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ARCHITECTURAL STUDIES

Vol. 3, No. 1, 2017

Bohdan Cherkes, Svitlana Linda, Julia Bohdanova

ARCHITECTURAL EDUCATION AT LVIV POLYTECHNIC DURING THE INTERWAR PERIOD

Lviv Polytechnic National University, 12, S. Bandera Str., 79013, Lviv, Ukraine,
tscher53@gmai,com, Bohdan Cherkes
svitlanalinda@gmail.com, Svitlana Linda
julbogd@ukr.net, Julia Bohdanova

Received: May 19, 2017/Revised: September 28, 2017/Accepted: September 29, 2017

Abstract. The history of architectural education during the interwar period is presented in this article. The basic directions of an architectural education development in Lviv of this time have been determined and the activity of the most prominent representatives of the Lviv architectural school has been analyzed.

Key words: Lviv Polytechnic, Department of Architecture, architects, professors.

1. Introduction.

In 1928–1929, Witold Minkiewicz was elected the rector of the Lviv Polytechnic where he worked as an architect and lecturer. In his inaugural speech he said: “Contemporary architecture rejects everything that is not caused by necessity. It corresponds with the guidelines of contemporary civilisation, aimed at the most minute exploitation of the natural properties to intensify the level of public life. The old forms are replaced by construction problems. The rhythm of repetitive elements of standardized building and monumental, primitive forms of factories influence artistic imagination stronger than stylish old-fashioned templates. The natural charm of the material used in accordance with its structure and properties, replaces mostly insincere effect forms of old” [1]. In this way, within the walls of Lviv Polytechnic, educating the future architects was officially legitimized that broke with Traditionalism and Historicism and changed the focus to assimilating new modern forms, materials and construction techniques. The new focus became the modernism. Architectural education in Lviv strove to be modern and progressive. And it was so, despite having a lengthy history of development and having deep and strong roots in tradition.

2. Basic Theory Part

The article deals with the analysis of information concerning the history of architectural education in Lviv Polytechnic during the interwar period. On the basis of analysis of the most significant facts and events, the main directions of the development of architectural education in Lviv are determined, the contribution of the Lviv architectural school to the formation of architectural education in the period of the Second Polish Republic is determined.

3. Results and Discussions

The history of Lviv Polytechnic, and consequently, the formation of the Lviv school of architecture within its walls, has its roots early in the nineteenth century when on November 7, 1817, by decree of Austrian authorities a three-year school designed on the Viennese model was opened in Lviv. In

1825–1826, the school underwent reforms which changed its nature to a preparatory school. The graduates of this school were able to continue their studies at the relevant departments of Lviv University, particularly in the Department of Construction. As a result of long-term public efforts as well as the efforts of the Galician Parliament, Lviv Technical Academy was created by imperial decree on January 24, 1843 and its grand opening was held on November 4, 1844. This day is considered to be the official birthday of Lviv Polytechnic. The Technical Academy was composed of an Engineering Department which included the Department of Construction (formerly at the university). At the Department of Construction architecture was taught by the professor Jerzy Beskida and freehand drawing by the professor Karol Gunglinger. From 1853 till 1865 Jan Gabrieli taught design and architecture. After 1865 these subjects were delivered by Professor Edmund Stiks[1]. Initially it was a two-year program, but starting in 1847–1848 the program was re-organized into a three year technical school, a one year business school and a two-year real school, which later evolved into a separate secondary technical school [2].

In connection with setting the Galician autonomy in 1867, and Lviv self-governance in 1870, the city had to present itself as a European capital, and the territory needed to rise to a new economic and cultural standard. Therefore, in 1871, the Technical Academy was designated a university. On June 18, 1871 the professor Julian Zachariewicz (1837–1898) was appointed the head of the Construction Department (building construction and architecture, combined with the mechanics of building) at Technical Academy. Thanks to his efforts in 1872–1873 a separate school of architecture was founded at the Technical Academy.

In 1871, when the Technical Academy became the institution of higher education, the necessity to build a new building that would convey not only its high status, but also meet the new requirements of a technical education appeared. The chosen construction site was in Nowy Świat Street (today Stepan Bandera Street), which belonged to the Cracow suburban district which was being actively developed at that time. Revitalized construction activities contributed to the opening the railway line in 1861 and the construction of the first railway station, which became a draw for the dynamic development of the urbanization process. Nowy Świat Street, which was directly linked to Grodetska Street – the main thoroughfare of the city – became very representative in its character. The construction of the new Technical Academy was to become the dominant part of the street as well as the whole district.

In 1872 Emperor Franz Joseph I-st gave permission for the construction of new facilities for the Academy, and the Austrian government contributed 1,300,000 zlotys for their construction. Julian Zachariewicz was commissioned to designi the new building. Hoping to create a school that would meet modern requirements and the needs of a higher technical school, the architect toured Europe, where he studied the functional and architectural-planning solutions of the polytechnics in Vienna and Munich. The project of the new technical school was completed in 1872 and quickly approved by the Austro-Hungarian Ministry of Education.

The Technical Academy, which was constructed under the supervision of Julian Zachariewicz was begun in 1874 and completed in 1877. In designing the main building, the architect used popular forms of Italian Renaissance which emphasized the connection with Austrian architecture of that time, where Italian New-renaissance was extremely popular. The first draft was similar to the Polytechnic in Vienna. But in the second, implemented version, the key architectural elements of the main facade became Corinthian columns capped into one compact sculptural group that completed the composition. Unlike the Polytechnic in Vienna, where the main axis is emphasized by its relationship with its internal courtyard, the Lviv Polytechnic's axis is connected with its main lobby and monumental stairwell [3].

Julian Zachariewicz became the first rector of the establishment of higher education whose name was changed to Technische Hochschule or the Polytechnic School in October 1877. The change of the name emphasized the status of the academy which included a Construction Department where architects received their training. In 1894 the Construction Department was reorganized into the Department of Architecture. Due to the active pedagogical, creative and organizational activities of Julian Zachariewicz the importance of the Department of Architecture and its significance in the architectural and construction practices of Galicia were growing day by day [4].

Symbolically, a professional career of Professor Julian Zachariewicz as the founder of the Lviv School of Architecture was launched with the construction of the school's main building, which is the exact space and environment where he provided his personal example of how to expertly apply knowledge into practice as well as the other architects were to be moulded. His subsequent creative, educational, scientific and theoretical work

was just a confirmation of what had already been said. At the opening and consecration of the new building Julian Zachariewicz demonstrated his talent as a theorist, with his solemn lecture ***Sztuka w służbie techniki*** (Art in the service of technology). Earlier, in the spring of 1877, his ***Wykład o architekturze*** (Lecture on Architecture), dedicated to the theoretical reflection on the history of architecture, the definition of style, the influence of religion and social change on architecture and the role of materials, design and current tastes in its formation was published. This treatise became the Professor's first theoretical work on architecture and the first work on this subject in Galicia [5].

It should be noted that the Department of Architecture at Lviv Polytechnic University was the only higher educational institution in Galicia that trained architects in the second half of the 19th and early 20th century. Its opening in Lviv nearly eliminated Galician students from the ranks of students at the Vienna Polytechnic's school of architecture [6]. The creation of Galician own school of architecture lead to the result that, since the 1890s the graduates from the Lviv Polytechnic clearly outweighed others in municipal construction projects. Teachers of the first generation of architects from the Department were graduates of European architectural schools. Julian Zachariewicz graduated from the Vienna University of Technology in 1858. He was not only an excellent administrator, but also a man with a great experience. In 1860 for example, he worked at the Lviv-Czerniowce railway in various positions – from engineer to Head of Transport in Czerniowce where he designed the railway station in Jassy. Later, while working in Lviv, he created many iconic buildings of the historical era. In addition to the above mentioned main building of Lviv Polytechnic, he designed such famous Lviv buildings as the Galician Savings Bank (1888–1891), villas for scientists and artists in the Kastelowka district, and the Church and Convent of the Franciscan sisters (1876–1888). From 1877 Julian Zachariewicz was a member of the Polytechnic Society in Lviv, and in 1879 was the part of the Society's administrative body. From the early 1880s he served as a correspondent for the Central Commission for the Study and Conservation of Art and History in Galicia. From 1888 he became a member of the newly created Circle of Conservationists and Correspondents of Eastern Galicia [7].

In addition to Julian Zachariewicz, it should be mentioned the other outstanding personality among the second generation faculty of the Department of Architecture, namely Teodor Talowski (1857–1910). He belonged to a group of architects who were equally skilled in design, construction and teaching. Talowski attained his education in Cracow, Vienna (1875–1877) and Lviv (1877–1881) [8]. He was a disciple of Karl Konig and Julian Zachariewicz and focused on the extensive study of ancient architecture of Middle Ages and the Renaissance, which contributed to his artistic training. Teodor Talowski designed nearly a hundred churches in different parts of western Galicia, and in 1897 he published a printed work on this accomplishment. From 1900 he worked at Lviv Polytechnic, and in 1906–1908 was the Chair of the Department of Architecture [9]. Architect, professor of drawing and ornamentation, restorer, a member of the Central Commission on the Historical Heritage of Art in Vienna, a member of the College of Fine Arts in Cracow, and board member of the Wawel Restoration Committee, teacher of Ancient Christian and Medieval Architecture at Lviv Polytechnic – it is the list of the professional and creative activities of Teodor Talowski [10].

At this time Jan Sas-Zubrzycki (1860–1936) launched his teaching career at the Polytechnic, whose peak occurred during the post-war period when he was holding the post of the head of the Department of Architectural History for many years. He was an outstanding practicing architectand a theoretician of architecture as well. In 1894 he published a fundamental work ***Filozofia architektury. Jej teorja i estetyka*** (Philosophy of Architecture, its Theory and Aesthetics), in 1901 ***Żołkiew – szczegołowy opis zabytkow*** (Żołkiew – Detailed Description of Monuments), in 1905 ***Kościoł warowny w Bobrce koło Lwowa*** (Fortified Church in Bobrka near Lviv), and in 1914–1916 a ***Zwięzła historja sztuki*** (Brief History of Art). A separate book published in 1895 was ***Rozwoj gotycyzmu w Polsce pod względem konstrukcyjnym i estetycznym*** (The development of Gothic Architecture in Poland from a Structural and Aesthetic Perspective) [11].

Tadeusz Obmiński (1874–1932) also belonged to the second generation of lecturers at the Polytechnic School. In 1898 he graduated from the Department of Architecture at Lviv Technical Academy with the honour "especially gifted." Obmiński was a practicing architect, but additionally from 1897–1905 he worked as an assistant at the Department of Building Structures, and from 1906–1908 as a designer at the Construction Department. After he defended his thesis "Genesis of Wooden Construction in Poland" in 1908, he became an assistant professor of drawing and wooden construction, and in

October 1910 professor and chairman of the Department of General Construction [12]. In 1912–1913 he was the dean of the Land and Water Department, in 1915–1916 and in 1920–1921 the dean of the Architectural Department, and in 1916–1917 the rector of the Polytechnic School. Tadeusz Obmiński combined active teaching and administrative activities with his architectural practice. In particular, prior to the First World War, he designed a lot of buildings in Lviv: in collaboration with Alfred Zachariewicz, the Chamber of Commerce building and the Institute of Technology. Working in collaboration with Iwan Lewiński he developed the forms of Ukrainian modernism in the architecture of the city and was the designer of the most beautiful facades of Secessionist tenement houses, creating a stylish vision of Lviv at the beginning of the 20th century.

An extraordinary personality was the architect, teacher, businessman, and Ukrainian public figure Iwan Lewiński (1851–1919). In 1868 he entered the Construction Department of the Lviv Technical Academy. After completing his studies in 1875, he stayed at the Academy. From 1901 Iwan Lewiński worked as an associate professor of Construction at the Lviv Polytechnic School, heading its Department of Applied Building. He also taught rural and railway construction. In 1909 Iwan Lewiński became a full-fledged professor. Gustaw Bisanz, a 1873 graduate of the Technical Academy worked at the Construction Department after graduation; in 1876 he was chairman of the newly established Department of Architecture II. In 1878 he became an associate professor and in 1883 a full-fledged professor. Gustaw Bisanz was elected in 1883–1898 and 1901–1903 as the head of the Department of Architecture. For a long time he headed the commission on the "second state examination" at the Construction Department. Twice, in 1888–1889 and 1898–1899, he was elected the rector of the Polytechnic. In 1877 he became a member of the Polytechnic Society in Lviv. Gustaw Bisanz was an active contributor to the magazines "Allgemeine Bauzeitung" and "Czasopismo Techniczne" and a member of the editorial staff of the latter in 1889–1890 [13]. He authored the textbook *Budownictwo* (Construction), which was used in Galicia through the 1920s. The book consisted of two volumes and contained 1500 illustrations. It was a unique Polish language manual of building materials, technologies and designs that were relevant to introducing the industrial methods of construction, such as the mass use of steel and concrete structures. In addition to writing his theoretical work he also worked as a practicing architect. The teachers of the Department of Architecture were active participants in local civic organizations. Thus, in 1876 Lviv, a group of 22 engineers and additional lecturers from the Polytechnic founded the Society of Certified Technicians (Towarzystwo Ukończonych Techników). In 1878 it was renamed the Polytechnic Society of Lviv (Polskie Towarzystwo Politechniczne we Lwowie). The purpose of the partnership was to unite engineers to deepen the knowledge of its members and familiarize them with technical progress. The Society published a periodical called "Dźwignia", which was printed from the group's inception; Julian Zachariewicz was a member of the editorial board. Starting in 1883, the periodical was called "Czasopismo Techniczne". Architect-Teachers from the Polytechnic were always active in the Society and contributed to the periodical. In 1908 the Circle of Polish Architects in Lviv was formed within the Polytechnic Society; one of the Circle's founders was Tadeusz Obmiński. It was assigned a section indicated the members to support art and specifically architecture. They also planned annual exhibitions and participated in international architectural conferences [14]. In 1912 "Czasopismo Techniczne" began systematically reviewing pressing issues in architecture and construction.

Prior to the First World War seven major faculties were created at the Department of Architecture, each headed by prominent personalities whose names are associated with the best works of architecture in Galicia created in the second half of the 19th and early 20th centuries. Students of the Department of Architecture studied construction materials, design, the history of architecture and architectural forms, and drafting (houses, commercial and industrial buildings, and hospitals). The curricula and programs in 1873–1918 had a constant increase in the number of architectural and artistic classes, the stability of the technical-engineering component, and a gradual reduction in general subjects. Approximately 700 individuals graduated with an Engineer-Architect diploma during this time [15]. The system of architectural education anticipated that students would earn their diplomas only after a period of actual practice, so graduate students passed their final exams a year after graduation. A commission of no fewer than three professors assessed the students.

In 1902, Polytechnic School student Zygmunt Dobrzański along with his colleagues Wacław Krzyżanowski and Marian Heitzman created the Union of Student Architects (or the ZSA – Związek Studentow Architekury). The students received a lot of support from Edgar Kovats, the Dean of the Department of Architecture and professor Władysław Pilat. At the first meeting of the ZSA on February 10, 1903, the group elected a chairman, secretary, and librarian. The Union was established to consolidate the student body; polytechnic students whose interests reached far beyond the curriculum. In 1904 it consisted of 36 students, who were guided by professors Edgar Kovats and Ivan Lewiński. Future Polytechnic professors were active in the ZSA, including Witold Minkiewicz, Marian Osiński, and Wiesław Grzymalski. Due to the activities of the ZSA, a large collection of books and professional periodicals were gathered in a short period of time. Students were also active in organizing architectural exhibitions and competitions, as well as photographing architectural landmarks and art [16].

The period until 1918 was extremely important for the development of the Lviv School of Architecture. A stable tradition was started with the continuation of the pedagogical component of the Lviv School of Architecture; teachers and students were actively involved in professional and artistic associations, societies, and art exhibitions; they contributed to publications and reported at meetings of the Polytechnic Society on issues connected to Lviv architectural and artistic creativity. But the most important was the fact that a European type of architectural education had been established in Galicia.

It should be noted that at the end of the nineteenth century polytechnics were extremely occupied with the question of the ways of further architectural development. In their theoretical contemplations they tried to answer the question: "What should architecture be in the future?" In 1877, Julian Zachariewicz wrote in his *Lecture on Architecture*: "…unfortunately, the nineteenth century did not create its own style" [17]. However, changes were approacing, and the teachers and students were ready for them. A sad evidence of this was the students' boycott of a well-known architect Władysław Sadłowski's (1869–1940) classes in 1918 the representative of Secession and historic development of architecture. The students required the new trends in architecture. [18].

The consequences of the First World War, which for Lviv marked the end of its political and cultural connection with Vienna, were particularly palpable in 1918. Lviv was no longer the capital of the largest province of the Austro-Hungarian Empire but simply a centre of a Polish province. It meant Lviv gave up its long held designation of cultural and intellectual centre to the capital – Warsaw. It is important that during the interwar period the Lviv Polytechnic remained one of the leading centres for educating the architects, competing even with the capital. The newly created Department of Architecture at the Warsaw Polytechnic did not command such a historic basis, so the trend of popular Modernism was immediately and quickly adopted. The Lviv School of Architecture, on the other hand, continued to develop on the foundation of its deep traditions. Perhaps, this was an important reason to ignore information about the development of Lviv architecture in relation to the rest of Poland. Contemporary professional publications contained a lot of information about the development of architecture in Warsaw, Gdynia, Silesia, but very little about Lviv [19].

So, in 1918, the Polytechnic's Polish period began and caused a number of organizational changes. In 1919 the Polytechnic became subordinated to the Polish Ministry of Religion and General Education. On January 13, 1921, in accordance with the Ministry of Religion and Education's order the name of the Higher Polytechnic School was changed to Lviv Polytechnic where, considering the new political and economic realities, changes were also made to the learning process. In the interwar period enrolment of architectural students increased from 103 students in the 1920–1921 academic years to 276 in the 1938–1939. From 1919 to 1939 2.277 individuals, including 63 women, obtained engineering degrees at Lviv Polytechnic [20].

In the early 1930s, the Department of Architecture included the following faculties:

- The General Construction Faculty led by professor Tadeusz Obmiński. Marian Nikodemowicz, Stanisław Kowalski, and Rudolf Śmiałowski also worked at this department. This faculty included courses in general construction, creating project expense estimates and construction law.

- The Statics Faculty chaired by professor Adam Kuryło, which was founded in 1920, during the first post-war period. Teachers conducted classes during the second and third year of studies in statics, metal construction, rein-forced concrete construction.
- The Faculty of Applied Art and Interior Design under the guidance of professor Władysław Sadłowski (this was the successor to the Drawing and Modelling specialty, which was established back in 1872 and long headed by Leonard Marconi, then by Teodor Talowski).
- The History of Architecture Faculty which for many years was under the leadership of the professor Julian Zubrzycki, and then Marian Osiński. The faculty held classes for first and second year students which included drawing a historical architecture.
- The Faculty of Architecture I for a long time (up to 1929) was led by professor Władysław Klimczak, who delivered a number of lectures, including *Współczesny styl w architekturze* (The modern style architecture) or *Problemy współczesnego stylu w polskiej architekturze* (The problem of modern style in Polish architecture) at the Polytechnic Society on 14 March 1922 and won twenty awards in various architectural competitions. The faculty was formed in 1913, by separating it from the Faculty of Drawing and Medieval Architecture. Up to 1918 it was headed by Adolf Szyszko-Bohusz, who later moved to Cracow. The staff also included Jan Bagieński.
- The Faculty of Architecture II was guided by the professor Witold Minkiewicz. Its beginnings can be found in 1871, when it was called Building Construction and Architecture Faculty and headed by Julian Zachariewicz. In 1874 it was divided into the Faculties of Architecture I and II, and Architectural Forms Faculty. After the death of Julian Zachariewicz, the head of this faculty became Edgar Kovats, and then Oskar Sosnowski (from 1914) and Witold Minkiewicz (from 1920). The basic subject taught in the faculty was designing monumental buildings for public use. Besides, Witold Minkiewicz, Adam Mściwujewski, and Tadeusz Broniewski also worked in this faculty.
- The Utilitarian Construction Faculty was under the guidance of the professor Władysław Derdacki. It was formed back in 1901 and its first director was Iwan Lewiński. Tadeusz Wrobel and Irena Obmińska-Wieczorkowa worked there.

In addition to the faculties the curriculum provided the two workshops:

- A sculpture workshop, which was formed back in 1873 and was led by Leonard Marconi and later by Edward Lepszy. At some point Antoni Popiel, Tadeusz Błotnicki, and Jan Nalborczyk all worked in this workshop.
- The photography workshop, which was formed in 1920. It was spearheaded for many years by Henryk Mikolasch, the grandson of Piotr Mikolasch, owner of the ”Under Golden Star” pharmacy where the first gas lamp was developed.

The pre-war Polytechnic curriculum included ten faculties. The three others were created after the war:

- The Descriptive Geometry Faculty led by professor Kazimierz Bartel.
- The History of Polish Architecture Faculty, headed by Professor Marian Osiński.
- The Bridge Building Faculty where Ignacy Drexler and Tadeusz Wrobel worked.

Perhaps, one of the most prominent personalities of the interwar Polytechnic was Witold Minkiewicz (1880–1961) (Fig. 1). He was born in the family of exiled insurgents in the remote Russian Irkutsk. Initially, he studied at the Warsaw Polytechnic in the Engineering-Construction Department, then in 1901 he was transferred to the Lviv Polytechnic School, where among the lecturers of architecture were Tadeusz Obmiński and Iwan Lewiński. In 1908, Minkiewicz graduated and worked for one year as an assistant in the Utilitarian Construction Faculty. After some time, he completed his practicum in Lviv, St. Petersburg, and by the Lake Baikal. On January 1, 1920 he became an associate professor of the Department of Architecture of the Lviv Polytechnic, and a full professor on 1 June 1923. Due to his administrative and organizational skills Witold Minkiewicz’s career developed quite rapidly: in 1923–1924 and 1927–1928 he was the dean of the Department of Architecture, releasing a collection of student projects in 1925, with his introduction *O projektowaniu* (On designing) [21]. In 1930–1931 he became the rector of Lviv Polytechnic. Starting in 1909 Witold Minkiewicz was a member of the

Polytechnic Society in Lviv. In 1911–1913 he was elected to the board and to the committee that, as a part of the publishing body of the association (the periodical "Czasopismo Techniczne") issued several publications devoted to architecture every year. The achievements in the field of architecture and construction required a special periodical, so in 1924 Professor Witold Minkiewicz initiated the publication of the scientific journal "Architektura i Budownictwo" (Architecture and Construction). The two professors of the Polytechnic, Jan Sas- Zubrzycki and Adolf Szyszko-Bohusz, edited the monthly devoted to architecture, construction and decorative art, called "The Architect". On November 26, 1926 the Circle of Polish Architects (a subsidiary of the Polytechnic Society) elected Witold Minkiewicz to the permanent delegation of Polish Architects in Warsaw [22].

