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Style and stone – Stonemasonry in Switzerland between the Gothic and Renaissance

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ABSTRACT: In Switzerland, the Italian influence is evident since the 16th century, mostly through characteristic style features like rusticated facades and arcade courtyards, while churches kept a Late Gothic character. Are there stone working techniques and tools that are specifically related to an architectural style or is the processing dependent on the material? Building in a certain style or implementing stylistic elements is certainly decided by the architect or client. The material used for the buildings, on the other hand, is usually tied to the local stone deposits. It therefore seems plausible that stonemasons used techniques which depend on the type of stone rather than on the style of the building. This survey investigates this correlation between style and stone using specific examples of sandstone and limestone.

1 INTRODUCTION

The 16th and 17th centuries are of particular architectural interest in Switzerland, as buildings were still being built in Gothic style while new stylistic features from Italy were being incorporated in Swiss architecture. Stone working and the processing techniques have been discussed in detail by Karl Friedrich (1932), Bessac (1986), Doperé (2018) and Völkle (2016), among others, based mainly on the examples in Germany, France and Belgium. These provide fundamental knowledge, especially for the medieval period, on how the stone material was extracted from the quarries and transported to the construction sites, as well as which work steps were involved and what tools have been used by the stonemasons. Some of these studies also include investigations regarding the dependency of the material on tools and working techniques. They prove that for the regions mentioned above, the use of certain tools can, in fact, be related to the material properties of the stone type. Similar studies in Switzerland are insufficient.

To investigate the stone working traces visible on the stone surfaces and to evaluate if a dependency of material and used tools can be traced for Swiss buildings, examples from two cities, Lucerne and Solothurn, whose architecture is dominated by different types of stone, will be examined.

The buildings in Lucerne are mainly built of local gray sandstone, which is a fairly soft material that is rather easy to work with. Three buildings serve as examples. The Gothic Franciscan church, built in the 13th century, shows the restrained spatial program of mendicant churches. The arcade supports were renewed in the 16th century and testify to the

stonework of that period. The Ritter'sche Palast, which was built in the middle of the 16th century, was inspired by Italian Renaissance palaces and served partially as a model for the town hall which was rebuilt at the beginning of the 17th century. In contrast, the buildings in the city center of Solothurn are dominated by Jurassic limestone and Hauterive limestone, a rock with material properties different from those of sandstone, particularly in terms of its hardness and brittleness.

Due to modifications over time, no whole buildings of "pure" Gothic or Renaissance style can be found in Solothurn as such, but a fairly large number of window jambs and portals showing both stylistic features have been preserved. The fact that some of these are made of sandstone and some of limestone makes them suitable examples for a comparative study.

2 THE GOTHIC FRANCISCAN CHURCH IN LUCERNE

2.1 *Edification and modifications of the Franciscan church*

The former Franciscan basilica is one of the very few, preserved Gothic churches in Switzerland (Meyer 1998). The history of the building has been thoroughly presented by two authors (Meyer 1998; Reinle 1953): Built from 1269 onwards, the three-aisled nave is divided by arcades, which are supported by five pairs of pillars. The long choir, with a polygonal closure, is covered by a Late-Gothic ribbed vault. The building was probably completed towards the end of the 13th century. A choir screen, used to separate the choir from the nave, was demolished in 1733 during the baroque reconstruction of the church. In the

Figure 1. The Franciscan church in Lucerne. View on the northwestern arcades (author 2020).

period between the completion of the Gothic church and the Baroque period, several extensions and alterations were made. The most extensive interventions included the raising of the side aisles along with the enlargement of the window openings, as well as the replacement of the arcade pillars in the middle of the 16th century. The lack of symmetry between the bay openings and the windows led Reinle (1953), among others, to the assumption that the heights and spans of the arcades had been increased. Recent research, however, has shown that the arcades remained unchanged and that the bases and plinths of the supports from the construction period were used as foundations for the new pillars, which resulted in a 60 cm increase of the floor level (Hegglin & Glauser 1989) (Figure 1).

