Trgovska gora : [booklet]

Hruškova Hasan, Michaela; Mileusnić, Marta; Maričić, Ana; Skitarelić, Adelita

MINEHERITAGE | eit RawMaterials ACADEMY

Trgovska gora

Trgovska gora

MINEHERITAGE | eit RawMaterials ACADEMY

This booklet was created in the framework of the Project MineHeritage / Letak je pripremljen u sklopu projekta MineHeritage:

Historical Mining – Tracing and Learning from Ancient Materials and Mining Technology

Booklet/Letak: nº1, v. 13 – Trgovska Gora

Text/Tekst: M. Hruškova Hasan, M. Mileusnić, A. Maričić, A. Skitarelić, UNIZG-RGNF Zagreb

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation

Mining Wealth

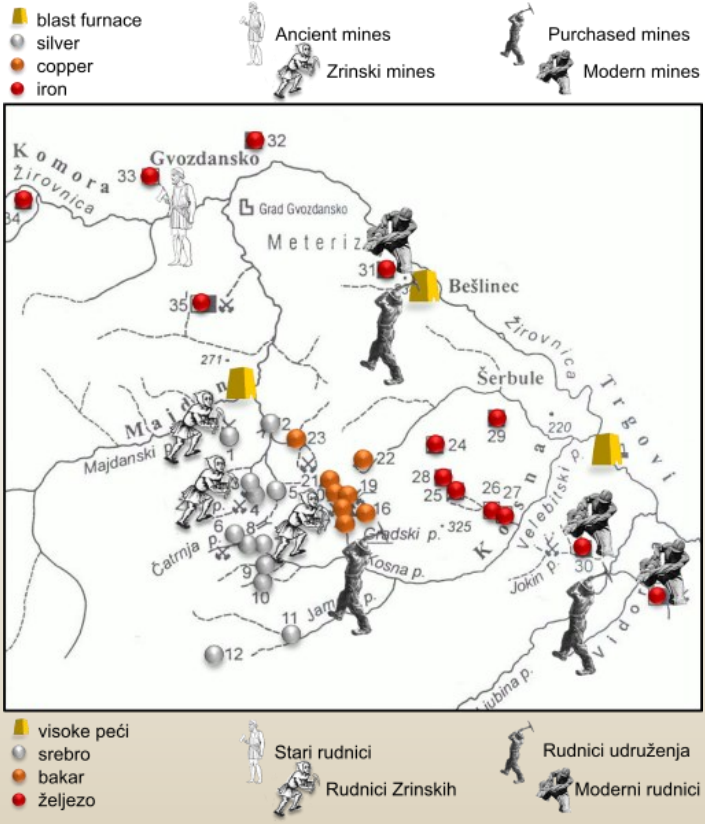
Trgovska gora is located in the southern part of central Croatia, in the Sisak-Moslavina county whose administrative centre is the city of Sisak. This region is unique due to abundant metal ore deposits that have been mined since antiquity. Intensive mining began in the Ilirian and Roman times and was accompanied by a significant development

Locality Trgovska gora / Lokalitet Trgovska gora (http://os-veruda-pu.skole.hr/upload/os-veruda-pu/images/static3/1094/attachment/8._razred_-_Drustveno-geografska_obiljezja_Hrvatske_(slijepa_karta).jpg, accessed/preuzeto 13.12.2019)

Rudno bogatstvo

Trgovska gora nalazi se na jugu središnje Hrvatske u Sisačko-moslavačkoj županiji, čiji je administrativni centar grad Sisak. Posebnost ovoga područja je njegovo rudno bogatstvo. Intenzivno rudarenje započelo je u davnoj prošlosti te je stvorilo temelj za snažan

of metallurgy. Mining was present in the entire region of Trgovska gora. Most frequently exploited ores were **iron** and **copper**, as well as **lead-silver** ores. Iron was predominantly extracted from limonite – an ore whose main constituent is the mineral goethite. It was also extracted



Mines in Trgovska gora (modified from [3]) / Rudnici Trgovske gore (modificirano iz [3])

razvoj metalurgije. Rudnici su se nalazili na cijelom području Trgovske gore. Dominantno su vađene rude **željeza** i bakra te **olovno-srebrene** rude.

