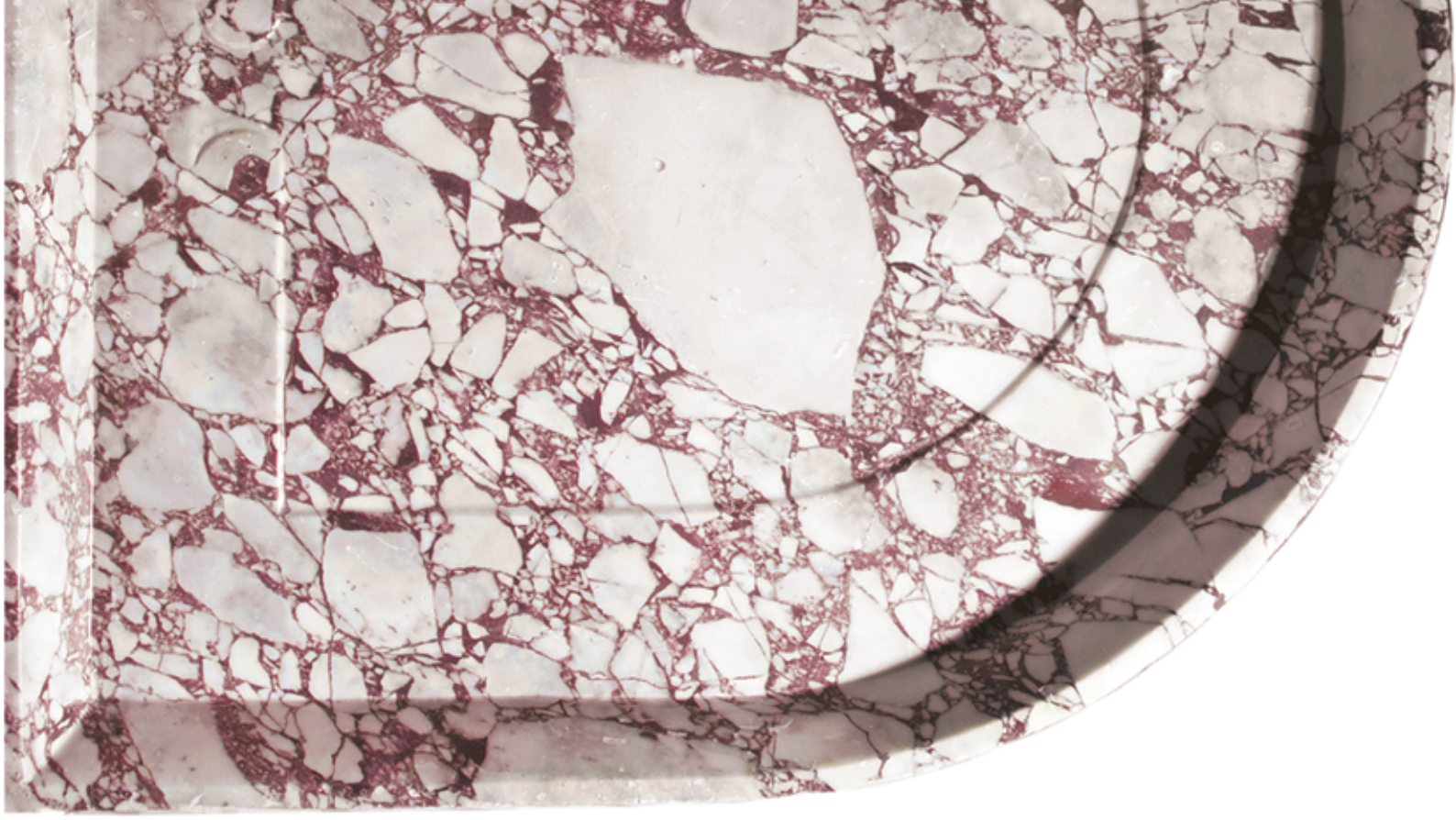
Quarries of the Lumbarda Archipelago

Lipanović, Ivka; Marinković, Vinka



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CONTENT

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QUARRIES OF THE LUMBARDA ARCHIPELAGO

