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UNDERGROUND GEOTOURISTIC ROUTES IN THE MAŁOPOLSKA DISTRICT

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Abstract: In the Małopolska District two underground routes located in old mine workings have been opened to the public. They were developed in the Forecarpathian Basin, in the salt mines in Wieliczka and Bochnia. The salt deposits are hosted in Tertiary - Miocene formations accompanied by anhydrites, gypsum and clays. From the south, these formations are surrounded by the sandstones and shales (flysch), which belong to the Carpathian Foredeep. In both the salt mines in the tourists visit the old mine workings, mainly in the form of spacious chambers and galleries. In those mines the visitors experience a small boat trip across the underground sweet lakes. In Bochnia's salt mine visitors are also carried by the historical underground railway along 1km distance. Those salt mines are very popular underground health resorts. People ill of breathing system can spend there some time for inhalation.

Keywords: geotourism, mine, working, salt

1. Introduction

Salt mining in the Małopolska District has been known from the medieval times. It was exploited from the underground in two towns, Wieliczka and Bochnia (Fig. 1) since the late XIIIth century. Both in Wieliczka and Bochnia it was stopped in 1996 for the economical reason. Wieliczka is situated very close to Cracow. Bochnia is 30 km east from Cracow (Fig. 1).

Some parts of the old, closed salt mines in the Małopolska District have already been opened for the public. Up today, there have been made sightseeing underground routes there. In such a way, the salt mines in Wieliczka and Bochnia were transformed into museum complexes. The visitors can see there plenty of very nice chambers and galleries, the most interesting workings and experience the boat trip across the underground sweet lakes.

In Bochnia's salt mine are some more attractions. The historical underground railway carries the visitors along the distance of 1 km there. There is also an underground playground for basket-ball, a room for rehabilitation and a bedroom.

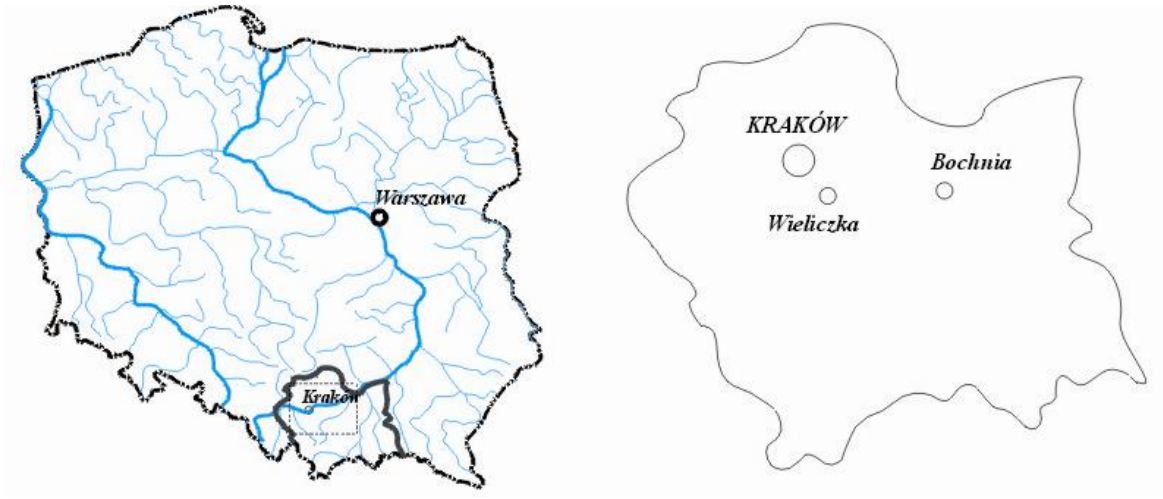

Fig. 1. Location of the Małopolska District and some of its cities and towns.

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The salt mine in Wieliczka is so interesting and important that it has already been known all over the Europe for decades and ages. In Bochnia, it was opened for the public much later than in Wieliczka but it can also become popular all over the world.

2. Geological structure of the northern part of the Małopolska District area

Both Wieliczka and Bochnia are located on the border between the Forecarpathian Basin and the Carpathian Foredeep (Fig. 2, 3, 4, 5). The area between Wieliczka and Bochnia is composed of Upper Jurassic, Cretaceous, Tertiary – Miocene and Quaternary sediments. The Upper Jurassic rock is limestone there (Fig. 3). It is covered by the Miocene - Badenian formation, hosting salt deposits, which occur all over the area.

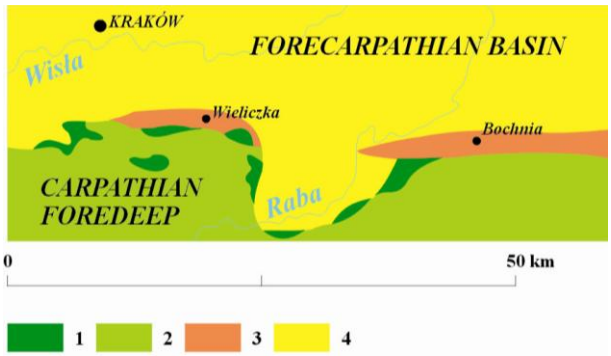

Fig. 2. Forecarpathian Basin and Carpathian Foredeep (Książkiewicz, 1972). 1- Under Silesian Nappe (Cretaceous), 2- Silesian Nappe (Creataceous), 3- Salt deposit (Miocene), 4- Autochtonic Miocene.

