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## ХУДОЖНІЙ АНАЛІЗ СКЛЯНИХ ВИРОБІВ, ЗНАЙДЕНИХ У РОЗКОПКАХ ЯРОСЛАВА ПАСТЕРНАКА НА ЛЬВІВЩИНІ 1936–1944 РОКІВ

Статтю присвячено детальному мистецтвознавчому аналізу унікальних скляних прикрас середньовічного періоду, виявлених під час археологічних розкопок у Галичі. Вперше опубліковані дані про скляні знахідки з розкопок видатного вченого Ярослава Пастернака на Львівщині 1936–1944 років. Окреслено основні віхи наукового шляху вказаного вченого та здійснено аналіз значення його відкриттів для історії мистецтва України. З'ясовано, що скляні прикраси з розкопок Я. Пастернака збережені у колекції Львівського історичного музею і відкривають нові перспективи вивчення мистецької спадщини Галицько–Волинського князівства. Вперше представлено мистецтвознавчий аналіз цих скляних виробів, що демонструють різноманітність та високу якість виробництва у середньовічних майстрів. Особливу увагу приділено чотирьом археологічним локаціям: Крилос, Зеленче, Підгірці та Белз. Кожне з цих місць має свою унікальну історію і розглядається окремо в історико-культурному аспекті. Подано загальні відомості щодо виробництва скляних прикрас на теренах сучасної України в добу з античного часу і до Середньовіччя. Дослідження базувалося на статистичному та художньому аналізі всіх знахідок за наступними характеристиками: колір, прозорість, тип поверхні та різноманітність декоративного оздоблення. Окремо здійснена спроба проаналізувати техніку виготовлення браслетів, уведених до наукового обігу згаданим вченим. При цьому слід зазначити, що статистичний аналіз знахідок по всім локаціям демонструє спільні тенденції і розбіжності у виробках при їх виготовленні. Мистецтвознавчий аналіз цих предметів дозволяє краще зрозуміти мистецькі традиції та культурну спадщину у галузі художнього скла Галицько–Волинського Русі. Описані прикраси не лише розкривають технічні аспекти виготовлення скла, але й свідчать про високий рівень естетики та художньої майстерності середньовічних склярів.

**Ключові слова:** прикраси, скляні артефакти, скло, середньовіччя, Київська Русь, археологія, Галицько-Волинське князівство, Ярослав Пастернак.

### **Puhachenko Marharyta. ARTISTIC ANALYSIS OF GLASSWARE UNEARTHED IN YAROSLAV PASTERNAK'S EXCAVATIONS IN LVIV REGION BETWEEN 1936 AND 1944**

The article is dedicated to a comprehensive artistic analysis of distinctive glass adornments from the medieval period, unearthed during archaeological digs in Galicia. This publication marks the first release of data on glass artifacts found in the excavations led by the eminent scientist Yaroslav Pasternak in the Lviv Region between 1936 and 1944. It outlines the key achievements in Pasternak's scientific career and evaluates the impact of his discoveries on the study of Ukrainian art history. The findings reveal that the glass ornaments excavated by Pasternak are conserved in the Lviv Historical Museum's collection, offering fresh insights into the artistic legacy of the Galician-Volhynian Principality. This is the inaugural presentation of an art-critical examination of these glass items, showcasing the diversity and superior craftsmanship of medieval artisans. The paper gives special focus to four archaeological sites: Krylos, Zelenche, Pidgirtsy, and Belz, each with its distinctive history and cultural significance. It provides an overview of glass jewelry production in the territory of present-day Ukraine from ancient times through the medieval era. The research is grounded in both statistical and artistic scrutiny of the artifacts, considering attributes such as color, transparency, surface type, and decorative variety. An individual analysis is conducted on the bracelet-making technique introduced to scholarly discourse by the aforementioned scientist. Notably, the statistical assessment of findings across all sites reveals both commonalities and variances in the manufacturing processes of these artifacts. The art-historical examination of these items enhances understanding of the artistic traditions and cultural heritage in the realm of Galician-Volhynian Rus glass art. The ornaments discussed not only illuminate the technical processes of glassmaking but also reflect the high aesthetic values and artistic prowess of medieval glass artisans.

**Key words:** adornments, glass artifacts, middle ages, Kyivan Rus', glass, Galician-Volhynian Principality, archaeology, Yaroslav Pasternak.

## 1 Introduction

The first glass objects discovered on the territory of Ukraine date back to the 6th century BC. These artifacts were unearthed during excavations of the ancient cities of Chersonesos, Panticapaeum, and Olbia [16].