2.2 Traces of stone working from the 16th century

The round pillars, renewed in 1554, pass directly into the arcades without capitals. Pilaster strips are placed in front of them on all four sides. The uncovering of an original pedestal, during the renovation in 1988, showed that the columns of the construction period probably also had a similar shape (Hegglin & Glauser 1989). The pillars and pedestals are made of gray sandstone and show the traces of two different tools. The isolated, deeper punctiform holes are produced when the stonemason uses a pointed chisel (French: *broche*,

Figure 2. A selection of stone working tools. 1a and 1b: stone axe with two pointed edges. 2 and 3: stone axe with two straight edges. 4: combination tool with a straight and a serrated edge. 5: pointed chisel. 6: small chisel. 7: serrated chisel. 8 and 9: wide chisel. 10: serrated stone hammer. 11: bush-hammer (Krauth & Meyer 1896; changes by the author 2020).

German: *Spitzeisen*, Figure 2 No. 5) or a stone axe with two pointed edges (*pic de tailleur de pierre*, *Zweispitz*, Figure 2 No. 1a and b).

The pointed chisel is held and positioned by the stonemason with one hand and struck with a mallet. In contrast, the stone axe with two pointed edges is guided with both hands. Since both tools produce very similar traces on the surface, it is difficult to clearly identify them. Combination tools, with two different cutting edges (Figure 2 No. 4), enable more efficient work and were also used in the medieval period. Therefore, a tool of this kind, with at least one pointed edge, may have been used for the pedestals, as well. These tools are generally used for an initial working of the natural stone block to level its surface. The individual sections of the pillars are designed without a peripheral edge. As a next step, the roughly processed surface was smoothed with a different tool. The fine lines created by this tool run at different angles over the surfaces of the pillars and pedestals; but, within a cuboid, they are arranged regularly and mostly parallel to each other. The lines on the pillars are often very subtle so that the surface of some of the cuboids appears almost polished and the traces are only visible in lateral light. They are probably caused by a stone axe with straight edges (*marteau taillant*, *Glattfläche*, Figure 2 No. 2–4).

This tool has been used throughout the medieval periods for working on rather soft stones, and the stonemason wields it with both of his hands. As mentioned before, the use of a combination tool, in this case probably a stone axe with a pointed and a straight edge, would have been reasonable. This would have allowed the stonemasons to use the same tool for different work steps.

The pedestals have a square ground plan and consist of individual ashlars with narrow mortar joints. As decorative elements, they have small, triangular spurs on the four outer corners. The transitions to the pillars were carved out of the uppermost ashlars of the pedestals and show quatrefoils, pyramids and a base penetrated by a ring (Reinle 1953). All the pedestals of

Figure 3. a (top) and b (bottom). The Franciscan Church in Lucerne. The traces on a pedestal from 1554 show the use of a stone axe with straight edges without additional light (3a) and with lateral light (3b) (author 2020).

the pillars show repaired or replaced areas whose surface treatment was adapted exactly to the older stone working. They can be clearly identified by the differentiated coloration and the more strongly defined edges and decorative elements when compared to the original areas (Figure 3a). Although some of the areas from 1554 are heavily eroded, the fine lines of the tool's cutting edge can be seen. They are 4.5–6.5 cm long. They run in parallel position perpendicular or diagonally on the surface.

The lines on the roughly 2 cm wide peripheral edge are created with a small chisel (Figure 2 No. 6) and run horizontally or diagonally, but not on every ashlar – only on the outer edges of the pedestal.

This condition makes it possible to conclude that a final processing step after the alignment of the individual cuboids was planned from the beginning. That the lines in the inner surface cross the joints of the cuboids is another argument in favor of this conclusion. According to the findings, the cuttings on the edges must have been made at a relatively flat angle with the chisel. The inner surface is shaped by fine lines running parallel to each other. Examination of the traces suggests the use of a stone axe with straight edges. The individual lines show that the stonemason guided the tool quite steeply. The observation of the lines crossing the borders of the individual cuboids mentioned above also apply to the boundaries between the renewed areas and the original ones. With a lateral

light source, no major differences in processing can be detected (Figure 3b).