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Abstract

Signs of quarrying that date back to Antiquity are evident on the central-Dalmatian island of Korčula. Most of the quarries from Antiquity recorded are concentrated in the Lumbarda archipelago. The quarries and their surroundings have been only partially explored, and have not been completely presented to the public. Stones that were exploited are of the highest quality, but have not been subjected to petrographic analysis. This paper brings a topographical view of the quarries set in the Lumbarda archipelago, today's state of the quarries in visual imagery and a description of stones based on visual analysis. All of the aforementioned is a modest base for the multidisciplinary research to be conducted.

Keywords
island of Korčula, ancient quarries, limestone

Introduction

Geologically speaking, the central Dalmatian island of Korčula is part of the Outer Dinarides area. It is composed of limestone and dolomite that accumulated during the lower and upper Cretaceous period (Fig. 1)[1]. The upper-Cretaceous rudist limestone (white to yellow-brown colour) is one of the highest quality stones, very similar, in its mineral-petrographic characteristics, to the stone from the island of Brač. Due to its quality and large crystalline structures, both types of limestone are referred to as "marble" or "polymarble" by the local population.

It is obvious from the traces of exploitation on the group of islands east of Korčula (Lumbardian archipelago) that there has been systematic and organized stone exploitation on the island since Antiquity[2]. Throughout the Middle Ages and later, stone exploitation was very vigorous, as shown by material evidence and numerous inscriptions and documents. Extracting and processing the stone was very common on the island, which is confirmed by the Statute of Korčula dating from the year 1214. One part of the statute says expressly that "everyone who exports the stone from the island of Korčula is obliged to report it to the government and note down in the municipal office, just as every foreigner who exports the stone is obliged for every 100 *modijasol* in weight to give 1 golden ducat".[3]

With the founding of the town of Korčula, numerous stonecutting workshops were formed, spreading their influence outside of the island and the Dubrovnik-Neretva County. Among the best known are the Andrijić Brothers stonecutting workshop, which was the core of the so-called Dubrovnik-Korčula school of architecture and stonemasonry. In that period stone was intensely exploited for the needs of building the city of Dubrovnik. Stone was exported also to Zadar, Kotor, Venice and Istanbul. Throughout history the exploitation was conducted in several zones of islands and also on the nearby smaller islands concentrated on the north-east side of the Korčula itself: Lučnjak, Badij, Planjak, Kamenjak, Vrnik, Sutvar, Gubavac and Sestrice (Fig. 2). Interestingly the exploitation of stone was the most intensive on the island of Vrnik, with an area of 0.282 km² (Fig. 3). On such a small footage there were 29 registered stone quarries. The extraction of stone was conducted until recently and visible by the inactive stone quarries are the stone houses (known under the name "trimi") in which the processing and preparation of stone was made.

Today the extraction of stone on the island of Korčula is done only in Humac quarry, while the Brendana and Krmača quarries were abandoned in the 20th century.

Clear testament to the tradition of stone extraction and processing is the longevity of the educational system for stonemasons on the island.[4]

Ancient quarries of Korčula

On a group of small islands called Vrnik, Sutvara, and Kamenjak (east side of the island of Korčula, positioned on the route from the town of Korčula to the

