



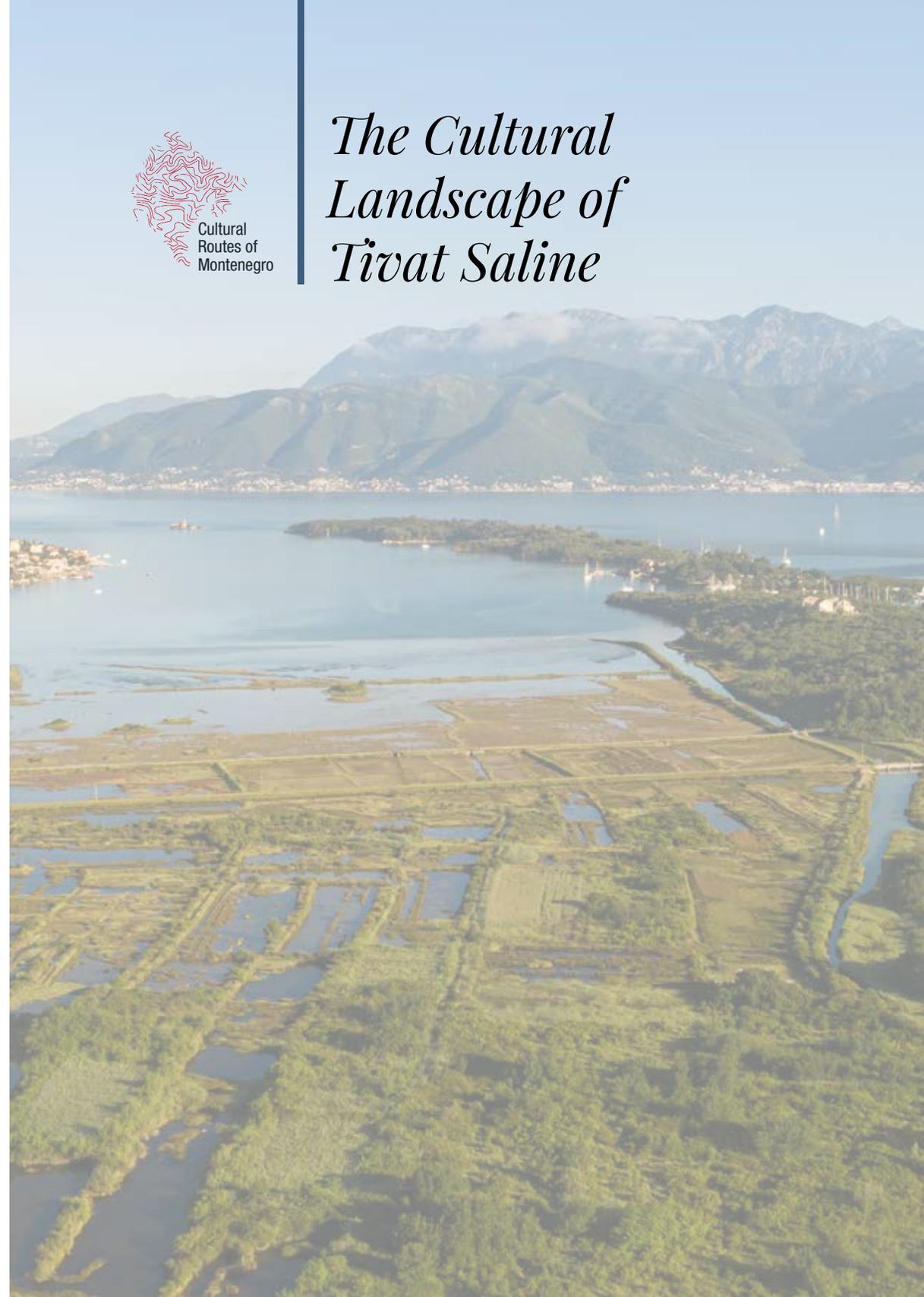
The Cultural Landscape of Tivat Saline





Cultural
Routes of
Montenegro

The Cultural Landscape of Tivat Saline



The Cultural Landscape of Tivat Saline

Publisher: Expeditio

Authors: Aleksandra Kapetanović, Milena Vrzić

Contributor: Tatjana Rajić

Translated by: Anela Dedić, MA

Photographs: Expeditio, Dalibor Ševaljević, Miloš Mitkić

Cover photograph: Dalibor Ševaljević

Design: Expeditio

Prepress: Nataša Ilić

Printing: Biro Konto, Igalo

Print run: 500

Kotor, 2024.

The publication of this book was supported through the project titled “Tivat Saline - Presentation of an Outstanding Cultural Landscape,” financed by the Tourist Organization of the Municipality of Tivat, through the Public Call for participation in the allocation of funds for the selection of a project for the valorization of cultural heritage related to archaeological research, conservation and restoration works, reconstruction, and promotion of cultural assets in the Municipality of Tivat.



The basis for preparing this book was the “Study on the Protection of Cultural Heritage in the Special Reserve Tivat Saline,” created by Expeditio architects Ltd. in 2017, commissioned by the Public Enterprise for Coastal Zone Management of Montenegro.

We owe our gratitude to everyone who assisted us in the creation of the “Study on the Protection of Cultural Heritage in the Special Reserve Tivat Saline” and this book.

CONTENTS

Foreword	5
Salt Pans as Mediterranean Heritage	6
Tivat Saline - Saline	8
Geographical Framework and Natural Characteristics	9
The Saline - Exploitation of Salt and Clay through History	12
The Saline in Historical Sources	12
Salt Marsh, a Natural Resource in Prehistory and Antiquity	13
The Saline in the Middle Ages (7th to 15th century)	16
The Saline under the Ottoman Empire from the 15th to the 18th Century	20
The Saline During the Venetian Republic, 18th Century	22
The Saline From the Late 18th to the First Half of the 20th Century	24
First Bay of Kotor Clay Industry in Krtoli	26
Attempt to Revive the Saltworks in the Second Half of the 20th Century	28
Layers of the Cultural Landscape of the Saline	30
Natural Context	31
Archaeological Heritage	32
Old Medieval Saltworks	33
Concept and Structure of the Saltworks	34
Remnants of the Old Saltworks	38
Road Network	39
New Saltworks from the Second Half of the 20th Century	40
Organization of the Saltworks and Production Process	42
Reservoir Embankment	47
The First Group of Concentration Basins	48
The Fourth Evaporation Basins and Reservoirs	49
Crystallization Basins	50
Operating building and pump station	51
Elements of the First Bay of Kotor Clay Industry Krtole	54
Elements of Traditional Architecture in the Contact Zone	55
The Saline as Natural and Cultural Heritage	56
Natural Values	56
Cultural Heritage	58
Map of the Saline	61
Literature and Sources	62
Photographs, Maps, and Illustrations	65

FOREWORD

The book “The Cultural Landscape of Tivat Saline” was created as part of the project titled “TIVAT SALINE – Presentation of an Exceptional Cultural Landscape,” supported by the Tourism Organization of the Municipality of Tivat with funds secured through a public tender in 2023. The idea for this project arose from the recognized need to better inform the local community and visitors about the characteristics and values of the outstanding site of Tivat Saline, which is protected as a special nature reserve due to its natural values, but also possesses significant cultural and historical values and represents an important segment of the cultural heritage of the Bay of Kotor.

The foundation for writing the book was the “Study on the Protection of Cultural Heritage in the Special Reserve of Tivat Saline,” created by Expeditio architects Ltd. in 2017, commissioned by the Public Enterprise for Coastal Zone Management of Montenegro. The Study identified the main elements and values of the cultural heritage of Tivat Saline and provided guidelines for protecting this site as a special type of cultural asset – a cultural landscape, which represents a combined work of nature and of man.

This book presents the results of research conducted during the preparation of the study, and additionally, through the process of preparing the book itself, based on available materials. Certainly, more detailed

research is necessary in the future, including, among other things, detailed recordings of segments of the old medieval saltworks as well as archaeological and architectural research. All of this would surely contribute to a better understanding and appreciation of this complex and significant area, which we sincerely hope for. This book is one step towards highlighting the values and significance of the Saline and its promotion.

The book “The Cultural Landscape of Tivat Saline” is intended for the general public, local residents, and visitors, for all who wish to deepen their knowledge of cultural heritage or become acquainted with it. We are confident that this book will contribute to the promotion and presentation of Tivat Saline and enable everyone to gain a better understanding of the history and development, as well as the values and significance, of the cultural landscape of this unique site.

The Expeditio Team

May 2024

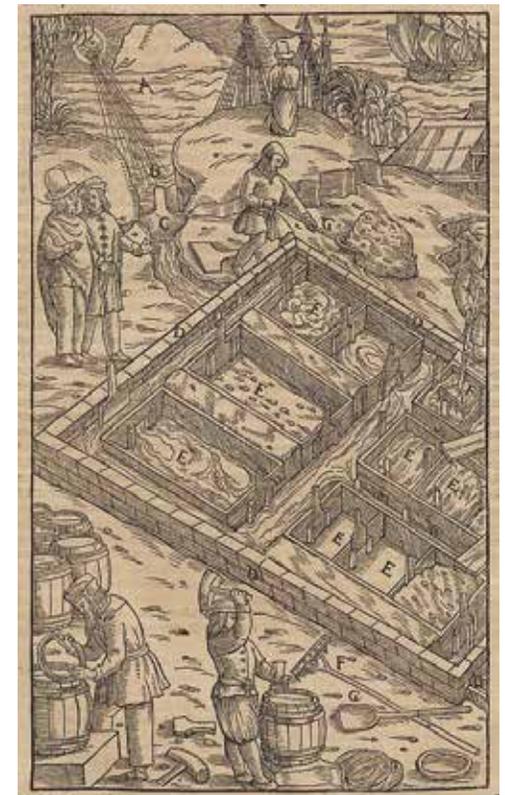
SALT PANS AS MEDITERRANEAN HERITAGE

Salt is a mineral essential for human life and has been vital to humanity since its inception. It is necessary for the proper functioning of the body and for preserving food. Salting meat and fish is one of the oldest methods of food preservation, allowing human communities to store food for extended periods. Salt is also crucial for livestock feed. Given all this, salt played a key role in the development of human civilization, enabling the transition from a nomadic hunter-gatherer lifestyle to a more stable agricultural and sedentary one.

Salt was extracted from salt mines or obtained from saline springs and seawater. In the Mediterranean, salt naturally crystallized and deposited in shallow bays, lagoons, and salt marshes. Later, humans constructed embankments to create pools and expedite the salt production process.

The principle of obtaining salt from seawater in salt pans is straightforward. Seawater in shallow enclosed pools evaporates under the influence of sunlight and wind, gradually concentrating until it becomes saturated, meaning the salt can no longer remain dissolved and crystallizes, settling at the bottom of the basins. Experience showed that the salt was of better quality if the movement of saline water through a series of connected basins was controlled, ending in the final basin where the salt crystallized and was then harvested. For this reason, Mediterranean salt pans are a system of flat, wide, and shallow

basins separated by embankments, through which seawater is gradually introduced during the warm months, resulting in the production of precious salt.



△ Salt production process in sea salt pans, engraving from 1556 (Georgius Agricola, *De re metallica*)

In the Mediterranean, sea salt pans were intensively used. Given the importance of salt for human and livestock life, it held great economic value. Salt production and trade were significant industries, with power concentrated in the hands of those who controlled these processes. The method of producing salt in sea salt pans and their importance remained unchanged until the 20th century when new preservation methods reduced the use of salt.

At the beginning of the 21st century, out of a total of 168 salt pans in 18 Mediterranean countries, 64 are inactive, 11 have been transformed into fish farms and brine shrimp farms, while 90 salt pans are still operational. More than 80% of active salt pans in the Mediterranean enjoy some form of protection. In addition to national protection, many salt pans are listed as Wetlands of International Importance under the Ramsar Convention on Wetlands, particularly as bird habitats. (Protection Decision for Tivat Saline)

Although the construction of salt pans in wetland areas changes the natural landscape, the impact of these construction interventions on the environment is minimal or even positive. The development and operation of salt pans rely on the natural dynamics of existing wetland areas, tidal cycles, and seasonal flooding-drying processes. Thus, salt pans are an example of sustainable exploitation of natural resources and simultaneously represent ecosystems of great richness.

Moreover, sea salt pans reflect a specific way of utilizing natural resources for the important activity of salt production, influenced by various historical and social currents. Through this process, a unique cultural landscape has been formed, representing a significant segment of our cultural heritage.

“The view provided by salt pans is only partially visible from the outside. Their construction is simple, symmetrical, archaic, and has not changed much over the centuries: a flat coastal area where the sea enters easily and remains calm, enclosed by embankments and dams, crisscrossed by inlets and outlets, forming a salty field. On this field, there are no plows or scythes. Different tools are used: toothless rakes, buckets, pumps, scoops, and shovels, tarpaulins covering white heaps, wheelbarrows transporting them, wooden sandals protecting the feet. The sun provides energy, the wind is the driver, and the raw material is the sea.”

(Predrag Matvejević, Mediteranski brevijar)

TIVAT SALINE - SALINE



Tivat Saline, or simply Saline as it is also known, is a site in the Bay of Kotor that stands out for its origin, natural and morphological characteristics, and cultural-historical heritage, making it a unique bay in the Mediterranean. Saline is a natural area of salt marshes within this complex bay. Over various historical periods, this area was used for the exploitation of clay and, especially, salt.

production here as far back as prehistoric or ancient times. Numerous historical records and preserved elements of architectural heritage testify to the existence of a very significant medieval saltworks that operated until the end of the 17th century, the use of the area for the clay industry in the first half of the 20th century, and attempts to revive the saltworks in the second half of the 20th century.

Today, Saline is protected as a special nature reserve primarily due to its ornithological significance, being one of the key points on the Adriatic migratory corridor for birds. The natural values of Saline are recognized internationally, and it is particularly significant that Saline is listed as a wetland of international importance according to the Ramsar Convention.

Saline, which was formed through centuries of utilizing the specific space of salt marshes, represents a characteristic example of a cultural landscape. Saline is one of the most significant elements of the protected area of the Natural and Culturo-Historical Region of Kotor, which is listed as a UNESCO World Heritage Site due to its outstanding universal value. This value is primarily reflected in the harmonious relationship between the built heritage and the natural environment. Saline illustrates what we call a cultural landscape – “the combined works of nature and of man” – in the best possible way.

In addition to its natural values, Saline holds significant cultural-historical values. The area’s exceptional location and characteristics hint at possible salt

GEOGRAPHICAL FRAMEWORK AND NATURAL CHARACTERISTICS

Basic Information:

Country: Montenegro

Region: Bay of Kotor

Administrative Unit: Municipality of Tivat

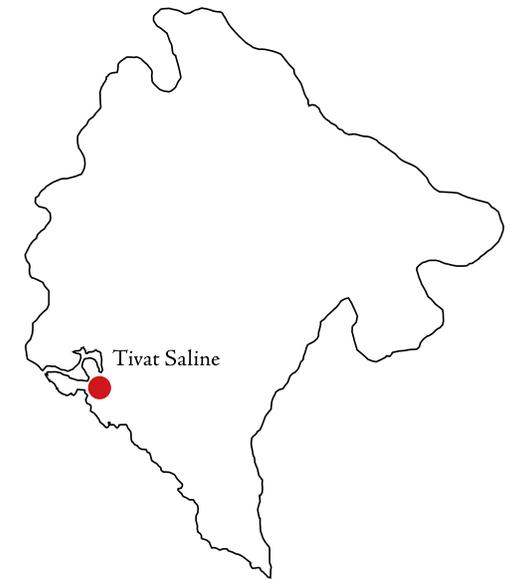
Cadastre Unit: Cadastre Office Đuraševići (Krtoli)

Geographic Coordinates:

42°23'36.59"N

18°42'54.56"E

Area: 150 hectares



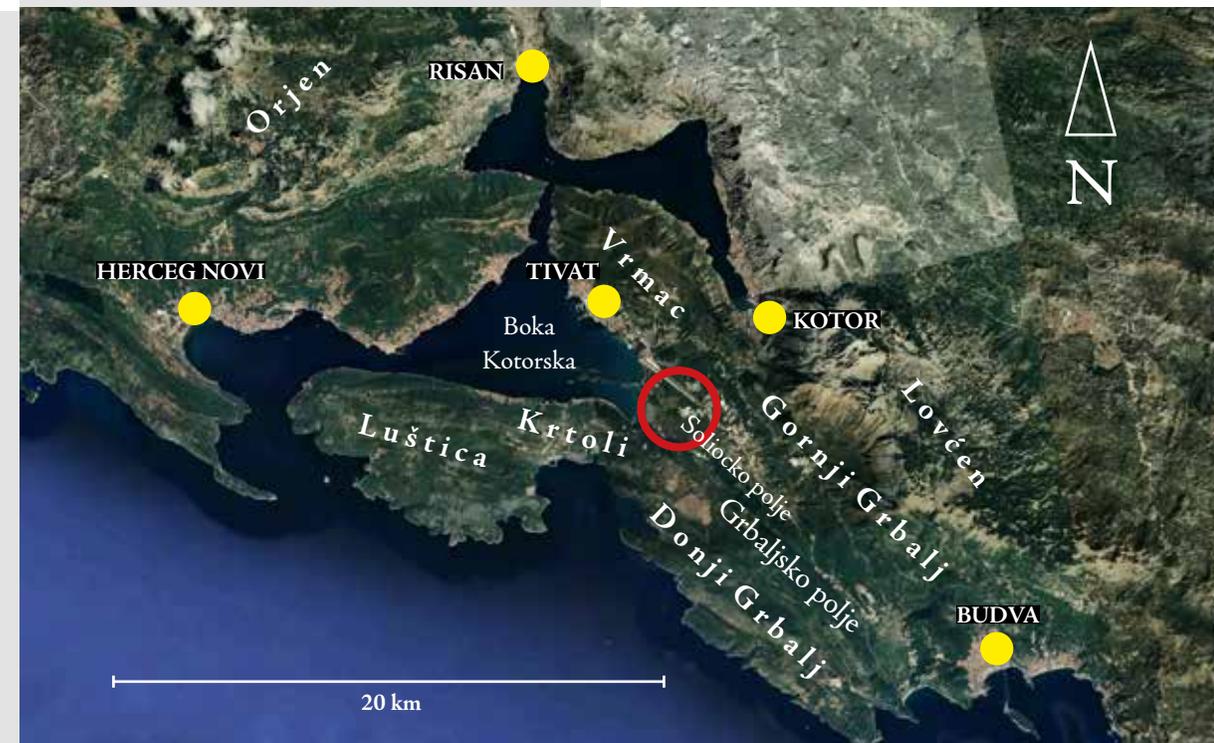
▽ The position of the Saline

△ Map of Montenegro with the location Saline marked

Saline is an area “in which the centuries-old symbiosis of natural heritage and human activity is contained in one of the most complex forms. It is precisely this symbiosis that has created in the area of Saline one of the most beautiful preserved examples of cultural landscape on the eastern coast of the Adriatic Sea.” (Zorica Čubrović, *Tivatska Solila: proučavanje i valorizacija*)



△ Saline



The salt marsh of Saline is located within the municipality of Tivat in the Bay of Kotor, a region and bay in the northwest of the Montenegrin coastline.

Nestled between the mountainous massifs of Lovćen and Orjen, the Bay of Kotor consists of smaller bays: Topal-Herceg Novi, Tivat, and Kotor-Risan bays. The Tivat Bay, bordered by peninsulas (Vrmac, Luštica with Krtoli), is dominated by a series of islands - Školj or Otok od Milosti, Sveti Marko, and the peninsula of Prevlaka. This smaller archipelago and the hills on the mainland divide the Tivat Bay into two bays, Kalardovo or Polje Bay and Krtoli Bay, beyond which lies Soliocko Polje, the field, and the area of Grbalj. In the Krtoli Bay (Krtoli is also referred to as Krtole in historical sources), where the sea penetrates deeper into the land, lie the saline marsh and the medieval saltworks, Saline.

Soliocko Polje (Saline field) forms the northwestern part of Grbaljsko Polje, which extends below the slopes of the Lovćen mountain massif (1749 m) on one side and the Donji Grbalj area on the other side. It is oriented in the southeast-northwest direction, which corresponds to the main direction of the Dinarides. Soliocko Polje got its name from the salt marsh used for salt exploitation, where salt pans were once

located. The field is surrounded by the slopes of limestone hills and mountains, from which numerous streams and rivers descend. Over time, these transported and accumulated material, forming impermeable flysch and alluvial sediments in the field. These processes created a floodplain ideal for building a salt pan. Research conducted in the late 1950s for the project to restore the salt pan confirmed that the surface and deep layers of the Saline area consist of dense, compact clay and loam with little sand, making the terrain highly impermeable to water.

The watercourses passing through Soliocko Polje are torrential in their upper hilly zones, while in the lower part, in the field, they spread into numerous branches and channels constructed for water regulation purposes. The main watercourses in the Saline area are the Koložunj and the Odoljenštica rivers, also known as the Široka Rijeka (Wide River).

The Koložunj river, which is also referred to as Koložun in written sources, originates on the slopes of Lovćen at an altitude of about 1000 meters. It flows into the field, running its entire length from the southeast direction, and branches into several channels. It partially

▽ *View from the slopes of Lovćen towards the Tivat part of the Bay of Kotor with Soliocko Polje and the Saline*

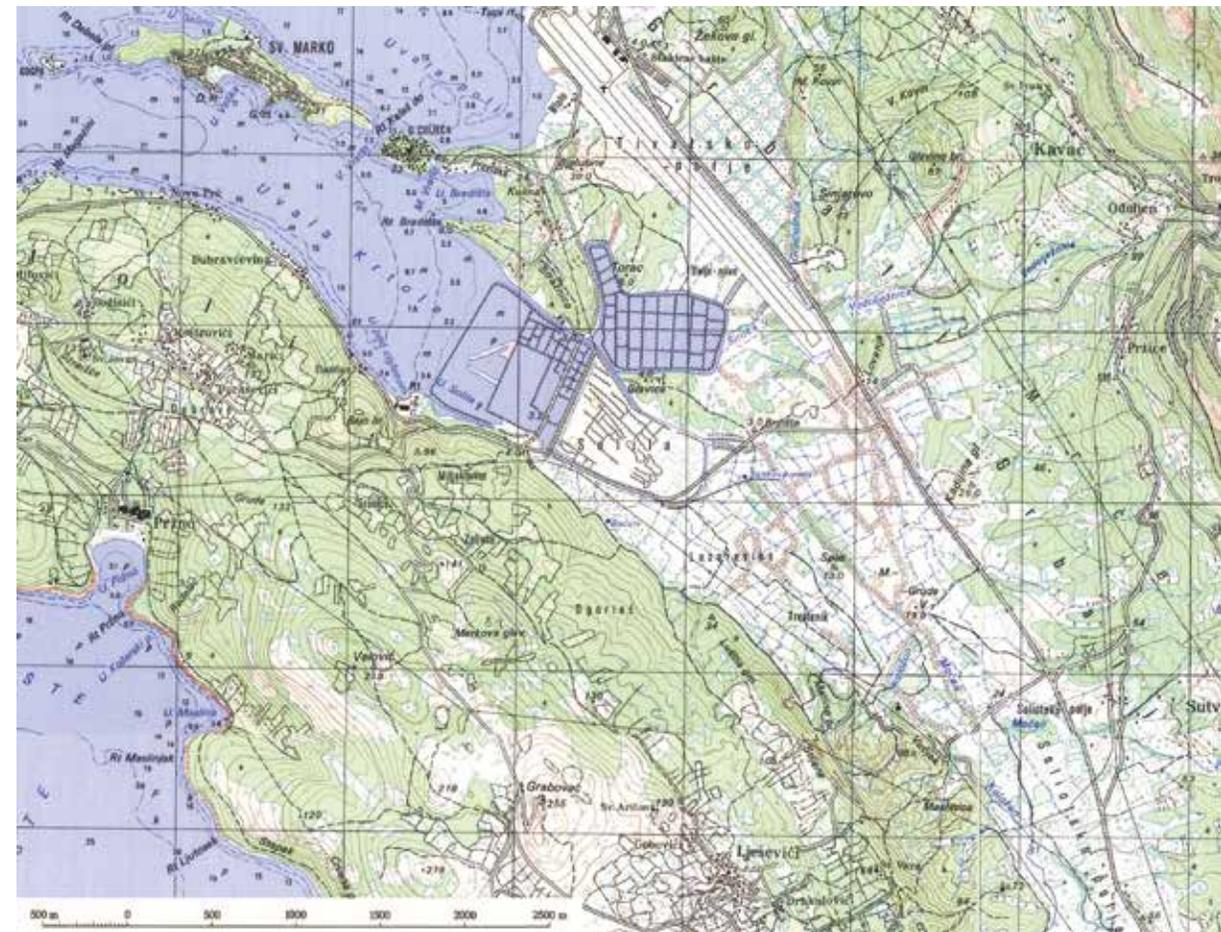


flows into the Široka Rijeka and partially directly into the sea.

