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Visiting facility in the Jurassic outcrop in Papilė. The exposure is protected by a shelter, and this is the first of its kind in Lithuania.

Jurassic geological heritage in Lithuania

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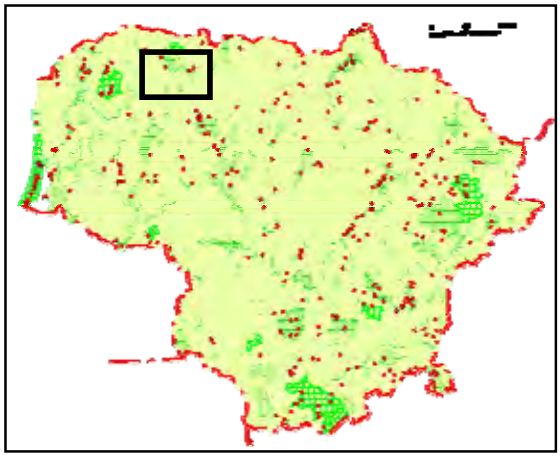
The outcrops of Jurassic rocks in the Venta river valley have been known since 1811, when Dionizas Poška, the famous writer and collector of antiquities visited Papilė village and collected a number of fossils. The first scientific investigations of these outcrops were carried out by the engineer Jan Ulman in 1825–1826. Later on the outcrops were visited and reinvestigated by great number of researchers from universities and other geological organizations of Russia, Germany Poland, Lithuania and other countries. Due to the long history of investigation, rich collections of fossils from Papilė are disposed in geological museums of many European cities.

The Jurassic outcrops in Papilė and its vicinities are unique in the Baltic region and are of great scientific significance. The course of the Venta river valley with its outcrops was established as a geological protected area in 1960 and the outcrop in Papilė was established as a geological natural monument in 1964. The Venta Regional Park is based on Jurassic geological values.

The outcrops attract researchers of Jurassic period and are visited by students of geology from Vilnius University each summer.

Ammonites are prevailing fossils. The ammonite, symbol of sedimentary geology and biostratigraphy is the logotype of both the Lithuanian geological survey and Venta Regional Park.



Location of Venta regional park. Adress: Dariaus ir Girėno g. 2, Viekšniai, Mažeikiai district, LT-89488 http://surviglotersupermedia.pl/Litwaparki/parkai/22_0.htm.

The Papilė outcrop is included in the list of most representative geosites of the Baltic region (Satkūnas et al. 2004

According to A.Linčius, more than 300 species of fossils have been identified in Jurassic rocks: ammonites, foraminiferra, fishes etc. Among them fossils of mollusca (41 species) and ammonites (25 species) prevail. The name of the town of Papilė is included into names of several species of ammonites – Indosphinctes (Elatmites) papilensis (Pak.), Binatisphinctes (Okaites) popilanicus (Krenk.), Cardioceras (Plastmatoceras) popilaniense Bod. Astarte (Astarte) papilensis Rotkytė L. The Papilė outcrop is the stratotype of the Papilė Formation.

Besides Jurassic outcrops there are number of other valuable geotopes in the Venta regional park: Quaternary outcrops, picturesque erosional remnants, erratic boulders etc. Quarries of Triassic clay and Permian limestone, located nearby are additional interesting sites for visitors, studying geodiversity.

Geological mapping in the Venta regional park was recently completed. In the course of the mapping it was revealed interesting features of the Quaternary cover. The area is characterized by its occurrence of Middle Weichselian lacustrine deposits which outcrops in several exposures in the Venta river valley. It is necessary to stress that sites with Middle Weichseliann deposits are very few in entire Baltic region. Therefore, the Venta regional park is of great interest for Quaternary researchers as well.

Loops of the Venta river.

The section of the Papilė outcrop (according to L. Rotkytė (1968):

Depth of layers	Geological age	Sediments and fossils
0.0–15.0 m	Quaternary	Glacial brown clayey loam with boulders.
15.0–17.8 m	Jurassic period, Callovian age, Skinija Formation	Black clay with mica, with interlayers of sandstone and lenses of siderite. Fossils of ammonites Astarte sauvalei., Astarte trembiazensis Lor., belemnites.
17.8–18.8 m		Sandstone, yellow, with interlayers of black clay. Ammonites: Kosmoceras transitionis Nik., Kosmoceras cf. Compressum Quenst. Mollusca Oxytoma inaequivalvis (Sow.), Chlamys (Aequipecten) fibrosa (Sow.), Protocardia cognata (Phill.), Trigonia zonata Ag., Myophorella undulata (Ag.).
18.8–19.3 m		Limestone dark brown, sandy. Fossils of brachiopoda, bivalvia.
19.3–20.5 m		Sandstone brownish, weekly cemented. With detritus of fossils and wood.
20.5–21.0 m	Jurassic period, Callovian age, Papartynė Formation	Sand grey, very fine. Fossils of bivalvia, brachiopoda, tracks of worms.
21.0–23.9 m		Konglomerate. Fauna – ammonites: Kosmoceras jason Rein., Kosmoceras castor Rein., obductum Buck.
23.9–25.4 m	Jurassic period, Callovian age, Papilės Formation	Sand yellow. Fine grained with interlayers of grey clay.

