



## **EWOLUCJA ŚRODOWISKA ŚWIATŁA WE LWOWIE**

### **EVOLUTION OF LIGHT ENVIRONMENT IN LVIV**

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#### **STRESZCZENIE**

Środowisko światła każdego miasta jest ściśle związane z jego merytoryczną treścią, historią i bezpośrednio z mieszkańcami. Lwów nie był wyjątkiem. W artykule autorka przedstawia historię środowiska światła miasta w kontekście wydarzeń historycznych i kształtowaniu wizerunku miasta. Światło jest postrzegane jako silny czynnik "graficznej" różnorodności źródeł, jako środek do zrealizowania udanego planowania miejskiego środowiska.

Słowa kluczowe: światło, latarnia, oświetlenie, środowisko miejskie, wizerunek miasta.

#### **ABSTRACT**

Light environment of any city/town is closely connected with its material content, history and, directly, inhabitants. Lviv is no exception. Therefore, the authother decides to investigate the development history of light environment of Lviv within the context of historical perspectives and the process of formation of the city image. Light is considered to be a strong *descriptive* factor, and variety of its sources to be means for successfully planning of the city light environment.

Key words: light, lamp, illumination, urban environment, city image.

## INTRODUCTION

Electric lighting of cities did not appear unexpectedly: it had been preceded by a thousand-year history of people's using light effects. This history dates back to the times of use of fires, lit chips, tree branches and torches yet in the ancient cultures. The Egyptian, Greek, Roman civilizations and culture of the Eastern peoples make their contributions in the form of a number of oils lamps, tallow candles and the reasons themselves for use of fire, for it even triggered fear at first<sup>1</sup>. Fire is also known to have been respected by the ancient Slavs the heathens; that is why fire was initially seen by the Christians with prejudice, especially during churching procedures where components of this cult continued to exist, though in a new cover. In the Middle Ages, however, a custom to organize extravaganzas takes a more temporal form. There is no doubt that one of this custom was to burn straw on in the Lviv Square, the fact twice noted by D. Ziubrytskyi in his *Chronicle of the City of Lviv* (near 1526 and 1655). After all, the historian himself names this tradition using a pagan term 'subotka'<sup>2</sup>. Since history of Lviv as a city goes back to the Middle Ages, the beginning of formation of its light environment should be found right in those times.

## ARCHAIC PERIOD IN LIGHTING OF LVIV

Lviv, thanks to its good geographical location – at the intersection of the main trade routes between the Black and Baltic Seas – was influenced by a constant movement and active migration of people; it excited interest and underwent interference of different peoples, cultures and social orders, which promoted its rapid development. The city light environment developed along with its planning structure and semantics. Referring to the history, it is possible to find evidence of actively using torches, chips, icon lamps and candles in the medieval cities<sup>3</sup>. They acquired special importance in temples where they fulfilled two functions at a time: utilitarian and symbolic.

Illumination in honor of monarches, their visits, coronations, weddings and military victories is a characteristic of the ancient Lviv. Based on the preserved descriptions and mentions in the city council acts, it makes it possible to get an idea about the scope and scale of illuminations of that time. For instance, when Stefan Batorii was going through Lviv to Kraków (1576) for coronation, the illumination in honor of him consisted of so many fires that the city council, bewareing of a conflagration, specially purchased from shoemaker Krzysztof from Pshevorsk, a device to extinguish fire. The illumination was supplemented by sound effects: music, played by an orchestra on the town hall tower gallery, and cannon rounds. Further, to strengthen the effect, they used traditional fires as well: during celebration of coronation of Zigmund III (07.02.1588), they hung a „chain-fixed big iron grid that had a constantly burning big fire on it, which could be seen from far away at night” on the city hall tower<sup>4</sup>.

Time of singular prosperity of the art of illumination goes back to the XVII-XVIII centuries. Fairy shows became so popular that arrangement of 'fire performances' became one of the educational subjects at the University of Lviv. Based on the lectures of that time, a book was published in 1747. Witnesses of the ancient illuminations are the tracery stone lamps on the St. Yura church, meant for *artificial fires*. It is interesting that their installation

<sup>1</sup> Bouman M. J., *Luxury and Control : The Urbanity of Street Lighting inNineteenth-Century Cities*, Journal of Urban History 1987, Chicago, p. 8-9; Brock A. *A history of fireworks*, London, Harrap and co LTD, 1949. p. 10; Cowell F. *Ancient Rome. Life, religion, culture*. M.: Tsentrpoligraf, 2006, p.14.