At virtually the same time as the late Gothic arcade pillars in the Franciscan church were built, a building with a very differentiated stylistic features was erected in the immediate vicinity, the stone working of which will be examined for comparison.

3 LUX RITTER'S PALACE IN LUCERNE

3.1 Construction history of the palace

Stylistically following the tradition of Italian Renaissance palaces, the Ritter'sche Palast is an important phenomenon north of the Alps. Lux Ritter received permission to build it in 1556, but he died three years later. His descendants did not want to complete the palace construction and the building was, therefore, handed over to the city of Lucerne (Reinle 1953). The building was to be completed according to the plans of master builder, Domenico Salbiolo de Ponte, and the architect, Johannes Petrus Grilietus (Giovanni Pietro del Grilio or Grieto), from Lugano, who had already been contracted by Ritter (Reinle 1953). After the city council donated the palace to the Jesuits in 1577, various building interventions followed, including the construction of a church and an extension of the building, along with the acquisition of the neighboring buildings; since 1804, the Ritter'sche Palast has been used as a government building (Reinle 1953).

3.2 Renaissance features

Externally, the rusticated façade on the street side is already reminiscent of the design of Italian *palazzi*. Inside, the three-story building wings with loggias open up around an originally uncovered courtyard with arcades (Reinle 1953, Figure 4).

Twelve Tuscan monolithic columns support the arcades on each floor; they are made of local, gray sandstone on the lower two floors and of wood on the top floor. Every base sits on a pedestal which, in the upper floors, functions as part of the balustrades.

3.3 Stone working traces of the arcade pillars from 1557–64

The columns on the ground floor clearly show the traces of the stonemason's work. Up to 10 cm-long horizontal lines run in paths around the columns (Figure 5, left side). The lengths of the lines vary because the following rows partially overlap the previous ones. Therefore, the actual blade of the tool could be slightly longer than the traces let assume. The lines are arranged in parallel, even and ordered layers, which suggest the use of a wide chisel (*charrue*, *Scharriereisen*, Figure 2 No. 8, 9). They run in circular paths around the entire column, and the overlapping lines indicate that the work was started at the top of the column, although it is safe to assume that the column was

Figure 4. The arcades from 1557–64 in the three-story inner yard of the palace of Lux Ritter in Lucerne (author 2020).

Figure 5. a (left) and b (right). The column in the ground floor (5a) of the palace of Lux Ritter in Lucerne show traces of a wide chisel. The one in the second floor (5b) show traces of a pointed chisel and a stone axe with straight edges (author 2020).

placed horizontally or at a slight angle during the work. The wide chisel, in contrast to the stone axe which is guided by both hands, is held by the stonemason with one hand and driven by a mallet with the second hand just like the narrow chisel that is used to create the peripheral edge. This provides more control over the tool and makes it possible to process the surface more evenly. As in the Franciscan Church, fine and deeper

punctiform holes of the previous work with a pointed chisel or stone axe with pointed edges are visible.

The columns on the second floor also show traces of a pointed chisel. However, it seems unlikely that a wide chisel was used for the subsequent smoothing of the surface. The fine lines run around the column in different lengths, slightly diagonally.

They are so fine that they are only visible with lateral light (Figure 5b). These traces were probably created by using a stone axe with straight edges, like in the Franciscan Church.

In comparison with the columns on the ground floor, whose strongly structured surface is also a deliberate means of design, those on the second level are designed to create a smooth and unstructured effect. With the wooden columns on the third floor, the traces of the stone working reflect a hierarchical order between the floors, with descending importance towards the top.