Besides the values of geological heritage there are many villages with historical and architectural values within its border: chapels, roadside poles with a statuette of a saint, mounds and rests of the manor's parks. Purviai reserve with a unique part of the Uogė river, Purvėnai geomorphologic reserve, Avižliai, Dabikinė, Virvytė hydrologic reserves, Užpelkiai botanic-zoological reserve, Viekšniai urban reserve are also found within the regional park.

There are four water mills left in this park, two of them (Viekšniai and Augustaičiai mills) are still working. Among other valuable objects the Dubiškiai estate can also be listed. In the park of the estate there are 13 local and 9 introduced tree species. Totally in Venta regional park there are 670 species of plants with abundance of orchid family, 140 species of birds, 184 – insects, 27 – mammals, 7 – amphibians and 3 – reptilians.

Thanks to endeavors of the National service of protected areas of Lithuania and the Venta Regional Park, the outcrops of Jurassic rocks now are prepared for visitors. The geological trails are equipped with information stands, view sites etc.

(Satkūnas J., Ransed G., Suominen Y., Taht K., Raudsep R., Mikulėnas V., Vdovets M., Makarikhin V., Cleal C., Erikstad L. et al. Geosites listings for Northern Europe – a status report // 32nd International Geological Congress, Florence, Ital. August 20–28, 2004: Volume of Abstracts. Part 1. – [Florence], 2004. – P. 581)

Geological trail in Jurakalnis (Jurassic Hill). Vistors have the opportunity to take a look into the Venta river valley and examine Jurassic rocks. The site is interesting due to active processes of formation of ravines, occurence of landslides, springs and exibition of erratic boulders

Trepca plymetallic ore deposit, an important geoheritage of European value

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Trepça polymetallic ore deposit is placed in the Mitrovica region, in Kosovo. In this region, in the Vardar tectonic zone, there are located polymetallic ore deposits forming the Trepça Mineral Belt.

Last September, after the International Scientific Symposium: "Geo-mining Potentials – Strategy and their Management" (27-30 September, 2006 - Mitrovica), organized by University of Prishtina (Faculty of Mining and Metallurgy) and Polytechnic University of Tirana (Faculty of Geology and Mining), a group of participants came to the Trepça ore deposit on a field trip.

The Trepça and Stanterg deposits are found on the eastern slope of a small river valley northeast of Mitrovica,. The deposits were known and were exploited since the pre-Roman times by Illyrians, Romans, Byzantines, Saxons and Turks. Later, French and Britons have conducted extensive mining in the region. The first documents about this mine, from the 14-th Century AC, are found in the Archive of Dubrovnik. Modern mining began in the 1930's, when the British company Selection Trust Ltd. revamped the Trepça Complex.

Regional Geological location of Trepça ore deposit. (After Miliorad D. Dimitrijevic in: "Geology of Yugoslavia", 1997).

In regional geological aspect, the Trepça ore belt is placed in the Vardar tectonic zone (A. Koliqi, A. Tmava, 2006), in the central part of the Kopaonik Block (Miliorad D. Dimitrijevic, 1997). Ore deposits are linked with contact between schists and limestone rocks of Triassic age, along with the Sitnica regional fault wich goes in a southeast-northwest direction. This unit has developed along the suture zone of a former ocean.

Intensive volcanic activity happened during early Oligocene and Miocene. The ore deposits are commonly associated with Oligocene-Miocene volcanic complexes of calc-alcaline series. Polymetallic mineralization is related to the Neogene andezite-latitte volcanics and intrusives (Kosovo-Mining Journal, special publication, London, October, 2005). Carbonate-replacement and vein type lead-zinc mineralizations are formed. Strong structural control in NNW trending Vardar zone is predominant.

Polymetalic mineralisation has originated from hydrothermal fluids related with Tertiary volcanism (G. Maliqi, M. Diehl, B. Shala, 2006). Two types of Pb-Zn-Ag mineralizations occur:

- Massive Pb-Zn sulfide mineralization of hydrothermal origin formed by carbonate replacement processes with high Pb-Zn content.
- Skarn mineralisation of metasomatic origin associated with paleokarst processes and Pb-Zn content.

