



The Traces of Mining on the Krzeszowice Land – Geotouristic Path

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Abstract

The paper shows the idea of a geological and didactic path “The traces of mining on the Krzeszowice Land”. The route was located in the three villages: Zalas, Tenczynek and Krzeszowice. The main purpose of the path is promoting the values of the scientific and geological heritage in the Krzeszowice Land. Designed path has 16 km long and 5 stops. The path is designed for people of any age, the most convenient to travel the route by bike.

Keywords: geotouristic, Krzeszowice, geological path

Introduction

Geotouristic paths are a special kind of natural and educational paths. The main purpose of their creation is to familiarize the local community and tourists with geological heritage, which is located in the area. [Dowling, Newsome, 2010] Currently in the Poland and the European Union, more and more geotouristic tracks is formed in addition to promoting the values of geological sites and other qualities of the lands. Dissemination of information about the geological heritage is one of the basic principles of sustainable development [Gliniak, 2012; Gliniak 2013, Poros, Sobczyk, 2014]. The Krzeszowice Land is a very interesting area for hiking and cycling. There are many tourist guides in which we find information about the most interesting routes running around Krzeszowice. The Tenczyński Landscape Park are numerous trails for a variety of topics. The most interesting routes are devoted to nature, geology and historical coal mines. [Zinkova, 1988; Gradziński, 1974; Gorecki, Swede, 2006]

Natural and geographical characteristics of the Krzeszowice Land

Geotouristic path “The traces of mining on the Krzeszowice Land” is located about 14 km in the west of Cracow. The route runs through the natural reserve, among others fault and reserve Valley Stream Rudno. Reserves are the part of the forest, called Orla Forest and with it are a part of

Rudno Landscape Park. The area of the reserve at the highest point has a height of 318 m above sea level and is located in the western part of Malopolska. [The Program...] The route covers an area between the Krzeszowice rift valley and Tenczynek gibbosity. Krzeszowice rift valley is geological region located between Krakow and Trzebinia (Fig. 1). [Milijanović, Satora, 2006]

Geologically the area of Krzeszowice Land lies within the Silesia - Cracow Fore, adjacent to the Carpathians, representing a range of alpine and separated from the sinkhole Foredeep. Its genesis is connected with the movements of mountains, taking place at the end of the Cretaceous and Tertiary. The Land build the rocks of the Devonian, Carboniferous, Permian, Triassic, Jurassic, Cretaceous, Tertiary and Quaternary. The oldest rocks occurring within the Silesian - Cracow monocline are from Devonian, which can include limestone, dolomite and marl. During the Carboniferous was formed the limestone containing carbon. In the area of the municipality Krzeszowice states the existence of a number of igneous rocks. Most of them are of an extrusive rocks from lava flows. These are mainly melaphyres in Rudno, porphyry in Miekinia and Zalas, diabase at Bear Mountain. [Gradziński, 1974; Rutkowski, 1986] The most important tertiary tectonic unit is Krzeszowice rift valley. This area was covered in Quaternary by south Poland glaciations. The Krzeszowice area are glacial tills the ground Miocene, Jurassic, Permian