The skill of the artists who created these objects is evident in their diverse range of colors and designs. Although the color palette is broad, ranging from almost white to vivid and dark hues, the transparency of the glass is not as flawless as in modern-day items. Among the ornaments discovered, the most common were beads made in various ways and with different types of decoration. Additionally, some items featured different types of molded decorations. However, the sources of inspiration for these designs remain unknown.

Records of glass ornament production on the territory of modern-day Ukraine date back to the 6th century BC. One such workshop existed in the Yavorlytska settlement, located in the Northern Black Sea region. Additionally, evidence indicates that small plastic glassware was produced in Crimea, specifically at Alma Kermen, during the Roman occupation of the peninsula between the 2nd century BC and the 1st century AD. Archaeologists can identify these production sites by the remnants of raw materials, finished products and equipment. However, due to the significant migration of peoples in subsequent centuries, identifying traces of ancient workshops has become increasingly rare.

The true golden age of glass production occurred during the Middle Ages. Excavations of workshops from the time of Kyivan Rus have revealed a vast array of glassware, including dishes, beads, inserts, glass panes, and some bracelets. These bracelets vary in color, transparency, and decoration. What is particularly fascinating is that some were crafted from two different types of glass and embellished with decorations on top. In fact, some of these pieces were so expertly crafted that they resemble semi-precious stones.

Glass ornaments, such as beads and bracelets, were also discovered on the territory of the Principality of Galicia-Volhynia, which are the objects discussed in this article. These arti-

facts were donated to the archives of the Lviv Historical Museum by members of the Taras Shevchenko Scientific Society. Yaroslav Pasternak unearthed over three hundred samples during his expeditions of 1940-1946 in Lviv Region, specifically in Krylos, Zelenche, Zvenyhorod, Pidhirtsi, and Belz [13].

### 1.1 Yaroslav Pasternak, An Eminent Researcher Of The Antiquities Of The Ukrainian Carpathians

For a long time, the name of this outstanding scholar, teacher, and researcher – Yaroslav Pasternak – was suppressed in Soviet historiography. His numerous publications and archival documents were relegated to special state funds, and his archaeological materials and meticulous scientific findings were disregarded and unexplored. The extent of his contribution to the advancement of scientific knowledge regarding Ukraine's past is not only measured by the number of his expeditions and works. His discovery of the foundations of the chronicled Assumption Cathedral and the sarcophagus containing the ashes of Prince Yaroslav Osmomysl in 1936–1937 in the village of Krylos was a groundbreaking event in the field of archaeology. This discovery is difficult to overstate, as it resolved the question of the location of the chronicled city of Halych [5].

Pasternak's destiny was intertwined not only with his remarkable discoveries of global significance, such as the existence of the ancient and enigmatic city of Halych, but also with the challenging times of war, camps, and emigration. Despite these difficulties, his research nature constantly made itself felt, even in Czech camps, during the Soviet oppression and under German rule. For instance, in the autumn of 1944, he excavated a Bronze Age burial ground in Linz, northern Austria, together with students from the University of Vienna. In these difficult wartime conditions, Pasternak continued to supervise museum collections, lectured at the Theological Academy, and made several sporadic trips to archaeological sites. However, in October 1942, he conducted his last field research study on Ukrainian land.

During the Soviet period of his life, Pasternak did something unheard of at the time: in

1941, at the All-Union Congress of Researchers of Old Rus Cities in Leningrad, he read a report titled “The Princely City of Halych” in Ukrainian. He repeated the same report later in Moscow. In 1944, Pasternak left his homeland forever. Prior to his departure, there were repressions against Lviv professors, which resulted in the university’s closure, his arrest on June 23, 1941, and his subsequent imprisonment in Tomsk. However, even before that, he conducted extensive archaeological work, as evidenced by the materials published in his final work in Krakow in 1944.

Pasternak’s scholarly work culminated in the publication of “The Archaeology of Ukraine”, which was released in Toronto in 1961. The 789-page book made its way to all of the world’s most prominent libraries and served as a convincing argument for Ukraine’s right to an independent future, which is logically derived from the thousand-year history of the Ukrainian people.

On September 27, 1997, the Lviv newspaper “Za Vilnu Ukrainu” (For a Free Ukraine) published an article about the fate of two of the most valuable artifacts from Pasternak’s excavations: a gold pendant (kolt) found at the Zoloty Tok in Halych and a bone plate from the frame of an icon depicting a boyar-knight from Plisnesko. For a long time, these objects were believed lost to the scientific community. However, when Pasternak went into exile, he took with him some masterpieces of Ukrainian national culture. Before his death, he instructed his student Lilia Paliy, through his wife, to return these historical treasures to Ukraine when it became an independent state. This is how the ancient Ukrainian cultural treasures were eventually returned to their rightful descendants [10].

