Razstava / Exhibition

Anno Domini 1511

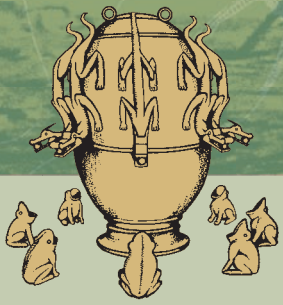
Ob 500-letnici največjega potresa na Slovenskem

On the 500th anniversary of the largest earthquake in Slovenia

Idrija, Grad Gewerkenegg
26. 3. – 10. 5. 2011

Škofja Loka, Sokolov dom
22. 6. – 22. 7. 2011

Tolmin, Tolminski muzej
8. 9. – 6. 11. 2011



Vabimo vas, da se skupaj sprehodimo skozi razstavo Anno Domini 1511, odkrijemo dogodke, ki so zaznamovali 16. stoletje, podoživimo posledice uničujočega potresa, oživimo podobo Idrije in Tolmina v tem času ter spoznamo vzroke nastanka potresov.

You are invited to walk with us through the Anno Domini 1511 exhibition and discover the events that marked the 16th century, relive the consequences of devastating earthquake, find out what Idrija and Tolmin looked like in those days and learn about the causes of earthquakes.

Novi vek – 16. stoletje

Novi vek se je začel z odkritjem Amerike, kar je sovpadlo z odkritjem živega srebra v Idriji. Obdobje so zaznamovali številni dogodki in nesreče, ki niso prizanašale prebivalcem. Pestile so jih pogoste bolezni, še posebej epidemije kuge, lakota in skrb za preživetje. Socialne nepravičnosti so pripeljale do izbruha kmečkih uporov leta 1515. V zraku je visela nenehna nevarnost pred turškimi vpadi. Turški konjeniki so večkrat plenili tudi po bližnji okolici Idrije ter sejali grozo in smrt.

Stalne napetosti med Habsburžani in Benetkami zaradi boja za premoč nad severnim Jadranom in Furlanijo so v začetku 16. stoletja sprožile dolgotrajno beneško vojno. Habsburžani so bili uspešnejši. Uspelo jim je premagati tekmece in pridobili so Tolminsko, Idrijsko in Bovško.

The Modern Age – the 16th century

The modern age began with the discovery of America, which coincided with the discovery of mercury in Idrija. The 16th century was a turbulent time for this area, marked by numerous incidents and disasters that did not spare the local population. Diseases were frequent, particularly plague epidemics. Social injustices led to a rash of peasant revolts in 1515. The constant danger of Turkish raids hung in the air. Ottoman horsemen frequently robbed and pillaged in the immediate surroundings of Idrija, sowing terror and death.

In the early 16th century, the constant tensions between the Habsburgs and the Venetians for supremacy over the northern Adriatic and Friuli spilled over into a lengthy Austro-Venetian war, from which the Habsburgs emerged victorious. They succeeded in overcoming their opponents and in doing so obtained control of the Tolmin, Idrija and Bovec areas.

Goritiae, Karstii, Chaczeolae, Carniolae, Histriae et Windorvm Marchae ..., 1573. (D. Brezigar, S. Bačar)

Žiga Herberstein leta 1513 kot zastavonoša na pohodu štajerske konjenice proti Benečanom.
(Žiga Herberstein, Moskovski zapiski, 1557)
Sigismund von Herberstein, 1513, as flag bearer in an expedition of the Styrian cavalry against the Venetians.

Potres 1511

Merianova upodobitev Škofje Loke leta 1649. Negativ posnetka hrani Zgodovinski arhiv Ljubljana, Enota v Škofji Loki.
Merian's depiction of Škofja Loka from 1649. The negative is kept in the Ljubljana Historical Archives, Škofja Loka Unit.

V sredo, **26. marca 1511**, med tretjo in četrto uro popoldan se je zgodil eden najmočnejših potresov v tem delu Evrope. Najhuje sta bili prizadeti gosto poseljena Furlanija in območje današnje zahodne Slovenije. Večkrat objavljena številka 12.000 žrtev pa je verjetno pretirana. Podirali so se gradovi in naselja. Furlanski kronisti pišejo, da v tej deželi ni bilo nesrečnejšega leta, kot je bil leto 1511. To je bil čas vojne, že leto poprej pa se je na podeželju razširila kuga, ki je močno zredčila prebivalstvo.

V današnji zahodni Sloveniji so bile razmere precej drugačne, predvsem zaradi redke poseljenosti in lesenih hiš. Lesene koče, ki so bile v tistem času značilne tudi za **Idrijo**, so dobro kljubovale potresu, opečne in kamnite pa veliko slabše. Ohranjena so poročila, da sta se v **Tolminu** podrla oba gradova. Očividci so zapisali, da je bil Bovec porušen, pomembna gorska cesta čez Predel pa zaprta, ker sta se sosednja hriba zrušila eden proti drugemu.