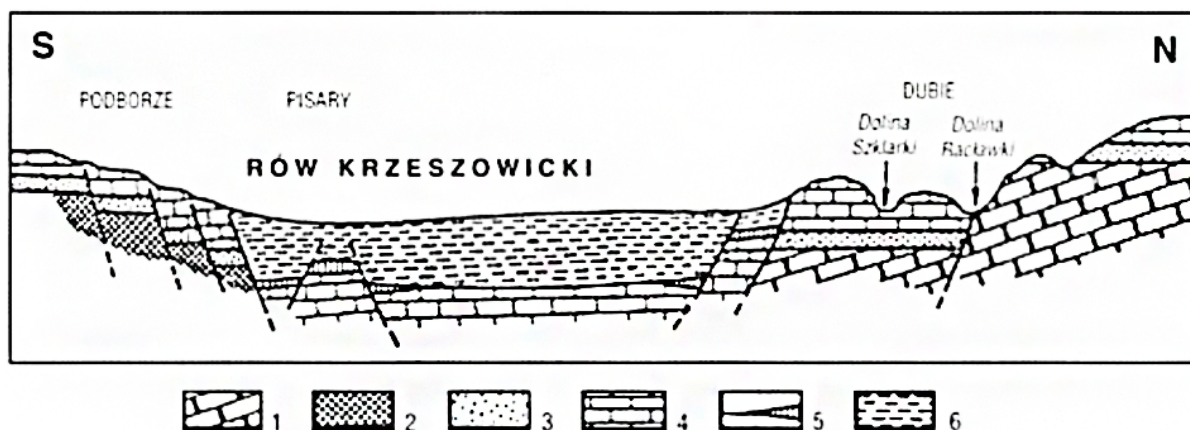


Fig. 1. Cross section of the ditch Krzeszowice south of Dubie: 1 - Devonian and Lower Carboniferous, 2 - Upper Carboniferous, 3 - Middle Jurassic, 4 - Upper Jurassic 5 - chalk, 6 - Miocene. [Gradziński, 1974]

Ryc. 1. Przekrój poprzeczny przez rów krzeszowicki na południe od Dubia: 1 – dewon i karbon dolny, 2 – karbon górny, 3 – jura środkowa, 4 – jura górna, 5 – kreda, 6 – miocen. [Gradziński, 1974]

and Carboniferous. Middle Poland glaciations sediments are mainly sands and gravels. Quaternary sediments are younger part only in the river valleys and hollows. In the area of river sediments Krzeszowice floodplains are sands, gravels, silts and clays.[Gradziński, 1974; Rutkowski, 1986]

The route of “The traces of mining on the Krzeszowice Land”

The route starts close to the bus stop Zalas Quarry in the north-eastern part of the village Zalas (Fig. 2). In the northern part of the hill, which stretches from east Zalas towards Frywałd, there is a large porphyry quarry. With appropriate permission, you can visit the mine. Rock mined in the Quarry can be found in two disused quarries, located east of the road Zalas – Sanka. Along this road on the right hand side you can see heaps that are remnants of the aggregate production from the mine Zalas. The first one is located about 500 m from the intersection. Going further down the road towards Sledge encounter outlet quarry called “crowbar raised face” or “reserve fault”. With quarry return back to the intersection and head north towards the village Frywałd. Following the path on the right side of the watch as part of the mine excavation Zalas. We reach a junction where we go north. There asphalt road ends and begins the path through the forest. This area is called Tenczynski Landscape Park. We walk along a forest road to the north, then north-west and reach the south-eastern edge of the diabase Bear Mountain Quarry. Then go back the way heading south and turn left on the red bike trail.

Along this route we follow approximately 2,5 km and then turn left and follow the forest road to the village Rudno. Part of the trail is covered with asphalt so it is going to be very pleasant. This leads us on paths tranquil woodland Orla forest. Heralds the end of the trail crossroads, which recognize the chapel standing there. We head east. There are numerous, fairly extensive, but now abandoned quarries where melaphyr was mined. The walls crowbars can observe different varieties of these species. It is worth mentioning that the place in which we find ourselves is the highest hill Tenczynski Spine. It reaches a height of 411 m above sea level and is known as Castle Hill. After seeing the crowbar we follow the road towards the junction and follow the street to the village of Tenczynek Castle. Along the way if we have time we can stay near Wronski Pond. It is a pond, which a few years ago has been rehabilitated and adapted for recreational purposes. When the tank is the ability to move a different educational path possessing alley, benches and information boards. Near the church, turn left and follow the path Tenczynek – Zalas. We come to the intersection with the Sienkiewicza street. On the right side of the road stands the mound with the unveiling of sandstone – which is called “The rock under a pine tree“. From the rocks turn right on the trail of Old Mining PTTK, entering the Sienkiewicza street. Then turn left (facing north) onto General Joseph Chłopiczki. After a few hundred meters, we can see the left side of the heap of the former coal mine. Now the area is privately owned. There are, created heaps of gray shale and sandstone. The area