The Miocene–Badenian formation around Wieliczka and Bochnia is divided into four stratigraphic series: the Skawina beds, Wieliczka beds, Chodenice beds and Grabowiec beds. The Skawina beds include dark clays and marl claystones (Garlicki 1968; Połtowicz 1977). The Wieliczka beds include the main salt seams in this region. They consist of halite, anhydrite and gypsum with addition of clays and claystones. The full profile of this unit is outcropped in the salt mine in Wieliczka. Its thickness is of 30 – 100 m (Fig. 3). That series is characterised by cyclic evaporate system comprising five series. Those are evaporates of Proszówki, Łężkowice, Bochnia, Kłaj and Szczepanów (Garlicki, 1994). Their thickness is 4 – 30 m on average. The evaporates of Proszówki and Szczepanów are the most important ones. The Proszówki evaporates consist clays and sulphatate sediments. The Szczepanów evaporates include anhydrites and marl claystones with halite. There also happens to occupy some tuffs and bentonites among the clastic sediments (Fig. 4, 5) (Garlicki, 1979; Wiewiórka, 1979; Bukowski et al., 1996; Bukowski, 1999; 2000). Salt seams located close to the Carpathian Foredeep are especially tectonically disturbed and often over folded (Poborski, 1952; Poborski and Skoczylas-Ciszewska, 1962; 1963; Połtowicz, 1977). The Chodenice beds are composed of grey claystones with some tuffs. Their thickness does not exceed a few hundred meters (Olszewska, 1999). The Grabowiec beds consist of sands and clays. Their thickness is also about a few hundred meters (Aleksandrowicz, 1962; Garlicki, 1968; Peryt and Piwocki, 2004).

In the southern part of the Forecarpathian Basin, occur flysch rocks belonging to the Carpathian Foredeep. These are mainly sandstones, mudstones, shales and marls. They belong to the Silesian and Sub Silesian nappe. The whole described area is covered by Quaternary weathered loams, river sands and gravels (Fig. 2,3,4,5).

Miocene salt seams were deeply folded under the pressure of the Carpathian orogen (Książkiewicz, 1972; Jodłowski, 2000). In Wieliczka, two kinds of salt deposits are distinguished: sedimentary and blocked (Fig. 3). In Bochnia, flysch rocks occur also in the central part of two steep salt folds (Fig. 4).

3. Salt mine in Wieliczka

The origin of salt mining in the area of the present town of Wieliczka took place probably in the Middle Neolithic (3 500 BC). It is supposed by the old traces of the first plant in which salt was manufactured from the brine just there. Large-scale salt mining in Wieliczka began in the 1280s. The Goryszowski shaft connected with that was then discovered in the courtyard of Żupny Castle in Wieliczka (Piotrowicz, 1968; Reguła, 1969).

The golden age of Cracow's salt mines was between XVIth and mid-XVIIth century. Production exceeded 30,000 tonnes then and the salt was exploited at three levels. During that period, eight shafts were on. Among them was the Daniłowicz Shaft, which is currently used for tourist purposes (Fig. 7, 8). In result of prolonged wars, plagues and the accompanying natural disasters the safety work was neglected by the miners (Długosz, 1958; Keckowa, 1965).

Under Austrian management (1772-1918) salt production was greatly increased, which made the great

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development of the Wieliczka salt mine again. New technology of mining operation was found. It was mechanized by the new steam and electric machines. Professional engineering staff was beginning to be employed and the first tourist route there was created (Markowski, 1978; Dziwik, 1980).

After a time, salt exploitation was becoming extensive, so current safeguarding started to be neglected. In result of that, the stability of the rock mass and the condition of the mine were broken down. It was even planned to flood the salt mine after the Second World War. The exploitation was

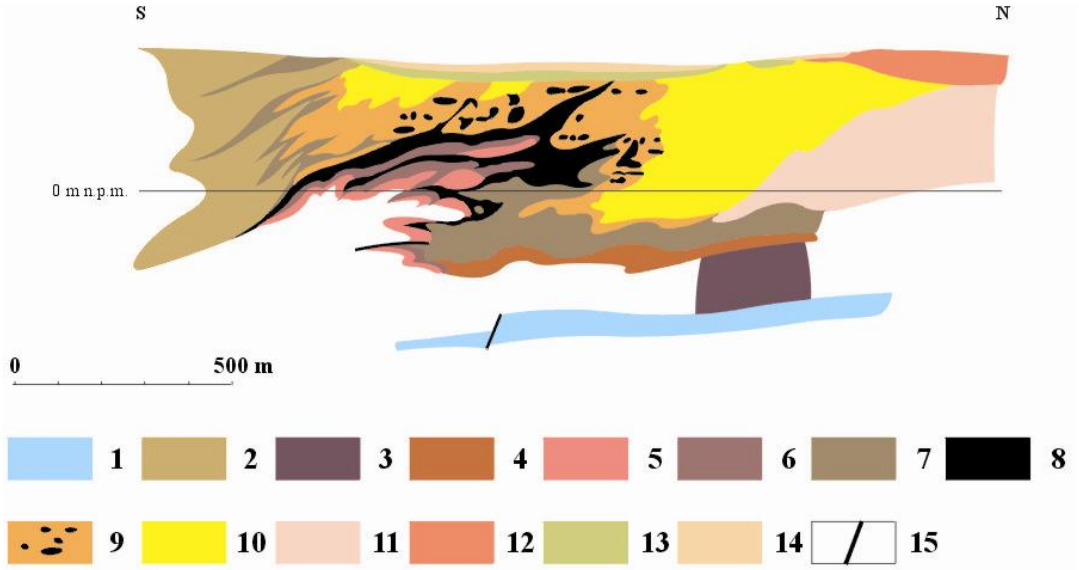

Fig. 3. Cross section through the salt deposit in Wieliczka (Poborski, Skoczylas-Ciezewska, 1968. 1-Upper Jurassic (limestone), 2-Carpathian flysch, 3-11-Lower Badenian, 3-5-under salt beds (3-marly clay, 4-sandy clay, 5-conglomerate and sandstone, 6-anhydrite clay with green salt, 7-anhydrite clay, 8-sedimentary salt, 9-salt clay with blocky salt, 10-clay with flysch material, 11-Chodenice clay, 12-Grabowiec beds (Upper Bademian), 13-gypsum, 14-Quaternary, 15-faults.

