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Protection and Rehabilitation
of Fort Kosmac at Brajici Montenegro

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DIPLOMA THESIS

PROTECTION AND REHABILITATION OF FORT KOSMAČ
AT BRAJIĆI, MONTENEGRO

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PROTECTION AND REHABILITATION OF FORT KOSMAČ

Brajići, Montenegro

ABSTRACT

Fort Kosmač was constructed by Austrian Empire in 1858, as fortification to protect the southern border of the empire. Abandoned and demolished by the imperial army of Austro-Hungary, in 1918 it became a part of Kingdom of Yugoslavia. It remained a ruin until today. The condition of the fort worsened over the time as it was not in any use any more.
Today, it is a monument but because its bad condition, lack of infrastructure and poor approach, it is only sometimes visited by locals and hikers, who come to enjoy the great view over the Bay of Budva. The building is a ruin, completely unsecured and as such, it poses danger to the curious visitors, who want to explore the ruin. The fort lies near the main road that connects Budva with Cetinje. From the main road the old street leads to the fort, although in a bad condition, the fort is still accessible even by car over the new part recently built. The serpentine approach is partially collapsed with a danger of bigger parts collapsing the site is in danger to lose its important parts. Although protected as a national cultural monument, until now nothing has been done to physically protect it and equip it with any infrastructure for safe touristic visits.

The project focuses on analyzing the site. Besides the detailed research, it should extract the best possible solutions for future treatment, to avoid the complete loss of this unique piece of history. The detailed building archaeology including a documentation of its current status will be the first part of the project. After collecting and processing the data, an analysis and evaluation will be made of what would be needed minimum to rehabilitate the site. Afterwards further options will be designed.

SCHUTZ UND ERSCHLIESSUNG FÜR BESUCHER VON FORT KOSMAČ

Brajići, Montenegro

KURZFASSUNG

Fort Kosmač wurde in dem Jahr 1858 von der österreichische Monarchie als Festung zum Schutz der Südgrenze des Imperiums erbaut. Von der kaiserlichen Armee Österreich-Ungarns aufgegeben und gesprengt, wurde es 1918 Teil des Königreichs Jugoslawien. Es blieb bis heute eine Ruine. Da sie nicht genutzt wurde, verschlechterte sich der Zustand der Werk im Laufe der Zeit. Heute ist es ein Denkmal, aber aufgrund seines schlechten Zustands, der fehlenden Infrastruktur und des schlechten Zugangs wird es nur gelegentlich von Einheimischen und Touristen besucht, die die herrliche Aussicht auf die Bucht von Budva genießen. Das Gebäude ist eine Ruine und völlig ungesichert, und als solches stellt es eine Gefahr für neugierige Besucher dar, die die Ruine auf der Suche nach einer besseren Sicht erkunden möchten. Das Werk liegt in der Nähe der Hauptstraße, die Budva mit Cetinje verbindet. Von der Hauptstraße führt die alte Straße zur Festung, die kurz vor dem Werk erbaut wurde. Derzeit ist die Straße in einem schlechten Zustand, aber das Werk ist trotzdem über der neugebauter teil der Straße mit dem Auto erreichbar. Die Gebäudeteile sind teilweise eingestürzt, wobei die Gefahr besteht, dass weitere, größere Teile einstürzen und mit ihnen der wichtigste Teil des Festungsbereichs und der Standort verloren gehen. Obwohl als nationales Kulturdenkmal ünter Schutz gestellt, wurde bis jetzt nichts unternommen, um es physisch zu schützen und mit der Infrastruktur für sichere Touristenbesuche auszustatten.

Das Projekt konzentriert sich darauf, das Werk mit seinem Standort zu analisieren und durch detaillierte Recherchen die bestmöglichen Lösungen zu finden, wie sie in Zukunft behandelt werden sollte, um den vollständigen Verlust der einzartige Werk zu vermeiden. Die detaillierte Untersuchung des Gebäudes und seiner Geschichte bildet den ersten Teil des Projekts, der durch eine Dokumentation des aktuellen Zustands unterstützt wird. Nach der Erhebung und Analyse der Informationen wird festgesetzt, welche Mindestanforderungen nötig sind und welche realistischen weiteren Möglichkeiten es für diesen Ort gibt.

FOREWORD

Strongholds are as old as war. They dominated the warfare and the society itself. Through its eventful history, lands of today's Montenegro were a place that demanded many fortifications. These special and unique objects always dominated the landscape that dictated their form. Serving as a refuge or a projection of military force and power, they were always prominent, easily attracting attention of everyone in their surrounding, awakening the desire to interact with them. Even abandoned and forgotten or a popular landmark, they are a dramatic and poignant reminder of a turbulent times these lands have seen. With their form and atmosphere, they are monuments of hope, representing the struggle of the people.

Since the early age, the fortifications intrigued me. These buildings on the peaks, always perfectly fitted on the location, looked natural, the perfect symbiosis of nature and human creation. Some are fitted so well, that they can be considered as a decoration to the nature itself. Exploring them, I could feel the refuge they offered while enjoying the view that was spreading in all directions. I enjoyed wandering about how they were built on these unreachable places, how did they begin and how long did it take. They come from many periods, and many of them were upgraded by many different nations and cultures, with each layer telling a different story. They all witness the identity of the people that made them and the others that used them through time. Here, the focus will be on the advanced fortification object, coming from the time when the old, stone fortress building technique was at its peak, just before the concrete became the key material for their construction. This makes it special along with the fact that it is the only one of its kind still left standing in Montenegro. Even as a ruin it offers many beautiful and valuable experiences, with a lot more potential to offer.

Through the studies I managed to cooperate with key experts on the topic of Austro-Hungarian fortresses which encouraged me to research it deeper, explore its potential and summarize it in this book. Through this research I discovered that the local inhabitants only have a limited knowledge on what they were and how they looked like, with no real experts in Montenegro on this topic. This finding motivated me to research and properly analyze this monument of great potential which led to many new interesting discoveries.

THANKS

Big thanks to all the interviewed people on their will and motivation, for selflessly narrating the stories. They gave me important informations and guidelines during the research.

Thanks to my mentor Mrs. Ao.Univ. Prof. DI Dr.techn. Caroline Jäger-Klein for supporting me before and during this theses as well as for advices and her guidance. Most importantly for introducing me to many professionals, with which I cooperated at this project.

I would also thank DI Volker Konstantin Pachauer and the "Austrian Society for Fortification Research" for cooperation and support during the preparation and research for this project. With his priceless knowledge of the Austro-Hnugarian fortification systems he introduced me to the topic and the methods of the research.

Special thanks to my friends for their constant support during this project, as well as to my family for supporting me during my whole studies. This would not be possible without them.

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INTRODUCTION

From the situation observed on site, it is clear that the fortress is in bad condition, overgrown by vegetation. As many other fortresses, it has not been maintained at all. Fort Kosmač is the last one left of its kind in Montenegro, that has more than just foundations left. It is close to a populated place and it is accessible by vehicle. Even dough it is declared a cultural monument in 1964, no action hast been taken so far, to conserve it and stop further deterioration.

This project focuses on researching and analyzing all available documents, together with the informations collected on site. The aim is to show the situation and the condition of the fort as accurate as possible. From the detailed research, the historic timeline of the fort will be reconstructed for the first time, telling its story throughout important events of the past. Furthermore, the aim is to analyze it on the base of the rapport plans and compare it to the current condition, analyzing the most critical elements. Based on this analysis, the best possible solutions for future treatment would be explored, to avoid the complete loss of this unique piece of history. Afterwards, the minimal effort to conserve the fort as a ruin will be determined and proposed. These proposals would be discussed in order to evaluate are the investments and needed measures justified. Depending on the results, an alternative rehabilitation option will be considered and developed.

The protection strategies are included in this project proposal. The future use that justifies the investment will be discussed in order to achieve the sustainable conservation through the rehabilitation of this monument.

STATE OF RESEARCH

The building and development of the Austro-Hungarian fortresses was well documented but sadly many of these documents and archives have been lost through the turbulent history of these lands. In the case of Fort Kosmac the Rapport Plans and a few old Photographs can be found in the Viennese War Archive along with many documents that may contain or mention the fort, which would require further research. Some coarse situation plans can be found and Kotor archive, along with the two Photographs in Museum of King Nikola and a few found in the personal collections in Montenegro.

After the collapse of the Austro-Hungarian Empire there were no published documentations of the fortress up until the year 1964 when the Institute for monument and culture protection of Montenegro in Cetnije documented the ruined state in which they found the fortress and officially listed it as a cultural monument.

In the year 2005 the team led by the Mag. Lidija Ljesar made the "Preliminary Technical Assessment" with the feasibility study. This was a part of a "Regional program for cultural and natural heritage in Southeast Europe 2003-2006" financed by European Commission and Council of Europe. The team documented the ruin, tried to reconstruct its form and explored the possibilities of conservation and reconstruction. The research of the fortress was pretty coarse as they haven´t searched the archives outside of Montenegro. The focus was on the future potential of the fortress as a rehabilitated cultural monument.

In 2010 as a part of the same program and based on the previous two reports the same team made the "Business plan of integral rehabilitation and revitalization" which gave a rough cost estimate of the rehabilitation proposals.

The short summery of Fort Kosmač was made in 2012 in the book "Werk: Austo-Hungarian fortresses in Montenegro" of the author Radojica Pavićević, who put a lot of effort in researching the defensive fortifications systems the empire built in Montenegro. This book was upgraded in 2019 dough the description of Fort Kosmač was not changed.

The Administration for the Protection of Cultural Properties under the Ministry of Culture of Montenegro made the study on the revaluation of immovable cultural property in 2014. In this study made by Dobrila Vlahović - conservator, restaurateur advisor, Stevan Dzaković - architect conservator, Žarko Milošević - art historian, researcher and Bratislav Radunović - spec. architecture summarized the information from previous studies, documented the ruin and aimed to precisely define the area around the fortress for its protection.

A year after, in 2015 a conservation project of the fort was made by Architect Goran Radović as an addition to the cable car project that was planned in close vicinity to the fort. The purpose was to show that the cable car upper station along with its gastronomy content does not violate the image of the fort in order to get the permit, which it succeeded.

Two master thesis projects with a topic "Rehabilitation of Fort Kosmač" were developed and presented at the Faculty of Architecture in Podgorica. First in 2010 form Mirko Savićević and the second one in 2017 from Tijana Perović.

In 2018 the Ministry of Culture in cooperation with Austrian embassy in Montenegro organized a survey, documentation and digitalization of the fortress. This was made by the team of the Austrian Archaeological Institute and repeated in 2019.

Since 2019 there were no further official publications or actions planned but the last study indicates that there is an interest for some form of conservation or rehabilitation project. None of these projects contained thorough research of the fort's history nor did they searched further than Montenegro, so none of them has a proper analysis of the fort from the time when it was operational.

METHOD

The main method is the analysis of the material surveyed on the site. After the survey and classification of the collected materials, further research would be conducted in the archives in Vienna and Montenegro, combined with diverse needed literature. The most important are the rapport plans of Fort Kosmač found in Viennese War Archive and the book "Werk 2: Austro-Hungarian fortresses in Montenegro" 2019 by Radojica Pavićević. These were the starting points of the research with the plan as a key element of the analysis supported by the data collected on the site. These connected elements created a base for further archaeological research of the ruin, gradually discovering more details every time. The analysis and the reconstruction of the collected materials was made in cooperation with experts on the topic as well as the locals of the nearby villages through many valuable interviews, talks and visits to the site. Several other interviews have also been made with people tied to the topic of cultural heritage in order to gain better perspective on the topic and situation in the country of Montenegro.

From the analyzed data gained by comparing the rapport plans with the situation on site and the old photographs, the 3D reconstruction was made, improving the awareness of the fortress' from and structure. Additionally, the ruin was filmed and photographed by drone from outside and inside as well. This gadget was an important element during the survey of the ruin and its site, as it enabled the reaching of the hardly accessible places such as the second floor and for valuable areal images. Finally, the Internet search will provide the additional needed support in form of maps, photos to compare and diverse useful information.

site introduction

1

1.1. LOCATION

Fort Kosmač, Latitude: 42°18’04”N Longitude: 18°54’00”E, is situated on the mountain some 815m above the Bay of Budva in Montenegro. Built in 1858, the fortress lies on the peak which rises next to the village of Brajići and falls steeply towards the sea in the Bay of Budva. These characteristics made this peak a perfect observation point for controlling the border between Kingdom of Montenegro and the Austro-Hungarian Empire, which was nearby at the time the fortress was erected.

The village of Brajići lies in southern part of Montenegro, on the mountain range along the shore, spreading from Paštrovska gora on southeast to the Lovćen on the northwest. Northeast, the mountain rises above the valley by the village and on the west the mountain side falls steeply towards the sea.

The village can be reached by road leading from Cetnije to Budva, some 17 km away from Cetinje and about 16 km away from Budva. Fort Kosmač lies on the hill rising above the field, with Brajići village on the west side and Uglješići village on the east edge of the field. The mountainside on the southwest, falls steeply towards the sea in the Bay of Budva, creating a magnificent landscape. Today the village of Brajići has a population of roughly 20 people. Dough small, it is still populated by many native families that lived there for centuries, as well as on the other side in Uglješići too. The people of these villages live in other, nearby cities like Budva, Cetnije and Podgorica. Today, houses in these villages are mostly used as weekend retreats for the families that once lived here in the past.

Fig. 1: Location in Europe
Credits: CountryCodeGuide

The terrain makes the area and the village strategically important, as it forms a natural gateway from the rocky hills of "The Old Montenegro" to the coastal area and lowlands of Budva. Even dough the pass is some 800m above the sea level, it is only 2.8 km away from the shore. In this area the mountains are steep and rocky, creating a difficult terrain, hindering the movement of the people, making it challenging and almost impossible for any kind of vehicles in the past. This type of terrain creates a natural barrier and makes the location a perfect vantage point for observing, both the mountains and the whole coastal panorama. It is a logical position to blockade the pass from "Old Montenegro" to the coastal area, as well as the path along the mountain ridges. This path led just under the peaks, along the mountain range from the old town of Bar from the southeast, to the old town of Kotor to the northwest. The natural crossroads at the village Brajići, as well as many springs concentrated in this area, made it always strategically important for everyone who ruled these lands.

Fig. 2: Ruin of Fort Kosmač with the Bay of Budva in the background, 2018
Credits: ÖAI (Austrian Archaeological Institute)

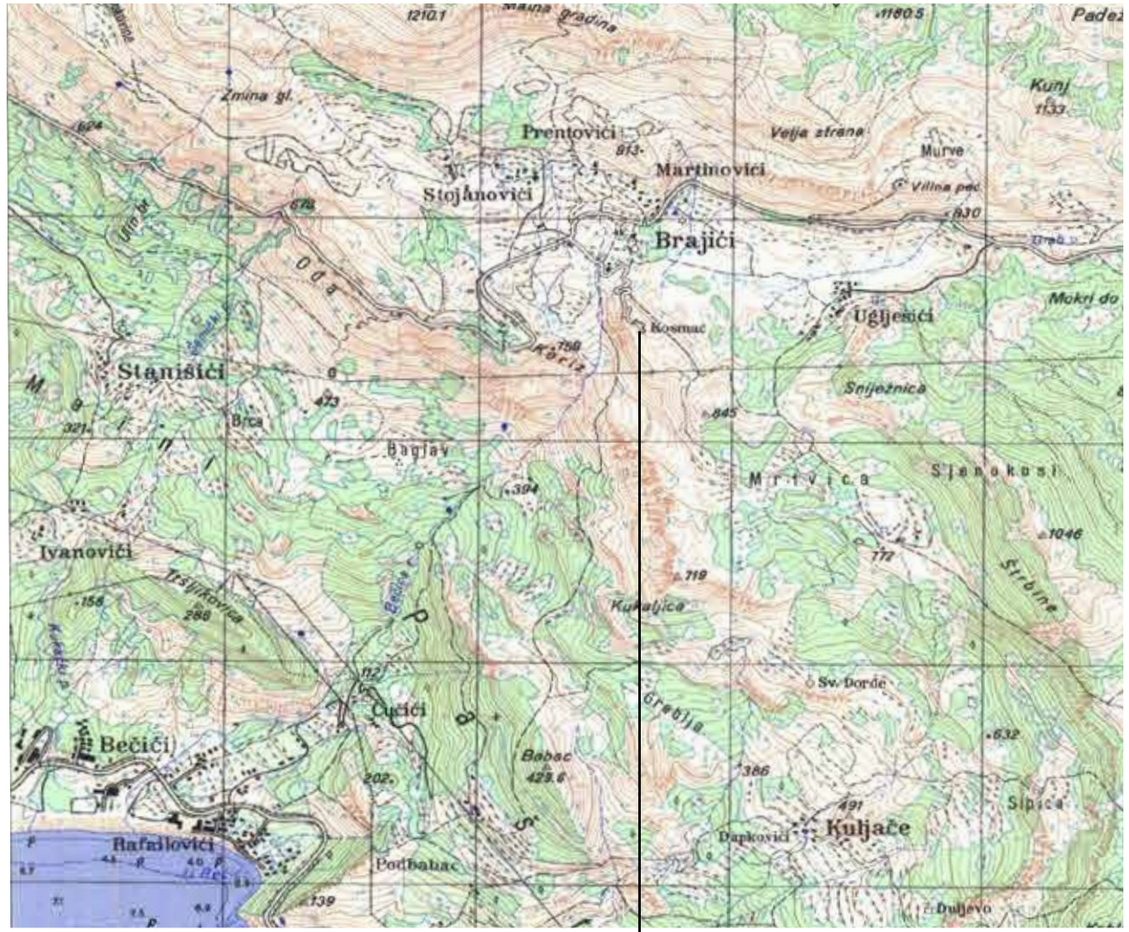


Fig. 3: Topographic map of the area around Brajići
Credits: Military Geographical Institute of Yugoslavia

Fort Kosmač

1.2. HISTORIC REFERENCE

For the Austro-Hungarian Empire, the coastline was the most important part so they used the first high peaks and ridges over the sea as a natural border, which should have made the border easier to defend and observe. To defend the border, they built a chain of fortresses along the border and every fortress had a visual contact with at least one other fortress, so that they could communicate by a light-telegraph, later replaced by telephone. Except visually, all the fortresses were connected with one another by road, wide enough for the animals and carriages to pass, making the logistics and defense easier and faster. On some parts, the old road from the time of Austro-Hungarian Empire is still visible and even usable.

On the part from Budva to Brajići the new road is positioned above the old imperial road that climbed from the sea to the pass by the Brajići village. Northwest from Brajići, the old road called “Pandur Way” leads to Stanjevići monastery and further to the Fort Goražda, above the fortified pass Trojica/Trinita to the old town of Kotor.

Due to its strategic location, the old monastery Stanjevići was bought from the Kingdom of Montenegro, under pressure of Austro-Hungarian Empire, and turned into a fortress. Today, the Stanjevići is a monastery again, rebuilt by the Serbian Orthodox Church after it was left in ruins for many years. On the southeast, the road leads to monastery St. Spiridon where the Fort Spiridone was located. Only the foundations of the Fort Spiridone remain today after it

Fig. 4: Map of Europe 1815
Credits: themaparchive

was demolished during the retreat by the Austro-Hungarian Empire. The road led further southeast to Fort Kopac, Fort Presjeka and the most southern point of the empire. Both Fort Kopac and Fort Presjeka were demolished so only foundations remain today. Overgrown by the vegetation, the foundations are hidden and both forts remain practically unknown to most of the inhabitants and the tourists. Further the road led to Buljarica, along which a plate carved into the stone was placed, marking the most southern point of the Austro-Hungarina Empire at the time. Later, the road went even further to the old town of Bar and the empire reached even to Ulcinj, close to today´s border with Albania, but the empire didn´t manage to hold these lands for long, therefore they didn´t build bigger fortifications in this part.

1.3. CURRENT SITUATION

Lord Byron, an English poet and politician from XVIII - XIX century.

"When the pearls of nature were sown, on this soil an overflowing handful was gathered"

"The most beautiful contact between the earth and sea took place at the Montenegrin littoral"

Lord Byron

The mountains in this part of Montenegro are still wild and underdeveloped in the means of infrastructure, even though there are some small, old villages and some monasteries in the area. The roads that lead to villages and monasteries are narrow and mostly unpaved, on some parts even the old Austro-Hungarian road is still being used today, in its original state, without any reparations. The old road made by the empire goes along the ridges, so it has a great view of the coast all along its trajectory. This makes it perfect for hiking, so wherever possible the hiking routs are placed on it. Some places along this route are also being used as improvised starting points for para-gliding and only a few brave tourists explore it in search for some adventure. This breathtaking wilderness, rich with history and relics from the past times, has a great value, not for a modern development with new hotels, villas or resorts but as wild nature, where the time stopped, on a palm of your hand, just a few minutes drive from the coastal towns.

1.4.
THE RISK OF DEVELOPMENT

Today, the mankind is capable of building faster and more than ever before, consuming the space quickly leaving just a few oases for the nature that once flourished in the area. The resulting expansion and low-cost oriented development are rarely fitting with the nature of the area. The materials and methods used, leave traces that can hardly be undone in the future, needing even more money and time to do it.

Therefore, now more than ever, it is very important to control the development and the expansion with the aim to preserve as much nature and space as possible. The uncontrolled development of the coastal towns and narrow area around it has filled up almost all the space on the coast, so slowly it reaches the mountains in the background and the highlands behind it. Neither the greatly needed infrastructure, nor the proper planning and regulations, that were supposed assure the sustainable development, to save the wilderness of the coast as it's most important quality, has been made till today.

The coast, one of the most important and most valuable part of the country is being developed without a future oriented strategy where the usage of the space is controlled and focused on small areas to preserve the space and the quality of the land. This way of development makes more and more problems during and off the season each year, so today it looks more like the cancer eating away the land, destroying the nature in the process. If continued, the buildings will eventually reach the top of the hills and the wilderness will turn to poorly planned suburbs, which will eventually endanger the iconic silhouette of the coast that gave the name "Montenegro".

The mountains in the background of the coast are one of the few elements still preserved due to their inaccessibility. This will not pose an obstacle for long, as the technology advances and becomes cheaper and more available to everyone. Therefore, a urgent change of course is needed to preserve the only thing that makes the cost of Montenegro authentic - it's wilderness. To achieve the self-sustaining development of the coastal area, it is necessary to improve the quality of the existing by providing the proper infrastructure. Good examples are so called "Etno villages" and "Eco villages", aiming to give the feeling of the old times when people coexisted with a nature in a symbiosis. In this area there are many places for development of such a tourism, which doesn't require big costly buildings and focuses on improving the existing old buildings, preserving the nature and revives the old way of living. This type of a getaway is becoming more popular, as the life in big cities gets too monotone and stressful. Great addition to this villages are the old, hidden

Fig. 5: Bay of Budva with the hinterland, 2019
Credits: Google earth

and forgotten ruins, softly reminding us of this area's rich history. They are a perfect detail in this strategy, which makes the place unique and improves the quality of the area.
Fort Kosmač has the greatest potential for preservation and rehabilitation, as it has a unique form and breathtaking location, suitable for such action.
The old road as well is an important element, to make the nature accessible to hikers and bikers, visitors in general, dough it is not equipped with infrastructure adapted for a contemporary human habits. The road is in a poor state, sometimes barely even recognizable, but it is still good enough for hiking, riding, or mountain biking. It's current state gives a mystical feeling to the area and makes people aware that this wilderness was once a turbulent borderland. Therefore, the road does not require many financial investment, restoration or reparations, only much needed infrastructure such as garbage bins, benches, and info tables. Currently, the old road is partially used as a hiking transversal Orijen-Lovćen-Rumija, connecting the coastal mountains along the ridges and leading to some remote monasteries but there are no shelters or any other infrastructure, anywhere along the way.

The descriptions of the surroundings and the signposts are only found at the begging of the trails, containing some information about the trail, but not of it's history rich surroundings. Along the road, hikers will find several natural springs due to the geological composition of the terrain. Around thirty springs are located only in the close vicinity of Fort Kosmač. During and after heavy rains all these springs swell with water, creating streams and waterfalls. Under the fortress, there is a cave that fills up with water from the nearby streams during heavy rains with water poring out of the rock, on the steep side of the hill under the fortress. Among many others this would surely be an interesting detail to see along this road, but due to the poor informing infrastructure such things are hidden from sight and only the locals know where they are. On the approach to the fort there are some carvings with names, ranks and companies of soldiers that served in the fortress.

After so many years, most of them are barely readable but some can still be restored. Near fortresses and along the road, small objects can be found, dating from long passed times but many people can´t tell what the object, although they could be easily holding some 150 years old piece in their hands.

Fig. 6: Pržno, 2018
Village near Budva (only a few houses were here less than two decades ago)
Credits: A place in Montenegro

Fig. 7: Bečići,2018, next to Budva (barely a village a decade ago. Example of an uncontrolled development)
Credits: Paragliding4.me

Fig. 8: Rank, name (Oberst Wolf) and company of a soldier who served at Fort Kosmač carved in the stone along the serpentine road
Credits: Ivan Vratnica

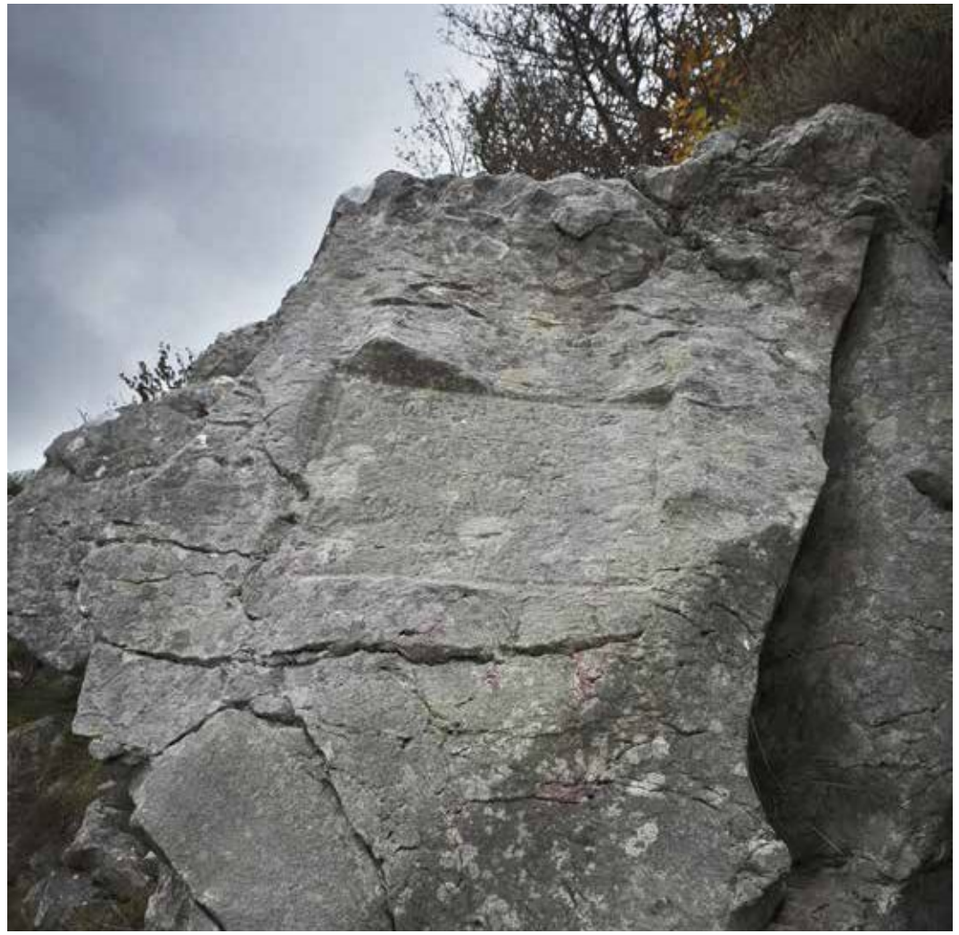


Fig. 9: Rank, name and company (not readable) of a soldier who served at Fort Kosmač carved in the stone along the serpentine road (not far away from previous one)
Credits: Ivan Vratnica

Fig. 10: Spring well along the road from Fort Kosmač to Fort Spiridone, made by the Austro-Hungarian army
Credits: Savo Martinović

Fig. 11:
Austro-Hungarian coins found around the Fort Kosmač
Credits: Savo Martinović

1.5. FORT KOSMAČ TODAY

Finished in year 1858, after more than 160 years, Fort Kosmač is a ruin today. After it was demolished and set on fire by the imperial army in summer of 1914, just after the beginning of the First Word War, it was left in inadequate condition for military use and the locals slowly started taking stone and other parts for construction material after the war. In the Second World War, the ruin was used by Italians as a fortified position, but no reparations were made.
During the Second World War there were encounters in this area and the ruin was damaged during these battles. Some cannon shots are still visible on the walls. On the northwestern part of the building, in the corner of the joint of the southern wing and the central part, there is a big opening in the wall on the first floor, probably made by the cannon shoot in the Second World War according to the stories of some locals. Due to it's critical location, the opening was getting bigger as the time passed. The stones above the opening became unstable and everything slowly crumbled. This hole is a bigger structural damage on the outside walls.

Other than the big structural walls, all the inside walls are gone, and their material lies on the ground floor mixed with the material from the first and second floor.

Fig. 12:
Fort Kosmac, 2018
Credits: Ivan Vratnica

1.6. THE GOAL

The task is to explore and assess the situation of Fort Kosmač and from it, to develop ideas to conserve and revitalize it. After many visits to the ruin and surveying the area several times, gradually discovering details about its history, structure and current state, there is much more to it than meets the eye or can be found in the official records.

The fort still has most of its original substance but a lot of it had collapsed over time and recently a lot of stone, as well as all the metal parts had been taken away to be reused. On paper, the fortress is a protected monument by law, with a great view still attracts curious visitors, although it has neither infrastructure nor needed measures to protect the visitors and the substance of a fortress. These aspects are going to be thoroughly analyzed in the frame of this thesis as well as the possibilities, developed on the result of this analysis.

Fig. 13: Signs inside the Fort's courtyard, 2019
Credits: Ivan Vratnica

history

2

The Balkan Peninsula has always been the crossroads between Europe and Asia Minor to the southeast, therefore all the great powers of the time Russia, Britain, France, Austria, Italy and the Ottoman Empire had their interests in the region and tried to control important strategic locations.
The Boka is a fjord shaped bay composed of three wide basins, which makes a good natural safe harbor and it is unique for the Adriatic, which makes it an important strategic location.

2.1. GENERAL HISTORY OF THE REGION

After the collapse of the Venetian Empire in the 1797, the Austrian Empire got the north-eastern coast of the Adriatic Sea in the Treaty of Campo Formio, between Austria and France. Among those newly gained territories was the Boka Kotorska (Bays of Herceg Novi, Tivat, Risan and Kotor) and Bay of Budva. At the time there were disagreements in the Boka and due to the fear that the French may get the Boka with surrounding territory, inhabitants asked the Austrians to occupy the Boka as some of the inhabitants were Catholics, so they preferred the Austrian rule rather than the French and the orthodox wanted Petar I, the ruler of Montenegro. On August 24th, 1797, the Austrian flotilla enters the Bay of Kotor with the ceremonial welcome. On the August 27th they enter Budva and immediately start further fortifying the old town as well as the towns in Boka.[1]

Due to the overlapping interests between Austria, France, Russia, Britain as well as Montenegro, there were frequent conflicts in the area, resulting with war between Austria and France in May 1799 which lasted in the area up until the 1801. Montenegro saw the Boka as a rightful part of its territory, as many orthodox lived there and the natural connection of the land. In 1805 the war breaks out again and the Austria loses, so it had to give up all the territories it gained in the Treaty of Campo Formio to the French, including Boka and Budva.[2]

With help from Russian navy in 1806, Montenegro led by Prince Bishop Petar I Petrovic, enters Boka and establishes a sphere of influence. The same year,

Fig. 14: - Map of Europe, 1810
Credits: themaparchive

the French try to enter Boka by force but it is protected by Montenegrin troops and Russian ships, so the French are repelled whit huge losses on both sides and many soldiers taken prisoners. The conflict ended with the Treaty of Tilsit on July 7th, 1807 between Russia and France. The French got the Boka and they started fortifying it straight away.[3]

After the Napoleon`s failure in Russia in 1813, Montenegro captures Budva and later, supported by British ships, regains Kotor and Boka. In the 1814 the Austrians try to enter Boka with their troops, but they are stopped by Montenegrins by Herceg Novi. The same year the Great Powers annexed Boka to Austria at the Viennese Congress. Boka and the Budva remained as part of Austria until the end of the First World War.[4]

2.2. AUSTRIANS IN BOKA AND BUDVA

After the Boka officially became the part of Austrian Empire in 1814, it was the most southern part of the Kingdom of Dalmatia and of all the empire. The official language was Italian, but the military was commanded in German. Soon afterwards, they started fortifying the towns, building smaller fortresses to secure the border and new roads as well. The empire aimed to totally integrate the newly gained provinces, so to achieve this, they abolished the self-government of Boka and installed the total military control. In the year 1820 the religious jurisdiction of Petar I Petrović, bishop of Montenegro was transferred to Dalmatian bishop in Zadar. Despite this, the Bokelians still praised Petar I and sought his council. After the collapse of the Venetian Republic, Austrian Empire inherited their fleet. After realizing the importance of the navy in the middle of the 19th century, the Austrian Vice-Admiral William Baron von Tegetthoff

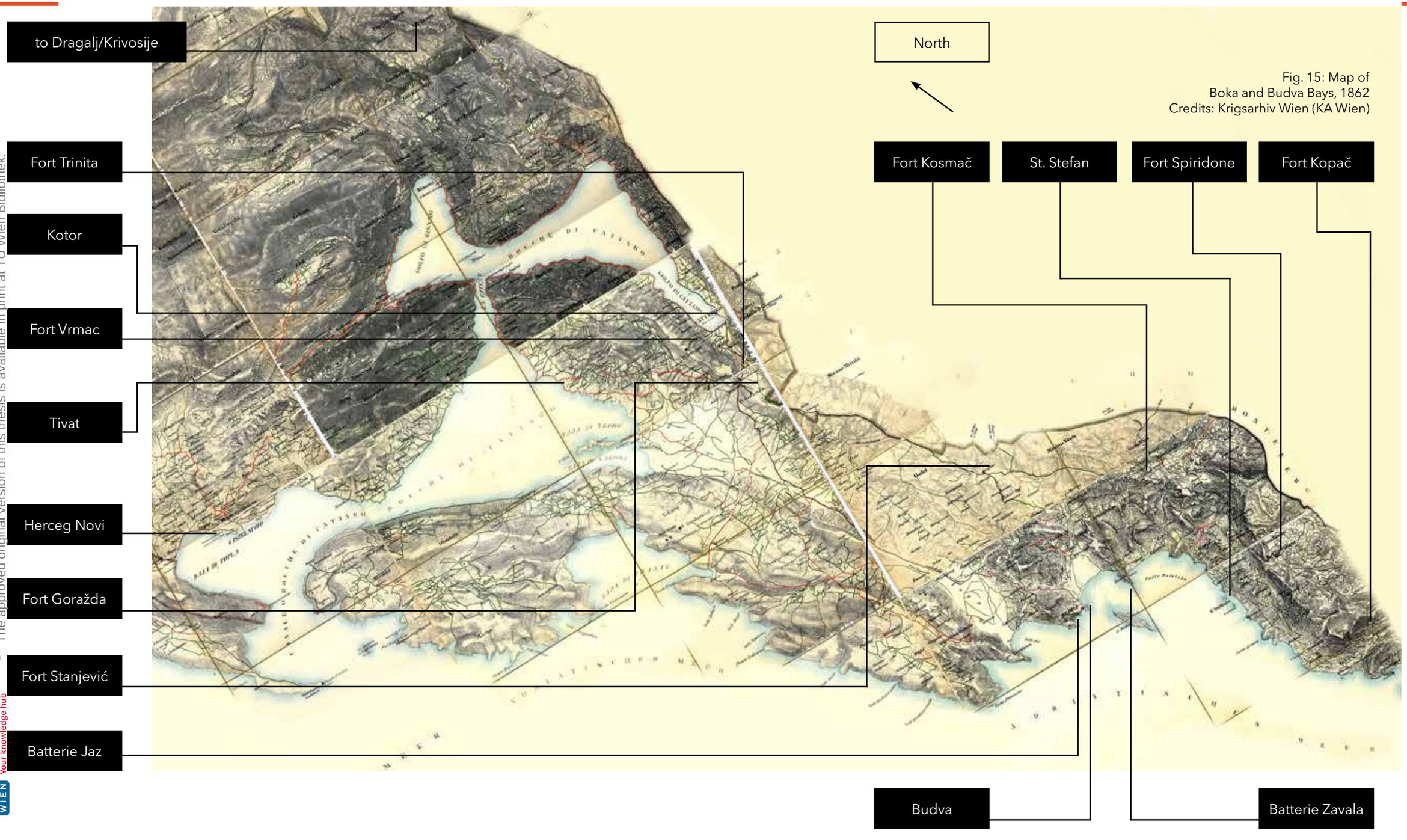


Fig. 15: Map of
Boka and Budva Bays, 1862
Credits: Krigsarhiv Wien (KA Wien)

5. R. Pavićević - Werk II: Austro-Hungarian Fortresses in Montenegro

6. Kovačević - Uprising in Southern Dalmatia p. 225

ordered the modernization of the fleet and the building of new modern ships. The one of the purposes of the navy was to help maintain the order in the newly gained coastal area but soon they released it had much bigger potential. The Austrian Empire have seen the great importance of Boka and Budva for its navy and started building fortifications to defend its borders there. Boka was a good natural harbor and the Austrians made it their second war harbor, building many layers of fortification to defend it. The Bay of Budva was also fortified and made into a support harbor, dough with less fortifications than in the Boka. Its purpose was to close of the possible approach to Boka from the south-east. The goal was to hamper the possible assaults from Montenegro to the north-east and by the Ottomans from the south-east. Initially, the fortresses were made as coastal blocking fortresses but as the navy took the main role, they changed the strategy into zone fortifications intended to secure the war harbors for navy ships. This strategy was mostly concentrated to the fortresses built around the Boka bay.[5]

To properly secure Boka, the extended area of the Old Town Budva had to be secured too. To achieve this, the Austrians created the extended defensive area of Budva. It was a chain of mountain fortresses placed on top of the mountain ridges rising above the coastline. This was not a simple task to achieve as the local inhabitants did not sympathize the new rulers. The border was not clearly defined, which led to occasional conflicts in the first few decades. In the year 1837 the Austrian Empire started the demarcation procedure that lasted until the 1841. This included precise measuring to establish the border and buying the land from locals for the needs of the empire. The empire started building new roads, repairing the old ones and building mountain fortresses, so called blocking fortresses on all important mountain passes and roads that lead to Kingdom of Montenegro. In 1838 there was a bloody conflict at Kosmač and all along the border with Montenegro. Due to these conflicts the demarcation negotiations were seized, and they continued after the Russian Empire intervened on behalf of the Austrian Empire.6 The same year, the empire builds Forts Spiridone and Fort Kopač, connecting them with roads. In the year 1839 the empire bought Stanjevići and Podmaine (Podostrog)

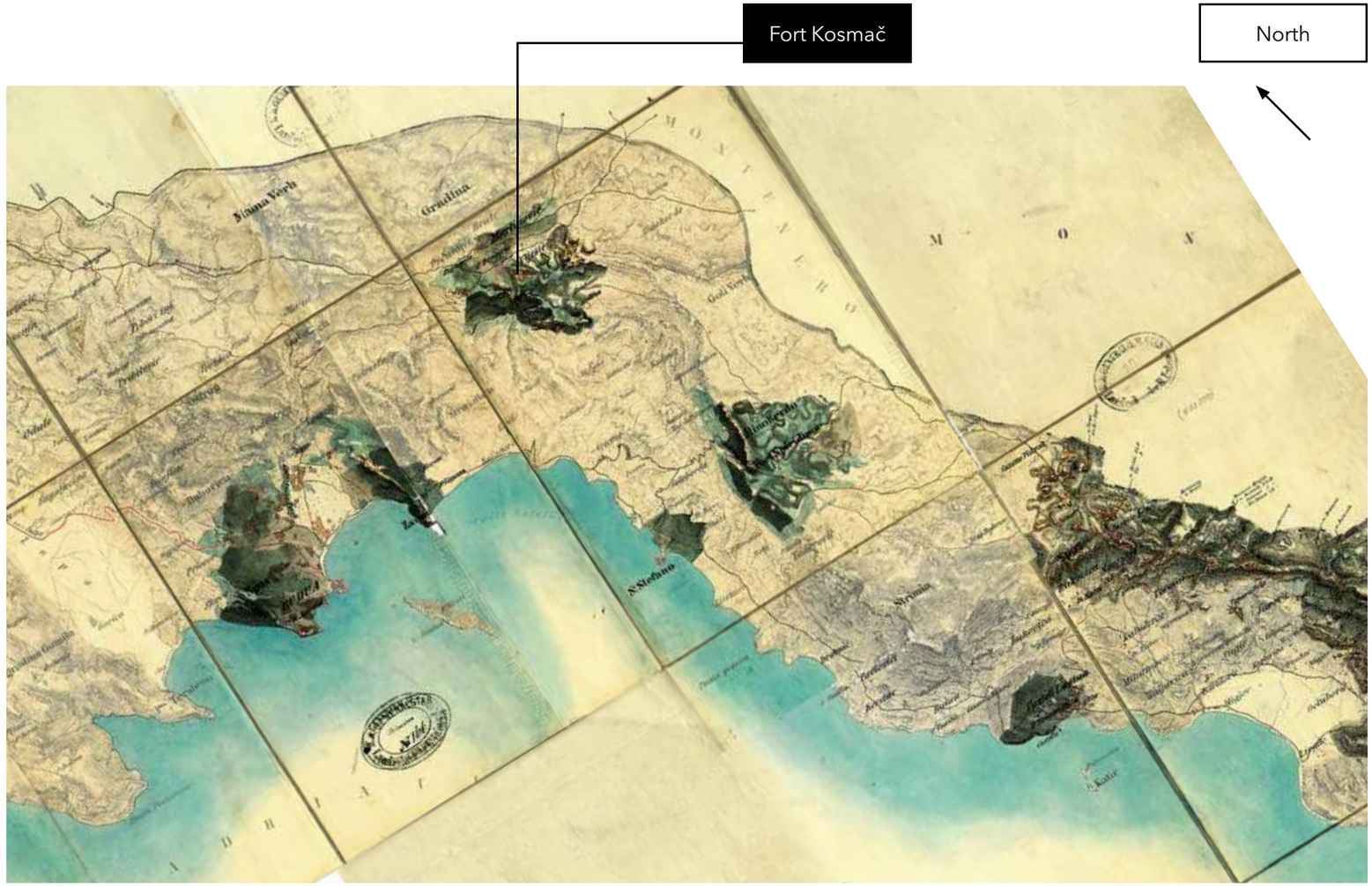


Fig. 16: Extended defensive area of Budva, 1903
Credits: KA Wien

monasteries, under political pressure as it was an important place for the Dynasty Petrović, the rulers of Monetengro. Later the Stanjevići monastery became Fort Stanjević. The monastery was halfway on the road between the Trojica pass in the Boka and the village of Brajići, an important mountain pass and crossroads. This was a very important strategic point for the Austrians, therefore they pressured the Bishop of Montenegro to sell them the monastery with the argument that it lies too deep into Austrian territory. From the village of Brajići the road lead south-east to the monastery St Spiridone. Near this monastery the empire erected Fort Spiridone to block the pass from Montenegro to Paštrovići and St Stefan. From there, the road leads to Fort Kopač, on the mountain ridge above Petrovac blocking the pass from Crmnica (a region in Montenegro) to the town of Petrovac. Ten years later in 1848, the empire builds Fort Presjeka further along the mountain ridge and connects it with a road to Fort Kopac. Fort Presjeka was blocking the pass from the highlands to the shore and secured the road along the ridge that further led to Spic and the Old town of Bar, under ottoman rule.

In the year 1858, the construction of Fort Kosmač was finished. It was meant to improve the control at the mountain pass, by the Brajići village, from Montenegro to Budva. In 1867, the Austrian empire became the unity of Austria and Hungary after the Hungarian uprising and changed the name into Austro-Hungarian Empire. The fortification of the border continued until the beginning of the First World War in 1914.

These fortresses created an extended defensive area of Budva and even though the strategy was developing to zone fortresses, these were made as blocking mountain fortresses intended to secure the passes along the border. Due to their border controlling function they were all abandoned and demolished at the beginning of the First World War as the empire realized they could not be used to form a functional front line, therefore they could not be properly defended.

"Der Bau wurde im Jahre 1858 begonnen und geht in diesem Jahr zu Ende"
(The construction began in the year 1858 and it was finished the same year)

Source: KA GPA Inland C III Cattaro Nr. 13 "Historische Notizen"

Fig. 17: Map of Europe, 1867 (uprisings)
Credits: Edmaps

ARMAMENT AND CREW

In the year 1869 it had a crew of 46 infantry men from 27. Jägerbataillon[7]:

1 Lieutenant
(Commander of the fortress)
1 Sargent
1 Staff Sargent
4 Lance Sergeants
3 patrol leaders
1 chronicler
33 soldiers (Ger. Jäger)

19 men from the k.u.k Artilleriebataillon:

1 Lieutenant – battery commander
1 ammunition specialist
(Ger. Feuerwerker)
2 corporals
9 Gunnery corporals
6 Gunners)

The armament was:

4x 6-pounder mountain cannons
4x 7-pounder grenade cannons.

Judging by its form and the crew, the fortress was constructed in the old-style fortifications, tough modern for the time, made to be versatile and not only as artillery position, as the specialized fortresses built later on. Its purpose was to observe, guard the border and control the pathways that converged on its position.

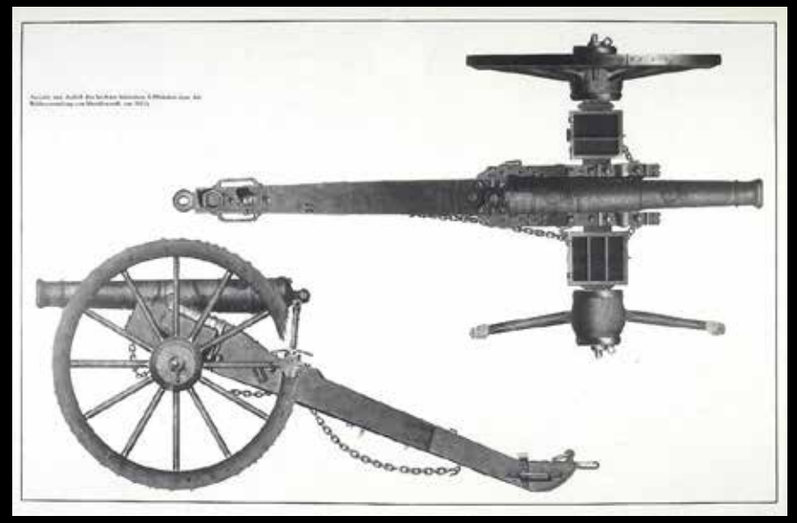
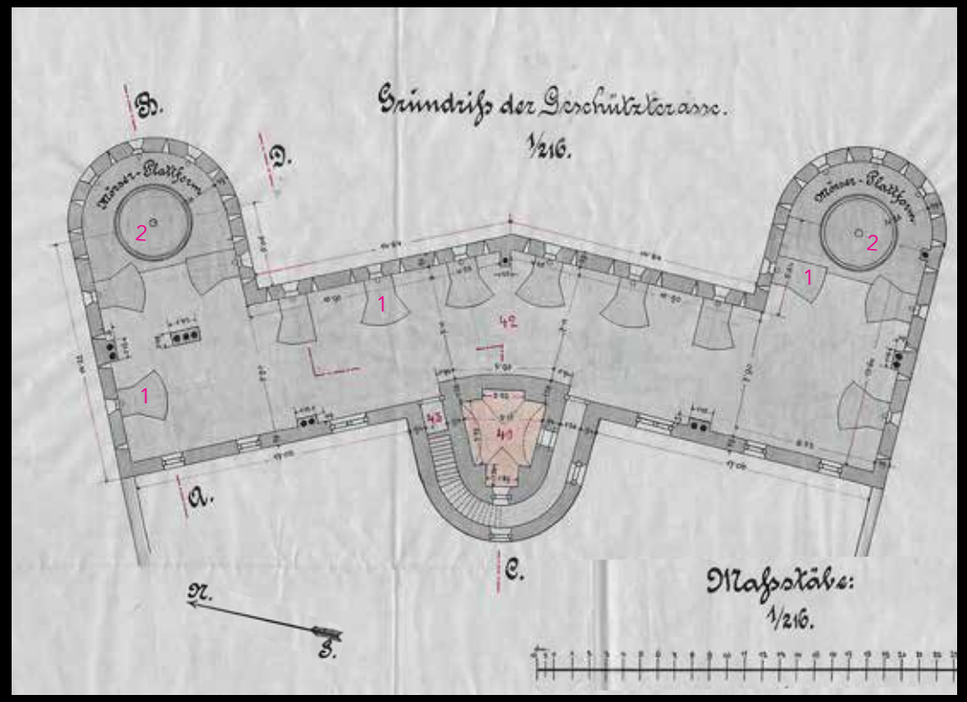


Fig. 18:
6 Pounder cannon
Credits: Mark Dressler, Ernst Landolt "DIE KANONE VON WÄDENSWIL"

Fig. 19: Second floor plan, Fort Kosmač Rapports plan 1902

The cannon terrace - 42 (Ger. Geschützterrasse)
Ammunition storage - 41
Lafette for the 6- and 7-punder canons, later for 9cm M4 canons - 1
(blue circle under the window where the M4 was docked)
Lafette for the 15cm
mortars - 2
Credits: KA Wien



ARMAMENT AND CREW

In 1902, It housed some 254 men thereof[20]:

2 infantry officers a
134 infantry men
3 artillery officers
104 artillery men
1 pioneer officer
8 men
2 telephone operators.

This many troops were a lot for its size, meaning the fortress and the units stationed there had a versatile role. The main armament consisted of:

6x M4 90mm cannons
2x M78 150mm Mörser cannons

These were placed on the second floor of the fortress called the cannon terrace (Ger. Geschützterrasse) covered by slanted roof.

From the antipersonnel armament it had:
2x M89/4 8mm Mitrailleusen (machine-guns)
16x 8mm rifle (mounted on gun mounts)

Inside the courtyard there was a room for pigeons, or some other birds used for delivering massages which was later supplemented by the telegraph, and then the telephone as well as stables for two horses.

