GEOLOGIA W SZTUCE I ARCHITEKTURZE

Local and exotic building and decorative stones in historical castles of SW Poland: a reconnaissance study

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A b s t r a c t. South-west Poland (Silesia) is the region of dramatic history which has left significant heritage, comprising, e.g., numerous historical castles. In this paper, we describe selected castles in Lower Silesia, with special attention given to the usage of exotic (imported) decorative stone materials traded across Europe in various historical periods. Out of the total number of c. 100 historical castles and palaces in SW Poland, only three of them, i.e. Czocha, Książ and Moszna, have preserved significant amount of the original stone decoration. In Czocha Castel, apart from local stones, we have identified, e.g.: red and white, and grey limestones (from Belgium, Germany or Italy). In Książ Castle, the interiors have a great variety of exotic stone materials: travertine, marbles and limestones, e.g. Rosso di Francia, and many others, mostly from France and Italy. In Moszna Castle, representative rooms are adorned with "marbles": Rosso di Verona, Giallo di Verona, Giallo Siena, Rosso di Francia, and serpentinites and ophicalcites (from Austria and Italy). Most of the exotic stones in the three castles studied were imported at the turn of the 19th–20th centuries and in the early 20th century, when the castles were largely reconstructed and redecorated.

Keywords: *castles, Lower Silesia, SW Poland, building stone, decorative stone, architectural heritage, cultural heritage*

Our study has been performed under a joint Austrian-Polish research project that aimed at investigation on material-cultural heritage connected with exploitation and usage of natural building and decorative stones in Central Europe. The project was based on case studies from Western Austria and Northern Italy (N and S Tirol) and SW Poland. Special attention was given to the usage of local rocks, as well as exotic (foreign/imported) decorative stone materials traded across Europe in different historical periods. The results were expected to highlight historical and social issues of natural stone usage through centuries: stone-mining heritage, inter-regional trade links, as well as social customs, preferences and relationships. The recognized state of preservation of architectural stone elements in the castles should be useful in case of renovation. Educational and tourist potential of historical stony castles and palaces was also addressed in our project.

We started our joint research with the inventory of historical stony castles in SW Poland and with selecting unique objects for future, more detailed interdisciplinary studies (combining historical aspects, petrographic investigations and weathering/biodeterioration issues), aiming first at determination of the rock types and their provenance. It should be noted that this part of Poland is well known for its building stone deposits and that the most famous Silesian sandstones, granites, and marbles have been intensely used, both locally and also exported to neighbouring countries. Vice-versa, exotic (foreign) stone materials were imported to embellish the architectural decoration of palaces and castles in this area.

Out of the total number of c. 100 historical castles and palaces in SW Poland, many are in ruins or in very bad condition, mostly because of the damage and plundering during and after the World War II. Based on the available data, we have selected 30 of them for preliminary inspection and documentation. However, in most of them, the original architectural decoration and endowment has not been saved, due to damage, dismounting and theft, and/or major

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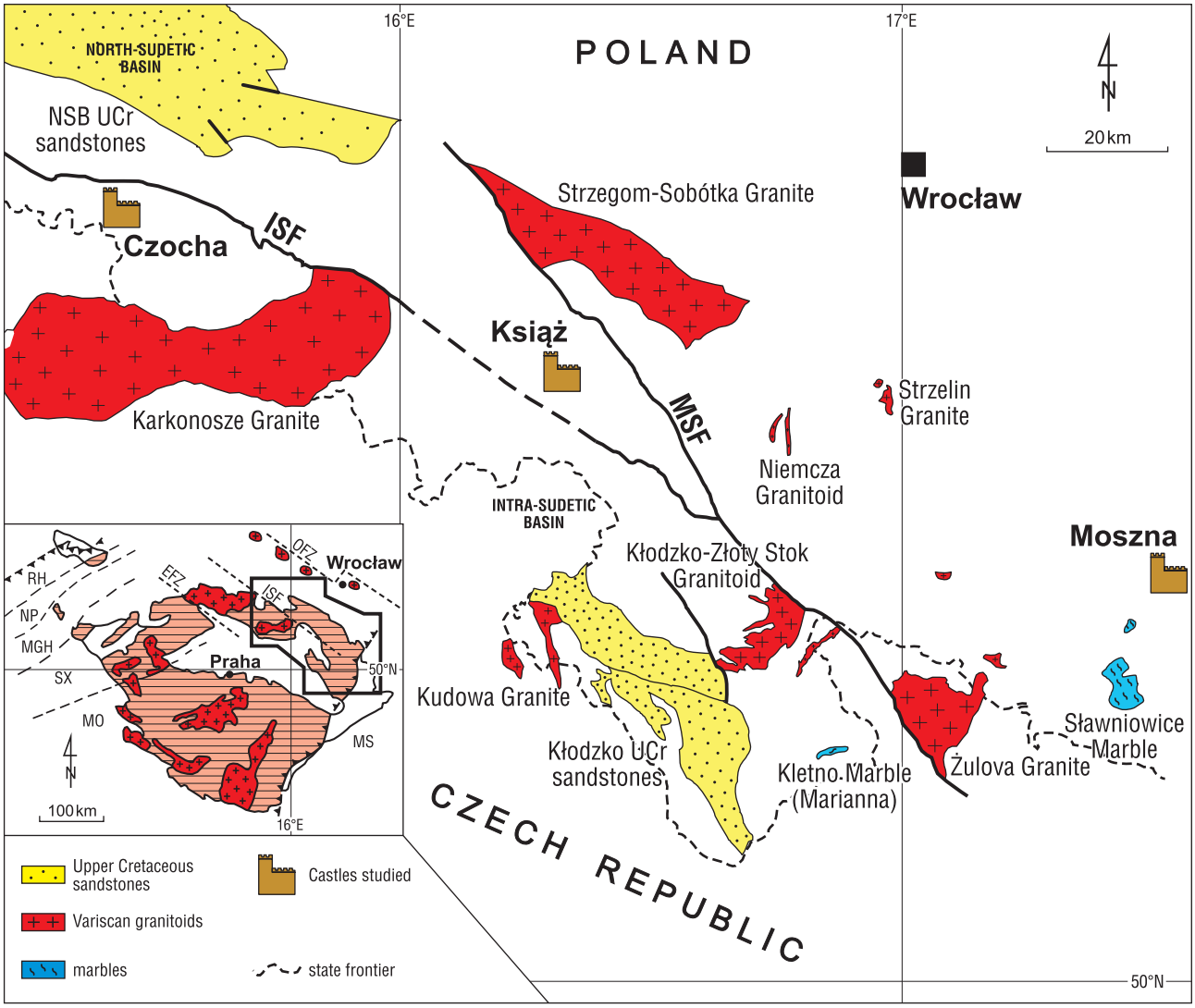