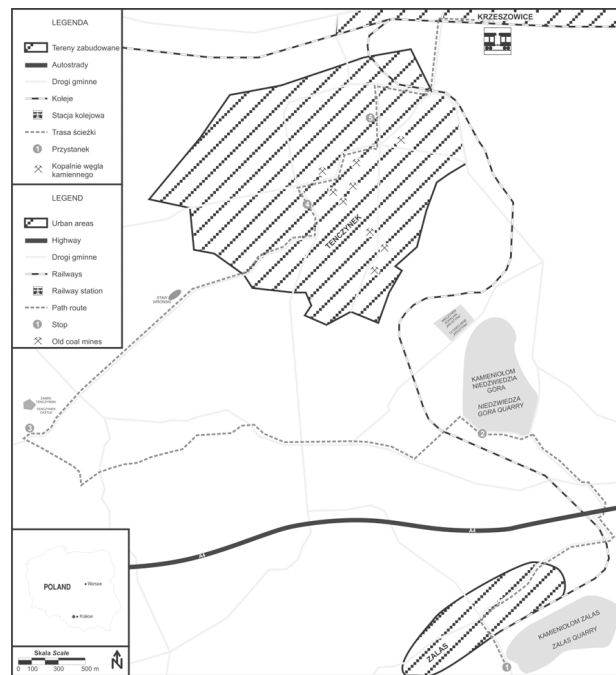


Fig. 2. Map of the route “The Traces of mining on the Krzeszowice Land” [arr. own]

Ryc. 2. Mapa przebiegu trasy geoturystycznej „Śladami górnictwa ziemi Krzeszowickiej” [opr. własne]

that occupies the area is reduced as there arise new building space. After seeing heaps we head north to the intersection of roads. Turn into the Głogowa street (to the north-west) and follow it to the intersection of the streets: Tenczyńska, Zwierzyniecka and Daszyńskiego. We choose the latter and we follow it up to the Railway Street, where the right side is a railway station in Krzeszowice.

Stop 1. Mine porphyries in Zalas

Large quarry porphyry, whose origins date back to the operation of the interwar years (Fig. 3). Featuring a porphyry characterized as lithological differences primarily highlighting in colour. Viewed here profiles provide an overview of the whole complex of Jurassic brown and allow to trace the lowest levels of the Upper Jurassic. With appropriate authorization is the opportunity to visit the quarry. Note! The quarry is still active so be careful! The dominant variety is of red porphyry. On the surface of a fresh fracture can be seen that the main background rocks creates a seemingly amorphous mass in which lie numerous crystals more or less weathered feldspar, distinguished by a bright colour. Apart from them, you can see the badges of biotite and quartz crystals. The mineral composition of porphyry, built mainly of feldspars (over 50%) and quartz, this rock invests in a group of acidic effusive rocks. In addition to the colour red porphyry meets a variety of green colour. Research has shown petrographic, the first of them

– it’s already showing the initial phase of weathering, greenish variety of porphyry. The colour change is caused by oxidation of iron contained in rock.

Stop 2. Bear Mountain Quarry

Large quarry (Fig. 4) coming a bed of volcanic origin very rare minerals – diabase. It is operated from the bed “Bear Mountain”. The plant is located in the Tenczynek village was built in 1902. Rocks from the local quarry are used to build roads and dusting the railroad tracks. With appropriate authorization is the opportunity to visit the quarry. Note! The quarry is still active so be careful! The quarry is established within the hill built from igneous rock, a specific name diabase. It is the rock of dark colour, grey or even black. On the outer surface is coloured lighter with a yellowish tint. In the fresh state is characterized by high hardness and compactness. Even the naked eye can see that the rock is a fine crystalline structure, although single crystals are difficult to distinguish. Diabase of Bear Mountain is composed primarily of pyroxene and feldspar (mainly plagioclase). It belongs to the extrusive basic igneous rocks and is related to melaphyr. Unlike melaphyres that developed primarily to the surface spilled lava flows. Down diabase parties are slightly different from the rest of the rock – less concise, slightly porous and reddish coloured. It should be added that in diabase can be found sometimes quartz grains of



Fig. 3. Porphyry wall in Zalas Quarry. [own photo]
Ryc. 3. Ściana porfirów w kamieniołomie na terenie Zalasia. [fot. własna]



Fig. 4. Diabase wall in Bear Mountain. [own photo]
Ryc. 4. Ściana diabazu w kamieniołomie Niedźwiedzia Góra. [fot. własna]

the size of a hazelnut, and violet coloured crystals remains quartz (amethyst), which fill small vacuums.

Stop 3. Castle Hill - quarry melaphyre

There are numerous, fairly extensive, but we are already closed quarries, which was mined melaphyr. Hill is truncated by faults to the north and south-west. The place where we find the highest hill point – Spine Tenczyński. It reaches a height of 411 meters above sea level and is called Castle Hill (Fig. 5). Note! Above the quarry are the ruins of the castle, which can be up to fall wall fragments! The walls of the quarries we can observe different varieties melaphyre. Typically, the breccias composed of crumbs and lava blocks melaphyre bonded melaphyr, there is a few meters thick dense rock party, devoid of bubbles and relatively hard (this variety was mostly extracted), which passes upwards in melaphyr with numerous blisters. Above him again lying breccia, etc. In the profile slope is therefore possible to discern a number of successive lava flows melaphyres.