The ore bodies are of different shapes, characterized by discordant masses, lenses or veins of massive and sub-massive ore textures along with a breccia pipes, funnels, chimneys, columns, and dykes. K-Ar isotope study reveals 16.62 (+ or 0.54) ma. for the skarn ore body.

Due to its genetic origin, the morphology of the ore bodies and geological structure, Trepça polymetallic deposit represents a classical example, and has been

Common view of Trepça valley. (Photo: A. Serjani).

included in geological books of higher education for a long time.

Among the geological, genetic, morphological and structural features the Trepça complex of polymetallic ore deposits has a major economical importance in Kosovo. According to data provided by the Trepça Kosovo under UNMIK Administration (February, 2005) the ore deposit hold the following reserves:
6 843 000 T. of content: Pb- 6.20%; Zn- 6.04% and Ag- 117.6 gr/ton.

The Stanterg Museum of crystals represents a great collection of minerals and crystals from polymetallic ore deposits of the Trepça region. Here 1 150 beautiful minerals, crystals, and rocks are exposed. They astonish with form, brightness and colors. Here you can see a lot of minerals such as: Galena, Sphalerite, Pyrite, Pyrhotite, Calcite, Rhodohrosite, Siderite, Dolomite, Vivianite, Boulangerite, Ilvaite, Plumosite, Casalite, Bournonite, Quartz, Johannsenite, Arsenopyrite etc.

The museum was built in 1963, opened for visitors in 1965, and was put under protection in 1969. The museum is managed by “Trepça” mine, from where the minerals and crystals are collected. Another collection of 100 mineral specimens from the Trepça mine, selected by Slavica Bllagojevic-Babic is in Beograde, in the Institute of Mineralogy, Crystallography, Petrology and Geochemistry, Faculty of Mining and Geology (S. Karamata, D. Mijovic, 2005).

The Trepça deposit of Pb-Zn-Ag content is one of the biggest polymetallic deposits in the world, and one of the oldest mines. Here many beautiful minerals and crystals of hydrothermal and skarn genesis are formed.

This ore deposit and mine, together with the museum of crystals, minerals and rocks represent one of the most important geoheritage in Europe. At the same time this region, representing a World-class of lead-zinc-silver deposits is of the greatest economical importance for Kosovo.

The group of participants during field trip on September, 30, 2006 at the outcrop of Trepça ore deposit. (Photo: A. Serjani).

History of Geoconservation Conference

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This conference, held on the 24-25th November 2006 in the town of Dudley, in the West Midlands of the UK, was organised on behalf of Natural England, the Geoconservation Commission, HOGG (History of Geology Group) and UK RIGS. All of the local organising was done by Graham Worton and his team from the Black Country Geological Society, and the Dudley Museum.

The purpose, as I would interpret it, was to take a step back from day to day work on geoconservation for all those involved and make some assessment of where we have got to, and what have we achieved? It was a chance to look at the bigger picture of geoconservation and how some of the disparate pieces actually fitted together. The panel of speakers and the programme as a whole was very well thought out, with a good balance of different topics, interesting and stimulating speakers.

Phil Doughty, former Chairman of the Geoconservation Commission, gave a philosophical overview of the origins of geoconservation and the scientific curiosity that underpins the need, the sites and collections that engage our community. It would seem that geoconservation could have been around for over 300 years with the status of the Giant's Causeway being the subject of concern in 1693, as it still is today.

The geoconservation activities of the 19th and early 20th centuries were then assessed by Barry Thomas and Lynda Warren, who demonstrated a strong contrast between the UK and the USA. In the UK there were sites such as the Fossil Forest in Sheffield, Victoria Park in Glasgow, Hutton's Rock in Edinburgh and others that were protected or efforts were made to protect them. In most cases it was down to individuals in the UK, but in the United States of America, with federal ownership of vast tracts of land taken from the native Americans, it was possible to protect large areas as National Parks such as Yellowstone in 1872, the Devil's Tower, Wyoming (1906), and the petrified forest in Arizona (1913). The remainder of the first session on the origins of geoconservation was devoted to Tom Hose attempting a condensed history of geotourism and Murray Gray appraising the origin and evolution of geodiversity as a paradigm.

