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## IGNACY DREXLER'S VISION OF PLANNING DEVELOPMENT OF THE CITY OF LVIV

### WIZJA ROZWOJU PLANISTYCZNEGO MIASTA LWOWA IGNACEGO DREXLERA

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#### ABSTRACT

The article considers the Lviv planning development vision of Ignacy Drexler. Urban planning problems exacerbated in the interwar period, reaching their roots from Austrian period are emphasized. The ideas of "Great Lviv" creation by administrative boundaries expanding are clarified. Special attention is paid to the development of the street network, regulation of separate city districts and arrangement of street cross-sections. Without losing relevance, the necessity of Lviv radial planning structure transformation to radial-ring by the creation of bypass streets is highlighted.

Key words: Ignacy Drexler, Lviv, interwar period, planning development, street network, Great Lviv, planning structure transformation.

#### STRESZCZENIE

Artykuł dotyczy analizy wizji rozwoju planistycznego Lwowa Ignacego Drexlera. Ujawniono problemy urbanistyczne, które nasiliły się w okresie międzywojennym i sięgają korzeniami okresu podaustriackiego. Określono ideę stworzenia "Wielkiego Lwowa" poprzez poszerzenie administracyjnych granic miasta. Szczególną uwagę I. Drexlera zostały objęte rozwój sieci dróg i ulic, regulacja poszczególnych dzielnic miast i regulacja przekrojów profili ulic. Uzasadniono konieczność przekształcenia promienistej struktury planistycznej Lwowa w pierścieniowo-promienistą poprzez stworzenie obwodnic, co do dziś nie traci swojej aktualności.

Słowa kluczowe: Ignacy Drexler, Lwów, okres międzywojenny, rozwój planistyczny, sieć ulic i dróg, Wielki Lwów, transformacja struktury planistycznej.

## 1. INTRODUCTION. BEGINNING OF THE FORMATION OF THE PLANNING STRUCTURE OF LVIV

Lviv went through evolution typical for early Middle Ages, that was based on the natural characteristics of the region and geographical determination [26]. Center with the merchant place was formed at the crossing of the roads at the ferriage across the Poltva River (the place of the contemporary areas of Torhova square (plac Gołuchowskich)<sup>1</sup> and Prince Yaroslav Osmomysl square (plac Krakowski). The Old Rus prince's early-medieval Lviv grew mainly on the slopes of the mountain, now called High Castle towards the Volyn road with the central cultural and administrative square - Saryi Rynok (Old Market square). For servicing of the ferriage a custom toll was taken, which gave the settlement the proto-urban characteristics. The trade route was leading from the Central Europe to the East. The closest significant cities in this route were Cracow, from the west, and Kyiv, from the east. Today those roads became the modern streets of Horodotska (Gródziecka) and Lychakivska (Łyczakowska). Another route from the South to the North connected Halych (modern Halytska street (Halicka), Kniazia Romana (Stefana Batorego) and Zelena (Zielona)) with the Volyn centers - Cherven and Belz (modern Bogdan Khmelnytsky street (Żółkiewska)). Archaeological researches in 1992 confirmed the origin of the settlement on the site of former trade center of the V-VI th centuries, which in the XII-XIII centuries gained all the signs of a city center with a high level of development of craft and trade [25].

New, southern district, was surrounded by powerful defensive fortifications, with a geometrically correct structure of the plan, which was later called the Seredmistia (Downtown) with a new center - Rynok (Market) Square. The new regular district was formed on the model of rectangular urban plans, which represented the progressive urban planning ideas of the Christian Europe. The network of streets in the city center finally settled to the end of the XIVth century, and in 1356 the Old Rus law in Lviv was replaced by the Magdeburg law [10], [25]. After the death of Rus king Boleslav Yuri the Second the city passed under the control of the Polish kings.

Behind the fortified walls of Lviv, unfortified suburbs were situated. The areas of the former Rus city became part of Krakivske (Krakowskie) suburb (Pidzamche), which continued to develop further in the XIVth century, along with the formation of the southern suburb – Halytske (Halickie) suburb. At the heart of the planning structure of the suburbs the out routes were laid that radially diverged from the city to other cities. The most settled streets of the Krakivske (Krakowskie) suburb were the old "Volyn road" - modern Khmelnytskoho street (Żółkiewska) and the road to Horodok (Gródek Jagielloński) – modern Horodotska Street (Gródziecka). The main streets of the Halytske (Halickie) suburb were formed on the old routes to Kyiv and Halych – modern Lychakivska (Łyczakowska) and Zelena (Zielona) streets. The rest of the suburbs in the XVI-XVII th centuries were occupied by manors and suburban estates of wealthy petty bourgeoisie, nobles and monasteries. The roads leading to them laid the foundation for the Shyroka street – modern Kopernyka (Kopernika), Yezuiska street – modern Hnatiuka (Jagiellońska), Strilnytska street – modern Lysenka (Kurkowa) and others. In the XV-XVII centuries. More than two dozen churches and monasteries appeared in the suburbs, and in the first half of the XVII century, more than 20 thousand people lived in the suburbs - four times more than in the center of the city. The economic significance of the suburbs led to attempts to establish their independence from the Lviv magistrate. The unrealized projects of fortifications for these suburbs were developed in 1607 and 1634 [17].

In 1772, as a result of the first division of Rzecz Pospolita (Polish Republic), Lviv became part of the Austrian monarchy and became the capital of a newly formed Austrian province - the "Kingdom of Galicia and Lodomerien (Volodymyria with the Grand Duchess of Cracow with its capital in Lviv" (full official name). Due to this, the city began to lose its

<sup>1</sup> Further in the article, modern street names are specified first. The interwar period names are given in brackets.

former military and commercial functional purpose and become a carrier of the Austrian government system. The territory of Lviv, which until now was limited to the fortified inner districts of the city and suburbs along the main roads, began to change its urban form and become the administrative center of the great province of the Austrian Empire. The further development of Lviv was characterized by rapid urbanization and the development along the main roads. The formation of suburbs took place without a certain development plan and this caused a number of urban development problems. The main reason was that regardless of Regional directorate of construction at the Galician governorate existing, all important decisions were accepted and approved in Vienna. Lviv became able to control the development of the city only from 1870, together with creation of special Lviv City Building Department [15]. Urban problems accrued during the Austrian period were first fully described by Ignacy Drexler in the 1910-1920s.

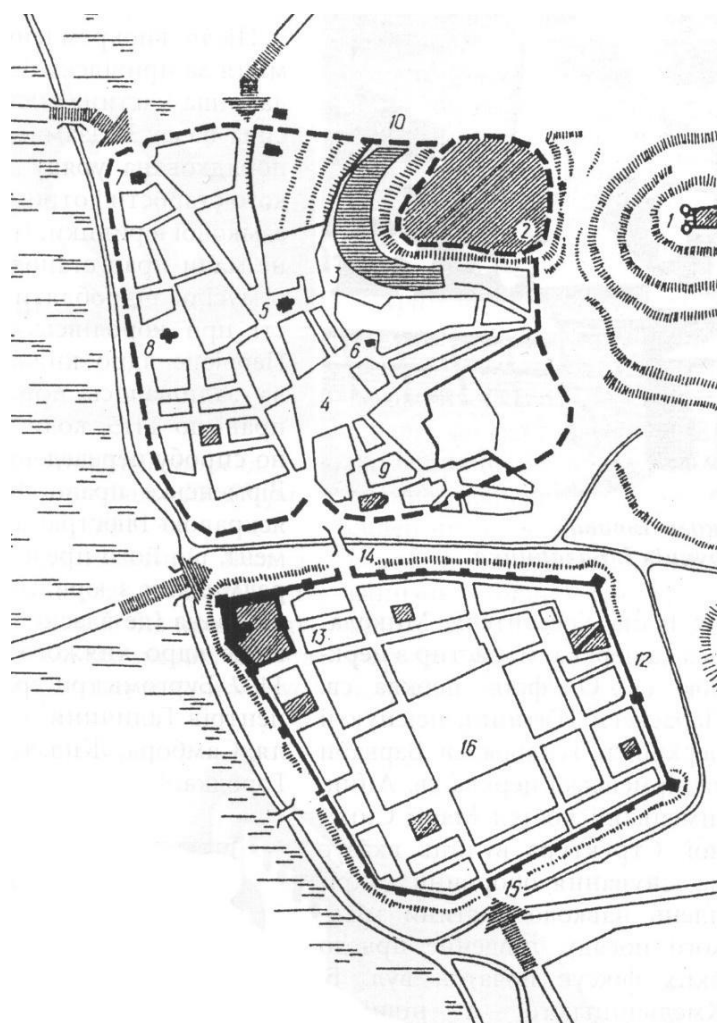


Fig. 1. Central part of Lviv in the last quarter of XIII-XIV centuries. Scheme by Yu. Dyba and V. Petryk by the assumptions of A. Rudnytskyi. Source: R. I. Mohytych [25].

