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**SOCIETÀ
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3RD
**INTERNATIONAL
SYMPOSIUM
ON UNDERGROUND
QUARRIES**

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A T T I

a cura di R. Paone e C. Piciocchi

Napoli - Castel dell'Ovo - 10/14 July 1991

RE-UTILIZATION OF UNDERGROUND QUARRIES IN CZECHOSLOVAKIA

V. Cilek*

Riassunto

La mancanza di pietre da costruzione adatte conduce in alcuni casi, in paesi altrimenti ricchi di materie prime, all'estrazione sotterranea. Il più antico resoconto su cave sotterranee nella collina di Petřín, attualmente parte di Praga, risale alla fine del 18° secolo, al 19° e via via fino al primo trentennio del 20°. Molte cave sotterranee furono destinate a scopi militari (Richard presso Litoměřice, Rabštejn, Amerika presso Karlštejn) fra il '43 ed il '45. Alcune cavità furono riutilizzate dall'esercito dopo la seconda guerra mondiale, ma la maggior parte di esse fu abbandonata. Tre cavità servirono come deposito di rifiuti radioattivi (Richard, Alcazar in Boemia, Sarka a Praga). La cava militare di Michálek fu modificata in un impianto di produzione del formaggio, molte altre cave furono utilizzate come depositi di frutta e verdure (la White Horse a Praga, Lindava). Nessuna cava sotterranea in Cecoslovacchia viene utilizzata a scopi culturali, ma alcuni siti medievali sono stati modificati in "cave da mostra". L'articolo elenca le località includendo cenni storici e brevi descrizioni.

1. History

The history of mining in Czechoslovakia dates back to Neolite and Bronze age /underground mining of quartzite and marmor in Tusimice and White Stone by Sázava/. Celts were famous for gold washing and very probably open pit tin and copper mining. The mining boom appears in two medieval waves associated with Saxony miners in about 1260-1420 and during 16th century. At least about 600 small ore deposits were known in 16th century in Bohemia alone, but very few of them — with exception of iron ores were mined profitable. We observe never ending succession of mining attempts till the beginning of 20th century on most of the deposits.

The non-metallic materials such as sand /Poniklá, Giant mts./ sand-stone /Prague, Pasinka by Kolín, Cášlav, Česká Lípa district/, limestone /Loreta by Klatovy, Litoměřice, Trebomín by Cášlav, Věhlovice by Melník/, Czech garnet - pyrope /Linhorka/, precious opal /Dubník/, salt /Solivar by Presov/, china clay /Horní Brána by Plzeň, České Budějovice/, grinding and milling stones /Lázně Belohrad, Lindava/ and others were mined since unknown times. The peak of the non-metallic materials underground mining was reached during the half of 19th century. Most of the mines were abandoned on the beginning of 20th century, but some of them were working till late 60th.

The country was occupied in 1938 by Germans but owing to high technological level

* Geological Institute CSAS, Praha

at these times it was gradually turned to the machinery background of the Third Reich. During the last two years of war at least 30 objects /quarries, mines railway tunnels, even caves/ were intended as underground factories, but few of them were finished before the end of war. Czech army then took some of the objects for military purposes and the others were abandoned for few years.

The history of re-utilization of underground mines during Communist rule is rather sad and after the Communist rule is practically negligible.

Three underground objects were turned to radioactive wastes deposit, two of them on illegal basis /Sárka in Prague discovered by my working group just few months ago and Alcazar in Bohemian karst/. Few underground quarries served as fruit and vegetable storeys but none of them is opened for cultural purposes unlike some old mines, city catacombs and military underground. The following review gives the list of some important re-utilised underground objects either for cultural or technological purposes. Few of the mentioned localities are opened to public: 14th century mine in Kutná Hora, Josefov — military passages under unique 18th century fortres and city catacombs in Plzen, Tabor and Klatovy.

2. Underground quarries

2.1 *Richard by Litomerice*

The Mezozoic clay limestone were mined in several places in north Bohemia. The most significant mine Richard was established in 1860. During the 2nd world war Richard reached almost 30 km of underground passages and it became one of the six most important German underground sites. A. Hitler personally decided about the construction of underground factory and proclaimed it to be of highest emergency. The Nazi factory was proposed to cover some 10 km of passages connected with surface by several shafts about 70m deep. Prisoners from the Terezín concentration camp working in the mine were Polish, Yugoslavs, Italians etc. but relatively few Czechs. Three formerly independent mines — Richard I-III — were interconnected during 1944. The largest mine, Richard I, became the working place of the Elsabe firm, which was the code name for Auto-Union. The firm produced shafts and cylinder heads for HL-230 motors used in Tiger and Panther tanks. The factory was after 2nd world war re-utilised as radioactive wastes deposit with perspective at least another 20 years.