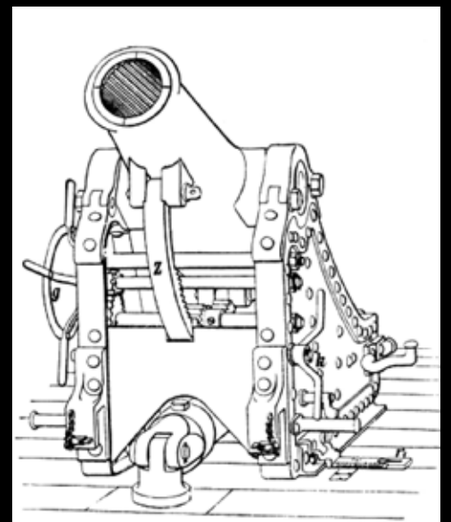


Fig. 20: 15cm M78 Mörser
(150 mm Mortar)
Source: Lehrbuch der Waffenlehre, 1905

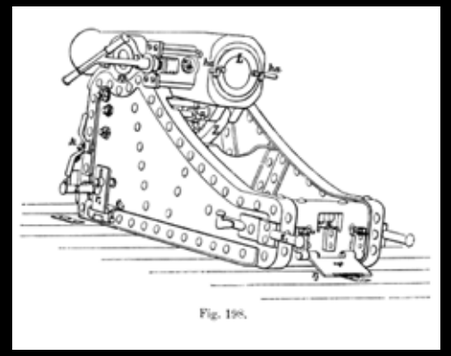


Fig. 21 (bottom right): Rifle mount
(Ger. Schartenkonstruktion für eine Gewehrlafette)
Source: Austrian Society for Fortification Research

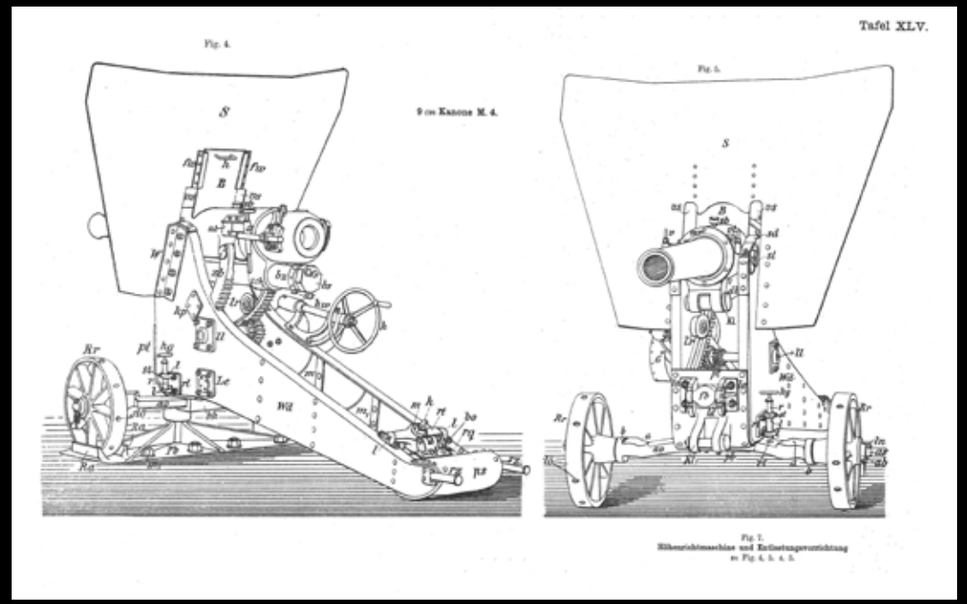
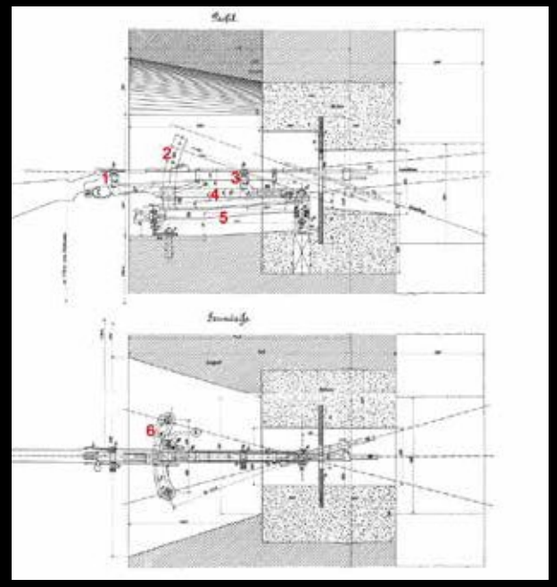


Fig. 22: 9cm M4 Cannon
Source: A. Dolleczek - "History of the Austrian artilleryʺ, 1973



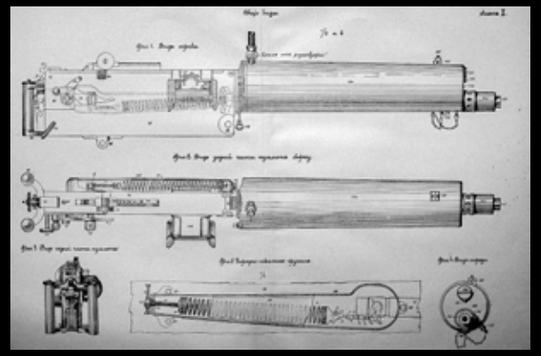


Fig. 23 (far right):
Maxim Gun
(The M89/4 8mm was similar to the Maxim Gun)
Source: Blueprints

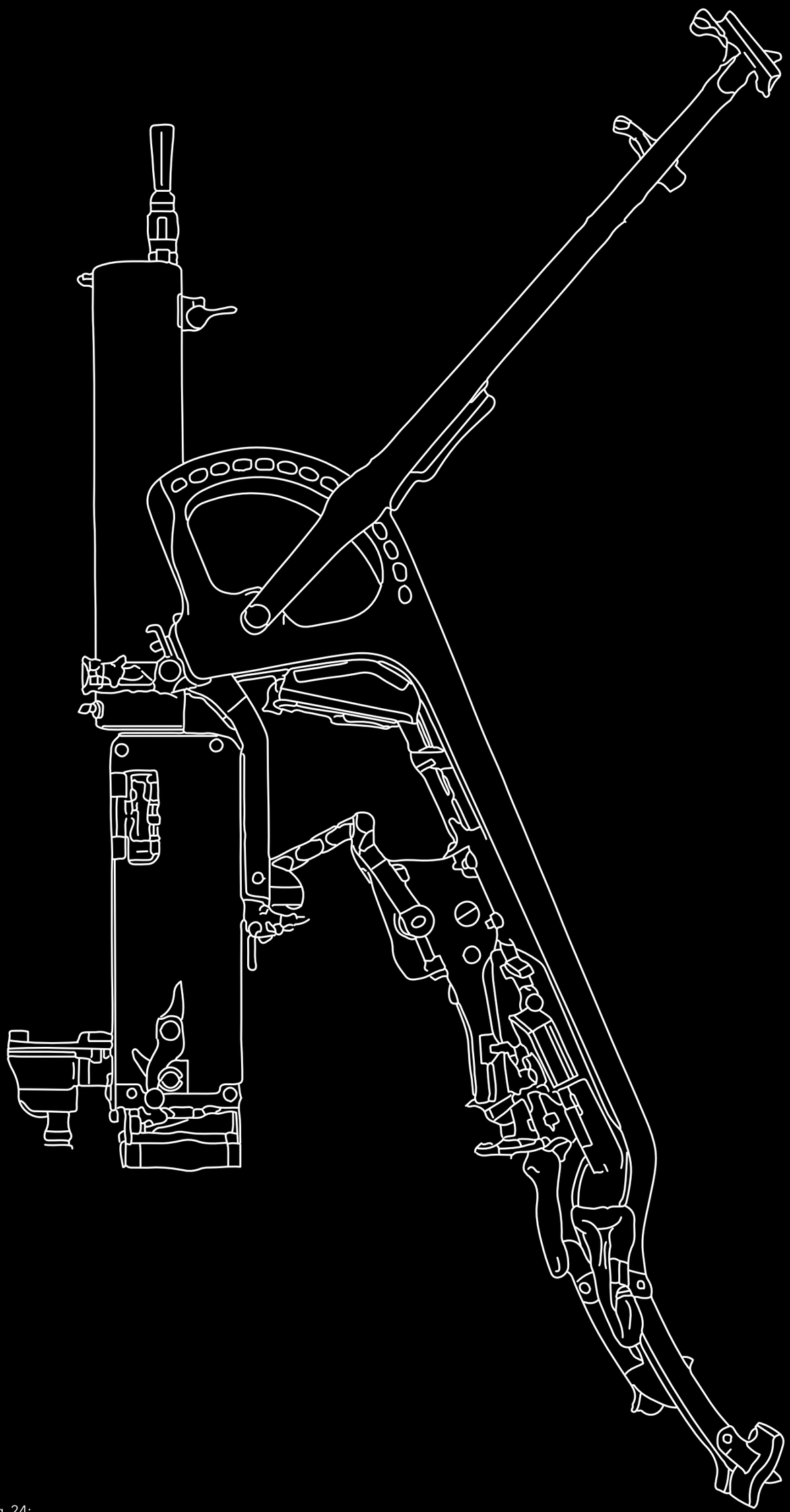


Fig. 24:
Maxim Gun
(The M89/4 8mm was similar to the Maxim Gun)
Source: Blueprints

2.3. FORT KOSMAČ DURING THE 1869 BOKELIAN UPRISING

Fig. 25: Budva around, 1860
Credits: KA WIen

The situation in Boka was tense whit occasional conflicts as most of the population saw the Austrian rulers as occupants which had to keep up the order with military control. This resulted in general dissatisfaction.
On the October 7th 1869 started the Krivošije uprising (better known as the Bokelian uprising and Dalmatian uprising) which lasted for 100 days, as a reaction to a new law that was to introduce conscription in the region of Boka, as well as the loss of the other benefits the Bokelians had. The conscription was to be 2 years in active service and 10 years in reserve, preventing the young men to leave the Boka and work as sailors, which was the common profession. The parliament of Kotor objected on September 27th, demanding adjustment of the law, which was completely rejected. This uprising started in Krivošije, on the plateau Dragalj, north of Boka bay, but quickly spread all along the border with Montenegro. Even dough it started in Krivošije most of the 2000 insurgents some 70% were from the area of Budva. By the census made in 1869 there were 565 people living in Brajici.[8]
At the start of the uprising, the imperial army had 44th Infantry regiment (around 300 soldiers) in Kotor and the 27th Jägerbataillon (Eng. 27th Fighter battalion) in Budva. They were set up in the fortifications in platoons from 15 to 46 men. Consequence was an overstretch of forces in the area weakening their power. In addition, many of the mountain fortresses no telegraph connection and only relied on couriers to communicate to each other.[9]

Two weeks later they were reinforced by forces from 22nd Infantry regiment from Dubrovnik, 48th Infantry regiment

8. Population statistics in Dalmatia, Zadar 1885

7. 27th Jägerbataillon's Captain Hugo von Czechka – Uprisings in South Dalmatia in years 1869/70 and 1881/82

Fig. 26: Panoramic drawing afrom Fort Kosmač
Author: B. Zinnenberg
Credits: KA Wien

from Zadar, 52nd Infantry regiment from Split, 7th Infantry regiment from Graz, 8th Jägerbataillon from Maribor and 9th Jägerbataillon from Celje.[10]

The inhabitants of Grbalj, Maine, Pobori and Brajići gathered at Podlastva monastery on October 20th for a vow to each other to fight in the uprising. The tribe of Grbalj was to take Fort Goražda, Brajići to take Fort Kosmač, Pobori to take Fort Stanjević and Maine to take Budva. Every tribe have formed companies, made of 100 people which were internally divided into squads of 10 people. The goals were to sever the connection to Kotor by taking fortress on Trojica pass and Fort Goražda near Kotor, to take the fortresses along the border with Montenegro and simultaneously to capture the town of Budva as the 27th Jägerbataillon stationed there went to fight the insurgents in Krivošije.

First, the insurgents cut the telegraph lines to Kotor, to disable the fastest way of communication to delay the reinforcements response.
On October 21st, the Pobori with help from Maine infiltrated and captured Fort Stanjević taking all the armament and ammunition, later setting it on fire. The next day, Stefan Mitrov Ljubiša, the representer of Boka in the Dalmatian parliament as well as in the imperial council in Vienna and a mayor of Budva at the time, realized there was a rebellion and tried to inform his superior Field marshal Wagner in Kotor. As the communications were cut off, he was eventually forced to use the international lines and so, the whole Europe knew about the uprising and the fall of the Fort Stanjević, everyone except the nearby imperial forces. The rebellion spread fast in the region and soon Budva was under siege, which did not last long as the 27th Jägerbataillon returned on 23rd early in the morning aboard the warship "Andreas Hoffer" and the insurgents were repealed.
The same day the insurgents attacked Fort Goražda and Fort Trinita near Kotor, dough unsuccessfully as the reinforcements came from Kotor. From there, the imperial army under Field Marshall Wagner, general Dormus and Lieutenant Fisher organized a push, advancing towards Budva, to quell the uprising in the region.
Meanwhile, the Brajići had a plan to take Fort Kosmač by surprise, as it's crew still has not been aware of the fall of Fort Stanjević in the night between the 21st and 22nd. The women and children were moved to Monetenegro on November 2nd as they prepared for the sudden attack. They were wrong, as the commander of the fortress was warned of a possible attack on the 23rd by a local. He closed the fort but as they still haven't been aware of the fall of nearby fort they still managed to lose both of their commanding officers in the attack. The battle for Fort Kosmač started with the insurgents capturing the Infantry Lieutenant and killing the commander of Fort Kosmač by Vukale Perov Stojanović, at dawn on November 4th. He was a good marksman, so he was selected to make the first strike. During the night he moved to about 120 meters close to the fort with a few men, from where he shoot the commander as he appeared at the gate.[11]

This event is well described in the book of Josef Graf Stürgh G.d.I. – "Politische und militärische Erinnerungen aus meinem Leben" List Verlag Leipzig 1922 (Eng. Josef Graf Stürgh G.d.I. – "Political and military memories from my life" Leipzig 1922), who was stationed there with a 36th Jägerbattalion in 1882.[12]

10. Stijepović - Uprising in the Boka 1869
11. Local source
12. Norbert Zsupanek in "K.u.K. Befestigungen, Militärbauten und Anlagen im Raum Cattaro (Kotor)"; Eng. "K.u.K. Fortifications, Military buildings and installations in the area of Cattaro (Kotor)" 2009

The Grave in Blocking fortress Kozmac

"In the year 1869, the artillery First-Lieutenant Josef März was the commander of the Fort Kosmac, whose infantry was commanded by the lieutenant and the artillery detachment commanded by a Feuerwerker (equivalent to Master-Sargent, the firing and ammunition specialist). In spite of the uncertain conditions, the infantry lieutenant[13] could not be dissuaded from often leaving the fort alone, either because of the hunting passion, or because the repeated secret meetings with a girl from the village he tried to hide. So, he left the fort again on a November afternoon, although First-Lieutenant März advised him against it. When dawn came and he had not returned, First-Lieutenant März began to get worried and finally, as there was still no sign of the lieutenant for a long time, could no longer hold back his fear and concern for his comrade.
He hurried to the gate, had the guard open it, and crossed the ditch on a plank to look outside for his comrade. But he had barely reached the edge of the ditch beyond when a few shots were fired from a close distance and several wild figures broke out of their hiding places behind the rocks and rushed towards the gate. First-Lieutenant März had just enough strength to flee back into the fort and have the gate closed; then he collapsed lifeless. The attackers, who saw their attack unsuccessful, quickly retreated from the firing range of the guards into the darkness. The poor First-Lieutenant was brought to his room in a dying state. The fort now had only the Feuerwerker as the commander. He, an energetic, cold-blooded person, made himself and the crew clear of the situation and carefully made every effort to withstand a night attack. But the night was calm, although the insurgents sneaked around and watched the fort.

The next morning, however, a group of insurgents, waving a white flag, showed themselves within walking distance of the fort and, in the group of them, brought with them the lieutenant who had been missing since the previous day. Their leader, in which the crew recognized the leader of the congregation in Braic, was now asking the commander to hand over the fort, in exchange of lieutenant's release, and the crew would be given a free passage.

The good Feuerwerker, mindful of his duty, did not started any negotiations, but chased the insurgents away with a few rifle shots. They dragged their prisoner away with them. Prepared to be attacked by them, especially during the dark, and in those places where, the ditch was the weakest and the entry into the courtyard was most likely, he not only doubled his vigilance, but now began firring on the houses with the guns of the fort, for there was no longer any doubt that it was the local residents who had captured the lieutenant and carried out the attack on the fort. Indeed, this unique battle lasted for two days, in which a crowd of insurgents with the most primitive means besieged a well-defended fortification, hoping that the defenders would be demoralized by the loss of their two officers, would, under pressure of the persistent attacks, surrender the fort. However, they were wrong and meanwhile a well-aimed gunfire destroyed several of their houses, primarily that of the Braic leader.

The fort chronicle conscientiously reports the type and number of projectiles the guns have fired. Only when a strong relief column approached, did the insurgents retreated. Poor First-Lieutenant März, who fell victim to loyal companionship, rests to the side in the courtyard of the fort, on the place of his last occupation. The unfortunate lieutenant who fell into the hands of the insurgents have never been seen or heard of again, but the good Feuerwerker received the gold medal for bravery and his performance." [14]

13. Lieutenant Mazurek (FJB 27.) (KA Wien)

14. Norbert Zsupanek - K.u.K. Befestigungen, Militärbauten und Anlagen im Raum Cattaro (Kotor) 2009; Translated from German

By November 6th, the imperial forces managed to quell the rebellion in Grbalj and Pobori, so it seemed that only Brajići are still fighting, but the rebels reorganized and attacked again on 7th using guerrilla style warfare. The forces of General Dormus, Lieutenant Fischer and Col. Schönfeld of 27th Jägerbataillon had to retreat to Budva and guard the strategic positions they retook from the insurgents in the past few days. Meanwhile, on November 6th, Colonel Kaissel with of the 7th regiment marched from Budva on the 6th to relieve Fort Kosmač with 2nd and 3rd battalion of the 7th regiment, half of the engineering brigade and two mountain cannons, all together around 800 men. Fort Kosmač was under siege for many days now and it was almost out of provisions. To reinforce garrison of the besieged fort the they were followed by one officer with 30 men, a column with provisions of 30 mules and livestock intended for slaughter that could last for 10 days. He was first to support Col. Schönfeld fighting the rebels at Maine, capture the road and continue towards Kosmač. They managed repel the attackers (some 67 people) and entered the fort. Soon the rebels regrouped and attacked again but they were forced to retreat as more reinforcements came. After lifting the siege, relieving the crew, and resupplying the fort, the forces of Col. Kaissel and Col. Schönfeld left for Budva leaving the Lieutenant Karl Pokorny of 27th Jägerbataillon as commander of the Fort Kosmač. He officially took command of the fort on the November 7th, at the same time when General-Major Count

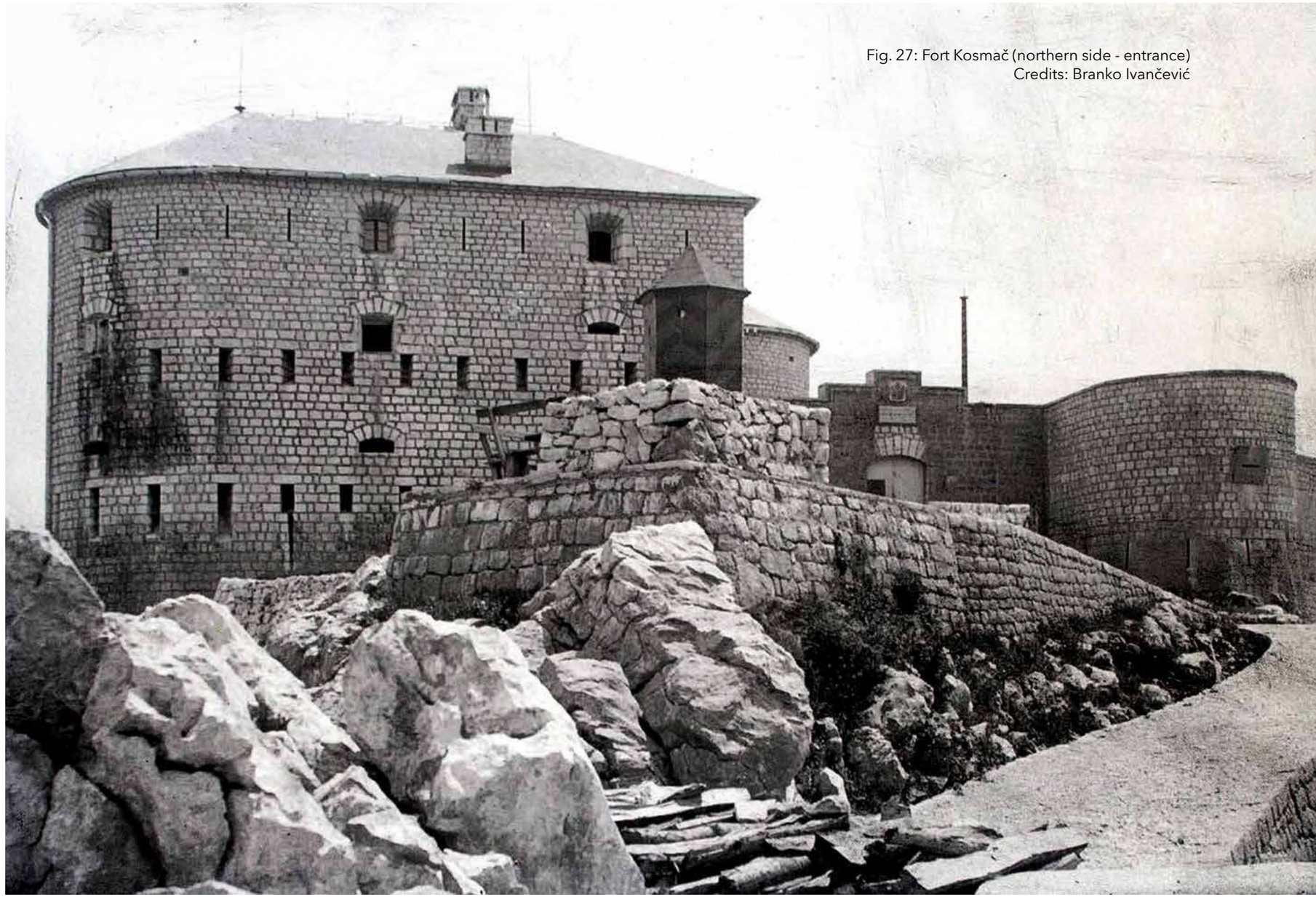


Fig. 27: Fort Kosmač (northern side - entrance)
Credits: Branko Ivančević

Auersperg took command of the South Dalmatia from Field Marshall Wagner. Col. Schönfeld with 22nd Infantry regiment, 27th Jägerbataillon, one mountain and half of the rocket battery was instructed to take command in the region of Budva. The new garrison at Fort Kosmač had 47 men from 27th Jägerbataillon and 13 men commanded by Lt. Pauler of the 11th Artillery battalion, who brought a light telegraph with him. The former fort commander Lt. März was buried with full military honors in the fort's courtyard on November 8th. On the following days, the insurgents continued harassing the fort, making the Lt. Pokorny and Lt. Pauler shell the nearby villages of Brajici and Uglješići to retaliate and deny the rebels the cover of their houses. This infuriated the insurgents which intensified the attacks as the days passed. This resulted in more frequent attacks and soon another expedition to quell the rebellion will be lunched from Budva.

On the 16th, the reinforcements managed to reach the fort, dough under heavy fire from the insurgents and losing a few men in the battle near the fort. With the help of the cannon fire, using shrapnel grenades the attackers quickly had to retreat. The forces of Col. Schönfeld made Fort Kosmač their HQ for the next few days during their stay at Brajici. The reinforcements left Fort Kosmač on 21st and the rebels took nearby hills and opened fire on them, inflicting no casualties. The battery from the fort fired on them and forced them to retreat again.

Fig. 28: Fort Kosmač around, 1860
(southern side - road to Fort Spiridone)
Credits: King Nikola´s Museum - Cetinje

On the following days, the insurgents kept coming back on the nearby hills, so the battery opened fire to disperse them. They used the fog to reach the village of Uglješići and used the houses for cover, the fort fired shrapnel shells, inflicting heavy loses to the insurgents and almost completely destroying the village. This made them more determined and they kept watch on the roads leading to Fort Kosmač and attacked any convoy to the fort. In this time of year, the thick fog is a usual weather condition which only made it worse for the defenders, as they could not see even if the attackers came only few dozen meters to the fort. As the time went by, frequent fog gave the possibility to the insurgents to attack the fort up close. The garrison and it's commander were tormented by the idea, that the attackers could use the captured cannons and gunpowder from Fort Stanjević to blow up the weak spots in the walls of the fort.

This frequent attacks in the middle of the night forced the garrison to be at full alert all the time. The battery shot flares in the night to light up the area and then shelled Uglješići again, with little success. As they could not see the attackers in the fog or at night, they could not respond to the attacks. This took a toll on the moral of the garrison as they could only sit and wait, hoping the attackers won't blow them up. Every time the supply convoy or any patrol was on it's way to Fort Kosmač, it was met with heavy fire from the insurgents, aiming to destroy the cargo. This implies that the plan was to make the fort crack under pressure and starve them out, as well as to make them use up all the ammunition. Realizing that the situation is only getting worse with every force response from the fort, Col. Schönfeld ordered the commander of the fort Lt. Pokorny, not to fire except fired upon. As the sudden attacks during night and fog continued on the November 30th, the commanders decided to wall up the loopholes and windows in the ground floor, on the eastern walls so the attackers could not throw any explosive in the fort.

The close attacks scared the crew so much that the commander taught their fall was imminent and prepared his mentally exhausted crew to fight to the last men, which is confirmed in the telegraph message he sent to his superior Col. Schönfeld in Budva on the December 2nd 1869 at 8am:

15. Uprising in Dalmatia 1869 - Event journal of Karl Pokorny, KA Wien; Translated from German

Fig. 29: Bay of Budva,1903
Credits: KA Wien

"I believe, the insurgents intend to blow us up. Due to the great fog and strong wind here, they could succeed in their intentions. I will hold until the last man."[15]

16. Tracing documents of the past: - Primorske novine; Prepared by Marko Ivanović, supported by the translators of the Translator association of Montenegro who translated the chronicles of the Austro-Hungarian army – War Archive in Vienna; Translated from Serbo-Croatian

Fig. 30: Fort Kosmač
Author: Karlo Weber
Credits: Jovan Vuksanović

On the next day, the Col. Schönfeld repeated a strict order not to fire and provoke the insurgents if they don´t attack, so they can have peace during the night. The night attacks stopped but the insurgents started gathering in larger number on all the peaks around the fort, which scared the commander and he order his soldiers to fire their rifles on the nearby insurgents. This infuriated the colonel and he repeated his order not to attack at all, if not attacked directly. The food supplies were running low again and the colonel informed the fort's commander, that on the December 9th the whole garrison would be relieved and on the 9th the command of the fort was given to Lieutenant Westerholz. The skirmishes continued until the end of the uprising but the fort wasn't taken by the insurgents.

The uprising was officially finished on the January 17th, 1870 in favor of the insurgents. The peace treaty was signed by General-Colonel Gavrilo Rodić, who replaced General Count Auersperg (he replaced Gen. Wagner) as a governor of Southern Dalmatia, as the emperor hoped he would find the peaceful solution to the uprising.

To retain the peace in province of Dalmatia, the empire granted the people of Boka the conditions they asked before the uprising: the Bokelians will not be conscripted in the army; they will be able to carry their weapons; total amnesty for all the insurgents; help with the reparation of the destroyed buildings during the uprising. With this agreement, the law was indefinitely postponed, but it would only last for 12 years.[16]

2.4. THE EMPEROR FRANZ JOSEF I VISITS BOKA AND BUDVA IN 1875

Fort Kosmač

Fig. 31: Panorama of Budva (around 1880)
Credits: KA Wien

After the uprising, the situation stabilized in the regions of Boka and Budva. The empire held on the agreement they made, and the emperor visited few years after the uprising to see for himself the most southern edge of the empire at the time.
In the year 1875 the Austro-Hungarian Emperor Franz Josef I visited Boka. On May 5th the imperial ship "Miramar" came to Castel Lastva (Petrovac). There, he was welcomed by the officials and the locals. Afterwards he rode to Fort Presjeka where he stayed to rest. He later rode along the border to Fort Kopač, then to Fort Stanjević where he stopped to rest. Next he came to Fort Kosmač where he was welcomed by few hundreds of locals with flags and flowers. After he visited the church of St. Dimitrije and the school, the empire have rebuilt after the uprising, the emperor, followed by the people, rode on the road along the border and later returned to Budva, after 13 hours of riding, where the town of Budva organized a reception.[17]

17. Grazer Zeitung nr 102, Friday 7th of May, 1875 "Historical journal of Franc Josef I during his travel in Kingdom of Dalmatia", Zadar 1878; p.2-4

2.5. SECOND UPRISING IN THE BOKA DURING THE REVOLT IN BOSNIA AND HERZEGOVINA IN 1881-1882

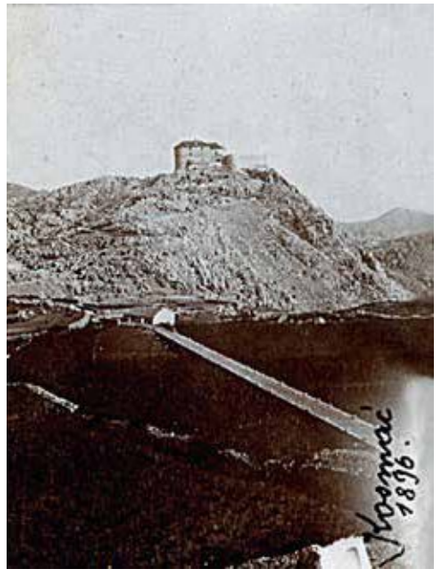


Fig. 32: Fort Kosmač, 1896 (view from Brajići)
Credits: KA Wien

After occupying Bosnia and Herzegovina, it was much easier for the empire to reach Boka as they now had an approach from the land as well as from the sea. In the Autumn 1881 the empire ordered conscription in Boka again. Aware of the situation that another uprising would likely not be a success, the Bokelian municipalities accepted the conscription. Despite the official decision, the people of the Boka took up their weapons again to fight for their rights but this time unsuccessfully.

The Kingdom of Montenegro could not support the uprising due to the political reasons and decisions of the Congress of Berlin in 1878. The uprising ended in 1882 with the defeat of the Bokelians and the empire managed to impose the regular army service in the Boka. Since then many of the young Bokelians went abroad to search for work and evade the service so the number of the people living in the villages started to decline as the life got harder.[18]

18. Archpriest Djordje Samardzić - "First Uprising in Krivošije" - Newspaper of the national university of Boka 1940 nr. 1-4 p.4

2.6. FORT KOSMAC BY THE BEGINNING OF THE GREAT WAR IN 1914

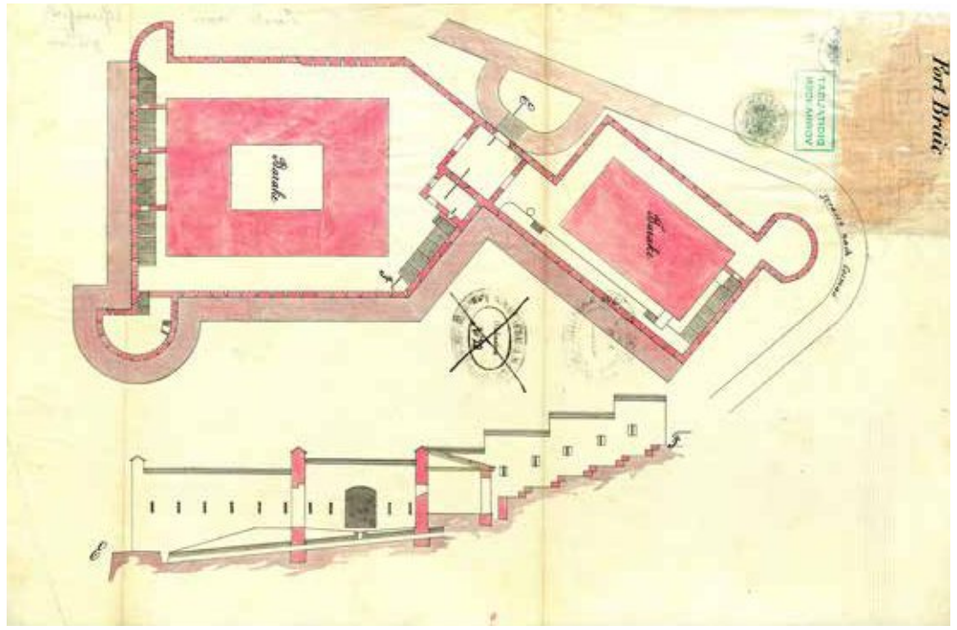


Fig 33: Fort Brajić
Credits: KA Wien

In the years after the uprising, since they realized their defense system had a lot of weaknesses, the empire invested into improving it by making new and modernizing the old fortresses. Tough the main defense roll of the coastal areas was still held by the Navy, there were plans to build more fortresses at Kosmač to support bigger operations against Montenegro if needed.[19]

After the uprising in 1882, more smaller defensive objects were constructed along the border, mostly on the crossroads. The Fort Brajić, built around 1862 just under the hill below Fort Kosmač, was further improved and fortified. The position of this fortified barracks was exactly on the crossroads and much lower in the field, surrounded by higher peaks and ridges therefore much more vulnerable.

Sometimes between 1910 and the start of the Great War, it was dismantled as the plans for the bigger defense system at Brajići was abandoned. Fort Kosmač received modern artillery and the final improvement by the year 1902. The crew increased to almost 250 people, much more than 60 what it had in the 1869 but bigger plans never came to be and the whole extended defense line of Budva had to be abandoned with the start of the Great War in 1914.
Therefore, the fort was abandoned on the August 18th, 1914 (according to Julian calendar, 31st according the current, Gregorian calendar) (Journal of the commander of the Montenegrin border guards 1914). Fort Kosmač was rigged with explosive by the imperial army, that blew up the floor between the ground and the first floor and set it on fire. The roof collapsed but the rest of the building was left standing. With this ended the Austro-Hungarian presence in the fort and they never used it again.

Fort Kosmać diente während der Niederwerfung des Aufstandes in Süddalmatien im Jahre 1869 den Truppen der Brigade Oberst v.Schönfeld als Rückhalt. Am 4.November wurde der ausserhalb des Forts rekognoszierende Art.Oberleutnant Merz meuchlings erschossen, Leutnant Mazurek (FJB.27) von Insurgenten ~~erschossen~~ gefangen genommen.

1914 : Letzte k.u.k.Besatzung des Forts war die Kompagnie 2/91 unter Hauptmann Rudolf Kron, nach deren Abmarsch das Fort befehlsgemäss gesprengt wurde.

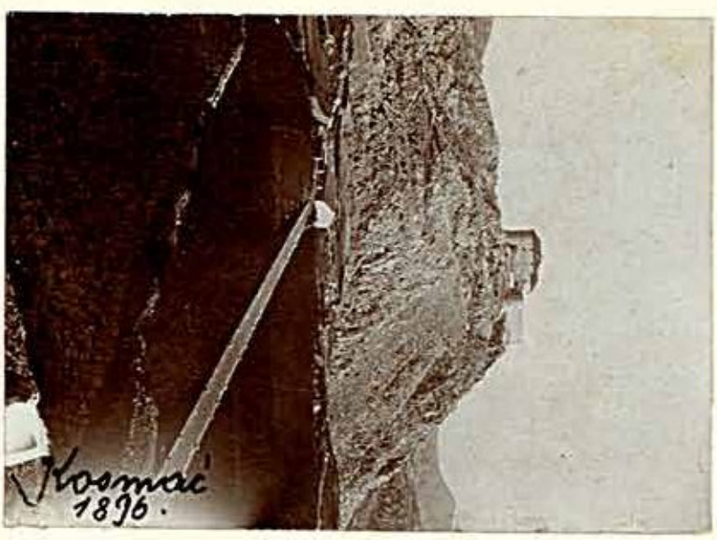
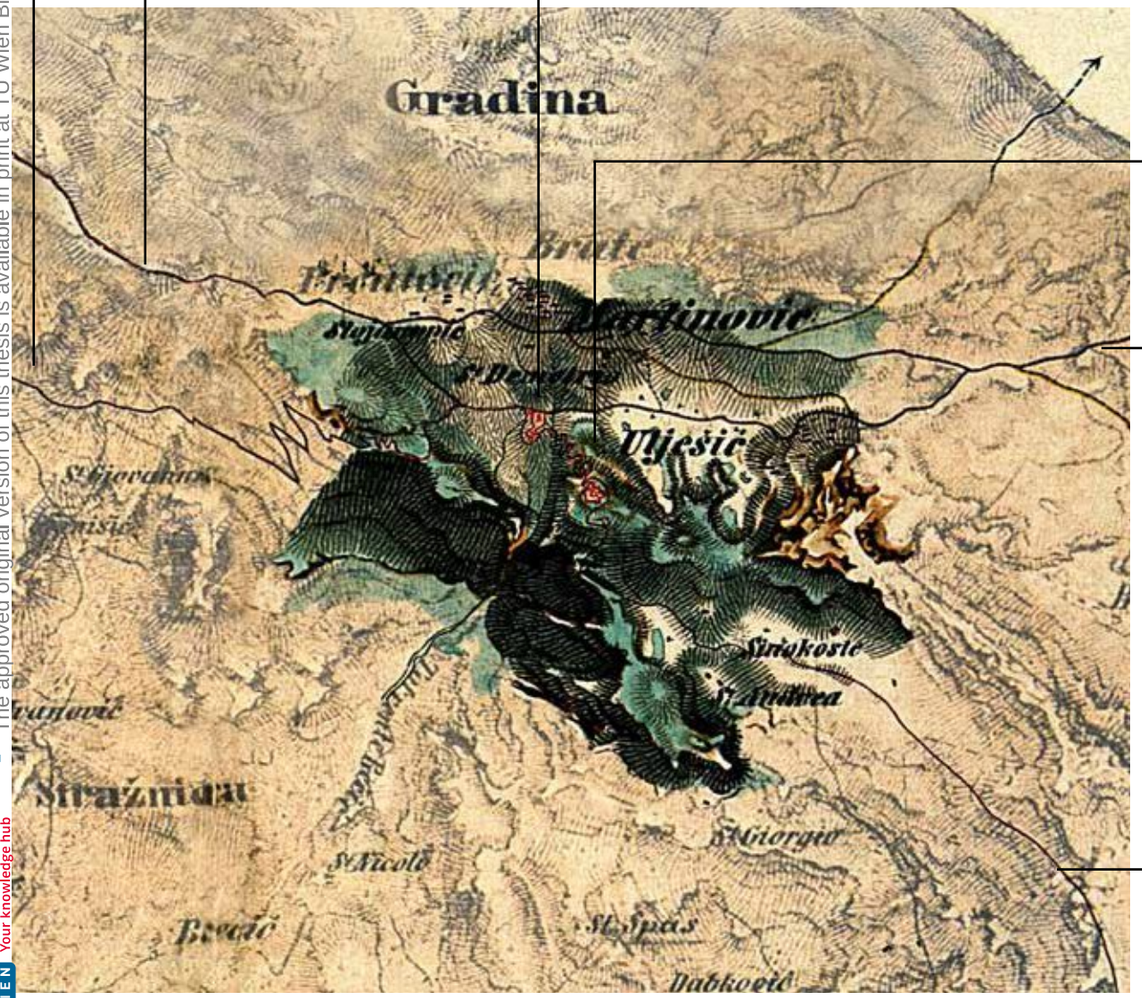


Fig. 34: Fort Kosmač, 1896 (view from Brajići)

Translation of the text in German:
"Fort Kosmač served the troops of Colonel v. Schönfeld's brigade as a support during the suppression of the uprising in South Dalmatia in 1869. On November 4th the Artillery First Lieutenant März was shoot outside the fortress while scouting, the Lieutenant Mazurek (FJB. 27) was caught prisoner by the insurgents.

1914: The last k.u.k crew of the fortress was the 2/91 company under the Captain Rudolf Kron, after which the fort was blown up by the orders."
Credits: KA Wien



to Budva

to Fort Stanjević

Fort Brajić

Fig. 35: Map of Brajići, 1903
(Positions of Fort Kosmač and
the barracks Fort Brajić)
Credits: KA Wien

Fort Kosmač

to Cetinje

to Fort Spiridone

2.7. THE PERIOD BETWEEN TWO WORLD WARS

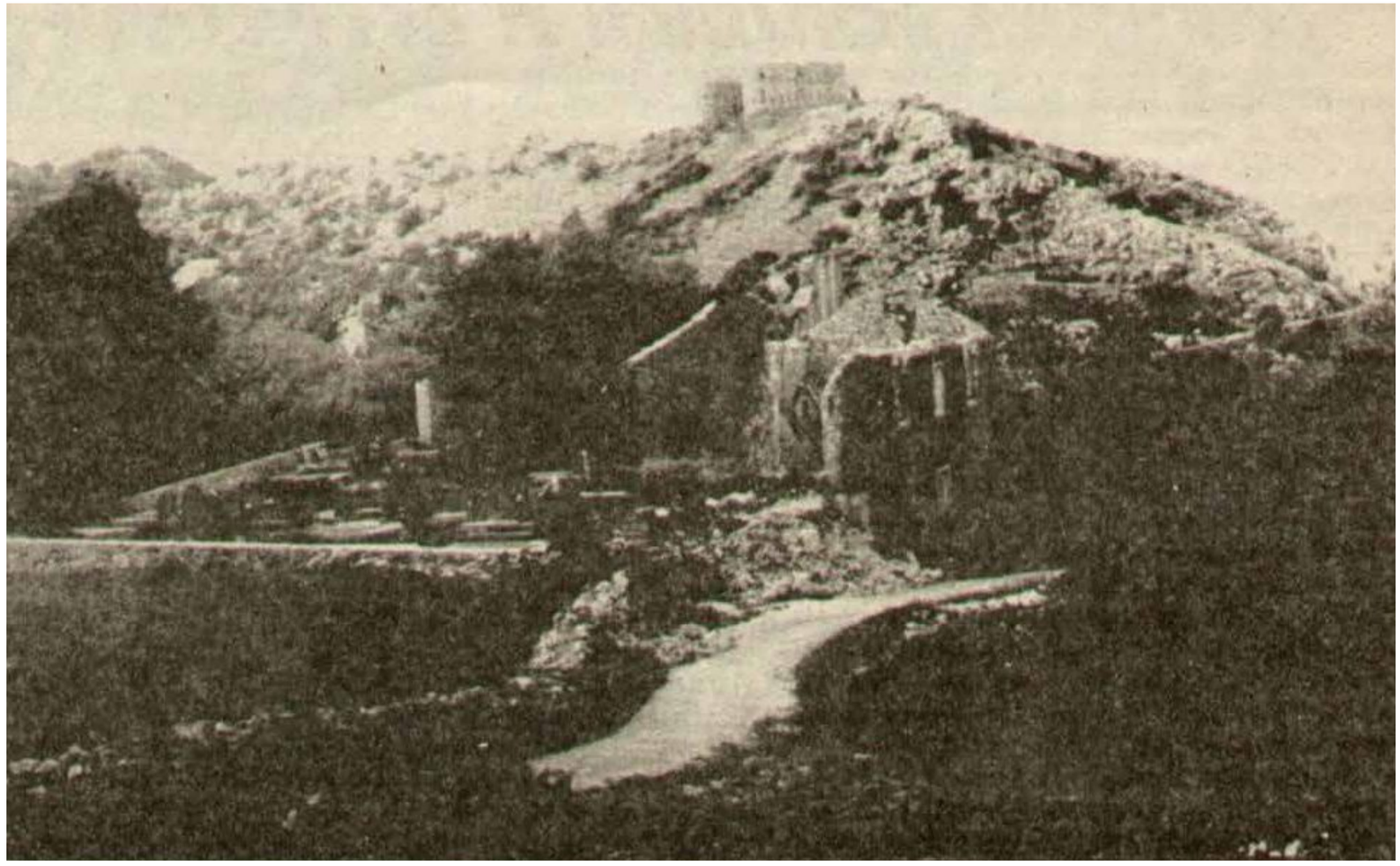
After the Great War ended, Boka became a part of newly formed Kingdom of Yugoslavia. In the village of Brajići there were 143 homes with 769 inhabitants in 1924. War left the land in ruins and terrible economic state, so in 1931 there were only some 358 people left, as many moved due to bad economic situation which many could not survive.

During these years, the Fort Kosmač was a ruin in a state as it was when the Austro-Hungarian army left it. Most of the substance was still there what can be confirmed form the old photograph made in 1936. In May 1931, the kingdom started building the new road from Cetinje to Budva which was finished in December same year and the old Austro-Hungarian road was no longer in use.[21]

21. Newspaper "Vesti" 13.12.1931

Fig. 36: Fort Kosmač, 1936 (in the background)
Credits: Maja Đurić

2.8. THE PERIOD UNDER ITALIAN OCCUPATION



22. Dr. Radoje Pajović – "Liberation war and the revolution in Montenegro" (1941-1945); Belgrade, 1976

Fig. 37: Fort Kosmač after the Second World War (view from Brajići) Credits: Newspaper "Primorske novine" Budva

On April 17th, 1941, the Italian troops occupied Montenegro as Yugoslavia was split in pieces between the axis powers. Their headquarters was in Cetinje where they had a partial support, as Montenegro was to be an "independent state" under the protectorate of Italy. This was on the account that one of the princesses married to Italian prince. "Italians had main support from some leaders of the Federalist party, which saluted the arrival of the Italian troops".[22] During this occupation, the Italian army controlled the supplying of local population with provisions, which

"couldn't cover the minimal needs".[23] Soon the tensions rise among the population as the Italian soldiers started molesting the population.

On the July 13th, 1941 starts the uprising of the people of Montenegro against the invaders, led by the communist party. As the population was disarmed and the armed forces disbanded, the locals used guerrilla tactics as they could not face the enemy on the open. Again, Brajići as a strategic location were the place of few harsh battles against the Italians. Inhabitants of Brajići formed their squads, armed themselves and blockaded the road Cetinje-Budva, waiting for the enemy to come to them. They had 67 people and around 90 more from the surrounding area but around a quarter of them was not armed due to the lack of weapons.

On the July 18th, the Italians responded by sending the 108th Combined battalion of "Taro" division, around 450-500 soldiers. This was a motorized unit with 7 tanks, 28 trucks, 3 medics and 7 motorbikes armed with machine guns as well as few mortars. They were supported by hydro planes bombing the partisan's positions from the air, as well as from the light artillery fire from two ships near the shore. As they reached Brajići in columns they were ambushed, and the battle lasted for hours. During the battle, the partisan support came from Paštrovići on the south east and took position in the ruin of Fort Kosmač, installing two heavy machine gun positions, inflicting heavy losses on the Italians, charging, and forcing them to retreat. During the retreat many surrendered, and partisans sized many needed weapons.[24]

On July 27th, the Italians came from the direction of Cetinje with around 6000 soldiers supported by mechanized units to retaliate. They took all the strategic positions around the village as well as Fort Kosmač which was afterwards used as an improvised prison camp for the arrested inhabitants of the village. Later, they shoot many men they believed to have been participating in the attacks on the 18th and burned down all the houses and crops. The Italians used the ruin of Fort Kosmač as their fortified camp to control this strategically important village. During they stay, they built some improvised drywalls from the stone lying around the fort and set their camp inside and next to the courtyard. The serpentine road leading from Brajići to the fortress was widened on the curves, so that the vehicles can drive to the fortress.[25]
As the partisan forces in the region were weak and the Italians held the fortified position, there were no attacks until the total retreat of the Italians from village Brajići.

After the surrender of the Italians on September 9th, 1943 the partisan's attacks started, liberating the region. The soldiers from the battalion stationed at Fort Kosmač started to desert. The ruin was attacked from the east by the partisans with cannon fire, forcing the Italians to leave the fort.[26] This could explain the big hole in the wall on the eastern side. Many of them didn't surrender to the partisans, as they feared they would be executed and instead later surrendered to the Germans advancing to retain the area held by the Italian army. After this, the fort was abandoned and have not been used as a fortified position again.[27]

2.9. FORT KOSMAČ AFTER THE SECOND WORLD WAR UNTIL TODAY

After the war, the region became a part of SFR Yugoslavia. Devastated in every way, and due to the lack of materials, tools, and people, the survivors used whatever they could find. The fortress was a ruin used as a source for material in the years of recovery. It is hard to determine exactly what was destroyed in the battles and what was dismantled for material.

To preserve it, the state of Yugoslavia officially gave it the status of the cultural monument in August 1964[28], but no measures were taken to secure it, or conserve it. Unsecured, the ruin was further dismantled for materials as the time passed by. In 1979, big earthquake devastated the whole region but the fortress has not been surveyed, so it is not clear what damage was caused by the earthquake. In the 1990s, the region suffered again due to the economical sanctions so taking care of the monuments fell down even more on the list of priorities. This situation caused even more substance loss as the stealing continued. Also, the serpentine road has been damaged during the years, as the supporting walls partially collapsed. The big substance loss and damage to the ruin was done in recent years in the 2000´s on, due to the collapse of the SFR Yugoslavia under heavy economic sanctions, the people were left to fend for themselves again. In 2006,

Fig. 38 (left): Fort Kosmač, 2018
(Northern wall of the barracks)
Credits: Ivan Vratnica

Montenegro became an independent state again. The first studies about cultural heritage were done from 2003 till 2006, concluding that Fort Kosmač had a great cultural value and should be conserved but the action failed to happen. In 2008, the director Peter Kahene filmed some key scenes for the movie "Rote Zora". In the move it can be observed that the state of the ruin has not changed much lately but also that the piled material on the floor has been leveled for the needs of the movie.

More studies were done over the past years, with the last one in 2014, which also defined the surroundings as a part of the protected monument. In 2018/19 the Austrian Archaeological Institute made a survey of the fortress and since then no further studies or actions to preserve it have been done.

