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The Ignacy Łukasiewicz Memorial Museum of Oil and Gas Industry in Bóbrka and historical monuments of petroleum and salt industries in the vicinity of Krosno (the Polish Outer Carpathians)

Skansen – Muzeum Przemysłu Naftowego i Gazowniczego im. Ignacego Łukasiewicza w Bóbrce oraz pamiątki przemysłu naftowego i solnego w okolicach Krosna (polskie Karpaty zewnętrzne)

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Abstract: *The beginnings of petroleum industry in Poland are connected with the opening of the first "rock oil mine" in Bóbrka village near Krosno, in 1854, thanks to the initiative of three gentlemen: Tytus Trzecieski, graduated farmer and miner, and investor, Karol Klobassa-Zrencki, landowner and Ignacy Łukasiewicz, pharmacist and inventor of oil distillation. In 1961, at the site of this first "oil mine" the Ignacy Łukasiewicz Memorial Museum of Oil Industry was opened in Bóbrka. The exhibition includes: the Open-Space Museum with a number of valuable pieces and the outline of museum history and development plans, the outline of geological setting of the Bóbrka Fold, the short geotouristic trail named "The Birthplace of the World Petroleum Exploitation", which connects the localities important for the early history of the oil industry (Bóbrka, Chorkówka, Krosno, Rogi, Wietrzno and Równe) as well as the sites known for exploitation of mineral waters (Iwonicz Zdrój and Rymanów Zdrój spas). Both the Open-Space Museum in Bóbrka and the educational trail in the vicinity of Krosno will be the part of trans-border geotourist trail Staruna-Boryslav-Lviv-Bóbrka-Wieliczka-Kraków named: "Traces of large extinct mammals, earth wax, oil and salt".*

Key words: *Bóbrka, geotourist trail, Memorial Open-Space Museum of Oil Industry, Ignacy Łukasiewicz, the Lower Beskidy Mts.*

Treść: *Powstanie pierwszej kopalni ropy naftowej w miejscowości Bóbrka w pobliżu Krosna w roku 1854, dało początek światowego przemysłu naftowego. Uruchomił ją Ignacy Łukasiewicz na gruntach Karola Klobassy-Zrenckiego. W 1961 r. na terenie istniejącej kopalni Bóbrka utworzono Skansen - Muzeum Przemysłu Naftowego im. I. Łukaszewicza. Podano zarys historii skansenu, jego zbiorów, plany rozwoju muzeum, a także zarys budowy geologicznej fałdu Bóbrki. Przedstawiono również krótką trasę geoturystyczną „Światowa kolebka górnictwa naftowego" po miejscowościach związanych z rozwojem przemysłu naftowego (Bóbrka, Chorkówka, Krosno, Rogi, Wietrzno i Równe), a także eksploatacją wód mineralnych w Iwoniczu Zdrój i Rymanowie Zdrój. Zarówno skansen naftowy w Bóbrce jak i edukacyjna ścieżka turystyczna w okolicach Krosna będą w przyszłości stanowiły element transgranicznej trasy geoturystycznej Starunia – Borysław – Lwów – Bóbrka – Wieliczka – Kraków „Śladami olbrzymich wymarłych ssaków, wosku ziemnego, ropy naftowej i soli".*

Słowa kluczowe: *Bóbrka, trasa geoturystyczna, ropa naftowa, Skansen – Muzeum Przemysłu Naftowego, Ignacy Łukasiewicz, Beskid Niski*

Introduction

Bóbrka is a special site in the Carpathian region. Here, the Open-Space Museum of Petroleum Industry is presenting the history of oil industry from its beginning to the present days. Some 150 years ago Bóbrka was a small, poor mountain village, but in the second half of the 19th century this small world had dramatically changed, bringing the wealth to the local population (Orliński et al., 2004). The changes have been caused by development of the "oil mine" in 1854. The forested land, useless for agriculture, was full of oil seepages.

Fig. 1. The "Franek" dug-well in the Bóbrka oilfield. Phot. A. Radwański ● Kopanka „Franek" na terenie kopalni ropy naftowej Bóbrka. Foto A. Radwański