<sup>2</sup> Grankin P., Fesenko D., In the shine of artificial lights (illuminations in the old Lviv), „Elektroinform”, 2006 No.3, Lviv, p. 37.

<sup>3</sup> Kravchenko V. M., Jakovenko N. M. *Trading in Ukraine. XIV - the middle of XVII century*, K., Science opinion, 1990, p. 48-50.

<sup>4</sup> Grankin P., Fesenko D., In the shine of artificial lights (illuminations in the old Lviv), „Elektroinform”, 2006 No.3, Lviv, p. 37.

above the cornice was stipulated already in the contract for the temple construction; thus, the St. Yura cathedral has gained a special importance in the Lviv landscape (Fig. 1).



Fig. 1. Fair near St. George's Cathedral (engraving, K. Auer, beg. XIX c.) and stone lanterns on the Cathedral. Source: <http://sobor-svyura.lviv.ua/istoriya;>



Fig. 2. Bernardine church (engraving, K. Auer, beg. XIX c.) and street lights. Source: <http://www.lvivcenter.org/>



Fig. 3. A view of one part of Lviv (engraving, K. Auer, beg. XIX c.). Source: <http://www.polona.pl/item/339297/0/>

Time generates some new weighty reasons for the public formed street lighting to appear: population upsurge and migration to cities and towns; enrichment of merchants

who sought active leisure; growth of night travelers in number, who were also involved in urban life; expansion of production for big markets for account of a prolonged working day, and a revolution in the meaning of time by inventing a mechanical timepiece<sup>5</sup>. Within the city, they started using hanging lanterns equipped with candles, or oil icon lamps not only during a celebration period (Fig. 2), but the light they gave was dim, short-lasting and expensive. The light environment was still point; it was of a local nature and emphasized cogency of a downtown, which, in principle, is a reflection of semantics of idealistic Renaissance cities and towns<sup>6</sup>. Baroque, in its turn, realized new conceptions on unity, infinity and diversity of the world, on its complexity and abilities to vary. The city becomes open, the main roads cross the city and step outside it (Fig. 3).

Typical of the Baroque style is the synthesis of all kinds of plastic arts: architecture, sculpture, and painting, theatricality, strengthening of emotional effects used for achieving grandeur, allegoric nature and symbolism of thinking. All the above was met by means of light illumination that in many cases covered a territory of the whole city and the *Vysokyi Zamok* (High Castle). The light complex, besides fire, comprised of: works of arts: banner boards bearing allegoric pictures or big lanterns wrapped in oil cloth with pictures on the lanterns walls that were illuminated from inside, small architectural forms: summerhouses, obelisks, triumphal gates decorated with burning candles or lampions, statues, reliefs, inscriptions and monograms. All the above made a uniform pattern which was but static: figures changed off one another, one decoration shaded the other. All this was accompanied by firework flashes, music sounds which alternated with cannon volleys, and by performances played by not only professional actors, but also by the audience<sup>7</sup>. Such aesthetics of design of illumination actions quite suited the Baroque spirit.

Lviv having been dominated by Austria (1772), arrangement of illumination actions began to acquire more and more political coloration. The authority of the *Kingdom of Halychyna and Lodomeria*, for the purpose of illumination design, specially sent for pyrotechnicians from Vienna. A custom to make festive illuminations was preserved in Lviv, almost without alterations, during the whole XIXth century. One of the novelties was that the illuminations were moved to the city parks. One more novelty was an emergence of a gas illumination (along with the traditional oil lamps and candles).

## KEROSENE AND GAS FIRES

Since the beginning of the XIXth century, higher sanitary standards for cities have been put into effect. New methods are used, and namely: installation of sewerage, removal of surrounding walls, the near-church cemeteries being moved outside the cities, territories with very old buildings being rooted out. At this time the first urban lighting layouts appear. Thus, it promotes an intensive search for new sources of light.