Ryc. 1. Centralna część Lwowa w ostatniej ćwierci XIII - XIV wieku. Schemat Y. Dyby i V. Petryka według założenia A. Rudnitskiego. Źródło: R. I. Mohytycz [25].

## 2. PLANNED DEVELOPMENT OF LVIV DURING AUSTRIAN PERIOD. PREREQUISITES OF PROBLEMS

The key phenomenon of Lviv's urbanization during the Austrian period is its transition from the category of medium-sized cities to the category of large cities. In addition, the dynamics of the growth of the population of Vienna and Lviv during the XIXth century.

was the same. In 1772, the population of Lviv was barely more than 20 thousand, and in 1869 - 87 thousand, in 1914 - 212 thousand people, without changing the size of the territory [27]. The planning structure of Lviv continued to develop on the basis of the radial system of roads, which was due to the location of the medieval city in the wide basin. The most important direction was the road through Yavoriv, which led to Cracow, and then connected Lviv with Vienna - the capital of the empire, as well as the road through Zolochiv (Żłoczów) and Brody to the border of the Russian Empire. The Warsaw road led through Zhovkva (Żółkiew) and Rava-Ruska and Berezhanska (Brzeżańska) road led to Stanislaviv (Stanisławów).

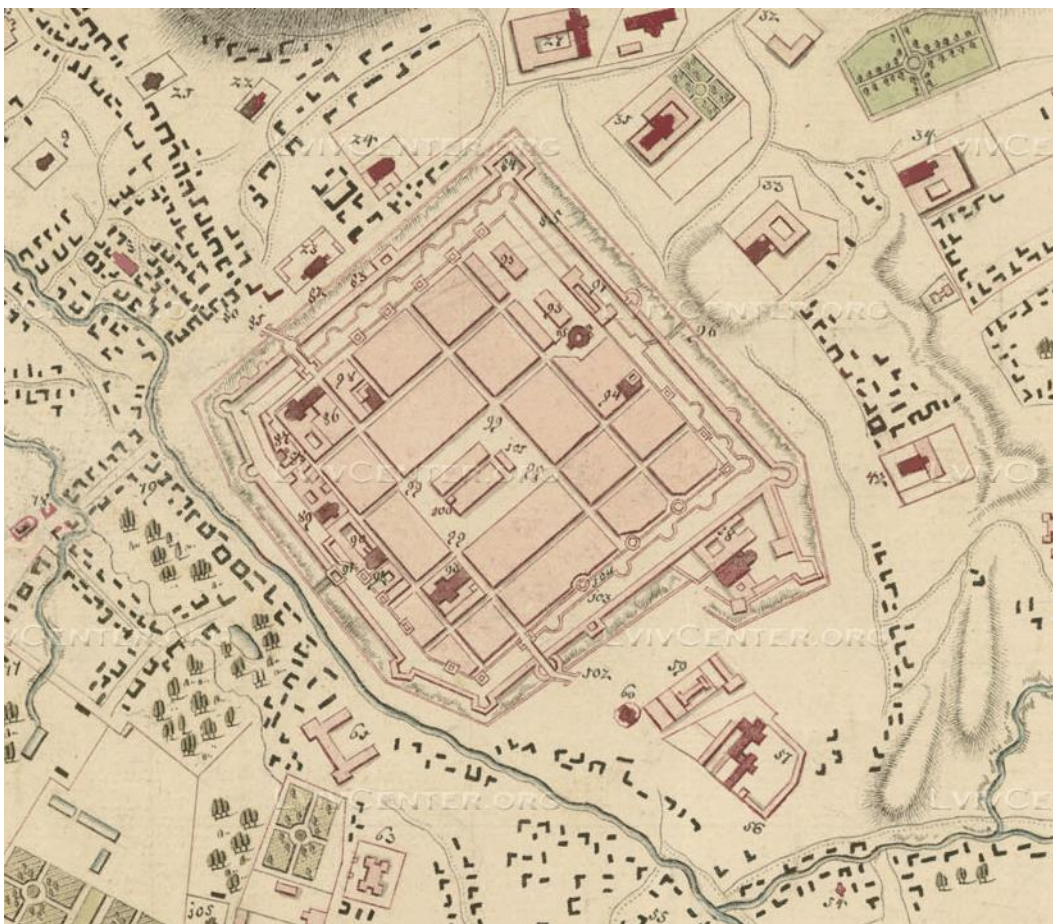


Fig. 2. Center of Lviv before 1770. Source: Austrian Military Archive, Vienna [16].

Ryc. 2. Centrum Lwowa przed 1770 r. Źródło: Archiwum Wojskowe Austrii we Wiedniu [16].

The first step in the formation of the modern planning structure of Lviv was the disassembling of medieval fortifications, which began in 1777 and lasted till 1825. On the ruins of the fortress bulwarks the walking zones began to be arranged. The projects for the reconstruction of the "city among the walls" were compiled by architect Jean Ignace du Desfilles and director of the Design and Construction Department Casparini Caspar in 1774-1784 and formed the basis of the "Landscaping Plan (Improvement Plan)", which was carried out by several stages. The dismantling of the fortifications had led to the formation of a "street around the city" - the first ring formed by new streets in place of the former walls [19], [30], [38].



Fig. 3. Center of Lviv after demolition of the walls in 1828. Source: Austrian National Library, Vienna [2].

Ryc. 3. Centrum Lwowa po rozbiórce obwarowań w 1828 r. Źródło: Biblioteka Narodowa Austrii, Wiedeń [2].

Later, during 1826-1848, the intensive construction movement led to the continuous development along the main transport streets. Henceforth, between those streets the dispersed development of four suburbs began: Zhovkivske (Żółkiewskie), Lychakivske (Łyczakowskie), Halytske (Halickie) and Krakivske (Krakowskie). Administrative and public structures were formed around old historical core, which became the areas of gravity of the development of Lviv. Construction was carried out without a consolidated urban plan for building of the city, only by mechanical expansion of the neighborhoods. As a result, on the basis of old roads that diverged from the historical core and the streams of water flows, the radial-beam planning, ignoring transverse connections, began to be used. With the advent of mechanical means of transportation it caused significant difficulties for the development of urban transport. Between the rays of the radial roads, the old field roads, the access paths to the manors and estates were turned into streets with perimeter building [15], [33].

In 1861 Halychyna (Galicia) gained wide autonomy, which contributed to the economic development of the territory. In network of urban settlements, the fastest developed those, that were important communication nodes. Originally, they were situated on postal routes, state roads, and later on railway lines. Territorial self-government became widespread. The commissioning of the railway in the 1850's and 60's gave the cities-railway nodes a new impetus. It included Halychyna (Galicia) into the orbit of the European market and contributed to the development of oil fields, forestry and logging. As a result, the intensive development of Lviv in the eastern and western directions was conditioned by the laying of a railway lines. Near them industrial enterprises, working quarters and villages were formed [29].