Thanks to Roman Chmelyk, Director of the Lviv Historical Museum, and Oksana Kutseniak, Head of the Department Museum of the History of Ukraine, we were able to study several glass objects from Yaroslav Pasternak’s excavations for the first time. This study examines 299 glass ornaments from four locations in Lviv, Ivano-Frankivsk, and Ternopil Regions, and provides descriptions and systematic analysis.

## 1.2 Historical Overviews Of The Excavating Places Of Glass Ornaments

A systematic approach plays an important role in the study of works of art, as it provides a structured framework for analysis. This analysis involves three main interdependent planes: subject-structural, functional, and historical. The subject-structural plane involves the study of the main forms of existence of art objects, including their origin, content, and external features. All the specimens included in this study were from the same time period, specifically the Middle Ages, and were sourced from four different locations: Zelenche, Belz, Pidhirtsi, and Krylos.

The city of Belz is located in the north of Lviv Region of Ukraine and boasts a rich cultural and historical heritage. Its first chronicle mention dates back to 1053 in “The Tale of Bygone Years”. Archaeological research suggests that a settlement existed on the territory of Belz as early as the 5th-4th millennium BC. During the Middle Ages, the city of Belz was the capital of the local principality of Belz, and was situated at the crossroads of trade routes leading to Kyiv, Warsaw, Krakow, and other cities.

During the 13th century, Belz was a fortified city that was frequented by kings and nobles and thrived as a center for crafts and trade. As a result, shops, fairs, and craft workshops appeared in Belz, and the city gained a reputation for its pottery. Following the excavations carried out by Yaroslav Pasternak, it was discovered that glassware was also present in the medieval layers of the city.

Zelenche is a historic village situated in the south-west of Ternopil Region, located on the banks of the Hnizna River. It is well-known for its archaeological sites, with one of the most significant being the Trypillian settlement. This settlement dates back to the 3rd-2nd millennium BC and was comprised of several farms that were enclosed by a fortress with walls and towers. Apart from the Trypillian settlement, other archaeological sites have been preserved on the territory of Zelenche, including the Pshevorsk and Cherniakhiv settlements, as well as burial grounds from the Old Rus period.

The first recorded mention of Zelenche dates back to 1556, where it is described as a village in the Podilsk Voivodeship. It is an area of great historical importance, containing a significant number of archaeological sites from various eras. The region includes burial grounds that are considered to be archaeological treasures of ancient principalities. Furthermore, evidence has been found of a treasure containing 500 glass bracelets discovered in 1894. However, this material is not considered in our study.

Pidhirtsi has a rich history that can be traced back to different stages of development of the territory. The Slavic settlement that originated in the 7th-8th centuries in this area indicates that this place was inhabited long before it was first mentioned in the chronicles. The town was also known by the name of Plisnesko during the period of the 11<sup>th</sup>–13<sup>th</sup> centuries and was associated with its accession to the Principality of Galicia-Volhynia. Archaeological findings show that blacksmiths, saddlemakers, tailors and other craftsmen worked here, which indicates that the town had a prospering craft industry.

Located on a hilly terrain, Pidhirtsi had a strategic position that provided strong defense against potential enemy attacks, which was crucial during those times. As a result of its favorable location and its thriving craft industry, the settlement grew into a significant cultural and economic center of the region. Historical records suggest that the settlement may have played a role as a major trading hub along the Viking route from Dnipro, Scandinavia to Great Moravia during the 10<sup>th</sup> century. On the territory of Plisnesko, there are three large cemeteries and numerous individual burials. A kurhan necropolis with hundreds of burial grounds can also be found to the north of the settlement, where Christian burial sites appeared from the 12<sup>th</sup> century. Although open sources mention the discovery of bronze ornaments, rings, and a glass bracelet on the site, there is no information available on Yaroslav Pasternak's findings.

Krylos is a village in Ivano-Frankivsk Region, where Halych, the capital of the Galicia-Volyn state, was situated during the Middle Ages. Through his excavations in Krylos,

Yaroslav Pasternak was able to demonstrate the combination of Byzantine and Romanesque styles in the architecture of princely Halych.

## 2 materials and methods

### 2.1 Statistical Research Method

This statistical study utilizes an array of data sources collected through conventional categories, with a focus on certain criteria that characterize the object. As a result, we constructed a Table 1<sup>1</sup>, where individual objects of the collection form the rows and the factors that characterize them are displayed as columns.

