 2007]. Having that in mind, I would like to look through selected town centre areas focusing on one aspect, namely the management of water – the existing state of the matter as well as possible, minor alterations to the places in question.

'Green' v. 'grey' infrastructure

Permaculture design solutions are compatible with the notion of green infrastructure. They both draw from nature, whereas the so-called 'grey' infrastructure refers to closed, engineered systems of stormwater collection and distribution such as pipes, drains, drainage wells, pumps. Technical solution predominance is what characterizes 'grey' infrastructure with frequent maintenance checks, the use of artificial materials such as PVC, PEHD, sometimes complicated, hazardous groundworks which alter the original stratification of geological soil layers, natural ground density, plasticity, or change groundwater conditions. Pumping stations' operation requires significant energy input.

Before the actual comparison of the two aproaches to the management of landscape elements it is reasonable to briefly explain the terms. The first – green – refers to man-made or natural ecosystem elements of a landscape which contribute to a human well-being by fostering ecological practices, preventing or halting, absorbing the outcomes of natural disasters such as floods, draughts, storm surges. Among the aims of green infrastructure are restoration of degraded natural habitats, biodiversity boost, the provision of the most efficient amenities that would collect, reuse, purify water, gather natural energy. Bettering the quality of urban public spaces seems to be too often overlooked and diminshed due to robust, consumerist surge in dense land overbuilding. Green infrastructure favours integrating rather than segregating. Applying permacultural thinking, nature is a system of interrelated, influential elements (including humans) where entities in order to sustain relevant equlibrium must stay in reciprocal relation. When you take, you must give something in return, this is a healthy, fair approach to environment. If you decide to build up a particular land, introduce building development to a land distorting natural connections within the system, it is fair, advisable to just make up for the loss created. Green infrastructure is highly beneficial on several domains: environmental, social, to name a few. Among many advantages there are for example [18]: rainwater harvesting, retention, smart distribution and natural purification, Soil erosion prevention, Better land quality, Human physical and mental healthcare improvement, Jobs' provision, Elevating city aesthetics by the introduction of green spaces, Promoting recreation, sports culture, Educating on pro-eco way of living, Strengthening a sense of community as co-responsible for the creation and maintenance of the most immediate, local surroundings, Enlarging, restoring, preserving, uplifting biodiversity, Reducing urban heat island effects, Permeability enhancement, Battling some impediments caused by ongoing climate change, Seeing potential and restoring dilapidating, post-industrial areas into green zones.

Green spaces are suitable for being green infrastructure components so long as they are a part of inteconnected network where 'green' also stands for something additional, meaning creating networks, green corridors. Investing in planting new trees, the implementation of additional plant cover could have this suplementary quality of creating infiltration, introducing hydrophyte species thus improving permeability of soil, the quality of rainwater or preventing excessive runoff.

SUDS (Sustainable Urban Drainage System)

One of major branches of permaculture is the sustainable water management. Sustainable Urban Drainage System (SUDS) [11] . This concept proposed taking into consideration natural water flow mechanisms and probable chances of water infiltration characteristics. Urbanization processes are directly correlated with a relatively common paving practices resulting from auto-oriented society habits. Bus transfer facilities/ transit are still fairly underestimated and scarce. Since road infrastructure requires highly developed car traffic systems green, biodiverse areas have been gradually depleted and reconfigured. Due to greater surfaces being paved, the widespread phenomenon of impermeabilization occurs. Rain water inflow is acutely impeded by compacted structure of road layers. Soil undergoes the process of densifying. What is more, road investments tend to destabilize natural water run offs at the same time disturbing natural soil composition.

Courtyards

One of the most characteristic features of the Zamość town centre is the existence of inward courtyards located primarily on the east side of the Great Market Square. Despite their undoubted potential, their function is largely undetermined, unclarified. Tenement houses surrounding the courtyards provide residential spaces for the citizens who do not make enough use of the space they have at their disposal. The buildings and the courtyards are accessible from the outside streets, via gateways. The ground floor parts of the houses provide small vending and service spaces (accessible from the main streets) with the residential units being situated on the upper floors. Social interactions within the courtyards tend to be scarce, random. No sense of community could be observed, reflected in taking care of the space around.

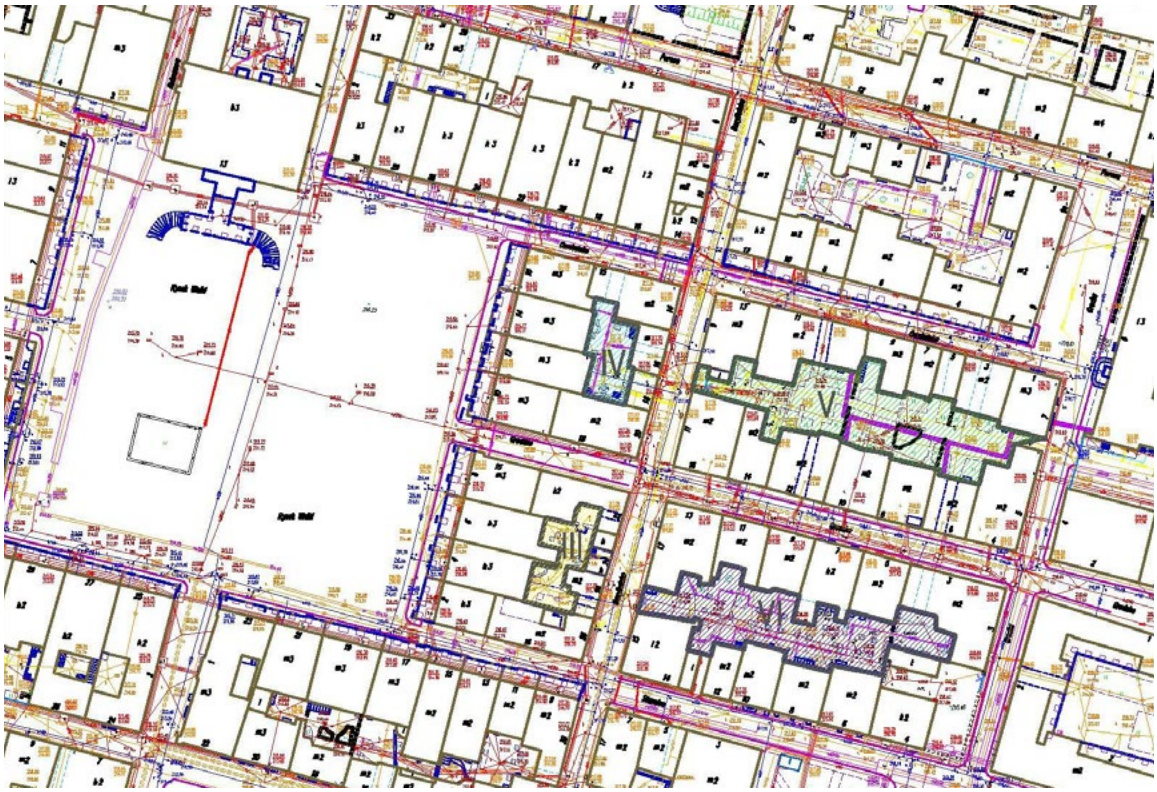

Fig. 1. Courtyards; Source: author's own material

Fig. 2. Courtyard No. III, Lowered surface of the courtyard; Source: author's own photo

Fig. 3. Courtyard No. IV, Lowered parts of the courtyard; Source: author's own photo

Fig. 4. Courtyard No. IV, Bird's-eye view on the Courtyard and the positioning of green slots; Source: author's own photo

Fig. 5. Courtyard No. VI, Access to the courtyard spaces provided by gateways (1–2); Source: author's own photo

Fig. 6. Courtyard No. III, Enclosed space, potentially high risk of urban flooding; Source: author's own photo

Fig. 7. Courtyard No. IV, Sun exposure, ; Source: author's own photo

Terrain work related to the common features and spatial organisation of the couryards were carried out in October and November 2018. The location of the analysed places is presented on the map showing the Zamość historical centre.

Fig. 8. Courtyard No. III, sewerage inlet built over by a brick circular piece of small architecture; Source: author's own photo

Fig. 9. Courtyard No. VI Down pipes 'sinking' beneath the ground connected to sewerage closed system; Source: author's own photo

Fig. 10. Courtyard No. III, Extensive pavement contributes to more rapid water run off; Source: author's own photo

Fig. 11. Courtyard No. IV Steep basement staircases; Source: author's own photo

Common spatial characteristics:

- Relative proximity to a central part of a historical town – The Great Market Square
- They all fall under strictly delimited outline of streets, intersecting ortogonally: Zamenhofa, Pereca, Ormiańska, Grodzka, Staszica following east-west direction and the edge of Great Market Square, Bazyliańska, Grecka, enclosing Waleriana Łukasińskiego heading from south to north
- The inside of the quarters are of irregular shape with some parts of the housing entering, 'protruding' from the main volume
- The inside space is sometimes divided into smaller parts by means of walls with window and door openings; the division tends to be situated at the boundary between two neighbouring buildings

- The spaces are approachable by means of more than one gateways which sometimes differ in level with the rest of the space (difference of several steps, with the courtyard area lowered in relation to the entrance)
- The bigger ones are longitudinally arranged, the smaller yards direct towards the relation north – south
- Enclosed spaces which in case of abrupt, heavy downfalls may be in danger of sudden overflooding, basement levels accessible from the inward courtyards through plunged, grated basement windows
- The organisation of window openings follows north – south direction which is valid in terms of capturing the sun

Fig. 12. Courtyard No. III, Clotted, 'blocked' inlet to the existing water drain; Source: author's own photo

Fig. 13. Courtyard No. V, paved impermeable surfaces of the sidewalks; Source: author's own photo

Fig. 14. Courtyard No. VI, Possible tight, infiltration reservoir; Source: author's own photo

Fig. 15. Courtyard No. VI, Possible location for rain garden; Source: author's own photo

Current system of managing rainwater:

- Down pipes which collect rainwater from the roof gutters sink beneath the ground and connect to the sewerage, closed system
- Insufficient number and size of the existing drain collectors
- Poor maintenance of the existing collectors (garbage, leaves, remnants of ciggaretes clotting/ blocking the collector inlets

- Extensive pavement, relatively small, compacted surface allows for rapid runoff and irreversible waste of rainwater which might as well be reused for watering the plants
- The current system adds little to the aesthetics of the places
- Some courtyards are 'sunk' taking into account the levels of the surrounding streets, there is a potential risk of the storage/ inflow capacity turning out insufficient for a certain amount of sewage
- Uneven, rough paved courtyard surface halts water and results in puddles
- Lowered groundfloor areas, open, steep basement staircases, flooded in case of unexpected, rapid water downfalls

Common greenery and soil characteristics:

- In spite of vast variety of plant species present in the spaces, the overall outlook seems to lack conscous plan or design, though the first impression is quite a pleasant one
- Presence of ivy species that cover the walls and hang over the entrances to the buildings
- Plants play primarily aesthetical role, not enough attention is given to their pro – ecological parameters such as water retention, phytoremediation or rehabilitation impact they can have on the people living in the nearby tenement houses

Fig. 16. Courtyard No. VI, The existing containers for plant cover and prospective rain garden implementation; Source: author's own photo

Fig. 17. Courtyard No. VI; Unused green space suitable for the introduction of rain garden; Source: author's own photo

Fig. 18. Courtyard No. VI The existing greenery, the possibility of supplementing it with hydrophyte species of plants; Source: author's own photo

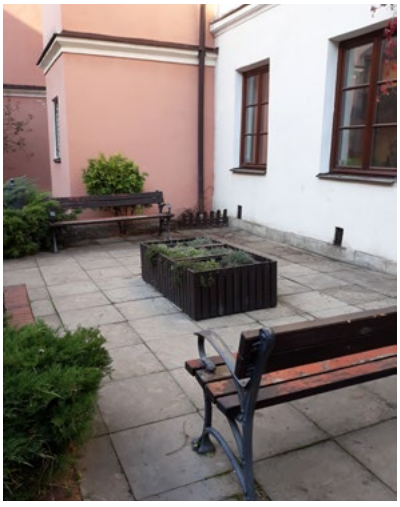

Fig. 19. Courtyard No. VI, The arrangement of greenery; Source: author's own photo

The soil profile and water conditions

The author availed herself of the geological document prepared for the terrain around the streets of Królowej Jadwigi and Zamkowa issued in April 2013. The materials were handed in by the co-working design studio who undertook the project for the streets in question. On that particular terrain which is situated in the proximity of the analysed courtyards, soil conditions were marked as complex with a significant amount of moist and high plasticity whereas below 1.5 – 2.3m – wet, soft plastic in shaped into loose, uncompacted embankment made of clay and debris. The native soil profile consists of loessial-like fines with expansive/ swelling capacity (heave soil). No ground water was found up to 3.0m, however, bottom-to-top filtration processes were observed which contribute to loosening top layer soils. Soil freezing depth was estimated at 1.0m under the surface. Taking into account the aforementioned soil condtions, it is advisable to introduce leakproof, tight, impermeable rain garden either in the form of ground basin or as a above ground, aesthetical container.

Having analysed the aformentioned factors it is reasonable to introduce the system of rain garden as the one with the easiest implementation and fitting into the existent surface layout. By using those squared ground slots, the amount of groundwork is limited to minimum which is cost-effective and, what is more, it does not damage the paved surface to a large extent.

What is rain garden? How is it applicable in these particular spaces?

Rain gardens are one of the methods of accumulating, purifying rainwater channeled both from rooftops and paved surfaces. They can be of different shapes and sizes, designed both in the ground and separate containers, easily suited into the existing paved surface.. While intended in the ground, they can be connected in a system of several units which allows for an easy transportation of any surplus of rainwater. This system might be supleted with the one for capturing rainwater and putting it to good use by watering plants present in the vicinity. Rain gardens treat contaminated rainwater via hydrophytic species of plants that are grown within the unit. The inflow to the garden may be positioned above or underground allowing for greater variation in the system easthetics. The surface needed for the garden is directly related to the roof surface being estimated at 2% of a total roof surface. The section provided shows the subsequent layers of geological material with the top layer being coarse gravel which facilitates the infiltration of water. The percolation of water happens gradually with the excess of it flowing through a supplementary pipe positioned at the bottom of the basin right to a sewerage system.

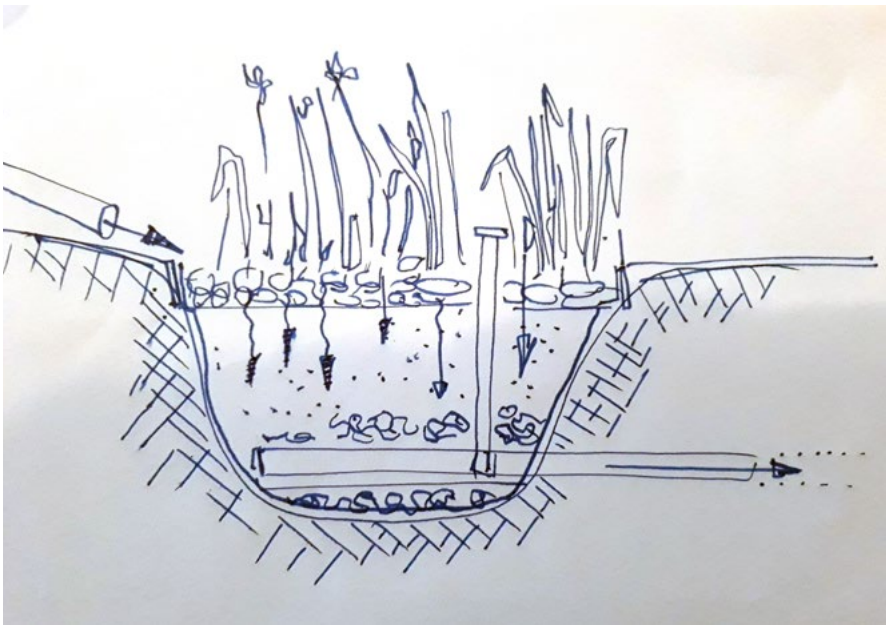

Fig. 20. Rain water garden schematic representation; Source: author's own material based on Schematic section from The Sendzimir Foundation

There are two types of rain water systems; one with permeable outer surface chosen for the permeable soils (some fractions of sand, gravel) with higher infiltration capacity or another tight, leakproof system which accumulates rainwater, cleanses it and directs it to a traditional sewage system. Rain gardens aim at capturing water at its source preventing it from turning into sometimes uncotrollable runoff. Not only does the system manage rainwater but it also adds diversity of plants which make the place more attractive and pleasant to stay in. Carefully selected plant compopnents (and their roots) solidify the soil structure, are both draught and moisture tolerant. Such systems have this potential of reinvigorating local ecology and raising awareness of issues related to smart, permaculture solutions. They fulfill the principles of permaculture such as Catch and Store Energy, Produce no Waste (unless it is connected to the system of water harvesting), Integrate rather than Segregate, Use Small and slow solutions, reuse, recycle.

The social aspects and reasons for the introduction of proposed changes

Permaculture design strategies include the involvment of a community in the process of changing immediate environments. Therefore, the engagement of average local resident of the places discussed might stimulate their working capacities and restore self value hence the Old Town District (Stare Miasto District) has been rated the lowest position in the chart summarising the districts' performance in key social parameters such as:

- people affected by social problems (the greatest ratio of 60 people per 100 Old Town locals)
- domestic violence [14]

Therefore, Stare Miasto is the first among three degraded areas, the rest being Promyk District and Planty District) to undergo the process of revitalisation within the time span of 2017–2023. As far as the technical condition of infrastructure and development, The Old Town was described as the poorest with the age of 156 years. This is the part of the town with the highest domestic violence instances (6 children per 1000 people) and the greatest unemployment level (12 people per 100). The area selected for the revitalisation process spreads over 132 ha with 5239 residents. The establishment of revitalisation areas was followed by a survey conducted between 01.01.2017–31.03.2017, prepared by the Revitalisation Board. They collected 679 filled-in survey sheets, out of 1100 distributed. Among the most problematic social issues noticed by the respodents were unemployment rates (almost 20% of the people questioned). Additionally, in the section of the most pressing social problems, people mentioned high crime rates, emigration of young people and families with children, low engagement in public and cultural life of the Town, the problem of ageing society, poor integration among the citizens, poverty. As far as environmental concerns, 35,15 % of those who responded reported citizens' tendency to express unecological behaviour (the problem selected as the one requiring the most immediate attention), 23,89% were of the opinion that air pollution is the most detrimental to their health while 14,66% of people surveyed indicated low quality of water reservoirs and watercourses together with high degree of water contamination. 13,30 % of respondents disapproved of insufficient or bad condition of green zones/ areas. In the domain of spacial and functional problems of Zamość, survey participants (23,4%) perceived deficits in the quantity and quality of technical infrastructure: railway, road, water-and-sewage management systems. What is also symptomatic, the most acute problem concerning the condition of built develompent and building structures was insufficient amount of energy-efficient, pro-eco, sustainable equipment. All the numerical data come from ''The Local Revitalisation Program for Zamość for the period 2017 to 2023 which has been updated and is widely available on the website: http://rewitalizacja.zamosc.pl/.

The suitability and permaculture value of a chosen system for sustainable water management can be supported by the following outcomes and advantages:

- the system improves the quality of rainwater by alleviating its pollution – the engagement of phytoremediation processes [7]
- reduces the risk of urban flooding by means of collecting water at the source rather than allowing for uncontrollable runoff; see spatial characteristics of the analysed courtyards
- the physical introduction and later maintenance of the system might be ordained and conducted by the most immediate community members living around the courtyard (high percentage of residential units) – such actions fall under the concept of hortitherapy;

- creating work opportunities for the unemployed living nearby
- boosting integration and reponsibility among community members, gathered around the goal of making a common space healthier and more aesthetically pleasing (fulfilling the social aspect of permaculture principle: Integrate rather than Segregate
- proposed changes offer multi-dimensional response to issues stated in the Program survey
- the introduction of the system might spark citizens' awareness and interest in pro-ecological behaviour as well as spread knowledge of the importance of plant cover for physical and mental well-being
- the system would use the existing fragments of exposed soil layer as well as already implemented piesec of street furnishing such as brick wells, plant containers, wooden fencing,
- the introduction of plants with hydrophytic qualities which are at the same time the elements of a traditional Renessaince garden [...] such as for example: Iris germanica, Iris pseudacorus, Iris sibirica, Viola palustris

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Search of futuristic principles for the concept of the medical center for young people

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Abstract: The article emphasizes the role of architecture in creating an atmosphere of mental comfort and its positive impact on human health. Futurological tendencies of the organization of the medical space in the medical facilities of the future are analyzed taking into account the views of students.

Keywords: futurological trends in the organization of architectural space, a youth medical facility, functions, and psychological comfort.

Introduction

The conditions of human existence in the physical environment are considered to be a more influential factor on health than genetic predisposition to disease. Architecture, as a mandatory element of the physical world, is constantly present in the human environment, mainly in buildings with functional purpose, which makes it a highly effective manipulator of consciousness. Contemporary health care buildings are reflected in the design of models developed for hotels, shopping centers and homes, and patients are constituted as consumers and responsible citizens [6]. Further research is needed to compare different project approaches and how to combine them to minimize the contradictory implications for a building project [5, 11].

The effect of psychological manipulation of architecture can have alternative manifestations (for better or for worse), and proposed design decisions can contribute to health stabilization or vice versa, to the development of the disease. In order to change the obsolete practices of organizing the space of medical institutions, it is necessary to turn to new futuristic approaches that have evolved over the last twenty years on the same level of architecture, psychology and medicine, but have not yet gone beyond experimental decisions. Some important medical projects have no chance of being implemented in modern conditions, yet they already require conceptual development. First of all, it is a question of the need to protect youth's health, which is the potential for state development (reproductive, economic, intellectual), but in modern times has limited access to medical care and prevention programs.

The aim of this study was to determine the principles of optimal design of the space of a youth medical facility based on the results of the analysis of the views of university students in Lviv. The task was to conduct a

student survey of traditional universities and to analyze futuristic trends that could be used in the architectural design of the medical center for youth.

Materials and methods

An anonymous study of student youth took place at the two largest state universities in Lviv: Lviv Polytechnic (LP) and Ivan Franko University (UF). The study was attended by 100 students of the Institute of Architecture of the LP and 94 students of the Foreign Language Department of UF in the majority of the fourth year of studies aged 20.3 $\pm$0.4 and 19.6 $\pm$0.9 years respectively. A special questionnaire was prepared, in which questions were asked regarding the analysis of the health status of students, their needs in terms of medical assistance, the effectiveness of their provision and personal opinion on the functional and architectural compatibility of existing medical facilities and their components.

Results and discussion

The health status of students was assessed in the comparison: at the time of the examination and during the period of joining the university. According to the data provided, 41% of students recognized good health at the time of admission (75% were good at the time of admission), satisfactory – 49% (respectively 25%), unsatisfactory – 10% (0% among students LP, 2.2% – in UF). Thus, for the 3–4-year study period, the health status of students has almost doubled. At the time of the study, 19% of students needed medical care every two months, and even more often. It turned out that in the fourth year of study most of the respondents do not have a chosen medical facility, especially this applies to residents of dormitories and those who rent a flat, and together they constitute 63% of LP students and 46.3% of UF students. At the same time, 21% of the surveyed LP students and only 8.5% of UF students use the student passers-by services, but for the most part it is a referral for a medical review, "to be admitted to the session".

Students are convinced that young age guarantees them stable health and does not reflect on the future. Over one third of students (36%) do not go to doctors in case of illness, dealing with self-medication. To the question "Do you turn to the doctor if it was bad, but did it happen?" 83% of respondents answered negatively. Among the reasons that hold back from calling a doctor, half of the respondents answered "self will", 18% complained about the lack of time or unwillingness to have an absence at the university, as well as the distance from the university to the medical facility. Only 28% answered that they did not stop them from visiting the doctor, but they only turned to medical help in urgent need.

Every fourth respondent (26%) admitted that he did not seek medical help because he was ashamed or afraid of doctors and hospitals („suddenly they will find a disease"). Over one third (36%) of students do not trust doctors, complaining about lack of attention and uncertainty about the quality of medical care. Every third respondent personally noticed the unsatisfactory conditions and psychological discomfort that create interiors of medical facilities. Students assessed the functional and aesthetic correspondence of the Student Clinic's premises for less than 3 points on a 5-point scale, and in 93% of cases they supported the need for renovation. 88% of respondents stressed the need to introduce information technology into the medical care system and assessed the need to create a specialized medical online resource for young people (3.68 + 1.0 point on a 5-point scale).

The vast majority (80%) of the respondents said they considered the existing system of medical care at traditional universities ineffective and chose some of the proposed decisions aimed at improving the situation. The largest support among future architects from the LP (71% of respondents) received a proposal to establish a Medical Center at the University with information and advice on acute health problems and prevention programs. Every third respondent (37%) needed effective access to information (website with doctor's advice, electronic record to the doctor), 57% pointed to the immediate need to renovate the Student Clinic. Students – UF philologists mostly favored the modernization of existing medical facilities (73%), and supported the creation of a new medical center at the university (49%) and development of information resources (42%) as a comprehensive solution to the problem of creating a network of medical facilities at traditional universities.

Studies have shown that the implementation of the right to medical care by a young person is a complex problem for many reasons: lack of time in the teaching process, reluctance to stop this process, blind faith in the health of the young body, lack of trust in the „budget" medical aid system and inability to use of commercial medical services due to lack of financial resources. The lack of the need to control health is revealed during the study of the student environment, has a psychological background due to age immaturity and lack of experience in planning life and overcoming its challenges. This was manifested by the reluctance to address doctors for fear of pain or discouraging information about health, even in cases of complaints, no longer referring to a preventive visit. It sounds unbelievable, but every second respondent (48% from LP and 51.6% from UF) does not use dental care. Despite the special period of active sex life, students are not aware of the protection of future reproductive function: only one in five women uses the advice of a doctor-gynecologist (17.7% from LP and 21% from UF), and only 3% and 5% male students respectively are consulted by a physician-urologist. In this, pay attention to the visits of 10% of students of both sexes to the doctor-dermatologist, which indicates the main attention of students on their appearance.

Psychological problems are widespread among students due to the immaturity of age and it is not worthwhile to expect that they themselves will implement preventive programs. In representative studies of the physical and mental health of German [3] and Austrian [4] students, agreed data were obtained that non-medical students are more susceptible to symptoms of anxiety and development of depression, and there are not less than 14%. Research [9] showed a critically low degree of use by students of regular relaxation exercises, without looking at the fact that their positive impact on health has been proven and is offered as a potential starting point to improve the health of young people. An effective way to reduce stress along with solving the problem of overweight, which is severe for young people, is dance or dance [1].

In conclusion, we must pay attention to the salutogenesis theory that good emotional, mental and somatic health requires awareness of the need for action, and the lack of action and its consequences result from the lack of awareness of a specific situation (A. Antonovsky, 1979) [quot. for 2]. Continuing the thought of A. Antonowski, an important psychological principle that should be applied in the design of a youth space is the interest – the emergence of an emotional and sensual relationship between a person and the place where he is [cf. for 2]. Man is interested when on the one hand he can satisfy his needs and expectations, on the other hand, everything is done in harmony with his own psychological needs. Thus, to achieve a positive effect, there must be a combination of functional (need) and emotional aspects. As the results of the research show, students are quite rigorous in assessing architectural solutions used in the design of state medical institutions, they talk about inconveniences and aesthetic discomfort while staying in a medical facility, and in the vast majority insist on changing the architectural design concept and creating a new type of medical facility.

Determining the principles of optimal design of medical facility space for young people based on analysis of futuristic architectural trends

Contemporary world architectural thought emphasizes an extremely limited number of research aimed at scientific justification of architectural and design decisions regarding medical facilities [5, 6. 11].

In the context of conceptual issues, the greatest attention is paid to the problem of psychological adaptation of a human being to the conditions of existence in a physical environment [2, 7, 8, 10]. According to modern thinking, if the physical environment does not meet the usual psychological conditions of a given person, there is a conflict of misunderstanding, stress and unfavorable psychological states: embarrassment, disappointment, anger, aggression. It also emphasizes the need to ensure the privacy of a person through architecture, which positively affects her psyche [7]. A clearly formulated need to personalize personal space and existence in an atmosphere of mental comfort

The „three-dimensional" architecture – functional, aesthetic and psychological – comes together in place of the functional architecture that is subordinate to medicine, and it directly combines the perspectives of improving human health. The promoter of the new style in the architecture of medical facilities is the International Academy of Design and Health, which associates architects, doctors, scientists, practitioners, industrialists, public figures and rewards each year for the integration of salutogenic theory with the architecture of healthcare institutions [10]. Because salutogenesis is an active promotion (development) of health (A. Antonovski,

quoted in [2]), the Academy declares: „We are biased in promoting our health and we believe that the built environment should strengthen and maintain health and well-being [10]. It is believed that the integration of the theory of salutogenesis in the strategy of architectural design in the last 20 years in the world is due to the sudden improvement in the overall quality of new healthcare facilities [2].

Research has shown that the physical environment significantly affects the health outcomes, emotional state, benefits, satisfaction and orientation, but the parameters of mental and behavioral health are not sufficiently researched to effectively include them in architectural design. M. M. Sheeply and co-authors [7, 8] began to study design guidelines that would take into account the mental and behavioral behavior of a human being. The characteristics of the physical environment that have a positive impact on patients and staff have been determined based on a review of over 400 articles and expert opinions (architects, doctors, administrators).

Identified principles can be useful in the design of any medical facility, because almost every patient has a psychological problem.

The first and most important principle is to try, if possible, to avoid institutionalization (link to the medical profile of the institution), on the contrary, to design conditions for creating a sense of hospitality, safety and unconditional trust in institutions in successfully solving their personal health problem [7, 8] . An important issue is the interior of the premises: „non-institutional", resistant to damage furniture, which do not remind the patient that he is a sick person. It is necessary to use daylight as much as possible in different parts of the object, because electric lighting is an inappropriate substitute. During design, it is necessary to provide access to nature and skillfully combine the natural environment of the object and landscape. In the conducted research [2, 7, 8], access to the natural environment and aesthetics was given to the strongest support of respondents.

You need multifunctional non-medical premises (kitchens, corners with plants, gardens, etc.) that can be shared by doctors and patients, which will increase trust and communication between them [2, 7, 8]. Patients' confidence in their free choice and control in the surrounding environment is achieved thanks to the flexible seating system. The sense of autonomy and free choice will be facilitated by the use of personal development items (books, computers, video games). Considering the importance of patient access to the open space, provision should be made for the creation of indoor and outdoor areas for space therapy and the promotion of physical activity. Therefore, the physical characteristics of the patient's environment are of great importance and should be taken into account in the architectural design of medical facilities with a broad profile. The futuristic principles of organizing the space of a medical facility considered above are in fact ordinary elements of self-esteem, peace, comfort and free life.

Conclusions

An analysis of futuristic trends was carried out, which will allow to set the principles of designing a health center for young people with an optimal psychological climate. Clearly underestimating the need to track the health of young people has a significant psychological basis. In order to change the negative attitude of young people to using the preventive side of medical care, the approach to the organization of the architectural space of medical facilities should be changed. One of the solutions may be designing youth physical and mental health care facilities, taking into account the views of young people and the principles of salutogenesis in architectural design.

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Allotment gardens in the Lublin downtown in the spatial and urban planning context – origins and issues concerning their preservation

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Abstract: Allotment gardens situated in city centers are particularly at risk of the development of buildings serving commercial (service-related or residential) purposes. The present article presents allotment gardens in the downtown of Lublin from the historical, architectural and landscape context. The analysis of urban planning determinants was undertaken for the functioning of gardens from the moment of their establishment until the present day at the example of the oldest of them – "Nasza Zdobycz nad Bystrzycą". The article also constitutes an attempt to explain the increasing alienation of the owners of allotment gardens, progressing devastation of the area of allotment gardens as well as to present a suggestion for design application inscribing in the scope of revitalization of this area.

Keywords: Allotment gardens, Lublin, revitalization, Rusałka.

Introduction

Allotment gardens constitute an important element of the landscape of Lublin downtown. Their complex – Nasza Zdobycz by the Bystrzyca River – existing since the 1930s in the area of Rusałka Street, together with family allotment gardens established after the Second World War within the Podzamcze district, constitute the background for the panorama of the Old Town Hill and the historic downtown. Both complexes are located in the immediate vicinity of Bystrzyca River and recreational cycling and pedestrian route forming their borders along the river. Wetlands by river valleys were for years considered problematic for undertaking construction activities within them. Current technical opportunities make it possible to shape architectural developments in a practically unrestricted manner, even in view of unfavorable land conditions, which is proved by different projects in the Bystrzyca River valley.

The subject of allotment gardens is very controversial due to the diversified attitudes of the citizens of Lublin and the owners themselves. Some of them perceive the gardens as useless, while others treat them as a very precious element, forming a unique identity of this place. In recent years, the subject of allotment gardens has attracted a lot of attention in connection with the government's attempt to introduce the act on allotment gardens in 2013, posing a threat to the existence of gardens[1]. The act encountered vivid protest and owners'

1 Act as of December 13th 2013 on family allotment gardens.

"fight" for their gardens. Liquidating a garden may result in losing greenery, which has a large potential on the scale of the city, may lead to the occurrence of disharmony in the existing urban tissue as well as have a negative impact on the aesthetic when the land is sold to developers. The 21st century marks the period of demographic growth, which makes it necessary to satisfy the needs resulting from urban development. Appropriate activities may transform the gardens into flourishing and fully used city greenery, satisfy increasing food demand, motivate social participation and activity. The suggestion for preservation and modifying the basis of functioning of the gardens constitutes an attempt to answer the question whether allotment gardens may become an attractive, partially public space, serve as city farms and contribute to the revitalization of their surroundings, and as a result, be an element on the way to provide adjacent areas with a new urban quality.

Advancement of research and study material

The field of research refers to the areas of allotment gardens situated in the Lublin downtown, understood as a functional and landscape area. Two garden complexes were examined, located within the viewing foreground of the Old Town panorama, situated on the left bank of the Bystrzyca River within the Rusałka Street and historical Łąki Tatary meadows.

The study was based on the available archive materials – plans originating from the Archives of the Planning Department of the Lublin City Hall, a manuscript chronicle of the "Nasza Zdobycz" allotment garden by the Bystrzyca River[2], extensive interviews performed with garden owners as well as own records gathered in situ.

In Poland, allotment gardens have a long tradition and they constitute the subject of research within different fields of science (history, urban planning, social issues, spatial development). Already in the inter-war period, allotment gardens were described in subject-related literature and monographs (Kubik 1912, Kosińska 1934, Wilczyński 1927, Lubawy 1939). In subsequent decades, allotment gardens did not constitute the subject of research. As late as in the recent years, we can notice the comeback of scientific publications referring to the topic of allotment gardens, usually in the context of their role in the urban space (Pawlikowska-Piechotka 2010, Szczęsny, Kimic 2012, Szkup, Pytel 2016, Dymek, Bednorz 2017, Szczepańska, Krzyżaniak, Świerk, Urbański 2016, Gawryszewska (ed.) 2015). Social perception of allotment gardens is conditioned to a large extent by their aesthetics and the level of being cared for, which is visible not only in the context of Polish examples (Scott A., Dean A., Barry V., Kotter R., 2018). Allotment gardens undoubtedly contribute to increasing biodiversity in the city as well as have a positive influence on its microclimate (Cabral, et. al. 2017).

Allotment gardens in Lublin were already the subject of research interest of nature scientists and landscape architects who would analyze them in connection with their vegetation and biological role in the ecosystem of the city (Adamiec 2010, a, b). In 1935, the publication by the Association of Gardening Enthusiasts was issued, entitled *Lublin Voivodeship and allotment gardens*, which to a large extent concerns historical outline and the development of these two gardens. It also describes vegetation diversity on the plots as well as the initiative to do sports within these areas. One can also find there the chapter devoted to solutions which are supposed for the gardens to serve as support for the unemployed of that time. In 1939, Władysław Lubawy includes in his book *Historia ogrodów działkowych w Polsce* (The History of Allotment Gardens in Poland) statistical data presenting an increasing number of allotment gardens within the Lublin Voivodeship. According to the information which can be found there, in 1932, there existed two gardens with a total surface of 8 hectares, while in 1937 the number grew to 80 hectares forming 17 gardens. In 1974, Henryk Gawarecki mentions in his book *O dawnym Lublinie* (On the History of Lublin) how city greenery was reduced, which resulted in the trend among citizens to maintain continuous contact with nature, made possible by allotment gardens. The author also emphasizes that in the initial period of their functioning the gardens also served the educational function through day camps organized within their premises.