Željezo se uglavnom pridobivalo iz limonita (rude čiji je glavni sastojak mineral goethit), siderita i pirita. Bakar se najčešće dobivao iz siderita i sulfidnih minerala kao što su halkopirit, halkozin, tetraedrit i bornit, koji su se u srednjovjekovnoj rudarskoj praksi

from siderite and pyrite. Copper was mainly obtained from siderite as well, but also from sulphide minerals such as chalcopyrite, chalcocite, tetrahedrite and bornite.
Lead and silver were obtained from galenite, which is often referred to as *lead glance* because of its strong metallic luster. Other minerals found in the area of Trgovska gora include sphalerite, covelline, malachite, cuprite, ankerite, azurite and many others, associated with the aforementioned minerals, in addition to quartz, which is almost

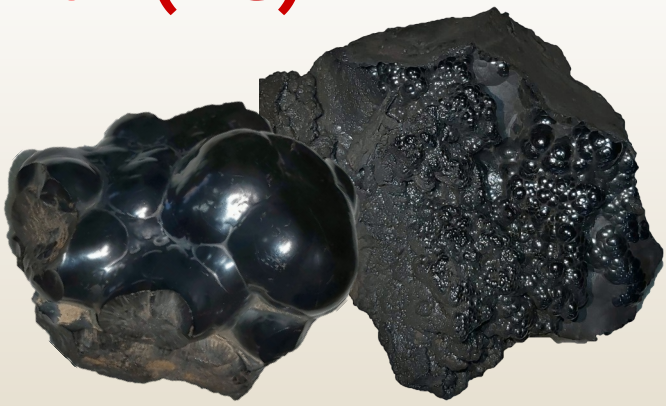
Silver (Ag)

Srebro (Ag)

nazivali i *sinjavci* zbog svoje karakteristične tamno-sive boje. Olovo i srebro dobivali su se iz galenita, koji se često zbog svog jakog metalnog sjaja naziva i *olovni sjajnik*.
Na području Trgovske gore su pronađeni također sfalerit, bornit, halkozin, kovelin, malahit, kuprit i brojni drugi minerali, koji su se uz gotovo uvijek prisutan kvarc, nalazili zajedno s prethodno spomenutim mineralima.
Rudnici željezne rude u Komorskoj glavici kod

always present. The iron ore mines in Komorska Glavica near Gvozdansko have been exploited since the Roman and Illyrian times. Similar ores were also found in Kosna, Vinogradine and in the "Barbara" mine. Ore deposit was dominantly of Upper Palaeozoic age (359-304 Ma), whit parts formed in Mesozoic deposits by Middle Triassic (247-237 Ma) submarine volcanism. Tertiary deposits of limonite were found in the area of Jokin potok and in the de-

Iron (Fe)



Željezo (Fe)

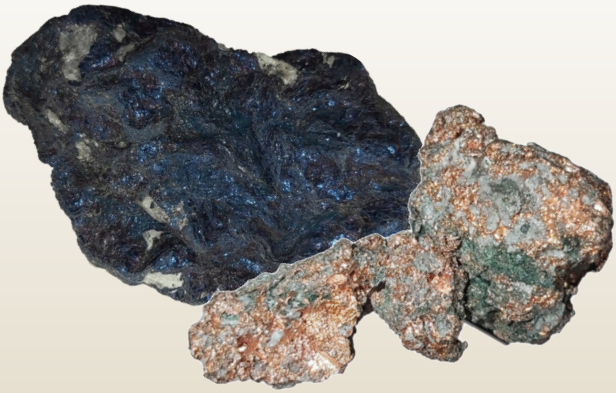
Gvozdanskog eksploatirani su od doba Rimljana i Ilira. Osim njih, postoje tragovi nekadašnjih rudnika i u Kosni, Vinogradinama te u rudnom polju „Barbara".

Dominantno su gornjopaleozojske starosti (359-304 mil. god.), a značajno orudnjenje pronađeno je i u mezozojskim naslagama nastalim pod utjecajem srednjotrijskog (247-237 mil. god) submarinskog vulkanizma. Tercijarna nalazišta limonita pronađena su na području Jokinog potoka te u ležištu Me-

posit of Meterize, which represented the most significant iron mine before WWII.