An emersion of a kerosene lamp dates back to 1853. Johann Zech and Ignacy Łukasiewicz, workers of the Lviv pharmacy "Under a Golden Star" owned by Petro Mikoliash, developed a procedure to refine mineral oil and obtained some new not very expensive flammable material - kerosene<sup>8</sup>, which was granted a patent for by Austria. That was a revolutionary breakthrough. Use of kerosene for the purpose of lighting allowed for considerably increasing brightness of lamps which encouraged emergence of a great number of new lanterns and lamps (Fig. 4). However, in addition to their installation, there began adaptation of oil lamps into kerosene ones. Their number had been increasing until the electric light appeared. Assortment of lamps and their design was constantly expanding.

<sup>5</sup> In Lviv, to mount the Swiss time device fitted with a striking mechanism (the mid eighteenth century.), decision was made on a thirty-eight meters high tower of the Bernardine Polish church.

<sup>6</sup> Savarenskaya T. F. The history of city planning art, M., Strojizdat, 1984, p. 250-260.

<sup>7</sup> Grankin P., Fesenko D., In the shine of artificial lights (illuminations in the old Lviv), „Elektroinform”, 2006 No.3, Lviv, p. 38.

<sup>8</sup> Shpak O. G. Oil and oil products, Kiev, Yason-K, 2000.

It was not just the downtown which was illuminated; extent of the lit districts was increasing. They started using kerosene in many European cities. In Vienna, they used such lamps to illuminate the station building and hospital, whereupon such lamp was named as the *Vienna Lamp*. Like Lviv, the neighboring cities - Ivano-Frankivsk, Uzhhorod, Kamianets-Podilskyi etc. – went over to kerosene lighting.

History of using kerosene lanterns, though very rapid and important, is not long. Kerosene lighting had a competitor – gas lighting that was evolving in parallel. In the world, they were implementing street lighting by means of coal gas obtained from solid fuel (coal). A major step towards forming an urban light environment was rise of a gas pipeline which made it possible to create a centralized system for fuel supply. This changed consciousness of society and gave birth to new social processes, which became a good impulse in development of electric lighting techniques. In 1856 in Lviv, they conclude a contract with a German Continental Company of Dessau for construction of a gas enterprise (gas maker) and lighting of the city with coal gas. The gas maker was placed in operation on September 1, 1858. At the gas enterprise, they produced gas from black coal brought from the Prussian settlement of Zhabno (today, the Polish Żabno). Besides gas, there they also made such valuable by-products as coke, resin, ammonia and ammonia spirit.

In forty years (from 1858 to 1898), the German Company laid 40km of underground cast-iron gas pipelines in the Lviv downtown and to the main train station, which supplied 815 street lamps with gas. The largest public places were illuminated, as follows: city hall, office of the public prosecutor, theaters, museums, schools, hotels, banks, polytechnic institution, railroad, as well as property of private consumers, firms and companies. In 1894, all the gas street lamps were substituted with lamps with Auer screens that increased a luminous intensity and considerably reduced gas consumption. The gas factory being passed into ownership of the urban municipality in 1898, they started works on its rehabilitation, which made it possible to expand a gas supply network and increased quantity of street lamps<sup>9</sup>.