The second session addressed the more modern development of geoconservation in Britain, starting with Cynthia Burek on the vital role of volunteers. Chris Green from the Geologists' Association reported on the GA's proactive involvement in goconservation and its role in educating geologists themselves, through codes for geological fieldwork, coring and from the financial support of the Curry Fund. The picture being compiled then moved to the governmental area, with Neil Ellis summarising the Geological Conservation Review (1977-1990) and the more recent publication of the GCR series, documenting some 3000 sites in 100 blocks, or geological topics. Colin Prosser the outlined a substantial series of milestones in both official policy and in legislation since 1949 in England. Graham Worton rounded off the session with a look at how people

View over the Dudley reef towards the urban landscape surrounding the Wren's Nest National Nature Reserve. Photo: Matthew Parkes

The Seven Sisters cavern. At the moment filled in by gravel for security reasons, waiting for restoration works to begin. Photo: Matthew Parkes.

from different social backgrounds have made a contribution to geoconservation from their own local perspective.

In the third session an international scale appraisal was begun by Cheryl Jones who reported on the almost explosive development of Geoparks. Our own editor, Lars Erikstad then gave a fascinating summary of the development of geoconservation in Europe. Individual natural monuments were being protected in Germany as early as 1820, whilst Sweden and Norway began in 1909 and 1910. He emphasised the great variations from country to country, but also the important modern role of ProGEO in finding common ground. In particular he noted the importance of integrating geoconservation into nature conservation and into wider land use planning. The final talk by Patrick Boylan took a more pessimistic view of the position of geology within the 1972 World Heritage Convention, exploring how the structures and procedures are stacked against geological sites being inscribed.

The excellent day was complemented by a superb evening dinner underground in the Dudley Caverns. These are now disused limestone mines which are reached only by canal narrowboats. After dinner speeches by Patrick Boylan, Cynthia Burek and Alan Cutler took the form of historical re-enactments including Sir Roderick Murchison giving a famous oration to the crowds in the mine in the 1800's.

The second day was a field visit to Wren's Nest National Nature Reserve. This is a famous locality where an inlier of highly fossiliferous Silurian limestones in an anticline forms a long narrow hill in the midst of plains of Triassic rocks; flat plains with endless urban development, and much social deprivation. The limestone was quarried and mined and the whole area was a nucleus of the industrial revolution in Britain. We saw much practical geoconservation, in management of land use, preservation of the geological resource whilst maintaining the access and scientific availability of the sites for a population who generally have a fierce local affection for the place.

The success of different efforts was best achieved when local people were directly involved in the actions taken. Hearing of the plans for major innovative reopening of the caverns which had been closed and back-filled for safety reasons was exciting and we would wish Graham Worton and his team the success they deserve with funding bids. The day was completed by lunch and tours back in the Museum.

Over 40 people attended but the Conference deserved many more as it was very well thought out, consistently interesting and thought provoking. It was, as at many such conferences, encouraging and rewarding to meet with colleagues old and new, and take strength and ideas back to continue working for geodiversity and the conservation of the best of it. The rush of people across the road during breaks indicated one success of local involvement – a Dudley Winter Ales Fayre had beers for sale named after and featuring the famous Dudley Bug (the trilobite Calymene blumenbachii). That really is a way to make geology popular!

Conferences

ProGEO WG3 Geodiversity and geology for Nature Heritage

May 20–24, 2007, in Vaasa, Finland

The meeting continues the tradition of annual conferences that brings together European scientists interested in geological heritage. The conference in western Finland will focus on geodiversity, glacial dynamics and landforms, nature heritage and conservation. Excursions will visit the Kvarken Archipelago – newly approved World Nature Heritage Site – and also other Geosites and sites included in a regional Geopark project. Please read the first announcement on the ProGEO website.

International Conference GeoPomerania 2007

24–26 September in Szczecin, Poland.

The international conference will be organized by the German Society for Geosciences and the Polish Geological Society. There will be a special symposium on Geosites - Geoparks - Ecotourism organized by Kurt Goth and Bill Wimbledon. Please read the first announcement on the ProGEO website. The conference webpage will be http://www.geopomerania2007.org

Open Conference of the Russian ProGEO group Geological Heritage Study and Protection Problems

6–12 August 2007, Ilmen State Reserve, Urals Branch of the Russian Academy of Science, Miass, Russia

The Organizing Committee is pleased to invite ProGEO members and others who are interested in mineralogy and the organization of geosite protection in Russia to participate in a conference organized by the Russian ProGEO group and Ilmen State Reserve. The Ilmen State Reserve, situated in the Southern Urals, is the most important among all nature reserves in Russia. This site is characterized by enormous geodiversity and has been named “a mineralogical Eden”. Please read the 1st circular on the ProGEO website.

ProGEO Website:

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