Copper ore deposits were recorded in the area of Gradski potok (August mine) – Svinica – Kosna Glavica. The deposits of silver-bearing lead ore were located in the wider area of Mali Majdanski potok, Zrin potok and Šumoviti potok, as well as the area of Četrnja (Upper Paleozoic layers) and Manašnica potok (tributaries of Velebitski potok and Jamski potok) and along the slope of Zorić Kosa.

Copper (Cu)



Bakar (Cu)

terizama koje je predstavljalo najznačajniji rudnik željeza prije 2. svjetskog rata.

Nalazišta bakrene rude zabilježena su na području Gradski potok (rudnik August) – Svinica – Kosna glavica.

Nalazišta srebrenonosne olovne rude pružala su se širim područjem Malog Majdanskog potoka, Zrin potoka i Šumovitog potoka, kao i uz potok Četrnju i Manašicu, pritoke Velebitskog potoka i Jamskog potoka te uz padinu Zorića Kose.

History of mining

Mining in Trgovska gora goes back to the ancient times of Iliric tribes and the Roman Empire. It is assumed that the ore was exploited and used in Siscia (nowadays Sisak).

Intensive mining was introduced by the Zrinski family. In 1347, King Louis I of Hungary donated the Zrin fort and the surrounding land to the counts of Bribir, the Šubić family. Afterwards, this branch of the Šubić family changed its surname and became the counts of Zrin (Zrinski).

Fortification of Gvozdansko / Utvrda Gvozdansko (Available at: https://povijest.hr/bitkeiratovi/gvozdansko-nepoznata-prica-o-hrvatskom-junastvu/ accessed 12.12.2019.)

Povijest rudarstva

Rudarska aktivnost na području Trgovske gore vuče korijene još iz doba Ilira i Rimskog carstva, pri čemu je vađena sirovina prvenstveno korištena u Sisciji (današnjem Sisku).

Jačanje rudarenja povezano je s obitelji Zrinski, počeci čijega uspona sežu u 12. stoljeće. Godine 1347. hrvatsko-ugarski kralj Ludovik I. Anžuvinac poklonio je utvrdu Zrin i okolna dobra knezovima Bribirskim od plemena Šubića te se otada jedna grana te veli-

In 1463, king Matthias Corvinus allowed Petar Zrinski to mine gold, silver, copper and other metals. Moreover, he waived his right to the royal mining tax, allowing Zrinski to keep the entire income.

Due to the threat of the Ottoman Empire, Zrinski built the fortress of Gvozdansko in 1488. Around 1524, a mint was established, and silver coins were made. In addition, there were a smelter and foundry, which made it possible to make beautiful pennies, groshes, and tallies with various engravings (mostly coats of arms, characters, and initials - from those of mine owners to the initials of the mould cutter).

Tallies of Zrinski / taliri Zrinskih—Arheological museum in Zagreb / Arheološki Muzej u Zagrebu, inv. E21714, by: Igor Krajcar, AMZ

kaške obitelji Bribirskih počinje nazivati knezovima Zrinskima. Zrinska gora bila je bogata rudama, što je obitelj Zrinski htjela iskoristiti. Godine 1463. Petar II. Zrinski je od kralja Matije Korvina dobio dozvolu za vađenje zlata, srebra, bakra i drugih kovina. Osim toga, dopušteno mu je da zadrži prihode te nije morao plaćati kraljevski rudarski porez. Zbog prijetnje Osmanskoga carstva Zrinski su 1488. godine izgradili utvrdu Gvozdansko. Oko 1524. u Gvozdanskom je otvorena kovnica novca te se počeo kovati srebrni novac. Uz kovnicu novca nalazile su se i talionica i

In 1529, King Ferdinand authorized Nikola III Zrinski to forge Hungarian coins - pfennigs. During that year, 600 tons of ore were extracted from the mine, with 50 tons of lead and 19.63 kilograms of silver produced. A year later, Nikola defined and prescribed the sequence of operations of the mine and the mint and leased the entire enterprise to Leonard Gruber of Samobor and Mark Stettner of Ljubljana.