The table comprises the following columns:

- 1) Number – number in the museum catalogue;
- 2) Color – color;
- 3) Surface – polished or unpolished surface;
- 4) Shine – does the object shine, is it an imitation of a precious stone;
- 5) Decor – presence of some kind of decorative ornament;
- 6) Transparency – transparency/no transparency/low transparency;
- 7) Wave – is the surface smooth or wavy;
- 8) Technology – what is the manufacturing technology;
- 9) Place – the place where the object was discovered;
- 10) Size – size (in cm);
- 11) Type – what the object represents;
- 12) Feature – additional data about the object.

In all the columns, except for “Surface”, the missing values of the factor were ignored; for the “Surface” column, the absence of a value was interpreted as “unpolished surface”. Pie charts displaying the percentages for each factor value were created for “Color”, “Surface”, “Shine”, “Transparency”, and “Wave”. Subsequently, the same diagrams were constructed for the data obtained from each location.

The study results were presented using separate diagrams for each location, as well as a summary diagram that includes all 299 samples. The article includes graphical representations only for the general statistical analysis of the following features:

<sup>1</sup> The table is available on the author's Google Drive at the shortened link: – <https://shorturl.at/yHSVW>

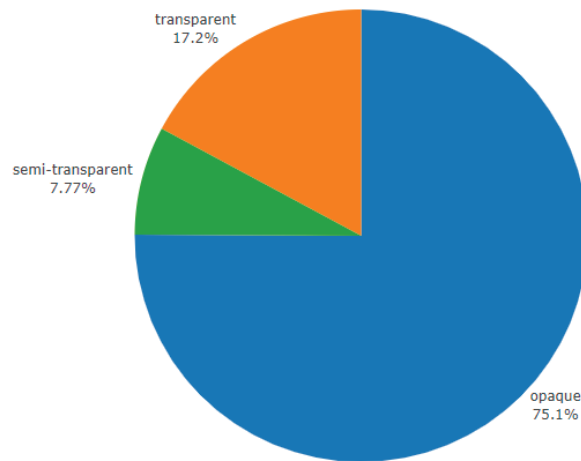


Fig.1 Transparency: **opaque**-75.1% **semi-transparent**-7.8% **transparent** -17.2%

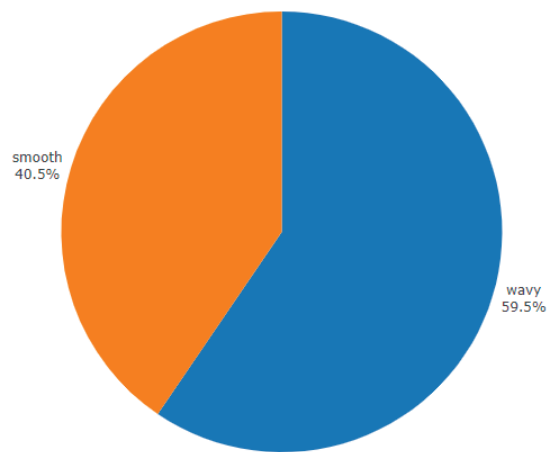


Fig.2 Surface: **wavy**-59.5% **smooth**-40.5%

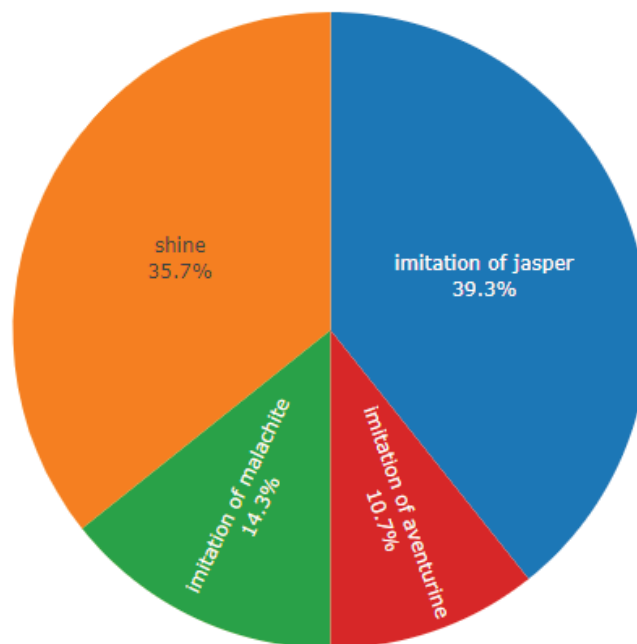


Fig.3 Shine: **imitation of aventurine**-10.7% **imitation of jasper**-39.3%  
**imitation of malachite**-14.3% **shine**-35.7%

