

Michal Medek, January 2011

The Punkva Caves is one of prominent tourist attractions in the Czech Republic. The Caves receive around 200 000 visitors a year (Správa jeskyní 2010) which makes one quarter of all the showcaves attendance in the country. Together with other 13 Czech showcaves the Punkva caves are run by Cave Administration of the Czech Republic (CA). Punkva Caves are opened all year round though from October to March the opening hours are shortened. Interpretation is delivered by 3 professional guides and 9 boat pilots reinforced with more than 70 seasonal guides, mostly students.

Groups of visitors enter the cave with a guide in 20 minutes intervals. Maximum size of a group is 54 adult visitors or 70 children and thus the interpretation by the guide throughout the 720 metres long tour takes place only at 8 spots where the group can gather to listen to the guide. During the boat trip the tour is guided by a boat pilot. He or she can communicate with the boat passengers continuously.

This text looks at interpretation in the Punkva caves from the perspective of several learning and communication theories applied on visitor experience of disadvantaged groups: children below six, physically challenged visitors and foreign visitors. Appendix 1 shows the content of the guided tour, the script is universal and applied by guides to all groups of visitors, often in simplified way.

Both Brochu (2003:72) and Carter (2001:33) stress necessity of defining objectives of interpretation to evaluate its performance. At this point only statutory purposes of CA are available: three out of nine field of activities in CA status deal directly with visitor experience: 1. provision of guided tours in showcaves by own employees only, 2. conservation of cave environment and 3. safety assurance of visitors (Ministry of Environment 6/10) The conservation and safety concerns are further specified in visitors' rules of the Punkva Caves (Cave Administration 2006) setting management objectives. No document, public or internal, sets interpretive goals or objectives that could be used for evaluation of interpretation.

Children below 6

Successful audience-centred interpretation objectives must be underpinned with knowledge about visitors and non-visitors Black (2005:7), Brochu (2003:81). For the purpose of this work proportion of child visitors is of great importance since the children have specific learning needs that differ from those of adults: Freeman Tilden (2007:77) suggested the interpretation to children below 12 years of age should follow fundamentally different principles. This corresponds with the age of reaching stage of formal logical operations defined by Piaget (1972). Some authors (Čížková, 2004:44) use the term second structural metamorphosis at this age of cognitive development. The first structural metamorphosis takes place between 5-7 years of age – a child replaces intuitive thinking with concrete logical operations according to Piaget's theory of cognitive development. Unlike Beck and Cable (2002:57) who stretch Tilden's demand for special interpretation to children below 12 with the same claim for teenagers and seniors, the work of Piaget (1972) suggests to refine the below 12 category into at least three stages: sensori-motor (0-yrs), pre-operational (2-6 yrs) and concrete-operational (7-11). Vygotsky's Zone of Proximal Development theory (Atherton 2010) reminds interpreters that social interaction is crucial in the process of making meaning. This in practice means

different attitudes or interpretive stimuli should be offered to organized groups (schools, kindergartens) and to families where adults can directly collaborate with children.

The data collected by CA do not give clear picture of visitors, children in particular. Visitors are divided by nationality and into four categories according to type of tickets sold: a. full price, b. senior, c. discounted (students up to 26, children 6-15 years of age, children below 6 in organized groups) and d. free admission (children below 6, visitors with special status). Thus all the children categories suggested above mix together except children below 6 accompanied by adults in family (like) groups.

Black (2005:66) states that children below 6 are the audience to which little attention was paid in museum literature. One of the reasons he identifies is that children are considered "museum-suitable" from the age of 7 which corresponds with stage of concrete logical operations (Piaget 1972). Nevertheless this audience is for various reasons coming and as we can see it makes considerable proportion of the Punkva caves visitors (8% of all visitors are the children below 6 coming with adults plus unknown share of children in organized groups, presumably most of them aged 4 – 6 since the Punkva Caves Rules advise adults not to visit with kids below 3). Using division of interpretive objectives into learning, emotional and behavioural ones (Veverka 1998: 45) the emotional interpretive objectives should play the main role in this age group. Činčera (2010) lists several studies proving that strong experiences with nature in childhood play an important role in later development of environmental sensitivity. Provision of strong positive experience with outstanding natural beauty of the underground world could be convenient interpretive objective for the children below 6 years of age.

Examining the guided tour through the Punkva caves we found several aspects that meet the suggested interpretive objective and needs of this age group listed by Beck and Cable (2002:63): 1. The program consists of short stops that accommodate child's attention. 2. Engagement of fantasy: naming dripstone formations, fairy-tale about Macocha abyss. 3. There are several moments of surprise throughout the tour: lightening of dripstones, entering the Macocha abyss bottom, boarding the boat. 4. The large underground spaces host big dripstone formations thus playing role of "large scale exhibits" that proved to be very attractive to young children despite lacking interactivity (Piscitelli and Anderson 2001: 279).

There are several aspects of the visit to the Punkva caves that do not suit the audience of young children below 6 (Beck and Cable 2002: 63): 1. If children come in an organized group there is little chance to interact with an adult. 2. Children are advised to be quiet and suspend their spontaneity – visitors should not "disturb talk of the guide" (The Punkva Caves Visitor Rules 2010). 3. Movement or other physical activity is not encouraged.

Based on work of Piaget (1972) and Machlis and Field (in Beck and Cable, 2002:62) the following improvements are suggested for visitors below 6 years of age. 1. Redesign the guided tour for organized groups of pre-schoolers: 1a. Encourage carers to involve in interpretation. 1b. Put more emphasis on fantasy based on natural objects. 1c. Involve children's activity – they can point to dripstone formations with flashlights. 1d. Avoid abstract concepts, historical dates and unfamiliar words (lime-stone, devon, sedimentation). 2. Enable multi-sensory experience within conservation limits of the caves – test cave acoustic by singing or clapping hands, artificial stalagmite touching. 3. Connect underground features with familiar on-ground ones (underground stream, cave animals,

flora near sources of light). 4. Dedicate small outdoor area for child-play while waiting at cave entrance.

Physically challenged visitors

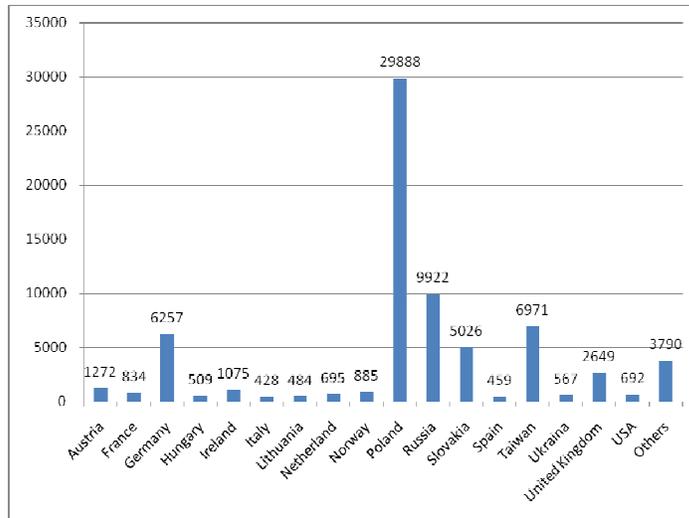
Wheelchair users are offered limited tour – visit to the first dome – spot 1 (Appendix 1) and then they come back to entrance, where they can board boats with assistance of boat pilots and go on empty boat to meet the group and then back on full boats. Positive aspect is that this information is provided on CA webpages together with advice to visit another 3 caves suiting better to wheelchair users. It would be technically possible to enhance wheelchair users' experience of viewing the Macocha abyss bottom.

Other physically challenged visitors may get into serious problems since no previous warnings are published online or at cave entrance. Both 70 stairs in the Reichenbach's Dome and boarding the boats require good mobility. These visitors as well as wheelchair users should be offered alternative access (e.g. video tour).

Visitors with hearing difficulties may enjoy the cave thanks to the printed guide (Appendix 1), which unfortunately does not exist in Czech while Czechs make 60% of visitors. Blinded visitors and those with visual impairments might enjoy the microclimate of the cave, its acoustics and safe rock surfaces (artificial tunnel versus natural corridors). However, this is at some place possible only with an assistant to avoid collision with rocks protruding to the path. Acoustic signals may give advance warning to these particular visitors.

Foreign visitors

40% of the Punkva Caves visitors come from abroad. Graph 1 shows proportion of different nationalities coming in 2009. In 2002 the spots on the guided tour where interpretation is delivered were equipped with speakers and recorded audio-guides in 6 languages. Explanation in up to 2 recorded languages can be played to a group at one spot within the time limit. If there are more people assigned to a group that are not comfortable with the languages of the tour they are either asked to join another group or are equipped with a copy of printed guide (Appendix 1). While the record is played the group guide follows its content and illustrates the facts pointing to objects around with his or her flashlight. Interpretation delivery of boat pilots is continuous in Czech, however, limited only to basic information in some foreign languages: depth of water, names of dripstone formations. Visitors leave the boats to visit Masaryk Dome which is equipped with recorded audio guide.



Graph 1 Nationalities of foreign visitors coming to the Punkva Caves in 2009

One information panel at the cave entrance (Appendix 2) bears information about showcaves in Moravian karst in Czech, English and German, other panels are in Czech.

Official languages of states where most of the visitors come from are provided through audio guides except Chinese for visitors from Taiwan. Some guides can speak English, Russian or German so they are able to deliver live interpretation, however most of them prefer records even though they are able to answer questions in the above mentioned languages. Some respondents in qualitative research of Mortier (2004) complained about quality of recordings. They found it difficult to understand the non-native speakers who read the script.

The content of the guided tour (Appendix 1) is typical representation of one-way transmission from interpreter to visitors (Mason 2005: 201). Table 1 in Appendix 3 analyses the script and examines messages and supposed prior knowledge within the text. It also suggests some improvements. The improvements are based on integral paradigm of interpretation (Kohl 2010) incorporating different views on topics and their social background. However, the main drawback of the guided tour content is that it lacks system derived from interpretive objectives and transformed into themes and storylines (Brochu 2003), (Ham 1992). This according to constructionist approach to information processing (Bransford and Johnson 1972) suspends development of inferences throughout the information processing which makes it less effective. Another constraint to effective interpretation emerging from the lack of interpretation planning is frequent use of unknown terms and concepts as illustrates Table 1. This point applies to all visitors of the caves regardless of their nationality.

Making interpretation records in Chinese and improving the map scheme on the printed guide could easily enhance experience of most of the foreign visitors. Nevertheless, deeper rethinking of the whole interpretation on the cave tour would be necessary to meet to be defined learning, emotional and behavioural objectives of interpretation delivery.

Conclusion

The Punkva Caves are place of outstanding natural beauty. The visitor experience could be dramatically enhanced by employing basic interpretive planning strategies, defining interpretive goals and objectives and tying messages into themes and storylines. Cave Administration could on the other hand meet its objectives in the field of conservation and health and safety. Simple improvements based on employment of communication and learning theories could be made to meet the needs of children below 6, visitors with hearing impairments and foreign visitors. Physically challenged visitors should be better informed about demands of the guided tour. There is much work to be done to deliver high quality interpretation that could go beyond the natural assets of the Punkva Caves.

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APPENDIX 1 – THE PUNKVA CAVES TOUR SCRIPT

Cave Administration (c.a. 2003)

THE PUNKVA CAVES



DEAR VISITORS,

Welcome to one of the four caves of the Moravian Karst that have been opened up to the public. The Moravian Karst is regarded throughout Europe as a classical karst landscape i.e. a limestone region including underground streams, caves and gorges, and as the birthplace of modern karstology and speleology or caving.

These caves represent an important part of the natural and cultural riches of our country and in order to care for them effectively the caves and the entire surrounding area are protected by law. In fact the whole area was proclaimed The Moravian Karst Protected Landscape Region.

THE PUNKVA CAVES

The Punkva caves are part of a large cave system created by the water courses that have flowed for millennia from the north in the karstified limestone region. These streams are in fact tributaries of the subterranean Punkva river (the most powerful of them being the Sloupský potok (Sloup Stream) and Bílá voda (White Water) stream. It was these which cut out the Amateurs' Cave system to a length of 27 km.

In this system the Punkva caves represent the resurgence sector, through which the Punkva river leaves its subterranean bed and appears on the surface.
In this resurgence area the Punkva river also created a complicated network of cave galleries, two branches of which connect the Macocha abyss with the Pustý valley.
The presentation of the Punkva caves as they are today is a tribute to the vision and daring with which Professor Karel Absolon carried out the project.

STOP No. 1 - THE FRONT DOME

We are standing in the place which the discoverers, headed by Professor Absolon, reached on September 26th 1909. This dome is the last part of the cave system that connects the Macocha abyss with the Pustý valley. However the waters of the subterranean Punkva river left it thousands of years ago. The monumental speleothem decoration really is a rich collection of almost all the known speleothem variations, from simple stalactite, stalagmites and stalagnates, as is for example the Salm column, up to those forms that indicate a complicated development of the spaces themselves (e.g. the Umbrella). The discovery of the Front Dome was followed by the discoveries of other cave sections that culminated in the opening of the dry cave sector to the public in 1914 and which made access to the bottom of the Macocha abyss possible.

STOP No. 2 - THE MIRROR LAKE

We have passed through the Front Dome to its rear, where this large dome changes into a cave gallery sinking towards the siphon. This is the place, where the advance of the discoverers was halted, because the siphon was full of water and muddy deposits. The speleothem form called the Umbrella standing in this section is of importance for the explanation of the development of the entire Front Dome. The speleothem shield fixed on the stalagmite body is what remains of the formerly continuous flowstone layer resting upon the original surface of the muddy deposits that subsequently were carried away by floods. The rock wall under the opening of the chimney is furrowed up by ripple-marks excavated by water flowing slowly down from above. The discoverers had to pump out the water and to clear the deposits out of the siphon before they could go forward and get into the next parts of the cave.

STOP No. 3 - THE REICHENBACH DOME

We have to follow in their footsteps to pass through the siphon and to climb up the steep slope into the horizontal parts of the upper level. The tectonically fractured zone of the limestone beds was disintegrated by the karst process to such an extent that the rock partition between the cave galleries of the two different levels collapsed and due to this a single shaft-like space originated, called the Reichenbach Dome or the Dome of Destruction. Two tables with years marked on them indicated the positions of the subterranean Punkva river water table during the times of floods that unusually inundated these normally dry sections up to considerable levels. At the upper level we will pass through the spacious Stalagmite Gallery with numerous remarkable speleothem formations - for example the Sitting Hare, the Snow-covered Fir, the Camel and the Roccoco Doll.

STOP No. 4 - THE BACK DOME

We slowly leave the upper cave level and descend into the Back Dome or the Quiet Dome, situated again at the level of the Front Dome. The long slope is partly coated by flowstone with a group of stalagmites called the Turkish Cemetery. The pile-like stalagmite called Sněžka (the highest mountain in the Czech Republic) shows a strange and unwelcome phenomenon peculiar to the tourist caves, the so-called cave-lamp flora. Its cause is simple: the little seeds and spores of plants are washed by the infiltrating water from the surface down into the open cracks and fissures in the underlying limestone and the artificial light and warmth in the caves open to visitors stimulate the undesirable growth of green flora. The water dripping from the chimneys creates interesting stalagmites called the Vase and the Dwarf. A real textbook example of a stalactite-stalagmite pair called the Eternal Lovers or the Needle can be seen in front of you.

STOP No. 5 - THE ANGEL

The discovery of the dome called the Angel resulted from the exploration works that proceeded at the bottom of the Macocha abyss. The continuation of the dome is the Tunnel Gallery, which is a typical cave corridor created by a former underground stream. This leads back towards the siphon, through which we had to pass before we began to ascend into the Reichenbach Dome. The speleothem decoration of this place is represented by two dominant features - the Angel

and the Curtain. We have already approached very near to the bottom of Macocha. The original discovery corridor had to be blocked off because for safety reasons and since 1979 the visitors have used a new artificially made corridor, the mouth of which is situated right in the abyss.

STOP No. 6 - THE BOTTOM OF THE MACOCHA ABYSS

We have reached the place to which many bold men and explorers descended many years ago before the discovery and the interconnection of the Punkva caves with the abyss. They used to descend from a place 92 m above the bottom, where the sightseeing platform called the Lower bridge is now situated. The first, historically documented, descent took place in 1723. The total depth of the abyss, measured from the Upper bridge to the mean level of the Lower lake, is of 138.4 m. The depth of the Lower lake, through which the Punkva river leaves the Macocha bottom is about 40 m (according to the measurements taken by cavedivers). Before the river falls into the shallow Barren Bed on the Macocha bottom from a long complicated siphon, it flows through the large system of the Amateurs' cave (the known corridors of which are about 27 km long). The water of the Punkva river also links up with the Upper lake, the depth of which changes after each individual flood (the mean value is of about 13 m). In the opinion of some karstologists the abyss originated due to the collapse of the bottom of a funnel-shaped (doline) karst depression in the original upper ground surface layer into the large dome-shaped space under that same ground. The name of the abyss is derived from the popular folk legend about the evil stepmother (in Czech - Macocha), who threw her stepson down into the depths of the abyss. However, a protruding branch saved him from certain death and, after his lucky escape from the abyss, he told the people of his village what had happened. The stepmother, overcome by fear of punishment, then threw herself into the abyss. Sadly, there have been numerous cases of people who have committed suicide by throwing themselves into Macocha. As well as being a place of legend, despair and rugged beauty the Macocha bottom is also a very rare habitation site of strictly protected flora usually found in high mountainous regions. Now we'll proceed from the abyss towards the subterranean routes of the Punkva river. The discoverers of these permanently inundated parts started their work in 1920 but it was not until 1st July 1933 that the grand opening of the subterranean water cruises took place

STOP No. 7 - THE UPPER LANDING STAGE

We now board the electrically driven, flat-bottomed boats and start on the half-kilometre-long cruise through the so called Water Domes of Macocha. During the cruise please follow the pilot's instructions. The first part of the cruise passes through cave galleries where the water is only about 1 m deep. The corridors lead into the Black Lake Dome. The chimneys opened in the ceiling of this section reach up into the system of channels and galleries of the upper level. The temperature of the water is about 6°C, whereas that of the air is about 10°C. Both values tend to be stable throughout the year. We have slowly approached the place that was named by the discoverers the Forty due to the depth of water there. It is in fact the mouth of the deep siphon from which the Punkva river rises up from under the cave. It is the same water that we could see entering the Lower lake on the Macocha bottom. Through the artificially run navigation gallery we come again into naturally formed parts with a depth of water of about 20 m. The preserved remains of the original cave vault of the southern branch of the so called Wicked Siphon occurs under the water table and resemble rock bridges. The Wicked Siphon, 18 m deep, was overcome only with help of very effective pumps on the 5th of February, 1933 at 8 o'clock p.m. After that we enter the First Fairy Tale lake with the speleothem formations of the Krakonos and the Water Elf. The sharply curved gallery leads us forward to the Second Fairy Tale Lake. A large, completely inundated gallery follows us under the water table. Then we enter the dome of the Third Fairy Tale Lake. In this dome we pass by the so-called Dragon's Gallery through which we enter the Fourth Fairy Tale Lake. There we get out of the boats and walk to see the loveliest part of the Punkva caves.

STOP No. 8 - MASARYK'S DOME

The discovery of this dome resulted accidentally from the works carried out by the military stone-drilling detachment from Olomouc headed by Second Lieutenant Sláma. The target of this sapper unit was to enable the upstream advance above the water table of the Punkva river from the place reached by Dr. J. Wankel on a primitive raft in 1857. The suppers discovered on this occasion a set of Pleistocene beaver skeletons.

Probably all of you will be surprised by the rich speleothem decoration of Masaryk's Dome. It must be said that the fine and fragile part of the stalactitic decoration in particular was largely destroyed in the course of the discovery work. The remaining decorations are still endangered owing to the great numbers of visitors, so the Administration has to carefully monitor all the changes in the cave's microclimate and has made numerous provisions for the effective conservation of its decoration.

Now we must return to our boats and go on to the very end of the Fourth Fairy Tale Lake. A few minutes later we'll see daylight penetrating into the caves through an impressive gate as the Punkva river comes to the surface in the Pustý valley.

IMPORTANT INFORMATION

Address of the management:

Caves Administration of the Czech Republic <http://www.cavemk.cz>
Administration of the Caves of the Moravian Karst
Svitavská 11/13
678 01 Blansko
Czech republic

Information, ticket sales and reservations:

Central Information Service (C.I.S.) Phone: (420) 516 410 024
Skalmýln Fax: (420) 516 415 379
678 01 Blansko, Czech republic e-mail: info@caves.cz

THE PUNKVA CAVES

0 50 100m



THE ENTRANCE

THE EXIT

The Punkva River



THE DRY PART

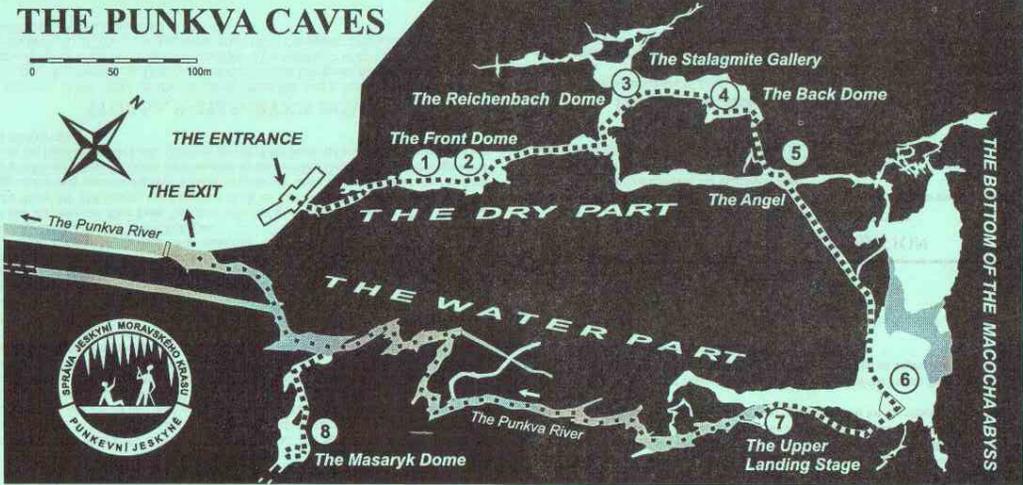
THE WATER PART

THE BOTTOM OF THE MACOCHA ABYSS

The Stalagmite Gallery
The Reichenbach Dome
The Front Dome
The Back Dome

The Angel

The Masaryk Dome
The Upper Landing Stage

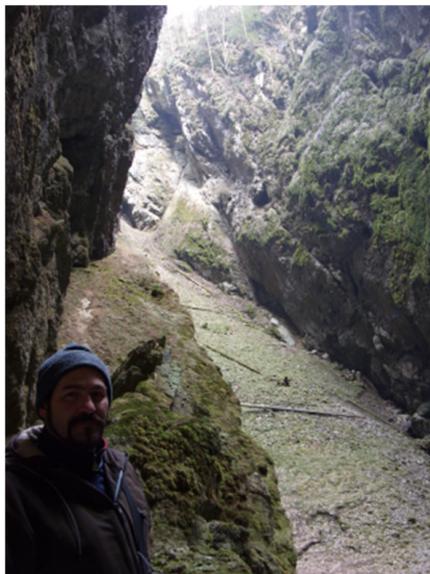


APPENDIX 2 – PHOTODOCUMENTATION

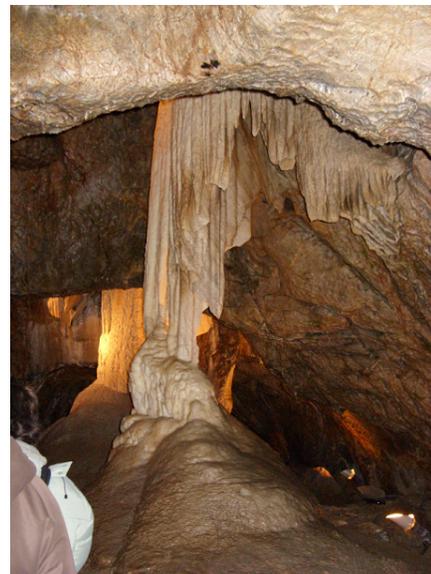
Information tables at the cave entrance



Cave tour



Macocha abyss bottom



Stalagnate "The Angel"



Visitors on the abyss bottom



Boat boarding

APPENDIX 3 – THE PUNKVA CAVES TOUR ANALYSIS

Analysis of the script (Cave Administration c.a. 2003) focuses only on expected prior knowledge and summarises messages within the text. Wider assessment of underlying paradigms was not undertaken.