Stop 4. The rock under a pine tree

The rock has about 4,5 meters high built of conglomerate composed of fragments of various rocks. On the basis of the characteristic oblique stratification the precipitate was formed in the environment in Carboniferous river. Pine growing on the Rock was executed in 2006. Leaving only the high trunk and roots that penetrate into the gaps rocks (Fig. 6). Note! The rock under a pine tree is a monument of inanimate nature! In “The Rock under a pine tree” appear weathered, yellow-

ish-brown sandstones feldspar. These rocks belong to the Upper Carboniferous. Likely represent the upper Westphalian settlement, which lie in the vicinity of Tenczynek contrary to the lower layers of Namur. Within the various schools of oblique layering can be observed. Stratification of this kind is a common sedimentary structures in clastic sedimentary rocks. Stratification characteristic feature is the presence of any diagonal layers, which are inclined with respect to the main surface of the solid pod. Such a team is formed when the grain sliding along the bottom of the current slip to at some point down the slope some inequality. In this way, on the side overlap one over the other sloping solid film. Depending on the size of package, the thickness unevenness may be from a few millimeters to several meters. In aqueous layering oblique usually arises in connection with the shifting sandy bottom riplemarks or larger dunes underwater. In the same way the films are formed teams pitched in the dunes as a result of transporting grain by the wind. On the basis of the spatial pattern in the bands oblique films and the nature of the surface of the lower and upper layers bands different types distinguished by oblique stratification.

Stop 5. Traces of former coal mining

Remains of coal mining in the region is mainly Krzeszowice heaps of grey shale and sandstone (Fig. 7). Sometimes you can find here also fragments of coal. These rocks belong to the Upper Carboniferous productive formations are classified as marginal layers and correspond to the lower part of Namur. A closer search of the heap may be encountered specimens of shale with impressions of plants Carboniferous and the shells



Fig. 5. Melaphyres in old quarry near Rudno. [own photo]

Ryc. 5. Melafiry w nieczynnym kamieniołomie koło Rudna. [fot. własna]



Fig. 6. Feldspathic sandstones in the Rock under a pine tree. [own photo]

Ryc. 6. Piaskowce skaleniowe w skałce pod sosną. [fot. własna]



Fig. 7. A fragment of the mine dumps Adam in Tenczynek. [own photo]

Ryc. 7. Fragment hałdy kopalni Adam w Tenczynku. [fot. własna]

of brachiopods. Some of brachiopods belong to the living forms in the sea or brackish lagoons. Their presence indicates that during the sedimentation of the lower part of the Upper Silesian productive formation occurred to periodic, short- sea lagoons. Basin coal, which deposits formed near the banks of the sea, and which ones are inserts marine sediment basins. Upper Silesian Basin has such characteristics in the initial stages of its development (the lower part of Namur – layers of coastal sedimentation). While younger layers of productive formations - Units and medicines, are lodged in the upper part of Namur and the West-

phalian - are already represented only by land sediments.

Summary

Presented geotouristic path can contribute to enhance tourism Krzeszowice Land. The proposed trail may be an additional supplement to other geological trails that run around Tenczynek and Krzeszowice. Path “The Traces of mining on the Krzeszowice Land“ was developed under the concept of sustainable development, with particular emphasis on the development of environmental attitudes among tourists.

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Ścieżka dydaktyczno-przyrodnicza: Śladami górnictwa Ziemi Krzeszowickiej

W niniejszym artykule przedstawiono koncepcję utworzenia geologicznej ścieżki dydaktyczno-przyrodniczej: Śladami górnictwa Ziemi Krzeszowickiej. Trasa ścieżki zlokalizowana została na terenie miejscowości Zalas, Tenczynek i Krzeszowice. Głównym założeniem ścieżki jest propagowanie walorów naukowych dziedzictwa geologicznego na terenie Ziemi Krzeszowickiej. Opracowana ścieżka liczy 16 km długości, a na jej trasie zlokalizowano 5 przystanków. Ścieżka przeznaczona jest dla ludzi w dowolnym wieku, jej trasę najwygodniej pokonać rowerem.

Słowa kluczowe: geoturystyka, Krzeszowice, ścieżka geologiczna