The Odoljenštica river springs above a place called Odoljen near the Trojica Pass, between Vrmac and the slopes of Lovćen, at about 150 meters above sea level. In its lower course, in the field, it receives part of the flows from Gradiošnica from the northwest and part of the flows from Koložunj from the southeast, forming a wider riverbed. For this reason, this part is called **Široka Rijeka (Wide River)**, which flowed between the elevations of Gomilica and Stražnica and then emptied into the Krtoli Bay. The river was navigable from its mouth to a place called Brod, somewhere along

the stretch beyond these elevations. The course of the Široka Rijeka was completely altered in the second half of the 20th century during the construction of the airport, the main road, and the new salt pans, so its current route does not correspond to the original one. The lower part of Soliocko Polje is intersected by smaller **elevations** rising from the alluvial plain. In the southeast-northwest direction, they line up as **Gomilica** (4 m) and **Stražnica** (29 m), which is connected to the Brdišta cape. Gomilica is an elongated hill with two prominent elevations, Kulina towards Grbalj and Glavica towards Krtoli Bay. Glavica, i.e., Glavice, is the earlier name of the elevation that is preserved today in the name of the northwestern peak.

▽ *The Saline on the topographic map from 1973*



SCOPE AND BOUNDARIES OF THE SALINE

The Saline is located at the end of Soliocko Polje and encompass the area between the lower reaches of the Odoljenštica and Koločunj rivers, including the area of Jankova Voda in Grbalj.

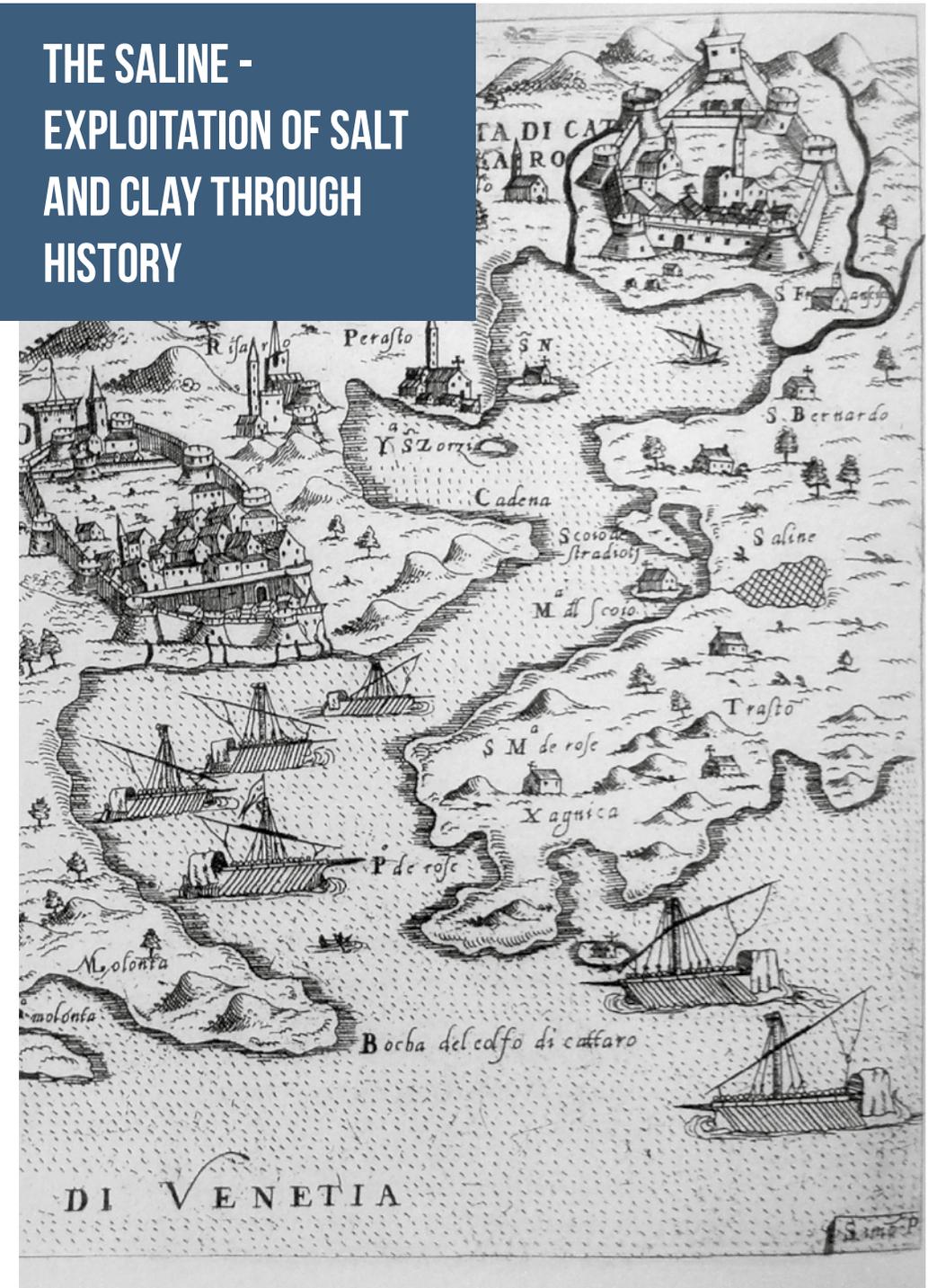
The Saline zone, which is protected as the "Tivat Saline" Special Nature Reserve, consists of the central part of the historical salt pans and the smaller Počecišta area. The central part, which includes the remains of the old medieval saltworks and the 20th-century saltworks, extends in a northwest-southeast direction, approximately 1600 meters in length and 420-850 meters in width (about 700 meters in the area of the road/main embankment crossing the Saline). The Saline

zone is bounded on the south by one of the branches of the Koločunj river that flows directly into the sea, alongside which lies the route of the old pedestrian path and now the new main road. On the northern side, the area is bounded by the altered course of the Široka Rijeka and the elevations of Stražnica and Gomilica. The Počecišta zone, also referred to in sources as Pocečište or Poceriste, is located to the north of the altered course of the Široka Rijeka, between and behind the elevations of Gomilica and Stražnica. This area covers about 450 meters in width and approximately 750 meters in length.

▽ Map with marked boundaries of the "Tivat Saline" Special Nature Reserve



THE SALINE - EXPLOITATION OF SALT AND CLAY THROUGH HISTORY



THE SALINE IN HISTORICAL SOURCES

The area known today as “Tivat Saline” or “Saline,” has been referred to by various names over time. These names often reflect geographic interpretations, different administrations, or the ownership of the salt pans.

In medieval sources, the Latin or Italian term *saline* was used to refer both to **the saltworks, the place where salt was produced,** and to **saline, the salt pans.** Thus, the Slavic toponym “Solila” (Saline) would indicate the place where the salt pans or salt pits were located.

As far as it is known, the Saline is first mentioned in the books of Kotor notaries from the 14th century, written in Latin, referring to a place where salt was collected. The term *salinis* appears in a document from 1333, and *salinas* in Teudo in a document from 1337.

Descriptions of events from the late 14th century mention the salt pans of Kotor. At the beginning of the 15th century, Balša III Balšić referred to “salt pans,” and Stefan Crnojević called them his (pans). Crnojević’s or the despot’s salt pans are noted in Turkish defters from the 16th and 17th centuries. During the Turkish rule in the Grbalj area, the salt pans were referred to as “salt fields in Grbalj” or “Grbalj salt pans,” and the salt from these salt pans was known as salt from Sutorina and Grbalj or as Turkish salt. Italian cartographers

first marked the salt pans as a **toponym, “Saline,”** on maps and engravings created during the Venetian Republic’s rule.

In 1665, the Swiss engraver M. Merian wrote the Saline in German *Salts Pfannen* on a map. On Austro-Hungarian maps from the first half of the 19th century, the Slavic toponym “Solila” appeared for the first time, along with more detailed depictions and names of geographic features. The names *Ravna Solila* (Flat Saline) or *Careva Solila* (Emperor’s Saline) are mentioned in folk songs, often recorded in the 19th century.

Since the second half of the 20th century, given that the Saline administratively belongs to the municipality of Tivat, the name “Tivat Saline” or simply “Saline” has been commonly used.

SALT MARSH, A NATURAL RESOURCE IN PREHISTORY AND ANTIQUITY

On the peaks and slopes of the mountain massifs rising above the Bay of Kotor, numerous caves have served as safe havens for humans since ancient times. Some of these, such as Vranjaj above Herceg Novi, Brštanica above Risan, and Spila and Tamnica above Perast, were permanent or occasional human habitats from the Neolithic, Eneolithic, and Bronze Age. Near these caves, there was mountainous hinterland suitable for livestock grazing and hunting, as well as coastal areas ideal for fishing and salt gathering. In the continental parts of the Balkans and Europe, salt was known to be produced by heating water during the Neolithic, Eneolithic, and Bronze Age, whereas in the warmer regions of the Adriatic (including the Bay of Kotor), salt was found on rocks or in marshy areas. Cultivation of grains, livestock breeding, hunting, and fishing were the primary activities of prehistoric communities living in the immediate hinterland of the bay, as well as those in later epochs tied to the coastal areas. Besides being used for human and livestock consumption, salt was crucial for making and preserving cheese, meat, and fish, as well as for tanning leather. By using salt, these communities ensured their survival and a more secure future, and the knowledge of salt application accelerated its use as a trade commodity with hinterland communities.

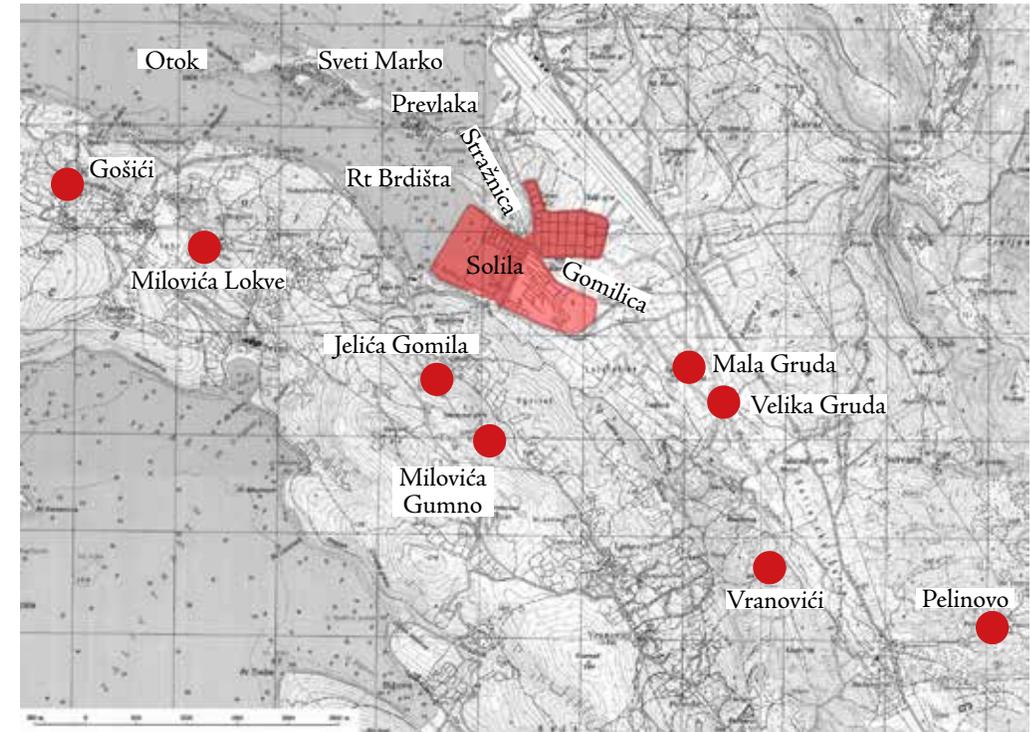
The salt marsh was a source of salt and clay, which was used for human hygiene and healing, thus it was not surprising that it was attributed with magical properties. On a spiritual level, the symbolic significance of the salt marsh in the Tivat Bay, as a natural purifier of rivers, was transferred to the field behind it. **The community of the Early Bronze Age** could only place the tumuli Mala Gruda and Velika Gruda (3000-2500 BCE) on sacred ground (the field), located in Soliocko Polje, in close proximity to the Saline. In the graves (stone cists) under the earthen mounds, members of the tribal aristocracy were buried, the chieftain and progenitor of the prehistoric community in Mala Gruda and his son in the primary grave at Velika Gruda. The rich grave goods, including a diadem (golden hoops likely connected by a ribbon and found near the head of the deceased), weapons (an electrum axe, blades, or knives), and ceramic vessels, testify to the highest social rank of the deceased. The burial method and the above-ground grave marking, the tumulus, represent the first recorded grave form in the region, which would become dominant during the Bronze and Iron Ages until the arrival of the Romans. Indigenous communities adopted new steppe influences from the east that reached the Adriatic coast. The appearance of princely tumuli in the region of northern Albania, Montenegro, and eastern Herzegovina is considered an important cultural change, positioning this area as the initial region for the development of the Bronze Age.

Unlike Mala Gruda, the tumulus Velika Gruda was used multiple times as a burial site. Members of the developed Bronze Age and subsequently the Iron Age communities, who lived in this area from approximately 1500 to 500 BCE (not continuously), were buried there. Unique rock drawings in Lipci (Kotor-Risan Bay) are associated with this period, depicting hunters with running deer and swastikas. At the beginning of the last millennium BCE, the differentiation of tribal communities occurred, which historical sources refer to as **Illyrians in the context of the Iron Age**. From the tip of the Luštica Peninsula, through Krtoli and Donji Grbalj, and from the tip of the Luštica Peninsula and Gornji Grbalj, smaller or larger necropolises of stone tumuli can be found. According to current research, burials took place here and life continued on the hillforts until the establishment of Roman rule and the founding of the Roman province of Dalmatia.

According to archaeological findings from the Iron Age in the northern Adriatic, where seawater, or salty brine, was heated in special containers to extract salt, crystallized salt was readily available in the Bay of Kotor, covering marshy areas in the autumn. The importance of salt for Iron Age communities is evidenced by ancient sources, which describe conflicts between the Illyrian tribes Autariatae and Ardiaei over saline springs, likely near Konjic in Bosnia and Herzegovina, during the 5th and 4th centuries BCE. These sources detail the method of obtaining salt: in the spring, water was collected and left to stand for five days before being filtered. Livestock required salt supplements, without which they would perish. By the 4th century BCE, the Ardiaei were associated with the Bay of Kotor. They became the leading tribal community, dominating the regional Illyrian Kingdom. The kingdom's center were in the city of Risan,

where King Balaos (3rd century BCE) had the privilege of minting coins, modeled after Hellenistic monarchies. In addition to Risan, the oldest urban settlements in present-day Montenegro, such as Budva and Ulcinj, were founded by Greek settlers and coexisted with native Illyrian communities, forming the backbone of the Illyrian Kingdom's development. In the 2nd century BCE, the Labeates took over the leading role in the Illyrian Kingdom, with their seat in Skodra (Shkodra in Albania). Following the defeat of the last Labeate king, Gentius, in the war against the Romans in 167 BCE, the Illyrian Kingdom was divided into three regions. The first region included those originally called Illyrians, from Dyrrachium to Lissus (Durrës and Lezhe in Albania), the second region around Lake Shkodra included the Labeates, and the third region encompassed the Olcinateas, Agravonites, and Rizonians. The Ardiaei were no longer mentioned, suggesting that the regions were named after ancient settlements like Ulcinj (Olcinium), Acruvium, and Risan (Rizinium). The districts of these Illyrian-Hellenistic settlements are geographically defined areas that do not necessarily coincide with the territories of tribal communities.

Besides Olcinium and Rizinium, the settlement of **Acruvium**, *Acruium* is mentioned for the first time. Located in the Bay of Kotor, its exact location remains unknown. In addition to Kotor and the coastal village of Bigova in the Trašte Bay, it is believed that the hillfort with an associated settlement and the Church of St. Luka in Kostići, a hamlet of Gošići in Krtoli, could be the Illyrian Acruvium, which historical sources mention until the 2nd century. The name Acruvium/Agruvium is linked to the Greek word *αγρό* and the Latin *ager*, meaning field, likely referring to the Soliočko Polje



△ The Saline and archaeological sites in the immediate surroundings

(Saline filed) in Grbalj. The district of the Illyrian-Hellenistic and Roman settlement in Krtoli, geographically connecting Grbalj with the Luštica peninsula, contained a field and a salt marsh, contributing to its economic development. The settlement was likely under the influence of Hellenistic Risan, whose inhabitants needed large quantities of salt. Considering the Illyrian communities' need for salt, Risan probably monopolized the salt trade.

The Roman encyclopedist Pliny the Elder (23–79 CE) mentions Acruvium as *opiddum civium Romanorum* in his work "Naturalis Historia" (NH XXXII, 144), which does not necessarily mean that it was a settlement of Roman citizens, but that its inhabitants from the

former Illyrian kingdom, now Illyricum, were incorporated into the Roman administrative system. The core area of the settlement in the Roman period likely included Gošići, with the islands of Školj/Otok od Milosti, St. Marko, and the Prevlaka peninsula. Prevlaka is a well-known multi-layered ancient and medieval site, where a maritime villa with mosaics was discovered, along with a tombstone of a city council member at Mrčeljevina near Prevlaka, and a monument dedicated to Juno Lucina, the supreme Roman goddess and protector of childbirth, unique in the province of Dalmatia. The district includes remains of Roman rural estates (*villae rusticae*) in the villages of Vranovići, Pelinovo, and Kavač, as well as at Cape Seljanovo in Donja Lastva near Tivat and in Gošići. No other region in Montenegro

has as many Roman villas as this small, geographically cohesive area in the Bay of Tivat.

The Romans recognized the economic value of salt long ago, standardizing its production and monopolizing its trade. Pliny the Elder attributes the mythical role of the first salt basin builder to Ancus Marcius, the fourth king of Rome (642–617 BCE). Since salaries were often paid in salt, the Latin word for salt (*Lat. sale*) is associated with the word salary (*Lat. salarium*). The *villae rusticae* offered the comfort of a rural setting and represented self-sufficient agricultural economies. In coastal regions, saltworks were built for estate needs and for making *garum*, a highly valued salted fish sauce in Roman cuisine, which was a lucrative product. *Garum* was transported in amphorae, frequently found at underwater sites, including those in Montenegro. Numerous amphora fragments and other ceramic vessels, along with remnants of an ancient road, have been found at the base of Gomilica near Solila, further supporting the belief that salt production took place in the Bay of Tivat. The ancient settlement and rural estates in the Grbalj valley were located along the coastal road connecting Naronia with Shkodra and Risinium with Butua.

Soliocko Polje, named after the salt marsh, preserves the name of the medieval village autonomy, Grbalj, where the marsh and field are geographically located. The Slavic toponym Grbalj is etymologically linked to the name of the city *Agruvium* (*Agruvium*, *Grubio*, *Grbio*, *Grbjo*, *Grbljo*), derived from the Latin or Greek word meaning field, with roots in Indo-European language. The same root is found in the Slavic words for salt (*so*, *sol*), Greek *ἄλας*, and Latin *sal* (Mayer 1952; Zaninović 1984). This term refers to the marshland where the sea and sun combine to produce salt crystals in the early autumn. Perceiving the field and salt marsh as sacred spaces where burials and rituals were conducted, the landscape of the Lovćen foothills valley was first altered at the beginning of the Bronze Age, and it remained unchanged until the Roman period.

In the 3rd-4th centuries, when the separate province of *Prevalis* (modern-day Montenegro and parts of Albania and Serbia) was created from the province of Dalmatia, the Bay of Kotor became a border area. Some estates disappeared, others survived and/or changed their purpose in the early Christian period, but the need for salt in the newly established church centers and among the local population remained the same. The method of mass salt production is unknown to us until ancient Rome, from which time Pliny states *that civilized life is not possible without the production and use of salt* (NH XXXI, 88).

THE SALINE IN THE MIDDLE AGES (7TH TO 15TH CENTURY)

In the Middle Ages, salt became a valuable commodity, which, due to the demand from the hinterland population, brought significant revenues to coastal cities on the eastern Adriatic coast. The growing needs for this mineral prompted Adriatic communes to speed up and improve salt production by building new saltworks or expanding existing ones. Cities like Valona, Durrës, Dubrovnik (Ragusa), and Zadar, which had saltworks within the city's territory, communal district, and were well connected by maritime and land routes, had the advantage.

The Slavs permanently settled in the Balkans and occupied the eastern Adriatic coast in the first half of the 7th century. They founded Sclaviniae led by princes who recognized the supreme authority of Byzantium. In the southeasternmost part of the Slavic principalities was Dioclea, which roughly encompassed the basin of Lake Skadar and the coastal strip of Montenegro and northern Albania.

