TEKA 2022, Nr 2
Komisji Architektury, Urbanistyki i Studiów Krajobrazowych
Oddział Polskiej Akademii Nauk w Lublinie

Building Materials and Architectural Details of Natural Stone used in the 13th Century Castle Buildings of King Daniel in the City of Chełm

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Abstract: The city of Chełm (Kholm in the past; today located on the territory of Poland) was founded by King of Rus` (Ruthenia) Danylo (Daniel) Romanovych in the middle of the 13th century. Initially, it was a small town with a small castle, but later Daniel rebuilt it and turned it into his capital. Unfortunately, buildings from the 13th century are preserved here only in the form of archaeological remains of the foundations and lower parts of the walls. The great historical significance of this city prompted us to study its building structure. It is important to know from which materials and in which technological solutions a large metropolitan city could have emerged in such a short time in the 13th century. The archaeological reports were the main source base for the study. Reports reflect all results of in-situ fixations of the walls and foundations remains of the castle. These fixations were carried out directly during archaeological research. The analysis shows that Chełm was built using materials from both local deposits and imported ones. Various stone raw materials and bricks were used for construction. It turned out that the main rock for the construction of walls and the manufacture of decorative architectural details was glauconite. The largest quantities of this raw material were used for the castle. Limestone, sandstone, opoka, and fossilized chalk were also used. The nature of the processing of stone materials shows that the builders of the castle had extensive technological knowledge and conducted numerous experiments with materials. The results of the study give an understanding of how castle buildings were erected in the 13th century both in technological and artistic aspects.

Keywords: City of Chełm (Kholm), stone materials, architectural details, construction, the technology of building, 13th century.

Introduction

In the "Galician-Volhynian Chronicle" [Litopys, 1989] there is an interesting mention of the main stone construction materials and architectural details of the buildings erected by King of Rus` [Ruthenia] Danylo Romanovych

[nown as Daniel of Galicia too] at the castle in his capital Kholm (Chełm). The castle is preserved today only in the form of an archaeological ruin on the so-called High Hill in the city center. These mentioned stone construction materials (white Galician and green Chełm stones) appear today during archeological excavations in the discovered ruined walls and fragmentarily preserved walls of the buildings.

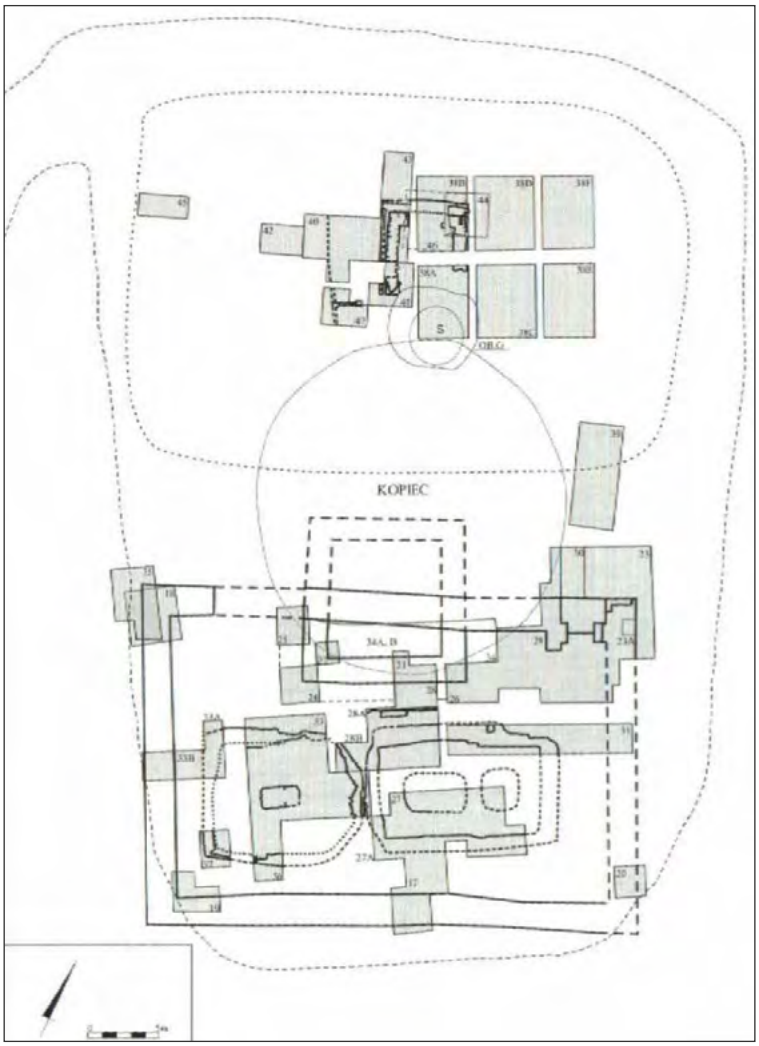

Fig. 1. Scheme of archeological excavations of King Daniel's Castle in Kholm (Chełm) during 2010–2018 years with marking of buildings [Buko, Dzieńkowski, Gołub, 2012].