At present, there are 47 allotment gardens in Lublin[3]. Their owners form the group of about 15 thousand members. They take up about 400 hectares. Compared to the city, it constitutes about 3.1% of the administrative

2 The name of the allotment garden changed – initially the garden was called "Nasza Zdobycz nad Bystrzycą" and currently the name "Nasza Zdobycz" is used.

3 https://www.dziennikwschodni.pl/lublin/400-hektarow-lakomego-kaska-czy-dzialkowcy-moga-spac-spokojnie,n,1000153581.html

surface of Lublin. Downtown gardens take up about 40 hectares, which constitutes 8.5% of the administrative surface of the Downtown and Old Town districts[4].

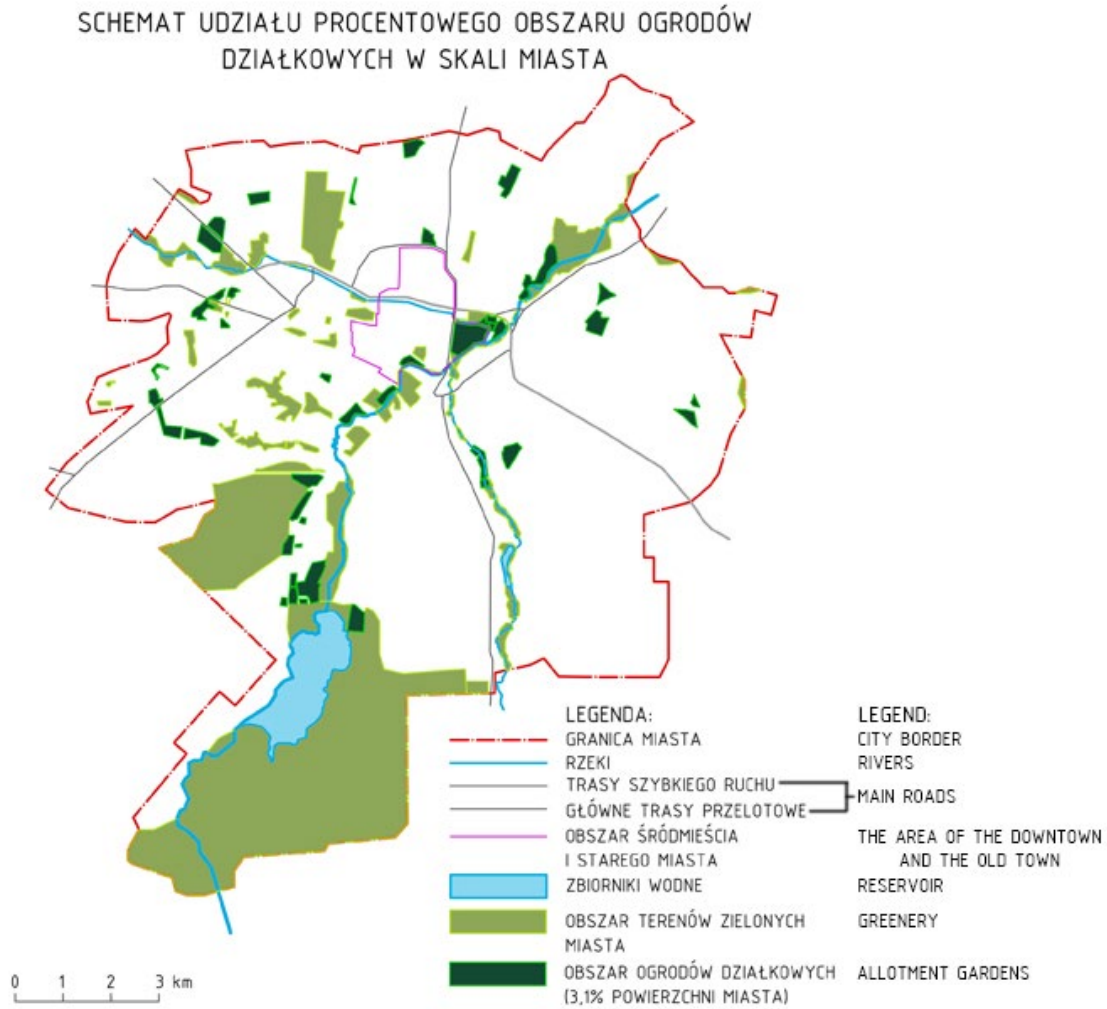


Fig. 1. Distribution of allotment gardens in Lublin compared to green areas. Developed by R. Strojny 2018.

Origins of allotment gardens in Lublin

Allotment gardens, understood as a form of agricultural activity within the city, used to emerge in Europe in the mature phase of the 19th-century industrial revolution, constituting among others the response to the lack of access to fresh food that many workers' families suffered from. The period of economic crises, particularly in the 1930s, contributed to the development of subsequent city gardens. City gardening were developed to a varying extent and under different forms in European countries. Poland belonged to the group of countries in which the development of allotment gardens was connected with the willingness to provide the poorest citizens with food during the industrialization period and as a result of philanthropic thoughts and the development of Ebenezer Howard's idea of garden cities. The allotment garden established by Dr. Jalkowski in Grudziądz

4 Own research

in 1897 is considered the first facility of this kind in history[5]. According to statistical data, in 1918 in Poland there were 19 gardens with the surface of 70.16 hectares[6], while in 1937 their number reached as many as 421 gardens, taking up the surface of 2704.68 hectares. After WW2, there were 1500 gardens and their greatest development could be observed in the 1980s, when they began to constitute the surface of 14 000 hectares[7]. After 1989 the function of allotment gardens was rather concentrated around recreation than the production of fruits and vegetables. The study from 2011 showed that persons aged 51–65 constitute the biggest group of users of allotment gardens[8].

International allotment gardens movement emerged in the years 1911–1950, i.e. in the period of two world wars, economic crises and food shortages. First unions, clubs and associations of allotment garden owners were established then[9]. As far as the city of Lublin is concerned, references to the idea of garden housing estates and garden cities were still implemented in the 1930s, the best example of which is constituted by the establishment of the Tenth District under the form of a garden suburb as well as the urban concept of the Ponikwoda district[10].

Allotment gardens in Lublin were vividly established most often on wet and undeveloped lands in the vicinity of residential areas. These areas were practically deprived of any facilities (no fencing, water supply network or alleys). With the course of time, subsequent plots and common areas were successively developed[11]. The establishment of Lublin allotment gardens coincides in time with the period of great economic crisis (1932–1937) when their organization received the form of support activities for the unemployed. In that time, with the financial support of the Labor Funds, special allotment gardens colonies were established all over the country to serve the unemployed[12].

History of the establishment of the first allotment garden in Lublin

The first allotment garden in Lublin was established in 1933. It was called "Nasz Plon"(*Our Harvest)* and was not preserved until today. The allotment garden "Nasza Zdobycz Nad Bystrzycą" (*Our Achievement by the Bystrzyca River)* was officially established a year later[13].

The garden "Nasza Zdobycz"[14] was established in 1934 at the initiative of the Association of Gardening Enthusiasts. It was the first garden of this kind within the city of Lublin. The garden was located in the area called Rusałka, formed by meadows partially used for recreational purposes and extending between the Bystrzyca River and Rusałka Street. In connection with the vicinity of buildings forming the downtown as well as good connection with southern part of Lublin, developing from the fourth quarter of the 19th century (Bronowice, Piaski suburb, vicinity of the railway station, district Za Tunelem and the Tenth District), the area of river meadows situated on the western side of the bridge on Zamojska Street was predestined to serve a recreational function. The view from "Rusałka" to the panorama of the city, preserved on Lublin iconography numerous times, constituted another important factor here[15]. In the late 19th century, attempts were made to develop

5 According to the sources, the garden named after the Greater Poland Insurrectionists in Koźmin Wielkopolski established in the 18th century was the first on the territory of Poland. However, the "Kąpiele Słoneczne" (Sunbathing) garden in Grudziądz established in 1897 is considered the most similar in its form to current allotment gardens. A history of Urban garden in Europe, Keshavarz N., Bell S., p. 13

6 Władysław Lubawy, Historia ogrodów działkowych w Polsce (History of allotment gardens in Poland), Centralny Związek Towarzystw Ogrodów Działkowych i Osiedli Rzeczypospolitej Polskiej w Warszawie (Central Association of Allotment Gardens and Residential Estates Union of the Republic of Poland in Warsaw), Warszawa 1939, pages 36–38

7 http://pzd.pl/artykuly/12746/108/Rodzinne-ogrody-dzialkowe-w-miastach-dzisiaj-i-jutro---wyzwania-i-funkcje.html

8 Ibidem

9 A history of urban garden in Europe, Keshavarz N., Bell S., p. 8–10.

10 N. Przesmycka, Lublin. Przeobrażenia urbanistyczne 1815–1939 (Lublin. Urban transformations 1815–1939), Publishing House of Lublin University of Technology, Lublin 2012.

11 P. 4

12 Kilka słów o ogródkach działkowych (A few words about allotment gardens), p. 5

13 Association of Gardening Enthusiasts in Lublin, Województwo Lubelskie a ogrody działkowe (Lublin Voivodeship and allotment gardens), Lublin 1935, pages 10–12.

14 Ibidem, p. 13. The name used alternately with "Nasza Zdobycz nad Bystrzycą", Garden Chronicle includes the information about 1932 as the establishment date.

15 The oldest representation of the city from this point of view is the engraving from the work by Barun and Hogenberg....., Hackert, etc. The area was frequently represented on postcards.

this area in order to serve a recreational and cultural function. The building of timber "on-the-water" theater was constructed in 1898, together with canoe harbors and bathing zones. The projects described above were undertaken in the eastern part of "Rusałka", while the western zone was not developed to such an extent. It included meadows as well as constituted an illegal landfill[16].

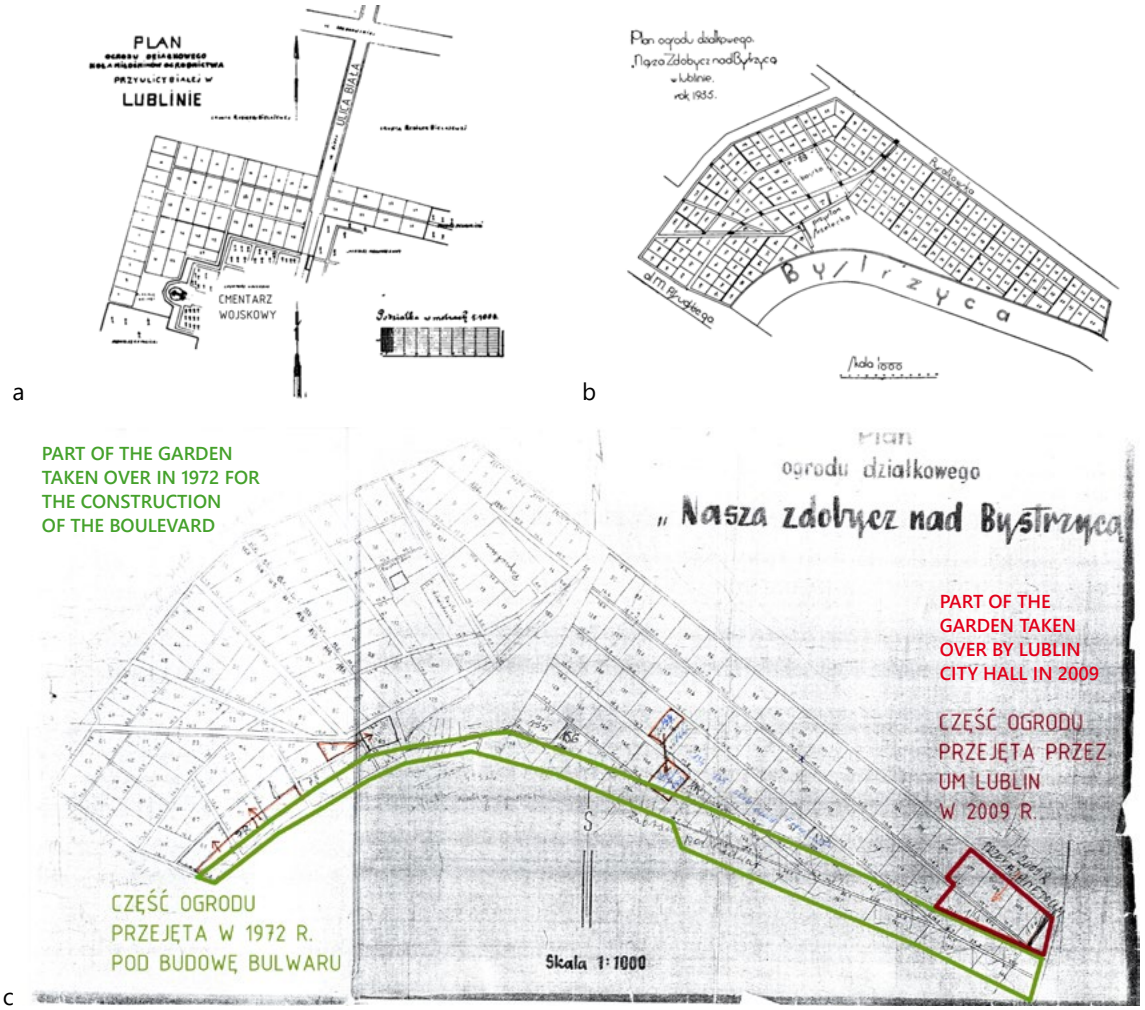


Fig. 2. A, B – plans of the oldest allotment gardens in Lublin, Source: Association of Gardening Enthusiasts in Lublin, *Województwo Lubelskie a ogrody działkowe* (Lublin Voivodeship and allotment gardens), Lublin 1935, C – ownership structure of the "Nasza Zdobycz" garden after subsequent annexations, developed by R. Strojny 2018

The Association of Gardening Enthusiast was established on April 27th 1932[17]. The main objective of the association consisted of the activities aimed at improving health and the aesthetic qualities of the city. Initially, association's activities included: conducting the courses devoted to caring for house plants, decorating balconies and residential buildings as well as organizing gardening competitions. In the autumn of 1932, an attempt was made to obtain areas for the official establishment of the allotment garden from the city[18]. The intention was to locate the garden at a short distance from the place of residence of its future users, make it easily accessible

16 Chronicle of the garden "Nasza zdobycz nad Bystrzycą", M. Kozyra, written in the late 1980s basing on the collected archival, press and photographic materials of the garden management.

17 Association of Gardening Enthusiasts in Lublin, Województwo Lubelskie a ogrody działkowe (Lublin Voivodeship and Allotment Gardens), Lublin 1935, p. 10. Another source quotes the date of May 27th 1931 – M. Kozyra, Chronicle of the garden "Nasza zdobycz nad Bystrzycą", manuscript owned by the management of the "Nasza Zdobycz" Allotment Garden in Lublin.

18 Ibidem, p. 10

and characterized by good quality soil. On November 17th 1932, during the meeting with the representatives of different authorities called by the Association of Gardening Enthusiasts K. Jankowski, Director of Public Works, informed about the chance which had emerged for the lease of city spaces for the establishment of allotment gardens. On March 30th 1933, a lease agreement was signed with State Treasury. The area assigned to the association members consisted of 2 hectares of the "Nasz Plon" allotment garden, together with 6 hectares of the "Nasza Zdobycz" garden. In the spring of 1933, the first gardeners began their activity. The participants of the initiating general meeting accepted "Nasza Zdobycz nad Bystrzycą" as the name for the garden"[19].

Early days of the existence of the garden turned out to be difficult, as the land was not meliorated, and before, it had constituted a landfill. There was no fencing or gazebos, and water was taken from the river. On June 10th 1934, the "Gardens Festival" was organized. The ceremony began with a march on the streets of Lublin and reached the "Nasza Zdobycz" allotment garden. The march was led by children holding banners with the following slogans: "Long live allotment gardens", "Allotment gardens bring health to citizens", "There is no Lublin without the gardens", "We love the gardens" etc. The banners were ornamented with such radish, kohlrabi etc. At the end of the parade, a children's ball was held. The day of the "Gardens Festival" was summarized with the general meeting of gardeners, during which the activity of the Association of Gardening Enthusiasts was extended into other cities: Zamość, Chełm and Siedlce. In late 1934, the Association was transformed into the Society of Allotment Gardens and Residential Estates. In the interwar period, the garden served a very important educational function – day camps for children were organized there. A playground was constructed together with a shooting range[20]. In the years 1934–1949, the area of the garden was organized and fenced, wells were constructed together with the pavilion which became the seat of the management's office. In 1949, the gardens were taken over by the Central Trade Unions Council[21].

Development and functioning of the garden

In 1939, the garden was overgrown with very little trees and bushes. Before, only a few gardeners had their own gazebos, and those which existed there rather resembled storage sheds.

After the end of the war, the construction of gazebos was not controlled by the Management of the Garden, which resulted in the fact that they would often take various forms, while their look would leave a lot to be desired. However, this issue was regulated with time and gazebo types were developed. Before the construction of a gazebo, its owner had to present the design for acceptance by the Management of the Garden and receive permission[22]. New decorative bushes and dwarf trees were planted from year to year. Gardens began to change their character from those intended for the cultivation of vegetables into decorative and recreational ones, maintaining the function of vegetable and fruit production.

"Experimental Circle" was established in 1950 by Krystyna Jastrzębska, uniting 20 members. On the surface of 1100 m^2, it had 38 cold frames, in which the seedlings of tomatoes, peppers and lettuce were cultivated. Other were used for the most beautiful species of bulb flowers, such as tulips, gladioluses, daffodils, crocuses. The plantation of roses, as well as dwarf fruit trees, were also established. The circle used to satisfy the needs of gardeners and excess products were intended for sale. In 1969, its activity was extended with bee breeding. Plot owners represented among others by railwaymen, militia members, the employees of the post office, education sector, national councils as well as commerce. Gardeners aged 40–60 prevailed. On average, from 2 to 5 gardens would change their owners every year[23].

In 1950, the gardeners received the adjacent area on the opposite side of Rusałka Street. One hundred and nine plots were arranged there, in this way increasing the number of plots in the entire garden to 278. In the

19 M. Kozyra, Chronicle of the garden "Nasza zdobycz nad Bystrzycą", manuscript owned by the management of the "Nasza Zdobycz" Allotment Garden in Lublin.

20 Henryk Gawarecki, O dawnym Lublinie, szkice z przeszłości miasta (On the History of Lublin, sketches on the city in the past), Wydawnictwo Lubelskie, Lublin 1974, p. 218

21 M. Kozyra, Chronicle of the garden "Nasza zdobycz nad Bystrzycą", manuscript owned by the Management of "Nasza Zdobycz" Allotment Garden in Lublin.

22 At present the gazebo can have the maximum surface of 35m2, which results directly from the Construction Law in force.

23 M. Kozyra, Kronika ogrodu..., op. cit.

older section of the garden, the surface of plots amounted to 200–300 m² and in the new part having a temporary location – 400 m². The surface for agricultural purposes amounted to 9 hectares, while 2 hectares were formed by squares, green areas, roads and fallow lands. In 1957, allotment plots took up the space of 109.1 hectares of the entire city, which gives 7.8 m² of allotment gardens per capita per citizen[24]. Due to the rapidly growing number of citizens, three years later this ratio decreased to 6.8 m² (122.9 hectares of gardens, which constituted the area compliant with the normative standard of that time)[25].

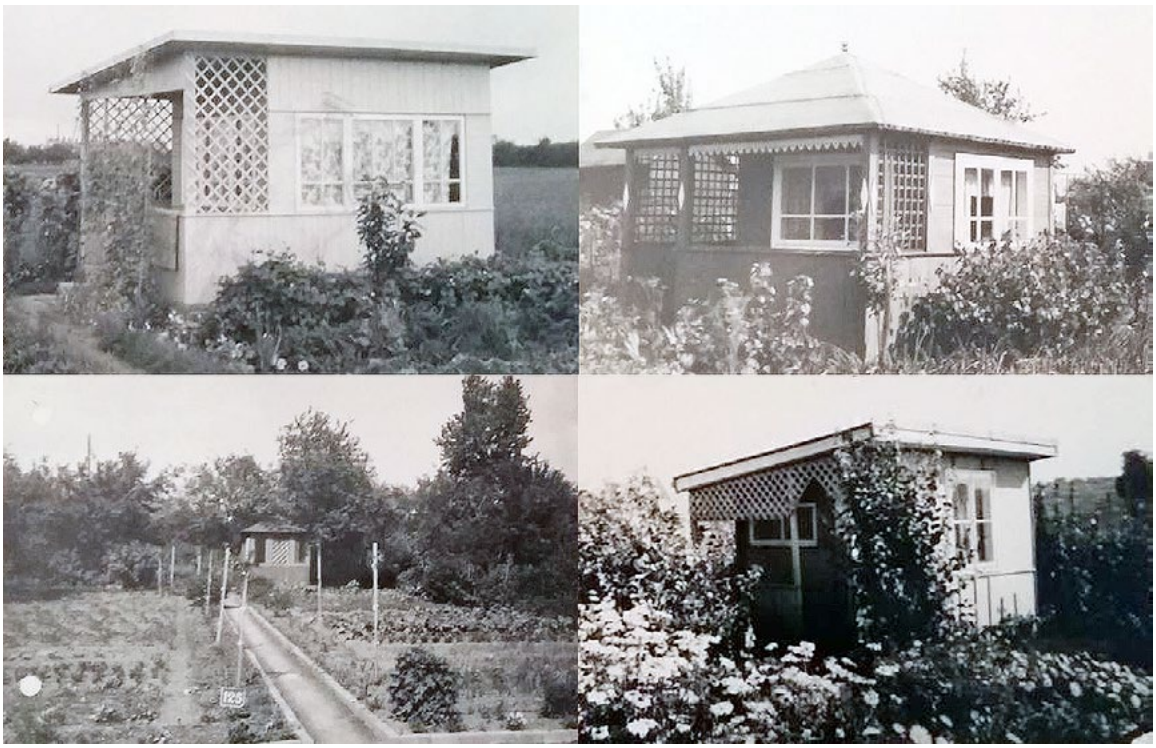


Fig. 3. Archival photographs of gazebos on allotment gardens, source: Chronicle of the garden "Nasza zdobycz nad Bystrzycą", M. Kozyra, written in the late 1980s basing on the collected archival, press and photographic materials of the garden management.

In the years 1950–1969, further development of the garden took place. Also, thanks to the subsidy, a new timber pavilion was constructed in the central part of the garden, which included the Board's chancellery, library, Women's Commission room, assembly hall for 250 participants. On September 3rd 1952, the official commissioning of the pavilion took place. A sewage network was developed in the older section of the garden and 81 taps were assembled. The garden obtained new fencing, steps were constructed in the main alley and all aisles were separated with curbs. Apart from material input and expert's advice, all works were performed voluntarily by the gardeners. In addition to the administration pavilion, the garden includes also a storage pavilion for the equipment necessary for plant cultivation. Brick and mortar sanitary devices were also performed.

In the 1970s, the modernization of the area was conducted. The aisles were widened and separated with curbs, draining trenches were equipped with concrete culverts. Flowerbeds were established, planted with roses and entrance gates were decorated with clematises. From 1952, the timber pavilion from was thermally insulated with aerated concrete, while office rooms were painted. New fencing from the Rusałka Street was also constructed. In 1986, the performed tree records reported the existence of a lot of various species of fruit trees and bushes as well as vegetables. The garden was the first to include the plantations of such vegetables

24 Opis do planu 1957 s. C-60.

25 Lublin P.Z. P. Inwentaryzacja, stan 1960, Pracownia Urbanistyczna Miasta Lublina, S. 6.

as scorzonera, eggplant, bok choy, endive, broccoli, etc., which were uncommon at that time. The average yield of a plot reached 600 kg of vegetables, fruits excluded[26].

The social and cultural activity of gardeners was equally rich. Already in 1946, a community room was opened for teenagers (not only those belonging to plot owners' families). Day camps for children were organized every year, together with meetings, gatherings and parties on the occasion of Gardener's Day, Mother's Day, Children's Day, national holidays etc. Such events are also held now, and additionally, pupils from nearby schools visit the garden within the framework of their Biology classes.

In 1975, the exhibition of flowers and crops began to be organized on the occasion of the Harvest Festival in the renovated timber pavilion. In 1976, a delegation of gardeners from the Czech Republic, Slovakia and German Democratic Republic visited the "Nasza Zdobycz" garden in order to share their experience connected with the functioning of this type of gardens. For years, the garden has won numerous distinctions and diplomas[27].

First threats for the functioning of the garden

The surface of the allotment garden within the so-called Rusałka area, due to its attractive location in the Lublin downtown, was included in planning works conducted by the Lublin Urban Planning Atelier[28]. In 1957, the establishment of the Downtown Park with the surface of ca. 10 hectares was planned within this area, taking up the space of former meadows on both sides of Rusałka Street, through liquidating the allotment gardens[29]. The park was supposed to pass the bridge at Zamojska Street and connect with the Culture Park with the surface of 90 hectares taking up the area of wet meadows within the former Royal Pond in the Podzamcze district. The General Plan from 1969 followed previous assumptions referring to establishing a park on Rusałka grounds. In 1960, allotment gardens within the Downtown took up the surface of 43.9 hectares (the largest among Lublin districts)[30]. The plan from 1969 assumed preserving the western part of allotment gardens in the vicinity of the designed park area[31]. In the same year, the design for the reorganization of the arrangement of allotment gardens in the entire city of Lublin was developed. Gardens located within the valley of the Bystrzyca River: in Podzamcze, Rusałka, within the former Krause's mill in Tatary district on the right bank of Czerniejówka River were intended for liquidation. Allotment gardens supposed to replace them were designed on the outskirts of the city or arable lands. Nasza Zdobycz Allotment Garden was supposed to be liquidated in the years 1973–75, while the garden in Podzamcze in the years 1976–1980[32].

Already in 1972, the city took over 68 plots for the construction of the boulevard and the liquidation of the newest part of the garden on the northern side of Rusałka Street took place. As a part of the compromise, gardeners received 6.5 hectares of meadow at Wapienna Street and in the spring of 1973 moved it to new areas.

However, the construction of a park on the Rusałka grounds did not become a fact, even if subsequent detailed urban planning designs were developed (similarly for the park in the Podzamcze district). Uncertainty referring to the existence of allotment gardens has accompanied their users since 1970s.

26 M. Kozyra, Chronicle of the garden "Nasza zdobycz nad Bystrzycą", manuscript owned by the management of the "Nasza Zdobycz" Allotment Garden in Lublin.

27 Among others: diploma for the organization of fairs, exhibition of crops and flowers, diploma for engagement in environmental protection, diploma for the development of workers' allotment gardens, for the organization of summer stays for pensioners. M. Kozyra, Chronicle of the garden "Nasza zdobycz nad Bystrzycą", manuscript owned by the management of the "Nasza Zdobycz" Allotment Garden in Lublin.

28 In the General Plan of the City of Lublin from 1954, the area was intended for boulevards, promenades and green areas – allotment gardens were planned exclusively in the area of Wapienna Street. Lublin, General Spatial Development Scheme, Miastoprojekt Wschód – Design enterprise, Eng. Kaszycki, Eng. Wilski, together with the description to the plan 1957, p. C-58 Urban Planning Atelier M.Z.A.B. in Lublin, 1957, typescript.

29 Ibid.

30 General Spatial Development Scheme. Perspective 1969.

31 Ibid.

32 The city of Lublin. Allotment gardens. Records. 1969, 1:1000 plan.

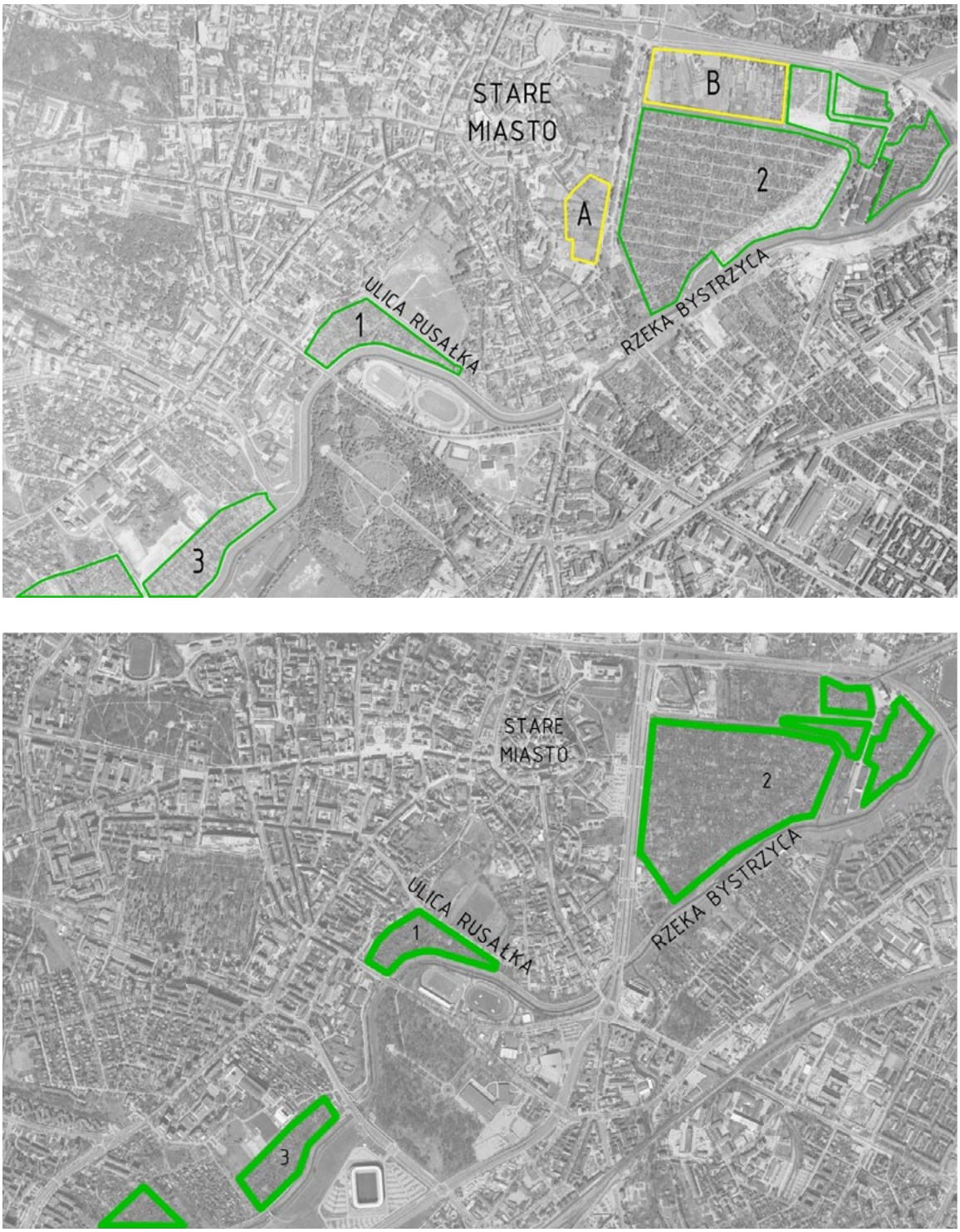


Fig. 4, 5. View as of 1980s together with current state. 1 – Family Allotment Garden "Nasza Zdobycz" at Rusałka Street, 2 – Workers Allotment Garden "Podzamcze" within the area of Łąki Tatary and Podzamcze districts, 3 – Family Allotment Garden "Bystrzyca". A, B – agricultural grounds within the downtown zone. Developed by R. Strojny 2018.

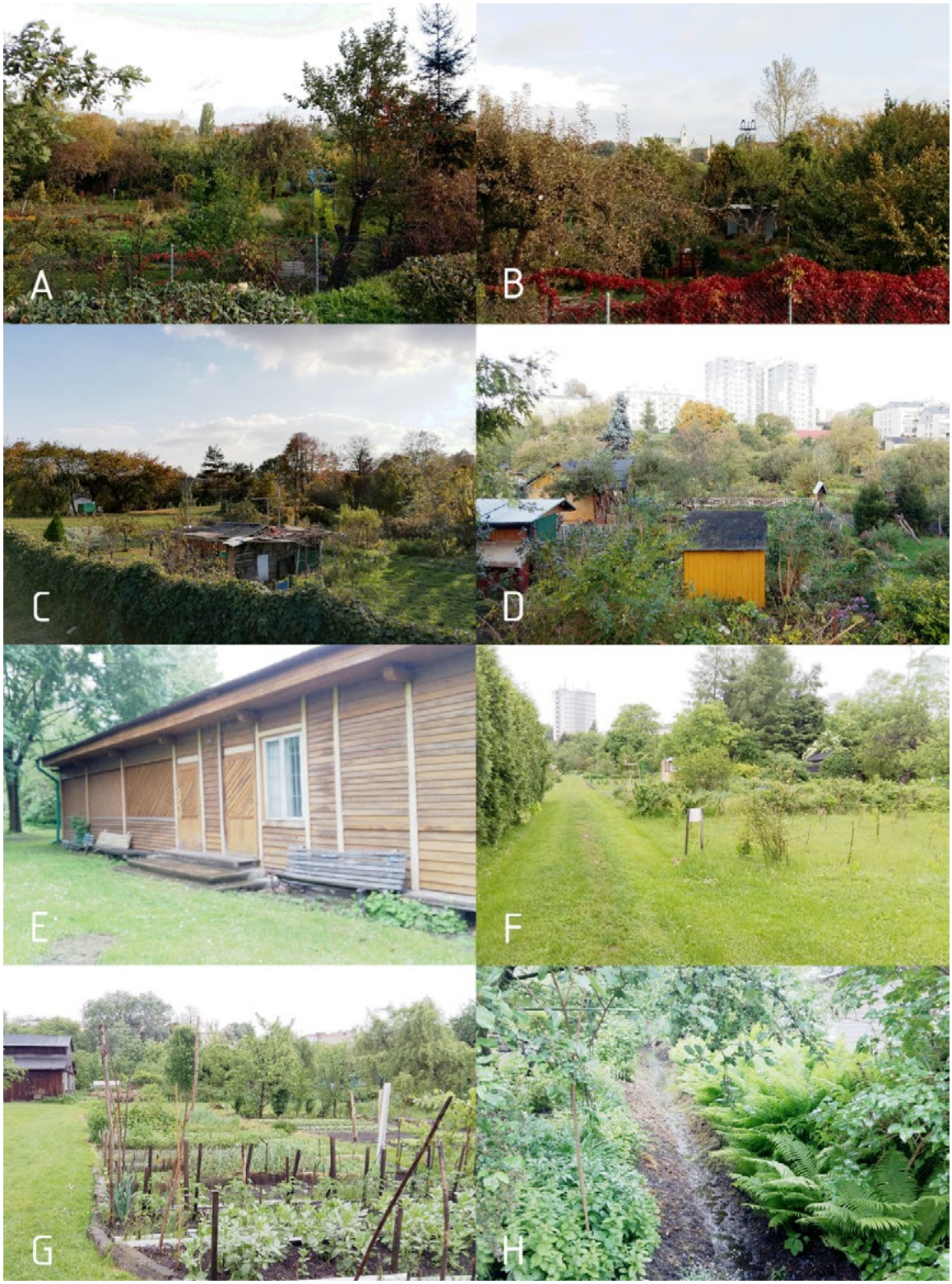


Fig. 6. Fig. 6. A, B – view from the side of the walking and bicycle path on the boulevard of the Bystrzyca River towards the Old Town, C – view in the direction of the river from Rusałka Street, D – view from the boulevard to Dolna Panny Marii Street, E – timber multi-functional pavilion, erected in 1952, F, G – view of the central part of the garden, H – one of rain watercourses. Photo R. Strojny 2017/2018

Allotment gardens in the Lublin downtown – current state

The opinion of the society referring to the owners of allotment gardens is currently very diversified and a lot of inhabitants of the city have never had any contact with allotment gardens. Part of the society perceives the owners of allotment gardens as a group forming their own closed community. In order to deepen the knowledge about the area, an interview was conducted with Teresa Wrońska, the Head of "Nasza Zdobycz" allotment garden[33]. After entering the area of the garden and trying to gather the information about it, one of the gardeners asked: "Are they again trying to take our gardens?". For a person not involved in this matter such attitude may seem incomprehensible, but after interviewing the oldest gardeners and analyzing the history of the garden their attitude may seem justified.

The allotment garden "Nasza Zdobycz" by the Bystrzyca River still looks unique and shows to its visitors how big the treasure owned by the gardeners is. From the outside, it looks neglected and uninteresting, but having entered it one can notice a totally different character of the space. It is true that gazebos and buildings belonging to the management are not in a perfect condition, aisles also require new pavement, but the diversity and richness of greenery are amazing. Plots belonging to subsequent users are not fenced, but separated with curbs, watercourses draining the rainwater resemble rain gardens as they are not usual ditches, but they are in a large part overgrown with plants and aisles extend along them. A lot of plots have pergolas with flowers and evenly cut grass, where daisies or ears of grain appear from time to time. While entering the garden area, you can immediately feel the sense of community between plot users. We can see how they respect and care for their land. Some gardeners breed hens, pigeons or rabbits there.

During the conversations with gardeners, it was possible to feel a very strong sense of belonging to this area as well as notice the pride that they expressed while talking about the oldest allotment garden in Lublin; in spite of so many problems they managed to survive. Disappointment could be heard in their voice when they were describing how they had to go through all these difficulties and fight for what they had already achieved years before. They devoted an important part of their lives for the garden to be perfect. When they compromised and managed to preserve at least the oldest part of the garden, the authorities liquidated the garden on the opposite side and it turned out with time that no funds were available for establishing the Youth Park or the footbridge. As a result, vast green area emerged, including only neglected football pitches with rusty fencing and streetlamps dominating the place. Park area planned for several decades did not serve its function. Growing illegal parking zones, neglected greenery and remnants of recreational infrastructure under the form for example of a sledding hill intensify the impression of an abandoned space. Walking down the Rusałka Street, one can only sometimes see children playing on the sledding hill and the remaining part of this area seems extinct. It is particularly difficult for the gardeners to see the condition in which the areas which used to constitute their property and could remain vibrant currently are.

The areas of allotment gardens within the former Łąki Tatary and Podzamcze districts were also reduced in the course of time, which was connected with municipal and commercial investment projects. Planned realization of the park together with recreational areas did not succeed, but recreational infrastructure is growing on the right banks of the Bystrzyca River, connected with the bicycle path along the river. The river itself is here more accessible to anglers and canoeists.

Gardens and their future – liquidation or preservation?

Allotment gardens in city centers, also in Lublin, have constituted a contentious issue for years. Liquidating the garden may result in losing green areas representing important potential on the scale of the entire city, contribute to disharmonies in the existing urban tissue as well as decrease the aesthetics and natural value of the place if the land is sold to developers and intended for commercial or residential purposes.

The greatest space-related issue connected not with the presence itself of allotment gardens in the Lublin downtown, but rather with their isolation and limited access, is constituted by closing the areas by the river, functioning as publicly available recreational grounds, from the downtown zone.

33 Rozmowa przeprowadzona przez R. Strojnego 26 kwietnia i 27 maja 2018

Current urban planning trends referring to the protection of green areas in central zones of the cities seem to promote the preservation of allotment gardens in the Lublin downtown. In highly developed countries new forms of city greenery and urban farming become popular, both under their industrialized as well as spontaneous forms. We can differentiate here social and neighbors' gardens, guerilla gardening together with various forms of urban gardening concentrated on obtaining valuable, healthy and natural food. Interestingly enough, in poorer countries, where informal urban farming constitutes the answer to food shortages, social perception of these areas is more negative, and they are usually located in the peripheries (Schwab, Caputo, Hernandez-Garcie, 2018).

The Rusałka area is subject to municipal Revitalization program. It assumes the reconstruction of Rusałka Park together with a skatepark, which will constitute one of the places activating the citizens, local entrepreneurs as well as attracting visitors from other districts and tourists. Buildings representing bad technical condition are going to be liquidated and the remaining part of the existing development is going to be renovated. The area by Rusałka Street was considered to constitute the greatest potential in developing new green areas[34].

In the revitalization and development concept program prepared in 2017 for the valley of the Bystrzyca River in Lublin within the area of allotment gardens in the Downtown, the establishment of park zones was planned. The presence of the function of urban gardening was not addressed, while allotment gardens were assessed as elements impeding the development, which "should be transformed into open recreation grounds and within the intermediary phase – perforated, forming open pedestrian and courses of transit character"[35]. The concept returned to the idea of establishing the Rusałka park, completely eliminating the function of allotment gardens. A sensual garden was supposed to be established in their place[36].

Possibilities for using the potential of allotment gardens in the Lublin downtown in the context of urban agriculture

Allotment gardens functioning in the Lublin downtown may be considered to form modern city farms, the popularity of which is growing in highly developed countries. Different forms of agricultural activity were present in the cities and towns for centuries (for example monastic gardens). City farms constitute a type of social garden which serves not only the purposes of food production, but also educational and recreational functions. It is a modern multi-functional urban space, resulting from a carefully thought-out and conscious decision of space managers. The farm creates an attractive urban space. In Paris, such areas are present in almost all districts. They form a meeting place for people representing different environments and age groups. Similar solutions can be found in New York and Vienna. England is one of the countries characterized by the greatest advancement referring to the aspect of agriculture.

Urban agriculture consists not only of the areas serving recreation purposes, but also concentrated on sustainable development and food production (the Netherlands, Chile). In some countries, urban farming supplies the cities with as much as 90% of food (e.g. China)[37].

The studies of complex urban and social determinants were the motivation for developing the subject of alternative suggestion for the revitalization of the Rusałka area, applying the ideas connected with urban agriculture[38].

34 Resolution number 735/XXIX/2017 as of April 27th 2017 of the Council of the City of Lublin concerning the Revitalization Plan for Lublin in the years 2017–2023

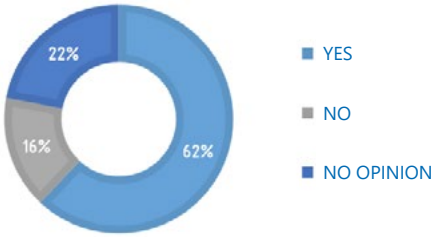
35 Concept, p. 14

36 The Concept assumes intensive use of both the northern as well as southern part of the future park with simultaneous respect for recommendations included in the local plan. It is suggested to connect both parts of the area intended for the park with a footbridge constructed with 5% downslope to the place where sledding hill is currently situated – but from the height of 7.0 meters – over Rusałka Street, above the area of allotment gardens to the Bystrzyca River bank. In the future, in the place currently taken up by the crops, it is suggested to develop the southern part of "Rusałka" park, intended for a sensual garden.

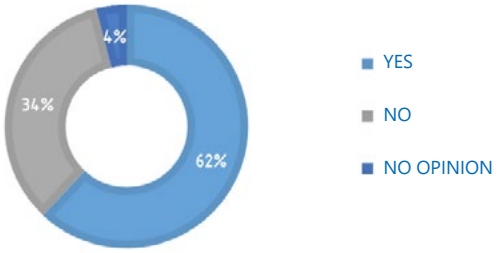
37 I. Karczmarczyk, Zielone dachy, farmy miejskie i ogrody wertykalne jako element ekologicznego zagospodarowania przestrzeni miejskiej (Green roofs, urban farms and vertical garden as an element of ecological arrangement of urban space), in: Miasto zielone z natury. Poradnik dobrych praktyk. (City green in its nature Guide to good practice.) Szczecin 2014, p. 23.

38 Title of the paper.... 250 surveys were conducted within the framework of the study ...

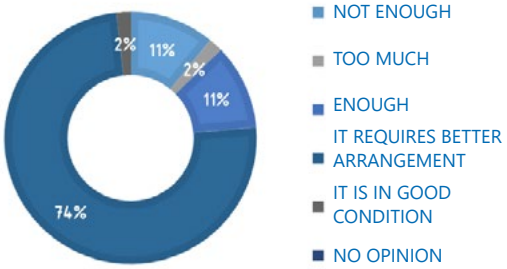
DO YOU THINK THAT THE SPACE OF ALLOTMENT GARDENS SHOULD (IN WHOLE OR IN PART) BE ACCESSIBLE TO EVERYONE?



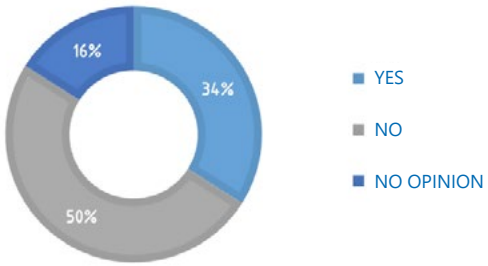
DO YOU THINK THAT THIS AREA IS ATTRACTIVE FROM THE PERSPECTIVE OF THE CITY?



WHAT IS YOUR OPINION ABOUT GREENERY PRESENT WITHIN THIS SPACE?



DO YOU LIKE THIS PART OF THE CITY OF LUBLIN?



Two hundred and fifty respondents – Lublin citizens – took part in the survey. Among a number of questions asked, a few of them were directly connected with the issue of the functioning of allotment gardens. The majority of respondents (62%) noticed its big potential on the scale of the city, at the same time perceiving it as unattractive in its current form (50% answered that they do not like the space and 16% had no opinion about it). The greenery present within the Rusałka zone was assessed by the majority of those surveyed as requiring better arrangement. Sixty-two percent of respondents approved the suggestion for making part of the space of "Nasza Zdobycz" allotment garden by the Bystrzyca River publicly accessible. Results of the survey confirmed social openness to the suggestions of introducing the function of an urban farm, at the same time preserving part of the allotment garden with the framework of Rusałka revitalization project.

The design concept assumes the establishment of an urban park on the northern side of Rusałka Street with introducing new functions (Youth Park, sensual garden, rainwater garden, flower meadows etc.) and connecting the existing recreational boulevard along the Bystrzyca River with communication route conducted in the area of allotment gardens made partially available to the public. The course and form of the main promenade were conditioned by the analysis of landscape and communication connections together with the structure of the internal division of the garden. It was suggested to introduce public space, which constitutes an intermediary structure between private gardens and the recreational zone and the majority of its surface was intended for the organization of modern urban farm. In connection with the location in the heart of the Lublin downtown, part of this space should serve educational functions.

It would constitute publicly available space including various crops, spaces for recreation and integration with nature. Such a zone would integrate the garden with the remaining part of the city as well as open the space to new users. It would initiate social participation and activity in the gardens. At present, gardens constitute fenced space unavailable from the outside. After their transformation, the division into farming lands intended for subsequent gardens would still exist, but they would be integrated with the farm and periodically accessible to everybody. Appropriate plant species could be planted along watercourses in order to filter rainwater from communication pollution, and most importantly, they would make this typical garden structure more attractive. Aisles or promenades could be established along them, from which everyone could admire the crops and remain in contact with nature. Such space would stimulate all senses in the same way as sensual gardens, preserving, at the same time, its usable character. Beds that include cultivated crops could be found by the aisles.

Fig. 7. Urban concept for developing the Rusałka area. 1 – Youth Park, 2 – Rusałka Park, 3 – part of the garden made publicly available in the form of urban farm, 4 – semi-private section of the allotment garden. Source: R. Strojny, *Rewitalizacja urbanistyczno-architektoniczna zdegradowanych obszarów miejskich w rejonie ulic: Dolnej Panny Marii, Rusałka, Wesołej oraz rzeki Bystrzycy w Lublinie* (Urban and architectural revitalization of degraded urban areas within the Streets: Dolna Panny Marii, Rusałka, Wesoła as well as the Bystrzyca River in Lublin), 2018, engineer thesis under the direction of N. Przesmycka

Even if the idea to introduce an urban farm in the allotment garden by Rusałka in Lublin refers to current trends present in big cities, its aim would not be to copy foreign models, but it would constitute the answer to the needs and realization opportunities. Modernization of allotment gardens will prevent their further degradation, at the same time preserving their historical identity.

Summary

Allotment gardens located in the Lublin downtown constitute a natural, cultural and social resource developed by several generations of gardeners. The different condition of gazebos and gardens, and in particular no possibility to pass through their area for those who do not form part of the gardeners' community, contribute to negative opinions in this field as well as complex determinants of such a state of affairs. We can hope here that current urban trends promoting urban farming under different forms contribute to the possibility of preserving this already historical function in the space of the Lublin downtown.

Urban planning recommendations constitute the only guarantee for their protection. The chance for opening the city into the river and integrating gardeners with the city may be constituted by making the garden

publicly available in its part. The revitalization of plots together with their surroundings may help the citizens to find a way of achieving a healthy, sustainable and happy life. The garden may be given the modern function of an urban farm. The farms will eliminate the necessity to transport food and will make it possible to obtain higher quality products. The integration of the urban tissue with gardens in the functional and spatial sense is necessary for the correct course of the process of revitalization of this space. The suggested modifications of the process will restore past glam of the gardens, make it possible to preserve their identity, at the same time making them modern and transforming them to match the needs of the present and future society.

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Shaping space in practical therapy

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Abstract: The authors of this article present issues concerning not only disability but also rehabilitation, which allows the disabled to become more independent. The principal aim of this article is to discuss the problem of the handicapped who have to face the world that is still non-adapted to their needs in terms of architecture. Hence, this paper is focused particularly on the role of designers creating the space surrounding the disabled who strive for returning to normal active life.

Keywords: disability, rehabilitation, therapeutic rehabilitation, social and professional rehabilitation.

Introduction

The authors of this article emphasize the variety of rehabilitation processes and, simultaneously, related requirements concerning the space, colours, and functional layouts. It is also of utmost importance that rehabilitation buildings or areas always have to be provided with additional rooms, otherwise such premises could not function normally. This article also addresses serious problems encountered not only by architects but also users, e.g. members of staff, rehabilitated persons, and carers. By focusing on selected examples of different types of disability, the authors of this article demonstrate sample solutions which can improve and speed up the process of returning to living normal and active social life.

Fig. 1. A rake and a ramp for a disabled person. (photo: author)

The issue of designing objects with a function intended for people with reduced mobility is a challenge not only in terms of formal but also aesthetic. Nowadays, often there are different types of design solutions (Figure 1) in facilities for the needs of people with dysfunctions such as, for example, railyards or ramps. Requirements for buildings that serve rehabilitation purposes are determined not only by the Regulation of the Minister of Infrastructure regarding technical conditions that should be met by buildings and their location of

April 12, 2002 (Journal of Laws No. 75, item 690) or the Construction Law but in the case of willingness to provide medical rehabilitation services financed from public funds through the Regulation No. 53/2010 / DSOZ of the President of the National Health Fund of September 2, 2010 on defining conditions for the conclusion and implementation of contracts in terms of medical rehabilitation. In addition to medical rehabilitation, aimed at helping a disabled person to achieve the greatest possible physical fitness, one should also look at centers specializing in social and professional rehabilitation, equally important in the event of a person's return to functioning in both the professional and private sphere. The authors of this article will introduce the meaning of the word «disabled person» to on this basis bring closer the existence of centers specializing in various types of rehabilitation. They will quote some of the requirements as well as, in order to prove that it is possible to meet the needs of both an investor and a user, present an example of a rehabilitation center that fulfills its function in terms of both formal and technical as well as aesthetic.

The definition of disability

The Act of 27 August 1997 on vocational and social rehabilitation and employment of disabled persons stipulates that it concerns «(...) *persons whose physical, mental or mental condition permanently or periodically impedes, limits or prevents the performance of social roles, in particular the ability to perform professional work* « [1]. Three degrees of disability were distinguished: «*significant, moderate, light*» [2]. In the same act, the definition of rehabilitation of disabled people was defined as «*(...) a set of activities, in particular organizational, therapeutic, psychological, technical, training, educational and social, aimed at achieving, with the active participation of these people, the highest possible level of their functioning , quality of life and social integration*" [3]. The participation in '(...) *occupational therapy workshops, rehabilitation stays* [and – author's note] *physical exercise, psychoactive, recreational and sporting teams and other social activity teams according to the needs of disabled people*" [4] was considered the basic forms of social rehabilitation. Published by the World Health Organization in 2001, the International Classification of Functioning, Disability and Health [5] states that «*disability serves as a broad term encompassing all impairments in functioning, limiting participation and limiting participation*» [6]. The above definitions indicate that disability does not refer only to limited mobility as it is usually perceived but includes various limitations of both physical and social functions.

Requirements for facilities providing rehabilitation services

Requirements and conditions for the provision of services in the field of medical rehabilitation (financed from public funds) are set out in Regulation No. 53/2010 / DSOZ of the President of the National Health Fund of September 2, 2010 on defining conditions for the conclusion and implementation of contracts in the field of rehabilitation, where it was determined that services in the field of medical rehabilitation can be «*carried out in outpatient, home, daily and stationary settings*» [7]. The said document (along with subsequent amendments) also defines the requirements (including personnel, premises or work time) for institutions providing the aforementioned services. Annex 3 to the said ordinance specifies the conditions for the provision of benefits in specific areas of contracted services. Requirements have been specified in relation to housing conditions, such as the need to place handrails and handles in sanitary facilities (Fig. 2.) for beneficiaries or the need to provide commuting and access to buildings adapted for people with reduced mobility. In the case of cardiac rehabilitation, attention was also paid to the need to place recreational rooms inside and outside the building [8]. These guidelines regarding the adaptation of the facility to the needs of users with reduced mobility are also included in the Regulation of the Minister of Infrastructure on technical conditions that should be met by buildings and their location of April 12, 2002 (Journal of Laws No. 75, item 690). An example may be a fragment regarding sanitary and hygienic rooms: «*In the building, on floors accessible for the disabled, at least one of the generally accessible sanitary rooms should be adapted for these people by:*

1. *providing a maneuvering space of at least 1.5×1.5 m,*
2. *using doors without thresholds in these rooms and on the route,*

3. *installing a suitably adapted, at least one toilet bowl and washbasin, as well as one shower if, due to the purpose, such devices are planned in the building,*
4. *installing brackets to enable the use of sanitary facilities.* [9]"

Fig. 2. Handrails in the toilet for a disabled person. (photo: author)

In addition to technical or legal requirements, the task of the architect is also to find solutions that can facilitate the disabled person's return to life outside the rehabilitation center. With regard to a user with reduced mobility, the availability of individual levels in a building or the adjustment of toilets plays an important role. However, there are also other groups such as blind people for whom the perception of space differs significantly from that of a healthy person. In the case of such limitations, it is necessary to create surfaces that are easy to remember, marked in a suitable way both by using various materials to help distinguish between individual spaces and described in a suitable way (examples may be descriptions in Braille). Deaf and deaf-mute people also have to face a number of difficulties, in these cases the color plays a particularly important role. An architect who develops centers addressed to a given group must demonstrate special empathy and understanding. Universal design should find a special place here, so that the proposed spaces at a later time do not have to be adapted to specific groups. A remarkable article referring to the functioning of disabled people is the one by Agnieszka Kłopotowska, where the author draws attention to the blind and the way in which the other senses are able to help in the reception of space [10]. There are a number of possibilities that can facilitate the specific return to life of these users and adaptation to a world adapted for healthy people.

Occupational therapy centers as an element of rehabilitation

In the article published in 2000, «Medical rehabilitation – its goals, assumptions and practical meaning» Irena Karwat and Andrzej Skwarcz described that «(...) *it aims to achieve psychophysiological efficiency as quickly and efficiently as possible in the current situation of a sick person. Medical rehabilitation is closely connected on the one hand with methods of treatment, and on the other with social and psychological rehabilitation* [11]". The need to return to relative, possible efficiency and gain social independence can be considered the primary, overarching goal of rehabilitation, but this does not mean that the less important aspect is the adaptation to life in society or the acquisition of skills enabling the performance of specific functions, including in the professional sphere. In connection with the above, the presence of centers specializing in occupational therapy should be emphasized; their advantages were noted by Anna Celińska-Pietrzak describing that «*it can simultaneously operate on three different levels – physical, consisting mainly of rehabilitation, psychological, because the appropriate adjustment of exercise enables a disabled person to accept their disability and social one because they learn to live in a way that their health allows.* [12]" In the Act on Vocational and Social Rehabilitation and Employment of People with Disabilities along with rehabilitation stays, these occupational therapy workshops have been included in the basic forms of activity supporting the process of vocational and social rehabilitation.

[13] These centers are characterized by a wide spectrum of activities carried out in them not only in the field of medical rehabilitation with the use of rehabilitation equipment but also in the non-medical field such as artistic, tailor, ceramic or other activities aimed at achieving practical skills by those in its care. The fact of compiling a large number of the building's purposes as well as the need to fully adapt them so that they serve people with limited mobility or vision makes them a particularly difficult subject in terms of design.

A positive example of a building intended for rehabilitation purposes

Despite the difficulties and limitations faced by the designer deciding to develop a building with these goals, it is possible to achieve a satisfactory result for both the users and the investor as well as the architect himself. As an example of positive solutions, the authors of this article would like to present a center for social and professional rehabilitation of the Foundation «Family Home Rehabilitation of Children with Cerebral Palsy» in Opole. A project prepared by M. and A. Domicz Pracownia Architektury, which in 2014 won the Honorary SARP Award for design activity, which is carried out mainly in Opole [14].

The center, thanks to the aesthetics of the authors and their awareness of the problems faced by people requiring rehabilitation, is not only a distinctive building in terms of style but, more importantly, functional. It should be noted that the Foundation received the object as requiring immediate renovation. A former kindergarten, with a one-story block located in the industrial and warehouse district of the city, underwent a kind of metamorphosis. Reconstruction included adding a story in a building fragment to create a form of two interpenetrating solids. From the original assumption, only fragmentary elements of walls and ceilings have been preserved.

In the case of adjusting the facility for the needs of people with disabilities, the interior layout and their above-mentioned functionality are of particular importance. The authors of the described project managed to obtain this effect by separating the function. The ground floor, which largely houses classrooms, training rooms and a large multi-purpose hall, has been designed to suit the needs of users with limited mobility. On the first floor there are administrative rooms, which do not have to be available for those in the care of the center. Through this solution, the authors of the project could afford to narrow the corridor and the location of footbridges leading to individual rooms. This creative idea allowed to include more light in the corridor on the ground floor as well as made the space visually larger. The aesthetics of the building is simple, almost ascetic based on natural façade materials interwoven with glass panes [15].

Currently, the Vocational Activation Center runs a number of workshops in which disabled people can acquire professional skills, including printing, sewing, artistic, ceramic and others. They employ people with disabilities to a varying degree, including a significant degree. Qualifications that the employees of the center achieve allow them to find jobs in the current job market [16].

The above-mentioned example proves not only that with a highly developed sense of aesthetics and empathy, while maintaining the existing standards and regulations in Polish conditions, it is possible to complete a facility specializing in both professional and social as well as medical rehabilitation. The fact that people with disabilities are permanently employed in the above-mentioned center proves the need to locate similar places on the map of the country.

Conclusions

The problem of disability, although sometimes limited only to people with reduced mobility, refers to a wide range of both physical and mental limitations. Depending on the type of problem faced by a person affected by disability, there are a number of different forms of rehabilitation aimed at helping the patient return to independent functioning both in the field of healing rehabilitation as well as social or professional. All of these spheres have an impact on the subsequent functioning of this person in society. And it is there that the purpose of the existence of rehabilitation centers appears. In her article, Agnieszka Kłopotowska appreciates their existence because, as she points out (in relation to the visually impaired): «*staying in a rehabilitation center is an extremely important stage, preceding the independence of the blind in everyday reality. The experiences*

gathered in this space teach openness, the ability to overcome further barriers, and overcome difficulties [17]." A similar statement can be applied to all places specializing in restoring the fitness of the blind and visually impaired as well as the deaf, and those with limited mobility or with all kinds of psychological problems. The space in which these people will come back to relative health is of great importance, as regards accessibility, clean functional layout or materials used, and additional amenities. With all the requirements an architect can not forget about aesthetics and costs, which in the case of modern solutions directed to particular disability groups can significantly increase the project costs. The projects carried out so far prove, however, that a compromise is possible in this matter.

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Assessment of use of public transport in cities by elderly and disabled persons

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Abstract: The public transport system is one of the key factors determining the economic and social development of modern cities, faced with the goal of providing convenient connections between different areas of the functional structure, i.e. ensuring high comfort and short travel time, while minimizing environmental impact. However, it is worth asking: is creating such a transport system possible, does it exclude certain social groups, and is it capable of satisfying the needs of all users? More and more modern planners and transportation engineers are facing this dilemma. According to many scientific publications, universal design is the answer, hence shaping public spaces and the transport systems with awareness of the diversity of the human collectivity in terms of sex, age, physical ability and health condition. Elderly people above 60 years of age and the disabled, who have various types of mental, physical and sensory dysfunctions, are at the greatest risk of social exclusion. These groups of people encounter many architectural and transportation barriers in their daily lives that make it impossible for them to move freely, thus limiting their access to education, employment and culture. Only through analysis of the existing transport system, identification of transportation barriers, and the appropriate decisions to eliminate them can this exclusion be counteracted and a city without barriers be created – a free city where every resident can move easily, whether they are blind, hard of hearing or a wheelchair user. This article defines the concepts of elderly and disabled people and presents the barriers most frequently encountered in city transport systems. Moreover, guidelines for designing a transport system according to the needs of the analyzed group are proposed. The results of survey studies conducted in Oswiecim and Cracow concerning assessment of public transport and its adaptation to elderly and disabled people are a significant part of this article. Results and conclusions obtained from studies can be an inspiration for other cities that want to create a transport system adapted to the needs of the analysed group, however it is also worth remembering that shaping public spaces and transport "for everyone" is only possible by engaging all parties interested in the problem, i.e. above all, elderly and disabled people as well as city authorities, and then making every effort to reach a consensus between these groups.

Keywords: transportation system, elderly people, disabled people.

Introduction

The city of the 21st century is a "product" of civilization, filled with residential development of high and low intensity, modern office and services buildings, supplemented by green public spaces friendly to residents. Moreover, it is an urban unit equipped with a strong, prosperous transport system, which constitutes a key factor determining the city's economic and social development, faced with the goal of providing convenient connections between areas with different purposes, ensuring high comfort and short travel time, while minimizing environmental impact. Today's urban units are unfortunately characterized by many difficulties for elderly and disabled persons who have various types of mental, physical and sensory dysfunctions. These groups of people encounter many architectural and transportation barriers in their daily lives that make it impossible for them to

move freely, thus limiting their access to education, employment and culture. Thus, modern planners and transport engineers face an enormous challenge: to create a transport system with high accessibility, not excluding certain social groups while satisfying the needs of all users. But is this possible to achieve, and what measures would be appropriate? Can a transport system be fully adapted to the needs of elderly and disabled people?

Elderly and disabled people – basic concepts

The modern world is inhabited by approximately seven billion people, among them Muslims, Christians, citizens of Spanish, German, Polish origin, black people, people suffering from gigantism, dwarfism, paralysis, blindness or mental impairments. So it is worth thinking about how to correctly define a disabled person. Is such a person an "individual with impaired bodily functions relative to the norm, causing certain limitations and difficulties in fulfilling social roles" [Rzempowska 2011] or a person who has suffered impaired functions of organs, systems or of the entire body as a result of congenital defects or diseases or diseases acquired at different periods of life, which limit their biological and/or social functioning to a varying extent"? [Rzempowska 2011].

Disability is a widespread phenomenon in today's world, and its definition has evolved over the years, changing its original meaning. According to the Resolution of the Sejm of the Republic of Poland dated 1 August 1997, the "Bill of Rights for Disabled Persons" [World Health Organization 1980], "disabled persons are persons whose physical, mental or intellectual capacity permanently or periodically renders difficult, limits or disables daily life, learning, work and the performance of social roles according to legal and customary norms."

But how to define an elderly person or the aging process? Generally speaking, aging is one of the stages of human life, characterized by a reduction of the body's fitness, independence in living, and a decrease in capacity to adapt to changes that occur. In this process, the risk of health problems is elevated, and general mental and physical condition is deteriorated [Gutowska 2015]. According to the World Health Organization (WHO), aging is a process consisting of individual stages [Gutowska 2015]:

- pre-elderly age – 45–59 years of age,
- early elderly age – 60–74 years of age, people of this age are typically still characterized by full physical and mental capacity,
- late elderly age – 75–89 years of age, people who require the assistance and care of third parties,
- long-lived age – above 90 years.

According to the definition above, an elderly person will be associated with a person aged 60 or more years, with full or reduced physical capacity, with varying health condition, lifestyle, and requiring care from third parties or not.

The public and individual transport system and elderly and disabled people

Currently, cities and their spatial management remain unadapted to all groups of users, despite the efforts of city authorities, and this leads to exclusion of individual social groups. Failure to adapt to their needs can be observed in the architecture of buildings (limited access to the interior and limited movement inside them), public spaces (uneven pavements, absence of ramps, lifts) and the public transport system [Misiewicz 2014]. The table below (Table 1) presents the most important difficulties of disabled and elderly people using the transport system.

Table 1. Transportation difficulties of disabled and elderly people.

Journeys on foot	**Pedestrian routes** ■ inappropriate width of pedestrian routes, making free movement impossible, particularly for wheelchair users, ■ chaotic arrangement of small architecture such as benches, waste bins, lamps along pedestrian routes (a barrier to, above all, people with impaired vision), ■ incorrectly selected material and inappropriately maintained pavement of pedestrian routes, with unevennesses and pits, **Pedestrian crossings, light signalling** ■ absence of curb ramps or making them only on one side with improper accuracy, with the result that the height between the ramp's edge and the roadway cannot be crossed by a wheelchair user, ■ no voice messages on pedestrian crossings on an intersection with light signalling (hazard to people with impaired vision), **Devices assisting people with overcoming elevation differences in the terrain** ■ no differentiation between structure of materials at the start of flights of stairs, ■ presence of handrail on only one side of stairs, ■ no ramps or public space equipped with improperly designed ramp (excessive slope, no handrails, absence of appropriate manoeuvring space in front of and behind ramp),
Individual transport	■ absence or insufficient number of parking spaces for disabled people, ■ inappropriate dimensions of parking space, resulting in a lack of manoeuvring space for wheelchair users, ■ incorrect management of space near parking spaces, e.g. due to the application of high curbs making it impossible to conveniently access the sidewalk from the car park,
Bicycle transport	■ no marking with contrasting colour and inappropriate situation of button for cyclists on intersections with light signalling (difficulty for elderly people), ■ placement of bike racks in hard-to-reach places (requiring crossing of multiple points of collision with other users), ■ making bicycles with a high frame available at city bike rental stations (difficulty for the elderly when getting on) ■ complicated process of city bike rental
Municipal public transport	**Passenger information system** ■ hard-to-read information boards, utilizing lowercase and capital letters, without contrast between characters and the background, placed on material reflecting daylight, ■ no voice messages inside vehicle announcing the name of the current stop and the name of the next stop, **Stop infrastructure** ■ protruding, sharp elements of equipment at public transport stops (hazard to blind people and people with impaired vision), ■ pavement of the stop not adjusted to the floor level of the public transport vehicle (difficulty for people with motor disabilities), **Vehicle fleet** ■ no markings on vehicle informing of its adaptation to the needs of disabled people (a person waiting at a stop is not able to unambiguously determine whether the incoming vehicle meets basic conditions), ■ no devices assisting disabled people with getting on and off (ramps, lifts, kneeling system), ■ door widths of the collective transport vehicle not adapted, or placement of posts, steps, breaks or limitation of manoeuvring space inside of it, ■ no grips, handrails in vehicle, and no buttons informing the driver that a disabled person is awaiting assistance, ■ no contrasting marking of handrails and application of hard material to make them (difficulty for people with impaired vision), ■ insufficient number of seats for elderly people,

Railway transport	**Point infrastructure – railway station building** ■ no handrails or improperly shaped rails, stairs of varying height and width (difficulty for elderly people), ■ no elevators, ■ no colouristic and material differentiation of warning strip in front of and behind stairs (hazard for people with impaired vision), ■ railway station not equipped with obstacle-free route that would connect the most important locations (stop points of other means of transport, parking spaces, ticket desks and vending machines, bathrooms and platforms), ■ improper material of pavement at the railway station, ■ no bathrooms adapted to the needs of disabled people, ■ traditional cashier windows with glass panes (significantly limiting audibility) and high counter for money transfer and ticket issue (difficulty for wheelchair user), ■ no videophone function (difficulty for deaf-mutes who want to buy a ticket), **Platforms** ■ uneven payment, with cracks and pits, ■ platform not equipped with warning strips of varied texture and colour scheme, constituting the boundary between the useful surface and the hazard zone (difficulty for blind people and people with impaired vision), ■ excessive distances between rails and concrete elements on railway crossings at rail level (jamming or puncture of wheelchair wheels), **Vehicle fleet** ■ no specially designated seats for disabled people, ■ floor height of train car not adjusted to platform level, necessity of applying devices assisting getting on and off, ■ inappropriate width of entrance doors, significantly limiting free passage into the vehicle, ■ insufficient number of seats for people with limited mobility, ■ no lavatories adapted for disabled people, **Passenger information system** ■ no boards with directions, pictograms indicating significant locations at the railway station, ■ colour scheme and height of informational boards not accessible, ■ no voice messages concerning travel time, departure time, direction of travel or sudden changes in the event of an emergency (difficulty for people with impaired vision, above all),
Transfer nodes	■ inappropriate management of transfer terminal, which is linked to the absence of the shortest possible connections between significant locations (public transportation stops, ticket vending machines, pedestrian crossings and equipment for surmounting elevation differences), ■ uneven pavement, with linear obstacles, without differentiated colour scheme, texture and without warning strips, ■ no readable, comprehensible passenger information system, ■ chaotic placement of boards with directions, ■ pedestrian crossings without voice messages at intersections with light signalling,

Source: own material based on [Forum Kolejowe – Railway Business Forum 2015, Kowalski 2013, Raczyńska-Buława 2017]

Assessment of the transport system in Oswiecim and Cracow by elderly and disabled people

The next part of the article presents the examples of two cities in the Malopolskie (Lesser Poland) voivodeship: Cracow, the voivodeship's capital, inhabited by 767,348 people [http://stat.gov.pl] and Oswiecim, the seat of the Oswiecimski poviat's authorities, with a population of 39,972 [http://stat.gov.pl], in the context of assessment

of the transport system's adjustment to the needs of elderly and disabled people. These cities differ in population and occupied surface area, but they share one common denominator: problems with transport. Like many other cities of the 21st century, these urban units are affected by continuously increasing traffic intensity, low throughput of road systems and the addition of transit traffic to internal traffic. As a consequence of this, there are attempts to limit the traffic of individual vehicles in favour of the development of alternative means of travel.

Both cities are serviced by collective public transport: only bus transport operates in Oswiecim, organized by the Municipal Transportation Company, while in Cracow, transportation is provided by both buses and trams. City transport in both Cracow and Oswiecim realizes connections not only within the respective city's administrative boundaries but also renders services in neighbouring communes. It should be emphasized that Cracow is serviced by 27 tram lines and 161 bus lines [Maderak 2017], while Oswiecim has 27 bus lines, including 9 city buses and 18 suburban buses [Figura 2018]. The difference in the number of offered connections is substantial, but one must take into account that these urban units are characterized by varied levels of economic development, and above all, demand for transport services. But is the transport system in place in these cities adapted to the most demanding group of users – elderly and disabled people? This was the guiding idea behind the survey studies conducted among elderly and disabled people residing in these cities. It is worth noting that the target group (elderly and disabled people) make up a significant percentage of the total number of residents in these cities (Table 2), which will continue to grow over the coming years. Conducted survey studies made it possible to identify the transportation barriers and difficulties encountered by elderly and disable people while travelling on means of public transport.

Table 2. Percentage of elderly and disabled people in the total number of residents in the cities of Cracow and Oswiecim

	Oswiecim	Cracow
Number of residents	38,972 (data from 2016)	767,348 (data from 2017)
Percentage of elderly people	28.49%	23.12%
Percentage of disabled people	16.65% (44% women, 56% men)	18.8% (58% women, 42% men)

Source: own material based on [Figura 2018, http://krakow.stat.gov.pl]

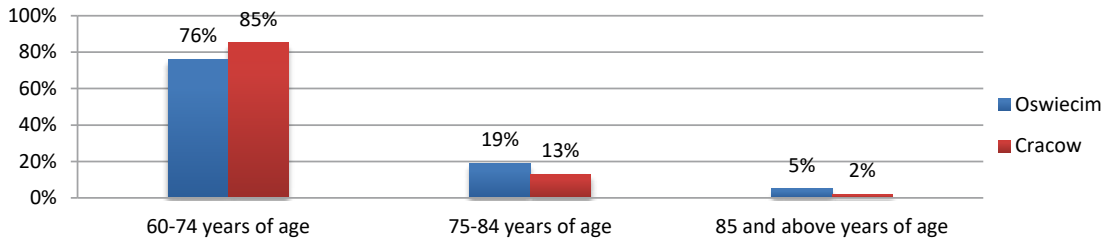
The survey study in Oswiecim was conducted using the traditional research technique of direct interview at three locations critical to the city: the transfer node at the PKP Railway Station, one public transport stop (strict city centre) and in the neighbourhood of the largest residential settlement of the urban unit, on a group of 150 elderly and disabled people in 2018 (estimation error 6.7% at confidence level 0.9). Whereas survey studies in Cracow were conducted in 2017, solely at selected bus and tram stops, on a group of 400 people (estimation error 4.1% at confidence level 0.9).

The most numerous age group among those surveyed both in Cracow and Oswiecim consisted of people between the ages of 60 and 74 (Oswiecim 76%, Cracow 85%) (Table 3a). A clear disproportion between the share of surveyed people aged 75 years and above is visible in both cities, which is due to the fact that these people rarely leave home and so use city transport only sporadically. Over 60% of the Oswiecim respondents and approx. 75% of Cracow respondents indicate that they have or experience dysfunctions that limit normal functioning and the performance of daily activities to a significant extent (Table 3b). In the capital of the Malopolskie voivodeship, elderly and disabled people most often travel using city transport, and as many as 54% of those surveyed indicated the tram, and 31% the bus, as the most frequently used means of transport. Meanwhile, the Oswiecim urban unit is characterized by a different structure, with 66% of those surveyed travelling most often by foot, and only 17% using public transport (Table 3c). However, it is worth noting that this disproportion is the result of, above all, the expansiveness of the cities, and thus the distance to destination points. Commercial and services buildings, visits to acquaintances were the most frequently indicated reasons for travel in Oswiecim, whereas in Cracow, those surveyed emphasized that they were taking care of diverse affairs, i.e. matters at local government offices, healthcare points as well as shopping and entertainment. Detailed results

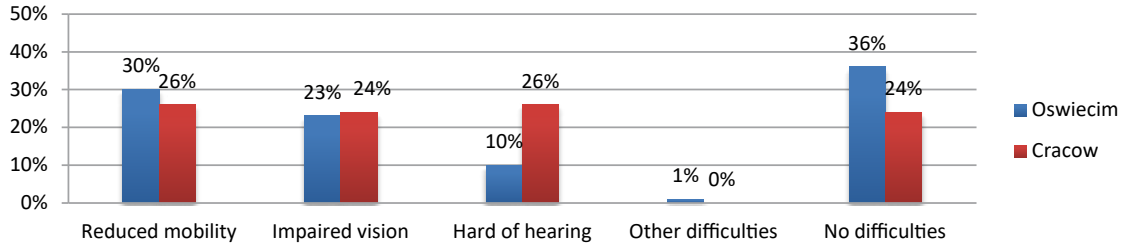
concerning the age structure, type of impairment, and motivations of those surveyed as well as the division of transportation tasks are presented in the table below (Table 3d).

Table 3. Comparison of obtained results of survey studies with regard to age structure, type of impairment, division of transportation tasks, and motivations for travel in Oswiecim and Cracow

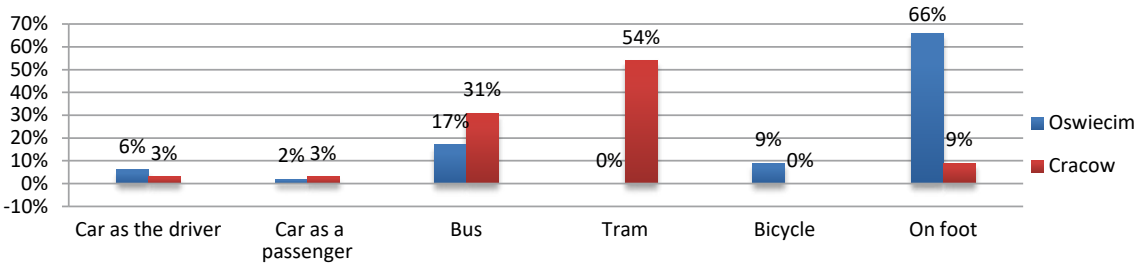
a) Age structure



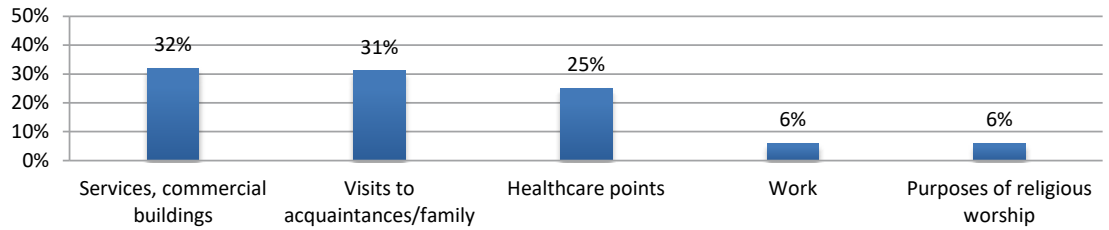
b) Difficulties – type of impairment



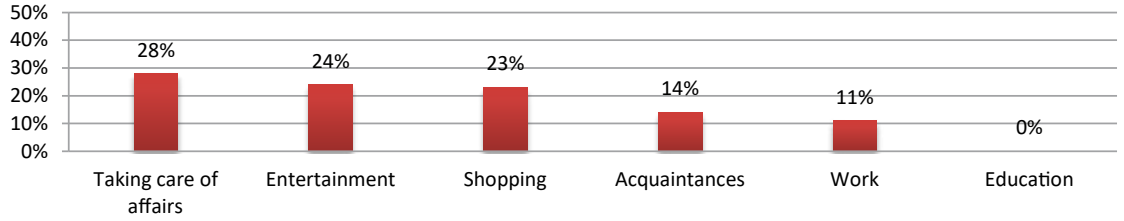
c) Division of transportation tasks



d) Motivations for travel: Oswiecim



Cracow

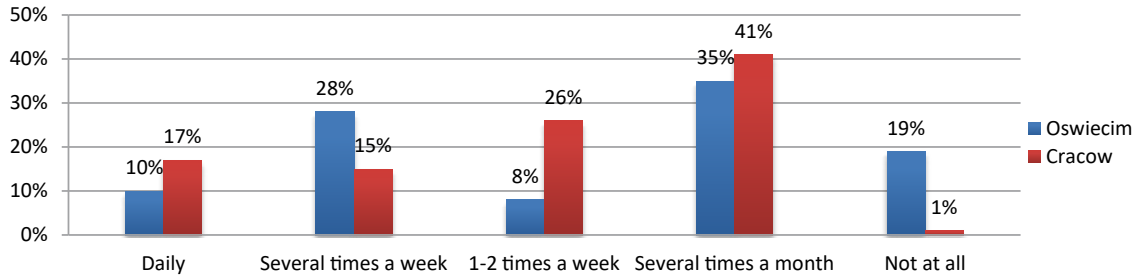


Source: own material based on [Figura 2018, Maderak 2017]

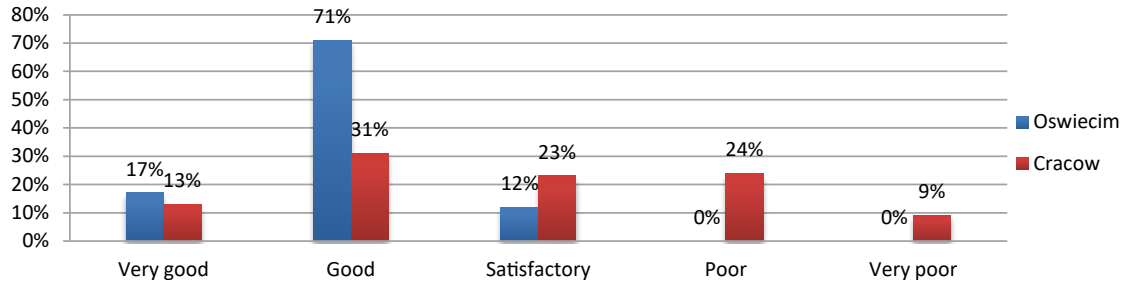
Moreover, conducted survey studies indicate that the largest group of elderly and disabled people use public transport services several times a month (35% Oswiecim, 41% Cracow) (Table 4a). City transport in Oswiecim was assessed at a good level, but only 17% of those surveyed state that the system fully satisfies their needs (Table 4b). In Cracow however, over half of the respondents assessed the public transport system at a satisfactory, poor or even very poor level (Table 4b). Another key aspect of the conducted studies was determining the apprehensions of elderly and disabled people during travel by means of public transport. In Oswiecim, approx. 60% of those surveyed do not declare any apprehensions related to use of city transport services. Whereas in Cracow, the majority of respondents have apprehensions about their security during daily travel, difficulty finding a free seat in the vehicle, getting in/out of the vehicle, buying a ticket and swapping to another vehicle (Table 4c).

Table 4. Comparison of obtained results of survey studies with regard to the frequency of using public transport, assessment of public transport, and factors inducing apprehension in Oswiecim and Cracow

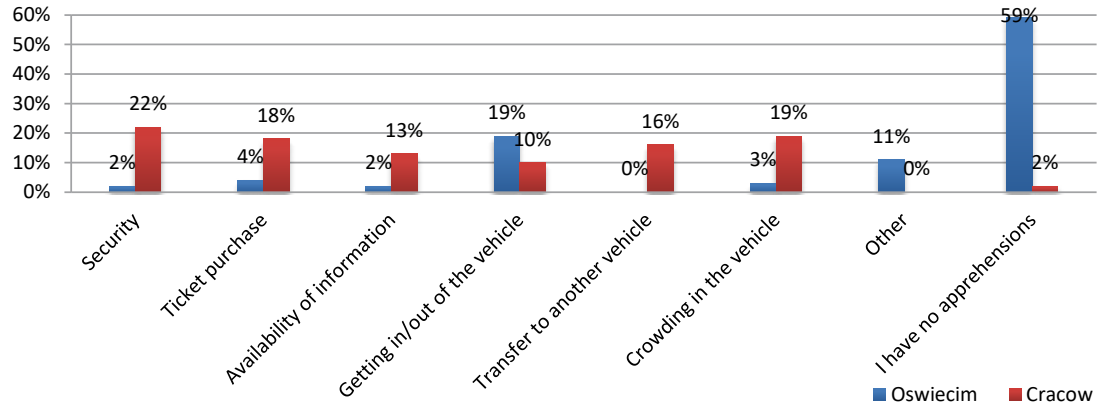
a) Frequency of using public transport



b) Assessment of public transport



c) Factors inducing apprehension in those surveyed



Source: own material based on [Figura 2018, Maderak 2017]

The results of survey studies show that elderly and disabled people who are residents of Oswiecim and Cracow are individuals who exhibit high mobility and eagerly travel both on foot and using city transport. Generally speaking, the target group has a good assessment of the public transport system, but at the same time, perceives elements that require partial or total modernization. To sum up, the most significant difficulties encountered in both cities are the high-floor vehicle fleet, which forces elderly people to exert greater physical effort when getting in or out of the vehicle, and crowding in buses, which leads to an insufficient number of seats for people with limited mobility. In addition, respondents reported their remarks concerning hard-to-read line schedules and the absence of voice messages, which is the case in the Oswiecim fleet of vehicles.

Proposals for changes improving travel via public transport for elderly and disabled people in cities

Analysis of the Oswiecim and Cracow transport systems based on survey studies conducted among elderly and disabled people demonstrated the existence of a number of facilitations as well as a series of elements limiting, rendering difficult or disabling the free movement of elderly and disabled people in the city. Because of this, there is a need for changes to be introduced and transformative measures to be taken to modernize the current public transport system. This subject matter pertains to both larger cities, where the city transport system is highly developed, and smaller urban units, which are characterized by a lower level of development of public transport and a more narrow territorial reach of rendered transport services. So what changes are recommended, what should be done to better adapt the transport system to the needs of elderly and disabled people?

Vehicle fleet

City transport vehicles play a key role in shaping available collective transportation, and in relation to this, it is recommended to take measures facilitating embarking/disembarking vehicles for people with limited mobility by adapting the floor of a given means of transport to the level of the stop platform and by introducing a low-floor vehicle fleet. Vehicles adapted to the needs of disabled people should be designated by the international pictogram of a person on a wheelchair, situated on the left or right side on the front of the vehicle and near the main door. Another significant element of the equipment of the city transport vehicle fleet, which should account for the needs of elderly and disabled people, are doors (fig. 1). Vehicles should be equipped with doors of a width above 90 cm, so that a wheelchair user can freely manoeuvre when entering and exiting, and an elderly person with a cane can enter the vehicle freely. Inside vehicles, there should be a specially designated space for a wheelchair user close to the door (fig. 2). An important part of this space is proper marking with a pictogram illustrating the proper wheelchair position as well as handrails, a safety belt and button calling for assistance (fig. 3). In addition, separate seats for people with limited mobility should be separated near the door. Handrails and grips distinguished by a contrasting colour are a significant part of vehicles' equipment. It is important that they do not have any sharp edges and are not made from hard material. Moreover, vehicles should be equipped with buttons informing the driver that a disabled person is getting on or off, on both the inside and outside of the vehicle [Figura 2018].

From the perspective of passenger information, it is recommended for vehicles to be equipped with voice messages informing users of public transport of the name of the current and next stop as well as possibilities for changing the means of transport. It is recommended for messages of this type to also be used in emergencies (failure, change of transport routes, etc.). In such a case, it is proposed for them to be preceded by a special sound signal, preparing passengers for the voice message. Collective transportation vehicles are to be equipped with external sound notices emitting messages about the line number and direction of travel or name of the final stop. Measures of this type substantially improve travel comfort for people with impaired vision and blind people who are waiting for a vehicle.

Another proposed measure is to augment visual information, and so, to introduce additional boards illustrating the entire route of a transport line, with clear indication of the stops and streets on the route. It is proposed to replace traditional information boards with boards in the form of a bead diagram displayed on LCD

panels, which has a GPS connection, indicating the geographic position of the vehicle, the part of the route already travelled, and the number of stops until the end of the line.

Fig. 1. Bus door equipped with visible pictograms

Source: [Maderak 2017]

Fig. 2. Examples of spaces intended for wheelchair users in city transport vehicles

Source: [Maderak 2017]

Fig. 3. Safety belts for people on wheelchairs

Source: [Maderak 2017]

It is also worth paying attention to ticket vending machines, which are unfriendly to elderly people in many cities. The font size is too small and unclear, making the information displayed hard to read. In addition, the placement of ticket vending machines in vehicles causes the person operating them to stand in the middle of the corridor and be jostled by other passengers. All of these factors discourage elderly people from using ticket vending machines; furthermore, the target group is very often unable to operate them. In relation to this, it is important to organize special training for elderly people related to the operation of ticket vending machines.

Transport stops and transfer nodes

Stops and transfer nodes are sites of intensified traffic due to the constant stream of passengers getting on/off public transport vehicles, and where changes of the means of transport take place. Shaping these locations in a way that accounts for the needs of all users poses a great challenge to planners and engineers. Such places must be equipped with the appropriately shaped ramps, elevators or escalators in the case of large elevation differences. The choice of solution is also conditioned by the availability of free land. In the case of small elevation differences, ramps are applied, which should be equipped with handrails, while in the case of significant elevation differences, elevators or platform lifts are applied. It is important to situate the control panel for operating such equipment in their vicinity, with tactile buttons designated using the Braille alphabet as a facility for blind people or people with impaired vision, situated at a height accessible to a wheelchair user [Maderak 2017].

In Poland, the high-floor vehicle fleet is systematically being replaced with low-floor vehicles, and because of this, the side mirrors of buses/trams are lower, which may lead to a person waiting at a public transport stop to be hit by them. Consequently, it is recommended to clearly designate the clearance outline, or the space that is safe for passengers on the stop platform, by means of so-called tactile indicators, which are pavement panels with a contrasting colour scheme (fig. 4). This type of solution will be a facility for people with impaired vision as well as for other users of public transport.

The passenger information system plays a key role in point (stop, station, node) infrastructure, and in relation to this, it should be equipped with the appropriate visual and sound messages. In and around transfer nodes, it is recommended for as much information as possible to be conveyed in the form of pictograms situated in visible locations at the height of a passerby's line of sight. Moreover, besides pictograms, boards with directions indicating access to key locations within the node should be applied. It is important to situate detailed information at forks and intersections of roads – where a decision must be made about the direction of further movement. In addition, boards with directions are to be placed along the most commonly used pedestrian routes, also indicating the name of the buildings to which traffic is being directed (fig. 5).

Moreover, it is important to provide clear information near public transport stops. It is recommended to place boards with the name of the stop on: the front and sides of the stop canopy, as well as boards with transport lines stopping at the stop on the side walls. It is recommended for such boards to be made using black letters on a white background, making them clear and easy to read. It is proposed to equip transport stops with electronic boards with a button in the Braille language initiating a voice message for blind people, which

will display the time of departure, potential difficulties and delays, adapting the illuminating power of the display to current weather conditions. In addition, it is important for all stops to be equipped with an informational "display case", intended to house easy-to-read line schedules with the appropriate font size as well as a diagram of the transport network. It is proposed to separate free space for wheelchair users and reinforce its presence with an additional horizontal marking at stops characterized by the largest passenger streams in the city, with the remaining stops being the next priority for implementation of this measure. This type of space should be located directly under the informational "display case", which will also allow a wheelchair user or person with impaired vision to get as close as possible to the line schedule. Accenting the presence of such a space with the appropriate pictogram will allow for improvement of "communication" between the disabled person and vehicle driver. A person who requires assistance when getting into a vehicle will be obliged to wait for the bus in this space, thanks to which the vehicle's driver will be aware of the need to provide assistance when approaching the stop, also allowing them to position the vehicle properly in order to minimize the distance between the sidewalk curb and the bus.

Fig. 4. Pavement panels with yellow tactile indicators at a tram stop in Cracow: Mogilskie roundabout

Source: [Maderak 2017]

Fig. 5. Pictograms and boards with directions in a transfer node

Source: [CZMUDA Groups Sp. z o.o. 2017]

Pedestrian routes (pavement and small architecture)

The needs of elderly and disabled people should also be accounted for when designing and managing pedestrian routes, ensuring a space of the appropriate width that is free from obstacles. According to directive [Obwieszczenie Ministra Infrastruktury i Budownictwa z dnia 23 grudnia 2015], a person without any limitations of mobility occupies a width of only 0.75 m. In relation to this, at the design stage, one must keep in mind that people of varying age and different impairments and limitations will be users of this space, requiring much more space for movement in comparison to people without impairments. Ensuring the appropriate width of traffic routes is only one method of improving the comfort of travel for the target group. An additional solution that is proposed is to introduce TGSIs (Tactile Ground Surface Indicators) in cities – a texture system on pedestrian routes having the main goal of directing a person with impaired vision through an obstacle-free route connecting key areas in the urban space. This system would connect pedestrian crossings, transport stops, kiosks where public transport tickets are often purchased, as well as characteristic points in city squares. A solution of this type is analogous to the designation of obstacle-free routes in a railway station. The system will consist of warning, directional and attention textures (fig. 6), perceptible under the foot of a pedestrian, cane of a blind person, and visually due to their contrasting colour.

Another proposed measure is to introduce so-called "rest stops" near pedestrian crossings or long pedestrian routes. These will allow elderly people and people with limited mobility to rest for a while before continuing their journey. In the city centre, it is recommended for such rest stops to be situated at intervals of approx. 50 m along the routes with the heaviest pedestrian traffic (fig. 7).

Another measure that improves the comfort of travel is to provide separate benches for disabled people, designated by the appropriate pictogram, on both sides of every railway platform in the city. These benches

will be intended for people with limited mobility (fig. 8). A solution of this type will allow railway personnel to efficiently determine whether any traveller requires assistance with getting on the train, even if no prior notice has been given via telephone [Figura 2018, Obwieszczenie Ministra Infrastruktury i Budownictwa z dnia 23 grudnia 2015].

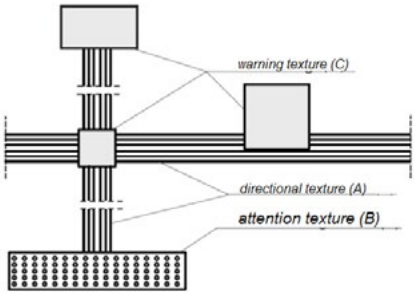


Fig. 6. Elements of the texture system on pedestrian routes
Source: [Wysocki 2013]

Fig. 7. City rest stops
Source: [UM Gdynia, 2017]

Fig. 8. Benches intended for disabled people (SKM Gdansk)
Source: [Ciszewska-Kulwińska 2016]

Furthermore, additional measures improving travel around the city for elderly and disabled people are:

- Adapting the websites of the organizers of collective transportation to the needs of hard-of-hearing people and people with impaired vision
- Creating an application – travel without barriers – which provides information on available city transport and rail transport connections accounting for the user's individual needs, operating according to the example of the VBB program, which searches for connections in Berlin and Brandenburg.

Summary

The examples of Oswiecim and Cracow show that elderly and disabled people encounter various barriers and difficulties in day-to-day travel. The absence of ramps, chaotic placement of small architecture on pedestrian routes, high-floor buses, the absence of devices assisting a wheelchair user in embarking/disembarking city transport vehicles are just some of them. One must be conscious of the fact that the available transport system is transportation for everyone, for a fifteen-year-old boy, a thirty-year-old pregnant woman, a fifty-year-old man with impaired vision and a sixty-year-old woman on a wheelchair, and if it is designed with the needs of the most demanding users in mind, the comfort and satisfaction of other users of the public transport system will also be improved, substantially raising the quality of public transport services in users' eyes. The key is to be aware of the problem posed by transportation barriers and then to take measures contributing to their elimination. The final effect of these measures will be to the satisfaction of all residents; and satisfied residents are a hallmark of a well-functioning city as well as a stimulus for undertaking further development actions.

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Stone wood and metal in the memorial sculpture of Ukrainian historical cemeteries of the Polish-Ukrainian borderlands

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Abstract: The memorial sculpture of Ukrainian historical cemeteries of the Polish-Ukrainian borderlands was analyzed. The existing state of objects is characterized. Use and preservation of materials – stone wood and metal – from which the typical models of the memorial imagery are executed was investigated. Special attention is paid to the discovery and research of unique samples of the memorial plastics made of different materials which were discovered during field works.

Keywords: historic cemetery Polish-Ukrainian borderlands, memorial sculpture, monument, stone, wood, metal.

Introduction

Memorial imagery ia a significant element of the material cultural heritage of the borderlands. This includes roadside crosses and figures, small architectural forms. But the most striking objects are architectural ensembles of historical cemeteries – Catholic, Greek Catholic, Protestant, and Jewish. The history has developed in such a way that it was Ukrainian cemeteries on the borderlands that remained inconsumable deprived of care, lost in the forests because they lacked real owners. However, they are witnesses of history and museums – open-air lapidary.

Many researchers of both Ukrainian and Polrnd were interested in the memorial imagery of the borderland. In particular, the Museum of Crests in Lubachiv has published a book devoted to Brusno masonry, the lion's share of which is the memorial imagery [1]. The materials of our field studies of the borderlands cemeteries were published in newsletters and collections of scientific works of the Lviv Polytechnic National University [2, 3]. In 2012, a book by Tomasz Cervinski dedicated to chapels and roadside crosses in Poland was published in Warsaw. The book explores the symbolism, assembles a huge factual and illustrative base from all over Poland, and the objects themselves are divided and analyzed by materials. [4]. Extremely interesting and valuable work of Polish researchers is dedicated to the inventory of Lemko cemeteries. [6] – rich and detailed photo fixation, a brief historical background, dimensional drawings. Another rich source of information about the Ukrainian historical cemeteries of the border is Internet resources, in particular Apokriff Russky [7].

The material of the study

The Brusno stone-masonry school froms most of the memorial imagery of the borderland on the territory from Krakow to Lviv. This is one of the most striking cultural phenomena of the Polish-Ukrainian borderland, which is the heritage of many generations of folk masters of stone masons from villages in the vicinity of the main stone-masonry centre in Old Brusno, Lyubacheeve region. In addition to stone such materials as wood and

metal also form the memorial imagery of the borderland. Namely the cemeteries are the studying polygons of the memorial imagery. The cemeteries are very different – in size (that is, in area), in saturation (the number of monuments – from several dozens to several hundreds), in quality (how interesting and various monuments are present at a particular cemetery) and, finally, on natural factors (what vegetation, presence or absence of water, etc.). In this case, when we are talking about quantity or quality, we are talking about the assessment on the day of today, that is, we are oriented only on the preserved monuments. The last factor, that is natural, directly affects the preservation of the physical substance of the tomb memorials.

Historical cemeteries of the borderland are filled with monuments executed mainly of stone, namely, limestone. The oldest form of the tombstone is a simple cross. First, just a pure cross, without the inscriptions or drawings, and later with cut inscriptions, dates or solar signs. Such a cross was mounted on the base of an incorrect, irregular shape, similar to a stone simply pulled out of the river, somewhat hemmed with water. These ancient crosses are usually very well preserved. They are executed though from a porous but strong stone. And already in these first crosses a technical model was laid – a method of mounting tombstones. This is a way of a peculiar designer «lock» – a «nest», without any glue, solution or sealant. Over time, the number of elements of the composition increased, but the method remained the same. The most common type of monument is the cross with the figure of the crucified Jesus Christ on a simple square in the plan-base and a cross with the figure of the crucified Jesus Christ and coming sometimes on a complicated, well-developed basis with a high base and a pillar. In this case, the composition consists of three parts. There is the most of such monuments, they can be found at every cemetery. Sometimes, but very rarely, there are figures. The most popular motive is the Mother of God. Sometimes with a child Jesus on her hands. Much less often is a male figure like Jesus Christ, Nicholas, or the image of an angel.

The state of preservation of the physical substance of stone depends primarily on the quality of the stone itself. It happens that if the stone is of poor quality then it can slip like a French dough. Unfortunately, such a state of stone is practically not subject to renovation or restoration. The next factor that greatly affects on the preservation and strength of the stone is a natural factor. It is he who decides how much the stone is covered with moss, fungi and other biological pests, that is, how quickly the stone will be destroyed. Here, we can count the roots of trees, which is very relevant in the case of a cemetery found in the forest and which is unused. The last factor, but no less harmful is human activity. The drawing of a stone is a complicated and ambiguous procedure. Very often we see that it is precisely this kind of activity that causes the destruction, scattering of stone. Various materials lead to such consequences – this is a thick layer of lime, oil paint, various chemical and synthetic paints, such as gilding, varnishes, and the like. Drawing a stone monument is decided by a specialist-restorer in each particular case – whether it is possible and necessarily. Cleaning or gluing with incorrect materials leads to similar negative consequences.

For today, the state of preservation of the physical substance of the stone can be considered satisfactory. So there are a number of problems with biopsies and unprofessional ordering of objects, but in the general stone is strong, well-worked and set, inscriptions and decorative elements are expressive and readable.

Sometimes in some cemeteries you can see the remains of wooden crosses and other wooden structures – it's mostly a variety of fences and railings. There are no wooden objects at all in many cemeteries, such as New and Old Brusno, Goraytsy, Zhukov, Lyubichi Korolevska and Kameralna, Prince, Podemshiny. Perhaps the tree served as an element of the fence of the cemetery itself, as some objects preserved stone fences with characteristic nests in which pledged wooden elements were mounted. But such designs are not preserved.

On the other hand, some wooden crosses can be found in the territory of some cemeteries, for example in villages or in former villages of Tsityl (Fig. 1), Dobra (Fig. 2), Dubrovitsa, Chervona Volya. Such crosses are usually very simple. These, so-called Latin crosses are made of plains, square in the section of boards. Sometimes a cross-section of the cross contained a small wooden or metal plate for the inscription. Still, more often than not, this is simply a cross without any decor, ornaments and the inability to identify who is buried there.

The cemetery in the former village of Sukha Wola, which we researched during one of the expeditions, turned my view of wooden crosses. There are not so many in the cemetery. Some still firmly stand, some have already bent (Fig. 3). During the cleaning of the cemetery, we occasionally stumbled upon the remains of wooden crosses, which clearly indicated that such crosses were much larger, but they simply did not physically survive until our time. So the crosses that were located at the beginning of the cemetery were Latin, traditionally quite simple in shape, made of plains, square in the section of boards.

Fig. 1. Wooden crosses at the cemetery in the village. Citation

Fig. 2. Wooden crosses at the cemetery in the village. Good

The raams of the crosses ended with decorative bullets, and the bodies were covered with inscriptions. These inscriptions are engraved on a tree and are arranged in different ways – along, across, diagonally. The font of the inscriptions is correct and professional, and the work is executed skillfully. Some crosses have niches made of rectangular, circular or oval shapes, possibly for insertion of a photo, or maybe icons.

Fig. 3. Wooden crosses at the cemetery in the former village Sukha Volya

But the greatest impression was made by the great but very destroyed wooden cross that lay on the ground and was hidden between the grass, the leaves and branches were falling off. In form, this cross is an exact copy of a traditional stone cross on a complex built-up basis with a high base and a pillar of a stone. Not enough just crucifixion. The construction of the pillar carries a classic architectural character – it is completed with a traditionally profiled cornice crowned crown with teeth. In this case, these teeth are semi-circular. The teeth may be sharper or smoother, they may be different amounts depending on the size of the object. On the front side of the pillar practically for all its width niche with arch completion is carved. Such niches, at least in stone monuments, were intended for inscriptions. But in this case the tree is very destroyed. The lower part of this cross is very destroyed and partially lost so it is impossible to understand how and where it was installed and how it was attached to the base. (4)

Fig. 4. Cross at the cemetery in the former village Sukha Volya

For comparison, here are two stone tombstones with the same compositional structure and construction, as in a wooden cross from former village Sukha Volya (рис. 5,6). There are much more of such examples, and several can be found on the each cemetery. The given examples are different in proportions, there is a richer and more modest profile of cornices, a different form of completion of a niche on the front side of the pillar. The cross that crouches the composition once is a crucifix, and once without. That is, there is always a place for creativity for the author of the art work, but composite models are preserved.

And the technological aspect of building these monuments deserves attention. Stone monuments were always executed from several parts and these parts were mounted one to another without glue. A vertical cross made from one piece of wood. Even if a piece of wood is not one, then the integrity is mounted firmly and is perceived as one continuous fragment. The transverse plate is mounted, that is, the arms of the cross. They are executed from another piece of wood. In this part the master does not try to create the impression of integrity, but all the details are still mounted tightly. While parts of the stone monument are easily disassembled and collected together.

Another material that can be found on some of the cemeteries is metal. It can be forged metal as a grille or fence. This can also be cast iron casting. In the Local Lore museum in Lubachiv they claimed that that on these lands there was a widely developed blacksmithing. However, we never meet the crosses of blacksmithing work at the cemetery of borderlands On some cemeteries you can find samples of cast-iron cast crosses. The cast iron cross is mounted on a stone base of various sizes and shapes. Such cast products were distributed in eastern Europe from the second half of the 19th century till the thirties of the 20th century. [7]. Cast-crosses were a mass production that grew rapidly. Particularly widespread such products were in metallurgical areas where the cemeteries can be seen just like a castle cross forest. There were catalogs of cast-iron products, in particular, tomb crosses [8]. Cast iron casting was quite diverse, rich in ornamentation and dynamic (it allowed the use of the same parts in different compositions). Cast iron casting listened to the customers' tastes. End of 19 – the beginning of the 20th century. it was a time of neo – styles and the most popular were Gothic, Renaissance and Baroque motifs.

Fig. 5. Cross at the cemetery in the village Oleshucia

Fig. 6. Cross at the cemetery in the former village Sukha Volya

There are not many cast iron crosses in the cemeteries of the Ukrainian-Polish borderlands. For example, in the cemeteries in Novyi and Old Brusno, Goraitsy, there is not a single metal cross, in Sukhya Volya one, in Zhukov two. Other Ukrainian cemeteries of borderlands.have a similar situation. Cast iron crosses we we met were, as a rule, with baroque motifs. Concerning preservation – it is different and depends primarily on the quality of the metal itself and the casting. There are cases when metal is in excellent condition, it happens when the metal is very rusty and destroys the stone with which it coexists. There are cases when the metal is brittle and easily broken. During the studies of the borderland cemeteries, we often encountered fractures of cast iron crosses, perhaps even more often than the surviving objects. And we have never met cases of the repairing or restoration of cast-iron objects (for example, gluing, welding, etc.).

As has already been said about serial production – tombstones are ordered by catalog. The same crosses can be seen at the cemetery in Prague, Krakow, Lviv, Przemysl or Lubachiv, as well as in the cemetery of the non-existent already village in Lemkiv mountains. This is the motive of the cross with the crucifixion and the coming with Baroque motives. In this Lemkiv village in the mountains, they made something unique and special. An exact copy of a cast-iron cast cross with baroque motifs – with figures of upcoming, angels – was cut from a stone. The composition, the posture and movement of the figures, the folds of clothing – is identical Make such a thing is not very easy. The author of this monument is unknown, but it was to be a skilful and professional sculptor. The monument is located in Volosate, a former Lemko village, and now the official settlement of the Beskydy National Park in Poland.

Fig. 7. Cross at the cemetery in the village Drohojiw

Fig. 8. Cross at the cemetery in the village Volosate

General conclusions

Wood stone and metal on the Ukrainian historical cemeteries of the polish-ukrainian borderlands exist in parallel. Because of the physical properties of the material (the wood is destroyed the fastest, the metal serves longer and the most stable is the stone). Wooden monuments have survived very little and they are dated 30 years of the twentieth century. The metal also remained a bit, but the older objects are of better quality and preserved better than the later. The stone was and remained in the dominant position on the cemetery. There are no examples when the wood and a stone were used together in one tombstone. Instead, metal has always been combined with stone.

The nature of the material dictates the style of the product made in this material, his artistic techniques and features. Two unique examples are presented when trying to make a copy of another material in one material.

The first is when wooden monument repeat stylistically, and actually copy the stone model. I do not think that such a monument was truly unique, but at the moment it is the only surviving example that we have been able to find. Moreover, the wood collapses just before the eyes – it breaks down, drain down, rubbing, and requires conservation and preservation. The second is when stone monuments repeat stylistically, and actually copying the cast iron model. I do not know if such a monument was truly unique, but at the moment it is the only surviving example that we have been able to find. The stone is in good condition, it does not threaten the rapid destruction.

Both examples are unique, at least because they are the only surviving examples. They are part of the history. And such examples deserve not only fixation, but also restoration and preservation. The traditional stone carving of the Brusno stone-masonry school is evidence of the uniqueness and features of the region where it was born. Cast iron crosses of ukrainian historical cemeteries of the polish-ukrainian borderlands is evidence that Europe was united already in the 19th century. Experiments with traditions and materials – wood, stone and metal – testify to the fact that we are constantly moving, changing, looking forward and building something new.

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Evaluation of the protection status of masonry crowns and proposals for their repairs – the castle in Janowiec on the Vistula

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Abstract: The article deals with issues related to the conservational protection of objects in the historical ruin. The article discusses the technical condition of existing protections, their impact on the historical matter and a method for repairing damaged wall crowns.

Keywords: castle, ruin, Janowiec, crowns of walls, protection of crowns.

Introduction

One of the basic features of objects in the form of a permanent ruin is a very large number of free-standing masonry walls. This number consists of historically free-standing walls (mainly defensive curtain walls) and the walls of the original buildings. Definitely the biggest problem is the second group of walls, which do not have a finial, which protects against the influence of atmospheric factors. In these structures without protective elements: roof, flashing, insulation, destructive processes are much faster and their negative effects are much larger than in other types of walls.

This article is devoted to the issue of the state of protection of masonry crowns developed as a part of works related to conservation and restoration in the castle in Janowiec on the Vistula. Work carried out in the 1976–1994 led to the construction protection and conservation of the walls of the majority of the castle. One of the last steps was to secure historical and secondary wall crowns using different technologies and materials.

Due to the deteriorating condition of the walls' crowns, in 2017, research and evaluation of the technical condition of the higher parts of the walls and elements protecting them was carried out. Due to the significant degradation of the above-mentioned elements, a number of solutions have been proposed to secure free-standing walls at the castle in Janowiec on the Vistula.

Types of protection of masonry crowns with assessment of technical condition

The protection works of masonry crowns are usually connected with partial or complete reconstruction of the wall. Depending on the assumptions of the conservation program, the method of securing the crown is chosen. Individual types of security features are characterized by different durability, readability, and reversibility of their use. Solutions aimed at protecting the crown against the influence of destructive factors depend on: the type of the wall – the form in which it survived to the present times, the type of construction and materials

in which it was erected, condition, architectural concept for the whole building, and the conservation works conception. Methods of securing the wall's crowns can be divided into two groups.

The first involves the creation of a new additional layer on the historical wall. In principle, it is a layer that can be destroyed and when destroyed, it will be periodically rebuild. This group includes: rebuilding of part of the walls, bricklaying, protection of the crown with mortar or concrete, and the technical-green method.

The second group are methods which aim is to cover and protect the historical matter against rainwater. This type of solution may be temporary or permanent. The second group includes: roofs, protection of the crown with steel sheets and chemical coatings.

In all cases, earlier repair of a degraded historical wall is required to a greater or lesser extent. The methods applied on the walls of the castle in Janowiec on the Vistula are described below.

Bricklaying

Bricklaying is the basic and most frequently used conservation treatment aimed at protecting the historic matter of the wall. It consists in completing defective or damaged fragments of the upper part of the wall, with the appropriate shaping of the upper surface. Bricklaying does not stop the processes of a crown destruction but transfers destructive actions to the material of the superstructure intended for periodical replacement. The correct selection of masonry materials and mortars is important to extend the lifetime of the security. The materials used must not adversely affect the historical fragments. The superstructure is made using native or foreign materials. In the case of native materials, over time the problem of distinction of additions may occur. When performing superstructures with foreign materials, the distinctive protection of the crown looks not natural and the artificiality of such a solution can be felt. An important advantage of superstructure is the ability to shape the crown line freely. This allows to obtain a shape, which is compatible with the historical state. Superstructure can be made with the introduction of the insulation layer.

The superstructures of the walls' crowns of the Janowiec castle was made mostly with the use of quartzite stone (foreign material on a strong cement mortar). In the case of all crowns, the insulation layer was not introduced in contact with the historic wall or the wall made of limestone rock.

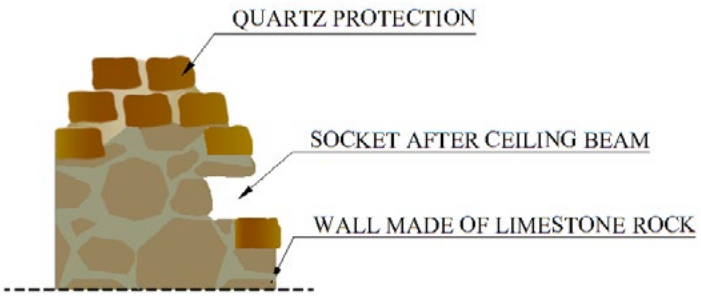

Fig. 1. Cross-section of the protection described

Fig. 2. Photo 1 Bricklaying the crown of the wall with a quartzite stone

Fig. 3. Photo 2 Bricklaying the crown of the wall with a quartzite stone

The technical condition of the quartzite superstructures is in most cases good or sufficient. There are minor damages, loosening of the quartzite material from the joints, and surface paralysis with the biological corrosion.

In insufficient condition there is a wall made of limestone rock directly under the quartzite superstructure. At the interface there was a strong degradation of the limestone wall. It was found that there were numerous large surface losses of masonry facing layers, losses of individual stone blows, defects and corrosion of joints. Degradation of the wall under the quartzite protection is related to the lack of any insulation at the interface of the layers. Over time, the quartzite superstructures lost their tightness and rainwater penetrates at the interface of quartzite and mortar into the interior of the limestone rock wall. In addition, the lack of drips allows penetration of water flowing down the quartzite superstructures.

An important problem is also the poor technical condition of the superstructures with quartzite for wall faults in the places of wooden ceilings (not existing at present). These superstructures, usually made of one layer of quartzite stone, are locally defective and detached from the face of the wall. Intense damage occurred mainly in the sockets on the ceiling beams.

Shaping the crown of the wall

The protection consists in making an additional layer, the purpose of which is to give a slope allowing the rain water to drain away from the wall surface. Various types of solutions are used, using mortars, concretes, and using native or secondary materials. In each case, the protected wall must be prepared in advance for the finishing layer (reinforced, standardized or aligned). The crowns are secured by profiling slopes of various shapes that allow water to be drained in one direction (one-side) or on both sides (gable or spineless). The assumption is that the slope layer should have tightness as high as possible so that rainwater can not penetrate into the protective layer and penetrate into the historical layers in case of absence of the insulation. In the case of low walls this method can be perceived as not very aesthetic.

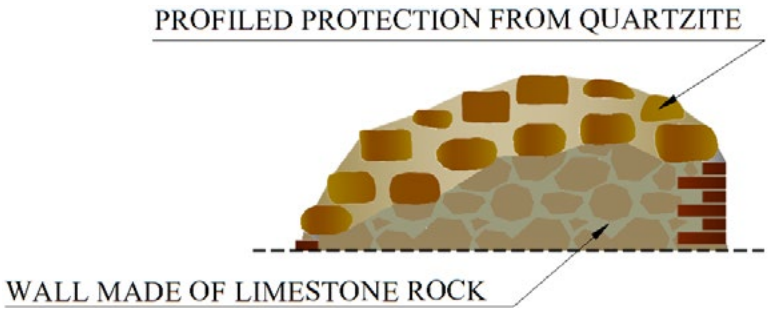

Fig. 4. Figure 2 Cross-section of the protection described

Fig. 5. Photo 3 Shaping the crown of the wall

The crown made of quartzite is in good technical condition. As a part of the inspection, longitudinal fractures of the crown were noticed (several meters long), which were most likely caused by the performance and deformations of the masonry structure. In the poor technical condition, as in the case of the superstructures of the original structures, significant damage was found at the interface between the crown profiled and the limestone rock wall.

Protection with ceramic materials

The protection is usually made of small-size elements, ceramic tiles, or glazed tiles on the mortar layer laid on the crown. This type of protection is of permanent character and is most often made in the case of the wall crowns of relatively small width at high altitudes. Due to the materials used, it is a solution with a very high

durability. This solution was applied on a significant part of the walls of the east wing of the castle in Janowiec and partly on the south wing.

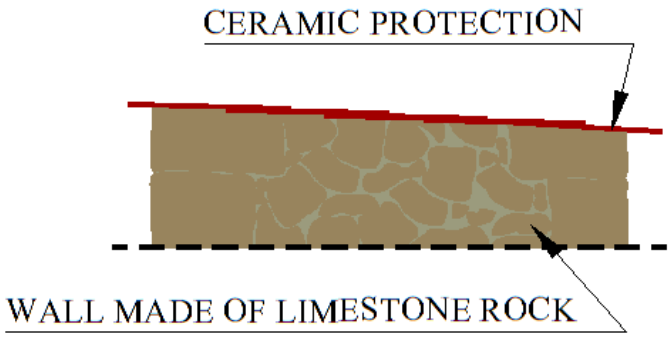

Fig. 6. Figure 3 Cross-section of the protection described

Fig. 7. Photo 4 Shaping the crown of the wall

The walls protected with ceramic tiles remain in a much better condition compared to other types of protections. The roof tiles beyond the face of the wall lead rainwater to the outside of the castle. No significant damage to the face was found directly under the roof. The condition of ceramic tiles is good. Only point damage to the security material was found.

Roofing

They are a little aesthetic, but permanent and reversible solution protecting the wall crowns from atmospheric precipitation. The most often canopies are made as temporary covering especially damaged or degraded fragments of walls and as permanent structures over pedestrian routes enabling visiting the crowns of the walls. In the case of temporary solutions, freedom is noticeable in the use of materials and constructional solutions. Permanent roofs in their form and material can be historicizing or completely contemporary. They are made directly on the crown or on supporting structures without permanently binding the material to the historical matter. As the covering material in roofs, metal sheets, laminates, wooden shingles, ceramic roof tiles, roofing paper are used.

In the case of the castle in Janowiec, a very large variety of applied technological and material solutions was found. The roofs of a wooden structure with roofing paper, corrugated board, and galvanized steel sheet are visble.

Fig. 8. Photo 5 Cross-section of the protection described

Fig. 9. Photo 6 Shaping the crown of the wall

The technical condition of the protection system is varied. Elements protected by steel sheets are in good condition in most cases. The extended metal sheets protects the face of the elements being shielded. No significant damage was found to the coating itself. The problem is not the great aesthetics of this type of protection and the color diversity of plates used in the Janowiec castle. Wooden canopies occurring primarily in the southern part and they are in a bad technical condition. Both wooden constructions and cover are damaged. The occurrence of newly erected protection structures has also been found.

Proposal to repair masonry crowns

Due to the technological and economic aspect of all methods used to secure the crowns of the walls, the methods of protection were chosen: by superstructure and roofing (by a lead sheet or ceramic molders). An advantage of the methods proposed is the possibility of re-using some of the materials that will come from the demolition works of existing protections. The proposed solutions together with the technology of their implementation are described below.

In all cases, due to the poor technical condition of the historic and secondary walls under protections, there is a need to carry out repair works consisting of bricklaying, injections, and other structural reinforcements.

Protection of the quartzite superstructure with an insulation layer

The technology of performing the protection of the quartzite superstructure with the insulation layer:

1. Removal of the existing protection layer of the wall's crown – in the case of demolition of the quartz stone protection, works should be carried out carefully so as not to damage the stone. The stone coming from demolition works can be used as a material for re-securing the crowns. The demolition stone must be protected from weathering during storage.
2. Visual assessment of the technical condition of the wall below the protection – a detailed inspection of the technical condition of the masonry structure is possible only after removing its surface layer. At the design stage, the designers were not able to make such an assessment. The inspection should be carried out by an experienced person with appropriate qualifications: designer or work supervisor. If the technical condition of the wall during the visual assessment is doubtful, it is necessary to perform a detailed expert assessment of the technical condition of the wall in a given place.
3. Preparation of the wall for the protection planned – after a visual assessment, a decision should be made regarding the works related to the construction of the wall under the superstructure.
4. Leveling the substrate for the insulation – due to the necessity of laying the insulation on flat surfaces and sharp edges of wall elements that can damage the insulation, it is recommended to create a leveling layer. The thickness of the leveling layer will depend on the shape and structure of the wall and the assumed slope. To level the surface for the insulation, it is recommended to use the trass mortar.
5. Laying the insulation layer – due to the need to create a waterproof membrane, it is recommended to perform the membrane from the roll materials. The flexibility of these materials allows to adapt to the shapes of the wall's crown. Joining the insulation layers must be carried out in accordance with the technical card and the manufacturer's instructions.
6. Making drips made of the lead sheet – in order to drain water from the face of the wall it is necessary to make drips. The lead sheet will allow to fit into the irregular shape of the wall structure. The drips should be attached to the previously made insulation.
7. Isolation of drips in the masonry structure – after attaching the drips, on their surface, another layer of insulation should be made. The insulation should be on the whole surface of the sheet, which will be in the wall's surface. Connecting with existing insulation should be performed in accordance with the product technical card or manufacturer's recommendations.
8. Implementation of the supporting structure for the superstructure – it is necessary to use a support structure due to the need to veneer the superstructure with the structure of the existing wall. It is recommended to construct a supporting structure made of U-shaped ribbed steel bars anchored in the

existing wall structure with resin adhesives. Detailed solution of the supporting structure should be performed in accordance with the drawing below.

9. Sealing of the transitions of steel rods through the insulation layer – it is recommended to use bentonite-polymer masses.
10. Superstructure with quartzite stone – on the insulation layer, the superstructure with quartz stone should be performed. The shape of the superstructure should be in accordance with the shape before replacing the structure protection. It is not acceptable to increase the height of the wall. Quartz stone should be mason on the trass mortar. Additionally, it should be tied with the support structure.

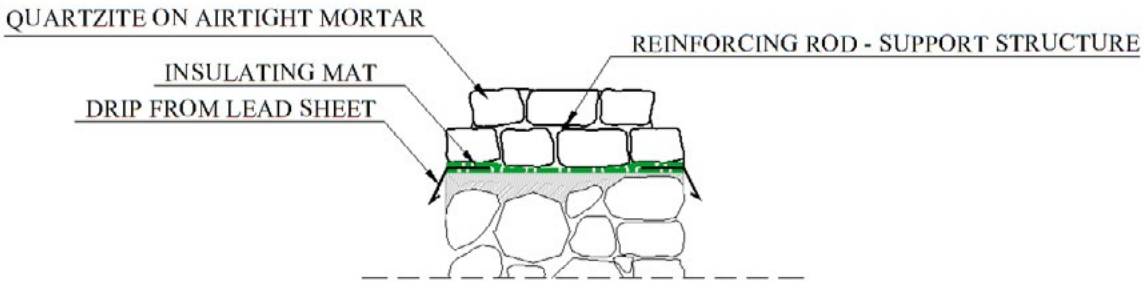

Fig. 10. Figure 4 Cross-section through the quartzite protection with a layer of insulation

Protection with the ceramic molders of a wall step

Repair technology for the quartz protection:

1. Visual assessment of the technical condition of the wall fragment under the protection planned. The substrate should be consistent and free of biological corrosion. If the fragments of the wall raise doubts as to their technical condition, they should be partially disassembled or reinforced and repaired.
2. Aligning the masonry surface and making a slope – in the case of significant surface irregularities, the fragments of a wall should be leveled with the trass mortar. Additionally, the appropriate slope can be made by the trass mortar (at least 2% towards the fall of water).
3. Laying the mineral insulation layer – lay a layer of the mineral insulation on the leveled substrate. The thickness of the insulation and the method of applying should be according to the recommendations and the manufacturer's technical card.
4. Laying the insulation layer in the corner of the walls – in the place of connection with vertical walls, the insulation should be pulled out on these walls at a minimum of 5 cm and pulled with horizontal insulation. If the substrate is not suitable, local repairs and restorations should be performed as in the case of the horizontal insulation.
5. Arrangement of the ceramic molders – the frost-resistant ceramic molders should be laid on a frost-resistant adhesive. Ceramic molders should be extended behind the face of the wall at about 3 cm. It is recommended to use molders with profiled drips.

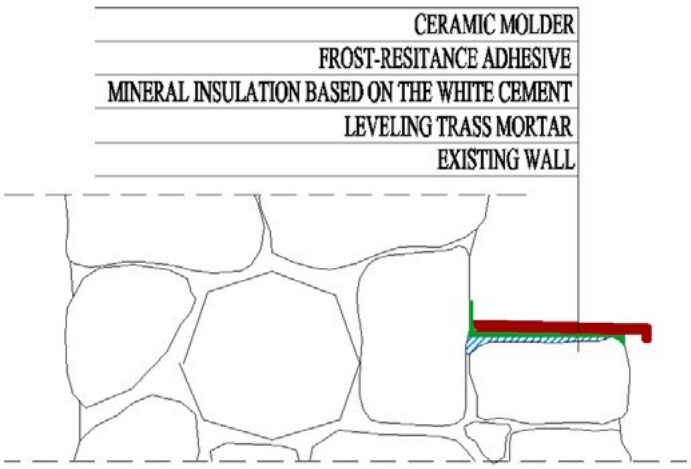

Fig. 11. Figure 5 Cross-section through the step of the wall secured with the ceramic molders

Protection of a step of the wall with a lead sheet

The protection is an alternative to the ceramic molders.
Technology of making the protection with a lead sheet:

1. Visual evaluation of the technical condition of an existing protection or a wall fragment – if signs of irregularity are not found after the fragments have been cleaned beforehand, it is possible to provide them with the lead sheet insulation. If the fragments of the wall raise doubts as to their technical condition, they should be partially disassembled or reinforced and repaired.
2. Alignment of the masonry surface – in the case of significant unevenness of the surface, the fragments should be leveled with the trass mortar. Additionally, the appropriate slope with the trass mortar should be made (at least 5% towards the fall of water).
3. The incision of the wall over the insulated part – in the first place it is necessary to furrow or cut the wall to a depth of approximately 3 cm at a height of about 5–6 cm above the insulated surface so that it can be insulated.
4. Cutting the wall under the protected step – under the row of the wall of the protected part, the joint should be cut in order to anchor the lead sheet.
5. Execution of the facet made of the trass mortar in the corners of the step with the wall – the shape of the facet should correspond to the future shape of the forged lead sheet in the corner.
6. Laying the lead sheet layer – place the lead sheet layer anchoring the bent section in the wall. The fragment of contact with the wall should be secured with a roofing sealant. Then, using a rubber hammer, the lead sheet should be "hammered" to the existing shape. The sheet should be turned from the bottom to one row of a limestone rock and taped to anchor the sheet in the previously prepared joint using a roofing sealant.

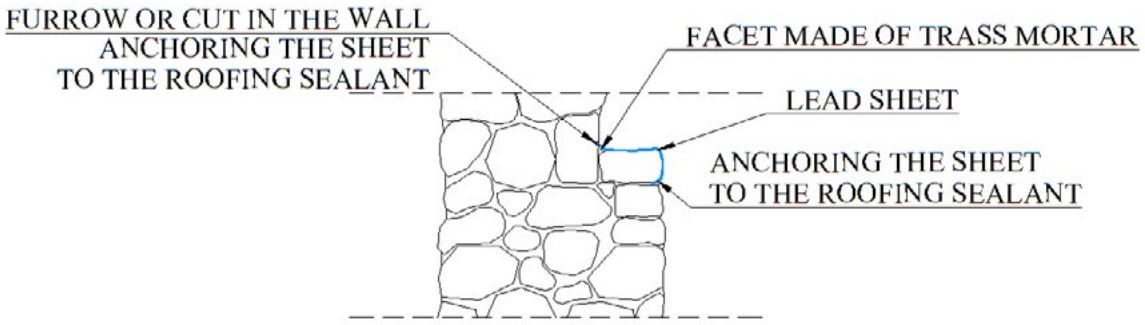

Fig. 12. Figure 6 Cross-section of the step secured with the lead sheet

Securing the crown of the wall with the ceramic molders

A repair technology for the quartz protection:

1. Visual assessment of the technical condition of the wall fragment under the protection planned. The substrate should be consistent and free of biological corrosion. If the fragments of the wall raise doubts as to their technical condition, they should be partially disassembled or reinforced and repaired.
2. Aligning the masonry surface and making a slope – in the case of significant surface irregularities, the fragments of a wall should be leveled with the trass mortar. Additionally, the appropriate slope can be made by the trass mortar (at least 2% towards the fall of water).
3. Laying the mineral insulation layer – a layer of the mineral insulation on the leveled substrate should be laid.
4. Laying the insulation layer in the corner of the walls – in the place of connection with vertical walls, the insulation should be pulled out on these walls at a minimum of 5 cm and pulled with horizontal insulation.
5. Arrangement of the ceramic molders – the frost-resistant ceramic molders should be placed on a frost-resistant adhesive and should be extended at about 3 cm. It is recommended to use molders with profiled drip.

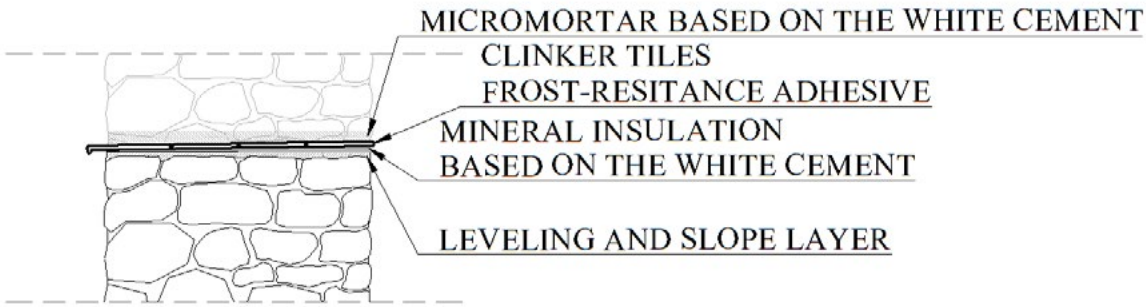

Fig. 13. Figure 7 Cross-section through the protection with the ceramic molders

Repair of existing quartzite protections

Repair of existing quartzite protection applies to the places where only the mortar bonding of the quartzite stone has been damaged, and the complete removal and re-provisioning of the crown protection would not be justified. Cracking of mortars of the quartz superstructures is recommended to be completed with a low-viscosity injection resin. The crack can be sealed by repeatedly soaking with a brush or pour the material directly into the crack by gravity.

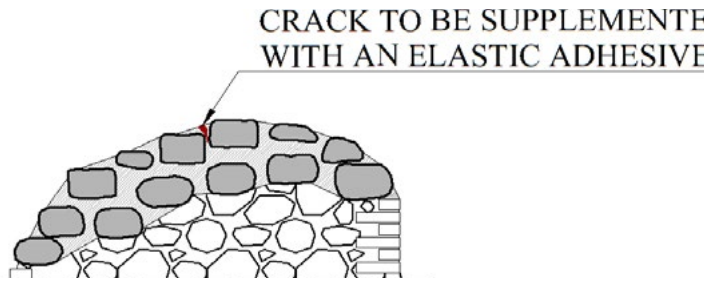

Fig. 14. Figure 8 A cracked fragment of the profiled stone superstructure

Summary

The diversity of the protection of the walls' crowns at the castle in Janowiec on the Vistula is associated with a very large material, geometric and functional diversity of the protected fragments of the object.

In the best technical condition are the protections made of ceramic materials permanently connected with the crown of the walls. The greatest damage was observed in the case of dominant protections, i.e., the quartzite superstructure on a cement mortar without horizontal insulation. The row of limestone rock walls (mostly secondary) lying directly under the superstructure has been damaged.

Damaged crown protections negatively affect the historical matter of the walls. Limiting the degradation process requires taking conservation and repair actions. The publication proposes solutions to protect the historical part of the walls from rainwater.

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The paradox of safety in urban space

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Abstract: Mutual penetration of pedestrian and vehicle traffic in many cases produces better effects in terms of the quality of staying in the city, and even safety, than their sharp separation. The present article discusses examples of such solutions.

Keywords: safety, urban space, pedestrian traffic, vehicle traffic, tram traffic, woonerf, residential zone, pedestrian precinct.

The space of a great many cities worldwide, and not only cities, was transformed in the 20th century – and in many cases still undergoes transformation – in order to introduce a far-reaching segregation in different fields. From the segregation of functions, with separate industrial, service, and residential areas, to segregation of various kinds of traffic, with frequently implemented separation of pedestrian traffic from vehicle traffic by situating them on different levels. Segregation was assumed, and it may intuitively seem, to bring about improved living conditions, including an increase in safety levels. Yet, it often happens otherwise. Mono-functional areas become deserted for many hours each day, while the lack of people deprives them of social control [Gehl 2009, Gehl 2014].

A particularly interesting question is posed by the segregation of traffic. Underpasses and footbridges above the street level theoretically exclude the possibility of collisions between pedestrians and cars. Yet, separation of pedestrian and vehicle traffic on different levels paradoxically, also from the point of view of safety, turns out to be a less fortunate solution than configurations more prone to collisions. In February 2007, a car speeding down Niepodległości Avenue in Warsaw skidded, fell off the road, hit a lamp post and crashed on stairs leading down to a passage under the avenue – an underpass that also offers access to the platform of the Racławicka metro station. On the stairs, the car killed an 81-year-old man [mar 2007]. It was obviously an exceptional situation, which did not bear any general implications concerning the question of safety in underpasses. Yet, it shows that even a complete separation of pedestrian and vehicle traffic by situating them on different levels does not completely exclude the possibility of collision. What is more, this accident can also be viewed not only as a spectacular example of a theoretically impossible situation that indeed happened, but also in a broader context. The crash was caused by the driver's bravado. The layout of Niepodległości Avenue in Warsaw, with sparsely distributed pedestrian crossings, two separate lanes, additionally separated along that section with a fence to prevent pedestrians from crossing the street on the ground, encourages speeding. Speeding cars decrease safety levels on pedestrian crossings in such streets, but in many cases also in the side streets into which cars turn at a greater speed than from streets that slow traffic down. There are known cases of accidents caused by drivers who significantly reduced their speed after exiting a highway, but, momentum-driven, they were still travelling at a much greater speed than they should and if they had not been driving on a highway. Moreover, organisation of traffic based on separating pedestrians from vehicles on different levels does not always mean that they are indeed separated. Instead of crossing the road across different levels, which is arduous and more time-consuming, many pedestrians prefer to stay on the ground level and cross directly, even if it is forbidden. As isolated spaces, footbridges and underpasses are criminogenic in many cases. Criminal acts are facilitated when such passages form long sections without the possibility of changing the route, while remaining at the same time beyond social control, since there are no nearby apartments or services from which they could be observed [Czarnecki, Siemiński 2004]. Underground tram or bus stops and metro stations may also become criminogenic much more often than public spaces located on the ground level.

Resignation from the segregation of traffic, or its significant limitation, often produces counterintuitive effects. Shared use of a single public space by pedestrians and motor vehicles does not necessarily have to pose threat. For that matter, we may think of the 2007 accident in Warsaw, during which a car landed on stairs leading to an underpass. Even if that accident was evoked to show that underpasses do not guarantee safety, a strong argument against combining pedestrian and vehicle traffic in a single space was delivered by the 2016 terrorist attacks in Nice and Berlin as well as prior and subsequent attacks in the Middle East, in which trucks entered pedestrian zones causing many deaths. Yet, notably, terrorists turned trucks into deadly weapons against pedestrians in zones reserved for exclusive use by the latter, and not shared by pedestrian and vehicle traffic. Let us take a look at examples of spaces for pedestrian traffic and use where contact with vehicle traffic occurs without a clear separation of the two types of traffic. A spectacular example can be found in Leidsestraat (Fig. 1 and 2) in the centre of Amsterdam. The street comprises three sections for pedestrian and tram traffic separated with two bridges over canals carrying additional car and bicycle traffic. Wider than the sections of the street between them, the bridges carry two tram tracks each; two tram stop platforms each, which simultaneously function as pavements; two motor vehicle lanes each, which offer access between the streets on both sides of canals; and two pavements each, located by the bridge railing. The stops situated on the bridges also function as passing loops, since trams operate on a single track in narrow Leidestraat, which limits the space available for them. The track along Leidestraat is used by three tram lines with a two-minute total peak frequency in each direction. In the street, less than ten metres wide, pedestrian traffic co-exists with tram traffic. They are not separated with any physical barriers. The co-existence of tram and pedestrian traffic in a single space can also be observed in many other cities, including those in Poland, such as Chorzów, Gorzów Wielkopolski and Wrocław. The example of Leidestraat in Amsterdam is particularly spectacular given the very limited width of the street, very high pedestrian traffic and two-way high-frequency tram traffic on a track with passing loops, due to which regularity needs to be ensured.

Associated with the Netherlands, the so-called woonerf (English: linving street) is a traffic organisation solution based on the co-existence of pedestrian and vehicle traffic. It gained popularity in Poland owing to the spectacular success of the redevelopment of 6 Sierpnia St. in Łódź (Fig. 3 and 4). Prior to the works, the street was divided into a vehicle lane and narrow pavements, which did not provide an attractive environment for people to stay in. Following a transformation into a woonerf, this fragment of the city began to teem with life. Despite mutual penetration of pedestrian and vehicle traffic, or perhaps because of such a solution, there are no safety issues [Kubecka, Zimny 2016]. As opposed to many living streets (woonerfs), it serves not only local, but also transit, traffic. The Dutch word woonerf means "residential zone". Yet, in Łódź and in other places in Poland, the term is used to refer to strictly public spaces in city centres.

Fig. 1. & 2. Leidestraat in Amsterdam. Space for pedestrian and tram traffic to co-exist. Top: street between bridges. Bottom: bridge between sections of the street. Source: photo by Hubert Trammer, August 14th, 2009.

Fig. 3. & 4. 6 Sierpnia St. in Łódź. Transformation into a woonerf (living street) sparked the popularity of this solution in Poland. Source: photo by Hubert Trammer, August, 10th, 2014.

As for the relation between pedestrian and other kinds of traffic, what matters is their co-existence in places where their separated routes overlap for the sake of continuity of each of these types of traffic. Different manners of solving such combinations establish different relations between specific kinds of traffic. These are usually places where a vehicle traffic lane can be crossed from one pedestrian pavement to the other. Regarding the most frequent ways to organise traffic in Poland, three most popular types of such places can be distinguished. The first are spaces where a place to cross the street in accordance with general regulations is not indicated in any special way: intersection areas and street sections situated more than 100 metres away from intersections and designated pedestrian crossings; deprived of characteristics that would make no-crossing regulations apply. According to the law, and also in practice, in such spaces vehicle traffic is subordinated to pedestrian traffic. The second type are designated pedestrian crossings without traffic lights. According to regulations, in such instances vehicle traffic is subordinated to pedestrian traffic. Yet, in fact, due to the attitude of many drivers, it is only theoretically so. The volume of pedestrian and vehicle traffic is highly significant in such places. Although an improvement in the drivers' approach can be observed, we are still far behind many countries where pedestrian rights are much more firmly guaranteed by the law. The third type among the most frequently encountered surfaces are designated pedestrian crossings with traffic lights. According to the Polish law, when the light is red for pedestrians, the surface can only be used by vehicles, whereas when pedestrians see the green light, the surface is to be essentially used by them, although vehicle traffic is also allowed in some situations. As for pedestrian crossings at intersections, turning vehicles may cross a pedestrian crossing with a green light, but must yield priority to pedestrians. There is thus a striking inequality between pedestrians and vehicles. The former would enjoy an equal position to cars if they could cross the street on the red light when no vehicles are approaching, or if cars could not cross when pedestrians see the green light.

A solution that is often used in Poland and improves relations between vehicle and pedestrian traffic, reducing discrimination against the latter, consists in elevating pedestrian crossings or even entire intersections. In such cases, a pedestrian crossing or an entire intersection becomes a large speed bump. Thus, pedestrian and car traffic are essentially situated on an equal footing. There is a separate surface that needs to be crossed both between pavements and sections of the street. This surface is situated on the pavement level (Fig. 5 and 6).

In a configuration that subordinates vehicle traffic to pedestrian traffic the continuity of the street is interrupted, whereas the continuity of the pavement or other pedestrian way is not. A common situation in which pedestrians cross the street is replaced with a situation in which cars cross the pavement or a pedestrian way (Fig. 7 and 8). When the pavement is narrow, or the vehicle route is separated with bollards, the situation bears a slight resemblance to an elevated pedestrian crossing. Yet, in some spatial organisation instances, pedestrians may even fail to notice that a vehicle route crosses a pavement or a pedestrian precinct (Fig. 9 and 10). Such a situation occurs for instance in Krupówki pedestrian precinct in Zakopane. It might seem that such a solution is very dangerous and causes many accidents. Yet, it turns out that when entire responsibility for safety is put on drivers and the surface is arranged so that vehicles enter a pedestrian zone, accidents are less likely to happen than when pedestrians need to exercise caution, or even when pedestrians cross the street on the

green light. There are also examples in which pedestrian precincts are unproblematically crossed by public buses (Fig. 11 and 12).

Fig. 5. & 6. Intersection of Juliusza Ligonia St. and Królowej Jadwigi St. in the centre of Katowice. The surface of the intersection is elevated to the level of the pavement and marked by paving. Source: photo by Hubert Trammer, August 3rd, 2014.

Fig. 7. & 8. Zeebrugge, Belgium. The surface of the intersection is elevated to the level of the pavements and integrated with their surface. Source: photo by Hubert Trammer, May 4th, 2007.

Fig. 9. & 10. Zakopane town centre. Krupówki promenade breaks the continuity of the perpendicular course of Kościuszki St. and Zaruskiego St. Cars cross the promenade in a place that is not marked in any way. Source: photo by Hubert Trammer, October 23rd, 2016.

Fig. 11. & 12. Kielce. Intersection of Sienkiewicza promenade with Paderewskiego St. shaped in a way that privileges pedestrian traffic. Frequently running public buses and other selected types of vehicles can cross the promenade. Source: photo by Hubert Trammer, January 26th, 2017.

The presented example of an intersection with a pedestrian precinct – Sienkiewicza St. in Kielce (Fig. 11 and 12) – shows that pedestrian traffic may safely co-exist without separation from very intensive traffic of considerably-sized vehicles. What is more, Paderewskiego St. becomes narrower at the intersection with the precinct, and therefore vehicles need to cross the precinct in alternate traffic, uncontrolled by traffic lights. It might intuitively seem that buses and other authorised vehicles are bound to collide head-on. Yet, the organisation of traffic that compels greater caution in order to prevent accidents between cars increases safety levels. Drivers who need to be careful to avoid collision also pay more attention to pedestrians. Greater caution is also favoured by a change in the road surface.

Various examples discussed above are merely a fraction of countless places where similar solutions function successfully. Yet, the awareness of their good effects is not yet widespread and introduction of such solutions frequently meets with resistance, often also on the part of specialists in road and urban space design. An example here are the woonerfs in Łódź [Kubecka, Zimny 2016]. For this reason, knowledge in this regard should be broadly disseminated.

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Shaping of the systems of greenery in the districts of Lublin Cooperative Housing (LSM) in the context of planning and implementation of the project

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Abstract: Collective Housing districts of Lublin Cooperative Housing (LSM) were the example of model multifamily developments of the second half of the twentieth century, conceptually designed by Roman Dylewski (architect and urban planner) in the years 1956–1977. They were built in the southern part of the city, on the hills cut by dry valleys and ravines, which significantly influenced the form of the buildings and the way of shaping the architectural and landscape enclosures.

The Housing district named after polish poet Adam Mickiewicz, designed by Felix Haczewski was based on the garden city concept. Famous visionary architect Oskar Hansen implemented his idea of a linear system and the principle of "absorbent background" into design of Juliusz Słowacki`s district. LSM housing districts were planned in detail, starting from the urban plan of the entire area, through architecture and meticulous arrangement of public spaces. Particular emphasis has been put on the nature of public and social activity spaces, as well as the surrounding greenery.

Various species of trees, shrubs and perennials were planted as a complementary element of social space in the district, which was also a part of the city's greenery system. Different elements of small architecture, such as: sculptures, ponds, and "rockeries" were placed there.

The article aims to characterize the principles of landscape and greenery design, as an inseparable element of LSM district and its current condition.

It is also interesting to study the transformation of the city sections deriving not only from the changing needs of users, but also from aesthetic preferences and the desire to follow a widely understood design trends.

Keywords: Lublin Cooperative Housing (LSM), systems of greenery, Rury Park.

Introduction

After the World War II, there has been a fast development of residential areas in Lublin as the response to the influx of people to the city within the realization of the six-year plan and because of lack of apartments, which followed this trend. Back then Lublin had one of the biggest density index in Poland – 2.4 persons per one room. Some of the first residential districts were created as early as in the 1950s thanks to the Zakład Osiedli Robotniczych ZOR (the Workers' Housing Development Administration). In that time, the following housing districts were built: ZOR Bronowice, ZOR Tatary I and ZOR "Zachód". They were built in the style of socialist realism, and they adopted the rule of the style of *the architecture, which was traditional in style and socialist in content*. Green areas dedicated to the residents were assigned to the regular quarters of residential buildings

as their supplement. Currently, most of these green areas are used for parking areas inside the district. In most cases, housing districts had monofunctional character and were situated far from any service centers.

In 1955, Lublin had 131,500 residents, which gave the average index of 2.23 person per one room. In some quarters like Śródmieście, Czechów or Kalinowszczyzna, this index was much higher – 3 persons / room. Therefore, the decision was made to expand the area of the city – the residential areas in two directions – the north in Kalinowszczyzna and Czechów and the southwest in the area of so-called Rury[1]. These areas were devoted for multifamily districts of Lublin Cooperative Housing (LSM) and housing districts of one-family houses in Czuby and Węglin. Pre-war development of the area of current Nadbystrzycka street, called in the urban development plan "half-savage" was intended to be destroyed, or otherwise to be rebuilt and organized[2].

The quality of thinking about designing of residential districts started to change at the end of the 1950s, when the idea of collective housing districts had its return[3]. The new quality of architecture and urban planning of the residential complexes in Lublin was being introduced by Lublin Cooperative Housing (LSM), which was founded in 1957[4].

Urban planning composition started to take into account such factors as topography, and the central parts of the districts were spared of high buidlings, and instead detached apartment houses of maximum four floors was planned. Special attention was put to planning and functioning of the public spaces and areas between the residential buildings, which were hierarchized and got diverse architectural form and "equipment" in the form of the architectural details designed individually for each of the new districts. The areas between the residential buildings were linked with the surrounding buildings (the residential complexes of the Adam Mickiewicz's district had direct entrances to the gardens between the buildings). The problem of communication and vehicular traffic was solved in an interesting way. In most of the districts, pedestrian traffic was separated from vehicular traffic with the use of interdistrict ring roads. The centres of residential districts were large common spaces dedicated to the users of diverse age groups. The green areas of the residential districts were joined with the green areas of the quarter thanks to the topography. It was possible, because 1957 was a kind of time frame, when *it was possible to design for non-anonymous residents. A member of a housing collective, who paid the full price of their apartment, was someone different than a person who got their apartment as a gift, only because they were next in the line (...)*.[5] The members of the collective housing were concerned not only about the future apartments, but also the entirety of their housing district. What is more, both in case of the oldest housing district –Adam Mickiewicz's district and more recent Juliusz Słowacki's district, the urban planners were cooperating with the future residents and space users as early as at the designing stage. There were surveys about functionality of the apartments especially made for the members of the housing cooperatives, where people could draw their ideas how to design their apartment[6].

The state of research

The subject of post-war cooperative housing districts of LSM was very popular since the time that the first residential complexes were built. The history of their development and main functional – spatial assumptions were the professional interest of H. Gawaracki and C. Gawdzik (1964, 1974). Interesting materials about LSM were published by this asscociation as propaganda and promotional materials (*5 years of Lublin Cooperative Housing LSM "Na słonecznym wzgórzu"*), B. Dębiniec – Kalinowska (1968), (Nowy Lublin Osiedla LSM – New

1 "Rury" residential quarter was built in the area of former agricultural fields in the south-west part of Lublin. Most of the area belonged to monasteries (Rury Jezuickie, Bonifraterskie).

2 *Ogólny Plan Zagospodarowania Przestrzennego Miasta Lublina* (General Spatial Development Plan of Lublin), 1956–1965, D III – housing, C14, the archive of the Lublin Town Hall.

3 Collective housing districts in Lublin were built as early as during inter-war period.

4 D. Kociuba, *Lublin, Rozwój Przestrzenny i funkcjonalny od średniowiecza do współczesności,* Wydawnictwo Adam Marszałek, Toruń 2011, p. 282–283.

5 *Materials 1957–1967*, 8/6, I/6, F. Haczewski, *Zasady projektowania osiedla im. Adama Mickiewicza w Lublinie*, the archive of Lublin Housing Collective LSM, after: I. Pastuszko, *Nowoczesne planowanie przestrzenne na przykładzie planu ogólnego rozwoju Lublina*, in *Annales Universitatis Mariae Curie – Skłodowska, Lublin – Polonia*, sectio L, vol. XV, 2, 2017, p. 73.

6 H. Dąbkowski, R. Karaś, *Lubelska Spółdzielnia Mieszkaniowa*, Edition; Centrala Rolnicza Spółdzielni „*Samopomoc Chłopska*", Zakład Wydawnictw, 1968, p. 43.

Lublin of LSM district, 1968), L. Gnot (1987). The changes of the area of the districts of LSM were researched by E. Przesmycka and M. Sosnowska (2007, 2010, 2013). The way to shape the public space in cooperative housing districts was also the interest of N. Przesmycka and M. Dmitruk (2017), and participation model of planning of a residential complex – I. Pastuszko (2017). The publications of one of the planners of the Juliusz Słowacki's district – Oskar Hansen are separate category. The assumptions made in his plans – the idea of linear continuous system and the idea of the open form were the important chapter of Polish and international urban planning development of the second half of the 20th century. He described himself the main concept of his works in professional journals, eg. *Architektura* (1959, 1960, 1966). Uncompromising works of Oskar Hansen were described in a comprehensive monography edited by J. Gola (2005). The rules of creating Rury quarter were appreciated in Poland and abroad. They were mentioned as a perfect example of the post-war modernism districts, which was the subject of research of international group of students and staff of Massachusetts University of Technology Special Interests Group of Urban Settelments (SIGUS), Center for Envirenmontal Development and Planning (CENDEP) of Oxford Brookes University and the faculty of Architecture of the Warsaw University of Technology. The result of this study was the publication of D. Abramson (1992) focusing on an attempt to work out the new, alternative (to the planned one) centre of LSM using the method of participation planning. The unseparable element of the districts of Rury was greenery, which was the subject of the research of the Univeristy of Life Sciences and Lublin Catholic University (KUL). The tree stands and greenery of the districts of Lublin Housing Cooperative LSM including creating of the urban parks as the form of protection of the Lublin ravines were the subject of the articles of E. Trzaskowska and M. Adamiec (2014), (2015). This issue was raised also in the new multiauthor monograph presenting diverse outlooks and opinions of Lublin's academics on the potential and dangers of the ravines and dry valleys of Lublin (2014).

Ecological system of protected areas of Lublin city

Ecological system of protected areas of Lublin city (ESOCH) was the part of the Local Spatial Development Plan of Lublin of 1986. It was supposed to be *"an active spatial layout interconnecting protected areas"*. This layout was designed as "open form" consisting of the structure made of natural ecological systems, open areas of Lublin city merged with external ecological systems. The whole system was hierarchized: starting from river valleys and valley depressions, which were the basis of the cohesion of the system, which *merges basic structural entities with the field and forest areas*[7]. Important functional areas in the whole system were Zemborzycki Resevoir, Stary Gaj forest and Dąbrowa forest, which create Czerniejewski Protected Area[8] in the south-west part of Lublin and "Baczki" functional area on the north of the ESOCH system. The key role in the whole system belongs to so-called "ecological nodes", of which most important are the estuaries of Czerniejówka and Czechówka to Bystrzyca river in the centre of Lublin, in the place of Staw Królewski (Królewski pond) in the past, which now is settled by alottments (Rodzinne Ogródki Działkowe)[9]. The important areas called in the plan "the link of the ecosystem" were municipal parks, didactic greenery (botanical garden) and forest parks. In the area of the districts of LSM, the bases of the systems were ravines and valleys being the links to above-mentioned river valleys of Bystrzyca, Czerniejówka and Czechówka as the *"active biological ecosystems"*.[10] Their extension was the greenery of the dry valley, which was supposed to be the quarter park in the urban development plan

7 *Local Plan of General Spatial Development Plan of Lublin – the text of the plan*, 1986, p. 5

8 M. Żurkowska, *Planowanie przestrzenne jako instrument ochrony systemu przyrodniczego dolin rzecznych i suchych dolin w Lublinie*, in: *Wąwozy i suche doliny Lublina potencjał i zagrożenia*, pod redakcją Ewy Trzaskowskiej, Lublin, 2014, p. 16

9 The allotments (Rodzinne Ogródki Działkowe) at the place of the former pond (Staw Królewski) are "Robotnik" and "Młynarz" allotments of 2.71 and 7 hectares respectively. These allotments were made in the 2nd half of the 20th century and were dedicated for the use of 192 families. The biggest and oldest allotment complex was made shortly after the 2nd World War (1948) at the place of the former pond (Staw Królewski). The Podzamcze allotments ("Rodzinny Ogród Działkowy Podzamcze") of 34 hectares were used by 571 families; after: *Działkowcy nie chcą oddać ogródków działkowych pod wielki staw. Mają rację?* http://lublin.wyborcza.pl/lublin/1,48724,21010782,dzialkowcy-nie-chca-oddac-ogrodkow-pod-wielki-staw-maja-racje.html, accessed 10.10.2018, in: Gazeta wyborcza, 22 November 2016, and: M. Żurkowska, *Planowanie przestrzenne jako...*, p. 16.

10 *Local Plan of General Spatial Development Plan of Lublin*, 1986, p. 11–13.

of the districts of Lublin Housing Collective LSM. Currently it functions as the Rury quarter park localized on the area of the one of 84 ravines and dry valleys[11] in Lublin (Fig. 1).

Fig. 1. Lublin Urban Complex, nature 1985, the Archive of the Lublin Town Hall

Lublin Housing Collective LSM – the districts – urban development plan

The districts of Lublin Housing Collective LSM were planned in south – west part of Lublin on the south of Głęboka Street. Historically, this area was called "Rury" and was used for agriculture. In the past, it was a field used mainly for horticulture and orchards in the individual parcels. According to the guidelines of plan, this area was to be divided and used for the needs of detached housing complex. That is why it was the unimproved area, poorly communicated with the city. After the change of general urban development plan of Lublin in 1957 and introduction of the passage about the location of the multi-storey residential districts in the area of Rury quarter, as of 17 April 1958, the new district got general location of 46/58 and the permission to build the area of the surface of 30.25 ha. Detailed location was obtained one and a half year later (17/07/1959)[12]. At first, the area of the first district was forecasted on the parcel of the surface of 42 ha (Adam Mickiewicz's district). In the general development plan, the area of "sunny hills" were supposed to be an alternative to the parcels along Lipowa Street, which were to constitute the new area of the city of Lublin in the first development plan devoted to the residential buildings[13].

The borders of the Rury quarter are from the south – the Rury ravine – quarter park, from the north – Gleboka, Nadbystrzycka and Plazowa Street, from the south – Bystrzyca River and Nadbystrzycka Street and from

11 M. Trzaskowska, in: *Wąwozy i suche doliny Lublina potencjał i zagrożenia*, editor: Ewa Trzaskowska, Lublin, 2014

12 H. Dąbkowski, R. Karaś, *Lubelska Spółdzielnia Mieszkaniowa*, Ed.; Centrala Rolnicza Spółdzielni „Samopomoc Chłopska". Zakład Wydawnictw., 1968, p. 29

13 M. Szlachetka, *Jak budowała się dzielnica LSM "Panie Inżynierze to są przecież góry"*, in: Kurier Lubelski, https://plus.kurierlubelski.pl/jak-budowala-sie-dzielnica-lsm-panie-inzynierze-to-sa-przeciez-gory/, accessed 10.10.2018

the west – Armii Krajowej Street, Bohaterów Monte Cassino Street and further in the direction of Krasińskiego Street, Zana Street, Balladyny Street in the direction of Głęboka Street[14].

The characteristic feature of this part of the city is diverse topography and the system of dry valleys and ravines, which now is the basis of Ecological system of protected areas of Lublin city (ESOCH). The concept of the districts was prepared by Lubelska Pracownia Urbanistyczna (Lublin Urban Development Office) led these days by architect and planner Romuald Dylewski[15] between 1956 and 1974. According to him: *Every element of topography was drawn very carefully and accurately. The main assumption was that residential buildings will be built on the hills and ravines and dry valleys will be used for roads and greenery.*[16] Construction of the residential buildings being the part of the complex, which is currently located in the surface of 242 hectares started in the 1950s. The first to build was Adam Mickiewicz's district (1959), then Juliusz Słowacki's district (1964 – 1972), Piastowskie district, Krasiński's district (1971), Sienkiewicz's district (1973) Konopnicka's district (1974) and at the end Bolesław Prus's district (1975).[17] (Fig. 2)

Fig. 2. Lublin Urban Planning Team, Spatial Development Plan, 1:100000, the fragment of the plan (the Archive of the Lublin Town Hall).

The districts of LSM were designed by many outstanding architects like engineer architect Feliks Haczewski (designer of Adam Mickiewicz's district and general, not implemented concept of the residential complex of LSM from 1960) or Zofia and Oskar Hansen responsible for architectural plan of Juliusz Słowacki's district being

14 *The Act no. 627/XXIX/2009, of the Lublin City Council of 19 February 2009* regarding the status of Rury quarter.

15 M. Szlachetka, *Jak budowała się...*, op. cit.

16 Ibid.

17 N. Przesmycka, M. Dmitruk, *Rewitalizacja przestrzeni międzyblokowych inicjatywa społeczna w procesie rewitalizacji na przykładzie wybranych przestrzeni w Lublinie*, typescript, p. 286. Adam Mickiewicz's district has a surface of 24.32 hectares, Juliusz Słowacki's district, Maria Konopnicka's district – 17.20 hectares, Zygmunt Krasiński's district – 14 hectares, Piastowski district – 10.71 hectares, Prus' district – 22 hectares and Henryk Sienkiewicz's district – 12.5 hectares.

the materialization of the linear continuous system and the idea of open form in the scale of the district. Antoni Herman was responsible for the development plan and architecture of residential districts of Piastowskie district[18] and Maria Konopnicka's district and for Henryk Sienkiewicz's district and Zygmunt Krasiński's district – engineer architect Janusz Link.

The typical feature of these districts was detached residential block buildings characteristic for new built residential districts of post-war modernism, which was an attempt to realize the assumptions of the Charter of Athens[19] and to solve the post-war problem of lack of apartments in Lublin.

Residential districts were accompanied with the full program of basic services in the scope of culture, education, commerce, gastronomy, artisan services, communication and health[20]. The best example is Adam Mickiewicz's district planned in a way that the buildings with services were not farther than 150 meters from residential buildings[21].

Adam Mickiewicz's district is the oldest district made by the housing cooperative LSM. It was planned as a garden district. Its designer and dowser – Feliks Haczewski got the price of 2nd degree (KBUA) for the urban development plan of this district. It is located between Głęboka, Wileńska, Filaretów and Zana Street. Głęboka Street was built for the anniversary of 15 years of Polish People's Republic. It joined Kraśnicka Road with Sowińskiego Street (the start of the construction was in 1959). This route has improved greatly the communication of LSM districts with central quarter of Śródmieście.[22]

Fig. 3. General development plan of the LSM of eng. arch. Feliks Haczewski of 1960, the Archive of the Lublin Town Hall

18 Co-planner of Prus' district was Jerzy Kumelowski.

19 *Charte d'Athènes*

20 B. Jezierski, *Zespół centralny dzielnicy Rury*, in: *Miesięcznik Osiedle*, gmina, region, kraj, Miasto 88, 9/September, p. 9

21 M. Denys, *Źródła idei i drogi powstania Lubelskiej spółdzielni Mieszkaniowej*, in: 50 lat Lubelskiej Spółdzielni mieszkaniowej, p. 27

22 H. Dąbkowski, R. Karaś, *Lubelska Spółdzielnia Mieszkaniowa*, op. cit. p. 33

The streets followed the shape of the ravines. The characteristic feature was that the material solutions and standard of apartments was much better than in the districts that were built later within the framework of LSM investments. Later norms and standards fixed much higher population density (from 330 people / hectare to 660 people / hectare).

The first concept of the residential district prepared by Feliks Haczewski in 1960 included the central part of the district as public space used for greenery. From the north, south and west, four-storey residential buildings were indicating the inside of the square and from the north on the other side of the internal street, just like on the east side, lower, three-storey housing development. The district contained also evenly spaced service – social buildings: schools, health center, service pavilions, centre for culture. Urban accent was four buildings in the north-east part of the complex (Fig. 3).

Shaping of the green areas in the districts of LSM

The area of Adam Mickiewicz's district was realized on the surface of 42 hectares, 20 of which were used for greenery and recreation. It means that for every resident, it was 20m2 of the green area.

The oldest district of Lublin Housing Collective LSM had the annual tradition of planting the trees. About 1485 deciduous trees, 1030 deciduous bushes and 345 coniferous trees and bushes were planted in Adam Mickiewicz's district during the period of two years[23]. From the very beginning (the end of 1950) the public areas of the districts have been made by the residents themselves as a part of community service. *The plasters were still wet on the freshly erected buildings, when the constructors together with residents started to organize the surroundings, make the lawns, plant the trees and bushes. After two years the district started to look like neat garden, and the care of administration and residents made it flourish.24*

At first, the residents were responsible for organizing of the space and conservation of greenery. With time, the most duties were taken over by the landscape service equipped with professional tools[25]. This service was later called *zakład zieleni* (entreprise for urban greenery).

It was not true that community service was in this case the set of chaotic actions. The greenery planted by the residents was well-thought in terms of their species and provenance. The garden complex was managed by its planner – eng. Józef Maciejewski, who was also responsible for the Park Ludowy[26]. As for the species planted in the district, the most common ones were native limes, popplars, oaks, beeches, birches, willows, maple trees and spruces.

The biggest decoration of the district is its marvelous greenery. The plan is closed by the course of four main streets – this is the perfect example how to organize green areas. What we have here... Graceful beeches creating green wall against the noise and metropolitan air pollution, old weeping willows, bushes and dwarf trees as the middle part of the greenery and also beautifully maintained lawns, many diverse flower beds planned in a way that no matter if it's earliest spring or latest days of autumn – it's always flowery and colorful. The plan is completed by stony alpine gardens and pond with a fountain with fishes fed by most residents. Benches along the pedestrian lanes are occupied by the elderly and mothers with children. Children can use many playgrounds. One of them has even the small model of space rocket, plane with turning propel and real but immovable car27.

The greenery designed and planted in Adam Mickiewicz's district was not appreciated by central authorities, despite the fact that at the beginning it was assumed that all districts realized within Lublin Housing Collective LSM would have the similar proportion of greenery per capita. The fact that in the central part of the district was a playground so big that it could be used for a couple of additional apartment blocks was also controversial. Maintained iconography and aerial photos made at the beginning of the 1980s prove that

23 *Nowy Lublin Osiedla LSM, Lubelska Spółdzielnia Mieszkaniowa*, Wojewódzki Ośrodek Informacji Turystycznej w Lublinie, Lublin, 1977, p.33–34

24 *Ibidem.*, p. 8

25 H. Dąbkowski, R. Karaś, *Lubelska Spółdzielnia Mieszkaniowa*, op. cit., 61,

26 Ibid., s. 61

27 *Nowy Lublin Osiedla LSM, Lubelska Spółdzielnia Mieszkaniowa*, Wojewódzki Ośrodek Informacji Turystycznej w Lublinie, Lublin, 1977, p. 10

Adam Mickiewicz's district had significant ratio of high greenery[28]. Other districts of LSM that were built later, together with Juliusz Słowacki's district, the construction of which was partly overlapping with the construction of Adam Mickiewicz's district, have much less greenery. According to the documentation in the form of dendrochronology inventory of the district from 1992, it was as much as 4200 trees on the area of the Adam Mickiewicz's district.[29] The landscape plan of Juliusz Słowacki's district was made by Wanda Staniewicz. The system of greenery introduced into the area of the district was supposed to mention the idea of open form of Oskar Hansen and together with planned infrastructure – centre for culture, kindergarten, market etc. was supposed to be Hansen's "absorptive background" – the space of life. (Fig. 4A, 4B).

Fig. 4. A: The 1980s, the aerial photography of LSM, the archive of KAUiPP, Lublin University of Technology, Picture B: Current shape, Source: geoportal, accessed 10.10.2018

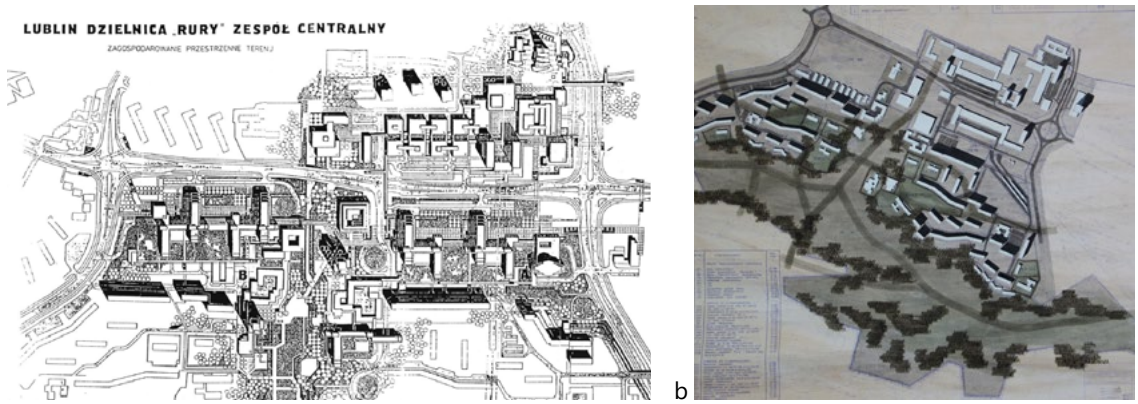

Fig. 5. A – Lublin, Rury quarter, the central complex, spatial development plan (the Archive of the Lublin Town Hall), Lublin, B – Composition plate, Detailed spatial development plan of the second part of the Rury district of LSM – districts: H. Sienkiewicz's district and M. Konopnicka's district in Lublin.

28 M. Szlachetka, *Jak budowała się…*, op. cit. In this article, eng. arch. Romuald Dylewski said that Stanisław Kukuryka, president at that time, was defending fiercely functional – spatial assumptions adopted by the planners and designed infrastructure, and due to that it was possible to force through the plan despite the defiance of central government with Julian Tokarski, the deputy prime minister at that time.

29 E. Przesmycka, M. Sosnowska, *Przeobrażenia układów zieleni osiedlowej na przykładzie zespołu im. Adama Mickiewicza Lubelskiej spółdzielni Mieszkaniowej*, Czasopismo Techniczne, p. 73

Table 1. Table on the basis of the data from LSM materials, own elaboration of the author

Name of the district	Period of construction	Architect	Infrastructure	The surface of the district [ha]	The surface of the green areas [ha]
Adam Mickiewicz's district	1958–1969	Arch. Feliks Haczewski, greenery, eng. Maciejewski	58 residential buildings, 3107 apartments, 46 public utility buildings (kindergarten, two schools, culture centre, health centre, service pavilions)	24.34 ha	12 ha
Juliusz Słowacki's district	1964 – 1972	Arch. Zofia and Oskar Hansen, greenery eng. Wanda Staniewicz	18 residential buildings, 1957 apartments, 7290 – residents, gross population density index 449 residents/ ha, sculpture of Kazimierz Stasz	16.2 ha	10 ha
Piastowskie district	1967–1972	Antoni Herman Jerzy Kumelowski	30 residential buildings, 1314 apartments, 4 buildings for commerce and services, sculptures of Barbara Zbrożyna, Ryszard Lis, Marian Swist, Lech Kunka, Tadeusz Huszczo	13.1 ha	6 ha
Zygmunt Krasiński's district	1970–1975	Janusz Link Tadeusz Bobek Euzebiusz Maj	17 residential buildings, 1294 apartments, sculpture of Pegaz of Jan Borowczak	14 ha	7.64 ha
Henryk Sienkiewicz's district	1973	Janusz Link Ezuebiusz Maj	15 residential buildings – 1292 apartments,	12.5 ha	8.6 ha it borders from the north with the quarter park
Maria Konopnicka's district	1974	Janusz Link Euzebiusz Maj	22 multi-family buildings (19 designed by architectural team of arch. Janusz Link, sculptures of Mieczysław Welter, Władysław Frycz	17.20 ha	it borders from the north with the quarter park
Bolesław Prus' district	1975–1984	Antoni Herman Euzebiusz Maj	50 residential buildings, 1989 apartments,	18.4 ha	11.5 ha it borders from the north with the quarter park

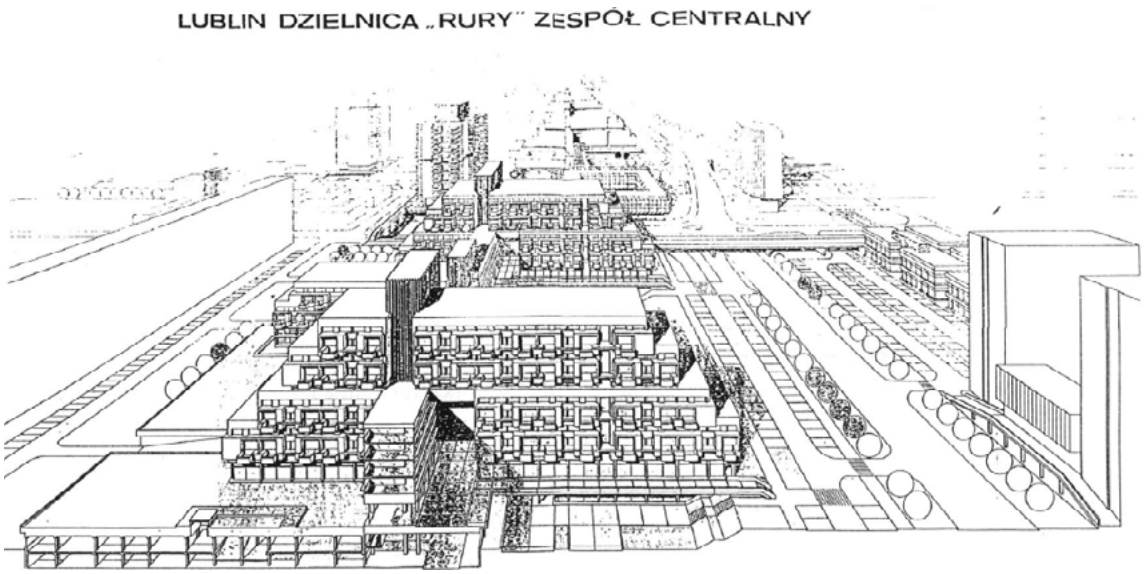

Fig. 6. Lublin. Rury quarter, the central complex, spatial development plan (the Archive of the Lublin Town Hall), Lublin.

In the districts of LSM, the greenery was not only used for recreation, but also for services. The general development plan of Rury quarter was not implemented as the whole.
The Rury quarter comprised of seven housing districts. In the part of the complex along Zana Street which separated the whole residential area into the two parts, the area was reserved for the realization of the Central Complex divided into four program – functional complexes in the form of *commerce – service – administration centres* localized in the north part of the development[30], *centre for culture* in the form of the existing cultural centre extended by the district's library, recreation garden joining two parts of the urban development complex – with the use of topography and physiography of the area and non-intrusive industry factories. The development plan was implemented only in marginal scope, because only the buildings of the planning office and the Roman-catholic church were built. (Fig. 5A, 6)

The principles of shaping of the greenery of Rury residential quarter in Lublin

The principles of shaping of the greenery of Rury residential quarter in Lublin were defined in the General Development Plan of Lublin approved in 1959 and made by City Urban Planning Office. According to the plan, the complex of greenery was to be created, which fulfills the needs of everyday passive recreation (infrastructure such as pedestrian lanes and benches) and active recreation (infrastructure such as allotments and sport equipment) of the residents. Greenery in this plan was also supposed to be health-oriented – through creating of characteristic microclimate and winding of the city. It was supposed to isolate the district from the intrusive areas, noise and air pollution. The basis of shaping the system of greenery in the city scale was three river valleys – of Bystrzyca, Czechówka and Czerniejówka, which together with the system of planned parks were supposed to create *"the network of organized greenery linked with building bands which create green entrances to the parks"*.[31] According to the development plan, the green areas together with quarter parks on the surface of 201 hectares[32] were to be created, which would give the ratio of 8 m^2 of the greenery for one resident and

30 Planned buildings were a cinema, a gastronomic complex, a department store, a passage of commercial-service pavilions megasm, police station, after: B. Jezierski, *Zespół centralny dzielnicy Rury*, in: *Miesięcznik Osiedle, gmina, region, kraj, Miasto 88*, 9/ September, p. 10.

31 *Urban Planning Office M. Z. A. B. in Lublin,* General Urban Spatial Development Plan of Lublin, Lublin 1957, VII Greenery and sport, C 56, C 59, C 60

32 Planned investments in greenery were founding of Ludowy Park (50 ha), Śródmiejski Park (10 ha), Kultury Park (90 ha).

would increase significantly from the former 1.1 m^2 of the greenery surface and 0.9 m2 of the sport infrastructure surface. The additional elements to the green networks of the parks were greenstones and squares of total surface of 50 hectares. These areas were dedicated for mothers with children and situated not more than 10 minutes walking distance from the places for passive rest (eg. benches).[33]

The plan envisaged the ratio of 2 m^2 of this type of areas for one resident. The local spatial development plan of the second Rury quarter of LSM from 1969–1971 provided for the detailed guidelines for shaping of the landscape and greenery of the south districts of LSM quarter which border with planned quarter park. The basis was to protect existing landscape and topography of the area taking into account its characteristic features including native flora.

Planned buildings were supposed to be subject of zoning with the regard to their height, and grouping – zoning in case of medium-height buildings. Functional – spatial plan was created in a similar way; the principle that was used was *the principle of internal organization of a structural entity with concentration of the related program groups*. Next problem that was taken into account was the way of creating of communication tracts depending on external public transport, connections of individual residential entities and the system of greenery, which created the green infrastructure of the districts of LSM. The basis of this "green network" was supposed to be the quarter park, so-called South Park. The main planner of this complex was architect Janusz Link, and of greenery – Euzebiusz Maj.[34](Fig. 5 B)

The Rury Quarter Park was planned in the south part of the residential complex of LSM. Its location was determined by the topography of the area in the form of the dry valley, which was the border of Rury and Czuby quarters. The main principle of the landscape planners was to create the system of greenery that would join the green areas between the block of flats with the areas of district gardens and the quarter park. At first, the surface of the quarter park was supposed to be 57 hectares[35]. The space dedicated to the park complex was former agriculture areas with field plantings and the rest of old orchards. Taking into account existing plantings, the main principle of space organization was the park with irregular forms of high greenery and low greenery, which were to be included into the greenery of the residential entities "penetrating" into the individual areas between blocks of flats and respecting characteristic topography of the area. The physiography of the area was particularly emphasized. The area of the district park was the area where it was forbidden to change the topography. Introduced greenery was only to underline its natural landscape. It was supposed to be landscape park; intensive use of the space was possible only in close neighborhood of the buildings. For this reason, high greenery was introduced only in higher grounds of the district park in order to create a kind of acoustic isolation – the buffer and shield for residential buildings. The valley plan included the low- and medium-height greenery. The space of the park was defined in the development plan as a space for passive relaxation taking into account the rule of division of the areas depending on the age groups of the users[36]. The program of recreation took into account the principle of division of the areas and their equipment depending on the age of the users.[37] The key element of the project was to link designed quarter park with the north districts of LSM quarter (Juliusz Słowacki's district, Adam Mickiewicz's district, Piastowskie district). The link with south communication tract of the district park was the route along the district centre for culture with the small valley between the residential districts of Konopnicka and Sienkiewicz led farther by central park and opposite hills to Rury railway station and Stary Gaj forest. Zygmunt Krasiński's district was linked with the quarter park with the pedestrian lane through Henryk Sienkiewicz's district. The lane joining the south districts with planned sport centre by Tomasza Zana Street was supposed to be led parallelly to the main lane of the central park (direction

33 Apart from this, it was planned to make so-called „special gardens" – woodlot of the Museum of Majdanek (54 hectares) and new area of botanical garden with zoo of 20–40 hectares and Lublin cemeteries. It was planned to partly remove allotments in favour of new areas of greenery taking into account proportional increase of their surface depending on the number of residents, after: *Urban Planning Office M. Z. A. B. in Lublin, General Urban Spatial Development Plan of Lublin*, Lublin 1957, VII Greenery and sport, C 56, C 59, C 60.

34 *Local Plan of General Spatial Development Plan of Lublin of the second part of the Rury quarter of L.S.M:* H. Sienkiewicz's district, M. Konopnicka's district in Lublin, A.2 text of the plan, main planner eng. MSc. Arch. Janusz Link, senior assistant eng. MSc. Arch. Mirosław Załuski, landscape planner eng. MSc. Euzebiusz Maj, 1969–1971, the archive of the Lublin Town Hall, p. 3

35 Ibid., p. 4

36 Ibid., p. 7

37 Ibid., p. 7

Helenów – Bystrzyca – Wrotków) and according to the plans it was to run across in two variants – by the north border of the central park and by the districts.[38](Fig. 7A, 7B, 8)

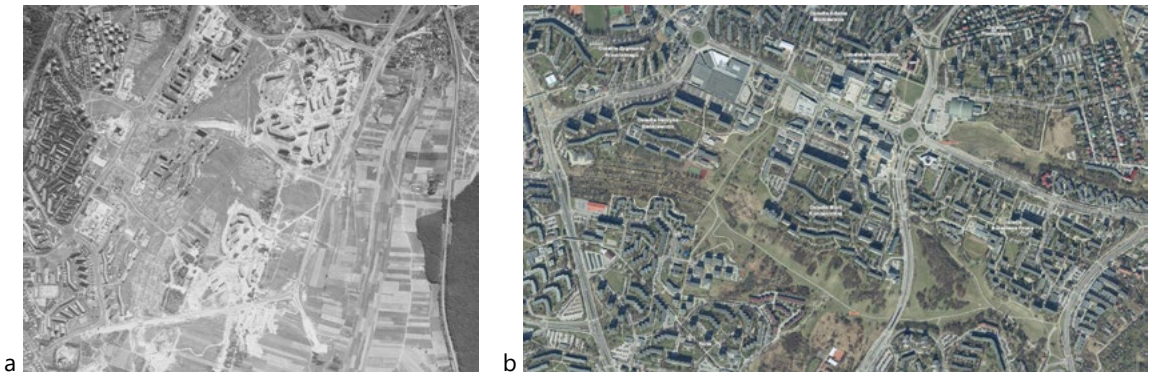

Fig. 7. A – The 1980s, the aerial photography of the Rury district park, the archive of KAUiPP, Lublin University of Technology, B – Current shape, Source: geoportal, accessed 10.10.2018

Fig. 8. Rury Park, the main communication tract along the dry valley, author's own photography

Summary

The complexes of the districts of the Lublin Housing Collective LSM were the examples of unique way to plan the space and architecture for non-anonymous users. It's important to emphasize that it was made in the 2nd half of the 20th century, when introduced norms and standards were harmful to the quality of the buildings and their surroundings. Adam Mickiewicz's and Juliusz Słowacki's districts were the example of successful personalized space accessible for everyone, with a large ratio of greenery and omnipresent art in the form of sculptures, murals and mosaics being the legacy of Lubelskie Spotkania Plastyczne – the initiative of artists to decorate the districts with the works of art. Romuald Dylewski – the director of Lublin Urban Planning Office in 1956–1974 said that he hoped that *"each of (...) subsequent districts (after the Mickiewicza and Słowackiego district – editorial note) will be better than the others. According to the rule that practice makes perfect"*.[39] Unfortunately, the era of pre-fabricates and the reduction of the construction budget left a negative mark on the residential complexes built by LSM in the 1970s. The green architecture[40] designed by next architects and urban planners,

38 Ibid., p. 7

39 M. Szlachetka, *Jak budowała się...*, op. cit.,

40 The system of greenery was supposed to be the element merging southern and northern districts and joining them with the quarter park situated in the dry valley – so-called Rury Park.

which was supposed to constitute the common element of seven districts of LSM, was realized only partly. In the 1990s the idea of the system of green boulevards and accessible to all district park was completely abandoned, because of the new buildings constructed along Tomasza Zana Street. Many investments including the controversial project of central complex[41] being the heart of interregional services, which was planned in the centre of the district for around 30 years, were not realized for technical and financial reasons, and the rest of area was devoted for residential buildings and large-surface service and office buildings.

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Location of single-family house settlements from 60s to 80s of 20th century in Wrocław's urban space

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Abstract: Housing construction in the second half of the twentieth century was intensively developed in Europe and in the whole world. The expansion of industry and the development of cities, initiated at the turn of the 19th and 20th centuries, had a huge impact on urban planning, the creation of housing estates and their location in the city structure. In Wrocław, new post-war housing estates, including single-family housing, were inscribed in the existing urban layout of the city from the inter-war period. Wrocław in the 1920s and 1930s increased its area several times. New, connected areas were intended, above all, for housing construction. After the war, Wroclaw's planners drew on pre-war plans to expand the city, but also updated and modified them, adapting them to the current needs of residents. The article focuses on the urban development of Wrocław from the 1960s to the 1980s in the field of organized single-family housing.

Keywords: single-family housing, Wrocław, urban planning, development plan.

Introduction: Single-family housing in Polish socialism period

At the beginning of the 1950s, the scale of individual housing construction in Poland wasn't large. After 1955, there was a double jump in the number of completed investments of this type[1]. At the turn of the 1960s and 1970s, co-operative single-family housing began to develop on a large scale, often implemented as part of workplace housing co-operatives. In order to promote and develop this type of construction activity, in 1963 the Ordinance of the Minister of Public Utilities was introduced on the maximum amount and conditions for granting a bank loan for the construction of single-family houses[2]. The rules for financing housing construction changed in 1970, when Edward Gierek assumed power in the country. The scope of activities of cooperative housing construction was increased, which then became the main engine of the housing economy. Single-family housing was still considered secondary, but its development was favored by the housing policy of the state and the development of cooperative housing using social initiatives. So-called co-operatives of social initiatives could deal with the construction of small blocks of flats and single-family houses[3]. Single-family housing erected in cooperative or individual forms was to be treated as an important link in the housing construction program. The emphasis, however, was placed on the development of intensive forms of single family houses, such as terraced, atrial or semi-detached housing realized by building cooperatives. The industrialization

1 E. Przesmycka, Przeobrażenia zabudowy i krajobrazu..., s.122.

2 Pursuant to the Ordinance of the Minister of Public Utilities of May 29, 1965, building and housing co-operatives and cooperative associations of single-family houses may obtain a bank loan for the construction of single-family houses or premises in small residential houses in the amount of: 1) up to PLN 110,000, and for construction on sites unarmed up to 130,000 from one single-family house – in cities, housing estates and clusters located in the Western and Northern Territories, 2) up to 100,000 PLN, and when building on area not equipped with a network of sanitary installations – up to 120,000 PLN per one family house.

3 Resolution no. 22 of the Central Board of the Union of Housing Cooperatives of 06/04/1981 on the implementation of additional cooperative housing with the use of social initiatives.

process of single-family housing was to be accelerated and intensified. The resolution also puts emphasis on the promotion of labor associations of house construction for employees. Assistance provided by enterprises in this matter was to be a factor stabilizing the employees of the plant. Workplaces were to provide financial assistance as part of the company's housing funds, sales at the expense of unnecessary building materials or make available labor's construction equipment for the employees. In the last decade of the Polish socialism period, legal acts in the field of single-family housing mainly concerned the development of single-family housing, in which the government saw an important link in the development of housing economy in the country. The process of typization of this development also served to popularize single-family housing. Its aim was primarily to improve the construction process and optimize its costs. To this end, typical project catalogs and nationwide competitions for cheap, typical single-family housing were implemented. Single-family housing has met many barriers on its way to realization. According to the assessment of the Ministry of Public Utilities, the most serious were difficulties in obtaining suitable plots (incomplete spatial development plans prevented the division of plots), areas offered for individual construction were usually not quipped with sanitary installations and in a much worse location than those, intended for multi-family housing. Other problems were related to the insufficient amount of construction materials rationed by the state and the loan taken, which was also unable to cover the investment costs. As a result, in the country were created much fewer single-family housing estates than it was originally planned.

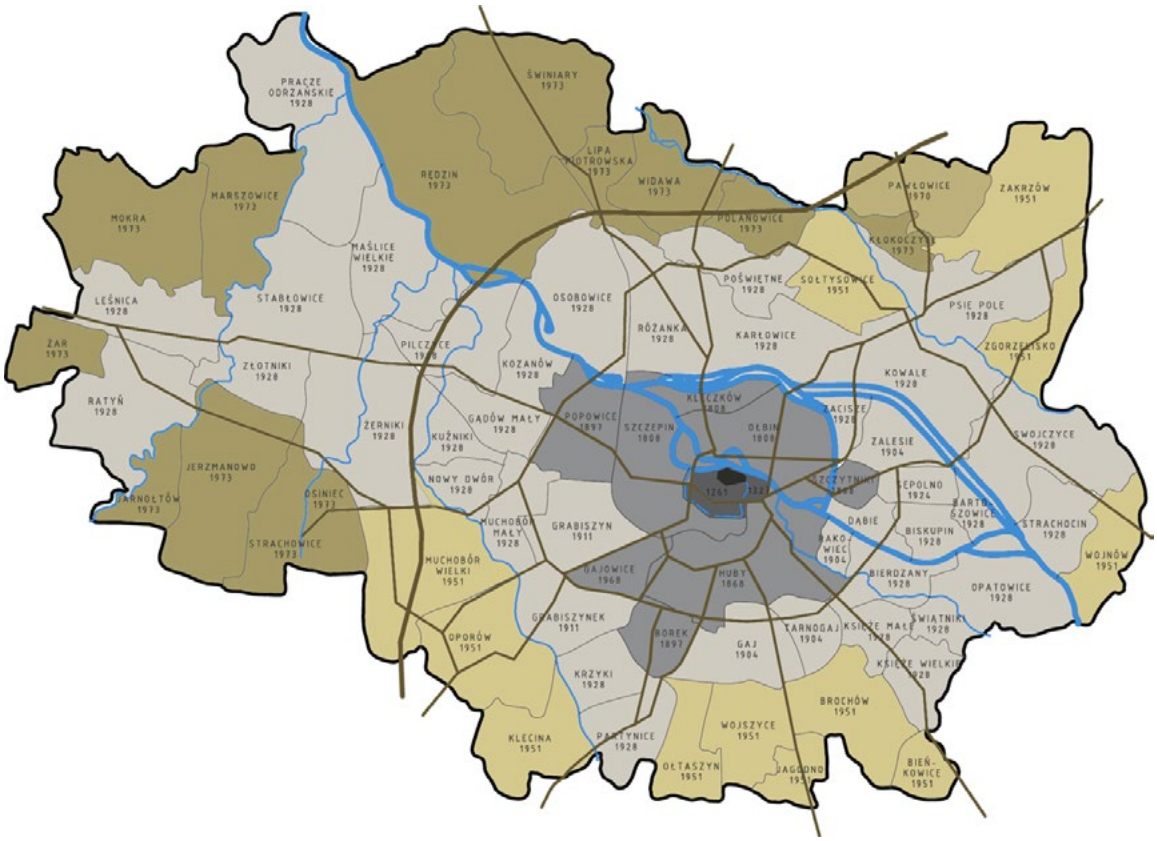

Fig. 1. A map showing the territorial development of Wrocław in the years 1261–1973; source: author

Wroclaw's cooperative, single family house settlements.

Urban processes and architecture of the interwar period had a major impact on the development of Wroclaw's present spatial layout. Until 1945 Wroclaw was a German city. An important figure for urban planning and city development for this period, was city architect Max Berg. On his initiative in 1921 a competition for

the development of Great Wrocław was announced. In his vision, Breslau was to be enlarged by adjacent to the city suburbs, in which new, social housing estates would be created, surrounded by greenery. In 1928, the area of the city was enlarged almost four times by joining the neighboring areas: in the west – Leśnica, Pustki, Ryn, Żerniki, Kuźniki, Gądów, Nowy Dwór, Muchobór Wielki; in the south – Krzyki and Partynice; in the east – Księże Małe and Wielkie, Świątniki, Bierdzany, Opatowice, Biskupin, Bartoszowice, Swojczyce, Kowale; in the north – Psie Pole, Karłowice, Różanka, Ligota, Poświętne, Osobowice, Pilczyce, Kozanów, Maślice Wielkie and Małe, Pracze Odrzańskie, Janowa Góra.

Within the city limits there were two, once independent cities: Leśnica and Psie Pole[4]. Thus, the Great Wrocław had almost 175 square kilometers. The city enlarged by new areas could afford to extensify the inner-city development, eliminating partially substandard tenement housing from the turn of the 19th and 20th centuries. Urban planners and architects of pre-war Breslau could design housing estates with low building intensity, in accordance with the prevailing trends regarding a green, human-friendly housing environment. Those large and complete residential areas were erected with modernist principles of the functionality of buildings. Despite the huge war damage, many complexes of multi-family, single-family and mixed housing from this period survived.

Post-war single-family housing estates in Wroclaw reconstruction and extension urban plan for the years 1959–1985.

In 1946, the Wrocław's Urban Plan Office was created at the Directorate of Spatial Planning, headed by architect Tadeusz Ptaszycki. The interdisciplinary team of designers managed by him proceeded to work on the Plan for Reconstruction and Spatial Development of Wrocław. It was established in specific conditions of simultaneous city learning, determining and assessing the surviving values of urban investment, city programming and designing. The general and prospective plan for Wrocław, which was implemented after the war, was to be a continuation and further development plans of the city initiated before the Second World War. At the design stage, the questions arose whether to rebuild the urban structure with the network of streets according to the state from before 1939? Or because of war demages, changes of ownerships and almost total population exchange, city structure should be adapted to the new needs? The area of Wroclaw has been divided into four parts: northern, southern, eastern and western. The subject of single-family housing appeared in the records concerning each area. The northern area was supplemented by the Karłowice housing estate, completed in the years 1925–1939, with one- and two-storey buildings. The project called for the extension of the estate to a full-fledged housing unit, equipped with the appropriate number of services, workplaces and rest areas. The southern area, practically destroyed in 100% during military operations, had relatively good health and construction conditions. The plan postulated, inter alia, for the completion of existing housing estates in 1–2 storeys and the organization of two new housing estates with single and multi-family housing with housing estates in this area of the city. The spatial development plan for the western area envisaged maintaining the industrial character of the district with the simultaneous expansion of housing estates serving workplaces. The project assumed a fundamental change in the communication system through the construction of an external bypass that would connect industrial plants with the southern and northern residential district. Housing units were designed with full service and recreation infrastructure. The preserved eastern area – Biskupin, Zalesie, Zacisze and Sępolno, limited by the flow of the Old Odra and industrial canals, was to remain a complex of single- and two-storey housing estates surrounded by public green areas, allotment and home gardens. The dominant of this district was Szczytnicki Park with the Olympic Stadium, the Centennial Hall and the Zoological Garden. These buildings served as a holiday center, play, sport and didactics. The urban plan had not foreseen major changes in the character of the district. However, it postulated the organization of residential service centers and the implementation of housing construction, supplementing existing urban structure[5]. At the turn of the 1950s and 1960s in Wrocław, because of the possibility of purchasing plots for single-family houses, District Urban Planning Groups developed detailed spatial plans of the most important pre-war housing estates

4 O. Czerner, S. Arczyński, Wrocław krajobraz i architektura, wyd. Arkady, Warszawa 1976.

5 Rocznik Wrocławski 1961, Plan odbudowy i rozbudowy Wrocławia na lata 1959 – 1985, s. 23–24 (Wroclaw Yearbook of 1961, Plan for the reconstruction and extension of Wrocław for the years 1959 – 1985, p. 23–24)

in Wrocław: Biskupin, Dąbie, Szczytniki, Zalesie, Zacisze, Krzyki, Partynice, Brochów – Bieńkowice, Ołtaszyn, Wojszyce, Grabiszynek, Gądów Mały, Złotniki, Maślice, Stabłowice, Różanka, Karłowice and other smaller ones. The purpose of these studies was to preserve chosen areas for the planned development of communication infrastructure or installation networks, but also to protect existing green areas and historic urban plans against the unplanned and spontaneous development of individual housing. Since detailed local plans for single-family housing estates were usually the only urban projects of these areas, they required to be more precised. Often in the area that goes beyond the statutory framework of local plans. The illustrations show examples of spatial development plans for the housing estates in Oporów and Wojszyce districts.

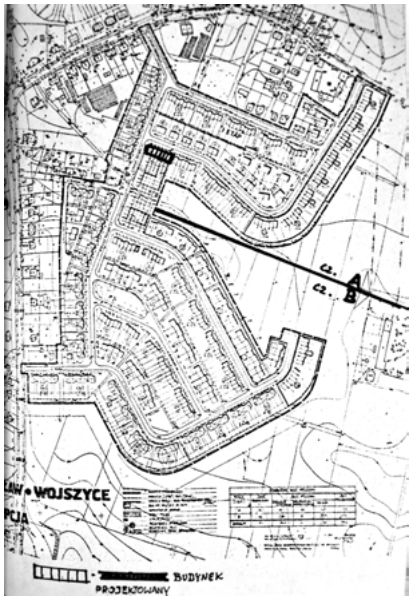

Fig. 2. Detailed development plan of single family house settlement in Oporów district, 1974, designer D. Przyłęcka, source: D. Przyłęcka, Odbudowa i rozwój Wrocławia w planach zagospodarowania przestrzennego z lat 1945 – 1994

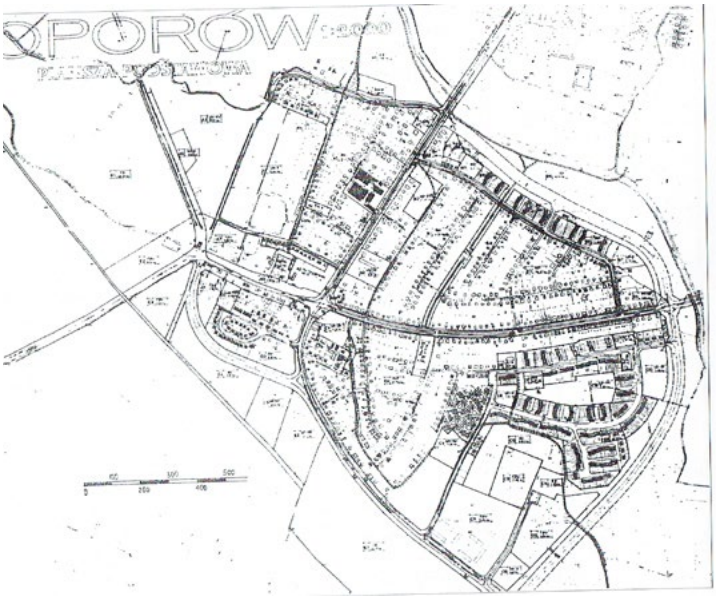

Fig. 3. Detailed development plan of single family house settlement in Wojszyce district, designed by R. Marak. M. Gross – Markiewicz, 1974, source: D. Przyłęcka, Odbudowa i rozwój Wrocławia...

Single-family housing estates of the Polish socialism period (1945–1989) in the urban layout of Wrocław

A significant part of Wrocław's post-war single-family houses were created in the neighborhood or as a complement to prewar German villa settlements, that were characterized by low, extensive architecture. An important element in shaping those prewar housing areas was surroundings of the greenery. Residential buildings were integrated with large gardens, common green spaces, parks or avenues. It emphasized the picturesque character of those estates, where all the buildings have been freely led, minimalising the rigid, orthogonal urban space. The examples of complementing prewar residential districts with post-war single family buildings are: terraced houses 'Pod Jaworami' from 1958, being a supplement to the former villa development of Borek district; atrium and terraced buildings from the 60s and 70s, complementing the prewar, residential district of Karłowice; semi- detached houses 'Budowlani' and 'Radiowiec' settlements from the 60s and 70s, being a form of intensification of prewar residential district Partynice; terraced housing estate 'Osiedle Młodych' ('Youth Estate') and 'Metalowiec' that was a complement of prewar residential district of Grabiszyn, or the housing cooperative from the 1960s which has erected a single-family housing complex for employees of Wrocław's universities (Academic Association of House Constructions) that has been a complement to the villa estate of Bartoszowice district.

Another group of Wrocław's post-war single-family residential complexes was located on the areas designated for this type of buildings after the II World War. These areas were located mainly in the vicinity of the southern border of the city and before the war they were villages adjacent to Wrocław. The detailed, spatial development plans were created by the District Urban Planning Groups. An example of such localized single-family house complexes of the Polish socialism period, erected on former, suburban farmland, are: a colony of so called weave-fabric settlement erected by the Youth Cooperative Association and terraced houses from the 1970s for ZREMB production plant employees. Those two house complexes has complemented the villa and agricultural areas of the former village of Oporów (annexed to Wroclaw in 1951). Another example of the placement of single-family houses in the villages adjacent to the city's southern boundaries is the house complex erected by Cuprum – Politechnika building cooperative in Wojszyce district (annexed to Wroclaw in 1951), or terraced houses from 1980s in Klecina district (annexed to Wroclaw in 1951), erected by the building association 'Wiarus' of the Polish army members.

Some of designed single-family housing complexes were located in the immediate vicinity of multi-family buildings, on the outskirts of large block of flats urban complexes. An example of such mode of designing of urban space are terraced houses at Hermanowska street (Kuźniki district) from 1972. They were located in the immediate vicinity of a multi-family complex designed on the other side of Hermanowska street. Another example are terraced houses at Żubrza street located directly at the multi-family housing estate of Popowice district. Low residential architecture was also located in the neighborhood of former civilian airports, where the development plan have to take into account the requirements of the Civil Aviation Department, due to special buildings hight regulations in the zone of landing. This situation took place in Wroclaw, where the single-family house complex for employees of the Pafawag and Elwro production plansts was erected. The settlement consisting of 123 houses Kwiska street (Gądów Mały district) was designed in 1974 in the direct neighborood of Wroclaw's Civil Airport. The urban plan for this area was created in 1968 and it has assumped a bigger stlement of low residential architecture. However, the decision to liquidate the airport in Gądów Mały district at the beginning of the 1970s and the adaptation of the General Plan for the City of Wrocław in 1973 enabled the implementation of the large scale multifamily housing estate 'Kosmonautów' for 35,000 inhabitants[6].

Conclusions

The rapid development of single-family houses began in Wrocław in the 1970s. As part of a governmental program related to improving the living conditions of the population in the Recovered Territories after the WWII, in 1976 the Catalog of Single-family House Projects for Wrocław Voivodeship. It aimed to promote projects with low material consumption and cost-efficiency. What's more, the regional catalog was also supposed to promote an individualized type of single-family buildings adapted to the local conditions of city of Wroclaw[7]. Until 1980, single-family housing in the city, its location and intensification were determined by terrain reserves in peripheral settlements. On all of the urban plans for Wrocaw's single family builidngs were designed around 10 000 plots (about 400 sq m each). Based on the analysis of the existing field reserves and the detailed development plans implemented in 1975, an information brochure on the possibilities of development of single-family housing in Wrocław was developed.

Figure 4 presents the distribution of single-family housing complexes from 1950 – 1989 in the spatial layout of Wroclaw city. It can be observed that most of them were located in the south-western districts of Wrocław, which were rural areas before the war, annexed to the city in the 1950s and 1970s. The examples of this house complexes are those designed in Wojszyce, Ołtaszyn, Oporów, Klecina and Muchobór Wielki districts. The figure also shows that part of the housing estate of post-war single-family housing in Wrocław was located in a closer distance to the city center, marked in the legend as a complex of cameral buildings. These are prewar

6 D. Przyłęcka, Odbudowa i Rozwój Wrocławia w planach ..., p. 159

7 Creation of the catalog was entrusted to arch. Witold Molicki. The catalog included 30 single-family houses projects, of which 20 were designs of single-family houses already existing in Wrocław and Lower Silesia, and 10 new projects were to promote cheap private construction with a small cubature. The houses presented in the catalog had usable surface from 65.0 to 90.0 m2, with the possibility of it extension.

villa settlements (such as Borek or Karłowice) or low multi-family and single-family settlements (eg. Sępolno, Biskupin or Bartoszowice).

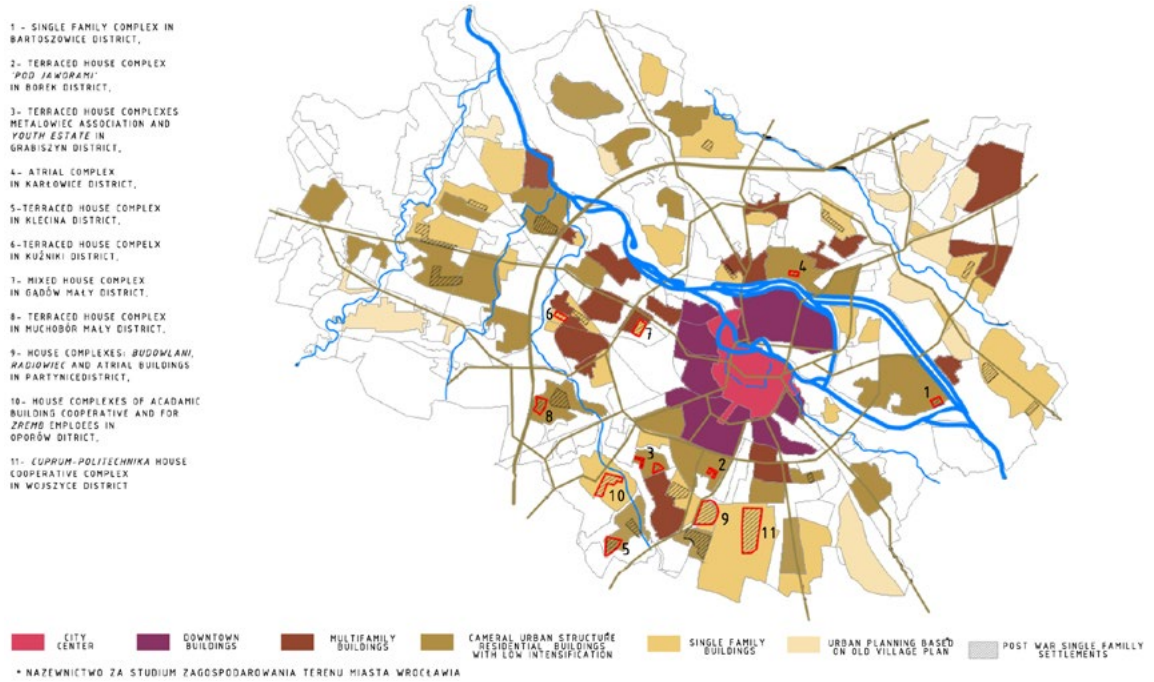

Fig. 4. Location of single-family housing units from the 60s – 80s of the 20th century in the structure of the city of Wrocław, ed. author

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Eye tracking jako metoda stwarzająca nowe możliwości w urbanistycznych badaniach eksperymentalnych

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Streszczenie: Eye tracking, a więc metoda badania aktywności okulomotorycznej wśród rozlicznych zastosowań stwarza także unikalną możliwość badań w zakresie urbanistyki eksperymentalnej. Dzięki dużej liczbie danych jakie dostarcza ta metoda przybliża ona nie tylko poznanie sposobu patrzenia na budynki i otaczającą je przestrzeń, ale także reakcji emocjonalnych, jakie budzą one w odbiorcy, przyczyniając się do tworzenia tzw. przyjaznego środowiska architektonicznego. Przy założeniu interdyscyplinarnej współpracy i dyskusji specjalistów z dziedzin psychologii, architektury oraz informatyki wydaje się, że współczesna okulografia może stać się narzędziem harmonijnie scalającym działania, w efekcie których zwiększa się zarówno wiedza, dotycząca efektu wpływu przestrzeni architektonicznej na człowieka, jak i takiego jej zaplanowania, aby aktywnie przyczyniała się ona do optymalizacji warunków życia współczesnego człowieka w oparciu o obiektywne dane.

Wprowadzenie. Eye tracking wczoraj i dziś

Zastosowanie metod neuronauki do analizy i rozumienia ludzkich zachowań w kontrolowanych środowiskach lub laboratoriach zyskało ostatnio wzmożoną uwagę badaczy. Jest to spowodowane faktem, iż technologie śledzenia aktywności okulomotorycznej są coraz częściej wykorzystywane w przemyśle i badaniach ze względu na dostępność oraz względnie umiarkowany koszt tego rodzaju badań. Zastosowanie eyetrackingu umożliwia sprawdzenie, co angażuje wzrok człowieka, a co jest przezeń ignorowane (pomijane). W świetle tego, co dziś wiemy na temat naurobiologii człowieka powiedzieć można, że oczy oraz ich aktywność są silnie powiązane z niektórymi procesami poznawczymi (Błasiak et al., 2013[1]). Rejestracja aktywności oczu może pomóc w zrozumieniu mechanizmów percepcji wizualnej, ważnej z punktu widzenia wielu ludzkich zachowań. Eye tracking

1 Błasiak W, Godlewska M, Rosiak R, Wcisło D, Eye tracking. Nowe możliwości eksperymentalne w badaniach edukacyjnych. Edukacja-Technika-Informatyka 2013, 4(1): 481–488.

często nazywany jest metodą śledzenia ruchu gałek ocznych, co w rzeczywistości jednak nie jest głównym celem metody, którym jest informacja o „ścieżce" wzrokowej, utworzonej w czasie wodzenia wzrokiem po oglądanym obrazie, przedmiocie – lub mówiąc ogólnie – w czasie widzenia (Duchowski, 2007[2]). Działanie eye trackerów w przypadku większości nowoczesnych modeli opiera się na metodzie nazywanej odbiciem rogówki (corneal reflection), polegającej na wykryciu i śledzeniu położenia i ruchów gałek ocznych. Kamera o dużej rozdzielczości wykrywa położenie źrenic, które oświetlane są niewidzialnym dla człowieka światłem podczerwonym. Podczerwień odbija się od oczu, tworząc odbicia stanowiące dobrze widoczne w źrenicach refleksy, za pomocą których można zidentyfikować miejsce, w które w danym momencie badany patrzy (Garczarek-Bąk, 2016).

Eye tracking i marketing. (Wedel, Pieters, 2008[3]; Kaczmarek, 2012[4]; Horsley, 2014[5]; Wąsikowska, 2015[6]; Garczarek-Bąk, 2016). Przykładami zastosowania eye trackingu są tu np. badania nad percepcją materiałów reklamowych, zdjęć rozmaitych produktów (np. w różnych opracowaniach), rozmieszczenia towarów, elementy wystroju skutecznie angażujące uwagę, zauważalność logo i marki, projektowane i wykonywane w celu wyjaśniania czynników, determinujących zachowania konsumenckie – decyzje zakupowe, czynniki wyborów czy prezentowane postawy (jawne i utajone). Na potrzeby tej gałęzi badań utworzono nazwę neuromarketingu (Mruk, 2008[7]; Ohme, 2011[8]).

Eye tracking i zdrowie. W dziedzinie medycyny i psychologii zdrowia śledzenie oczu jest wykorzystywane do badania skutków różnych chorób oraz zachowania i procesu decyzyjnego osób w różnych przypadkach związanych ze zdrowiem – stał się on narzędziem do badania wzrokowej uwagi i poznania oraz diagnozowania w różnego rodzaju procesach chorobowych (Harezlak et al., 2017[9]; Raudonis et al., 2009[10]; Yang et al., 2013; Garcia-Blanco et al., 2015; Gillespie-Smith, Fletcher-Watson, 2014[11]). Interesującą ścieżkę stanowią tu także badania nad zastosowaniem okulografii do analizy danych medycznych, w tym wizualizacji kognitywnych (Pilipczuk, 2013; Pilipczuk, Eidenzon, 2013[12]). W ostatnim czasie na szczególną uwagę zasługuje także użycie eyetrackingu w badaniach nad metodami symulacyjnymi w medycynie (Law et al., 2004[13]; Wilson et al., 2011[14]).

Eye tracking i ergonomia. Do tej pory ergonomia, badana za pomocą eye trackerów rozumiana była głównie jako badania użyteczności (telefonów komórkowych, paneli sterowania, kokpitów, urządzeń RTV i AGD,

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14 Wilson MR, Vine SJ, Bright E, Masters RS, Defriend D, McGrath JS. Gaze training enhances laparoscopic technical skill acquisition and multi-tasking performance: a randomized, controlled study. *Surg Endosc*. 2011;25(12):3731–9.

a nawet stanowisk pracy). Testowano więc np. łatwość i intuicyjność obsługi rozmaitych urządzeń, prawidłowość urządzenia stanowisk pracy, skuteczność rozwiązań makro- i mikronawigacji sklepowej, dostępność potrzebnych elementów, ewentualne dystraktory, analizowano czytelność aplikacji internetowych, infografik, sprawdzano systemy informacji publicznej, oznakowania na drogach, rozmieszczenia elementów na kartach wyborczych, itp. Szczególną wagę mają tu też badania obciążenia zadaniowego, np. kierowców bądź pilotów (Merkisz et al., 2015[15]).

Eye tracking i edukacja. Istnieją również prace, w których wykorzystywano eye tracking do innych celów, takich jak terapia lub poprawa edukacji (Studer et al., 2010[16]; Manelis, Reder, 2012[17]; Błasiak et al., 2013; Kraus, Horowitz-Kraus, 2014[18]; Wang et al., 2014[19]; Wawer, 2014[20]; Piotrowska, 2014[21]; Paśko, 2017), także w odniesieniu do różnych grup odbiorców (Josephson, Holmes, 2004[22]; Tullis et al., 2007[23]). Badania eyetrackingowe pozwalają śledzić przebieg ścieżki wzroku w czasie oglądania zarówno obrazu statycznego, jak i ruchomego, a także poszczególne etapy oraz optymalny czas rozwiązywania zadań problemowych. Na podstawie wyników analizy zapisu przemieszczania się wzroku można określić optymalny czas wyświetlania obrazu (Paśko, 2017). Wyniki badań eyetrackingowych można wykorzystać w trzech aspektach. Jednym z nich jest optymalizacja procesu uczenia się i nauczania oraz przygotowanie strategii indywidualnego oddziaływania na ucznia w tym procesie. Drugi aspekt obejmuje problematykę związaną z doborem i tworzeniem środków dydaktycznych, które będą w najbardziej optymalny sposób oddziaływać na uczących się. Po trzecie rezultaty tych badań dają możliwość wykrywania u uczniów ewentualnych dysfunkcji w procesie myślenia (Paśko, 2017[24]).

Eye tracking i wsparcie osób niepełnosprawnych. Eyetracking jest techniką, za pomocą której osoby sparaliżowane mają możliwość swobodnego kontaktowania się ze światem zewnętrznym. Technologia ta oferuje wsparcie osobom niepełnosprawnym przez rozpoznanie poleceń wydawanych za pomocą wzroku: osób z zaburzeniami neurologicznymi, jak i osób z udarem mózgu, urazami mechanicznymi w obrębie głowy, szyi, tułowia i kończyn, które często zachowują poprawnie kontrolowaną aktywność wzrokową. Na podstawie rezultatów szeroko zakrojonych badań z użyciem tej metody w roku 2011 stworzono na przykład pierwszy tablet, pomagający osobom niepełnosprawnym w kontaktach z otoczeniem (Pilipczuk, 2014[25]).

Wydaje się także, że eye tracking może być szerzej wykorzystywany w badaniach ergonomii środowiskowej, głównie w obszarze optymalizacji warunków funkcjonowania jednostek w określonych warunkach, co wyraźnie sugeruje wynikające stąd implikacje dla urbanistyki i projektowania przestrzennego (Tuszyńska-Bogucka et al., 2018).

15 Merkisz J, Markowski J, Fuć P, Galant M, Przegląd metod pomiaru obciążenia zadaniowego operatora w badaniach z wykorzystaniem symulatorów. Logistyka 2015, 3: 3188–3194.

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21 Piotrowska I, Okulografia w badaniach postrzegania i konstruowania wiedzy geograficznej. Prace Komisji Edukacji Geograficznej 2014, t. 3, s. 175–189.

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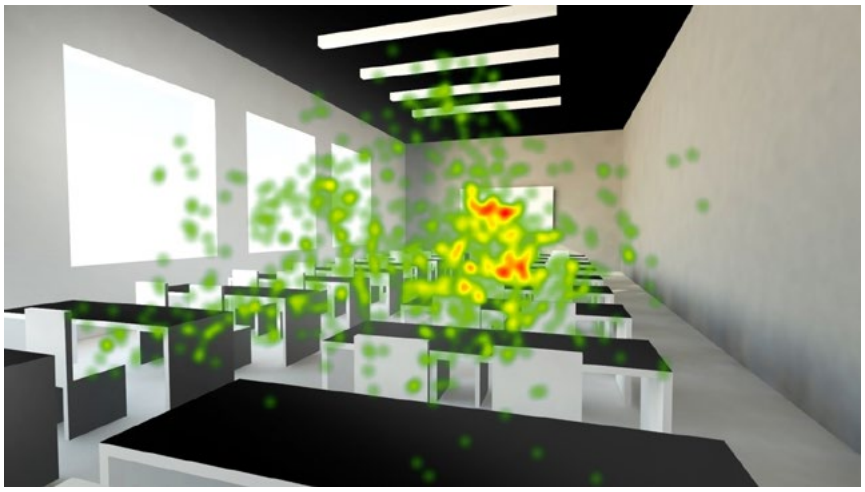
Dane dostarczane dzięki użyciu eyetrackingu

Eye tracking umożliwia bardzo precyzyjne przedstawienie zachowań gałek ocznych jednostek. W literaturze przedmiotu wyróżnia się trzy podstawowe atrybuty badań, takie jak: lokalizacja, czas trwania i ruch. Typowy pomiar eye trackingowy opiera się na analizie dwóch podstawowych aktywności narządu wzroku – ruchu gałek ocznych (sakkad) oraz ich bezruchu (fiksacji):

- fiksacji – ruchów gałek ocznych, które stabilizują siatkówkę nad nieruchomym obiektem (trwają one od 100 do 600 milisekund);
- sakkad – szybkiego przeniesienia wzroku z jednego punktu skupienia na drugi (zajmują od 20 do 40 milisekund);
- całkowitego oraz średniego czasu poświęconego na oglądanie materiału;
- ilości rewizyt – ponownego oglądania danych elementów [Duchowski 2007; Kabaja, Kruka, 2017].

Ruchy sakkadowe charakteryzują się następującymi parametrami ilościowymi: latencją, amplitudą oraz czasem trwania i prędkością. Fiksacja wzrokowa umożliwia gałkom ocznym utrzymanie obrazu nieporuszającego się obiektu w obrębie plamki żółtej poprzez minimalizację dryfu gałki ocznej. W przypadku zsunięcia się obrazu obiektu z plamki żółtej układ generuje sakkadę korekcyjną o niewielkiej amplitudzie, tzw. mikrosakkadę (Kabaja, Kruka, 2017). Zebrane podczas badania *eye trackingowego* dane dotyczące liczby, czasu i miejsc powstawania sakkad oraz fiksacji są podstawowym narzędziem umożliwiającym dokonanie analizy i interpretacji uzyskanych wyników. Inną formą wizualizacji i prezentacji zebranych podczas badania eye trackingowego danych są ścieżki patrzenia (mapy fiksacji). Obrazują one miejsca fiksacji wzroku, czas ich trwania, kolejność oraz łączące je sakkady.



Ryc. 1. Przykładowa mapa cieplna punktów charakterystycznych o najdłuższym czasie obserwacji przez uczestników badania eye-trackingowego.

źródło: Tuszyńska-Bogucka et al., 2018

W wyniku realizacji badania eye trackingowego można uzyskać informacje o tym, gdzie patrzy użytkownik, jakie elementy są zauważane jako pierwsze, które przyciągają najwięcej uwagi, a które są ignorowane, a także to, jakie elementy sprawiają mu problem – co może wynikać z dłuższych czasów fiksacji (Garczarek, Bąk, 2016[26]).

Oprócz tego danymi najczęściej analizowanymi są tzw. mapy ciepła. Ideą tej formy przekazywania danych jest użycie poszczególnych barw dla obszarów, które skupiają uwagę osób badanych (**bardzo przystępna forma graficzna obszarów, na których użytkownicy skupiali swój wzrok**). I tak barwa czerwona oznacza obszary, które cechowały się najdłuższym czasem i najwyższą częstotliwością obserwacji, barwa żółta nieco mniejszym, a zielona – najmniejszym zainteresowaniem. Obszary bez żadnej barwy oznaczają miejsca pominięte. Inne analizowane informacje to tzw. AOI – obszary zainteresowań (Jordanowski, Chojnacki, 2009[27]), a więc te fragmenty

26 Garczarek-Bąk U, użyteczność badań eye trackingowych w pomiarze utajonych determinant zachowań zakupowych nabywców. Ekonometria 2016, 3(53): 54–71.

27 Jordanowski P, Chojnacki W, Obszary zainteresowań (ang. area of interest – AOI) jako metoda analizy wyników badania eye tracking. Interfejs użytkownika – Kansei w praktyce 2009, 107–118. Retrieved from https://repin.pjwstk.edu.pl/xmlui/bitstream/handle/186319/128/kansei2009_Jardanowski_Chojnacki.pdf?sequence=1 [access: 2018–11–12].

bodźca wizualnego, które budzą szczególne zainteresowanie (szczególnie użyteczne np. w badaniach, które elementy prezentowanego obrazu budzą największe zainteresowanie). Na rys. 1 zaprezentowano jako przykład aktywność oczu (mapa cieplna) w trakcie oglądania materiału eksperymentalnego (Tuszyńska-Bogucka et al., 2018) w badaniach nad znaczeniem emocjonalnym przestrzeni edukacyjnej.

Wiedza o tych procesach, a w szczególności informacja na temat czasów fiksacji, prędkości, liczbie oraz częstotliwości ruchów sakkadycznych, może być niezwykle cennym materiałem ułatwiającym zrozumienie mechanizmów percepcji wzrokowej. Dodatkowe elementy, takie jak np. aktywność źreniczna mogą z kolei przyczynić się do pogłębienia wiedzy na temat efektu emocjonalnego prezentowanego obrazu (Partala et al., 2000[28]; Onorati et al., 2013[29]).

Niniejsze omówienie nie wyczerpuje całości zagadnienia, jakim jest wielość i złożoność dostarczanego przez eye tracking danych, sygnalizuje jedynie ich potencjalną wartość w badaniach różnego typu.

Eye tracking w urbanistycznych badaniach eksperymentalnych

Obecnie metoda eye trackingu zaczyna być stosowana także w sztukach pięknych (malarstwie, sztukach audiowizualnych), gdzie najciekawsze zastosowania dotyczą okoruchowych korelatów piękna (Francuz, 2013[30]; Kędziora, 2016[31]), uniwersalności języka abstrakcji (Brinkmann et al., 2014[32]) oraz analizy performance (Kuś, 2015). Zdaniem autorów artykułu metoda ta może być także z powodzeniem stosowana w badaniach nad krajobrazem kulturowym w aspekcie urbanistyczno-architektonicznym oraz ogólnie w badaniach nad przestrzenią architektoniczną pod kątem m.in. jej jakości oraz rodzaju wywieranego efektu (Kabaja, Kruka, 2017[33]; Rusnak, Szewczyk, 2018[34]), nie tylko estetycznego, ale także psychologicznego. Postulat ten opiera się na twierdzeniu, iż dobór optymalnego rozwiązania powinien opierać się nie na subiektywnych preferencjach, a na poszerzonych analizach interdyscyplinarnych zespołów badawczych (Rusnak, Szewczyk, 2018).