The cities of Budva, Kotor, and Rose at the entrance to the Bay of Kotor are mentioned in the work of Byzantine Emperor Porphyrogenitus (905-959) concerning the Saracen attack in the 9th century. This area was most likely encompassed by the pre-feudal county Grbalj, mentioned in the Slavic literary-historical work the Chronicle of the Priest of Dioclea (12th-14th century), as a county on the border of Dioclea

towards Travunia. Soon, village communities differentiated as Grbalj (from Budva to the coastal strip of Tivat Bay), Krtoli (land near the islands), and Luštica (peninsula) are mentioned in late medieval sources.

During the rule of the Dioclea princes from the Vojislavljević dynasty, the name Dioclea increasingly changed to Zeta. In the 13th century, the Grand Župan (prefect) Nemanja conquered Zeta, which Serbian rulers from the Nemanjić dynasty would govern from 1166 to 1371. The coastal commune of Kotor, which represented a link between the Mediterranean and the interior of the Balkans, gained a privileged position. This was a period of economic prosperity for the city, a commune with a statute and legislative, judicial, and administrative bodies. The oldest area of Kotor covered approximately today's coastal zone of Kotor Bay and the Prevlaka Peninsula (12th century). Serbian rulers expanded the district's territory with donations, so in the first half of the 14th century, Kotor acquired Grbalj, as well as Ledenice above Risan, Bijela, and Kruševica.

Kotor, at the bottom of the Bay of Kotor in the southeast Adriatic, became one of the salt markets during the Nemanjić rule, along with St. Srđ on the Bojana, Dubrovnik (Ragusa), and Drijeva at the mouth of the Neretva. The salt market was a place where salt was sold and taxed. In the 13th century, Kotor engaged in salt trade and imported it from Dubrovnik (Ragusa) and Zadar, and in 1285 it was

Kotor Notary Office, Document dated January 3, 1333:

The Kotor municipality, gathered in the usual manner, sells its salt market with the saltworks and 4500 measures of salt for 10,000 crossed perpers to Petar Katenin, Toma Bugonov, Merin Mekša, Miho Buća, and Pavle Tripun Buća. For two years, no one else may sell salt; only the municipality may procure 800 measures of salt annually according to the old custom, but not for money, and may buy 450 measures of salt for churches. If due to war salt runs out in Kotor, the municipality must compensate for the damage. If the superior authority takes the sold market from them, they will keep all municipal duties until full payment; if the municipality takes it, the judges fall under the king's penalty of 1000 perpers for each of them. If the archbishop takes the Budva market from them, the municipality must compensate for the damage...

Kotor Notary Office, Document dated February 17, 1337:

Drage, daughter of the late Tripun Stankov, with her mother Doma, sells vineyards with nurseries near the saltworks in Tivat to Niko, son of the late Pavle Dabronov, for 300 Venetian perpers. Bogde Dobrenov and Junije Gambe guarantee to Niko for one year against any claim that might result in the vineyards being taken from him.

recorded that Queen Jelena, at that time the widow of Serbian King Uroš I (1241/42-1276), had a salt customs in Kotor. Salt trade was a municipal monopoly, but part of the revenue was allocated to the Serbian ruler.

According to a document from the Kotor notary office dated January 3, 1333, the saltworks (salinis) are mentioned for the first time, recording that the people of Kotor were the lessees of the salt market (mercato salis). In a document from 1337, it is stated that the saltworks were located in Tivat (according to the Kotor statute, then the western municipal territory). In addition to the saltworks, today's Saline, there were also salt fields in Bobovište below Bogdašići, a village on the slopes of the Vrmac Peninsula. In the immediate hinterland of Tivat bays, the population of surrounding villages had their vineyards and fields where grain was sown and so on.

According to the Kotor statute, it was stipulated that salt could be sold in salt markets in Kotor and Risan, where salt warehouses were located. Also, the Kotor salt market, or a share in the profit from salt customs, could be leased. The Budva salt market was under the jurisdiction of the Kotor commune. The produced salt had to be handed over to the municipality, which was responsible for its sale. The municipality distributed a certain amount of salt to citizens annually, first 600, later 800 modii of salt per head, per capita.

Experienced Kotor merchants and nobles traded with merchants from nearby cities, such as Shkodra, Durrës, Ulcinj, Ragusa, Hvar, Zadar, and cities in Italy, and went to cities and markets in Serbia (Brskovo near Mojkovac, Rudnik or Prizren). The coastal inhabitants offered various goods, salt, wine, fish, or expensive fabrics from Italy, and bartered them for metals (silver, lead),

livestock products (cheese, meat, leather), or timber, which brought significant income to both the state and cities. Payments were made in cash, or salt was exchanged for metals (silver, lead, copper) or wax.

Coastal communes sought to maintain or take over the monopoly on salt trade along the Adriatic, inevitably leading to disputes. The Ragusan residents, as the wealthiest and most influential traders on the eastern Adriatic, referred to old privileges guaranteeing them this right. When disputes could not be resolved diplomatically, the import or transit of salt to Kotor, Risan, or Budva was banned. Goods were often smuggled, ships hijacked, salt confiscated, and sailors enslaved. It is recorded that the Ragusan residents demolished Kotor saltworks before the salt harvest in 1327 and 1380. Salt was a means of extortion and pressure, and during plague epidemics, trade with Kotor and cities in Zeta was prohibited.

During the reign of Uroš II, the last emperor of the Nemanjić dynasty, regional lords gained strength. In Zeta, the ambitious ruler and founder of the Balšić dynasty (mid-14th century – 1421) – Balša I Balšić (first half of the 14th century – second half of the 14th century), occupied cities in the hinterland and coast, so Zeta included cities from Lezhe to Ragusa, but Kotor, then under the nominal rule of the Hungarian king, remained unconquered. However, the survival of the city was seriously shaken due to the threat to the largest estate, Grbalj, where wheat, millet, and olives were grown, vineyards planted, and salt extracted on the coast. It is known that the saltworks were the target of plundering by the subjects of Đurađ II Stracimirović (second half of

the 14th century). To get permission from the Venetians to trade in grain and salt, he had to compensate for previously inflicted damage. Đurađ II did not succeed in retaining the territories of Zeta that his predecessors had conquered. He retreated before the Bosnian lord and king Tvrtko I (1338—1391), who achieved a strategic outlet to the sea for Bosnia by occupying Dračevica and Risan. In Sutorina, he built saltworks and Novi (later Herceg Novi), a city with a salt market. This not only threatened the interests of Kotor but also Ragusa. Besides the fact that the Ragusans managed to secure a ban on the sale of salt in the Novi market, invoking old privileges granted by the Nemanjić dynasty, the agreement was not respected. By taking Kotor in 1384, Tvrtko I, and later the Bosnian noble Sandalj Hranić (1370 – 1435), collected significant revenues from the salt customs in Kotor.

After Sandalj Hranić conquered Kotor in 1414, Balša III (1385 – 1421), who helped him in this military campaign, received a portion of the revenue from the sale of salt amounting to 1,000 ducats. Since the Venetians did not pay him the customs revenue on time, Balša III organized military campaigns to reclaim territories and the agreed customs revenues. The salt pans were an economic resource particularly highlighted in peace negotiations concerning the determination of possessions and the exchange of towns between the Venetians and the Balšić family. Documents from the first two decades of the 14th century testify to this, in which, besides Budva and Luštica, Balša III was promised the return of their saltworks.

The 15th century was marked by socio-political turmoil in the Bay of Kotor. During this period, the saltworks were constantly divided among multiple owners and rulers.

The demand for salt continually increased, so the municipality of Kotor had to secure additional quantities of salt. Notarial records preserved information about merchants from Ragusa, Zadar, Venice, as well as from Corfu and Apulia.

In peace negotiations, cities and rural autonomies, along with the right to saltworks, would pass from one ruler's hands to another's. The saltworks during this period were always owned by multiple owners. A more detailed insight into the ownership of the salt fields is gained from the negotiations that the Serbian despot Stefan Lazarević continued with the Venetians as the successor of the last lord of Zeta. During the negotiations between the Venetian representative Francesco Bembo and the despot's envoy Đorđe Branković in St. Srđ on the Bojana in 1423, the boundaries of the Kotor district and the ownership of the salt fields at the Saline were established. Out of a total of 143 salt pans, it was stated that 32 belonged to the Kotor commune, 34 to Balša, 24 to the Metropolitan of Zeta, 27 to the people of Luštica, 10 to the Đurašević (Crnojević) family, 8 to Bogdan Sikis, 2 each to Nikola Zaulović and Kivić, and 4 to Rajko Moneta. The negotiations over the despot's right to inherit Balša's salt pans became questionable again when in 1425, the new negotiator appointed was the Venetian duke, Francesco Quirini. By the treaty in Vučitrn and Drivast in 1426, this issue was resolved in favor of the Serbian despot Stefan Lazarević, who gained ownership of 34 salt pans of the Zeta lord, while the ownership of the remaining 109 salt pans remained the same. The Serbian nobleman Đurađ Branković (1377 – 1456) was granted the right to import salt

into Budva. He soon opened a salt market in Budva in 1431 (in the meantime he had become a despot), which led to conflicts between the two neighboring communes and the seizure of ships loaded with salt.

As owners of the salt pans at Saline, three Paštrović families were also mentioned in 1437.

The Crnojević noblemen, during the Despotate, attempted to secure safe access to Budva and Grbalj, where they had salt pans. Grbalj and the salt pans were the subject of negotiations that the rulers from the Crnojević dynasty (1451 – 1496) conducted with the Venetians in the second half of the 15th century. On the other hand, the people of Kotor sent their envoys to Venice multiple times (1448, 1449, and 1450) to secure approval for several demands, one of which was to demolish the salt pans in the Grbalj field, as they attracted surrounding tyrants to attack and occupy the area around Kotor. The demolition of the salt pans affected municipal revenues, but it also impacted the people of Luštica, who had previously agreed with the Kotor duke to sell salt at the salt market at old prices.

During the 1450s, the salt pans caused discord between the lords of Montenegro and Kotor.

They were probably rebuilt after 1482. According to the Charter of Ivan Crnojević on demarcation, the border drawn from Jaz near Budva, which then went by sea to the Bigova Bay, then through the village of Lješević along the coast to Slanica, then to the Brda, etc., included the salt pans. The border across Saline (or including Saline) was confirmed by a document from 1683.

Production and Sales Process

The trade of salt was a municipal monopoly, but the municipality was obligated to share part of the revenue with the ruler. The amount depended on the socio-political and historical circumstances. Historical written sources do not provide sufficient information about the process of production and sale of salt, but the reconstruction can be traced through the legislation on salt, both in the Statute of Kotor and the statutes of similar communes on the eastern Adriatic coast (Lezhe, Ragusa, Zadar, etc.).

The importance of this economic sector for the development of the city is evidenced by the developed administrative apparatus. According to the Statute of Kotor, the municipality had a service, the salt customs office, whose two officials, salt customs officers (*doanarii salis*), were chosen by judges and the Minor Council from among the nobility. They managed the internal and external trade in salt and built salt pans. From the profits from the sale of salt, the customs officers allocated money for the construction of walls and oversaw the realization of that work. External trade was sometimes conducted by syndics. Three officials of the municipal revenue administration, known as market overseers, were called justiciaries. They were responsible for collecting taxes, overseeing measures and the municipal scale, and maintaining communal order, among other duties.

Work at the salt pans was a seasonal job that took place from spring to autumn, until the first rains. All tasks at the salt pans were performed by skilled labor force, officially known as salt workers or masters of the salt pans (*magister salinarum*). They most likely handled the loading and unloading of salt or served as warehouse guards. The salt warehouse, where the salt was stored, was located at the city dock. If goods were not picked up on time, the Commune charged storage fees. During trade, notaries wrote contracts specifying the price, payment method, delivery time, and penalties. Guarantors usually vouched for the agreed transactions.

About Measures

The basic unit of measurement for salt was the *modius* (*modius*, *moggio*, *mozo*), which falls under volumetric measures for dry substances in liters. As stated in the Statute of Kotor, the volume was "by the measure of the stone" (*ad mensuram lapidis*). According to the stone measures preserved in Dalmatian communes, it was a stone vessel, semi-circularly hollowed out with an outlet for loose material by unit of measure. It is assumed that such a stone vessel also existed in Kotor. The volume of the stone vessels was not standardized, but it is known that the measure in Kotor was twice as large compared to the one in Zadar, and thus the price of Kotor salt was doubled. Also, the *modius* for grain was not the same size as the *modius* for salt. The Kotor *modius* for salt was divided into 12 *stari*, with a volume of 27.77 liters, making a total of 333.24 liters. The price of salt was determined by 100 *modii*, the *centenarius*, or by 1000 *modii*, i.e., *per migliaia* (thousand).

Statute of Kotor: About Measures for Wine, Oil, and Other Things, Chapter CCCXXIX

We decree that all measures for wine, oil, or other things shall be equal to those carved in the stone of the Commune. Whoever has otherwise shall pay 5 perpers and compensate for the damage of what he has sold.

THE SALINE UNDER THE OTTOMAN EMPIRE FROM THE 15TH TO THE 18TH CENTURY

Unlike Herceg Novi and Risan, which resisted Turkish attacks until 1481/82, Grbalj voluntarily accepted Turkish rule in 1497. In the Ottoman possession were two saltworks, the Sutorina and the Grbalj saltworks. Administratively and judicially, Grbalj was a nahiya (district) of the Montenegrin kaza, which had the status of an imperial estate (has). Financial revenues, however, were under the jurisdiction of the Bosnian defterdar (treasurer) of the Herzegovinian Sanjak, specifically his trustee (emin) in Novi, while the supervisor (nazir) was directly responsible for salt production and the saltworks.

Salt from the salt pans in Sutorina and Grbalj was sold in Herceg Novi and Risan. The Ragusans made an agreement with the Turks on sharing profits from the sale of salt from Novi and Ragusa to protect their interests. The 1485 agreement remained in force for several decades. At that time, the Grbalj saltworks was neglected, but it was cleaned and prepared for regular production in 1489 and 1503, so that by 1510 production amounted to 16,259 measures of salt. It is known that Montenegrin sanjak-bey Skender Crnojević managed to get permission in 1517 for the people of Kotor and Ragusa to transport salt from Grbalj to the mouth of the Neretva by boat. The following year, the Montenegrin sanjak-bey again granted permission to the qadi and emin of Novi for two Kotor ships to transport 2,500 modii of salt to the same destination.

The traffic and production of salt in the Grbalj saltworks are documented in the defters, Turkish cadastral books of the Shkodra Sanjak from 1523 and 1570, and a document from 1683. The defters listed the population and their estates based on which taxes were calculated. The inhabitants of Grbalj were free peasants, with some paying property tax (filuri) on their land, amounting to around 77 akçe (Turkish silver coins) annually per household. The rest of the population consisted of salt workers who paid their taxes through labor at the saltworks. According to the 1523 defter, Grbalj had 260 filuri households and 300 salt worker households; in 1570 and 1683, there were 268 filuri households and 304 salt worker households. The profitability of salt working is confirmed by data from the 1683 document, which states that the income from the Crnojević saltworks amounted to 194,878 akçe, while all other revenues together totaled 28,885 akçe, meaning that income from the saltworks accounted for about 80% of total revenues.

At the beginning of Turkish rule, taxes did not heavily burden the inhabitants of Grbalj, but over time, levies increased, making life harder for the peasants. Historical sources from the 17th century reveal that the people of Grbalj were often frustrated with the actions of certain emin officials, frequently complaining about high taxes and seeking the Montenegrin qadi's mediation in disputes.

Increased business volumes required additional labor. According to the 1570 defter, the population of contemporary Montenegro was also obliged to annually maintain the Crnojević saltworks. This levy remained in force until the Ottoman-Venetian Morean War in 1684. During this time, work in the salt pans was neglected, and taxes were reduced to a basic tribute paid by both filuri and salt workers. When the Venetians captured Herceg Novi in 1687, the collection of taxes in Grbalj, previously under the Bosnian/Herzegovinian Sanjak, was transferred to the Shkodra Sanjak.

From the reports of Ivan Bolica, a former Venetian governor in Montenegro, about his meetings with the emin and the Grbalj princes, and negotiations with the Turkish

pasha in 1702, it is evident that the desires of the people of Grbalj to resume work on the salt pans did not align with the interests of the Venetian Republic.

During Turkish rule in Grbalj, the people of Kotor most frequently obtained salt from Corfu. The Turks benefited from this trade as they took a share of the entire Kotor customs revenue. The stradioti (light cavalry) stationed on the island of Gabriel (Saint Gabriel, later named Stradioti after this Venetian military force) were paid in money and salt. Irregular and low wages often forced the stradioti to take on additional work, usually involving trade, including in salt.

▽ Map by Venetian publisher and engraver Simon Pinargenti, Venice 1573



CARTOGRAPHIC REPRESENTATION OF THE SALINE IN THE 16TH AND 17TH CENTURIES

The oldest known graphic depiction of the Saline in the Bay of Kotor is on a map by Simon Pinargenti from 1573. The Saline is clearly marked with hatching, drawn from the sea coast and connected to the sea by a channel. The Saline is similarly depicted on a map by M. Merian from 1665.



△ Map by German Engraver and Illustrator Matthäus Merian, Frankfurt 1665

On the maps of the Bay of Kotor by V. Coronelli (1684, 1688, 1690), the partitioned basins of the saline are depicted with dotted lines between the mouths of the rivers Odoljenštica (Odolienstiza F.) and Koložunj, that is, the river coming from Župa, Grbalj (F. che viene da Zuppa).

▽ Map by Venetian geographer and cartographer Vincenzo Coronelli, Venice 1690



THE SALINE DURING THE VENETIAN REPUBLIC, 18TH CENTURY

After years of warfare, the Venetian Republic and the Ottoman Empire concluded peace in Požarevac in 1718. The Treaty of Požarevac granted Grbalj with its salt pans to the Venetians. This region remained under Venetian control until the fall of the Republic in 1797.

At the beginning of the 18th century, the Venetian Republic abandoned salt production in all smaller saltworks on the Adriatic coast where it had previously been carried out. To prevent smuggling and strengthen its monopoly on salt sales, Venice concentrated production in three locations: Pag, Piran, and Santa Maura on the Greek island Leucas. The Saline, likely neglected since the late 17th century, was certainly abandoned in the 18th century.

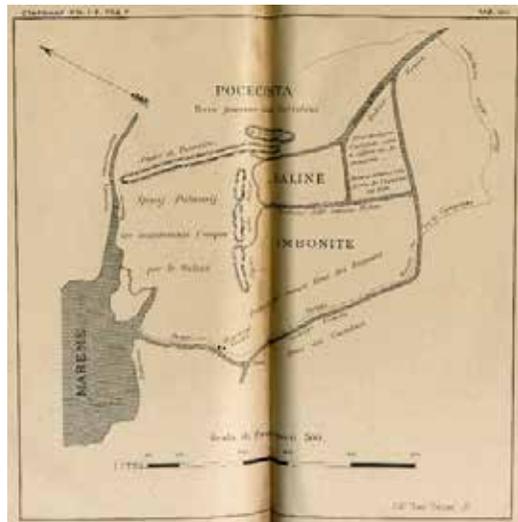
In the last decades of Venetian rule, salt for the Bay of Kotor was imported from the Piran saltworks. Historical documents provide evidence of this: the contract for leasing area for salt sales in southern Dalmatia and Montenegro from 1729; in 1765, 969 modii of salt were transported from Piran to Kotor, and in 1767, 235 modii and 7 stari of salt were brought in four shipments to Budva, Risan, and Kotor. Additionally, there are leasing contracts for selling Kopar and Piran salt (each 1500 modii) in the Bay of Kotor area from 1772 and 1778.

Although the Saline was abandoned in the 18th century, the land, enriched with mineral-laden clay, was turned into fertile arable land. Salt continued to be collected for local needs, and arable land gained value. This land was sold by the inhabitants of Grbalj and Krtoli, with buyers including people from Dobrota (a settlement in the Bay of Kotor). In 1638, the people of Krtoli purchased a large area of arable land in the Saline and remained its owners even after the border was established with the people of Grbalj in 1736.

It is known that in July 1736, borders were drawn between Grbalj and Krtoli across the Saline in Soliocko Polje in the presence of four Grbalj princes, Krtoli captain Petar Starčević, Krtoli elders, and Venetian engineer Colonel Francesco Melchiori. He created a sketch representing the first detailed depiction of the organization of the Saline, showing the ownership division of the Saline, with zones belonging to either Krtoli or Grbalj.

On the topographic map from 1785, the locality Saline (Saline) and Magacini (Magazzini) are marked between the rivers Odoljenštica (Odolienstica T.) and Koložunj (Coloxun F.). This map also depicts the administrative division of the territory. The Saline zone is divided into three ownership areas: the central part belongs to the Grbalj county Tujković (Contea Tuicovich), one of the four Grbalj counties, while the eastern and western territories belong to Kotor—the eastern part belongs to Tivat (Teodo) and the western part to Krtoli (Kartoli).

▷ Sketch of the Saline by Venetian Engineer Colonel F. Melchiori, 1736



▽ Topographic Map by C.T.S. for Ludovico Furlanetto (delineata dal sig C.T.S. per Lodovico Furlanetto), Venice 1785



THE SALINE FROM THE LATE 18TH TO THE FIRST HALF OF THE 20TH CENTURY

From 1797 to 1918, with brief interruptions, the entire region of the Bay of Kotor was under the rule of the Austrian and later Austro-Hungarian monarchy. During this period, there was no salt production in the Saline. However, the fertile Soliocko polje, which Crnogorčević described in 1893 as “a beautiful, skillfully cultivated, and very fertile field,” was used for various purposes.

During this period, almost all parcels were privately owned. Besides people from Krtoli, the land in the Saline was also used by people from Grbalj. However, in 1817, they were forced to sell part of their land to wealthy families from Dobrota (the Ljubanović-Lazarović family sold their part to the Tripkovići, the Bojković family sold to the Maći family, and the Tujković family sold to the Perinovići). People from Krtoli began to repurchase the Saline lands from people of Dobrota around 1830-40 and continued to use them as their property.

During the Austro-Hungarian rule, a cadastre for the entire Bay of Kotor region was created, with measurements taken during 1837 and 1838. In addition to cadastral maps, land registers for each tax municipality were established from 1881 to 1894, with entries made until 1974.

In the archival documents of the Historical Archive in Kotor, the land registers for the cadastral municipality of Đurašević (Krtoli) can be used to track the purposes of parcels

in the Saline area and their ownership starting from 1896. In the Saline area, parcels closer to the sea coast were marked as swamp, and others as arable land, pastures, or vineyards.

People from Krtoli, who were mostly engaged in agriculture, had fields in the Soliocko Polje where they grew corn, wheat, rye, barley, beans, lentils, and other crops. They transported goods from the Soliocko Polje by boat to warehouses on the coast below the village.

Due to its natural characteristics, Soliocko Polje was a very rich and first-class source of clay, so people from Krtoli began extracting clay early on to make roof tiles and later bricks. The clay from Soliocko Polje was transported by boat to warehouses in the coastal villages, where roof tiles were made and fired in tile kilns. It is noted that people from Krtoli were skilled craftsmen and that these roof tiles were in high demand from Dubrovnik to Bar. The Krtoli production and its supply to almost all places in the Bay of Kotor are often mentioned in documents preserved in the Historical Archive in Kotor.