The use of white and green stone in the architectural design of the church of St. John Chrysostom, described by a Ruthenian chronicler, was no accident. Sacred, royal and representative buildings of early Byzantine Christianity or the empire of Charlemagne were built in white and green, and, finally, also were the most architecturally perfect Romanesque cathedrals, created by the so-called builders of the School of Pisa and Tuscany, which appeared in the second half of the 12th and 13th centuries. The architectural decoration, which combined green Chełm glauconite and white Galician stone (it could be alabaster or white limestone) [Gazda, Bevz, 2019; Gazda, Bevz, 2020], brought Chełm closer to the fine examples of Byzantine and Romanesque Europe. These examples could have been known to King Daniel through direct and indirect contacts and connections with the Hungarian royal court, but also from his military expedition to the Czechia [Dąbrowski, Jusupović, 2017: 98, 110, 151, 153, 161–163, 179, 190–191, 210, 214]. The architectural decoration of the objects built by Danylo in Chełm is significantly different from the contemporary buildings in Kyiv or Chernihiv. This means that Danylo's close contacts with the royal courts in Poland and Hungary influenced his aesthetic tastes. His military campaign in 1253 in the Chekhia could end with the arrival of the local masters and craftsmen to Chełm. This

is what historians assume because the annals mention the constant arrival of craftsmen from the east and the west to the city [Litopys, 1989; Dąbrowski, Jusupović, 2017; Bevz, 2016]. The fact that Daniel`s mother was the daughter of the Byzantine emperor should not be ignored [Dąbrowski, Jusupović, 2017: 205]. A truly royal scale of construction of buildings and city is characteristic of Danylo. In addition to the castle, he builds four temples in Chełm too. It is also known about defensive towers and shrines built by him in the vicinity of the capital – in Stołpie, Bieławin, and Podgórze [Buko, 2016; Gazda and Bevz, 2020; Golub, 2015].

Such a wide build activity of Danylo in Chełm raises questions about – what materials were used in construction. The **purpose of the article** is to analyze the natural building stones that were used in King Daniel's Castle and have been found during the last 10 years of archeological research. Information about natural building materials from the castle is important, as it can be used for identification and verification analyses on other sites in the city, where the remains of ancient building substances can be found.

Materials and Methods

The specificity of our research lies in the fact that the object is the archaeological remains of a vanished castle of the 13th-16th centuries. Our research covered only those materials of archaeological research that relate to the first stage of the castle's existence in the 13th century. Archaeological research of the castle has been carried out in small batches during the summer seasons for the last 10 years. So, the results of these 10 years of research made it possible to summarize the results and draw the first conclusions. Identification of building materials was carried out both in the process of excavation and in chamber conditions. The dating of building materials was carried out based on the results of a complex stratigraphic analysis of archaeological excavations.

The main source base for this study was the archaeological reports, which reflect all the results of in-situ fixations of the remains of the walls and foundations of the castle. These fixations were carried out directly during archaeological research. In the process of archaeological research, surveys, measurements, photo-fixation of walls, building materials, and architectural details, and their description were carried out. Movable finds were fixed in place, and later again, after their cleaning and primary conservation. A sampling of materials for laboratory analysis was carried out in the process of archaeological excavations in designated places. All authors of the article are participants in the archaeological excavations. The archaeological expedition worked under the auspices of the Institute of Archeology and Ethnology of the Polish Academy of Sciences under the general leadership of Professor A. Buko.

A separate analysis of primary sources (chronicle records) and scientific literature on the topic was performed.

In this publication, the authors describe building materials made of natural stone only. The methodology of the study of stone materials in the preparation of the publication was divided into four main stages:

- In the first stage, written references to the castle buildings in the primary sources, in particular in the Galician-Volhynian chronicle, were analyzed;
- In the second stage, measurements, photo fixations, and descriptions were made and tables with the characteristics of construction and architectural elements were compiled (these data were partially disclosed by us in a special publication [Gazda, 2019]);
- In the third stage, a detailed petrographic study of stone materials was performed;
- In the fourth stage, laboratory studies were performed to identify the properties and technical characteristics of stone materials.