4 THE TOWN HALL OF LUCERNE

4.1 *The new building at the beginning of the 17th century*

During construction works in 1588 (Reinle 1954), the statics of the first town hall at the Kornmarkt were so severely compromised that a new building had to be constructed. The building documents mentioned by Reinle (1954) provide evidence of discussions about the implementation of the Italian Renaissance style. The fact that the palace of Lux Ritter had just been built at that time on the opposite side of the river may have encouraged the desire to apply the representative style to the new town hall as well. The master craftsman, Anton Isenmann, from Prismel was hired in 1602 to carry out the work and he recruited workers directly from Milan (Reinle 1954). The façades were designed in the rustic style and the external shape and structure were also inspired by Italian originals, but the shape of the roof rather corresponds to farmhouses and may not really fit the palazzo style, which was a reason for discussions during the construction period. However, on the first floor, a hall-like functional room, called Kornschütte, is located. The flat, wooden ceiling of the hall is supported by arcades resting on massive pillars and two supportive horizontal beams on columns. All elements consist of gray sandstone. Compared to the palace of Lux Ritter, which was built at about the same time in the same style and with the same basic material, completely different traces can be seen on the surfaces of the pillars.

4.2 *The pillars of the Kornschütte from 1602–04*

The pillars consist of individual cuboids of different formats. The outer edges are chamfered, the approximately 2.5 cm-wide peripheral edges run at a slant into the surface (Figure 6, left side). They show traces of a small chisel, as seen before in the Franciscan

Figure 6. The pillar in the Kornschütte of the town hall in Lucerne show traces of a pointed chisel and a serrated tool. (author 2019).

Church. Again, isolated punctiform holes are caused by a pointed chisel from the previous working step (see marking in Figure 6). They are about 3 mm in diameter. The surfaces are covered by small punctiform punched holes. These were generated by the use of a serrated tool, probably a serrated stone hammer or chisel. Compared to the traces of the same tool category on harder limestone (section 5.2), the traces on the gray sandstone appear more blurred. Since these tools are known to be used for harder stone types, their use can be questioned here, especially given that the massive arcade pillars on the south side of the town hall, the river side, were worked with a wide chisel. Since the elements are built at the same time and are both made of sandstone, the question arises: why did the stonemasons work with different tools on the arcade pillars? A possible explanation can be found in the need for representation. While the exterior arcades are part of the representative façade design, those of the hall are usually not visible to visitors, as the space is not part of the public area of the town hall. Removing the material with a serrated tool was likely more efficient in terms of time.

5 SANDSTONE AND LIMESTONE IN SOLOTHURN

For the Solothurn buildings, primarily gray Jurassic limestone and yellowish Hauterive limestone were used (Blank & Hochstrasser 2008). Today, sandstone building material is rarely found and is mainly limited to sculptural elements and smaller construction tasks such as window jambs. Several window jambs are preserved from the 16th and 17th century and show Gothic or Renaissance style features. Some of them are made out of sandstone and some of limestone.

5.1 *The window jambs in sandstone*

The window jambs on the second floor of the house in Friedhofgasse No. 11 originate from the time of a reconstruction between 1520 and 1530 (Blank &

Figure 7. The window jamb in Friedhofgasse No. 11 shows Gothic features and processing traces of a wide chisel. (author 2020).

Hochstrasser 2008). They show Gothic-style features, such as intersecting round bars and ornaments (Figure 7). The jambs are painted over with white paint, but the stone working is still visible and clearly shows the traces caused by a wide chisel. The narrow profile of the edges has been processed with a smaller chisel, which creates the characteristic parallel and stronger lines, as seen before. A stonemason's mark is also visible on the central bar. Due to the colored coating, the type of stone cannot be visually determined, but the processing with tools typical for softer stones, such as sandstone, as well as the fine elaboration of the ornaments indicate that the windows were made of sandstone. The delicate ornaments require different tools, for this purpose stonemasons and sculptors had various fine tools at their disposal, such as small chisels with curved or pointed ends or scraping irons (Völkle 2016).