After the construction of the Ringstrasse in Vienna, the idea of creating a bypass (ring) road arose in Lviv in 1877 as well, which, however, was never implemented (Fig. 4). The author of the project, Teofil Merunowicz [24], put on the first place the communication movement between heterogeneous functionally important urban areas, as well as the connection of the center with the newly created Pidzamche (Podzamcze) railway station. As a result of the construction of the ring road, in addition to the revival of the movement, the author expected the increase in the cost of commercial and residential property along the ring and adjacent streets. Merunowicz stressed that every part of the city, which was proposed to connect the ring road had a certain property that differed from others. In the

center of the city the main function is administrative and public, in the adjacent to the center of the city in the north is trade and further north industrial enterprises and railways. Podzamcze (Podzamcze) station are placed. Describing further the proposed ring, the author emphasizes the great recreational potential of the Zamkova Hill, highlighting its poor accessibility. On the roundabout circular road around Lviv, which would have to connect various functional zones, in the proposal of Merunowicz, laying of a line of equestrian tram was planned, which would be economically expedient for the transportation of passengers and cargo. According to Merunowicz, the Podzamcze (Podzamcze) station should have an advantage over the main railway station, due to proximity to the city center, and the formation of the ring would only enhance its attractiveness. In addition, the author proposed to set unified tariffs for travelers from the main train station and the Podzamcze (Podzamcze) station [24].



Fig. 4. Lviv ring road (Ringstrasse) project, 1877. Source: T. Merunowicz [24].

Ryc. 4. Projekt drogi obwodowej (Ringstrasse) we Lwowie, 1877 r. Źródło: Teofil Merunowicz [24].

Lviv became able to control the development of the city independently of the Austrian authorities only from 1870 with a creation of Lviv City Building Department. It was engaged in the laying of streets, their straightening, expansion, arrangement of squares. This was reflected in hundreds of projects that were fragmentary by their character. The most striking example radical intervention was the plan of rehabilitation and regulation of the central part of Lviv approved in 1891-1893, covering the territory of the old city and a number of neighborhoods in Krakivska (plac Krakowski) and Halytska (plac Halicki) squares. It was supposed to demolish 181 buildings, break through two exits from Rynok Square to the Svobody (Legionów) avenue and to the Valova (Walowa) street, to expand most of the streets. Fortunately, the project was implemented only partially which led to preserving of valuable historical buildings. One quarter was dismantled near the Dominican church, and a number of buildings were erected in accordance with the red lines in Ruska, Virmenska (Ormiańska) and other streets [29], [38].

The further development of the planning structure of Lviv during the Austrian period continued with the build-up of high-density buildings around the city center, and in the suburbs. Because of complicated relief, irregular quarters were formed, the development of which contributed to the laying of lines of the horse tram (1879), and from 1894 – an electric tram. At the beginning of the 20th century, the main building movement was carried on the territory between the rays of the main transport arteries. Newly created areas were considered more prestigious, and housing - more comfortable.

A significant city-building action was taken in 1884-1905 under the project of the Lviv Polytechnic Society. This was the overlapping of Poltva (Pełtew) river and the creation of new parade avenues along the course of the river stream - the wide greened Svobody (Legionów) and Shevchenka (Akademicka) avenues. With the overlapping of Poltva (Pełtew) river and creating of Svobody (Legionów) avenue, it was decided to construct of the Opera theatre (Teatr Wielki) on its axis [28]. In 1909, in Zhovkivske (Żółkiewskie) suburb, the beginning of the formation of a new radial urban axis "north-south" on the site of the Poltva (Pełtew) river was laid. At the expense of demolishing of a large part of the buildings north of the Opera theater (Teatr Wielki), the left side of Svobody (Legionów) avenue was connect to Chornovola (Pełtewna), laying a new street section. The regulation of this and other city areas was described by J. Lewicki [20].

Fig. 5. New radial urban axis "north-south" (modern Chornovola avenue) creation based on "Regulation project of the area between streets Pełtewna, Żółkiewska and Krakowski, św. Teodora squares [...]". Project by Józef Chowańiec from Lviv City Building Department, 1909. Source: archive of Department of Architecture and Restoration of Lviv Polytechnic National University.

Ryc. 5. Utworzenie nowej promienistej osi urbanistycznej „północ-południe” (obecnie prospekt Chornowola) na podstawie projektu „Plan regulacyjny części zawartej między ulicami Pełtewną, Żółkiewską, placem Krakowskim i placem św. Teodora [...]”. Projekt wykonany w Urzędzie Budownictwa we Lwowie przez Józefa Chowańca, 1909. Źródło: Archiwum Katedry Architektury i Restauracji Uniwersytetu Państwowego „Politechnika Lwowska”.



The development of the planning structure during the Austrian period of Lviv was based on the development of the radial planning network laid down in the Old Rus time, ignoring

the ring links. The lack of a general program for the development of Lviv provoked sharp criticism. The vice president, later president of Lviv (1905-1915) Tadeusz Rutowski stated: "According to the instincts and the count of private speculation without a shadow of public thought, without predicting the development of the city on a few years luster, what to speak of any future. Without a city regulation plan, without thinking about further development, nay! without situational and vertical photography, the city itself "regulates" from accident to accident, from home to home, from the threshold to the threshold – let us add: from the one private action and intervention - to the second" [34].

In connection with the overwhelming need to develop plans for building cities in the region, at the Congress of architects in Cracow held in 1912, the issue of the organization of the department of urban planning at the Lviv Polytechnic Institute was raised. This resulted its creation in 1913 [35].

### 3. INTERWAR POLISH PERIOD. DREXLER + TOLWIŃSKI

Lviv, although it was the capital of the "Kingdom of Galicia and Lodomeria with the Great Principality of Cracow", however, in planning of the city, it gave way to Cracow, where the competition for the master plan was already held in 1908. The general plan of "Great Cracow" provided for the expansion of the city at the expense of the accession of suburban communities. For Lviv, a similar event was urgently needed, since in the interwar period Lviv was one of the most densely populated cities in Europe, with 36,900 people per square kilometer living in it (for comparison, in the much larger Paris in 1914, 35,000 people lived per square km, in Vienna - 40 thousand people per square km) [4]. The author of one of the nine projects was Lviv urbanist Ignacy Drexler, whose project was recognized as a successful in Cracow and it was purchased by the city. After success in Cracow, Drexler returned to Lviv. He headed the Measurement and Regulatory Bureau of the Technical Department of the Magistrate, and directed his efforts to develop a city regulation plan of Lviv that was delayed by the war, but in difficult circumstances the work on the project continued. In 1914 Drexler emphasized the necessity of maps creation in scales of 1:25000, 1:5000, 1:7500, 1:1440 that would become the basis for competition project development. He also formulated the terms of the competition and highlighted the importance of taking into account suburban villages, whose territories would be needed for further development of the city. The importance of the creation of connections between suburban villages and Lviv was emphasized by Drexler as well [7]. In 1915 the Measurement and Regulatory Bureau prepared and issued a map of the outskirts of Lviv in a scale of 1: 25000, and in 1917 - a high-rise city map in a scale of 1: 5000 that included the materials on the basis of which the competitive offers should be processed, and a program and terms of the competition were also drawn up, agreed with the Polytechnical Society on October 16, 1918. However, to the exact date of March 15, 1921, no projects were submitted to the competition [3].

Under the guidance of Drexler, the Measurement and Regulatory Bureau of the Technical Department of the Magistrate in 1920 issued a project for the arrangement of the city center. It envisaged the alignment of the transversal profiles of the streets by expanding them and introducing larger radii of turns by demolishing of the certain buildings or transferring of the fronts of the building into the depth of the site with the aim to improve the urban tram traffic. It suggested tracing of new tram lines from Pidvalna (Podwale) street, through Nasypna (Szkarpowa) and Chornomorska (Czackiego) streets, then through Staryi Rynok square (plac Stary Rynok) to Zamarstynivska (Zamarstynowska) street. It also considered the possibility of laying new tram routes along Kopernyka (Kopernika) street and Chornovola (Pełtewna) street, which according to the regulatory plan (Fig. 6) was supposed to connect Osmomyśla square (plac Krakowski) with the left part of Svobody (Legionów) avenue. The plan also identified new projected buildings (in red) that would further increase the density of buildings behind the Zankovetska (Skarbak) Theater.