Veliko več podatkov imamo o **Škofji Loki**, ki je bila v tistem obdobju živahno mesto z razvito obrtjo in številnimi cehi. Potres je porušil grad, hudo prizadel mestne hiše ter poškodoval samostan klaris, sodnikovo hišo in kaščo. Tedanji freisinški škof Filip je pospešil obnovo porušenih stavb. Popravili so kaščo, grad pa pozidali skoraj na novo.

The earthquake of 1511

Between three and four o'clock in the afternoon of Wednesday, **26 March, 1511**, the area was struck by one of the most powerful earthquakes ever recorded in this part of Europe. The two worst affected areas were the densely populated Friuli region and present-day western Slovenia. The often cited number of 12,000 casualties is, however, probably exaggerated. Castles and settlements were levelled. Friulian chroniclers write that the province had never seen as unlucky a year as 1511. This was a time of war, while just a year earlier plague had spread through the land, greatly thinning the population.

In the area of present-day western Slovenia, the situation was quite different, largely because the population was sparse and the houses were made of wood. The wooden cottages typical of **Idrija** in that period survived the earthquake relatively unscathed, but brick and stone houses fared considerably worse. According to surviving reports, both castles in **Tolmin** collapsed and were abandoned by their garrisons. **Bovec** was destroyed and the important mountain road over the Predel pass was closed when two neighbouring hills collapsed into each other.

Much more information is available about **Škofja Loka**, in that period a bustling town with numerous guilds of craftsmen. The earthquake badly affected the densely packed townhouses along the town's streets. The castle was destroyed and the Poor Clares' convent, the judge's house and the town granary were damaged. Philipp von der Pfalz, the prince-bishop of Freising, accelerated the reconstruction of ruined buildings. The granary was repaired, while the castle was almost entirely rebuilt.

Živo srebro – temelj za nastanek in razvoj Idrije

Viljem Neumann iz Beljaka. (Fototeka Mestnega muzeja Idrija)
Wilhelm Neumann of Villach. (Photo Library of Idrija Municipal Museum)

Po odkritju živega srebra so v dotlej nenaseljeno idrijsko dolino začeli prihajati rudarji. Priseljevali so se s Koroške, Tirolske, Češke, iz Furlanije in Nemčije. V prvih letih po odkritju živega srebra ni bilo zaslužka, zato je več družb propadlo. Z odkritjem bogate cinabaritne rude leta 1508 pa se je Ahacijevi družbi nasmehnila sreča. Družbo je v tem času vodil sposobni podjetnik **Viljem Neumann** iz Beljaka, ki je s svojim družabnikom iz Salzburga prevzel celotno trgovino z živim srebrom.

Idrija je bila v tistem času težko dostopna. Edine povezave z zaledjem so bile ozke in nevzdrževane poti. Za potrebe rudnika in prebivalstva so morali vse pritovoriti na konjih. V prvih letih je bila proizvodnja živega srebra majhna, le do deset ton letno. Tovorniki so iz Idrije tovorili živo srebro, v Idrijo pa ves živež in predmete za potrebe rudnika.

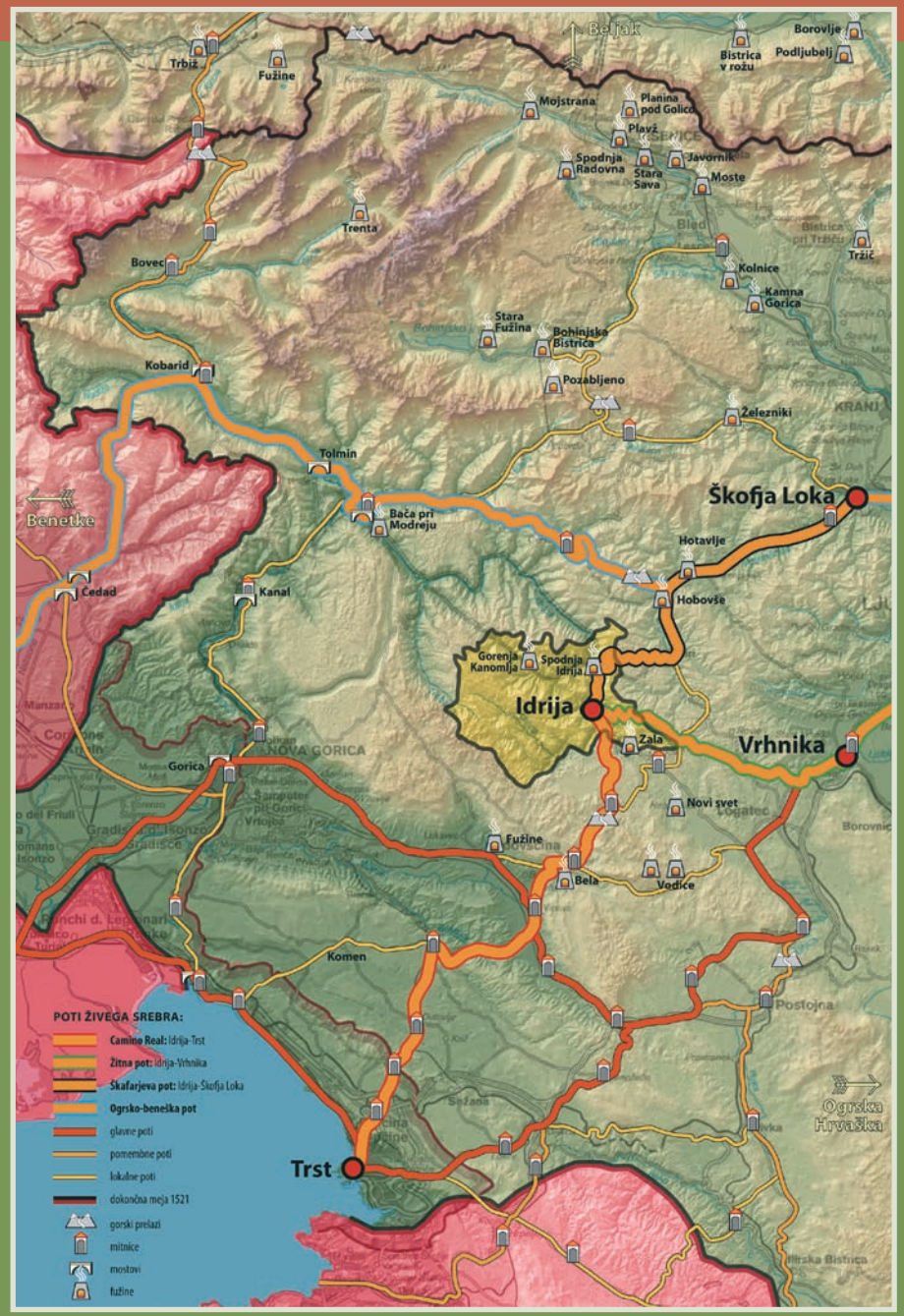
Mercury – the basis of the origin and development of Idrija

