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,

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1 Constantin Grewingk, "Zur Kenntniss der in Liv-, Est-, Kurland und einigen Nachbargegenden aufgefundenen Steinwerkzeuge heidnischer Vorzeit", *Verhandlungen der Gelehrten Estnischen Gesellschaft*, VII:1 (1871), 1–56.

the research on Stone Age materials has focused mostly on foreign rocks and minerals,[2] although the historical periods related to rock finds have also been identified.[3]

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.[4] 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.[5] 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.[6] 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;[7] and the floor tiles in the Püha Church (Saaremaa) probably come from the island of Öland (Sweden).[8]

2 Aivar Kriiska, Alexey Tarasov, Juho Kirs, "Wood-chopping tools of the Russian-Karelian type from Estonia", *Man, His Time, Artefacts, and Paces. Collection of articles dedicated to Richard Indreko*, ed. by Kristiina Johanson, Mari Tõrv (Tartu: University of Tartu, Institute of History and Archaeology, 2013), 317–345; Aivar Kriiska, "Foreign Materials and Artefacts in the 4th and 3rd Millennia BCE Estonian Comb Ware Complex", *When Gods Spoke. Researches and Reflections on Religious Phenomena and Artefacts. Studia in honorem Tarmo Kulmar*, ed. by Peeter Espak, Märt Läänemets, Vladimir Sazonov (Tartu: University of Tartu Press, 2015), 107–124.

3 Maili Roio, Lembi Lõugas, Alar Läänelaid, Liina Maldre, Erki Russow, Ülle Sillasoo, "Medieval Ship Finds from Kadriorg, Tallinn", *Archaeological Fieldwork in Estonia / Arheoloogilised Välitööd Eestis 2015* (Tallinn: Muinsuskaitseinspektsioon, TLÜ, TÜ, 2016), 139–158, here 146.

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, *Raidkivikunst 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 Kurisoo, *Ristimise läte. Ristimiskivid keskaegsel Liivimaal* (Tallinn: Muinsuskaitseamet, 2009), 57).

5 Helle Perens, *Paekivi Eesti ehitistes I–IV* (Tallinn: Eesti Geoloogiakeskus, 2003–2010).

6 Üprus, *Raidkivikunst Eestis XIII–XVII sajandini*, 7, 9; Helle Perens, Elmar Kala, *Paekivi – Eesti rahvuskivi* (Tallinn: Geoguide Baltoscandia, 2007).

7 Kurisoo, *Ristimise läte. Ristimiskivid keskaegsel Liivimaal*, 95–103.

8 Perens, *Paekivi Eesti ehitistes I*, 80–81.

Fig. 1. Location of the carved stone fragment of sanidine trachyte. A – Viljandi in Estonia. B – Viljandi Castle and the medieval town (defences based on a Swedish map from 1683): 1 – main castle, 2 – second bailey, 3 – third bailey, 4 – medieval town. C – part of the third bailey: 1 – Estonian Traditional Music Centre (former granary of the manor), 2 – heat storage hypocaust, 3 – SW wall of the stable boys' house, 4 – NE wall of the third bailey. (Andres Tvauri et al. 2008, Fig. 1 and 2).

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 Tvauri, in the third bailey of the Viljandi Castle on Kirsimägi Hill in the city of Viljandi. In the course of excavations,

Fig. 2. Viljandi carved stone fragment. Photo: Aivar Kriiska.

a new medieval heat storage hypocaust[9] was discovered (Fig. 1A and 1B). The find was discovered slightly to the east the hypocaust, lying on the wooden floor that had been on top of it (Fig. 1C) (preserved as a thin charred wooden streak at a height of 84,54–84,57 m a.s.l.) in a layer of building ruins that was a dozen centimetres thick and contained various artefacts. This was the last utilisation stage of a stable boys' house, which was built during the Middle Ages and appears on a 17th century town map – a medieval cellar with a heat-storage stove had been filled with earth and a wooden floor built above it. The carved stone fragment was located in the pile of ruins that developed on the floor. The layer of ruins can be dated based on the Russian iron arrowheads and shards of clay vessels from Northwest Russia, which allude to the fact that the ruins developed during the Livonian War. Viljandi was occupied by the army of the Grand Duke of Moscow from 1560 to 1582.[10]

9 Andres Tvauri, *Aruanne arheoloogilistest uuringutest Viljandi ordulinnuse kolmandal eeslinnusel (Tasuja pst 6 hoone ümbruses) 2007. aastal* (Tartu, 2007). Manuscript in the Archive of the Estonian National Heritage Board.

10 Andres Tvauri, Aivar Kriiska, Rivo Bernotas, "Archaeological Research in Viljandi", *Archaeological Fieldwork in Estonia / Arheoloogilised välitööd Eestis 2007* (Tallinn: Muinsuskaitseamet, 2008), 153–163, here 158.

Fig. 3. Viljandi carved stone fragment (A) and porphyritic trachyte from Drachenfels (B) from the collection of the University of Tartu Natural History Museum (Droop 195-82). The length of the large greyish rectangular sanidine phenocrysts is about 2 to 2,5 cm; the length of the clearly visible white plagioclase crystals is about 5 mm. Photos: Juho Kirs.