A report from 1834, listing “Factories and manufactures of all kinds in the Bay of Kotor,” mentions 135 manufacturing workshops, including “one roof tile and brick factory in Krtoli.” However, it is assumed that the term “factory” in this case does not refer to the modern meaning of the word or organized production in one workshop, as roof tile and

brick making in Krtoli remained individual, unorganized, and primitive until the early 20th century, though it met a good part of the needs in the Bay of Kotor (Mijušković, 1956).

However, the fact that Krtoli clay site in Soliocko Polje was the most abundant and highest quality in the Bay of Kotor is proven by the circumstance that in 1908, the first factory in the modern sense of the word, “First Bay of Kotor clay industry,” was established at this very site, which will be described in more detail.

At the beginning of the 20th century, another use of the Saline was recorded—duck hunting. There are also records of initiatives for land reclamation in this area at the beginning of the 20th century.

▽ *The Saline on the Austro-Hungarian cadastral map from 1838*



Although Soliocko polje was used during this period, the neglected state of the Saline in the 19th century is described by Stjepan Mitrov Ljubiša in 1875: “On the other side lies Soliocko polje, in the shape of a bow, at the bottom of which you see old saltworks, now brine and swamp, where plants grow taller than a man.”

The state of the Saline during this period is also reflected in the Austro-Hungarian cadastral and topographic maps. The Saline, part of the cadastral municipality of Đurašević, is marked on maps made during the first cadastral survey of the Bay of Kotor area in 1838. The originals of these maps are in the State Archive in Split, while the maps with modifications made at the beginning of the 20th century are in the Historical Archive in Kotor, although they are quite damaged. These maps use the Slavic name Solilla (the Saline) for the first time, marked as Solilla. The locality Saline in the northwestern zone near the coast is marked as flooded, swampy. The courses of two main rivers, Fiume Siroca Rieka (Odoljenštica) and Mala Rieka (Koložun), are visible on the map. Between them are the streams Torento Gruda and Torento Trestenik. The locality Gomiliza and Poćčićište, now the eastern part of the Saline, and Lugovi, the southeastern part, are also marked.

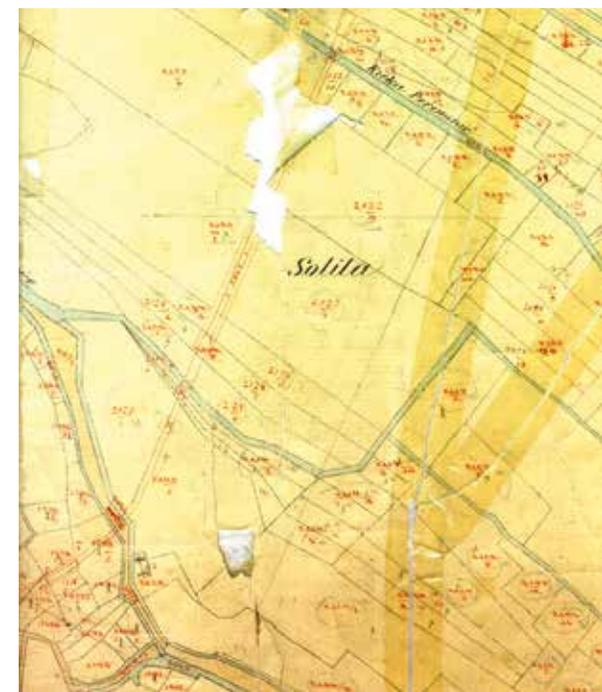
On the topographic map created during the Second Military Survey from 1851-1854, Široka Rijeka is highlighted, as well as the basic parceling of the Saline, although the name Saline is not mentioned. Gomilica and the locality Vepravči, i.e., Lukačovina, are marked.

▷ *Extract from the Austro-Hungarian cadastral map located in the Historical Archive in Kotor, showing the planned route of the Tivat-Krtoli road.*



△ *The Saline area on the Second Military Survey map of the Habsburg Empire for Dalmatia (1851-1854)*

At the beginning of the 20th century, one of the major infrastructural interventions in the Saline area was carried out. The Tivat-Krtoli cart road, which crosses the Saline, was likely constructed between 1907 and 1913. On the cadastral maps revised in the first decade of the 20th century, found in the Historical Archive in Kotor, this road is marked as a planned intervention in red on an older map. On the maps from 1913, the road is already drawn.



FIRST BAY OF KOTOR CLAY INDUSTRY IN KRTOLI

Near the Saline, in the southern part of the Krtoli bay, at the locality of Trsten, the First Bay of Kotor Clay Industry was established at the beginning of the 20th century. Construction of this factory lasted from 1905 to 1908. The founders of the factory, as a joint-stock company with limited liability, were Dr. Rudi Sardelić, Dr. Jovo Stefanović, Đuro Vukotić, Dr. Filip Lazarević, and Dr. Ardoje Jovović. In some sources, Božo Vukotić and Miho Dežulović from Janjina on Pelješac are also mentioned as co-founders.

The factory used the land of the old saltworks, which had long been non-operational, to extract the basic raw material for its work—clay. According to the land registers in the Historical Archive in Kotor, the land on which the factory was built belonged to the Lakičević family from Gošići

and was sold to the First Bay of Kotor Clay Industry in 1908. There are also records from the same year about the sale of parcels by various private owners in the western part of the Saline.

In the 1909 issue of the Boka newspaper, an advertisement for the First Bay of Kotor Clay Industry stated that the “newly established steam brick factory and factory of various clay products” produced “French, domestic, and other modern roof tiles of various types, bricks in the most diverse formats, various hollow bricks, bricks for arches and industrial enterprises, drainage pipes, etc.”

Sources indicate that the factory had a capacity of 14,000 to 15,000 bricks per day, and an equal number of various types of tiles, making it capable of producing 4.2 million



△ The First Bay of Kotor Clay Industry in Krtoli in an old photograph

bricks annually. It is also noted that only about 40% of the factory's production was used in the Bay of Kotor, with the rest being exported outside of the Bay of Kotor, from Split to Ulcinj, as there was only one other factory of this type along this long route.

During the 1930s, the First Bay of Kotor Clay Industry employed about 150 workers. It is recorded that in 1940, the factory experienced a strike involving around 100 workers when the management refused to sign a collective contract with them. It is recorded that the First Bay of Kotor Clay Industry and the Limited Liability Company for the Clay Industry in Tivat—Račica, established in the same year of 1908 on the other side of the Tivat Bay, were awarded a



△ Advertisement from 1909

gold medal and an honorary diploma at the Adriatic Exhibition in Split in 1925.

The First Bay of Kotor Clay Industry operated until after World War II, until 1948 (or according to some sources, 1949), when the equipment was reportedly dismantled and transferred to the Lazine brick factory near Danilovgrad, allegedly due to the exhaustion of quality raw materials and the worn-out condition of the equipment.



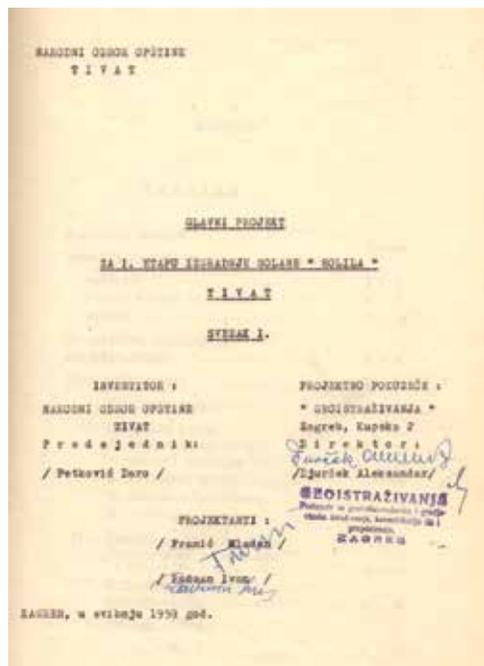
△ Work at the factory, 1943

ATTEMPT TO REVIVE THE SALTWORKS IN THE SECOND HALF OF THE 20TH CENTURY

In the mid-1950s, efforts began to revive the saltworks in Soliočko Polje. These activities were led by the Municipality of Tivat, where the Saline is administratively located.

As preparatory activities, geomechanical studies and practical production tests were conducted, carried out for two consecutive years on experimental saltworks. The conceptual project for the “Saline” saltworks was created in 1956 by the company “Geoistraživanja” from Zagreb, along with an investment study for the saltworks. The construction of the saltworks was planned to be carried out in stages, with its phased commissioning.

In August 1957, a major work action was undertaken, involving work on the main drainage canal, with “about five hundred members of the Socialist Alliance and the People’s Youth of the Municipality of Tivat” participating (Pobjeda, 27.08.1957).



△ The front page of the Main Project from 1959



△ Work on the saltworks, 1957

The main project for the first phase of construction, as well as the project for the Operating Building and Pumping Station, were completed in 1959, also by the company “Geoistraživanja.”

Work on the saltworks, managed by the Municipality of Tivat, began in July 1959. The work, funded with 241,000,000 dinars from RIF resources, was carried out from 1959 to 1961. However, parts completed during the first two years suffered damage due to erosion.

Trial salt production was conducted in 1961 while construction of the saltworks was still ongoing, and the results were outstanding even before the harvest was completed, as reported by Titograd’s “Pobjeda.” By September, about 10 wagons of salt had been collected, and, given favorable weather conditions, an equal amount was expected to be harvested.

At the end of 1961, additional funds were sought to complete the saltworks. In June 1963, the Privredna Banka SR CG approved a loan of 143,500,000 dinars to the Municipal Assembly for the completion of the saltworks. However, the Municipality of Tivat could not continue construction on its own due to a lack of manpower and necessary machinery, which were engaged in building the Adriatic Highway and rebuilding Skopje, which had been devastated by a catastrophic earthquake.

In September 1963, a contract was signed with the Construction Company “Crna Gora” from Nikšić to continue the work. During 1963, work was carried out on the pumping station and partially on Phases I and II of the saltworks.

According to “Pobjeda” on June 7, 1964, after five years of interrupted construction, the first salt harvest was expected that year. That year, only one-third of the total saltworks area, 250,000 square meters, was completed and put into operation.

Salt was reportedly harvested at the saltworks for only two seasons. After that, problems with continuing construction arose. In 1968, the Higher Economic Court of SR CG ruled that the Municipality of Tivat was obliged to repay certain obligations incurred from investments in the saltworks construction.

In the 1960s, as the establishment of the new saltworks began, salt from North African markets started entering the European market. The production costs there were much lower due to favorable natural conditions, with plenty of sun and wind that accelerated evaporation, and cheap labor. This caused about 200 smaller traditional saltworks to fail. It is assumed that these global processes, along with the substantial funds required to complete the saltworks at the Saline, contributed to the halt of construction and prevented it from becoming fully operational.

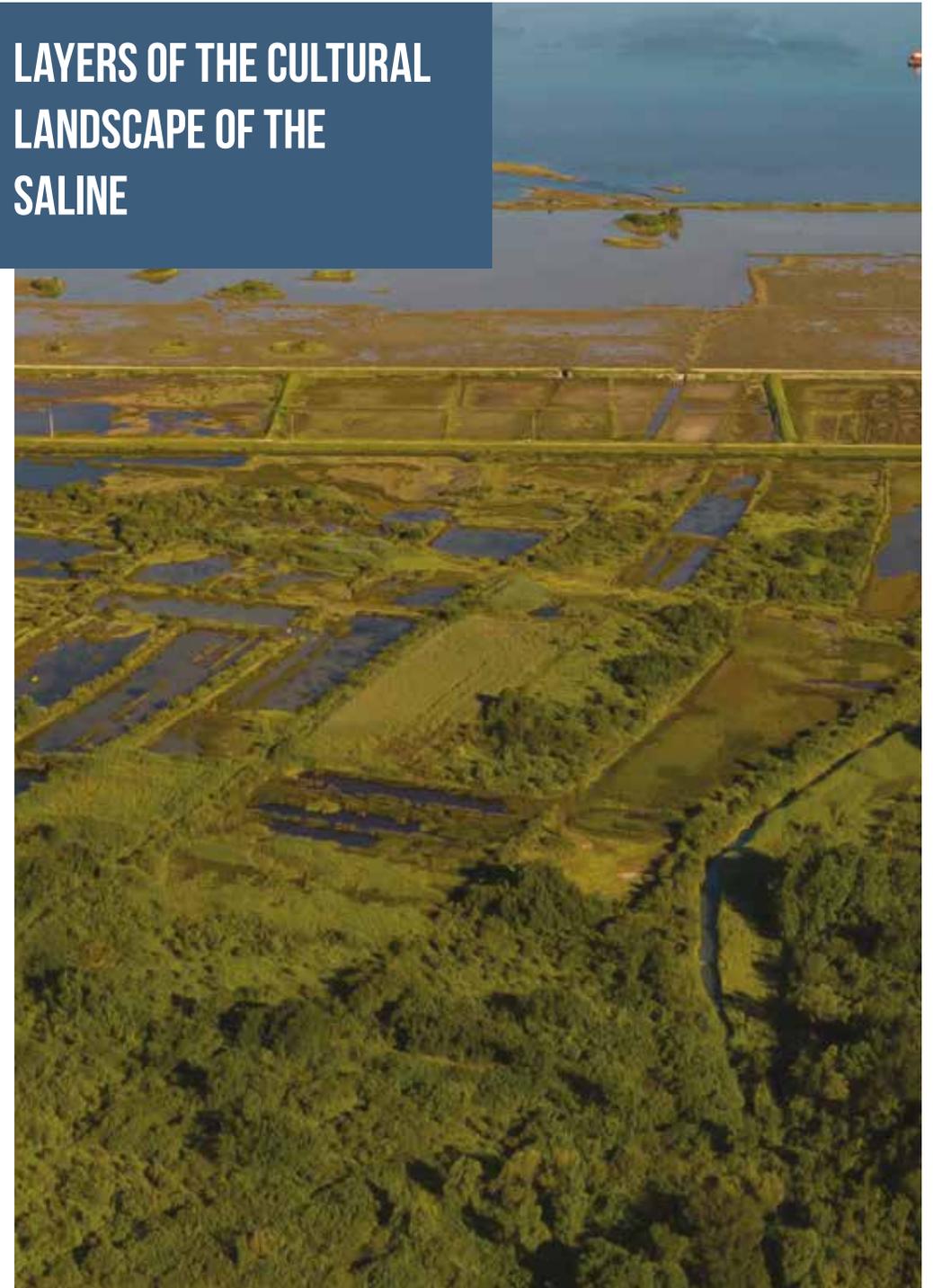


△ The Saline in the 1960s.



△ *Photograph from the Saline in the 1960s, taken during the salt harvest.*

LAYERS OF THE CULTURAL LANDSCAPE OF THE SALINE



The Saline, as we find it today at the beginning of the 21st century, was formed as a result of the specific way this area was used throughout different historical periods. The area of the Saline, with its exceptional location and characteristics, indicates the possible production of salt in this region as far back as the ancient period. Numerous historical records and preserved elements of architectural heritage testify to the existence of a significant medieval saltworks that functioned until the end of the 17th century. This was followed by the use of the area for clay industry in the first half of the 20th century and an attempt to revive the saltworks in the second half of the 20th century. All these phases shaped and transformed the area of the Saline, where today we have preserved various layers and elements of the cultural landscape that overlap, with the following being particularly notable:

- + Layers of ancient heritage
- + Remains of the old medieval saltworks
- + Elements of the clay industry from the first half of the 20th century
- + Remains of the new saltworks from the 1950s and 1960s

▽ View of the Tivat Bay and the Saline from the south, with Vrmac and the slopes of Lovćen in the background



NATURAL CONTEXT

The fundamental element of the cultural landscape of the Saline is its natural characteristics and environment, whose specificities and advantages made it possible to establish the saltworks at the existing location. The key natural factor is the presence of a salt marsh, in close proximity to the sea, in a field between the slopes of Lovćen and Donji Grbalj. The very name "Soličko Polje" (Saline field) speaks to the characteristics of the location.

Soličko Polje is intersected by the river flows Koložunj and Odoljenštica or Široka Rijeka, which originate on the slopes of Lovćen and Vrmac and flow into the sea. These flows are partially regulated and have altered courses, especially after the latest interventions in the 1960s.

The immediate frame of the cultural landscape of the Saline is composed of the undeveloped natural elevations of Brda, Stražnica, and Gomilica on the northern side, and the Krtoli slopes on the southern side, bordered by Vranjska Kupa and the peak Markova Glava with the church of Saint Archangel Mihail.

Towards the sea, in the immediate vicinity of Solila, on the northern side of the Krtoli Bay, the archipelago of Tivat (Krtoli Archipelago) is visible with the islands: Ostrvo Cvijeća or Prevlaka, Stradioti or Sveti Marko, and Otok or Gospa od Milosti, while on the other side of the bay, Orjen, the highest mountain of the coastal Dinarides (1894 m), and its slopes dominate.



△ View from the Saline towards the Krtoli Bay, with the islands of the Tivat archipelago (Otok Gospe od Milosti, Sv. Marko and Prevlaka) and the hills on the northern side, as well as the slopes of Krtoli on the southern side, and the massive Orjen in the background.



△ View from the Saline towards the Soličko Polje and the slopes of Lovćen.

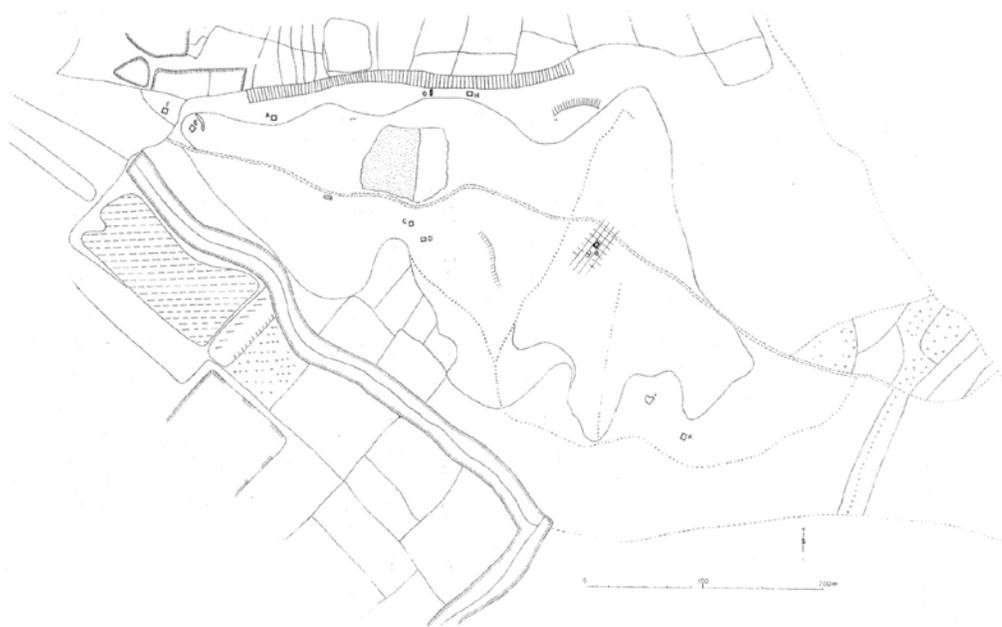


△ View from the Saline towards the slopes of Krtoli and the church of St. Archangel Mihail on the horizon.

ARCHAEOLOGICAL HERITAGE

During archaeological excavations on Prevlaka (an ancient and medieval site) and surveys of the surrounding area in the second half of the 20th century, remains of walls were observed on Gomilica, specifically on the northwest peak of Glavica and the hill Stražnica. These walls, stretching about twenty meters, were constructed using megalithic techniques and are believed to form a unified pre-Roman defensive system from the 2nd-1st century BCE. The site's strategic function is reflected in the name Stražnica, which faces the Krtoli Bay, protecting the approach from the sea. Despite subsequent archaeological

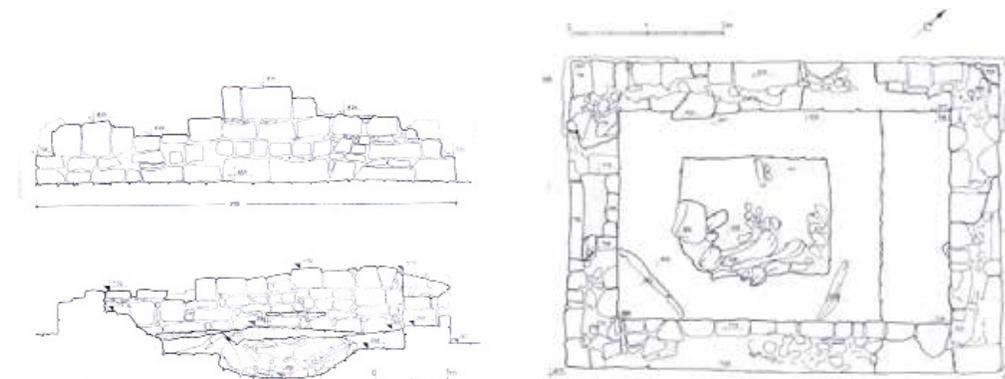
investigations not providing a more precise chronological determination of the walls, a significant number of fragments of ancient ceramic vessels, including transport and storage containers such as amphorae, were discovered on the summit and at the base of Gomilica. During field surveys, fragments of luxury Greek-Hellenistic pottery and amphorae were collected in the Saline and the area behind the Kalardovo Bay, indicating that during the Hellenistic period, trade between Greek traders and sailors and the Illyrian population occurred at multiple locations in the Tivat bay.



△ Gomilica, situational site plan (Parović-Pešikan 1979)

At the base of the northwest peak of Gomilica, remains of a Roman road were discovered, roughly dated to the 3rd-4th century. The road's direction suggests it may have been built to serve the saltworks.

Archaeological research at Kulina revealed that the ruined structure, judging by the toponym, was an observation post (*specula*) from the 3rd-4th century. This massive rectangular structure (dimensions: 5.80 x 4.30 x 0.65/70 m) was built from stone blocks bonded with lime mortar mixed with crushed brick. The tower was covered with tegulae and imbrices, while the floor was paved with large stone slabs. In the southern corner near the entrance was a hearth, and on the northeast wall, there was a protruding stone with a circular opening likely used to hold a torch. Below the tower floor, a Roman-period grave (2nd-3rd century) was found, though it had been disturbed in modern times.



△ Gomilica, ground plan, section, and appearance of the southwest wall of the tower (Parović-Pešikan 1979)

The tower faced the Soliocko Polje, through which, along the entire Grbalj valley, the presumed route of the Roman road extended. Connecting ancient Risan with Budva (a segment of the Roman road from Narona to Shkodra), it passed by Roman villae rusticae (Vranovići from the 2nd-5th/6th centuries, Pelinovo from the 1st-3rd centuries). The tower to the southeast and the wall on Glavica to the northwest of Gomilica, along with Stražnica, indicate the strategic importance of these sites for controlling land and sea traffic.