Meh in sodček za transport živega srebra. (Fototeka Mestnega muzeja Idrija)
A skin and barrel for transporting mercury. (Photo Library of Idrija Municipal Museum)

Following the discovery of mercury, miners began to arrive in the hitherto uninhabited Idrija valley. They came from Carinthia, Tyrol, Friuli, Bohemia and Germany. The first years following the discovery of mercury were not very profitable, and several mining concerns went out of business. With the discovery of a rich cinnabar ore in 1508, fortune smiled on the "Achacius" company. At that time the company was managed by an enterprising individual from Villach called **Wilhelm Neumann**. Together with a partner from Salzburg he took over the entire mercury trade.

In those days Idrija was relatively inaccessible. The only connections with the surrounding country were narrow, poorly maintained tracks. Everything needed for the mine and for the population had to be transported by packhorses. In the first years, mercury production was small: less than 10 tonnes a year. Carriers transported the mercury from Idrija, at the same time bringing provisions and mining equipment to Idrija.

Valvazorjeva upodobitev tovornikov v knjigi Slava vojvodine Kranjske, 1689.
Valvasor's depiction of carriers in his book, The Glory of the Duchy of Carniola, 1689.

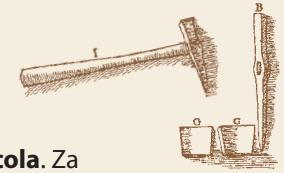


Rafael Bizjak, izris/*drawing by:* Jaka Modic

Poti tovorjenja živega srebra so se sčasoma spreminjale. V začetku delovanja rudnika je Idrija pripadala Benečanom, zato so živo srebro in cinober tovorili preko Tolminske in Furlanije do Benetk. Ko so Habsburžani leta 1509 zasedli Idrijo, so trgovino z živim srebrom preusmerili proti Beljaku in Trstu.

The routes along which the mercury was transported *changed over time. Until 1509 Idrija belonged to the Venetians, so mercury and cinnabar were transported across Tolmin and Friuli to Venice. When the Habsburgs occupied Idrija, part of the mercury shipment was redirected via Črni Vrh over the Karst to Trieste.*

Začetki rudarjenja



Podobe rudarjev, iskanje in sledenje ter izkopavanje rude, proces žganja ter rudarske naprave iz tistega časa nam slikovito prikazuje rudarski strokovnjak **Georgius Agricola**. Za odkop rude so v začetku uporabljali **klin** in **kladivo**. V lesene nečke, imenovane **»triglni«**, so s pomočjo motike nagrebli rudo, jo stresli v **»truhce«**, ki so jih nato po deskah potiskali do jaška. Nad vsakim jaškom so namestili **vitel**, s pomočjo katerega so iz jame dvigovali rudo in vodo, v jašek pa so spuščali jamski les za podpiranje. Za globlje jaške so pričeli uporabljati **»geplje«**, ki so jih poganjali s konji. Kot vsi večji rudniki v habsburški monarhiji je imel tudi idrijski rudnik že v 16. stoletju svoj merski sistem, tako imenovano **»idrijsko lahtro«**, ki so jo uporabljali do uvedbe metrskega sistema v 19. stoletju.