The house in Goldgasse No. 8 (Figure 8) has been documented as a mill since 1303 and was converted into a municipal mint house in 1622 (Blank & Hochstrasser 2008). A four-part staggered window of sandstone with fillets of plain appearance, created during the renewal of the mill in 1562 (Blank & Hochstrasser 2008), has been preserved on the west façade.

Figure 8. a (left) and b (right). Solothurn, Goldgasse 8. On the left the window jamb from 1562, on the right the jamb with volutes from 1622, both made out of sandstone (author 2020).

The narrow profiles of the edges are structured by the horizontal lines of a small chisel while the remaining surfaces show slightly more irregular lines of a chisel running parallel to each other. The length of the lines is estimated to be about 3–5 cm; it is possible that the same chisel was used for the wider areas and the narrow, straight profiles, as long as the width of the cutting edge was not an obstacle for these areas. Further windows, also made of sandstone, have been preserved from the time of the reconstruction in 1622 and show, in contrast to the window jamb from 1562, features which are characteristic for the Renaissance style, such as round bars and volutes. Their surfaces, on the other hand, show the same traces of processing as the staggered window from 1562. In areas with curved surfaces the chisels were guided vertically. The round bars show only a slight surface structure, and they were probably additionally smoothed as a final work step.

5.2 The portal and window jambs in limestone

In the Judengasse, where a vigorous building activity for the 16th century is documented (Blank & Hochstrasser 2008), several Late-Gothic staggered windows are preserved. One of those is located at house No. 5. The individual stones of the window jambs are delimited by peripheral edges that were processed with a small chisel. The remaining surfaces show the processing by a serrated tool (Figure 9). There are several serrated tools which are particularly well suited to effectively process brittle limestone. The traces visible on the surface of the window jamb let us infer the use of a serrated stone hammer (*boucharde*, *Stockhammer*, Figure 2 No. 10) a serrated chisel (*gradine*, *Gradierreisen*, Figure 2 No. 7) or a bush hammer (*peigne*, *Krönel*, Figure 2 No. 11).

Since the stonemason hits the surface several times with the serrated tool, the traces are usually not clearly assigned to a specific type. On surfaces that are not heavily eroded, it is sometimes possible to isolate

Figure 9. Solothurn, window with concavely curved soffits in Judengasse 5, 16th century. (author 2020).

Figure 10. Window jamb in Friedhofsplatz 14, mid-17th century. (author 2020).

traces with a linear or rectangular shape, which can indicate which tool was used. Since the concavely curved surfaces of this window soffit (see marking in Figure 9) also show uniform depths of the holes, a small serrated hammer with a convexly curved impact surface could have been used here. That a serrated hammer was also used for the window jambs can be assumed, but not proven.

The tavern at Friedhofsplatz No. 14 results from the merging of several buildings over time, seen in the irregular window axes. On the southern façade, staggered windows made of gray limestone have been preserved from the 17th century (Blank & Hochstrasser 2008). The edges are worked with a small chisel, while the jambs and concavely curved soffits show traces of a serrated tool (Figure 10), just like those seen in Judengasse 5.

In 1681, two previous buildings had to be demolished to build the representative residential house in Schmiedengasse No. 1 (Blank & Hochstrasser

Figure 11. Solothurn, portal in Schmiedengasse 11, 1682. (author 2020).

2008). It shows the appropriate dimensions for a patrician building and a representative portal from 1682 (Blank & Hochstrasser 2008). With regard to the construction task, portal jambs differ only slightly from window jambs, for this reason this suitable example should be mentioned.

It is located on the east façade and is made of limestone. The consoles with volutes support the segment pediment and provide Renaissance-style features (Figure 11). The surface of the stone shows again the characteristic traces of a serrated tool. Profiled edges are again worked with a small chisel; they show the typical regular sequence of lines. The spiral-shaped areas of the volutes have also been worked with a narrow chisel; the use of a serrated stone hammer, even if it were delicately formed, would not be suitable for processing this type of surface. However, a serrated tool with a quite slender design was probably used for the curved surfaces of the volutes (see marking in Figure 10). As with the findings on some curved window soffits made of limestone, it becomes evident that for such areas serrated tools with slimmer and curved cutting edges were probably used.