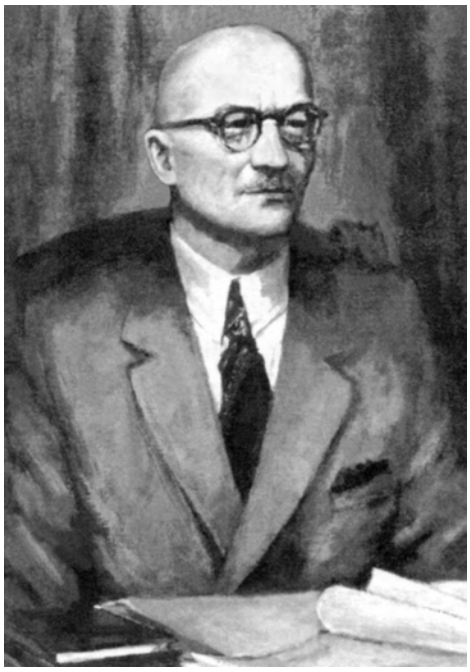

Fig. 1. Witold Minkiewicz (1880–1961). Oil painting

Fig. 2. Tadeusz Obmiński (1874–1932). Photograph from 1920s

Moreover, Witold Minkiewicz also carried on an intense private practice. His most important works of that time were the Mechanical Department and the Machine Lab of Lviv Polytechnic, a pre-war design project which the architect reworked in 1921, giving the building features of reduced Classicism; residential buildings for a Pension Fund in the form of early Functionalism in Stryjska Street (1927), which was the first building where central heating was set in Lviv for an entire complex; the water towers in Pasichna Street and near the "Żelazna Woda" park, where reinforced concrete structures were used (1932–1934); and the Post Office in Borysław (1928–1930). The latest project fully reflected the creative credo of the architect, who sought to fulfil the new sanitary, construction and aesthetic demands. Witold Minkiewicz continued the practice, started by Julian Zachariewicz, which had the teacher-architects designing new buildings for the Polytechnic. The Electrical Laboratory and the Mechanical Department of Lviv Polytechnic, created in 1923, were to be the projects of such kind. Minkiewicz designed a grand ensemble of buildings, constructed in a synthesis of the historicizing New-renaissance style of the main building and a retrospective Neoclassicism of the Mechanical Department buildings and the new pavilions. The implementation of this plan would have provided the finishing touch to Leona Sapiehy Street (today Stepan Bandera Street), artistically enriching the functional and stylistic palette of the Lviv Polytechnic compound. The project was highly regarded internationally and won a silver medal at the World Exhibition in Paris in 1928. Unfortunately, the completed project was rejected by the Ministry of Education due to the lack of funds [23]. In a few years, on the same lot, the construction of a scientific and technical library was started and Tadeusz Obmiński (Fig. 2) worked on the design. After his death Witold Minkiewicz was commissioned to supervise the construction.

The significant educational and practical achievements of Tadeusz Obmiński happened to occur during the inter-war period. Besides, while heading the General Construction Faculty, he also created some iconic buildings. One of them was the new library in Jozef Nikorowicz Street (today Profesorska Street) which Tadeusz Obmiński developed after having won a competition in 1928. Construction started in 1929 and was completed only in 1934, as it was suspended due to the lack of funds. Tadeusz Obmiński developed the idea of a neoclassical resolution of the main facade by organic combining a traditional architecture with the latest architectural planning and functional resolution [24]. One of the biggest projects of Obmiński as well as of all the religious constructions of interwar Lviv became the Church of Our Lady of the Gate of Dawn in Łyczakowska Street that was designed on a competitive basis in the 1929–1930. The construction of this large-scale building and the new urban planning accent of Greater Lviv were completed by Wawrzyniec Dayczak. The Church of Our Lady of the Gate of Dawn is one of the most modern works by Tadeusz Obmiński where he organically synthesized the traditional three-dimensional structure of sacred building with the latest techniques of stylistic solutions: terseness, reduction of historic architectural forms and an actual lack of decor.

Ignacy Drexler (1878–1930) (fig. 3), renowned urban theorist of the interwar period, also worked within the walls of the Polytechnic. He was a graduate of the Polytechnic School, but studied civil and water engineering at the Department of Engineering from 1897–1901, receiving his degree in 1903. In 1913–1925 he lectured on urban planning and related disciplines at the Faculty of City Planning of the Polytechnic School newly established (1913), and first of its kind in Poland. In the autumn of 1925 he was appointed associate professor, and in 1928–1929 was the dean of the engineering department [25].

Fig. 3. Ignacy Drexler (1878–1930)

Marian Osiński (1883–1974) was a graduate of the Department of Architecture at the Polytechnic School and went on to study in Rome and Munich. At the Polytechnic he lectured on topics related to the history of architecture. After defending his thesis on the castle in Żołkiew in 1933, he became a professor and the director of the newly created Faculty of History of Polish Architecture. His work involved the development of the field of restoration in Poland.

An outstanding personality associated with the interwar Polytechnic was Jan Bagieński (1883–1967) (Fig. 4). He graduated from the Lviv Polytechnic School (1905–1910) and then worked in the construction company of Wojciech Dębiński from 1909 till 1914. After five years working in the Crimea he returned to Lviv in 1920. Just then he became a member of the Polytechnic Society and the Circle of Polish Architects, which operated within the Society. He was repeatedly elected to its board, and to the permanent delegation of Polish Architects in Warsaw [26]. In 1921 Jan Bagieński began teaching at the Lviv Polytechnic; by 1933 he had been given a title of a professor and led the course "Architectural Composition Based on Classical Forms". This particular course was specifically chosen for him as he had a deep respect and understanding for the classics that he brought to his work. He explained his own approach to using the forms: "…deep ideological understanding of Classicism tells us that there is no reason to introduce a system of architectural orders where it has no role or place. A system of orders on fairly small walls, for example, on a row of the houses, will be inappropriate. Could anyone believe that pilasters or affixed columns are performing a serious task in such an instance? It is the formalism – walls can be divided by other means". Jan Bagieński completed a large number of projects with the fundamental architectural compositions which were based on architectural orders. A typical example of such works is the Bielski Palace in 42, Mikołaj Kopernik Street, in Lviv reconstructed by him in 1921–1922. On the eve of World War II Jan Bagieński's creativity was significantly affected by the rationalist orientation of architectural thought dominated at that time. The style of his works changed dramatically. The author, a consistent supporter of Classicism, assimilated the principles of a new architectural trend – Functionalism. An exacting professional culture helped Jan Bagieński quickly master the new architectural language and successfully work within its confines. One of his most successful attempts is a building in Żegiestow (in collaboration with Zbigniew Wardzała, 1932). The similar characteristics can be applied to the Social Care building (later the Bering Institute and now the main building of the Medical University) built in 1939 in 12 Zielona Street; its design won first prize in the competition held in Lviv in 1938 [27].

Fig. 4. Jan Bagieński (1883–1967). Photograph from February 1958

Fig. 5. Andrzej Frydecki (1903–1989)

The list of the teaching staff of the Department of Architecture at the Lviv Polytechnic in the interwar period would be incomplete without mentioning Władysław Derdacki (1882–1851). He graduated from the

Polytechnic School in Lviv in 1907, but started teaching while still a student. He worked in the architectural bureau of Iwan Lewiński (1907–1910), and in 1911, together with Witold Minkiewicz, founded his own architectural firm. In June 1908 he was one of the founders of the Circle of Polish Architects in Lviv. Władysław Derdacki's contribution during the interwar period to the Lviv School of Architecture was enormous: he not only lectured but was also active on the community and civic levels and published his works in professional journals. In 1937 he was appointed Minister of the Interior and was a member of the Commission for the Regional Planning of Lviv Region. In the same year the Committee for Developing the Polytechnic established a bureau for developing the Mechanical and Electrical Departments, and the Mechanical Research Station. After finalizing the architectural drawings, the construction of new buildings in Stryjska Street had been started but was interrupted by the war in 1939 [28].

Another active creative personality was Andrzej Frydecki (1902–1989) (Fig. 5). He studied at the Department of Architecture of the Lviv Polytechnic in 1922–1930 and got a diploma with two awards. This success allowed him to remain within the walls of his native university as an assistant, and later an adjunct. In 1934 he was elected a vice-president of Lviv SARP (Association of Polish Architects). He was an architect-innovator who actively contributed to the formation of the Lviv School of modernism.

Tadeusz Wrobel (1886–1874), the architect, urban planner and pedagogue also may be belonged to the galaxy of the unique personalities. He worked up until 1924 as an assistant at the Faculty of Utilitarian Construction of the Lviv Polytechnic, and later until 1928 as a designer. In 1928 together with Leopold Karasiński he opened his own architectural office in Lviv. In 1929–1930 he taught Construction Norms at the Architectural-Engineering Department. In 1939 he headed the Faculty of Bridge Building at the Lviv Polytechnic. Later, after World War II, he went to Wrocław, where he participated in the creation of Wrocław Polytechnic. After the founding the Department of Architecture and Construction, he became its first dean (1945–1947) and created the Urban Planning Faculty. In 1950 he became a president of the Wrotcław branch of the Association of Polish Urbanists (Towarzystwo Urbanistów Polskich, TUP) [29].

As can be seen, lecturers of the Lviv Polytechnic were outstanding personalities, talented architects who practically formed the architectural image of interwar Lviv. They actively developed their creativity, assimilating cutting-edge architectural trends, which were based on the principles of Modernism. However, there was no active creative confrontation between supporters of historicism and proponents of avant-garde. Attention to classical details, the disintegration of forms, wealth of textures and colours were the echo of the heritage of the Austro-Hungarian period and a unique feature of Lviv modernism [30].

The activities of these architects created the necessary prerequisites for a successful curriculum and for the unique development of architecture in the city on the eve of World War II. Architectural studies were four years in duration; each year was divided into two semesters. Students attended classes for sixty hours a week; this practically required each student to be in the campus all day long. The quantity of academic hours was caused by introduction of the new subjects in the curriculum, among which, for example, were reinforced concrete construction, the history of Polish architecture and urban planning. It was becoming more and more difficult to include all necessary issues into the architectural design curriculum, since the typology of modern residential and public buildings was changing steadily.

Then, the idea to increase the training period to five years appeared and most people became convinced that separating the students into narrow specializations served no tangible purpose.

During the first year students studied basic subjects and gradually prepared themselves for design, which was the main subject of the department. The last three years were filled with architectural design curriculum which was divided among particular faculties. Every year the assignments became increasingly challenging and this was reflected in the names of the faculties which provided the classes. Thus, the Architecture I Faculty was teaching the fundamentals of architecture and spatial design during the two semesters, while linking projects with traditional regional features. Architecture II's academic program consisted of three semesters in the third and fourth year of study. The lecturers placed the main

emphasis on issues related to the utilitarian value of objects in the spirit of the functionalism. The design class was extremely far-reaching: from residential buildings to a wide variety of facilities for public use, but of a relatively small scale – schools, small health facilities and industrial buildings. In turn, the Architecture III Faculty, in its two semesters program which was introduced in the fourth year of studying, offered projects connected with monumental buildings – cultural, administrative, and trade facilities as well [31].

In addition to their course design project, students of the Department of Architecture completed such subjects as descriptive geometry, higher mathematics, statics, preservation of architectural monuments, urban planning, metal and reinforced concrete design, cost estimation and construction production, construction statutes (legal framework for design and construction), construction materials, physics, photography, machine construction, economics, state and civil law, heating and ventilation, and hygiene and safety.

Among the forty-four subjects that were taught by the Department of Architecture in 1919–1939, twenty-nine were related to the arts. Among them were: history of architecture (general and Polish), drawing, graphics, perspective, the elements of Renaissance architecture etc. The arts approach was also used in educational training at other Departments, specifically at the Department of Land and Water Engineering and the General Department (from 1921–1933), where mathematics majors such as Physics-Chemistry and Drawing were located. A portion of arts courses were present in the curricula of these departments. Students might pass the second year of study if they obtained confirmation of having passed all the necessary exams. To be enrolled at the third year of study, it was necessary that students should pass a general exam (the half-diploma), and confirm that they completed all necessary subjects. One could enter the fourth and fifth year of study after confirming that the necessary exams and practical studies had been passed. The general examination assessed the student's mastery of higher mathematics, descriptive geometry, physics, statics, and artistic perspective. The test was usually oral, so depending on the subjects it could include elements of writing and drafting. Exam results were entered into the exam protocol [32].

To obtain a diploma, one had to pass the graduation exam. The subjects in the graduation exam were construction, history of architecture, and architectural design; prerequisites for sitting the exam included passing subjects such as elements of measurement, engineering science, machines in construction equipment, building materials, urban planning, art history, building regulations, heating and ventilation, figure drawing, detail drawing and interior decoration. The graduation exam spanned seven days and consisted of invigilated part, public defence of the diploma project and an oral examination of items defined by the Graduation Examination Board. During the pre-war period such personalities as Władysław Derdacki, Jan Bagieński, Marian Osiński, Kazimierz Bartoszewicz, Wiesław Grzymalski, Witold Minkkiewicz, and Władysław Sadłowski were the members of this Board [33].

The most important subject remained architectural design. Priceless examples of the topics of coursework subjects and their implementation were published in *Zeszyty Architektoniczne* (Architecture Notebooks) from the years 1926–1932 and 1930–1938. The presented projects allow us to become acquainted with the topics and to understand the pedagogical approach used in teaching course. Thus, as we can see the theatre project by Andrzej Frydecki (1926–1927) is characterized by an extremely rational approach: a clear planning structure, a symmetrical main axis, clearly defined vestibule and accessory spaces, and seating area (Fig. 6). The architectural image of the theatre is modern and conforms to the principles of Bauhaus: expressing the functional purpose of the building on its facade. The glazed main facade highlights the splendour of the main entrance, beautifully letting daylight into the vestibule and foyer. The cubic arrangement of the spectator area demonstrates the chambered construction and the enclosed structure of the space where performances take place. The huge expanse of the stage area dominates the building, clearly demonstrating its function (in the nineteenth century stages were considered to be unattractive and were disguised or decorated). Administrative offices and dressing rooms, which required lighting, were set along the three sides of the seating area with continuous ribbon glazing. The architecture of the theatre is not only rational, it is real, openly demonstrating the tenets of contemporary architectural ideology embodied in the truths of structure, function, and material. The Architectural project fully complies with Witold Minkiewicz's vision, claimed in his inaugural speech:

"Invigorating drive of sincerity and purposefulness pushed the architects' attempts on new tracks. Being out of pretentious accretions, the building was brought back to the forms of the simplest elements, the equivalents of "Cubism" in architecture" [34].

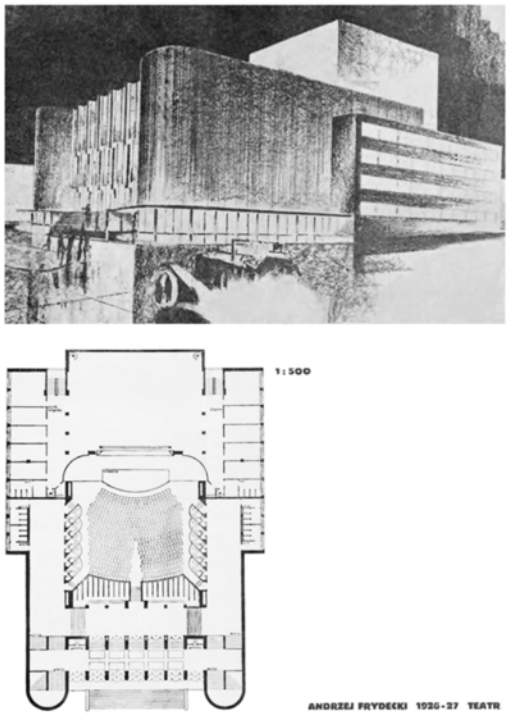

Fig. 6. Theater design,
Andrzej Frydecki, 1926–1927

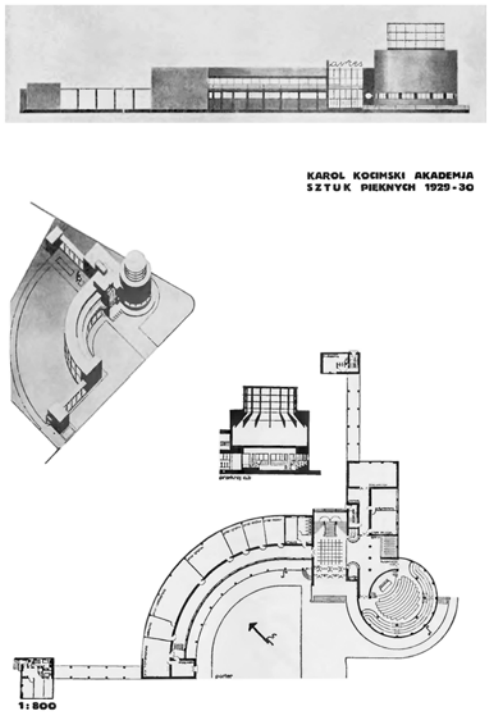

Fig. 7. Academy of Fine Arts design,
Karol Kocimski, 1929–1930

The same approach is demonstrated in other projects, for example, the pool designed by Andrzej Frydecki in 1928–1929 [35]. The expanse of the pool basin is clearly articulated. The space is covered with a modern construction incorporating reinforced concrete arches; sunlight reaches the interior between the arches, creating an interesting light effect. A two-storey administrative offices and a public cafeteria building along with a single storey locker rooms building are attached to the pool. The main entrance is accented with concise colonnade. The balanced asymmetrical composition demonstrates the true purpose of each part of the building.

A second pool was designed by Stanisław Knobloch in 1931–1932. This work demonstrates a fundamentally different architectural and artistic approach: the three-dimensional arrangement is based on the classical principles of symmetry and accents the main axis. A spacious hall separates the male and female locker rooms through which people enter the pool located in parallel to the line of the facade. The stairs to the second floor (where the administrative offices are located) are on the main axis. The facade is extremely laconic: its cubic composition is at once modern and classic, as it is constructed on the hierarchy of space and on submission to the integrity of the main axis. The latest architectural and planning solutions were presented in the design of the railway station developed by Dobrosław Czajka in the 1930–1931 [36]. The center of the planned composition is a spacious hall, around which the service facilities are grouped. The luggage department functionally separates the arrival area from the waiting one. Stairs lead to the underground passageways with exits onto the train platforms.

In 1929–1930 Karol Kocimski presented a draft of the Academy of Fine Arts [37]. The dynamic asymmetrical composition demonstrates a new vision of the building dedicated to art (Fig. 7). The general image of the Academy embodies the idea of Le Corbusier – a building as a machine for living. The idea of machine aesthetic permeates the composition and is implemented in the cylindrical mass of

the lecture hall, which is a vertical accent for the entire resolution in a dynamically curved wing with classrooms, resembling a conveyor belt. The general image is built on the contrast of the clear glass surfaces and remote arrays of reinforced concrete walls.

The course project of a small architect's villa from 1930–1931 by Tadeusz Teodorowicz-Todorowski is a typical example of architectural Functionalism. The plan of the building is extremely rational that promotes the growing asymmetry and the massive solution. The combination of curved and cubic spaces, the contrast of solid walls and glass surfaces, and the multiple levels of the entire project demonstrate a beautiful mastery of the principles of architectural composition as well as the talent of the draftsman.

A very interesting project by Tadeusz Karasiński is the church designed in 1929–1930 [38]. Here one can notice the influence of the new Expressionism and the "glass pavilion" of Bruno Taut. The resolution in the plan is both traditional (which, after all, was required by the function) and ultramodern. This symmetric spatial structure built on a modular diagonal grid of squares, provides both the planning and volume of extraordinary emotional expression. Diagonal squares are present in the glazing, decoration of the portal, and in the paved floor. The student created a unique work of art completed in the spirit of "Neue Sachlichkeit". The next issue of *Zeszyt Architektoniczny* which came out in 1938 showed the best projects created by students in the past eight years. It is immediately noticeable that they were complicated by the assignment and by the proposed architectural solutions. The Kazimierz Dziewoński's theatre project of 1931–1932 was particularly interesting. The planning solution reflects a traditional approach to the vision of the theatre building, but the dynamically expressive facade completed with a continuous undulating wall is very impressive.

The vision of Frank-Lloyd Wright and his ideas of organic architecture are clearly reflected in the Yacht Club project, developed by Zygmunt Kowalczuk in 1932–1933 [39]. The building is harmoniously interpolated in the landscape, its architectural image built on the combination of stark surfaces of natural stone, glass and concrete.

The Fabian Kozik's office building project developed in 1932–1933 is an example of searching for an image of a multi storey building, a "skyscraper", which became increasingly relevant for European architecture in the 1930s [40]. The image of the building is extremely progressive for its time, much like the bold constructive resolution of its reinforced concrete frame. Among the projects are those for multi-storey commercial buildings, railway stations, hotels and dormitories. An interesting theme is the one of representative halls designed for conferences and large-scale presentations. Whereas the project by Andrzej Madejski created in 1935–1936 interprets the forms of the well-known Centennial Hall in Wrocław (1911–1913), and impresses with its courageous and creative constructive solution, the project by Zbigniew Chwalibog created in the same years can be considered as a monumental central composition based on the latest reinterpretation of the order system [41].

The published projects clearly demonstrate progressive views on the direction of architectural creativity which prevailed among the younger generation and were formed within the walls of the Polytechnic. Their analysis suggests that students had a deep awareness of the development of modern architectural trends and a desire to use them in their practice, while maintaining a connection with the local architectural heritage.

In the interwar period, the Union of Student Architects was very active. In particular, they continued identifying and inventorying the architectural landmarks. The results were published as *Materiały do architektury polskiej* (The Materials for Polish architecture) – *Domy wołyńskie* (Houses of Wołyń) in 1923, and *Lewocza – zdjęcia architektoniczne* (Lewocza – Architectural Photographs in 1929) with the support of editors of the journal "Życie Technickie", that was founded by Zygmunt Sawczyński, a former student of the Architectural Department and member of the Union of Student Architects. An important focus of the Union remained organizing the exhibitions of students' works, where they presented their coursework and creative work, as well as photographs (Fig. 8–9). A well-known event which caused amazement and great joy among the professional community was the victory of fourth year student Rudolf Indruch in the design competition. The subject was the monument to the Defenders of

Lviv in1921. Later he worked as an assistant in the Drawing Faculty at the Lviv Polytechnic. Under the auspices of the Union, the annual student balls were organized at the city casino, and were extremely attractive and popular among the people of Lviv [42].

Fig. 8. Poster Exhibition of Works by the Union of Student Architects – Projects, Photographs, Drafts, J. Romański, 1928

Fig. 9. Poster The Union of Student Architects organizes an Exhibition of Extracurricular Works by its Members, J. Romański, 1931

4. Conclusions

In this way, the Lviv School of architecture in the interwar period, despite economic difficulties and the relative isolation of the city, was one of the strongest in the Second Polish Republic, worthy the competing with the capital. An inextricable link between real design and studies, provided by the Department of Architecture, where the teachers were also the best practicing architects of Lviv, as well as social activism and patriotism of both teachers and students, expressed in extracurricular activities, were the important features of the interwar Lviv School of architecture. The specificity of its functioning was the strong link with tradition, the invisible presence in the training and creative activities of genius loci, which resulted in the formation of a specific form of Lviv Modernism that is recognizable among the modernist school of contemporary Poland. The tie to traditionalism did not exclude the constant pursuit of innovation that was instilled in the student designs, and then in actual projects, or modern ideas of architecture and urban planning, built on the ideology of rationality, expediency, and to some degree on the utopian dreams of building a renewed society with the help of new architecture.

Thanks to the continuous and active exchange of information between representatives of Modernism, the common characteristics of this style were gradually developed, that later were spread throughout the world as the “international style”. The library of the Department of Architecture subscribed to French and German professional journals and books. Regardless of the change in status that Lviv underwent, when compared to the Austrian period, and the changes in financing it received, the quality of education in the Lviv Polytechnic was not only maintained but it increased steadily as well. The Commission led by the Vice-Minister of Education from Moscow, that in November 1939 arrived to check the qualifications of the teaching staff at the Polytechnic, stated that travelling to the city they even didn’t dream to see the training of such high quality. All professors and associates were reviewed to assess their level of professional and scientific achievements, as well as the presence

of published articles 73. Perhaps, these impressive results led to the staff chosen during the Second Polish Republic remaining unchanged at the establishment re-named the Lviv Polytechnic Institute when Soviet authorities came to Lviv in September 1939, and through to the arrival of German troops in late June 1941.