Fig. 6. "Regulation project of the central part of Lviv, developed by Measurement and Regulatory Bureau of the Technical Department of the Magistrate of the Royal Capital City of Lviv", 1920. Source: State Archives of Lviv Region [32].

Ryc. 6. "Plan regulacji Śródmieścia wedle projektu Oddziału Pomiarowo-Regulacyjnego Dep. Techn. Król. Stoł. m. Lwowa", 1920. Źródło: Archiwum Państwowe Obwodu Lwowskiego [32].

Drexler paid special attention to the arrangement of transverse profiles of the streets. Even a special book of him was dedicated to this topic – "The width of the roadway in city streets" ("Szerokość jezdni w ulicach miejskich") [6], where he criticized projecting of excessive widths of driveway section of the streets "just in case", "so that the two biggest trucks in Europe could pass each other" etc. Drexler encouraged the design of the minimum allowable widths of the driveway parts of the streets and introduced standards for their widths, depending upon the transport importance of the street (2.2 m, 4.6 m, 6 m, 7 m, 8.5 m, 10 m). According to I. Drexler's visions, the width of the driveway parts of many streets were adjusted (narrowed) in Lviv. It is worth mentioning that after such alterations the traffic complications were not observed [6]. The book stressed the im-

portance of humanizing of the urban environment by means of narrowing of driveway parts of the streets, where possible, with the subsequent transformation of the saved parts into the necessary elements of improvement (sidewalks, green stripes with recreational zones, etc.), as well as for infrastructure development - the allocation of lanes for trams and cycle tracks (Fig. 7). In global context, after years of the rapid automobilization of Europe cities, the concepts of road narrowing attracted a general interest only in the early 1980's [22]. Ahead of time, Drexler underlined that parking spaces should only be provided in quiet, side streets of living areas. Interestingly, modern studies have shown that parking on such streets can even contribute to creating a safe environment, and when parking lots are arranged in main streets, the risk of road accidents with serious consequences increases significantly [21].



Fig. 7. I. Drexler's arrangement of Kochanowski (today - Levytskoho) street, 1928. Due to the width narrowing of the driveway part of the street up to 6 m and change of the radii of turns into the side streets, 38% of the street space was saved for other needs - the sidewalks were expanded and lanes with green islets from the northern side of the street were formed, where they received the necessary insolation. Source: I. Drexler [6].

Ryc. 7. Regulacja I. Drexlerem ulicy Kochanowskiego (obecnie - Levytskoho) w 1928 r. Ze względu na zwężenie szerokości jezdni do 6 m i zmianę promieni zakrętów w ulice boczne, zaoszczędzono 38% powierzchni ulicy na inne potrzeby - rozbudowano chodniki i utworzono pasma i wysepki zieleni od północnej strony ulicy, gdzie otrzymały niezbędne nasłonecznienie. Źródło: I. Drexler [6].

In January 1920, Drexler published his work "The Great Lviv" ("Wielki Lwow"), which included a retrospective review of Lviv's territorial development from the Princely times of the Old Rus to the modern for the author era. The development of the Austrian road network and the following problems were analyzed as well [9]:

- Drexler observed that broad, free-of development space around the city center ("the street around the city"), which was supposed to develop communications, due to the lack of an unified plan for the construction of Lviv began to build up at a rapid pace in the end of the XIXth century (Fig 9.);

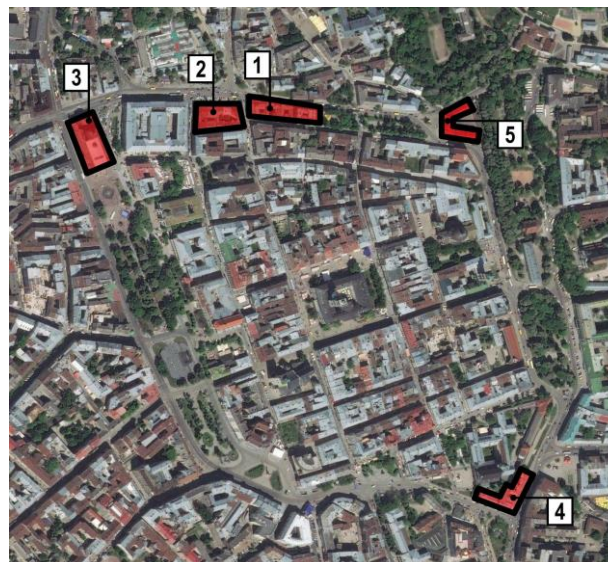
Fig. 8. Current state of implemented regulation of Kochanowskiego (today - Levytskoho) street according to the project of I. Drexler. Source: R. Liubyttskyi, 2018

Fig. 8. Stan obecny wcielonej regulacji ulicy Kochanowskiego (obecnie – Levytskoho) zgodnie projektu I. Drexlera. Źródło: fot. R. Liubyttskyi, 2018.



Fig. 9. Problems of ring road around the historic core of the city forming, observed by Drexler and reflected at the modern satellite imagery<sup>2</sup>. Source: Scheme by R. Liubyttskyi, satellite imagery by Google maps.

Ryc. 9. Problemy kształtowania obwodnicy wokół historycznego centrum, zauważone przez I. Drexlera i zaznaczone na współczesnym zdjęciu satelitarnym<sup>2</sup>. Źródło: schemat R. Liubickiego, zdjęcie satelitarne - mapy Google.



- An irregular, confusing network of streets caused by the chaotic laying of districts between the old ray streets formed a number of long and short beam streets (Fig. 10). They often ended in a deadlock, and at the same time the streets that were laid in a circular direction were not interconnected. The ends of the streets were often shifted relative to one another (Fig. 11);

<sup>2</sup> Problems of creating of a circumferential ring around the historical core by Drexler:

1. Building on the Danyla Halytskoho square (plac Strzelecki) from the western side, thus forming streets of Havryshkevycha (Strzelecka) and Honty (Kościelna);
2. Building of a quarter between Osmomysla square (plac Krakowski) and Zhyzhky (Kamińskiego) street;
3. The construction of the New Theater (contemporary Opera House) in Torhova square (plac Gołuchowskich) created short, not too wide streets in its place;
4. Building between the bell tower of Bernardine church and the beginning of Valova (Walowa) street from the side of Pidvalna (Podwale) street.
5. Construction of the fire department at the crossroads of the Pidvalna (Podwale) street and Danyla Halytskoho square (plac Strzelecki) complicated the laying of the first ring artery.

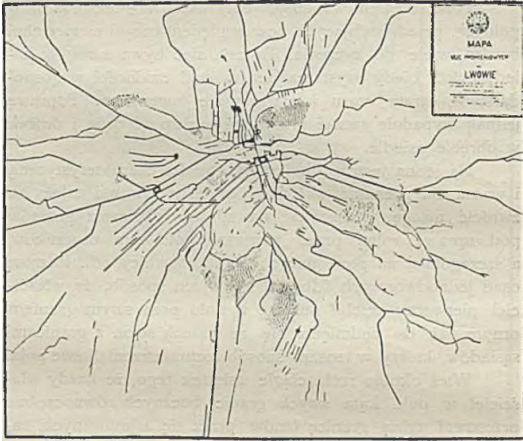


Fig. 10. Lviv radial street network scheme, 1920. Source: I. Drexler [5].

Ryc. 10. Schemat promienistych ulic miasta Lwowa w 1920 r. Źródło: I. Drexler [5].

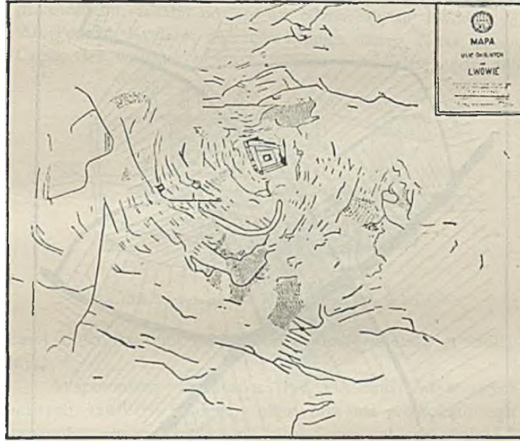


Fig. 11. Lviv circular street network scheme, 1920. Source: I. Drexler [5].

Ryc. 11. Schemat poprzecznych i obwodowych ulic miasta Lwowa w 1920 r. Źródło: [5].

- Ignoring of the construction of circular streets caused complicated traffic between districts. Old beam roads at long distances had not circular connections between each other, or they were narrow and confusing;
- The movement between the settlements near the city, which had not links with each other, took place through the streets near the city center. Drexler also observes that the entire street network “hangs” on Svobody (Legionów) avenue [5] (Fig. 12);
- Overloading of the main streets of Lviv due to the lack of ring roads.

In the book "Great Lviv", in addition to a retrospective analysis and critique of the unregulated development of the Austrian Lviv, Ignacy Drexler also outlined the further prospects for city planning of Lviv, which was to expand it through the accession of suburban communities. He paid special attention to the creation of roundabout ring roads and, as a consequence, the transformation of the radial planning structure of the city into a radial-ring. The ring roads, as Drexler described, “would allow the city to be avoided and to allow easy movement from one community to another, to reduce the cost of money, time, horses and carts, and prevent the destruction of expensive roads” [9]. According to the plan, one circular road would have to go about in the belt of city custom posts (entrances to the city), and the second - the exterior ring, it would have to connect suburban Lviv settlements. Unfortunately, the network of Lviv roundabout circular roads, proposed by Drexler, was not fully implemented over the years, causing traffic problems today [39].

In 1924, the city authorities commissioned Ignacy Drexler and Tadeusz Tołwiński, professor of Warsaw Polytechnic, projects to develop the city. Both developed projects had the main goal of expanding the boundaries of Lviv by affiliating the surrounding villages, the creation of ring roads, as well as optimization of transport and pedestrian traffic. The elaborated ideas were publicly presented twice - primarily at the city hall and then at the eight-day exhibition at Lviv Polytechnic that was visited by 2210 people [12]. Text parts of the projects were supplemented by plans and schemes which, supposedly, were not preserved [3].

The project of Tołwiński envisioned the creation of a future city from radial planning sectors, between which there would be green areas that should reach, as close as possible, the center of the city in the form of the wedges. For passenger transportation, a new railway station was proposed between Chornovola (Pełtewna) and Zamarstynivska (Zamarstynowska) street. From the city center to this station the transport artery was planned along the new axis from the Zankovetska (Skarbek) theater. The second artery would

have started from the fire department on the Pidvalna (Podwale) street and was to pass through the tunnel under the Castle Hill and continue with viaduct over the railway, from where the wide transport artery (35-40 m) began to Zamarstynivska (Zamarstynowska) street and further to Briukhovychi. One more highway had to go perpendicular - from the foot of the High Castle to the Kortumivka (Tercjarska) street. New highways were to be the basis for a thorough reconstruction of the Zhovkivske (Żółkiewskie) district. The same role, though to a lesser extent, the transport corridors had to play going through Kaiserwald to Lisna (Leśna) street and near Lychakiv railway station. The roundabout roads were planned in the eastern and northern parts of the projected area. Their minimum width was 28 m (except densely built up areas), giving the possibility of laying tram lines in the future [37].

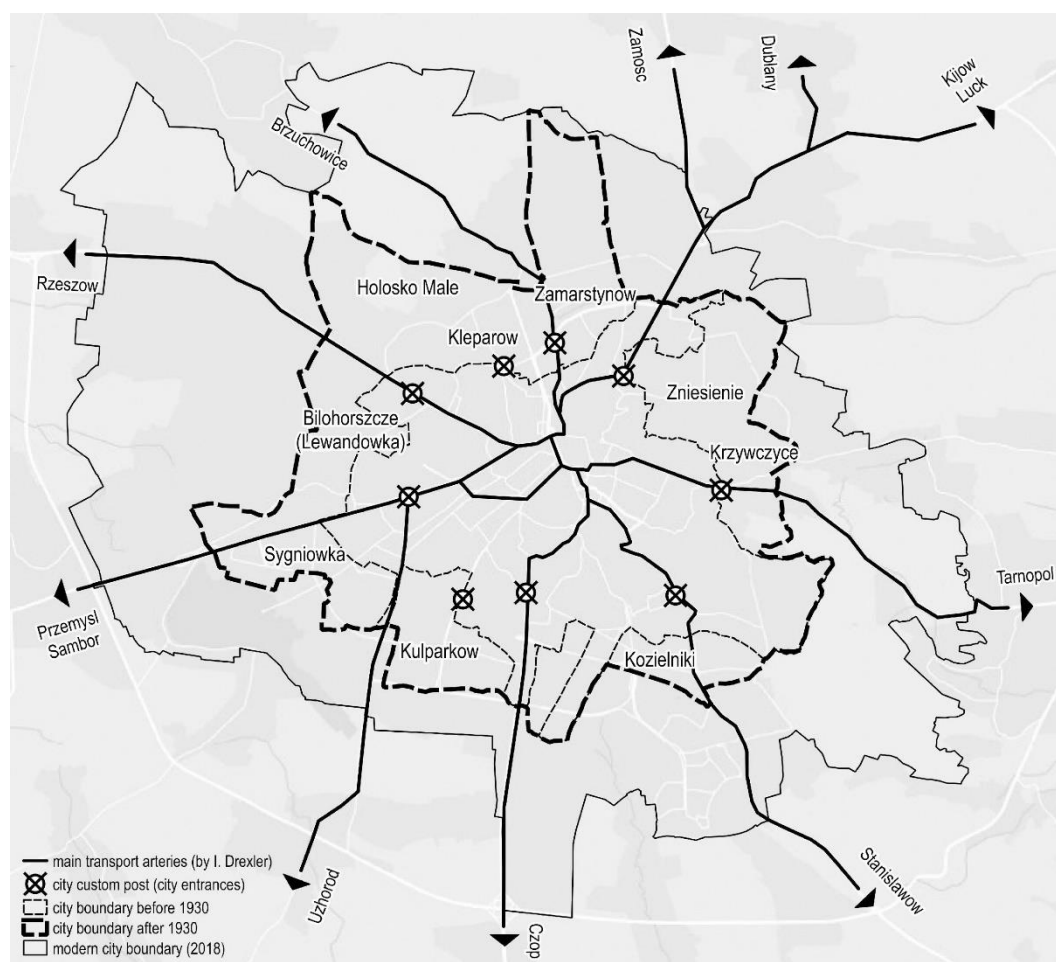


Fig. 12. Modern Lviv scheme with reflection of city boundaries before and after expansion in 1930, main transport arteries according to I. Drexler. Source: scheme by R. Liubyt'skyi. Main transport arteries in 1921 by I. Drexler [5], city custom posts and city boundaries before 1930 by 1917 map [23], city boundaries after 1930 by 1936 map [18], contemporary basemap by OpenStreetMap.

Ryc. 12. Schemat współczesnego Lwowa z zarysem granic miasta przed i po rozbudowie w 1930 r. i uwzględnieniem głównych arterii komunikacyjnych według I. Drexlera. Źródło: opracowanie R. Liubyt'skyi. Główne arterie komunikacyjne w 1921 r. autorstwa I. Drexlera [5]; miejskie rogatki i granice miasta przed 1930 r. z 1917 r., mapa [23]; granice miasta po 1930 r. według mapy 1936 [18]; współczesna mapa bazowa OpenStreetMap.

Drexler based his project on "the strong growth of communication, construction and industrial needs of our city, with an increase in the number of inhabitants to about half

a million". But the citizen of Lviv I. Drexler who knew much better the local problems and the situation of the city, did not map out excessive financial expenses in his project for its realization. The development of the project was based on the ideas expressed in 1920 in "Great Lviv", which were transferred to the plane of real design. The main modern task of the project was the building of two bypass roads - one in the area of city custom posts (entrances to the city – see Fig. 12) and the second - through the surrounding villages, and as a consequence of this the transformation of the planning system of the city into a radial ring type. Two urban tunnels - under the Castle Hill and the Citadel - were offered only as a prospect for the future. Certain improvements were also planned in the already built-up part of the city. In them Drexler proposed optimizing of the movement on separate sections around the city center. The project also solved the problems of pedestrian traffic, which was directed to new passages in the historical center [8].

In certain provisions, the projects offered similar solutions. It is worth noting that part of the project proposals repeated the ideas expressed much earlier. For example, the idea of the city development by the involvement of neighboring communities was developed for the first time by the City Council on January 21, 1901. This question became again and again relevant in 1904, 1908, 1910, 1914 [9]. The Bureau of Regulation of the City of the Third Technical Department of the Magistrate worked out a city regulation plan based on the two competition projects. I. Drexler, in his turn, influenced this process, as the professor of the Lviv Polytechnic Urban Development Department, when he moved to this post in 1925.

In addition to addressing of the city-wide problems, Drexler highlighted the problems of forming the planning network of Lviv at the level of separate city districts. For example, I. Drexler characterized the street network of the villa district of Novyi Svit (Nowy Świat) between streets Horodotska (Gródecka) and Kniahyni Olhy (Wulecka) up to the railroad (whose section that was laid down in 1866) as formed completely thoughtlessly. He drew attention, that there were no annular streets that would conveniently connect two of the main radial streets in the southwest area of the city - Horodotska (Gródecka) and Kniahyni Olhy (Wulecka). According to his observation, for this purpose it was necessary to move by numerous zigzags [5], [6]. Comparison of the scheme of 1928 (Fig. 13) and the modern one (Fig. 14), allowed us to conclude that in almost 100 years, the street network in this area was compacted and developed, but the problem of connecting of the radial streets by the ring roads was not solved (Fig. 14).

Creation of the Great Lviv consisted not only in the association of rural communities, but also their planning and architectural integration with the city into a single organism. Drexler criticized not only the functional and spatial disorder that had developed at the periphery of Lviv, but also performed a number of real proposals for their solution. In the master plan for district of Bohdanivka (Bogdanówka), I. Drexler tried to solve several problems as: planning development of the Great Lviv; the creation of high-standard-city residential districts for urban development; the laying of a ring road in the places of the city old custom posts.

The rapid development of Lviv started from the 19th century on the lands of the old suburban estates. The lands on both sides of Horodotska (Gródecka) street belonged to the armenian family of Bohdanovych, which from 1645 passed to the property of the armenian church [1]. After the construction of the railway line Przemysl-Lwów (1861), and then Lwów-Stanisławów-Czerniowce (1866), these lands were subject to industrial development. However, a significant amount of them were used as agrarian lands. I. Drexler worked out the urbanization proposal for the unfinished triangular section of the southern part of Bohdanivka (Bogdanówka) at that time, limited by the departing Horodotska (Gródecka) and Kulparkivska (Kulparkowska) streets and the railroad lines, which was primarily directed at the logical planning of the neighborhoods, as well as the formation of a circular street (Fig. 15) [5].

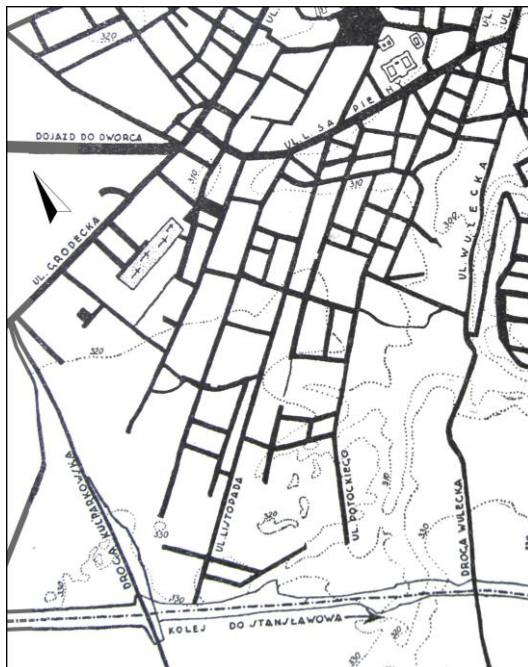


Fig. 13. Street network between streets Horodotska (Gródecka) and Kniahyni Olhy (Wulecka) in 1928 by Drexler. Source: I. Drexler [6].

Ryc. 13. Sieć ulic na obszarze między Gródziecką (Horodotska) i Wulecką (Kniahyni Olhy) w 1928 r. autorstwa I. Drexlera. Źródło: I. Drexler [6].

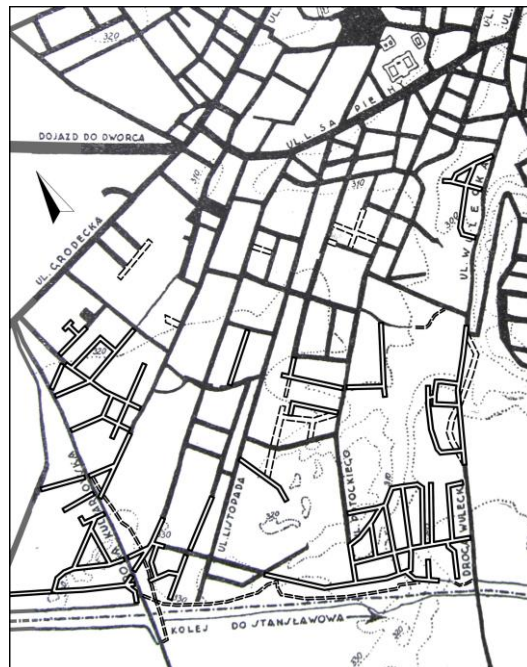


Fig. 14. Modern development of the street network between streets Horodotska (Gródecka) and Kniahyni Olhy (Wulecka) (excluding driveways and pedestrian ways). Disappeared streets are shown by dashed lines. Source: R. Liubytzkyi

Ryc. 14. Rozwój współczesny sieci ulic na obszarze między Gródziecką (Horodotska) i Wulecką (Kniahyni Olhy) (za wyjątkiem podjazdów i szlaków pieszych). Znikłe ulice są zaznaczone linią kreskową. Źródło: R. Liubytzkyi.

Continuation of the ring street, according to the plan, had to create as well the by-pass streets in neighboring areas - in Novyi Svit (Nowy Świat) and Levandivka (Lewandówka) districts. This is known from the maps of 1931, which, along with the current state, also reflected the propositions of new streets tracing [14], [31].

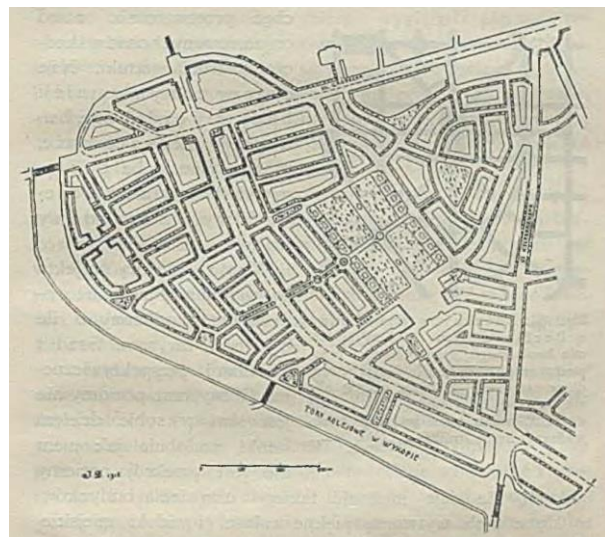


Fig. 15. The urban proposal of I. Drexler for Bohdanivka (Bogdanówka) district. Source: I. Drexler [5].