Fig. 1. Major local stone deposits and location of the castles studied. ISF – Intra-Sudetic Fault; MSF – Marginal Sudetic Fault. Inset map (from Mazur et al., 2006): Tectonostratigraphic units of the Variscan belt: MGH – Mid-German Rise, MO – Moldanubian Zone, MS – Moravo-Silesian Zone, NP – Northern Phyllite Zone, RH – Rhenoherzinian Zone, SX – Saxothuringian Zone; Fault zones: EFZ – Elbe Fault Zone, ISF – Intra-Sudetic Fault, OFZ – Odra Fault Zone; crosses – Neoproterozoic-Ordovician and Variscan (red background) granitoids, horizontal lines (pink background) – other basement rocks of the Bohemian Massif

re-building. Fortunately, still a few castles have preserved some of their original values of stone architecture.

Ten of the largest and best preserved castles are excellent examples of common usage of local stones as construction and decorative materials, e.g.: Czocha (early XIV c., rebuilt in 1909–1914); Grodziec (XIV c., rebuilt 1906–1908); Świny (XIII/XIV c.); Książ (late XIII c., renovated in late XX c.); Kamieniec Ząbkowicki (XIX c., under renovation; Otmuchów (early XIII c., rebuilt in 1820's and early 1930's); Moszna (XVIII c., renovated 1912–1914) (Guerquin, 1957; Eysymontt, 1993; Cichoń-Bitka, 1993, 2008; Łuczyński, 1997, 2008; Kozina, 2001; Kajzer et al., 2007). Only three of these castles, i.e. Czocha, Książ and Moszna (Fig. 1), have preserved significant amount of the original stone decoration, including a range of exotic materials, such as colourful limestones and marbles, serpentinites, imported sandstones etc.

The sources of the exotic decorative stones can be determined, in general, either from historical documents or detailed comparative petrographic studies, using detailed direct observations, sampling (where possible) and mineralogical and geochemical investigations, as well as referring to literature and extensive Internet data bases (e.g. http://chc.sbg.ac.at/sri/thesaurus; www.marmistone.com/category/slab). We should emphasise, however, that our project was a reconnaissance study only, not including detailed investigations, such as deep archive inquiry or detailed petrographic and geochemical works. Despite these limitations, we provide: (1) systematic information where exotic stones, apart from local materials, were used in historical castles in SW Poland, (2) short description and photographic documentation of the imported stones in three best preserved castles, and (3) identification of the foreign stone materials and interpretation of their derivation (unfortunately, in many cases, still only tentative or impossible at all, due to the lack of detailed investigations). The results are of potential use to art historians, conservators, as well as to all others interested in decorative stone usage in the past centuries. They also provide a background for possible further, more detailed research.

CZOCHA CASTLE

Historical remarks

The first report about Czocha (Fig. 2A) is from 1329 (Staffa et al., 2003; Kajzer et al., 2007). Presumably, it was a small rectangular object with a circular tower in its NE corner. The entrance was from the west. The object was made of stone and located on a river point of the Kwisa river. It was owned by duke Henryk of Jawor. After his decease in 1346, the castle was attached to Czechia and belonged to the families Dohna and Klük. In the period of 1451–1700, Czocha was owned by the Nostitz's. In the 16th century, the castle was reconstructed in the Renaissance style and external fortifications and bastions were added. Further building works were conducted in the 17th century. In 1700, Czocha was bought by the Uechritz's family. During the night of 17/18 June 1793, the castle was burnt. Till 1798, it was reconstructed and the roof of the main building was covered with mica schist.

In 1909, Ernst von Gütschkow, the owner of a tobacco factory, bought the castle for 1.5 million marks. Under his directory, an architect Bodo Ebhardt reconstructed the castle in 1909–1914, in the Gothic-Renaissance style. The interiors got a new Neo-Gothic–Neo-Renaissance decoration (Kajzer et al., 2007).