During the German occupation, from mid-1942, Advanced Technical Courses were taught at the Polytechnic but students were not matriculated. After the geopolitical map of Europe was re-drawn at the end of World War II, the fate of many architects, whose life and professional creations were associated with the Lviv Polytechnic, was significantly changed. Most of them left for Poland (Cracow, Wrocław, Gliwice, Gdańsk and other cities), where they worked professionally for life. In connection with the strong post-war destruction of Europe, Modernism, by the typification of its design and its international entity, continued to be extremely popular, as its principles allowed for rapidly increasing the pace of construction, thereby reviving destroyed cities in a short time. It again became the prominent style of government buildings and houses, symbolizing modernity and democracy, an alternative to the architecture of Nazi Germany and Stalinist socialist realism. The teachers of the Department of Architecture, who had very high professional level, held management positions in various architectural educational institutions and in government agencies in various Polish cities, thus directly influencing the formation of post-war architectural education and practice.

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Богдан Черкес, Світлана Лінда, Юлія Богданова

АРХІТЕКТУРНА ОСВІТА У ЛЬВІВСЬКІЙ ПОЛІТЕХНІЦІ МІЖВОЄННОГО ПЕРІОДУ

Анотація. *У статті розглянуто історію розвитку архітектурної освіти у Львівській політехніці у міжвоєнний період. Визначено основні напрямки розвитку архітектурної освіти цього часу, проаналізовано діяльність найвизначніших представників львівської архітектурної школи.*

Ключові слова: *Львівська політехніка, архітектурний факультет, архітектор, професор.*

Vol. 3, No. 1, 2017

Svitlana Linda

ARCHITECTURAL SCHOOL OF LVIV POLYTECHNIC DURING THE WORLD WAR II

Lviv Polytechnic National University, 12, S. Bandera Str., 79013, Lviv, Ukraine, svitlanalinda@gmail.com, Svitlana Linda

Received: May 19, 2017/Revised: October 06, 2017/Accepted: October 09, 2017

Abstract. The article deals with the functioning of the architectural faculty of Lviv Polytechnic during the period of the Second World War. The activities of professors in the conditions of the formation of Soviet power, as well as in the situation of German occupation, are shown.

Key words: Lviv Polytechnic, Architectural School, Second World War, occupation.

1. Introduction.

The notion of Lviv architecture school has already been defined. Professor J. Lewicki writes, "The group of Lviv circle, which is widely known as Lviv architecture school, should include the architects who worked and were educated in Lviv, who graduated from Polytechnic School, which had existed since 1844, and which was called Lviv Polytechnic in 1918–1939. The notion of Lviv architecture school refers to creators who worked in Lviv, outside it, almost in all Central Europe. The impact of this architecture school was felt everywhere the architects, formed in Lviv, worked" [1].

After the Second World War, the professors and graduates of Lviv Polytechnic University continued their professional activities in different cities of Poland and in other countries of Europe and America. They made a significant contribution to the formation of the post-war architecture of the countries that became their second home after forced emigration from Lviv. This emigration was preceded by several difficult years of reorganization, change of power, occupation. These were the years of the Second World War.

2. Basic Theory Part

The materials of the article are based on the analysis of the materials and information taken from articles and monographs devoted to the functioning of the Lviv Polytechnic during the Second World War. The article analyzes the changes that took place during the study process, showing the difficulties the architectural school faced with at that time.

3. Results and Discussions

On the eve of September 1939

On the eve of September 1939, nothing indicated rapid and drastic changes in the life of Lviv Polytechnic. Professors, associate professors, assistants and students were preparing for the new academic year. The department of architecture in Lviv Polytechnic was one of the most successful in the inter-war period. In 1919, Polytechnic School became subordinate to the Ministry of Creed and General Education of Poland. On January 13, 1921, according to the decree of the Ministry of Religious Recognition and Education, the name of Higher Polytechnic School was changed into Lviv Polytechnic. It meant reorganizing the learning process in accordance with the new political and economic realia [2].

At the beginning of the 1930-s, the Faculty of Architecture included the Departments of General Construction headed by Prof. T. Obmiński; of Statics headed by Prof. A. Kuryłło; of Applied Art and Interior Décor headed by Prof. W. Sadłlowski; of the History of Architecture headed for a long time by Prof. J. Zubrzycki, and then by M. Osinski; of Architecture I headed for a long time (until 1929) by Prof. W. Klimczak; of Architecture headed by Prof. W. Minkiewicz; of Utilitarian Construction headed by Prof. W. Derdacki. Right before WWII, the three more departments were created: the Department of Descriptive Geometry headed by Prof. K. Bartel; the Department of the History of Polish Architecture headed by Prof. M. Osiński; the Department of City Planning, where I. Dreksler and T. Wróbel worked [3]. Apart from the departments, the learning process was catered for by two studios: Sculpture studio, which was created in 1873, headed by L. Markoni, and then – by E. Liepshi; Photography studio [4]. The number of students admitted to the Faculty of Architecture was constantly growing: from 103 students in 1920 to 276 in 1938–1939 [5]. Between 1919 and 1939, 2277 people, including 63 women, obtained the diploma in Engineering of Lviv Polytechnic [6].

The surnames of the heads of the departments spoke for themselves: they were not only educators, theorists, but also well-known architects-experts, which provided the necessary prerequisites for high quality, efficient learning. The period of studying at the Faculty of Architecture lasted four years. Each year was divided into two semesters. A student was supposed to study 60 hours per week. Such big number of hours was predetermined by introducing into the curriculum such new disciplines as Construction using reinforced concrete, History of Polish architecture and Urban Planning. The main subject was Architecture Design, and the list of tasks for design was constantly growing, since the typology of dwelling and public buildings was constantly growing too. So, the idea to increase the period of studying to five years appeared just at that time [7].

The first year of studying was seen as preparatory one, and the course of Architecture Design spanned the next three years and was distributed among the departments according to the tasks. Priceless examples of the topics for course projects are given in two editions of “Zeszytów architektoniczych” (“Architectural notebooks”) published in 1926–1932 and in 1930–1938. The published projects demonstrate the views, formed in Polytechnic, on the modernistic trend in the development of architecture, which dominated among the younger generation [9].

Apart from course projects, the important disciplines included in the curriculum were Descriptive Geometry, Calculus, Statics, Architecture Monuments Conservation, City Planning, Metal and Reinforced Concrete Constructions, Estimates and Construction Industry, Construction Statutes (regulatory and legal framework of design and construction), Building Materials, Physics, Photography, Machinery in Construction, Economics, State and Private Law, Heat Supply and Ventilation, Industrial Hygiene and Safety [10]. History of Architecture (general and Polish), Drawing, Graphics, Perspective, Practice in Elements of Renaissance Architecture, etc. dominated among the artistic disciplines [11].

The whole course of studying resulted in taking a Diploma exam. The prerequisite for taking this exam laid in positive scores in such subjects as Elements of Measurement, Engineering Sciences, Machinery in Construction Technology, Building Materials, City Planning, Art History, Construction Statutes, Heat Supply and Ventilation, Figure Drawing, Ornamental Drawings and Interior Décor. The Diploma exam lasted seven days and consisted of proviso, public defense, as well as oral exam in the subjects selected by the Diploma Examination Board. During the pre-war years, the Examination Board included W. Derdacki, J. Bagenski, M. Osinńki, K. Bartosiewicz, W. Grzymalski, W. Minkiewicz, W. Sadłowski [13].

The professors of the Department of Architecture were well-known architects-experts, most of them worked on building up the Lviv Polytechnic. It is quite enough to mention the building of Lviv Polytechnic Electrical Technical laboratory and Mechanical Department in modern 5 Ustyianovych str. W. Minkiewicz was working on its design and construction from 1912 till 1927. An outstanding achievement of Lviv inter-war Neoclassicism was the building of the Library in 2 Profesorska str., which was designed by T. Obmiński together with W. Minkiewicz in 1929–1931 [14]. Besides, it was planned to develop the construction of the Polytechnic teaching buildings. Therefore, in 1938 in Lviv Polytechnic, there was designed a project for constructing the five buildings of the Mechanic and Electrical Technical Departments in Stryiska str., which was to be implemented in the next three years. On November 26, 1938, a solemn consecration of the cornerstone took place, and the construction works began. In 1939, the whole frame of the Mechanic Research Station and the half of the frame of the Technology and Metal Processing building were completed [15].

The social life of professors-architects was very active. As a matter of fact, the first organization of Polish architects, known as the Circle of Polish Architects, acted as a subdivision of Polytechnic Society, which

after 1919 was known as Polish Polytechnic Society. Under the aegis of the Society, the architectural contests were organized, architecture exhibitions were held, periodicals were published [16].

Altogether, such situation provided adequate preparation of Lviv architects, and, during the inter-war period, Lviv architecture school was one of the strongest in II Rzeczpospolita competing with the capital. Close connection between a real design and studying, social activity and patriotism of students and teachers, which manifested themselves in exceptionally fruitful learning, were the most important features of Lviv architecture school in the inter-war period.

Period between Occupations

On September 1, 1939 at 11.30 am, first bombs fell on Lviv. German troops were bombing the main railway station and the area nearby, Sknyliv airfield. In total, 83 people perished and 100 people were wounded because of German bombing raids on the first day of the war [18]. For some time the Wehrmacht troops were keeping the city under siege, but, on September 22 1939, the Red army came into the city. Lviv became Soviet unbeknownst to its inhabitants. Official records were different. "In the chronicle of struggle (the struggle of the proletariat for social and national liberation), glorious pages are written by the proletariat of Lviv, whose lifelong dreams and desires came true in September 1939," – these were the usual words which characterized the events of those days in the Soviet press [19].

The destiny of Lviv turned out to have been determined earlier than September. On August 23, 1939 in Moscow, German Minister of Foreign Affairs Joachim von Ribbentrop and the Head of the Council of People's Commissars, People's Commissar of Foreign Affairs of the USSR Viacheslav Molotov signed a Non-aggression Pact between Germany and Soviet Union. Secret additional protocol defined the spheres of mutual interests of the two states in Eastern Europe and the division of Poland between them after the expected German invasion of Poland. Galicia, with its centre in Lviv, was included in the zone of Soviet interests.

September events, the decline of Polish state and the first Soviet occupation created new conditions in which Lviv Polytechnic started to exist. There appeared a complicated issue of how to treat the newly arrived Lviv "inhabitants" that included the military of different ranks and civil servants with their families. The attitude to this problem was not mono-semantic. It varied from hostility with uncompromising fighting to downright collaboration and could be noticed within the walls of Polytechnic, too. The events that were taking place there for two years showed the model of social relations functioning in Lviv and in all occupied areas in general.

In May 1939, Edward Sucharda was elected the rector of Lviv Polytechnic, but he, however, refused to take the post. So, this post was taken over by Antoni Wereszczyński [21]. He held this post when World War II began. The first step that he took was to organize civil defence and a hospital. Student subdivisions of Person's selfdefence started to be organized in Polytechnic. Their headquarters were located in Polytechnic library. It is the fact that, during German raid on Lviv on September 12, the officer cadet Andrzej Lauterbach, an architecture student, firing a 75 calibre canon, destroyed German tanks that were located near St. Elizabeth church [22].

But the destiny of Lviv was determined – on September 22, the Red army occupied Lviv and all the institutions were supposed to start work immediately. Rector A. Wereszczyński ordered to begin the studying process (although the hospital continued working on the territory of Polytechnic). At the beginning of October, Rector called for the general meeting of the professors of Polytechnic. It took place on the main staircase. The main person in this meeting was comrade Yustymov, who introduced himself as the commissar of Polytechnic. Comrade Yustymov claimed that the educational institution would operate according to the Soviet standards just from now. Jarosław Żaba, the assistant of the Department of Chemistry, who turned out to be an undercover member of a communist cell, made a speech that shocked everyone. He spoke about happy future for the state, about class struggle and congratulated everyone on their liberation. Bronisław Bochenek, a student of the Department of Mechanics, turned out to be a secret representative of a student communist organization. The meeting ended with signing a compulsory resolution and Polytechnic became a Soviet educational institution [23].

Soon Lviv Polytechnic was reorganized into Lviv Polytechnic Institute (LPI). In December 1939, Maksym Sadovskyi, a former director of Kyiv tram trust, was appointed the director of the Institute, professor Volodymyr Krukovskyi was appointed the deputy. In November 1939, a commission came from Moscow to check the academic level of the professors and lecturers. All academic degrees and titles were confirmed. It is a well-known fact that, at the end of August and at the beginning of September 1940, Lviv Polytechnic professors were invited to Moscow to get familiar with the achievements of Soviet science. Witold Minkiewicz, professor of the Department of Architecture II, Dean of the Faculty of Architecture in 1926–1927, Rector of Polytechnic in 1930–1931, was among those invited. He, together with many other Polytechnic professors, was granted the

academic degree of Doctor of Technical Sciences and was allowed to work at his Department of Architecture II by the Soviet government.

So, the academic process in Polytechnic resumed in October 1939, although its principles changed according to the requirements of Soviet education. Admission regulations changed. The most important factor for a prospective student to be admitted was his/her social background. The results of the entrance exams were not taken into account. The preference was given to those who came from the country or had a working class background. The number of students did not decrease. On the contrary, it increased because of those who came from Poland occupied by Germans. They were mostly Jews, who hoped to escape the Nazis.

Polish remained the main language of teaching, since most students knew only this language. Apart from this, there was the lack of lecturers who could teach in Ukrainian or Russian. Professors and lecturers in Polytechnic, including the Faculty of Architecture, almost did not change. The number of people that emigrated was insignificant and it had no impact on the academic potential of the higher educational institution. According to the standards of the Soviet education system, all professors and associate professors who had no academic degree had to undertake writing doctorate thesis immediately (this particularly referred to the Faculty of Architecture, where a lot of architects-experts, who had no academic degrees, worked). In addition, all professors were obliged to attend lectures in Party history and take part in seminars [24].

New subjects – Marxism-Leninism and Party history taught in Russian – appeared in the curricula for every specialty. The curriculum of the Faculty of Architecture was also revised. For example, the list of objects suggested to design for students was changed (in particular, the design of sacral buildings was excluded). Introducing the specialties such as Monumental Architecture, Urban Planning and Construction was a new thing. Students did not quite understand what this division meant, that is why, there were problems with admitting students for the specialty "Constructions", which no one wished to be enrolled. Professor Emil Łazoryk, who was the Dean at that time, had to distribute students himself. Students of the fourth year of studying were preparing to do their diploma projects according to earlier regulations. In 1940, defence of diplomas according to the old standards was already impossible [25].

Rather strict rules for attending classes were introduced: the prefect wrote a report signed by the lecturer, where he/she recorded the presence of students, every day. Students that did not attend classes could be expelled and their names were sent to the military registration and enlistment office, which automatically meant enlistment in the Red army. Studies gave an opportunity to postpone military service [26].

Despite the fact that the academic process had been resumed, the situation in Polytechnic was not calm. Everyone was learning to live in the atmosphere of suspiciousness and fear. Repressive machinery was gradually gaining momentum – freedom of meetings and societies was abolished, secret arrests and executions were beginning. All students and professors were under constant and watchful eye of the NKVD (People's Commissariat for Internal Affairs) agents. To ensure total control in Lviv, as in all Soviet Union, new organizational forms of activity were being introduced. This was reflected in the practical work of architects of that period.

Immediately after Soviet troops occupied Lviv, a whole group of architects from Soviet Ukraine was sent there. According to their leader, later Chief Architect of Lviv, O. Kasyanov, who came from Kharkiv, this group was supposed "to transfer Lviv city planning to Soviet fashion". Transformations began with organizing architects into one single Union, which was to become a component of Ukrainian Union and the Union of architects of the whole USSR respectively. This was done immediately and, in autumn 1939, Lviv organization of the Union of Soviet architects was founded [27].

H. Holovko, Head of the Committee for construction and architecture of Ukrainian Soviet Socialist Republic, came to Lviv for this occasion. The work of the first meeting went according to the numerous developed scenarios: organizing committee was elected at this meeting. It included local architects-Ukrainians – Lviv Polytechnic alumni – Mykola Mykula, Yevhen Nahirnyi and M. Perfetska. This committee started admitting membership of the Union. However, the same O. Kasyanov was elected the first Head of the Board for Lviv branch. The Union had almost 200 members, most of them were the local architects. All in all, architects were able to pursue their professional career officially only being members of the Union. At the same time professional work of architects was being restructured. Private design bureaus were substituted by branches of centralized design institutes. In January 1940, Lviv branch of the State Design Institute of Ukrainian Soviet Socialist Republic was founded on the basis of Kyiv and partly local architects. The same O. Kasyanov became its Chief Architect [28].

It is clear that Soviet government appointed for the leading posts non-local professionals, who were not trusted and who were feared.

In June 1941, Lviv was occupied by Nazi Germany and it became the centre of Galicia district as a component of General Governorship organized on the territory of former Poland. On the eve of July 4 1941 on Vuletski Hills, dozens of scientists were shot by Germans, Polytechnic professors among them – S. Pilat, W. Stozhenko.W. Krukowski, K. Vaihel, A. Lomnicki, R. Witkiewicz. On July 26, Kazimerz Bartel, professor of the Faculty of Architecture, who had been teaching Descriptive Geometry to students-architects for many years, died in Gestapo basemen. Lviv Polytechnic was closed and during 1941–1942 the institution did not work. A hospital was organized on the premises again. Professors at that time were left without jobs and livelihood. However, in 1942, there arose a need to resume work of some educational institutions, since there was lack of professionals. That is why, in March of the same year, enrollment for courses was announced and studying was to begin on April 15 1942. Courses of Mechanical Engineering, Civil Engineering, Geodesy, Architecture, Hydrotechnology, Industrial Chemistry, Agriculture and Forestry were set up. Representatives of the Occupation government supervised the courses [29].

Since there was a need not for professionals with higher education, but for technical workers, on the basis of the abolished higher educational institution, German Occupation authorities opened Engineering courses (Staatlishe Technische Fachkurse Lemberg), which, of course, did not provide a higher education diploma. Obviously, the need for professionals in Architecture was predetermined by great ambitious plans of German authorities to transform Lviv in terms of urbanization and architecture. German urbanists took the reconstruction plan of Berlin from 1942, designed by Albert Speer, as their sample. German urbanists that worked in the Central Technical Department in Krakow (Technisches Zentralamt Krakau) saw Lviv exactly in such context, transforming it into a German city. The basis of a new space organization lay in a reconstructed network of streets, adapted for busy traffic (streets were widened by demolishing historic buildings). Also, a new ring road, from which there had to be viewing axes on the "city crown" complex – a monumental complex of administrative and government buildings in Citadel – was to be built [30]. Such plans called for experts.

Polish underground government wished to use the opportunity of educating the youth to preserve a high level of teaching and integrity of the educational institution. At that time, secret rules of the courses functioning were defined. They implied the following:

– all courses continue secret existence of Polytechnic as a higher educational establishment;

– academic level of learning will be realized on the basis of 1939/1940 curriculum;

– after the occupation, this education will be equal to the education in a higher educational institution;

– formal learning, which is obvious to the occupant, in fact, will be covered by a system of secret learning;

– all specialities and separate institutes continue to provide an integral union of Lviv Polytechnic and are governed by Polish private and public law.

Thus, during German Occupation (until 1944), the Faculty of Architecture started to function again, although it was located not in the main building: the Faculties of Engineering and Architecture had to vacate because a hospital was organized there. They took shelter in the building of the Machinery Laboratory, in the Library, but mostly in the building which was located in a former Mary Magdalene monastery (modern building 14). The language of studying was German. Professors Jan Bageński, Kazimiesz Bartosiewicz, Władysław Lam, Władysław Derdacki, Emil Łazoryk, Witold Minkiewicz, Marian Osiński, Antoni Plamitzer, Zbigniew Wardzała, associate professors Angrzej Frydecki, Adam Mściwujewski, Tadeucz Wróbel, Eliasz Zielski, assistants Michał Paszkiewicz, Julian Duchowicz, Tadeusz Teodorowicz-Teodorowski continued their work teaching architecture subjects. Emil Łazoryk was Dean of the Faculty of Architecture during the period of German Occupation [31].

After Nazi Germany capitulated and Lviv became again part of the Soviet Union, serious changes happened in the life of Lviv Polytechnic. New arrival of Soviet administration in July 1944 was accompanied by a wave of new repressions and arrests. During the period of five days – from January 3 till January 8–approximately 17,300 people were arrested, among them there were professors of Lviv higher educational institutions, many well-known doctors, as well as engineers and artists [32]. At that time, NKVD agents arrested professors of the Faculty of Architecture W. Minkiewicz and E. Łazoryk. They were accused of co-operating with Germans and at the beginning of February taken to Donbas to Krasnodon, to a filtration camp No. 0310. W. Minkiewicz was released in June 1945 after prosecutor's checks, and E. Łazoryk did not live to his release, – he died on February 11 1945 in the camp [33].

In 1944 Lviv Polytechnic Institute started working again. The changes in its functioning which occurred this time were drastic and connected with mass emigration of ethnic Poles from Polytechnic. On December 6

1944 at the meeting with Lviv intelligentsia, Ivan Hrushetskyi, Secretary of Lviv committee of the Communist party, informed that those professors who wished to teach in Polish had to leave and those who stayed had to accept the fact that Lviv was Soviet and governed by Soviet legislation [34]. Most people then did not fully believe that the changes were inevitable. But in January 1945, Lviv Polytechnic professors received first invitations to move to Gdansk to develop Gdansk Polytechnic. On February 13, local newspaper "Chervonyi Prapor" printed the results of Yalta Conference, where the eastern borders of Poland along the so called Curzon line were fixed: Lviv appeared on the territory of Soviet Ukraine. After German capitulation, repatriation bureaus were opened and ethnic Poles were encouraged to move to the territory of Polish People's Republic [35]. Polytechnic employees had a tough choice: to stay or to leave…

The choice was made almost unanimously – to leave. It was decided at the general meeting of Lviv Polytechnic professors that all academic staff would move to Gdansk to continue their work in an educational institution called Marine Polytechnic. However, Warsaw sent a rejection on the grounds of the fact that Lviv Polytechnic professors had to reinforce higher educational institutions not only in Gdansk but also in other cities of Poland – Wroclaw, Gliwice, Krakow [36].

Real exodus began at the end of spring in 1945. First group of the already former Polytechnic professors set off from the railway station Persenkivka to Krakow, Gliwice and Gdansk. Then next group left for Krakow, Gliwice, Wroclaw, Poznan and Gdansk on October 28. Last group set off to Poland in June 1946. [37]. Starting from 1945 only the professor Jan Bageński and former lecturer of the Faculty of Architecture of Polytechnic Marian Nikodemowicz continued working in Lviv Polytechnic Institute. Not only professors of the Faculty of Architecture but also students and practicing architects left Lviv. In several months there were practically no ethnic Poles, whose work and life was somehow connected with architecture, left in Lviv.