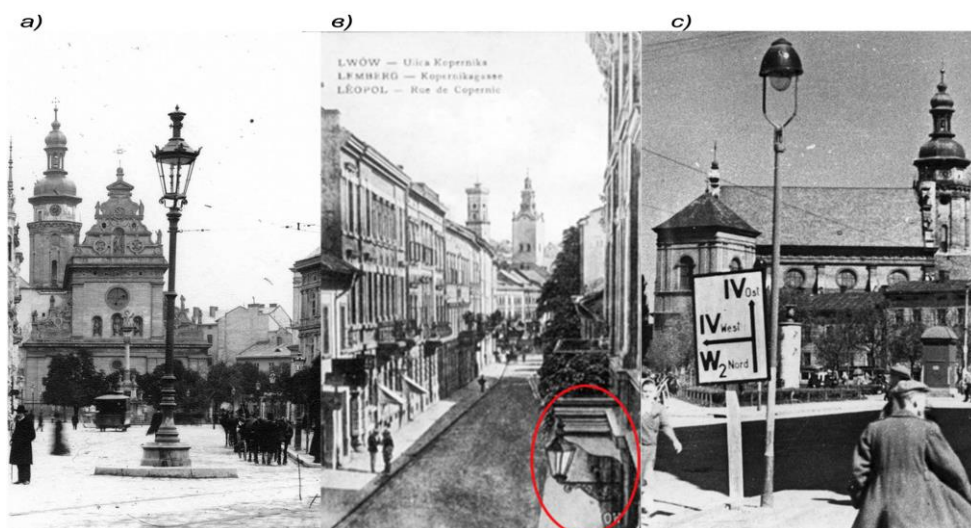


Fig. 4. Kerosene and gas lamps: a) a big lamp not far from the Bernardine Square, a photo (end of the XIXth – beginning of the XXth century). Source: <http://photo-lviv.in.ua/>; b) a gas lamp on a bracket in Kopernyk Street, a photo (end of the XIXth – beginning of the XXth century). Source: <http://photo-lviv.in.ua/>; c) a gas lamp not far from the Bernardine Square, a photo (1940). Source: <http://www.lvivcenter.org/>.

<sup>9</sup> Lukshin V.A., Chulkov E.I., Dupak A.S. Electric power industry of Ukraine: looking back and thinking about the future. – K., 2003. – p.28. <http://energetika.in.ua/ua/books/book-2/part-3/section-15/15-3>

Both gas and kerosene lighting had their advantages and disadvantages; that is why these two methods existed in parallel (Fig. 4). Gas pipelines made it possible to centrally supply fuel, simplify a lamplighter's work, expand the territories to be illuminated, but there was an explosion hazard and the line laying was complicated. The gas lamps, each and every one, were completely maintained by lamplighters, that took much more time, but there were more safe and mobile lamps.

They stopped using gas lighting in Lviv after the World War II, as the gas pipelines and gas holders were destroyed. Kerosene lamps gradually disappeared from the streets, for the city was finally taken captive by electric light.

### PERIOD OF INTENSIVE DEVELOPMENT OF ELECTRIC LIGHT

Since the advent of electric light, the urban environment has undergone irreversible changes (Fig. 5, 7). The XXth century became a period of intensive development of lighting technologies which opened many ways for forming the urban light environment and essentially influenced the urban development sphere.

In Lviv, the electric light appeared in 1900 in the form of 4 lamps near the city hall in the Market Square. The city where the central areas were brightly illuminated at once saw the advantages not only in comfort and protection, but also in commerce and aesthetics. Light became a necessity for attraction of a greater number of people and for a more active movement.

An impetuous development of electrified systems and backing of this source of illumination by architects, officials and citizens promoted large-scaled urban projects whose purpose was to regulate chaos of the XIXth century cities. In 1930, the Illuminating Engineering Society published a street lighting code and called local governments for its acceptance. The urban streets were categorized under quantity of traffic; recommendations were given as to levels of their illumination<sup>10</sup>.

New sources of light were springing up. T. Edison filament lamps with a tungsten filament, in some time gas-discharge sources such as sodium and mercury lamps were added up to the first arc lamps such as *Jablochkoff candles*<sup>11</sup>. They utilized fine urban projects for illumination of streets, parks, public places, stations and public buildings. It can be said that those were the initial installations whose purpose was to give a demonstration to society and the urban authorities, of safety, efficiency and elegance of electric light. In the 1930s, there appeared not less fascinating bright fires than a generation ago. At the 1939 New York World Fair they showed luminescent lamps and neon gas. That is to say that it showed expanded palette of light devices which were generally used for illumination, and description of architecture with a number of *bulbs*.

They began a competition for designs of lamps between a large number of firms. Initially, all these projects were a reflection of classicism inspired by kerosene lamps (Fig. 6). Technologies developed rapidly, giving new opportunities and new requirements, and soon there began to appear round or oval globes on classical pillars (Fig. 6).

