THE MARTEL'S CHAMBER IN ŠKOCJANSKE JAME

MARTELOVA DVORANA V ŠKOCJANSKIH JAMAH

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Mihevc, Andrej: Martelova dvorana v Škocjanskih jamah

Predstavljene so raziskave in najnovejše meritve Martelove dvorane v Škocjanskih jamah, ki je z volumnom 2.100.000 m^3 največja dvorana na Krasu. Dolga je 308 m, široka 123 m, v povprečju 89 m. Jamski strop je visok v povprečju 106 m, na najvišjem delu pa 146 m. Najnižja točka v jami leži 214 m nad morjem.

Ključne besede: speleologija, speleomorfologija, Kras, Škocjanske jame, Martelova dvorana

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The explorations and the most recent surveys of the Martel's Chamber in Škocjanske jame which is, in terms of its volume - 2.100.000 m^3 - the largest chamber on Kras are described. It is 308 m long, 123 m wide and 89 m wide on an average. The cave ceiling is 106 m high on an average, on the highest point it is 146 m high. The lowest point in the chamber lies at 214 m a.s.l.

Key words: speleology, speleomorphology, Kras, Škocjanske jame, Martel's Chamber

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INTRODUCTION

Without doubt E.A. Martel is one of the most important karstologists from the transition of the 19th to 20th century. This is the reason that numerous caves or parts of caves were named by his name (Casteret 1943, 218), five out of them lying on Kras.

By Martel's name are called Martel's Chamber and Martel's Breakdown in Postojnska jama in remembrance to his visit at Postojna, when his guide was W. Putick and together they explored 2 km of new passages. A. Perko named Jama na Pauli vrh cave near Prosek Fovea Martel (VG 144). It is 114 m deep pothole where the discovery of the underground Reka flow was expected.

At the discovery in 1890 already the Martel's Chamber and Lake in Škocjanske jame were named by him. On the occasion of the centennary of the discovery and Martel's visit the inner parts of Škocjanske jame were resurveyed. These surveys provide a more accurate idea of the chamber itself and correct the essential errors regarding the depth of the cave and the location of the chamber.

ŠKOCJANSKE JAME EXPLORATIONS AND THE DISCOVERY OF THE MARTEL'S CHAMBER

The first cave explorations are recorded since the first half of the 19th century. The most important explorers of the time were Svetina and A. Schmidl. In 1884 at Triest was set up the Littoral Section of DÖAV, it rented the cave and its vicinity and started the intensive explorations. In the same year they bridged the 6th waterfall in the Svetina's Chamber which was till then the biggest obstacle while exploring the cave downstream. In August 1890 they reached the largest space in the cave and called it Martel's Chamber and in October 5th of the same year the outflow siphon at the end of the Marchesetti's Chamber which is now known as the Dead Lake (Müller 1891; Pazze 1893).

According to the habit of the time the parts of the cave were named by various donators, well known or cave explorers of merit. The last are A. Hanke, man of merit for Škocjanske jame, W. Putick, the explorer of the caves at Notranjska and world famous speleologist E.A. Martel by whom the largest chamber was named.

In the following years some other passages were discovered in Škocjanske jame but all of them closer to the entrance. The continuation in the downstream direction was impracticable. The first new discovery in this direction succeeded to cave divers not earlier than in

September 15, 1991 when Janko Brajnik found the continuation and swam across the sump in Marchesetti's Lake. The explorations are still going on (Morel 1991; Sancin 1991).

The first explorers equipped the newly discovered passages and chambers by the inscription tablets. In the Martel's Chamber there are two such tablets put together.

The upper one is the tablet of thank to the explorers working in the cave mostly in 1890 and who discovered the chamber: Anton Hanke, Friedrich Müller, Joseph Marinitsch and the local workers Paul Antoncich, Joseph and Juri Cerkvenik, Janes Delles and Franz Snidercich.

Below it lies a tablet usual for the cave, denoting the name of this part of the cave, in this case "Martel Dom", the society, the explorers and the date of discovery. Unfortunately most of other such tablets were removed after the First World War.

MARTEL'S VISIT TO ŠKOCJANSKE JAME

Martel never visited the chamber named by him. During his visit to Kras, in September 23, 1893 this part of the cave was not accessible due to high waters of Reka river.