From archive sources we know that in 1944 the Faculty of Architecture consisted of two departments: the Department of Drawing, Painting and Sculpture (in 1944–1945 it was headed by A. Mściwujewski, who emigrated in 1945, and in 1945–1946 – by Ukrainian artist Ivan Boichenko) and the Department of Architecture and the Fundamentals of Architecture Composition (in 1944–1945 it was headed by Yevhen Nahirnyi, and in 1945–1947 – by I. Bahenskyi). In 1947, the two departments were combined into one and called "Architecture" It was headed by I. Bahenskyi until 1957. At that time the Faculty of Architecture had already been eliminated (in 1945). However, the Department also faced the elimination, as, according to Khrushchov's struggle against excessiveness, it was decided in Moscow that Soviet country did not need architects. After red tape in Moscow Ministry of Higher Education, the former Head of the Department of Architecture prof. I. Bahenskyi managed to receive a permit to open a speciality "Furniture and Interior Design" (FID) in autumn of 1959 but merely with a part-time study. Only in autumn of 1961, LPI resumed a full-time study. The Department of Architecture Design was the part of Engineering and Construction Faculty until 1971, after that the Faculty of Architecture was opened [38].

Thus, we can be grateful to I. Bahenskyi for preserving uninterrupted architecture education within the walls of Polytechnic. It is evident that thanks to the personality of professor I. Bahenskyi, it became possible to preserve the spirit and traditions of academic architecture education based on profound theoretical knowledge [39], combined with practical work, love to the motherland and city, respect for people, within the walls of Lviv Polytechnic. I. Bahenskyi, during the period of his teaching, had nurtured approximately 370 architects, among them the famous constructors and researchers, professors of Architecture Andriy Rudnytskyi, Roman Lypka, Iryna Rusanova, Tetyana Maksymyuk. He was a member of several public organizations in Lviv, namely, Lviv Branch of the Union of Architects of Ukraine and Regional Council for Architecture. Thanks to I. Bahenskyi, the tradition of designing and constructing the new buildings of Lviv Polytechnic Institute lived on. He supervised the group which designed building 1 in 2/4 Karpinskyi str. in 1960 [40].

Marian Nikodemowicz as a student of the Polytechnic School in 1912–1914 worked in a construction company created by W. Minkiewicz and W. Derdacki. In 1915 he obtained an engineer-architect diploma with distinction, and in 1916 he became a senior assistant and later associate professor of the Department of General Construction (headed by T. Obminski). Working actively, apart from Lviv Polytechnic (where he taught until 1928), he worked at Lviv State Industrial School in 1927–1936 teaching Construction and Drawing. During World War II, he worked at different institutions which dealt with the reconstruction of damaged buildings. After the war, due to the lack of staff, he was invited to work in LPI, where he had been working until 1950 teaching Perspective and Descriptive Geometry [41].

There were not enough professors, that is why, practicing architects, such as Yevhen Nahirnyi, were invited to work there. In 1912, Yevhen Nahirnyi graduated from Polytechnic School. During the inter-war

period, he designed a lot, founded his own architecture bureau, which functioned until 1940. During German Occupation, he headed State Industrial School. From 1944 till 1945, during the period of transition for Polytechnic, he headed the Department of Architecture Design, and since 1947 he also taught in Lviv State Institute of Applied and Decorative Art. Y. Nahirnyi was an extremely fruitful architect: 300 objects, out of 500 designed, had been realized.

Immediately after Soviet power was restored in Lviv, in July 1944, Lviv Branch of the Union of architects of Ukraine resumed its work. Architects from different cities of Ukraine and Soviet Union were sent to Lviv. The staff of the post-war Faculty became completely different than before the war: there were, practically, no local professionals left and it was formed by "new arrivals". Thus, in 1946 in Lviv, there were 49 architects – the members of the Union, in 1947 – 45 members, and the total number of architects was 75 [42]. Apart from the above mentioned Yevhen Nahirnyi, the architects Jerzy Gölis, Mykola Mykula and Valerian Sahaidakivskyi – graduates of Lviv Polytechnic also stayed in post-war Lviv.

Jerzy Gölis, after graduating from Lviv Polytechnic, worked as a scientist at the Department of General Construction of the Faculty of Architecture, where in 1929 – 1930 he held the post of assistant, and in 1933–1934 – constructor. After the war, he worked as a practicing architect. The building of the Institute of Radioelectronics in Chuprynka str. (1950-ies) is among his most outstanding post-war objects.

Mykola Mykula entered the Faculty of Architecture of Lviv Polytechnic in 1930 and completed his studies in 1935. However, he defended his diploma only in 1939. In 1938–1940 he worked in O. Mukha's design bureau. Since 1944 he worked in Lviv "Regional Project" as Head of the architecture-construction section. He also worked on reconstructing the architecture monuments. He designed many dwelling and administrative buildings. The design of the LPI laboratory buildings of chemistry problems was recognized as one of the best buildings in Ukraine of the first post-war decade.

The experience, accumulated by architects during the inter-war period, was used in a design practice of the post-war years. An illustrative example is constructing the estate dwelling houses. This practice was renewed for a short period of time in Lviv at the end of the 1950-ies. M. Mykula, J. Gölis, V. Sahaidakivskyi were the ones who created designs of individual dwelling houses taking into account the experience of Lviv inter-war functionalism: flat roofs, corner rounded balconies, combination of brickwork and metal lattice in balcony fencing . These features were noticed and later strictly criticized by the ideologists of Soviet architecture. In the article by N. Ivanchenko and M. Tsapenko it was written, "However, it is necessary to outline defects … They are the results of the author's mistakes, his admiration for formal composition tools of constructivism" [43].

4. Conclusions

The years of the Second World War have become a real challenge for Lviv Polytechnic. They were associated with the repression, lack of work and struggle for elemental survival. Despite the difficult conditions of the Lviv Polytechnic School of Architecture during the Second World War, the teachers and professors managed to preserve the traditions of architectural education, a high level of teaching, love and a responsible attitude to their profession. Due to this, the professors and students of Lviv Polytechnic who were compelled to move to Poland and other countries in the postwar years made a significant contribution to the development of the post-war architectural education and practice in their new homelands.

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(to be continued)

Світлана Лінда

АРХІТЕКТУРНА ШКОЛА ЛЬВІВСЬКОЇ ПОЛІТЕХНІКИ У РОКИ ДРУГОЇ СВІТОВОЇ ВІЙНИ

Анотація. *У статті розглянуто питання функціонування архітектурного факультету львівської політехніки у період Другої світової війни. Показано діяльність професорів в умовах становлення радянської влади, а також у ситуації німецької окупації.*

Ключові слова: *Львівська політехніка, архітектурна школа, Друга світова війна, окупація.*

Vol. 3, No. 1, 2017

Kateryna Holubchak

FUNDAMENTAL PRINCIPLES OF ARCHITECTURAL INTERNAL ARRANGEMENTS OF SPACE OF SPIRITUAL-RETREAT CENTRE

Ivano-Frankivsk National Technical University of Oil and Gas
15, Karpatska Str., 76019, Ivano-Frankivsk, Ukraine
golubchak.kateryna@gmail.com

Received: May 19, 2017/Revised: October 03, 2017/Accepted: October 04, 2017

Abstract. In this research, based on the analysis of the current experience of the architectural organization of spiritual-retreat centers, the main tendencies and requirements for interior design of these structures were discovered. The principles and recommendations for making internal arrangements of space of the spiritual-retreat centers are suggested.

Key words: spiritual-retreat centers, principles, internal arrangements

1. Introduction

The key to the successful functioning of any building is the harmoniously combined complex of all structure elements of the architectural space – building massing, landscaping and outfitting of the interior space of the building.

The factor that determines the popularity and attendance of any building is the visual comprehension. The world's sacred architecture exposes the unique and original solutions that turn out to be original visiting cards of its localities. Unlike with the temple architecture, that still is the subject of the certain canon, the architecture of the spiritual-retreat centers gives the architects much more opportunities for imagination and experiments, that definitely should be used. The task of an architect is to create a coherent piece with the harmonious combination of internal functional arrangement and external envelope.

The building of the spiritual-retreat centre, accumulating a wide range of social functions, is intended to ensure comfortable stay of visitors and unhindered implementation of all functional processes. The internal arrangement of space plays an important part in this aspect.

2. Analysis of recent research and publications

Such scientists as: Cherniavskyi [1], Linda S. [2], Novykova E. [3], Timokhin V. [4], Starmar A. [5], Ustyn V. [6] and others dedicated to the general research on the interior design of public buildings. Slieptsov O. [7], Stotsko R. [8], Bulychova T. [9], and others investigated the architectural arrangement of sacred centers, spiritual educational institutions and spiritual and educational centers as well.

However, the principles and tendencies of the internal arrangement of spiritual-retreat centers space are not sufficiently highlighted, and it determines the urgent character of this research.

3. Research findings

The analysis of the Ukrainian functioning experience of spiritual-retreated centers indicates the significant disadvantages and problems in this area, which are, primarily, caused by the insufficient funding of the religious and spiritual sphere in Ukraine. The majority of the Church's social processes are concentrated in unforeseen constructions: basements of temples, separate buildings of monasteries or redesigned buildings, the internal environment of which is unattractive for the target audience – space first of all for the young generation

and is not intended for educational or recreational activities of the Church. Instead, the foreign practice of designing of the spiritual-retreat centers demonstrates the unique design solutions, modern textures, well-designed ways of lighting solutions, furnishing and interior decoration of the facilities.

Therefore, in order to create the profound recommendations for the finishing and arrangement of the internal space of the spiritual-retreat centers it is reasonable to analyze the main world trends of this sphere.

In the course of this research it was discovered that the interior of the modern spiritual-retreat centre should meet a number of **requirements**: economic, functional-technological, environmental, aesthetic, socio-demographic, ergonomic.[1]

Economic requirements allow applying the rational architectural solutions, constructive technologies, materials that will guarantee the cost reduction of construction and operation of the building.

The consideration of **functional and technological** requirements involves creating the appropriate functional and planning conditions that take into account the progress of new technological processes in building, as well as the possibility of re-planning, transformation and adaptation to new functions.

The essence of **ergonomic** requirements is the creation of comfortable psychophysiological and proper sanitary and hygienic conditions for visitors, based on the regulatory requirements of orientation, insolation, noise protection, etc. [1].

Environmental requirements are based on the use of techniques of ecological architecture, namely the use of environmental building materials, the introduction of renewable energy sources, the use of gardening in the interior, which in total provide a favorable and comfortable microclimate of the facilities.

The modern industry of building materials and technologies provides architects and designers with a wide range of opportunities to implement the most original ideas of interior arrangement of space and creating a unified stylistic and compositional harmony to meet the **aesthetic** demands of the society. In recent years, there is a tendency to use the stylized ethnic and cultural peculiarities of the territory for decorative interior design. It is a good practice to use elements and works of Ukrainian arts and crafts for internal arrangement of space of spiritual-retreated centre. Such elements of decor and interior objects will be absolutely attractive and interesting for visitors.

The facilities of the spiritual-retreat centers are focused on a number of important processes – recreation, communication, training, leisure, liturgical service, food, lodging, household and technological processes, which determine the formation of appropriate functional groups of facilities, each functional group requires separately selected techniques for design of the internal space.

While analyzing the world experience of modern spiritual-retreat centers organization, a number of main trends in the design of the internal space of these institutions have been identified (Fig. 1).

The interconnection of the functional organization of the facility with the volume-spatial internal arrangement of space is the characteristic feature of the arrangement of the spiritual-retreat centres and other public buildings The interior space and its interior objects (equipment, furniture, means of art and landscape) are clearly connected with the designation of the building, while creating the necessary level of aesthetic-psychological comfort. (fig. 2) One characteristic feature of the interior of the modern spiritual-retreat centre is the harmony of the internal space and the external environment that interact with each other, filling the interior with air and light using the modern engineering solutions. [3] This feature is accentuated by the creation of atriums, winter gardens, the use of fragments of landscaping and water components in the internal arrangement of the space.

In addition, it is worth noting that institutions of this type are often visited by people with disabilities. That is why it is important to ensure unhindered ways of their movement (ramps, specially equipped bathrooms, elevators, etc.).

Another characteristic of the internal arrangement of the facility of the spiritual-retreat centre is **the provision** of **flexible planning capabilities.**

This principle allows creating the general-purpose facilities that can be adapted to various processes with the help of appropriate structural and composite materials (relocatable partitions, screens). The main purpose of flexibility and transformation is to ensure the adaptation of the architectural and planning organization to the new needs of society. Such flexible planning and space transformation opportunities are especially popular in the world experience concerned the public facilities. And, as the practice shows, such experience is successful, as it provides architects and designers with a wide range of opportunities to implement the most original design solutions for the internal arrangement of space.

No less important feature of the internal arrangement of space of spiritual-retreat centers is **the selection of color scale**. The color is one of the most important compositional and psychological means, which has special emotional properties that influence the mood, psychology and feelings of the visitor. [5] Special attention should be paid to the identification and selection of the harmonious color scale of the facilities and the interior objects of the space.

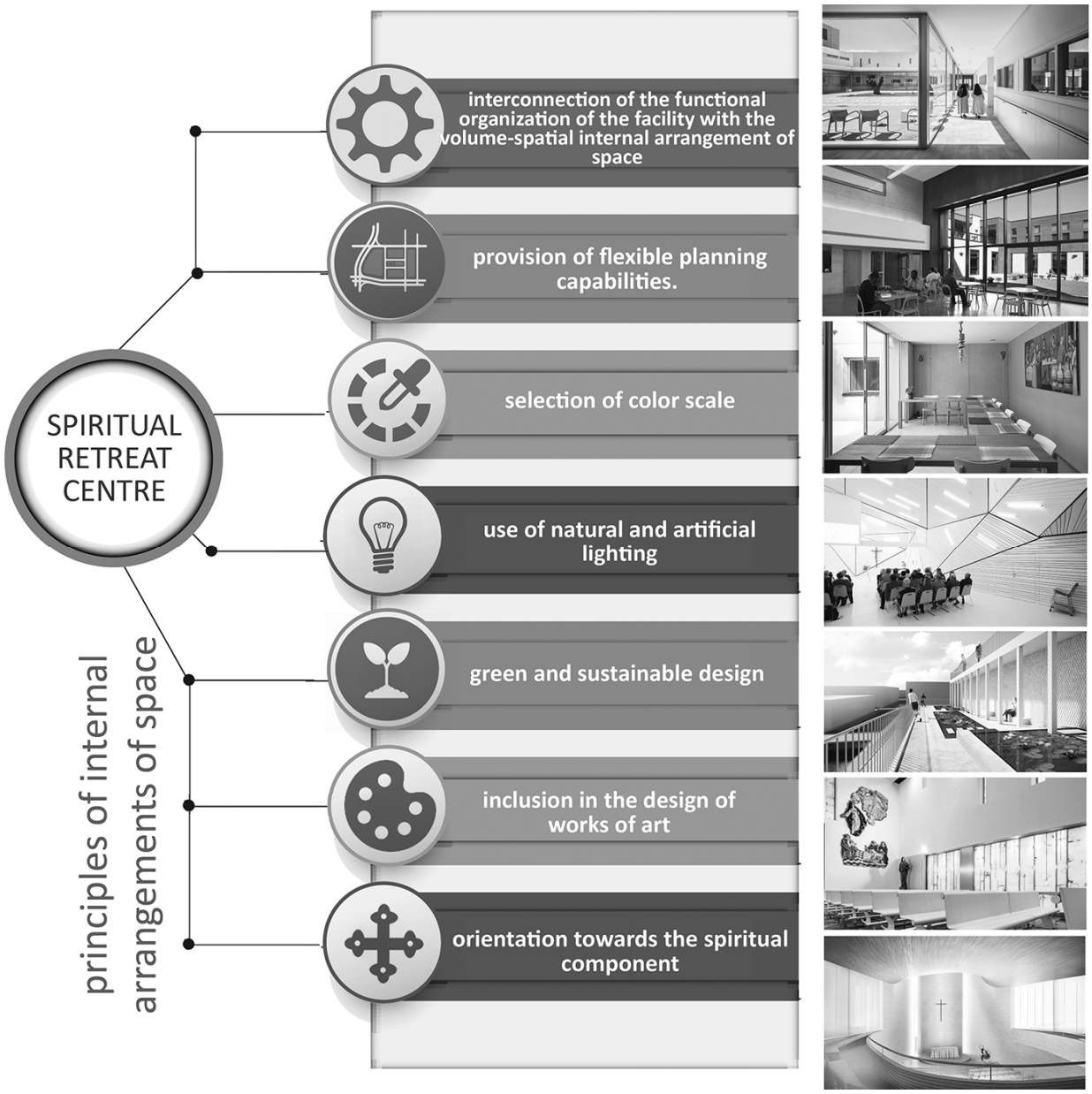

Fig. 1. Principles of architectural internal arrangements of spiritual-retreat center space (author's proposal)
Images source: http://www.archdaily.com/

Each functional group of facilities requires a carefully selected special color scale. It is reasonable to solve the recreational-leisure zone in bright colors (orange, green, yellow hues) (Fig. 2). Educational facilities should be light and pastel (Fig. 2). In decoration of the sacred core (of chapel), it is necessary to refrain from tartish combinations and to give a preference to natural textures (wood, stone, concrete, glass) and bright colors (white, gray beige) that will help on peace, rest, prayer (Fig. 2). Retreat and prayer rooms should be solved in the same manner.

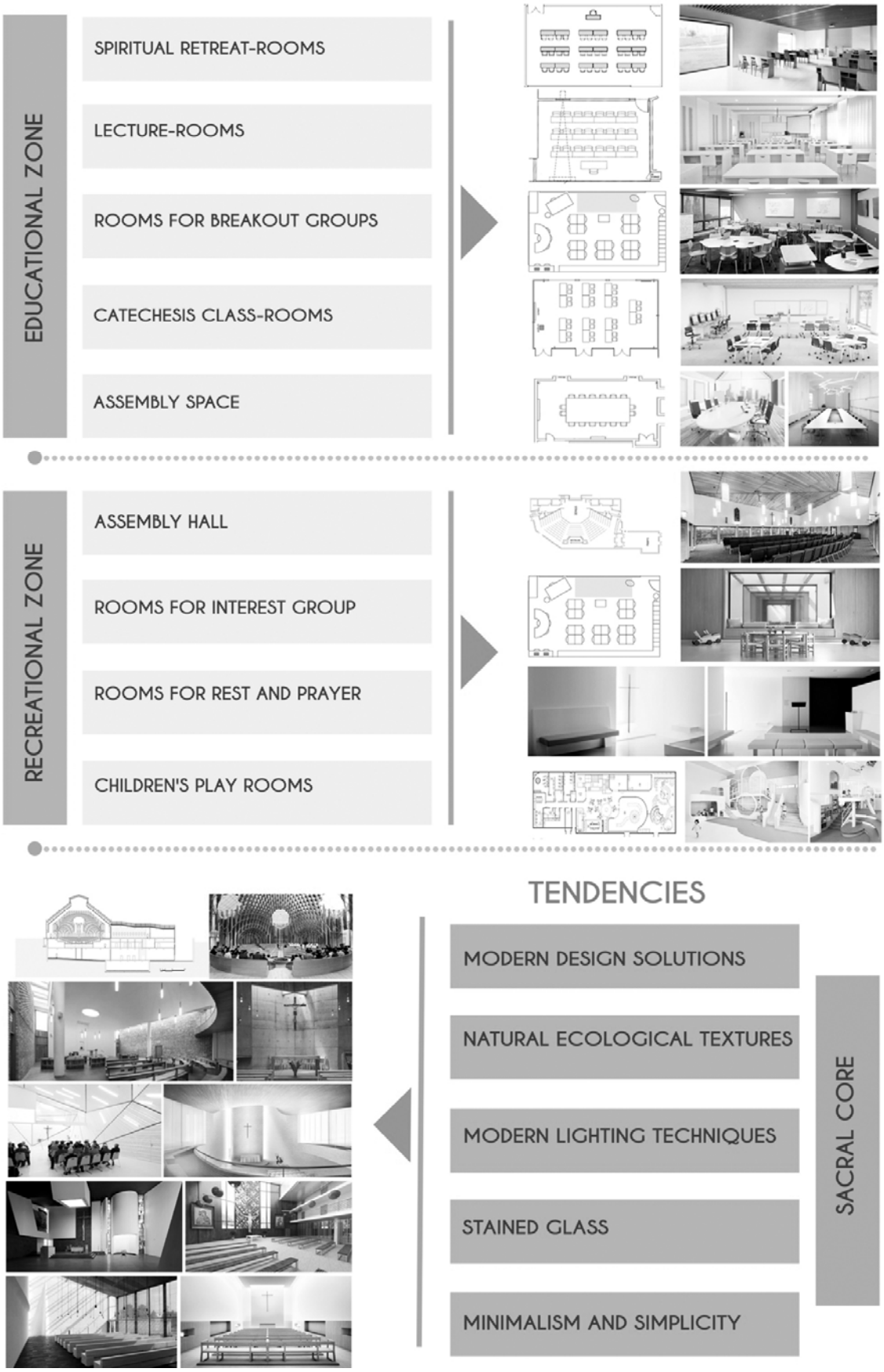

Fig. 2. Interior solution of different functional zones of spiritual-retreat centre (author's proposal)
Images source: http://www.archdaily.com/

Unique textures and color combinations are achieved with a wide range of construction materials and technologies offered by the construction industry. When selecting materials, it is important to give preference to easy-to-use, safe and maximal ecologic materials to ensure a healthy and comfortable atmosphere in the building and to achieve the natural surface finish.

One of the most important designer techniques in the interior arrangement of the space of facilities, in particular the sacred core, is **the use of natural and artificial lighting (**Fig. 2). The modern experience of internal arrangement of the space of the sacred core demonstrates the original designer techniques of using of natural and artificial lighting to achieve a variety of effects: underlining the sacred symbolism (area light in the form of cross), creating a special spiritual atmosphere (game of light-shadow, use of stained glass windows), space planing, unique decorative elements (openwork decorated inserts on skylight), etc.

When selecting the lighting systems it should be taken into account its compliance with the functional process that will take place in the building. In particular, the facilities of educational or recreational zone require a lot of natural light (Fig. 2).

Green and sustainable design takes on the significant popularity in modern solutions of public buildings interior. This technique considers the use of natural textures and materials, unprocessed surfaces, planting elements and water components. Unity with nature, inner quietness and harmony, that can be achieved due to this technique, are especially currently important for the internal space of spiritual-retreat centers. Rooms for retreats and meditations should be decorated with large window openings that command a view of natural landscapes. Such kinds of technique expand the space visually, increase the level of comfort and erode the boundaries between architecture and nature.

The design solution, based on **the inclusion in the design of works of art**, provides the uniqueness of the interior. The harmony of art and architecture creates a unique effect. This technique satisfies also the need of the society in the spiritual and aesthetic education.

Works of decorative art holds the unique position among the artistic means involved in the formation of the internal space of institutions of public services. Decorative art is one of the oldest branches of artistic human activity, hence, the humanity has been surrounded by the products made of ceramics, textiles, and wood for a long time. It is their artistic level that reflects the level of nation culture and was closely related to the customs as well as national and ethnic peculiarities. [1]

Modern Ukrainian decorative art in its entirety and distinctly national identity has high aesthetic qualities and keep the touch with the traditions of folk art of the past, modern decorative art acquires new content, new properties and features. [10]

The obligatory interior feature of the facilities of the spiritual-retreat centre is **the orientation towards the spiritual component** (Fig. 2). The general style of the spiritual-retreat centre undoubtedly has the spiritual, **sacred character**, formed primarily due to the presence of a sacred core in the vicinity or in the structure of the institution. The sacred core, that is the chapel or prayer hall, occupying a large area and volume in the general structure of the building, presents to the architect the most of specific requirements of constructive, functional and canonical character. That is why the process of searching for architectural and artistic solution of the building should be based on the features of the sacral component, its tectonic, structural, volume-spatial features, which will determine the ultimate appearance of the institution.