A new modern salt-boiling plant in Wieliczka was installed in 1913. It created a number of workplaces and prospects for the increase of salt production for a long time, especially in the inter-war Second Polish Republic. It was possible because of the new technology of salt leaching under ground.

going to be finished in 1964 (Piotrowicz, Grzesiowski, 1977) and was completely over in the mid 1996.

At present, the picturesque old salt workings serve tourism, museum and health purposes. The number

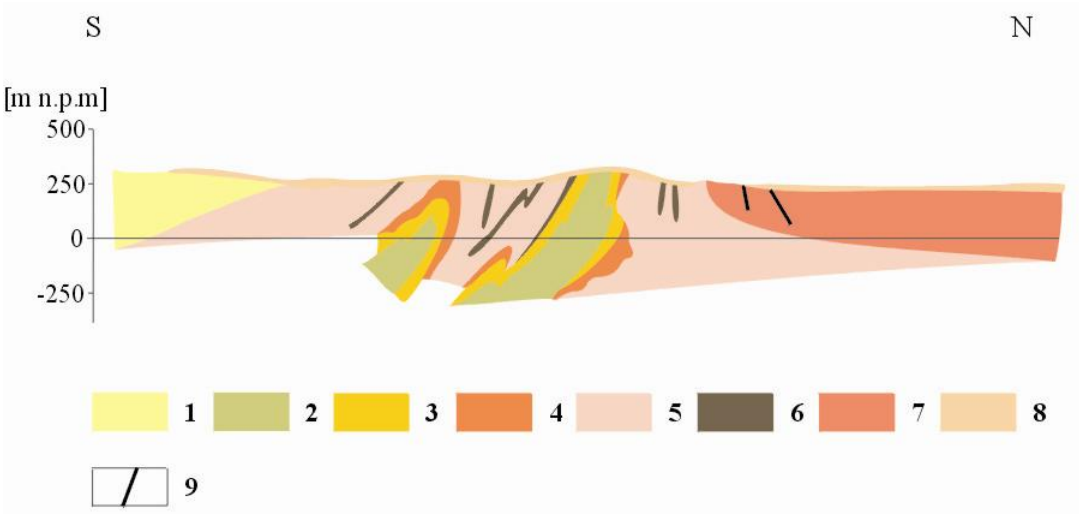

Fig. 4. Cross section through the salt deposit in Bochnia (Poborski, 1952). 1-flysch of the Carpathian Foredeep, 2-flysch in the centre of the salt folds, 3-sediments under salt deposits, 4-salt sediments, 5-Chodenice beds, 6-tuff in Chodenice beds, 7-Grabowiec beds, 8-Quaternary cover, 9-faults.

of the old excavations is growing very fast. During seven ages, 26 surface and 180 smaller shafts connecting different levels of the mine were excavated. The exploitation of the salt deposit was made on the nine levels on between 57 – 327 meters under ground. In consequence, 2 350 chambers and over 240 km of galleries were carved. For better protection of the most valuable excavations, a historic zone has been delimited in the salt mine in Wieliczka. Up to 2004, it embraced 218 galleries and 190 chambers al levels I – V. Over 20 of them is available for the visitors in the Tourist Route (levels I – III) and 16 at the Museum of Cracow's Salt works (level III) (Jodłowski, 2000).

In the Spalone Chamber tourists can be reminded that methane explosions were a very great danger for the mine in the old times. There is illustrated the work of the experienced miners, named "penitents" who burnt out the colourless gas accumulating under the chamber ceiling. They were doing so with torches on the long poles, crawling on the floor of the excavations (Majka, 1996) (Fig. 7).

The Sielec Chamber presents authentic device used for salt transportation in underground galleries (Fig. 7). The old miners used wooden carts, named "Hungarian dogs", chests, and special sledges. Fine salt was put into barrels and carried on the