28. Lidija Ljesar - "Preliminary technical assessment of architectural and archaeological heritage of the South-eastern Europe" 2005

Fig. 39:Fort Kosmač during the filming of the movie "Rote Zora", 2008
Credits: "Rote Zora", 2008

Fig. 40: Fort Kosmač, 2018
Credits: Ivan Vratnica

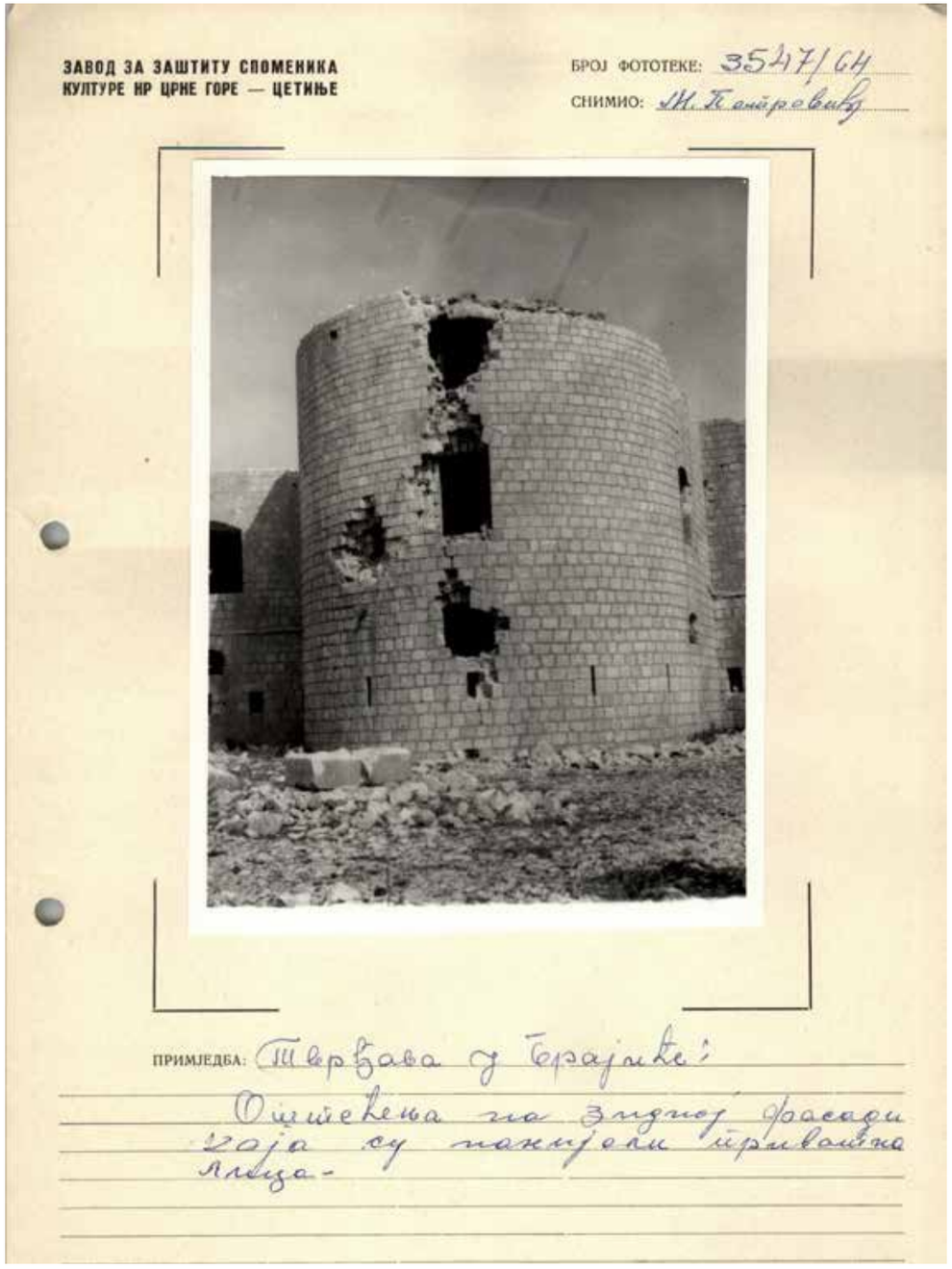


Fig. 41: Fort Kosmač, 1964
(Western wing - core)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

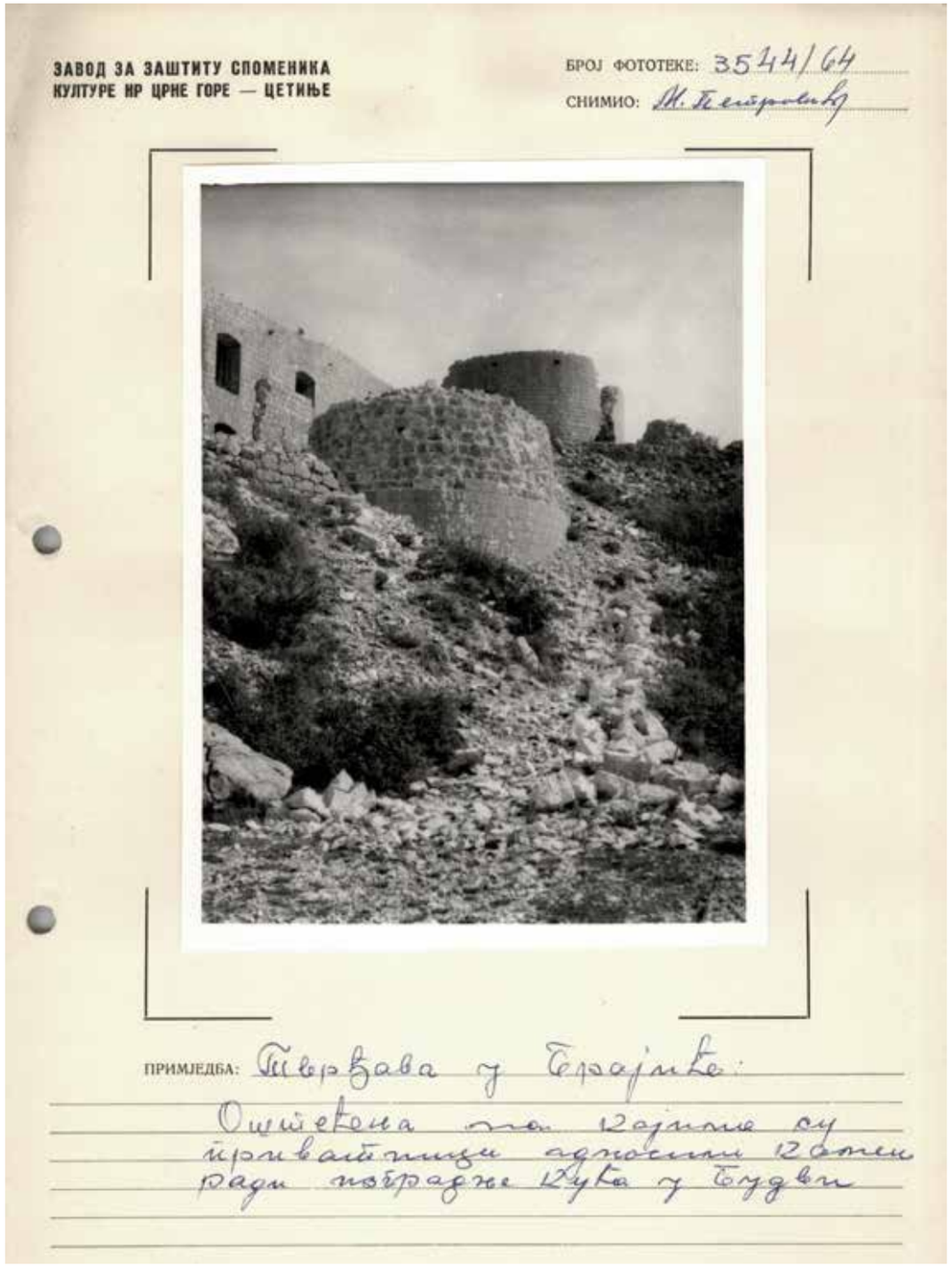
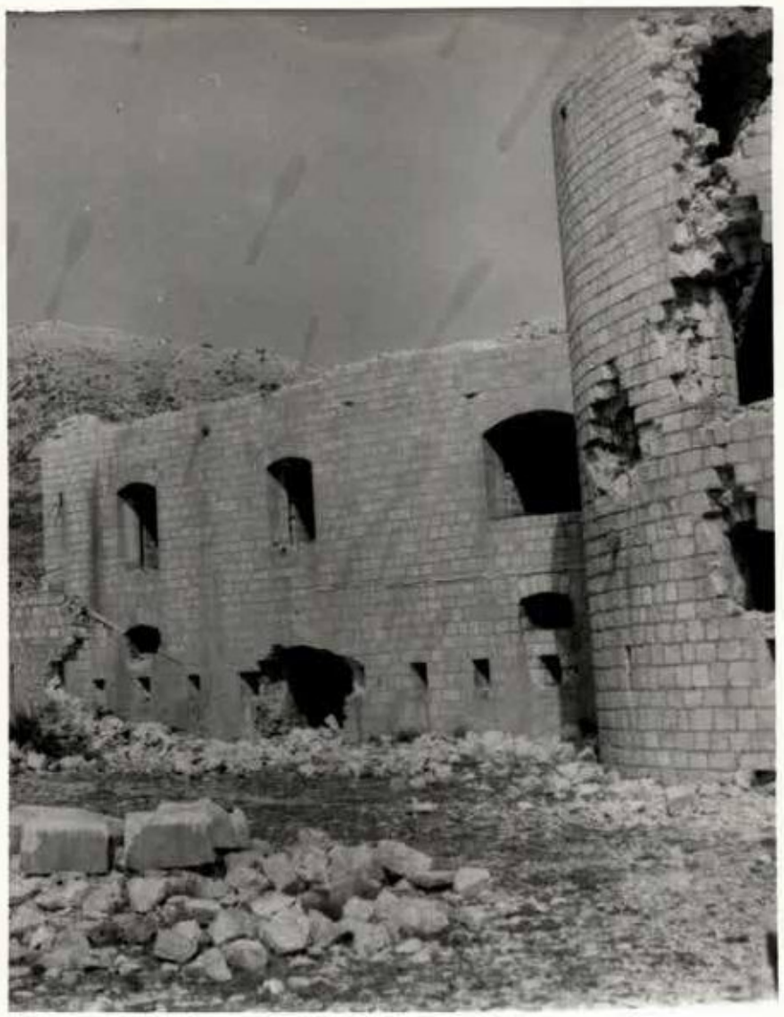


Fig. 42: Fort Kosmač, 1964
(Northern caponier foundations)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

ЗАВОД ЗА ЗАШТИТУ СПОМЕНИКА
КУЛТУРЕ НР ЦРНЕ ГОРЕ — ЦЕТИЊЕ

БРОЈ ФОТОТЕКЕ: 3546/64

СНИМИО: М. Петровић



ПРИМЈЕДБА: Тврђава на Брајићи
Оштећена тјесања одакле су
приватници односили камен
за градњу кућа у Будви

Fig. 43 (left): Fort Kosmač ,1964
(Courtyard)
Translation: "Fortress at Brajići
Damaged places from where the private individuals took the stone to build houses in Budva"
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

Fig. 44: Fort Kosmač, 1964
(Southern side of the courtyard wall)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

site analysis

3

Fort is a permanent fortification for independent defense, as part of a system of separate fortifications connected into a single unit of defense. The development of the industry resulted in the range increase of the artillery in the 18th century, so the fortified cities could be successfully targeted from far away. Therefore, important strategic points were established in front of defensive walls, in order to strengthen the defense, keep "an attacker at a safe distance from the city" and prevent the possibility of action against the elements of fortification. At the middle of the 19th century, with the emergence of the armored bore, the construction of fortresses with continuous, unsuitable and expensive walls, was abandoned, so defense was ensured by a system of permanent, independent and separate fortifications, of various shapes and sizes. A predecessor to the fort was the Cannon tower which was in use since the late Middle Ages, usually as a standalone building with one or more cannon positions, encircled by a ditch, and since the end of the 18th century it was the center of defense fortifications. The tower was in use as a separate independent building (18th century) in the French coastal defense (tours models), and in the English coastal defense (Martello towers) and had several cannons "in barbeta" (on the roof terrace), while the casemate base, which could have been organized as a two-floor caponier with a cistern and a gunpowder store, was used for close defense by the shooters. The contemporary tower was an autonomous defense building for independent operation equipped with housing casemates, a cistern or well, gunpowder and ammunition storage, kitchen and a sanitary block. It usually had a circular ground plan, but could also have other, more or less complex ground plans with a courtyard in the middle (circular or horseshoe-shaped), with a central staircase with one ,or more floors of cannon casemates, cannon positions on the roof terrace with breastworks for circular defense and concentrated multi-directional cannon fire.

Source:
"Werk 2 - Austro-Hungarian fortresses in Montenegro" 2019 - Radojica Pavićević

3.1. ROAD

The road was the important part of the fortification system of Austro-Hungarian Empire. Fort Kosmač was the control point of the roads from Budva, Kotor and from Montenegro, converging near the fortress and leading to Fort Spiridone and further south-east. The road construction from Budva to Brajići started in 1840s and it was modern at the time. It was a stone paved, around 2.6m wide road, enough for a horse carriage to pass, with a constant slope.

The aim was to make it constant as possible, so they built embankments, bridges and carved rocks to adapt it with terrain. The draining system was built all along on the places where it was needed. To overcome the steep slopes of the mountains they used the serpentines, zigzagging one above the other, to keep the slope as constant as possible with occasional long steps when needed. The side to the abyss was secured with stone walls and small posts, engraved with the kilometer marker and the next destination it led to, as well as "k.u.k" (Ger. "keiserlich und königlich") meaning imperial and royal. Part of the serpentine road, climbing from the field up to the fortress, gives the fortress a unique appearance, emphasizing it as a peak of the hill. It is carefully positioned on the western side of the hill protecting it from three other directions. Today, it is still in usable condition but the supporting walls are damaged and collapsed on some spots along the approach. The securing walls and stone posts are all gone, even dough the stone material from the supporting walls is still lying around. The road has

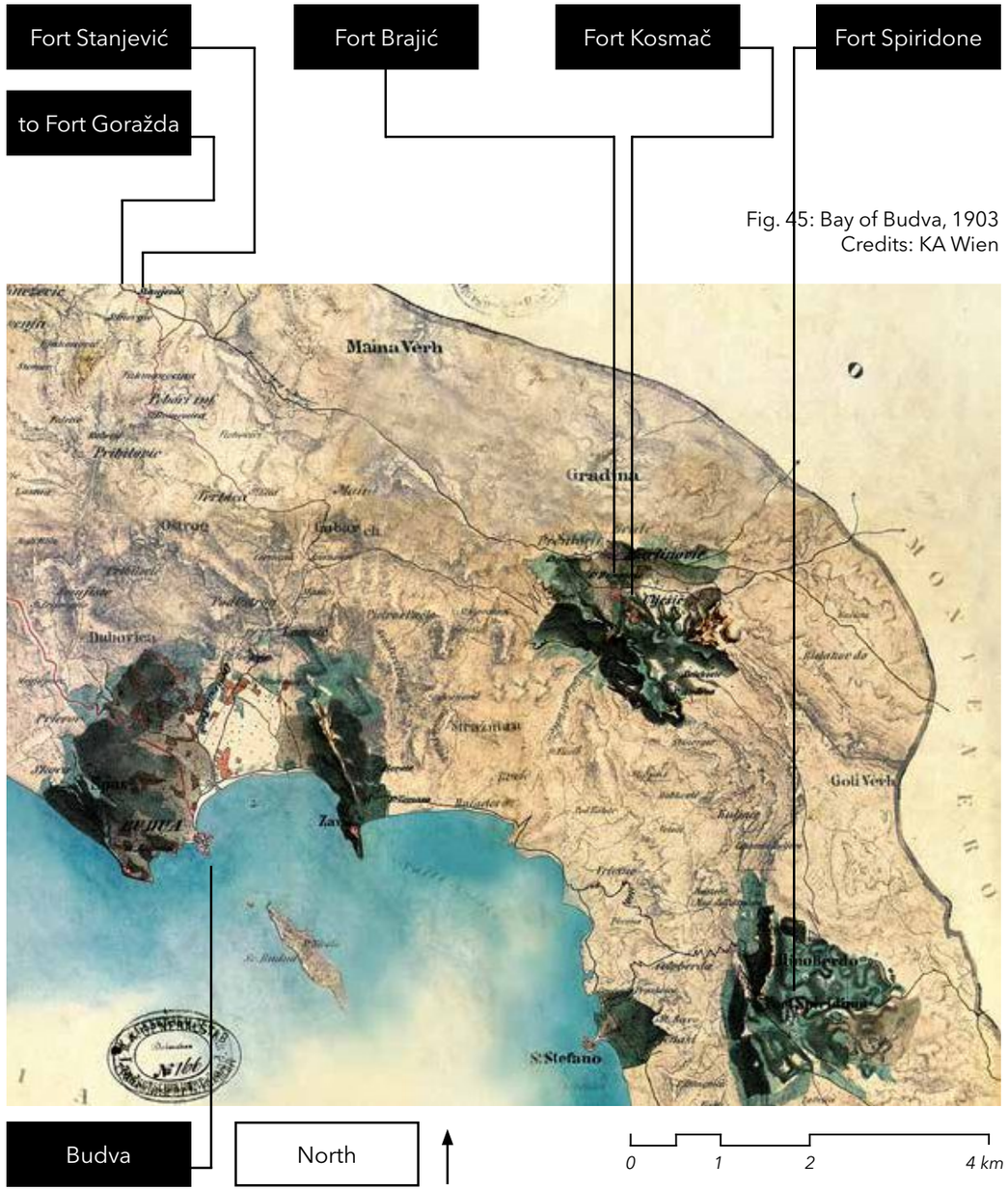


Fig. 45: Bay of Budva, 1903
Credits: KA Wien

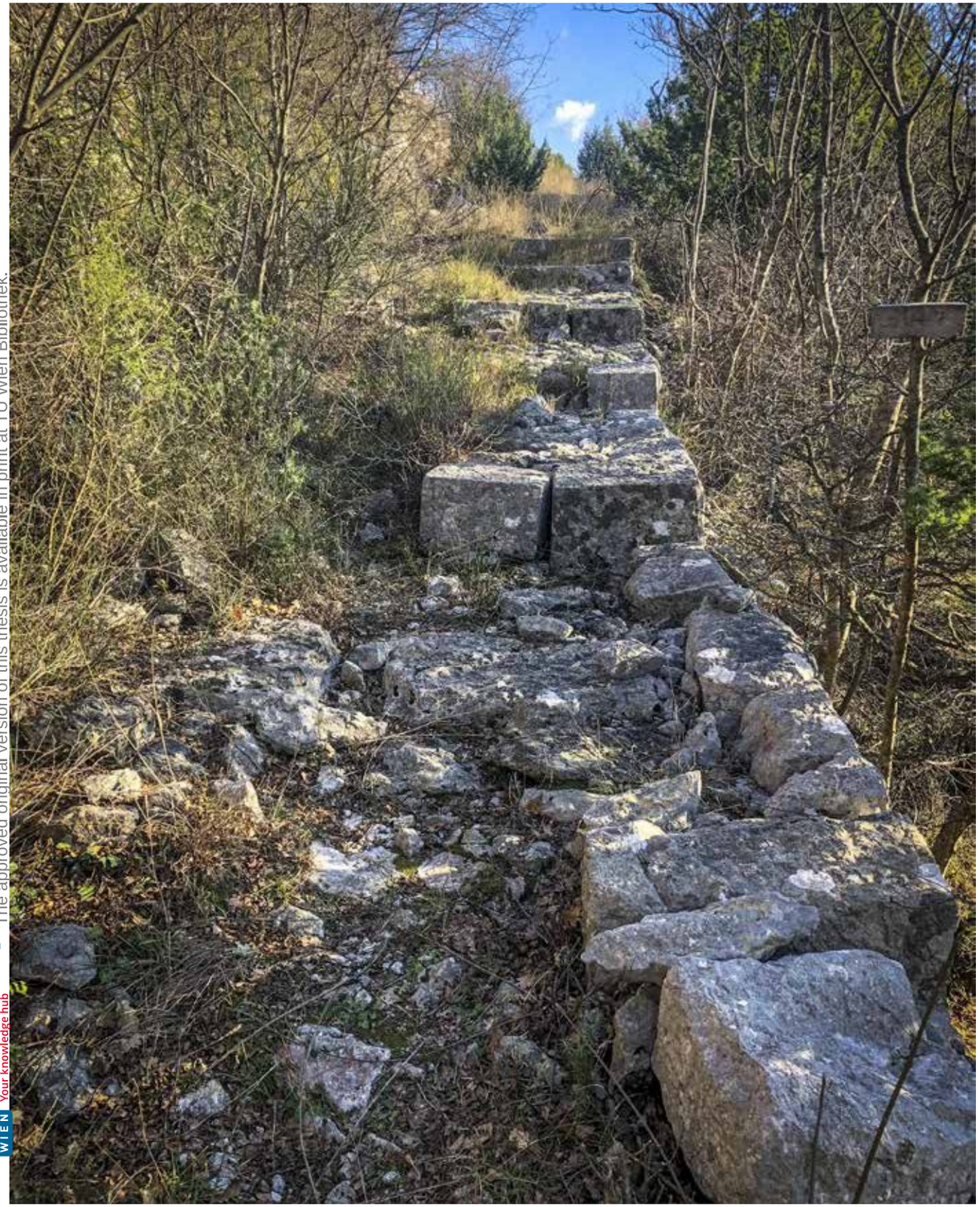


Fig. 46: Old Austro-Hungarian road from Budva to Fort Kosmač ,2020
(Even tough the slope was mostly constant, on some steeper places long stairs were needed to overcome the slope)
Credits: Savo Martinović

been widened to be fit for cars and trucks up until the fourth curve from the bottom. From there, the new macadam road was made in recent years for the trucks to pass, converging with the old road after some 500m, making the fortress accessible by vehicles and creating a new approach from the south. The old northern part of the approach, some 400m from the fourth curve on, is used as a hiking trail and it is no longer fit for vehicles due to the overgrown vegetation and damage. This part of the road has the narrow serpentines, which was extended on the curves in the Second World War by the Italians so they could access the fortress with their vehicles.

Fig. 47: Old Austro-Hungarian road from Budva to Fort Kosmač, 2020
(Embankment made out of stone blocks)
Credits: Savo Martinović

Fig. 48: Top surface of a bridge on the old Austro-Hungarian road from Budva to Fort Kosmač, 2020
(Surprisingly but due to its remote location the metal bridge is still in its place)
Credits: Savo Martinović

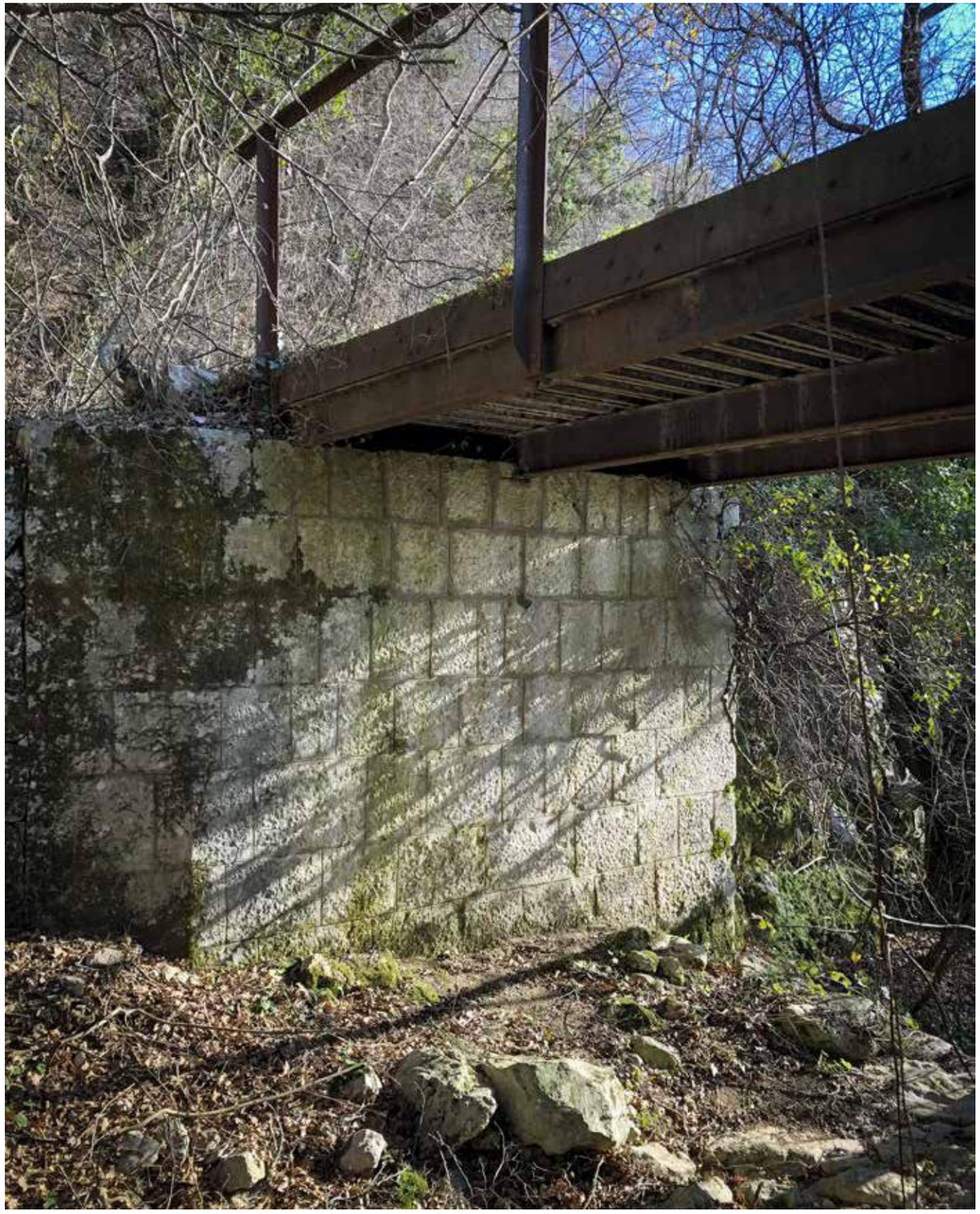


Fig. 49 (right): Bridge over the creek on the old Austro-Hungarian road from Budva to Fort Kosmač, 2020
Credits: Savo Martinović

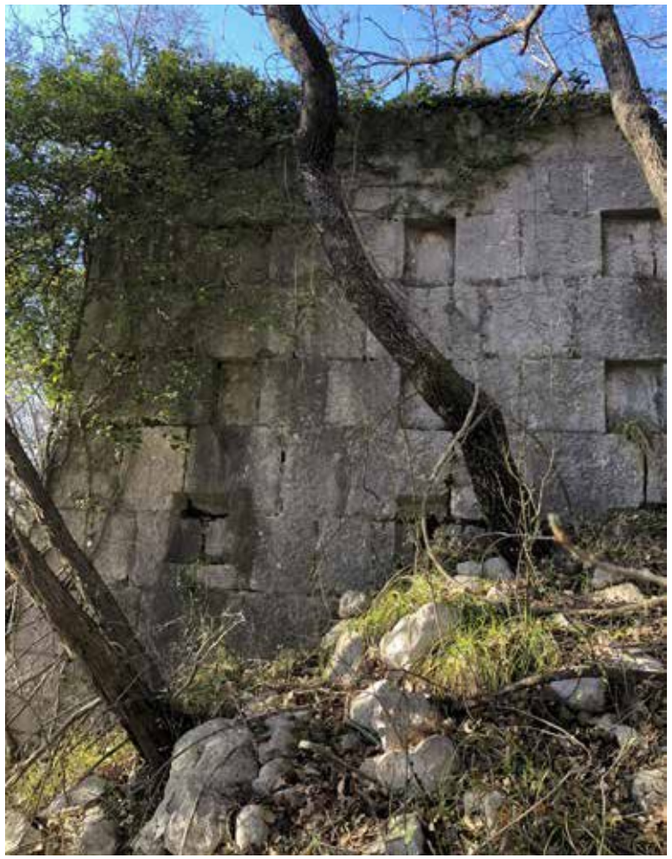


Fig. 50: Base of a bridge on the Old Austo-Hungarian road form Budva to Fort Kosmač, 2020
Credits: Savo Martinović

Fig. 51: (right)
Remaining of a bridge on the Old Austo-Hungarian road form Budva to Fort Kosmač, 2020
Credits: Savo Martinović

Fig. 52 (left): Curve in front
of the northern wing of
Fort Kosmač, 2020
(The embankments collapsed)
Credits: Ivan Varatnica

Fig. 53 (bottom left):
Approach to Fort Kosmač, 2020
(The original road is hardly visible today)
Credits: Ivan Vratnica

Fig. 54: View of the coast from
the old road from Budva to Brajići
(St. Stefan in the background)
Credits: Savo Martinović

Fig. 55: Serpentine approach to Fort Kosmač,
further leading to Fort Spiridone, 2020
(Collapsed stone blocks still lying under the road)
Credits: Ivan Vratnica

Fig. 56: Serpentine approach to Fort Kosmač, 2019
(Current state)
Credits: Ivan Vratnica

3.2. WEATHER

The location has a very variable climate. Due to its vicinity to the sea and elevation above it, the weather over Brajići can change quickly and drastically in a matter of hours or even minutes sometimes. The weather in the summer is sunny and dry with an average temperature around 20°C in July and August but it can easily reach 35+°C. The summer nights are colder than on the coast with almost 15°C less than in lower areas, making the possible temperature difference of 20°C in the period of just few hours.

The weather is mostly stable during the summer, but low clouds can suddenly form in front of the ridge, creating a thick fog and the visibility would drop to only 10m as the cloud passes through. It can rain suddenly and heavily during almost any season. The winters are mostly cold, and the climate could be described as mountain climate, with January as the coldest month with an average of around 5°C and often dropping way below 0°C. November and December are the most humid months with around 182mm/m2 rain or snowfall with frequent, thick fog.

Again, the close vicinity of the sea makes the temperature variate even in the winter, from around 12°C during the day to average -8°C in the night. As this mountain ridge is close, only some 2km from the shore, the wind blows almost daily, from various directions, dough the main wind directions are from north and south.

The southern, from the sea, rolls over the flat sea surface and rises with fast wind speeds after colliding with the mountain. Southern wind is warm and brings a humid weather with it, where the northern is dry and extremely cold, clearing clouds and bringing the sunny weather. Northern wind can be extremely critical during winter, as it would freeze everything after rain or snow, so everything can stay frozen for weeks.

The weather is really important factor for this location and had a lot more influence on building strategy and technique than today. This basically dictates the form of a building as well as the material choice to provide more suitable accommodation.

Fig. 57: Fort Kosmač, with Uglješići in the foreground, September 2019
Credits: Ivan Vratnica

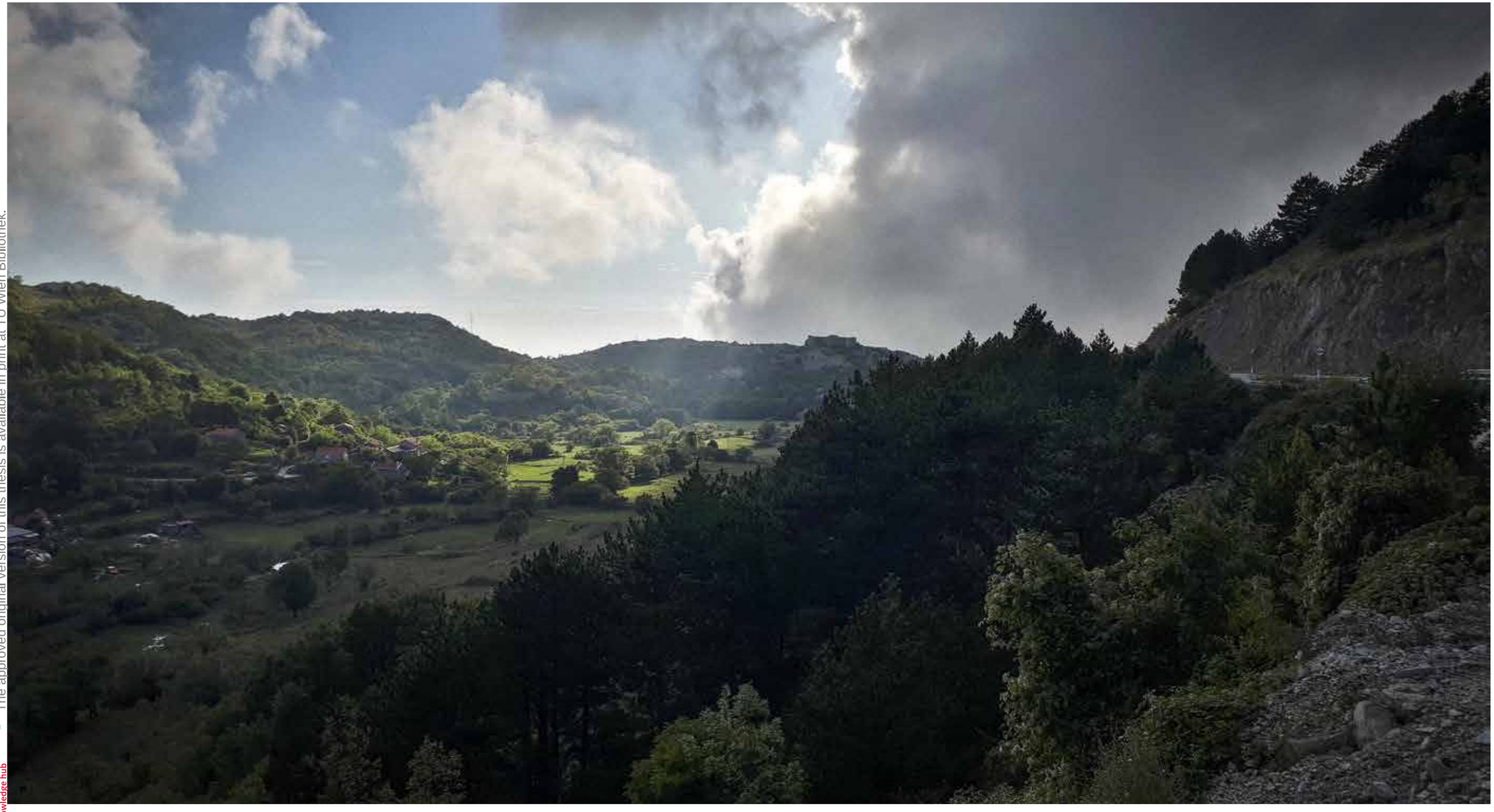


Fig. 58: Fort Kosmač, with Uglješići in the foreground
(few minutes apart from the last photo)
Credits: Ivan Vratnica

Fig. 59: Fort Kosmač, with Uglješići
in the foreground, January 2020
(Examples of the thick fog and fast changing weather)
Credits: Ivan Vratnica

Fig. 60: Fort Kosmač,
south-eastern wing,
January 2020
(Same hour as the
previous two photos)
Credits: Ivan Vratnica

Fig. 61: Fort Kosmač, January 2020
(Examples of the fast changing weather,
few minutes apart the last photo)
Credits: Ivan Vratnica

3.3.
MATERIALS AND CONSTRUCTION

Fig. 62:
Stone masons
from Dalmatia
Credits: KA Wien

When building a Fortress, the material plays a key role. In 19th century the Austro-Hungarian fortresses were mostly built out of stone and later concrete. The choice of the material depended a lot of the fortress' location, as the empire tried to use local materials as much as possible, which made the construction faster, easier, and cheaper. Fort Kosmač was mostly built out of local materials, the local, gray limestone (Montenegrin "Krš").

This typical, gray stone is hard and has a good pressure resistance, which was perfect for the defense walls. It was convenient for shaping, so they made a stone blocks approximately a pyramid with some 25cm side length. This material is still wanted today, dough the cost is high due to masonry techniques and a lack of skilled masons.

Back in the 19th century, it was a common thing, so stone masons were easier to find and the quality of their work was much higher than today. Most of the stone was extracted from the nearby quarries. One of them was just under the fortress near the road and many locals worked on the extraction and transportation of the stone in exchange for payment.

The stone masons were mostly from Dalmatia, today's Croatia where the stone masonry was widely spread and perfected on the islands and along the shores, even today. They understood themselves well with locals, as they spoke the same language, so they cooperated easily. Wherever possible, the local limestone was used, among all due to its resistance to the climate of the area. The other stone type was used for the vaults of the floor construction, known among the locals as "Siga".

Fig. 63: Rock quarry from which the stone
for the fortress was extracted
Credits: Ivan Vratnica

Fig. 64: Location just under the fortress
Credits: Ivan Vratnica

Fig. 65: The rock type used for the vaults inside (local "Siga")
Credits: Ivan Vratnica

This one was lighter, due to its structure and high porosity and much easier to shape into precisely made blocks to construct the arches, domes, and vaults. Even dough this type of stone can be found near the shore in Perazića Do, most of it was probably imported from the other parts of the empire which was a common practice in the empire, because they used similar designs and solutions. The metal, wood and glass were also imported from today´s Croatia, Bosnia and Herzegovina as well as other territories, due to the lack of industry in the vicinity of the newly acquired territory in today's Montenegro. The special and uncommon material were the roof tiles, as no other fortress in Montenegro had such a roof. The slanted roof over the barracks was composed out of a wooden construction and stone tiles cover, reinforced with sheet metal. The stone tiles were almost perfectly flat and only some 5mm thick plates. Only small pieces of these tiles can be found today in the ruin, but the plates were probably some 20-30cm wide and 30-50cm long, judging by the remaining parts. This type of stone can´t be found anywhere nearby and it was surely transported from far away, somewhere close to Timisoara in today´s Romania according to the stories of the locals. In the years after it was abandoned, the locals used the remaining tiles, lying around the ruin, for writing boards in schools, as the paper was rare at the time. The doors and windows, as well as loopholes had wooden frames and casements, only the gates and the casements of the cannon windows on the cannon terrace were made out of metal. Inside, the floor finish was made of wooden boards with walls and ceilings covered by white plaster in the ground and first floor. The gun terrace walls had a flat fine formed stone faces on the inside as well. The sliding draw bridges had a metal load bearing construction and the sliding mechanism, with a wooden planking in between.

The construction started by creating the foundation plateau on the peak of the Kosmač hill. Fortress foundations are built on the existing rocks and the carved-out material was used directly

Fig. 66: The rock type used for the vaults inside (local "Siga")
Credits: Ivan Vratnica

for foundations. The solid rocky ground was good for foundations, but it made making any underground structures difficult, therefore only the water reservoirs are the actual underground rooms in the fortress. When the plateau was finished, the barracks construction started in the eastern part and the bigger, western part became the fortified courtyard.

The barracks had a massive type construction system but with some key differences compared to civilian buildings. The construction and the building were planned to withstand

war, therefore every element had to be thought through carefully. The building was made, not only to withstand small arms fire and even artillery fire to some extent, it was also constructed to make the reparations easier after the battle.

On the rapport plans and photos of the ruin, it can be clearly seen that the load bearing walls are inside, unexposed to possible enemy fire. Construction was made with the outer walls bearing minimal loads from the floor vaults, due to their function as protection. Instead outer walls were made as a hull, so if damaged or destroyed, the rest would still stand uninterrupted, which is the reason that, the walls are still standing firmly, even dough everything is demolished from the inside. They are 1.26m thick, except the western wall and the rounded walls of the wings which are 1.56m thick due to their load-bearing function of the floor vaults. The floors are vaults composed out of 30cm thick stone blocks in the first floor. In the second floor the vaults were 47cm thick, so they could support the artillery on the terrace above.
On them there was fine gravel filling for leveling and the wooden flooring placed on it. The face of the outer walls was made out of stone blocks, 25cm high and flat, fine formed face, precisely joined, with a thin gap closed with cement. The inner side of these stone blocks was always narrowed, creating a pyramidal form of the stone block with the flattened peak pointing inwards. This shape and the way of laying them together enables them to sink in when hit by the projectile and transfer its force

Fig. 67 (top left): Parts of the roofing tiles
(Hole where the metal sheet was attached, that held the tile in place)
Credits: Ivan Vratnica

on a larger area than the initial hit, thus minimizing the damage and lowering its pricing capabilities. This technique was developed to withstand the cannon ball hits but it was not as effective against the much faster and thiner, pointed rotating projectiles that were developed after the fortress was constructed. Inside, the face was not fine formed, as it was covered with white plaster. In between these two rows, there were roughly shaped stones mixed with mortar, holding all layers together. The construction walls on the first floor are the same, as well as outer walls. On the second floor the walls were 79cm thick, thinner than the ones below, only bearing a slanted roof over them.

Fig. 68: Sketch of the wall layer
(Pyramidal shape of the face blocks with the rough filling in between)
Credits: Ivan Vratnica

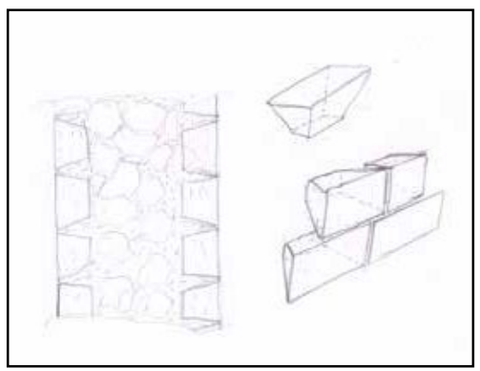


Fig. 69: Stone layer of the western wing outer wall
Credits: Ivan Vratnica

Fig. 70: The outer wall of the barracks,
Fort Kosmač, 2019
(With the wall construction clearly visible, due to the stealing of the fine formed outer stone layer)
Credits: Ivan Vratnica

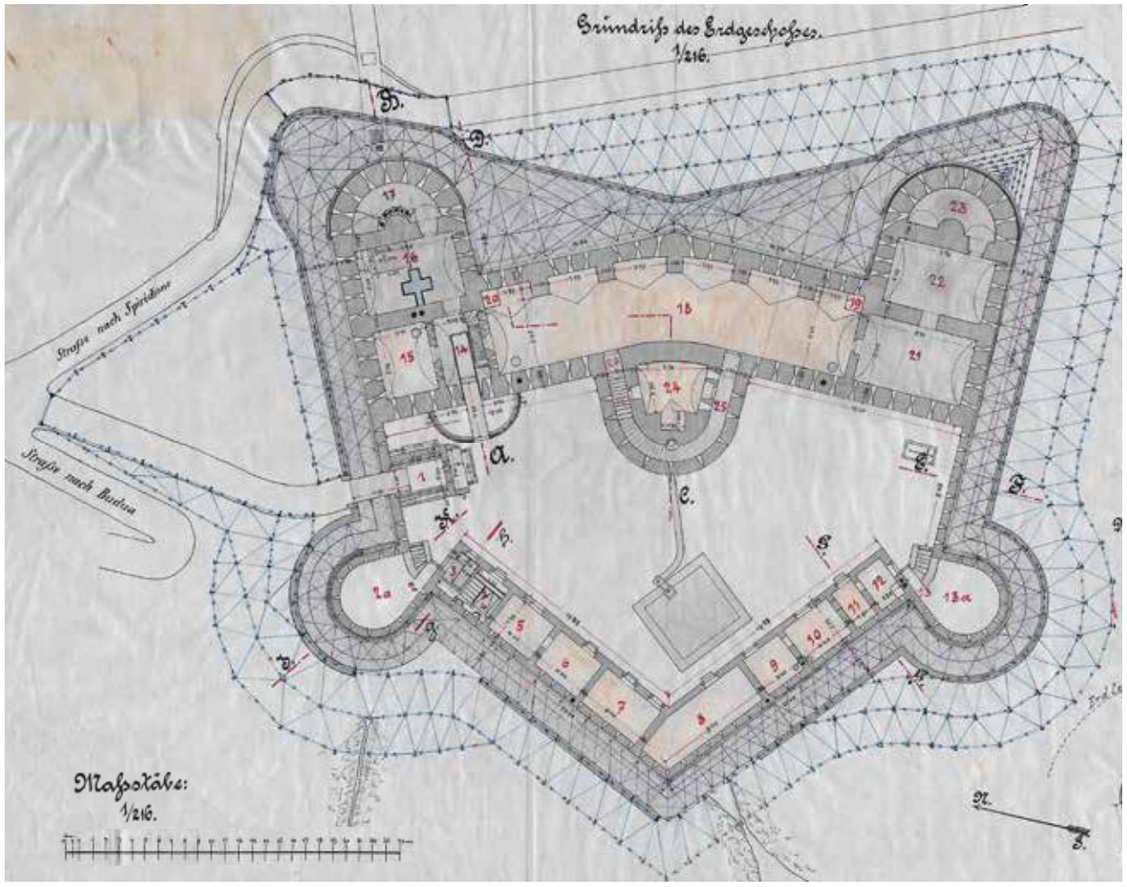


Fig. 71: Ground floor plan,
Fort Kosmač
Rapports plan, 1902
Credits: KA Wien

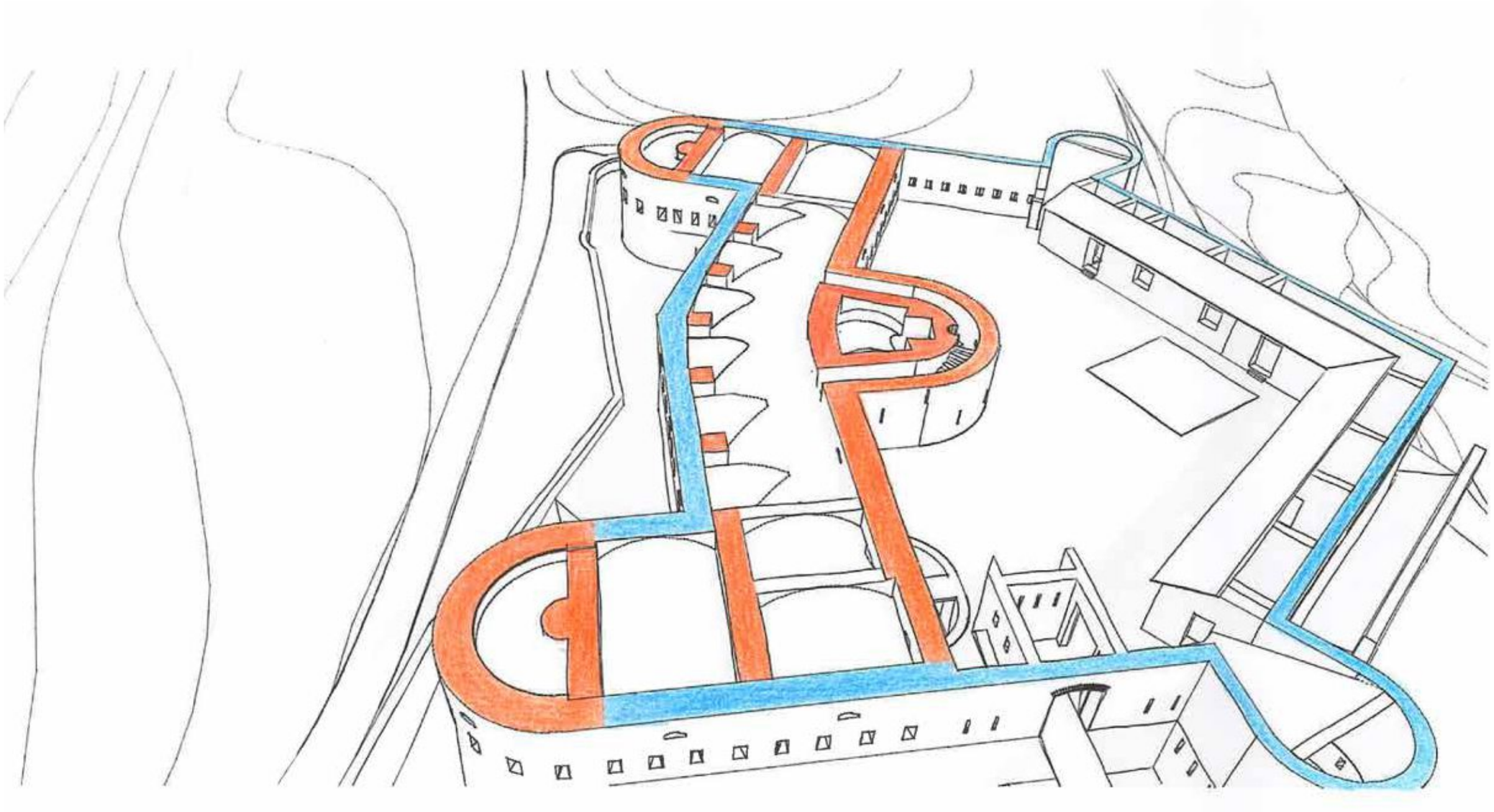


Fig. 72: Fort Kosmač
3D reconstruction based on Rapports plan from, 1902
(Highlighted main load bearing elements)
Credits: Ivan Vrtnica

Core -
Load bearing elements -
Hull elements (protection) -

Fig. 73: Wall surface inside the ground floor, 2019
(The parts of the cement and white plaster are still visible on some spots, as well as the carvings around the window frames where the wooden frames with casements were attached to the stone wall with metal nails)
Credits: Ivan Vratnica

Fig. 74: Remaining of a chimney in the ground floor, 2019
(Chimneys are the few elements where bricks were used instead of stones)
Credits: Ivan Vratnica

Fig. 75: Metal part of the gates locking mechanism still existing on the vault above the entrance of the barracks, 2019
(One of the few spots where the plaster is still visible)
Credits: Ivan Vratnica

Fig. 76: Remaining of the inside walls in the courtyard where the mortar on the walls is still visible
Credits: Ivan Vratnica

Fig. 78: Stone layers of the eastern barracks wall
(Regular stone layer was made out of 25cm high stone blocks at wall faces. Inner faces were plastered with lime plaster)
Credits: Ivan Vratnica

Fig. 77 (top left): Window on the first floor, western barracks wall
(The wooden frame was ripped out)
Credits: Ivan Vratnica

Fig. 79 (top right): Arch of the window, eastern barracks wall, 2020
(Made out of 45cm thick stone blocks.)
Credits: Ivan Vratnica

Fig. 80: The last remaining part of the first floor vault
(The vault is 30cm thick made of “Siga” stone)
Credits: Ivan Vratnica

Fig. 81: Stone layers of the western barracks wall
(Regular stone layer was made out of 25cm high stone blocks at wall faces. The gaps were thin and precisely formed, closed with cement)
Credits: Ivan Vratnica

3.4. FORM

The fortress is positioned on a peak of the rocky hill named Kosmač (local name for a peak of a ridge), 815m above the sea. This fort is a good example of a mountain blocking fortress. It got its name by the peak on which it was built, as it was common for many fortresses of the Austro-Hungarian Empire to be named by the location where they were built. Even dough they used native names, it was not always easy to pronounce or to use the same name due to the language barriers, so the empire often used names from Venetians or at least adapted the writing and pronunciation.

The name Kosmač was official but in some documents the name, as well as the preposition is different or differently spelled. It can be found "Fort Kosmač" which is the official name in Montenegro, "Sperre Kosmač", the official name on the rapport plans[29], found in the War archive in Vienna or "Sperrfort Kozmac"[30] and the similar variations. Over time, as technology and techniques advanced, the military upgraded its fortifications not only with advanced armament but they added some defensive elements like the defense ditches and wires too.

Viewed from the above it has a shape of a six-pointed star and two major dominant parts, the barracks and the fortified courtyard. The three-story barracks is positioned on the eastern side, facing the Kingdom of Montenegro and the courtyard to the west, where the cliff falls steeply to the shore. Around the fortress, there was a defense ditch[31] with wire obstacles

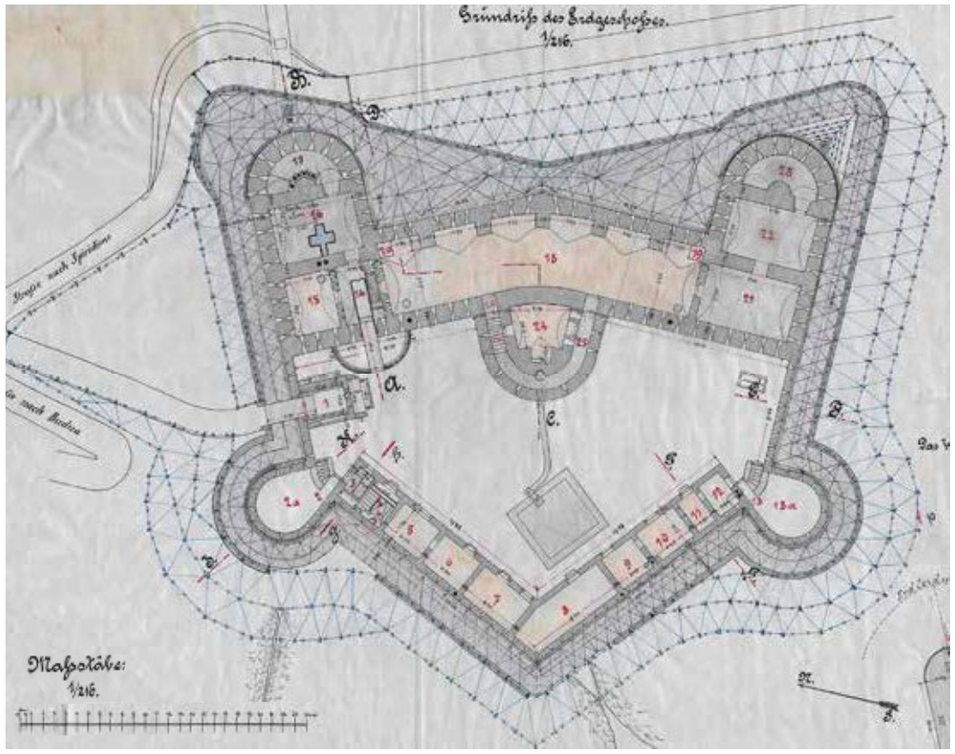


Fig. 82: Ground floor, Fort Kosmač
Rapports plan, 1902
Credits: KA Wien

finished in 1896, that should have made it impossible for the attacker to come near the walls of the fortress.

The ditch was 2.5m or wider and on the average 2.5m deep, intertwined with smooth wire and even with short spikes on some parts of the floor, to make the movement of the troops impossible if they managed to get into it. Around the ditch, there was a wired fence type "Brixen" that consisted out of, up to three layers of single lined fences stretched between the I-profiled steel poles. These poles were around 2m high above the ground and these layers were connected with each other by intertwined smooth wire between them. There was only one entrance on the northern side by the road leading from Budva to Fort Kosmač and further along the eastern side, in

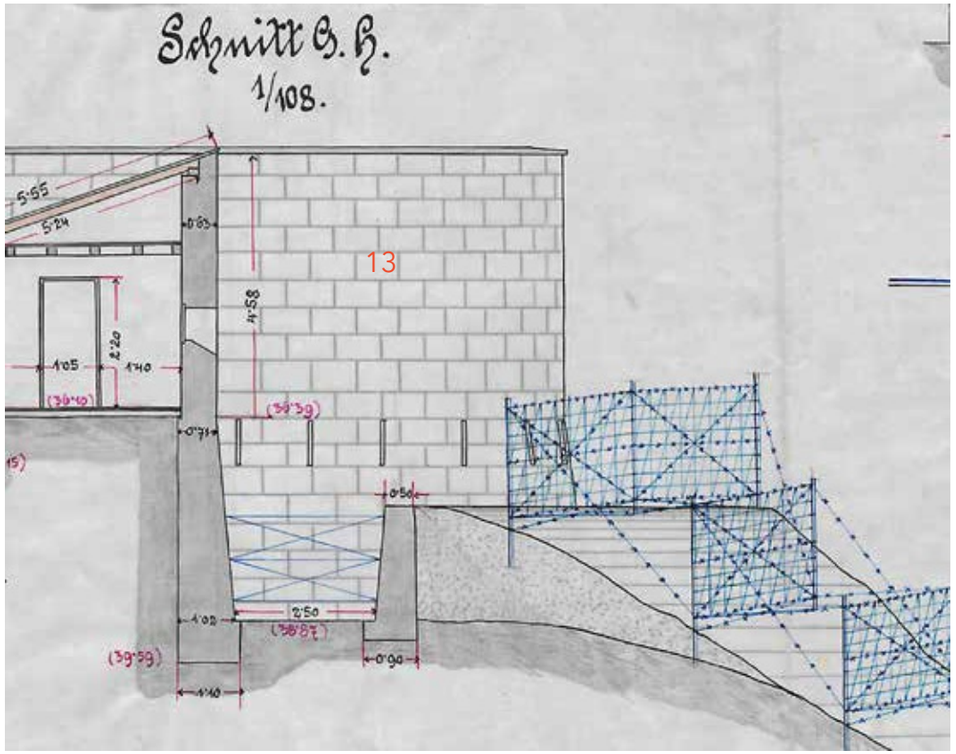


Fig 83: Section of a defense ditch
in front of the southern caponier (13)
Fort Kosmač Rapports plan, 1902
Credits: KA Wien

Fig. 84: Southern side of Fort Kosmač, 2019
Credits: Ivan Vratnica

front of the fortress, through the fenced double gate, to Fort Spiridone on the southeast.
After the retreat of the imperial troops at the beginning of the First World War, the fortress was rigged with explosives, demolished and set on fire to render it unusable as a functional military object for anyone else that might come afterwards. The explosions destroyed the most of the vaults of the first floor.

All the material of the floor fell onto the ground floor and filed approximately half of its initial height. The roof construction was made out of wood, covered by stone tiles, so it burned out and crumbled inside the building.

A lot of the initial substance and form has been lost till today but most of the substance is still there. The initial form can´t be recognized, as most of the courtyard is gone, as well as the ditch, road and fences too. Most of the remaining substance is concentrated in the barracks. Even though badly damaged, outer walls are still standing but those of the gun terrace and its roof are gone. Due to the shortage of materials, tools and manpower, the locals dismantled parts of the fortress that were easy enough to reach, therefore most of the material and metal pieces that are missing, have been taken to serve as building material for houses and various tools.

