Aivar Kriiska, Juho Kirs, Kaur Alttoa, Lennart Maala

CARVED STONE FRAGMENT
OF SANIDINE TRACHYTE FROM THE
VILJANDI CASTLE

INTRODUCTION
Determining the way that rocks and minerals were utilised in the past, including their origins, is a research direction with long tradition in archaeology. The materials have mostly been dealt with in the context of the Stone Age, which is understandable, because stone tools and their production residue comprise the largest deposits from this era. In Estonia, the research on rocks and minerals in the context of human history started with the activities of Professor Constantin Grewingk of the University of Tartu, in the second half of the 19th century, when as Grewingk, who was a geologist, identified the materials used for making stone tools.\(^1\) During the last decade,\(^1\) 

DOI: https://doi.org/10.12697/BJAH.2017.13.04
Translated by Juta Ristsoo.
Grants for this paper has been provided by Estonia in Circum-Baltic Space: Archaeology of Economic, Social, and Cultural Processes, a research project of the Estonian Research Council, and, Visual Culture of Estonia as a Carrier of Baltic and North-European Continuity and Identity: Long-term and Interdisciplinary Perspectives, a base-financed project of the Institute of History and Archaeology of the University of Tartu. We would like to thank Erki Russow for his useful comments and Kristel Roog for preparing the illustrations.

the research on Stone Age materials has focused mostly on foreign rocks and minerals, although the historical periods related to rock finds have also been identified.

A separate group of topics is focused on determining the places of origin for building materials and details. In Estonia, attention has seldom been paid to this question in earlier literature, and errors can be found in the statements made in the past. During the last few decades, geologist Helle Perens has been systematically dealing with the topic – the result is four volumes about limestone and dolostone in Estonian buildings. Understandably, local building materials have mostly been used in Estonia, since large amounts of limestone and dolostone with various properties, along with crystallised erratics, can be found here. There were also quantitative limits on the massive utilisation of building materials, and generally, materials from the vicinity were used for construction in Estonia.

To date, rock from Estonia has been documented as the main material for carved stone; Saaremaa dolostone (e.g. the portal of the church in Valjala), Orgita dolostone (carved stone in the Castle of the Teutonic Order in Rakvere) and various other carbonate rocks. At the same time, in individual cases imported materials or finished products have been used. Thus, at least six baptismal fonts on Saaremaa Island were made from Gotland limestone; and the floor tiles in the Püha Church (Saaremaa) probably come from the island of Öland (Sweden).


4 For example, in the case of the baptismal font in the Anseküla Church (island of Saaremaa) it can have been claimed, based on geological analysis that it was made of local stone. (Sten Karling, “Gotland och Estlands medeltida byggnadskonst”, Rig 22 (1939), 65; Helmi Üprus, Raidvikivit Eestis XIII–XVII sajandini, ed. by Voldemar Vaga (Tallinn: Kunst, 1987), 12. Subsequently Helle Perens ascertained that the baptismal font was made of Hoburgen limestone (from Gotland). (Merike Kureson, Ristimise lähde. Ristimiskivid keskaegsel Liivimaal (Tallinn: Muinsuskaitseamet, 2009), 57).


7 Kureson, Ristimise lähde. Ristimiskivid keskaegsel Liivimaal, 95–103.

8 Perens, Paekivi Eesti ehitisest I, 80–81.

Undoubtedly, there is a potential for new information in analysing the materials that come from areas that are further away – if not for the explication of great historical events, then at least to clarify the intentions and opportunities, contacts and artistic inclinations of the clients and builders of the past. This article examines the medieval carved stone fragment found in the course of archaeological excavations in the third bailey of the Castle of the Teutonic Order in Viljandi (Fig. 1), which is made of materials that do not naturally occur in Estonia.

**ANALYSIS OF THE DISCOVERY SITES AND MATERIAL OF THE VILJANDI CARVED STONE FRAGMENTS**

This carved stone fragment (Viljandi Museum, VM 11180:34) is a wedge-shaped piece of light grey limestone-like stone, which is few centimetres thick, 6–9 cm long and 5–8 cm wide, with carved profiling still visible on its sides (Fig. 2).

The carved stone fragment was found in 2007 during excavations being led by Andres Tvaari, in the third bailey of the Viljandi Castle on Kirsimägi Hill in the city of Viljandi. In the course of excavations,
The original location of the carved stone and its exact use is unclear. It is likely that the piece of carved stone ended up in the layer of ruins when the buildings in the third bailey were demolished. Based thereon, no conclusions can be drawn about the original location of the carved stone – it may have been brought from somewhere in the vicinity. However, based on the place it was buried it is clear that the stone was carved before the second half of the 16th century.

An initial visual examination was enough to confirm that the carved stone fragment did not originate in Estonia. It is macroscopically light beige porphyritic volcanic rock, with rectangular Na-Ca feldspar, plagioclase, crystals up to 5 mm in diameter, with a few black biotite flakes dispersed in groundmass comprised of granules measuring a few millimetres. Typically the rock also has individual, significantly larger (up to 4.2 cm long and 2.5 cm wide) aquatic grey lamellate potassium feldspar, sanidine phenocrysts (Fig. 3A).