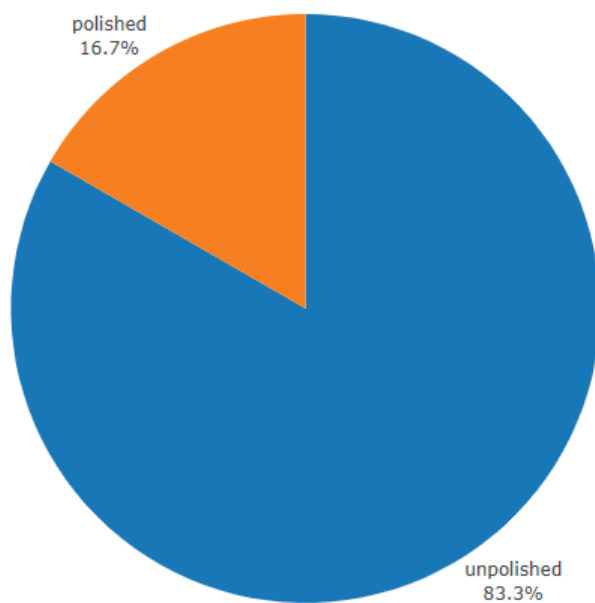


Fig.4 Surface in terms of polish: **polished**-16.7% **unpolished**-83.3%

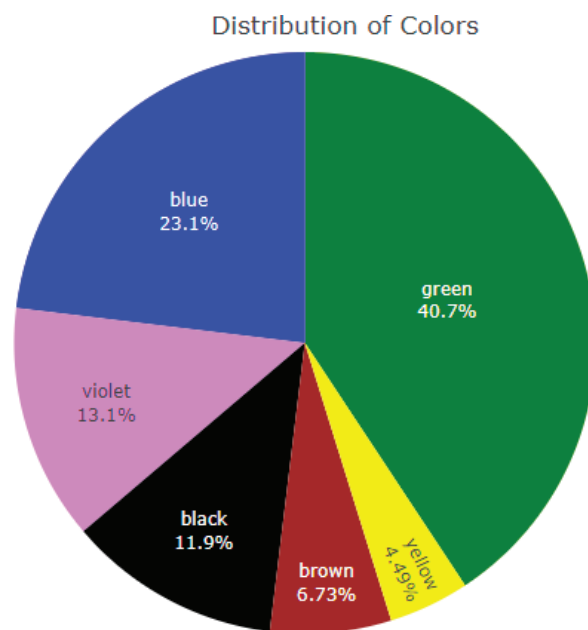


Fig.5 Color Summary

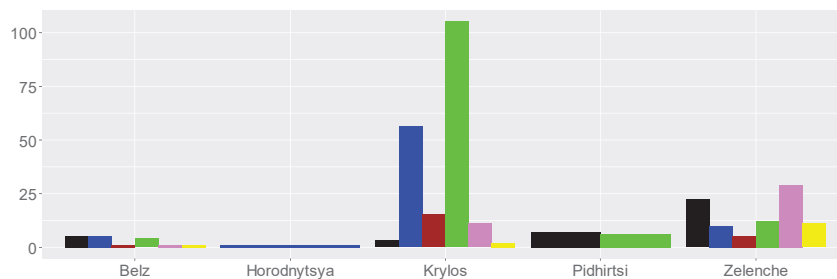


Fig.6: Color Distribution by Settlement



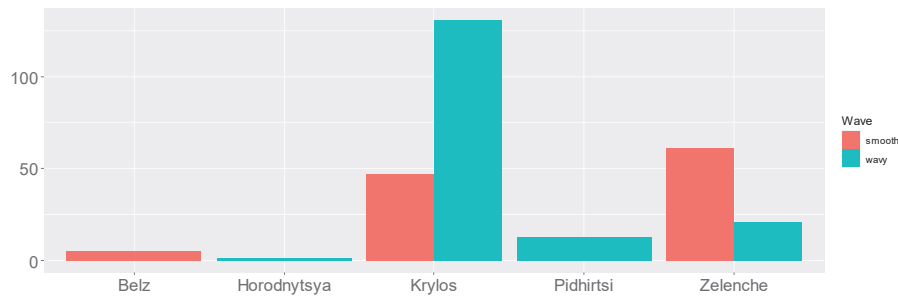


Fig.7: Wave Distribution by Settlement

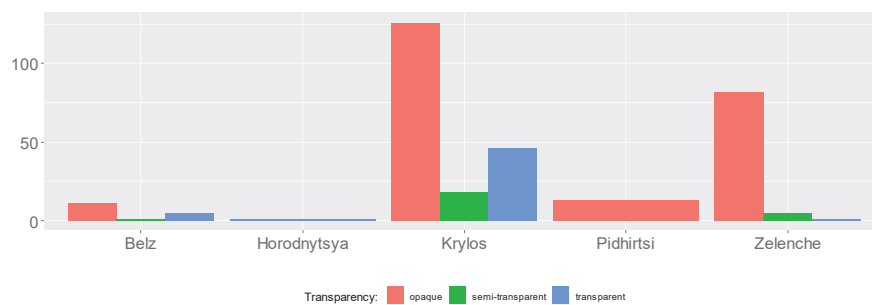


Fig.8: Transparency Distribution by Settlement

## 2.2 Color Investigation And Surface Type Investigation

For the purpose of statistical comparisons, the color palette was simplified to include basic, open colors. However, each sample was individually photographed and described, and the following shades of green were identified: marsh-green, emerald-green, dark emerald-green, light green, malachite-green, and yellow-green. The samples also exhibited variations in transparency, ranging from non-transparent to transparent.