Fig. 85: Piece of the fence pole - I beam with K.u.K. inscribed on it
Credits: Ivan Vratnica

Fig. 86: Joint of the wiring with the barracks wall in the eastern part of the ditch
Credits: Ivan Vratnica

Fig. 87: Joint of the wiring with the barracks wall on the south-eastern part of the ditch
Credits: Ivan Vratnica

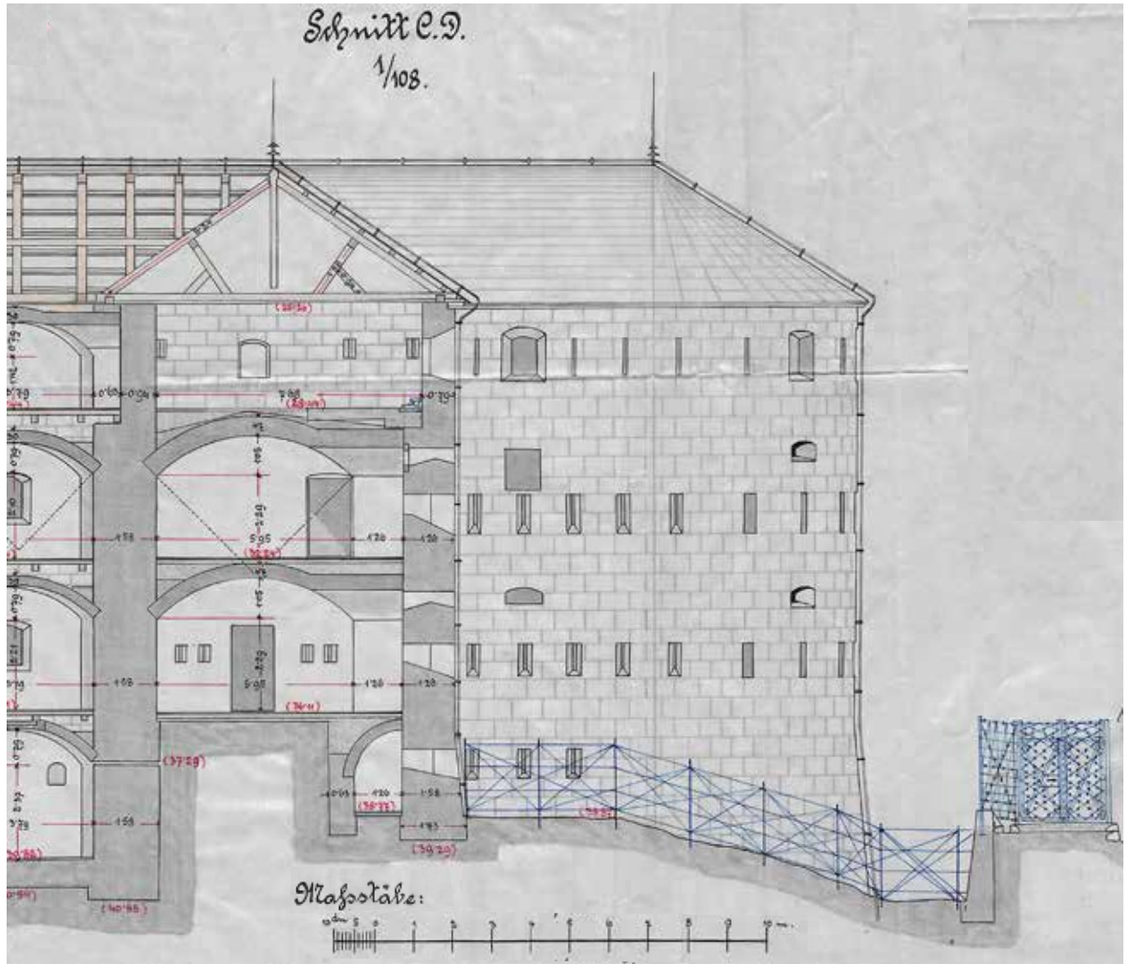


Fig. 88: Section C-D,
Fort Kosmač
Rapports plan, 1902
(The outer fenced gatehouse on the eastern side, made out of two gates, controlling the pass from Fort Spiridone to Fort Kosmač and further to Budva)
Credits: KA Wien

3.5.
ENTRANCE

The entrance consisted of a drawbridge and a double gate system connected with a 4.6m tall wall, creating a gatehouse (Ger. Zwinger[32]) 3.7m long and 2.9m wide, leading into the courtyard. The outer gate was 1.9m wide and some 3.3m high. Both gates were made of reinforced steel plates and could withstand the projectiles fired from a rifle. The inner gate was not parallel with the outer one, instead it was in the side wall, out of the direct line of fire as an additional protection. The drawbridge was 1.9m wide and 4.26m long, integrated into the floor of the gatehouse and it could slide over the defense ditch, under the outer gate. This was made to make any attempt of ramming the outer gate impossible and if somehow, someone managed to get over the ditch through the first gate it would find itself into a confined space surrounded by loopholes[33]. Across the outer gate there was a small baladur[34] to make the protection of the gatehouse easier enabling the direct view through the outer gate. Above the outer gate, there was a stone plate in the wall where the name “Fort Kosmac”, “Sperre Kosmač” or “Sperrfort Kozamc” was carved with an imperial coat of arms above it.

The gate and the gatehouse have been destroyed sometimes after 1936 as the parts of it are still visible on the old photograph[35] from the year 1936. Only one part of the gatehouse wall with loopholes remains today and the original floor with bridge construction and mechanism are not visible as everything is now covered with soil and overgrown with vegetation. The ditch has been cluttered with soil on the place where the gate once was, therefore, it can not recognized, that there was once a gatehouse with a drawbridge.

32. Page 298 - Glossary
33. Page 298 - Glossary

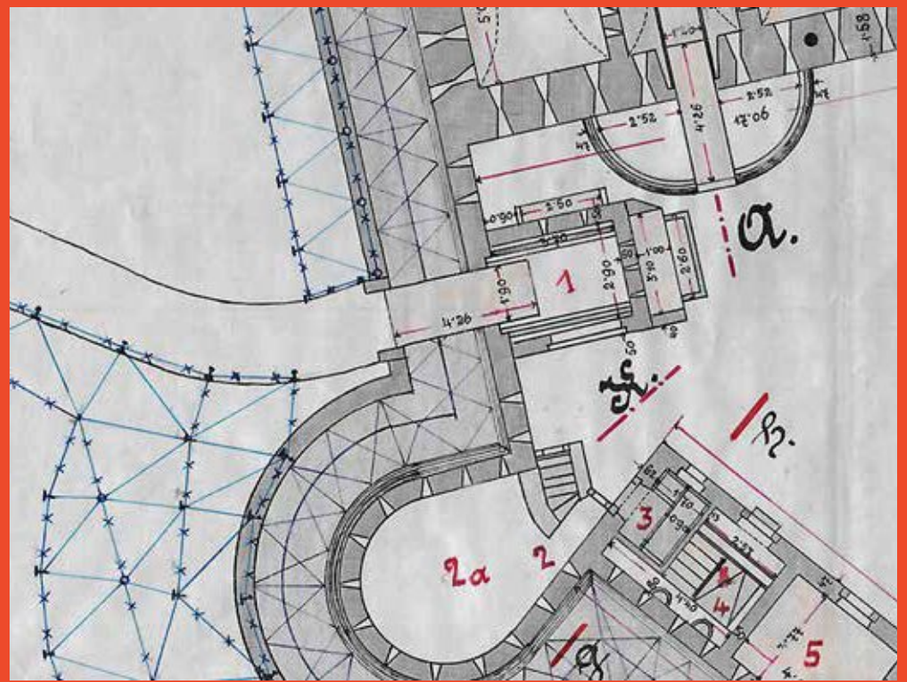


Fig. 89: Plan of the entrance into the Fort Kosmač through Zwinger (1)
Rapports plan, 1902
Credits: KA Wien

34. Page 296 - Glossary
35. Page 82-83, history

Gatehouse (Zwinger) - 1
Northern caponier - 2
Messenger pigeon room - 3
Stables - 4
Showers - 5

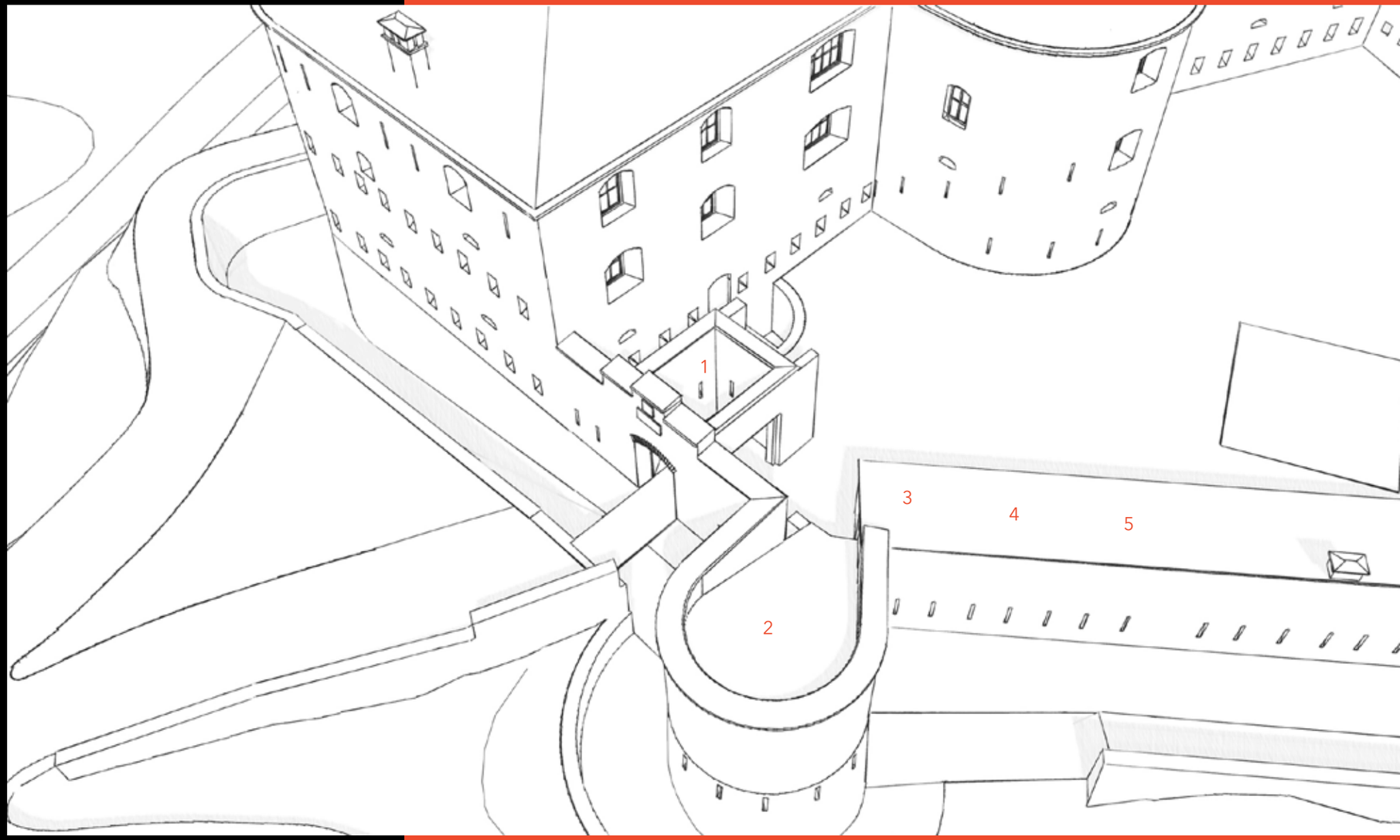


Fig. 90: 3D Reconstruction of the entrance based on the rapports plan from, 1902
Credits: Ivan Vratnica

Fig. 91: Northern side where the gatehouse once was, 2019
(Only one wall remains of the gatehouse, next to the barracks)
Credits: Ivan Vratnica

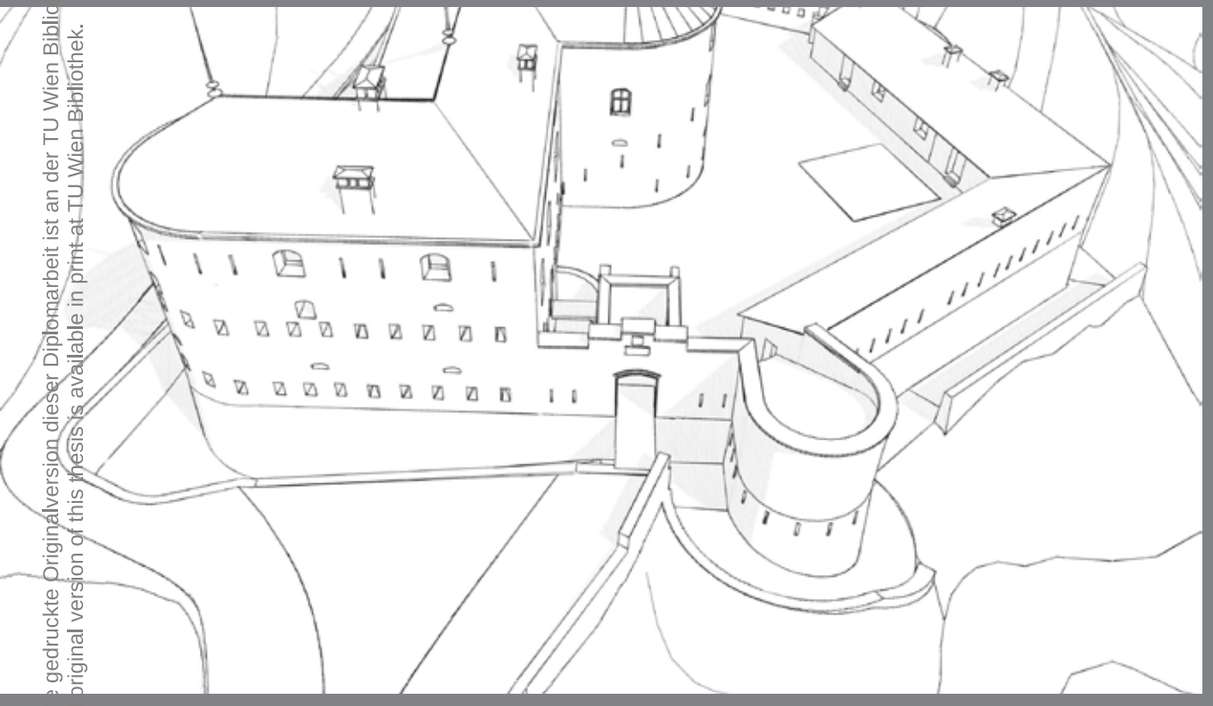


Fig. 92: Gatehouse and the Courtyard
3D reconstruction
Credits: Ivan Vratnica

Fig. 93:Northern side of the fortress, 2019
Credits: Ivan Vratnica

3.6. COURTYARD

The courtyard (Ger. Innenhof) was oriented west on the edge of the steep mountain side with a great panoramic view to the sea. The open part has the area of some 650m^2 and it was used for troop inspection. No direct attack was expected from the west, as it was directed to the cliff, to the inside of the territory, therefore the courtyard was fortified with a wall made out of fine formed stone blocks, 63cm thick and 4.6m tall from the courtyard floor and up to 12m on the outside, due to the ditch surrounding the fortress.

On the north and the south there was a half circular tower called the caponier[36] (Ger. Koffer), stretching outside the wall line. The caponier were used to flank[37] the opposing forces if they somehow managed to come in the ditch, close enough to the wall so they would be out of sight, in the blind spot of the loopholes positioned alongside the wall.

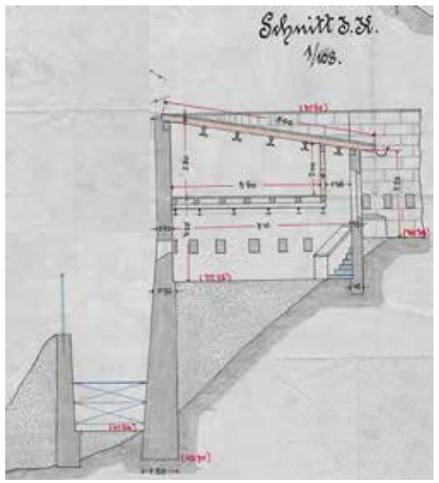
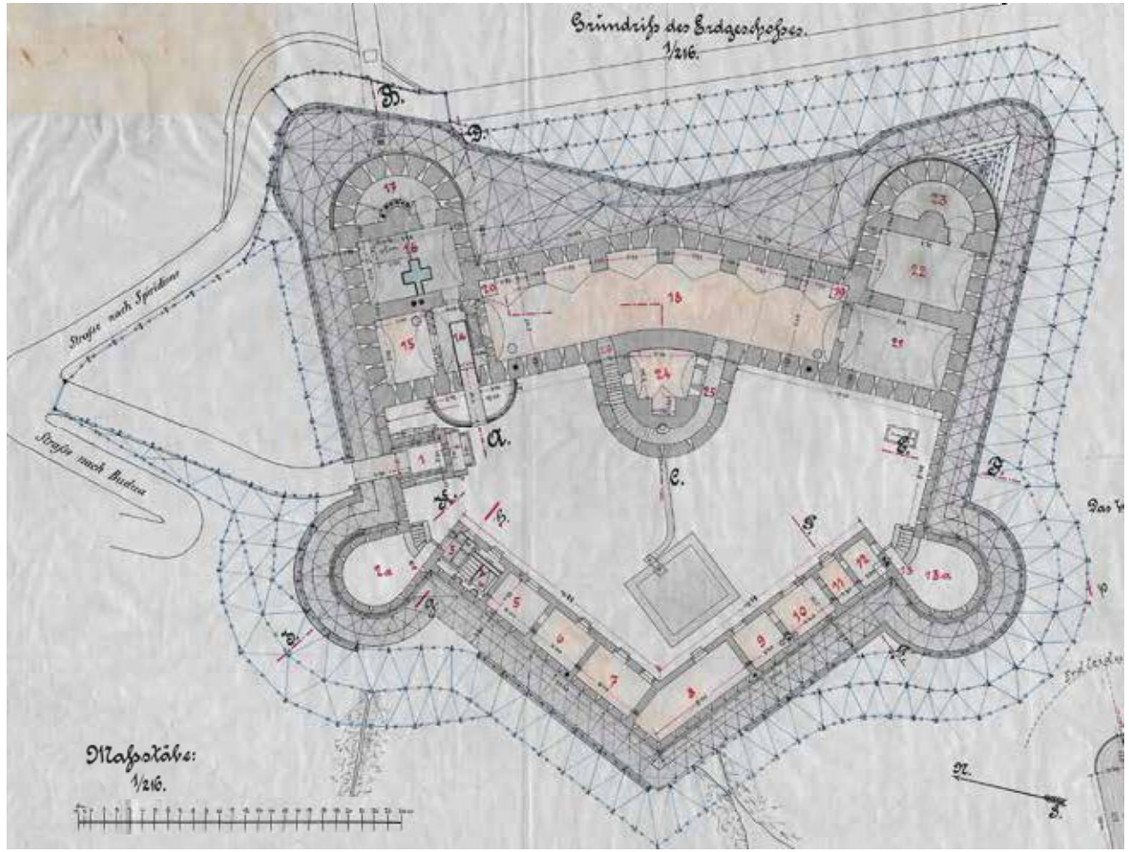


Fig. 94: - Section J-K, caponier (2)
(next to the gatehouse)
Rapports plan, 1902
Credits: KA Wien



Gatehouse (Zwinger) - 1
Northern caponier - 2
Provisions storage - 2a
Messenger pigeon room - 3
Stables - 4
Showers - 5
Changing room - 6
Workshop - 7
Equipment storage - 8
Guest room - 9
Officer´s dining room - 10
Anteroom - 11
Officer´s kitchen - 12

Southern caponier - 13
Provisions storage - 13a
Barracks` entrance lobby - 14
Guard´s room - 15
Kitchen - 16
Toilets - 17
Crew´s quarters - 18
Flanking gallery - 19
Flanking gallery - 20
Provisions storage - 21, 22, 23
Ammunition storage - 24
Passage - 25
Stairway - 26

Fig. 95: Ground floor plan, Fort Kosmač
Rapports plan, 1902
Credits: KA Wien

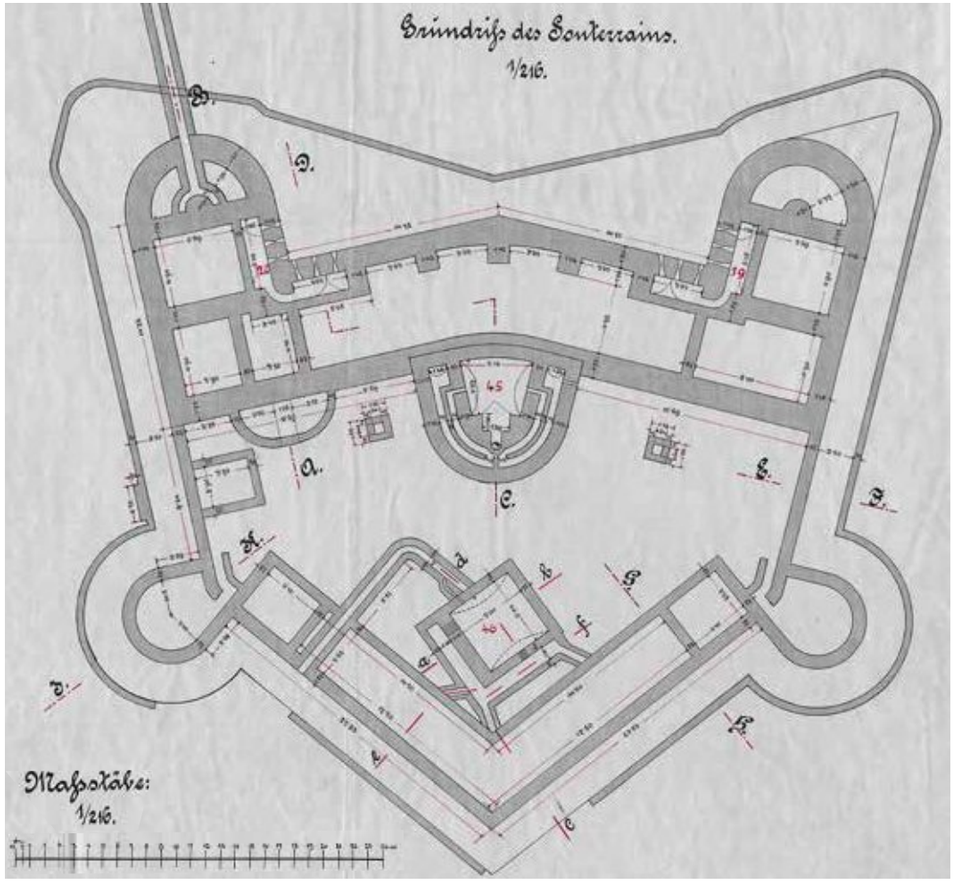


Fig. 96 (top left): Foundations plan,
Fort Kosmač
Rapports plan, 1902
(The drainage and sewer system)
Credits: Ivan Vrtnica
Source: KA Wien

The roof of the caponiers was constructed with metal I-beams covered with wooden planking, isolated, and coated with sheet metal. Later the light platform was installed on them so they could be used for easier observation. Along the wall on the west, there were some 160m^2 of various utility rooms, like the messenger pigeon room, small stables, shower and change room(very rare at the time when the resident buildings in Vienna had only the toilet on the floor), workshop, tool storage, guest

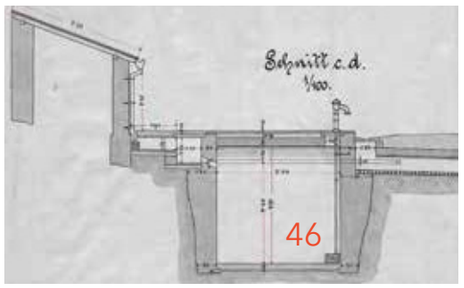


Fig. 97: Section c-d through the water reservoir in the courtyard (water collecting system)
Rapports plan, 1902
Credits: KA Wien

Crew´s quarters - 18
Flanking gallery - 19
Flanking gallery - 20
Ammunition storage - 24
Passage - 25
Inner reservoir - 45
Outer reservoir - 46

room (rarely seen in the fortresses) and the officers dining room with a small kitchen. These rooms were positioned between two caponiers with loopholes on approximately every 1.2m all along the outer wall. The roof was made out of wooden beams

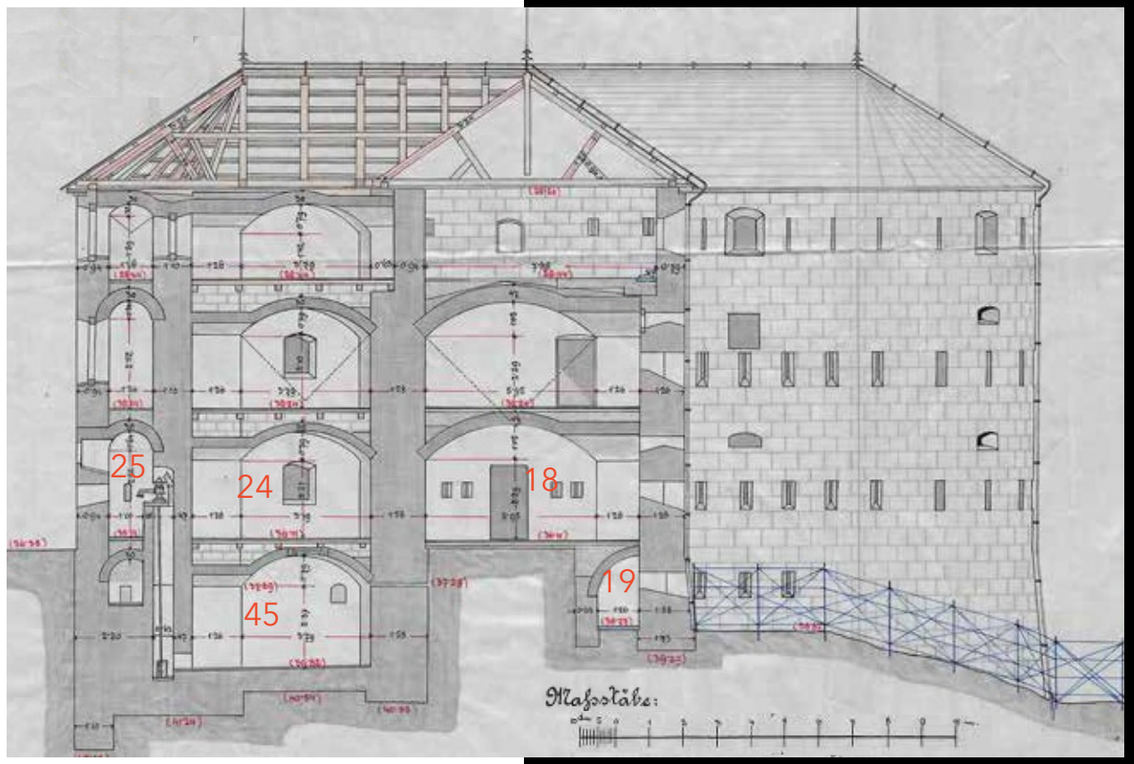
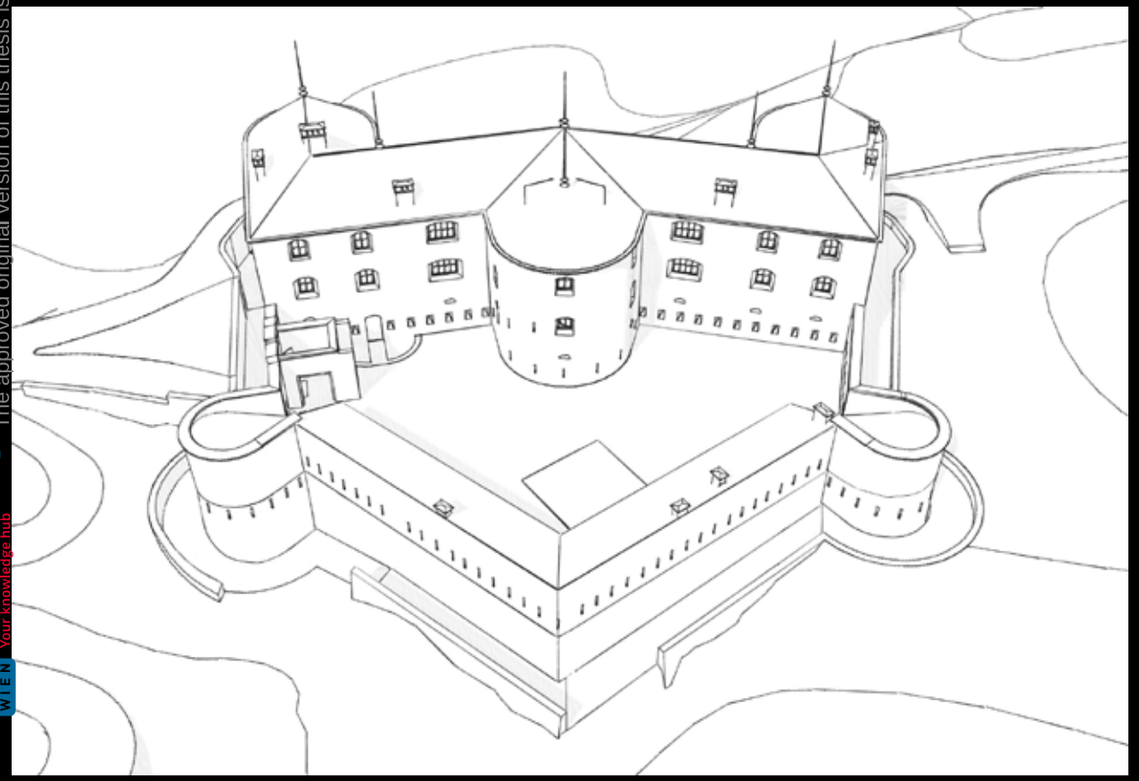


Fig. 98: Section C-D
(Through the western wing - core)
Rapports plan, 1902
Credits: KA Wien

Fig. 99: Fort Kosmač 3D reconstruction based on the Rapports plans, 1902
found in War Archive Vienna (KA Wien)
Credits: Ivan Vratnica



Entrance gate (Zwinger) - 1
Northern Korf - 2
Messenger pigeon room - 3
Stables - 4
Showers - 5
Changing room - 6
Workshop - 7
Equipment storage - 8
Guest room - 9
Officer´s dining room - 10
Anteroom - 11
Officer´s kitchen - 12
Southern Korf - 13
Barracks entrance lobby - 14
Canon terrace - 42
Courtyard reservoir - 46

covered with metal sheets, slanted towards the inside of the courtyard so it can be used as a water collecting surface for the well (Ger. Zisterne), located underground in the middle of the courtyard. The courtyard well has a capacity of 108 000 liters and it was connected by drains with another 48 000 liter reservoir inside the barracks, serving as backup. It had the drain system to prevent the flooding when the reservoirs were full.

On the east, there was the three-story high barracks with the entrance next to the main gate, also protected with a small, half circular ditch and a sliding drawbridge to prevent the possible door ramming.

In the south-eastern corner of the courtyard next to the barracks, there was a grave of the fortress commander Oberleutnant Fridrich (Josef) März who was killed during the uprising[38] in the village of Brajići in the year 1869.

Fig. 100: Western side
Courtyard of Fort Kosmač, 2018
Credits: ÖAI (Austrian Archaeological Institute)

3.7. BARRACKS

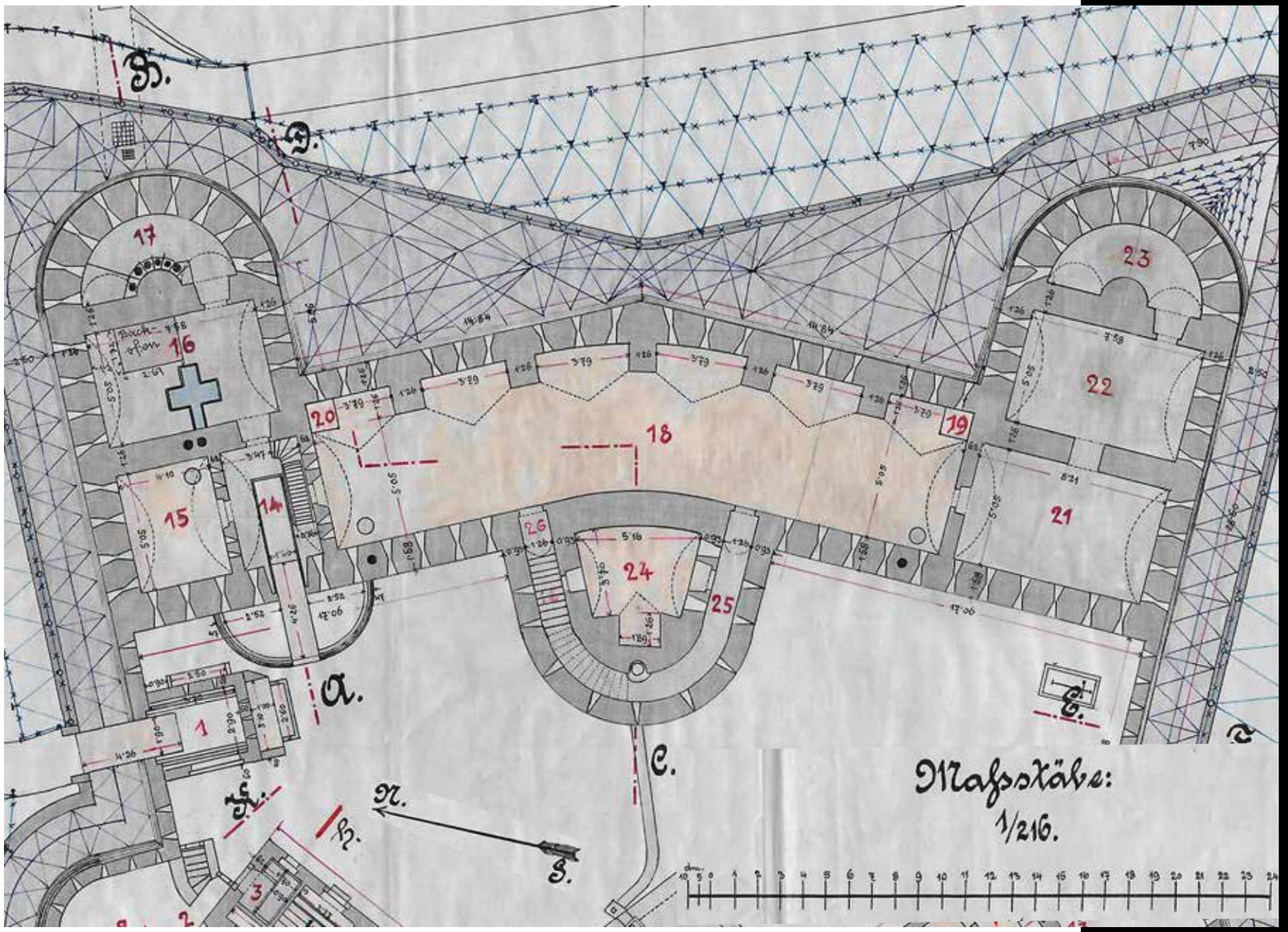
The main part of the fortress is its barracks, which accommodated the crew and all the heavy armament. The building is composed of the main tract, northern and southern wings and a wing on the west side in the courtyard, making it the reinforced core of the fortress. The main tract has a shape of a cuboid 9.15m wide, bent in the middle with an angle 155°, stretching in the direction north to south, some 50m long, 10.5m high on the courtyard side and at least 13m high on the outside due to the surrounding ditch. The two wings are 10m wide and 10m long with rounded walls and the third one in the middle of the western side is 9m long and 12m wide also with a rounded wall. The building was covered with a slanted roof, 3.16m high, making the total height of the building 13.66m in the courtyard and 16.2m on the outside.

The barracks had three levels, ground, first and the second floor covered with slanted roof. The ground floor had an area of around 423m^2 and the height of 2.3m with additional 1m in the middle of the vaults. The first floor was similar with an area of around 403m^2 and the same height. Above, the cannon terrace had an area of around 517m^2. Altogether, the barracks had an area of some 1425m^2.

The entrance was from the courtyard on the ground floor, positioned next to the main gate on the northern side. The entrance to the barracks was over the sliding draw bridge integrated into the entrance hall floor, physically separated from the courtyard with a half circular ditch 6.3m wide and 2.5m deep. Inside the entrance hall, there were loopholes on both sides, so it could serve as a zwinger in case of main entrance breach. From the hall, there was a door to the guard room on the north, kitchen and through it, the toilets in the north-eastern wing. The kitchen was some 40m^2 with a big stove in the middle and a big baking oven in the corner. The toilets were in the half circular room at the end of the wing. There were six toilet seats with only some narrow wooden barriers, except of the officer´s toilet in the corner that was enclosed, as toilets were still a new element it the architecture and the military life had little privacy. From the toilet, there was a drain connected to the sewers, conducting into the field below the hill on the east. The entrance, kitchen and toilets all had a stone paved floor, adjusted to their purpose.

Under the wooden stairs in the entrance hall, which led to the first floor, there was the entrance to the common room which was also the biggest room in the barracks with an area of around 180m2. Positioned in the center of the building, it was probably used for dining and the accommodation of the crew. In the north-eastern and south-eastern corner of the common room there are two shafts in the floor, an access to the defensive galleries in two corners of the room. These two L-shaped, narrow rooms are the only underground rooms in the barracks. Their use was to flank the opposing infantry that managed to get into the eastern ditch close to the walls. Due to its lower position, the galleries had a good view on the lowest part of the eastern ditch, close to the barracks eastern wall, thus eliminating the dead angle of the upper loopholes and as it turned out, were the weak spots because the attackers could throw the explosives inside and blow up the wall of the barracks. From the common room, there was an access to the main stairway and the water reservoir in the western wing and the access to three provisions storages in the southern wing. The provision storages had an area of some 100m^{2,} paved with stone and they were meant to hold provisions to last for many days of isolation in case the supply lines were broken. All the rooms on the ground floor, except the entrance, storages, toilets, and ammo storages were heated by the stoves placed in the corners, with wood as heating material. On the outer walls of every room in the ground floor there were loopholes on every 1.3m for hand weaponry and the arched windows 75cm above them for the natural lighting and ventilation. All the loopholes could be closed with a wooden casement as well as the arched windows above it.

The western wing was made to be the core of the fortress, housing the most important functions. In the western wing positioned central in the fortress there was a stairway along the outer wall connecting all the levels of the fortress. All along the stairway corridor, there were loopholes on the outer wall to make the flanking position for the entrance and the opposing corner



Entrance gate (Zwinger) - 1
Northern caponier - 2
Provisions storage - 2a
Messenger pigeon room - 3
Barracks` entrance lobby - 14
Guard´s room - 15
Kitchen - 16
Toilets - 17
Crew´s quarters - 18
Flanking gallery - 19
Flanking gallery - 20
Provisions storage - 21, 22, 23
Ammunition storage - 24
Passage - 25
Stairway - 26

Fig. 101: Ground floor plan, Fort Kosmač
Rapports plan, 1902
(Barracks)
Source: KA Wien

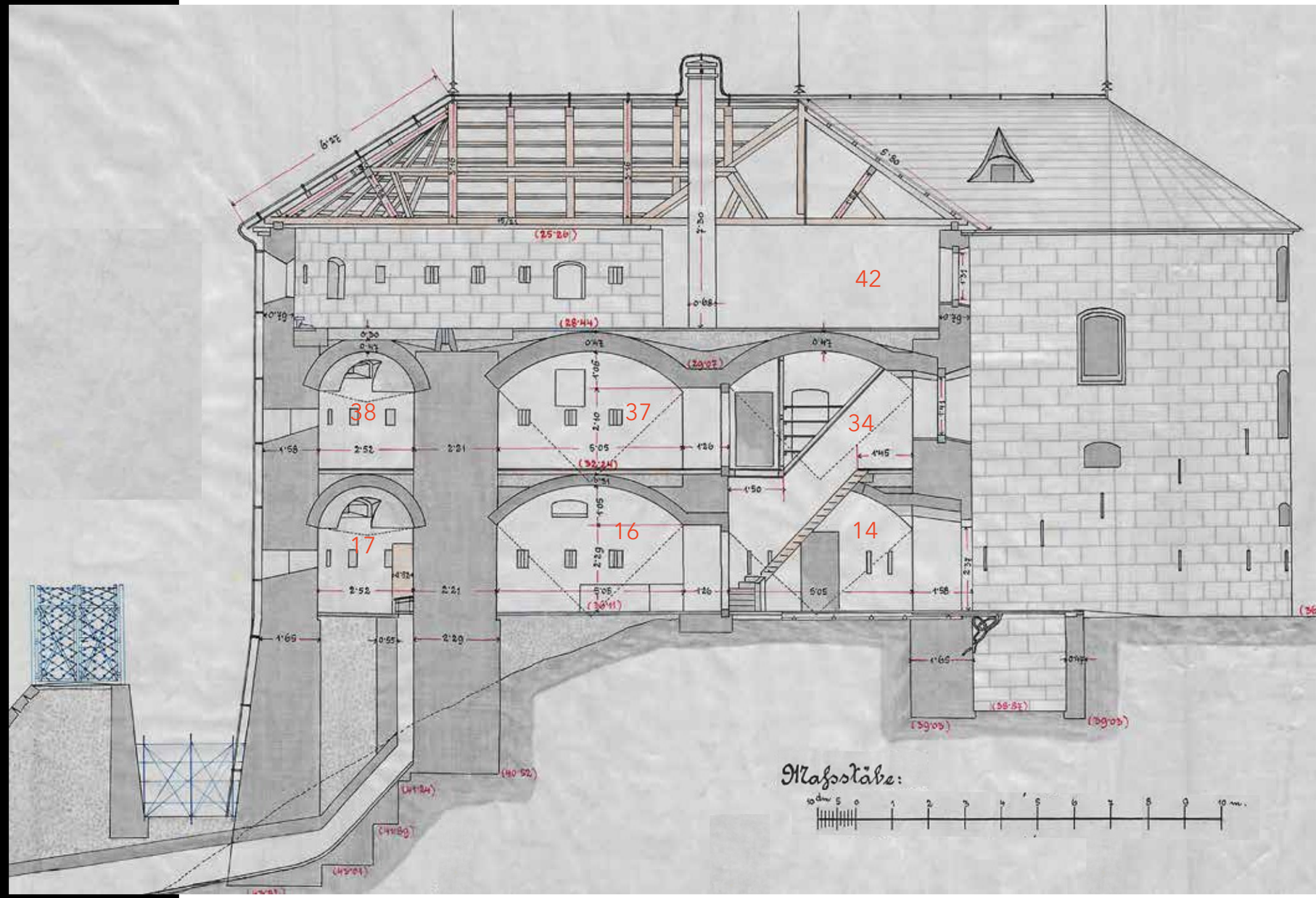


Fig. 102: Section A-B
(Through the entrance lobby
and the northern wing)
Fort Kosmač
Rapports plan, 1902
Credits: KA Wien

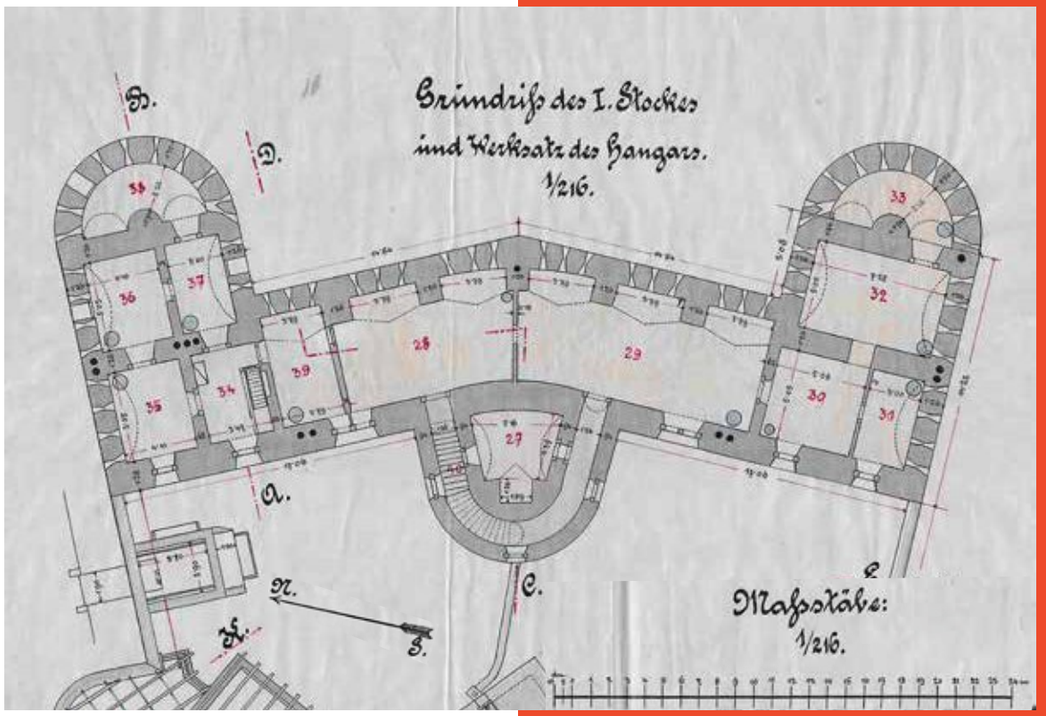
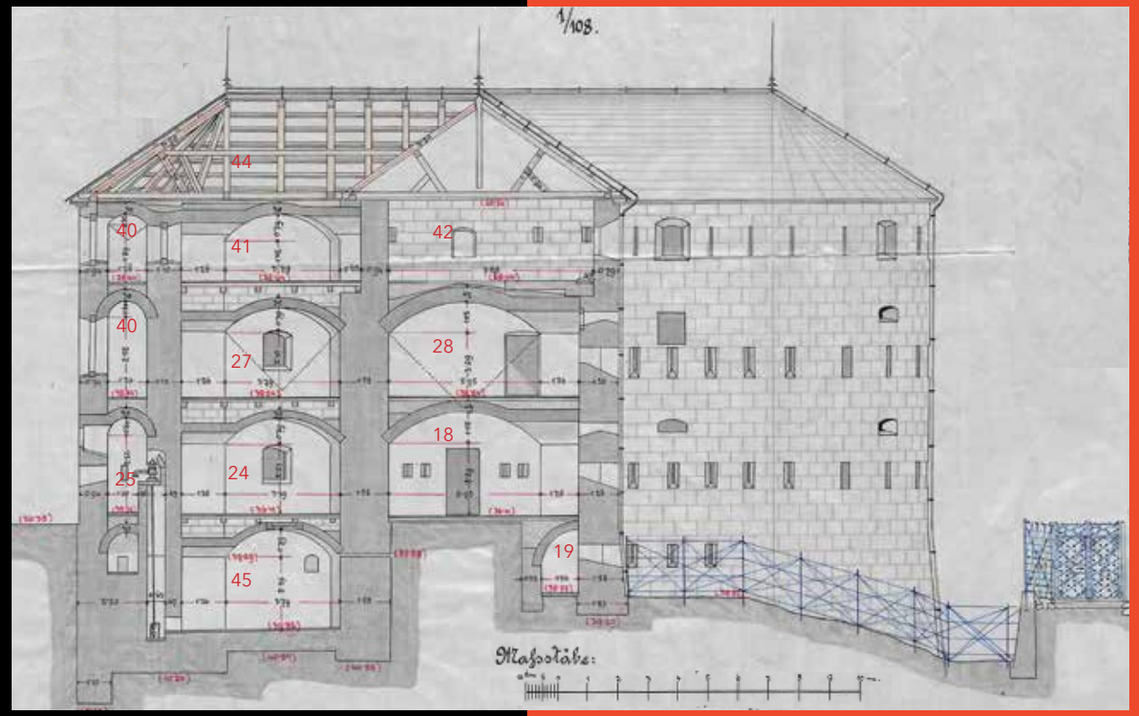


Fig. 103: First floor plan,
Fort Kosmač
Rapports plan, 1902
Credits: KA Wien

Fig. 104 (right):- Section C-D
(Through the western wing)
Fort Kosmač
Rapports plan, 1902
Credits: KA Wien

of the barracks. On the other side of the corridor, placed centrally in the western wing and behind a 93cm thick wall, there were three munition storages, one on each level of the fortress. These were the most protected rooms in the fortress, isolated from the outside additionally by the stairway corridor and the outer wall, serving as a buffer room for ventilation, so the ammunitions would stay as dry as possible.
The ammunition storages also had the stone dome roof and the wooden floor raised above a stone dome construction under it, to avoid the moisture buildup in the floor. Under



Flanking gallery - 19
Passage - 25
Ammunition storage - 27
Crew quarters - 28, 29, 30
Sargent´s room - 31
Sick bay - 32
Hospital room - 33
Anteroom - 34
Officer quarters - 35, 36, 37
Off. Equipment room - 38
Commander´s quarters - 39
Stairway - 40
Ammunition storage - 41
Cannon terrace - 42
Equipment room - 43
Attic above 40 and 41 - 44
Reserve water well - 45

the ammunition storages, there was a water reservoir underground, connected to the one in the courtyard. Around it, there is a system of drains serving to additionally filter the water and prevent the overfilling of the reservoir. The water could be pumped out with a hand water pump, from the corridor under the stairs, accessed from the common room in the ground floor. The reservoir had a service access hatch under the wooden floor in the ammunition storage above it, in case it got clogged or it needed cleaning.

The access to the first floor was over the wooden stairs at the entrance hall and the main stairwell in the western wing. The stairs at the entrance hall led to a first floor in the northern wing, with the commander´s and senior officer´s quarters. In the main tract there were the commander´s room and the sleeping quarters for the soldiers, presumably mostly the artillery crew so they could quickly rush up in case of a sudden attack. In the southern wing on the first floor there were two hospital rooms. Same as bellow, the loopholes are all along the outer walls with an arched window above them for natural lighting and on the western side where there are six 1.4m high windows, two of them 2.1m and four 1.2m wide. These bigger windows also had a casements with glass as well, to make the feeling in the rooms more natural.

On the second floor there was a cannon terrace(Ger. Geschützterrasse), accessed only over the main staircase in the western wing. The walls of the terrace were 79cm thick and 2.6m high. Inside, there were no inner walls on the terrace, to make the space practical for maneuvering the artillery. It was the biggest covered area in the fortress with a slanted roof made out of fine, thin stone tiles resting on the wooden construction without any planking on the ceiling. The roof was built to be dismount-able. In a case of war, it would have been dismantled to prevent the collapse of the roof on the crew manning the artillery, disabling the defensive capabilities of the fortress[39]. On the terrace there were circular mounts(Ger. Lafette) for two M78 150mm Mörser cannons, one in the northern and the other in the southern wing. Also, there were 18 mounts for smaller M4 90mm cannons or similar, dough the fortress was armed with only six of these cannons. The mounts were placed under the windows 75cm wide and 90cm high, with metal casements. The arches above the windows were high and slanted upwards to enable the high elevation shots for long range firing.