Ryc. 15. Propozycja urbanistyczna I. Drexlera dla dzielnicy Bogdanówka (Bohdanivka). Źródło: I. Drexler [5].

Historically, Novyi Svit (Nowy Świat) area at the end of the nineteenth century got the structure of parallel (radial) streets. Drexler applied this structure to Bohdanivka (Bogdanówka), accepting the existing parcellation, creating on this basis rows of parallel streets linking them with chords. The main planning principles of the so-called regulatory plan of Bohdanivka (Bogdanówka) became the following:

1. The planned integration of the street network of Novyi Svit (Nowy Świat) and Bohdanivka (Bogdanówka) districts was proposed by continuing the existing streets, using chords between radial streets and artistically creating compositions from semi-circular streets, moving away from utilitarianism in favor of the beauty of the city;
2. In the network of streets of the district, their differentiation was laid in 3 categories: the widest - a ring street with the laying of a tram track (10 m, Okružna (Okreżna) street); streets with two-way traffic with 6 m width - Liubinska (Lubienska), Narodna (Ludowa) and other local streets;
3. The idea of connecting of the city with roads in the outskirts of the city in the places of the old custom posts could not longer be objectified, as the city was rapidly built up. For the laying of Okružna (Okreżna) street it became necessary to turn aside from the city old custom posts in Horodotska (Gródecka) street for 1-1.3 km to the west, closer to the southern railroad line, since the built-up areas of Novyi Svit (Nowy Świat) did not longer allowed to extend Boberskohe (Za Rogatką) street perpendicular to Horodotska (Gródecka) street;
4. Movement near the railway was duplicated - two roundabout streets parallel to the railway were laid - the main street Okružna (Okreżna) and parallel to it, close to the railroad line - the local street Terletskohe (Torowa);
5. It was planned to form the area of new development, subject to the main axis – Okružna (Okreżna) street, as well as continuation of the beam structure of Novyi Svit (Nowy Świat) streets;
6. For realization of building process, a quarterly construction was proposed by big-city blocks with courtyards as it was in Vienna and Berlin [36]. Only near the park the villa construction was proposed (see Fig. 15). However, one and two-story buildings in the style of constructivism were realized in 1920s-1930s. Due to the industrial growth of Lviv and lack of cheap housing in the area, Bohdanivka (Bogdanówka) was treated then as a worker settlement (Fig. 16);
7. The only spatial accent of the district was the Greek-Catholic wooden church of saints Andriy and Volodymyr built by the ukrainian community of Bohdanivka (Bogdanówka) suburb in 1918 at the corner of Kravchenko (Cerkiewna) and Horodotska (Gródecka) streets. Around 1938, a wooden church was dismantled to erect a new stone one. The completion of the construction of the church was prevented by the Second World War. In 1961 the unfinished church was demolished.
8. In the center of the district from the central axis of Sulymy (Obrony Dworca) street to Liubinska (Lubienska) a park that had to lay adjacent to the main square with church at the Liubinska (Lubienska) street was proposed. However, this church is not traced on the other city plans.
9. In 1929 the territory of the planned park began to be used as a stadium of the Worker's Sports Club. The necessity of placing of the park because of the lack of greenery in the surrounding areas was again considered in 1936 by the Lviv Comission for greening [13].

According to the plan designed by Drexler, Okružna (Okreżna) street had to unite 3 radial streets of Bohdanivka (Bogdanówka), which began from the old custom post at Horodotska (Gródecka), i. e. Horodotska (Gródecka), Liubinska (Lubienska) and Kulparkivska (Kulparkowska) streets. The next eastern fragment of the ring street in Novyi Svit (Nowy Świat) area between Kulparkivska (Kulparkowska) and Kniahyni Olhy (Wul-ecka) streets, passing by the railway stop "Kulparkiv", attempted with the aim to unite



them and to create logical communication links. Continuation of the ring street from Kni-hyni Olhy (Wulecka) street to Stryiska (Stryjska) street through Vulka (Wulka) district was prevented by the steep terrain, so the connection between these streets was foreseen with a retreat closer to the center by the existing at that time Corso street (now one of the alleys of Stryiskyi park).

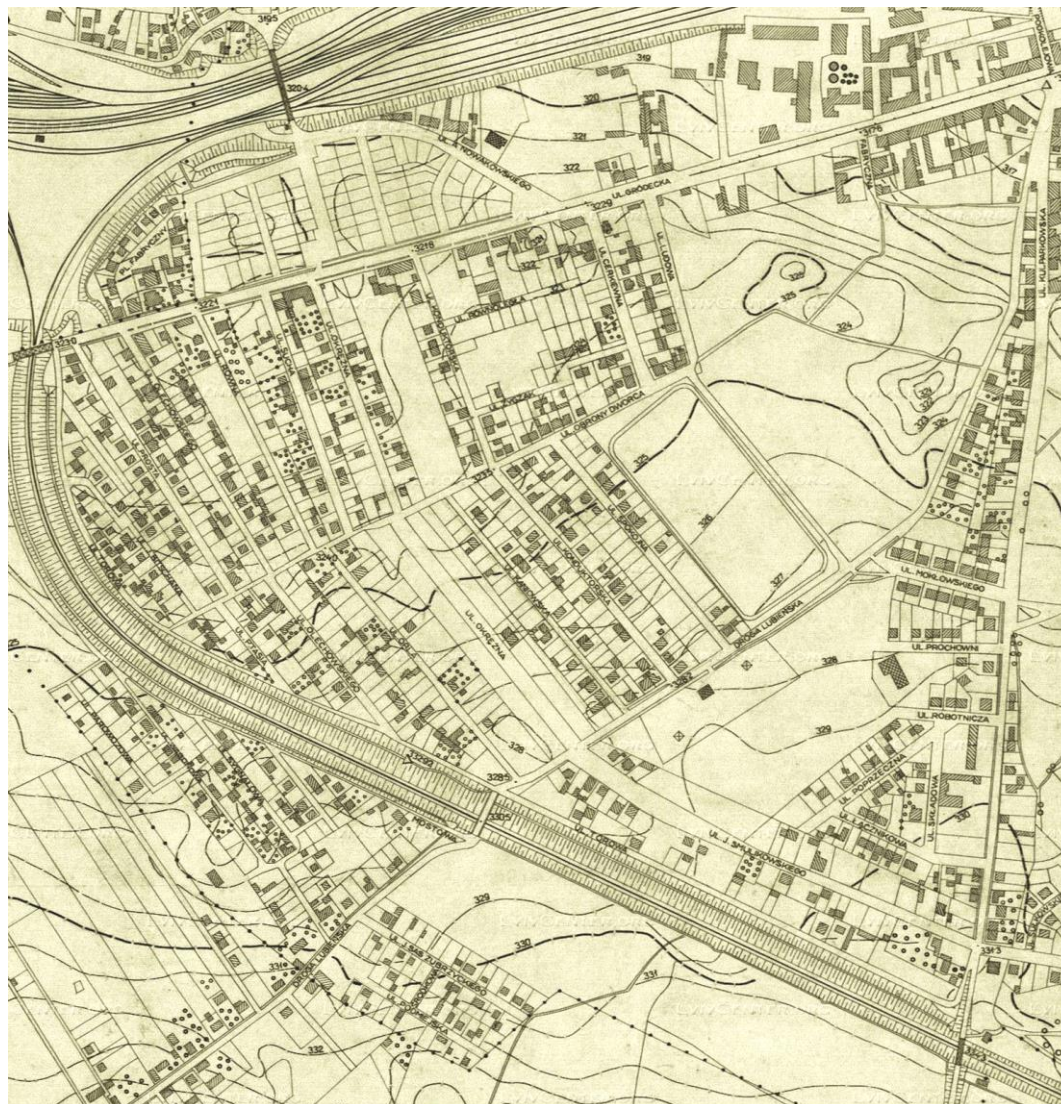


Fig. 16. District of Bohdanivka (Bogdanówka) on the fragment of 1936 map of Lviv. Source: State Archives of Lviv Region [18].