The blue color palette includes the following shades: very light, dark, almost turquoise, bright turquoise, and blue with a violet shine. The black color palette includes not only open black, but also shades of black-green, black-violet and black-brown. The violet color palette comprises shades of lilac, bright violet, beetroot and true violet.

In the brown color palette, we can observe shades resembling either jasper or aventurine with a shiny finish. In the yellow color palette, we can find a non-transparent, dull yellow shade in the beads, while in the bracelets, they appear sunny and bright. Additionally, we can include an almost grey color in the yellow color palette. This color has a hint of yellow, but it is not clear

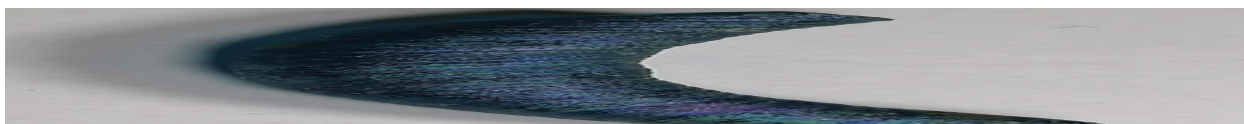
whether it is due to being in the soil or if the color was originally this way.

If we consider transparency as a feature, we can observe three distinct variants. The first variant is completely non-transparent. The second variant is slightly transparent, where we can see light through the lumen. The third variant is transparent, where it is almost as transparent as modern glass, but the color still prevails over the transmission property of light.

When it comes to polishing, we only consider the bracelets, because this characteristic is not observed in beads. In the bracelet samples, it can be noted that the polishing technology is present in 83% and absent in 17% of the samples, as shown in Figure 4.

From an artistic perspective, the most interesting quality is the one presented in the diagram shown in Figure 3. It presents imitations of precious stones, particularly malachite, jasper, and aventurine. This feature was also analyzed statistically.

In the same diagram in Figure 3, a separate examination was conducted on a property known as the brightly colored shine, which is present only in the blue samples. This shine is illustrated in Figure 9 and requires a separate investigation.



**Fig. 9 Sample of an unusual shine**

### 2.3 Transparency And Technology Investigation

The surface of the bracelet samples appears either wavy or smooth, depending on the manufacturing technology. In some cases, the master craftsman twisted the bracelet from glass wire, as shown in Figure 9, or simply bent and connected it.

On some samples of smooth bracelets, we found facets or applied decorative elements. This type of decoration was not created using lampwork technology, as this is done on a hot product with a hot glass thread. Instead it was applied in a cold state using paint. This can be further investigated by carefully analyzing the remains of the painting on the fragments (Fig. 11).

At the Belz site, 17 samples were found, which were fragments of bracelets. The color distribution of these samples is as follows: green – 24%, blue – 29%, black – 29%, brown – 6%, yellow – 6%, and violet – 6%. Out of the 17 samples, only four (23.5%) have two stones, while ten (59%) have facets covering the entire bracelet, and five (29%) have a smooth surface without waves. One sample, which is a smooth fragment of a yellow bracelet, has a painting of a ribbon-like pattern and accounts for 6% of the total samples. As for transparency, only one sample has low light transmission and is therefore slightly transparent, which also accounts for 6% of the total samples. There are 11 samples (65%) that are not completely transparent, while five samples (29%) are almost transparent by modern standards, three of which are blue. Furthermore, a sample of a bracelet fragment made of blue non-transparent glass was found, which has a bright shine.