Wydaje się, że eye tracking może więc stanowić metodę urbanistycznych badań eksperymentalnych. Współczesne badania w tym obszarze dotyczą głównie kontroli równowagi w otoczeniu urbanistycznym, których efektem są wskazania przykładów zmian i interwencji, których konsekwencje można zbadać przy użyciu eye trackingu (Rusnak, Szewczyk, 2018). Dotyczy to zarówno układu przestrzennego wnętrz, wpływu architektury na zachowania i orientację osób weń przebywających, zbadania skuteczności oznaczeń ewakuacyjnych czy efektów oddziaływania przestrzeni architektonicznej na rożne grupy odbiorców. Podsumowując, w tym obszarze badań metoda eye trackingu może być pomocna w wyjaśnieniu braku pełnego zrozumienia między ogółem odbiorców i użytkowników przestrzeni architektonicznych, a środowiskiem profesjonalistów (Rusnak, 201[35]7; Rusnak, Szewczyk, 2018).

Obecnie zaznacza się także silne zapotrzebowanie, aby lepiej konceptualizować projekty technologiczne i konteksty przestrzenne użytkowania rozmaitych przestrzeni – np. szkół, szpitali czy urzędów. Oznacza to, że powinniśmy bardziej bezpośrednio angażować się w ich projektowanie i ocenianie, aby w ten sposób postrzegać przestrzeń jako integralną część „technologii", która może pośredniczyć w rozmaitych procesach – np. uczeniu

28 T. Partala, M. Jokiniemi, V. Surakka, "Pupillary responses to emotionally provocative stimuli" in *Proceedings of the 2000 symposium on Eye tracking research and applications*. ACM, pp. 123–9, 2000.

29 F. Onorati, R. Barbieri, M. Mauri, V. Russo, L. Mainardi, "Characterization of affective states by pupillary dynamics and autonomic correlates," Frontiers in Neuroengeenering, vol. 6, no. 9, eCollecton 2013. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3818468/ [access: 2018–11–10]

30 Francuz P., Imagia – w kierunku neurokognitywnej teorii obrazu. Lublin. Retriewed from: http://afterimagia.pl/book/ system-kadrowania-sceny-wizualnej/(access: 2018–05–11].

31 Kędziora Ł, Wykorzystanie badań okulograficznych w historii sztuki, [w:] Badania i Rozwój Młodych Naukowców w Polsce. Nauki humanistyczne i społeczne, tom 1, Poznań 2016, s. 25–32.

32 Brinkmann H, Commare J, Leder H, et al. Abstract Art. As a universal language? Leonardo 47/3, 256–257.

33 Kabaja B, Kruka M, Możliwości wykorzystania metody *eye tracking* do badań nad historyczną przestrzenią architektoniczną w kontekście jej postrzegania przez użytkowników (na przykładzie Rabki-Zdroju). Część 1. Uwagi wstępne. Wiadomości Konserwatorskie/*Journal of Heritage Conservation 2017,* 52: 74–85

34 Rusnak M, Szewczyk J, Okulograf jako innowacyjne narzędzie konserwatorskie. Propozycja poszerzenia zakresu badań, dotyczących dziedzictwa architektury i urbanistyki. Wiadomości Konserwatorskie/Journal of Heritage Conservation 2018, 54: 25–35.

35 Rusnak M. Eye tracker as a reserch tool for studying architectural heritage. In: V International Polish Eye Tracking Conference, Lublin, 2017, 23–24.

się. Wiedza, jak bardzo przestrzeń i funkcjonowanie jednostki (w każdym obszarze, a więc funkcjonowanie emocjonalne, intelektualne czy społeczne) są ze sobą powiązane wciąż nie jest pełna, stąd wynika konieczność badań nad tym zagadnieniem i określeniem kierunków w badaniach nad projektowaniem i oceną przestrzeni (Woolner et al., 2007[36]; Tuszyńska-Bogucka et al., 2018). Metoda pomiaru eye trackingowego wydaje się być interesującym sposobem badania reakcji na rozmaite typy wnętrz i przestrzeni, co daje szansę na ich lepsze zaprojektowanie w bardzo wstępnej fazie realizacji projektu architektonicznego, a więc już na etapie konceptualizacji. Stwarza to dodatkową wartość aplikacyjną, pozwalającą zmniejszyć ewentualne koszty. Warto tu wymienić np. serię eksperymentów nad diagnozą charakteru przestrzeni szkolnych czy szpitalnych (Meyer, 1992; Reiling, 2006; Painter et al., 2013; Skałbania-Gretkowski, 2015; Szewczenko-Benek, 2015[37]), także z użyciem eye trackingu (Tuszyńska-Bogucka et al., 2018[38]). Jest to nawiązanie do poprzedniego nurtu badań, gdyż podobnie tu zapis i analiza procesu patrzenia na dany obiekt czy przestrzeń mogłyby stanowić klucz, najpierw do zrozumienia tego, jak człowiek wizualnie odbiera przestrzeń, a następnie do optymalnego jej aranżowania – podkreślenia elementów istotnych i wycofania dysharmonijnych (Rusnak, Szewczyk, 2018), zapewnienia ergonomii kolorystycznej i przestrzennej, itp. Może to mieć zastosowanie w projektowaniu przestrzeni architektonicznych, także takich, jak szkoła, szpital czy też budynki użyteczności publicznej, a więc przestrzeni, odgrywających ogromną rolę w kształtowaniu przyjaznego środowiska życia i funkcjonowania jednostki i społeczeństwa.

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Eyetracking as a method to create new possibilities in urbanistic experimental research

Abstract: Eye tracking, and thus the method of testing oculomotor activity among various applications, also creates a unique opportunity for research in experimental urbanization. Due to the large amount of data provided by this method, it not only shows how to look at buildings and the surrounding space, but also the emotional reactions that they cause in the recipient, contributing to the creation of so-called. a friendly architectural environment. Assuming interdisciplinary cooperation and discussion of specialists in the fields of psychology, architecture and computer science, it seems that contemporary oculography can become a tool harmoniously integrating activities, which in turn increases both knowledge about the effect of architectural space on a human being, and how to plan it, that it actively contributes to the optimization of the living conditions of modern man based on objective data.

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Recovery of urban development stages of town Rashkiv

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Summary: In this article, the authors considered the development of Rashkiv (Raszków in Polish and Raşcov in Rumunian), the fortified settlement which is situated on the Middle part of the Lower Dnister Region. An attempt of reconstruction of the most important stages of its town-planning biography of the 15th-18th centuries was made. The authors based their research on newly identified sources. The systematization of the historical chronology of the most important events which have influenced the formation of the defensive structures and the urban environment of Rashkiv has been carried out. In the course of the 15th-18th centuries, four major urban planning periods were identified: the Lithuanian – fort Karaul in the form of a defensive roundel type castle, further – Zamoyski's town fortress with a fortified downtown, then – the fortifying of the suburbs and, finally, – trade and handicraft town without any defense function. At each stage, an attempt was made to hypothetically localize separate elements of the city – fortifications, historical roads, street planning system, civil and sacral dominant elements. The authors all available source data – archival sources, historical and contemporary cartography, toponymics, field surveys, surveys, and iconographic materials for analysis.

Remains of the 1st period represent today ruins of earth shafts under the fortress. This hillfort is monument of archeological heritage and it is protected by state. Ukrainian historian M. Hrushevskyi connects appearance of the fort here with necessity todefend the river crossing and the trading way.

From the 2nd period we have today just two preserved bastions of the early of 17th century and some relicts of urban planning system, for example, part of the historical market square.

The article also substantiates the value and necessity of preserving the historical plan of Rashkiv which was, in particular, developed under the influence of the development of defense strategies of its time.

3rd period was graphically hypothetically reconstructed in many ways. To a greater extent it is because we have not enough materials to create a definite model of the urban development of this period.

Research is based on historical topographic works of 17th and 18th centuries and onlysince the early 19th century we have more detailed historical plans to make more far reaching hypotheses. Using historical photos of early 20th century, authors succeeded in discovering historically determined rhythm of urban environment in Rashkiv. Unfortunately, it is disappearing now due the physical ruining of historical substance of old town and reconstruction according present-day inhabitants' ideas about country houses or summer cottages.

The present results are significant in elaborating historical and reference architectural plan of the settlement, registration of the newly discovered objects of cultural heritage as monuments of architecture and urban planning, archeology, history and nature. New master plan of Rashkiv urban development should be based on our complex architectural and urban planning research to preserve cultural legacy of Rashkiv and to use it for modern economical and tourist revival.

Keywords: town of Rashkiv (Raszków), Podilia, Dnister, urban structure, fortification, castle, settlement, urban development, 15th-18th centuries.

State of the problem. Analysis of the results of previous studies

The numerous mentioning of the town of Rashkiv (Raszków in Polish) in the famous trilogy of the Polish writer Henryk Sienkiewicz testifies to the extraordinary role of this fortified place in the historical events of the 17th

century. What were the architectural and urban structure and the system of fortifications of this former well-fortified town, which is now a village, the traces of ancient greatness of which can be read only by the eyes of a very experienced professional researcher.

As of today, comprehensive historical and architectural studies of Rashkiv have not been conducted. A significant problem is the lack of historical documentary records, some of which had been made public in the second half of the 19th century, and the originals were lost during the Second World War. The only meaningful work devoted to Rashkiv is the article by Volodymyr Antonovych from 1897 called "Нѣсколько данныхъ о землевладѣніи въ южной Украинѣ въ XV столѣтіи" [Some data on land tenure in southern Ukraine in the 15th century] [1], in which an essay describing the history of the town with the attempt to localize the Lithuanian castle Kalaur (Karavul) is provided. There is a mentioning of Kalahur also in the work of Molchanovskyi from 1885. [2]. The research of the history of Lithuanian Rashkiv-Karavul was also joined by M. Hrushevskyi during the preparation of a review of the aforementioned article by Antonovych [3]. Local history information about Rashkiv was published by Guldman, Sytsynskyi, Bilynskyi and Lipynskyi and Dr. Antoni (J. Rolle). "Słownik Geograficzny..." mistakenly dates Rashkiv back to 17th century. [4]. No materials about the study of the historical and cultural heritage of Rashkiv by Ukrainian scholars during the interwar period were found. After the inclusion of the Ukrainian Transnistria to the Moldavian SSR, the historical heritage of Rashkiv was isolated from the Polish and Ukrainian contexts, and as a result it led to a number of inaccuracies in the interpretation of cultural heritage objects. So, the Soviet Moldavian archaeologists Chetraru and Hîncu considered the castle Karaul, already discovered by V. Antonovych in 1888, as fortification of the Russian army of 1711, which forced a crossing over Dnister to help the Moldovan Voivode [5] . The absurdity of this statement will be explained below. Castle Karaul was included to the neighboring Caterinovca village council and no longer appeared in the information about Rashkiv. In addition, the development of the historic-architectural key plan of Rashkiv in the 1970's by the state project institute "Moldgiprograzhdanselstroy" in Chișinău was conducted without taking the entire historical heritage into account. On their key plan, only dispersedly located objects of the Baroque architectural heritage of the 18th century are marked, and disharmonious objects of the Soviet period in the historic center are defined as "having architectural merit", historic valuable and ordinary buildings in most cases were offered for demolition. In accordance with this key plan, in 1975, a new general plan of the village [6] and a detailed plan of the central part were worked out. Plans developers – V. Ostrovsky, V. Postoyeva, T. Rodionova., O. Dubrovskaya – obviously neglected the historical heritage of the town. Fortunately, this general plan was not implemented, and with the collapse of the USSR and the establishment of the unrecognized Pridnestrovian Moldavian Republic's authorities in Rashkiv, all work on the research of the architectural environment of Rashkiv also were ceased.

The development of our hypotheses concerning the development of Rashkiv relies on the work of Ukrainian scholars S. Kravtsov [7], M. Bevz [8, 9], O. Rybchynskyi [10, 11] and the formulated by them theoretical principles of identification of the historical and urban structure of cities and towns of the Western and Right-bank Ukraine. Taking into account the location of Rashkiv in a single cultural space with the mentioned territories and colonization movements from west to east and from north to south in the 15th-18th centuries in the territory of Ukraine, our research is based on the techniques developed in the above-mentioned papers.

Objective of the article: to analyze materials on the history of Rashkiv, to explore the town on site, to discover the remnants of the historical planning structure and fortifications; to reconstruct on this basis the processes of the urban genesis of the town in the 15th-18th centuries.

Fig. 1. Location plan of Rashkiv (Raszków, Raşcov).

Introduction. The historic town of Rashkiv de jure is located on the territory of the Transnistrian region of the Republic of Moldova (de facto it is controlled by the unrecognized Pridnestrovian Moldavian Republic) in the Camenca district on the picturesque left bank of the Dnister (Fig. 1). Before the second division of Poland it was its border outpost on the border with Turkish Moldova. It was founded in the 15th century by Grand Duke Vytautas, gained the city status during the possession of Jan Zamoyski at the end of the 16th century. His son, Tomasz, fortified the town according to the project by Andrea dell'Aqua in the early 17th century. At the end of the 18th century, Russian imperial authorities deprived Rashkiv of its urban status, and in Soviet times, Rashkiv became an ordinary village. All this lead to decay of the central historical part. Today, it becomes relevant to find out the biography of the town's architectural and urban environment and to identify its authentic elements.

Presentation of research results

Based on the study of all available published and archival sources, the authors have reconstructed the course of all historical events associated with the town. The beginnings of the settlement are connected with the time when the territory of Lower Part of the Dnister region was part of the Lithuanian-Ruthenian state. Based on data of I. Daniłowicz, it can be assumed that in the place of the current Rashkiv there was a fortified point in the interval between 1402 and 1411. [14]. Molchanovskyi disproves this date, and dates it back to 1432. [2]. The same dating is confirmed by Hrushevskyi [3] and by most contemporary researchers of the history of the Grand Duchy of Lithuania. Although until 1432, Karaul castle was referred to at least in the year 1411 in the chronicle of Długosz about the visit of King Władysław Jagiełło to the border fortresses [12]. Since among the Podilian towns in the document on the purchase of Podilia by Vytautas from Jogaila dated 1395 we do not find Karaul [2, 13], it is possible to establish the chronological limits of its origin and construction exactly between 1395 and 1411.

In 1442, a documentary confirmed transfer of Karaul and Rashkiv by the Polish King Władysław III to the nobleman Teodoryk Buczacki took place. Although M. Hrushevskyi considers the possession over Kalaur by Teodoryk Buczacki as nominal [3], it is difficult to agree with him, knowing the active construction and fortification activities of the members of the Buczacki family.

Table 1. Analysis of the chronology of Rashkiv main historical events according to published and archival sources

Year	Event	Ownership	Type of fortifications
1402/1411	1st mentioning of Kalaur (Karaul), founded by the Grand Duke of Lithuania Vytautas [14: 330–331; 15:111–115; 16]	State (Grand Duchy of Lithuania)	*Castra* (castle)
1442	Transfer of Karavul and Rashkiv to Teodoryk Buczacki by the Polish King Władysław III	Private (Teodoryk Buczacki Jazłowiecki)	–//–
1545	Development of Rashkiv	Private (Hrytsko Chechel)	Unknown
1590s	Purchase by Jan Zamoyski	Private (Jan Zamoyski)	Castle-residence + *osada* (settlement)
1600	Capture of Rashkiv and of the castle by K. Ostrogski	Private (prince Vasyl Konstanty Ostrogski)	–//–
1617	Voluntary destruction of Rashkiv and the castle by Poles at the request of the Turks	Private (prince Aleksander Ostrogski)	Ruined
1625	Fortification of the city according to the project of Andrea dell'Aqua by subordinate of T. Zamoyski Jerzy Trzycki	Private (Tomasz Zamoyski)	Wooden castle, earthen bastion town fortifications
1633	Destruction of fortifications by Abaza Pasha's troops	–//–	–//–
1634	Restoration of fortifications, the request of Sultan Murad IV to demolish the fortresses of Rashkiv, Yampil and Mohyliv [17: 150–151]	–//–	–//–
1646	Award for Jerzy Trzycki from Tomasz Zamoyski for long-term work in the development of Rashkiv [1]	–//–	–//–
1648	Inclusion of Rashkiv to Bratslav regiment	Private (St. Koniecpolski (de jure)/Tymish Khmelnytsky (de facto)	–//–
1652	Marriage of Tymish Khmelnytsky with Ruxandra Doamna	Private (St. Koniecpolski (owner)/ Ruxandra Doamna Khmelnytsky (hypothecary ownership)	–//–
1665	Capture of Rashkiv by Hetman Petro Doroshenko		–//–
1671	Capture of Rashkiv by Great Crown Hetman Jan Sobieski		–//–
1675	Capture of Rashkiv by Ibrahim Pasha [18:136], mentioning about a fortified monastery [19: 106–107]		–//–
1699–1703	Rashkiv's return to Poland under the conditions of the Treaty of Karlowitz	Private (princes Koniecpolski)	–//–
1711	Purchase of Rashkiv by the family of princes Lubomirski	Private (princes Lubomirski)	–//–
1728	Restoration of city fortifications by Lubombirski's constable Michal Roguzki	Private (Jerzy Lubomirski)	"walls"
1734	Haidamakas rebellion headed by Sava Chalenko	–//–	–//–

1749–1786	Construction of the Armenian-Catholic Church at the cost of the priest Krzysztofowicz	Private (Stanisław Lubomirski)	Decay of fortifications
1769	The last attack of the Crimean Tatars on the settlement along the Dnister, destruction of Rashkiv	–//–	
1778	Construction of the Ukrainian Orthodox church of the Holy Trinity on the initiative of Kyiv's priest Palukhovych	–//–	
1780s	Construction of the new stone Greek Catholic church of Our Lady's Mantle	–//–	
1792	Second partition of Poland, the transformation of Rashkiv into a town	Private (Aleksander Lubomirski)	
1796	Purchase of Rashkiv by Catherine II for the state treasury	State (Russian Empire)	
1801	Transfer of Rashkiv to Volhynian governor Tutolmin. Demolition of the Assumption and Ascension churches, resettlement of the Armenians	Private (Alexey Tutolmin)	
1860	Sale of Rashkiv to Barchevsky	Private (Sobeslav Barchevsky)	
1913	Construction of a zemstvo school	Private (Pavel Yurevich)	
1924	Creation of the Moldavian ASSR within Ukraine	Property right canceled	
1929	Creation of the collective farm "Truzhenik", forced collectivization, repressions		
1940	Cancellation of the Moldavian ASSR, inclusion of the region to the Moldavian SSR		
1967	Construction of a community center		
1990s	The restoration and opening of the Orthodox Holy Trinity Church and the Roman Catholic Church of Saint Cajetan		

Localization of the Kalaur castle of the 15th century and of the Rashkiv settlements

It is believed that the Castle of Kalaur on the Dnister was founded by the Grand Duke of Lithuania Vytautas to protect the southern borders of his state. The castle was first discovered and generally described by Aleksander Jabłonowski at the end of the 19th century. [1; 20:11]. According to his information, in 1888, V. Antonovych was there with his scientific expedition and described in details the remnants of fortifications in his article. [1]. Then he was found and published a document – an extract from the Vinnytsia city books dated 1580, which confirmed the hereditary connection of the fortress Kalaur (Karaul) and the Rashkiv settlement, which arose as a trading quarter outside of the fortress. The location of the castle in this area was caused by the following factors: the presence of a ford across the Dnister and, accordingly, of a crossing, and of a rocky inaccessible cape[1], from which a perfect view of the Dnister valley opens. Exactly on the corner of this cape the fortress was built. Its earthen fortifications included a rampart and a ditch which formed a half-circle on the side of the fields; on

1 Nowadays the cape is called "Chervonka", or "Chervoni Skeli" [Red rocks]

the corners of the rectangle of the fortress were roundels, massive round bastion towers. The castle, as evident from its name[2], performed a purely observational function and was not built for a long-lasting siege or assault.

Interestingly, in 1442, when Podilia was occupied by the Poles, Kalaur, together with Khadjibey (Odesa) and the Black City, were given for lifelong ownership to Teodoryk Buczacki Jazłowiecki with an order to restore fortifications [21, 22:25]. The questions about the measures taken here by Teodoryk still remain unclear. Perhaps he carried out only minor modernization works in the castle. Some scientists believe that he did not start any serious construction works, since in 1469 in the act of division of the Buczacki estates, Karavul was mentioned only as a village without any fortifications [23: 330]. In 1564, Karavul together with the mentioned settlement appears in the list of hereditary lands of the Jazłowieckis [24: 363], although in fact it was then owned since at least 1545 by the Chechels-Sidimuntovichs [25:] who then sold it to Jan Zamoyski.

The remnants of the fortress are recorded in the pace method survey of S. Kovalenko of 2006. The width of the earthen rampart is 10–12 m, the height is up to 5 m. The state of the settlement is unsatisfactory, it is located under the woods, the top of the rampart is destroyed by later digging and holes of animals, the edges are wavy, the rampart has slid a lot. The ditch is almost not preserved. In the north-eastern section, there is a passage that levels down the rampart along its full vertical extent. After removing trees and shrubs, the settlement can be studied as a fixed site [26:18].

Regarding the location of the settlement itself, it is not possible to establish it precisely. We only assume that it was located in the area of the central part of the present Rashkiv. This version has indirect confirmation: on the banks of the river, near the crossing, along trade routes, in the valley of the Dnister and the Rashkiv River, this location was most convenient for location of the settlement, and the lengthy market square, which was still there in the 19th century, was typical for settlements of the 15th-16th centuries, which inherited the principles of the Rus` law (Fig. 2).

Fig. 2. Hypothetical reconstruction of the town-planning period of Rashkiv at the beginning of the 15th century 1. Fortress-Castle Karaul (Kalaur, Karawol). 2. Settlement of Rashkiv. 3. Crossing of the Dnister

2 Kalaur aka „Karaul" [guard duty]

Localization of urban fortifications and the castle of the Zamoyskis at the end of the 16th – 1st half of the 17th century

After purchase by Chancellor of Poland Jan Zamoyski of the territories in Lower Dnister Region, he immediately addressed the issues of defense and colonization of these lands. For the defensive castle he chose the area at the mouth of the Rashkiv River. [27]. The castle was wooden; in 1600 it was destroyed and captured by the people of Kyiv voivode Prince Konstanty Ostrogski as a result of the conflict between Jan Zamoyski and Princes Ostrogski [28: 89–90]. The map of the Podolian Voivodeship by Beauplan shows us Rashkiv as a town fortified with two unclosed half-circles of defensive lines, and the Dutch geographer Andreas Cellarius described Rashkiv as a "mighty fortress on the border of the desert steppe" [29: 368]. Such powerful fortifications appeared, apparently, under the rule of the son of Jan Zamoyski - Tomasz - who had the Venetian architect Andrea dell'Aqua at his court. This military architect fortified Brody, perfected the fortress of Zamość, designed the castle in Zbarazh and the palace in Pidhirtsi and built a tower at the Cracovian Gate in Lviv. He sent the project of fortifications of Rashkiv to Tomasz Zamoyski in 1625. [30: 29–31].

The hypothetical planning scheme of the town and fortifications of this period was elaborated on the basis of remnants of the earth bastions, and some planning landmarks – market space, historical roads and configuration of the terrain – found on the site. (Fig. 3) The most difficult question is the location of the Zamoyski's castle. Since the map of Beauplan does not depict it. Taking into account the protests of Zamoisky's constables in 1600 about the founding of the castle at the mouth of the Rashkiv River and analyzing the relief, as the probable location of the castle the site on the corner of a flat hill was chosen. In favor of this hypothesis speaks also the fact of location of the administration of the lords, or of the court in the likely castle area before 1917, which may indicate the continuity of the separation of urban and castle (landlord's) territories. At this stage, the most plausible option is the conjugate combination of city and castle fortifications, as was the case in Bar, Chyhyryn, Medzhybizh and Zhvanets.

Fig. 3. Hypothetical reconstruction of the planning of the city center of Rashkiv, beg. of 17th century (left). Applying a traverse sketch of fortifications of the 17th century. on the modern orthophotomap (right): 1 – Remaining fragments of ramparts of the city center. 2 – hypothetical reproduction. 3 – probable location of the wooden residence castle

Localization of fortifications of the suburbs

The growth of the population led to construction of housing in the suburbs which also needed to be defended. We have much more information about Rashkiv in the middle of the 17th century. First, there are recorded memoirs of travelers Evliya Çelebi and Patriarch of Antioch Macarios, who mention the fortress of Rashkiv, and Patriarch Makarios added about a wooden castle with guns. Cellarius calls Rashkiv a "mighty fortress on the border with desert steppe". Given that in 1671 there was a garrison of 7 cavalry chorągiews of the Polish army [31: 584] (700–1000 people) in Rashkiv, we can assert that Rashkiv was a rather significant military argument of Poland in its southern borderland. On the map of Beauplan, Rashkiv is depicted as being fortified with two semi-circles of fortifications. This suggests that the project by Andrea dell'Aqua was implemented, and the expansion of Rashkiv (in 1654 there were 7 churches, thousands of inhabitants and a monastery in the town) led to the need to fortify the suburbs. Unfortunately, the only source maps for these fortifications are the maps of Beauplan, Friedrich Wilhelm Bauer and Rizzi Zannoni. Based on them, analyzing the present planning structure of Rashkiv, we can conclude that the outer perimeter of defense was not closed and adjoined the Dnister with its western end, and the Rashkiv River with its north-eastern end. The hypothetical outline of fortification of the suburbs is based on the study of relics of urban planning and some landmarks, in particular, the Jewish cemetery, the first gravestone of which dates back to 1709 when these fortifications still existed. Obvious is also that there was a bastion belt corresponding to its time and fixed on the mentioned maps. Thus, from the north, the settlement was covered with natural protection – the Rashkiv River – and the castle fortifications, which, as noted above, were connected with the city fortifications (Fig. 4).

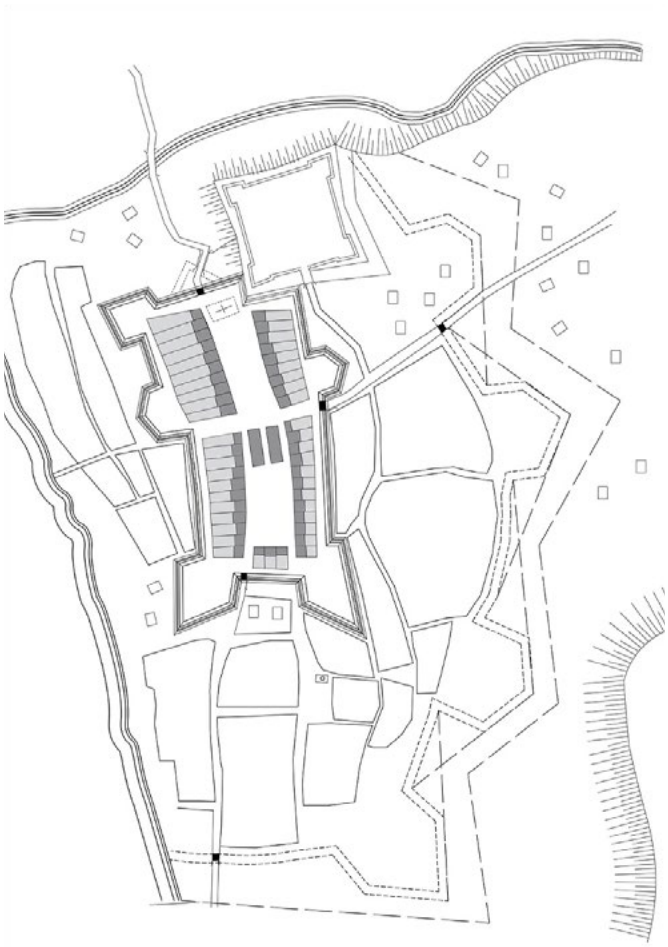


Fig. 4. Hypothetical reconstruction of Rashkiv's planning with fortified center and suburbs in the middle of the 17th century.

Table 2. Analysis of historical mapping of the 17th-18th centuries.

No.	Name of the map	Author	Year	Depiction of Rashkiv on the map	Inscription (according to the legend of the map)
1.	Delineatio specialis et accurata Ukrainaæ [33]	Guillaume Levasseur de Beauplan.	1650		Urbs Munita (lat. "town secured by fortification")
2.	Ukrainæ pars qvæ BARCLAVIA PALATINATUS Vulgo dicitur	Guillaume Levasseur de Beauplan.	1662		
3.	Karta granic Polski… [34].	Rizzi Zannoni	Mapping of 1767[3], printed 1772		Miasto obmurowane (pol. "town within walls")
4.	Carte de la Moldavie pour servir à l'histoire militaire de la guerre entre les Russes et les Turcs	Friedrich Wilhelm Bauer	1770		Bourg ole Ville (fr. "little town or village")

3 Assumption of Ihor Sapozhnikov

The description of the castle of 1662 was found in the inventory [32: 300], signed by the owner of Rashkiv Stanisław Koniecpolski, the voivode (governor) of Sandomierz, and Ruxandra Doamna Khmelnytsky, who received it in hypothecary ownership. According to the description, the castle was wooden-earthen, with bastions and "turrets" on the corners. The gate and the bridge led to the town. Inside, there were 2 buildings, gunpowder and sulfur warehouses, bath, a larder, stables, and a treasury above the gate tower.

Fig. 5. Fragment of the plan of Rashkiv dated 1810 [39]: 1. Market square 2. Shops 3. Preserved earth bastion of town fortifications. 4. Dormition of Our Most Holy Lady Church 5. The Great Synagogue Complex. 6. Church of Our Lady's Mantle 7. Landowner's court 8. Ascension Church 9. Roman catholic church of St. Cajetan. 10. Trinity church. 11. Larders and storehouses. 12. River Crossing.

The "Plan of location at the town of Rashkiv", compiled by Lieutenant-General Simeon Alexandrovich Mukhin in 1810 helped to understand this issue (Fig. 5). The plan is an ocular estimation, sketched in black inked. Clearly obvious is the dense, formed in the 17th-18th centuries building system of the center, consisting of quarters and located within the limits of the outer defense perimeter, outlined by us in the previous section. Interesting is the urban composition of the market square, the southern part of which is flanked by a passage

of stores. The Roman Catholic church of St. Cajetan, erected on an artificial hill above the center of the town, is located along the central broadwise axis of the southern half of the square. Although it is obvious that the plan is not accurate in proportions, there is a conditionality and simplification of the planning structure, which is very important information for this period of Rashkiv.

To test the hypothesis of preservation in modern Rashkiv of the end of the 18th century planning, an attempt was made to create a projection with the methods of descriptive geometry of the building from the historic photo-panorama of 1903 [28: 89–90] onto a modern orthophotomap and to count the number of streets (Fig. 6).

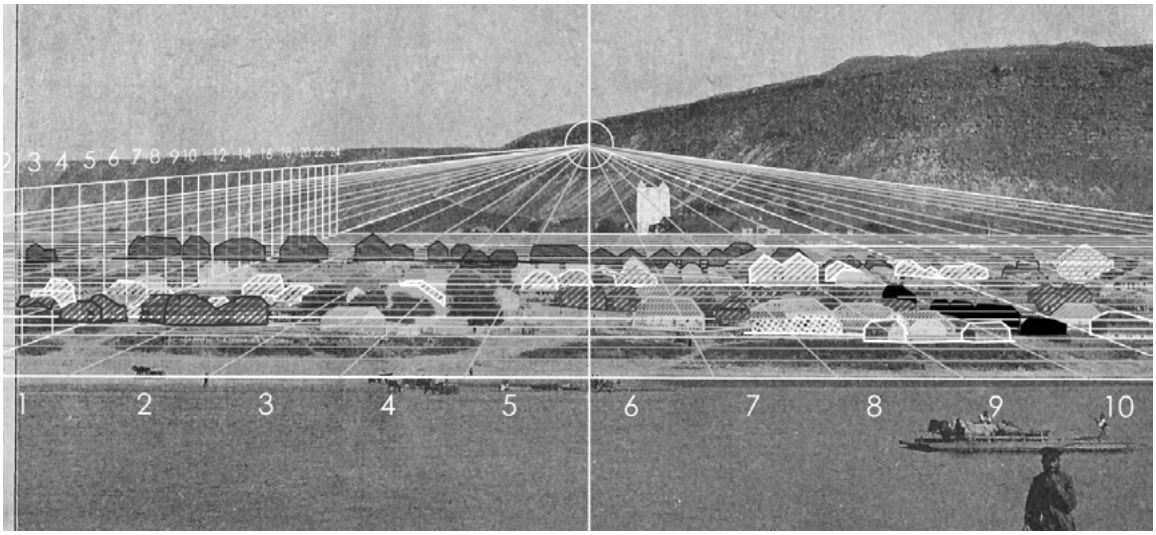
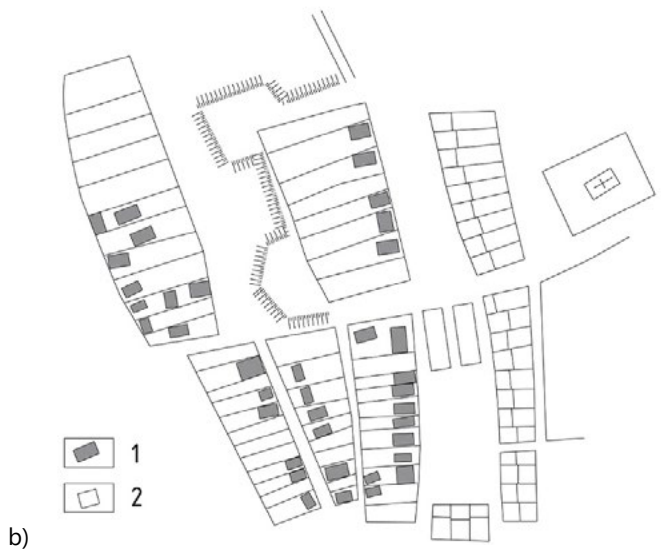
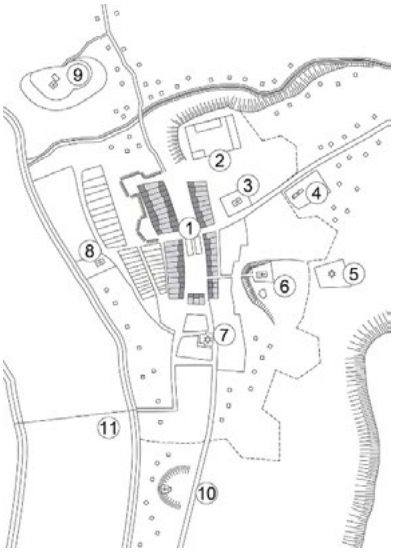


Fig. 6a. Identification of the street network and the buildings of the historical center of Rashkiv by the methods of descriptive geometry



b)



c)

Fig. 6b. Projection of buildings from a historical photo (a sketch from the modern underlay): 1. Buildings seen on a photo-panorama of 1903. 2. Implicit reconstruction of quarters and parcels

Fig. 6c. Hypothetical reconstruction of the planning of Rashkiv in the 2nd half of the 18th century. 1. Market area with stores (partially preserved) 2. Territory of the defensive court or castle (not preserved). 3. Dormition of our Most Holy Lady Church, 1777 [41: 7–90] (not preserved), 4. Trinity church 1779 [42: 840–843] (preserved). 5. Jewish cemetery 1709 6. Roman catholic church of St. Cajetan, 1786 (preserved). 7. Synagogue of the 18th century (partly preserved) 8. Christ Ascension Church, 1700 (not preserved) 9. Church of St. Nicholas the Wonderworker (former monastery) (not preserved) 10. Church of Our Lady's Mantle 1780s (now in ruins). 11. Crossing of the Dnister.

Conclusions

On the basis of the analysis of historical cartographic materials, published archival sources and rethinking the research of predecessors, it was possible to prove the location of Rashkiv at the foot of the ancient Lithuanian fortress Karavul at the beginning of the 15th century. Field surveys and a careful study of cartographic materials allowed to spot the relics of the historical planning structure of the former town center and the suburbs of Rashkiv in the modern urban development situation. It was also possible to hypothetically outline the lost lines of fortifications, which surrounded the town center in the first stage, and included the suburbs in the second. The genesis of the town and the stages of the historical urban planning of Rashkiv in the period between the 15th and the early 18th centuries was reconstructed. In addition to fortifications, other elements of the old town were localized, in particular, the lost sacral objects.

The given hypotheses of the main periods of urban development provide the basis for further research, and the localization of lost defense and sacral buildings and structures is important for carrying out archaeological research. The materials of our research allow to supplement the lists of architectural, urban planning and archeological heritage. A further in-depth study of Rashkiv is needed to identify the remnants and detailed localization of lost fortification structures, civilian and sacral buildings, namely, the monastery complex of St. Nicholas, the castle of Zamoyski, fortification ramparts with bastions, curtain walls and gates. We believe that supplementation of the list of the archaeological cultural heritage by finding foundations of churches, monasteries, stone cellars of market square buildings of the 16th-18th centuries is promising. We plan to develop projects for their excavation, conservation and museumification, including the restoration marking of the lost buildings by landscaping and urban-designer means.

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