1 KRKLEC, LJUBENKOV, BENSA 2011, 5.

2 ZANINOVIĆ 1997, 38.

3 KLISURA 2009, 97.

4 KLISURA 2009, 97.

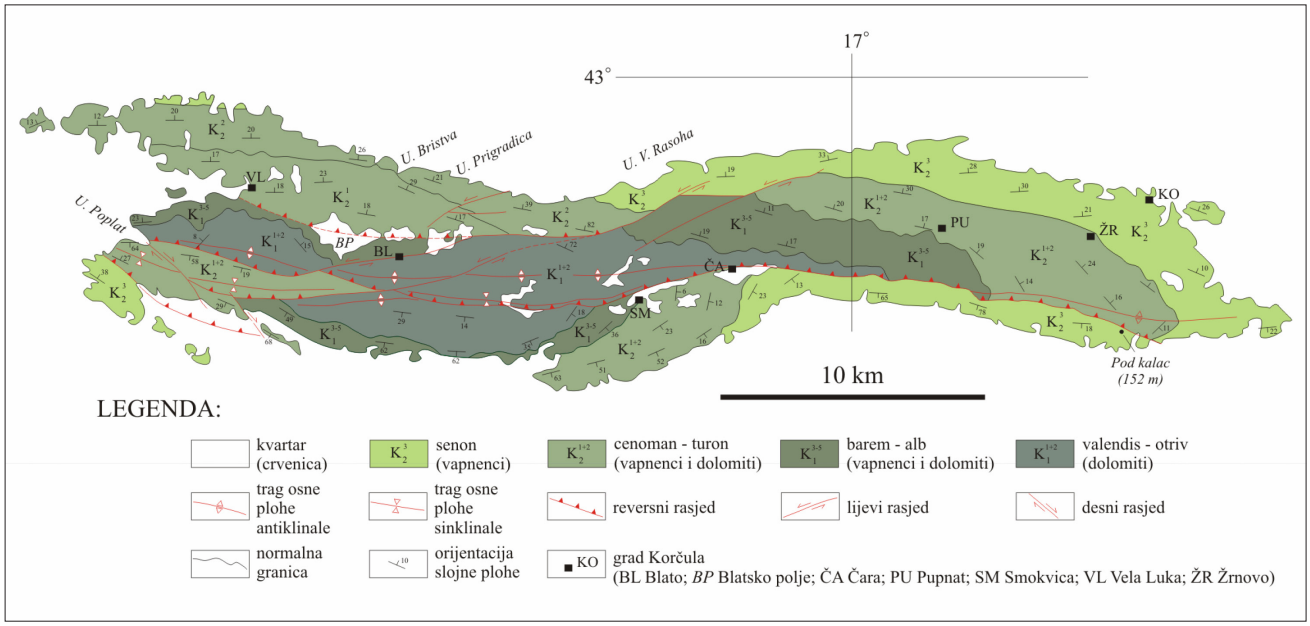

Fig. 1. Geochemical map of the island of Korčula (source: KOROLIJA *et al.* 1977)

Fig. 2.
View of the eastern part of the island of Korčula with places from which stone was excavated marked (source: Google Maps)

Fig. 3.
Island of Vrnik (photo: I. Lipanović, 2014.)

Fig. 4. Ancient quarry on the island of Sutvara, state today (photo: I. Lipanović, 2014.)

Fig. 5. Ancient quarry on the island of Sutvara, state today (photo: I. Lipanović, 2014.)

Fig. 6. Tool marks in the ancient quarry on Sutvara, state today (photo: I. Lipanović, 2014.)

town of Lumbardia), there are signs of quarrying that date back to Antiquity. Encouraged by historical sources, descriptions and remains which bear witness to the exploitation of stone during the period of the Roman Empire, M. Givoje was the first to publish traces found by reconnoitering the terrain.[5]

In the *Periegesis* of Pseudo-Scymnus, a verse work dating from the 1st or 2nd century B.C. there is information telling of the exploitation of white stone on the islands of Korčula.[6] On the northwest side of the island of Vrnik an early Christian inscription was found that dates from the 5th century[7], while on the small island of Sutvara there are remains of a small Early Christian church dedicated to Saint Barbara.[8] Formerly mentioned material remains tell of early use on the island, and correlate with the fact there were excavations and processing of stone on the island.