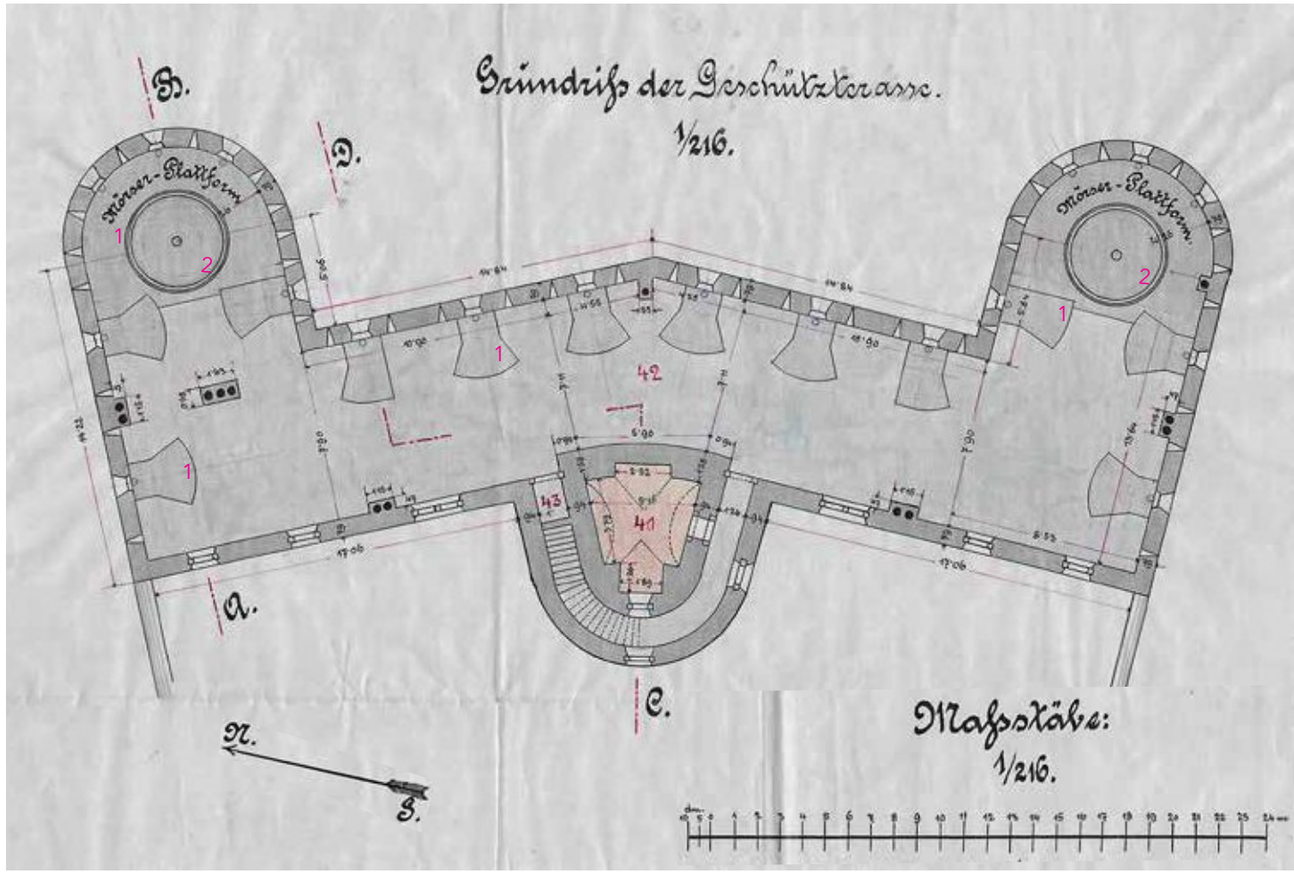


Fig. 105: Second floor plan, Fort Kosmač
Rapports plan, 1902
The cannon terrace - 42
(Ger. Geschützterrasse)
Ammunition storage - 41
Equipment room - 43
Lafette for the 6- and 7-punder canons, later for 9cm M4 canons - 1
(blue circle under the window where the M4 was docked)
Lafette for the 15cm mortars - 2
Credits: KA Wien

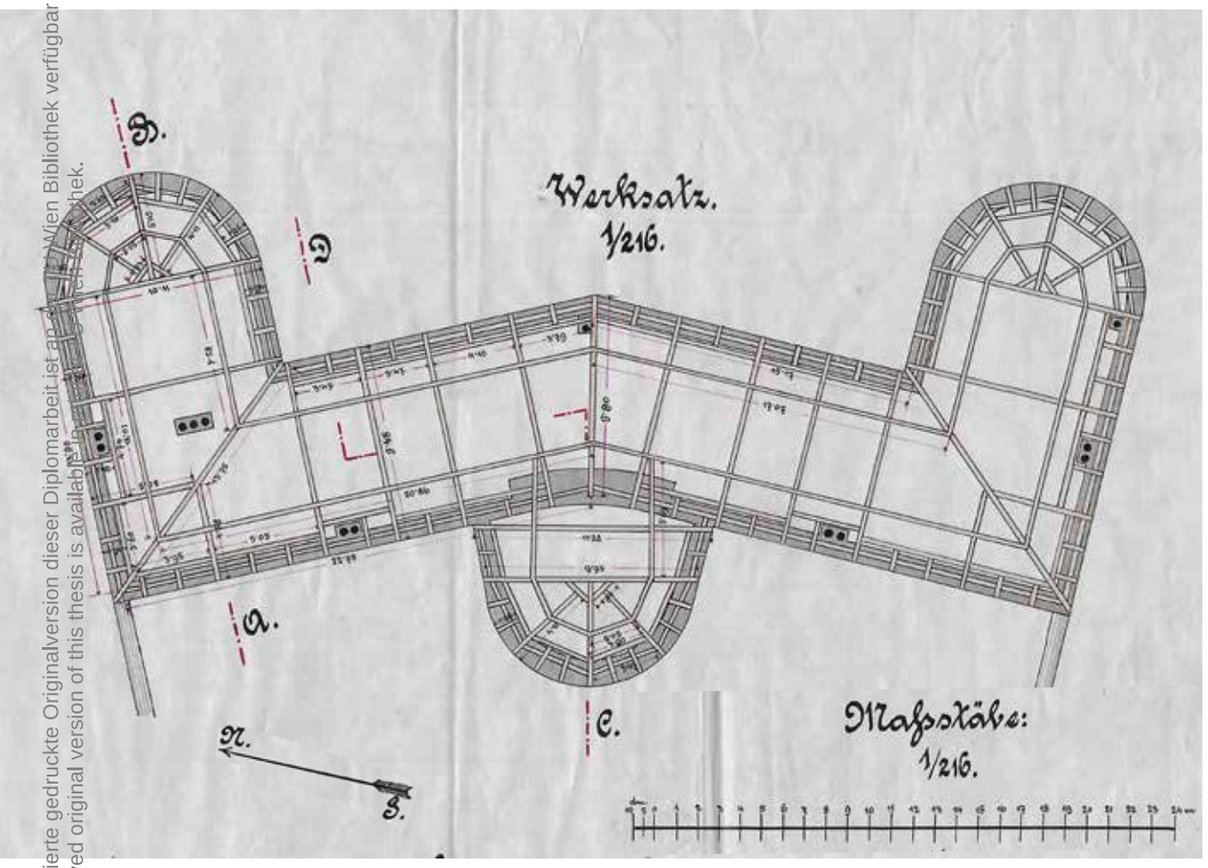


Fig106: Roof construction floor plan
Fort Kosmač
Rapports plan, 1902
Credits: KA Wien

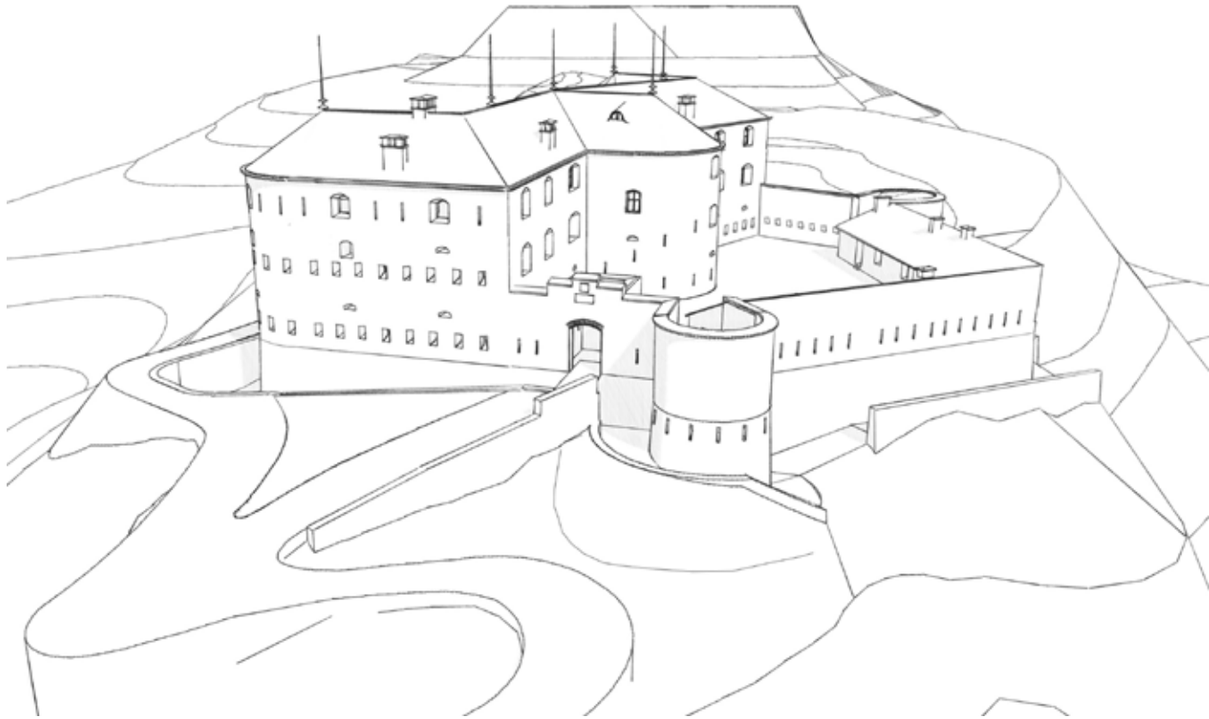
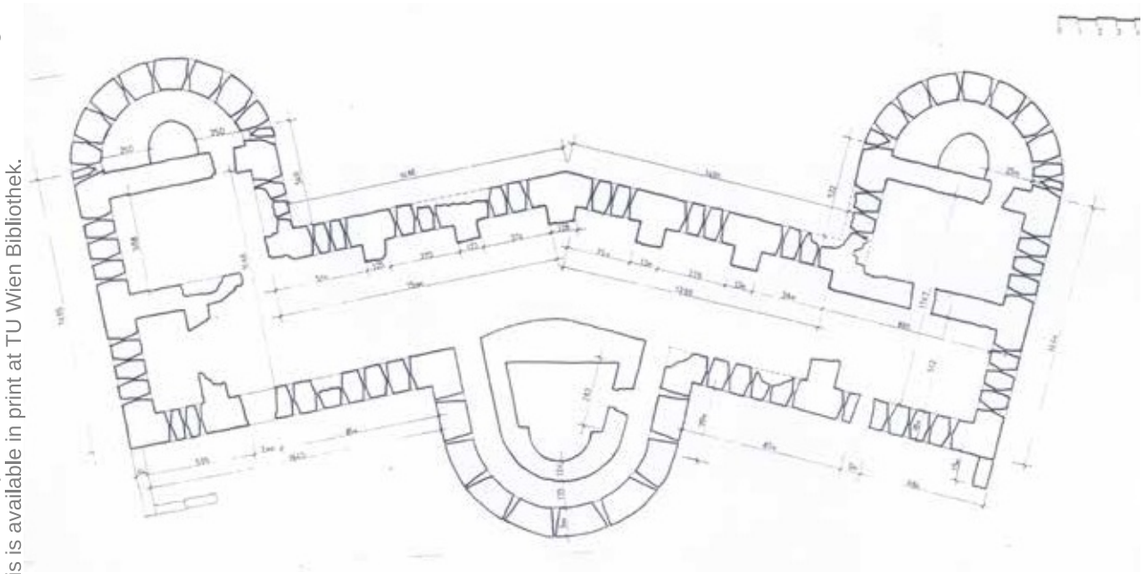


Fig. 107: Fort Kosmač
3D reconstruction based on the Rapports plans, 1902
found in War Archive Vienna (KA Wien)
Credits: Ivan Vratnica

Six mounts were placed on the eastern wall in the middle, two on the northern and southern side, one on each wing on the inner side and three on the half-circular wall in each wing. These three mounts could not be used if the two bigger cannons were placed on circular mounts and only served as a backup. Next to the artillery windows there were loopholes for hand weapons and six windows on the western side, same as ones on the level below. Due

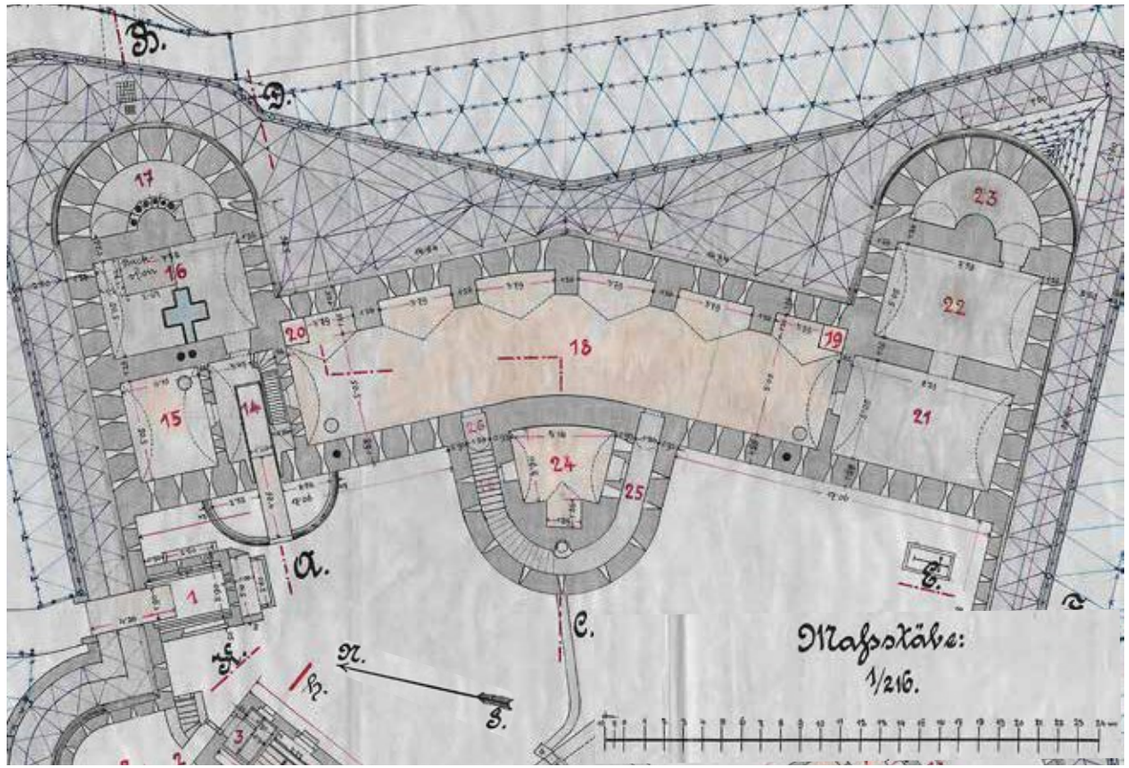


to the specific location of the fortress, there were six lightning rods, 4m high, placed on the roof ridge that gave the fortress a unique silhouette[40].

Today the barracks make most of the ruin. The outer walls are damaged but still standing firmly. The vaulted floor construction between the ground and first floor was demolished in August 1914 after the beginning of the First World War, when the imperial army retreated, to render the fort unusable for anyone else. The walls of the cannon terrace are almost all gone, except of the one small part with a cannon window on the southern wing, but the floor, even heavily damaged is mostly still there. Almost all the metal parts on the terrace, including the rails in the floor, on which the cannons slided, are gone. Judging by the old

Fig. 108: Ground floor plan (sketch of the remaining ruin) Fort Kosmač
Credits: Feasibility study 2008 - Working group for implementation IRPP/SAAH Montenegro

Gatehouse (Zwinger) - 1
Northern caponier - 2
Provisions storage - 2a
Messenger pigeon room - 3
Barracks` entrance lobby - 14
Guard´s room - 15
Kitchen - 16
Toilets - 17
Crew´s quarters - 18
Flanking gallery - 19
Flanking gallery - 20
Provision storage - 21, 22, 23
Ammunition storage - 24
Passage - 25
Stairway - 26



photograph[41] from 1936, the upper terrace walls were still there at the time, which indicates that they have been removed later, probably to be used as a construction material.

The reason why the top walls are missing is that they had no stone vaults resting on them, therefore they were easy to dismantle layer by layer starting from the top. Every layer has been picked of down to the floor and only some small pieces remain. The stone vault construction covered with concrete is still standing with some

Fig. 109: Ground floor plan, Fort Kosmač
Rapports plan, 1902 (Barracks)
Credits: Ivan Vratnica
Source: KA Wien

Fig. 110: Northern wing Fort Kosmač, 2018 (Missing outer stone block layers of the barracks walls) Credits: ÖAI (Austrian Archaeological Institute)

large holes in it. The original material of the floors is still inside, piled up in the ground floor, filling over half of its height. The only vaults left are in the southern part of the barracks. The fill in the loopholes in the outer wall, made during the 1869 uprising can still be seen inside the barracks on the ground and first floor. The main staircase in the western wing is also dismantled and it can be clearly seen that they have been carefully ripped out of the walls as whole, as each stair was a solid stone block. On some places there are pieces of stair blocks still in the wall, where can be seen that it had been carefully cut out to preserve most of the block and no larger pieces of stair blocks can be seen inside the ruin.

The vaults in the ammunition storages and of the reservoir in the western wing have also collapsed, laying piled up in the reservoir, which is still full with water. When the walls of the gun terrace were gone, the lower sections of the fortress outer walls were the next easiest part to dismantle. Starting mostly from below or at some week points like windows, the stone blocks were carefully broken out with the chisel at the gaps. The outer layer of stones on the outer walls are missing on the spots like the bottom of the walls, easy enough to reach but also some upper layers collapsed as the bottom layers, supporting them, were broken off.

The inner walls are mostly gone. The ones remaining are badly damaged, thicker construction walls. With inner walls mostly gone the outer walls became less stable. The outer layer of the corner, where the main tract is bent, is on the verge of collapsing, taking the upper part of the eastern wall with it.

Fig. 111: Stairway in the western wing
Fort Kosmač, 2019
(Monolith stair blocks were carefully pulled out)
Credits: Ivan Vratnica

Fig. 112: (top right) Interior of the barracks
Fort Kosmač, 2019
(Crew quarters in the ground floor(18)
and above (28, 29, 29)
Credits: Ivan Vratnica

Fig. 113 (top right): Interior of
the barracks
Fort Kosmač, 2019
(Entrance shaft to the defensive gallery (19))
Credits: Ivan Vratnica

Fig. 114 (bottom right): Interior of the barracks
Fort Kosmač, 2019
(Entrance door. The wall between the entrance
(14) and the crew quarters (18) is missing but the
identical upper one still remains with the original
vaults merging under a 90° angle)
Credits: Ivan Vratnica

Fig. 115 (top left): Stone chisel
Fort Kosmač
(Forgotten chisel used to break off
the outer stone blocks)
Credits: Norbert Zsupanek - K.u.K.
Befestigungen, Militärbauten und Anlagen
im Raum Cattaro (Kotor), 2009

Fig. 116 (bottom left): South-eastern wing
Fort Kosmač 2019
(The upper stone blocks collapsed as the bottom ones
were broken off)
Credits: Ivan Vratnica

Fig. 117 (right): Northern barracks wall
Fort Kosmač, 2019
(Outer layer stone blocks broken off
and pulled out)
Credits: Ivan Vratnica

Fig. 118 (left): Toilets (17) and Equipment room (38) in the North-eastern wing
Fort Kosmač, 2019
(The vault between collapsed but it´s material has been removed)
Credits: Ivan Vratnica

Fig. 119 (right): Toilets (17) in the North-eastern wing
Fort Kosmač, 2019
(The special toilet stone blocks are broken and missing)
Credits: Ivan Vratnica

Fig. 120 (top left): Interior of the barracks
Fort Kosmač, 2010
(Still Visible in the background is the inner wall of the officer´s quarters (35))
Credits: Radojica Pavićević

Fig. 121 (bottom left): Interior of the barracks
Fort Kosmač, 2019
(Position of the guards room (15) and officers quarters (35) on the floor above. The inner wall collapsed in the recent years)
Credits: Ivan Vratnica

Fig. 122 (top right): Interior of the barracks
Fort Kosmač, 2010
(Position of the chimney in the kitchen (16) that collapsed,critically weakening the bearing wall, making it deteriorate more over time)
Credits: Radojica Pavićević

Fig. 123 (bottom right): Interior of the barracks
Fort Kosmač, 2019
(Entrance to the kitchen (16) and to the officer´s quarters (36, 37) on the first floor)
Credits: Ivan Vratnica

The earthquake in 1979 probably caused further damage to already destabilized outer wall of the western wing as there was nothing connecting it to the inner wall of the wing. Without bracing the middle part of the rounded wall tilted outwards during the earthquake. This caused the arches leaning on the walls to loosen as one side moved away, creating a vertical crack stretching along the weakest line, the windows. This conclusion is drawn from the photographs made in 1964 where the wall was in much better condition than today. No side cracks are visible on these photographs and the upper window arches are still in good shape. The tilt could be also caused by mild sinking of the middle part of the foundation, even dough the foundations mostly rest on a stable rocky ground. This would have to be properly investigated before the needed measures can be implemented. This wall and the middle edge on the eastern wall are the most critically damaged parts of the walls, making them prone to imminent collapse in this high earthquake risk area.

All the wooden and almost all metal parts are nowhere to be seen. The wooden roof construction burned out when the fortress was set on fire during the demolition. The other parts like the window and loophole frames, and the flooring are probably reused as material and not a single part can be found on site. From the metal parts, only some small metal parts like the roof sheets can be found on site but almost everything else has been dismantled and reused. Some parts of the gutter and lightning rod holder are still present on the walls, as well as some small pieces of I-profiled poles from the defensive wiring. For the other metal peaces it is hard to determine what they were a part of, as well as from which time they came.

Fig. 124: Outer wall of the barracks
Fort Kosmač, 2019
(The middle edge of the main tract is tilted outwards)
Credits: Ivan Vratnica

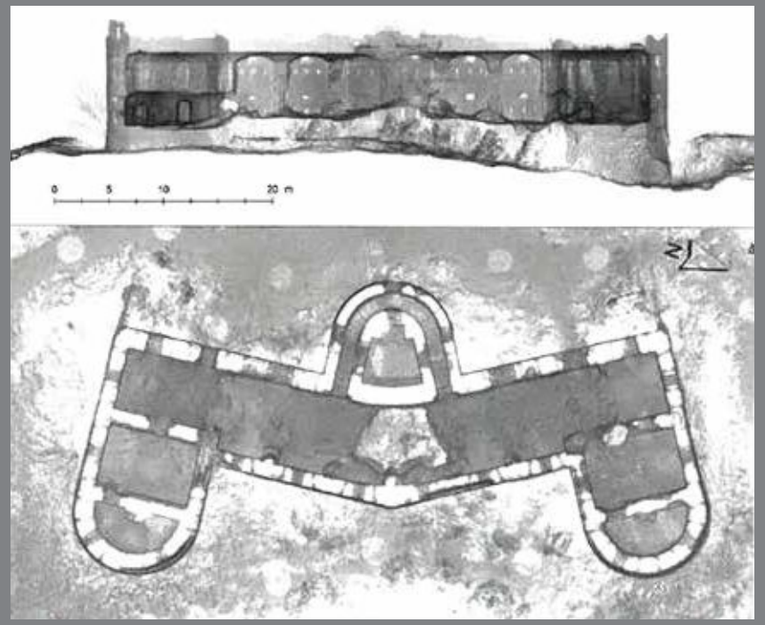


Fig. 125: Laser scan of Fort Kosmač, 2018
Author: Christian Kurtze, ÖAW-ÖAI
Credits: Zsolt Kaplar “Past and present of the 19th century Fortifications built in central Europe”

Fig. 126: Fort Kosmać, 1964
(Western wing)
Translation: "Fortress at Brajići
Damage on the facade caused by private individuals"
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

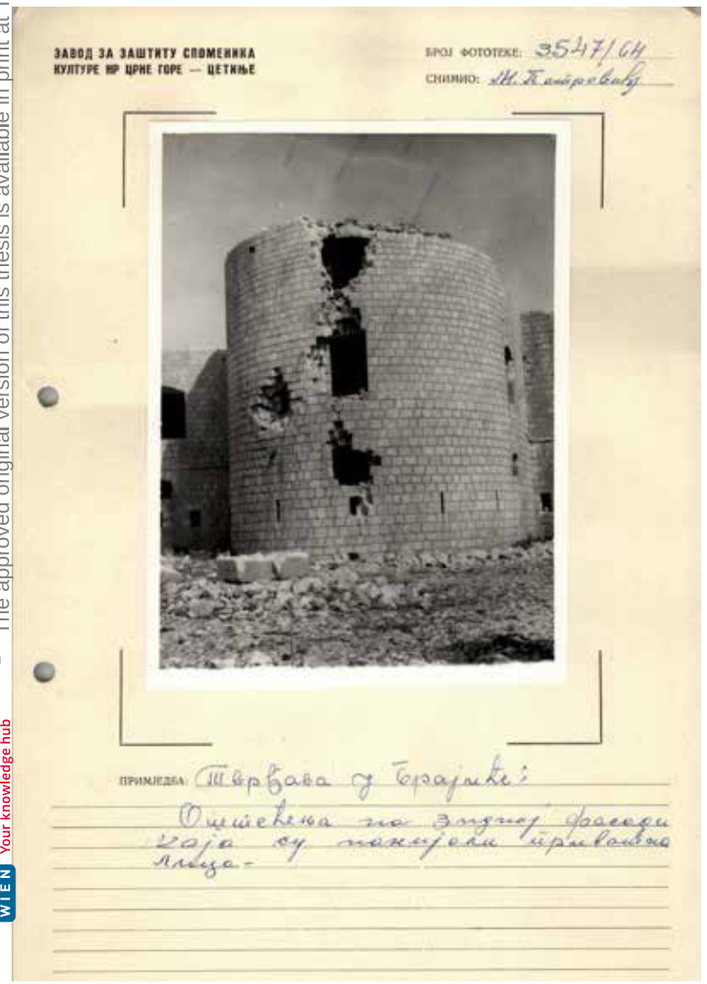


Fig. 127: Western wing
Fort Kosmač, 2019
(The outer wall tilted outwards from the earthquake due to the lack of brassing)
Credits: Ivan Vratnica

Fig. 128: Western wing
Fort Kosmač, 2020
(The damage on the northern outer wall resulted from the further tilting outwards from the earthquake due to the lack of brassing)
Credits: Ivan Vratnica

Fig. 129: Western wing
Fort Kosmač, 2019
(The northern outer wall tilted outwards from the earthquake due to the lack of brassing)
Credits: Ivan Vratnica

Fig. 131: Southern wing
Fort Kosmač, 2019
(Remaining of the chandelier in the ceiling
one of the few metal parts remaining)
Credits: Ivan Vratnica

Fig. 130: Cannon terrace wall in the Southern wing
Fort Kosmač, 2019
(The only remaining part of the wall on, with the only part of
the M4 90mm lafette still present)
Credits: Ivan Vratnica

Fig. 132 (top left): Water reservoir (45)
in the western wing
Fort Kosmač, 2019
(Full of water and material)
Credits: Ivan Vratnica

Fig. 133 (bottom left): Ammunition storages (24, 27)
in the western wing
Fort Kosmač, 2019
(Vaults collapsed into the water reservoir below)
Credits: Ivan Vratnica

Fig. 134 (bottom right): Place of the water pump in
the passage (25)
in the western wing
Fort Kosmač, 2010
Credits: Radojica Pavićević

Fig. 135 (top left): South-eastern wing Fort Kosmač, 2019
(Provisions storage (21) in the ground floor and crew
quarters (30, 31) above. The only remaining part of the
vault between ground and the first floor)
Credits: Ivan Vratnica

Fig. 136 (bottom left): Hole in the eastern wall
Fort Kosmač, 2019
(The collapsed corner between the provisions
storage (22) and the crew quarter (18))
Credits: Ivan Vratnica

Fig. 137 (top right): Southern part of the main tract
Fort Kosmač, 2019
(The biggest hole in the eastern wall in the corner of
the crew quarters (18) and the provisions storage (22).
Loopholes closed during the uprising 1869)
Credits: Ivan Vratnica

Fig. 138 (bottom right): Provisions storage (22)
in the south-eastern wing
Fort Kosmač, 2019
(Base of the collapsed vault)
Credits: Ivan Vratnica

Fig. 139: Metal part
Fort Kosmač, 2020
(Possibly for connecting the telephone line)
Credits: Ivan Vratnica

Fig. 140: Metal nails
Fort Kosmač, 2020
(Possibly from the wooden roof construction)
Credits: Ivan Vratnica

Fig. 141: I-profile pole foundation
Fort Kosmač, 2020
(Some pieces of the pole still visible)
Credits: Ivan Vratnica

Fig. 142: Remaining of a rifle mount built in the loophole Fort Kosmač, 2019 (One of the few metal parts to be seen) Credits: Ivan Vratnica

Fig. 143: Stone arch construction of the door to the passage (26) Fort Kosmač, 2019 (The vault construction above collapsed leaving the arch visible) Credits: Ivan Vratnica

Fig. 144: The provision storage (23) in the south-eastern wing Fort Kosmač, 2019 (The half circular vault construction still present) Credits: Ivan Vratnica

Fig. 145: Stone arch construction of the door to the stairway (26) Fort Kosmač, 2019 (The vault construction of the door above is still visible compared to the previous photo) Credits: Ivan Vratnica

Fig. 146: The Sewers drain leading to the field below on the east
Fort Kosmač, 2020
(The ending of the drain does not exist as the newly made road to the east cuts it)
Credits: Ivan Vratnica

Fig. 147 (right): The manhole on the drain of the sewers from the toilets (17)
Fort Kosmač, 2020
(Used for cleaning in case of clogging)
Credits: Ivan Vratnica

Fig. 148: Southern side
Fort Kosmač, 2010
(The cracks above the window in the outer wall of the western wing looks like the damage from the 1979 earthquake)
Credits: Radojica Pavićević

Fig. 149: Southern side
Fort Kosmač, 2018
(Even dough no significant change compared to 2010 is visible the state of the outer walls slowly deteriorates)
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 150: Eastern side
Fort Kosmač, 2010
(The embankment of the curve the blocking gate on the road from Budva to Fort Spiridone collapsed but most of the material lies underneath)
Credits: Radojica Pavićević

Fig. 151: Eastern side
Fort Kosmač, 2018
((The state of the fortress slowly deteriorates especially on the cannon terrace floor, dough not clearly visible))
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 152: Northern side
Fort Kosmač, 2010
Credits: Radojica Pavićević

Fig. 153: Northern side
Fort Kosmač, 2018
(The holes in the cannon terrace floor are slowly getting bigger leading to the sudden collapse of the whole floor as the inner bearing walls have already collapsed)
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 154: Western side
Courtyard
Fort Kosmač, 2018
(The state of the outer wall of the western wing deteriorates faster as its top remains free in the air making it more susceptible to the effect of the earthquakes which are common in this region of Europe)
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 155: Top view
Fort Kosmač, 2020
(The hole in the north-eastern wing of the cannon terrace is the most critical, as the supporting walls underneath have almost completely collapsed)
Credits: Ivan Vratnica

conservation

4

As a recognized cultural monument of great importance (category 2), Fort Kosmač needs to be properly maintained and taken care of. Until today, almost nothing has been officially done to preserve and secure the ruin. As the needed measures haven´t been taken by the authorities, the condition of the ruin deteriorated over time, losing its substance to the weather and erosions, becoming a target of the individuals who used it as a quarry to extract fine formed stone blocks for construction.

As seen through the analysis, the condition of the ruin is bad and the danger of further collapsing rises over time. From the outside, it seems that the condition of the ruin haven´t changed much in the last 10 years but careful analysis showed continuous substance loss. On the inside dough, it can be easily and clearly seen that, year by year more material collapses from the walls and the vegetation grows around, inside and on the fortress, slowly leading to the collapse of the remaining floor vaults. This would completely destabilize the structure and only few walls would be left standing completely prone to earthquakes. Taking all of this into the account, pure conservation wouldn't be effective, as the state of the fortress would still worsen over time. Considering its current state, a form of the sustainable conservation is a more effective approach, including reparations and reconstruction of various supporting elements in order to stop further deterioration and preserve the ruin. Restorations would be carried out, so that the newly added parts would be clearly differentiated from the authentic substance, making them easier to dismantle if needed. As this would require considerable investment, it is clear that even as a ruin, it would need to be valorized to justify the investment.

The condition of the original serpentine approach road also worsens as more stones fall off from the supporting walls and embankments. Along the road's inner edge, the vegetation grows uncontrolled, narrowing the road and forcing people to walk closer to the outer edge, making it even more prone to collapsing in the abyss underneath and taking the lower serpentines with it.

4.1. CULTURAL HERITAGE PRESERVATION IN MONTENEGRO

Currently the main government organ for monument preservation in Montenegro is the Ministry of Culture. The Ministry consists of several sections in charge of monument protection: "Directorate for cultural heritage protection", "Administration for the Protection of Cultural properties" and the "Center for Conservation and Archaeology of Montenegro". The law predicts three categories: monuments of exceptional importance (category 1), monuments of great importance (category 2) and significant monuments (category 3). The directorate handles the financing through the government's decisions and the minister of culture with its secretary. The administration gives out permits for the projects considering the monuments and the center carries out the chosen projects and measures. Obviously the structure is needlessly complex for such a small country but situation is the same in the country's whole administration. In contrary to this, the cultural heritage of the country is often mishandled, not completely explored, improperly analyzed and not even clearly listed or protected. This oversized administration and complex structure inside the ministry is infective, allowing many nontransparent projects and doings to "slip" through.

The country inherited its administration from the SFR Yugoslavia, which had a more expert approach to cultural monument preservation and management. Montenegro, small as it is, devastated by the crisis and wars of the 90s, remained underdeveloped, having the summer tourism as its main resource for last twenty years. Its natural beauties combined with eventful history that left many monuments, quickly became the resource as many of them are located near the coast, the most important region for the economy. Slowly, the cultural heritage such as old fortified coastal towns became victims of an uncontrolled and highly dependent tourism. Being the main resource, tourism had the priority, pushing for fast development to raise its capacity. This left little time and interest for careful spatial planing. The administrative structures in charge of taking care of cultural heritage were quickly replaced by this complex structures, for causing too much problems and delaying this new wave of "development". Suddenly, many of the experts became politically unwanted on the governing places in the old administrations, resulting not only with their replacement but with complete disappearance of the whole institutions such as the "Regional Institute for the protection of Cultural Monuments" in Kotor. The NGOs like the first ICOMOS Montenegro, aiming to advise and criticize the government's management of the cultural heritage, were made silent, insignificant or ineffective through political influence, leaving clear way for anything the government individuals wanted to achieve. The space was quickly consumed, like the fast falling "tetris" blocks private buildings piled up next to each other, quickly covering all favorable places along the coast without developing a proper infrastructure. The small villages along the coast overdeveloped quickly and aggressively, melting together with their nearest neighbors. Through this process, very little protected space was left around the old towns and smaller objects like the fortresses were misused, vandalized and raided for materials. The ones on attractive locations like the island Fort Mamula, which served as a concentration camp during the Second World War, already became a target for rehabilitation in the 90s, in form of luxurious resorts and casinos, ending up loaned to foreign private companies for 50 up to 100 years for only a few euro per square meter. Similar examples are too many to count where valuable historic and cultural heritage monuments and sites are becoming prey of corrupt privatizations and uncontrolled development. At the end, this caused that the culture itself and its development, exist only to serve the tourism and not the other way around.

There are few examples of rehabilitated fortresses in Montenegro. One thing they all have in common, is that they are a part of fortified old towns or really close to it. These were mostly in good condition with a good structure integrity so they were "gently" rehabilitated without bigger changes to their structure. Mostly, they serve as simple museums, summer stages or restaurants and non of them are used frequently, serving as touristic attractions in the summer. Some of these examples are the Old towns of Budva, Bar, Ulcinj, Kotor and Herceg Novi, where only these in Budva, Kotor and Herceg Novi are in a suitable condition and the others

42. "Feasibility study for cultural monument Fort Kosmač" 2005 - L Ljesar

were never maintained at all. Many Austro-Hungarian fortresses in the belt around the UNESCO protected area of Kotor Bay, like Forts Goražda and Vrmac where the damage and marks of the First World War can still be seen, are not even listed for legal protection by the Ministry. Because of this "lack of political will", these and many other important monuments are deteriorating more and more every year, losing a lot of their unique substance to stealing just in this past decade.

Sadly since after the big earthquake in 1979, there were no rehabilitations of bigger cultural monuments such as fortresses, except of Fort Mamula which is still in the process, therefore it can not be evaluated at this time. This and several other projects are planned, built and supervised by private offices and companies, delivering a questionable results. Currently, due to nontransparent politics of the Ministry, there are only rumors of projects planned for attractive Austro-Hungarian fortifications, made externally with no experts on this topic. Many of the projects are announced by the Ministry when the execution begins, leaving no time to discus them, let alone to debate on the idea and approach. In several studies[42] it was officially announced that there is a lack of experts in this field but in spite of this, the attempts for cooperations are lacking.

In the case of Fort Kosmač the big obstacle to any project is its undefined property. Officially the Fortress is owned by the "Republic Institute for

Fig. 156: Fort Mamula, 2019
(Before the rehabilitation)
Source: Tageskarte.io

the protection of Cultural Monuments of Montenegro" which does not exist any more but since then the Ministry has not defined an official owner. The mater now relies solely on the "mercy" of the Minister of Culture if anything would be done with this monument in the future, because the owner's permit is required for any project.

Fig. 157: Rehabilitation proposal of Fort Mamula, 2019 (Currently being built) Source: Tageskarte.io

Fig. 158: Old Town Budva (One of the best maintained old towns in Montenegro but the uncontrolled development in the background, slowly overshadows its image) Credits: Travelsicht.de

Fig. 159: Fort Goražda, 2018 (One of the targets for an nontransparent rehabilitation) Credits: Ivan Vratnica

Fig. 160: Fort Vrmac in the recent years (Located in the UNESCO protected area it but never maintained. It remains abandoned, a victim of stealing and vandalism. Still it contains a valuable pieces of history) Credits: Radojica Pavićević

Fig. 161: Old town Kotor, 2014 (UNESCO protected zone. Fort Vrmac on the hill in the background) Credits: Ivan Vratnica

Fig. 162: Old town Ulcinj, 2018 (Dating back more than 2000 years) (Even dough it has a long and eventful history the town is still unprotected by state and its condition keeps worsening due to uncontrolled development) Credits: Ivan Vratnica

Fig. 163: Fortress St. John, Old town Kotor, (St. Giovanni; St. Ivan)
(Even dough the old town and the bay are on UNESCO
world heritage list, the fortress remains a ruin
without proper maintenance or infrastructure of many
tourists that climb there for a breathtaking view)
Credits: MyGuideMontenegro.com

4.2.
TECHNIQUE OF RECONSTRUCTION

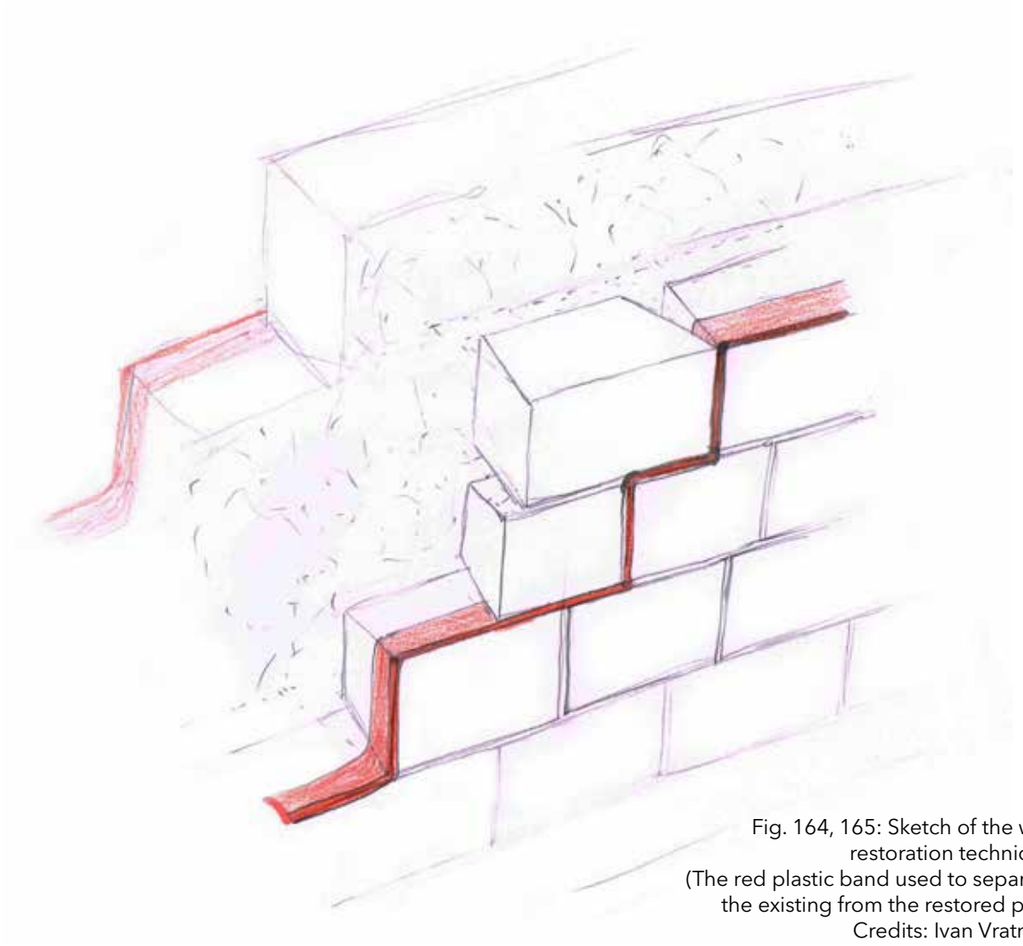
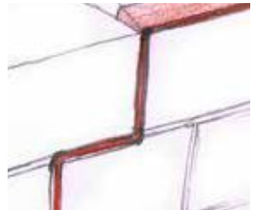


Fig. 164, 165: Sketch of the wall restoration technique
(The red plastic band used to separate the existing from the restored part)
Credits: Ivan Vratnica

These reconstructions would be made so that the reconstructed part can be clearly differentiated from the original substance. This can be achieved in a few different ways but adding a new stone only, will not be enough. Its white new color will fade to gray over time and after a few decades, it will not be possible to see the difference, let alone to tell from which period did it came from. To keep the separation clear, the authentic layer of the wall would be prepared and photo-documented. During the preparations, with the laying of new stone layers, the horizontal and vertical gap between the new and the old layer would be filled with red plastic tape, highlighting and clearly separating the new from the old. The new part could then be constructed with the same block and gap dimensions to keep the original wall surface structure.



The structure itself is important in emphasizing the loopholes and other defensive openings which define the form, appearance and the silhouette of the fort.
The best material for the reconstruction is the local stone and the sorted out stone found on site, originally used due to the special climate of the site. Even dough, sometimes it is favorable to reconstruct the walls from the different material than the original. For this operation, it is crucial to properly study and introduce the way the fortress stone walls were constructed, as well as the precision of the edges, and gaps of the outer layers. This method of reconstruction would allow easy dismantling if it's ever needed as well. To promote the conservation to younger generations and potential future professionals, the conservation work should be carried out through the series of workshops carried out on site. The workshops would include students from all over the world through various student organizations but mainly from Montenegro and Austria. They would be led by the professors and supported by the experts from both countries. All the participants would be living together for around 10 days in the villages of Brajići and Uglješići, so that they could meet the locals and cooperate.
This circulation of people would also have a good influence on the economy of these villages, as well as on the effectiveness of the teamwork between the participants. In the workshops, the students would learn the stone masonry skills from skilled masons, as well as the techniques for conservation of the cultural monuments, which they could then apply on site under supervisions of the professors and experts.
Additionally, the lectures held by the professionals on the fortresses and the cultural heritage would be organized at the end of the day. Through such an approach to conservation, the gaps between younger and older as well as domestic and foreign professionals would be eliminated in the future, creating a stable educational platform and new opportunities for cooperation on many similar projects.

4.3. THE FORT APPROACH ROAD

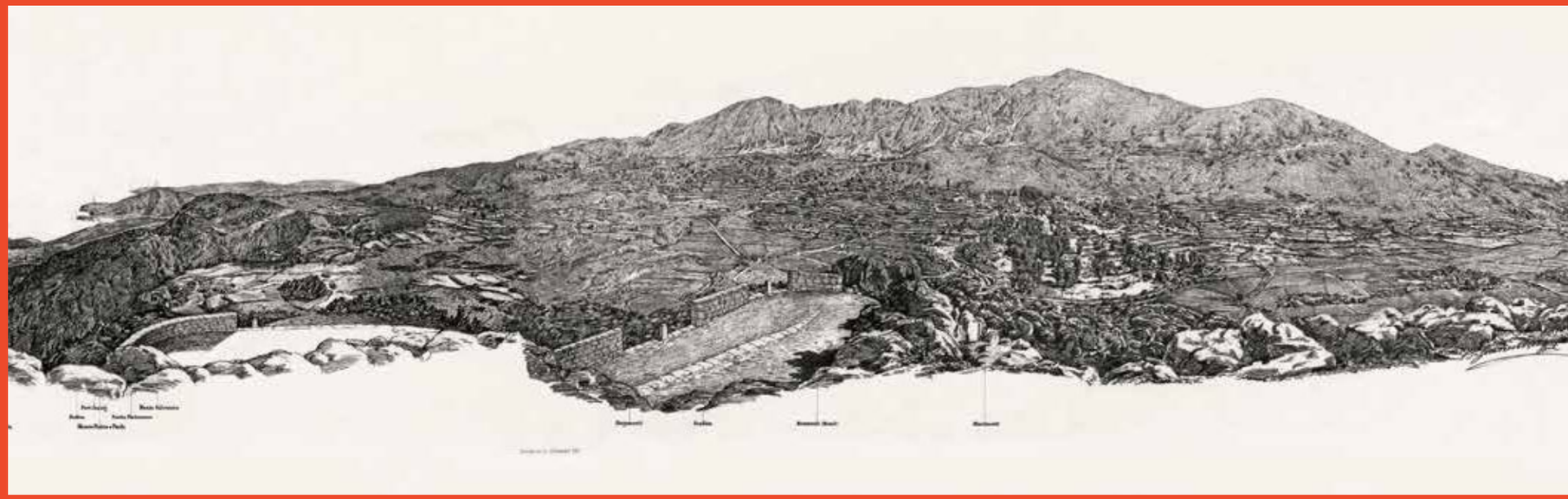


Fig. 166: Panoramic drawing from the entrance to Fort Kosmač, 1860s
(The protective walls and posts are clearly visible on the drawing)
Author: B. Zinnenberg
Credits: KA Wien

The way leading from the main road Cetinje - Budva is the same old one from the time the fortress was built. On the lower part through the valley, it was lowered and repaved with asphalt. The bridge over the stream stayed the same. On the upper part leading to the fortress, the serpentines are not used frequently any more, so the vegetation grew out of control. Occasionally, it is used by locals, livestock and hikers as the transversal trail Orijen-Lovcen-Rumija passes through the courtyard and the fortress is a checkpoint. Even dough the old serpentine road is still in official use as a hiking trail, no improvements or maintenance has been done so far.

The serpentine approach is an important part of the fortress' image because it emphasizes the fortress as a peak of the hill, creating its unique silhouette. Even dough there is a new road on the eastern side of the hill, the original one is an important part and a preferred route visitors choose when going to the fortress.

To preserve and save it from further deterioration, it needs to be cleared, secured, repaired and maintained. First, the vegetation needs to be cleared to make the way as wide as it originally was. This would be a big improvement as it would make it wide enough for people to walk and pass by each other at the safe distance from the cliff. This way the danger would be significantly smaller, both for the visitors and for the support walls along the road. The second step would be to sort and use the original blocks still lying along the road to repair the support walls and embankments. This way the road could be safely used by everyone without the imminent danger of collapsing. After the vegetation clearing and needed reparations, the original safety walls and posts on the edges of the road should be restored, so the road can be used by bikers and bigger groups of people, as well as for

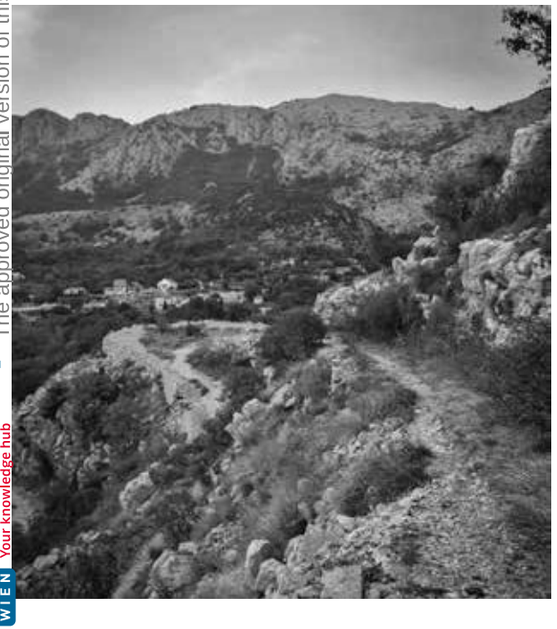


Fig. 167: Damaged embankments on the serpentine approach
Credits: Ivan Vratnica

Fig. 168: Collapsed edge of the approach road
Credits: Ivan Vratnica

Fig. 169: Collapsed edge of the approach road
Credits: Ivan Vratnica

Fig. 170: (bottom right)
The piece of the stone post
(Found along the serpentine approach to Fort Kosmač this tip of the post was placed somewhere along the road.)
Credits: Savo Martinović

smaller service vehicles occasionally. These three steps would restore the road in its original state as it was seen in old the photographs and make ti safe for visitors to use.

Additionally, further work on improving the approach would include installation of indirect lighting integrated close to the floor so it would not affect the form and the silhouette. Along the road there are more than 140 year old engravings made by the soldiers that served at the fortress. These details should be protected and described with the info tables next to them.
The engravings are exposed to rain, therefore the letters are slowly being washed away. To preserve them, some kind of a transparent cover would be needed with the old photograph where the writing was still readable, on an info table next to it. Along the serpentine road, it would be a suitable place to put the illustrations and stories about the historic battles that happened at the fort during the Bokelian uprising in 1869 and the Second World War.

The rock quarry at the bottom of the serpentine road can be highlighted with explanatory info boards as it is getting obscured by the growing vegetation. This way the road would be a part of the monumental site, leading to the fortress and introducing it at the same time.

Fig. 171: Collapsed embankment of a curve
at the serpentine approach
Credits: Ivan Vratnica

Fig. 172 (top left): Location of the quarry just under the fortress next to the road, 2019
Credits: Ivan Vratnica

Fig. 173 (bottom left): Engravings made by the soldiers along the serpentine approach road 2019 (Comparing it with the Photograph from 1964, the condition worsen and the writings are almost not readable)
Credits: Ivan Vratnica

Fig. 174 (bottom right): Fort Kosmač (view from the road to Budva. The protection stone walls and posts can be seen along the road)
Author: Karlo Weber
Credits: Jovan Vuksanović

Fig. 175: Engravings made by the soldiers along the serpentine approach road 1964 (The writings were still readable. author: Oberst B. Wolf)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

Fig. 176: The serpentine approach road to Fort Kosmač, 2019
(Mostly narrowed due to overgrown vegetation and the collapse of the supporting walls)
Credits: Ivan Vratnica

Fig. 177: The serpentine approach road to Fort Kosmač, 2019
(Mostly narrowed due to overgrown vegetation and the collapse of the supporting walls)
Credits: Ivan Vratnica

4.4.
FORT SURROUNDINGS

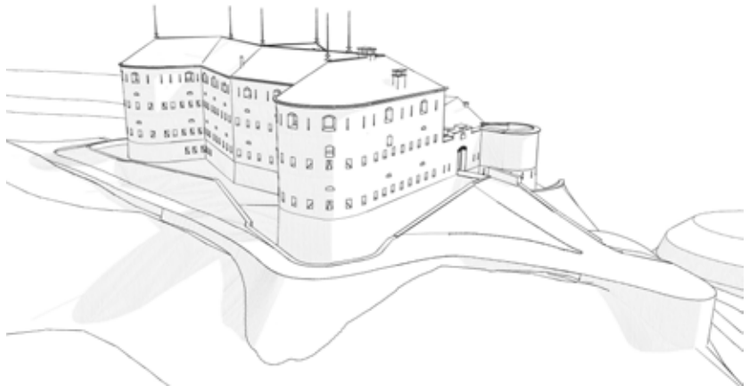


Fig. 178: Fort Kosmač (3D reconstruction based on the Rapport plan from 1902, with the plateau and the curve)
Credits: Ivan Vratnica

Fig. 179: Curve in front of the northern wing of Fort Kosmač, 2020 (The embankments collapsed)
Credits: Ivan Varatnica

Currently, the fortress is overgrown with vegetation. The defense ditch is now full of soil, stone from the fortress and a lot of bushes and trees growing from it, obscuring the form. To properly preserve the ruin, most of the closely surrounding vegetation needs to be removed, to uncover the substance and prevent the damage caused by the vegetation roots. This would also enable a more detailed analysis of the remaining substance, which is vital for any further steps. Additionally, the soil and the substance of the fortress needs to be dug out from the defense ditch to uncover how much substance is actually still there and to make the lower part of the walls accessible for future works. Then, the preparation of the workspace needed to secure the damaged walls can begin. During the clearing, the excavated stone blocks need to be sorted according to the quadrant where they were found. This would enable further detailed analysis of an each block in order to determine from which part of the fortress they came from. After the clearing of the defense ditch, the supporting walls should be uncovered and rebuilt as they kept the surrounding ground, around the fortress from collapsing.