From the early 1910s, on the facades of stone buildings in the central Lviv, there appears the first electric light advertising. The pioneers to implement such advertising were cinemas owners. Electric advertising had a variety of shapes and sizes - from "meter-long letters" on the front to only a 20cm high inscription of a small colored kaleidoscope from the side. However, in those times they paid much attention to emergence of such lighting

<sup>10</sup> Mackinnon G. Brandston H. Dennis D. Bray C., Heritage Lighting Master Plan for Old Town Toronto. Final Report, Toronto Heritage Preservation Services, 2011, p. 60.

<sup>11</sup> Eisenberg J. Reference book on lighting engineering, 3 editions, M., Znak, 2006, p. 89.

effects and this process was strictly controlled by local authorities<sup>12</sup>. After the First World War illuminated advertising becomes more and more distributed and it no longer goes in tandem with improving the aesthetic qualities of the signs. Later, the appearance of neon advertising attached gave Lviv the European form, and the city was in no way inferior to the other big urban centers.

Fig. 5. Lviv in the evening, pictured by coevals. (Otto Dobrovolskyi. 1910. Mari Square. E.M. Lilien. Catalog of the 1<sup>st</sup> exhibition in Lviv. 1914.) Source: <http://www.lvivcenter.org>

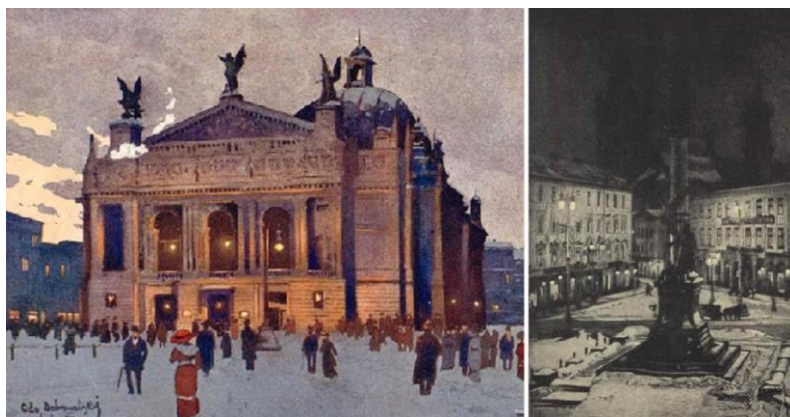


Fig. 6. Change of types of electric lamps in the streets of Lviv. 1900 - 1990 years. Source: <http://www.lvivcenter.org>

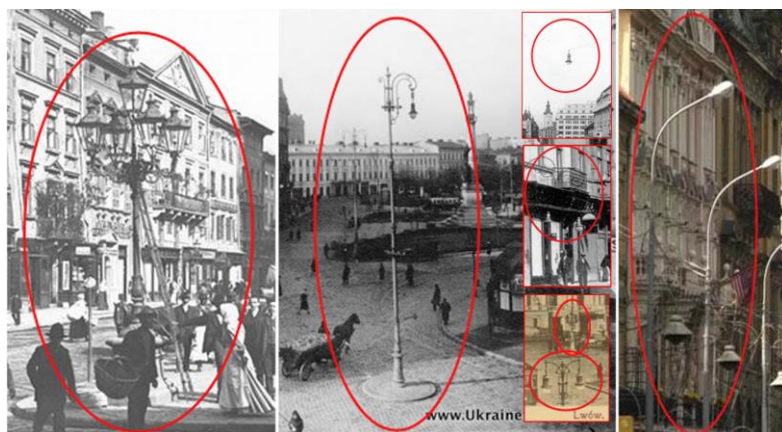


Fig. 7. Illumination of architecture. 1928 -1939. Source: <http://www.lvivcenter.org>



Lanterns, in turn, were evolving under the terms of rationalization where industrial designers denied ornaments, applied elements and complicated curves in every piece of

<sup>12</sup> Grankin P., Klymeniuk T., Lviv' Light advertisement in 1900–1939, „Galicka Brama”, 2003 No.1-3(97-99), Lviv, p. 23-24.

their work. By the late 30's, there had been created thin smooth luminaires which were taken as a symbol of future.