6 CONCLUSION

The investigation shows that the stylistic appearance of a building and its stone processing are subject to

rather different considerations and should be evaluated independently. The findings in Lucerne and Solothurn from the 16th and 17th century show that the tools used were directly dependent on the material which required differentiated processing techniques.

If a stonemason was to use a wide chisel for working large surfaces of limestone, the cutting edge of the tool would wear out quite quickly and the whole blade would have to be frequently sharpened or exchanged. However, this tool is only conditionally suitable for removing the harder material and smoothing the surface. Therefore, the traces of a chisel on limestone are mostly found only on narrow profiles, where the processing is similar to elements made out of sandstone. A great advantage of both the serrated stone hammer and the bush hammer is that the spikes are individually replaceable, so single spikes can be easily exchanged. This makes them particularly suitable for processing the hard and brittle material found in Solothurn. Another aspect that can influence a stonemason's choice of a specific tool is apparently the representative character. The surface texture can be used as a conscious finishing or, as in the palace of Lux Ritter, as a means of hierarchization. Among the examples studied, the town hall of Lucerne seems to be an interesting phenomenon. Although some serrated tools may be suitable for working softer stone, they were rather seldomly used for processing soft sandstone. One reason why the pillars in the hall of the town hall were processed with a rather unusual tool for this purpose could be its use as a purely functional room without a special representative claim. It is likely that the use of the serrated tool saved time and, thus, also costs.

In conclusion, the choice of the tool does not seem to depend on a particular architectural style, but on the material itself, on design requirements and on economic reasons. It made no difference whether a stonemason worked on a Renaissance portal or a Late-Gothic arcade pillar, he always used the appropriate tool for each stone.

REFERENCES

- Bessac, J.-C. (ed.) 1986. *L'Outilage traditionnel du tailleur de pierre de l'Antiquité à nos jours. Revue archéologique de narbonnaise, Supplément 14*. Paris: Centre national de la recherche scientifique.
- Blank, S., Hochstrasser, M. (eds) 2008. *Die Kunstdenkmäler des Kantons Solothurn. Band II. Die Stadt Solothurn II*. Bern: Gesellschaft für Schweizerische Kunstgeschichte.
- Doperé, F. (ed.) 2018. *Dater les édifices du moyen âge par la pierre taillée*. Bruxelles: Éditions Safran.
- Friedrich, K. (ed.) 1932. *Die Steinbearbeitung in ihrer Entwicklung vom 11. bis zum 18. Jahrhundert*. Augsburg: Dr. Benno Filser.
- Hegglin, C., Glauser, F. (ed.) 1989. *Kloster und Pfarrei zu Franziskanern in Luzern*. Luzerner Historische Veröffentlichungen (24). Luzern/Stuttgart: Rex-Verlag.
- Krauth, T., Meyer, F.S. (ed.) 1896. *Die Bau- und Kunstarbeiten des Steinhauers*. Leipzig: E.A. Seemann.

- Meyer, A. 1998. *Die Franziskanerkirche Sankt Maria in der Au, Luzern*. Schweizerischer Kunstführer. Bern: Gesellschaft für Schweizerische Kunstgeschichte.
- Reinle, A. 1953. *Die Kunstdenkmäler des Kantons Luzern. Band II. Die Stadt Luzern: I. Teil*. Gesellschaft für Schweizerische Kunstgeschichte. Basel: Birkhäuser.
- Reinle, A. 1954. *Die Kunstdenkmäler des Kantons Luzern. Band III. Die Stadt Luzern: II. Teil*. Gesellschaft für Schweizerische Kunstgeschichte. Basel: Birkhäuser.
- Völkle, P. 2016. *Werkplanung und Steinbearbeitung im Mittelalter. Grundlagen der handwerklichen Arbeitstechniken im mittleren Europa von 1000 bis 1500*. Ulm: Ebner.