Under a polarisation microscope, one can see that the groundmass of the rock is comprised primarily of orthoclase and plagioclase type feldspars along with oxidised opacitic biotite, small amounts
of clinopyroxene and aggregates of magnetitic ore minerals. Inside
the granular mass, one can also notice an isotropic glassy mass –
volcanic glass (Fig. 4 upper).

Of the rock, approximately 65% is groundmass, about 24% is plagioclase
rectangles, 7% is sanidine, and biotite and ore is each about 2%.

This mineralogical-petrographical picture is characteristic of alkali
volcanic rock trachyte\textsuperscript{11}, and considering the relationships of main
minerals, it is more precisely characteristic of porphyritic sanidine
trachyte\textsuperscript{12} from the Drachenfels Hill in Germany (Fig. 3A and 4 under).

The rock crystallised from magma about 25 million years ago
when the so-called volcanism of the Eifel hotspot appeared in


\textsuperscript{12} E.g. Ian S. E. Carmichael, “Trachytes and Their Feldspar Phenocrysts”, *Mineralogical
Magazine*, 34 (268) (1965), 107–125; Birte Graue, Siegfried Siegesmund, Bernhard Middendor,
“Quality assessment of replacement stones for the Cologne Cathedral: mineralogical and

conjunction with the development of the Rhine Rift in the Eifel
region of Germany\textsuperscript{13} (Fig. 5A). The mass of mafic and alkali magma
that rose from the mantle created numerous volcanoes and explosion
craters as it rose to the surface. As products of the volcanic eruptions,
the lava flows of alkali basalt and beds of crumble trachyte tuff are
widely distributed there. As a more cemented, so-called sub-volcanic
rock inside and under the volcanic crater, the crystallised porphyric
sanidine trachyte is distributed in a relatively restricted area exposed
on the right bank of the Rhine River as the Drachenfels Hill in the
Siebengebirge hill range\textsuperscript{14} (Fig. 5A and 6).

According to the archaeologist that conducted the excavations,
this may be a piece from the edge of a heater cover plate that was part
of heating system connected to the heat storage hypocaust that was

\textsuperscript{13} Hans-Ulrich Schmincke, “The Quaternary Volcanic Fields of the East and West Eifel
R. Christensen (Berlin, Heidelberg: Springer, 2007), 241–322; Melanie Kolb, Holger Paulik,
Maria Kirchenbaur, Carsten Münker, “Petrogenesis of Mafic to Felsic Lavas from Oligocene
Siebenengebirge Volcanic Field (Germany): Implications for the Origin of Intracontinental Volcanism

\textsuperscript{14} Ibidem.
Carved Stone Fragment of Sanidine Trachyte from the Viljandi Castle

excavated in the same place. However, this determination cannot be accepted. This is an extremely small, seriously damaged fragment, but the fine profiling is clearly visible (Fig. 2 and 7). Here convex forms alternate with concave ones. The middle element has been destroyed, but it is most probably that it had a pear-shaped profile (German: Birnstab). On both sides, there are hollow mouldings (scotia), whereas the transition from one form to another is separated by a small step. On one side, the scotia smoothly transitions into a small semi-circular tube. (Fig. 7). On the other side, the corresponding zone has been destroyed, but a similar moulding probably existed here. The carved details are not straight, but slightly curved. Therefore the stone comes from an arch. Apparently, it is the frame for an opening. The profiled elements of the carved stone are quite small, and therefore, it cannot be precluded that they were part of a portal or window. For the same reason, it is doubtful that is the fragment of a vault rib or transversal arch. It is more likely that it comes from a small form. Since, in the Estonian context, this is a rare material, it is more believable that was a precious, rather than a mundane, object. First off, one would assume that it was a sacrament niche, but naturally there are other possibilities. It can be assumed that the raw material was not brought to Viljandi for processing – it is more likely that it arrived in its finished form. Of course, it is impossible to precisely date such a small fragment. This type of pear-shaped profile combined with tubing primarily dates back to the 14th century. In Old Livonia, this form was still found in the early 15th century. The Viljandi Castle’s main bailey was built in the last quarter of the 14th century. The carved stone fragment is not only a rare material, but it also provides a clue to the artistic and cultural development of the region.