2.2 *Amerika by Karlstejn*

The Paleozoic limestones were mined since the end of last century by system of open pits interconnected by 1,5 km system of underground railway passages. The Germans planned to build there another underground factory and to connect it by almost 3 km long passage to Alcazar quarry close to Berounka river near Srbsko in Bohemian karst. The end of war came too early for Germans to complete their plans. Unfortunately later in 50th and 60th the underground passages of Alcazar were misused as radioactive wastes

deposit localised in karstified rocks close to river flowing to Prague on the area of natural reservation! Few months ago some cavers trying to clean radioactive mess were irradiated and finally the scandal impossible in the previous regime emerged to clean up the whole area.

2.3. *White Horse quarry in Prague*

White kaolinitic sandstone was mined on the suburbs of Prague probably since 17th century but mostly during the second half of 19th century. The irregular, tectonically influenced underground passages of total lenght about 250m served as fruit and vegetable storey. The quarry is due to the collapses abandoned now.

2.4 *Lindava, Česká Lípa district*

Huge chambers up to 100m in diameter and about 3-4m high excavated in siliceous Mesozoic sandstone serve as potato and vegetable storey.

3. Caves

3.1 *Michalka cave, Moravian karst*

Originally about 100m long spacious cave was adapted in 37-38 for military purposes. Later it was taken by German army. It was re-utilised as cheese plant where special kind of delicious mould cheese is stored to obtain its quality by gradual maturation. The example of Michalka cave is one of the best cases in re-utilization of underground.

3.2 *Vypustek cave, Moravian karst*

The large system of Vypustek cave was enlarged by phosphate mining on the beginning of this century and earlier /regular mining since 1920, P₂O₅ content 5-7 wt. %/. The Germans adapted the cave for military purposes. Army object still exists there but probably the cave will be again opened for scientific study. Another underground Nazi factory was erected in Byčí skála cave covering famous Halstatt burial.

4. Mines

4.1 *Kutná Hora*

Kutná Hora some 70 km E from Prague represents important silver ore medieval locality. The depth of 500m was probably first time in the world reached in Kutná Hora on the beginning of 15th century according to the old but reliable descriptions. I saw

myself in the peripheral part of ore field in Kank passages in 425m depth dating to 14-16th century. The part of mining museum in Kutná Hora is "show mine" 250m long designated to exhibit 14-15th century mine. The mine is opened to public.

4.2 Příbram

The beautiful parts of Příbram ore deposit were supposed to become the part of mining skansen. Due to the lack of finance the underground was never opened to public, but mining houses, shaft and museum is opened to public in the heart of ore region in Brezové Hory, part of Příbram.

4.3 Jáchymov

Jáchymov or Joachimsthal is important medieval mining city established mostly by Saxony miners on the beginning of 16th century. M. Curie discovered radium in the pitchblende from Jáchymov. Jáchymov became huge concentration stalinist camp after the 2nd world war when it represented probably the most important uranium mine for Soviet Union.

It became exhausted after 12 years of incredibly intensive exploitation. The spa were built close to radioactive thermal springs in mine. Mine Svornost was opened for some time to public but owing to high cost and radon content in the air it was closed.

4.4 Dubník eastern Slovakia

The famous 22km long, 19th century, precious opal mine in Dubník is proposed to become the "show mine", but as usually the lack of finance will put the plan aside.

Other mining skansens and exhibitions must be mentioned in Ostrava /coal mining/ and Kremnica /gold/. The less important museums exist in Kladno, Mariánské Lázně, Sokolov, Kasperské Hory, but the various mining objects are scattered literally everywhere throughout the Bohemia and central part of Slovakia.

5. Other important underground objects

5.1 Josefov, eastern Bohemia

The underground fortification of Josefov Citadel close to Jaromer was constructed under the leadership of French engineer Querlonde du Hammel in 1780-85. It means nearly in the same time as exploration passages in Paris which it resembles. Returning back from Paris underground we did not believe the system comparable in architecture and partially in the scale could exist in our country. The 65 km of Josefov passages represent close analogy. However they served to another purposes — as magazines,

shoot — ing galleries, gun powder and intelligence passages by which the enemy ediths were destroyed. Small part of the underground is opened to public.