In 1540, 1574 and 1576, Gvozdansko was under attack

Nikola IV. Zrinski Sigetski (Available at: https://matica.hr/hr/530/nikola-iv-subic-zrinski-27448/, accessed 12.2.2020)

ljevaonica, što je omogućilo izradu prekrasnih denara, groša i talira s različitim gravurama (uglavnom grbova, likova i inicijala – od onih vlasnika rudnika, pa sve do inicijala rezača kalupa). Godine 1529. kralj Ferdinand je Nikolu III. Zrinskog ovlastio za kovanje ugarskih feninga a iste je godine iz rudnika izvađeno 600 tona rude, od koje je proizvedeno 50 tona olova i 19,63 kilograma srebra. 1530. Nikola III. propisao je način rada rudnika i kovnice te je cijelo poduzeće dao u zakup Leonardu Gruberu Samoborskom i Marku Stettneru Ljubljanskom.

from the Ottoman Empire. The fourth and last siege lasted for three extremely cold months and it ended with the death of brave defenders who refused to surrender.

„…and then Ferhad-Pasha changed tactics and decided on a night-time attack…just as the onslaught was about to begin, all the torches went out. Fearing the possible trap, he aborted the attack until the next morning. On Monday, the 13th of January 1578…everything was still. When they entered the main yard, they saw dead bodies of defenders. The harrowing sight impacted Ferhad-Pasha so greatly that he allowed the burrial of the dead according to Christian customs."[6]

Zrinski coat of arms / Grb Zrinskih (Available at: https://povijest.hr/nadanasnjidan/kako-je-izumrla-slavna-dinastija-knezova-zrinskih-1703/, accesseed 12.2.2020)

Tijekom 1540., 1574. i 1576. godine Gvozdansko je bilo pod najezdom Osmanskog carstva. Četvrta i zadnja opsada trajala tri iznimno hladna mjeseca, te završila smrću hrabrih branitelja koji se nisu predali.

„…Tada je Ferhad-paša promijenio taktiku i odlučio se na noćni napad … baš kad su trebali krenuti u juriš, na zidinama Gvozdanskog pogasile su se sve baklje. Strahujući od eventualne klopke, zapovjedio je odustajanje do idućeg jutra. U ponedjeljak, 13. siječnja 1578. … sve je bilo tiho. Ušavši u glavno dvorište, vidjeli su mrtva tijela branitelja. Taj se stravični prizor Ferhad-paše toliko dojmio da je dopustio pokopati poginule hrvatske branitelje prema kršćanskim običajima."[6]

The mines were abandoned until April 1705. In 1703, the last Zrinski died in captivity. The mines then became the property of the crown, with the area assigned to the Military Frontier. The clash of authorities caused many problems for all future mine owners.

Copper, silver and led were mined again in Gvozdna valley in 1707, by Ivan Chinetti & Co. In 1795, *Triester Compagnie* took over the mining enterprise. Tadija Rauscher was employed to supervise and improve mining. He saw the potential in iron ores and suggested building blast furnaces.

Blast furnace in Bešlinec / Visoka peć u Bešlincu, 1935 (from [4])

Rudnici su potom bili napušteni sve do travnja 1705. godine. Godine 1703. umro je zadnji Zrinski u zatočeništvu, rudnici su prešli pod kraljevsku vlast, a područje je pripalo Vojnoj krajini. Sukob vlasti prouzročio je probleme svim nadolazećim vlasnicima rudokopa. Godine 1707. Ivanu Chinettiju i njegovim poslovnim partnerima dozvoljeno je rudarenje bakra, srebra i olova a 1795. godine rudarenje preuzima *Triester Compagnie*. Tadašnji upravitelj Tadija Rauscher uvidio je veliki potencijal vađenja željeza te je predložio izgradnju visokih peći što je i ostvareno nakon njegove smrti. Godine 1838. rud-

His idea was realized after his death. In 1838, the mines were sold to Joseph Steinauer, who invested in mining by putting three steam plants into operation, opening a new blast furnace and new mines. In 1855, Desire Gilan bought mines in Bešlinec, but in 1879 the copper market collapsed, and mines swiftly changed owners many times. Vjekoslav Frohm stands out amongst all of them. He employed 78 workers in 1887. At the turn of the century, in