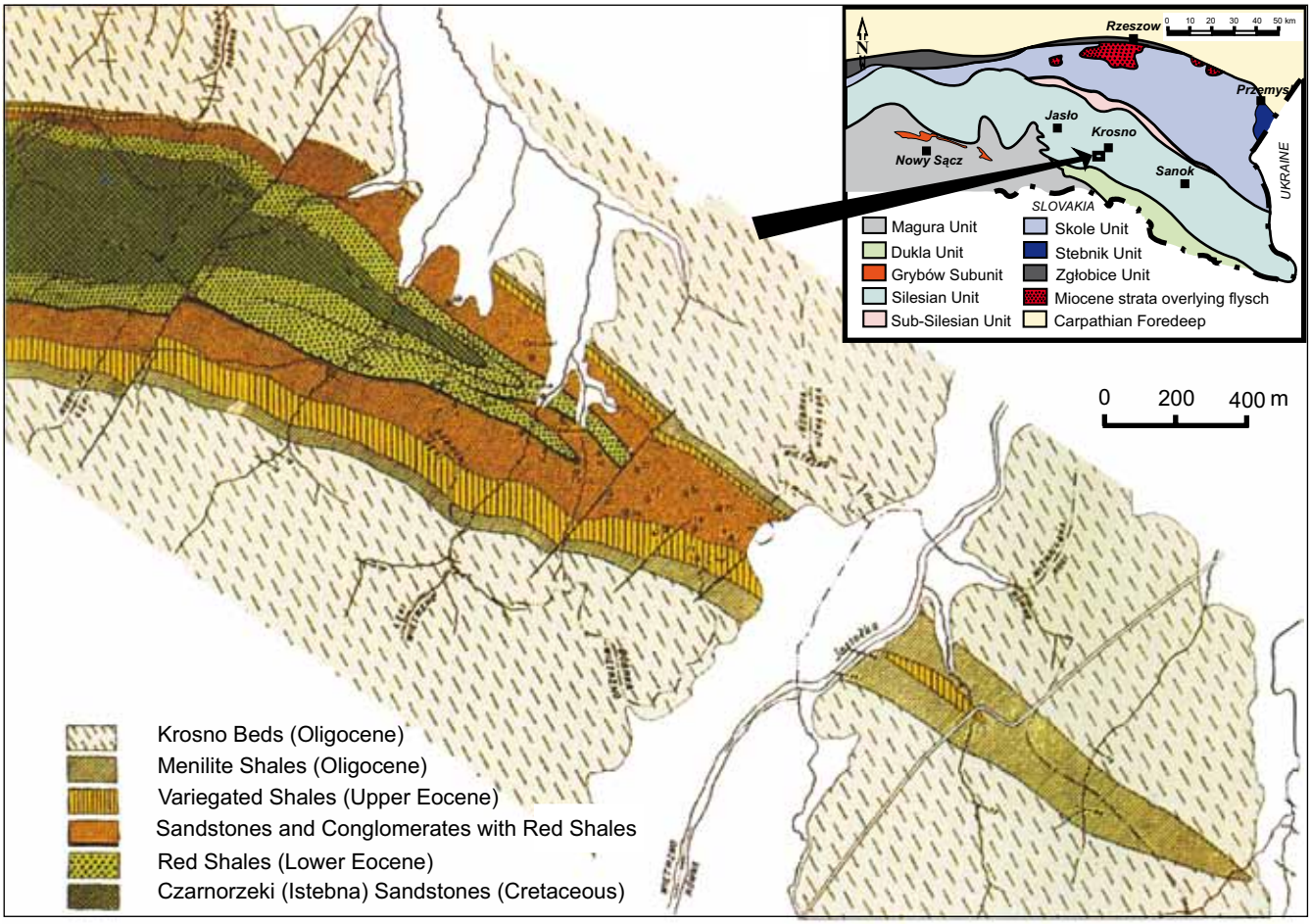

Fig. 2. Geological map of the eastern part of the Bóbrka-Rogi anticline, after Obtułowicz (1932) ● Mapa geologiczna wschodniej części antykliny Bóbrka-Rogi, według Obtułowicza (1932)

Thus, three founders: Tytus Trzecieski, graduated farmer and miner, and main investor, Karol Klobassa- Zrencki, local landowner and Ignacy Łukasiewicz, pharmacist and one of the patent holders, agreed to run a joint business: to exploit oil and distil it into kerosene (then called "new camphene"), which was applied as a fuel for kerosene lamps. The patent for distillation of petroleum was granted by The Patent Office in Vienna to Ignacy Łukasiewicz and Jan Zeh on December 2nd, 1853. Moreover, Ignacy Łukasiewicz was an inventor and coauthor of the project of a new oil lamp fuelled by kerosene, which generated bright light without fumes. The usage of kerosene lamps during an urgent, surgical operation at the public hospital in Lviv at night of July 3rd, 1853 has been regarded as the beginning of modern Polish and world oil industry (Brzozowski, 1994; Michalewicz et al., 2004; Sozański, 2004; Sozański et al., 2008).

The first oil dug-wells in Bóbrka were localized at the sites of natural oil seepages. Later, with the progress of geological exploration methodology, the producing wells were spud according to the principles of exploitation of the oilfields. There were many other persons who contributed to the development of petroleum drilling and exploitation methods in Bóbrka and at other sites in Poland: Henryk Walter, Albert Fauck, Adolf Jabłoński and Juliusz Noth (Brzozowski, 1994; Nater & Sozański, 2002; Sozański et al., 2008).

Traveling through the recent Carpathian region, the tourist can easily notice characteristic, anthropogenic elements of the landscape: drilling rigs, pumpjacks, tripods, and various oil tanks; all remained after over 150-years-long functioning of oil industry in this area. The aims of this paper are: to describe briefly the geological structure of the Bóbrka oilfield, to present the history of the beginning of the Open-Space Petroleum Industry Museum in Bóbrka and to promote the localities important for the beginning of oil industry in the Carpathian Foreland: Bóbrka, Chorkówka, Rogi, Wietrzno, Równe and Zręcin. Together with the neighbouring Krosno and Iwonicz towns, these localities are the elements of the educational trail of suggested name: "The Birthplace of the World Petroleum Exploitation". In the future, both the Open-Space Museum in Bóbrka and the educational trail will become the elements of trans-border geotourist trail from Starunia in Ukraine to Kraków in Poland, named: "Traces of large, extinct mammals, earth wax, oil and salt" (Kotarba, 2009).

The initiative of creation of the Oil Trail was made by "Low Beskid" – local touristic organization from Krosno, in cooperation with district councils from the southern Fore-Carpathian Region and also partners from Ukraine in the PHARE 2000 project – "Program for Polish Eastern Border". The found allocated for small Carpathian Euroregion projects in 2002, commemorating the 180th anniversary of birthday and the 120th anniversary of death of Ignacy Łukasiewicz.