5.2 *City catacombs*

Almost all medieval towns have some extent of gradually developing catacombs which often consist of a maze of old cellars, aquaducts, canalization passages, secret ediths, water supplies etc. interconnected by many various means. The catacombs of Plzen, Jihlava, Znojmo, Klatovy, Tábor are famous. The underground passages of Znojmo are thought to reach some 30 km, others are shorter. Several objects are opened to public: Tábor, Klatovy and Plzen. The speleology of medieval towns is quickly developing branch of speleology. Two different approaches to re-utilization take place: 1) the passages are used for modern technological network of electricity and canalization lines, 2) old cellars are adapted as clubs and vine pubs /Prague, Plzen/.

5.3 *The strange story of underground re-utilization in Prague*

The basic stone to J.V. Stalin's monument in Prague was laid down in 1949. Stalin considered the greatest person of modern history had to have a great memorial. Therefore the biggest monument in Europe was erected. The Stalin himself was 30,18m high and weighted together with figures of soldier, agriculture worker, intelligent a worker 17 thousands tons! The monument had to be in the axis of bridge and Parízká street to optically govern the place. Therefore an artificial hill was constructed upon the Letná hillock. *The steep hillock was statistically unstable so it was decided to make artificial cap hollow.* Two large chambers 60x80m and 25x80m, the former one being 8m high were constructed and Stalin's monument was erected upon them in 1955 just in time when after Stalin's death the opposition began to grow. The original idea was to make small museum under the monument, but in 1962 the Stalin's statue was destroyed and chambers served as potato cellar. Meanwhile local boys and hooligans found their way to the underground which was so re-utilised for some other purposes. The last attempt for reasonable usage of the underground was establishing an illegal post-communist radio station called 'Radio Stalin'. It is supposed the underground will become lapidarium of National Gallery in Prague.

6. Conclusions

I tried to give general review how underground quarries, caves, mines and other objects were or are re-utilised. Besides "show underground" the most common usage is for storage of various food products. The high energy cost and privatization of economy is forcing small firms to look for suitable underground objects. Other fastly developing discipline is urban speleology serving for both - cultural as well as technological purposes.

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- 2 - Vehlovice by Melník. Underground quarry in Cretaceous clay limestones locally called "opuka". *Photo J. Brozek*
- 3 - Large up to 80m deep open pits of limestone quarry in Bohemian karst are connected by underground railway. Amerika, by Karlstejn. *Photo J. Brozek*
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- 6 - Mines in Brezové Hory, now part of Příbram ore region.
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Photo 1