On the small island of Kamenjak Givoje recorded "indentations" which he dated to Antiquity.[9] In one of those so-called indentations or rifts, which it was possible to interpret as *pašarini,* handcut channels preceding extraction, a prehistoric stone hammer had been found much earlier.[10]

Stone quarries of the gallery type have been recorded on Vrnik and Sutvara. The gallery quarry on Vrnik is completely blocked with remains of stone extraction and is impenetrable, today as in Givoje's time. On the island of Vrnik in the past it was possible to record similar caves (quarries) on five zones of the island, as stated by Givoje.[11] Meanwhiwle on Sutvara, textbook examples of stone use were registered, and of mining methods inn three places: by the sea on the north-east side of the island and on two locations in the midlle of the island.[12] The biggest gallery (quarry) is on top of Sutvara, approximately 18 m deep, 12 m wide, and height up to 3 m.[13] Blocks extracted were mainly dimensioned approximately 2 x 1 x 1 m.[14] In a review of the terrain nearing the end of 2014, the same situation was confirmed: the quarry is well preserved and passable, and the traces of stonecut tools in the stone are still highly visible (Figs. 4, 5, 6).

The remaining two galleries on Sutvara are still not pervius.

5 GJIVOJE 1970, 68-70.

6 GJIVOJE 1970, 69.

7 RADIĆ 1887, 37-38; GJIVOJE 1970, 70.

8 RADIĆ 1891, 50-52.

9 GJIVOJE 1970, 71.

10 GJIVOJE 1970, 71.

Name	Petrographical name	The geological age	Colour	Quarry
SUTVARA	Limestone	Upper Cretaceous (Senonian)	whitish	Island of Sutvara, by Korčula - quarry from Antiquity
VRNIK *SALDI*	Limestone	Upper Cretaceous (Senonian)	whitish, yellowish	Island of Vrnik, by Korčula - not active quarrry
VRNIK *PIGAVAC*	Limestone	Upper Cretaceous (Senonian)	yellowish, brownish	Island of Vrnik, by Korčula – not active quarrry
HUMAC	Limestone	Upper Cretaceous (Senonian)	whitish, yellowish	Humac, east side of Korčula, active quarry

Table 1. Samples taken in 2014.

Characteristics of the stone from Korčula – selected samples

Although there is a mass of written evidence about quarrying on the island of Korčula, there has been no serious analyses and studies about the sort of stones and quarries. Stones that were exploited from the island of Korčula and the nearby smaller islands geologically mainly belong among Upper Cretaceous rudist limestones, and are very similar to rock from the island of Brač. Every locality (quarry) contains special varieties of stone.

During 2014, on several zones on the east part of the island Korčula, samples of stone were taken. A small number of samples were taken (4) from sites and quarries that were accessible. The samples were taken from the island of Sutvara (1 sample), the island of Vrnik (2 samples) and from Humac Quarry (see Table 1).

The samples of stone were polished to the highest shine and then macroscopically described. At this moment no other analyses are possible. Listed below is a modest survey, a starting point for the establishment of the multidisciplinary research effort to follow. The plan and purpose of this research is to form a detailed list of natural stone from the island of Korčula, charting ancient, medieval and recent quarries on the island and forming a data base. The creation of a database can be the foundation for the research of the provenance of ancient artwork and buildings, as well as for the defining of the dispersal of the products of stonecutting workshops on the island of Korčula.

On the island of **Sutvara** the samples taken were from an ancient quarry. The stone is thick and white with small remains of skeletal detritus (Fig. 7a). In contact with hydrochloric acid it shows a strong reaction. It is mentioned in literature that the stone was used for building facades, but too soft for certain elements (such as stairwells).[11] This type of stone is similar to a type from the island of Brač called Veselje Unito.[12]

The island of **Vrnik** is built from Senonian rudist limestone, with layers that vary. Upper layers are made from porous, yellow to black limestone of poorer quality popularly called "pigavac" [something mottled, i.e., with small shells] (Fig. 7c). Thick white limestone is positioned in the lower layers (Fig. 7b). This stone is of high quality, resembling that from the island of Sutvara and similar to Veselje from Brač. Although it was not possible to sample stone from the ancient quarry, it can be assumed to be similar to this specimen.