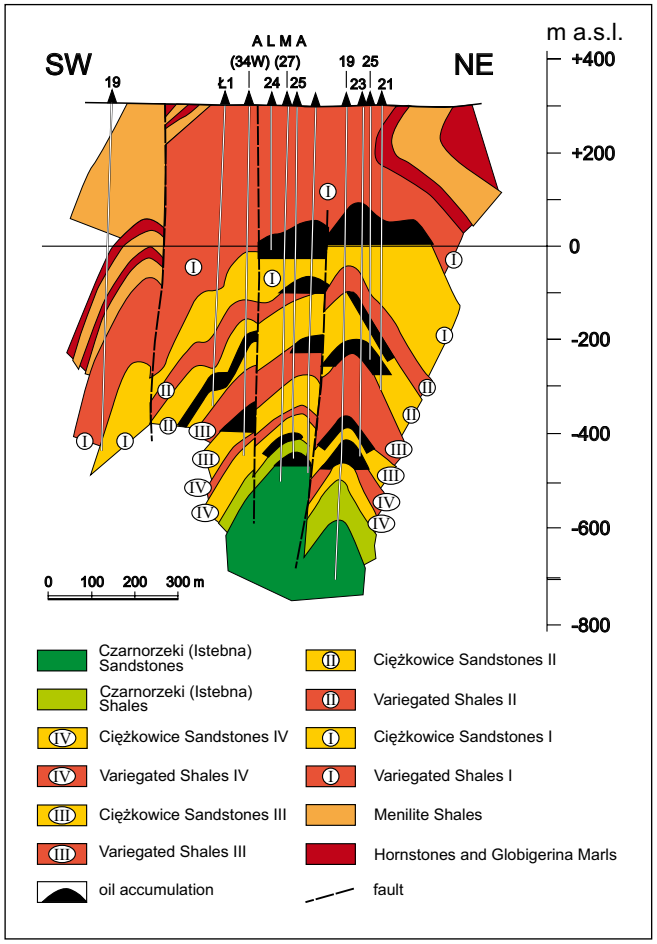

Fig. 3. Geological cross-section through the Bóbrka-Rogi fold, after Kruczek (1968) with author's modification ● Przekrój geologiczny przez fałd Bóbrka-Rogi, według Kruczka (1968) z modyfikacją autora

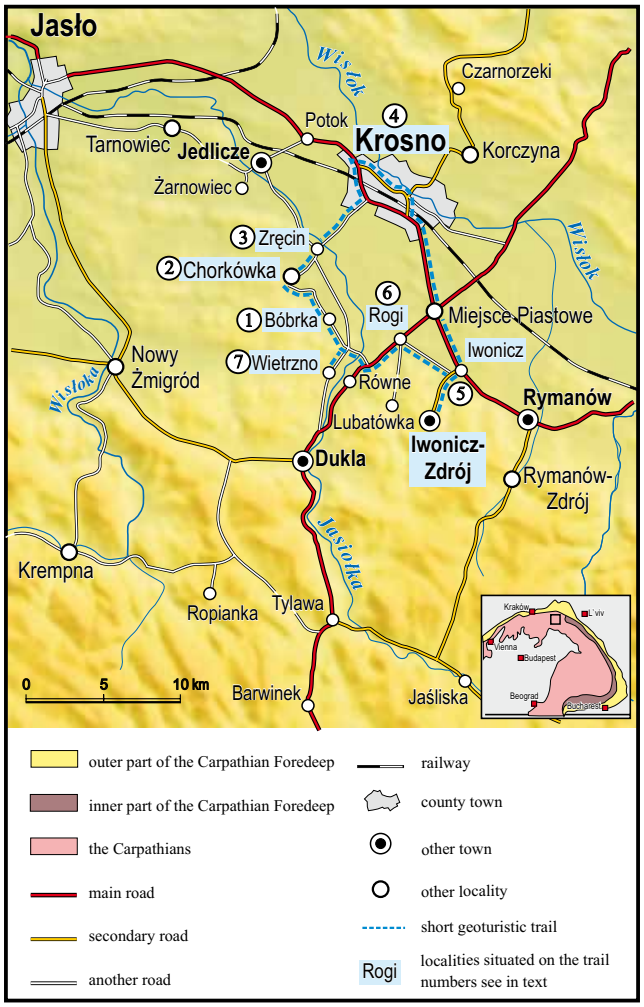

Fig. 4. Route "The Cradle of the World Petroleum Exploitation" ● Przebieg trasy „Kolebka Górnictwa Naftowego", 1 – Bóbrka, 2 – Chorkówka, 3 – Zręcin, 4 – Krosno, 5 – Iwonicz, 6 – Rogi, 7 – Wietrzno

The main parts of the Oil Trial are places connected with the birth and the history of oil industry on the terrain belonged to Austro-Hungarian Galicia in the second half of the 19th century. The course of the trail was designed especially for tourist interested in the subject of oil, who would have a chance to visit magnificent, secular and sacred monuments characteristic for terrains of borderland. The main part of the trial: Jasło – Krosno – Sanok – Lesko – Ustrzyki Dolne – Sambor – Boryslav – Dorohobych – Lviv has been completed by adding foot and bicycle trails.

On the route of the Oil Trail from Harklowa (Poland) to Lviv (Ukraine) it is possible to visit: (i) places connected with the activity of the creators of oil industry and also participants of the "oil fever" – totally in 58 localities, (ii) sacred monuments characteristic for culture of the borderland and also historical objects of material culture – totally 101 localities, and (iii) the most valuable natural attractions of this terrain – 20 objects.

The project was run from January to July, 2005. In September, 2005 the Oil Trail was included into the group of the best touristic products of the year and was awarded the Certificate of Polish Touristic Organization, which took the responsibility for promotion of the trail.

The next stage of development of the Oil Trial was to develop a new method of selling the product, run as a part of the national Polish project: "Tourism - Common Matter". The partnership group named: "The Oil Trail" was composed of 40 different participants acting in their regions but focused on the common task – the development of the Oil Trial and gaining profits from activity.

Further plans of development of the Oil Trail are related to its promotion in the southern Fore-Carpathian region in Ukraine, together with the Carpathian Oil Trail developed in the Gorlice District (Poland).

The local tourist organization "Low Beskid" has created the supraregional project of a tourist complex, embracing a small park with the paths simulating the course of the Oil Trial. Nearby the paths the replicas of oil exploitation and processing objects will be placed and also a pavilion for conferences and exhibitions will be built. Together with the replicas the miniatures will be situated of secular and sacred monuments (Sikorska et al., 2005, 2006; Sikorska, 2007).