After the World War II, part of the endowment was dismounted and deported to the West; part of the library collection was deposited in the Library of the University of Wrocław. First, the castle was used as a "House of Creative Work" for scientists and, afterwards, it was administrated by the Lower-Silesia Agriculture Chamber, which made efforts to create there an "education centre" and a "model farm". In 1952, Czocha was taken over by the army and used for recreation purposes. The exceptional scenery of the castle was used by film-makers to produce a few feature films. Czocha is a well-known tourist attraction.

Stones in the castle

Czocha Castle is located at the Złotniki dam lake near Leśna, c. 20 km SW of Zgorzelec. Geologically, it is the NW part of the Izera-Karkonosze Block of the West Sudetes, composed of Cambrian/Ordovician orthogneisses and minor mica schists. The castle has been built of the local stones, almost exclusively of the Izera gneisses. They are light-grey medium to coarse-grained rocks composed of quartz, K-feldspar, plagioclase and subordinate biotite and muscovite. The structures vary from well foliated, nearly schistose, through banded, to more massive granite-gneiss and granite varieties (Izera and Rumburk granites). The age of their igneous protoliths is c. 490–500 Ma and their tectonic deformation is assigned to Variscan times (Oberc-Dziedzic et al., 2005, 2010).

The Izera gneisses are nearly exclusive construction materials used in all the walls of the castle, as well as in the external defence walls, and also in the castle bridge. They are certainly of very local derivation, and the small blocks were collected from small exposures and crags at the castle site. In fact, a rather large exposure is located just at the base of the castle and can be seen in the external yard, where the walls are nicely composed over the natural rock basement.

In the gneiss walls of Czocha, a few other types of stones can be found: dark-grey mica schist, milk-white vein quartz, and blackish Neogene basalt. The mica schists, often cut by quartz veins, form four narrow belts separating the Izera gneiss outcrops. The schists are recently exploited at Krobica, c. 15 km SE of Czocha. The Neogene basalts are also widespread in the region, and used to be excavated in many local quarries (recently still active at Lubań, c. 10 km north of Czocha) but available also as pebbles in local streams. The latter have been used to pave the external yard of the castle.

An important construction and decorative material at Czocha is sandstone, first of all the yellowish-grey sandstone from the Upper Cretaceous deposits of Lower Silesia (Fig. 2B), located, e.g. in the North-Sudetic Basin (Synclinorium) near Lwówek Śląski and Bolesławiec, c. 20–30 km NE of Czocha (Fig. 1). These are fine- to medium-grained quartz arenites that have been widely used as construction and decorative stone since the early middle ages across and far beyond Lower Silesia. In Czocha, these yellowish sandstones can be seen in nice composition with darker gneiss in portals, doorposts and window frames, supports of the roofs, as well as in nicely decorated columns of a summerhouse near the castle bridge. Apart from the popular Cretaceous sandstones, much rare at Czocha are light-purple medium-grained sandstones which can be seen in balcony support-stones along the walls surrounding the external yard. The most likely source of these purple sandstones are the Lower Triassic outcrops at the outskirts of the North-Sudetic Basin (near Lwówek Śląski, c. 20 km east of Czocha).

After the World War II, many parts of Czocha Castle have been renovated, including the internal yard, where various types of stones easily available then were applied. Most of them are local Lower Silesian building stones: grey medium-grained Strzegom granite, pinkish porphyritic Karkonosze granite, and grey banded Sławniowice marble (Fig. 1).

Apart from the described local stones, some exotic decorative stone elements have been preserved in Czocha. In the castle bridge yard, two sculptures of ladies are carved in "high-quality" very fine-grained whitish sandstone (Fig. 2G), different from typical Upper Cretaceous sandstones. Such sandstones are known, e.g. from the vicinity of Dresden in SE Germany. Another metal sculpture, a man with a sword, is supported by a base of two ladies (Fig. 2C) which is made of light-grey Muschelkalk, the source of which are the Triassic deposits in central Germany. Yet another type of whitish light limestone was used for "water architecture" at Czocha, including a fountain to the left of the castle bridge, as well as a large trough (bath) in the internal yard of the castle. The source of this limestone is uncertain.

In the interiors of Czocha Castle, exotic limestones and marbles are preserved in several objects. First of all, in the vestibule, there is an impressive stone fireplace made of red limestones. Its top is made of banded greyish-red limestone (Fig. 2D), whereas the columns on both sides – of deep-red limestone with abundant white streaks (Fig. 2H). The source of these reddish limestones is difficult to define; they may come from Italy, France or other west European countries. The limestone on the top is similar to Rouge-