The generalization of the research results and their comparison with other construction schools of the time made it possible to formulate conclusions about the place and specificity of the use of stone materials in Chełm buildings.

The research was carried out as part of a long-term scientific archaeological expedition of the Institute of Archeology and Ethnology of the Polish Academy of Sciences under the general direction of Professor A. Buko. The expedition aims to study and interpret buildings on Cathedral Hill in Chełm [Buko, 2019]. The direct executor of the research was the company «Archaeological Services» from Chełm, and its director, Dr. Stanislav Golub, supervised the process of archaeological excavations at the site. All the authors of the article in one form or another are members of the archaeological research group.

Fig. 2. Preserved elements of buildings made of glauconite: a – the entrance gate to the palace part of the castle, b – a fragment of the wall around the perimeter of the southern part, built of glauconite (photo S. Gołub)

Presentation of research

The most characteristic building material in the architectural and residential buildings of the castle is glauconite, mentioned in the Galician-Volhynian Chronicle as a green Chełm stone [Dąbrowski, Jusupović 2017: 205]. It is most often found in the southern part of the residence, in particular in the wall with the gate (Fig. 1) and as reused raw materials for the foundations of buildings A and B (Fig. 2). The foundations of the buildings found in the northern part of the residence were also built of blocks of glauconite (buildings D, E, F – Fig. 3), and in the brick walls, the use of individual blocks and parts of this raw material was noticed.

The character of stone materials

Glauconite is a Paleogene sedimentary rock consisting of green glauconite and a carbonate-silica binder with accumulations of Cretaceous rocks, such as geizes, opokas, or chalk fossils [Gazda, Harasimiuk, Krzowski, 1992]. Compared to other types of stones with similar binder properties, glauconitis sandstone is characterized by relatively soft grains. In addition to soft accumulations and bioclasts of chalk rocks (opoka), it is 80% clay mineral – glauconite, built-in spherical shapes, with a characteristic aggregate internal structure. Due to this, when carving or cutting stone, the grains can be separated, and not as in the case of quartz sandstones when they are crushed in the plane of processing. As a result, this material behaves like a more plastic one but has strength parameters similar to those of most sandstones. However, its disadvantage may be low frost resistance, especially in humid conditions [Gazda, Gołub, Bevz, 2015]. It is a rock with interesting, unique aesthetic and technical characteristics, and can be handled relatively easily, which allowed for making profiled details and reliefs with quite complex compositions.

Glauconite owes its green color to the presence of iron in its crystal-chemical divalent structure. This color is unstable at high temperatures (above 300°C). This characteristic is confirmed by Dr. Lucjan Gazda's many years of experience working with glauconite [Gazda, Bevz, 2017]. Fragments of red blocks were found in the excavated destroyed parts of the walls (in many places in the southern part of the castle) as a result of high temperatures, and fire (or firing?). The question remains whether this was the result of a fire or a deliberate technological act of obtaining contrasting colored materials, which would not be surprising, given the presence of traces of other technological experiments found in archaeological materials. Research has also revealed the use of bricks and artificial stone blocks in castle buildings. These artificial materials had a wide range of colors [Golub, 2015]. A separate publication for presenting the analysis results of artificial building materials is planned. Part of this information has been written in some articles [Gazda and Bevz, 2019; Gazda, Bevz, 2019].

Fig. 3. A wall of glauconite blocks in the archeological excavation of building D in the northern part of the castle. Photo by S. Gołub

Uniform color throughout the volume of the block and the absence of defects due to thermal stresses may indicate a controlled firing process in an oxidizing atmosphere. Less likely would it be possible to be able to achieve this effect in conditions of a fire? Other fragments found among the destruction of thermo-altered glauconite as a result of strong fire have, as a rule, unilateral changes – they are strongly cracked, and their color is uneven and mostly ocher-brick-red.

Glauconitic masonry was documented in a preserved fragment of the entrance gate in the opus quadratum technique (see Fig. 2: a) and within the walls along the perimeter in the technique of opus emplectum (see Fig. 2: b). Architectural details made of the same raw materials were excavated in the early twentieth century by Petro Pokryshkin and today during archaeological research conducted in 2010–2018. All the finds come exclusively from the destruction of various buildings. It should be noted that a large number of them (several dozen) were also recorded during the study in the southern (Fig. 4 and 5) and the northern part of the castle hill. The details found so far (including fragments of the archivolt that probably decorated the northern portal of the southern part of the castle) are characterized by similar surface treatment and suggest the existence of one workshop or one stonemason and confirm the chronicle mentioning the master Avdiy [Dąbrowski, Jusupović, 2017: 205]. The person of the master stonemason Avdiy is mentioned only once in the Galician-Volhynian chronicle as the performer of the portals with relief images of saints – Christ the Savior and John the Chrysostom in the Church of St. John [Kotlyar, 2002: 122].