Martel was guided into the cave by Marinitsch, Müller, Pazze and Putick but they reached the Rinaldini's Chamber only. They have taken with them the paper baloon working on warm air "mongolfière en papier" in order to establish the ceiling height. The baloon raised for 45 m but did not reach the ceiling, it did not work due to humid air. The visit to the cave is described in detail by Martel in his book Les Abîmes (1896, 468).

MAPPING OF ŠKOCJANSKE JAME AND MARTEL'S CHAMBER

Parallel to explorations and penetrations down the Reka stream the explorers, in particular A. Hanke, surveyed and made the sketches, cross sections and cave plan. A. Hanke surveyed by the mining compass the final part of the cave and by aneroid he estimated the altitude of the last lake to approximatively 205 m. His plan of this part of the cave was published by Müller (1891, 130). All the Hanke's maps were later combined, somewhere a bit corrected but the cave survey remained generally the same.

The first such plan was not published until 1924 by Oedl and later the groundplan and cross sections were used by Bertarelli & Boegan 1926, Boegan 1938, XXVI and other later explorers. According to it the cave was 5000 m long, 253 m deep, the outflow sump at 173 m. Later only the show parts were resurveyed, the most demanding part of the cave, the underground canyon through the Hanke's Channel up to Martel's Chamber and further on to the Dead Lake was not resurveyed.

After the discovery of the underground Reka flow downstream in Kačna jama in 1972, according to caving compass measurements it was shown that the depth of Škocjanske jame was exaggerated (Petkovšek & Kenda 1974). The survey of Kačna jama up to Brzice in 1982 (Mihevc 1984) confirmed this statement as the inflow siphon in Kačna jama lies at

Fig. 1: Tablet of thank to the most meritorious explorers of Škocjanske jame in the past century (up) and the tablet denoting the Martel's Chamber.
Sl. 1: Zahvalna tabla najznamenitejšim raziskovalcem Škocjanskih jam v prejšnjem stoletju (zgoraj) in tabla, ki označuje Martelovo dvorano.

182 m a.s.l., hence higher than the outflow siphon in Škocjanske jame according to Oedl's plan.

All these facts required a new survey of Škocjanske jame. The Karst Research Institute approached to this work in 1980's. Classical, theodolite and compass surveys with the metal tape were not precise enough this is why the cave was resurveyed by electro-optical theodolite for measuring the angles and distances (Nikon DTM A10 LG).

The points of the basic polygon were fixed to the floor. These are rounded bronze tablets, 5 cm of diameter labelled by consecutive numbers. The points of the detail are not specially marked. But the instrument could not measure the ceiling height. Later we used the laser beam projecting on the unaccessible walls and ceiling the points which were then defined trigonometrically.

We continued with measuring the ceiling height helped by AMT profiler. With its help we measured 22 profiles between the Martel's Chamber and the entrance into Hanke's Channel. The first measurements were not successful due to extreme humidity, a layer of mist respectively in the cave. On the layer of mist the beam was disintegrated in such a manner that no reflection was obtained from the walls. When we continued these measurements during the winter at low waters, when the air in the cave is relatively dry and cool, the results were satisfactory in spite of problems posed by a layer of mist about 80 to 100 m above the floor. The measurements of the ceiling and walls distances were stored into computer and later the profile surfaces were calculated and the profile designed in the scale 1:500. By the help of these measurements the dimensions and forms of the Martel's Chamber may be much better described.

During the measurements we met with numerous problems which did not exist in other caves. The roaring of Reka, f.i. enabled the understanding among the surveyers and the radio communication was obligatory, high waters were frequent or else, a thick mist appeared at particular weather situations. This is the reason that in spite of great efforts done in the cave it is not yet completely surveyed.

SOME MEASUREMENT RESULTS

The measurements have indicated several mistakes existing on older plans. The above sea level of Martel's Lake is according to Hanke's aneroid measurements at 205 m, according to later citations (Bertarelli & Boegan 1926; Boegan 1938) 173 m. The new measured altitude is 214 m. The second mistake was done on the ground plan. According to old plan the cave is directed from the Hanke's Channel in the same direction towards NW. But new measurements have shown that the passage at the Rinaldini' s Chamber turns for about 30^0 and is oriented almost towards the north. Thus the final part of the cave, the Dead Lake, lies 350 m towards northeast. The measurements have indicated more precise forms of the chamber and the Reka channel.