The quarry **Humac** is positioned on the east side of the island of Korčula by the Korčula-Lumbardia road. According to recent data it is the only currently active quarry.

It produces organogenic stratified to banked limestone in two varieties, gray and thick whitish to yellowish crystalline limestone (Fig. 7d).

Suggestions for the future and conclusion

On the east side of the island of Korčula quarries from Antiquity of the gallery type have been adduced. Until this day, the quarries and their surroundings have not been adequately explored or presented. Exploring the quarries, the surrounding terrain, underwater terrain reconnaissance of Korčula could give new answers, correlating the ways of extraction of stone in Antiquity, activities and life on the island but also data about transport and the movement radius of the exploited stone. The last mentioned is still a complete unknown.

Ancient, but also medieval, quarries of Korčula

11 Croatian Geological Survey, 2008, 60.

12 More about stone from island Brač - CRNKOVIĆ, ŠARIĆ 2003, 55-60; MARINKOVIĆ, MILIŠA 2015.

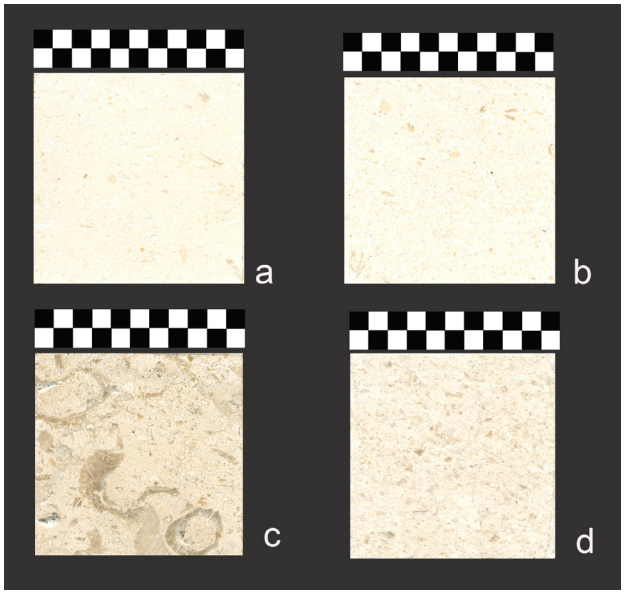

Fig. 7. Samples of stone from the island of Korčula
a) Sutvara b) Vrnik Saldi c) Vrnik Pigavac d) Humac
(photo: I. Lipanović, V. Marinković)

still have their use value. The exploitation of stone in strictly controlled forms offers the possibility of using the stone for restoration work on important buildings and artwork (Korčula, Dubrovnik etc.). Stone composed of the same mineral-petrographic characteristics is the best working material for conservation-restoration projects. But this has to be preceded by extensive research work that implies: forming a detailed list of natural stone on Korčula and charting ancient, medieval and recent quarries on the island. Furthermore it is necessary to carry out the sampling of stones from defined historic quarries, and then the analyses of the natural stone. Following these actions it will be possible to create a database. The creation of a database can be the foundation for the research of the provenance of ancient artwork and buildings, as well as for the defining of the dispersal of the products of the stonecutting workshops.

The organization and presentation of the old quarries represents a potential to the tourist offer of the island. Revitalized areas of the quarries offer a wide variety of possibilities: from using them for art colonies, plays and concerts, to utilizing them for sporting activities (for example climbing grounds, such as those at Ballykeefe Quarry in Ireland). All of the aforementioned could be a guideline for the revitalization and preservation of the stonecutting tradition of Korčula, which has unfortunately completely died out.

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