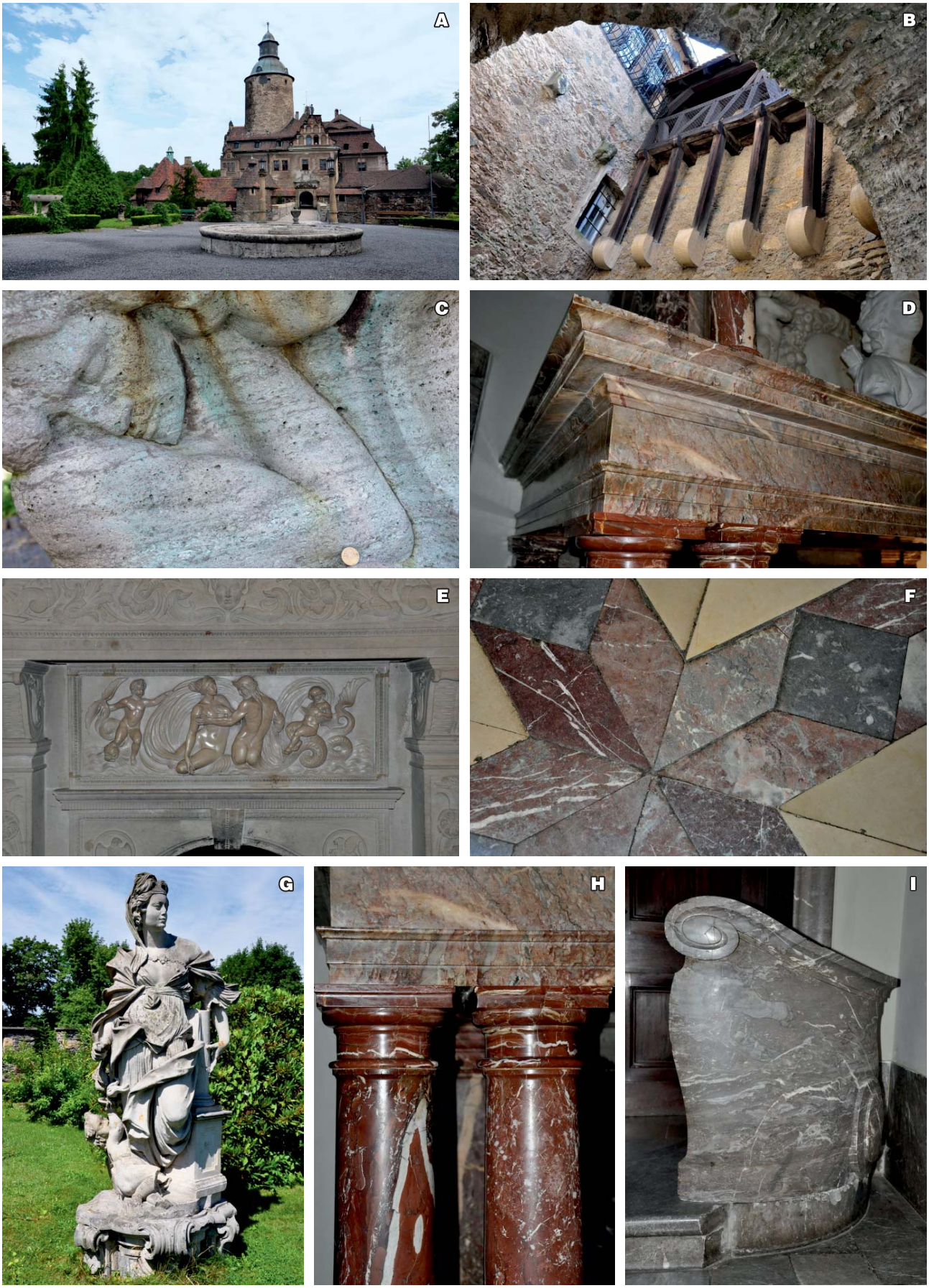

Fig. 2. Czocha Castle (**A**) and examples of usage of local and exotic stones (B–I); **B** – Izera gneisses in the walls and Upper Cretaceous sandstones in balcony supports; **C** – Muschelkalk sculptures; **D**, **H** – fireplace in the vestibule; **E** – top of the fireplace in the Dining Room; **F** – floor in the Dining Room; **G** – sculpture made of whitish, fine-grained sandstone; **I** – portal and step decoration in the vestibule (see text for details). All photographs in Figs. 2–7 by Ryszard Kryza

-Royal-Vif-Marble of Belgium. That one in the columns, is similar to, but no exactly the same as Austrian Vienerberg Neustadt, or Zafra Rojo of Spain, or Arabescato Orobico Rosso (Marmi di Carrara), or Belgium Rouge Royal. The top of the fireplace is decorated by bas-relief in creamy-grey well-polished limestone (Fig. 2E). To establish the possible sources of all these limestone would require more detailed petrographic investigations.

Another original and distinct stone in the vestibule is dark-grey, banded limestone (Fig. 2I). We find it mainly in doorposts and window frames. It resembles German Mecklinghausen Grau, to less extent Belgian Grand Antique de Meuse or Saint Anne marbles.

The Main Hall of Czocha Castle is dominated by impressive wooden wainscot and floor. The Dining Room (Marble Room) has its floor covered with a mosaic of multi-coloured limestones (Fig. 2F): banded-red and banded--grey, combined with light-creamy ceramic tiles. The red limestone is similar to that on top of the fireplace, i.e., Belgium Rouge-Royal-Vif-Marble or Belgium Byzantin, whereas the grey one resembles that in the vestibule doorposts and is similar to German Mecklinghausen Grau or Belgium Gris de Rochefontaine, Belgian Grand Antique de Meuse or Saint Anne marble.

KSIĄŻ CASTLE

Historical remarks

Książ Castle (Fig. 3A) was probably founded during the period of 1288–1292 by Bolko I, the duke of Świdnica (Eysymontt, 1993; Kajzer et al., 2007; Będkowska-Karmelita, 2012). After the decease of duchess Agnieszka (Agnes) in 1392, the widow after Bolko II, the last duke of Świdnica, Książ became the location of the Czech subprefects of the Świdnica Duchy. In the middle 15th century, the castle belonged to various "raubritters". In 1482, it was taken over by the troops of Maciej Korwin, the king of Hungary and Czechia. Their commander, Georg von Stein, became the owner of the castle and started its renovation and expansion. In 1490, Książ became a property of Władysław Jagiellończyk (Vladislaus II, Ladislaus Jagiellon), the king of Hungary and Czechia, who sold it, in 1497, to Hans von Schellenberg. The latter, in 1503, changed the castle for other land properties with Peter von Haugwitz. His son, in turn, sold the castle to Konrad von Hochberg in 1509, and since then it was owned by this family, till 1940.