During the ages, on the Fore-Carpathian region, recently shared by Poland and Ukraine, has been producing salt from common brine seepages, which were usually accumulated together with hydrocarbons in the Carpathian flysch strata. Nearby Bóbrka brines occur in Rymanów Zdrój and Iwonicz

Fig. 5. Tomb of Ignacy Łukasiewicz and his wife Honorata. Phot. A. Radwański ● Grobowiec Ignacego i Honoraty Łukasiewiczów. Fot. A. Radwański

Zdrój, where these are used mainly for therapeutic purposes. In 1866 famous chemist Adolf Aleksandrowicz published his paper entitled: "Chemical analysis of medical waters in Iwonicz" in which he described chemical composition of waters from springs "Karol", "Amelia" and "Józef". Among many springs, till the half of the 20th century the most important meaning have had the waters from springs "Karol" and "Amelia", which have been used to gain salt and lye. "In 1867 production of iodic salt has started from spring waters, according to indications of Aleksandrowicz. Salt has been produced by vaporization in baths. The production of salt amounted over 2,000 kg per year" (Kamiński & Mackoś, 1998).

At present, the Iwonicz Zdrój Health Resort continues production of medical salt from Iwonicz, cosmetic-bath salt "Elin" and also therapeutic mud "Iwonka". Salt is obtained from mineral water exploited from the I, II and III levels of the Ciężkowice Sandstones with the "Lubatówka 12" well and also from the II level of Ciężkowice Sandstones in the "Lubatówka 14" well (Kamiński & Mackoś, 1998).

In 1890s the Iwonicz Zdrój Health Resort, the production of bromine – iodic lye has started apart from the recovery of salt (Bolanowski & Mateszew, 1985). In the neighbourhood of Sanok, near the Słonne Mountains there are numerous salty springs, especially in Tyrawa Solna, where in the times of Polish Kingdom the salt mine was located, then closed by Austrian authorities in 1772. According to other source, production of salt ceased in this area in 1824. Tyrawa Solna was marked together with Iwonicz and Szczawnica on the pictorial map of Galician health resorts from 1857. Adam Fastnacht (2002) wrote: "the village existing from 1402 had on its terrain the salt mine and it was connected with the duty of service mentioned in one of earlier written sources. The duties were: carrying the salt, which was also the profitable priviledge, military service and others". Salt was transported mainly by riversusing simple boats called: "komięgi". Salt trade was held by people named: "prasoły". After buying salt in the salt-works and loading it into barrels, they delivered it to the store in Przemyśl and then down the San and the Vistula rivers to the stores in Dybów and Bydgoszcz. In Tyrawa Solna the brine was obtained and vaporized with primitive

Fig. 6. (A) Copy of the prototyp of the Ignacy Łukasiewicz kerosene lamp from 2010 and (B) drawing-room lamp from late 19th century from the collection of the Fore-Carpathian Museum, Krosno. Phot. K. Gierlach ● Kopia prototypu lampy naftowej Ignacego Łukasiewicza wykonana w 2010 i (B) lampa salonowa z kolekcji Muzeum Podkarpackiego w Krośnie, II poł. XIX w. Fot. K. Gierlach

methods even during German occupation from 1941 to 1944 (Fastnacht, 2002; Skowroński et al., 2009). Until now, it is possible to find in the vicinity of Tyrawa Solna relicts of salt -works, where the salt was gained and next transported downstream the river San in barges called: "szkuty" (Lipelt, 2004; Skowroński et al., 2009).

History of the Open-Space Museum of Petroleum Industry in Bóbrka and its collection

The Open-Space Museum of Petroleum Industry has been opened in 1961, but its organization has begun in 1956. The idea and initiative was born among the staff of the Oil Mining Enterprise in Krosno, where Dr. eng. Henryk Górka was a General Manager. The museum is located at the site of the historical "oil mine" in Bóbrka and covers some 20 hectares. The exhibition includes a number of pieces of drilling and production equipment as well as old buildings and other objects documenting the evolution of oil industry (Sozański, 1996; Gancarski, 2005; Sikorska et al., 2005, 2006; Olejarz, 2009a, 2009b; Zuzak, 2009). Generally, there are four categories of objects in the collection: (I) connected with the beginning of the "oil mine": original obelisk commemorating the foundation of the "rock-oil mine" and equipment: forge and workshop from the times of Ignacy Łukasiewicz, the first manager of the Bóbrka mine, and still existing building of manager's office with furniture coming from the epoch. In the office there is geological exhibition with maps and geological cross-sections of oil deposits, old photographs com-

memorating the operation of the mine, historical uniforms and also beautiful collection of kerosene lamps; (II) connected with mining and drilling works, starting from the simplest dug-wells at the sites of oil sweeps (Fig. 1), through full-scale model of hand-driven, wooden percussive derrick, than wooden "Canadian" derrick driven with locomobile, wooden percussive derrick of the "Bitków" type, mobile percussion derricks, up to the modern, deep-drilling rigs, (III) connected with exploitation of oil, starting from the windlass with pail installed above the dug-well, through manually driven, wooden well-sweep, dug-well for collective exploitation of oil pool driven by treadmill with transmission device, various models of treadmills and individual pumper well – sweeps, and (IV) the separate collection includes the drilling equipment and riggs. representating both types of drilling: Canadian percussion method with stiff string and also Pennsylvanian percussion rope drilling, there are scissors, extenders, rope sockets, many kinds of chisels and drills, drilling spoons, equipment such like spanners to screwing pipes, circulating heads, cramps to pipes and also rescue tools.

Separate group of exhibits is connected with seismic exploration: the URB-2A mobile drilling device, seismic apparatus and generator of seismic waves.

The special artefact is the production wellhead of the Karlino-1 exploration well in the Pomerania, deformed by explosion and fire during the famous oil eruption from the Zechstein Main Dolomite carbonate reservoir in 1980 (Zuzak, 2009). An unusual object is the exhibition pavilion designed as a huge, cylindrical oil tank.