V prvih letih so kopali siromašno rudo s samorodnim živim srebrom, ki so jo izpirali skozi vedno gostejša sita v bližnjem potoku Nikova. Bogatejšo cinabaritno rudo pa so **žgali** v preprostih kopah in **retortah**.

The beginnings of mining

Model »gepljav«. *A model of the »gepelj«*

Images of miners, the finding of veins and the digging of ore, the smelting process and mining equipment from this time are vividly presented to us by the mining expert **Georgius Agricola**. Initially a **pick and hammer** were used to extract ore. The ore was scraped into wooden troughs called »triglni« with the help of a pickaxe, and then transported in »truhce« along wooden boards to the shaft. A **winch** was installed above every shaft and used to raise ore and water from the pit, and to lower timber into the shaft to make pit support. For deeper shafts they began to use a lifting device known as a **»gepelj«** that was powered by horses. Like all the larger mines of the Habsburg Monarchy, in as early as the 16th century the Idrija mine had its own measuring system, the so-called **»idrijska lahtra«** which remained in use until the introduction of the metric system in the 19th century.

During the early years the miners extracted poor-quality ore containing native mercury, which was panned in a series of increasingly fine sieves in the nearby Nikova stream. **Richer cinnabar ore** was roasted in simple heaps and **retorts**.

Idrijo prizadeneta potres in huda poplava

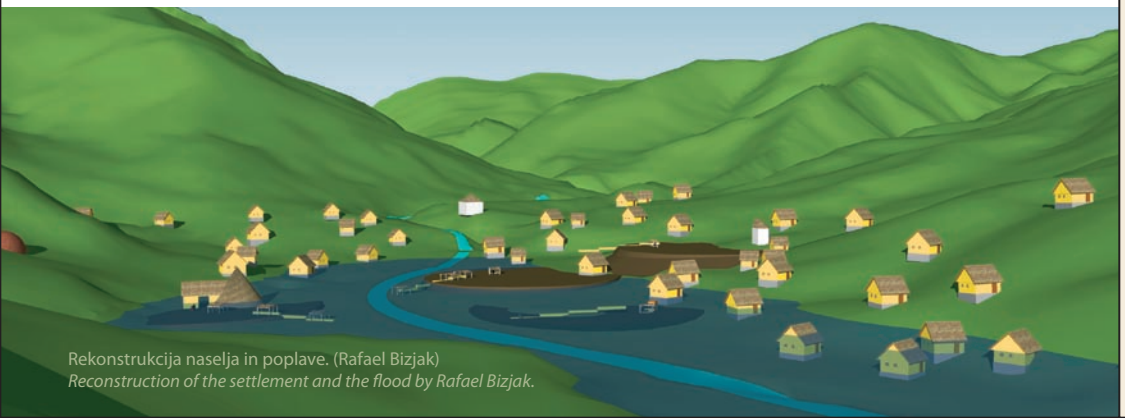
Idrija je bila v tistem času manjše naselje s preprostimi lesenimi kočami, postavljenimi v hrib, ter cerkvijo sv. Trojice. Na skali, ki se je strmo dvigala nad potokom Nikova, je Ahacijeva družba zgradila kapelo sv. Ahacija. Ob glavnem Ahacijevem jašku so že v začetku 16. stoletja postavili gepelj za dviganje vode in rude. Nakopano rudo in jalovino so nasipali v okolici kopov ob potoku Nikova, kjer so bile lesene naprave za drobljenje, sejanje in izpiranje rude.

Komaj tri leta po odkritju bogate rude je Idrijo prizadel potres. V pisnih virih, ki so nastali skoraj 170 let kasneje, beremo, da se je ob potresu sprožil velik zemeljski in skalni podor med Idrijo in Spodnjo Idrijo ter zasul strugo Idrijce. V zajezeni strugi je voda narasla, poplavila rudarsko naselbino, vse zunanje lesene rudniške objekte in naprave ter zalila jamske prostore. O nastanku podora viri navajajo dva datuma, in sicer, da je le-ta nastal neposredno po potresu leta 1511 oziroma kasneje leta 1525. V spomin na katastrofalno poplavo so pod gradom leta 1525 postavili kapelo sv. Janeza Nepomuka.

Idrija is struck by an earthquake and a terrible flood

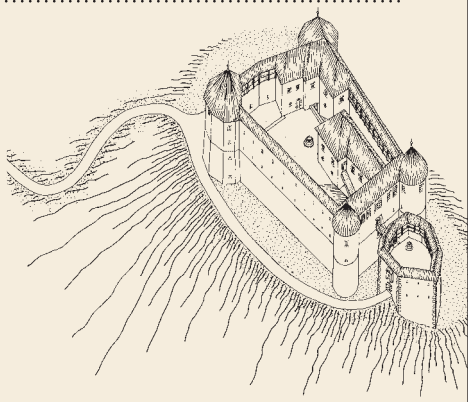
Idrija was at this time a small settlement with simple wooden huts built on the hill and a church dedicated to the Holy Trinity. The Achacius company built a chapel dedicated to St Achacius on the cliff rising steeply above the Nikova stream. A gepelj for raising water and ore was built by the main Achacius shaft in the early 16th century. The extracted ore and waste rock were deposited near the surface mining works by the Nikova stream, where there were wooden devices for crushing, sifting and washing the ore.