Fig. 4. Architectural details of glauconite from the southern part of the castle: a) from the ruin in the excavation 26; b) from excavation 27 (reused element in the foundation of the building). Photo by S. Gołub

Fig. 5. Architectural details of glauconite from the southern part of the castle after the cleaning: a) from the ruin in the excavation 26; b) from excavation 27. Photo by M. Bevz

Glauconite blocks and parts were subjected to microscopic examination. Small samples, which were used for petrographic and mineralogical studies with an electron microscope were taken from them. This study was conducted by Lucjan Gazda in the laboratory of the Faculty of Civil Engineering and Architecture of the Lublin University of Technology. Due to the absence of an in situ deposit of glauconites in Chełm, in the area of the castle complex on High Hill [Buko et al. 2014: 138–140] rock samples were taken from Stawska Gura and Podgorze, 10 and 4 km away from Chełm, respectively, in a straight line to the west. These deposits have legible traces of historical mining activities [Gazda, 2017]. Macroscopic analysis of glauconite samples revealed the presence of two species of this stone. The first type is dark green with a small number of white spots from the presence of clusters of chalk rocks. Their binder, of course, is silica, which gives the stone high hardness. The second type has a light yellow-green color, with a high proportion of granules and bioclasts of white or slightly rusty color. This type is soft and a little crumbly. The analysis was conducted by L. Gazda and reflected in the publication in the scientific journal «Budownictwo i Architektura» [Gazda, 2017].

Archaeological excavations have revealed some traces of glauconite mining on the High Hill and its slopes. Subsequently, a special study was performed by drilling, which aimed to confirm the initial occurrence of glauconite and its use on the High Hill. But the results of these studies were ambiguous [Buko et al, 2014: 138–140]. These may have been remnants of previous archaeological research and traces of past construction and excavation work. These remains could also be the result of the processing of raw blocks brought here in large quantities from other areas. The number of glauconite stones treated here can be evidenced by the several-centimeter level of sediments of fine glauconite powder found in the alluvium of the Uherka River. It could be formed by surface runoff from High Hill. These data were obtained by field studies of L. Gazda in 2016 [Gazda, 2019].

An interesting and important step to clarify the sources and logistics of the supply of building materials for the construction of the castle on the High Hill would be an accurate explanation of the origin of this stone. The presence of geizes and opokas in the structure of glauconite, as well as the absence of chalk grains, may indicate its origin from other parts of the Chełm hills (for example, Stawska Góra), at the foot of which there are geizes and opokas.

The source of glauconite could be Janów-Podgórze, where mining activity is confirmed by excavations and there are clear traces of remnants of this rock. Field research here was conducted by L. Gazda and S. Gołub in 2017. Glauconite from this place is greener, compact in texture, hard, and of better quality than Glauconite from Stawska Góra, which has an olive hue, lumpy texture, and crumbles easily. Therefore, it should be assumed that most of the preserved blocks of glauconite and carved architectural details came from the stone mine in Janów-Podgórze [Gazda, 2017].

Many years of archeological research on the castle hill in Chełm, which is an artificial hill, have revealed a rectangular complex measuring 22.5×33 m, with a perimeter defensive wall with a gate in the north-eastern part (phase I) and stone foundations for three buildings (phases II and III) inside, conventionally referred to as A, B, and C [Buko et al, 2014]. In the 1st phase selected by the researchers, a wall about 2 m thick was built in the

"opus emplectum" technique, built of cubic blocks of carefully treated glauconite with lime mortar. Inside the complex, a uniform level of utilization in the form of green glauconite sand was registered, which was residue from the processed blocks and parts. In the front parts of the inner and outer walls, well-chosen glauconite blocks in the horizontal thread were used (Fig. 2 and 3). They had different sizes: 40×25×20 cm, 33×34×23 cm, or 37×23×22 cm; their average height was similar and ranged from 20 to 23 cm, which may correspond to the maximum thickness of the horizontal layer of the rock. Blocks used to build the corners of the walls: the northern perimeter of the wall (Fig. 2:b; 6) and the entrance gate (Fig. 2: a) were very carefully prepared, had carefully treated surfaces, and were perfectly fitted, which allowed performing these objects in the Roman technique called "opus quadratum".