When considering the entire archaeological structure on the heights of Gomilica and Stražnica, the value and potential of the Saline gain particular significance when viewed in a broader geographical and archaeological context.

OLD MEDIEVAL SALTWORKS

The medieval saltworks, which is first mentioned in archival sources in the first half of the 14th century, and is presumed to have been established earlier, was very active during the Ottoman and Venetian rule, but likely fell into disuse by the end of the 17th century. Today, in the eastern part of the site, there are remains of a part of this old medieval saltworks. The basic elements and conception of the saltworks can be analyzed based on its preserved segments, available historical sources, and comparison with the functioning and organization of other saltworks, especially those on the eastern coast of the Adriatic.

Basic Principles of Saltworks Organization

Since ancient times, the inhabitants of the Mediterranean have known that seawater contains salts that vary in composition and properties. Evaporation of water in a single basin would result in the simultaneous precipitation of all present salts. They also knew that the precipitation of salts from seawater occurs gradually: first carbonates, then gypsum, and later halite or common salt.

This made it necessary to separate saline waters into several basins for each part of the process before obtaining common salt. For this reason, Mediterranean saltworks consist of a system of salt basins separated by embankments to prevent the mixing of water with different concentrations.

Firstly, spacious lagoons and estuaries retain seawater with a salt concentration of 3.5°Bé (3.5°Bé = 36 grams of salt per liter of water; Baumé degree or bome °Bé is an old unit of liquid density). From here, water is pumped to concentration basins, connected in a labyrinthine shape, where water progressively reaches higher levels of salt concentration, up to 25°Bé (325 grams of salt per liter of water), as it moves from one basin to another. This concentrated water is then released into the final part of the cycle, crystallization surfaces, smaller basins where sea salt crystallizes. There, the degree reaches a maximum of 30°Bé (370 grams of salt per liter of water).

It is essential that the concentration does not exceed 30°Bé because magnesium salts begin to precipitate, and above 34°Bé, potassium salts that give the final product a bitter taste. Therefore, at a certain point, the sluices are opened to drain off the excess water and collect the resulting salt.

(<https://medartsal.com/salinas/>)

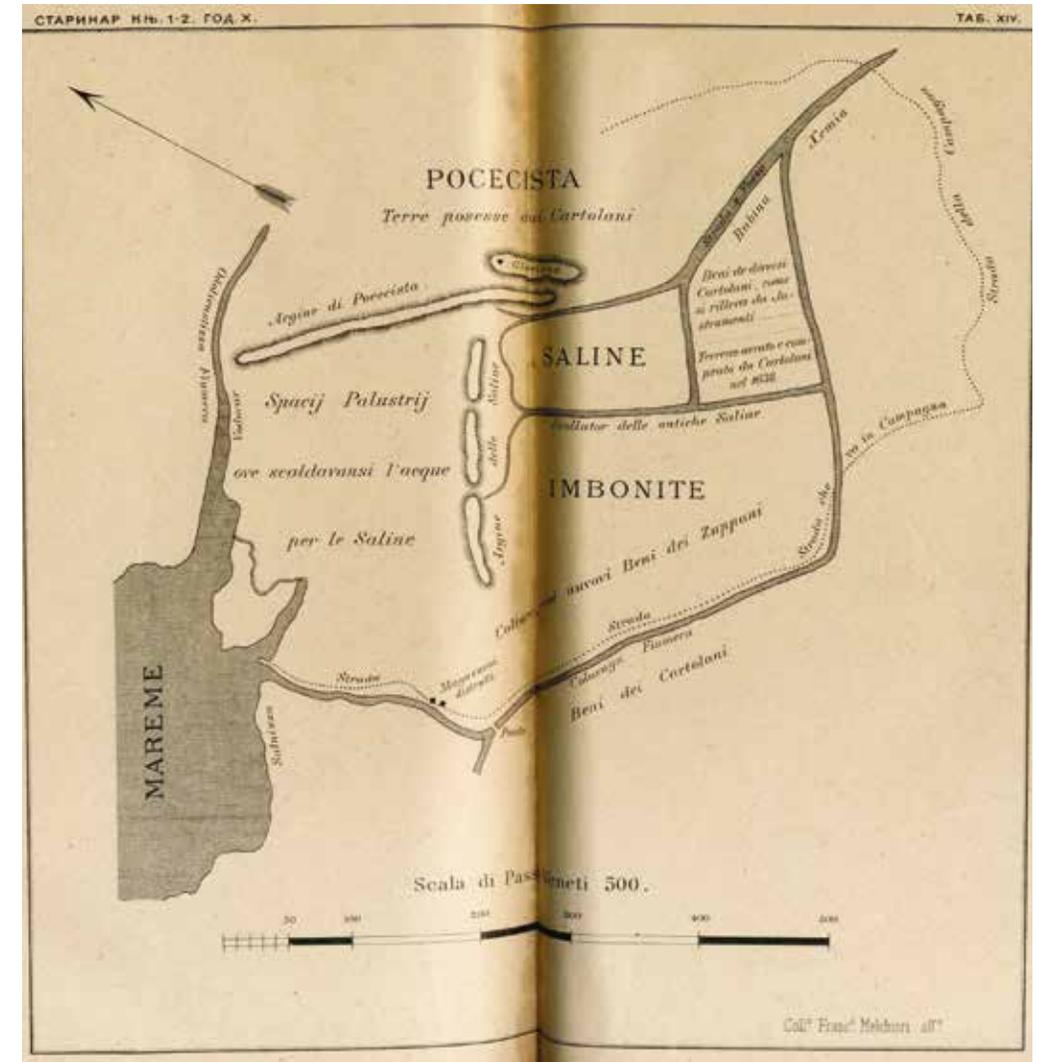
SALT PRODUCTION PROCESS

The salt production process begins in the spring, depending on the climatic characteristics of the location, from March to early May, when meteorological conditions become optimal for the evaporation of seawater. Seawater is gradually and under control released into the system of interconnected basins until it reaches the last ones where salt crystallizes and is collected or harvested. Production remains active until September or October, a period during which, as temperatures drop, the process becomes less profitable. Until the start of the new season, the basins are filled with water, and maintenance and rehabilitation work on the saltworks is carried out.

CONCEPT AND STRUCTURE OF THE SALTWORKS

For spatial and functional analysis of the saltworks at the Saline, the sketches by F. Melchiori from 1736 and Austro-Hungarian cadastral plans from 1838 are particularly significant. Although these documents were created at a time when the saltworks were no longer active, they recorded its basic structure, which probably did not change significantly after it ceased operations.

▽ Sketch of Solila by the Venetian engineer Colonel Francesco Melchiori from 1736



The sketch of the Saline from 1736 is extremely significant as it represents the first historical detailed depiction of the organization of the saltworks. According to the sketch, the position, size, and basic structure of the saltworks can be confirmed, which presumably developed in that area since the Middle Ages. According to the drawn sketch, the Saline is located between the rivers Odoljenštica (Odolinestizza Fiumera) and Koložunj (Colosugu Fiumera), extending in the northwest-southeast direction, from the sea coast to a length of about 500 Venetian steps (Passo Veneto = 1,738 meters) or about 869 meters, while the width varies from 250-350 Venetian steps or approximately 450-600 meters.

The sketch depicts the central part of the Saline, labeled as “dried salt pans” (Saline imbonite), which supports the hypothesis that the operation of the salt pans had been neglected by the late 17th century. From this central area towards the coast, separated by an embankment (Argine delle Saline), there is a large expanse that served to heat water for the salt pans (Spacij Palustrij ove scaldavansi l’acqua per le Saline). To its west, from the Glavica elevation to the Odoljenštica river, extends another embankment, Poćecišta (Argine di Pocecista), behind which lies the Poćecišta zone. In the southern part of the Krtoli Bay, where the Koložunj river flows into the sea, was the locality of Slanica (Salnizza). The toponym suggests that salt warehouses were located in that area. The main road leading from the village to the salt pans followed the southern edge of the Saline along the Koložunj river and reached Slanica. Along this road, near the salt embankment, there was a bridge over the Koložunj and structures marked as ruined warehouses (Magazzini distrutti).

Between the sea and the central part of the salt pans, separated by an embankment, was a large basin where the initial phase of the production process took place. In this basin, evaporation caused the water to saturate, which then flowed through a system of channels into the central part of the saltworks– the salt basins or evaporation basins.

In the central part of the saltworks, in the evaporation and crystallization basins, during the summer months, under the influence of water and wind, the salt crystallized. The salt was then gathered into piles, packed into bags, and/or stored in salt warehouses. It was then transported to Kotor, either by small boats to the Kotor harbor or overland by mules and horses.

Historical sources from 1425 indicate that there were a total of 143 saltworks, owned by various proprietors. By analyzing the operation of other saltworks on the eastern Adriatic coast and considering the relatively small area covered by the Saline, along with the preserved structure with grouped fields/basins, it can be concluded that the Saline likely did not consist of many physically separated salt pans. Instead, as the name itself suggests, it was a single integrated space containing salt basins, salt evaporation basins, or salt fields owned by different individuals. It is very likely that “one saltworks” referred to multiple evaporation and crystallization basins, forming a production unit for a single owner. All these basins were evidently located in the central part of the saltworks, in the area marked as Saline imbonite on the 1736 sketch.

The functioning of the old saltworks can be assumed based on data available for the saltworks on the island of Pag, which operated from the 13th century as one of the largest on the eastern coast of the Adriatic.

Description of the organization of the Pag Saltworks before the redesign from the beginning of the 20th century:

Over the centuries, saltworks were built “on a small scale,” according to the configuration of the coast and the economic power of the investors. ... It was a string of small saltworks. Each small saltwork was an individual property. Each saltwork had its basins for crystallization and evaporation; each was a separate unit with its production process and entirely independent of what was happening on neighboring properties. The size of each saltwork was different and somewhat arbitrary. ... The crystallization basins were the main part of each saltwork. Only they are mentioned in real estate transactions. They were called “kavedini” – salt pans. Only they were strictly defined by dimensions of 40x24 feet (Venetian foot – 0.3477 m), or about 13.9 x 8.34 meters, or 116 m². In addition to them, each saltwork also had its evaporation basins, which were not of a specific shape or strictly defined dimensions. According to their purpose, there were five of them, each serving its function in the production process. ... Each saltwork was protected from the sea by an embankment called “ardjin” (argine). They were low, built of drystone, in two rows, with the interspace filled with loam. ... Towards the land and the surrounding fields, the saltworks were protected by channels that received rainwater and drained it into the sea. ...

Larger saltworks or several of them had a common channel, which served for the mooring of ships that stored salt. It was navigable and deeply entered the saltworks. ... All basins, both for crystallization and for evaporation, were separated by small embankments or “stradelas.” These embankments were one foot (34 cm) wide and equally high or even less. They were made of compacted loam and lined with boards. The boards were made of larch and imported from Venice. Ten stakes (palini) made of spruce from the islands near Zadar were driven into one length of board. ... The bottom of the basins required careful maintenance and care, especially before the start of salt crystallization. Work on them began as early as March, and much depended on them to ensure that the salt would be white, pure, and free from clay impurities.

(Source: Ante Usmiani, Paška solana i sol – proizvodnja i trgovina od 1797. do 1813. godine)

Written sources from the late 19th century indicate that salt was stored in Slanica, specifically in a tower where, according to accounts from the 16th century, the Turkish qadi Omer-Aga Pinić resided. This tower belonged to the Lakičević family at that time.

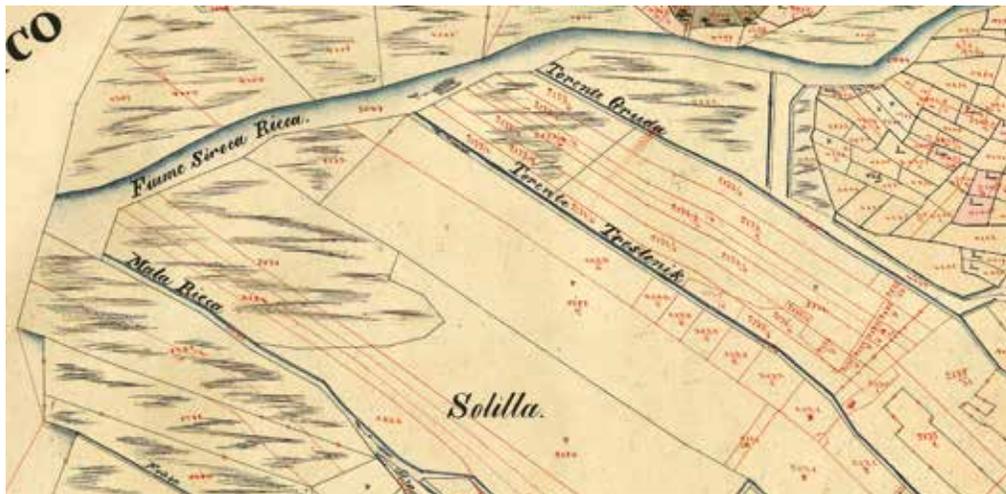
Additionally, another tower is mentioned, located along the road near the bridge, which was demolished at the beginning of the 19th century. Land records from the Historical Archives in Kotor confirm that the house located in the area of the “ruined warehouses” belonged to the Lakičević family from Gošići and was sold to the First Bay of Kotor Clay Industry in 1908.

“The salt was stored at Slanica in a tower near the stone bridge of the same name, in which the Turkish qadi (nazar) Omer-Aga Pinić resided in the 16th century, and today it belongs to the Lakičević brothers. ... Towards the tower of Omer-Aga Pinić, there was another tower in the Lakičević section, by the road to the bridge (ponte). It was demolished 50 years ago to gain more land. Two mills, above it, stopped grinding 40 years ago. These are the ‘Magazzini distrutti!’”
(Crnogorčević, 1893)

On the Austro-Hungarian cadastral maps from 1838, the Saline area is intersected by a network of watercourses. From the northwest, the Široka Rijeka (Fiume Siroca Riecca) flows into the Krtole Bay, joining the sea at roughly two-thirds of its total length from Brdišta. At the same location where the Široka Rijeka flows into the sea, the Mala Rijeka (Mala Riecca), one of the Koložunj's streams, also enters. The Mala Rijeka is divided into three parallel streams that

converge near the coast. Adjacent to it, towards the south, there is another shorter stream marked as the Saline ditch (Fosso Solilla). Parallel to the course of the Mala Rijeka, towards the north, the Široka Rijeka is joined by the Treštenik (Torrente Trestenik) and Gruda (Torrente Gruda) streams, which flow along the boundary of the Gomilica hill. Treštenik is also one of the Koložunj's streams and acquired its name by passing through the Soliocko Polje

▽ Watercourses at the Saline on the Austro-Hungarian cadastral map from 1838.



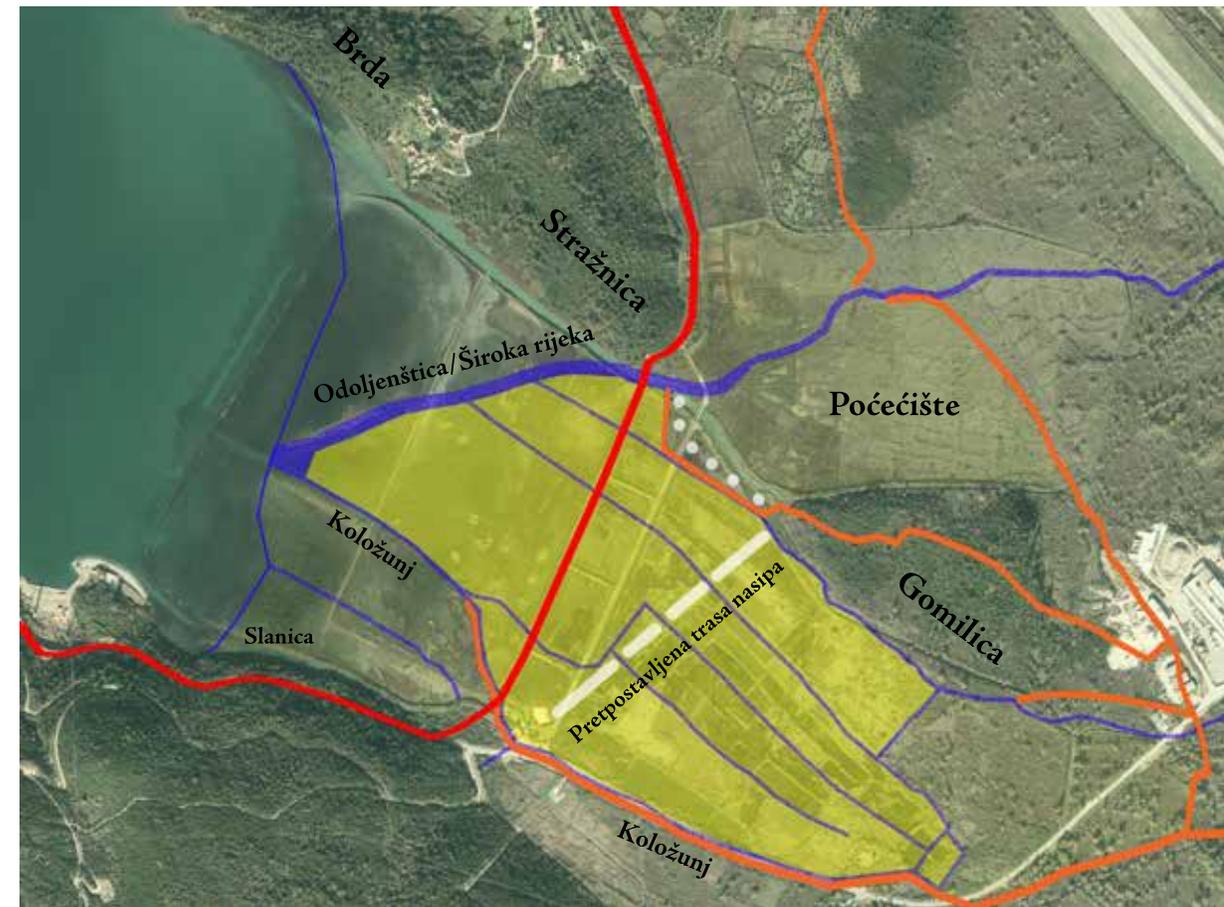
Najzapadniji od brežuljaka je tzv. “brijeg zeleni”. Jedna mu je pola ledina, a druga, ponešto višojim zasadena lozom i voćkom. To bijahu zemlje konta A. Tripkovića, a danas pripadaju braći Lakičevićima i Klakoru. .. Istočni je brežuljak zemlja sijanica. .. Između istočnog i središnjeg brežuljka teče riječica Gospođinica koja se slijeva u Široku rijeku.
(Crnogorčević 1893.)

near the Treštenik locality. The Gruda stream is named similarly because it passes through the field near the Gruda and Velja Gruda localities, originating from the slopes of Lovćen, west of Koložunj. These main streams running through Saline are mostly parallel, extending southeast to northwest, and are connected by shorter canals in some areas.

The watercourses passing through the Saline have been referred to by various names over time. For instance, on the sketch from 1736, the route of the canal for discharging water from the old salt pan is marked in the middle of the salt pan (Scollator delle antiche Saline), which is identified as the Treštenik stream on the original 1838 Austro-Hungarian cadastral map, and in another source from the Historical Archives in Kotor, as the Perinović Rieka. In 1893, Crnogorčević referred to it as the Gospođinica stream.

Written sources from the late 19th century provide information about the state of the neglected salt pans. During this period, it is mentioned that there was a pasture in Slanica, between the Lakičević house and the Široka Rijeka. The Poćečišta embankment, then called Bregovi, was partially collapsed and overgrown. The salt pans embankment was described as three low hills separated by ravines, significantly eroded and partially used for various agricultural purposes.

▽ Presumed area covered by the old saltworks, with marked routes of original river flows, as well as canals and roads that existed at the beginning of the 19th century.



REMNANTS OF THE OLD SALTWORKS

From the old saltworks, which likely operated until the end of the 17th century, segments have been preserved that form a significant layer of the cultural landscape of the Saline. The western part of the old saltworks, along the coast, has not been preserved due to efforts to restore the saltworks in the second half of the 20th century. During these efforts, the lower courses of the Odoljenštica (Široka Rijeka) and Koložunj were completely altered. Despite extensive construction interventions during the building of the new saltworks, which ultimately did not become operational, after 60 years, layers of the old watercourses and land parceling are still visible beneath the new layout. This allows the original courses of the Odoljenštica, Koložunj, and other streams to be discerned in this part of the Saline.



The eastern part of the old saltworks, which was actually the central part of the Saline, is relatively well-preserved. The basic structure has been maintained, with clearly visible traces of the watercourses Treštenik and Mala Rijeka. It is assumed that the original land parceling with fields/basins and the canal system is largely intact. The earth embankments and canals forming the basins are partially preserved. Significant interventions occurred in this area at the beginning of the 20th century when the land was used for clay extraction. Large quantities of clay were excavated from fields belonging to the factory, resulting in deepened zones where more water accumulates.

Significantly, satellite images reveal that the trace of the old saltwork's embankment is somewhat preserved. This embankment extended from the area where the ruined warehouses were located, now near the operational building, to the westernmost point of the Gomilica hill.

- ◁ *Remnants of the land parceling of the old medieval saltworks*
- ▽ *View of a section of the old medieval saltworks from the south, with Gomilica in the background.*



ROAD NETWORK

On the Saline, traces of roads and pathways from different periods can be identified. One of the oldest roads was likely the one that partly followed the route of the current main road, along the Koložunj stream. In the 1736 sketch of the Saline, a road in the southwest part of the Saline is marked as "the road leading to the villages/rural area" (Strada ce va in Campagna). This road extended along Koložunj all the way to its mouth at the sea.

Based on the Austro-Hungarian cadastral maps from the first half of the 19th century, other pedestrian paths can be identified, including the path that leads over Gomilica to the Saline, as well as the road that passed Gomilica, over Poćečište, further to Tivat.

The Austro-Hungarian road from Tivat to Krtoli, which crosses the Saline, was built at the beginning of the 20th century, probably between 1907-1913. It was utilized in the 1960s, during the renovation of the saltworks, as one of the main embankments of the saltworks.

- ▽ *Road network and pathways with river and canal system from the 19th century*



NEW SALTWORKS FROM THE SECOND HALF OF THE 20TH CENTURY

In the second half of the 20th century, there was an attempt to revitalize the saltworks. The conceptual design for the "Solila" Saltworks was created in 1956, with construction planned to proceed in phases and operational stages. Unfortunately, this conceptual design has not been preserved. The main project for the first phase of construction, along with the project for the operational building and the pumping station, were completed in 1959. After works carried out in two stages, 1959-1961 and 1963, one-third of the total area of the saltworks, covering 250,000 square meters, was completed and put into operation in 1964. According to reports, salt was harvested at the saltworks for only two seasons.

The project for the new saltworks was based on contemporary approaches to saltworks design of the time. Unlike the medieval saltworks, which consisted of a larger number of smaller saltworks owned by different individuals, each functioning as separate entities with their own production processes, the new project envisaged the formation of the saltworks as a single organizational and technological unit, with phased implementation.