Only three years after the discovery of rich ore, Idrija was hit by an earthquake. We learn from written sources dating from almost 170 years after the event that the earthquake triggered a major landslide and rockfall in the Pri Renkovcu area between Idrija and Spodnja Idrija, and filled up the channel of the Idrijca River. The water in the dammed river rose, flooded the mining settlement and all the outdoor wooden structures connected to the mine, and filled up the mine galleries. Some sources give two dates for the rockfall, meaning that it either occurred directly after the earthquake in 1511 or later on in 1525. The Chapel of St. John of Nepomuk was built below the castle in 1525 in memory of the catastrophic flood.



Rekonstrukcija naselja in poplave. (Rafael Bizjak)
Reconstruction of the settlement and the flood by Rafael Bizjak.

Razvoj naselja Tolmin



Podoba gradu sredi 16. stoletja.
Poskus rekonstrukcije. (Risba: Igor Sapač)
Image of the castle in the mid-16th century. Attempt at reconstruction.
(drawing by Igor Sapač)

Tolmin je imel zaradi svoje strateške lege na prehodu z Goriške proti Koroški pomembno vlogo že v arheoloških obdobjih, ob koncu srednjega veka in v začetku novega veka pa tudi kot politično in upravno središče ter sedež Tolminskega gospostva in glavarstva. V različnih virih se kraj omenja že v 11. stoletju kot *Tulmine/Tulminium/Dullmein*.

Po končani beneško-habsburški vojni v začetku 16. stoletja se je za skoraj tri stoletja ustalila meja med Beneško republiko in habsburškimi deželami. Tolmince je najbolj prizadela stroga prepoved trgovanja z benečansko Furlanijo, kar je posledično prispevalo k odpiranju novih prometnih poti in tihotapstvu. Tolminski glavar si je prizadeval tihotapljenje preprečiti s strožjim nadzorom poti. Ekonomski in socialni položaj Tolmincev se je še poslabšal, ko sta bila s pogodbo 19. marca 1511, le sedem dni pred usodnim potresom, tolminski grad in gospostvo predana Mihaelu iz Neuhausa.

Sprva je bilo naselje kmečkega značaja z lesenimi hišami. Jedro srednjeveškega Tolmina se je verjetno že v 14. stoletju izoblikovalo ob patriarhovi letni rezidenci na Doru, utrjenem pomolu med Grapo in Tolminko. Tu so se naseljevali patriarhovi višji uradniki, plemstvo, vitezi, čuvaji, vojaki in obrtniki. Baročno obdobje je pospešilo razvoj kraja v značilno trško naselbino. K novi podobi kraja je prispevala v 17. stoletju zgrajena Coroninijeva graščina, ki je hkrati podala smernice za nadaljnji razvoj. Šele ob koncu 19. in v 20. stoletju je Tolmin začel dobivati današnjo podobo z novimi pozidavami in povsem spremenjeno arhitekturo. Območje nove poselitve se je razširilo od starega jedra proti vznožju Kozlovega roba.

Jedilni pribor in krožnik s Kozlovega roba. (Last Goriškega muzeja, razstavljeno v Tolminskem muzeju, foto: Marko Grego)
Cutlery and plate from Kozlov Rob (property of the Gorica Museum, exhibited at the permanent exhibition in the Tolmin Museum, photo: Marko Grego)

Development of Tolmin

Owing to its strategic location at the transition between the Goriška region and Carinthia, Tolmin played an important role even in ancient times. At the end of the Middle Ages and the beginning of the Modern Age, it was a political and administrative centre and the seat of the Tolmin seigniory and governorship. Tolmin appears in various historical sources in as early as the 11th century as *Tulmine, Tulminium* and *Dullmein*.

Following the war between the Venetians and the Habsburgs in the early 16th century, the border between the Venetian Republic and the Habsburgs' lands remained fixed for almost three centuries. The people of Tolmin were badly affected by the strict prohibition on trade with Venetian Friuli, a circumstance that contributed to the opening of new routes and smuggling. The governor of Tolmin endeavoured to prevent smuggling by maintaining a closer watch over the roads. The economic and social position of the people of Tolmin worsened further with the signing of a deed on 19 March 1511 – just seven days before the terrible earthquake – under which the Tolmin castle and seigniory were passed to Michael of Neuhaus.