In the nearest neighbourhood of the museum there still exists the producing "oil mine", which continues the tradition of the historical exploitation. It is interesting to note that some equipment used in the recent production well does not differ very much from those collected in the Open-Space Museum.

Fig. 7. The "Bełkotka" spring with methane outflow in Iwonicz-Zdrój and monument of Wincenty Pol (Polish writer and etnograph). Phot. A. Radwański ● Źródło „Bełkotka" z wypływem metanu z popiersiem Wincentego Pola w Iwoniczu–Zdroju. Fot. A. Radwański

Outline of geology of the Bóbrka-Rogi oilfield

The Bóbrka-Rogi area is one of the oldest oilfields in Poland. It is hosted in a NW-SE-trending anticline divided by transverse faults into blocks, as described by Kruczek (1968). These dislocations downthrew the eastern block, hence, the oil horizons occur at various depths: from 0 down to 200 metres in the Bóbrka element, at down to about 500 metres in the Wietrzno element, to 1,100 metres in the easternmost, Równe-Rogi element of the block (Obtułowicz, 1932; Kruczek, 1968; Karnkowski, 1993, 1999; Zuzak et al., 2005) (Fig. 2).

The core of the Bóbrka-Rogi anticline is composed of the Czarnorzeki (Istebna) Shales (Upper Cretaceous-Paleocene) whereas limbs are built of the Ciężkowice Sandstones (Paleocene-Eocene) intebedded by the Variegated Shales (Paleocene-Eocene). Oil is accumulated in four horizons of the Ciężkowice Sandstones and in one horizon of the Czarnorzeki (Istebna) Sandstones (Fig. 3). Sealing is provided by the Variegated Shales intercalated by sandstones (Obtułowicz, 1932; Kruczek, 1968; Karnkowski, 1993, 1999; Jawor, 2004; Zuzak et al., 2005). Karnkowski (1993, 1999) wrote: The deposit belongs to the stratified type and is hosted in an anticline. It is lithologically and, partly, tectonically sealed by faults and overthrusts. The area of mining lease is 2.4 km^2, Oils from the horizons I and II of the Ciężkowice Sandstones are paraffine-free whereas those from the horizons III and IV are of paraffine type, the same as oils from the Łęki-Opal and the Bóbrka-South fields, which are reservoired mainly in the horizon IV of the Ciężkowice Sandstones and in the Czarnorzeki (Istebna) Sandstones.

Generally, the number of oil horizons increases with the depth but variously in various parts of the fold. In both the central and eastern blocks the most producing was the horizon III of the Eocene sandstones whereas in the western part of the fold the most effective were: the horizon IV of the Ciężkowice Sandstones and the Czarnorzeki (Istebna) Sandstones (Obtułowicz, 1932). Nowadays, the oilfield is still producing but it is not so effective and profitable as it was at the time of Ignacy Łukasiewicz.

The area recently occupied by the museum is very valuable as there are several, historical dug-wells, which have survived since the 19th century. The wells are still supplied with the oil and are recently under renovation for educational purposes (Olejarz, 2009a; Szmyd, 2009).

Revitalization plan of the Open-Space Museum in Bóbrka

At present, the revitalization plan has been implemented at the Open-Space Museum in Bóbrka. According to this plan, in the nearest future the collection will be extended, despite the ongoing conservation of existing exhibits (Bobek, 2007). It is proposed to retain the current organization of the exhibition. Recently, there are four thematic sections: (1) general -educational, which presents to the visitors the basic knowledge of what are oil and natural gas, how were these sub-

Fig. 8. Outcrop of the Menilite Shales in Rogi. Phot. A. Radwański
● Odkrywka warstw menilitowych w Rogach. Fot. A. Radwański

stances generated, where are they accumulated and how were they utilized in the preindustrial period; (2) "oil mine" at the turn of the 19th and 20th centuries, which shows the pioneer period of oil industry in Poland. Besides modernization of existing objects, this section will be extended to the new sites in the area where dug-wells are located. The newly exposed wells will be revitalized; (3) oil exploitation in the 1960s, the existing section will be reconstructed towards the exhibition of an operating oilfield from the 1960s; (4) historical, based on the existing Historical Section but extended towards the new aims, e.g. studies on the history of petroleum industry, promotion of scientific petroleum research, edition of books and source materials related to petroleum history, and comprehensive educational offer for schools.

Educational trail "The Birthplace of the World Petroleum Exploitation" in Krosno vicinity