Książ Castle was rebuilt several times in 1548–1555 and 1648–1655; during the latter period, the new NW wing was constructed. In 1718–1724, Książ was rebuilt under Felix Anton Hammerschmidt, in the Baroque style. During that time, among others, the representative Maximilian Hall was constructed. In 1908–1923, under Hans Heinrich XV Hochberg, the new Neo-Renaissance SW wing was built, with two corner towers. In the same style, the top part of the main tower was reconstructed. The chief architect in Książ at that time was probably a famous Vienna architect, Humbert Walcher von Molthein. In 1940, Książ became governed by the state. Since May 1943, there were works carried on to adapt the site for Hitler's headquarters. In that time, adits and halls were made under the castle (Kajzer et al., 2007).

In 1945–1947, Książ Castle was occupied by the Soviet Army. Up to 1971, part of the castle was used by the Polish Army. Since 1971, a horse breeding farm has been located in the castle grange. In the underground part of the castle, a seismic laboratory of the Polish Academy of Science was established in 1970. In 1971, the castle was taken over by the Wałbrzych District Centre of Sports and Tourism and started to be adapted for tourist purposes. Since 1989, Książ has been owned by the town of Walbrzych. A hotel and restaurant were located in the backhouse, and the castle has been opened for tourism. Also cultural events and conferences are being organized there.

Stones in the castle

Książ Castle is located on the steep slopes of the Pełcznica river, c. 8 km north of the centre of Wałbrzych, geologically within the Świebodzice Depression, filled with Upper Devonian and Lower Carboniferous conglomerates and greywackes. These sedimentary rocks, exposed around Książ, are the main construction material for the original construction and many subsequent reconstructions of the castle.

The easily accessible outer walls of the castle are those on its northern side, behind the so called "Donkey Gate", a side entrance decorated with a portal made of pinkish--grey sandstones (Lower Permian or Triassic). The defence walls, as well as most of the main walls of the castle itself, are built of blocks of the very local material – Lower Carboniferous greywackes and conglomerates, with very minor addition of other local building stones: medium-grained Strzegom granites, and Upper Cretaceous sandstones (the latter mainly in supporting elements of the walls).

The representative Main Gate of Książ Castle is decorated, on both sides, by impressive sandstone portals and blazons. The material used for columns and other decorative details is typical light yellowish Upper Cretaceous sandstone (Fig. 3B, D). A similar stone is also commonly used in many other places in the castle, as both construction and decoration material, e.g.: (1) numerous sculptures and balustrade around the internal yard; (2) the portal of the main entrance to the castle (yellowish sandstone columns have their heads of pinkish Triassic sandstones); (3) internal portals in the main lobby, as well as some portals and doorposts in other rooms of the castle.

The representative southern and western façades and walls of Książ, as well as decorated terraces and stairs, expose various local and exotic stone materials. In these walls, apart the local greywackes and conglomerates, red sandstone is rather common (Fig. 3C, G). It is a fine- to medium-grained rock, locally conglomeratic and cross-bedded. Its colour seems to be lighter than that in typical Rotliegendes building sandstones, e.g. from Nowa Ruda (c. 30 km SE of Książ) but darker than that in typical Silesian Triassic sandstones (e.g. from the vicinity of Lwówek Śl.), thus suggesting its exotic provenance (e.g. from Triassic deposits in central Germany). Similar red sandstones are used also in portals, doorposts and window frames. The large southern balcony and the external stair balustrades are built of Lower Silesian Cretaceous sandstones (Fig. 3D). Sculptures on the terraces are carved in fine white marble (Carrara, Greek or Croatian marbles?). The fountains are

Fig. 3. Książ Castle (**A**) and examples of usage of local and exotic stones (B–I); **B** – cartouche of the Hochbergs' family made of Upper Cretaceous sandstone; **C** – red sandstone decoration of the internal yard; **D** – sandstone balustrade of an eternal stairwell; **E** – stairs made of Rosso di Francia marble; **F** – Rosso di Francia marble; **G** – the SW façade decorated with red sandstone; **H** – corridor paved with Rosso di Verona and grey and light creamy limestones; **I** – travertine column in the "Travertine Corner" (see text for details)

Fig. 4. Książ Castle – stone decoration of the interiors: **A**–**C** – examples of "marble" floors; **D** – column base decoration in the "travertine corner"; **E**–**I** – marble fireplaces (see text for details)

made of light-creamy nodular limestone, sometimes with large (up to 15 cm) ammonites.

The interiors of Książ Castle have only partly preserved their original rich endowment, in which a great variety of exotic stone materials were used. The main stair, however, leading up from the main lobby, are made of the famous Silesian marble of Sławniowice, a whitish-grey, coarse-grained, banded crystalline limestone. Further up, we find particularly interesting stairs made in multicolour red and white marble, with intense red and white-greyish stripes and complex structural pattern (Fig. 3E, F). It is Rosso di Francia, a marble of global fame, which has been used in most prominent architectural objects in the world, e.g. in churches and palaces in Rome, Paris, Vienna etc.