15 Tvaari, Aruanne arheoloogilistest uurimustest Viljandi ordulinnuse kolmandal eeslinnusel (Tallinn: EKMT, 2007).


17 Such profiling appears at least twice in the brick Gothic of Old Livonia: in the chancel portals of St Peter’s Church in Riga (1402–1409) (Peter Arends, Die St.-Petri-Kirche in Riga (Riga: V. Teppers, 1944), 25) and the bricks of the transverse art found in the Kärkna (Falkenau) monastery (Kaur Alttoa, “Kärkna tsistertslaste klooster”, Padise ja Vantaa. Keskaaja sild Padise ja Vantaa vahel (Padise: Padise Vallavalitsus, 2012), 44–45).
of the 13th century, but naturally the castle was repeatedly renovated during subsequent centuries. Among other structures, a three-storey “officials’ house” was built in the Later Middle Ages and also included a chapel.18

DISCUSSION AND SUMMARY

Estonia’s medieval urban, sacral and military architecture was richly decorated with carved stone, which was made from various types of rock. To date generally, the use of local materials has been documented, although the carved stone detail found in Viljandi also alludes to the use of materials from further away. The specific fragment is sanidine trachyte (currently the only known example of carved stone made of this rock in Estonia) and it points to the Eifel stone-working region in Germany’s Rhineland.

The decorative porphyritic trachyte from Drachenfels has been used as a building material for a very long time. This has been fostered on the one hand by the availability of the rock, and the excellent means of transportation along the Rhine River (Fig. 6). Trachyte was mined there already during the Roman Empire19, when it was used as a building material in the Rhine region20 and it continued to be used during the Middle Ages. Perhaps the most famous building where Drachenfels trachyte was used as a building material is the Cologne Cathedral.21 In the second half of the 12th century, stones from this area were also used in the construction of the Ribe Cathedral in Denmark,22 where it was used ordinary construction stone, and fine-grained Weser sandstone was imported for the architectural details.23

Under what circumstances and how this carved stone arrived in Viljandi cannot be ascertained. In any case, it points to contacts with the Rhineland (Fig. 5B). Of course, Estonia’s connections to this region come as no surprise. Although, Eifel stone-working has only been associated with a single find – the mortar found in the medieval ship remains in Tallinn which is made from phonotephrite,24 the trade routes can be traced based on the imported ceramics that were in use in Estonia through the Middle Ages25. Currently, no counterpart to the Viljandi carved stone exists on the territory of Old Livonia, but it is unlikely that it is a unique case. It is more likely that many more carved stones from “exotic” materials were used in medieval Old Livonia, and they are just waiting to be discovered among the numerous collections of carved stones.

SUMMARY

This article examines the medieval carved stone fragment found in the course of archaeological excavations from a stable boys’ house in the third bailey of the Castle of the Teutonic Order in Viljandi (Estonia), which was built during the Middle Ages. It is likely that the piece of carved stone ended up in the layer of ruins when the buildings in the third bailey were demolished. Based thereon, no conclusions can be drawn about the original location of the carved stone – it may have been brought from somewhere in the vicinity. However, based on the place it was buried it is clear that the stone was carved before the second half of the 16th century.

The carved stone fragment is a wedge-shaped piece of light grey limestone-like stone, which is few centimetres thick, 6–9 cm long and 5–8 cm wide, with carved profiling still visible on its sides. This mineralogical-petrographical picture of carved stone fragment is characteristic of alkali

19 E.g. Christoph Rummel, The Fleets on the Northern Frontier of the Roman Empire from the 1st to 3rd Century, PhD thesis (Nottingham: University of Nottingham, 2008), 192. See: http://eprints.nottingham.ac.uk/27819/24/Rummel_PhD_Volume_I.pdf [viewed 28.05.2017].
21 Ibidem.
24 Roso, Lõugas, Läänelaid, Maldre, Russow, Sillasoo, “Medieval Ship finds from Kadriorg, Tallinn”, 146.
volcanic rock trachyte, and considering the relationships of main minerals, it is more precisely characteristic of porphyritic sanidine trachyte from the Drachenfels Hill in Germany.

Carved stone fragment is extremely small and seriously damaged, but the fine profiling is clearly visible. It is more likely that it comes from a small form. Since, in the Estonian context, this is a rare material, it is more believable that was a precious, rather than a mundane, object. First off, one would assume that it was a sacrament niche, but naturally there are other possibilities.

CV

Aivar Kriiska (b. 1965) is Professor of Laboratory Archaeology at the University of Tartu. His primary research interests are related to the Stone Age in Eastern and Northern Europe (early habitation and Neolithization of the forest zone in Eastern and Northern Europe, aDNA of Stone Age populations, etc.), but he has also worked on other fields of archaeology, including Medieval and Modern Age town archaeology and experimental archaeology. He has published more than three hundred scientific and popular scientific articles and books.

Juho Kirs (b. 1946) is a research fellow at the University of Tartu. His major fields of research are mineralogy and the geochemistry of impact craters, mineralogy-petrology of Estonian basement and East-European Craton crystalline and rapakivi formation rocks, but he has also studied lithic materials from different archaeological contexts.

Kaur Alttoa (b. 1947) has been a long-time scholar and teacher of art history at the University of Tartu and he is one of the foremost specialists of the history of medieval architecture in the Baltic region. His objects of interest have included both medieval fortresses and sacral buildings. Among his major contributions stands out the restoration and study of the St John’s Church in Tartu, which was also published as a monograph in 2011.

Lennart Maala (b. 1990) is a MA student at the University of Tartu. His area of research is petrology.