Out of the 17 samples found, the most interesting one is a bright yellow-colored bracelet fragment that is almost transparent and has a decorative element. On this fragment, there is a non-transparent yellow ribbon painted on top. Furthermore, there are four samples of bracelets

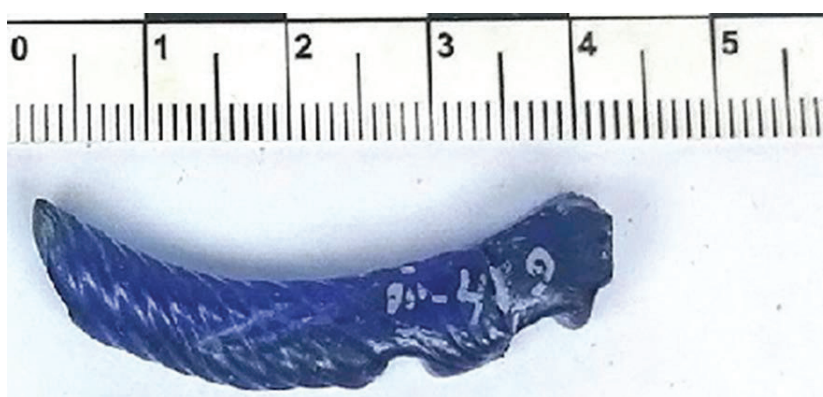
that have two stones, accounting for 23.5% of the total samples. Technologically, this is a more complicated product, as it involves taking one type of glass and covering it evenly with another type while it is in a hot state. After that, the decoration is applied, and rhythmic movements are visible, making the finished product more attractive.

In terms of other indicators, it is noteworthy that none of the glass samples were unpolished or had waves. Only one example of transparent glass was found. It is also interesting that 12 examples, accounting for 70.5% of the total samples, had facets, which is a characteristic that was not observed in other locations.

Krylos is the largest site in terms of the number of artifacts discovered, consisting of 193 samples, all of which are 100% bracelet fragments. The color ratio of these fragments is as follows: green – 55%, blue – 29%, brown – 8%, violet – 6%, black – 2%, and yellow – 1%. Among them, 78 have an unpolished surface, while 22% show obvious signs of polishing. Various features are observed among the fragments, including samples with a bright iridescent shine (as shown in Figure 9, which account for 26% of the total findings), samples with imitation jasper, which make up 48% of the fragments, samples with imitation aventurine (13%), and samples with imitation malachite (13%). The transparency of the fragments varies as well, with 66% of the fragments being non-transparent, 9.5% slightly transparent and 24% transparent, almost like modern objects. Technologically, 74% of the wavy pieces were made by twisting glass wire. Of all these objects, 26% are smooth, and some of them have facets. Two samples have triangular-shaped cuts. Among all the examined fragments, there is one with traces of protrusions (as shown in Figure 10).

After conducting a thorough analysis, it is apparent that the object was crafted using a technique that is very similar to creating





**Fig. 10 Fragment with protrusions**

protrusions with tongs on hot glass. Additionally, near these protrusions, there are clear indications that the bracelet was fastened into a closed circle. This confirms that the object is indeed a bracelet, albeit one with protrusions. The twisting technique used to make the bracelet suggests that the master

craftsman intentionally created the protrusions and fashioned the object into a circular shape.

A distinct type of fragment is exemplified in the specimen depicted in Figure 11.

After careful analysis, it is evident that the piece is composed of two glass wires: a transparent



**Fig. 11. Menthol-colored fragment with museum label 14274**

one in the middle and a menthol-colored non-transparent one on top, all arranged in waves. Additionally, on the preserved sections, there are remnants of polishing. The entire ensemble is further embellished with a yellow ribbon, which was applied separately using a brush in a rhythmic motion at the final stage.

#### PIDHIRTSI

Pidhirtsi is the location with the smallest number of findings, consisting of only 13 samples. All of these samples are fragments of bracelets, and all of them are non-transparent and have waves (100%). Five of the bracelets contain two stones, which accounts for 38% of the total findings. In terms of color, there are six green samples, making up 46% of the findings, and seven black samples, comprising

the remaining 54%, five of which have a greenish tint to the lumen. Five of the black samples are non-transparent and exhibit signs of polishing. In terms of surface polishing technology, 38% of the samples are unpolished, and six of them are black and non-transparent, representing 46% of the total number of findings at the Pidhirtsi site.

#### ZELENICHE

The 89 samples discovered at this location are in good condition. In contrast to other locations, where bracelet fragments were prevalent, most of the samples found here are beads. Bracelet fragments account for only 25-28% of the findings, while 64 of the 89 samples are beads, making up 72% of the total. Among these, 26 are an unusual shade of violet, very similar to the color of beets, which represents 40.5% of the

total number of samples at this location. All of the violet beads are smooth and non-transparent, and include grape- and barrel-shaped varieties. Additionally, 18 non-transparent smooth black beads make up 28% of the total samples discovered at this location.