The first stage of constructing the new saltworks at the Saline was realized in the western part of the old saltworks. The area where it was built extended from the seashore on the west, partially reaching into the sea, to the Tivat-Krtoli road from the early 20th century on the east, encompassing the road and an additional 100 meters beyond it. During this period, part of the work was also carried out at the Poćečište location.

The professional manual for the design and construction of new saltworks from 1954 outlines the basic concept of their operation and organization.

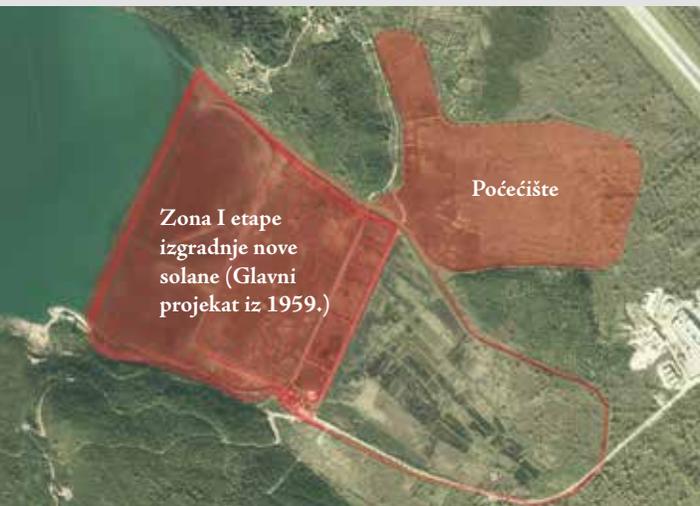
The entire area of the saltworks is divided into two main parts:

- part of the area where the concentration of seawater occurs from the initial state to full saturation, up to 25° Bé – concentration area or evaporation area
- part of the area where salt crystallizes and precipitates from saturated waters – crystallization area – salt deposition

The concentration of saline waters from the initial degree to full saturation is carried out over several groups of areas, which are divided into several sets of basins. Where possible, it is divided into four groups of areas: first evaporation, second evaporation, third evaporation, fourth evaporation. The area for the first evaporation usually constitutes 60% of the total surface area of the saltworks and is positioned so that the sea enters the highest set of basins in this group through a supply channel or by some other means using gravity, in order to avoid pumping large quantities of water. In the first evaporation, the concentration of saline waters usually reaches up to 7° Bé, in the second 12°-13° Bé, in the third up to 20° Bé, and in the fourth up to 25° Bé.

The crystallization area usually consists of one group of basins divided into several sets of basins, and the overflow of waters from the basins of one set into the basins of another set is carried out by gravity. The position of the crystallization basins depends on the configuration and elevation relationship of the saltworks terrain, but they are generally located on impermeable ground and constructed in smaller excavations because they hold the most valuable waters.

(Koludrović and Franić, Sol i morske solane 1954)



△ Zones where work was carried out in the 1960s, based on the conceptual and main project



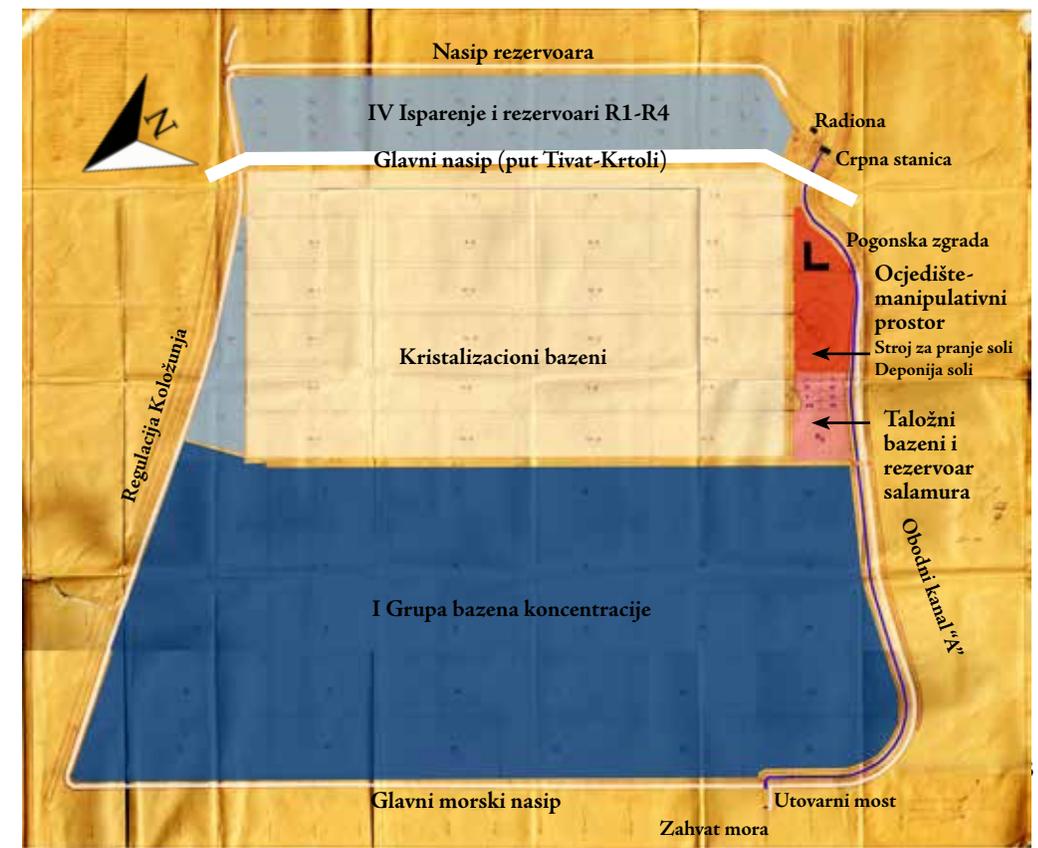
△ Project from 1959 on an orthophoto base

ORGANIZATION OF THE SALTWORKS AND PRODUCTION PROCESS

The part of the saltworks completed in the first stage of construction, based on the main project from 1959, included a zone bordered by a perimeter channel to the north, referred to in the project as “Koložunj” (which in fact represents the altered course of the Odoljenštica, also known as the Široka Rijeka), then by the perimeter channel “A” to the south (which regulated the waters of part of the Koložunj course), the sea embankment to the west, and the reservoir embankment to the east. With these embankments and perimeter channels, the surface of the saltworks in the first stage of construction was protected from the uncontrolled influx of water from the fields or the sea.

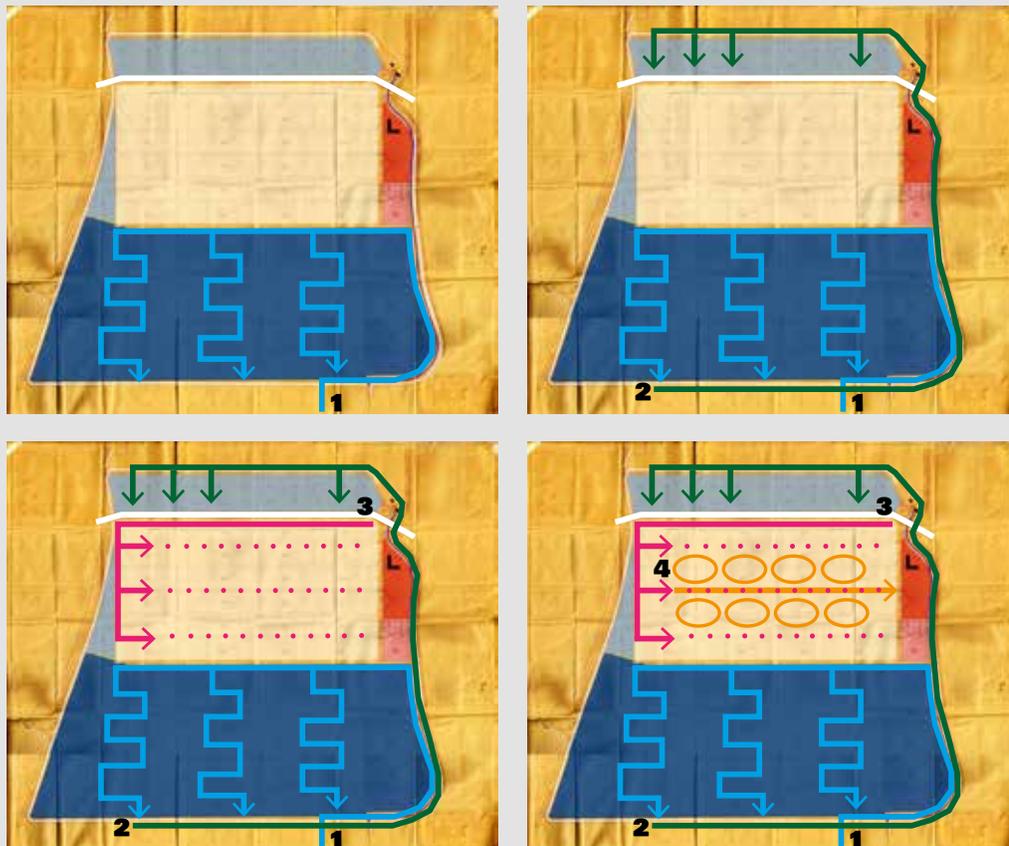
About 100 meters west of the reservoir embankment lies the main embankment of the saltworks, which was created by adapting the existing Austro-Hungarian Tivat-Krtoli road built at the beginning of the 20th century.

The saltworks' basins are arranged as follows: The first group of concentration basins is located immediately next to the sea embankment; the fourth evaporation basins and reservoirs are situated between the main embankment of the saltworks and the reservoir embankment; and the crystallization basins are located between the main embankment and the first group of concentration basins.



Description of the planned salt production process in the first stage of the Saline saltworks construction

From a technological standpoint, the saltworks is divided into concentration areas, crystallization areas, settling basins, reservoirs, and handling spaces. Saltwater is first brought into the first group of concentration basins via an intake channel with the help of a pump or by tidal influx. After passing through the basins in this group, the concentrated water is pumped to the fourth group of evaporation basins. Once it passes through these basins, the saturated water is channeled to the crystallization basins for production. After crystallization and collection, the salt is transferred from the crystallization basins via a “Decauville track” to the handling area, which includes a salt draining area, a salt washing machine, a salt mill, and storage. Finally, the salt is either loaded onto ships and transported by sea or onto trucks and transported by road. Reservoirs R1-R4 come into operation after the production season ends.



△ Outline of the process

The following sections describe the individual elements of the new saltworks, detailing their intended functions, the design and construction methods, and their current conditions.

THE MAIN EMBANKMENT OF THE SALTWORKS / OLD AUSTRO-HUNGARIAN ROAD TIVAT-KRTOLI

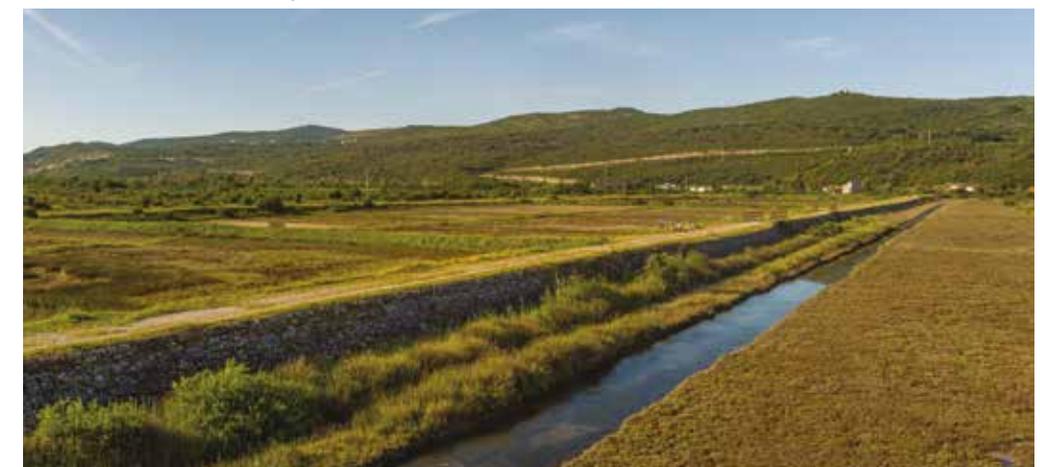
The main embankment of the saltworks utilizes the existing Austro-Hungarian road Tivat-Krtoli, which was built over the Saline at the beginning of the 20th century. During the construction of the saltworks in 1961, the embankment was created along this existing road. The embankment is lined on both sides with limestone blocks from the local area, each 30 cm thick. These stones were roughly hewn, varied in size, laid irregularly, and constructed using dry-stone walling techniques without mortar. There are six culverts within the embankment, likely constructed during the original road building, to allow the main waterways of the Saline to flow through. During the formation of the saltworks, concrete barrier elements were added to these culverts with removable wooden planks, enabling control

over the water release from the reservoirs. The openings above the culverts were reinforced with steel and concrete structures. According to information provided by local residents, there was previously a fence along the road with posts made from steel I-beams. Currently, wooden fences are installed in the areas above the bridges.



△ Detail of the main embankment

▽ Main Embankment of the Saltworks / Austro-Hungarian Road





△ Stone pillar of the Austro-Hungarian road with kilometer markings



△ Culverts on the Embankment

In the northern part of the embankment over the Široka Rijeka, there is a steel bridge. This bridge already existed during the construction work on the saltworks in the 1960s, suggesting it was built during the initial construction of the road in the early 20th century.

The main embankment of the saltworks is in good condition and serves as a crucial communication axis within the special nature reserve of Tivatska Saline.



△ Bridge on the Road / Main Embankment

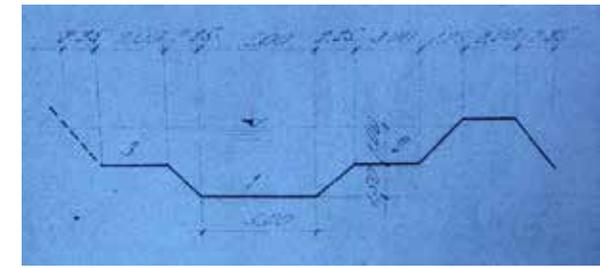
PERIMETER CANALS

To protect the saltworks from existing water flows from the Soliočkog Polje, their regulation was planned. On the northern side, the regulation of the Odoljenštica or Široka Rijeka was achieved by diverting its original course. A canal, referred to in the project as the perimeter canal “Koložunj,” was constructed. On the southern side, the perimeter canal “A” was regulated to receive part of the water from the Koložunj basin. The perimeter canals had embankments towards the central part of the saltworks.

After conducting soil tests before the start of the work, it was determined that the soil along the routes of the canals and embankments consisted of colloidal clay material, which is poorly permeable to water and thus suitable for the construction of embankments. Consequently, the embankments were made solely from earth, and no lining was planned. The embankments have a crown width of 2.0 meters to allow for communication, either

for worker access or for transporting salt for loading onto ships, as was intended for the embankment of perimeter canal “A.”

The perimeter canal and embankment “Koložunj” remain in relatively good condition today, while part of the embankment of perimeter canal “A” towards the sea is significantly damaged.



△ Cross-section of the regulation of Koložunj or Široka Rijeka, drawing from the Main project of 1959.



△ Regulation of Koložunj i.e. Široka Rijeka

SEA EMBANKMENT OF THE SALTWORKS

The sea embankment of the saltworks was constructed to protect the saltworks from seawater intrusion. It was built in the sea, in an area where the seabed depth ranged from 1 to 2 meters. The crown elevation of the embankment was 1.8 meters, which is 1 meter higher than the highest recorded sea level (0.8 meters). The crown width of the embankment was 2.0 meters, matching the width of the crowns of the perimeter regulation canals "Koložunj" and "A", to facilitate the movement of workers and wagons on the narrow-gauge railway for transporting salt for loading onto ships. Up to an elevation of +/- 0.1 meters, a stone foundation was formed in the sea, followed by the construction of the embankment, which was lined on the sea side with a 30 cm wide dry stone wall ("kaldrma") on a 20 cm

gravel base. The slope of the embankment sides was 1:1 on the sea side and 1:1.5 on the saltworks side.

Construction of the sea embankment was carried out during the first phase of the saltworks construction in 1961, as evidenced by temporary site reports that have been preserved.

The route of the sea embankment is still visible today, although it has significantly deteriorated due to lack of maintenance and exposure to the sea. In some segments, the stone foundation and part of the stone lining are still visible.

▽ Remains of the sea embankment of the saltworks



RESERVOIR EMBANKMENT

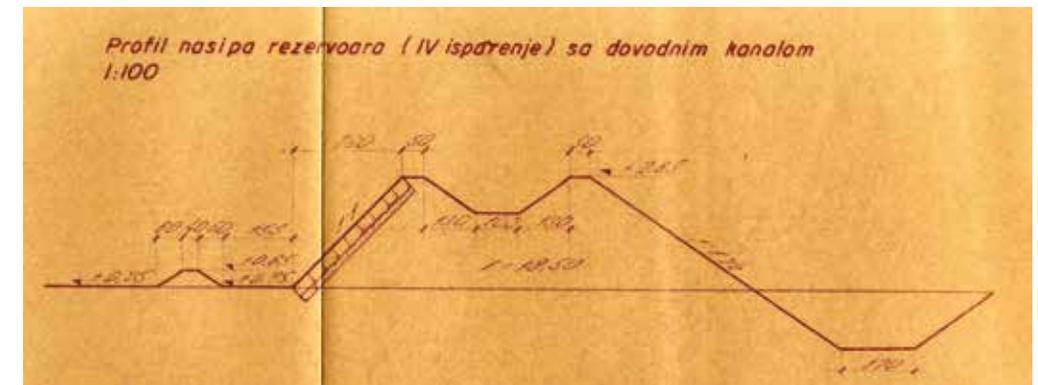
The reservoir embankment was constructed parallel to the Tivat-Krtoli road, approximately 100 meters east of it, with the aim of temporarily protecting the saltworks from field water during the first phase of construction. The permanent function of this embankment was to enclose the reservoirs and serve as a supply canal from the pump station to the reservoirs.

The crown elevation of the embankment was planned to be +2.85 meters, matching the height of the existing road. The crown width of the embankment is 4.6 meters to accommodate the planned supply canal on top, which was to

be 0.85-1.04 meters deep. The embankment, like the others, was made of clay soil, with a slope of 1:1 on the reservoir side, lined with a 30 cm thick dry stone wall of roughly cut local stone blocks on a 20 cm gravel base. The outer side of the embankment has a slope of 1:1.5 and is unlined.

The reservoir embankment is currently in good condition and, together with the main embankment and the transverse embankments of the IV evaporation basins, forms part of the main communication route within the special nature reserve.

▽ Cross-section of the reservoir embankment, drawing from the Main project of 1959.



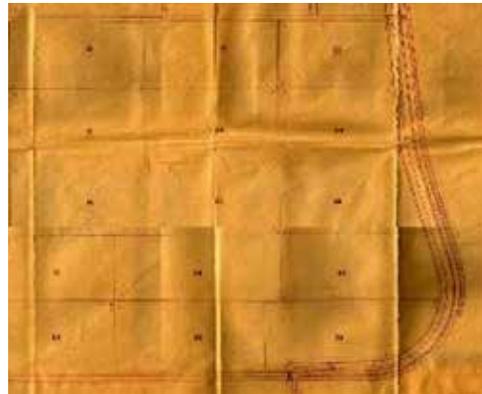
△ Reservoir Embankment

THE FIRST GROUP OF CONCENTRATION BASINS

The first group of concentration basins is located in the western part of the saltworks, adjacent to the sea embankment. Seawater was first brought into these basins via a supply canal using a pump or by tidal intake at the embankment of perimeter canal "A". This zone, covering a total area of 270,500 m², is divided into three subgroups called "releases", each consisting of 10 basins (1-10, 11-20, 21-30). Saline water is introduced into basins no. 1, 11, and 21, and as the water concentration increases, it is transferred to the subsequent basins, continuing this process until reaching the last basins in the subgroup (10, 20, and 30). The water is then released into the drainage canal towards the pump.

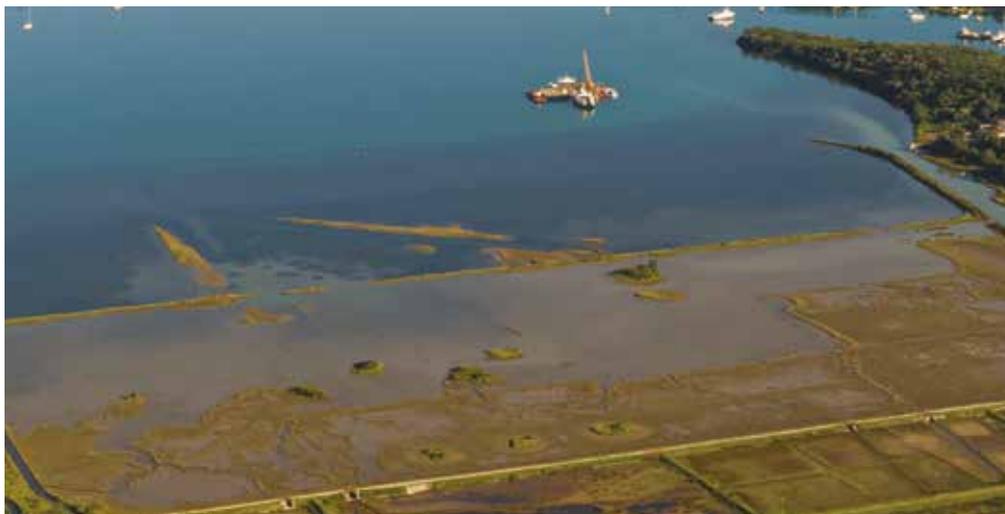
The basins were designed according to the terrain configuration, with the smallest elevation difference between two adjacent basins being 4 cm. All the embankments between the basins

were earthen, 40 cm high, with a crown width of 40 cm and a slope gradient of 1:1.5. Since this group of basins was directly adjacent to the sea embankment, which was damaged, they quickly deteriorated, and no remains are visible today.



△ Drawing of the salt pans base from the Main project showing the first group concentration basins

▽ Remains of the first group concentration basins under the sea, with crystallization basins and fourth evaporation basins in the foreground.



THE FOURTH EVAPORATION BASINS AND RESERVOIRS

Between the main embankment of the saltworks and the reservoir embankment are the fourth evaporation basins and reservoirs R1-R4. The entire zone consists of 22 basins, divided by three transverse embankments.



△ The Fourth Evaporation basins and reservoirs, between the main embankment and reservoir embankment (Remnants of the old salt pans are visible)

The top elevation of the transverse embankments was planned to be +2.85 m, aligning with the height of the main embankment/road and the reservoir embankment, although it was constructed slightly lower. The embankments were made of clay sourced from the site, with a slope gradient of 1:1 (45°), and were lined on both sides with approximately 30 cm thick dry stone paving. The width of the embankments at the crown is 1.00 m.



△ Cross-section of the embankment between reservoirs, a drawing from the Main project of 1959.

△ Embankments between reservoirs

The transverse embankments of the fourth evaporation basins and reservoirs are preserved, although overgrown with vegetation. The structure of the basins is largely intact, though in some segments, traces of the original parceling from the old medieval salt pans or the area used for the clay industry are visible.

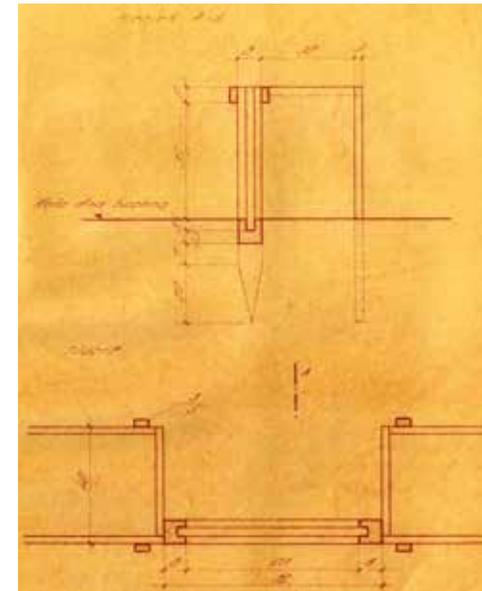
CRYSTALLIZATION BASINS

Below the main embankment of the salt pans/ road, there are crystallization basins where the final stage of salt production was carried out. These basins cover an area of 177,300 m² and consist of 6 rows with 4 basins each, totaling 24 basins, each with an area of 7,350-7,400 m² and a width of 50 m. The bottom of the crystallization basins is designed in a cascading manner both longitudinally and transversely to allow water to overflow from one basin to the next. The elevation difference between adjacent basins is 4 cm, resulting in a total difference of 32 cm.

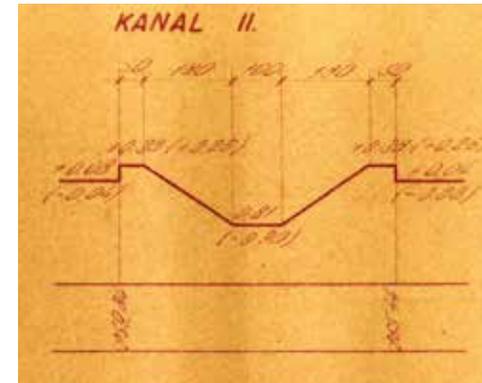
The crystallization basins have supply and drainage canals. The inner sides of the crystallization basins and supply canals were designed with a vertical wooden lining 40 cm high to protect the salt from contamination by soil. Wooden stakes were used to support this lining, many of which are still visible in various zones. The basic network of crystallization basins is mostly preserved and remains visible today, with the northern zone being better preserved than the southern zone.



△ Crystallization Basins



△ Gate of the crystallization basins on the supply canals, a drawing from the Main project of 1959



△ Cross-section of the drainage channel of the crystallization basins, a drawing from the Main project of 1959.



△ Canals of the Crystallization Basins



△ Remnants of the embankment of the crystallization basins

Between the crystallization basins and the first group of concentration basins, there is an embankment where the supply canal for the first group of concentration basins and the drainage channel for the crystallization basins are located. The remnants of these canals are still visible today.

OPERATING BUILDING AND PUMP STATION

The designs for the operating building and the “Solila” pump station were created in Zagreb on October 15, 1959, by the Architectural Design Bureau Ulrich, with engineer M. Vodička as the project designer. The investor was “SOLILA,” the company for salt exploitation in construction, Tivat.

Unfortunately, the project for the pump station has not been found. In the report on the “Solila” Pump Station Project, it is stated that “the facility is located on the southern side of the salt pans themselves, connected by a narrow-gauge railway, and the pump station connects the entire canal system and through them irrigates the second and third stage of the salt pans, which constitute separate salt pans with a common crystallization.”

In the project for the “Solila” operating building, it is stated that the task was to design an operating building to house offices, a laboratory, a storage area, and a salt mill. The operating building was supposed to enable the grinding, iodization, storage, and dispatch of bagged finished salt. Additionally, it was to house offices for workers, a laboratory, and sanitary facilities. Since the building was to

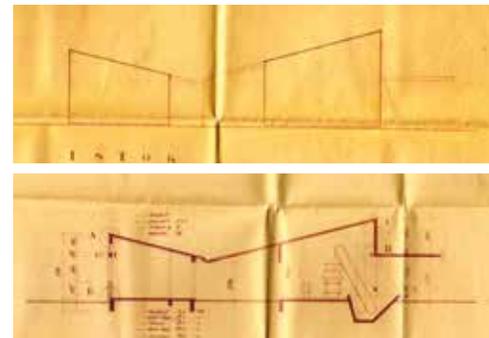


△ Situation plan showing the planned location of the pump station and operating building

accommodate two functions, this was reflected in its layout and structure. On the cover of the project, located in the State Archives of Montenegro, Archival Department – Kotor, it is handwritten “not executed” and “modified.”

According to the layout from the operating building project, the building itself was supposed to be located on the lower western side of the Tivat-Krtoli road, and the pump station on the upper eastern side of the road. However, it is evident that there was a change in the project, resulting in the construction of only one building, which probably included both the operating building and the pump station, located on the eastern side of the road. On the site where the operating building is today, there was a structure on the Austro-Hungarian cadastral plan. The site is called Vepravči on the map from 1851-1854, and Lukačovina on the map from 1869-1887 and all subsequent maps from the early 20th century.

The operating building, according to the project, has load-bearing vertical walls made of brick, and the ceiling is ribbed reinforced concrete. It is covered with channel tiles. The project specified that the facades should be partially plastered and



△ Drawings from the operating building project: east facade and cross-section

partially left in their natural material – concrete, while the storage and mill areas were to remain in raw brick. However, with the project modification, the facade treatment was changed, and the entire facade was clad with irregularly patterned stone slabs.

According to preserved interim situations from the second phase of construction work on the saltworks, in November 1963, work on the pump station included: building walls with dressed stone in cement mortar, concreting beams and walls, and creating a cross-reinforced concrete slab.

In the 1980s, a restaurant operated in this building. The building still exists today but is in a rather neglected state. Administratively, it does not belong to the “Tivat Saline” Special Nature Reserve, although functionally, it is certainly an integral part of the Saline and a valuable example of 20th-century architecture.



△ Operating building and pump station, north and east facade

LOCATION POĆEČIŠTE

Although the 1959 Main project only covered the first phase of the saltworks construction, it is evident that some work was carried out at the Poćečište location during the 1961 and 1963 construction phases. By diverting the Odoljenštica river, this area ended up north of the Široka Rijeka and the main part of the saltworks. In this zone, probably marked as the third phase of work, construction of evaporation basins and canals was done in 1961. The work included: “clearing thickets, shrubs, and rushes; removing humus; rough leveling of all evaporation areas; digging

canals; making embankments by compacting soil in 20 cm layers; creating evaporation basins and making a culvert from Ø500 concrete pipes for the drainage canal” (Interim Situation for the Construction of the “Solila” Saltworks Tivat, dated October 3, 1961).

Visible on the ground are remnants of the canals and embankments from that period, and satellite imagery shows traces of the orthogonal network laid out in the 1960s, as well as remnants of the original land parcelation.



△ Počecište



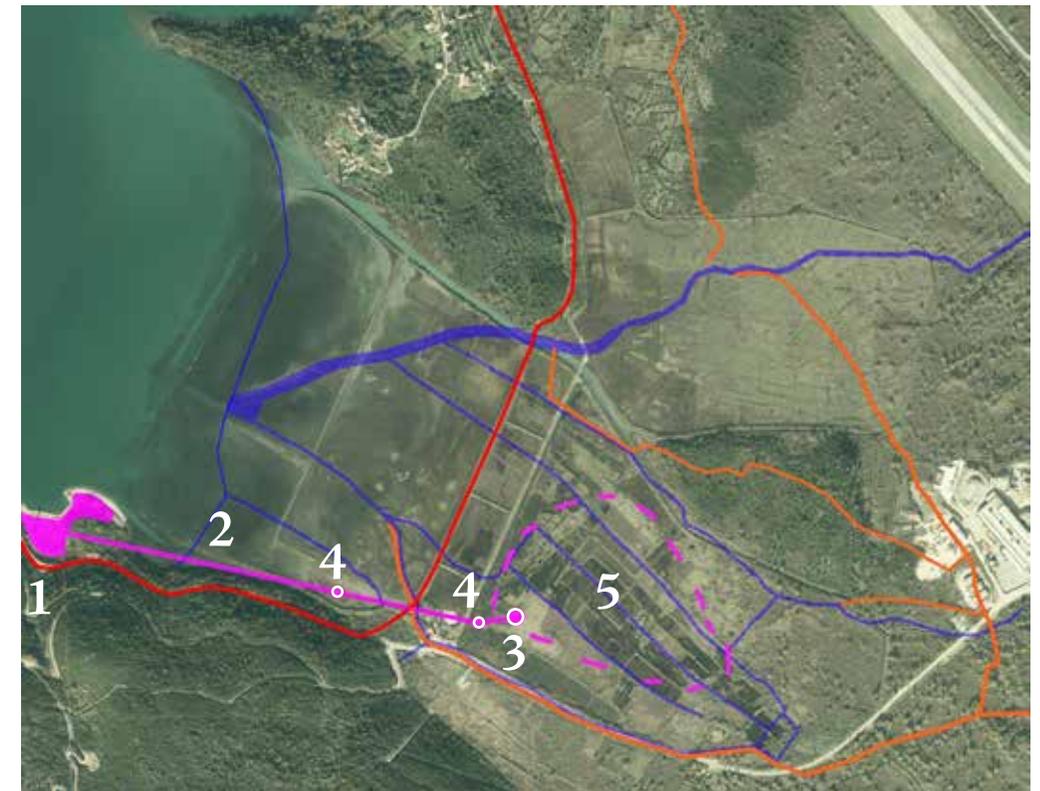
△ Počecište on an orthophoto base

ELEMENTS OF THE FIRST BAY OF KOTOR CLAY INDUSTRY KRTOLE

Near the Saline, at the Trsten site, the First Bay of Kotor Clay Industry Krtole operated from 1908 to 1949. This factory used clay from the Soliočko Polje, the site of an old medieval saltworks believed to have ceased operation at the end of the 17th century.

- ▽ *Elements of the clay industry: 1. Factory location
2. Route of the wire railway 3. Preserved
turning station 4. Preserved concrete bases 5.
Approximate clay exploitation zone*

In the report listing and describing the factory complex buildings, the following were mentioned: buildings housing presses and machines (ground floor and three stories), a building for offices and staff housing (ground floor and three stories), workshops, warehouses, drying buildings, water cisterns, a chimney for the circular kiln 48 meters high, and more. According to archival data from land registry books, the factory complex included: a dock, six drying rooms, a carpentry



and mechanical workshop, a coal storage, a warehouse, a water reservoir, a guardhouse, and a residential building. Sources indicate that the factory equipment was sourced from Austria. The only remaining structure of the factory complex is the factory chimney.

The sources mention that the exploitation area of the factory covered 300,000 m². Land from which clay was extracted, the raw material for the factory, were located in the area of the old medieval saltworks. Land registry books list lots owned by the First Bay of Kotor Clay Industry. Zones where clay was heavily extracted are still recognizable today because they are lower than the surrounding terrain and contain more water.

▷ *Bricks produced in the First Bay of Kotor Clay Industry in Krtole*

▽ *Preserved remains of the wire railway turning station*

A cable railway was built for transporting clay from the Saline to the factory. The railway was 900 meters long, designed for 16 wagons, with two stations. Within the factory complex, there was a building that housed the starting station of the cable railway, measuring 15 x 4.5 meters.

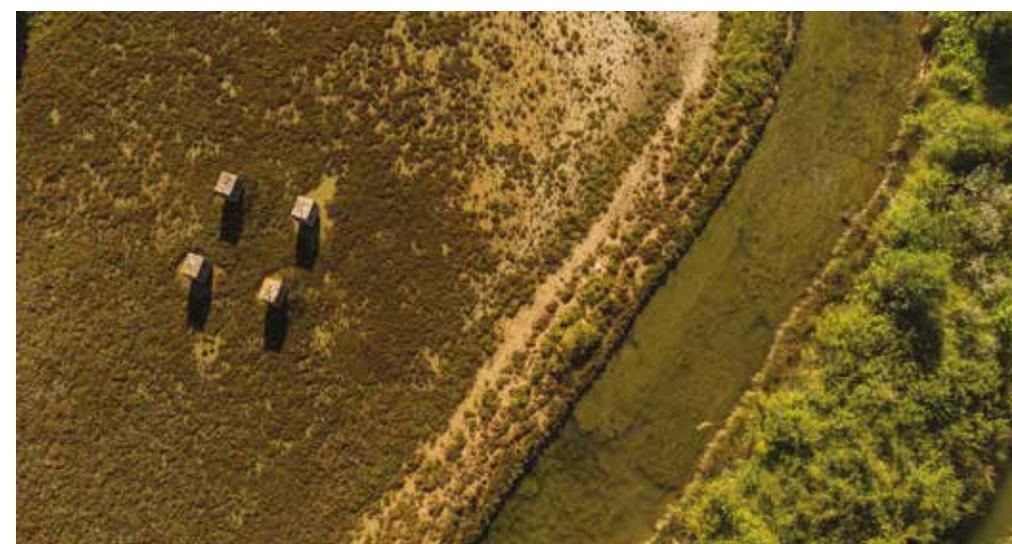


Preserved elements of this railway that can still be seen at the Saline include:

- ✦ Rotating station structure that was used as a rotating station for the cable railway transporting clay to the factory, is located in the central part of the Saline, east of the new saltworks operating building. The lower part of this structure is made of concrete, while the upper part has a circular base with segments of brick construction.
- ✦ Near the rotating station, there are remains of low concrete walls and basins, which were clearly part of the clay transport process, although their exact function cannot be determined at this time
- ✦ Square concrete bases which supported the railway structure, are preserved at two locations. Six bases are near the rotating station, and four are in the western part of the Saline, below the main road.



△ *Concrete bases of cable railway pillars near the turning station and the turning station*



△ *Concrete bases of cableway pillars in the western part of the saltworks*

ELEMENTS OF TRADITIONAL ARCHITECTURE IN THE CONTACT ZONE

Solioko Polje was not exclusively used for salt and clay exploitation. It was also very fertile agricultural land, particularly after the regulation of watercourses. The preserved parcelling of the area, with regulated water flows, along with some elements of traditional architectural heritage in the immediate contact zone of the Saline site, indicate that this area was a very significant agricultural zone.

Gomilica hill, which forms the natural boundary of the old medieval salt pans on the northeastern side, besides significant archaeological layers of defensive architecture from the ancient period, also has architectural heritage elements that confirm the area was part of a highly important broader agricultural zone, such as the Solioko Polje. According to the cadastral plan from the first half of the 19th century, from the Historical Archive in Kotor, this area contained vineyards, orchards, and pastures. On the hill, there are remnants of boundaries and retaining walls built using dry stone construction, indicating how the area was used and organized. Additionally, although quite overgrown, the route of an old pedestrian path across Gomilica is preserved. Furthermore, in the eastern and northern parts of the hill, there are remnants of two ground-level structures built in dry stone, which were likely auxiliary buildings on agricultural estates.



△ Remains of structures in the Eastern and Northern parts of Gomilica

In the immediate vicinity of the protected Saline site boundary, on its southeastern side, on one of the branches of the Koložunj stream, near the Jankova Voda spring, there is a stone bridge. The bridge has a shallow arch, above which slightly protruding steps remain, with only a few preserved in the upper zone. The bridge is built from finely carved local limestone with red lime mortar. Based on the construction method, it can be assumed, although not confirmed, that the bridge dates back to the Turkish period.

▷ Stone bridge in the field



THE SALINE AS NATURAL AND CULTURAL HERITAGE

The Saline, formed through centuries of utilizing the specific space of saline marshes, is a unique area and represents a significant segment of the natural and cultural heritage of the Bay of Kotor. Protected as an area of outstanding natural characteristics, the saline also harbors significant layers of cultural heritage and serves as a distinctive example of a cultural landscape.

“Heritage is our legacy from the past, what we live with today, and what we pass on to future generations. Cultural and natural heritage are irreplaceable sources of life and inspiration. They are our touchstone, our foundation, our identity.”

(Information Package on World Heritage, UNESCO World Heritage Centre)



△ Three types of herons at Solila: Spoonbill (*Platalea leucorodia*), Little Egret (*Egretta garzetta*), and Cattle Egret (*Bubulcus ibis*).

NATURAL VALUES

The Saline, due to its natural values, is recognized and protected as a natural asset at both national and international levels. Nationally, Tivat Saline has been protected as a special nature reserve since 2008. Covering an area of approximately 150 hectares, the protected area aims to preserve rare, sparse, and endangered animal and plant species, primarily ornithofauna and plant communities.

The Saline is a crucial point along the Adriatic flyway for birds. This reserve serves as an important wintering ground and resting place for birds during their autumn and spring migrations. Tivat Saline host 114 bird species out of the 330 species regularly seen in Montenegro. Cormorants, divers, gulls, terns,

▽ *Black-winged Stilt (Himantopus himantopus)* at the Saline.



and various duck species are common in the shallow marine waters in front of the Saline. Birds such as sandpipers and various species of herons regularly feed in the shallows, with species like the grey heron, great egret, and little egret observed throughout the summer. Considering that almost 109 out of the 114 recorded bird species enjoy some form of protection, including 11 species listed in Annex I of the EU Birds Directive, the significance of the Saline for population conservation is unquestionable.

In addition to birds, this area is home to a large number of other organisms (insects, fish, reptiles, amphibians, mammals, etc.). Fourteen species of amphibians and reptiles have been recorded in Tivat Saline, classified by the IUCN (International Union for Conservation of Nature) as "vulnerable," with three species globally endangered and on the brink of extinction.

Tivat Saline represents one of the last habitats of halophytic vegetation (vegetation adapted to life in saline habitats) on the eastern coast of the Adriatic. A typical representative of halophytes in the Saline is glasswort (*Salicornia europaea*), a plant that turns a deep red color in the autumn due to nitrogen deficiency in the saline soil.

The value of the Saline is also acknowledged internationally. Since it has been recognized as one of the most important wintering and nesting sites for birds in Montenegro, this locality was recognized in 2009 as an area of international importance for birds - IBA (Important Bird Area). The Saline is also identified as one of 32 areas of special interest for protection in Montenegro, as part of the Emerald national

ecological network under the Bern Convention for the protection of European wildlife, fauna, and natural habitats. Particularly significant is the designation of the Saline as a Ramsar site in 2013, listed as a Wetland of International Importance under the Ramsar Convention. Due to its importance and diversity of habitat types, this area is also on the preliminary Natura 2000 list, which Montenegro will establish upon joining the European Union.

▷ *Salicornia (Salicornia europaea)*



CULTURAL HERITAGE

In addition to its undeniable natural values, the Saline also possesses significant cultural-historical values, stemming from the way the local community has utilized the natural advantages and specific location of the area over centuries. It represent a segment of cultural heritage, although it is not yet formally protected as cultural asset.



△ *The cultural landscape of Tivat Saline*

The concept of cultural heritage has evolved and changed over time. In the 20th century, there was a shift from perceiving cultural heritage solely as individual objects to understanding the value of urban and rural complexes, extending to the overall landscape. Contemporary approaches to protecting cultural heritage recognize it as “encompassing all aspects of environment resulting from the interaction between people and places through time” (Faro Convention, 2005). One type of cultural heritage formally recognized at the international level in the late 20th century is the cultural landscape, which represents “combined works of nature and of man” (UNESCO, 1992).

The Saline undoubtedly represent a characteristic example of a cultural landscape. It is part of the protected environment of the Natural and Culturo-Historical Region of Kotor, which is on the UNESCO's World Heritage List due to its outstanding universal value reflected in the harmonious relationship between architectural heritage and natural environment. The Saline is one of the most significant elements of the protected environment covering the entire Bay of Kotor, and it best illustrates what we call a cultural landscape – the combined works of nature and of man.

RESEARCH AND PROTECTION OF THE CULTURAL HERITAGE OF THE SALINE

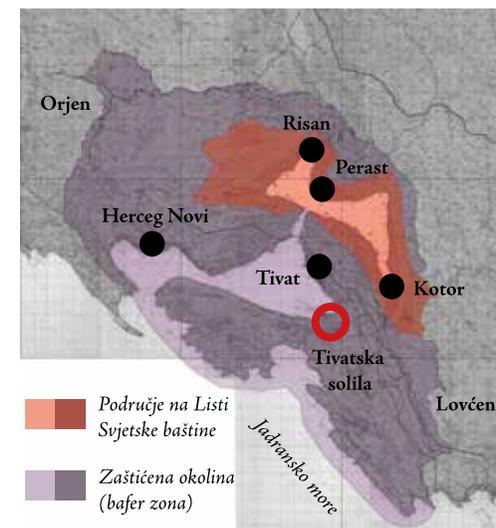
The first comprehensive scientific research focused on the significance of the Saline was carried out by Mladen Crnogorčević, a teacher and researcher from the Bay of Kotor, in the late 19th century. Crnogorčević provided a topography of the area where the saltworks were constructed, included a situation plan of the Saline from the 18th century, and shed light on the importance of the Saline since their earliest mentions during the time of the Balšić and Crnojević families, as well as during the rule of the Venetian, French, and Austro-Hungarian authorities. Additionally, he collected folklore and poems mentioning the Saline.

During the first half of the 20th century, numerous researchers, especially historians, continued to deepen their knowledge about this important economic resource in the Bay of Kotor.

However, it was not until archaeological artifacts were discovered and collected during the construction of the airport and renovation works of the salt pans in 1959 that archaeologists turned their attention to the eastern coast of the Tivat Bay and the salt pans themselves. In the mid-1960s, archaeological excavations were conducted in the areas of Luštica, Krtoli, and Grbalj, led by Jovica Martinović from Kotor (Maritime Museum) and Maja Parović-Pešikan from Belgrade (Archaeological Institute). Archaeological excavations on the Gomilica hill, located in the midst of the Saline, were undertaken by Maja Parović-Pešikan in 1966. The results of these excavations were

significant, as they determined that the visible defensive walls on the hill date back to the pre-Roman and Roman periods, while the parts of the paved road were chronologically dated to the ancient period, and the watchtower to the late antique period.

Although researchers' interest in the Saline lasted for more than a century, it was not until 2005 that it was first comprehensively studied as an important segment of cultural heritage. This was achieved through research accompanied by the exhibition “Tivat Saline, Study and Valorization,” conducted by the Regional Institute for the Protection of Cultural Monuments in cooperation with the Cultural Center of Tivat and Projektor - Center for Cultural Heritage, under the coordination of architects Zorica Čubrović from Kotor and Katarina Nikolić from Tivat.