In order to recognize the relics of oil industry in the vicinity of Bóbrka, the tourist round trail is proposed under the name "The Birthplace of the World Petroleum Exploitation". The trail includes several localities (Fig. 4): (1) Bóbrka – (2) Chorkówka – (3) Zręcin – (4) Krosno – (5) Iwonicz – (6) Rogi – (7) Wietrzno and back to Bóbrka. Below, sites on the trail are briefly described. Bóbrka (1) – detailed description of the history of the oilfield exploitation together with the Open-Space Museum has already been presented above. Chorkówka (2) – village located 5 km from the Open-Space Museum. Here, in 1865, Ignacy Łukasiewicz built the oil distillery, the largest in the Galicia Province of the Austro-Hungarian Empire (annual production – 1,500 metric tons of kerosene). Both Bóbrka and Chorkówka have become profitable centres of petroleum industry. The manor-house built by Ignacy Łukasiewicz in Chorkówka has also become the core of regional social life. Moreover, the Łukasiewicz family provided the shelter for Polish insurgents of the January 1863 Uprising against Russian tyranny. In 1904 the refinery was destroyed by fire. After the World War II the manor-house was totally ruined and robbed. At present, the only monument in Chorkówka is the huge sandstone block with inscription dedicated to Ignacy Łukasiewicz (Sozański, 2004; Gancarski, 2005; Sikorska et al., 2005, 2006). Zręcin (3) – village located some 6 km from Chorkówka. Here, in 1878, Ignacy Łukasiewicz and his business partner Karol Klobassa-Zrencki founded the Neo-gothic church with epitaphs dedicated to the founders and with two bells devoted to St. Ignatius and St. Carolus-patrons of the church founders (Darmochwał, 1995). At the local graveyard Ignacy Łukasiewicz and his wife Honorata (Fig. 5) were buried (Sikorska et al., 2005, 2006). Krosno (4) – capital of the county, formerly, in the years 1975-98, capital of the district. The civic rights were granted to the town in the half of the 14th century by the King of Poland Casimirus the Great. It was the important trade and industrial centre. Fortunately, the historical town centre has not been affected by the World War II; hence, the historical monuments have survived. The town is an important element of the trail as it hosts both the petroleum industry and other historical monuments, and cultural objects (Orłowicz, 1919). The petroleum industry objects are related mostly to Ignacy Łukasiewicz, who has become the Honorary Citizen of Krosno. There is a monument of Łukasiewicz near the church of Capucin Fathers and one of the streets bears his name. At the Museum of the Fore-Carpathian Region, located in the former bishop's palace, tourists can see the largest in Europe collection of kerosene lamps (Fig. 6), better known as "The Museum of Oil Lamps" (Kłos, 1987; Janowska & Wieliczko, 1990; Gancarski, 2005). The exhibition shows, in chronological order, a number of lamps manufactured in Europe and in the United States. There are also numerous artefacts related to Ignacy Łukasiewicz. Krosno hosts several institutions: The Petroleum Institute, The Offices of Oil – Gas Projects, The Institution of Mining Works, The Regional Department of Mining and also Polish Service of Drilling Liquids. There is also a secondary technical school of oil and gas (Sikorska et al., 2005, 2006). The monuments commemorating the 600-years-long history of Krosno are located mostly in the old town. Iwonicz (5) – village and heath resort situated in the valley of the Iwonicz Stream, the right-bank tributary of the Lubatówka River. The history of Iwonicz dates back to the 15th century and its development is closely connected

with the discovery of mineral waters. There are numerous historical notes on minerals waters from Iwonicz. Their therapeutic values were described as early as in 1578 by Wojciech Oczko - the royal medic of the King of Poland Stephen Bathory. In 1630 Jan Sechkini, medic from Przemyśl town described the valours of mineral waters from Iwonicz and provided medical indications. "Bathing springs" were mentioned in 1633 by Henry Firlej – the bishop of Przemyśl. In 1721 the pioneer of Polish natural sciences, Jesuit monk Gabriel Raczyński described the exploration for, exploitation and even processing of "rock oil" in Iwonicz. In Visitatio Szembekiana from 1722 (www.iwonicz-zdroj.pl) one can read about therapeutic power of waters from Iwonicz: "...This water (in Iwonicz) has a great healing power, it strengthens stomach and brings back appetite. However, the dynamic development of Iwonicz has started in 1799, when the Załuski family has become the owner of the village (and remained up to 1945). In 1837 they founded the health resort. The Iwonicz health resort flourished in the 19th century. In the town centre tourists can still admire beautiful wooden houses built in these times in the style imported from health resorts in Switzerland (Krukar et al., 2007). For advertising purposes the name "Zdrój" (spa) was added to the town name. Three mineral water springs were exploited in those days: two of them provided iodine-bromine waters, the third one was ferruginous. Bottled mineral water from Iwonicz was supplied to the Austro-Hungarian Monarchy and to Germany. At the end of the 19th century the annual number of patients visiting the spa reached 2,000. However, the valours of Iwonicz include also therapeutic mud and iodine-bromine salt. Mineral waters are reservoired in the Ciężkowice Sandstones, close to the oil and gas accumulations. From hydrogeochemical point of view these are chloride-hydrocarbonate-sodium, bromine, iodine, ferruginous and boron waters. Recently, the most valuable springs are: Iwonicz-II, Ellin-7, Zofia-3, Zofia-6, and Emma (Darmochwał, 1995). Moreover, the local oilfield in Iwonicz, developed in 1890 is still producing. A local peculiarity is the spring named „Bełkotka" ("Mumbler") – the monument of abiotic nature, which releases methane and carbon dioxide (Fig. 7). Near the spring there is a monument of Wincenty Pol (1807-1872), Polish poet, ethnographer and geographer (Orłowicz, 1919; Kłos, 1987). The Iwonicz Zdrój health resort was granted civil rights in 1973. Rogi (6) – village situated at the crossing of the Iwonicz-Rogi and the Miejsce Piastowe-Barwinek roads. The royal village Rogi was founded in 1358, together with the Roman Catholic parish. The first church in Rogi was the oldest built in the area, besides that in Krosno town (Fastnacht, 2002). The village has become important petroleum exploitation center in the 19th and 20th centuries, when oilfields were discovered in the four neighbouring localities: Bóbrka, Wietrzno, Równe and Rogi. Recently, the pumpjacks of the Rogi oilfield can still be seen about 1.5 km southwest from the village, on the hillslope opposite to the Open-Space Museum in Bóbrka. The pumps are now managed by the Równe oilfield (Klara, 2005). At the exit from main road to the Open-Space Museum in Bóbrka there is a huge exposure of Oligocene-Lower Miocene Menilite Shales (Fig. 8) – the principal petroleum source rock in the Carpathians (Kotarba & Koltun, 2006). Wietrzno (7) – village situated in the Jasiołka River valley, in the foreground of the Open-Space Museum in Bóbrka. Here, in 1866 the first trial drilling for oil was carried on by Juliusz Noth. In 1884 the petroleum exploration drillings were initiated in the land belonging to the Chłędowski's family – the owners of the Wietrzno real estate. In 1886 the first oil eruptions were noticed in the lease belonging to the W. H. MacGervey and Berghaim Co. In 1886, after discovery of profitable oilfields, the "oil mines" were opened in Ropianka, Bóbrka and Wietrzno. In that time the chief manager of the mines was Zenon Turczynowicz-Suszycki, who was also the school-master and teacher at the "Practical School of Canadian Drilling" active in Ropianka from 1885 to 1888. In 1888 this school was moved to Wietrzno and then, in 1896, to Boryslav (Zuzak et al., 2005). The oilfields in Bóbrka, Wietrzno and Równe, developed between the years 1854 and 1887, are still operating. Elements of oil exploitation infrastructure: pumpjacks, treadmills with transmissions, oil tanks, smithery and workshop are still preserved in Wietrzno village. Most of operating oil wells are scattered in the village but a few of them can be seen from the road to the Open-Space Museum (Sikorska et al., 2005, 2006).