Initially the settlement had a rural character and consisted of wooden houses. The centre of medieval Tolmin is believed to have developed in as early as the 14th century around the summer residence of the Patriarch of Aquileia on Dor, a fortified prominence between the Grapa and the Tolminka River. The centre of the settlement housed the Patriarch's senior officials, members of the nobility, knights, watchmen, soldiers and craftsmen. The baroque period accelerated the development of Tolmin into a typical market settlement. The Coronini Mansion, built in the 17th century, contributed to the town's new appearance and at the same time set out guidelines for its further development. Tolmin did not begin to take on its present-day appearance until the end of the 19th century, with new buildings and an entirely different style of architecture. Its appearance continued to change during the 20th century as the area of new settlements expanded from the old town centre towards the foothills of Kozlov Rob.

Litografija Tolmina z dvorcem, prva polovica 19. stoletja. (Avtor: Johann Jakob Dorner, fototeka Tolminskega muzeja)
Lithography of Tolmin with the mansion, first half of the 19th century. (Author: Johann Jakob Dorner, Photo Library of the Tolmin Museum)

Grad Kozlov rob v 16. stoletju

Železne topovske krogle, odkrite na Kozlovem robu. (Hrani: Tolminski muzej)
Iron cannonballs found on Kozlov Rob. (kept at the Tolmin Museum)

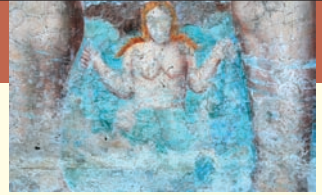
Grajska utrdba na dominantnem griču Kozlov rob nad Tolminom je stoletja obvladovala Tolminsko kotlino in njene prometnice. Na gradu Kozlov rob so tekom stoletij večkrat potekala obnovitvena dela in dodatna utrjevanja: ob menjavi lastnikov, zaradi mejnih konfliktov z Benečani, zaradi nevarnosti turških vpadov in seveda različnih naravnih katastrof (npr. potresa v letih 1348 in 1511). Grajsko utrdbo je potres leta 1511 porušil skoraj do tal in kmetje so morali za novega lastnika opravljati več tlake kot kdaj koli prej ali kasneje. Na grad so morali znositi vso vodo in gradbeni les, pa tudi apno, za katerega so idrijski rudarji lomili kamen v kamnolomu nedaleč od gradu. Ob potresu je bilo na gradu uničeno vse seno in grajski hlapci so novega na silo pobrali po bližnjih vaseh. Vse to je gnalo kmete v upor, morda pa je na to vplival tudi zgled furlanskih kmetov, ki so se uprli leta 1511.

Ostanki materialne kulture 15. in 16. stoletja izpričujejo povezave predvsem s furlanskim prostorom. Od druge polovice 16. stoletja in v začetku 17. stoletja pa je opazna navezava na slovenske dežele. Glavnina steklenih predmetov ter ostalih najdb, med drugim orožje s Kozlovega roba, je iz 16. stoletja, ko je grad doživel največji razcvet. O tedanji naprednosti priča tudi izjemna najdba dvorogelnih vilic.

Kozlov Rob Castle in the 16th century

This castle on the prominent hill of Kozlov Rob above Tolmin has dominated the Tolmin basin and the roads leading into it for centuries. Over the course of the centuries, the castle has been rebuilt and additionally fortified several times: as a result of changes of ownership, border disputes with the Venetians, the danger of raids by the Ottoman Turks and, of course, various natural disasters (for example the earthquakes in 1348 and 1511). The 1511 earthquake reduced the castle practically to rubble, and the local peasants were forced to do more compulsory labour for the new owner than ever before or since. They had to carry all the water and wood for construction up to the castle, and also lime, for which miners from Idrija shattered rocks in the quarry not far from the castle. During the earthquake, all the hay in the castle was destroyed and the castle farmhands were ordered to collect new hay from the nearby villages. All this drove the peasants to revolt – perhaps influenced by the example of peasants in Friuli, who revolted in 1511.

Remnants of the material culture of the 15th and 16th centuries reveal connections with Friulian culture in particular. From the second half of the 16th century and in the early 17th century, connections with the other Slovene lands can be observed. Most glass artefacts and other finds, including weapons from Kozlov Rob, date from the 16th century, the period of the castle's greatest prosperity. Evidence of the advanced level of the material culture of the time is provided by the remarkable find of a two-pronged fork.



Riba Faronika. (Foto: Janez Jocif)
The fish Faronika. (Photo: Janez Jocif)

Med miti in znanostjo

Nesreče in nenavadne pojave so nekoč povezovali z miti in legendami. Predstavljali so si, da Zemlja plava na vodi, potrese pa povzročajo živali s svojim gibanjem. Na Japonskem so menili, da je za potrese kriva riba som, v Mongoliji pa, da jih povzroča žaba, ki nosi svet. Pri nas je bila po ljudskem prepričanju zanje kriva riba Faronika. Pesem o njej je ohranjena na Tolminskem.