Ryc. 16. Dzielnica Bogdanówka (Bohdanivka) na fragmencie mapy z 1936 r. Źródło: Archiwum Państwowe Obwodu Lwowskiego [18].

On the opposite side of Horodotska (Gródecka) street (northern part of Bohdanivka) Okrężna (Okrężna) street should have passed through the railway bridge to Siaivo street (Grunwaldzka) street, connecting Bohdanivka (Bogdanówka) with Levandivka (Lewandówka), where a big worker settlement already existed. Drexler's proposal for the creation of a circular street was only partially realized - in accordance with the plan only fragment of the street was implemented (Fig. 18).



Fig. 17. A fragment of the 1931 map of Lviv (Gorbay's map) with the reflection of project proposals for regulating the street network in the area of Bohdanivka (Bogdanówka), Novyi Svit (Nowy Świat) and Vulka (Wulka). Source: Ihor Kotlobulatov collection [14].

Ryc. 17. Fragment mapy Lwowa z 1931r. (mapa Gorbaya) z uwzględnieniem propozycji projektów regulacji sieci ulic w obszarze Bogdanówki (Bohdanivka), Nowego Świata (Novyi Svit) i Wulki (Wulka). Źródło: kolekcja Igora Kotlobulatowego [14].

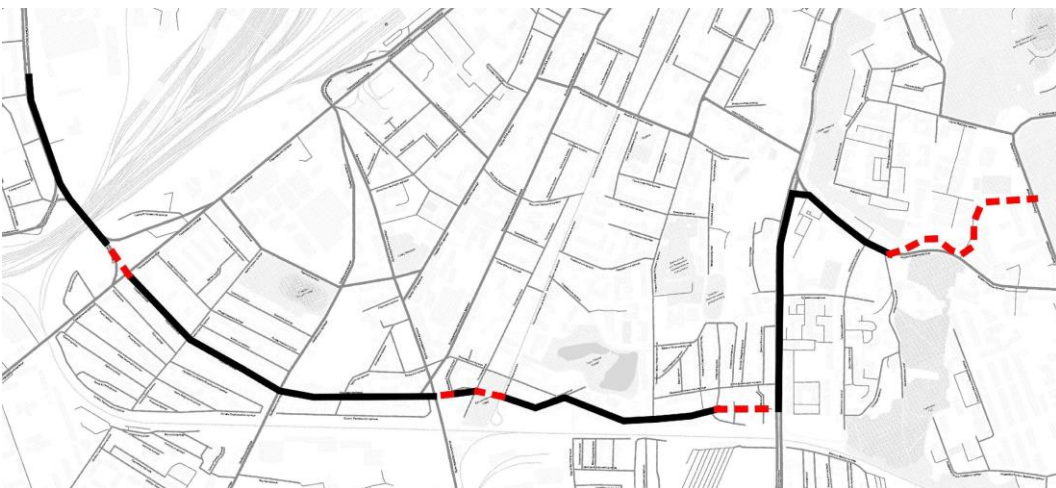


Fig. 18. Proposal of "Drexler's Ring" fragment for Lviv from 1931 map reflected on a modern map. The dotted lines represent street segments that have not been implemented or have changed their trajectory. Source: R. Liubyt'skyi, basemap by OpenStreetMap

Ryc. 18. Propozycja fragmentu "obwodnicy Drexlera" dla Lwowa z 1931 r. na współczesnej mapie. Linie kreskowe pokazują fragmenty ulic, które nie zostały realizowane lub zmieniły bieg. Źródło: R. Lyubitsky, tło - OpenStreetMap

The idea of increasing of the number of transverse (chordal) streets that began to emerge in the interwar period did not develop to the full extent due to further structural changes. After 1939, the Soviet government tried to turn Lviv into a defensive-industrial center on its western frontier, which continued intensively after the Second World War. In 1960-1970, the saturation of this strategically important near-railroad region with the industrial enterprises absorbed part of this street network.

On April 11, 1930, the suburban villages of Klepariv (Kleparów), Zamarstyniv (Zamarstynów), Male Holosko (Małe Hołosko), Stare Znesinnia (Stare Zniesienie), Nove Znesinnia (Nowe Zniesienie), Kulparkiv (Kulparków), Syhnyvka (Sygniówka) and partly Bilohorshcha (Bilohorszcze) – Levandivka (Lewandówka), Kryvchytsi (Krzywczyce) and

Kozelnyky (Kozielniki) were included into the city [11]. Accordingly, it was necessary to work out a regulatory plan for it, taking into account the associated territories. This task was assigned to the City Regulatory Bureau, which started its work in 1932.

### 3. CONCLUSIONS

Ignacy Drexler (1878-1930) – architect, urbanist, professor of Lviv Polytechnic, worked at the Measurement and Regulatory Bureau of the Technical Department of Lviv Magistrate, where, according to his official duty, he made adjustments to the city's planning structure in certain sections and was engaged in the tracing of new streets. Drexler's Bureau also prepared the reference material, which was supposed to be the basis for the development of a plan for the regulation of Lviv - the city's General plan in the modern sense.

Fundamental theoretical foundations for the reconstruction of cities and towns were published by Drexler in 1916 in the book "Reconstruction of villages and towns in our land" ("Odbudowanie wsi i miast na ziemi naszej"), reprinted in 1921. It served as a kind of textbook for city administrations. The book contained a large number of plans and schemes of cities in the world, including the native Drexler's Lviv. In particular, analytical schemes for planning of city fragments were performed, including the balance and logic of the laying of radial and ring roads of the city. Drexler paid considerable attention to the districts of the city that were developed among the rays of the radial streets without logical cross-links. In addition, in view of the promising growth of traffic, the book included recommendations for the design of cross-sectional street profiles and street intersections. They were reflected in concrete Lviv examples. Drexler street design topics were also separately described in his book "The width of the roadway in city streets" ("Szerokość jezdni w ulicach miejskich") which was also printed as a number of articles in the magazine "Czasopismo Techniczne" ("Technical Periodical") No. 18-22 for 1927.

Ignacy Drexler's concept of the development of Lviv was comprehensively formulated in two works. The "Wielki Lwow" ("The Great Lviv") of 1920 became a kind of justification for the need to develop a city regulatory plan, which until then was absent. It contained a retrospective review of Lviv's territorial development and described the problems caused by the unregulated development of the city. Drexler paid special attention to the development of the street-road network and strongly criticized its disorder formation during the Austrian period, anticipating acute transport problems in the future, in particular due to the lack of ring roads. In 1924, Drexler transferred the earlier ideas expressed in the book into the plane of real design, following the project of regulation of Lviv, commissioned by the city authorities.

His project, together with the project of professor of the Warsaw Polytechnic Tadeusz Tołwiński, became the basis for working out of a single city regulation project, which was carried out by the Regulation Bureau of the City of III Technical Department of the Magistrate. Drexler, who moved to the position of professor of Lviv Polytechnic University Urban Development Department in 1925, was able to influence this process as a consultant to the Bureau [35].

Since the publication of the work of I. Drexler "The Great Lviv" ("Wielki Lwow") almost 100 years have passed. Despite the fact that the theory and practice of urbanism has developed considerably, and in the course of the century Lviv has changed many times its state affiliation and socio-political and economic structure, the problems of the planning development of Lviv, defined by Drexler, in many aspects remains relevant to this day. Further development of regulatory plans and general plans of Lviv in the periods of German and Soviet occupation, as well as after the independence of Ukraine, have, to a greater or lesser extent, always adopted the ideas of I. Drexler. However, the disadvantages of the radial street-road network of Lviv, which for centuries could not be trans-

formed into a radial ring type, are reflected in the problems of complication of traffic movement in the city up till now.<sup>3</sup>

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