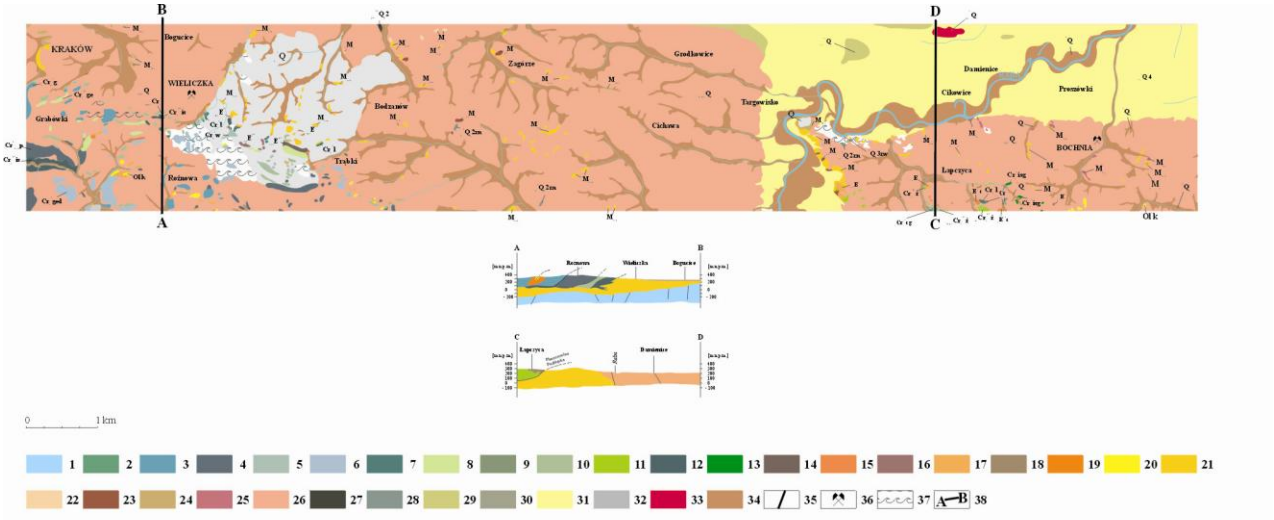

Fig. 5 Geological map of the area between Wieliczka and Bochnia (Burtan, 1954, Skoczylas-Ciszewska, Burtan, 1954)
1 - limestone (J˙) *2* - Cieszyn Lower beds (arrow sandstone and shale (Cr˙cg)) (Silesian nappe) *3* - Grodzisk beds (shale) and Cieszyn Upper shale (Cr˙g) (Silesian nappe) *4* - Grodzisk beds in general (thick grain sandstone and conglomerate (Cr˙...p)) (Silesian nappe) *5* - Wierzów shale (shale) (Cr˙w) (Silesian nappe) *6* - Lower spong beds in general (shale and sponge (Cr˙ged) (Silesian nappe) *7* - Lgota beds in general (sandstone and shale) (Cr˙l) (Silesian nappe) *8* - sponge beds in general (shale and sponge) (Cr˙ge) (Sub Silesian nappe) *9* - patchy shale (˙Cr˙) (Silesian nappe) *10* - patchy marl (˙Cr˙) (Silesian nappe) *11* - Żegocina marl (˙Cr˙ż) (Sub Silesian nappe) *12* - Istebna beds (Tomaszkowice sandstone) (Cr˙is)) *13* - Upper Istebna beds in general (sandstone and conglomerate (Cr˙isg) (Sub Silesian nappe) *14* - green shale and siderite (˙E˙) (Sub Silesian nappe) *15* - Ciężkowice sandstone (˙E˙) (Sub Silesian nappe) *16* - siliceous and glauconitic (˙E˙) (Sub Silesian nappe) *17* - patchy shale (˙E˙) (Sub Silesian nappe) *18* - patchy shale (˙E˙) (Sub Silesian nappe) *19* - menilite shale (with chert) (˙OE˙) (Sub Silesian nappe) *20* - Krosno beds in general (sandstone and shale) (Olk) (Silesian nappe) *21* - Chodenice beds in general (grey and black clay with tuff) (M˙) (Tortonian) (Tortonian = Lower Badenian) *22* - tuff (M) (Tortonian) *23* - gypsum (˙M) (Tortonian) *24* - Bogucice sand (sand from Bogucice and Rajsko) (M˙) (Tortonian) *25* - Grabowiec beds in general (sand and shale clay) (M˙) (Tortonian) *26* - dusty loam (˙Q) (Plejstocene) *27* - water glacier sand (˙Q 2) (Plejstocene) *28* - the highest terrace gravel (˙Q 2zn) (South Poland Glacier) *29* - "mixed" gravel (˙Q 3) (Middle Poland Glacier) *30* - the old high terrace gravel (˙Q 3zw) (Middle Poland Glacier) *31* - loam and gravel of low accumulation terrace (˙Q 4) (Baltic Glacier) *32* - weathered loam (˙Q) (Plejstocene/Holocene) *33* - dune sand (pk Q) (Plejstocene/Holocene) *34* - river sediment in general (gravel, sand and mud) (Q˙) (Holocene) *35* - fault/overlap *36* - salt mine *37* - landslide *38* - cross-section line

The tourist route in the mine is about 3,5 km long. It runs through quite a number of chambers and galleries (Fig. 6). The most interesting among them are: the Mikołaj Kopernik Chamber, the Spalone Chamber, the Sielec Chamber, the Casimir the Great Chamber, the Pieskowa Skała Chamber, the Kunegunda Traverse, the St. Kinga's Chapel, and the Józef Piłsudski Chamber. First, the visitors go down by steps to the depth above 50 m underground (Fig. 6).

The Mikołaj Kopernik Chamber has taken its name after the famous astronomer. He was one of the first visitors in that salt mine (Fig. 7). His salt monument was placed in the chamber on the 500th anniversary of his birth. The chamber, carved in a salt block is secured by wooden casings (Majka, 1996).

carts. Large blocks of salt were rolled on the wooden platforms (Majka, 1996).

In the XVIth century, miners began to use horses for help in transporting salt into the surface. It is illustrated in the Casimir the Great Chamber, in the centre of which a horse – drawn Saxon wheel tread can be seen (Fig. 7). It could transport salt rolls even up to two tones in weigh (Majka, 1996).