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 whitish 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

Fig. 4. Thin section photos of the Viljandi (above) ja Drachenfels (below) porphyritic sanidine trachyte in a polarisation microscope (on the left without an analyser, on the right with crossed polars). White rectangular plagioclase and black ore mineral and biotite crystals can be distinguished in the groundmass containing volcanic glass. Photos: Juho Kirs.

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[11], and considering the relationships of main minerals, it is more precisely characteristic of porphyritic sanidine trachyte[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

11 William S. MacKenzie, Anthony E. Adams, *A Colour Atlas of Rocks and Minerals in Thin Section*, IV edition (London: Manson Publishing, 1998).

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 petrophysical requirements", *Environmental Earth Sciences*, 63 (2011), 1799–1822.

Fig. 5. A – The fields of Cenozoic volcanism (Eifel hotspot) in the Rhine Rift area (after Schmincke, 2007). Rhine Graben – Rhine Rift, HEVF – High Eifel Volcanic Field, WEVF – West Eifel Volcanic Field, EEVF – East Eifel Volcanic Field. B – Drachenfels and Viljandi. As the bird flies, the distance is almost 1,500 km, when travelling along the rivers, sea and roads, the journey was probably about a thousand kilometres longer.

conjunction with the development of the Rhine Rift in the Eifel region of Germany[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[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

13 Hans-Ulrich Schmincke, "The Quaternary Volcanic Fields of the East and West Eifel (Germany)", *Mantle Plumes: A Multidisciplinary Approach*, ed. by Joachim R. R. Ritter, Ulrich R. Christensen (Berlin, Heidelberg: Springer, 2007), 241–322; Melanie Kolb, Holger Paulik, Maria Kirchenbaur, Carsten Münker, "Petrogenesis of Mafic to Felsic Lavas from Oligocene Siebengebirge Volcanic Field (Germany): Implications for the Origin of Intracontinental Volcanism in Central Europe", *Journal of Petrology*, 53 (11) (2012), 2349–2379.

14 *Ibidem*.

Fig. 6. A view of the small town of Königswinter on the Rhine along with the two castles built of sanidine trachyte on the Drachenfels Hill in the Siebengebirge Hills at the beginning of the 20th century, photochrom. Repository: Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA: http://hdl.loc.gov/loc.pnp/ppmsca.00835 [viewed 03.07.2017].

excavated in the same place.[15] 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

15 Tvauri, *Aruanne arheoloogilistest uuringutest Viljandi ordulinnuse kolmandal eeslinnusel (Tasuja pst 6 hoone ümbruses) 2007. aastal*.

Fig. 7. Profile and partial reconstruction of the Viljandi carved stone. Drawing by Kaur Alttoa and Kristel Roog.

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.[16] In Old Livonia, this form was still found in the early 15th century.[17] The Viljandi Castle's main bailey was built in the last quarter

16 Wolfgang G. Müller, "Birnstab", *Reallexikon zur deutschen Kunstgeschichte,* Bd. 2, ed. by Otto Schmitt (Stuttgart-Waldsee: Alfred Druckenmüller Verlag, 1948), 770.

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 (1408–1409) (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. Keskaja 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 Empire[19], when it was used as a building material in the Rhine region[20] 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

18 "Viljandi linnus 1599. aastal", *Viljandi Muuseumi aastaraamat 1997,* transl. by Katrin Vabamäe, notes by Kaur Alttoa (Viljandi: Viljandi Muuseum, 1998), 160–161.

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].

20 Birte Johanna Graue, *Stone Deterioration and Replacement of Natural Building Stones at the Cologne Cathedral. A Contribution to the Preservation of Cultural Heritage*. Dissertation (Göttingen: Georg-August-Universität Göttingen, 2013), 2. See: https://ediss.uni-goettingen.de/handle/11858/00-1735-0000-001E-8319-3?locale-attribute=en [viewed 28.05.2017].

21 *Ibidem*.

22 Meinard Pohl, *Steinreich. Mühlsteine, Tuff und Trass aus der östlichen Vulkaneifel und ihr Markt. Eine vergleichende Analyse vorindustrieller Produktions- und Handelsstrukturen* (Bochum: Dt. Bergbau-Museum, 2012), 154.

23 Ebbe Nyborg, *Ribe Cathedral: Church of Our Lady* (Ribe: Ribe Domsogns Menighedsråd, 2002), 6.

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 Ages[25] 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.

Aivar Kriiska, Juho Kirs, Kaur Alttoa, Lennart Maala:
Carved Stone Fragment of Sanidine Trachyte from the Viljandi Castle

Keywords: Estonia, Viljandi castle, Middle Ages, carved stone fragment, sanidine trachyte

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

24 Roio, Lõugas, Läänelaid, Maldre, Russow, Sillasoo, "Medieval Ship finds from Kadriorg, Tallinn", 146.

25 Erki Russow, *Importkeraamika Lääne-Eesti linnades 13.–17. sajandil* (Tallinn: Tallinna Ülikooli Ajaloo Instituut, 2006), 38, 209.

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

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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.

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