Beside the ditch support walls, the curve on the road in front of the northern wing, needs to be rebuilt as well, as it is the key for securing the northern side from further collapse. This curve was made on a stone embankment protecting the northern wing's foundation wall and stabilizing the terrain on this steep, unstable part of the hill. The sewers were

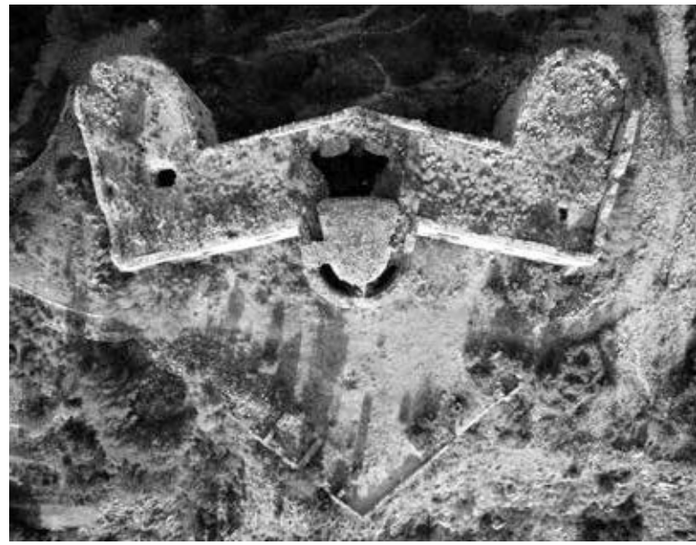


Fig. 180: Fort Kosmač, 2020
(Top view)
Credits: Ivan Vratnica

integrated inside of this embankment, leading down to the field bellow. The openings in the sewer channel are buried under the debris which indicates that only the upper part of the curve´s embankment is missing and the foundations still remain. After the clearing of the vegetation on the eastern side, restoring the original road would only need a little more effort. This would also mean to reconstruct the embankment of the road on the northern side, leading from the last serpentine to the curve. With this road restored, a small plateau would be formed In front of the entrance. Restoring it, the original way around

Fig. 181: Fort Kosmač, 2020
(Trees growing out of the foundations of the southern barracks wall)
Credits: Ivan Vratnica

the fortress would be established, eliminating the need to go through the courtyard for the duration of the necessary conservation work. This way the courtyard could be secured and used for sorting and storage of the stone collected during the clearing of the surroundings and the courtyard. To make this easier, after most of the works on the northern side are finished, the soil in the ditch in front of the gate should be excavated and the crossing replaced by a bridge.

This bridge would serve as a temporary crossing and it would be placed where the drawbridge originally was. In order to be able to withstand the harsh weather conditions of the site, the construction would be made out of metal. The design should aim to be multi-functional, serving as a gate, discouraging for cows and other animals to cross inside the courtyard but staying open at same time. This can be achieved through special but simple floor construction made in a form of cattle grid, safe for people to pass but discouraging for the animals. This type of passive, selective gates and constructions are widely used in Swiss alps and all around the world at the cattle farms as well.

The eastern side is easily accessible by road from the south, therefore clearing the vegetation should not pose a problem. Clearing it, the approach to the curve mentioned above would be established, making the works on the curve much easier. After all the

Fig. 182: Fort Kosmač, 2020
(Eastern side where the vegetation in the defense ditch overgrown)
Credits: Ivan Vratnica

vegetation is gone, the excessive soil in the ditch can be excavated and the support walls repaired. Even dough this side is easily accessible by a small excavator, a good part would have to be done by hand to avoid the possible damage of the material. To ensure the proper handling and sorting of the material during excavation, constant monitoring by the experts is required.

Afterwards the preparations for the interventions on the barracks eastern walls could begin.
The southern side is similar, easily accessible by road with a weak vegetation. Here, the ditch is full with mixed stone material which can be sorted and stored next to the ditch for further use. The ditch was shallow on this side, so the supporting wall can

Fig. 183: Cattle grid gate
Source: flickr
Credits: skittzitilby

Fig. 184: Courtyard of the Fort Kosmač, 2019
(Cows and other livestock resting in the courtyard.
A common sighting in the courtyard.)
Credits: Ivan Vratnica

easily be rebuilt. On this side there is a newly made entrance to the courtyard, wide enough for a vehicle to pass.
The passage is next to the foundations of the southern caponier and it could be used to access the courtyard with the vehicles during the conservation works on the fortress. Eventually it would be replaced with a temporary bridge so the ditch can be properly cleared and the foundations repaired. Later, it could be integrated as a part of rehabilitation of the fortress.

The western side is orientated towards the abyss, some two meters from the edge of the cliff. This makes the courtyard foundation wall exposed but dangerous to work on, therefore it would require fences and additional protection for the workers. Partial restoration of the ditch support wall would make this section more secure.
The vegetation grows low on this side and it can be easily cleared, being close to the cliff. Sadly, all the outer layer stone blocks of the courtyard foundation walls have been riped out on this side, therefore a full reconstruction is needed to stabilize the foundation and secure it for further works.
This part is the most visited part of the courtyard as it has a great panoramic view of the coast, therefore it is important to fix it as soon as possible to avoid further collapse of substance into the abyss.
When the ditch is properly cleared and the supporting walls restored, it would be a perfect place to install indirect lighting, highlighting the fortress at night.

Furthermore, the ditch would be an important zone for further works on the barracks walls which would require scaffolding. Additionally, northern, eastern and southern side offer a suitable area to position the necessary tools and workshops for the preparation and processing of the stone.

4.5. THE COURTYARD

Today, the courtyard can only be recognized by its foundations. To the common visitor's eye, it is unclear that it was heavily fortified, containing important elements such as the water collecting system and the flanking caponiers. Since the Second World War, the courtyard substance is disappearing rapidly every year. The substance was mostly removed by civilians from nearby towns in order to build houses. The courtyard offered a lot of good quality stone within the hand's reach. Stone by stone, it was dismantled and taken away. By the 1960s most of the courtyard structure was already gone, as well as all the stones from the courtyard's foundation walls on the western side. Now, only a few walls are still standing in the courtyard, the vegetation and soil covered the floor, making it almost unrecognizable from a human perspective. Often, the visitors mostly spend their time here, as it resembles more of a plateau than a fortified courtyard, with a great panoramic view of the coast. The fortifying walls are no more and the edges are unsafe, mostly obscured, making the most visited zone of the courtyard dangerous for both the visitors and the structure.

Fig. 185: Fort Kosmač, 2020
Credits: Ivan Vratnica

One of the most important parts of the courtyard is the gatehouse. The only remaining part of its walls is the one closest to the barracks, with one whole loophole left. This makes it a valuable part to determine their hight above the ground as they were higher then the others in the fortress. It also makes it a lot easier to determine and find the rest of the gatehouse foundations, as well as two gates and the slot for the drawbridge integrated in the floor. Because of the drawbridge, it is possible that the gatehouse floor was made out of stone, housing the mechanism, over which, the bridge slided out. The floor and the foundations are completely covered with soil, making the gatehouse unrecognizable even dough the way is still going through it, just not as it originally was. In order to preserve it, the remaining foundations need to be uncovered and the original floor and gate doorsteps properly marked. Uncovering the gate doorsteps would also help determine the original floor level in the courtyard making the search for the other buried parts much easier. The remaining gatehouse wall, can then be secured and stiffened to prevent its flipping over during future earthquakes. This can be achieved by partially reconstructing the other gatehouse walls on their original foundation according to the detailed rapport plans. As a final part, when all the research on the gatehouse is done, the temporary bridge over the ditch can be placed.

The caponiers overground structure is gone and the ruble covering the floor and the foundations makes it hard to assess how much of the caponiers is actually left, because their floor was lower than in the rest of the courtyard. These caponiers are important elements of the fortress' form, therefore they need to be preserved as much as possible. The first step is to clean the vegetation covering them, then the stones, piled up on them, can properly be sorted for reuse. As both of them had stairs leading down inside, it is important to excavate and determine the original level burred underneath. The final measure of the conservation would be to rebuild the outer layer of the foundation wall up to the original floor level, to avoid further substance shedding.

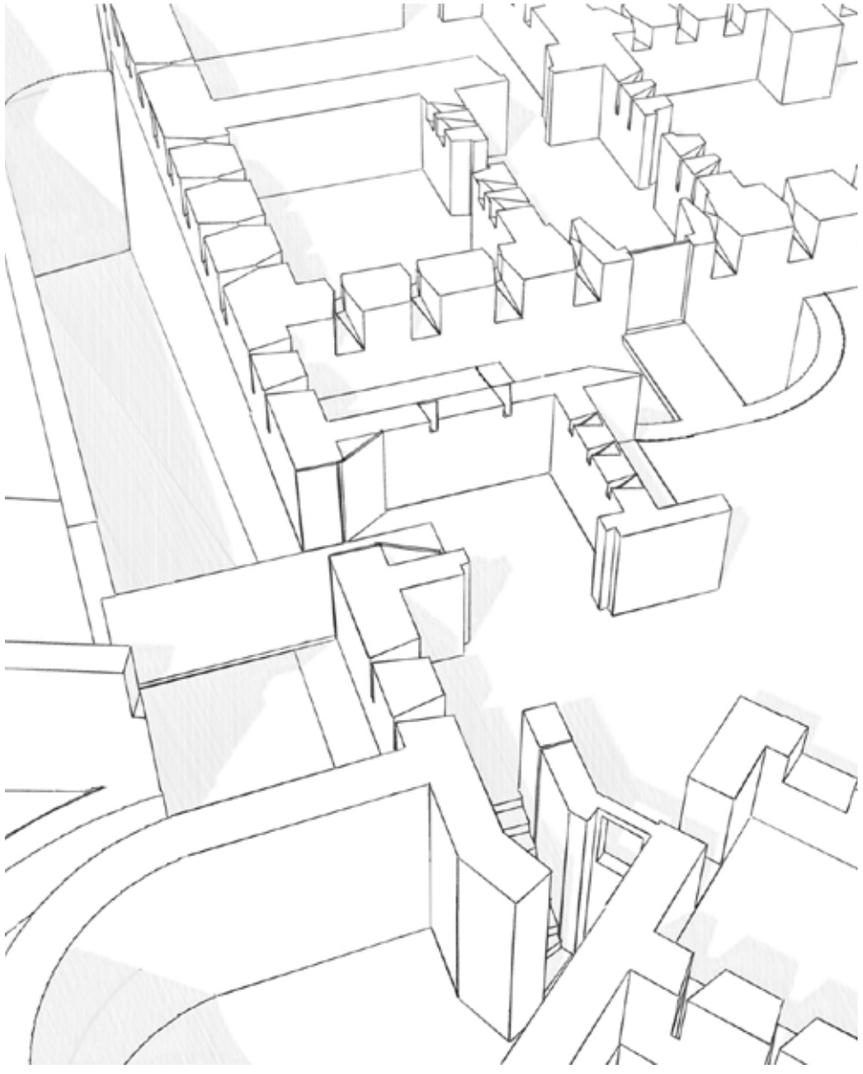
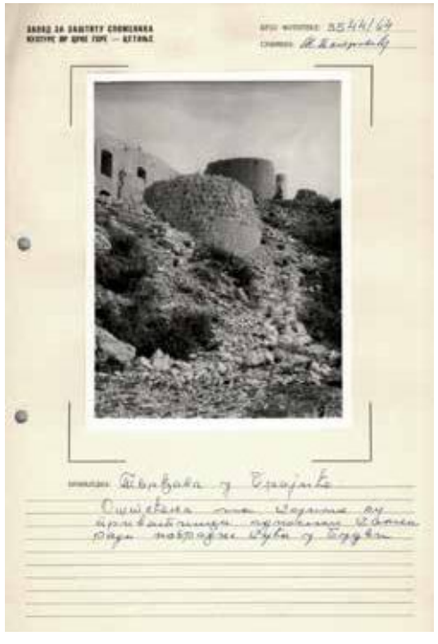


Fig. 186: The gatehouse of Fort Kosmač
(3D reconstruction; possible restoration)
Credits: Ivan Vratnica

Fig. 187: Fort Kosmač, 2019
(Remaining wall of the gatehouse)
Credits: Ivan Vratnica

The remains of the utility rooms positioned alongside the edge of the courtyard are in an unrecognizable state, therefore after the vegetation is cleared and the piled up stone is sorted, the remaining substance needs to be properly examined. Even dough the most of it is gone, few important details can be still found, like the flooring of the shower room, pretty uncommon for the fortresses at the time. After the proper examination, the missing outer layer of the foundation

Fig. 188: Fort Kosmač, 1964
(Northern Korf´s foundations)
Author: M. Petrović
Credits: Administration for
the Protection of Cultural Properties



wall would need to be restored to secure the edge, which is now in imminent danger of collapsing. This zone is currently the most popular for tourists and they usually sit on an unstable wall, not realizing the danger they are in. After the outer layer is restored, the outer courtyard fortifying wall would need to be at least temporary reconstructed 1.1m high, to secure the courtyard for the visitors. This includes the gatehouse and the caponiers as well, so the courtyard can be enclosed and secure once again.

Situated under the courtyard, lies the water collecting system with the main reservoir positioned in the middle of the courtyard. The reservoir is full with soil and stones but still there is water inside too. Considering it only has a small hatch on top, it will be tricky to clear it without opening the vault above it. Next to it are the drains feeding it with water that was collected from the roof above the utility rooms placed along the courtyard's western wall. On the other side, there was a drain leading to the western wing, into the back up reservoir inside and the drain leading from the reservoirs opening under the shower room and outside, into the cut in the defense ditch on northwestern side. The roof and gutters are no more, but the drains still lie burred underground. They should be uncovered to check, the condition of the system and if any piece of its cover can still be found. If the system is still in a good condition

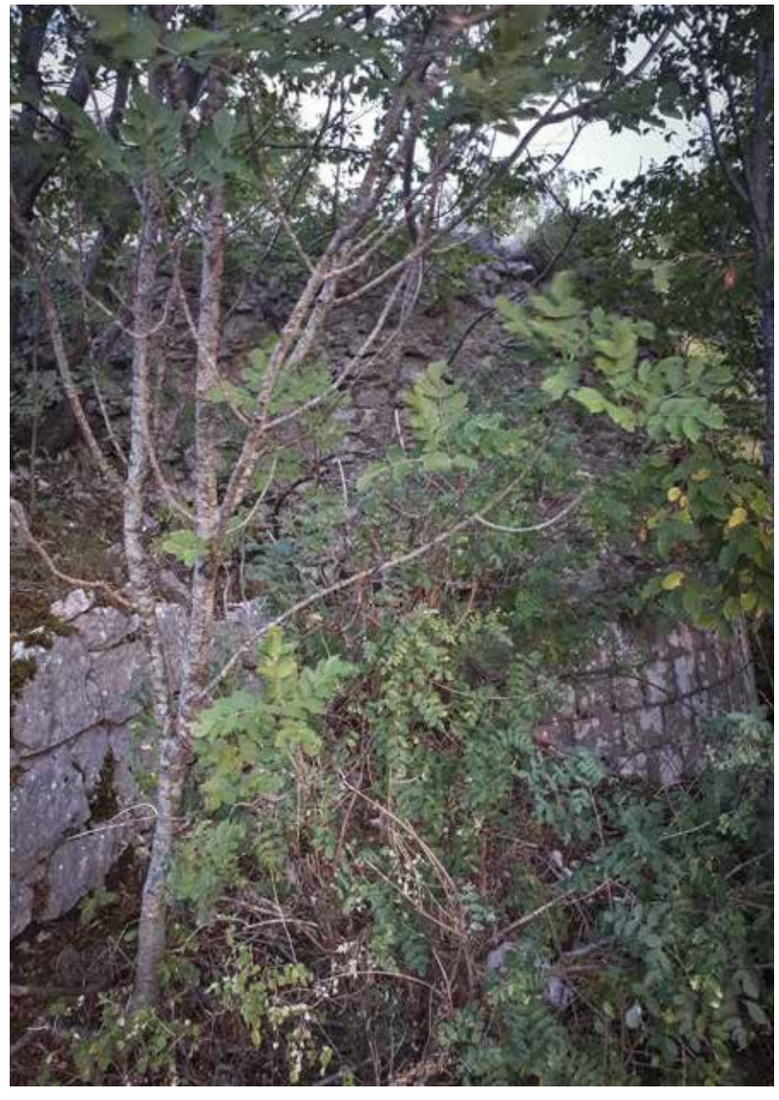


Fig. 189: Fort Kosmač, 2020
(Northern caponiers´s foundations)
Credits: Ivan Vratnica

there were two more holes in the courtyard, meant to take the extensive rain water from the courtyard and prevent its flooding during the heavy rains. These two would be uncovered and examined too, as they would be a important element for further use of the courtyard.

In the southeastern corner of the courtyard there was a grave of First Lt. März, commander of the fort, killed in the 1869 uprising. As the fortress was under siege, he had to be buried inside of the fortress courtyard. Later, the tombstone was made, which parts can be still found in the courtyard, indicating that it was still there when the fort was destroyed decades after. How much of it remains, can only be determined when the corner is cleared and the piled up stones are sorted. Afterwards, it needs to be determined if the remains of the commander are still buried there. The first step is to search for the diaries and logs of the fort commanders who served at the fort but it is not known if all the documents still exist in the War Archive of Vienna or somewhere else. This would require a lot of effort and time, so the more practical approach would be to conduct the archaeological excavations and research of the area where the tomb was. In case the commanders remains are found, the question will be raised, weather the remains should stay in the fort or should they be moved to his homeland, considering the new use of the fortress.

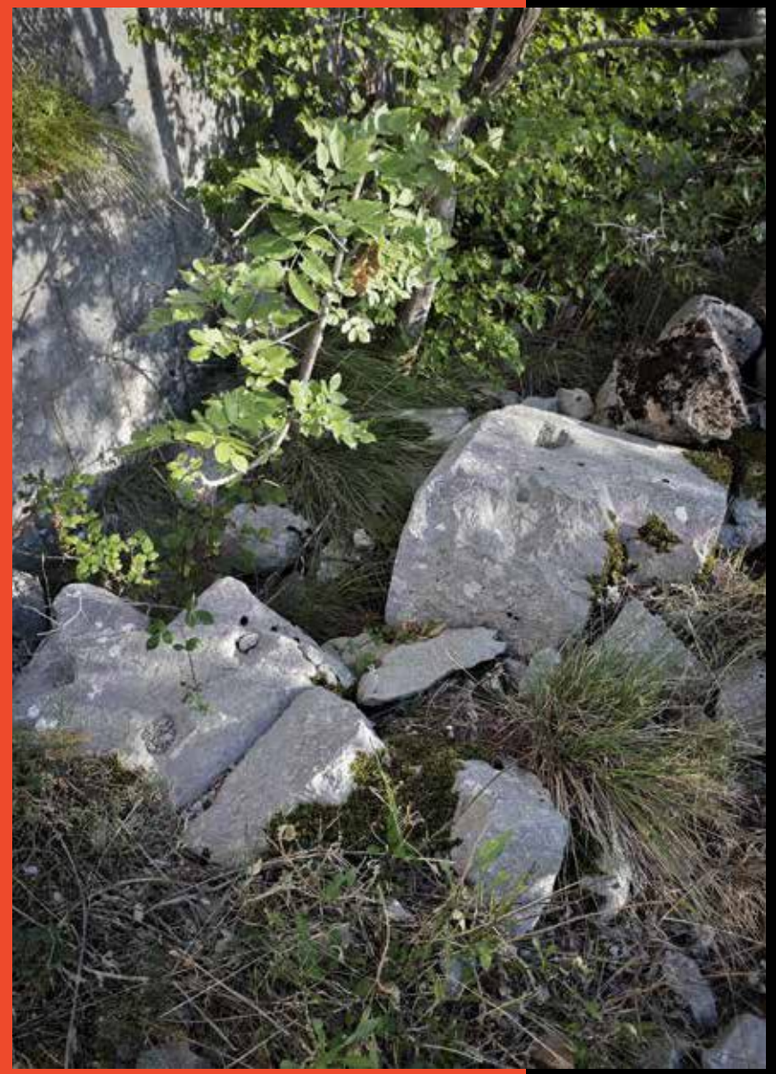


Fig. 190: Fort Kosmac, 2019
(Corner of the courtyard where the Lt. März was buried. The big cornerstone was part of the grave stone)
Credits: Ivan Vratnica

Fig. 191: Cornerstone of the grave
Credits: Ivan Vratnica

4.6. BARRACKS WALLS IN THE COURTYARD

Fig. 192: Fort Kosmač, 2020
(Outer wall of the western wing almost split in two as the window arches collapsed)
Credits: Ivan Vratnica

During the conservation works, the entrances to the barracks needs to be secured as well. Currently the barracks has two entrances, one original and one on the southern side of the courtyard, which was made by breaking the wall under the half circular window. Both need to be secured by placing temporary doors so no unauthorized individuals can come inside the unstable barracks. After all the works are done and the fortress is secured, the doors would be removed and the ditch in front of the original barracks door can be uncovered again, as there could be some valuable parts buried inside. Before the conservation works in the barracks are finished, only the top of the ditch support wall should be excavated and marked as it represented the floor level in the courtyard.

Except the western wing, the barracks walls in the courtyard are mostly in good condition. The outer wall of the western wing is in danger of collapsing during the next earthquake. As shown in the analysis, the half circular wall stands without any bracing and it is almost split in two now, as the middle window arches collapsed. On the rapport plans from 1902, it can be seen that these walls have a deep and big foundations, therefore the probability of the foundation sinking is small, as they are probably resting on the rock. Anyhow, this would need further examination before the needed measures can be implemented. To save this wall, it would take significant amount of effort and engineering, which would include additions and restoration of the western wing. To properly secure the wall, it is necessary to install the supporting construction on the outside, preventing its possible further outer tilt. On the inside the connectors need to be placed on carefully designated spots in order to attach and bind the wall to the wing's core. These connections would have to work simultaneously with the outside supports to correct the tilt by pulling the wall back in its position. As the upper arches disconnected due to the tilt, they would need to be disassembled and reconstructed again when the tilt is corrected.

Fig. 193: Fort Kosmač, 2020
(The side window arch loosened as the outer wall of the wing tilted outwards)
Credits: Ivan Vratnica

4.7. THE BARRACKS

The analysis showed that the barracks are in bad and unstable condition, in imminent danger of collapsing and permanent substance loss. Considering its condition, pure preservation would not stop further deterioration, which means that several collapsed parts need to be rebuilt just to stop further collapse. As described in the analysis, the structure was made so that the load bearing elements are independent from the hull, which served as protection. All the inside reconstructions would have to be done gradually, meaning that the rubble between the entrance and the element, would have to be cleared first, freed element secured and then proceeded to the next one. This would have to be done by hand to avoid potentially dangerous vibrations that could trigger the collapse of an unstable and unsupported structure.
Simultaneously the cleared material would be sorted outside to be reused in the following reconstruction. Next step would be to secure the unstable structure by inserting the temporary support elements, such as beams and extending metal support poles. After these are secured and the protection for the workers installed, the stone masons could start reconstructing. The walls would be reconstructed with the original slanted stone layer on which the vaults were resting, so that they could be rebuilt later if needed. Using this method ensures that every cleared element would be secured before the other is freed. The restoration of the hull's outer layer would have to be done synchronized with the restoration works done inside to avoid destabilization of the elements caused through loss of support as the pressing ruble is removed.

Starting from the original entrance in the northern wing, the first load bearing wall is about to collapse completely, taking the vault above with it. The biggest chimney, integrated in this wall was dismantled for bricks. Its removal left a hole in the vault above, which kept expanding over time. The southern part, where the door was, is completely gone and this is where the reconstruction should start. Once the wall and the portal is reconstructed, the chimney can be rebuilt again. This would be a complicated task but with its restoration, the most important part of the northern wing's structure would be secured.

The next most important elements are the pillars in the main tract. These were not typical pillars exactly, as they were connected with the outer eastern wall, but they were bearing the vaults instead of the wall. The middle part of them, where the destroyed vaults rested, was blown away and the upper parts, carrying the upper vaults, somehow remained. This probably happened because of their massiveness and connection to the eastern hull wall. It is imperative to rebuild all five of them to prevent the collapse of the gun terrace floor.

The next critical point is in the middle of the eastern barracks wall, where the outer stone layer at the edge loosened and tilted outwards. This would have to be done simultaneously with the middle pillar reconstruction as they are connected together. It is not clear whether the whole wall has tilled out or just the outer stone layer, but it is crucial to repair it. Here, the edge of the wall stands with no bracing, with large stone pile inside the barracks, leaning

Fig. 194: Fort Kosmač, 2020
(Middle structural wall in the northern wing seen from the kitchen)
Credits: Ivan Vratnica

on the edge, pushing it outwards. Above it, the vault has collapsed, leaving a huge opening through which the rain and snow fall inside building up additional load on the edge. This is the one of the most vulnerable points of the wall and considering its location in the bottom part, its collapse would take the whole section of the wall with it. This would be a huge loss of the substance and structure and it could start the chain reaction of the hull´s collapse.

After the pillars, the southern wing's middle wall is next. Exactly on the joint where the middle wall of the southern wing meets the outer wall, there is a big hole some 1.5m in diameter. After the hole is secured with temporary support beams and the protection for the masons is installed, they can start closing the hole. Parallel with the inside reparations, the outer layer of the barracks walls would take place. The outer layer needs to be reconstructed at the northern wing, eastern barracks wall and southern wing to prevent the further collapse of the stones.

The final critical part would be to secure and prevent the expansion of the holes in the vaults of the second floor. Prior to the reparations of the holes, the vegetation covering the terrace needs to be cleared, to uncover the vault structure and analyze its integrity. There are four holes in the gun terrace floor, the biggest one is in the middle where the vaults collapsed completely. The other are significantly smaller but one of the two in the northern wing was created after the biggest chimney was demolished for bricks. Judging by its location and size, it needs to be stabilized and closed with the restoration of the middle wall. The other two are small and would take less effort to repair. After the holes are secured, the structure would be

Fig. 195: Fort Kosmač, 2020
(Entrance to the barracks and the northern wing middle wall, missing its lover part)
Credits: Ivan Vratnica

Fig. 196 (top right): Fort Kosmač, 2020
(Middle structural wall in the northern wing seen from the entrance hall)
Credits: Ivan Vratnica

Fig. 197: Fort Kosmač, 2020
(Eastern wall inside the barracks. The "pillars" of the main tract blown up in the middle. View from the entrance hall)
Credits: Ivan Vratnica

Fig. 198: Fort Kosmač, 2020
Corner where the eastern barracks wall meets the southern wing (seen from the inside)
Credits: Ivan Vratnica

stable enough for further conservation measures. They would include the repairing of the vaults and securing the only remaining part left of the gun terrace walls in the southern wing. Afterwards, the temporary roof over the whole barracks would be required to prevent the damage from rain and snow.

With these measures the further collapse of the ruin would be prevented and the condition could be preserved. Still, as many structural walls inside are missing, the barracks could not be open for visitors due to safety reasons. Taking this into consideration and all the measures needed, just to stabilize the fort, preserving it as a ruin is not a cost-effective approach even if the courtyard could remain open for visitors. To save it from collapse and total loss, the rehabilitation would be much more effective approach, as all described conservation measures would precede the rehabilitation anyhow, representing roughly one third of the works needed for complete rehabilitation. The conservation and the rehabilitation would have a big effect on the villages of Brajići and Uglješići, attracting much more people hasting the economy and promoting these almost forgotten places.

Fig. 199: Fort Kosmač, 2020
(Eastern wall inside the barracks. The “pillars” of the main tract blown up in the middle)
Credits: Ivan Vratnica

Fig. 200 (top right): Fort Kosmač, 2020
(Eastern wall inside the barracks. The “pillars” of the main tract blown up in the middle. View from the entrance hall)
Credits: Ivan Vratnica

Fig. 201 (bottom left): Fort Kosmač, 2020
Corner where the eastern barracks wall meets the southern wing (seen from the inside)
Credits: Ivan Vratnica

Fig. 202: Fort Kosmač, 2020
Corner where the eastern barracks wall meets the southern wing (The biggest hole in the barracks walls with a small tree growing out of it)
Credits: Ivan Vratnica

Fig. 203: Fort Kosmač, 2020
Slanted stone layer on which the vaults were leaned
Credits: Ivan Vratnica

Fig. 204: Fort Kosmač. 2020
Middle of the barracks main tract(the vaults above collapsed and piled up in the round floor, filling it up, pushing against the outer wall)
Credits: Ivan Vratnica

Fig. 205: Fort Kosmač, 2020
The last remaining part of the gun terrace wall in the southern wing, southern wall. (Luckily one of the gun windows and one lafette still remains)
Credits: Ivan Vratnica

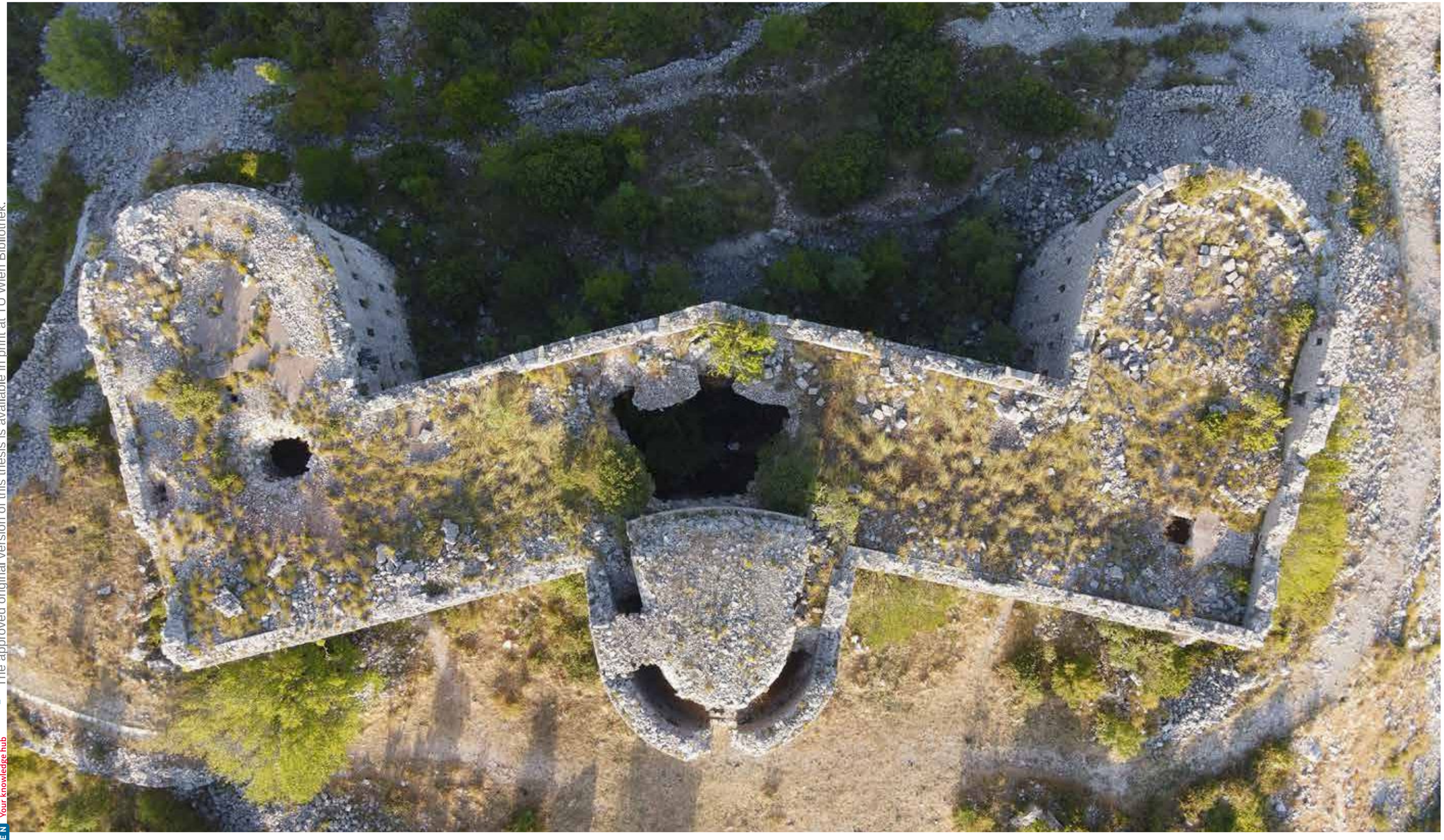


Fig. 206: Fort Kosmač, 2020
(Top view)
Credits: Ivan Vratnica

rehabilitation

5

5.1. NEED FOR REHABILITATION

Rehabilitation of a cultural monument is a complex process. When it comes to old fortresses and buildings in general, it is not always possible to properly conserve them without giving them a new use to keep them up. This especially applies to the buildings that are protected as cultural monuments, as they usually need special care. In most cases, they are totally or partially a ruin, prone to constant deterioration. The best way to prevent this and to justify the investments, is to rehabilitate it for a new use, more suitable for the current time.

The rehabilitation often requires partial reconstruction of collapsed elements as well as adding new ones to suite the new needs. This complex and sensitive process is preceded by thorough research of building structure to preserve the authenticity. As seen through the analysis, Fort Kosmač is in ruined condition. The measures to successfully conserve it, require too much investment to justify its future as a ruin, implying that the rehabilitation needs to be considered as a way of a sustainable conservation. In the case of Fort Kosmač, its unique form and location, combined with the information acquired through analysis, offer a great potential, making proper reconstruction and rehabilitation possible, without losing its authenticity. It is the last remaining fort of the extended defense system of Budva, built by the Austro-Hungarian Empire, as well as the last one remaining in Montenegro, built only out of stone.

5.2. SITE CONSERVATION

Preceding any project, a sustainable development strategy would need to be made, resulting in a detailed spatial plan of the area that would regulate the construction of new buildings. This plan must aim to preserve the landscape in its natural form as much as possible. Use and improvement of the existing village structures should be the leitmotif, preventing uncontrolled development in the area around the monuments. Without this plan, any investment would cause a surge of interest and uncontrolled development in the area, completely devastating these small places.

Specifically, the spatial plan of the area around Fort Kosmač and the nearby villages should exclude further random building of the housing on private lots in the area. Instead, the state would encourage the owners to rebuild their old stone houses, which could be used as an accommodation for renting. The best solution would be to combine these old houses and even whole villages into “eco” and “etno” hotels. Within, the people could be able to rent houses, or even just beds and rooms. The guests could either live with their hosts in the household and use the other buildings for different services, such as restaurants, relax, entertainment, sports etc. This way, the area would retain its wilderness and the rehabilitated fortress would serve as a highlight of the area.

In close vicinity of the fortress, there are already approved projects, dough non of them have been built yet. The most important one is the cable car, which upper station is planned just few hundred meters south of the fortress, that connects the hill with the coast. This project is supplemented with additional contents such as restaurant, bar, souvenir shop, open-air theater and cascaded terraces with a good panoramic view of the shore. Even dough the project has all the permits

Fig. 207: Village Uglješići, 2020
(There are still some house ruins left. Some old houses have been rebuilt but only two people permanently live here.)
Credits: Ivan Vratnica

Fig. 208: The Old “trip around the world” curve and the old quarry, 2020
Both abandoned
Credits: Ivan Vratnica

needed and its content would be useful for the area, it still lies too near to the fortress. The cable car station and the complex are positioned in the small valley, so they do lie lower then the fortress. This justified that it would not endanger the image by obscuring the fort, which eventually won the ministry’s permit for these projects. Since the cable car would be an important element in valorizing the fort and the area itself, these projects should be carefully implemented, as they would popularize the area and the rehabilitated fort. By moving them more to the south, the cable car and the center would be on a more suitable location further away and lower from the fortress but closer to the conjunction of the roads which would make them easier to approach and fulfill their future needs.
For further development, if the need for the additional structure arise, there is an abandoned quarry next to the main road, big enough to fit bigger project such a small hotel with a thermal pools and spa for better touristic offer. Placing it in the quarry, any content would be well hidden and will not disrupt the image of the area.

Fig. 209: The ruin of the old school next to the approach road, 2020
(This austro-hungarian building served as a school for locals before it was abandoned. It was made on the location of Fort Brajić)
Credits: Ivan Vratnica

Since the new tunnel was made the curve, locally known as a “trip around the world” was abandoned. Along side the curve there is a monument to the time when the road was made between the two world wars. This is a good position to make the infrastructure for visitors as it offers a view over the coast, the fortress from below and the village of Brajići as well as an access to the cliffs above. On this hill there is a small forest with the starting strip for para-gliders making this location a valuable place for the development of this area. The village can easily be reached by bus from Budva and Cetinje but they are still not frequent enough. Therefore the fortress can be comfortably reached by bus and when the frequency is improved, it will eliminate the need for everyone to arrive by car.

Fig. 210: Village Brajići, 2020
(Many ruins can be seen from the air and many of the houses are not permanently populated)
Credits: Ivan Vratnica

Fig. 211: Situation of Brajići and Uglješići
Credits: Ivan Vratnica

5.3.
REHABILITATION INTO THE CULTURAL CENTER

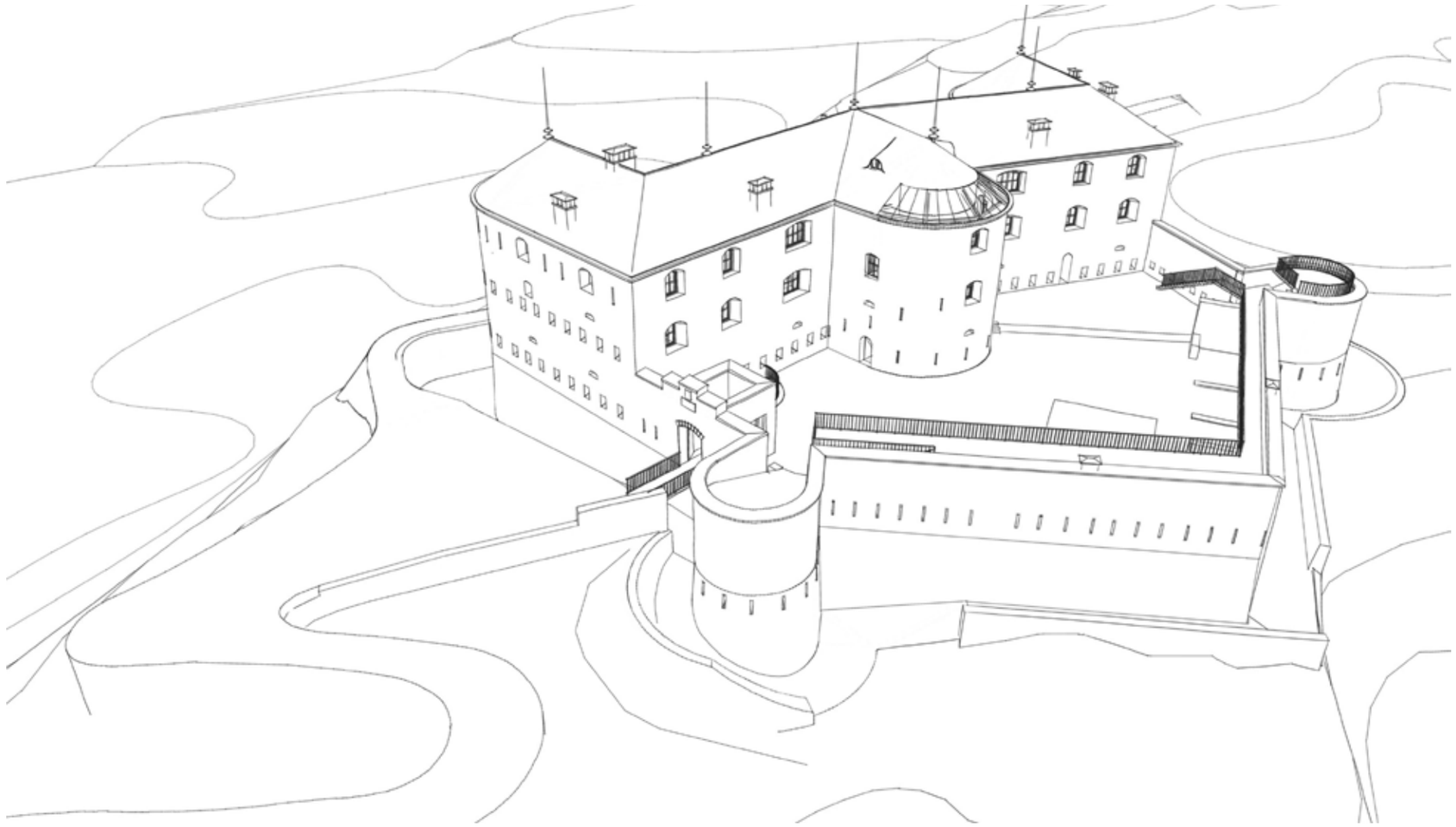


Fig. 212: Fort Kosmač rehabilitated
Cultural center
Credits: Ivan Vratnica

Through the previous studies, it is concluded that the rehabilitation should aim to optimize the fort for the cultural content. That way, its function as a monument would be additionally emphasized. The new cultural center could house various new functions such as workshops, museum, stage, infrastructure for visitors and several rustic halls that can serve as multi-functional rooms. To properly house the new function, the collapsed parts of the fort need to be reconstructed. The aim is to reconstruct the outer form as it was, based on the original plans and old photographs, as the fort was

a strong symbol of the castle on top of the hill. Its silhouette and position attracts attention, so the reconstruction of the form will emphasize it as a landmark. Inside, the existing structure will be repaired and kept. Some collapsed elements would not be reconstructed so that the interior and the structure can be better adapted to the new use. New elements would be made clearly different from the existing and so, that they can be dismantled if needed, leaving the original structure authentic. The reconstructed elements would be rebuilt as they originally were, made out of the same type of stone with adaptation to new use, leaving the possibility for total authentic reconstruction in the future. The new materials used in reconstruction will not the same but they will resemble the old ons, due to the new use of the fort. Most of the new construction will be wooden, with some elements made out of steel and glass where needed. All the frames of doors, windows and loopholes will be made out of wood, with the loopholes having glass casements with a wooden frame on the inside and the windows would have both glass and wooden casements for protection against the weather.

The new "Cultural center Fort Kosmač" can be reached over the reconstructed original approach, suitable for pedestrians. Its outer edge will be secured and indirectly lighted to emphasize the serpentine form. The serpentines lead to a small triangular plateau in front of the gate. From there the entrance to the fort will be over

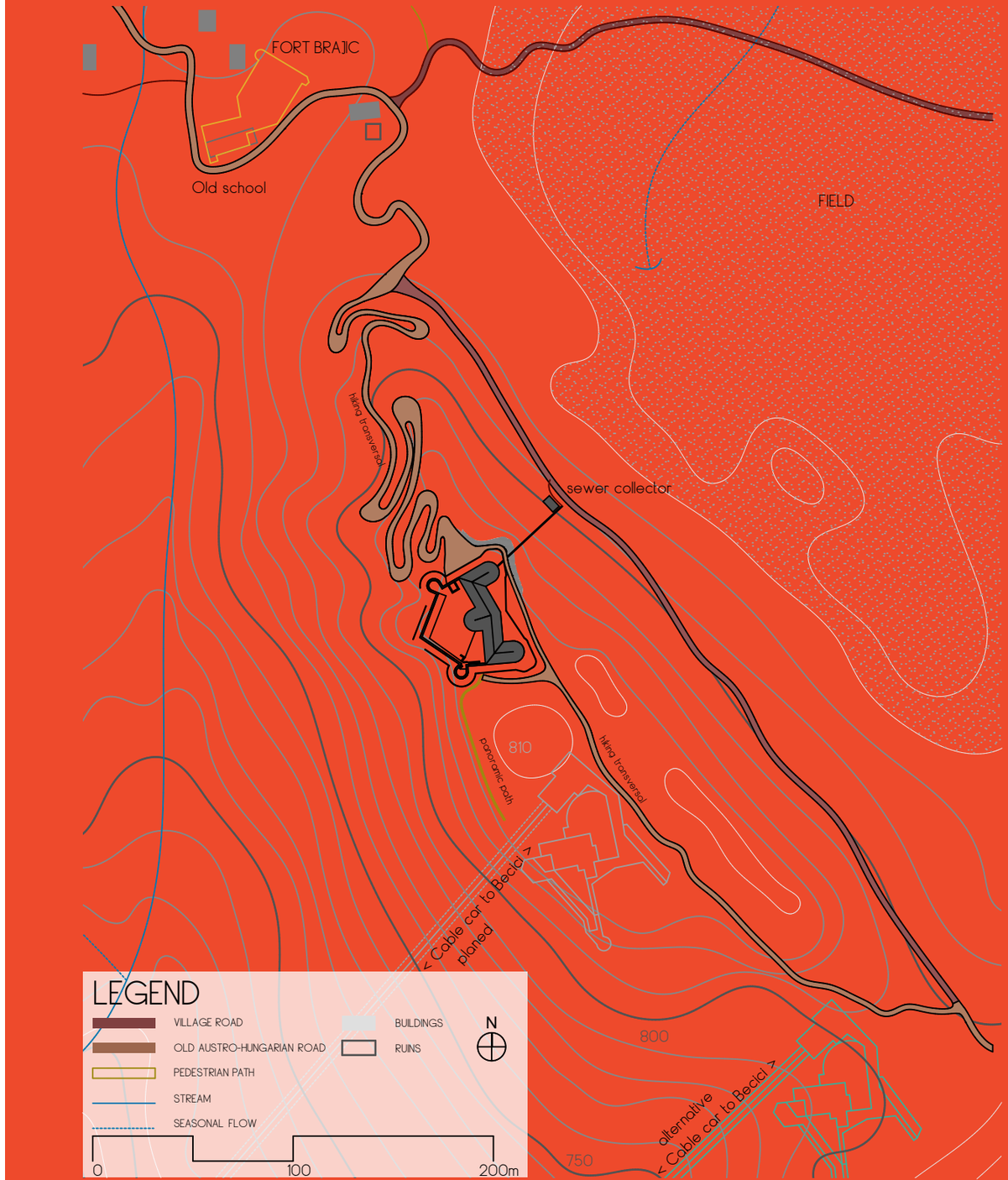


Fig. 213: Situation of Fort Kosmac
Credits: Ivan Vratnica

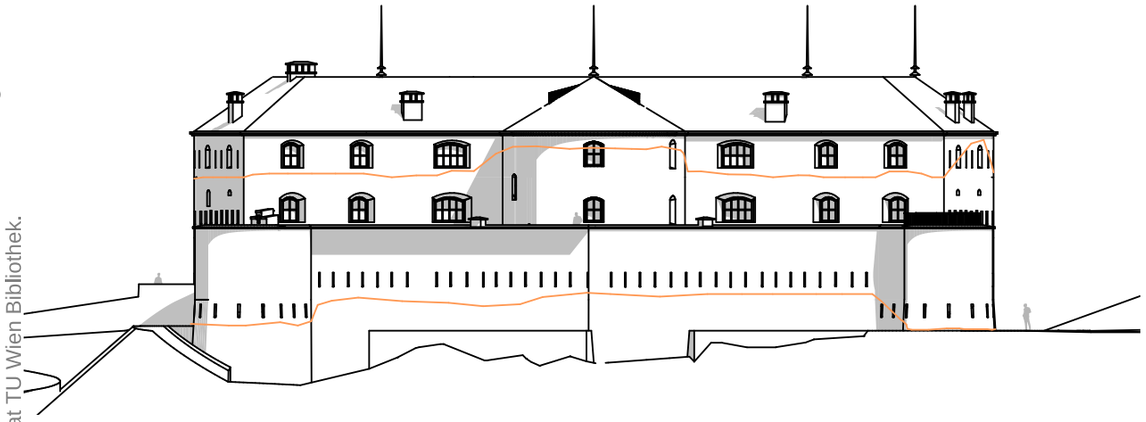


Fig. 214 (top): Fort Kosmač - rehabilitated
Western facade
(Orange line between the existing and reconstructed part)
Credits: Ivan Vratnica

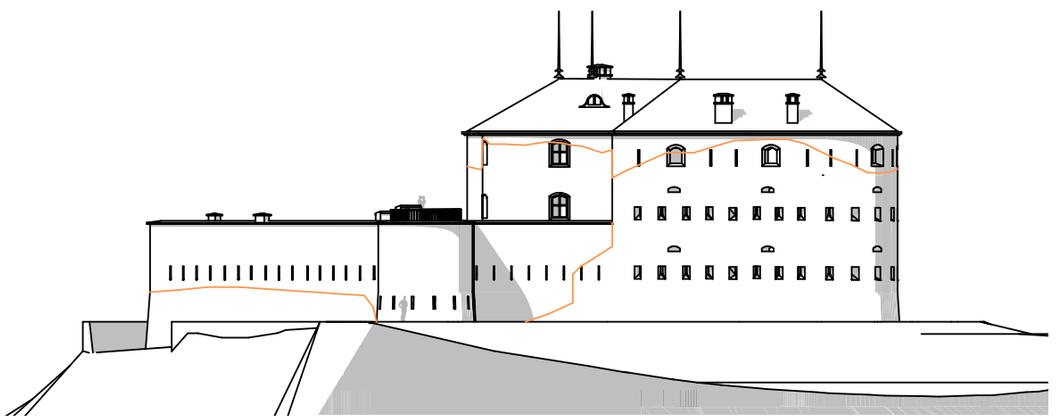


Fig. 215: Fort Kosmač - rehabilitated
Eastern facade
Credits: Ivan Vratnica

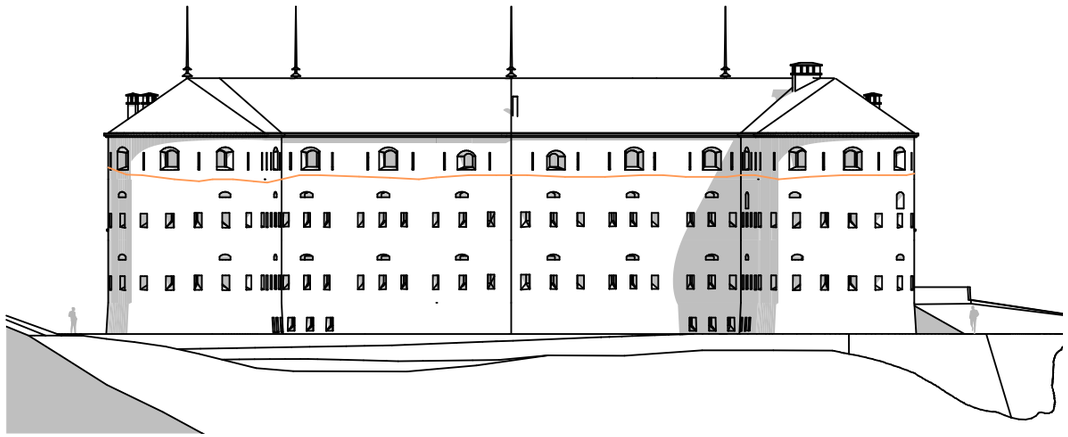


Fig. 216 (top): Fort Kosmač - rehabilitated
Southern facade
(Orange line between the existing and reconstructed part)
Credits: Ivan Vratnica

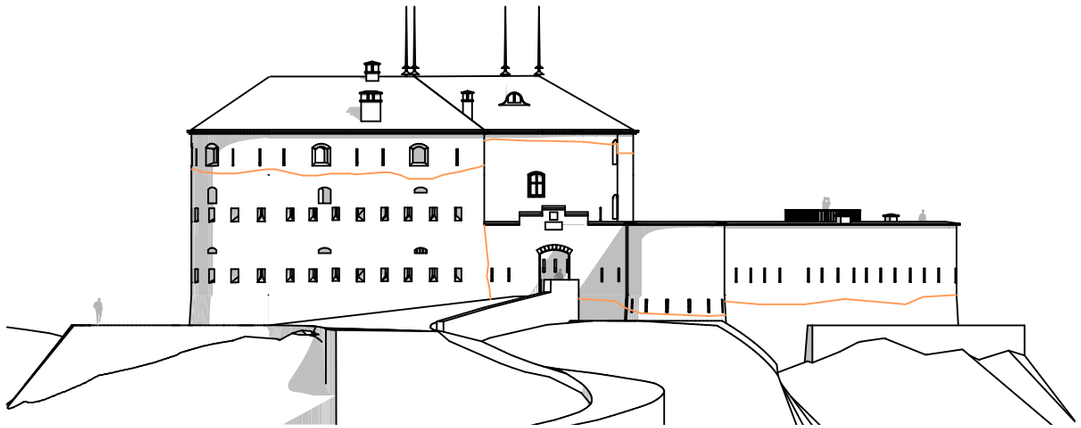


Fig. 217: Fort Kosmač - rehabilitated
Northern facade
Credits: Ivan Vratnica

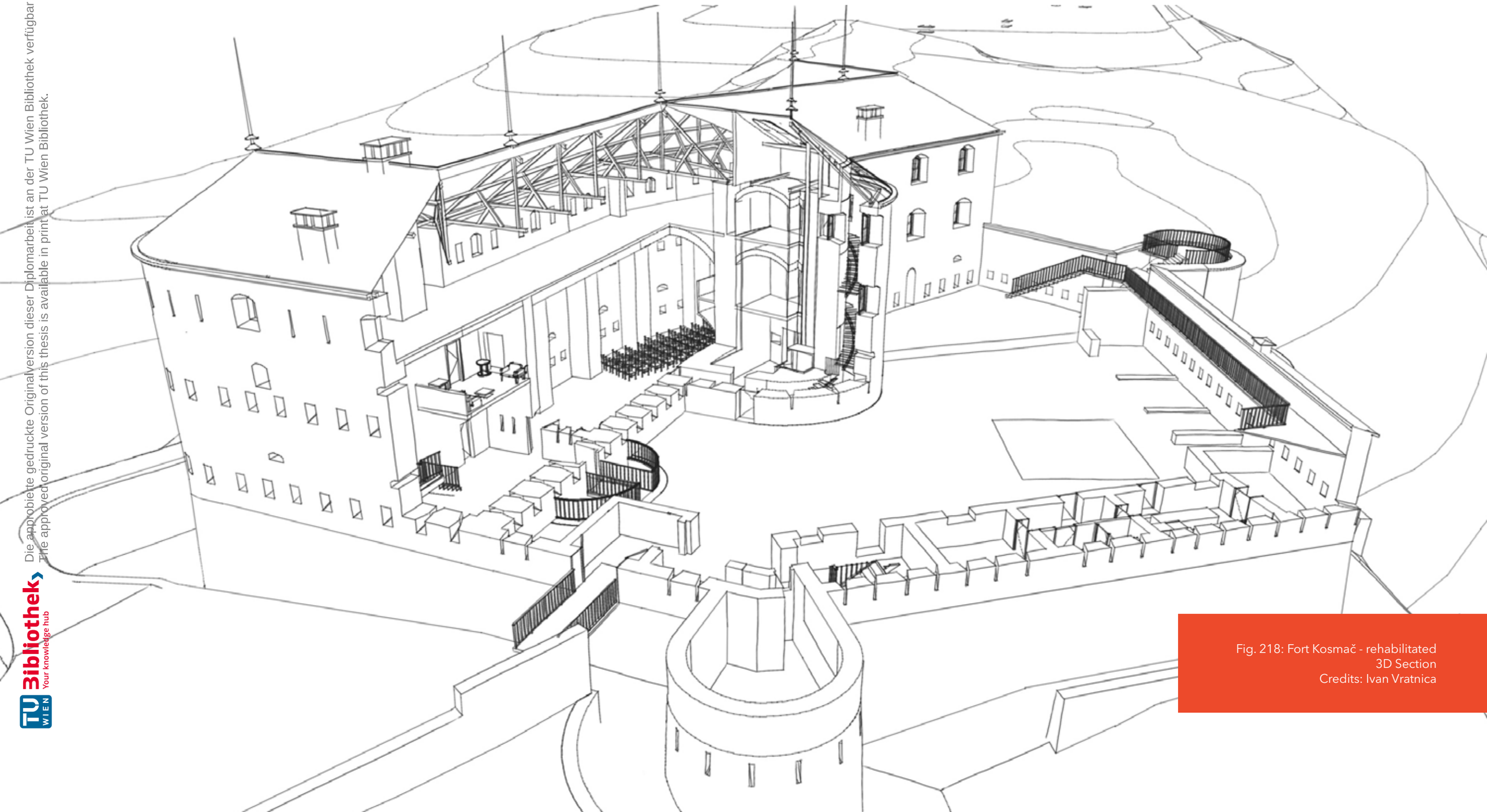


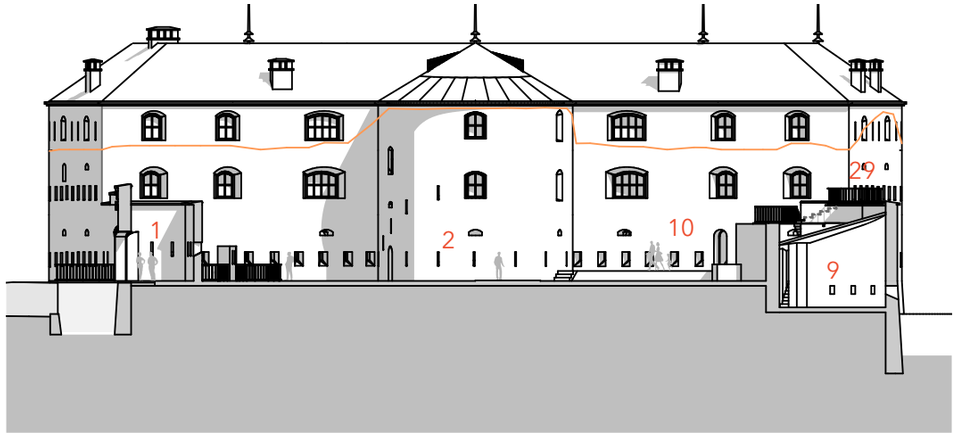
Fig. 218: Fort Kosmač - rehabilitated
3D Section
Credits: Ivan Vratnica

Fig. 219: Fort Kosmač - rehabilitated
Lighting at night
Credits: Ivan Vratnica

the bridge through the reconstructed gatehouse. On the other side the original road will lead to the cable car and additional content placed next to the conjunction with the new road.
The gatehouse will be reconstructed with the outer gate and the fixed bridge, making it the entrance to the center. The courtyard will be paved with cobblestones, multi-functional but dedicated to the summer events. In the southern corner of the courtyard, the detachable stage will be placed 1.2m higher, connected with the southern wing of the barracks.