The Pieskowa Skała Chamber is considered as one of the most beautiful places in the mine. The great space of the chamber links two adjacent levels of the salt stratified deposit, whose exploitation was started in the XVIIth century. In the chamber, some parts of the stairs carved in salt have been preserved (Fig. 7). Old miners carried fine salt in special bags or wooden troughs along such stairs (Majka, 1996).

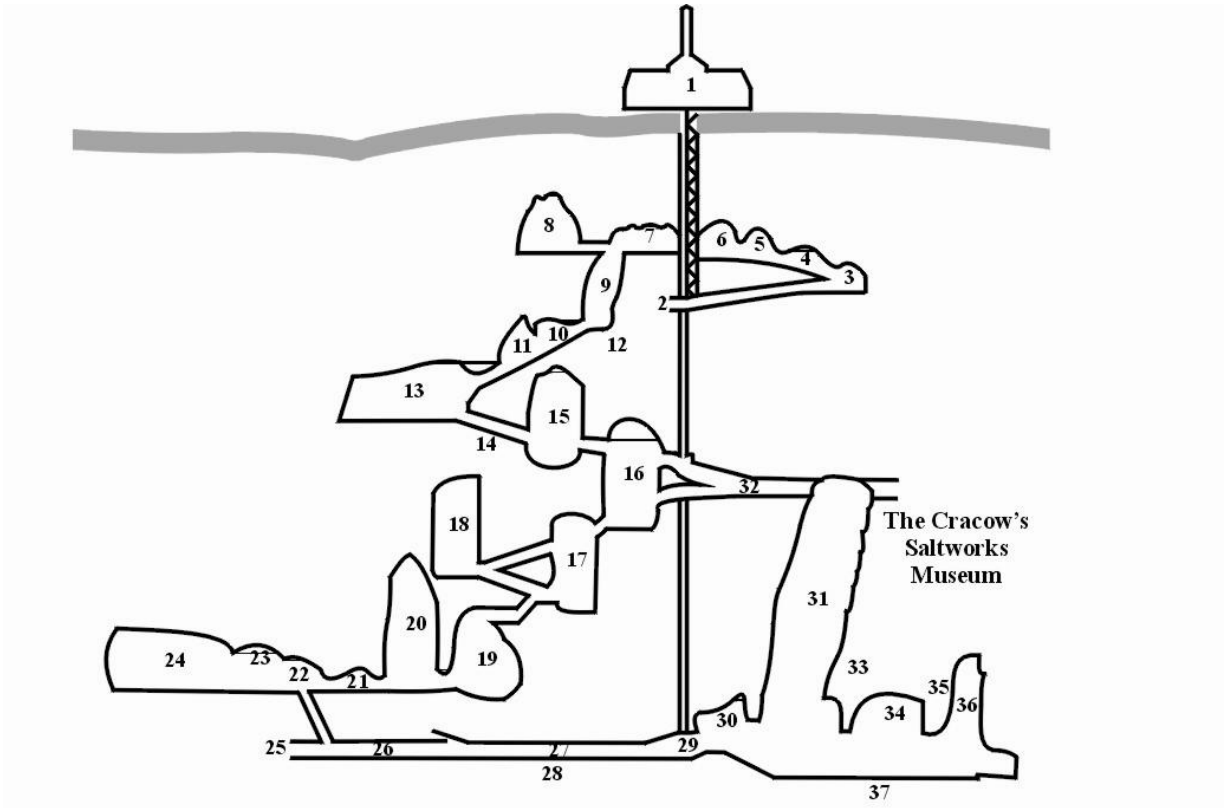

Fig. 6 Chambers on the tourist route in the salt mine in Wieliczka (Jodłowski, 2000):
1 - The Daniłowicz Shaft
Level I: *2* - The Daniłowicz Shaft Bottom *3* - The Mikołaj Kopernik Chamber *4* - The Janowice Chamber *5* - The St. Anthony's Chapel *6* -The Spalone Chamber *7* - The Sielec Chamber *8* - The Casimir the Great Chamber *9* - The Pieskowa Skała Chamber
Upper Level II: *10* - The Kunegunda Shaft Bottom *11* - The Holy Cross Chapel *12* - The Kunegunda Traverse
Lower Level II: *13* - The St. Kinga's Chapel *14* - The Barącz Slipway *15* - The Barącz Chamber *16* - The Michałowice Chamber *17* - The Weimar Chamber *18* - The Drozdowice Chamber
Kazanów split-level: *19* - The Józef Piłsudski Chamber *20* - The Stanisław Staszic Chamber *21* - Treasurer *22* - The Wisła Chamber
Level III: *23* - The Witold Budryk Chamber *24* - The Warszawa Chamber *25* - The Juliusz Słowacki *26* - The Jan Haluszka Chamber *27* - The Izabela Chamber *28* - The Anthony Longitude *29* -The Daniłowicz Shaft Bottom *30* - The Jan Długosz Chamber *31* - The Saurau Chamber *32* - The Harańcza Transverse *33* - The Kraj Chamber *34* - The Modena Chamber *35* - The Miejska Chamber *36* - The Maria Teresa Chambers *37* The Russegger Chambers

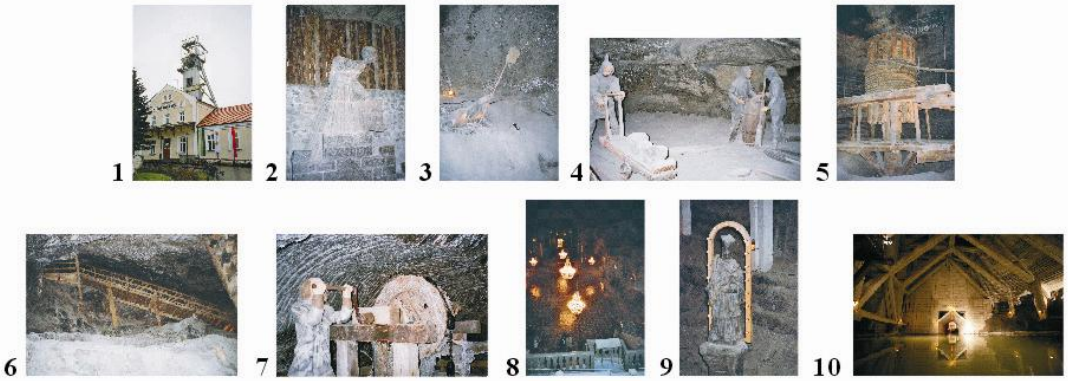

Fig. 7 Photos of the salt mine in Wieliczka:
1 - The Daniłowicz Shaft (author) *2* - The Mikołaj Kopernik Chamber (author) *3* - The Spalone Chamber (author) *4* - The Sielec Chamber (author) *5* - The Casimir the Great Chamber (author) *6* - The Pieskowa Skała Chamber (author) *7* - The Kunegunda Traverse (author) *8* - The St. Kinga's Chapel (author) *9* - The St. Kinga Sculpture (author) *10* - The Józef Piłsudski Chamber (http://www.kopalnia.pl)

In the Kunegunda Transverse, the method of the salt mine dehydratation is shown (Fig. 8). In the old times, water was first directed to vats and special tanks. Then it was directed through water troughs, piper to the main reservoir located by the shaft. In the end, water was drawn to the surface (Majka, 1996).

Te St. Kinga's Chapel is a very spacious chamber carved in a block of salt (Fig. 7). It has been a place of worship since 1896. The chapel chancel is decorated by a few sculptures of the New Testament scenes. Apart from them, there are also some statues of the last saint people. Among them is St. Kinga (Fig. 8), thanks of whom the salt mine was created, according to a legend. This sculpture was made as a gift of thanks for the canonizing of the Blessed Kinga by pope John Paul II in Stary Sącz in 1999. Large salt chandeliers illuminate the chapel. It is one of the most impressive and opulent underground temples in Europe (Majka, 1996).

The Józef Piłsudski Chamber (Fig. 8) was created by combining two adjacent green salt workings. In the early XIXth century, the Austrians connected the twin chambers with a 10-m tunnel when the first tourist route was being set up. There were also built wooden stairs and platform. The bottom of the chamber was filled with brine. At present, raft crossing through the tunnel is the additional attraction provided for tourists (Majka, 1996).

4. The salt mine in Bochnia

The Bochnia Salt Mine is the oldest one in Poland and the oldest industry in Europe. The salt deposit in Bochnia was discovered in 1248. It happened completely accidentally, while deepening brine wells and some salt rocks were met at a depth of 50 – 60 m. Since then Bochnia has become economically attractive. When Bolesław the Chaste, reigning in the city of Cracow and Sandomierz at that time, got known about salt discovery in his duchy, he bought out all the land around the place of discovery. Thanks to his investments and the help of Cistercians from Wąchock, the first mineshafts in Bochnia named "Sutoris" and "Gazaris" could be established in 1255 (Kobiela, 1999; Flasza, 2005; Bielak, 2007).

However, salt exploitation in Bochnia proved to be much more difficult than in Wieliczka. It was because of a very complicated geological structure of those salt deposits (almost vertically occurring salt rocks) combined with highly diversified and unusual shape of post-exploit caverns, and corridors. This untypical structure was caused by Carpathian's orogen pressure. In XIVth century, for the first time in deep mines, the connections between the mineshafts at a depth of 70 m were made in the salt mine in Bochnia. There were also galleries and smaller shafts. The salt was manually separated from the rest of the cube-shaped blocks with the help of pickaxes and splitting wedges. Then it was put into the ceramic forms and after that the salt fragments closed in barrels were drawn up. In between XVth - XVIth century the horses have been used for help in transportation of heavy blocks in Bochnia's salt mine.

The period of the reign of the king Casimir the Great was the most fruitful in the mine's history as the citizens of Bochnia were awarded with country's highest privileges. The mineshaft named "Regis" was constructed then, which made possible to discover some new rich salt deposits and build the Poland's first staff hospital – shelter for the sick miners. It was done due to numerous accidents occurring in the mine just then.

The salt mine in Bochnia played a vital role in the area's industrial growth and provided hundreds of citizens with work. Among them were not only miners but also carriers responsible for salt transport. As for industries existing thanks to the salt mine, there were mainly blacksmiths, coopers and rope makers.

In the XVth century, the salt exploitation reached the depth of 300 m what made the miners go even deeper in the search of salt. At the same time large salt seams were discovered in the western part of the deposits, due to which the "Campi" shaft was constructed. That shaft became the main one just in XVIth century and the salt mining was concentrated in that part of its deposit. The most significant crisis came together with the Swedish Deluge, in the XVIIth century.

The economic situation of salt evaporation ponds in Bochnia was improved only in the XVIIIth century when the system of the underground routs created in result of exploitation was rearranged by Jan Borlach, an outstanding land surveyor, who was invited to Bochnia. Consequently, two main corridors: "August" at the depth of 200 m and "Podmoście" 300 m underground were come into existence. That let salt extraction be much easier and more effective and put the mine's crisis to an end. In the XIXth century, some modern techniques were in usage, mainly dynamite, steam machine and steel line.

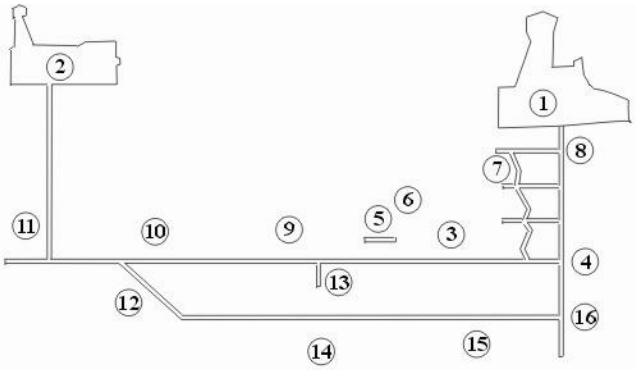

Fig. 8 The Sightseeing Route in the Bochnia salt mine (Bielak, 2007):
1 - The Sutoris Shaft *2* - The Campi Shaft *3* - The Mysiur Stable *4* - Level IV August
5 - Interlevel Chamber Dobosz *6* - The Christian Chamber *7* - Regis Stairs *8* - Level III Wernier
9 - The St. Kinga's Chapel *10* - A water trademill *11* - The Kołdras Chamber *12* - A slide
13 - The Ważyn smaller shaft *14* - The Ważyn Chamber *15* - A water wheel *16* - Level VI Sienkiewicz

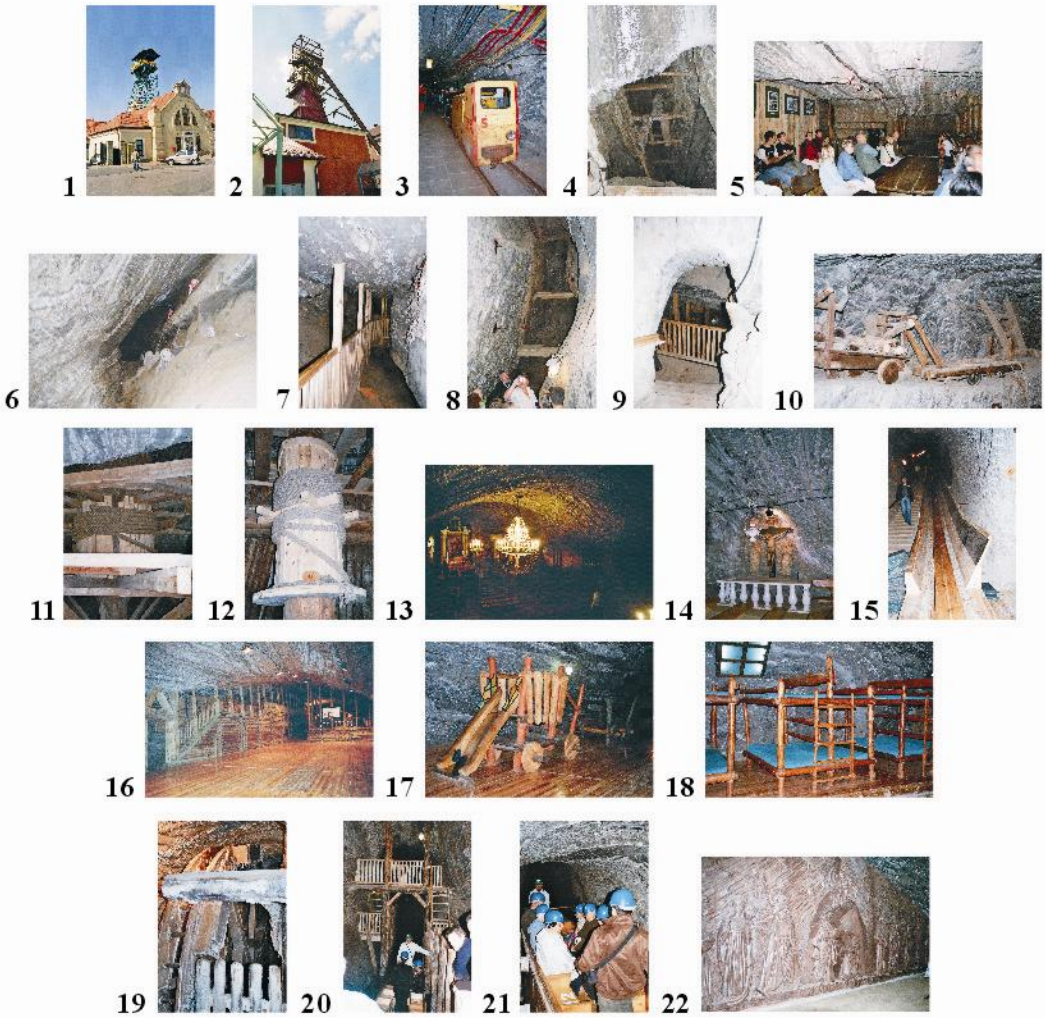

Fig. 9 Photos of the Sightseeing Route in the Bochnia salt mine (by author):
1 - The Sutoris Shaft *2* - The Campi Shaft *3* - Underground railway *4* - Old working miners *5* - The Mysiur Stable
6 - Old miners burning out methane (in the Interlevel Chamber Dobosz) *7* - Interlevel Chamber Dobosz
8 - The Christian Chamber *9* - Regis Stairs *10* - Old carts *11* - The Treadmill Chamber *12* - The Rabsztyn Chamber
13, 14 - The St. Kinga's Chapel *15* - A slide *16, 17* - The Ważyn Chamber *18* - The bedroom for bathers in the Bochnia Underground Health Resort *19* - A water wheel *20, 21* - Chamber 81 *22* - The Cross Way Relief (Level IV August)

After the World War II the salt miners revamped their extracting methods. With the help of electricity installment in the sixties, they could reach the depth of 470 m and the horses were no longer needed. In 1981 some mine excavations were taken under protection by one of the regional monuments restoring agencies in order to maintain its beauty.

The salt exploitation was over in the nineties, because the industrial plant "Solvay" in Cracow was closed in 1990. The resource of salt had been provided just for that plant. In the meantime the mine workers started adopting Bochnia's salt workings to be used for recreational and tourist purposes. Thus underground tourist rout and health resort was already created in 1995 (Charkot and Jaworski, 1992; Borkowski, 2000; Flasza, 2005; Bielak, 2007).

The tourist route in Bochnia's salt mine is about 2,5 km long. It involves a few chambers connected with drifts and smaller shafts (Fig. 8,9). First, the visitors go down by lift of the "Campi" shaft to the Level August, 212 m underground. Then they are carried by the underground railway to the "Sutoris" shaft. Its line runs down the Level August, on the distance of 1 km (Fig. 8, 9). Then the visitors start from there walking through old, very interesting, salt workings.

The Mysiur Stable (Fig. 8,9) was for keeping horses working in the mine safe. At present, this chamber is used as a place for conferences, trainings and parties.

The Interlevel Chamber Dobosz (Fig. 8,9) is situated 20 m above the Level August. It shows mainly the work of the miners burning out methane in the chamber's upper part. There can be also seen some carts used for carrying blocks of salt along the slides.

The Christian Chamber (Fig. 8,9) is a typical kind of working in the Bochnia salt mine. It has a specific vertical, narrow, and soaring shape, what results from the vertical pattern of salt deposit in the area. There are some traces of miner's work with the help of small pickaxes on the chamber's walls.

The chamber with a treadmill is the room where the visitors can watch methods of transportation of very big salt blocks, 150 - 450 kg in weigh. The horses were used for that. A water treadmill is a tool for dehydrating of the Rabsztyński smaller shaft (Fig. 8,9).

Regis stairs (Fig. 8,9) consist of 11 sections of different lengths and gradients. There are plenty of places to rest. Their length is 320 m of total and they are the only ones in the mine that lead round the shaft. The miners were walking up and down those stairs until 1923.

The St. Kinga's Chapel (Fig. 8,9) is the mine's biggest chapel preserved in a very great condition. The fact that mine work is very dangerous accounts for the religious climate in the mine. That's why there used to be plenty of chapels on the main communication routes. Up to now, there are many of the salt sculptures of saint people.

A slide connecting Level August with the Ważyn Chamber long on 140 m, is one of the biggest tourist attractions in the mine. The slide is situated on the drift along which the salt was transported from the Ważyn Chamber to the Level August.

The Ważyn Chamber is the most spacious chamber in Bochnia's salt mine. This room serves for recreational and health purposes. It is situated 248 m below surface and divided into 5 segments being long on 255 m in total. At present, the chamber is adopted for sport field (playground), attractions for children (Fig. 10), gastronomy, disco and bedroom for 260 people. There is also a restaurant and a souvenir shop. The tourists can ask a guide to rent a sports equipment there too. The room is also used on the various occasions such as conferences, symposia, trainings, theatrical performances, concerts, and other parties. People with some illnesses, especially of breath system can spend a time in the chamber, because there are quite suitable climate conditions there.

A water wheel is situated at Ważyn Level. That device served for pulling the brine out of the mine.

At the end of the visit in the Bochnia Salt Mine, tourists can have a raft ride on the distance of 120 m in the Chamber 81. It is situated 230 m underground. In the middle of XXth century, there were performed some experiments with wet mining. Thus, there are traces of them in the form of underground streams and lakes. That's why this additional tourist attraction is possible. After the ride the tourists can watch a very beautiful relief of the scene of the Cross Way on the Level August wall (Charkot, Jaworski 1992, Borkowski 2000, Flasza 2005, Bielak 2007).

5. Conclusions

Described underground geoturistic objects in salt deposit in the Malopolska District belong to the

most interesting sites not only in Poland but also in Europe. Both of them were acknowledged as the National History Monuments by the decree of the President of Poland, the Wieliczka Salt Mine in 1994 and the Bochnia Salt Mine in 2000 (http://www.kopalniasoli.pl). In addition, the Wieliczka Salt Mine was inscribed in UNESCO's First World List of Cultural and Natural Heritage (http://www.kopalnia.pl). All the underground geoturistic objects in the Małopolska District have become very popular mainly because the excavations of these old mines, in the form of galleries and chambers have been very well prepared for the visitors to watch them. In this way, the tourists can now imagine themselves the original picture of all those mines and the atmosphere among the miners in the past when they were working. It is possible thanks to the old exploiting machines exhibited in these objects, and the old underground railway in Bochnia's salt mine. In the author's opinion, all these objects described in the paper deserve to have a name as the most popular monuments in the world.

There is also one more underground salt mine open for tourists in Poland. It is situated in Kłodawa in Wielkopolska District. The structure of both the salt deposit and the salt workings in Kłodawa are quite different than in these in Bochnia and Wieliczka.

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