Outside the southern complex, the foundation walls of the buildings are located: A – two-part, which was previously identified as a sacred object; B – towers with a square plan; C – towers with housing and defense function but which were built using other construction technologies and other raw materials. They belong to the later phases of construction, although it cannot be ruled out that the relics destroyed in the lower parts, especially of building A, may also have originated from phase I. In the foundations of these objects, the reuse of two architectural details (very high-quality workmanship) of glauconite and several cubic blocks has been registered. Refusal to use glauconite in the second phase of construction (reconstruction?) may be the result of complete depletion of these raw materials, as evidenced by the inventory of this rock near the Hill, or a negative experience of using this stone in buildings (it turned out to be unstable to atmospheric influences and a short-lived material).

The properties of glauconite as a material acceptable for refined, complex processing are best seen in the refined architectural details (Fig. 4, 5, 7, 8, 9, 11, 18). During archeological excavations in 2011, two iron tools for stone processing were found in the southern part. The next two were found in 2015 in the northern part of the mountain (Fig. 9). They probably served to treat blocks of glauconite as evidenced by perfectly legible traces of mechanical treatment on the surfaces of parts, which traceably correspond to the found masonry tools (fig. 10, 11).

Fig. 6. The outer face of the western wall of the palatium – demonstrates the method of laying hewn blocks in the wall; excavation 35 (photo by S. Gołub)

Surfaces and corner edges of blocks and reliefs have no traces of use. Therefore, at the current stage of the research, there is a conclusion that the first phase of the development of buildings on the High Hill can be characterized as glauconitic. However, the buildings from this first phase were destroyed very quickly. This may have been due to a construction disaster or some other reason.

During the archaeological research of the remains of the castle, we attempted a hypothetical reconstruction of building elements (windows, doors, columns, cornices, etc.) based on the found stone blocks (fig. 12). In Figure 12, we present a hypothetical reconstruction of a doorway constructed using the details presented in Figures 5b and 9.

Fig. 7. Details of glauconite from the ruins of buildings in the southern part of the mountain (from the excavations of P. Pokryshkin, 1910–1911). Left: the model of a fragment of the block made according to the photo of P. Pokryshkin on a scale of 1: 1. Right: a hypothetical reconstruction of a lost part of the block with a reproduction of the full inscription on the stone. Work by Yaryna Tsapiak under the promotion of O.Rybchynsyi, V.Melnyk, V.Voloshynets, Y.Dyba, 2014, Architecture and Conservation Department, LPNU [Stasiuk, 2015]. Reconstruction is stored in the Ambrozevich Museum of Chełm land in the city of Chełm

The presence of other local rocks was found in the excavated destroyed and open fragments of buildings: geizes and opokas and Neogene quartz sandstones and silica shell deposits (remains of building D). Fragments of rocks that make the transition from opoka to glauconite have also been recorded. They represent the lithological boundary sphere of the Cretaceous and Paleogene. The slopes of Góra Czubatka have such a geological profile and are delicately preserved in Janów-Podgórze. Here, the morphology of geological forms after mining remains legible, despite the centuries-old agricultural use of this area. Geizes and opokas appear in the vicinity of Chełm in a thin layer, which did not allow to obtain larger building blocks.

Geizes, opokas, quartz sandstones, and shell deposits are found within the castle complex only in an untreated state, in the form of so-called wild or broken stone. They were used in less representative and less important parts of buildings. Larger stones of Sarmatian sandstone and shell conglomerate widespread in the Chełm Hills were used in the foundations and ground parts of Phase 1 buildings or as wall material in Phase 2 construction. An exception among the Sarmatian sandstones is fine-grained quartzite sandstones from the Virgin Mountain, which, like glauconites, were processed into a full-fledged format stone [Gazda, 2019]. They are used in the lower parts of the walls. The found fragment of the column was also made of this material in our opinion (Fig. 17). Household stone items were also made of fine-grained sandstone. The excavations were dominated by finds of bars, 17 of which were found in the northern part of the mountain. Opoka and harder grades of chalk were used in local crafts, for example, for the manufacture of molds and some products (mostly semi-finished products with one or two polished surfaces). But they were used mainly as a building material inside the body of the walls and rampart, as well as in combination with wooden frame structures to strengthen the latter. They were also used to stabilize the columns or to form leveling and compensating layers in the walls. After partial treatment, they were also used to cover the floor surface, for example, inside the building "D".

Chalk and its weathered rocks, which were found in large quantities directly on-site, were used, as the opoka, to create horizontal platforms and to build shafts. Due to its color and ease of precision, it has also been used to make household items such as spools, spinnerets, weights, etc. We also have numerous finds of semi-finished products with treated walls. Chalk and opoka were also used to build a small dome furnace, opened and partially explored in 2016 in excavation 42 [Gołub 2017: 8, 10; Dzieńkowski, Gołub, 2018: 386, 393]. Preliminary laboratory studies of the contents of the furnace, however, did not answer the question of what was burned in it.

Fig. 8. Excavation 38C, detail from glauconite with dashed marking lines (photo S. Gołub)

Fig. 9. Excavation 38C, detail of glauconite with marked lines for the construction of a vertical roller (photo T. Sławiński)

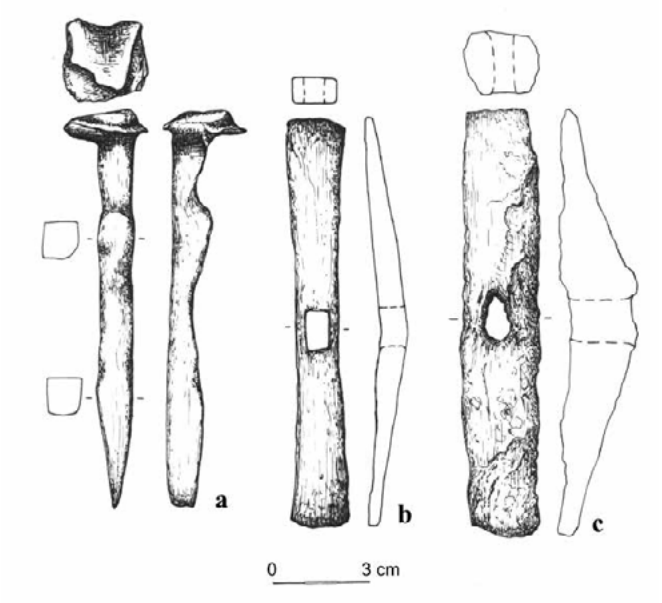

Fig. 10. Tools made of iron for processing and carving stone parts: a – inv. No. CH/G/w-72/2011; b – inv. No. CH/G/w-71/2011; c – inv. No. CH/G/w-27/2016, (drawing E. Hander).

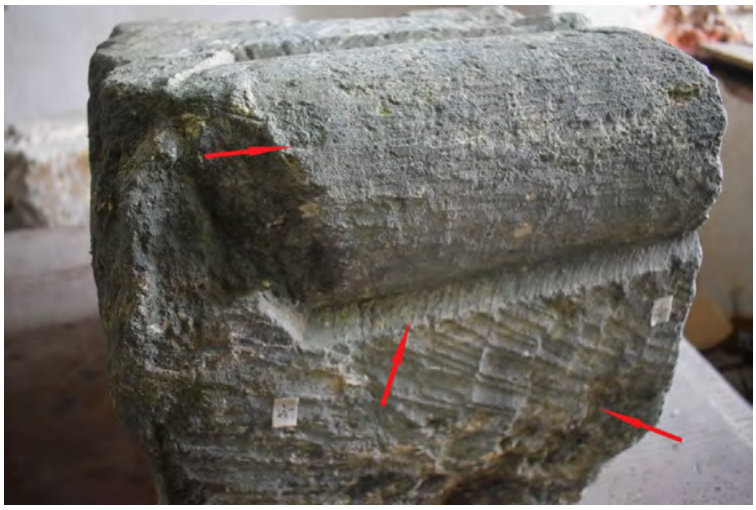

Fig. 11. Detail from glauconite (the corner stone block with a half column) with marked traces of handling (photo M. Bevz).

White stone from Halych, mentioned by the author of the chronicle [Dąbrowski, Jusupović, 2017: 205] is probably alabaster or organodetrite limestone. These stones were found in the form of fragments and the form of parts (fig. 13–14). Their use, along with chalk and opoka, allowed to create a color contrast on the facades of the architectural ensemble. Limestone was most likely used for external facades and portals, and it is mentioned in the chronicle as a white stone from Halych. The origin of these rocks cannot be determined based on petrographic analysis. Organodetrite and sandy limestones from Roztocze are very similar to Halych limestone.