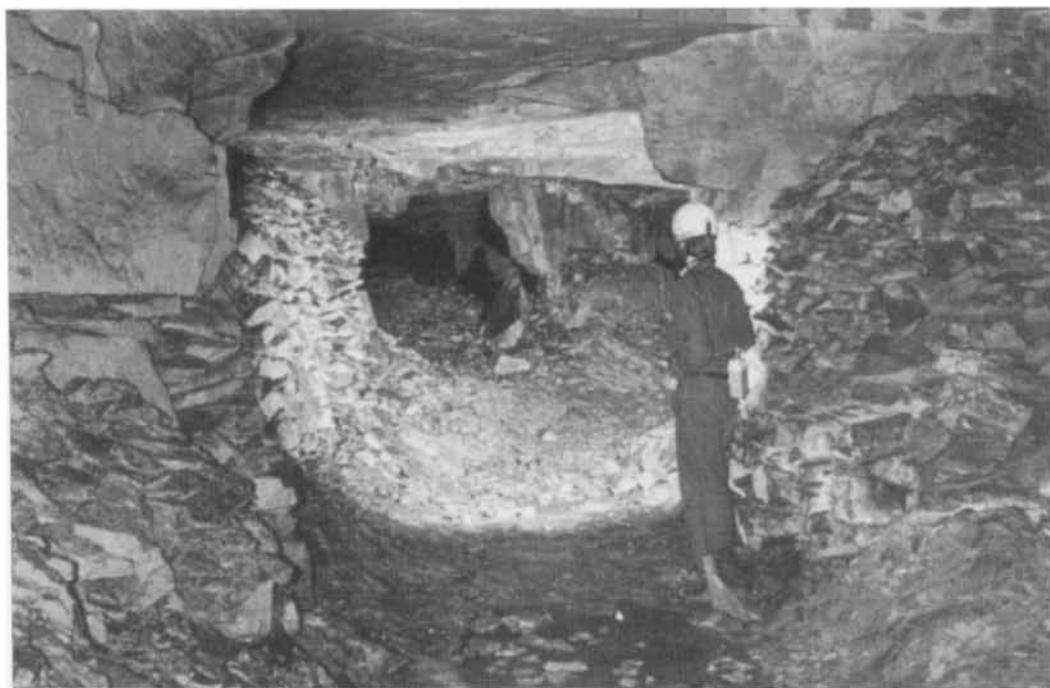
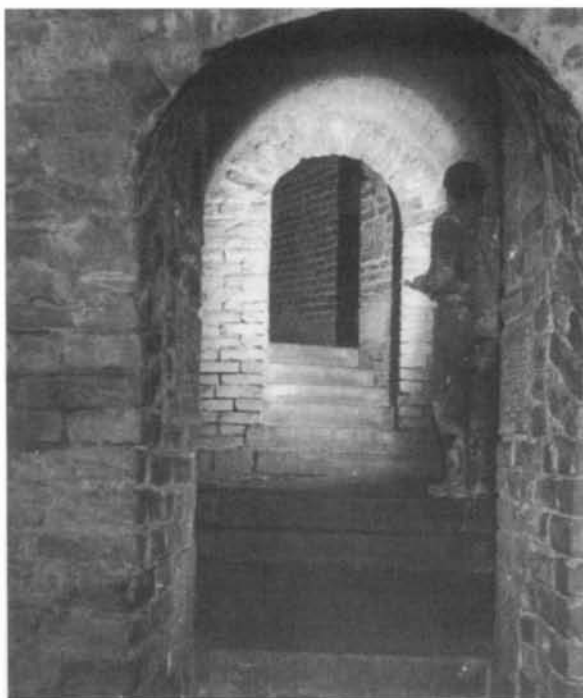


Photo 2



Photo 3



Photo 4



Photo 5

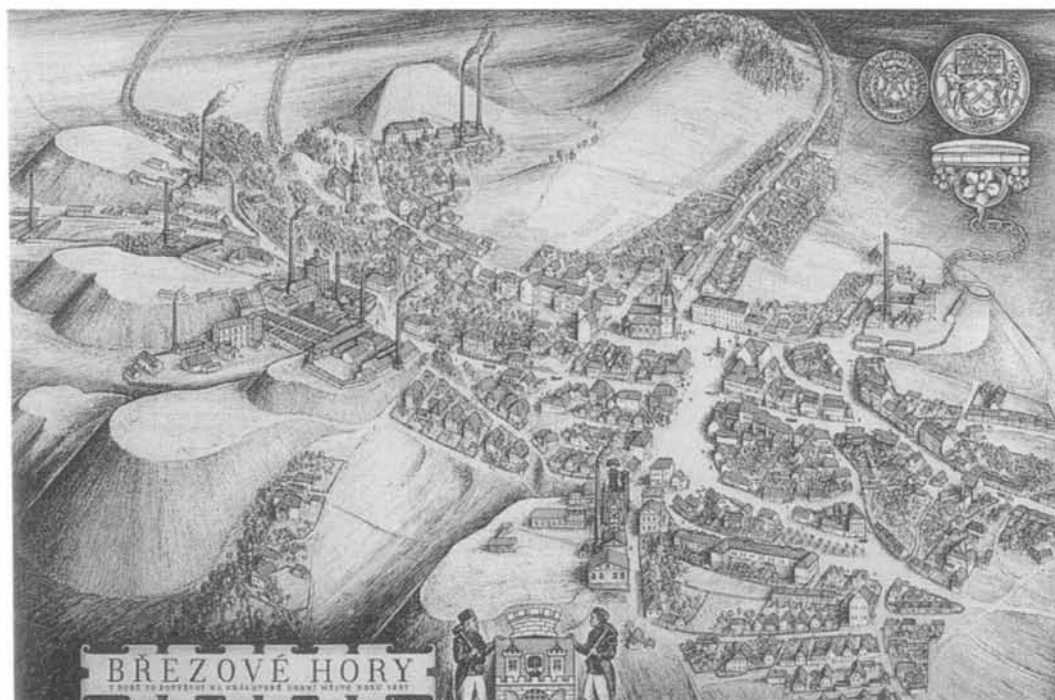


Photo 6



Photo 7