Aristotel, veliki grški filozof in znanstvenik, je domneval, da potrese povzročajo vnetljivi vetrovi, ki pihajo po rovih v notranjosti Zemlje. Leonardo da Vinci je primerjal zgradbo Zemlje z živim organizmom. Verjel je, da je Zemlja polna vode. Do potresa pride, kadar se hribi na površju porušijo in se zrak, ujet v podzemnih votlinah, sunkovito prebije na površje. Še v 19. stoletju je bilo veliko različnih teorij o potresih, ki pa so že nakazovale **teorijo o globalni tektoniki plošč**. Njena razlaga nastanka in razvoja Zemlje ima na področju geologije podoben pomen kot Darwinova teorija evolucije rastlinskih in živalskih vrst.

Between myths and science

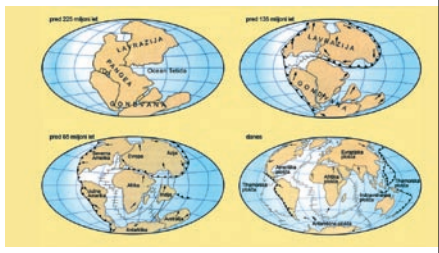
Disasters and unusual phenomena were frequently linked to myths and legends. People believed that the Earth floated on water and that earthquakes were caused by the movement of sea creatures. In Japanese mythology, earthquakes were caused by a giant catfish, while in Mongolia people believed that earthquakes were caused by a gigantic frog that carried the world on its back. In Slovenia, earthquakes were popularly blamed on a fish called Faronika. A song about this still survives in the Tolmin area.

The great Greek philosopher and scientist Aristotle hypothesised that earthquakes are caused by inflammable winds blowing through tunnels in the Earth's interior. Leonardo da Vinci compared the structure of the Earth to that of a living organism. Leonardo believed that the Earth was full of water. Earthquakes occur when hills on the surface collapse and the air trapped in the underground cavities bursts through to the surface. Even in the 19th century there were many different theories about earthquakes which, however, already pointed to the **global plate tectonics theory**. This explanation of the formation and development of the Earth has a similar importance, in the field of geology, to Darwin's theory of evolution of plant and animal species.

Tales (600 let pred n. št.) iz Mileta si je predstavljal Zemljo kot ravno okroglo ploščo, ki plava na vodi.

Six hundred years before the birth of Christ, Thales of Miletus described the Earth as a flat disc floating on water.

Večno gibanje plošč ...



Potovanje tektonskih plošč v zadnjih 250 milijonih let. (Izris: Matjaž Gostinčar)
Movement of tectonic plates in the last 250 million years. (Drawing by: Matjaž Gostinčar)

Zemlja ima značilno lupinasto zgradbo, ki se je izoblikovala iz žareče taline. Gradijo jo jedro, plašč in trdna, a tanka Zemljina skorja. Če primerjamo velikost Zemlje z breskvijo, je njena skorja tanjša od breskvine lupine. Zgrajena je iz dvanajstih večjih ter številnih manjših tektonskih plošč, ki se neprestano premikajo. Vzroki za premikanje plošč so procesi globoko v notranjosti Zemlje. V spodnjih delih zemeljskega plašča razpadajo radioaktivne snovi, ki segrevajo viskozno maso. Segreta masa se začne dvigati in kroži v obliki počasnih, a stalnih konvekcijskih tokov, ki so gonilna sila potovanja litosferskih plošč.

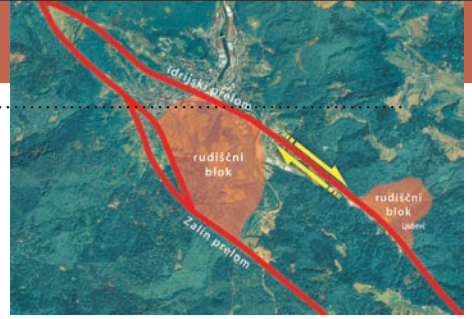
Ker plošče stalno potujejo, se položaj morij in kopnega neprestano spreminja. Pred dvesto in več milijoni let so bili kontinenti drugače razporejeni kot danes. Vsi skupaj so sestavljali en sam ogromen kontinent – Pangeo. To dokazujejo enaki fosilni ostanki v Braziliji in Južni Afriki, sledovi poledenitev in obrisi celin.

Eternal movement of plates...

The Earth has a typical shell structure formed from magma. It consists of a core, a mantle and a solid but thin crust. If we imagine the Earth to be the size of a peach, its crust would be thinner than the skin of the peach. The crust consists of 12 large tectonic plates and numerous smaller ones. These plates are constantly moving. The movement of the plates is caused by processes deep within the interior of the Earth. Radioactive substances in the lower mantle decay and heat a viscous mass. This heated mass begins to rise and circulates in the form of slow, but constant convection currents. Because of this process, the tectonic plates are constantly shifting.

Tektonske plošče. (Izris: Matjaž Gostinčar)
Tectonic plates. (Drawing by: Matjaž Gostinčar)

Because tectonic plates are constantly moving, the position of sea and land is constantly changing. More than 200 million years ago, the arrangement of the continents was different than today. The Earth's landmasses formed one enormous supercontinent called Pangaea. This is proved by the presence of identical fossilised remains in Brazil and in South Africa, by the traces of glaciation and the outlines of the continents.