Special attention is worth paying to the so called "Travertine Corner", where nicely carved portal, pilasters and stairs are made of rather dark honey-coloured travertine (Figs. 3I, 4D). The travertine is similar to those from Germany, e.g. Travertin Thuringia or Travertin Stuttgart, however, similar stones can be found in other locations (e.g. in Slovakia or Italy).

The floors in the castle corridors are paved with various stones, i.e.: (1) light-creamy limestone, with small nodules and fossils (source unknown); this kind of limestone is also found in some window stools; (2) grey limestone with bluish-purple tint, nodular in places, combined with reddish Rosso di Verona and the light-creamy limestone (Figs. 3H, 4A, C); (3) mèlange of various stones, after "chaotic" reconstruction, where different stones that were "at hand" were applied together, e.g. the Sławniowice marble, White and Green Marianna (from Stronie Śl., c. 70 km SE of Książ; Fig. 1), Carrara-type marble, and even the grey Strzegom granite.

The representative Main Room of Książ has preserved its original floor tiling and original fireplaces. The colourful floor is a mosaic of three different limestones ("marbles"; Fig. 4B, C): (1) white-creamy limestones, the same as in the window stools and corridors' flooring); (2) dark-grey with purple tint and indistinct augen (lenticular) structure; and (3) light-grey limestone with pinkish tint; the latter two may come from a similar source (e.g., French Verde Chassagne Marble or Campan Mèlange).

Fireplaces preserved in several rooms of the castle are built of several varieties of stones: (1) dark, nearly black banded marbles, in two fireplaces of the Maximilian Hall (Fig. 4G; source unknown); (2) multicolour purple-blackish marble (room next to S of the Maximilian Hall) (Fig. 4F, I) (possibly Alpine ophicalcite ?); (3) greyish banded marble (Fig. 4H); (4) light pinkish marble (Fig. 4E – similar to Rouge Royal-Vif); (4) Lower Silesian Upper Cretaceous sandstone, in a few other fireplaces in minor rooms of the castle.

MOSZNA CASTLE

Historical remarks

Moszna Castle (Fig. 5A) already existed in the 18th century, as a rather small building, without side-wings. The owners were changing at that time. In 1863, Moszna was purchased by Hubert von Thiele-Winkler and the village became owned by this family till 1945 (Cichoń-Bitka, 1993, 2008; Będkowska-Karmelita, 2012).

The original Baroque building was burnt at the night of 2/3 June 1896 (Cichoń-Bitka, 1993). The first period of next building works lasted until 1900 and during that period, a new F-shaped eastern wing was added to the old part of the palace. As an extension of the central projection, a new orangery was constructed. In 1913–1914, the western wing was constructed in a style related to German Renaissance (Kozina, 2001). In 1945, the castle became owned by the state treasury. In 1972–2013, it hosted the Prophylactic-Sanatorium Centre of the Opole Voivodship (Cichoń-Bitka, 1993). Presently, it is used as a hotel and a conference centre.

Stones in the castle

Moszna Castle (Palace) is located in the middle of Opole Silesia, c. 35 km SSW of Opole, in the region covered by Triassic and Upper Cretaceous sedimentary rocks, at the western outskirts of the Upper Silesian Coal Basin.

The palace, unusual in its architectural shape, is decorated by 99 spires. The walls of the palace are constructed and its façades decorated by local stones: the grey Strzelin granites predominating (Strzelin is located c. 60 km WNW of Moszna; Fig. 1) and grey Triassic Muschelkalk of the Opole region. Some other construction elements and architectural details are made of the Lower Silesian Upper Cretaceous yellowish sandstones (from the Kłodzko and/or Bolesławiec – North-Sudetic Basin areas; Fig. 5G). On the other hand, however, the interiors of the palace preserve very rich original stone decoration, one of the most impressive in such objects in SW Poland.

The representative eastern entrance to the palace faces a large pool and extensive gardens. The entrance yard is dominated by stony stairs leading to a large terrace. Here, we can see the basement of the palace walls that are constructed of fine- and medium-grained grey Strzelin granite, followed up by the walls built of grey Triassic Muschelkalk limestones. The stairs are made of the fine-grained granites, whereas the balusters – of Cretaceous sandstones. The group of sculptures (a "man and two ladies"; Fig. 5B) are carved in whitish very fine-grained sandstone (from S Germany?), located on granite bases, and screened by a sandstone wall. The main terrace is paved by greyish Sławniowice marble (Sławniowice is located only c. 40 km SW of Moszna; Fig. 1), and decorated by two lions carved in whitish banded marble (Carrara-type; Fig. 6B). To the left, on the 2nd floor, we can see a large arcade gallery extraordinarily decorated by sculptures and reliefs made in yellowish Cretaceous sandstones (Fig. 5C, D, H).

When entering the palace through the main lobby, worth noticing are door posts made of greenish serpentinites, the source of which is difficult to prove, possibly the Tirolean Alps or Italy. From the lobby, we may enter the spacy Dining Room, where we are impressed by an extraordinary decoration of various types of "marbles" (limestones). Pillars and lower parts of the walls ("wainscot") are covered with famous reddish Rosso di Verona "marble". Also the fireplaces in this room are covered with the same limestone (Fig. 6B, D). The internal planes on the walls are filled with yellowish nodular Giallo di Verona (Fig. 6C, I).

Fig. 5. Moszna Castle (**A**) and examples of usage of local stones (B–I): **B** – NE terrace decorated mainly with Lower Silesian Upper Cretaceous sandstones and granites; **C**, **D**, **H** – arcade balcony decorated with Cretaceous sandstone; **E**, **I** – Chapel with Cretaceous sandstone details; **F** – stairwell made of Strzelin granite; **G** – upper part of the western façade covered with Opole Triassic Muschelkalk and decorated with Lower Silesian Cretaceous sandstones (see text for details)

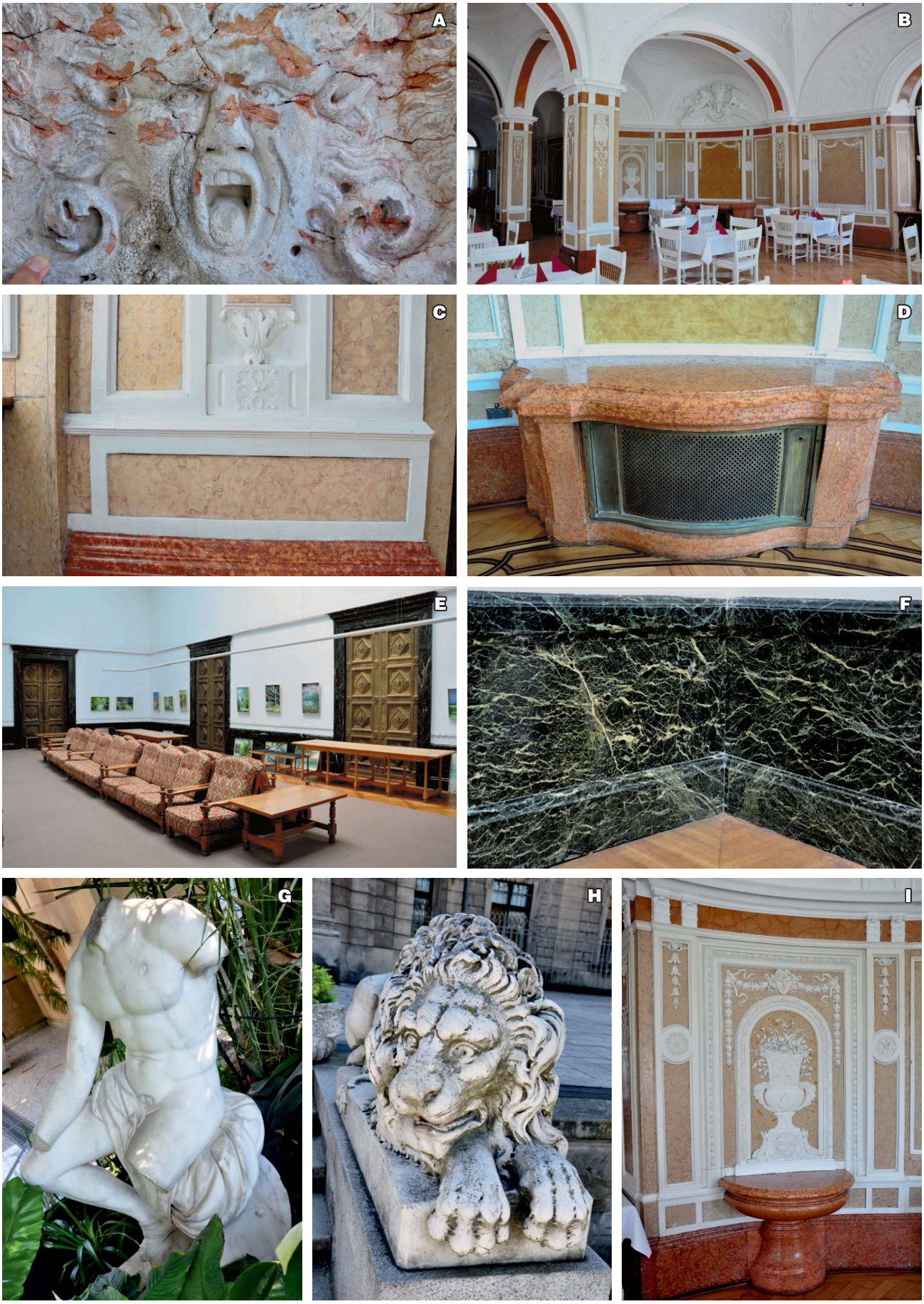

Fig. 6. Moszna Castle – stone decoration of the interiors: **A** – limestone flower trough in the orangery; **B**, **C**, **D**, **I** – Dining Room with decoration made in Verona limestones; **E**, **F** – castle gallery with serpentinite door frames and base wall; **G** – white marble sculpture in the orangery; **H** – white marble lion in the main eastern terrace (see text for details)

Fig. 7. Moszna Castle – stone decoration of the interiors: **A**, **F** – red and white marble columns in the Library; **B**–**G** – fire places in representative rooms made of several types of limestones and marbles; **H** – column of a portal in a representative room, made of purple ophicalcite with head in white marble (see text for details)

In the Orangery, we can see a variety of local and exotic stones. The stairs are made of fine-grained Strzelin granite. A decorative flower trough (bath) is made of an unusual creamy limestone, with reddish nodules (Fig. 6A), rather similar to Rosso di Francia (the weathering state of the stone makes its identification difficult). A similar trough can be seen in the main terrace of the palace. A classical sculpture (head- and hand-less man) is carved in snow-white fine-crystalline marble (Fig. 6G) from Carrara, Greece or Croatia (?). The floor and benches of the Orangery are made of recently imported exotic granites (from China and Scandinavia).