Conclusions

Travelling along the Oil Trail the tourists gain the opportunity to gather full information concerning the petroleum problem, starting from the history of petroleum industry, through the geological structure enabling them to understand what is an oilfield, then through the problems of drilling techniques and petroleum exploitation methods, and finally coming to the identification of main petroleum industry objects still visible in the Carpathian landscape.

The Open-Space Museum in Bóbrka is the world-class geotourist site. What is exciting, the Bóbrka-Rogi oil-bearing fold, where the first, historical "oil mine" was developed, is still producing oil in the neighbourhood of the museum. This is a real birthplace of world petroleum exploitation.

Besides petroleum, also mineral waters are the wealth of the Carpathians. The Oil Trail includes the Iwonicz Zdrój and adjacent Rymanów Zdrój health resorts. Both are also remarkable tourist attractions. The base of the proposed Oil Trail can be Krosno – the county capital of long and interesting history (also related to the petroleum industry), which itself is the tourist attraction.

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Streszczenie

Skansen – Muzeum Przemysłu Naftowego i Gazowniczego im. Ignacego Łukasiewicza w Bóbrce oraz pamiątki przemysłu naftowego i solnego w okolicach Krosna (polskie Karpaty zewnętrzne)

Andrzej B. Radwański

Bóbrka jest miejscem szczególnym na Podkarpaciu. Znajduje się tu skansen przemysłu naftowego, prezentujący jego rozwój od początku powstania do dnia dzisiejszego. Skansen ten zlokalizowany jest w miejscu, gdzie w roku 1854 powstała jedna z pierwszych na świecie kopalni ropy naftowej. Celem artykułu jest przedstawienie budowy geologicznej złoża Bóbrka, ukazanie w krótkim zarysie historii powstania skansenu oraz wytypowanie miejscowości związanych z powstaniem przemysłu naftowego na Podkarpaciu. Są nimi: Bóbrka, Chorkówka, Rogi, Wietrzno, Równe i Zręcin. Wraz z położonymi w pobliżu Krosnem i Iwoniczem tworzą one trasę edukacyjną o proponowanej nazwie „Kolebka Światowego Przemysłu Naftowego". Trasa ta będzie w przyszłości stanowić część transgranicznej trasy geoturystycznej „Szlak wielkich wymarłych ssaków, ropy naftowej i soli" od Staruni (Ukraina) po Kraków (Polska). Inicjatywę utworzenia Szlaku Naftowego (The Petroleum Trail) podjęła Lokalna Organizacja Turystyczna „Beskid Niski" w Krośnie, przy współpracy z samorządami powiatowymi południowego Podkarpacia i partnerami z Ukrainy w ramach projektu PHARE 2002, Program dla Polskiej Granicy Wschodniej, Fundusz małych Projektów Euroregionu Karpackiego w 2002 roku z okazji 180 lecia urodzin i 120 lecia śmierci I. Łukasiewicza.

Zasadniczą część szlaku stanowią miejsca związane z narodzinami i historią przemysłu naftowego na terenach należących w II połowie XIX wieku do austrowęgierskiej Galicji. Trasa szlaku została tak wytyczona, aby turysta zainteresowany tematyką naftową mógł równocześnie poznać wspaniałe zabytki świeckie i sakralne przenikających się kultur, charakterystyczne dla terenów pogranicza. Główną oś szlaku: Jasło – Krosno – Sanok – Lesko – Ustrzyki Dolne – Sambor – Borysław – Drohobycz – Lwów wzbogaciły pętle dla turystyki pieszej i rowerowej.

Na przestrzeni wieków na terenie Podkarpacia, obecnie po stronie polskiej jak i ukraińskiej, dla potrzeb własnych, a następnie głównie na sprzedaż, pozyskiwano sól z solanki która występuje tu masowo, zazwyczaj razem z węglowodorami w warstwach fliszu karpackiego. Solanki w pobliżu Bóbrki występują m.in. w Rymanowie Zdroju i w Iwoniczu Zdroju, gdzie są wykorzystywane głównie do celów leczniczych.

Zarys historii skansenu przemysłu naftowego w Bóbrce i jego zbiory

Skansen przemysłu naftowego powstawał sukcesywnie, począwszy od roku 1961, ale wstępne prace przygotowawcze zaczęły się już w 1956 r. Inicjatywa powołania Muzeum zrodziła się w środowisku pracowników Kopalnictwa Naftowego w Krośnie. Skansen położony jest na obszarze 20 ha, na terenie dawnej kopalni Bóbrka. Zebrano tu ogromną ilość sprzętu wiertniczego i wydobywczego jak również zachowano budynki kopalniane i inne obiekty dokumentujące postęp w dziedzinie przemysłu naftowego. W obrębie skansenu można wydzielić cztery kategorie zbiorów: (I) obiekty związane z powstaniem kopalni; (II) obiekty związane z pracami górniczo–wiertniczymi (Fig. 1); (III) obiekty związane z eksploatacją ropy naftowej; (IV) sprzęt i osprzęt wiertniczy.