THE SURVEY OF MARTEL'S CHAMBER

The Martel's Chamber is widened part of the gravitation passage shaped by the Reka sinking flow. In front of the chamber the Reka flows through narrow, 10 to 30 m wide and 80 to 95 m high Hanke's Channel. The Reka riverbed almost entirely occupies its bottom. On some places the channel widens, and these parts were named f.e. Putick's Chamber or Shadeloock's Chamber. The last one passes without any distinctive limit into Martel's Chamber.

The beginning of the Martel's Chamber was placed below the 22 nd waterfall to the polygon point 55, where the Hanke's Channel extremely widens and the ceiling height increases as well. The cave bottom is here 25 m wide occupied mostly by the Reka riverbed. The layout plan of the channel is 66 m wide.

Below the waterfall on the eastern side at the beginning narrow and later wider bank appears. The bottom of the chamber raises from the Reka riverbed towards the walls. In the first part the bank lies on the right, eastern side of the Reka and on its highest point it is 30 m above the riverbed. In the northern side of the chamber the Reka flows at the eastern wall, the chamber's bottom raises towards the western wall for 47 m.

The bottom is covered by huge breakdown blocks, on their lower parts the gravel was laid down, higher there are sand and fine-grained sediments. All over the sandy beach, in particular at point 57 there is a lot of deposited wood and plastics left by the Reka flood waters.

At the right side of the chamber in front of the point 56 there are on the wall fixed the mentioned memorial tablets. They are on the place where the pathway lowers from the right side and enabled the visit of this part of the cave during high waters even as it is built 10 to 20 m above the Reka riverbed mostly. The pathway later continues by the right side and reaches the Martel's Lake and goes further on towards the Marchesetti's Chamber.

At the point 57 the chamber narrows, the cascades calm down into Martel's Lake and from there passage, 1,5 m high and 9 m wide only, leads into next, the Marchesetti's Chamber. Between this place and the point 55, where the Martel's Chamber starts, there are 308 m of the distance.

The bottom of the chamber lowers from 233 m at the point 55 to 227 m at the 22nd waterfall and further on by several cascades to 214 m at the Martel's Lake. The ceiling height raises from the initial 81 m to the utmost 146 m in the profile 7 at the point 56, the average chamber's ceiling height is 106 m. The ceiling lies at 300-370 m, the surface at 430 to 445 m.

The widest is the chamber within the profile 6 where it is 123 m wide, the average width is 89 m. The figure shows three characteristical profiles of the Martel's Chamber.

Out of totally 10 profiles, measured in the chamber one may calculate the volume rather accurately. The profiles were taken on 30 m on an average. The biggest profile 6 has the surface of 11.740 m^2, the average profile 6694 m^2. Hence the volume of the Chamber is 2,100 000 m^3.

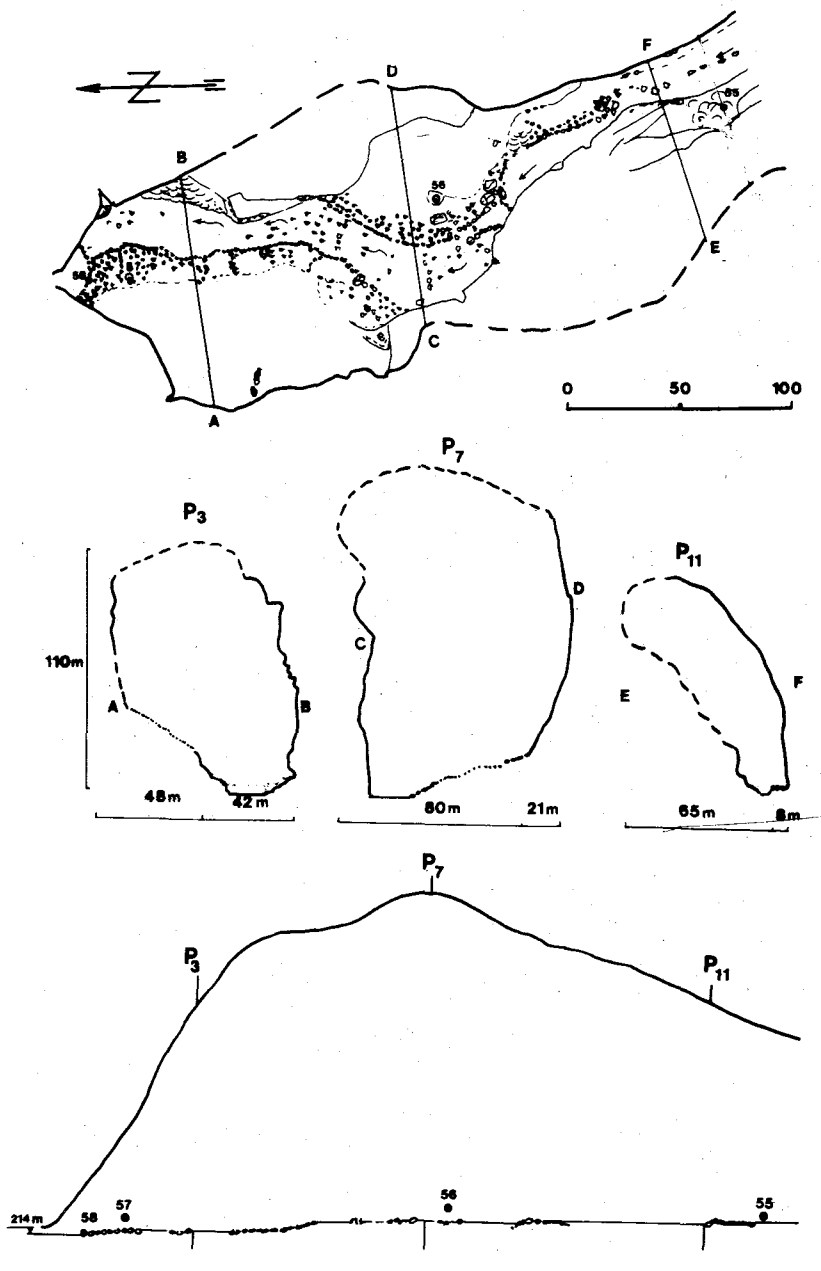
A
B
C
D
E
F
55
56
0
50
100
P3
P7
P11
110m
48m
42m
80m
21m
65m
8m
214m
57
58

Fig. 2

CONCLUSION

Out of respect for the eminent speleologist the explorers of the then the largest cave on Kras have named its biggest chamber by E.A. Martel. The chamber having the volume of 2,100 000 m^3 is the biggest chamber on Kras and in Slovenia.

New measurements with electronic theodolite and laser profiler by which 10 cross sections were surveyed enabled a precise calculation of the location and dimension of the chamber and corrected the mistakes that occurred at the first surveys of the cave.

The chamber is 308 m long, on the widest place 123 m wide, on an average 89 m wide. The chamber's ceiling is on an average 106 m high, on the highest place the ceiling is 146 m high. The volume of the chamber is 2.100 000 m^3. The bottom of the chamber lies from 233 m where the Reka flows into the chamber to 214 m, where is the lowest point of the chamber, the level of Martel's Lake respectively.

Translated by Maja Kranjc

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Sl. 2: Tloris in profili (profili p3, p7 in p11) Martelove dvorane v Škocjanskih jamah.
Fig. 2: Ground plan and profiles (profiles p3, p7, p11) of the Martel's Chamber at Škocjanske jame.

MARTELOVA DVORANA V ŠKOCJANSKIH JAMAH

Povzetek

V znak spoštovanja do uglednega speleologa so raziskovalci tedaj največje jame na Krasu poimenovali njeno največjo dvorano po E.A. Martelu. Dvorana je z 2.100.000 m^3 prostornine največja dvorana na Matičnem krasu in v Sloveniji.

Nove meritve z elektronskim teodolitom ter z laserskim profilerjem, s katerim smo v dvorani izmerili 10 prečnih profilov, so omogočile natančen izračun lege in dimenzij dvorane, ter popravile napake, ki so nastale pri prvih meritvah jame.

Dvorana je dolga 308 m, široka pa na najširšem mestu 123 m, s poprečno širino 89 m. Strop dvorane je v poprečju visok 106 m, na najvišjem mestu pa je dvorana visoka 146 m. Volumen dvorane je 2.100.000 m^3. Dno dvorane leži v višinah med 233 m, kjer Reka priteče v dvorano, najnižja točka dvorane oziroma gladina Martelovega jezera pa je v nadmorski višini 214 m.