The courtyard wall needs to be completely reconstructed to restore the form and iconic silhouette as well as due to the strong winds typical fort that location. The utility rooms along the courtyard wall will be only partially restored suitable to a new use. Northern part of the utility room will house a small temporary bar with a kitchen and storage to support the events happening in the courtyard and serve drinks to the visitors in the summer. On top of these rooms all along the wall, the terrace will be placed instead of the original slanted roof, to give the visitors panoramic view the courtyard now has. Integrated in the terrace construction, the courtyard would be equipped with the cooling mist system, using the reservoir in the courtyard to store water. The korfs will serve as technical rooms as their floors already lie lower than the courtyard. From there it is much easier to lead the installations in the defensive ditch in front of the northern wing where the small sewers collector will be position under the floor of the ditch, next to the original sewer. The original sewer channel is still present down until the new road under the fortress on the eastern side of the hill. It is clogged but it can be retrofired to serve as a sewer again.
At its lower end, next to the road, the main collector will be placed so it can be easily accessible for the maintenance crews. Using this utility vertical, other needed installations can be placed next to it for easier maintenance and installation. The indirect lighting will be placed inside the ditch all around the fortress to emphasize the new center in the night, increasing its popularity.

Fig. 220: Western Facade-section 3-3
Credits: Ivan Vratnica



Gatehouse - 1
Courtyard - 2
Southern korf (technical) - 9
Open air stage - 10
Korf Panoramic platform - 29

The entrance to the inner part of the center is over the bridge through the original main gate. The entrance hall is widened as the wall between it and the guard room would not be rebuilt. Instead, the guardroom will be the stairway and reception. From the hall, the door leads to the toilets and showers, which originally use to be the kitchen and the toilets. This would utilize the existing sewers that leads through the ditch and down to the new main collector by road. In the northern wing, the floors and all the walls except the load bearing ones are gone, so the new floor construction would be made out of wood, with the beams visible on the ceiling for the rustic appearance. The surface of the remaining walls will be repaired, so the rooms can have a stone texture, even dough they were originally plastered.
From the entrance hall on the right, the door leads to the 180m2 big main hall, that will serve as a multipurpose hall for presentations, films, theater, congress, gatherings etc. The floor vaults of the first floor where the main crew accommodation was are demolished in the main hall. Instead of rebuilding the vaults, which requires exceptional stone masonry skill, the man hall will have double floor hight with a hallway gallery in the first floor, connecting northern, western and southern wing. The flooring of the main hall will not be made out of wood, as it originally was, but out of polished concrete to better suit the new use.

The L-galleries underneath the floor, accessed from the corners in the hall will be used as a technical rooms, for electrical installations and hidden air intake. The northern L-gallery can be used as a storage for the bar in the small catering bar in the corner as well. Inside the main hall there are still two chimneys, damaged but repairable, which will be used for fireplaces to ennoble the old atmosphere of the hall and the other rooms inside. The main hall can also be accessed from the western and the southern wing. The ground floor of the southern wing houses the new workshops for acting theater, music and film, which can directly access the stage outside, as well as the main hall inside. This allows the workshop chambers to serve as

Fig. 221: Fort Kosmač - rehabilitated
Section 2-2 (Northern wing)
Credits: Ivan Vratnica

Courtyard - 2
Kitchen storage - 5
Entrance hall - 11
Toilets - 13
Sitting room (hostel) - 22
Sleeping room (hostel) - 23
Kitchen (hostel) - 24
Panoramic terrace - 28
Cannon terrace
(multipurpose hall) - 32

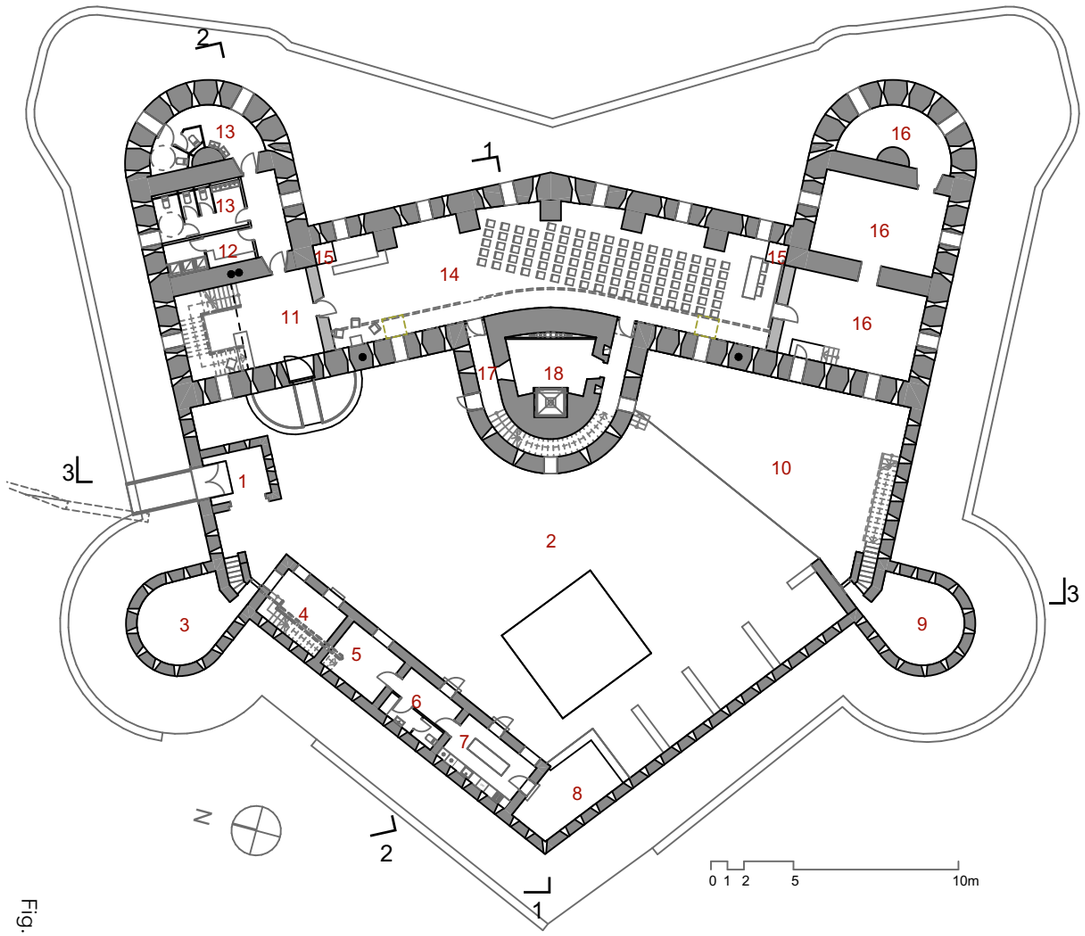


Fig. 222: Fort Kosmač - rehabilitated Ground Floor
Credits: Ivan Vratnica

Entrance gate (Zwinger) - 1
Courtyard - 2
Northern Korf (technical) - 3
Stairway - 4
Kitchen storage - 5
Staff room - 6
Kitchen - 7
Open air seasonal bar - 8
Southern korf (technical) - 9
Open air stage - 10
Entrance hall - 11
Showers - 12
Toilets - 13
Main hall - 14
Access to L-galleries - 15
Backstage - 16
Main stairway - 17
Lobby - 18

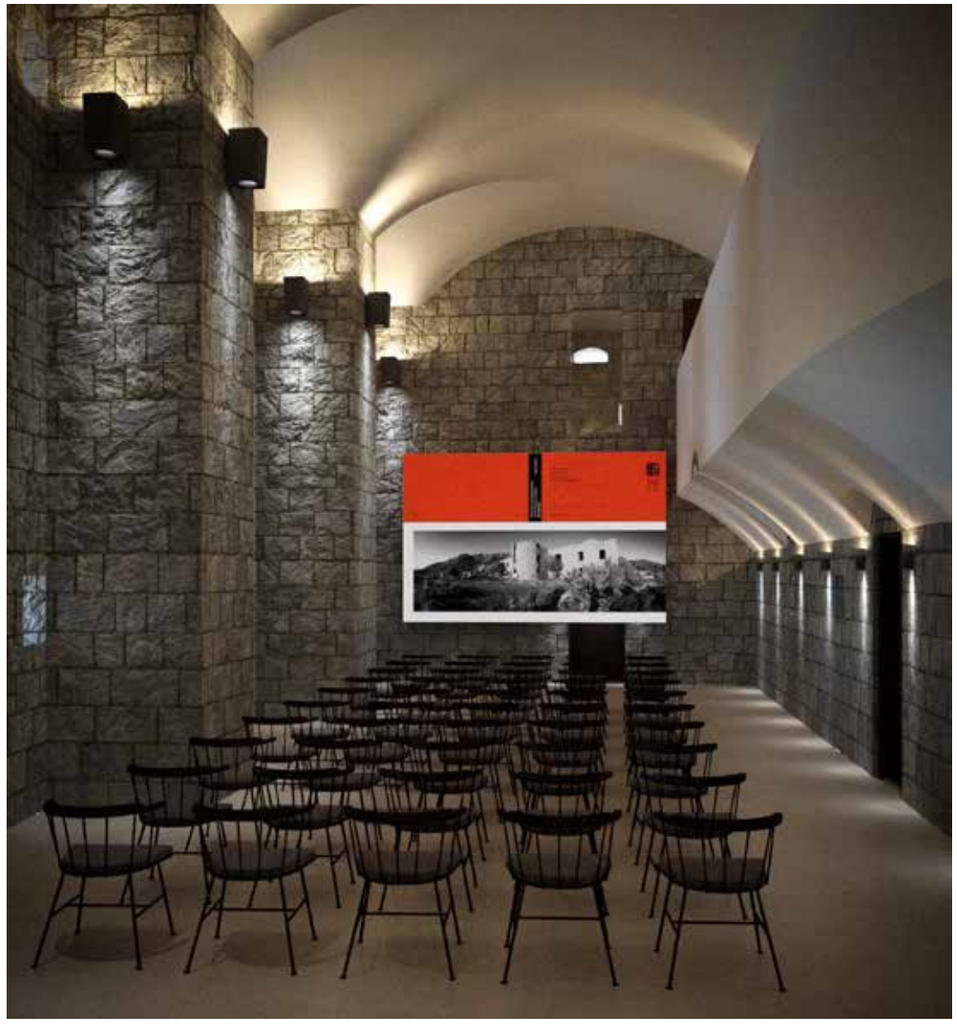


Fig. 223: Main hall Presentation disposition
Credits: Ivan Vratnica

a backstage during the shows on the courtyard stage and in the main hall.

From the entrance hall, the stairway leads to a small hostel accommodation in the northern wing. On the first floor, next to the stairwell, is the sitting room of the accommodation, with a fireplace to encourage the comfortable talks during the cold days. From there, the sleeping chamber is in the northern wing, with the kitchen in the half circular room at the end. The floor in the sleeping chamber would be made out of wooden planks, resembling the original as well as the doors but the walls will retain the stone texture and will not be plastered as they originally

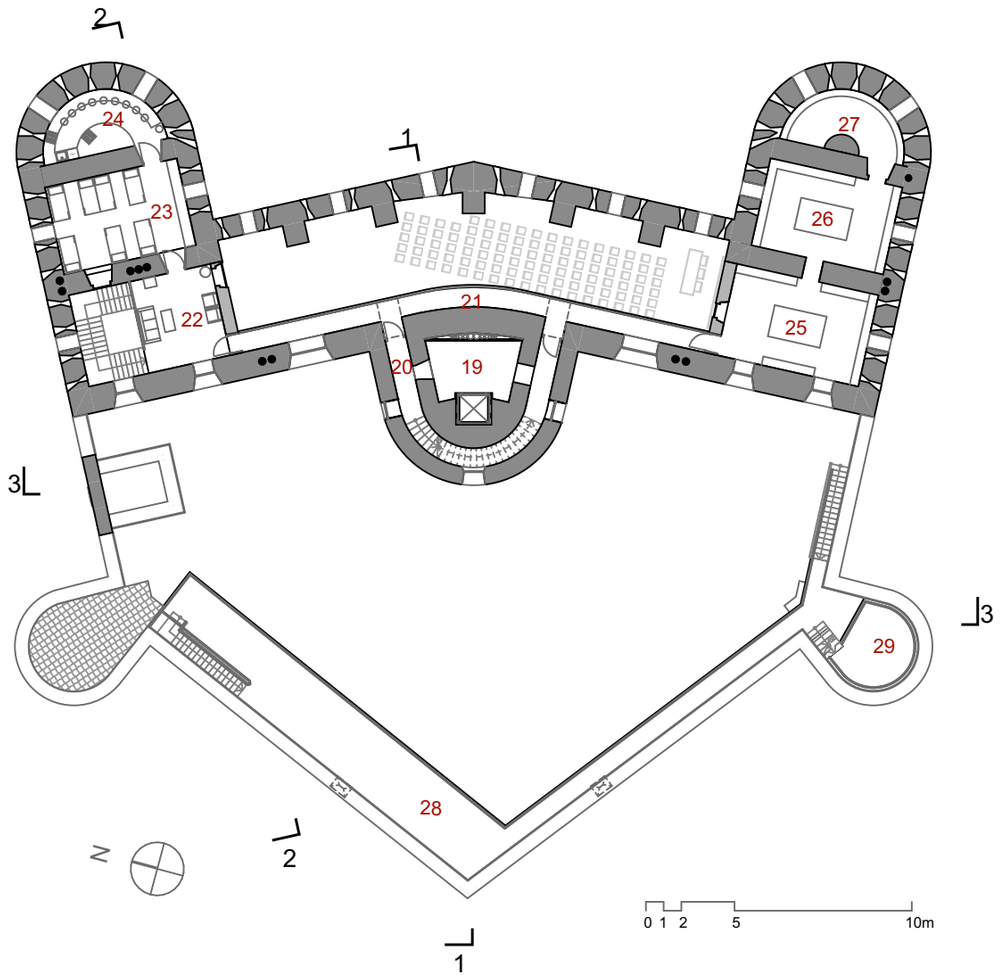


Fig. 224: Fort Kosmač - rehabilitated
First floor - hostel and museum
Credits: Ivan Vratnica

Lobby - 19
Main stairway - 20
Gallery - 21
Sitting room(hostel) - 22
Sleeping room(hostel) - 23

Kitchen(hostel) - 24
Museum - 25, 26, 27
Panoramic terrace(courtyard) - 28
Korf Panoramic platform - 29

were. The ceiling is still original and after the needed reparations it will be plastered again with white finish as it originally was. This would enhance the indirect lightning in the room and the vaulted white ceiling would serve as additional illumination. The loopholes and the arched window above them would be closed on the inside with the wooden frame, with openable glass casement. This accommodation is meant to be used by artists while practicing, occasionally by the staff during the longer events, youth working groups and hikers from time to time.

From the sitting room the door leads to hallway gallery in the main hall. This gives the access to the museum in the southern wing and to the main stairway in the western wing. The gallery is a cantilever construction, made out of steel, with the same wooden flooring as in the rooms. Under it, the gallery ceiling would be made to resemble the part of the vault with the same radius as the original. Inside this ceiling is the space for the various installations, including the air-conditioning for the main hall.

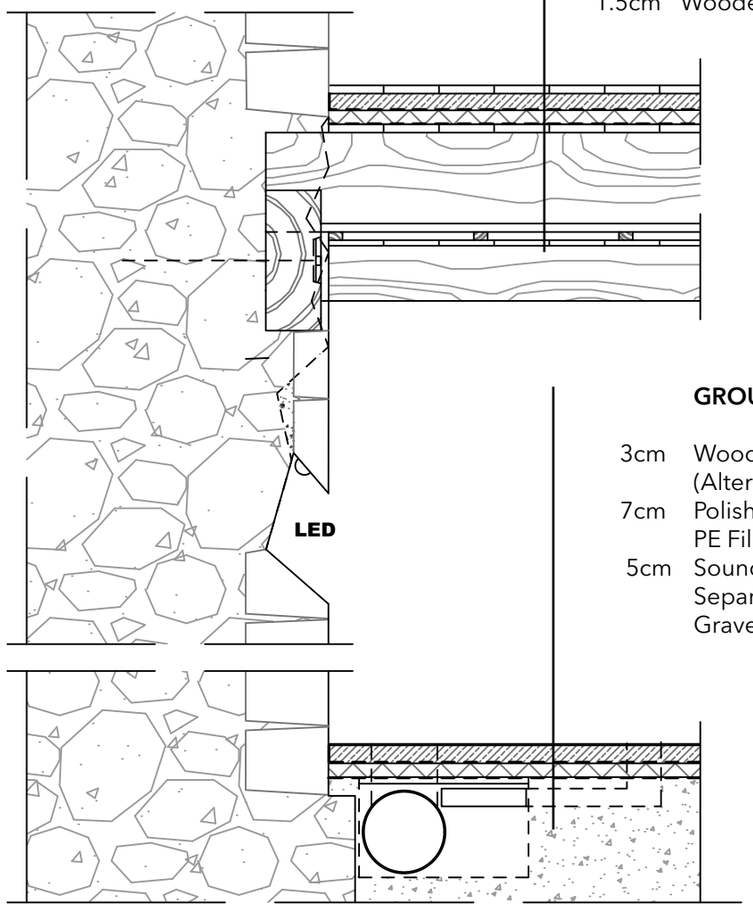
The rooms in the southern wings' first floor will serve as war museum, exhibiting the old pieces from the time the fort was operational. To make it authentic, the chambers will be fully restored as they originally were with white plastered walls and ceilings, wooden board floor, wooden doors and windows as well as loopholes frames with casements. Among these exhibits, there would be plans and

reconstructed models of the fort as well as the whole area of the Boka. Such a museum would be the first of its kind, presenting the enormous military heritage the Austro-Hungarian Empire left in Montenegro.

As a part of the museum, the reconstructions of various cannons would be displayed on the second floor a.k.a. the cannon terrace.

In the western wing, made to be a core of the building, housing stairwell and most important rooms such as munitions and watter storage, will be refitted as a communications and utility core with stairs, elevator and technical equipment connecting all levels. The original stairs have been riped out, so the stairwell would have to be built anew. It would be a steel construction with glass steps to retain the vertical effect and improve the natural lightning. To amplify this effect, the last vault would not be reconstructed and the roofing above would be made out of transparent tiles, to let in more natural light from above. As the floors in the ground and the first floor are demolished, the elevator would be placed inside in the niche in the western corner, connecting all three levels. The elevators hydraulic motor

Fig. 225: Entrance, Stairway, Hostel sitting room
Credits: Ivan Vratnica



NORTHERN WING FIRST FLOOR

3cm	Wooden board flooring
6cm	Screed
	PE Film
5cm	Sound insulation
	Separating foil
3cm	Wooden boards 3/20
60cm	Wooden beam/Installation shaft
5cm	Battens 5/3
3cm	Treaded battens 3/5
1.5cm	Wooden board ceiling

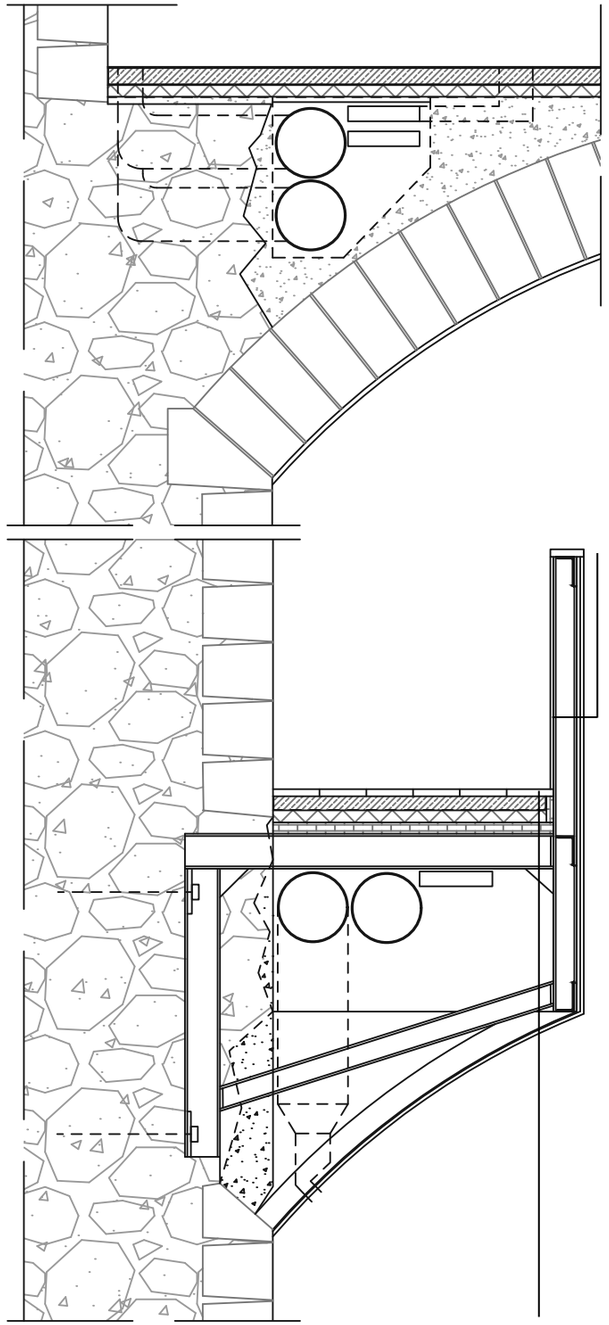
GROUND FLOOR

3cm	Wooden board flooring (Alternative)
7cm	Polished concrete
	PE Film
5cm	Sound insulation
	Separating foil
	Gravel/Installation shaft

Fig. 226: Floor detail in the northern wing
Credits: Ivan Vratnica

Fig. 227: Main hall
Gallery to Museum
Credits: Ivan Vratnica

mechanism will be placed under the storage in the ground floor, inside the reserve watter reservoir. This reservoir will serve as a future technical room, housing some of the needed technical equipment, same as the attic above the core. The vaults in the second floor would need to be drilled through, for the elevator and the installations going upwards. In the ground floor, the new door would be well integrated into the facade of the wing, facing the gatehouse, so all the floors in the building can have an independent and barrier free access.
The second floor can be independently



CANNON TERRACE FLOOR

7cm	Polished concrete
	PE Film
5cm	Sound insulation
	Separating foil
	Gravel/Installation shaft
47cm	“Siga” Stone vault
1.5cm	Reinforced white plaster

Fig. 228: Main hall gallery detail
Credits: Ivan Vratnica

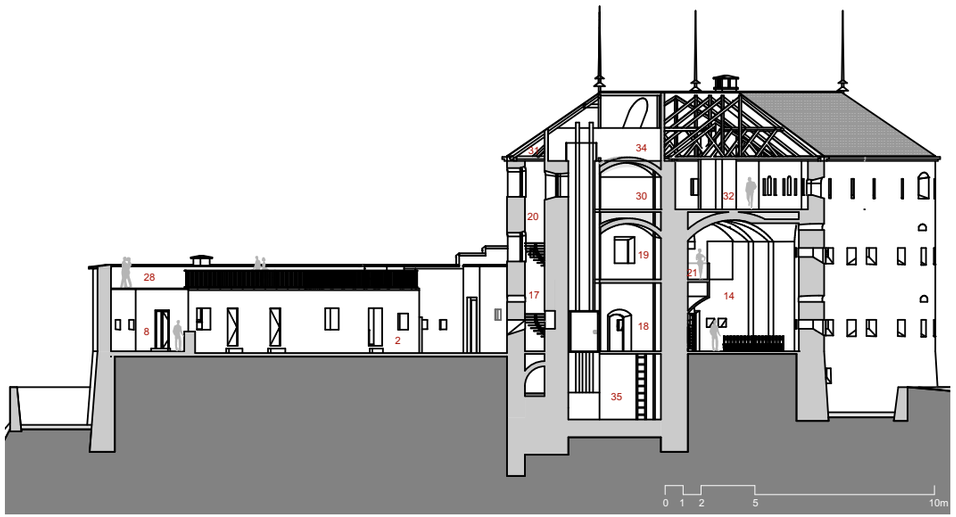
GALLERY RAILING

1.5cm	Plaster board
10cm	I-beam
1.5cm	Plaster board
1.5cm	Reinforced white plaster

MAIN HALL GALLERY

3cm	Wooden board flooring
6cm	Screed
	PE Film
5cm	Sound insulation
	Separating foil
3cm	OSB plates
12cm	I-beam
	Installation shaft
7cm	Profiled metal sheet support
3mm	Curved metal sheet plate
1.5cm	Reinforced white plaster

Fig. 229: Fort Kosmač - rehabilitated
Section 1-1
Credits: Ivan Vratnica

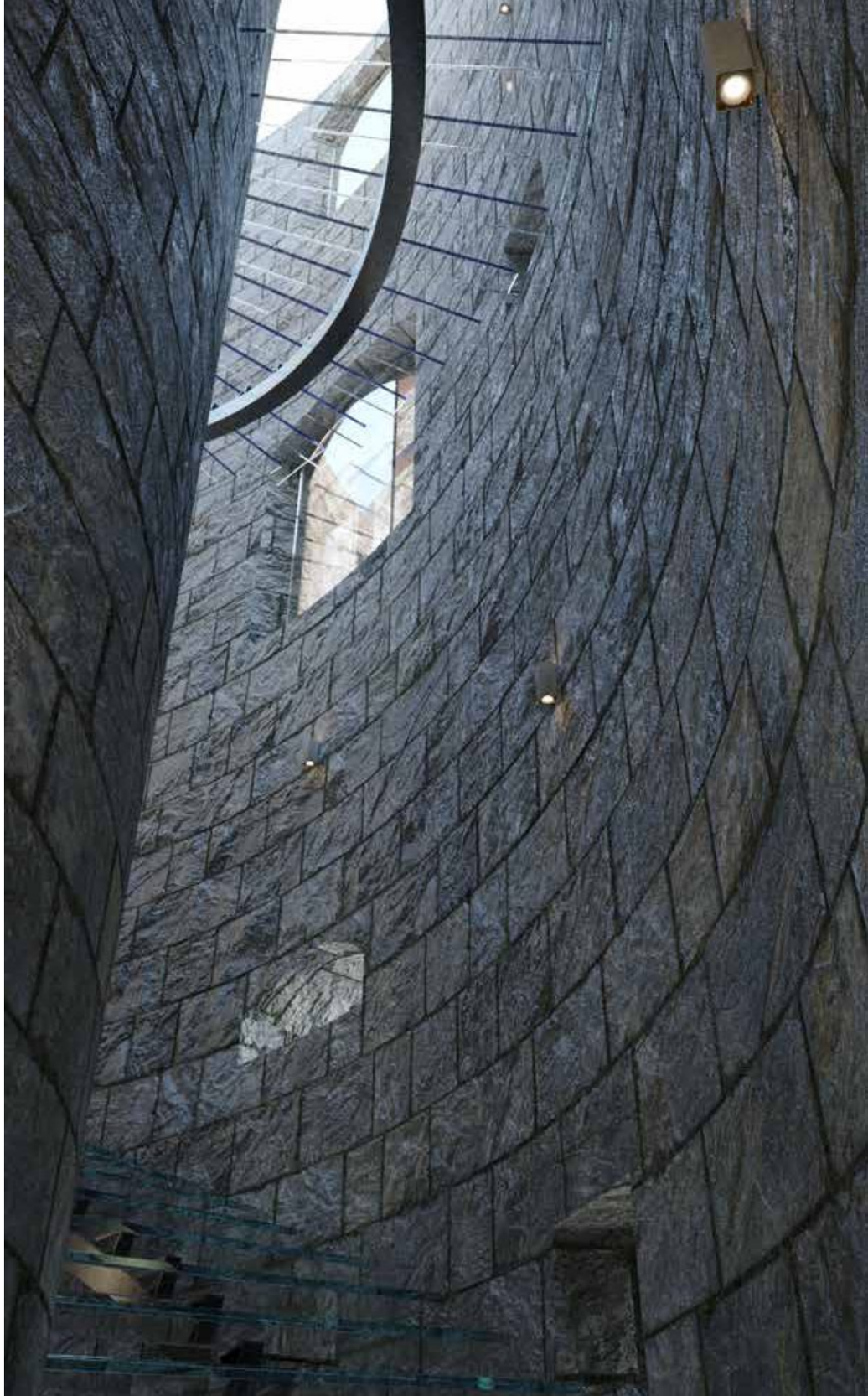


accessed through the western wing. The cannon terrace was the biggest room in the fortress, with more than 500m2, without any inner walls, to achieve the easier maneuverability of the artillery. This gives total freedom in the room, making it a perfect multipurpose hall. Covered with reconstructed slanted roof on a wooden construction, it will have a roomy and rustic apprentice. The walls will be reconstructed as they were with the original fine stone faces on the inside. The roofing itself would be made by the modern standard to be leak-proof and for easier room conditioning. The flooring will be made out polished concrete, similar to the original with the electrical installations integrated underneath to avoid its placement on the walls. To achieve its versatility, the system of curtains will

Courtyard - 2
Open air bar - 8
Main hall - 14
Stairway - 17
Lobby - 18
Lobby - 19
Stairway - 20
Main hall gallery - 21
Panoramic terrace - 28
Lobby - 30
Stairway - 31
Cannon terrace (multipurpose hall) - 32
Technical room in the attic- 34
Technical room in reservoir- 35

be installed on the beams to enable various partitions of this large room. It can be used as a presentation room for various exhibitions, for temporary workshops, lectures, presentations, seminars etc. The partition system

Fig. 230: Reconstructed main stairway
Visualization
Credits: Ivan Vratnica



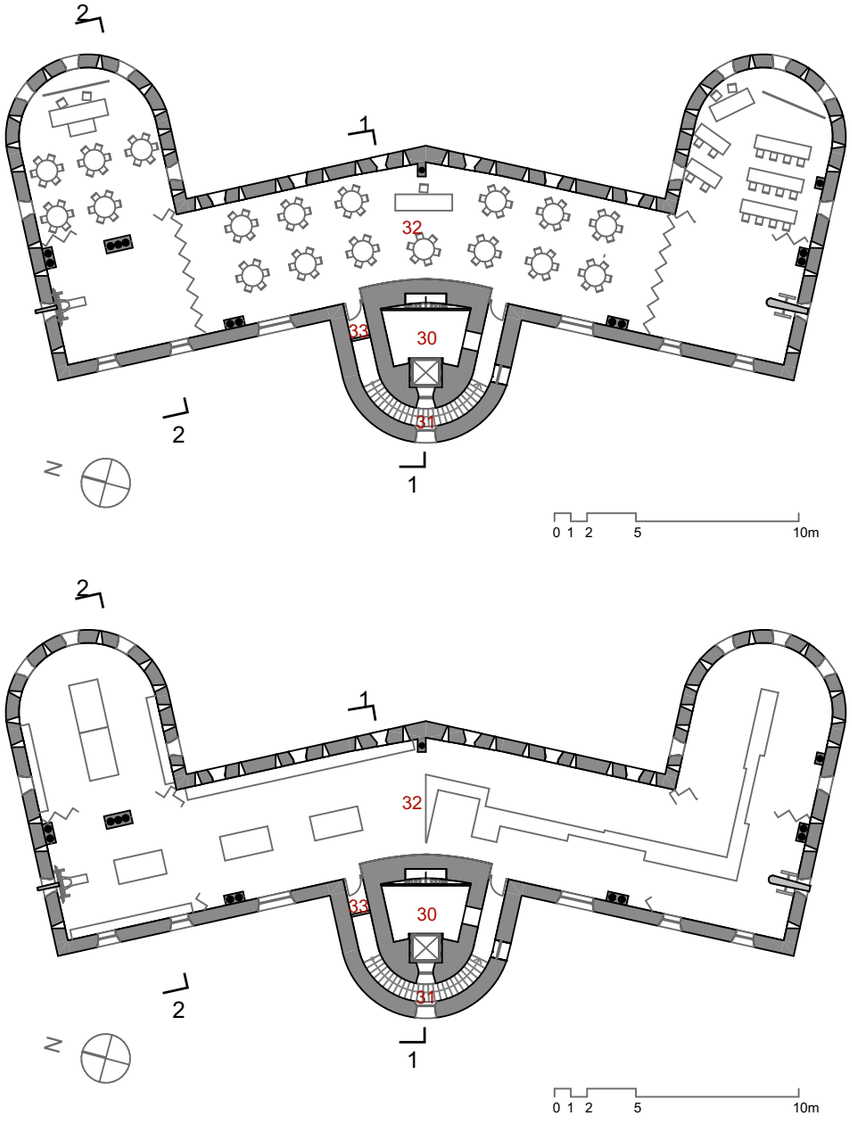


Fig. 231: Fort Kosmač - rehabilitated Second floor (cannon terrace) plan - different dispositions (Workshops and Exhibition)
Credits: Ivan Vratnica

allows it to be used individually or simultaneously as the need requires. This way it would evoke the feeling and atmosphere the cannon terrace had.

The building will be conditioned with the heated floors and the air-condition system. Tough the chimneys will be reconstructed with some fireplaces and heating ovens they would not serve as a main heating system, dough they will be functional. The air-conditioning equipment will be placed in the attic above the core, accessed by the elevator and the hatch in the second floor.

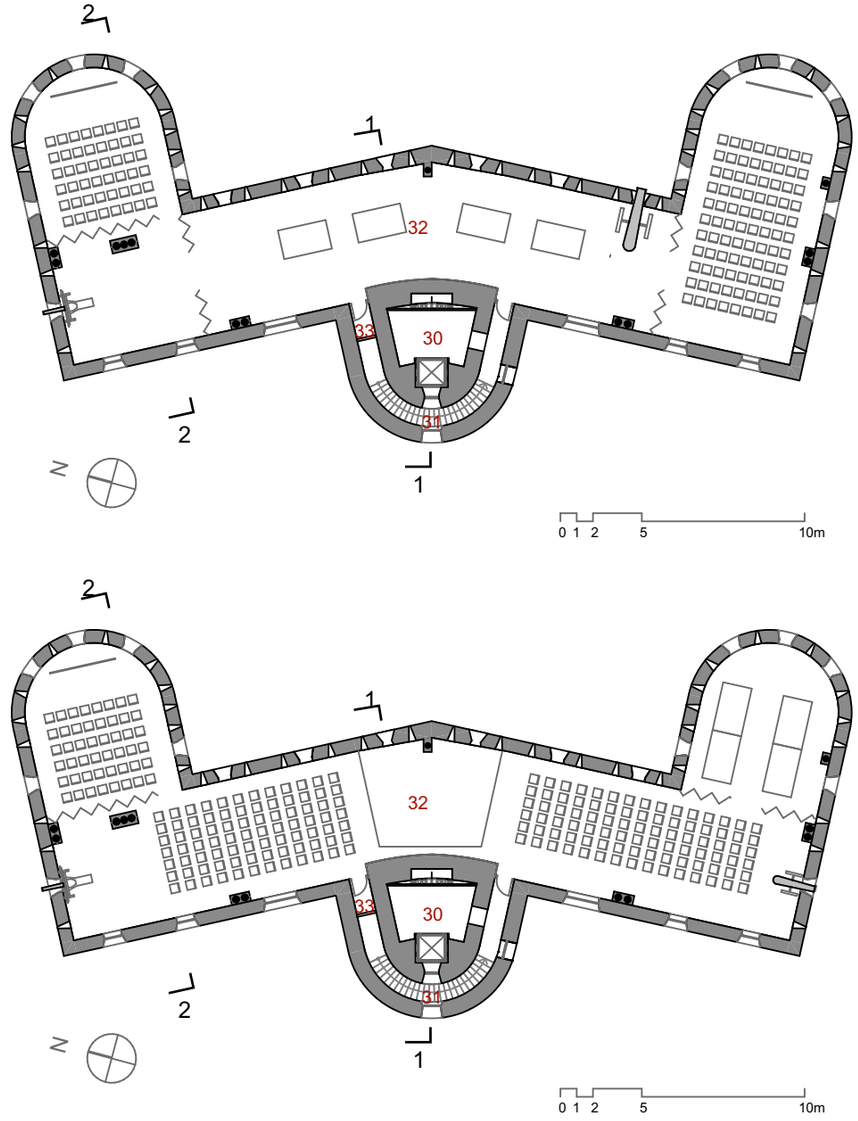
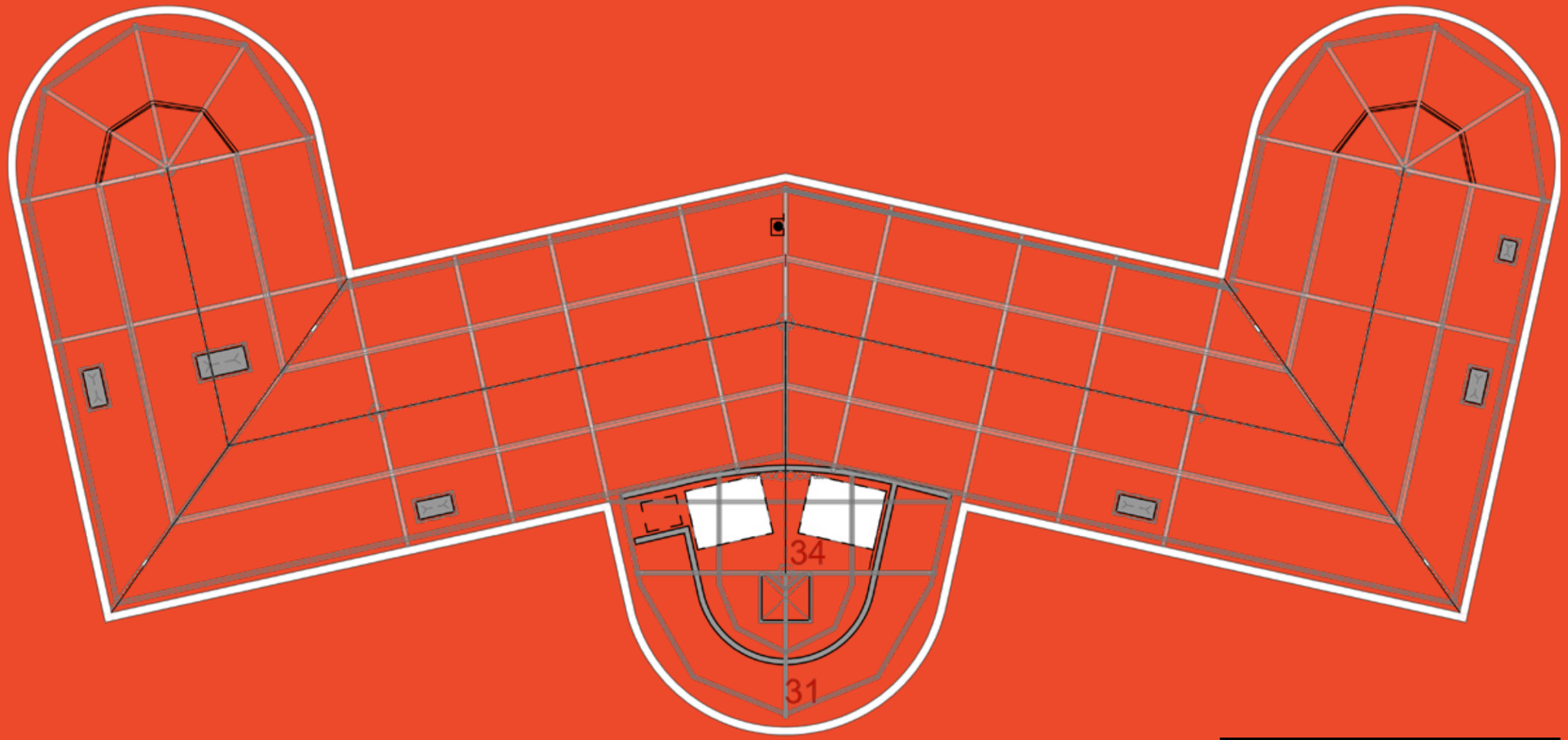


Fig. 232: Fort Kosmač - rehabilitated Second floor (cannon terrace) plan - different dispositions (Seminars and Theater stage)
Credits: Ivan Vratnica

Lobby - 30
Stairway - 31
Cannon terrace (multipurpose hall) - 32
Access to technical room in the attic- 33



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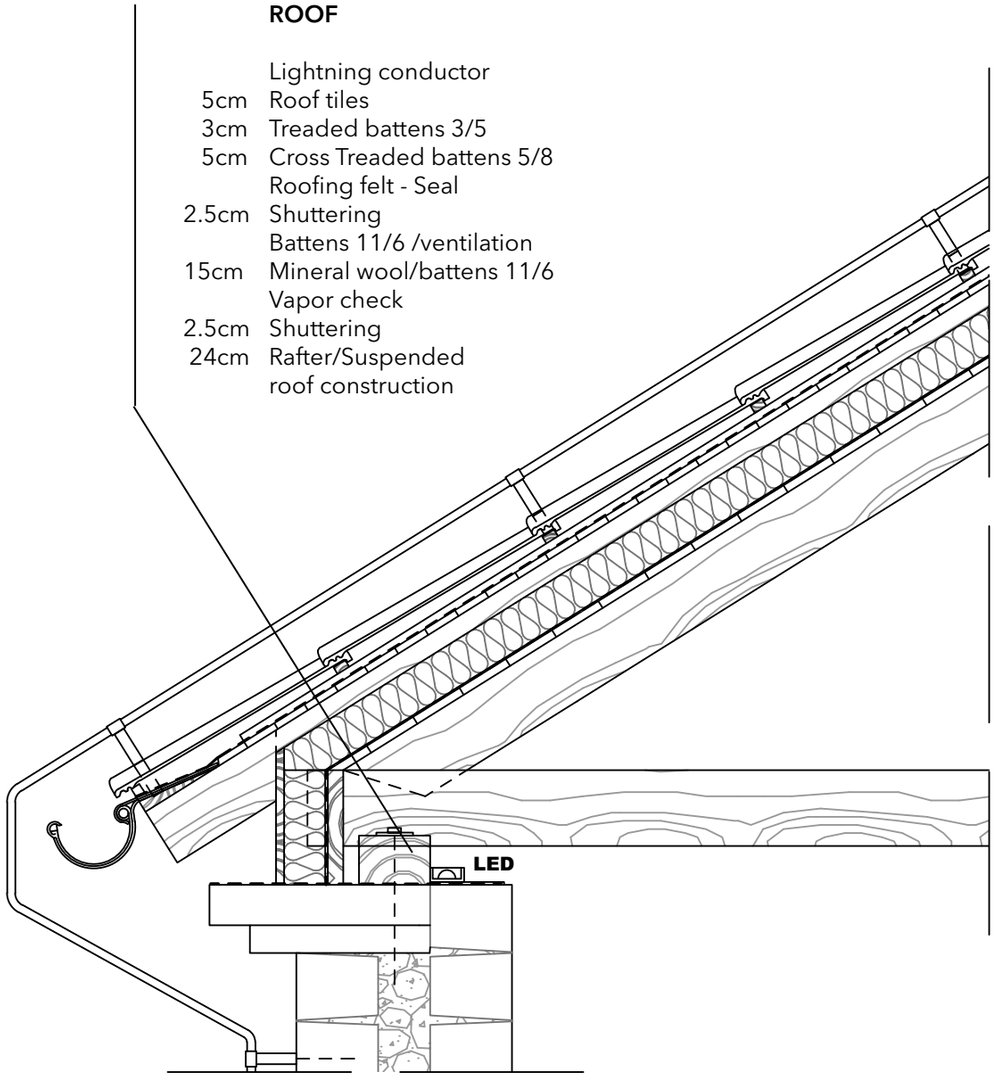

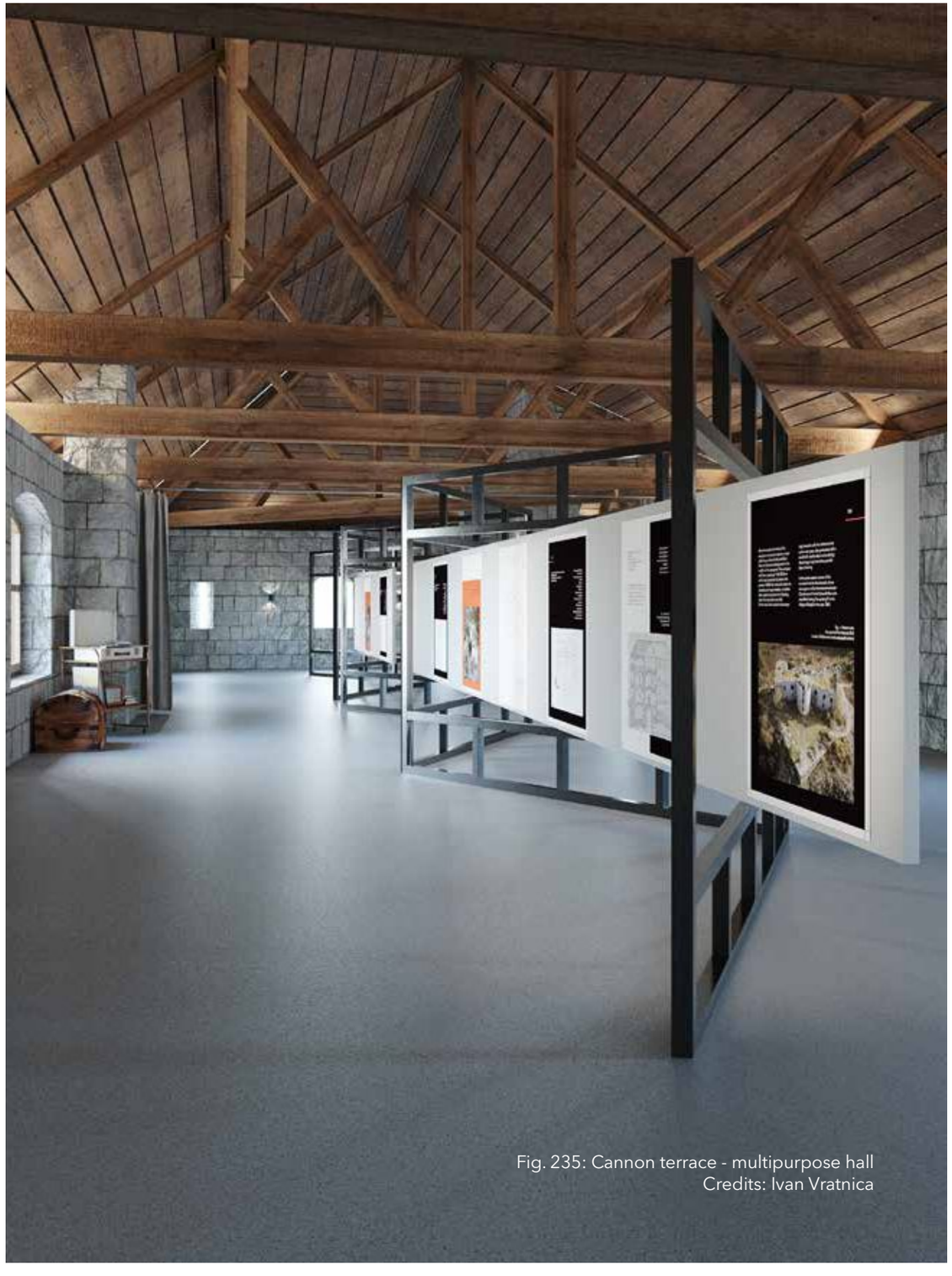

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5.4. INTERESTED PARTIES

The successful rehabilitation of this project depends on more than just a project. The most important part is the cooperation of the parties vital for its future life. The rehabilitation project should aim to connect and include the interested parties on the local and international level to achieve the best possible result.

The interested parties for the project can be divided into few categories, most important being the local state institutions, the NGO sector and the business sector. The second one is the national category and the third is the international category.

The local level is represented by the Municipality of Budva and the local community of Brajić and Uglješići villages. The local institutions such as the Tourist organization Budva and Public institution "Museums, gallery" of Budva would be important to cooperate as well as tourist agencies and private companies.

On the national level, it is important that the ministries in charge of culture, spatial planing, ecology and tourism are included in the project from the beginning, to better coordinate the development. On this level, the national touristic organization plays an important role to promote the center as a unique offer of the country. Along these institutions, the Universities are the key factor as such projects and their aim needs to be well known, disused and integrated into the educational process. Also the national NGOs such as the newly founded ICOMOS Montenegro, which includes the experts and emerging professionals on the topic of cultural heritage and as "Montenegrin-Austrian Friendship Society" would be significant partners in raising the awareness and additional funds for the project.