The palace Chapel is decorated using only the Silesian Upper Cretaceous sandstones (Fig. 5E, I). The stairs in the palace, where original, are made either of the Strzelin granites (Fig. 5F) or Cretaceous sandstones. The windows sills, locally on the 2nd floor, are made of multicolour marble of Rosso di Francia or similar type, e.g., Belgium Rouge Griotte Marble.

On the 2nd floor, there are three representative rooms. Room I (the Castle Gallery) has three doorposts smartly decorated with green serpentinite frames (Fig. 6E, F). Their combination with North Italian "marbles" strongly suggest a likely neighbouring region of provenance (e.g. Tirol) as the most likely source area for the serpentinites. Room II hosts two portals with impressive columns of dark reddish ophicalcite (carbonate-rich serpentinite; with their heads of white marble and bases of Sławniowice-type marble (Fig. 7H). In Room III, we find a fireplace made of extraordinary orange-coloured, banded marble (Fig. 7E, F). On the fresh surface, the marble is pinkish, thus the orange colour may be, partly?, a result of a special treatment, e.g. during polishing. This stone resembles Italian Giallo Siena marble. In another room, a fireplace is decorated with banded pinkish marble (Fig. 7D, G).

The Library, where we enter through a carved wooden Rococo door, is one of the most impressive rooms in Moszna Palace. Just behind the door, on the right-hand side, there is a large and fancy decorated fireplace made in pink-reddish nodular limestone (varieties of Rosso di Verona "marbles" Fig. 7B). In the middle of the Library, there are impressive four columns made of red and white marbles (Fig. 7A, I), (Rosso di Francia or similar type, e.g., Belgium Rouge Griotte).

SUMMARY AND CONCLUSION

The primary basic building stone materials used when the historical Silesian castles were constructed, were local stones: gneisses and mica schists in Czocha, greywackes in Książ, and Muschelkalk and granite in Moszna. These basic materials were combined, especially during later reconstructions, with other popular local construction/decorative materials, such as Silesian granites and yellowish Upper Cretaceous sandstones.

In more recent times, especially during major reconstruction and renovation of the castles in the late 19th and early 20th century, a lot of exotic (imported) decorative stone materials were applied in the Silesian castles and palaces.

In Czocha, major reconstruction works were carried in 1909–1914, when the interiors got a new Neo-Gothic–Neo-Renaissance decoration. The decorative red and grey limestones applied in the castle interiors came, apparently, mostly from Belgium, Austria, France or Spain – the precise sources remain, in many cases uncertain. The decorative materials used outdoors included fine-grained whitish sandstones, Muschelkalk and whitish light limestones, brought, most likely, from the interiors of Germany.

In Książ, the original outer walls and façades of the castle were built of local stones: Lower Carboniferous greywackes, with addition of local granites and sandstones. In 1908–1923, a major reconstruction was made and the new Neo-Renaissance SW wing was built, with two corner towers. The main building material for this reconstruction was red sandstone, possibly in part from Lower Silesian deposits but, apparently, mainly from central Germany. The originally rich internal stone decoration come from the same period of time. These include, e.g., famous and colourful marbles and ophicalcites, which could have been brought from the Alps, from Italy, France and other countries. These were added by more rare, at that time, stones such as travertine and various types of limestones.

The Moszna palace is an extraordinary example of the usage of local stones, mainly as construction building materials (Strzelin granites and Triassic limestones), but partly also for decoration (Silesian Upper Cretaceous sandstones and Sławniowice marbles). However, a lot of original decoration has been preserved, where exotic stone materials have been used. It is worth stressing that during our comparative studies in Tirol, we realized that much of the stone assemblage used in Moszna is very similar to the assemblages that were applied in famous architectural objects in the Alpine region in Austria and in northern Italy. The same combination of Rosso di Verona and Siena "marbles", with additions of Rosso di Francia, and significant amount of greenish serpentinites and dark-pinkish ophicalcites that we find at Moszna, were also used in the famous cathedrals of Innsbruck (N Tirol) and Brixen (S Tirol). This is a strong argument for designating the provenance of the stones which, otherwise, without detailed petrographic and geochemical investigations, would be difficult to assign to particular sources, e.g. as in case of the serpentinites. However, some of the exotics are still of enigmatic derivation as, e.g., the white marbles and whitish fine-grained sandstones used for sculptures in Moszna. The determination of their sources would require more detailed petroarchitectural studies.

It appears that during the Middle Ages and through a few centuries to follow, the exotic stone materials were transported over long distances in Europe in limited amounts and for special purposes only. A good example are the "kings' red marbles" used for gravestones for prominent people (e.g., kings, bishops) throughout Central Europe, and traded between, e.g., Austria (Salzburg), Hungary and many other neighbouring countries, in particular during the 15–17th centuries (e.g. Kryza et al., 2011).

A wide expansion of the stone trade took place only in the 2nd half of the 19th century, and was evidently stimulated by the development of new means of transportation, in particular the railroads. In particular, in the 2nd half of 19th and in the beginning of the 20th century, many old castles were reconstructed, renovated and re-decorated, and a few new ones constructed (Moszna, Kamieniec Ząbkowicki), and

during that period, a vast amount of stones were brought for decorative purposes from other countries, first of all from Austria, Italy, Belgium, France and Germany. This expansion has continued and developed until recent times.

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