Remains of blast furnace in Bešlinec / Ostaci visoke peći u Bešlincu, (References, notes / Reference, napomene)

nici su prodani Josipu Steinaueru koji je investirao u rudarstvo te stavio u funkciju tri parna pogona, otvorio novu visoku peć i nove rudokope. Godine 1855. Desire Gilan kupuje rudnike u Bešlincu, no 1879. godine tržište bakrom je kolabiralo te je došlo do smjene vlasnika rudnika. Vjekoslav Frohm je 1887. godine zaposlio 78 radnika. Godine 1901. je belgijsko udruženje *Societe anonyme des hauts four-*

1901, a Belgian association *Societe anonyme des hauts fourneaux, mine et forets en Croatie-Trgove-Bešlinec,* invested in the building of a new blast furnace and re-opened copper production. Railway finally reached Bešlinec in 1917 from Bosanski Novi, with a side railway reaching Gradski potok from Kosna.

After 1923, mines changed hands several times. Mining finally stopped in 1966, when Meterize and Jokin potok mines were closed for not being profitable.

Blast furnace in Bešlinec / Visoka peć u Bešlincu (from/iz: Izvještaj sa stručnog obilaska "Industirjska ruta Zrinski", Natalija Dolić, 7.10.2017)

neaux mine er forets en Croetie-Trgove-Bešlinec investiralo u izgradnju nove visoke peći te je obnovilo produkciju bakra. U Bešlinec je uskoro došla i željeznica iz Bosanskog Novog, s tim da je u Kosni napravljen odvojak za Gradski potok. Nakon 1923. godine rudnici su u više navrata mijenjali vlasnike. Rudarenje je u konačnici prestalo 1966. godine kada su rudnici Meterize i Jokin potok zatvoreni zbog slabe rentabilnosti.

References

Literatura

[1] Jurković, I.: Mineralne sirovine sisačkog pordručja, Rudarsko- geološko-naftni zbornik, vol. 5, 39-58, 1993.

[2] Laszowski, E.: Rudarenje u Hrvatskoj, svezak II, 1944.

[3] Šebečić, B.: O rudarskom poduzetništvu u Banovini (Hrvatska), Rudarsko-geološko-naftni zbornik, vol. 12, 99-124, 2000.

[4] Kolar-Dimitrijević, M: Rudarstvo i talioničarstvo, Prilog povijesti Bešlinca, Donjih Trgova i drugih rudnika željeza i bakra na području Dvora. Dvor na Uni—knjiga—prvi dio, Zbornik naučnih i publicističkih radova, 1991.

[5] Zrinska gora, regionalni park prirode, Petrinja 2010., ISBN –978-953-6668-46-5.

[6] Hrvoje Kekez: Pad Gvozdanskog 1578. godine, https://alfaportal.hr/index.php/predmetna-povijest/1188-pad-gvozdanskog-1578, 18.2.2020

Notes / Napomene

Fornt page / Naslovna strana

Blast furnace in Bešlinec / Visoka peć u Bešlincu, Ministry of culture, Directorate for the Protection of Cultural Heritage, Conservation Department in Sisak / Ministarstvo kulture, Uprava za zaštitu kulturne baštine, Konzervatorski odjel u Sisku.

Photos of minerals / Fotografije minerala (ZMPMS/RGNF)

Collection of the Department of Mineralogy, petrology and mineral resources, Faculty of Mining, Geology and Petroleum Engineering / Zbirka zavoda za mineralogiju, petrologiju i mineralne sirovine Rudarsko-geološko-naftnog fakulteta.

This booklet was created in the framework of the Project MineHeritage / Letak je pripremljen u sklopu projekta MineHeritage:

Historical Mining – Tracing and Learning From Ancient Materials and Mining Technology

Check out more sites and information / za više informacija pogledajte

www Twitter Facebook LinkedIn YouTube

or send an E-Mail to jpv@fct.unl.pt

eit RawMaterials ACADEMY

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation