Utilising possibilities of old postcards in research of surface relicts after raw material mining

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ABSTRACT
In the study we have evaluated possibilities of historical postcards utilisation in research of surface relicts after raw materials mining. Historical postcards are the oldest and the most common accessible historical photos processed by ground photogrammetry. They are not possible to elaborate now, therefore we need to use obtained postcards during historical research. Importance of historical research is approved first of all in obtaining of photos of research object in different time horizonts. It is necessary in this research to look for photographs which show the general view on the landscape, sites and also mining technical works. In overlapping of particular photos from chosen time horizonts, it is necessary to solve also vertical and horizontal location of shot taking place, picture distortion and photo scale problems. After digitalization of obtained photographs we have determined primary size and area dimensions of chosen surface relicts after raw materials mining in particular time horizonts. Advantage of these photographs is the only real historical image together with historical postcards.

Keywords: surface relicts after raw materials mining, old postcards, georeference and analysis of old postcards

INTRODUCTION

The first photographs came into being in France in 1820s. On the ground of their enhancement in the next decades, the photographs were predetermined to broad commercial use and already at the end of the 19th century they were used for scientific purposes. Ground photo-grammetry was used in the area of Slovakia in 1896 during the fourth military survey (so called exact map) of Austria-Hungary. The High Tatras only were mapped in the scale of 1:75 000 and the method of ground photogrammetry began to be used experimentally in order to specify the content of the maps (Sulo 1989).

The modern ground photogrammetry has been used in the country to map the field elements with planimetric and altimetric character. The survey of the land area, building, construction and projective elements and their 3D visualization models may be used in a broad spectrum of various analytic professional tasks. The 3D visualization of digital models of built-up areas or areas of extraordinary historic value is very attractive and has the same effect. It is widely used also in building industry, cultural preserve, agriculture, forestry, landscape planning etc. Recently, modelling is topical for uncovering the deposit by quarry mining, surveying the

field deformations resulting from raw material mining etc.

The pictures are of main documentary and information value. Any picture becomes historical immediately after being taken, because the land is dynamic and it has been developing and changing. The advantage of the pictures is that they are evaluated in laboratories and it allows processing according to chosen selection criteria of the selective information on the landscape included in the pictures (Žihľavník 1999, Bitterer 2005). Today the largest number of pictures analysed are pictures which are transformed into a digital form or received directly in a digital form. In this case, instead of the original pictures the pictures are evaluated which are scanned directly in a computer in various digital environments that substantially specify and simplify the work. Recently, it is natural to receive the digital data directly, as well as the coordinate pictures. According to the purpose of evaluation of the pictures some specialized cartographic software, CAD or GIS or analytic software environment for direct evaluation of photogrammetric pictures is used (AutoCAD, Geomedia, ArcGIS, MIPS, eCognition, ImageStation, TERRA Modeler, Leica Photogrammetry Suite, 3G Software&Measurement – Joint/Shape/BlastMetrix^{3D} etc.). A similar problem processed in his works for example K. Weis (Weis 2009), K. Weis and M. Nagy (Weis, Nagy 2009), K. Weis and E. Zupková (Weis, Zupková 2009) and other authors.

UTILISING OF HISTORICAL POSTCARDS

During the survey of the landscape and the surface relicts after mineral resources mining we have to focus on the postcards which show the panoramic view of the landscape and sites, towns or villages, individual streets or particular buildings. The postcards showing technical works are of thematic importance, with panoramic exterior views (at some mining towers, finishings, mines, waste dumps, smelteries, blast-furnaces, lakes etc.), or views of technical systems in interiors. The transport motives, portraits, jocular postcards, curiosities and annual postcards concerning mining are also important for the survey.

Historical postcards are the most common accessible historical images, which may be used for the survey of the landscape with the right method, although the processing of them needs specific methods and taking into account many restrictive requirements. Historical pictures and photographs are used to a lower degree. Analyzing the historical pictures, we have to take into consideration subjective view of their authors. Despite the subjectivity, the contemporary pictures made by the time of rise of photography belong to the most important illustrations in historical and historical-geographic publications. The use of old postcards (photographs) for the survey of the landscape and its elements – mainly for similar specific tasks, such as map of the surface relicts after mineral resources mining – has often been forgotten or it has not been paid proper attention. As the postcards were delivered for commercial purposes already in the last decades of the 19th century, today they belong to the eldest preserved historical photographs made by ground photo-grammetry.

This type of picture historical documents allows monitoring, analyzing and evaluation of the landscape in the local dimension for the first time in history; and dealing with its development and changes on the base of reliable visual grounds for the last 130 years of existence of the human community (Boltižiar, Olah 2009). The disadvantage of these grounds is that it is not possible to make them on targeted base. For the survey we can use only the existing historical postcards (photographs), while individual scientific approach is needed connected with long-time demand for seeking after useful historical postcards (photographs) showing the surveyed

landscape. The researcher must be good at historical archive research, which assumes long-term experience and critical approach to the evaluation of the historical picture sources.

Today, the collections of historical postcards (photographs) are to be found not only in the archives, museums and libraries, but mainly in private ownership of collectors. The collections in state institutions are incomplete and very often not properly catalogued, which is also one of the reasons making their scientific use difficult. Collecting historical postcards is going through its extensive renaissance and just the contents and size of private collections are wrought systematically on a very high level. Utilisation of these collections is difficult due to the financial intensity concerning acquisition of copyright in the case of further publication.

Recently, the more and more popular issuing the retrospective picture monographs, which are illustrated with historical postcards, is a restricted substitution for the non accessible original historical postcards. The authors of these popular-scientific monographs are mainly the collectors of historical postcards who, in some cases, are at the same time researchers or experts in montanistics, history or geography. These are for example the monographs by doc. Ivan Herčko (Herčko 2008, 2009), doc. Ján Lacika (Lacika 2008) and Dr. Ján Hanušin (Hanušin 2005, 2008) published by Dajama Bratislava in "Na starých pohľadniciach" edition.

In connection with the utilising of historical postcards in the survey of the landscape and surface relicts after mineral resources mining, an experienced researcher has to solve the problem of the lack of scale, which may be a particular problem for the mutual comparison. The lacking scale may be determined and derived according to bold land points, which also exist in the present time. It is possible to measure their distance by modern devices directly in the field or to calculate it according to the large-scale maps or plans.

Today, in order to collect data directly it is possible to use quite exact measurement by GPS devices and for example a GIS environment for their comparison, which allow for working in real coordinates, or specialized photogrammetric software. In the case of overlapping of some photographs from the selected time horizons it is necessary to take into consideration not only the scale of the photograph, but also the vertical and horizontal position of the place where the picture is taken from. The key element of proper positioning and orienting the layers is setting the point of photographing. During the evaluation of the historical postcards it is necessary to take into consideration the distortion that might be present in the original photograph used for printing the postcard. This is the reason why - in the ideal case - some register points are identified, the positions of which can be identified approximately also today and the flow lines and projections along the set directions at traverse may be used to determine the other dimensions of the objects of interest in the picture.

The focus distance of the camera used to take the photographs is an important aspect, which enters the process of interpretation of distances and dimensions of the objects in the historical pictures. Failing to know this parameter is often a restrictive factor of the effort to obtain exact results.

The shorter the lens focus distance, the larger the shot angle and the larger part of the scene will be caught. This is the reason why the scene appears more distant when using a camera with a lens with shorter focus distance. On the contrary a lens with long focus distance (teleobjective) causes the scene appears closer, so it is possible to take photos of it from a longer distance, but the perspective depth of the scene disappears. In order to eliminate the problems with the exact setting of the distance and the dimensions of the objects in the picture more effective it is possible to use the results of calculations from

processing of more shots taken from different positions catching the analyzed objects from various angles.

CLAY PIT ON SOUTHERN SLOPES OF THE KAČICA NEAR BANSKÁ BYSTRICA

In the quarry – faded in the present days – located on south-eastern slopes of ground elevation of Kačica (414 m a.s.l.) brick clay was mined on the base of the Quaternary deluvial clays (Polák et al. 2003).

The historical postcard (Fig. 1) shows the Town brick plant opened in 1879 and the nearby Alexander Knapp brick plant, which was put into operation in 1885 (Chromeková 1997). There are barracks in the foreground, which were opened in 1893 (Baláž 1993). Today the J.L. Bella school of music in Skutecký street is located in the original barracks on the left. In present days there is a ranged Kollár street behind the barracks and the clay pit of both brick plants predetermined the rise of the present Professor Sára street. The locality where the brick plants were situated was called Za sedriou in the past. The image in the analyzed postcard called "long address" was taken from Banoš (462 m a.s.l.) between 1893 and 1906 when the postcards called "long address" ceased to be issued. We have derived the scale of the postcard from the distance of the main barracks buildings. We have obtained their distances from the topographic map of the Slovak republic with the scale of 1:10 000 which we also have checked in the field research. Considering the quite long distance of the place of photographing – almost 600 m – and the fact that there is only one shot available at all, setting the dimensions of the clay pit was rather difficult. However, it may be said that the clay pit area had a partly elliptic shape at the break of the 19th and 20th centuries, with a longer NNE-SSW oriented axis and the length about 120 m along the longer axis and 90 m along the shorter axis. The height of the clay pit edge was between 6 and 8 m, in some inclined places it exceeded 10 m. It is not possible to set the total depth of the clay pit. The analysis of the dimensions was complicated by relatively small angle under which the clay pit is caught in the postcard.

QUARRIES ON THE SOUTHERN SLOPES OF ŠIKLOV (BREZOVÁ) NEAR PODBREZOVÁ

Opening the quarries – with working names Šiklov I and Šiklov II – on the southern slopes of ground elevation of Šiklov (Brezová, 702 m a.s.l.) in present Podbrezová town relates to the metalworks constructions below Brezová hill after 1839 (put into operation in 1851). After putting into operation of the metalworks

Fig. 1 Clay pit on southern slopes of the ground elevation Kačica (414 m a.s.l.), where clay was mined for the Town brick plant and later for the Alexander Knapp brick plant in Banská Bystrica (Baláž 1993)

sand was mined not only for construction purposes, but also for production of heat-resistant bricks. The brick plant started its operation directly in the metalworks area in 1858. Both of the quarries were opened on the base of Lower Triassic quartz sandstone of the Lúžna Formation (Biely et al. 1992).

These quarries are not recorded in the cadastral map of Lopej from 1868. Therefore the contemporary postcards from the break of the 19th and 20th centuries and from the first half of the 20th century are an irreplaceable historical source for the research. Based on this fact we may state that Šiklov I (Brezová) quarry (Fig. 2) was opened on the southern slope of Brezová directly above the Hron river flat. Initially it consisted of three separate quarries located very close one to another. The Šiklov II quarry (Fig. 3) was located similar to present location on the south-western slope of Brezová 20 m above the Hron river flat. The level difference was overcome by a gutter gravitation incline ("šút"). The mined material was loaded manually into an incline and dropped by way of gravitation into the prepared wagons of the narrow-gauge company railway, which transported the material directly into the brick plant. In the 2nd half of the 20th century stone was mined in Šiklov II quarry and processed by a stone breaker to gravel for road and construction purposes. The operation in the quarry ceased in the 1st half of the 1970s in relation to the construction of the state road Banská Bystrica-Brezno.

The analyzed historical postcard (Fig. 4) was taken from the opposite slope of the Hron valley – from the Kolkáreň locality after 1918. According to the print type of the postcard it may fall into the 1920s. We determined the postcard scale according to the length of the Podbrezová railway station which we measured during the field research.

Based on the postcard from the 1920s we tried to reconstruct the southern slope of Šiklov, however, it was not possible to interpret the most eastern part of the Šiklov I quarry, because that part of the postcard is rather unfocused. The central and western part of Šiklov I and a part of Šiklov II quarries were modelled (Fig. 5). In the given postcard the sloping of quarry part (centre of the postcard – western part of Šiklov II quarry) are obvious with the camber of about 110 m and the dimensions approximately 90 - 150 m horizontally and 170m vertically to the centre of the rock ridge.

Fig. 2 and 3 The last relict after Šiklov I. quarry in 2009 (on the left) and surface relict after Šiklov II. quarry in 2009 (on the right) **Photo by:** Hronček

Fig. 4 Quarries on the southern slope of Šiklov (Brezová) in Podbrezová at the beginning of 20th century (after 1918), first from the left is Šiklov II. quarry and on the right is Šiklov I. quarry, **Source:** postcard from the I. Herčko private collection of historical postcards)

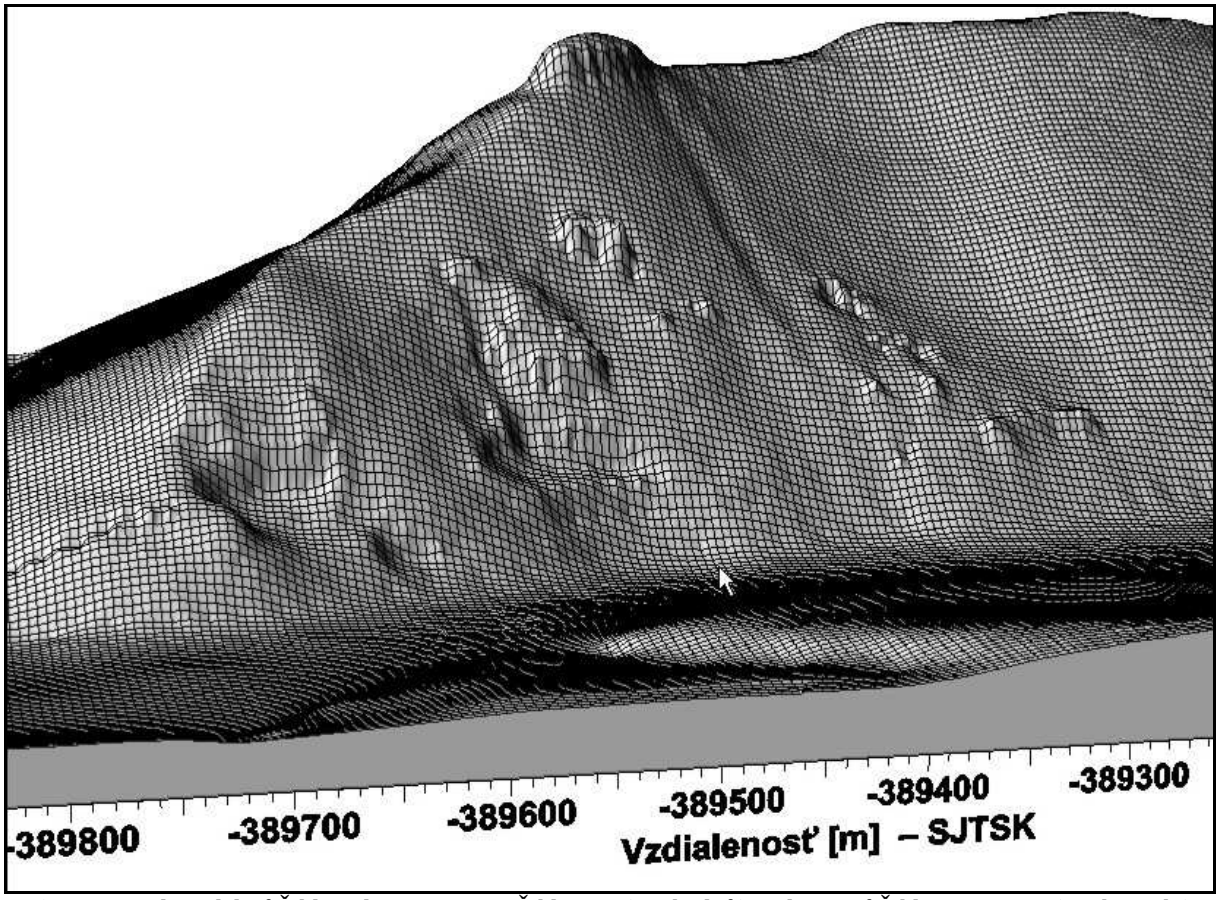

Fig. 5 Digital model of Šiklov slope, quarries Šiklov II. (on the left) and part of Šiklov I. quarry (on the right)

The depth of the quarry side in the plan is 130 m with the general slope of 40° in the quarry area. The western part of the photograph, Šiklov II quarry, is better visible. The height of the quarry side reaches almost 175 m, the width 95 m with the total camber of 105 m. In the picture it is a multiplate quarry and 3 - 4 smaller plates are visible with the base width by 12 m at the largest of them. The interpretation of the postcard depth is difficult due to the fact that the other available pictures do not always show the same area, always only with a partial overlap. The depth of the main quarry pit is almost 70 m in the plan.

CLAY PIT IN OPATOVÁ NEAR LUČENEC

The evaluated clay pit was opened on the base of Early Pleistocene eolitic sediments, which consist of loess, fine sand loess and partial calcified loess clay (Wass et al. 1992).

Prónay manor-house (later Hubay manor-house, so called Opatovský manor-house) was built in 1856 and it still exists today, but it is markedly devastated. In the field, we found its basic dimensions using a tape and we used the data found – after digitalizing the postcard – together with the rail gauge to set the clay pit dimensions.

We used a photograph from the Czechoslovak republic period (Fig. 6). The postcard belongs to Radoslav Kliment's private collection from Lučenec and the post stamp is dated 28 May 1935. The postcard shows the side clay pit, which was accessible directly from the strengthened road. Intensive clay mining in that time may be assumed on the ground of the number of the access paths, which radiate like a fan on the grass from a strengthened road to all parts of the quarry yard. The access path right at the quarry side bottom let us assume that the clay was mined manually and then it was loaded directly from under the side into the prepared wagons.

In 1930s the total length of the clay pit was 140 m and width 35 m and it consisted of three mining cuts in the direction of the longer NNW - SSE oriented axis which are showed in the postcard. Following the identification of the photographing place and the derivation of projection of the particular dimensions based on the known dimensions of the Kaštieľ building in the postcard we calculated following dimensions: the most remote mining pit was circle shaped with the radius 10 m. The radius of the middle pit with the largest surface was 16 m, and the nearest pit – the area of which was limited by the railway – was ellipsis shaped with the longer axis a = 30 m and the shorter one b = 16 m. The depth of the more remote mining cuttings was approximately 9 to 10 m, of the nearest one only 6 m. The total surface of the quarry area was about 4930 m^2, i.e. 0.49 ha. A more exact analysis was difficult due to the fact that there was only one picture available hence determining the depth of the picture was based on setting the shot into the real field relief today and considering the position of the identified determining elements in the closest neighbourhood.

After the end of the World War I the mines in Handlová were still ruled by Hungarian capital. The seat of the company moved from Budapest to Bratislava and the name changed to Handlovské uhoľné bane, úč. spol. so sídlom v Bratislave. In the time after the war the drill survey began, which monitored the coal layer shallow under the surface in the Konštantín mining field (Fig. 9). Hubert Kraszny, a mining contractor, rented the Konštantín layer. He started to prepare the surface mining in the Konštantín mining field gradually. In 1920 the mining started following the quarrying of the lap layer and the surface mining had not ceased until 1927 (Herčko 2003).

The historical postcard from the 1st half of the 20th century shows the surface relicts resulting from the coal surface mining in the Konštantín mining field. As the postcard was not posted, it is not possible to

Fig. 6 Clay pit in Opatová near Lučenec in 1935
Source: postcard of R. Kliment private collection of historical postcards

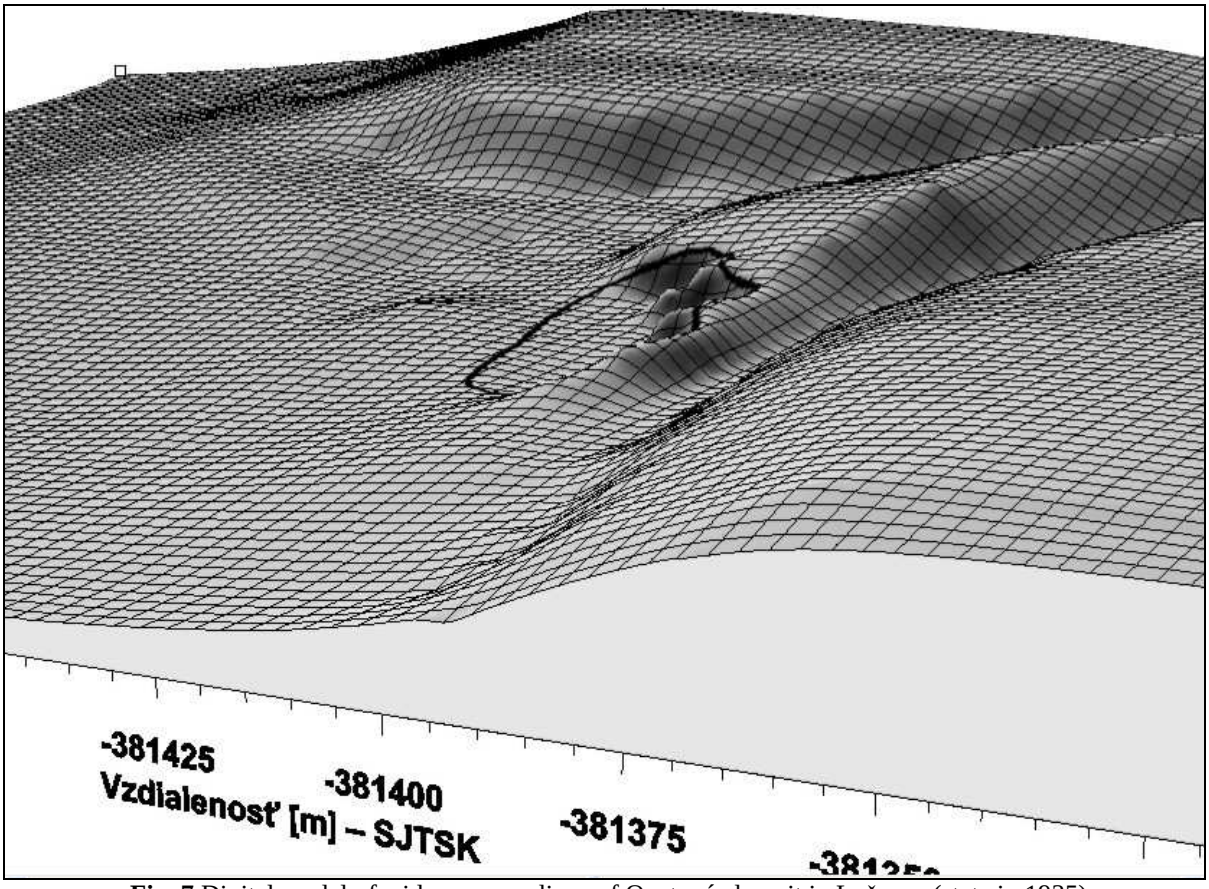

Fig. 7 Digital model of wider surroundings of Opatová clay pit in Lučenec (state in 1935)

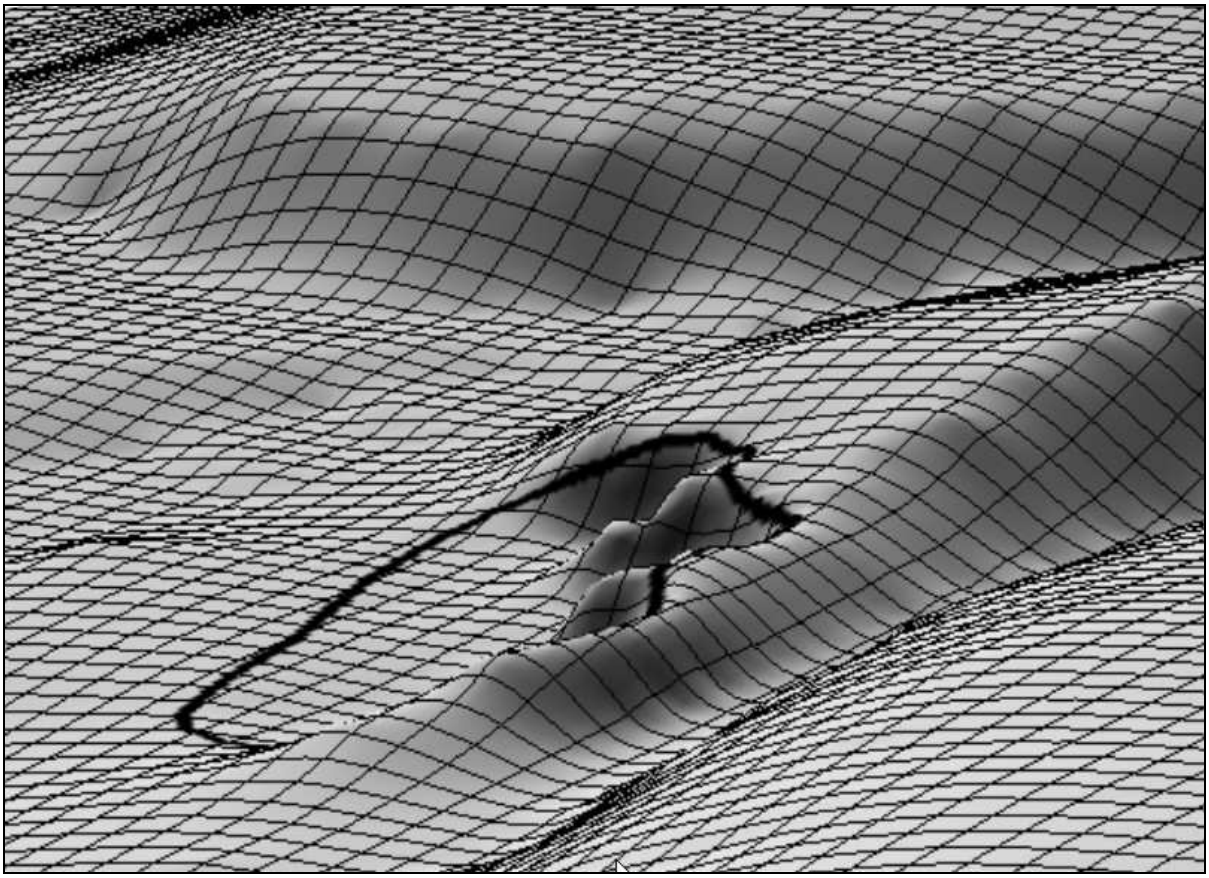

Fig. 8 Opatová clay pit in detail in Lučenec (state in 1935) Brown coal surface mining in Konštantín near Handlová

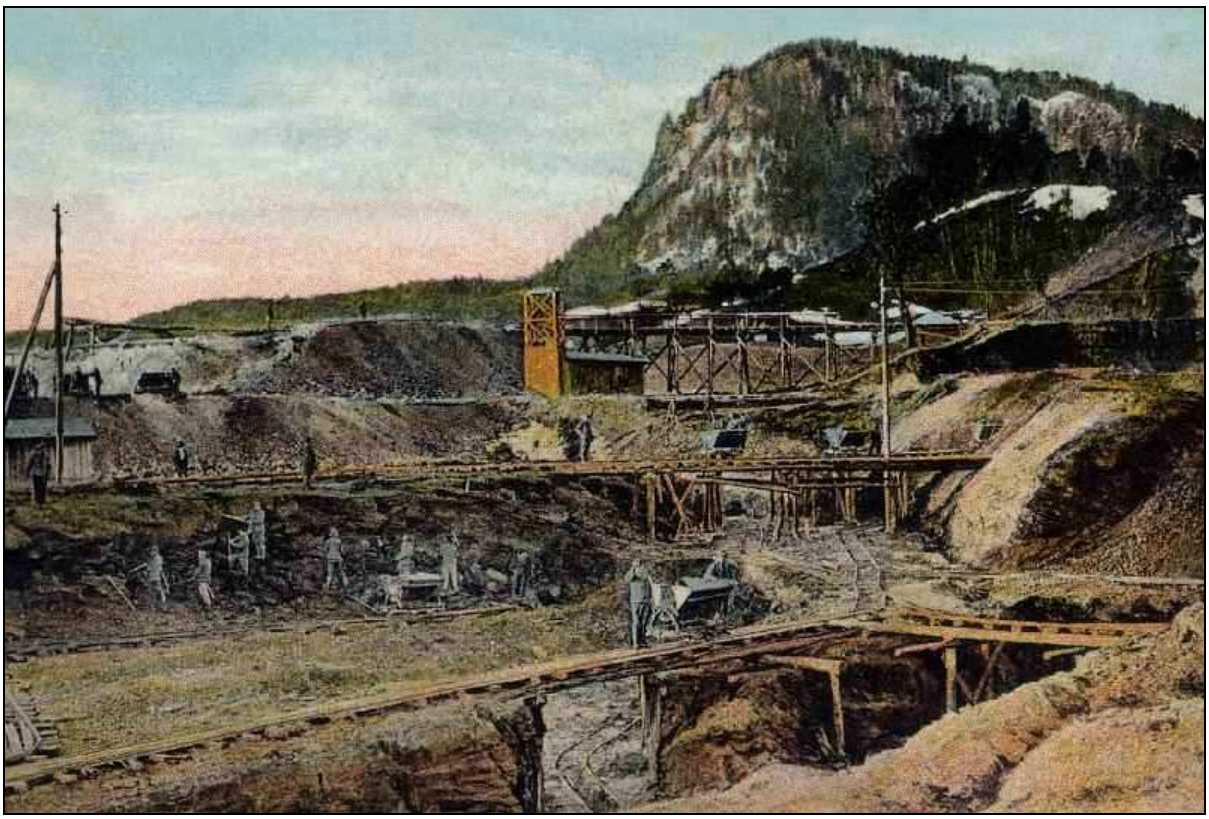

Fig. 9 Brown coal surface mining in Konštantín from the half of 1920s, postcard is without date
Source: postcard is from I. Herčko private collection of historical postcards)

date it. In the upper part of the postcard waste dumps can be seen created by the removed lap layer. The coal bed is clear. The miners mined the coal bed manually and loaded it directly into the prepared wagons in which they carried the coal into the finishing surface objects.

The approximate scale of the postcard may be set on the base of the height of the miners and the gauge of the incline railway. In order to set the dimension or the distances in the picture, which is partly perished probably by colour, geometric and goniometric relations were used e.g. "cotg" of paralactic angle while the base height was always represented by the particular miner figures in various distances (Dubecký 1958). In the picture the layer is opened in 4 depth levels, while the first two of them – 5 to 6 m and 4 to 4.5 m deep – served apparently only to remove the lap layer. The coal bed is on the slope between the second and the third plate about 11 m under the surface and according to the postcard we estimate its thickness to 1.3-2 m approximately 1 m above the slope bottom level between the second and the third plate. We have set the width of the basal areas between the plates from the most remote to the closest one to 15-20 m, 25-30 m and the last one, which is partly grassy and there is a railway transport there, is approximately 22-25 m wide. We are not able to deduce more about the total dimensions of the mining area because of the lack of any other shot taken from another angle.

ASBESTOS MINING IN DOBŠINÁ

The asbestic serpentinite layer in the north of Dobšiná in Kelbel locality (Teliatko, Fig. 10) has been known since the 17th century. Pavol Lányi, a mining contractor, began its experimental mining in 1723. He produced fireproof paper from the long-fibre asbestos that was only in minimum amounts in the layer. The mining and the production were shut down because of their inefficiency. In 1919 - 1920 the survey of the layer began. The mining and the pilot operation of the finishing began in 1921. The production started on 4 April 1928 (Rozložník, Husdorfer et al. 2008). Following various changes the asbestos mining and production were definitively stopped due to environmental reasons in 1998. As the utilisation rate of the asbestic serpentinite after finishing was only 1 - 5 %, the production was connected with large waste dumps generation. The waste dumps are localised in Teliatko locality in immediate closeness of the northern border of the built-up town area. The waste dumps are of complex shapes and combined with slope and taper waste dumps bulked in a large salient angle. The plan of the waste dump is almost an ellipsis and it is 300 m long and 200 m wide in the west-north direction. The waste dumps reach to 55 m and their volume is estimated to 13 - 1.5 mill. tonne. The serpentinite waste in the dumps consisted of the chrysolite processing rests, which were used to gain asbest fibres. The waste dump cone is opened by the quarry side in the eastern part, where the dumped material was mined. After the selection of fine parts this material was secondarily used to grit the roads (Leško, Búgel, Bakalár, Pietriková 2005).

The serpentinite quarry mining was followed by creation of a large side-pit quarry and a large devastated area surrounded it. The quarry was connected with a waste dump on the west.

The whole area devastated after the asbestos mining and processing is about 800 x 700 m large and its hypsographic interval is 480 to 556 m a.s.l. Today plants grow there.

The targeted archive research of the historical postcards helped us collect the postcards in four time horizons in case of asbestos waste dumps in Dobšiná, which allowed us not only to accomplish the basic analysis of the montanous relief shape, but also to compare its development in the particular time horizons. We identified and

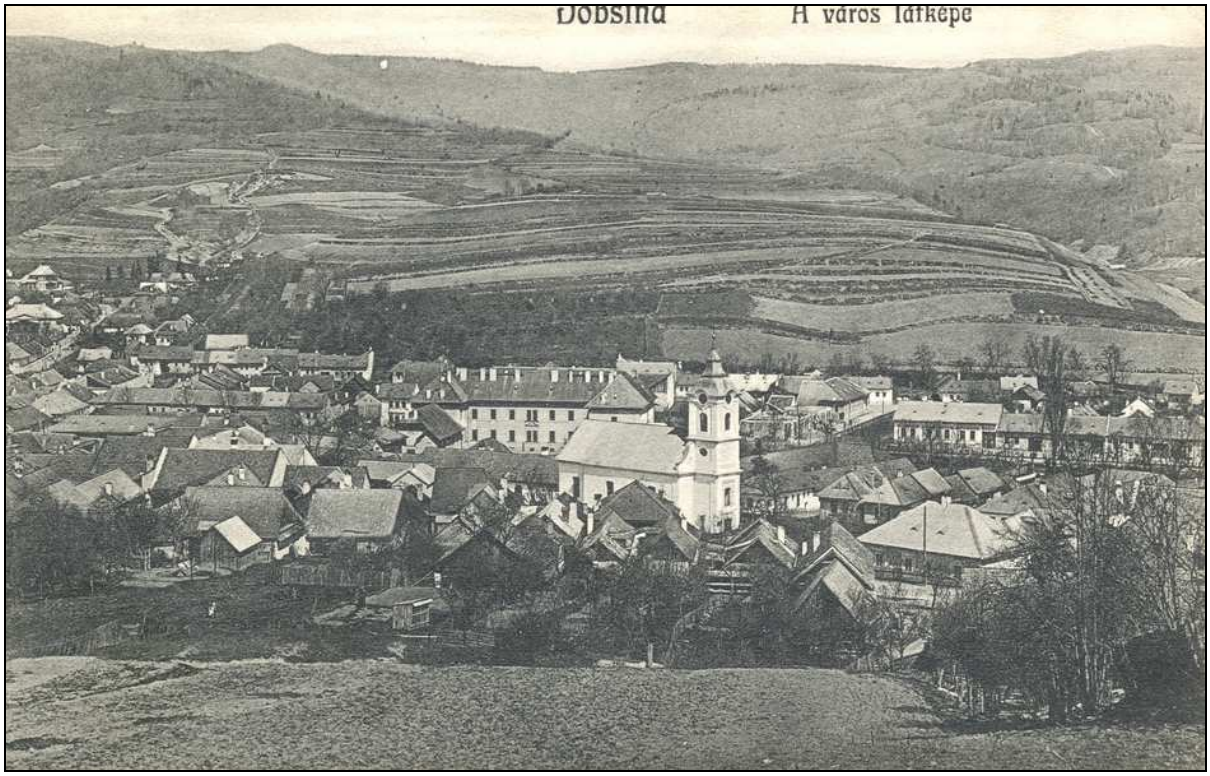

Fig. 10 View on the locality Kelbel northern side from Dobšiná town before beginning of industrial mining and magnesite processing. Historical postcard dated about 1915, **Source:** postcard from I. Herčko private collection of historical postcards)

dated the postcards and one historical postcard into the period of about 1915, to the 1930s, to the end of 1940s and to the 1960s. The view of these postcards is directed from the south to the north, however, the exact positioning and setting the distance of the shot point was a problem which might be compensated in the analysis in digital environment GIS. We set the scale by measuring the height of the windows of St. Francis Xavier roman-catholic church directly in the field, which was built in baroque-classicistic style in 1792.

In the first time horizon we analysed the historical postcard showing the landscape in the north of the town before begin of the industrial asbestos mining and processing. The postcard may be dated with certainty to the period of 1921 (when the mining and processing began), and as it is described by Hungarian nomenclature, it has to be shifted before 1918. On the other side, it is younger than 1906 when the long addresses period ceased. According to the printing method it may be dated about 1915. The postcard shows agricultural land intensively used in the Teliatko locality. The land is divided in stripes that are correctly divided by balks along the contour. The long-time tilth along the contour created agrarian terraces with various height degrees. In the western part of the locality (upper left in the postcard) an open quarry side may be identified with dimensions of about 40-50 m horizontally with the layer depth of about 25-30 m, while the height of the quarry side is about 15 m vertically according to the photograph.

We timed the second phase of the analysis into the 1930s according to the historical postcard. The postcard shows the quarry in Teliatko locality as a relict after the quarrying (in the centre of the postcard), the finishing of the produced rock and a large waste dump. In this period the slope conic waste dump was busy and shuttled by an incline from the west. The waste dump is a striking negative anthropogenic landscape element. Its height is assessed to 18 – 22 m. The total length including the embankment below the incline exceeds 100 m.

Fig. 11 Quarry and waste dump after asbestos mining and processing in Dobšiná on historical postcard from the 1930s, **Source:** postcard is from I. Herčko private collection of historical postcards

The quarry side in the quarry area has a complex shape and is open on southern slopes of Teliatko. The analysis of its dimensions is not possible because of the shot angle. In this period the layer was probably opened at several places near the original quarry.

The historical photography from the end of the 1940s shows the analysed waste dump. In addition to the original waste dump a new waste dump was stacked above the original one on the slope. The new dump had a complex shape and consisted of several conics resulting from shifting the place of waste dump stacking. Considering the slope of the original relief it is not possible to state definitely that the new waste damp was higher, but we suppose that it was higher than the original one by no more than 5-10 m in that time. The original waste dump began to be grown by the tree stock coming from the neighbourhood. As to the vegetation, from the postcard is clear that it is deciduous woody plants.

The photograph does not show the quarry in the west of the waste dump due to the shifting of the photographing point and zooming in.

The last phase of the analysis is a postcard from the 1960s. The postcard shows in detail the quarry on the southern slope of Teliatko. The quarry side is relieved by shadows. The quarry shape is side-pit with a side divided into four mining plates. The picture affirms the fact that the layer was opened gradually at several places at the same time resulting in formation of continuous mining area of about 280 x 220 m.

The original slope dump lower on the slope is grown by deciduous woody plants almost to its half. The convex shape of the new waste dump predominates over the general view and it rises as an opposite to the concave quarry in the eastern part of the devastated Teliatko locality. The new waste dump maintained its height which – from the shot angle – does not appear higher than 25-30 m above the surface of the original relief, which almost equals to the previous phase. However, its enlargement to the north-east by the new waste dump conics is obvious on the right of the picture. They are

Fig. 12 Waste dump after asbestos mining and processing in Dobšiná, in the backround, historical photograph from the end of 1940s, **Source:** Anonymus (2010)

Fig. 13 Quarry and waste dump after asbestos mining and processing in Dobšiná on historical postcard from the 1960s, **Source**: postcard is from I. Herčko private collection of historical postcards

not higher than 20 m and are at least 40 m wide, so the new waste dump is almost 300 m long in total in the north-east and south-west direction.

CONCLUSION

The study results point to the fact that the historical postcards are a reliable historical documentary material, a source of information appropriate for the land research in general, as well as for tackling the specific tasks in different fields of science – in this case the survey of montaneous relief forms.

It has not been possible to make the historical postcards directly in the field at need, so for the historical research we have to use any available and targeted obtained picture. The complexity of historical research may be clear particularly during obtaining photographs of the researched objects in various time horizons and this fact just supports the importance of this kind of research as for utilisation of unique information. It is necessary to focus on the postcards showing the general view of the landscape, relief, sites, natural or technical or – in our case – mining technical works. After the visual analysis and before the digitalisation we have to set the real scale. The scale is derived from the comparison of the dimensions of the photographed objects and the existing historical objects in the actual landscape from the large-scale map documents or measurements in the field. The analysis of the position of taking the photograph, the focus distance of the camera and the definition of possible distortion is the key step which the exactness of the results depends on. As for the pictures from several time horizons their comparison is necessary with considering the different positional characteristics of the place of taking the photograph (position in horizontal plane), but also their aligning along the vertical axis.

In order to get the correct positioning and orientation of the particular time segments some register points must be chosen. In the ideal case at least three such points must be identified, the approximate positions of which may be checked or at least located today as well and their flow lines and projections along the set directions at traverse may be used for derivation of the other dimensions of the objects of interest in the picture.

During the evaluation of the historical postcards we have to consider the distortion, which might be present in the original photograph used for printing the postcard. An undervaluated advantage of these postcards is that today they are – often with the historical photographs – the only images showing the objective reality in the particular time of history.

With the right method of postcard digitalization and analysis we may realise the real dimensions of the objects, as well as e.g. the 3D models of the historical surface relieves, and analyse their morphologic and morphometric changes. This showed to be of use in the surface relicts survey after the mineral resources mining for the given time horizons. The possibility of gaining postcards or other types of images for more time periods increases the importance, efficiency and information value of this type of historical sources geometrically. The results and conclusions of the research may be used in praxis not only in the historical research, montanous research, for support and development of montanous tourism, but also in the area of landscape mapping, nature conservation, education, environmental study etc. The use of the historical postcards is limited by their availability, the number of similar shots and their quality rather than their content.

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