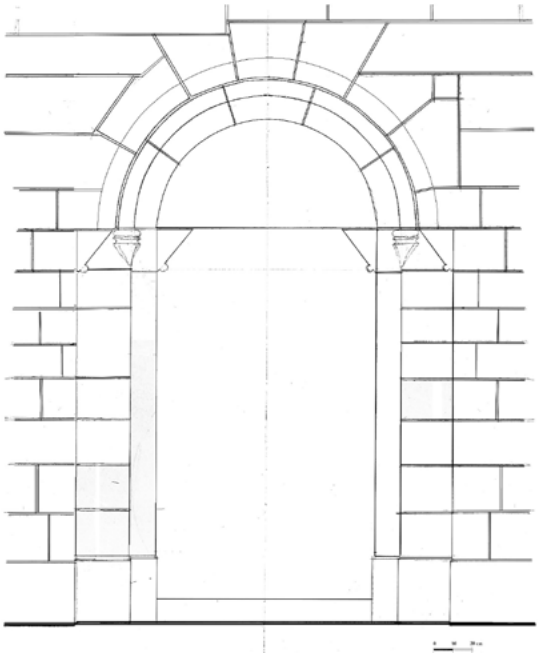

Fig. 12. The hypothetical graphic reconstruction of the doorway of a some building in the castle of King Daniel (see the details on fig. 5b and 9). The work of M. Bevz.

Alabaster was probably used in Chełm for details and interior design only, as evidenced by the fact that it was not found in the foundations of the building. This could be due to the low resistance of alabaster to atmospheric factors, as evidenced by the buildings of Halych-Krylos, which in the first stage were built of this material, but in the second stage, organodetrite limestone, i.e. harder stone was used [Bevz, Bewz, Lukomskyi, Petryk, 2017]. It occurs sporadically as a broken stone in the layers of destruction on the High Hill and shows (compared to the blocks and architectural details of the historic Halych-Krylos) very significant destruction of the surface and

mineral composition. Lucjan Gazda examined these samples from Chełm under an electron microscope in the laboratory of the Faculty of Civil Engineering and Architecture of the Lublin Polytechnic (fig. 15, 16). They revealed the changed mineral composition of the rock, which may be the effect of burning after fires. Probably most of these parts were then destroyed [Gazda, 2016].

Fig. 13–14. Fragments of the cap and architectural detail made from limestone. Photo by M.Bevz.

Among the materials discovered by research, we also find lazurite, which is also described in the chronicle. Among the fragments are documented fragments of carbonate-based lazurite (fragments of painting or polychromy in lime mortar?), as well as fragments of aluminosilicate rock with malachite-lazurite mineralization, which may indicate imports from present-day Slovakia, Romania, or Hungary. We have a hypothesis, however, only based on the macroscopic assessment of the surface of only one fragment of the stone shape, that the green color of the surface of glauconite could be enhanced by painting with malachite.

In the course of all previous archeological research during 2011–2021, the purple Hungarian marbles described in the chronicle were not found. Although a no less sensational, one-sidedly polished fragment of white marble has been documented, based on macroscopic features can be attributed to raw materials of Greek (Tasos, Pentelikon) or Italian (Carrara) origin. Due to its unusualness and size, this artifact can be interpreted (with great confidence) as an object of marketing (testing material), which came with one of the many artisans and merchants who were attracted to the Chełm by Danylo Romanovych.

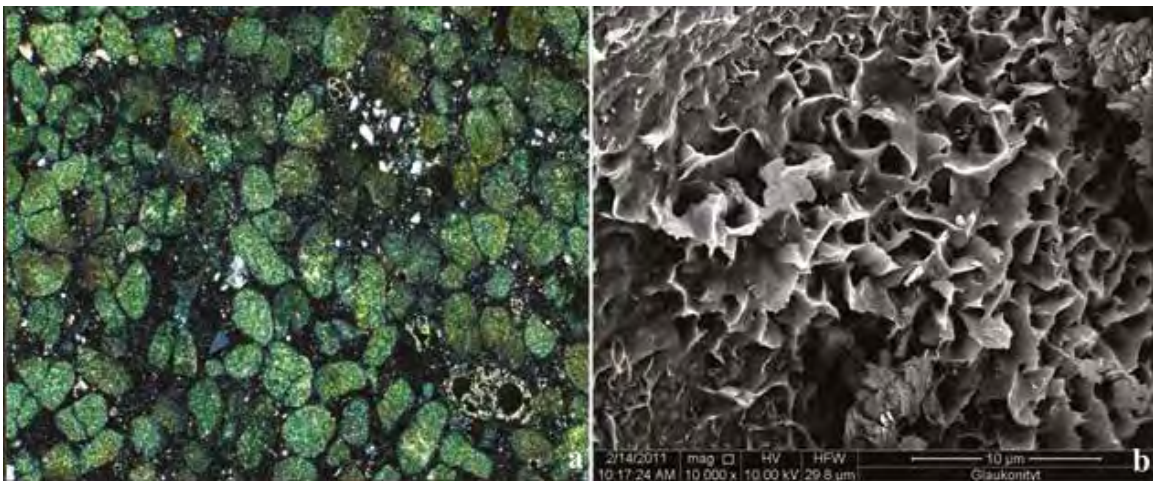

Fig. 15. Microscopic picture of glauconite: a – polarizing microscope, b – electron microscope (processing L. Gazda).