Budowa geologiczna złoża

Jednym z najstarszych złóż ropy naftowej w Polsce jest złoże Bóbrka–Rogi. Złoże znajduje się w antyklinie o kierunku osi NW–SE pociętej na bloki przez uskoki poprzeczne, co powoduje, że w kierunku wschodnim zwiększa się głębokość zalegania poziomów roponośnych (Fig. 2): od 0–200 m w elemencie Bóbrki, poprzez około 500 m w elemencie Wietrzno, do 1100 m w najdalej wysuniętym na wschód elemencie Równe-Rogi (Kruczek, 1968; Karnkowski, 1993, 1999; Obtułowicz, 1932; Zuzak, 2005). W jądrze antykliny zalegają łupki czarnorzeckie (istebniańskie, kreda górna-paleocen), a skrzydła budują warstwy piaskowca ciężkowickiego (paleocen-eocen) przedzielane warstwami pstrych łupków (paleocen-eocen). Akumulacja ropy naftowej (Fig. 3) związana jest z czterema poziomami piaskowców ciężkowickich i z poziomem piaskowca czarnorzeckiego (istebniańskiego). Skałami uszczelniającymi są poziomy pstrych łupków przedzielających piaskowce. W chwili obecnej kopalnia jest nadal czynna, ale złoże nie jest już tak wydajne i tak rentowne jak w czasach Łukasiewicza.

Plan rozwoju skansenu przemysłu naftowego w Bóbrce

Obecnie realizowany jest plan rewitalizacji Muzeum w Bóbrce. Plan ten zakłada, że w w najbliższym czasie zasoby muzeum zostaną poszerzone, niezależnie od bieżącej konserwacji istniejących eksponatów (Bobek, 2007). Proponuje się utrzymanie nadal sektorowego podziału prezentacji obiektów, uzupełniając jednocześnie skansen o nowe sektory: (I) ogólno-edukacyjny, (II) kopalnia przełomu XIX i XX wieku, (III) kopalnia w latach 60. XX wieku, (IV) historyczny i (V) ścieżka edukacyjna.

Trasa edukacyjna „Kolebka Światowego Przemysłu Naftowego" po okolicach Krosna

Chcąc się zapoznać z pamiątkami przemysłu naftowego w okolicy Bóbrki odbędziemy podróż po trasie prowadzącej przez następujące miejscowości (Fig. 4): (1) Bóbrka – (2) Chorkówka – (3) Zręcin – (4) Krosno – (5) Iwonicz – (6) Rogi – (7) Wietrzno – (1) Bóbrka.

Bóbrka (1) – skansen i kopalnia ropy przedstawione powyżej. Chorkówka (2) – wieś położona w odległości około 5 km od skansenu w Bóbrce. Tutaj Ignacy Łukasiewicz wybudował w roku 1865 destylarnię ropy naftowej, która była w tym czasie największym zakładem przemysłu naftowego w Galicji (roczna produkcja 1500 ton). Zręcin (3) – wioska położona w odległości około 6 km od Chorkówki. W wiosce tej Ignacy Łukasiewicz wspólnie z Karolem Klobassą ufundowali w roku 1878 neogotycki kościół. Na zręcińskim

cmentarzu zostali pochowani Ignacy Łukasiewicz wraz z żoną Honoratą (Fig. 5). Krosno (4) – miasto powiatowe, a w latach 1975–1998 wojewódzkie. Prawa miejskie uzyskało w połowie XIV wieku z nadania króla Kazimierza Wielkiego. Zabytki naftowe wiążą się przede wszystkim z osobą Ignacego Łukasiewicza, Honorowego Obywatela Miasta. Jego postać upamiętniona jest pomnikiem (w pobliżu kościoła OO. Kapucynów), jak i nazwą jednej z ulic miasta. W Muzeum Podkarpackim, mieszczącym się w dawnym Pałacu Biskupim , znajduje się duża wystawa prezentująca największą kolekcję lamp naftowych w Europie (Fig. 6). Iwonicz (5) – wieś i uzdrowisko położone w dolinie potoku Iwonickiego. Początki Iwonicza sięgają XV wieku, a jego rozwój postępował w związku z odkryciami wód mineralnych. W czasach autonomii galicyjskiej (w drugiej połowie XIX wieku) nastąpił gwałtowny rozwój uzdrowiska. Bogactwa lecznicze Iwonicza to nie tylko wody mineralne, ale również borowina, sól jodobromowa i kostka borowinowa. Wody mineralne występują w poziomie piaskowców ciężkowickich, obok ropy naftowej i gazu ziemnego. Ciekawostką Iwonicza jest źródło zw. Bełkotka – pomnik przyrody, z którego wydobywa się metan (Fig. 7). Przy źródle znajduje się popiersie Wincentego Pola (Kłos, 1987). Rogi (6) – wieś położona przy skrzyżowaniu szosy Iwonicz–Rogi z drogą Miejsce Piastowe–Barwinek. Wieś ta nabrała znaczenia na przełomie XIX/XX wieku, kiedy to odkryto złoża ropy naftowej w sąsiadujących ze sobą miejscowościach: Bóbrka, Wietrzno, Równe i Rogi. Przy zjeździe z głównej drogi w kierunku skansenu w Bóbrce widać duże odsłonięcie oligoceńskich warstw menilitowych (Fig. 8). Wietrzno (7) – wieś położona w dolinie Jasiołki, na przedpolu skansenu w Bóbrce. W 1866 r. przeprowadzone zostały tutaj pierwsze próby wierceń za ropą naftową przez Juliusza Notha. Zenon Turczynowicz-Suszycki, który pełnił funkcję dyrektora i nauczyciela w Praktycznej Szkole Wiercenia Kanadyjskiego w Ropiance w latach 1885-1888, w 1888 r. przeniósł ją do Wietrzna, a następnie w 1896 r. do Borysławia (Zuzak, 2005).

Kopalnie założone w latach 1854–1887 czynne są jeszcze do dzisiaj. Są nimi: Bóbrka, Wietrzno i Równe. Zachowaną infrastrukturę kopalnianą: kiwony, kieraty z transmisjami, zbiorniki na ropę, kuźnię i warsztat najłatwiej zobaczyć we wsi Wietrzno.

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