Interpretation spot	Previous knowledge	Messages	Suggested improvements
Foreword	connection between limestones and karst;	the reader is regarded as visitor (member of THEM) to whom natural riches of OUR country are shown; only small part of the treasure (four caves) is opened to the public;	avoid the we-you dichotomy in the text;
Introduction to the Punkva Caves	connection between streams and creation of caves; Punkva river is created by underground confluence of two streams; who was Karel Absolon and what was his vision and “the project”;	explanation of local geography; caves are complicated; there was an important man named Karel Absolon;	simple map can replace difficult explanation; clarify the magic of limestone being dissolved by water; avoid abstract terms (e.g. complicated network); Karel Absolon’s effort could be placed within broader social context;
Stop No. 1 – The Front Dome	what speleothem means; what is the relation between an underground stream and a cave; dripstone forms; dripstone nicknames;	Karel Absolon led the team that discovered this space and other parts of the caves; there are different types of dripstones and some formation bear information about cave development;	demonstrate connection between the text and enclosed schematic map; explanation how dripstones come into being instead naming their forms;
Stop No. 2 – The Mirror Lake	what is siphon and how can something “sink towards it”; what is flowstone; what cave chimney means;	the team of discovered come to an obstacle at this place; there were floods in the cave and it was filled with mud and water that needed to be pumped out;	if the story of discovery should be one of the main themes – more attention should be paid to introducing the topic; notion about ripple-marks should be put amid introduction of interaction of water and limestone not into the story of pumping-out siphon;
Stop No. 3 The Reichenbach Dome	what “tectonically fractured zone of the limestone beds” means; how caves are structured into levels and what “cave gallery” means;	some kind of catastrophe happened at this place; this place is also sometimes flooded;	explanation of the name of the dome; replacement of difficult words in explanation of cave ceiling collapse; explanation of flooding – where it comes from and why;
Stop No. 4 The Back Dome	stalagmite-stalagtite pair;	flora develops in showcaves, which is wrong; (though English of the text is left without comments at this point it should be pointed out that “peculiar” should probably be replaced by “particular”)	the lamp-flora phenomenon bears great potential for interpretation and illustration of plant physiology, eradication of flora by humans (chemicals are used) may provoke discussion about conservation management; different dripstone formations can well illustrate the erosion/sedimentation processes;

Stop No. 5 The Angel	what is "typical" on Tunnel Gallery; where the Tunnel gallery is situated on the schematic map;	some discoveries were made from the Macocha abyss; parts of the tour leads through artificially made corridors;	dripstones surrounded by hundreds of inches wide ponds can explain how the water dropping works within caves; crossroads of corridors shows how the flowing underground streams form caves; names used in the text should be noted on the schematic map;
Stop No. 6 The Bottom of the Macocha Abyss	what is siphon;	what is the name Macocha derived from and how the abyss has been used by suicides; how big is the abyss and how its hydrology works; how the abyss developed; the abyss hosts some very rare species; it took 13 years to make the next part of the tour possible;	hydrology of lake is of minor importance since it does not illustrate any wider principle; microclimate of the abyss is what visitors feel and can be used to illustrate the rare flora occurrence; making the boat tour possible using destructive methods and artificial lowering of water level is actually controversial and can be used to provoke visitors' interest;
Stop No. 7 The Upper Landing Stage	what is siphon;	names of different parts of the corridors; depth of water in different parts of the cruise;	what was the reason of overcoming Wicked siphon and how this relates to human-nature interaction; names used in the text should be noted on the schematic map; how the caves originally looked and how they were made floatable;
Stop No. 8 – Masaryk's Dome	what was role of military in discoveries of the Punkva caves; how the discoveries were made; what is Pleistocene;	the Masaryk dome was discovered by chance; discovery methods took their toll on dripstones; visitors have got negative impact on caves;	controversial destructive methods of discoveries could provoke visitors' interest; tertiary beavers and how they got deep into the cave can illustrate many stories from evolution of species to evolution of caves and evolution of knowledge;