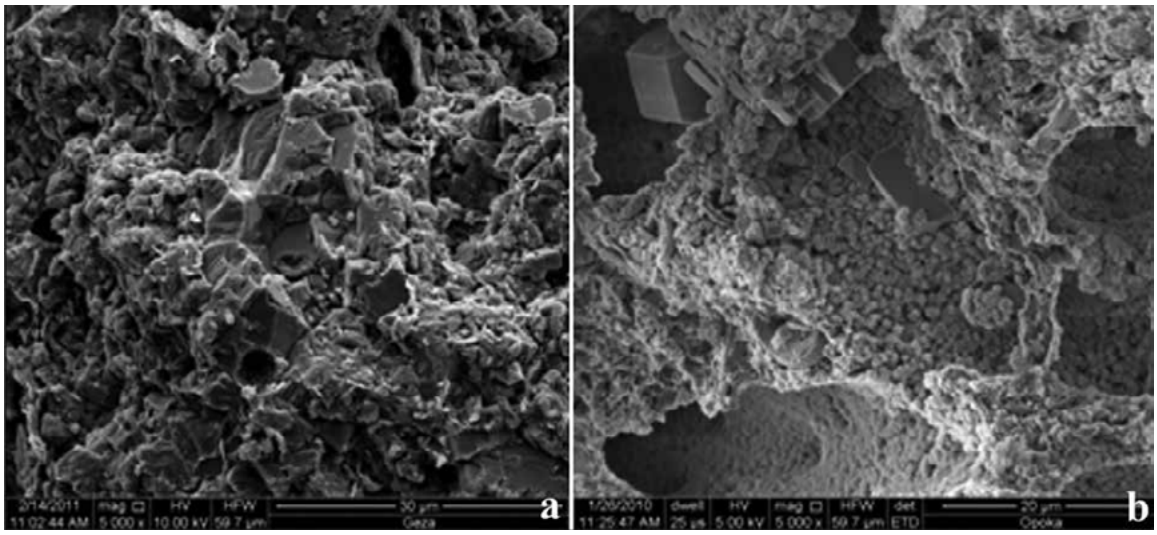

Fig. 16. Microphotographs of local Chełm rocks, which are found among the building materials of the residence-sacral complex: a – Geise, b – Opoka (elaboration of L. Gazda).

Summary

The analysis shows construction in Chełm (Chełm) of the XIII century with the help of local deposits, but also imported material, used various stone raw materials. The main type for the manufacture of decorative architectural details is glauconite. The largest quantities of this raw material were used as building and decorative material in the form of blocks for the construction of the perimeter wall with the entrance gate in the southern part and the foundation for buildings D, E, and F in the northern part. This led to almost complete depletion of the surrounding glauconite deposits (on Katedralna Góra in Chełm?, in Janów Podgóze, and Stawska Góra).

The nature of the processing of stone materials shows that the builders of the castle had extensive technological knowledge and conducted numerous experiments with materials.

It was found that white and green materials in Chełm buildings had significant shortcomings – they were not building materials of the highest quality. Alabaster was unstable to high temperatures during a fire that destroyed the castle buildings in 1256.

Glauconite also proved to be unstable to aggressive atmospheric factors, as well as to fire. These facts could be seen on the damaged walls of the so-called building D during excavations of the castle. The investors of that time had resources of green glauconite at the site, but there were much more problems with white stone. It was difficult to replicate the expensive transportation of organodetrite limestone and alabaster from the vicinity of Halych, as was done in the first construction phase. Perhaps this stone was no longer available for political reasons and frequent wars in Galicia. The Galician imported material needed to be replaced. This led to the need to experiment with chalk (soft rock, which is abundant in the Chełm), creating an artificial building material. But this should be the subject of another publication.

Although natural stones from the vicinity of the Chełm were not the best and most durable building material, they were easy to handle work and provided well for carving architectural details. It is this property that led to the appearance of the castle of King Daniel many decorated buildings in the Romanesque architectural style. Although the 13th-century architectural buildings in Chełm have survived only in the form of archeological relics, we can judge their unique shapes and sculptural elements even from an analysis of the preserved stone blocks and details.

Fig. 17. The fragment of the column from quartz sandstone in the excavation № 40. Photo by S. Golub

Fig. 18. Profiled block of glauconite. Probably an element of the portal arc. Photo by M. Bevz

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