In general, the formation of the architectural space of the institution (starting from the living room, recreational and leisure zones and completing with the landscape of the territory) must be conducted in a complex way with the aim to represent the specific features of this type of recreation to visitors, paying special attention to its spiritual component. This is to determine the special content and specifics of spiritually-retreat recreation. Such kind of approach will support spiritualization of the space and creation of an appropriate spiritual atmosphere that will reflect the specifics of this recreation.

For demonstration of the above-stated principles and means of artistic expressiveness of the interior of the spiritual-retreat centers, it is suggested to consider in more detail the project proposal of the spiritual-retreat centre in Pohonia village of Ivano-Frankivsk region, Ukraine (Fig. 3).

The building of the complex has a clear and modern shape, in which the modern day is aligned with tradition. The building is well adapted to the existing environment. The harmonious and unobtrusive shape of the building that apparently is coming out from the relief becomes dependent and independent at the same time.

The intention was based on the task of creating the new open and closed spaces with unique views in the territory of the pilgrimage centre.

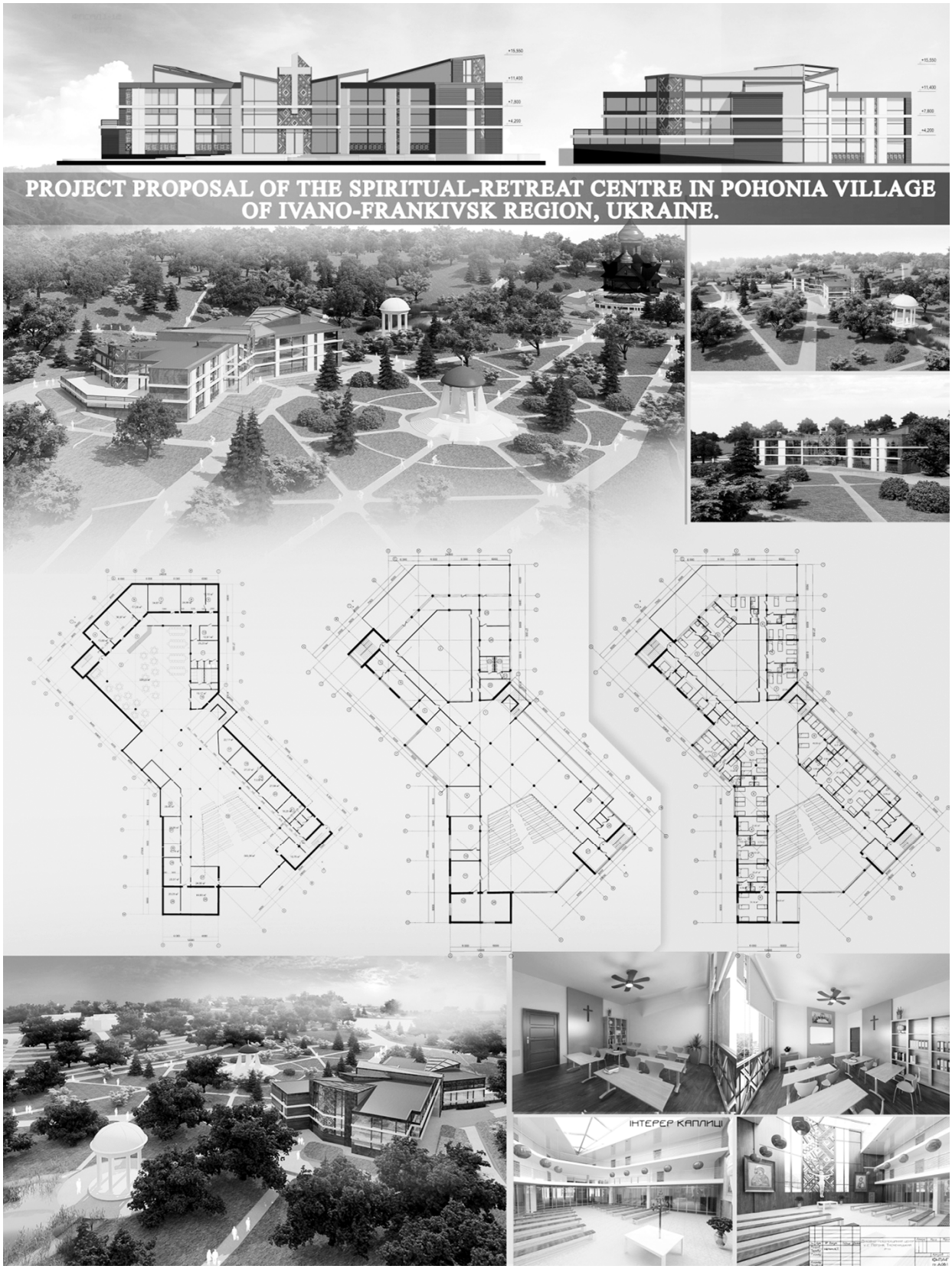

Fig. 3. Spiritual-retreat centre in Pohonia village of Ivano-Frankivsk region, Ukraine
(project proposal. Author – K. T. Holubchak**)**

The choice of stylistics, materials and color solutions of the interior was made on the basis of creating the harmonious conversation with the existing natural and architectural environment, in particular with the newly built wooden church occupying a dominant position in the territory.

The color of the wooden decoration of the building and the use of ornamented stained glass windows apparently is sending us to the origins of traditional wooden architecture, and at the same time the modern elements of facade decoration, namely, the large number of glazing and vertical concrete inserts create the unique bridge between traditions and modernity.

The whole complex is divided into two blocks connected to each other by the glass foyer. The interior of the spiritual-retreat centre is designed in a modern style, that is accentuated by a variety of modern interior decoration materials. The desire for geometry prevails in the interior.

Vertical colored stained glass windows give sacredness and majestic to the buildings. The sunlight that comes in through the stained glass windows returns into the colorful rays and creates the unique, spectacular effect inside the facilities.

An interesting component of the complex is the glass atrium on three floors, where the chapel, the sacred core of the building, is situated. The distinctive feature of the interior space of the building is the openness of the spaces, the absence of visual boundaries and the harmonious interaction of different functional spaces.

4. Conclusions

Summing up the analysis, it should be noted that modern experiments by architects with textures, colors, light and form plastic have formed a number of innovative architectural and designer techniques of expression of sacral in the buildings of spiritual-retreat centers. The internal space of the spiritual-retreat centers must combine the most modern innovative architectural solutions that will arouse admiration and interest of visitors, and at the same time must be subject to and harmonize with the existing complex of sacred buildings and the natural ensemble, emphasizing its integrity.

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Катерина Голубчак

ОСНОВНІ ЗАСАДИ АРХІТЕКТУРНОЇ ОРГАНІЗАЦІЇ ВНУТРІШНЬОГО ПРОСТОРУ ДУХОВНО-РЕКОЛЕКЦІЙНИХ ЦЕНТРІВ

Анотація. *У цьому дослідженні, на основі аналізу сучасного досвіду архітектурної організації духовно-реколекційних центрів, виявлено основні тенденції та вимоги, що пред'являються до інтер'єрного вирішення цих споруд. Запропоновано принципи та рекомендації для дизайнерів та архітекторів, якими доцільно керуватись при організації внутрішнього простору духовно-реколекційних центрів.*

Ключові слова: *духовно-реколекційні центри, принципи організації, внутрішній простір, інтер'єр.*

Vol. 3, No. 1, 2017

Larysa Shuldan, S. A. Al-Ahmmadi

DYNAMIC MONITORING OF THE HISTORIC CENTRE BUILDINGS FOR A SOLAR ELEMENTS ARRANGEMENT (using the example of Chernivtsi)

Lviv Polytechnic National University
12, S. Bandery Str., 79013, Lviv, Ukraine,
shuldanlarisa@gmail.com, PE "Alex-project" info@alex-proekt.com.ua

Received: May 19, 2017/Revised: June 05, 2017/Accepted: June 06, 2017

Abstract: The possibilities of integrating the solar power elements into formed environment of historic cities are considered in the article. Using the example of a historic city area of Chernivtsi it has been realized a multi-level dynamic monitoring of the buildings and presented the results of preliminary calculations of an energy efficiency of a roof photoelectric elements installation.

Key words: energy (power) efficiency, energy saving, power (energy) updating, reconstruction, historic building, historic monument, monitoring, solar power, photo-voltage, photoelectric elements.

1. Introduction

Energy efficiency is one of the most important aspects in the practice of contemporary architecture by the level of its relevance. Such activity is often in the nature of reflect or declaratory using the distinctive methods and arrangements. So, in this regard, the intervening into a historic building is of concern. The uniqueness of the historic buildings excludes the application of those energy efficiency measures which could influence the exterior of the edifice. Power updating the historic building needs the processing a considerably greater amount of information and carrying on the row of special investigations that enable moving beyond analysis of the problem to concrete effective solutions.

2. Basic Theory Part

2.1. Analysis of the published works and investigations.

For the duration of carrying on the research the relevant works of native and foreign authors, namely Pidhornyy O. L., Kazakov G. V., Khavkhun G. N., Farenyuk H. H., Belyayev V. S., Khokhlova L. P., Tabunshchikov Yu. A., Brodach M. M., Kashchenko T. O., Shuldan L. O., Murgul V. A. and others have been analyzed. The analysis of scientific works [1 – 9] allows make conclusion about the absence of science-based methods of power updating the city historic center buildings in general and those with the application of solar elements in particular.

2.2. Analysis of foreign and native experience

A native experience of photoelectric systems using in a historic formed environment isn't considerable. The analysis of foreign experience of energy effective reconstruction has shown substantially different methods of historic heritage buildings updating [10]. Thus, one of these methods is a ***demonstrative*** and ***accented*** method that lies in using the active stylistic forming solutions while performing the reconstruction. The integration of solar elements into the fencing constructions advances as a new artistic accent in a historic building perception and is aimed not so much using the renewable sources of energy as the idea to declare the principles of new energetic policy, new view on generation and consumption of the energy. The cases in point are: the project of

Reichstag building reconstruction performed by British architect Norman Foster in 1999, the XI century church reconstruction in the town Ales, done by the architect Jean-Francois Roger, the reconstruction of the church Groenhof Castel in Flanders (Belgium) implemented by architectural bureau "Samyn & Partners" in 1996 – 99-s.

The second method is *masking* – the method of unnoticeable modernization that lies in including the solar energy systems in the exterior of the building with a minimal intervening into an architectural image and the preservation of an authentic building appearance. The examples of this approach are the power updating of the Herz-Jesu Kirche church built in 1901 (Plauen, Germany, reconstruction 2002) as well as a Lutheran church Lutherkirche Meißen built in 1904 (Meissen, Germany, reconstruction 2006).

The third method, namely, *declarative,* provides solar power systems setting in a direct proximity to a historic building or on the roofs of the adjacent buildings. Such approach is mostly oriented to the preservation of cultural heritage buildings and their historic surrounding. A case in point can be the building of Los-an- Goel church in France.

2.3. The purpose and task of the publication

The purpose of this research is a dynamic monitoring of the buildings situated in a central historic part of the town (with the example of Chernivtsi) aimed to create the base of the objects applicable for a power updating. The task of the publication is the analysis of heliosystems placing possibilities on the roofs of the buildings, accompanied by the preliminary calculations of the power efficiency and smart economics.

2.4. Historic information

The first written record of Chernivtsi dates to October, 8, 1408 and was fixed in the charter of Moldavian landlord Oleksandr Dobryi. Chernivtsi is located in the south-west of Ukraine, at the eastern Carpathian foothills on the Prut river bank. This town is rightly considered to be one of the real pearls of architecture.

According to the governmental accounting a historic part of Bukovyna capital commands 602 architectural monuments, of which 25 are of national importance.

Historic building of an old city is a holistic and almost untouched ensemble of the XIX – early XX centuries. Among the architectural monuments of Chernivtsi the architectural ensemble of the Bukovina and Dalmatsia orthodox metropolitans former Residence occupies a special place. It was designated a UNESCO World Heritage sites on the 28th of June 2011 at the 35th session of their Committee.

A total area of Chernivtsi within the administrative boundaries is about 153 square kilometers. The population as at the March, 1 2013 was 260 669 inhabitants. The population density is 1 643inhabitants per km^2 [11].

3. Results and Discussion

The reduction of a power consumption of the historic buildings is a complicated and expensive process. The thermos-modernization of the historic and cultural buildings-monuments with the warmth keeping of the fencing constructions can't be considered in relation to the availability of protected facades and interiors at the same time. Therefore, the generation of additional energy within a building circuit (contour) that will reduce its consumption from the urban systems can be considered as an acceptable measure. In this case the building is both a consumer and a producer of the energy.

The analysis of world experience suggests that the least expensive and, for all it, the most abundant solution in conditions of historic building is the installation of photoelements on the roofs of the buildings.

The building of historic city centers is in the condition of a permanent reconstruction. Considerable part of residential buildings of Chernivtsi historic center had been built by 1940. Above a third part of them hasn't been repaired in major way yet. Most buildings are characterized by extremely low energy-efficiency indicators. In recent years there has been a process of an active compaction of Chernivtsi central district buildings. As the consequence of a housing stock increase is forecasted increase of energy consumption.

Complex protective zone of Chernivtsi within a central historic region has the area of 292.33 ha (Fig. 1). The roofs of this zone became the first objects of the monitoring.

We have created a base of objects excluding all the buildings that are the architectural and historic monuments of national and local importance (Fig. 2).

Within this territory it has been worked up about 2400 buildings of the background and inferior historic building with a total area of roofs of 620000 m^2 (Fig. 3).

The second stage of the monitoring was the determination of the main geometric characteristics of the building roofs and identification of the south oriented fragments as well (Fig. 4).

Fig. 1. Complex protective zone of Chernivtsi within a central historic area

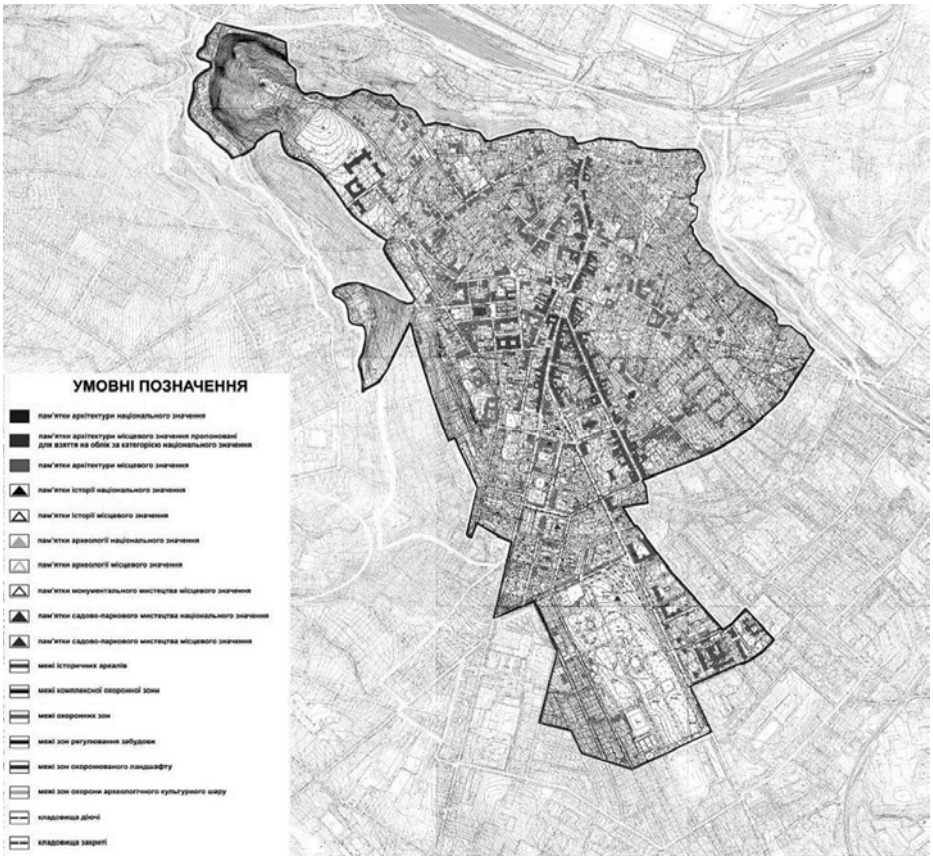

Fig. 2. Monuments of history and architecture (from the authors' archives)

Fig. 3. The buildings included in monitoring

Fig. 4. The fragments of south oriented roofs of buildings, included in the monitoring

The criteria in this case were defined by the deflection from the south within 30° (at which the losses caused by solar rays were minimal) and a minimal area of fragments that is suitable and reasonable for placing the photoelectric panels. Expediency in this case was determined from the point of view of panels fragment placement on the plane with the total power of not less than 1 KW-hr taking into the account the main losses.

The rectangular single-crystal panels of conventional size have been accepted as a photoelement. After working up the most iterated geometric shapes concerning the possibility to be made up by the panels of such total capacity it has been defined that the area of the fragment must be not less than 17м^2.The area losses were estimated by the reduction coefficient of K=1,5.

The analysis by these criteria identified 1330 roof fragments with the total area of 131057 square meters.

Chernivtsi city is situated at 48th latitude (the coordinates are 48° 17’ 27" north latitudes and 25° 56’04" east longitudes), therefore while installing the photo elements it is desirable one should use the angle of 48° with the correction at the mean position of the Sun between the winter and spring equinoxes.

Inclination angle of roof planes of the central area buildings ranges within 20-40°. While doing calculations it has been decided to use an average value of 30° in the first approximation as well as a static variant of panel installation which provides the lowest cost and the simplest assembling the elements. At the same time the power losses were estimated at least of 40 %. Due to the previous conclusions concerning forecasted power of every fragment enabled us to create the hierarchy of fragments’ value, to reveal numerical values in every design power segment.

The segment that ranges from 1 to 10 KWT-HR (Table 1***a***) is the most numerous and is presented mostly by the low-rise residential buildings. The segment that ranges from 10 to 20 KWT-HR (Table 1***b***) characterizes multi-family housings. The segment from 20 to 30 KWT-HR (Table 1***c***) is an exclusive characteristic of the public buildings. The public buildings with the flat roofs are belonged to the last segment (Table 1***d***).

Table 1

Distribution according to the power segments
(number of the buildings, area and value of the roof fragments, predicted total power)

a	***Power segment from 1 to 10 KWT***									***sum***
At the power within, KWT-HR	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	
Fragment area	15.1–30.2	30.2–45.3	45.3–60.4	60.4–75.5	75.5–90.6	90.6–105.7	105.7–120.8	120.8–135.9	135.9–151	
Number of the buildings	179	193	184	157	144	101	81	60	62	**1161**
Predicted total power, KWT-HR	268.5	482.5	644.0	706.5	792	656.5	607.5	510	589	**5256.5**

b	***Segment from 10 to 20 KWT***										***sum***
At the power within, KWT-HR	10–11	11–12	12–13	13–14	14–15	15–16	16–17	17–18	18–19	19–20	
Fragment area	151–166.1	166.1–181.2	181.2–196.3	196.3–211.4	211.4–226.5	226.5–241.6	241.6–256.7	256.7–271.8	271.8–286.9	286.9–302	
Number of the buildings	42	27	21	14	16	10	4	4	3	1	**142**
Predicted total power, KWT-HR	441	310.5	262.5	189	232	155	66	70	55.5	19.5	**1801**

c	***Segment from 20 to 30 KWT***										***sum***
At the power within, KWT-HR	20–21	21–22	22–23	23–24	24–25	25–26	26–27	27–28	28–29	29–30	
Fragment area	302–317.1	317.1–332.2	332.2–347.3	347.3–362.4	362.4–377.5	377.5–392.6	392.6–407.7	407.7–422.8	422.8–437.9	437.9–453	
Number of the buildings	3	3	2	2	2	0	1	2	2	2	**19**
Predicted total power, KWT-HR	61.5	64.5	45	47	49	0	26.5	55	57	59	**464.5**

d	***Segment from 35 and more KWT***					***sum***
At the power within, KWT-HR	36–37	40–41	54–55	65–66	85–86	
Fragment area	544–559	605.08	907.82	1085.44	1427.77	
Number of the buildings	2	1	1	1	1	**6**
Predicted total power, KWT-HR	73	40.5	54.5	65.5	85.5	**319**

4. Conclusions

1. Energy-saving is an urgent subject under consideration for Ukrainian architects. The analysis of the investigations and publications has suggested the absence of a scientifically-grounded methodology for energy renovation of the buildings belonged to historic city centers in general and those that are provided with solar elements in particular.

2. A widespread list of methods and measures may not be used in a historic building without reserve. The solutions should be based on special research accompanied by processing a significant amount of data taking into account the uniqueness of the objects that belong to a historic and cultural heritage. The authors have carried on a dynamic monitoring of the historic area buildings from the example of Chernivtsi.

3. During a five-level dynamic monitoring there have been defined the peculiarities of historic buildings and the criteria of objects selection in a historic area of 292.33 ha as well as created the base of buildings suitable for placing the solar elements. About 2400 houses of background and small value historic building with a total roof area of 620000 м^2 have been picked out. A considerable improvement of a city center power consumption without concerning the important historic monuments can be achieved due to the arrangement of the solar elements just on the roofs of an “inferior” building.

4. With a view to further monitoring it has been left over 1330 roof fragments with the total area of 131057 м^2 according to the clearly defined criteria as well as carried on the evaluation of their appropriateness for the photo-elements installation and power segments distribution. The preliminary energy results have been calculated and a maximal predicted power capacity has been determined on the level of 7840 KWT-HR. It offers grounds for substantiating a smart economics of the photo-elements installation as well.

5. A multilevel dynamic monitoring enables to forecast the energy modernizing prospects of the historic city center buildings and to plan the following steps.

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Лариса Шулдан., С. А. Аль-Ахммаді

ДИНАМІЧНИЙ МОНІТОРИНГ БУДІВЕЛЬ ІСТОРИЧНОГО ЦЕНТРУ ДЛЯ РОЗМІЩЕННЯ СОЛЯРНИХ ЕЛЕМЕНТІВ (на прикладі міста Чернівці)

Анотація. *У статті розглянуто можливості інтеграції елементів сонячної енергетики в сформоване середовище історичних міст. На прикладі історичного ареалу міста Чернівці здійснено багаторівневий динамічний моніторинг будівель, подано результати попередніх розрахунків енергетичної ефективності встановлення фотоелектричних елементів на дахах.*

Ключові слова: *енергоефективність, енергозбереження, енергетична модернізація, реконструкція, історична забудова, пам'ятка архітектури, моніторинг, сонячна енергія, фотовольтаіка, фотоелектричні елементи.*

Vol. 3, No. 1, 2017

Oleh Rybchynskyy, Ilia Lytvyncuk

FEATURES OF FORMATION AND FUNCTIONING FORTRESSES OF DNIESTER LINE OF DEFENSE

Lviv Polytechnic National University,
12, S. Bandera Str., 79013, Lviv ,Ukraine

Received: May 19, 2017/Revised: June 04, 2017/Accepted: June 05, 2017

Abstract. The article analyses insufficiently explored period of fortress building on the Ukraine territory in the end of XVIII century and considers actually condition of the fortress. The authors draw a parallel between the economic development and status of the towns near the fortress and the processes of fortress area transformation.

Key words: François de Wollant, earth bastioned fortress, Dniester line of defense, Ovidiopol, Tiraspol, Odessa

1. Introduction

Today the fortresses of the Dniester line of defense are under investigation and stay in an unsatisfactory condition. They are not protected by current legislation. The project of the Dniester line was not realized completely, and the fortresses as the defense units were functioning during a short period of time. (Fig. 1).That is why the analysis of the features of their forming is very important for the determination of strategic and tactic fortification principles, realized on the territory of South Ukraine in the XVIII century [1].

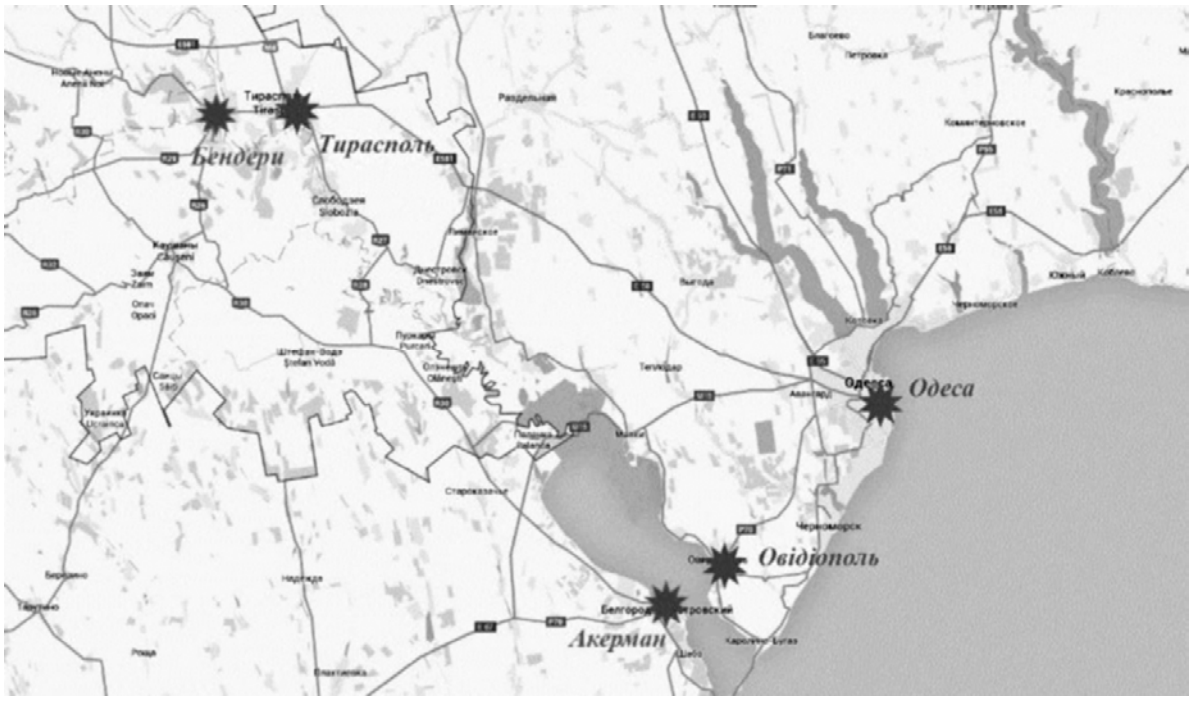

Fig. 1. The situation with fortresses of the Dniester line in front of Turkish fortresses at the end of XVIII century

The fortresses of the Dniester line of defense and their military settlements were started to be built due to the expansion of the Russian Empire and the necessity to protect new southwestern borders. In 1791 there was concluded the Treaty of Jassy that put the end to Russian-Turkish war. In accordance with the terms and conditions that promoted the territory between Southern Buh and Dniester to be joined to Russia – so-called Ochakiv region or the Yedisan land (Yedisan Horde) which was protected by Crimean Khanateand then Turkey. There were involved the foreign well-qualified experts such as Richelieu, de Ribas, François de Wollant in the planning and administration over the new territories. The author of the new fortification projects was the experienced Dutch military engineer, architect, and urban planner general François de Wollant.

2. Basic Theory Part

Planning features

The Dniester line was characterized by a small amount of near-border fortresses and a short period of their active military functioning. In 1815, after joining Bessarabia the borders of Russian Empire moved to the West. It was followed by loss of fortresses strategic meaning. The European military paradigm at the end of XVIII beginning of XIX centuries, which was accepted by Russian Empire, determined the main role for earth bastioned fortresses. They were less appropriate for the development of artillery at that time. "Stone wear" was sometimes used for strengthening the earth profiles of the mounds, in the context of Ovidiopol fortress. As exemplified by Tiraspol fortress there were used a stone strengthening of escarp. There were fewer fortresses belonging to the Dniester defense line than those belonging to Dnieper line. However, there was observed the increase of their fire power. It was manifested by the growth of the fortresses area, which allowed placing more numerous garrisons in the territory with the complicated profiling of mounds and sketches of the defensive complex. The earlier fortresses in Southern and Eastern Ukraine, constructed at the time of the Russian Empire had a radial symmetry, whereas the fortresses of Dniester defense line were projected on the bases of the central-axis symmetry principle. Fortresses looked like polygons, and the polylines of curtain walls created several bastioned fortresses. The fortress profiles consisted of glacis which was situated before the fosse, mounds of the ramparts with the escarps, counterscarps, parapets, ramps and gates. There were ravelins between the bastions situated on the lower level, under the bastions and strengthened a fire power of the fortress. It was made in order to give the guards on bastions the opportunity to bring down fire over the ravelins occupied by the enemy. On the corners of the ravelins there were equipped the bridgeheads for the collection military forces for counter sallies.

Ovidiopol fortress had one gate situated on the central axis of the fortress which connected fortress with the town. Tiraspol fortress had two gates – Bratslav Gate in the West and Kherson gate in the East (it provided the connection with the city). The connection of Odesa fortress was achieved via the gate located in southern-west part of the complex. All of three fortresses had one wide retrenchment side which was in front of the pond. Ovidiopol fortress is bordered by the Dniester firth, Odessa fortress – to the Black Sea and Tiraspol fortress was situated not far from the Dniester towards which the Southern retrenchment was directed. These retrenchments were strengthened along both sides by bastions and demi-bastions. They had the wide bridgehead and two-storied terracing. These retrenchments were also placed to the enemy fortresses (or sea) therefore they were carefully improved being the most vulnerable parts of the fortress as well as the look-out points. The improvement of these sides determined to refuse from typical star-shaped fortress used before and led to the projecting the new fortification configurations.

There were the military buildings situated inside the fortress. They fulfilled the function of the citadel. Military barracks were placed in a way to create the half-closed trapezoidal (Odesa, Tiraspol) and rectangular (Ovidiopol) quarters. The buildings in Odesa fortress were set in the off-standard way. Here the quarters form a central fortified circle-like nuclear which is inscribed in a star-like pentagonal contour of the fortifications. In Tiraspol the pairs of commissariat quarters, military barracks for soldiers and two-storied subaltern officer wings at the corners were situated in symmetric way (Fig. 2, 3, 4, 5).

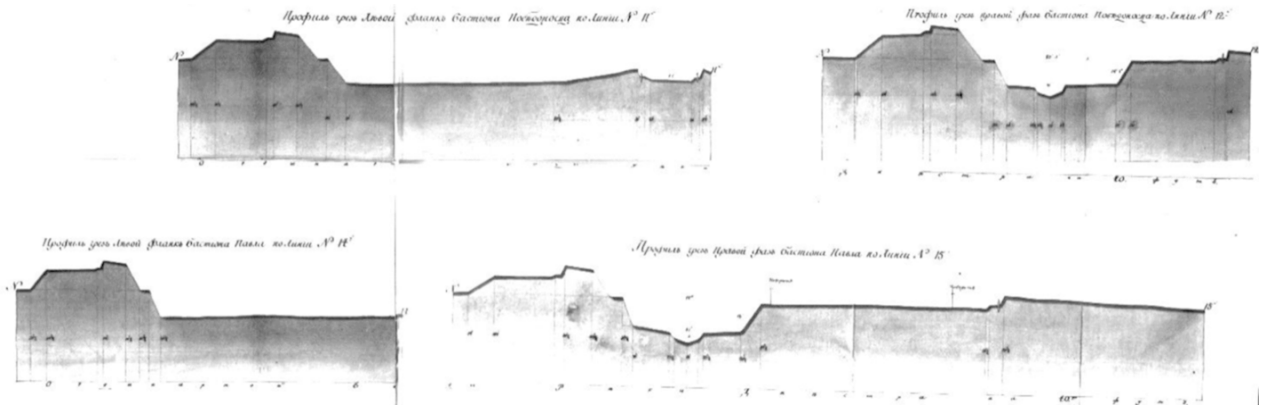

Fig. 2. The bastion profiles of Tiraspol fortress (drawing, XVIII century. Collection of Tiraspol United Museum)

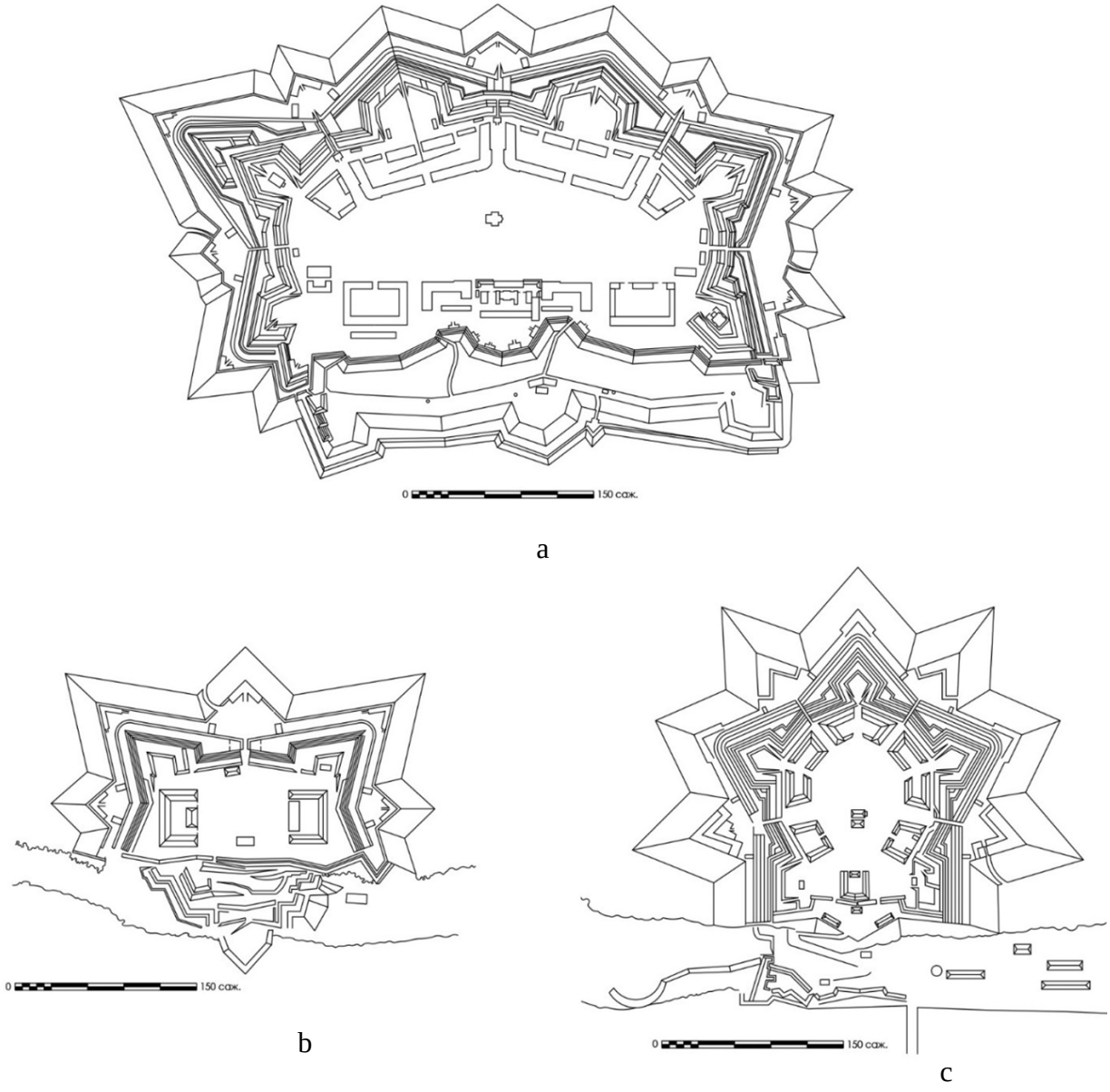

Fig. 3. Tiraspol (a), Ovidiopol (b) and Odessa (c) fortresses in one scale. Drawings by Litvinchuk I.

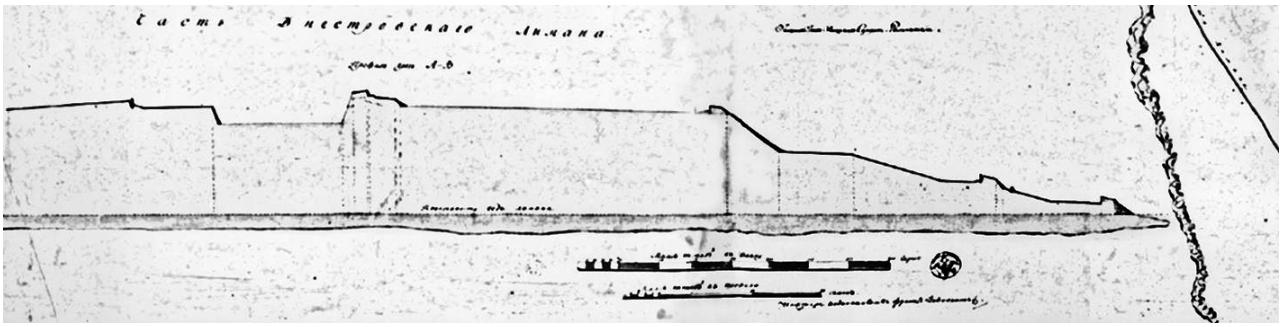

Fig. 4. Transverse profile of Ovidiopol fortress (drawing, XVIII century. From Julia Frolova collection)

Fig. 5. Profiles of Odessa fortress (drawing, XVIII century. From Julia Frolova collection)

Existence of fortresses after their cancellation

The territories of the Dniester line fortresses occupied the large areas, that is why, after the loss of the military value the question of their appliance had arisen. First of all this problem was solved with Odesa fortress as it was the smallest and the weakest one. The fortress was canceled in 1811 and its territory was given to the port quarantine. In the second half of XIX century the revetments were leveled and on their territory there was organized a city park. The only bastion of St. Andrew was saved. In 1891 the column in honor of the emperor Alexander II was erected. This bastion together with the monument survived to this very day (Fig. 6). In the Soviet days the Dynamo stadium was built in the site of the fortress [2, p. 28] [3].

Fig. 6. Actual view of St Andriy bastion with Alexander II monument, Odessa [6]

After the cancellation in 1835, Tiraspol fortress continued fulfilling its military function as long as there was a place of a military post. Then Tiraspol was recognized as one of the most convenient places for a military

unit housing. At the end of XIX century, the 15 artillery brigades, the 8th Astrakhan Dragoon and 56th Zhytomyr infantry regiment were located in Tiraspol. In the Soviet period, the fortress was used by NKVD-MDB- KGB and only at the end of 19 60-s its territory was decided to be relinquished for the development of the residential district. As the result, a significant part of the fortress was destroyed. However, in the construction site of the new micro-district a lot of the relics of fortress planning could still be found. For example, Nakhimov street superimposes on the contour of fossein the west, and Rayevskyi lane bypasses St. Peter's bastion. In 1980-s St.Volodymyr's and St.Peter's bastions, south curtain walls and retrenchment which was then build-up by summer cottages remained undestroyed. At that point in time, there was raised the question regarding entering the fortress to the state register of cultural heritage. The museum of the Tiraspol history is housed in the premises of the powder magazine (Fig. 7). [4, p. 149–158].

In Ovidiopol there was no need to keep a big military garrison as in Tiraspol because Ovidiopol was not a strategically important town and so, there were several projects on how to organize the territory of the fortress. One of the ideas lied in giving the fortress to Roman Catholic consistory. However, none of the projects was realized. The area of this fortress is not used even today. Its fortifications were saved, however, all the buildings inside the complex were demolished (Fig. 8). [5, p. 110] So, we can state that the economic development of the city affected the functional adaptation of fortresses belonging to the Dniester defensive line.

Fig. 7. Actual condition of St. Volodimir bastion
and powder magazine inside, Tiraspol. Author's photo

Fig. 8. Actual look of Ovidiopol fortress ruins. View from Google Earth [7]

3. Conclusion

As a result of our analysis of historical drawings we can claim that the fortresses of the Dniester defense line were projected and built according to valid military technologies at the end of XVIII century, and pursuant to the expansion of politics of Russian Empire. The general stages of fortress forming and function permit to see that the state of preservation of complexes depends on their geographical situation in the defense system of the Dniester Line, the space features of the territory and economic development of thee town as well.

We think that further research of this subject should be connected with the comparison between the Dniester defense line and Ukrainian and the Dnieper defense line of XVIII century. Besides, the comparison should include the defense lines in Austrian and Ottoman Empires which had been built at that time.

We can propose to create the public recreation spaces in the territory of the fortresses and include it in the tourist business for having investment. It will give the opportunity to care for the territories of fortresses. Technically, the methods of protection of this cultural heritage should include: the consolidation of the earth shafts, restoration of profile configuration, archeological baring and museumification of remained buildings of the fortresses, tracing the outlines of unsaved buildings.

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Олег Рибчинський, Ілля Литвинчук

ОСОБЛИВОСТІ ФОРМУВАННЯ ФОРТЕЦЬ ДНІСТЕРСЬКОЇ ЛІНІЇ

Анотація. *В статті аналізовано недостатньо вивчений період розбудови фортифікації на території України в кінці XVIII століття та оглядає їхній сучасний стан. Автори проводять паралелі між економічним розвитком і статусом міст при фортецях та трансформацією фортечного простору.*

Ключові слова: *фортеця, Франц де Волан, земляна бастіонна фортеця, Дністерська лінія оборони, Овідіополь, Тирасполь, Одеса.*

Vol. 3, No. 1, 2017

Andriy Pavliv

THE FACTORS OF IMPULSE MODELING THE TERRITORY AS A PART OF TRANSITIONAL NATURE OF MODERN CITY PLANNING

Lviv Polytechnic National University, 12, S. Bandery Str., 79013, Lviv, Ukraine, apavelli1116@gmail.com

Received: May 19, 2017/Revised: October 06, 2017/Accepted: October 09, 2017

Abstract. The article studies the problem of a gradual change in the direction of urban discourse under the influence of critical re-considering of the heritage in modernists projecting and the range of social and technological initiatives implemented on the verge of 21st century.

Key words: urbanism, discourse, modernism, modelling, urban development.

1. Introduction

One of the features that characterizes the modern approach to urban development is a diversity of the material, dedicated to the evolution of urbanism in the 21st century (which deals with various forms of its perspective and retrospective). Such scope of data rises a lot of questions about the development of a certain system of its analysis regarding the balance of dominating topics and tasks. The given article studies the main directions of scientific approach to the current state and perspective ways of urban evolution, based mainly on the potential incorporated in the traditional industrial urban development to reflect the phenomena and changes of a post-industrial city.

2. Basic Theory

The aim of a given article is the detection of ways of topical structuring a wide range of theories, which form the discourse of a subject of modern urban development in the context of differentiation of its perspective directions which are relevant to economic and technological transformations of the verge of the 21st century and inertial which forms the basis of a modern urbanism paradigm.

3. Results and Discussion

Given the fact that though considered on the level of a general-planning structure, urban devlopment as the form of intelectual property reaches the earliest stages of civilazation, we may certainly claim that up until the end of the 19th century, it was nothing more than regulation of road networks by applying the simplest geometric techniques. The largest artificially planned metropolises of the ancient times (such as Alexandria) as well as the pre-modern ones (such as New York), were built following almost identical concepts of the functional planning, with only some slight differences in the landscapes of their formation. Urban development in modern view, as a complex system of living, industrial and residential determinants is mainly the product of New Time, as well as the notion of the city itself – the one, with the population that exceeded one million of residents.

Having differentiated between the urban development as the human experience to build large settlements on the one hand and the scope of knowledge on building the industrial metropolis of New Times on the other, we may want to look closer at how this scope of knowledge fulfills the needs of modern informatized society,

which turned out to be the most urbanized in the history of civilization. The fact, which will later transform into the issue of adapting of ontologically industrial city to the needs of a society, the values of which are significantly different if not opposite to its nature.

The best illustration here, probably, would be the transformation of so called "The Charter of Athens", which for a long time was the main and very special quintessence of modern urban science. The history of this charter can be viewed as a perfect illustration of not just the sign of the end of the epoch of the city of 20th century, but also a naive assurance in its actuality in 21st century in terms of its directive nature.

Sixty years after the Charter's first edition in 1933, its new edition of 1994 became a statement of considerably different fundamentals, while the edition of 2003, was, in fact, the proclamation of the absolutely opposite ones [1]. While the city of the 20th century was viewed as the plane of clearly defined functional zones and large-scope geometrical generalizations, now we deal with the undefined image of constantly changing priorities, which require permanent re-considering and update; notably that the initiators of "new charter editions" took the resonsibility of making new editions of it every five years. Apparently, such constant and rapid change of priorities in such an inertial sphere as practical urbanism, the basement of which should be by default a long-term strategic planning, may be a sign of a disorientation of a modern discourse and loss of its essential link to the processes which trigger the development of a modern city.

All the before mentioned does not necessarily mean that urban analytics of the verge of 21st century lost the ability to reflect actual needs and phenomena of the development of urban settlements. It may be the opposite- the quantity of scientific and specialist studies on this topic is immensely large, and its contextual part is probably the richest in the sphere of all urban reflections of the preceeding historical periods. Yet, on the level of practical management of a big urban formation, this scope of material is hardly correlated with the conventional managerial stratagems, in which the master plan itself and its derivatives were developed within the paradigm of a large-scope industrial urbanism of the first waves of the industrial revolution. The reason why such irrelevance occurred most likely lies not just in the evolution of technological development or shifting the values of economics to service sector, but also in much more significant social inequality of the population in terms of its welfare. The verge of the 21st century turned out to be the period of the middle class crisis which brought up such notion as "the society of common well-being". The growth of the middle class led to the increased demand to comfortable living and relevant legal base of project activities, which in turn, created a favorable base to overcome contradictory consequences of the early industrial projecting, which also includes the heritage of the developed modernism of the initial "Charter of Athens".

Post-modernism and various forms of anti-industrialism (counter-culture of the 1960th, Eco-projecting, "new urbanism" of the 1990th) have become some of the reflections of the increased well-being of the middle class and thus established new, higher demands to its living space. In these exactly conditions, most of currently actual studies on modern urban planning emerged, which encorporate the ideas of the sustainable development, technological initiatives in the household, refrain from frequent car use, contextual green zones etc. However, the recent decade has demonstrated that such approach may prove to be unreliable, and views which were formed on its basis may turn out to be too idealistic.

Usual image of "the society of common well-being" which seemed invincible first but only until 2008, when world economic crisis enhanced the destructive processes of socially-economic consensus, which had started long time before that. Middle class that was shaped by industries and social guarantees (as well as by high wages), found itself in total deconstruction, which was caused on the one hand by globalization which enabled involvement of cheap labour from developing countries and, on the other hand, by industrial automatization and increased efficacy (robots, adaptive production methods).

As a result, a significant part of profits, which used to be distributed between qualified workers of the industrial sector moved to a small group of the owners of big enterprises, which shifted balance of social power. Statistically, in the second decade of the 21st century, half of global wealth (50 %) belonged to only one per cent (1 %) of world's population [2]. In the nearest future such dynamics will continue to develop and 99 % of humankind will get increasingly poorer. In such conditions, projecting and legal scheme of urban development, which is based on the norms of representative democracy, may be going through further destruction. As far as only very few persons globally have real financial potential to conduct effective election campaigns, this eventually allows them to manipulate their candidates with the help of their resources, both representatives of

elective power and those of executive power itself. As a result, the scope of scientifically - practical knowledge and managerial techniques, which traditionally formed the urban science , is gradually changing, step by step destroying the existing consensus. Managerial structures of the epoch of "the society of common well-being" lost their ability to maintain the system of modernist urbanism of the 20th century and are transforming gradually obtaining other qualities and functional characteristics.

This may be developing in two possible directions: on the one hand, there is a high likelihood of the gradual change of the legal field of urban development and its administration. On the other hand, in the conditions of a severe degrading (or a complete absence) of middle class, this field is not seen as a compulsory any more for the range of subjects of urban development. In the first case, this gradual change of the administrative field, declaratively, may even be characterized by the clearly defined system of measures targeted at improving of life standards which may involve technological advancements and innovations, use of which is relevant to marketing aims of their producers.

In given context, modernist urbanism is likely to encounter a wide range of new influence factors, which do not have equivalents in its constitutive content. Analysis of these factors as well as the notion of "urban development□, leads to the interpretation of the latter as the one with ontological essence. The principle of the distribution of knowledge within the branch is one of the fundamentals of science and economics of the New Time, within the time frame of which the modernist urbanism was not only formed but also coordinated with other branches, which were meant to create socially-economical body of the epoch.

However, in the course of its further development, branch fragmentation of the knowledge continued and as a result, some sub-branches or directions started to grow out of the basis. First as subsidiary branches and later as the independent ones, equal to those from which they originated. Eventually, new notions which originated from the urban development experience, separated from it and formed the range of independent, self-sufficient branches, while urban development itself remained unchanged within the limits of it initial basis. Thus, the system of source basis of the contemporary urbanism can not be viewed single-sidedly. On the one hand, this is the scope of scientific works, which are within the frames of the branch so knowledge, which is called "urban development" in it's initial meaning. On the other hand, this is a range of various branches, which are involved in the process of city functioning. The amount and limits of those branches can not be clearly defined. Taking into account all the before mentioned we can view the scope of source base in following provisional sections: conservative, contextual, synthetic and performative.

In ***conservative section*** we consider the scope of data, which is limited by the conventional framework of urban development notion, which acts as a branch of knowledge formed during the New Time epoch. These are, mainly, the scientific works, which operate the concept of the city as existentially monogenous structure, which in this meaning may be the object of project and complex transformation. Conceptual maxima of the conservative scope of urban planning knowledge is formation of a self-complete structure "from the scratch", in the form of instantly fully-equipped urban system, which will meet all demands of the administrative, industrial, residential and structural cycles. Such kind of sources consists of monographies and articles which view urban development as ontological phenomenon, which is closely related to the course of rationalistic thought and goes through the certain stages of adaptation to demographic, economic and infrastructural changes in accordance with natural development of a certain residential unit. Such context also allows some wider generalizations and conclusions regarding the phenomenon of a contemporary city-planning itself.

Contextual section is the reflection of the before mentioned process of fragmentation of urban knowledge and its transformation into separate, relatively isolated branches which are not always correlated with city planning or architecture. In a sense, we may say that emerging of these new branches had a beyond-urbanistic ontology and can be interpreted as a developmental process of not only other scientific branches, but also of a social publicistics. For instance, we may take the book of Rachel Carson "Silent Spring" (1962),which was the example of actualizational work on a very narrow topic of pesticides in our food and eventually became a key trigger of environmental movement, which, in turn, has grown into a range of popular urban concepts. The research works which can be provisionally referred to as of contextual type, often tend to consider the scope of knowledge of their newly-formed branch as the basis for a successful development of all city planning or as its next, more effective form. ("Silent Spring A good example in this case would be the theory of sustainable development, which was formed at the end of the 20th century and grew to be a largely varied system of theoretical and practical ideas and views on residential space which consists of esthetic, economical, ecological, transport, anthropological and other models. In modern science, these branches are usually viewed separately

and can be parts of very different spheres of knowledge ranging from economics and administration, to energy, culturology and architecture.

By ***performative*** section we mean sources and materials, which are not connected with the systems of modernist urbanism and create a new approach to interpretation of city planning space on the basis of a singular reality of informatized society. Despite the fact that this category of sources can not be clearly defined within a certain branch of knowledge and is open to accumulation of various data on interpretation and transformation of urban plane in the conditions of "post-industrial" paradigmatism, we should first of all consider those studies which have distinguished society-forming and city-forming features. Such kind of materials include the reflections of urban and counter-urban spontaneous formations, as for instance some residential units which appeared on the basis of street markets, and counter-urban residential units of a situational character, such as long- term refugee camps etc. All these and similar examples of parallel urbanism very often include some elements of performative interpretation of a contemporary city planning and make a valuable practical material for establishment of a contemporary urban concept.

As a rule, tranditional branch sciences are positioned in correlation with the theories of formational changes of the second part of the 20th century (and the beginning of 21st), which certifies their actuality and potential for practical application. However, in our context, a separate study of the scope of material on interpreting of post- (late-) industrial social system , is due to the fact that city planning in its current meaning, is, in fact, its functionally-spatial expression.

The scope of such kind of data can be divided into three principal groups: futuristic, manifestational and reflexive. The first group includes scientific and scientifically- publicistic materials, which view formational transforming as a hypothesis, which can be proved only in the future but its credibility is proven by a suggested abstract-logical scheme. Such kind of studies was typical for first of all, the early stage of the establishment of post-industrial conceptualism, their tone was determined by futuristic works of A. Toffler [4, 5], prognostic social analytics of M. McLuhan [6, 7, 8] and political economics of D. Bell [9]. Even though the main scope of these works belongs to the second part of the 20th century, rapid changes and popularity of the topic constantly prolonged the futuristic period and we can still see its features in numerous contemporary works.

The second group includes works that are affirmative and promotional in nature, and are often combined with the promotion of various technological and engineering solutions, mostly of the areas of communications and energy innovation. Formational transformation is presented as a kind of self-evidence, maximum statement of which increases the value of the proposed solutions and ways of adaptation. Sources of manifestational nature generally prevail also in domestic scientific literature that correlates with the current state and problems of development of various branches of science and industry. This is mainly due to the late acceptance of domestic science concepts underpinning post-industrial movement only from the end of 1980, when ideologically deterministic Soviet culturology gave place to a pluralistic approach, openning access to, at that time, already quite developed formational discourse on West.

Reflective group of sources is usually based on a critical analysis of already implemented formational transformations. Although, in this case, we often encounter signs of futurism and manifestationism, applied nature of reflective sources, especially those related to the experiments with the urban planning plane is the main argument for prioritizing such materials for modern urban studies.

An important part of the systematization of source database is positioning of relatively significant social changes that occurred on the boundary of XX–XXI centuries, due to the combined growth of the service sector, communication technologies and various forms of self-organization of small and large groups of population.

Currently sociologists and economists have not reached consensus in interpretation of economic and cultural effects of such changes, however, analysis and personal experience of the author with various groups of inhabitants of a large settlement, enable affirmative assessment of the trends of detachment from the paradigm of economic determinism. The economy can not be viewed as a unique and exceptional basis on which derivatives of social and cultural phenomena are developing. [10] Communication technology led to the creation of self-organized civic structures, which, having different objectives and scope, affect directive hierarchical structure of the industrial era.

In this context, the research on potential ways of modern urban planning, raises the problem of studying the before mentioned phenomena and incorporate them into hypotheses about the design of a large city. Several

studies, notably social futuristic and those which refer to the values of sustainable development, present the idea of transformation of the role of a city-planner as a designer to the one as a communicator. The experience of this way of forming the living space (for example in works of Alejandro Aravena), at the first sight, provides the basis for positive attitude to such shift of emphasis. However, some, still rare though, examples are often evaluated from exceptionally egalitarian standpoint and require some additional testing in the conditions of lack of the communicator of professional knowledge in the sphere, which is affected by communal activity.

Strengthening the role of communicatively cohesive civil communities also brings a change in a valorization plane. There are changes in categories and selection criteria, perceptions of value and means of their transmission (distribution). Formed in this way social system begins to act not as an "add-on" the economic "basis" but as it is equivalent to the value unit. On the other hand, it can be perceived as an evolution of the "base" itself whose content constitutes "egocentric" or "sociocentrical" functional system [11].

Although this terminology can cause concerns and probably needs to be improved, it defines the horizon that separates the phase of capitalist-industrial formational model from the consumer-individualized phase.

Works of Angus Deaton and his research into the problems of poverty, wealth and life satisfaction showed the existence of "insensitivity" threshold to wealth, after reaching a certain level of it (Deaton calls the figure of 6,500 dollars a month per person). After reaching this threshold (which guarantees basic consumption needs), individual behavior changes greatly as change the priorities of his choice [12]. Widespread recognition of Deaton's works in the world of science, can testify the achievement of some consensus on specification of the limits at which begins "sociocentrical" functional model and its inevitable approach, even in those countries that demonstrate the lowest GDP per capita and Human Development Index (HDI).

Given the above mentioned, we may outline possible sources that are associated with modern urban existence within the social stratigraphy which replaces the procedural one (it is worth noting that it does not mean the disappearance of procedural factors but their transition from the main categories to the category of auxiliary).

However, it is necessary to make some clarifications concerning the semantic content of concepts that are considered. In traditional industrial city of the twentieth century, the living space was also, in many ways, "egroeconomic". As part of the procedural stratigraphy, where industrial enterprise served as a basic element, whose needs created other elements of urban development plane-transport networks, residential areas with the appropriate infrastructure, administrative and management clusters. This company was the key to personal development, which, in the form of wages and some social security (pensions, scholarships, hospital, etc.) made it possible to maintain a certain level of consumption that was higher than the consumption level of rural residents. The ability to increase the level of consumption was associated with increased skills in vocational education. Thus education was mainly focused on a narrow industrial specialization, which individualized personality and gave it some social value. In this sense, the term "egroeconomics" is probably more correct than in theorists of post-industrial paradigm.

However, in the process of improving of industrial production and its replacement as a major source of employment in service sectors, already high consumption, provided with industrial production growth was further developed by the increase of not material, but intellectual consumption. For example, eateries that by the end of the twentieth century were considered only as a place for a meal, in the context of formational transition has been regarded as a place to obtain experience: visual, auditory, cognitive and communicative. Formation of proposals on intellectual consumption has become much more dynamic environment of capital accumulation, individualization of personality and the acquisition of social importance.

In this regard, at the beginning of the XXI century "procedural" urban model has undergone significant changes. The growth of services has changed the travel priorities, residential units, the requirements for the living space and many more. Service and non-industrial activities, mainly concentrated in central parts of cities, created new infrastructure challenges, which can not be solved within the modernist paradigm. The main reason is the high degree of variability of "non-industrial" activities, success factors of which are not stable and do not require constant creative search.

Thus, individual-oriented "socio-economics" ("egoeconomics") is the foremost system of communications, which provides not only for a physical consumption (like in agricultural epoch) or physical and limited intellectual consumption (as in industrial epoch), but dominant intellectual consumption, which requires other infrastructure solutions and management methods of a large residential unit.

At the moment, we can say that the source base, which applies to this body of knowledge is very unstructured and not formed. Many of these are distributed between different segments of knowledge from independent power supply to the "theory of happiness" and require more basic research that would have laid the foundation for a universal understanding of the phenomenon of "egoeconomics" or "social economics". This article considers only those aspects of the subject that overlap with existing architectural examples of urban planning practice as well as those non-empiric concepts, which relate to different types of self -organization of "social economics" that may be important to city planning in the future.

Here, above all, we are talking about experiments around the so-called "cash-strapped economy", or "gift economy", which involves establishing physical sequels of already created in communicative network, correlations. In this sense, individual-oriented paradigm can enter the systemic conflict with the policy structure of city management, as certain groups of local residents, hypothetically, can independently order the planning projects for functional areas in which they live and to implement them in their own requirements. This possibility opens up the prospect of a radical revision of the concept of centralized modeling of urban development and competence of state bodies, which will operate it. In this context, especially important are the works that trace the changes in the structure of livelihood of the individual and small groups of local residents after they leave the traditional system of industrial relationships.

However, the version of the city development that fully complies with the above-mentioned forecasts, is very unlikely. Practical observation and experience in ontologization of post-industrial principles, indicates that the formational layers do not change but overlap, gradually synthesising and creating a more complex logistics structure. Although in social-system aspect, previous layers marginalize due to the continuous technological improvement, which, however, does not mean that they will disappear, because, the objective need for their existence is the same.

Therefore, the study of contemporary urban concepts requires prognostic structuring and reflective material according to its degree of interconnectivity, which examines the effects of the previous formation as relevant and important to the functioning of the main. In this connection, those works which study adaptation and transformation of old structures after the loss of their main economic and administrative role, seem to be very perspective and trigger self-discovery of the potential of a certain territory.

As an example of such approach to modelling a city plane we may take a development concept of residential blocks of north-eastern part of Lviv, based on the phase transformation of a small building of a former jam factory, which was suggested by the author.

The concept envisages the development of microstructure concentrated within a building by gradually taking control of the space by the features incorporated in it to the size of the adjacent quarter limited to three streets (Fig. 1).

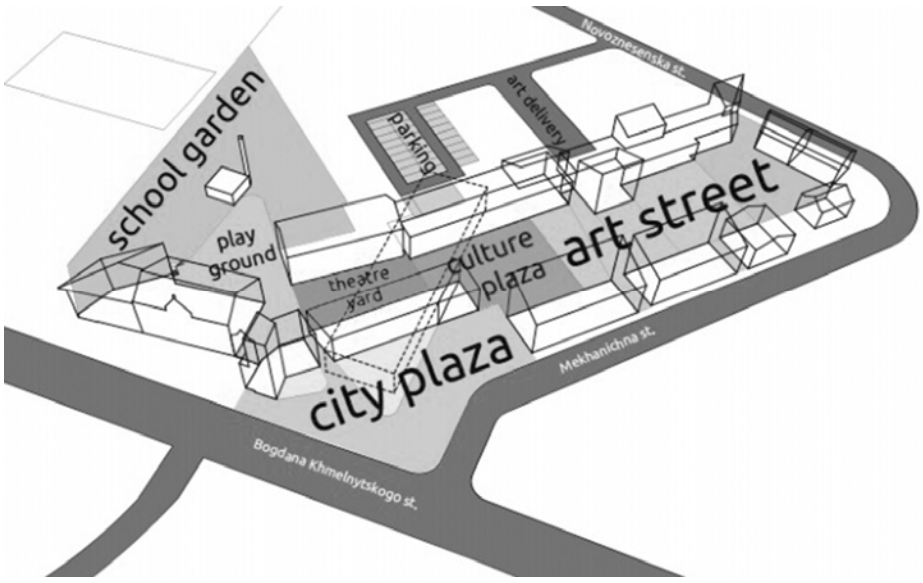

Fig. 1. Concept of the quarter development based on the deployment of the functions inherent in impulsed site - a former jam factory building

The project involves two stages of deployment of functionally-dimensional plane comprising five phases -two during the first stage and three in the second (Fig. 2).

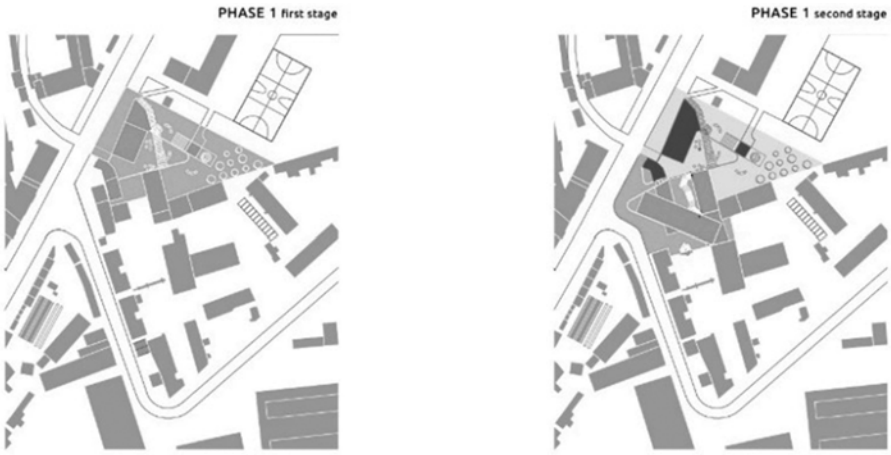

Fig. 2. Phases of the first stage involve re-valorization of old building and concentration of the primary functions within a small surrounding area: business activity, culture, public space, services, trade and so on

Fig. 3. The second stage of impulse development of the quarter with incorporation of metabolic qualities of further performative expansion to other areas in north-eastern outskirts of the city Lviv, (new street area, square, the local community center, children's and educational institutions)

On the second stage, the features incorporated in the first phases are growing and getting more complex, developing geographically to the quarter with the square of 3450.05 m^2 (Fig. 3). Thus a city formation is created, with its own area and community center further down the street. The planning and spatial structure of the formed territory is organized on the principle of evolutional metabolism, that each cluster of the final quarter which contains unfinished items for a possible further expansion in space and transforming the entire space of the south-eastern outskirts of the city, which is composed of abandoned industrial enterprises and low quality buildings.

4. Conclusion

4.1. We revealed the main factors of transformation of a contemporary urban discourse that are related to a) a shift of balance between the middle class and big capital that damages the stability and effectiveness of the regulatory field of administration of urban planning processes; b) activities of technological companies that distribute their products using urban reasoning; c) new horizontal connections between residents, which resulted in the development of new types of interactive communication.

4.2. We determined the main principles of structuring an array of a contemporary urban planning discourse based on chronological-branch fragmentation of modernist base of the first half of the twentieth

century, which in the coming decades, came to the distinction between individual self-contained spheres of knowledge, which were self-realized as a starting point for future urban evolution. In this connection, we can differentiate between the four groups of sources that can be described as conservative (generally reflect the features inherent in the modernist tradition), contextual (considering specific industry experience as nomogenous), synthetic (attempts to combine and balance various branch experiences in some universal base of knolwedge and recommendations) and performative (suggest relatively autonomous from modernist inertia ways of modelling of a contemporary urban planning plane).

4.3. We found that one of the key segments of knowledge that influences the formation of a contemporary urban planning discourse is the analysis of the evolution of the social system (or socially-economic formation). Such kind of knowledge formed the basis for numerous attempts to instrumentalize it on the level of city planning, which in turn lead to the emergence of the range of urbanistic programmes. It is established that such sources can be divided into three groups: futuristic (considering formational transformation as a hypothesis, final proof of which belongs to the future, but its probability stems from the proposed by the authors abstract-logical scheme), manifestational (affirmative and populist by nature, and are often combined with the propagation of various technological and engineering solutions, most often from the areas of communication and energy innovation) and reflective (based on critical analysis of already implemented formational changes).

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Андрій Павлів

ЕВОЛЮЦІЯ УРБАНІСТИЧНОЇ ДУМКИ В СИСТЕМІ ПОСТ-ІНДУСТРІАЛЬНОГО ДИСКУРСУ

Анотація. *Стаття розкриває проблему поступової зміни спрямованості містобудівельного дискурсу під впливом критичного переосмислення спадщини модерністського проектування та низки нових соціальних ы технологічних ініціатив межі XX–XXI століть.*

Ключові слова: *урбаністика, дискурс, модернізм, моделювання, міський розвиток.*

ARCHITECTURAL STUDIES

Vol. 3, No. 1, 2017

Iryna Dyda

PALLADIO'S ARTISTIC HERITAGE AND ARCHITECTURAL TRADITIONS: CONCEPTUAL PARALLELS

Lviv Polytechnic National University,
12, S. Bandera Str., 79013, Lviv, Ukraine, irdyda@gmail.com

Received: May 19, 2017/Revised: June 28, 2017/Accepted: June 29, 2017

Abstract: The phenomenon of Palladianism in architecture in terms of factors and circumstances that contributed to its emergence, dissemination and particular popularity in Eastern European region has been examined in the article.

Key words: palladianism, architectural traditions, composition of architectural environment.

1. Introduction

The Age of Renaissance endowed the world of architecture with a number of famous artists. They left us a grand architectural and artistic heritage. But the creative achievements of the majority of them represent only the Renaissance architecture. Their names remained within their historical time, and their undoubtedly outstanding works did not turn into a recognized symbol of the architectural ideals of the Renaissance. Quite a different situation is seen in relation to the architectural heritage of Andrea Palladio. The composition principles and proportions embodied in his works, passed the timeframe of the Renaissance, gained many followers that had reflected these principles in their new buildings for many centuries. Palladio's name is mentioned not only in the context of Renaissance architecture, it is associated with the architecture of classicism, historicism, and even with the modern buildings. The basis for the architectural composition of these buildings erected in different times and within different styles lies in the Palladio's creative principles. They formed the foundation for the special phenomenon of Palladianism in the world architecture. Palladian architecture does not fade, it is rather timeless. As confirmed by Encyclopedia Britannica, the buildings inspired by the works of Andrea Palladio appeared in England, Ireland, the United States, Italy, as well as in Russia, Poland (which included the territory of modern Ukraine at that time), and Sweden in the 18th century. [1]. Thus, Palladianism was spreading across the European architecture unevenly. In addition to native Italy, the principles of compositional architecture of Andrea Palladio were graciously accepted in Northern and Eastern Europe. In Poland the Palladian type of palace architecture spread in the late 18th century. Palladio's influence is noticeable in the projects of almost all contemporary architects. Palladian architecture is considered to be a feature of Polish classical architecture. Among the objects representing the Polish Palladian architecture and inspired by the Palladio's projects are the "Królikarnia" (D. Merlini, 1782–86) constructed by the principle of Villas Rotonda in Warsaw, mansion in Lubostron (S. Zavadski, 1795–1800), the palaces in Smilow (S. Zavadski, 1797) and Bialaczow (I. Kubitski, 1797–1800). The Palladian style was brightly embodied in today's Ukraine as well. There were many followers of Palladio among Russian representatives of classicism and neoclassicism. In Ukraine, among others, Zavadovskyi mansion in Lialychi (G. Quarenghi, 1794–1795) and the residence of Rozumovskyi in Baturyn (Ch. Cameron, 1799–1803) were created adhering to the Palladio's architectural principles. The residence in Baturyn can be considered to be Palladian not only in terms of the building architectural proportions but also due to its landscape location on the high bank of the Seym river and is seen as a treasurable crown amidst the greenery of the park. It should be noted that the Palladian style manifested itself primarily in the palaces and residences, i.e. buildings that were ordered by the individuals. This means that the architectural and compositional principles Palladio applied in his work were generally clear and met the society aesthetic tastes. It is important that this trend has remained unchanged for a long historical time.

Since both Andrea Palladio and contemporary architects used the similar compositions and aesthetic design principles specific to the Renaissance, the following questions arise: 1) why the work of Andrea Palladio became a model for subsequent generations of architects; 2) why did the creative heritage of Andrea Palladio gain so many supporters in Eastern Europe? The aim of this study is to find the answers to these two questions.

2. Basic Theory Part

One would assume that the reason for the continuing relevance of Andrea Palladio's creative technique lies in the ideological and compositional principles of the Renaissance architecture he had embodied in his works. However, other architects of the Renaissance followed the same principles. Both Palladio and his contemporaries drew them from the single common source – from classical Roman architecture. So, there must be some other reason why the work of Andrea Palladio reached far beyond its historical time. There exist various hypotheses. One of them is that Palladio bequeathed a kind of universal "architectural blocks" to his colleagues from which architects were creating their own architectural ensembles without a great effort for many centuries. It is also noted that his drawings are clear and visible, so they are easy to be borrowed. It is recalled that Andrea Palladio was a pioneer in architecture; he was the first to forge a private housing to decent architectural level and actually gave a new lease of life to theater and theatrical scenery, having constructed Teatro Olimpico in Vicenza.

Without prejudice to these merits of Andrea Palladio, though, we would suggest that the answer is to be looked for much deeper. We believe that the fact that Andrea Palladio managed to seize the essence of the ancient builders' technique and find the way to use this ancient technique in the contemporary architecture is due to his view on the architect's tasks rather than to his professional skills. At that time it was introduced in the forms of the Renaissance and was also relevant within the other architectural styles. Obviously, it is consonant with the archetypal ideas what architectural structure should be and how it should be embedded into the environment. The hypothesis of this research is that the two important factors, namely, the first, that Andrea Palladio managed to find and implement some timeless aesthetic and philosophical values in the architecture, thus his works turned out to be always relevant and the second, that the local traditions of environment forming in Eastern Europe coincided with the compositional principles of Palladio and served as a resonator, which promoted spread of Palladian architecture in the European region have greatly contributed to the emergence of the Palladian architecture phenomenon and its particular popularity in Eastern Europe.

In the course of analyzing the Palladio's heritage in terms of this hypothesis the two special features of his architectural works were discovered. First is the devotion to the architectural image. The architectural form of a building appears to meet the constructive principle of its design. The authors note in the book "Architectural Theory from the Renaissance to the Present" that the main creative credo of Andrea Palladio was the desire to revive the ancient architectural traditions and endow them the universal values through his architectural works [2]. The ancient architectural traditions evolved from traditional construction and unjustified decor is alien to them. Ancient architecture is thought to be very rational and functional, hence the presence of structural construction. Columns and all other parts of the ancient order are primarily structural elements that ensure the building stability. Decoration simply emphasizes their functional significance and therefore naturally complements the overall architectural appearance of the building. Palladio reinterpreted an ancient heritage and returned the original structural function to the order system. The architectural forms of the buildings have always been structurally and functionally justified. Probably, it was due to the fact that Palladio once worked at the construction site and found out a lot about the construction "from inside".

Andrea Palladio's merit lies in his drawing on rather the constructive logic of ancient buildings than in their exterior decor in his works. Naturally, he creatively approached the application of this constructive logic, since architecture got new functional tasks during the Renaissance. Palladio never considered ancient heritage to be some unconquerable compositional dogma. For example, designing the basilica in Vicenza, he made the adjustments to the ancient prototype being guided by aesthetic and functional arguments and aspiration to emphasize the building modernity. In this case, he acted like the architects of ancient Greece or ancient Rome: they solved a particular problem, and selected the appropriate proportions and decorative solution of architectural details. The proportions of Greek Doric order are known to be constantly improved and changed throughout the history of Greek architecture: if the height of Doric columns of the temple in Corinth was equal to four their diameters in the early period, the height of a column in the sanctuary in Delos erected in the late period of Greek culture and was already equal to six of the diameter. Just in the same experimental way the ancient Greek architects worked on the design of the bell of the Greek Corinthian order.

Consequently, there are significant differences between the Corinthian columns of Lizikrat monument and the ones of Apollo temple at Miletus.

The match between the form and the constructive solution is old-established and therefore is always a current requirement for the architectural construction. This approach is seen in the architectural solution of the Kyivan Rus temples, where all the design elements are clearly reflected in an external shape and highlighted by neat fixtures on the facade. This principle is also a characteristic feature of the folk architecture, regardless of the national identity, functional use (residential, commercial or sacred), and the type of construction (carcass or frame). Particularly evident shapes matching the design can be seen in the sacred buildings with the domes. For example, a dome in Ukrainian traditional architecture, which is visible from the outside, almost always opens into the interior regardless of the material the building is constructed of (Fig. 1). Obviously, an architectural form matching the constructive solution is psychologically comfortable for humans. The fact that the stylistic return to the authentic sources and the constructive truth of the architectural image formation regularly occurs over the centuries in the architecture history supports this statement. An illustrative example of such returns is the constructivist architecture of the 20th century. So, Andrea Palladio implemented the principles of ancient origin that are considered to be traditional and therefore are not associated with any specific historical time frame.

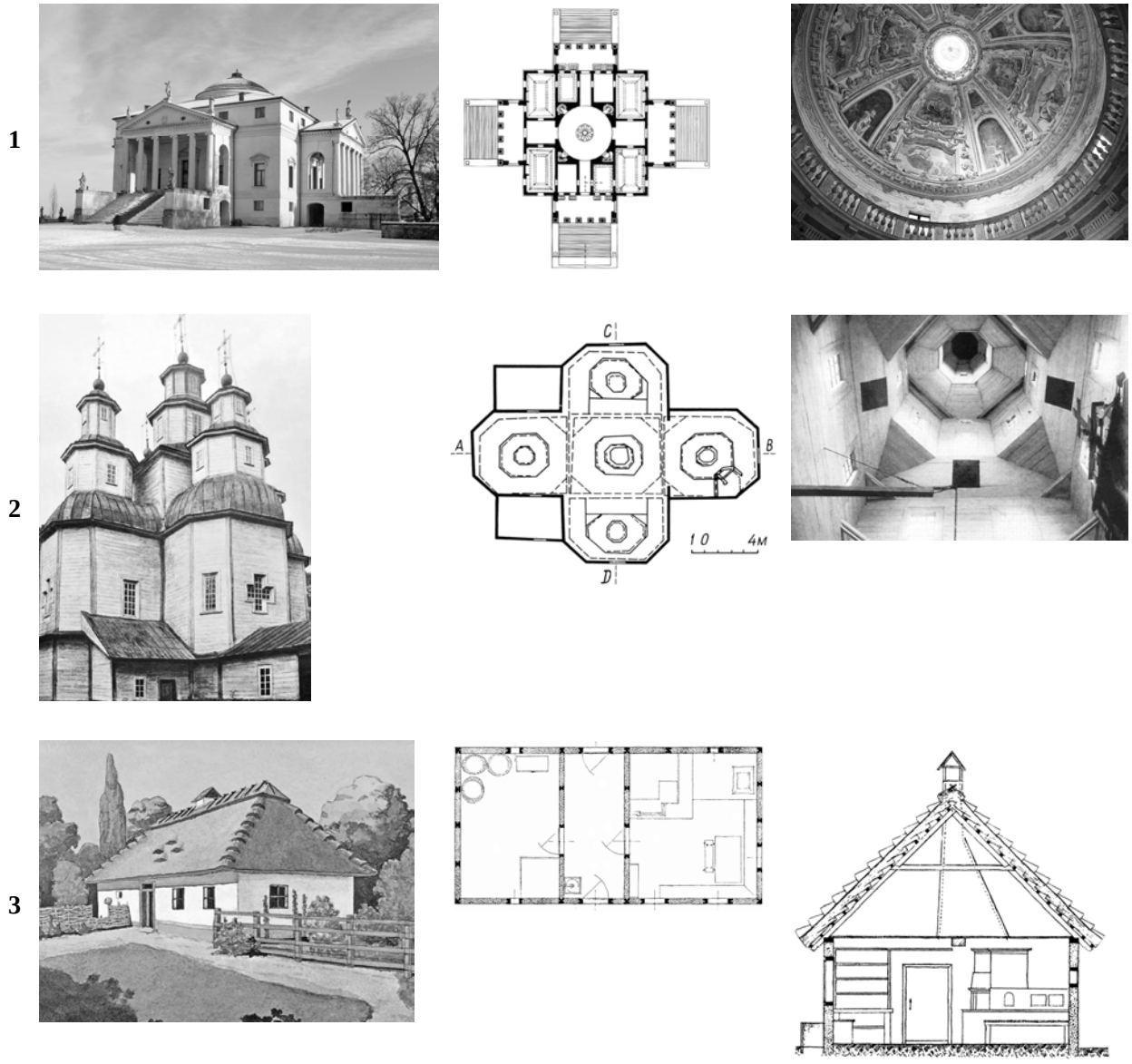

Fig. 1. Match between the form and the constructive solution in Palladio's Villa Rotonda (1), Ukrainian traditional church (2), and Ukrainian folk architecture (3)

The second feature of Palladio's work is compositional harmony between the architectural object and the landscape (Fig. 2). This harmony is implemented in two directions. The first is the way of building placement amid a natural environment. Here Palladio always tried to choose a kind of scene in the landscape, which could demonstrate the benefits of the architectural structures he designed. It could be a little low hill, as in case of villas in Vicenza neighborhood or an island amid water surface, as in case of churches in Venice. It is important that Palladio always tried to keep a free exposition space near the buildings, if it was possible. He not only thought of visual communication in the "environment – house" direction but also paid great attention to the scenery opening from the windows and loggias directed "from the house inner space towards the surrounding landscape". In contrast to the tradition of confined interior spaces common for the Mediterranean, Palladio sought to maintain the two-way visual link between the interior and exterior architectural environment whenever the circumstances allowed. The researcher David Watkin notes: "The countryside is visible not only from the porticoes of the Villa Rotonda but even from the central circular hall or saloon ..." [3]

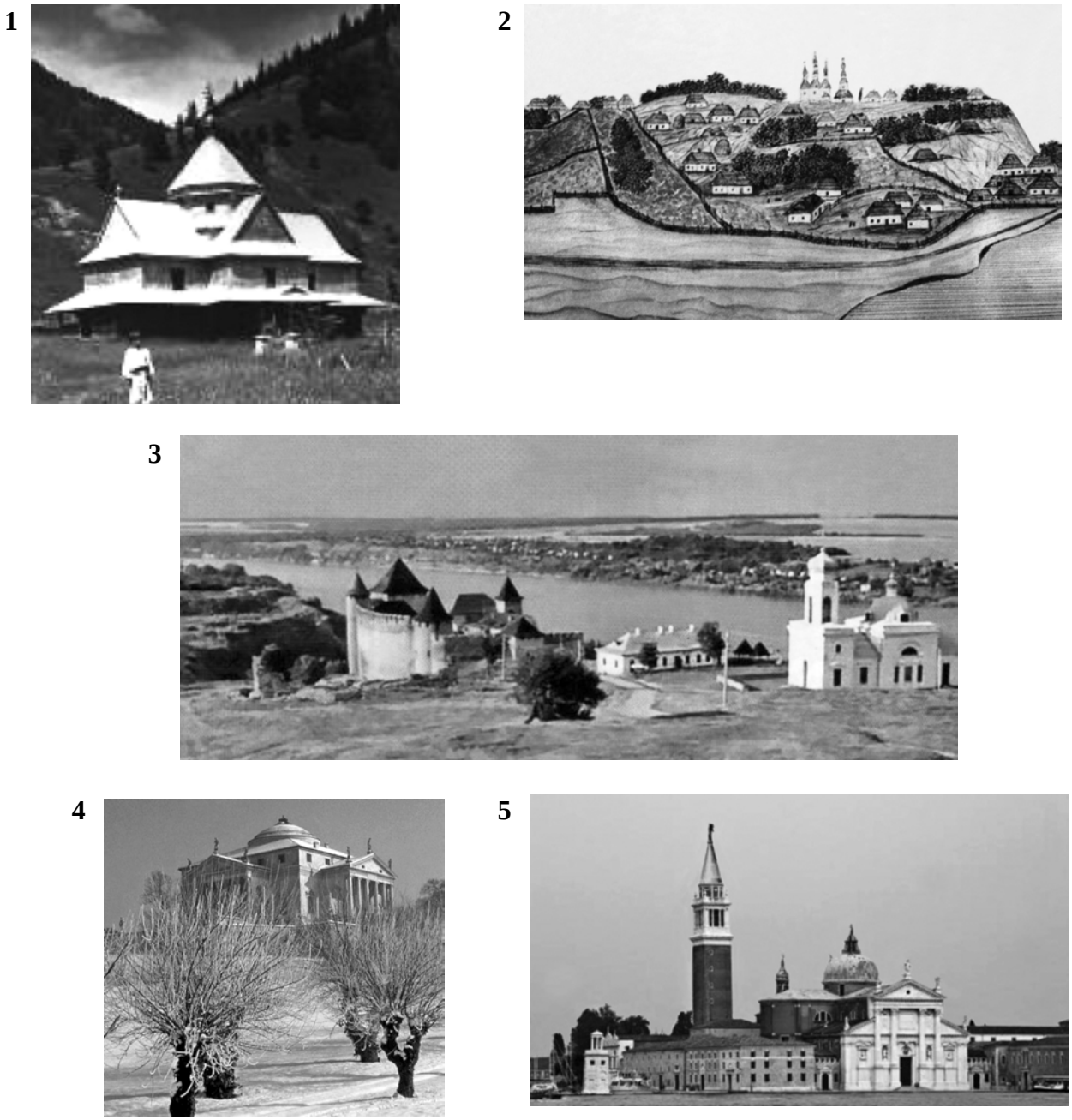

Fig. 2. The buildings location in the natural environment: in the traditional architecture of Ukraine (1; 2; 3) and in the buildings designed by Palladio (4; 5)

The second direction concerns the selection of architectural forms and color structures in the natural environment. Palladio used the contrasting aspects of both of these characteristics while he was placing his villas into the landscape. Buildings designed by Palladio always are marked by clear symmetry, statics, geometric accuracy and perfect proportions. Being located amid the landscape they constitute visual and even philosophical contrast to the beautiful, unpredictable, and dynamic natural surroundings that vary over the time. In addition, Palladio's works are very concise in color. They are perceived as an integrated light accent against a rich colored landscape. Thus, there is the contrast of colors, which is always present but formed in different hues, depending on the season.

Such contrasting concept applied by Palladio is based on the same principles as that a picturesque natural landscape is formed on. Indeed, in terms of the environment the objects that are the most important from the functional point of view (e.g. flowers necessary for the species' continued existence) are relatively small, but possess a regular, symmetrical structure as well as the fine details. They form a contrast to the surroundings in color, scale, shape, and thus attract the attention (Fig. 3). Buildings designed by Palladio are the example of this "flower principle" when placing architecture amid the landscape. This is applied not only to the residential architecture. For example, the San Giorgio Maggiore church in Venice contrasts with the natural space represented by the lagoon water.

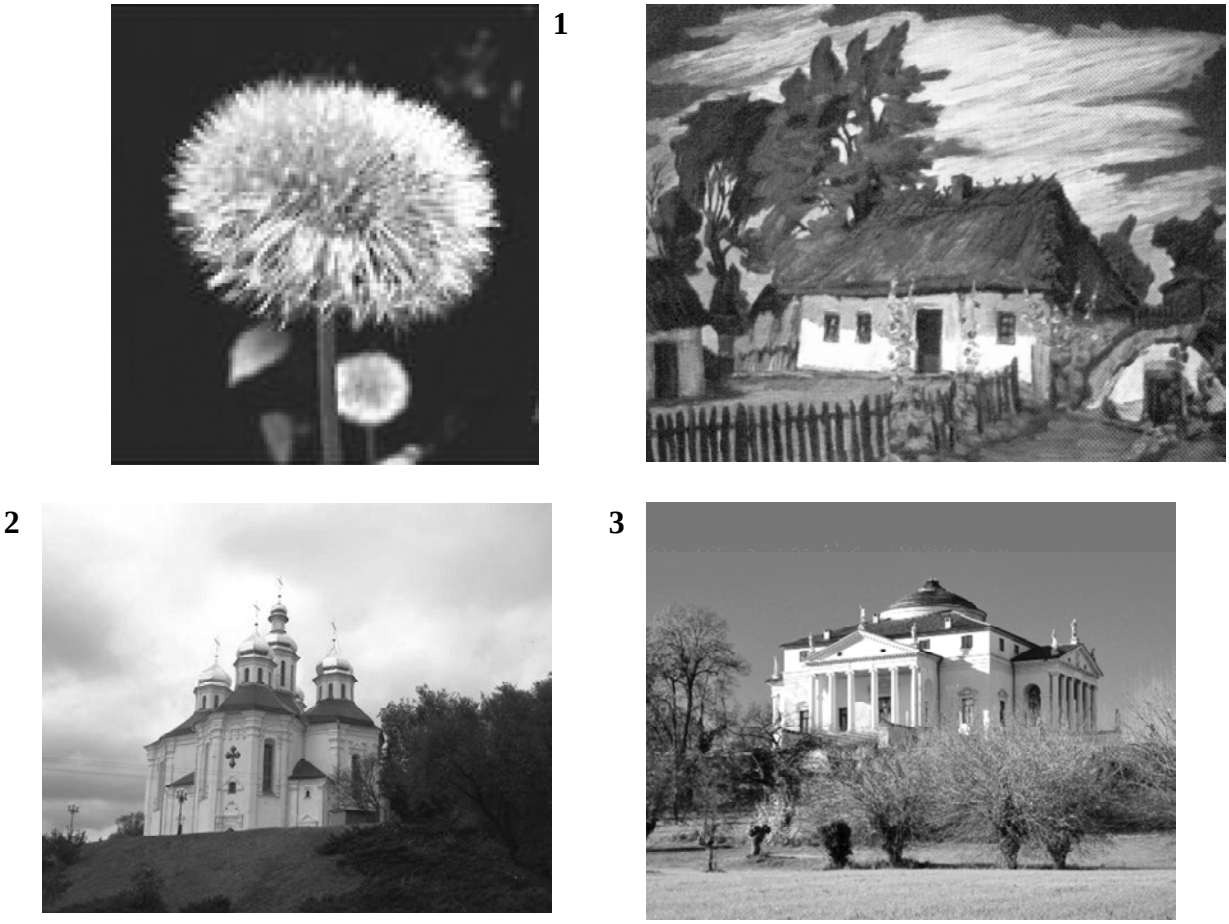

Fig. 3. The "flower principle" – a contrast to the surroundings in color, scale, shape – in the traditional architecture of Ukraine (1 – picture of Jaroslav Sheremeta; 2) and in "Villa Rotonda" Palladio (3)

3. Results and Discussion

There is reason to believe that architectural works of Andrea Palladio are based on the same compositional principles as the traditional folk architecture was formed upon. It maintains the archetypes of the ideas about how the house should look like and how it should fit organically into the environment.

But we need to answer the two questions in order to investigate the causes of the Palladian architecture spread in Eastern Europe. The first one – how do local architectural traditions pertain to the relationship between the building shape and its design? The second – how do these traditions pertain to the buildings location in the natural environment? Talking about archetypes reflection it is important to determine whether the architectural traditions of the region are old-established, and whether they are autochthonous. The way of arranging the architectural space established in ancient times is the basis of the architectural identity of this area later as well.

Eastern Europe is one of the most favorable in the climatic aspect. Numerous archaeological finds, of the age that is estimated as hundreds of thousands of years [4], suggest of the availability of inhabitants there from ancient times. Scientists believe that in the area of North Black Sea region and adjacent lands there was gradual formation of the Indo-European, and later Slavic cultures. [1] This means that the local architectural traditions are autochthonous. Europe, including its eastern lands, has never been geographically isolated. At different times the geopolitical systems intertwined here, as well as a lot of transit communication routes passed through. They provided for contacts with Central Europe, Central Asia and China. "Salt" and "Iron" ways led to the Ciscarpathian and the Caucasus; "Greek" way passed along the Dnipro and linked the Rus with markets of the Baltic and Black Sea region [5]. The location at the intersection of the communications of global significance allowed the inhabitants of Eastern Europe to get acquainted with the culture and architecture of the neighboring countries. They certainly knew that there formed a different approach to the architectural space composition in the south and west of Europe, within the area of Mediterranean cultures. It consisted in forming compositionally closed spaces of interior type with predominant geometric planning that was visually separated from the natural environment. This composition approach is most clearly evident in the architecture of the Roman Empire. Architectural environment of Central Asia cities was also formed according to such principles. Local architecture in Eastern Europe was formed by the other principles. So it was the result of conscious choice of the option that best met the local psychological and aesthetic priorities. The basis for the architectural traditions of the Eastern European region (to which Ukraine also belongs) is the composition that is opened to the surrounding landscape. Natural terrain with geometric shapes of architectural buildings has formed a single picturesque ensemble with nature's elements as an equal party of this composition. In addition, the houses built in the Ukrainian tradition always stood out in a natural environment by light, often by the white walls [6].

Visual links between the architectural spaces of different levels were of great importance in Eastern Europe. In particular, the construction legislation of Kyivan Rus included the so-called "rule of clarity". It obliged the constructor to keep the ways of visual communication with the surrounding landscape open for the neighbors. This rule still persists in the national traditions. The words of public philosopher Andrii Voron indicate a psychological necessity of the space: "It is good if there is the space where you live. And when the eye is not clinging to fences, sheds, etc. Trees, shrubs or cross poles should be the fence. It shall breathe, not to be locked. Such homes did our ancestors choose" [7].

In addition, traditional folk architecture is the mirror of social priorities – the principle of external shape correspondence to the internal space of the building has always professed in this area. Domes of the sacred buildings in traditional architecture were opened into interior space, the facades reflected internal planning structure, and decoration was focused on the most functional elements to emphasize their significance for the house. Vsevolod Karmazyn-Kakovsky wrote about this feature of the folk architecture: "... the spatial-plastic veracity of the major forms of architectural monuments of the 18th century, the correspondence between the interior and the exterior, avoidance of unmotivated decorative constructions – these all are the result of veracity of the natures of the very folk artists, ... their conviction of what we now call the formalism" [8].

Thus, having correlated the described features of traditional architectural environment with creative technique of Andrea Palladio, there are reasons to believe that Palladian architecture being the super-temporal phenomenon in architecture turned out to be the most popular in those European regions where the local architectural traditions were in tune with the architectural concept of Andrea Palladio, and were a kind of its resonator.

4. Conclusions

Undoubtedly the works of Andrea Palladio are the perfect example of the Italian Renaissance architecture. It is difficult to find works equal in rank and exclusivity. Naturally, it is incorrectly to make a direct comparison them with the works of folk architecture, since they belong to the different "architectural worlds". However, it is impossible to deny the obvious fact of a number of similarities in the works of Palladio and traditional folk architecture in Eastern Europe as to methodological approaches at the levels of facility shaping concepts and environment architectural arrangement. Conceptual parallels that explain the phenomenon of Palladian architecture in architecture and its particular popularity in Eastern Europe are clearly vis ible.

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Ірина Дида

ТВОРЧА СПАДЩИНА ПАЛЛАДІО І АРХІТЕКТУРНІ ТРАДИЦІЇ: КОНЦЕПТУАЛЬНІ ПАРАЛЕЛІ

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Ключові слова: *палладіанізм, архітектурні традиції, композиція архітектурного середовища.*

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Journalpaper : Authors (£ 4), journal (all the words with a capital letter), year, volume, initial page

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Patents: Authors, country and patent number, date of publication

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Conference: author, title of the conference, country, city, year, initial page.

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