On the international level, the Austrian embassy in Montenegro is a key partner for these projects, as Austria is keen on keeping and promoting the culture and its monuments. Also, the cooperation between the universities is a realty important factor for the development for the future project, sharing knowledge, experience and rethinking the strategies. The Austrian NGOs such as the "Austrian Society for Fortification Research" which includes the key experts on the topic of Austro-Hungarian fortresses and the ICOMOS Austria which oversees the whole cultural heritage in Austria and further.

Another important NGO that had significant amount of projects on the cultural heritage in Montenegro is the "Petrovic-Njegos foundation" founded by the Prince Petrovic of the dynasty of Montenegro, an architect living in Paris.

Significant others are the "Cultural heritage without borders" and ICOMOS International that are interested in cultural heritage world wide.

conclusion

6

Through this research, it became clear that the time of the fortresses, even not too long past is almost forgotten among the people in Montenegro. Today, a very few know about these buildings, left from the time of the Austro-Hungarian Empire, even dough its presence in the Boka lasted for more than a century. The detailed documentation that the empire had about their fortifications was lost through time and mostly, only the stories about them remain in Montenegro. The existence of these fortresses is known exclusively thanks to a few enthusiasts that took interest in this topic. Because of insufficient interest from the state, lack of experts in this field, it appears that only little is known about this rich legacy. The lack of communication between the state institutions in Montenegro with Austrian institutions and experts, led to many misinterpretations considering the fortresses, as there was no one who could compare the informations and give feedback to the research made in Montenegro. Such a situation ultimately caused that many of these buildings are undervalued and devastated through careless development. The lack of will and motivation in Montenegro, to properly research the its history and educate its people about it is the most concerning fact.

As a result of a long and thorough research on Fort Kosmač, many new details have been

discovered, at the end leading to the creation of the Fort Kosmač's time-line that can easily catch anyones attention. This shows that all the pieces needed to properly describe and introduce this rich legacy are available, needing only the will and determination to make it happen. Realizing this fact, the aim of this thesis was also to show how much of this "lost" knowledge still exist and how easily it can be used to improve many aspects in the state of Montenegro. The number of the written and realized projects is worryingly low compared to the number of the fortresses in Montenegro, where the fortresses represent the majority of the cultural heritage. Therefore this book was made to summarize all the aspects and all perspectives needed to begin the treating of such a heritage. Through the research to date, it can be concluded that this would be the first book to totally cover the aspects of the Austro- Hngarian fortification protection and rehabilitation in Montenegro. As there are many fortifications with different origins there, they need to be thoroughly researched so the strategy can be developed to define the approach to this type of monument and how they could be protected and reused. This strategy would contain the plans to valorize and integrate this numerous heritage into the cultural and touristic offer of the country, possibly resulting with the completely new touristic system.

One of the most important factors of any project is its cost-effectiveness and a justified investment. In the case of the Fort Kosmač, the situation is a bit more complex than usual. The sole function as a cultural center can not justify the funds needed to realize this rehabilitation. Yet, there is much more at stake here than just a ruin and the cultural center. The fortress is a cultural monument in a deteriorating state and in the need of urgent action to prevent its complete loss. It has a location with a great vantage point of the coast, close to a populated place and it is accessible by vehicle. It also represents the last fortress of its kind, completely made out of stone. This is a valuable monument that needs to be preserved and its values can be improved. Its rehabilitation will require the need to rethink the spatial planing and the tourism strategy in Montenegro and at the same time, it will improve and protect these wild areas in the back-land of the coast. It would be the spark that starts the proper development of such areas through promotion of art, history and culture.

The new center with its functions would have a flexible structure allowing it to accommodate and host many different events and uses. Beeing close to the main road gives it a good connection and it can be quickly reached by bus from nearby towns, eliminating the need for everyone arriving by car and overcrowding the area by many parked cars, such as the situation in the coast in the summer. It can be used to house many seasonal festivals such as “Theatre City Budva” which was moved from the citadel to a much smaller, improper place in front of the old church. This and similar festivals can actively use the center during the summer months with other events, concerts, workshops and exhibitions in between. This combined with the seasonal bar, a small restaurant and a small hostel will make the upkeep of the center self-sustainable. The fact that the center also lies on the transversal hiking path Orijen-Lovcen-Rumija, rich with breathtaking views of the coast and other fortresses, additionally increases its popularity, by putting the center on the path of many foreign tourists and enthusiast, who can use its very needed infrastructure. Combining all the factors and possible uses as well as the meaning it has for the local community, the state of Montenegro and Austria with the support and recognition from the European commission, can justify the investment and show how it can be done even if it is not rehabilitated into a luxurious resort. This way, the rehabilitated fort will live on as a monument and public building as a legacy of the old and current generations to the new ones.

“The aim of the conservation and restoration of monuments is as much the preservation of the work of art as the preservation of the historical testimony.” - Article 3, The Venice Charter 1964

GLOSSARY

BALADUR[34] (Ital. ballatoio)

An open walkway, usually cantilevered, on stone or wooden consoles. Often used in fortification architecture, initially with the sole purpose of defending the walls, but later for decoration.

CAPONIER[36] (Ital. kaponiera; Ger. Koffer)

A defensive part for the close-range defense of the fortress, of various shapes, placed in the ditch or across it, thereby covering it by its fire or providing flank protection at one or more levels. A caponier is a low casemate structure intended for the close-range defense of fortresses, i.e. protection of the ditch with longitudinal artillery, machine-gun or rifle fire and sometimes for the protection of the spaces between fortresses. A double caponier acts by firing along two sides of the defensive ditch. A semi-caponier acts only along one side of the defensive ditch of a fortress. A shoulder caponier is placed on the sides of the defensive ditch. A gorge caponier is used for the defence of the back of the ditch and entrance to 'the fort. Later, its location would become a bunker. Initially, the caponier was placed in the escarp, later in the cdunterscarp and finally at the gorge of the fortress.

Caponier is a low casemate construction of various shapes, located at the corners of the counterscarp (opposing to fortress), with the purpose of defending the ditch from attack by enemy infantry. Similar to caponiers, there were gorge, oblique, head-on, lateral, double and single caponiers, armed with infantry weapons, associated with fortification covered by protected corridors (posterns). Apart from the counterscarp, in the Boka Kotorska's fortifications, caponier are built in the scarps (fortresses' side of the ditch) and in the gorge and are also linked with the fortification by posterns.

DEFENSE DITCH[31] (Ital. fossato; Ger. Graben)

A deep and wide, hollow ditch around the fortifications and fortification positions, with the purpose of preventing an immediate assault on the fortification. It could be dry, filled with water or able to be flooded. In the Boka naval fortress, only the first type was used. Before the First World War defense ditches in the Boka naval fort represented an important obstacle for possible attackers. The ditches were equipped with barbed wire, korfs and bunkers from which the enemy could be fired on with cannon and infantry fire. In case of a breach of the ditch, fire from the korfs could cause huge losses to the attackers and prevent them from conquering the fortress.

FORT (Ital'. forte, fotezza; Ger. Festung, Feste, Befestigungswerk, Werk)

A permanent fortification for independent defense, as part of a system of separate fortifications connected into a single unit of defense. With the increase in the range of artillery in the18th century, fortified cities could be successfully targeted. Therefore, important strategic points were established in front of defensive walls, in order to strengthen the defense, keep "an attacker at a safe distance from the city and prevent the possibility of action against the elements of fortification. At the middle of the 19th century, with the emergence of the armored bore, the construction of fortresses with continuous, unsuitable and expensive walls, was abandoned, so defense was ensured by a system of permanent, independent and separate fortifications, of various shapes and sizes.

FLANK n. (Ital. fianco - beat; Fr. flanc)

The lateral, shorter side of a bastion or the external elements of the fortification. It links the face to the stronghold of the bastion. It may be flat or indented. Part of the fortification placed in such a way as to provide protection to the other, lateral part.

FLANK[37] v. (Fr. flanquef) mil.

To attack the flank, to attack the side of an army, to protect from the side, secure the sides.

FLANKER - (Fr. flanqueur) - a soldier who disturbs the enemy.

GATEHOUSE[32] (Lat. cingulum; I tal. antemurale; Ger. Zwinger)

A system of at least two gates connected with walls with loopholes all around and above within the bigger gatehouses. If the attacker managed to punch through the outer gate it would be trapped in the kill-zone before they could reach the inner one. This system gave additional protection if the gates were not aligned with each other, preventing the direct shoots on the second one if the first one was broken through.

GUN MOUNT (Ger. Gewehrlafette)

A base in the fortification, especially in the caponiers and korfs, where a gun is the basic weapon, to facilitate ,a gun pointing through the loopholes and increase shooting precision. Sometimes it was equipped with auxiliary shooting baseplate.

LOOPHOLES[33] (Lat. feritoie)

Holes in the breastworks or through the thick walls of the fort casemates for light infantry weapons, to protect shooters from enemy fire. The holes were smaller (narrower on lower) than cannon holes, and were built on the same principle as for guns and machine guns of various sizes and types, both those with a lafette and those that were manually operated.

LAFETT (Fr. affut; Ger. Lafette; Ital. affusto)

A set of structures used as its mount for a cannon, which enabled a cannon to be handled and moved. By its purpose, the mount (lafett) may be a coastal lafett, field lafett, fortress lafett, down-shooting or casemate lafett, upland lafett, etc. A special form of the cannon mount for the permanent fortifications was the lafett for a minimal tower and armored bases, which was rarely used in coastal fortifications. There were also mounts (lafetts) for guns. These can be mainly divided into fixed and mobile mounts. They could be siege, fortress, coastal or field mounts.

Source:
R. Pavićević - “Werk 2: Austro-Hungarian fortresses in Montenegro” 2019

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Fig. 127: Western wing Fort Kosmač, 2019
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Credits: Ivan Vratnica

Fig. 128: Western wing - Fort Kosmač, 2020
(The damage on the northern outer wall resulted from the further tilting outwards from the earthquake due to the lack of brassing)
Credits: Ivan Vratnica

Fig. 129: Western wing - Fort Kosmač, 2019
(The northern outer wall tilted outwards from the earthquake due to the lack of brassing)
Credits: Ivan Vratnica

Fig. 130: Cannon terrace wall in the Southern wing - Fort Kosmač, 2019
(The only remaining part of the wall on, with the only part of the M4 90mm lafette still present)
Credits: Ivan Vratnica

Fig. 131: Southern wing - Fort Kosmač, 2019
(Remaining of the chandelier in the ceiling one of the few metal parts remaining)
Credits: Ivan Vratnica

Fig. 132 (top left): Water reservoir (45) in the western wing Fort Kosmač, 2019 (Full of water and material)
Credits: Ivan Vratnica

Fig. 133 (bottom left): Ammunition storages (24, 27) in the western wing - Fort Kosmač, 2019
(Vaults collapsed into the water reservoir below)
Credits: Ivan Vratnica

Fig. 134 (bottom right): Place of the water pump in the passage (25) in the western wing Fort Kosmač, 2010
Credits: Radojica Pavićević

Fig. 135 (top left): South-eastern wing Fort Kosmač, 2019
(Provisions storage (21) in the ground floor and crew quarters (30, 31) above. The only remaining part of the vault between ground and the first floor)
Credits: Ivan Vratnica

Fig. 136 (bottom left): Hole in the eastern wall - Fort Kosmač, 2019
(The collapsed corner between the provisions storage (22) and the crew quarter (18))
Credits: Ivan Vratnica

Fig. 137 (top right): Southern part of the main tract - Fort Kosmač, 2019
(The biggest hole in the eastern wall in the corner of the crew quarters (18) and the provisions storage (22). Loopholes closed during the uprising 1869)
Credits: Ivan Vratnica

Fig. 138 (bottom right): Provisions storage (22) in the south-eastern wing - Fort Kosmač, 2019
(Base of the collapsed vault)
Credits: Ivan Vratnica

Fig. 139: Metal part - Fort Kosmač, 2020
(Possibly for connecting the telephone line)
Credits: Ivan Vratnica

Fig. 140: Metal nails Fort Kosmač, 2020 (Possibly from the wooden roof construction)
Credits: Ivan Vratnica

Fig. 141: I-profile pole foundation - Fort Kosmač, 2020 (Some pieces of the pole still visible)
Credits: Ivan Vratnica

Fig. 142: Remaining of a rifle mount built in the loophole - Fort Kosmač, 2019
(One of the few metal parts to be seen)
Credits: Ivan Vratnica

Fig. 143: Stone arch construction of the door to the passage (26) - Fort Kosmač, 2019
(The vault construction above collapsed leaving the arch visible)
Credits: Ivan Vratnica

Fig. 144: The provision storage (23) in the south-eastern wing - Fort Kosmač, 2019
(The half circular vault construction still present)
Credits: Ivan Vratnica

Fig. 145: Stone arch construction of the door to the stairway (26) - Fort Kosmač, 2019
(The vault construction of the door above is still visible compared to the previous photo)
Credits: Ivan Vratnica

Fig. 146: The Sewers drain leading to the field below on the east - Fort Kosmač, 2020
(The ending of the drain does not exist as the newly made road to the east cuts it)
Credits: Ivan Vratnica

Fig. 147 (right): The manhole on the drain of the sewers from the toilets (17) - Fort Kosmač, 2020
(Used for cleaning in case of clogging)
Credits: Ivan Vratnica

Fig. 148: Southern side - Fort Kosmač, 2010
(The cracks above the window in the outer wall of the western wing looks like the damage from the 1979 earthquake)
Credits: Radojica Pavićević

Fig. 149: Southern side - Fort Kosmač, 2018
(Even dough no significant change compared to 2010 is visible the state of the outer walls slowly deteriorates)
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 150: Eastern side - Fort Kosmač, 2010
(The embankment of the curve the blocking gate on the road from Budva to Fort Spiridone collapsed but most of the material lies underneath)
Credits: Radojica Pavićević

Fig. 151: Eastern side Fort Kosmač, 2018
(The state of the fortress slowly deteriorates especially on the cannon terrace floor, dough not clearly visible)
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 152: Northern side - Fort Kosmač, 2010
Credits: Radojica Pavićević

Fig. 153: Northern side - Fort Kosmač, 2018
(The holes in the cannon terrace floor are slowly getting bigger leading to the sudden collapse of the whole floor as the inner bearing walls have already collapsed)
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 154: Western side, Courtyard - Fort Kosmač, 2018
(The state of the outer wall of the western wing deteriorates faster as its top remains free in the air making it more susceptible to the effect of the earthquakes which are common in this region of Europe)
Credits: ÖAI (Austrian Archaeological Institute)

Fig. 155: Top view - Fort Kosmač, 2020
(The hole in the north-eastern wing of the cannon terrace is the most critical, as the supporting walls underneath have almost completely collapsed)
Credits: Ivan Vratnica

Fig. 156: Fort Mamula, 2019 (Before the rehabilitation)
Source: Tageskarte.io

Fig. 157: Rehabilitation proposal of Fort Mamula, 2019 (Currently being built)
Source: Tageskarte.io

Fig. 158: Old Town Budva
(One of the best maintained old towns in Montenegro but the uncontrolled development in the background, slowly overshadows its image)
Credits: Travelsicht.de

Fig. 159: Fort Goražda, 2018 (One of the targets for an nontransparent rehabilitation)
Credits: Ivan Vratnica

Fig. 160: Fort Vrmac in the recent years
(Located in the UNESCO protected area it but never maintained. It remains abandoned, a victim of stealing and vandalism. Still it contains a valuable pieces of history)
Credits: Radojica Pavićević

Fig. 161: Old town Kotor, 2014 (UNESCO protected zone. Fort Vrmac on the hill in the background)
Credits: Ivan Vratnica

Fig. 162: Old town Ulcinj, 2018 (Dating back more than 2000 years)
(Even dough it has a long and eventful history the town is still unprotected by state and its condition keeps worsening due to uncontrolled development)
Credits: Ivan Vratnica

Fig. 163: Fortress St. John, Old town Kotor, (St. Giovanni; St. Ivan)
Credits: MyGuideMontenegro.com

Fig. 164, 165: Sketch of the wall restoration technique
(The red plastic band used to separate the existing from the restored part)
Credits: Ivan Vratnica

Fig. 166: Panoramic drawing from the entrance to Fort Kosmač, 1860s
(The protective walls and posts are clearly visible on the drawing)
Author: B. Zinnenberg
Credits: KA Wien

Fig. 167: Damaged embankments on the serpentine approach
Credits: Ivan Vratnica

Fig. 168: Collapsed edge of the approach road
Credits: Ivan Vratnica

Fig. 169: Collapsed edge of the approach road
Credits: Ivan Vratnica

Fig. 170: (bottom right) The piece of the stone post
(Found along the serpentine approach to Fort Kosmač this tip of the post was placed somewhere along the road.)
Credits: Savo Martinović

Fig. 171: Collapsed embankment of a curve at the serpentine approach
Credits: Ivan Vratnica

Fig. 172 (top left): Location of the quarry just under the fortress next to the road, 2019
Credits: Ivan Vratnica

Fig. 173 (bottom left): Engravings made by the soldiers along the serpentine approach road 2019
(Comparing it with the Photograph from 1964, the condition worsen and the writings are almost not readable)
Credits: Ivan Vratnica

Fig. 174 (bottom right): Fort Kosmač (view from the road to Budva. The protection stone walls and posts can be seen along the road)
Author: Karlo Weber
Credits: Jovan Vuksanović

Fig. 175: Engravings made by the soldiers along the serpentine approach road 1964 (The writings were still readable.
Author: Oberst B. Wolf)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

Fig. 176: The serpentine approach road to Fort Kosmač, 2019
(Mostly narrowed due to overgrown vegetation and the collapse of the supporting walls)
Credits: Ivan Vratnica

Fig. 177: The serpentine approach road to Fort Kosmač, 2019
(Mostly narrowed due to overgrown vegetation and the collapse of the supporting walls)
Credits: Ivan Vratnica

Fig. 178: Fort Kosmač
(3D reconstruction based on the Rapport plan from 1902, with the plateau and the curve)
Credits: Ivan Vratnica

Fig. 179: Curve in front of the northern wing of Fort Kosmač, 2020 (The embankments collapsed)
Credits: Ivan Varatnica

Fig. 180: Fort Kosmač, 2020 (Top view)
Credits: Ivan Vratnica

Fig. 181: Fort Kosmač, 2020 (Trees growing out of the foundations of the southern barracks wall)
Credits: Ivan Vratnica

Fig. 182: Fort Kosmač, 2020 (Eastern side where the vegetation in the defense ditch overgrown)
Credits: Ivan Vratnica

Fig. 183: Cattle grid gate
Source: flickr
Credits: skittzitilby

Fig. 184: Courtyard of the Fort Kosmač, 2019
(Cows and other livestock resting in the courtyard. A common sighting in the courtyard.)
Credits: Ivan Vratnica

Fig. 185: Fort Kosmač, 2020
Credits: Ivan Vratnica

Fig. 186: The gatehouse of Fort Kosmač (3D reconstruction; possible restoration)
Credits: Ivan Vratnica

Fig. 187: Fort Kosmač, 2019 (Remaining wall of the gatehouse)
Credits: Ivan Vratnica

Fig. 188: Fort Kosmač, 1964 (Northern Korf´s foundations)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

Fig. 189: Fort Kosmač, 2020
(Northern caponiers´s foundations)
Credits: Ivan Vratnica

Fig. 190: Fort Kosmac, 2019
(Corner of the courtyard where the Lt. März was buried. The big cornerstone was part of the grave stone)
Credits: Ivan Vratnica

Fig. 191: Cornerstone of the grave
Credits: Ivan Vratnica

Fig. 192: Fort Kosmač, 2020
(Outer wall of the western wing almost split in two as the window arches collapsed)
Credits: Ivan Vratnica

Fig. 193: Fort Kosmač, 2020
(The side window arch loosened as the outer wall of the wing tilted outwards)
Credits: Ivan Vratnica

Fig. 194: Fort Kosmač, 2020 (Middle structural wall in the northern wing seen from the kitchen)
Credits: Ivan Vratnica

Fig. 195: Fort Kosmač, 2020
(Entrance to the barracks and the northern wing middle wall, missing its lover part)
Credits: Ivan Vratnica

Fig. 196 (top right): Fort Kosmač, 2020
(Middle structural wall in the northernwing seen from the entrance hall)
Credits: Ivan Vratnica

Fig. 197: Fort Kosmač, 2020
(Eastern wall inside the barracks. The “pillars” of the main tract blown up in the middle. View from the entrance hall)
Credits: Ivan Vratnica

Fig. 198: Fort Kosmač, 2020 Corner where the eastern barracks wall meets the southern wing
(seen from the inside)
Credits: Ivan Vratnica

Fig. 199: Fort Kosmač, 2020
(Eastern wall inside the barracks. The “pillars” of the main tract blown up in the middle)
Credits: Ivan Vratnica

Fig. 200 (top right): Fort Kosmač, 2020
(Eastern wall inside the barracks. The “pillars” of the main tract blown up in the middle. View from the entrance hall)
Credits: Ivan Vratnica

Fig. 201 (bottom left): Fort Kosmač, 2020 (Corner where the eastern barracks wall meets the southern wing
(seen from the inside)
Credits: Ivan Vratnica

Fig. 202: Fort Kosmač, 2020
Corner where the eastern barracks wall meets the southern wing
(The biggest hole in the barracks walls with a small tree growing out of it)
Credits: Ivan Vratnica

Fig. 203: Fort Kosmač, 2020 - Slanted stone layer on which the vaults were leaned
Credits: Ivan Vratnica

Fig. 204: Fort Kosmač. 2020 - Middle of the barracks main tract
(the vaults above collapsed and piled up in the round floor, filling it up, pushing against the outer wall)
Credits: Ivan Vratnica

Fig. 205: Fort Kosmač, 2020 The last remaining part of the gun terrace wall in the southern wing, southern wall. (Luckily one of the gun windows and one lafette still remains)
Credits: Ivan Vratnica

Fig. 206: Fort Kosmač, 2020 (Top view)
Credits: Ivan Vratnica

Fig. 207: Village Uglješići, 2020
Credits: Ivan Vratnica

Fig. 208: The Old “trip around the world” curve and the old quarry, 2020 - Both abandoned
Credits: Ivan Vratnica

Fig. 209: The ruin of the old school next to the approach road, 2020
(This austro-hungarian building served as a school for locals before it was abandoned. It was made on the location of Fort Brajić)
Credits: Ivan Vratnica

Fig. 210: Village Brajići, 2020
(Many ruins can be seen from the air and many of the houses are not permanently populated)
Credits: Ivan Vratnica

Fig. 211: Situation of Brajići and Uglješići
Credits: Ivan Vratnica

Fig. 212: Fort Kosmač rehabilitated - Cultural center
Credits: Ivan Vratnica

Fig. 213: Situation of Fort Kosmač
Credits: Ivan Vratnica

Fig. 214 (top): Fort Kosmač - rehabilitated - Western facade
(Orange line between the existing and reconstructed part)
Credits: Ivan Vratnica

Fig. 215: Fort Kosmač - rehabilitated - Eastern facade
Credits: Ivan Vratnica

Fig. 216 (top): Fort Kosmač - rehabilitated - Southern facade
(Orange line between the existing and reconstructed part)
Credits: Ivan Vratnica

Fig. 217: Fort Kosmač - rehabilitated - Northern facade
Credits: Ivan Vratnica

Fig. 218: Fort Kosmač - rehabilitated - 3D Section
Credits: Ivan Vratnica

Fig. 219: Fort Kosmač - rehabilitated - Lighting at night
Credits: Ivan Vratnica

Fig. 220: Western Facade-section 3-3
Credits: Ivan Vratnica

Fig. 221: Fort Kosmač - rehabilitated - Section 2-2 (Northern wing)
Credits: Ivan Vratnica

Fig. 222: Fort Kosmač - rehabilitated - Ground Floor
Credits: Ivan Vratnica

Fig. 223: Main hall - Presentation disposition
Credits: Ivan Vratnica

Fig. 224: Fort Kosmač - rehabilitated - First floor - hostel and museum
Credits: Ivan Vratnica

Fig. 225: Entrance, Stairway, - Hostel sitting room
Credits: Ivan Vratnica

Fig. 225: Entrance, Stairway, Hostel sitting room
Credits: Ivan Vratnica

Fig. 226: Floor detail in the northern wing
Credits: Ivan Vratnica

Fig. 227: Main hall Gallery to Museum
Credits: Ivan Vratnica

Fig. 228: Main hall gallery detail
Credits: Ivan Vratnica

Fig. 229: Fort Kosmač - rehabilitated
Section 1-1
Credits: Ivan Vratnica

Fig. 230: Reconstructed main stairway
Visualization
Credits: Ivan Vratnica

Fig. 231: Fort Kosmač - rehabilitated
Second floor (cannon terrace) plan - different dispositions (Workshops and Exhibition)
Credits: Ivan Vratnica

Fig. 232: Fort Kosmač - rehabilitated
Second floor (cannon terrace) plan - different dispositions (Seminars and Theater stage)
Credits: Ivan Vratnica

Fig. 233: Fort Kosmač - rehabilitated - Attic (technical)
Credits: Ivan Vratnica

Fig. 234: Roof detail
Credits: Ivan Vratnica

Fig. 235: Cannon terrace - multipurpose hall
Credits: Ivan Vratnica

LIST OF REFERENCES

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9) - "Uprisings in South Dalmatia in years 1869/70 and 1881/82" - Captain of the 27th Jägerbataillon Hugo von Czechka

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11), 25) - Local source

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42) - "Feasibility study for cultural monument Fort Kosmač" 2005 - Lidija Ljesar

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"Raports Plan Fort Kosmač" 1902 Krigsarchiv Wien - AT-OeStA/KA KPS GPA Inland C III Budua

Krigsarchiv Wien (KA Wien) - War Archive in Vienna

Archive in Kotor

"Typische Baukonstruktionen von 1860 bis 1960" zur Beurteilung der vorhandenen Bausubstanz" 2009 - Band 1-3 - Rudolf Ahnert, Karl Heinz Krause

"Baudeteils Hochbau" 2017 - Prof. Dr.-Ing. Rudolf Lückmann

"Baudeteils Hochbau-Atlas" 2007 - Prof. Dr.-Ing. Rudolf Lückmann

LIST OF INTERVIEWS

Interview with Branko Ivančević - elder resident of Uglješići village

Interview with Dragan Ivančević - vice-president of the Budva municipality(2018), originally from Uglješići

Interview with Radojica Pavićević - Author of “Werk 2: Austro-Hungarian Fortresses in Montenegro”, retired officer of YNA

Interview with Pedja Martinović - resident of Brajići village, owner of tavern “Kosmač” at the village Brajići

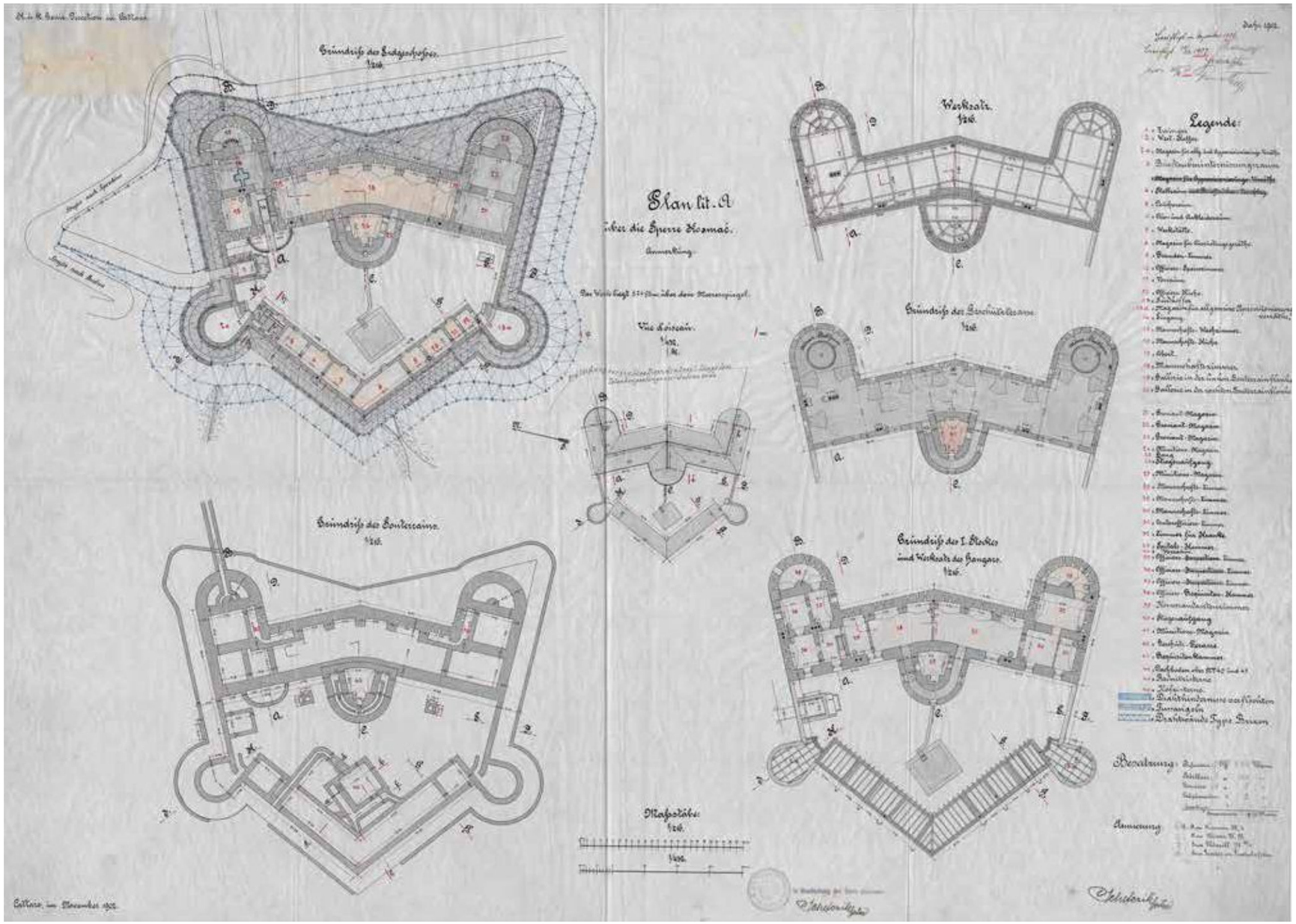
Interview with Joko Jovičić - elder resident of Brajići village

Interview with Savo Martinović - resident of Brajići village, author of the Monography of Brajići

Interview with Prof. Ilija Lalošević - Professor at University of Montenegro, Faculty of Architecture, Director of the former “Regional Institute for the protection of Cultural Monuments” in Kotor

Interview with Aleksandra Kapetanović - NGO Expeditio, Kotor

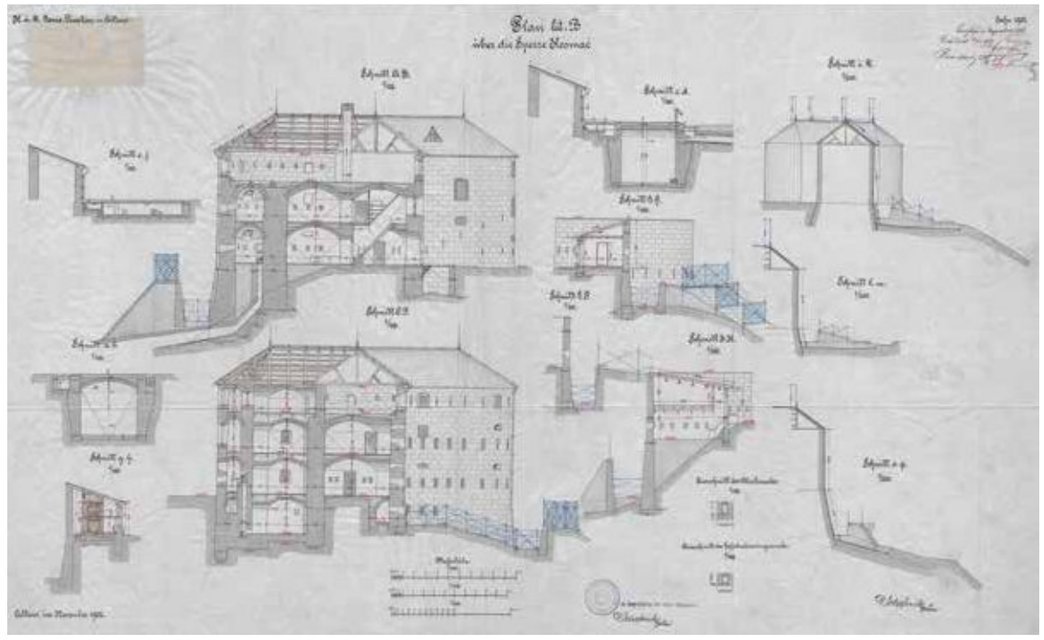
APPENDIX

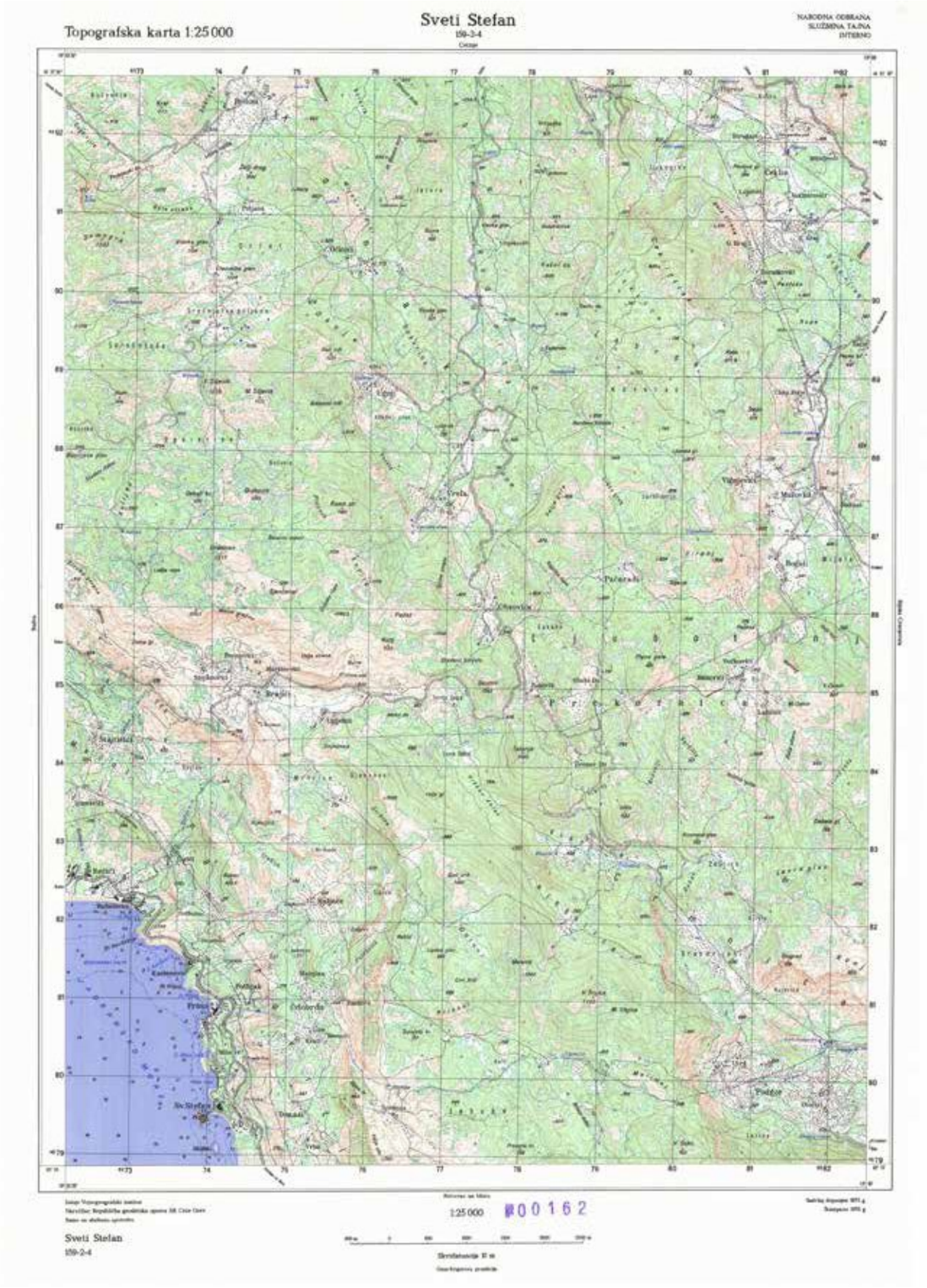


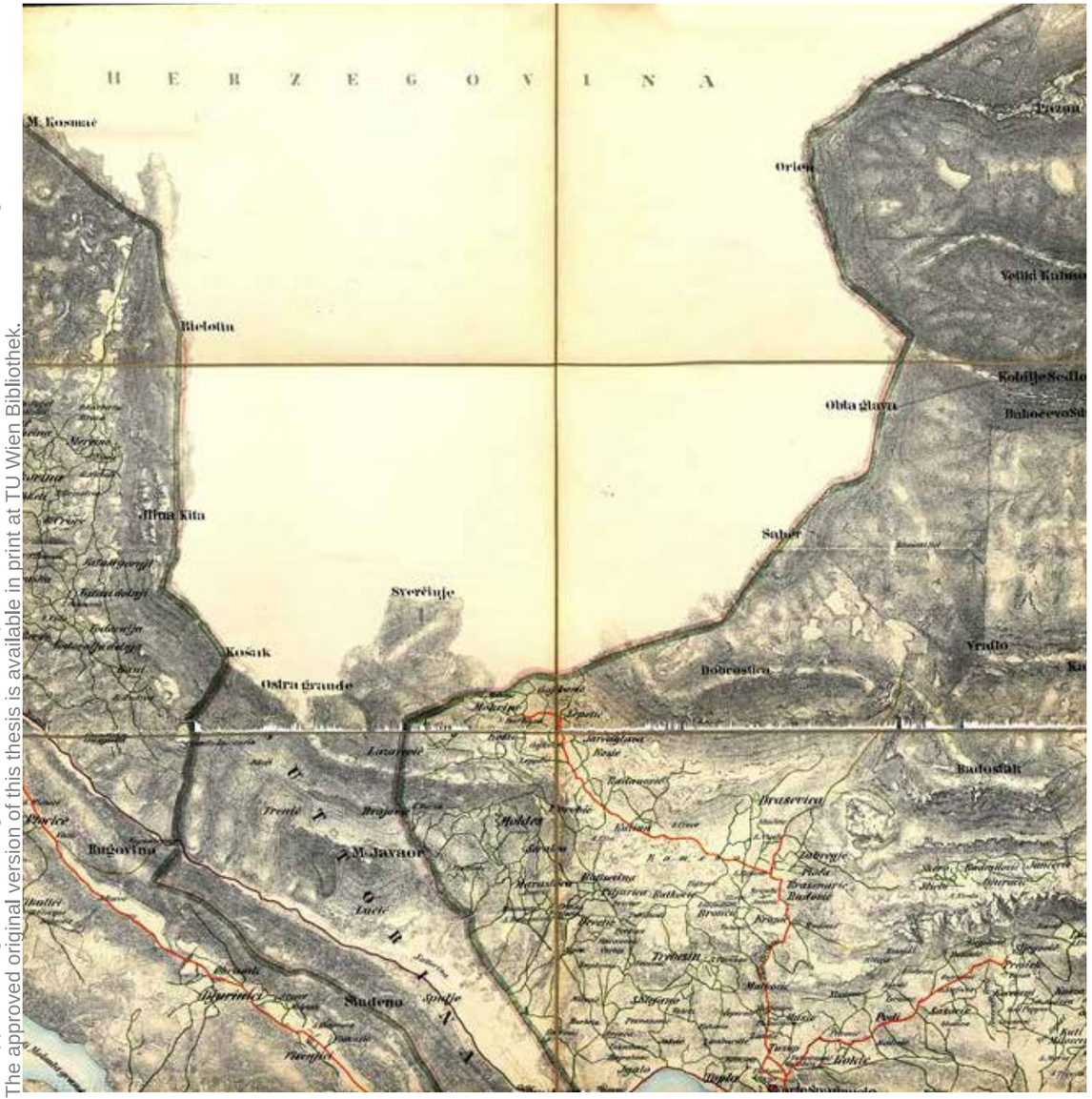
Fort Kosmač - Rapports Plan, 1902
Floor Plans
Credits: Krigsarhiv Wien (KA Wien)
AT-OeStA/KA KPS GPA Inland C III Budua

Right - Millitary Topographic map St. Stefan, 1972
Credits: Military Geographical Institute of Yugoslavia

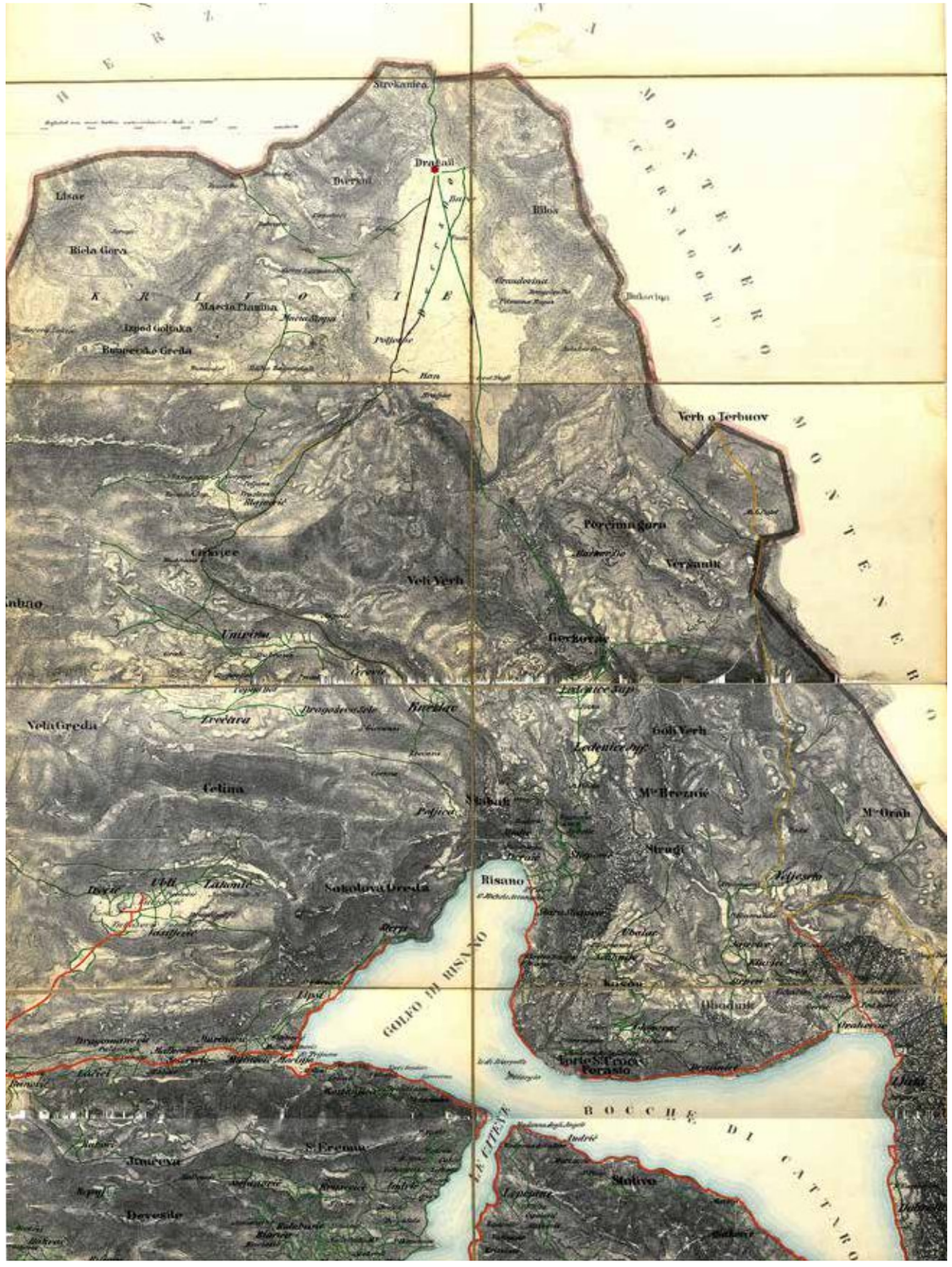
Fort Kosmač - Rapports Plan, 1902
Sections
Credits: Krigsarhiv Wien (KA Wien)
AT-OeStA/KA KPS GPA Inland C III Budua



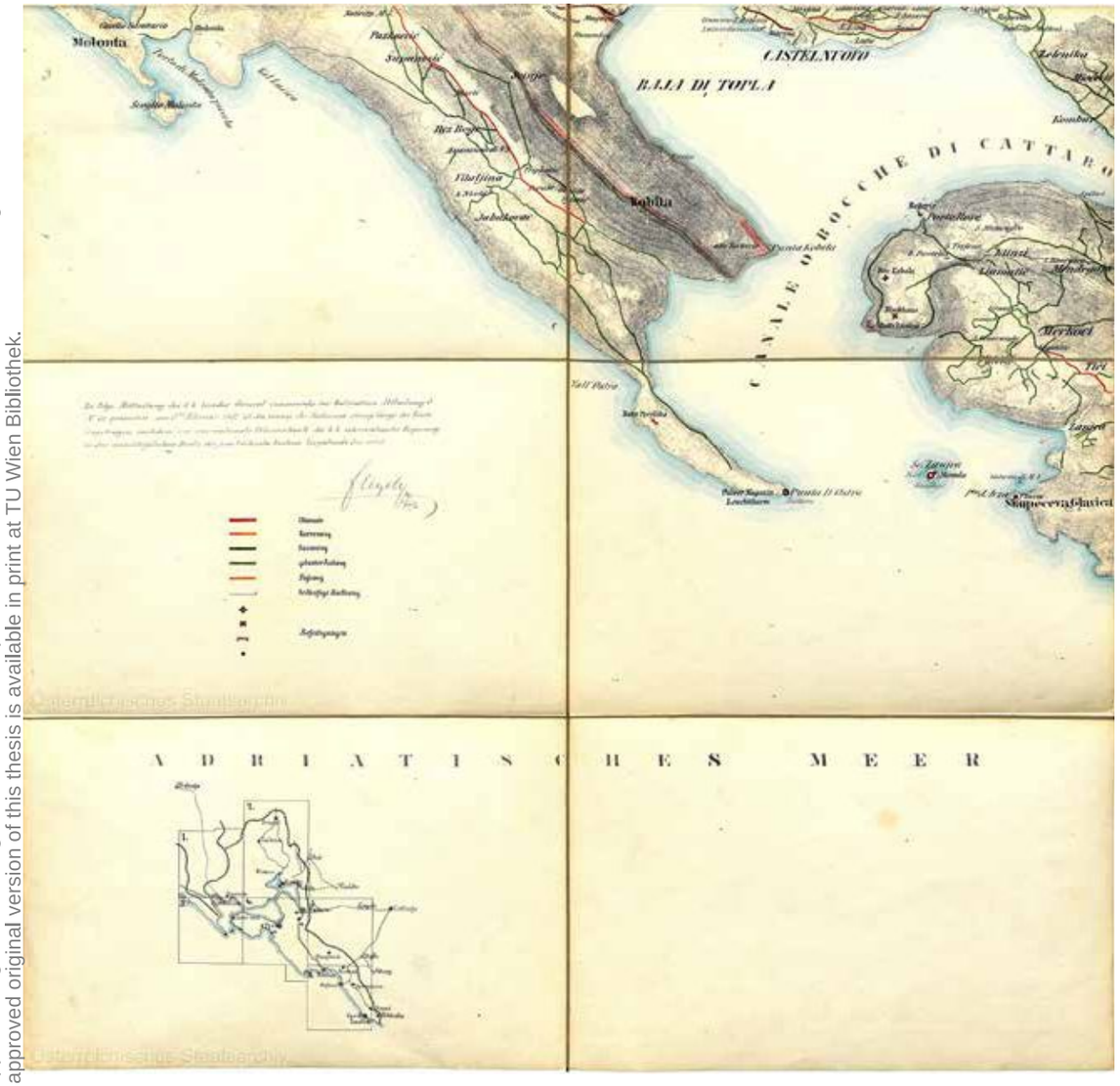




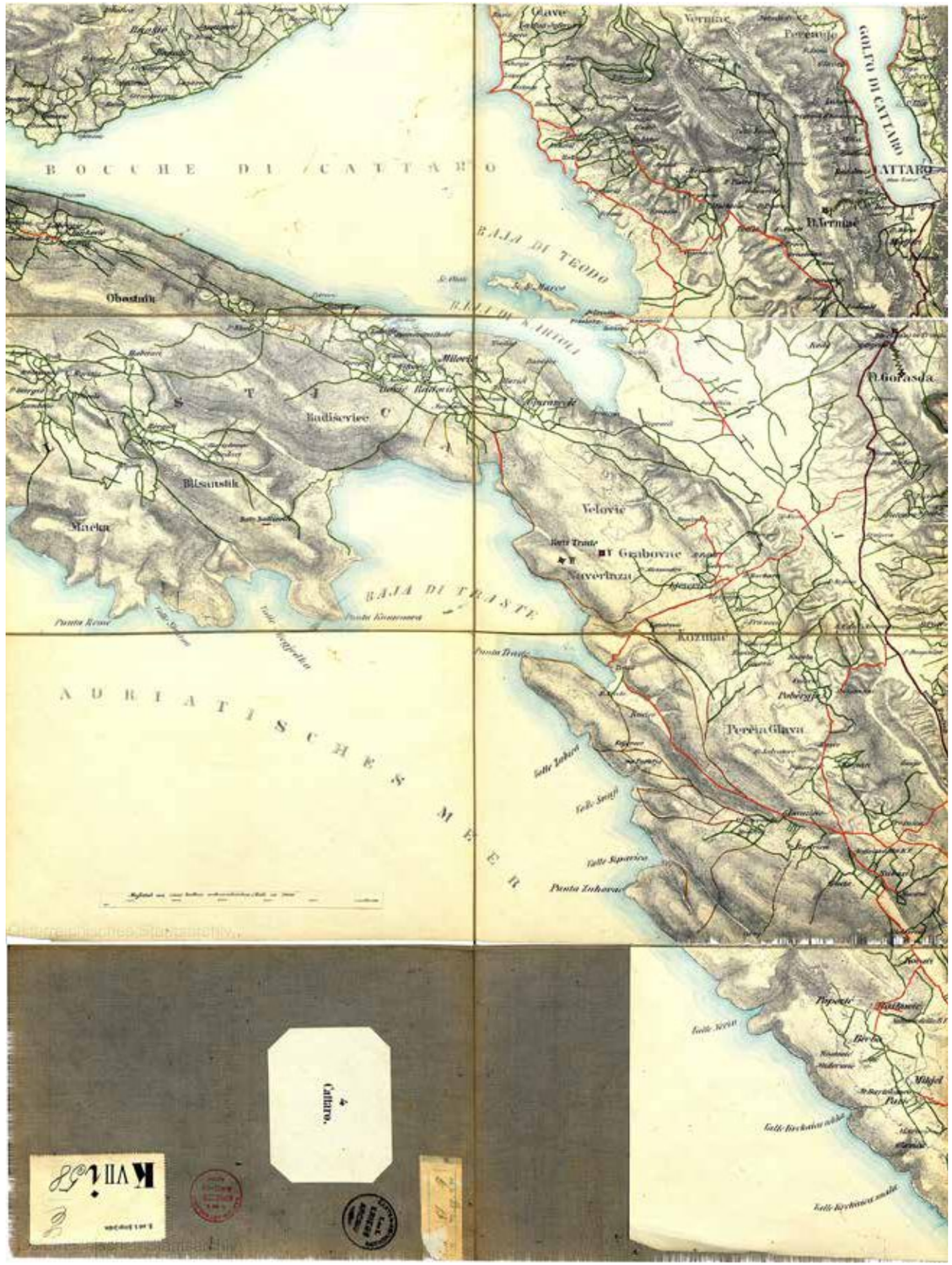
4. Cattaro, 1862 - map
Section of Herceg Novi
Credits: Krigsarhiv Wien (KA Wien)



4. Cattaro, 1862 - map
Section Bey of Kotor
Credits: Krigsarhiv Wien (KA Wien)



4. Cattaro, 1862 - map
Section Entrance to the Boka bey
Credits: Krigsarhiv Wien (KA Wien)



4. Cattaro 1862 - map
Section Bey Traste and Tivat
Credits: Krigsarhiv Wien (KA Wien)

4. Cattaro 1862 - map
Section with Fort Stanjevic
Credits: Krigsarhiv Wien (KA Wien)

4. Cattaro 1862 - map
Section Bay of Budva
Credits: Krigsarhiv Wien (KA Wien)

Extended defensive area of Budva, 1903
Credits: KA Wien

Top - panoramic photo from mount Spas
Budva around, 1860
Credits: KA WIen

Bottom - panoramic photo from
mount Spas, Budva around 1880
Credits: KA Wien

Fort Kosmač 1964
(Southern side of the courtyard wall)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties

Engravings made by the soldiers along the serpentine approach road 1964 (The writings were still readable.
author: Oberst B. Wolf)
Author: M. Petrović
Credits: Administration for the Protection of Cultural Properties