△ Position of the Saline within the Protected Environment of the Natural and Culturo-Historical Region of Kotor

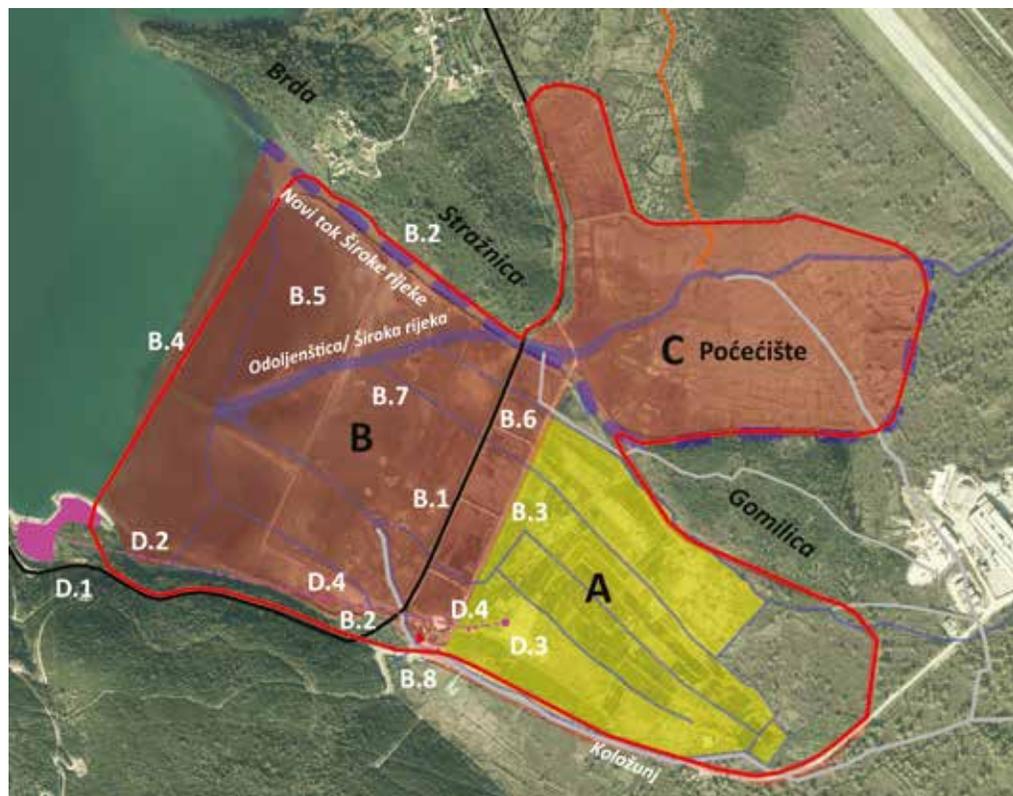
It is exceptionally important that in 2011, the Saline became part of the protected environment of the Natural and Culturo-Historical Region of Kotor. As an area of saline marshes and the site of medieval saltworks, it is one of the most significant segments of the protected environment of this cultural landscape of outstanding universal value.

The importance of preserving the Saline was also emphasized in the documents of the Administration for the Protection of Cultural Heritage in 2015, where they were recognized as an area with archaeological potential and as a potential cultural asset.

Through the research and analysis conducted during the preparation of the Study on the Protection of Cultural Heritage in the Special Reserve “Tivat Saline” in 2017, elements and characteristics of the cultural heritage of the Saline were identified. Due to the value of the entire area, it was proposed that it be protected as an immovable cultural asset - a cultural landscape. Based on the results of this study, the Public Enterprise for Coastal Zone Management of Montenegro, which has been managing the Special Nature Reserve “Tivat Saline” since 2014, submitted an initiative to the Administration for the Protection of Cultural Heritage of Montenegro to protect the Saline as a cultural landscape. The Administration accepted this initiative, but the Saline is still not formally protected as a cultural asset.

This book represents another contribution to promoting the value of the cultural landscape of the Saline.

MAP OF THE SALINE



△ Legenda:

- Border of the Special Nature Reserve "Tivat Saline"
- Water flows and channels, state from 1838
- Road network from 1838
- Austro-Hungarian road Tivat-Krtoli from the early 20th century

A- Zone of the old medieval salt pans

B - Zone of the new salt pans from the second half of the 20th century

B.1 - Main embankment of the salt pans / Old Austro-Hungarian road Tivat-Krtoli

B.2 - Peripheral channels

B.3 - Reservoir embankment

B.4 - Sea embankment of the salt pans

B.5 - First group of concentration basins

B.6 - Fourth evaporation basins and reservoirs

B.7 - Crystallization basins

B.8 - Operational building

C- Poćečište

D- Elements of the First Bay of Kotor Clay Industry

D.1 - Factory location

D.2 - Route of the cable railway

D.3 - Preserved turntable station

D.4 - Preserved concrete bases

LITERATURE AND SOURCES

- Bonin, F. (2015). Od kavedina do uporabnika; ne ladjo in v svet, u Piranske soline/Piran salt pans ed. Mitja Guštin, Univerza na Primorskem, Znanstveno-raziskovalno središče, Inštitut za dediščino Sredozemlja, Piran, 15–44.
- Božić, I. (1957). Selo Bogdašići u srednjem veku, Istorijski časopis, Organ Istorijskog instituta SAN, knjiga 7, Beograd, 83–121.
- Božić I. (1970). Doba Balšića; Zeta u Despotovini; Vladavina Crnojevića, Istorija Crne Gore vol. II, Od kraja XII do kraja XV vijeka; Titograd, 49–133, 135–275, 277–370.
- Crnogorčević M. (1893). Miholjski zbor u Boci Kotorskoj, Starinar X, Beograd, 1–73.
- Crnogorčević M. (1902). Solila (Ravan u području krtoljskome), Šematizam pravoslavne eparhije Bokokotrske, Dubrovačke i Spičanske za godinu 1902., Pravoslavne Konsistorije, Dubrovnik, 39–41.
- Ćirković S. (2011). Povelja cara Stefana Dušana o granicama Kotora, Stari srpski arhiv vol. 10(2011), Beograd. Čubrović Z. (2005). Tivatska Solila: proučavanje i valorizacija, Regionalni zavod za zaštitu spomenika kulture Kotor, Centar za kulturu Tivat, Projektor – centar za kulturno nasljeđe, Kotor, Tivat.
- Čubrović Z. (2005). Tivatska Solila: proučavanje i valorizacija, Regionalni zavod za zaštitu spomenika kulture Kotor, Centar za kulturu Tivat, Projektor – centar za kulturno nasljeđe, Kotor, Tivat.
- Dokoza, S. (2015). Zadarsko plemstvo i sol u drugoj polovici 14. i početkom 15. stoljeća. Povijesni prilozi, 34 (49), 86–123.
- Domines Peter, P. i Parica, M. (2021). Podvodno nalazište Sveti Juraj – Lisac i proizvodnja soli krajem brončanog doba. Archaeologia Adriatica, 15 (1), 133–176.
- Dragičević P. (2009). Dvije dubrovačke žalbe povodom prodaje soli u Sutorini, 1397, novembar 15, Građa o prošlosti Bosne vol. 2, Banja Luka, 99–109.
- Dragičević P. (2010). Povelja kralja Tvrtka I kojom ukida trg soli u Sutorini, Bišće 1382, decembar 2, Građa o prošlosti Bosne vol. 3, Banja Luka, 69–80.
- Đorđević J. (2005). Popis Grblja iz 1570, Grbalj kroz vjekove, Zbornik radova sa naučnog skupa „Grbalj kroz vjekove“, Grblj i Kotor, 11–13. oktobra 2001. godine, Grbalj, 215–230.
- Đurđev B., Hadžiosmanović L. (1973). Dva deftera Crne Gore iz vremena Skender-bega Crnojevića (druga sveska), Akademija nauka i umjetnosti Bosne i Hercegovine, Sarajevo.
- Džino D. i Domić Kunić A. (2013). Rimski ratovi u Iliriku. Povijesni antinarativ, Zagreb.
- Garašanin M. (1972). Crna Gora u doba rimskog carstva, Istorija Crne Gore vol. I, Od najstarijih vremena do kraja XII vijeka, Titograd, 143–267.
- Gecić M. (1955). Dubrovačka trgovina solju u XIV veku, Zbornik Filozofskog fakulteta u Beogradu 3, 95–153.
- Govedarica B. (2021). Monumentalni tumuli s područja Crne Gore i pitanje kontinuiteta kulnog mjesta (I dio – Primjer praistorijskih kneževskih grobova). Nova antička duklja XII, 7–31.
- Hadžibegić H. (1956). Nekoliko turskih dokumenata o Grblju u XVII st., Spomenik CV: Zbornik izveštaja o istraživanjima Boke Kotorske, Srpska akademija nauka, Beograd, 73–92.

- Hrabak B. (1976). Proizvodnja i prodaja soli u Herceg-Novom i odnosi s Dubrovnikom u vezi s tim (1482-1538), Boka zbornik radova iz nauke, kulture i umjetnosti 8, Herceg Novi, 63–109.
 - Hrabak B. (1972). Trgovina arbanaškom i krfskom solju u XIII, XIV i XV stoljeću, Balcanica III, Beograd, 237–272.
 - Jiriček K. (1952). Istorija Srba: prva knjiga do 1537. godine: Politička istorija, drugo ispravljeno i dopunjeno izdanje, Naučna knjiga, Beograd.
 - Krivokapić S. (2005). Krtoli u Boki Kotorskoj, Boka zbornik radova iz nauke, kulture i umjetnosti 25, Herceg Novi, 105–146.
 - Koludrović A., Franić M. (1954). Sol i morske solane, Udruženje rudnika i industrije nemetala, Zagreb.
 - Korać V. (1983). Ostaci materijalne kulture, Tivat (monografija), izd. Književne novine – Beograd, Veljko Vlahović – Beograd, 20–30.
 - Maliković D. (2007). Kotor i Grbalj u XV vijeku, Zbornik radova Filozofskog fakulteta u Prištini 36, 51-87.
 - Malović Đukić M. (2004). Kotorski kumerak solski u srednjem veku, Zbornik radova Vizantološkog instituta XLI, Beograd, 453–468.
 - Marković Č. (2005). Arheologija Crne Gore, CID, Podgorica.
 - Martinović J. (2017). Socijalno-ekonomska struktura društva u Kotoru prve polovine XIV vijeka, Pomorski muzej Crne Gore i OJU Muzeji Kotor, Kotor.
 - Mayer A. (1951). Kotorski spomenici: prva knjiga kotorskih notara od god. 1326-1335, JAZU, Zagreb.
 - Mayer A. (1952). Studije iz toponomastike rimske provincije Dalmacije, Gdje se nalazio stari Acruvium?, VAHD/L, 1928 i 1929, Split, 85–93.
 - Mayer A. (1981). Kotorski spomenici: druga knjiga kotorskih notara god. 1329, 1332-1337, JAZU, CANU, Zagreb.
 - Mažibradić A. (2015). Tivat kroz stoljeća – mjesto kmetova i gospodara, Donja Lastva.
 - Mijušković S. (1969). O rimskoj cesti kroz Boku Kotorsku, Boka 1, Herceg Novi, 33–51.
 - Mijušković S. (1956). Manufakture u Boki Kotorskoj 1834. godine, u Istorijski zapisi 1-2, Podgorica, 326–330.
 - Milošević, M. (1974). Granice Boke Kotorske u vrijeme mletačke vladavine (1420-1797). Godišnjak Pomorskog muzeja u Kotoru XXII, Kotor.
 - Milošević M. (1977). Grbaljske bune XV stoljeća, Radovi 10, Zagreb, 275–303.
 - Milošević M. (2008). Boka Kotorska, Bar i Ulcinj od XV do XVIII vijeka, CID, Podgorica.
 - Milošević M., Ćirković, S. (prir.) (2009). Statut grada Kotora, knj. I, II, III, Državni arhiv Crne Gore, Kotor.
 - Milović J. (1990). Istorijsko-geografski atlas Crne Gore, NIP Univerzitetska riječ, Nikšić.
 - Moškov D., Zloković M. (1983). Kulturno-istorijski spomenici na teritoriji tivatske opštine, Tivat (monografija), izd. Književne novine – Beograd, Veljko Vlahović – Beograd, 158–178.
 - Parović-Pešikan M. (1965). Novi arheološki nalazi u okolini Tivta, Starinar XIII–XIV/1962–63, Beograd, 211–217.
 - Parović-Pešikan M. (1968). Milovića lokve, Tivat – ilirske humke, Gradina, Sv. Luka Tivat – ilirsko naselje, Arheološki pregled 9, Beograd, 32–37.
 - Parović-Pešikan M. (1979). Arheološka istraživanja u Boki Kotorskoj, Starinar XXVIII–XXIX/1977–78, Beograd, 19–67.
 - Parović-Pešikan M., Martinović J., Trbuhović V., Savić-Trbuhović L. (1978). Pregled arheoloških spomenika na području južne obale Boke Kotorske, Starine Crne Gore VI, Cetinje, 141–165.
 - Parović-Pešikan M., Trbuhović V. (1974). Iskopavanja tumula ranog bronzanog doba u Tivatskom polju, Starinar, XXII, Beograd, 185–188.
 - Peričić Š. (2005). Prilog poznavanju stonske solane, Anali Dubrovnik 43, 139–163.
 - Petranović M. (1968). Razvoj industrije u priobalnom području Crne Gore do Drugog svjetskog rata, Istorijski zapisi 3, Podgorica, 455-466.
 - Piplović S. (2003). Prilog poznavanju dalmatinskih solana u XIX. stoljeću, Radovi Zavoda za povijesne znanosti HAZU u Zadru, sv. 45/2003, Zadar, 309–326.
 - Raukar T. (1970). Zadarska trgovina solju u XIV. i XV. stoljeću. Radovi Filozofskog fakulteta: Odsjek za povijest, (7-8), 19–79.
 - Sindik I. (1950). Komunalno uređenje Kotora, Od druge polovine XII do početka XV stoleća, SAN, Beograd. Posebna izdanja knj. CLXV, Istorijski institut vol. 1, Beograd.
 - Sindik D. (1983). Tivat kroz istoriju do 1918. godine, Tivat, Rijeka, 31–60.
 - Spremić M. (2005). Grbalj i Srpska despotovina (1421-1459), Grbalj kroz vjekove, Zbornik radova sa naučnog skupa „Grbalj kroz vjekove“, Grblj i Kotor, 11–13. oktobra 2001. godine, Grbalj, 193–213.
 - Stanojević G. (1976). Crna Gora od pada Crnojevića do Vladike Danila Petrovića, Crna Gora - monografija, Beograd, 176–193.
 - Stanojević G. i Vasić M. (2006). Istorija Crne Gore. knj. 3. Od početka XVI do kraja XVIII vijeka. Istorijski institut Crne Gore, Podgorica.
 - Stjepčević I. (1954, 2003 reprint). Kotor i Grbalj, Arhivska istraživanja Boke Kotorske, Gospa od Škrpjela, Perast, 181–318.
 - Šćepanović Ž. (1994). Cetinje u doba Crnojevića, Cetinje 1482–1982, CANU, Cetinje, 61–107.
 - Šekularac B. (1987). Dukljansko - Zetske povelje. Istorijski institut Crne Gore, Titograd.
 - Šerović P. (1958). Krtoljski arhipelag kroz istoriju, Godišnjak Pomorskog muzeja u Kotoru VII, Kotor.
 - Usmiani A. (1984). Paška solana i sol – proizvodnja i trgovina od 1797. do 1813. godine, Radovi Zavoda Jugoslavenske akademije znanosti i umjetnosti u Zadru, 153–177.
 - Vrzić M. (2005). Prilog proučavanju antičkih puteva i komunikacija na teritoriji južne obale Boke Kotorske sa kraćim osvrtom na ubiciranje Agruvijuma, Grbalj kroz vjekove, Zbornik radova sa naučnog skupa „Grbalj kroz vjekove“, Grblj i Kotor, 11–13. oktobra 2001. godine, Grbalj, 69–96.
 - Zaninović M. (1996). Sol u antici naše obale, Od Helena do Hrvata, Školska knjiga, Zagreb, 394–401.
 - Zaninović-Rumora M. (2012). Mjere za dužinu i površinu u Kotoru kroz stoljeća, Radovi Zavoda za povijesne znanosti HAZU u Zadru, 54, 35–46.
- Ancient Sources
 Pliny the Elder, *Naturalis Historia*, Karl Friedrich Theodor Mayhoff, Lipsiae. Teubner. 1906. <https://www.perseus.tufts.edu/hopper/text?doc=Plin.+Nat.+toc>

ARCHIVAL DOCUMENTS

- State Archives of Montenegro, Archive Section – Kotor, fund 6NOT, collection of Project Documentation 1959-60, f. I
- State Archives of Montenegro, Historical Archive of Kotor, archive fund Cadastral Administration Kotor - KUK, KO Đuraševići, maps and land registry entries
- State Archives in Split, HR-DAST-152, Archive of maps for Istria and Dalmatia, cadastral municipality Đurašević, 1838, sheets II and V.
- Austrian State Archives, Vienna, Second Military Survey 1851-1854.

PROJECTS

- Main Project for Phase I of the Construction of the “Solila” Tivat Saline, Volume I and Volume II
Investor: People’s Committee of Tivat Municipality, president Petković Daro
Project Company: “Geoistraživanja”, Zagreb, Kupaska 2, director Djirček Aleksandar
Designers: Franić Mladen, Radman Ivan
Zagreb, May 1959
- Project of the Operational Building “Solila”
Investor: “SOLILA” company for salt exploitation under construction Tivat
Architectural design office Ulrich, Zagreb, Petrinjska 7/II
Director: Arch. Antun Ulrich
Designer: Eng. M. Vodička
Zagreb, October 15, 1959

STUDIES, RESEARCH, MANAGEMENT PLANS

- Expert report for the protection of Tivat Saline, Republic Institute for Nature Protection, Municipality of Tivat, Podgorica/Tivat, October 2007
- Management Plan for the Natural and Cultural-Historical Area of Kotor, Ministry of Culture, Cetinje, December 2011
- Program for monitoring the state/changes in the special nature reserve “Tivat Saline” for 2015, Project Activity: Preparation of an Inventory of the current state of the special nature reserve “Tivat Saline”, “Winsoft” Ltd. Podgorica, October 2015
- Study on the valorization of archaeological sites in the Tivat municipality, Municipality of Tivat, Secretariat for Culture and Social Activities, Tivat, January 2017
- Cultural Heritage of Vrmac, Municipality of Tivat, Cultural Heritage Association Napredak Gornja Lastva, Expeditio, 2015
- Study on the protection of cultural heritage in the special reserve “Tivat Saline” in the Tivat municipality
- Kapetanović A., Vrzić M., Kastrati A., Expeditio architects, Kotor, September 2017
-

INTERNET

Internet portal for nationally protected areas of the Agency for Nature and Environmental Protection: <http://www.prirodainfo.me/>

Information on the Special Nature Reserve “Tivat Saline” on the website of the Public Enterprise for Coastal Zone Management of Montenegro: <https://www.morskodobro.me/me/zasticena-podrucja/mocvarna-zasticena-podrucja>

Information on the Special Nature Reserve “Tivat Saline” on the website of Parks Dinarides: <https://parksdinarides.org/specijalni-rezervat-priode-tivatska-solila/>

Information on Tivat Saline on the RAMSAR list of wetlands of international importance: <https://rsis.ramsar.org/ris/2135>

Slavko Krstović, Tivatska solila bez soli, Boka News, 18/12/2022: <https://bokanews.me/tivatska-solila-bez-soli/>

Slavko Krstović, Industrija koje više nema u Boki Kotorskoj, Boka News, 11/09/2022: <https://bokanews.me/industrija-koje-vise-nema-u-boki-kotorskoj/>

Lexicon of Montenegrin Dynasties, CANU 2023: <https://canupub.me/knjiga/leksikon-crnogorskih-dinastija/>

Topographic and cadastral maps: <https://maps.arcanum.com/en/>

About salt pans on the MedArtSal project website: <https://medartsal.com/salinas/>

Discover the salt pans: https://issuu.com/kpss/docs/knjiga_soline_web/9

PHOTOGRAPHS, MAPS, AND ILLUSTRATIONS

Photographs	
EXPEDITIO	10, 12, 38, 39 (top and middle), 48, 53 (top and middle), 55, 59 (top), 60, 61 (middle and bottom), 63, 64 (top), 66 (top), 67 (top), 68, 71
Dalibor Ševaljević	Cover photograph, 37, 39 (bottom), 53 (bottom), 54 (top), 56, 57, 58, 59 (bottom right), 61 (top right), 66 (bottom), 67 (bottom), 71 (bottom)
Miloš Mitkić	9, 69, 70
Anđelko Stjepčević, photograph provided by Anton Gula Marković from the Photo, Video, and Cinema Club "Mladost" Gornja and Donja Lastva	36
Photograph from Vuk Franović's album, provided by Lidija Franović	33 (bottom left)
Boka News Archive and Slavko Krstović	34
Bogdan Kušević	54 (bottom left)
Tivat : monografija, Književne novine – Beograd, Veljko Vlahović – Beograd, 1983	35
Private postcard archive	33 (top)
Illustrations, Maps, Drawings	
EXPEDITIO, based on Google Earth and orthophoto of the Saline provided by the Public Enterprise for Coastal Zone Management of Montenegro for the preparation of the "Study on the Protection of Cultural Heritage in the Special Reserve Tivat Saline"	11, 14, 19, 47, 49, 50, 51, 52, 65, 73, 74
Deutsche Fotothek	7
Topographic maps www.topografskakarta.com	13
Milović J. (1990). Istorijsko-geografski atlas Crne Gore, NIP Univerzitetska riječ, Nikšić.	16, 26, 27

Crnogorčević M. (1893). Miholjski zbor u Boci Kotorskoj, Starinar X, Beograd	28, 43
Grbalj kroz vjekove, Zbornik radova sa naučnog skupa „Grbalj kroz vjekove“, Grbalj i Kotor, 11–13. October, 2001	29
State Archives in Split, HR-DAST-152, Archive of maps for Istria and Dalmatia, cadastral municipality Đurašević, 1838, sheets II and V	31, 46
Austrian State Archives, Vienna, Second Military Survey 1851-1854	31
Montenegro State Archives, Historical Archives Kotor, archival collection Cadastre Administration Kotor - KUK, cadastral maps and land-register inserts, municipality Đuraševići	32
Boka : glasnik za opće interese Bokelja God. II, vol. 96, p. 3, 03-16.06.1909.	33 (bottom right)
Montenegro State Archives, Archival Section – Kotor, fond 6NOT, collection Project Documentation 1959-60, f. I; Main project for Phase I construction of the Saltworks "Solila" Tivat, 1959	34, 54 (bottom right), 57, 58, 59 (bottom left), 61
Montenegro State Archives, Archival Section – Kotor, fond 6NOT, collection Project Documentation 1959-60, f. I; Project for the Operations Building of "Solila," 1959	62
Orthophoto of Solila provided by the Public Enterprise for Coastal Zone Management of Montenegro for the preparation of the "Study on the Protection of Cultural Heritage in the Special Reserve Tivat Salina"	64