Idrijski prelom

Eden največjih prelomov v južnoalpskem prostoru je Idrijski prelom. Nastal je kot posledica napetosti, ki jih povzroča trk Jadranske in Evrazijske plošče. Na satelitskih posnetkih ga vidimo kot izrazito, skoraj ravno črto. Vzdolž skoraj 120 km dolgega preloma so se zaradi pretrtosti kamnin oblikovale globoke doline, strme grape, sedla in izravnave. Ob njem so nanizani Planinsko in Cerkniško polje, Loška dolina ter izrazite doline rek Kanomljica, Idrijca in Soča.

Tudi potres leta 1511 je nastal v širšem območju Idrijskega preloma in je z magnitudo 6,8 najmočnejši znani potres na območju Slovenije. V najbolj prizadetih krajih je dosegel intenziteto X. stopnje.

The Idrija Fault

One of the largest faults in the area of the Southern Alps is the Idrija Fault. It was formed as the consequence of tensions in the Earth's crust caused by the collision of the Adriatic plate with the Eurasian plate. Satellite photographs show it as a clear, almost straight line. Along the almost 120 kilometres of its route, deep valleys, steep gorges, mountain passes and levels have formed as the result of tectonic disruption. In the south-eastern part of the fault we find Planinsko Polje and Cerkniško Polje and Loška Dolina, while in its north-western part there are the deep valleys of the Kanomljica, Idrijca and Soča rivers.

The Idrija earthquake of 1511 occurred in the wider area of the Idrija Fault and, with its magnitude of 6.8, is the most powerful historical earthquake known in the territory of Slovenia. The effects in the most affected areas were of X intensity.

S Hudournika na Vojskarski planoti imamo prekrasen pogled na prelomno cono do Mosta na Soči. (Foto: Aleksander Šinkovec)

Hudournik on the Vojsko plateau offers a breathtaking view of the fault zone all the way to Most na Soči. (Photo: Aleksander Šinkovec)

Merjenje potresov in potresno odporna gradnja

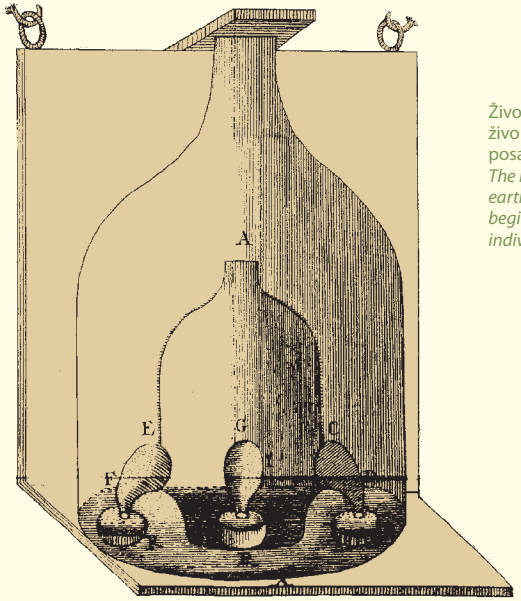
Na leto se zgodi okoli 11 milijonov potresov, od teh je okoli 300.000 tako močnih, da jih lahko občutimo. Danes merilne seizmološke naprave zaznavajo vibracije, ki so več kot milijonkrat šibkejše od tistih, ki jih lahko zazna človeško telo.

Kljub številnim poskusom napovedovanja potresov še vedno ostaja edina obramba pred njimi potresno odporna gradnja. Stavbe, ki so grajene iz lesa, armiranega betona in jekla, so odpornejše kot kamnite in opečne; postavljene na trdni skali pa so veliko odpornejše kot tiste, grajene na pesku ali glini.

Measuring earthquakes and earthquake resistant construction

There are around 11 million earthquakes a year, of which around 300,000 are powerful enough for us to feel them. The modern seismometres are highly sensitive devices that convert the oscillation of the ground into an electric signal that is recorded by seismographs. Modern seismographs are capable of detecting and recording vibrations that are more than a million times weaker than those that can be felt by the human body.

Despite numerous attempts to predict earthquakes, earthquake resistant construction remains the only defence against earthquakes. Buildings made of wood, reinforced concrete and steel are more resistant than stone and brick buildings. Building a house on solid rock is much safer than on sand or clay.



Živosrebrni seizmoskop. Ob potresu je živo srebro zanihalo in se prelilo čez rob v posamezne posode. (Vir: SGA, 1992)
The mercury seismoscope. When an earthquake occurred, the mercury would begin to oscillate and spill over the brim into individual vessels (Source: SGA, 1992).

Na naslovnici: Prvi seizmoskop je izumil kitajski astronom in matematik Čang Heng v drugem stoletju.
Cover: The first known seismoscope was invented by the Chinese astronomer and mathematician Zhang Heng in the second century AD.

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