The objects discovered can be categorized into three transparency types: 1% are transparent, 5.7% are slightly transparent, and 93% are non-transparent. Most of the samples are beads, and only a small percentage of them are polished, which accounts for 6% of the total findings. Regarding the surface, 74% are smooth, while 26% have waves, including all the bracelets and three additional beads. The statistical analysis of shine at the Zelenche site reveals that 94% of the samples have no shine. Among the 6% that have shine, 1% are imitation malachite found in the

bracelets with two stones and polished surfaces. The color palette at the Zelenche site is unique, with 33% violet, 25% black, 12% yellow, 14% green, 10% blue, and 6% brown. As a result, Zelenche stands out from other locations due to its distinctive color scheme, where blue and green colors are not prominent in the overall color palette.

The only type of decoration found on the beads is in the form of specks on the surface, as shown in Figure 12. Other variations are unique only in their shape, such as twisted variants or combinations of two to five beads or with facets. The beads also vary in size, ranging from 0.3 to 3 cm, and in color. In addition, there are some samples that take the form of plates with holes along the object, rather than in the usual central position for beads.



Fig. 12. Bead with decoration from Zelenche site

## Results

This study provides significant scientific value by analyzing and publishing, for the first time, the archaeological findings of glassware carried out by Yaroslav Pasternak, which were discovered eighty years ago and are currently preserved in the archives of the Lviv Historical Museum.

The artistic approach is founded on the functional basis, which consists of both artistic and scientific values of the product. This approach allows us to identify the patterns in the object's existence and explore its practicality, and artistic expression. Since we are focusing only on ornaments, the functional value of all products is already evident. All products clearly serve the function of decoration, regardless of their condition or shape. Artistry is a key aspect

of art that defines its content and meaning, but it is ethically neutral in itself, since it requires a balance of beauty and goodness, which is the essential dimension of art.

Statistical analysis of the 299 samples reveals that 64 of them are beads (21%) or bracelet fragments (79%). The most common color among the findings is green and frequent shades of marsh-green, representing 39% of the samples. The rarest color is yellow, representing only 5% of all findings. Non-transparent objects constitute 72.8% of the total, while decorated objects – 26 samples – account for 8.7% of all artifacts. Decorations in the form of paintings appear in beads in only four cases, representing 6% of all beads. As for bracelets, 22 samples feature decorative elements, which amounts to

9% of all fragments. Based on these findings, we can conclude that the production of decorated ornaments in the Galician principality during the Middle Ages was less than 10%.

There is a distinct type of bracelet made of two types of glass, which is more technologically challenging to produce. This is due to the process of applying one type of glass to another less valuable one, while both are in a hot state. This type of bracelet accounts for 25% of all bracelets. However, even more intriguing are the fragments that feature a composition of two types of glass, in addition to a polishing technique applied to the top. These fragments amount to 24 samples, representing 10% of all bracelets. Two different technological processes are involved. The first process involves shaping the product while in a hot state and utilizing different types of glass. In all samples, we can observe that the invisible inner layer is transparent, which suggests a certain thought and plan. The second process is manual polishing in a cold state, which suggests that the focus is on the product's artistic design.

The least common type of product is composed of two types of glass with a painted pattern. This particular type of product is the most complex, and it has only been found twice, at the Krylos location. From the artistic historical perspective, this variant is the most intriguing, because it involves three entirely different technological processes. In addition to the two processes mentioned earlier, there is also a painting, which was most likely created by a separate craftsman. The paintings can feature either one zigzag-like ribbon or two, and they may be the same color or different colors, varying in thickness. They reveal the rhythm and coloristic style of the Middle Ages.

When examining the beads, it is important to note that they are much simpler from an artistic point of view compared to the bracelet fragments. The characteristic of decoration is present in only one sample, in the form of specks on the surface. It is not the typical "eyelet" decor of the antique period, but rather droplets that may have been formed when glass fragments fell into the prepared bead mold. This particular sample was discovered at the Zelenche site. Thus, it suggests that the ornaments were not decorated.

Based on the analysis of the shape of the beads, it can be concluded that they were made using similar techniques to those used for making biser beadwork. Some samples have fragments on the edges of the samples, while others are composed of two, three, four, five beads fastened together. These beads account for 21% of all products, while bracelet fragments make up the remaining 79%. Green is the most common color, accounting for 39% of all findings, including shades of marsh-green, and yellow is the rarest color, found in only 5% of the samples. Non-transparent objects make up 72.8% of all samples, while decorated objects account for only 8.7%, or 26 samples. In the beads, decoration in the form of paintings is found in four cases, representing 6% of all beads, while in the bracelets, decoration is present in 22 samples, or 9% of all fragments. This suggests that the production of decorated ornaments accounted for less than 10% of all objects in the Galician principality during the Middle Ages.

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It can be concluded that the most popular glass ornaments on the territory of the Principality of Galicia-Volhynia during the Middle Ages were non-transparent green bracelets without decoration.

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