The Second World War and its aftermath greatly stopped the development of Lviv light environment that was replenished with innovations solely in the advertising industry. Further, the new urban illumination systems were spreading in the utilitarian illumination system, which were common for the USSR: pendant lights on guy-lines which, on the whole, flooded the city center; there appeared the most popular designs that consisted of metal-concrete pillars or of standard cast-iron pillars with a possibility of replacing the brackets that looked like a cobra head (Fig. 6).

In the 1990s, it seemed that the technologies gave a chance to illuminate the city so as to best complement the environment. Metal halide and improved mercury lamps in their whiteness approximated to incandescent lamps, while being backward from spark heat of the latter. Sometimes, they also use compact fluorescent lamps outdoors. Also, the twentieth century gave us the LEDs, which until now have been in a phase of active development. The first version was patented back in 1961 in the United States. In the 1980s, the new materials having been created, their efficiency has increased by 10 times<sup>13</sup>. The introduction of LED lighting helped to significantly improve the light environment of the city, arrangement of mass spectacles and rest of the citizens, while the peak of their application is in the twenty-first century.

## ACTUAL STATUS

The XX-XXI centuries gave an extremely wide range of electric lighting technologies which are in no time being used in the urban environment. They improved the existing means, added new media, projection, and interactive features, and all that immediately affected the city image. To avoid chaos, there emerged a need for a systematic approach to formation of the light environment of the city, as it affects both the quality of life of urban residents and the spatial orientation of all the involved people, and movement in economic activity, and the overall perception of the image of the city. In the world practice the learning process of artificial light environment started not too long ago, however, as a result of rapid development of this industry over the last century, there appeared many works, which significantly influenced the development of the lighting design.

Given that the lighting technologies of the urban space forever became part of our lives and consciousness, it should be considered in conjunction with the town planning sciences.

As Shymko V.T. mentions, the ability of light to detect and optically transform architectural forms, to provide a quick modification of the urban environment in accordance with the rhythms of city life, makes it (*the light*) an important town planning factor and a constant architectural material.

One of the requirements for the formation of any environment, including a light one, is arrangement of a clear framework that facilitates human orientation and contributes to the better perception of the image. Obviously, these trends in planning urban spaces have also been implied in Lviv. So, gradually, according to financial opportunities, they implement new projects on the city illumination, which, in addition to the utilitarian illumination, include development of the city dominant illumination programs of various scopes: from the city-wide one, such as Vysokyi Zamok (*the High Castle*), to the local one such as a colored light arcade to the main entrance of the M. Zinkovetska Theater (Fig.8).

And if you remember an ancient tradition of Lviv – holding fairy shows - it is too reflected even today, only with the use of modern technologies, and is conducted as a variety of light shows, temporary projects and festivals. Finally, during the holidays, in the streets of

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<sup>13</sup>Eisenberg J. Reference book on lighting engineering, 3 editions, M., Znak, 2006, p. 89.



Lviv, it is still possible to meet people who are arranging fire shows in the spirit of the Middle Ages.



Fig. 8. Light environment of Lviv today: a) illuminated tower of the High Castle as a dominant of the city-wide scale and the utilitarian illumination of the streets; a photo (2013). Source: [http://www.olegbabenchuk.com/gallery/foto\\_lvova.html?gallery](http://www.olegbabenchuk.com/gallery/foto_lvova.html?gallery) ; b) Local light installation; a photo (2013). Source: <http://lviv.travel/ua/~1999/nocne-zdj-cia-lwowa>

## CONCLUSION

Thus, the history of the Lviv light environment has more than one century. According to the development of the lighting means, it can be divided into three conditional periods.

The Period of Archaic experience, where the lighting means were bonfires, torches, candles and oil lamps. Of course, the Archaic Period, as well as throughout the world, was the longest and not so intense; however, even here we can observe a certain development: from the manual fires, being a company for a human being, to the first street lights stimulated by fire shows and by use of fire sets for various celebrations.

The period of use of illuminating gas and kerosene for the illumination purpose lasted much less, but was very important in shaping the image of the city at night, as it introduced a charisma and dictated the nature of the solution on the light environment of the city center for the next generations.

The period of development of electric technologies, is certainly the most dynamic. As a result, Lviv received a wide palette of possibilities, but there emerged a need to clearly regulate the use of light technologies with an understanding of their "expressive" effect.

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