

WELCOME TO THE LUR CAVE PEGGAU, THE LARGEST WATER-FLOWING DRIPSTONE CAVE IN AUSTRIA

Discovery of the cave and further history:

Although the existence of the cave was likely known since the mid-19th century, it was Max Brunello, an Italian speleologist, who - along with a group of like-minded individuals - conducted the first exploration on April 1, 1894. The exploration began from Semriach, as blockages and accumulated water in Peggau obstructed the entrance, making it impossible to enter; only in 1913 - after the water level was lowered by 7 meters through the construction of a drainage tunnel - could the Lurgrotte also be accessed from Peggau. Shortly after the initial exploration, the Lurgrotte gained dramatic fame. Tensions between two competing groups of researchers led to covert expeditions to outdo each other. During one such expedition on April 29, 1894, seven cave explorers were cut off from the cave exit due to heavy rainfall. Although they managed to flee to a higher area, it was only a small comfort, as no one could predict when the water would recede. They had no choice but to wait. The eventual rescue of the researchers was attributed to a rather absurd circumstance: the overweight Semriach priest. Originally intending to accompany the group, he could not fit through the narrow passages due to his size and had to turn back. When none of the cave explorers had reported back to him as agreed, he went to the cave entrance himself and found it completely flooded. An elaborate rescue operation involving over 1000 individuals (including miners, pioneer companies, and even divers from Trieste) was initiated. Initially unsuccessful due to continuous rain, it took nine days and the construction of several dams to create a rescue tunnel and free the exhausted and hypothermic, yet alive, trapped individuals. Although cave entry was prohibited due to this tragedy, the ban could not be enforced for long, and exploration and development of the Lurgrotte as a show cave began the following year. This development occurred in several stages, with the first significant step being the aforementioned drainage tunnel completed in 1913. Meanwhile, researchers from Semriach continued further into the system and eventually reached a cave dome by the late 1910s, where a massive rock wall and accumulated water blocked their path. As progress seemed impossible from that side, another drainage tunnel and connecting passage were driven into the rock from Peggau. These were completed in 1924, finally allowing passage; the dome that had previously marked the end of exploration was then titled the "Hall of Victory."

Although the passage was now technically open, it took another 11 years until the Lurgrotte could be traversed in one go for the first time; on February 13, 1935, this feat was achieved by a group of cave explorers. For the relatively short 5.5 km passage, they needed almost 18 hours and had to use a small boat several times due to the high water level in the middle of the system.

From this point on, efforts began to develop the passage for guided tours, which turned out to be a marathon project. After over 20 years of construction, the Lurgrotte could be traversed by ordinary visitors from 1957 onwards, as part of a guided tour lasting approximately 3-4 hours. However, these tours were in no way comparable to those of today. The groups were sometimes extremely large, with up to 100 people per cave guide, and the lighting was provided solely by carbide hand lamps distributed to every 10th visitor. In addition, there was the omnipresent danger of flooding, as the warning time from the flood station was too short to completely rule out a possible inundation; thus, visitors often had to wade through knee-deep water to reach the exit.

A flood was also responsible for the end of the crossings. In the summer of 1975, after heavy rains in Semriach, a retention basin in front of the cave entrance collapsed, causing a veritable flood wave to rush through the cave. Due to the enormous amounts of water, up to 15m³ per second - normal is about 50-60 liters per second - and the carried wood and rocks, large parts of the climbing facilities were destroyed. Furthermore, sand and sediments accumulated in lower galleries, filling them almost up to the ceiling in some places. Since a complete reconstruction seemed neither financially nor practically feasible, this event marked the end of (touristic) cave crossings.

Even the general tour operation was briefly on the verge of collapse. Due to the damage, the state of Styria - until then the operator of the Peggau tour operation - ended its involvement. Three months later, the municipality of Peggau took over the operation of the show cave, with the tour and maintenance

activities being outsourced to a specially established association, which continues to perform these tasks to this day.

In the following years, the first two kilometers of the Peggau side were renovated, and electric lighting was installed in the first kilometer. Despite several floods in the following decades - with sometimes extensive damage - the cave remained accessible to the public. After a last major flood in 2014, a new retention basin was finally built in Semriach, and a modern flood warning system was procured. These measures seem to be bearing fruit, as since then, the Lurgrotte has been spared from floods.

Origin of the Lurgrotte and Geological Features:

The formation of the Lurgrotte began around 350 - 400 million years ago with the formation of the Graz Highlands. Due to plate movements, the original seabed was uplifted to form mountain ranges, including the plateau known today as Tanneben, through which the cave system of the Lurgrotte runs. This mountain mass consists largely of limestone, which is primarily formed from deposits of corals and other marine organisms. As a result of the uplift, cracks and cavities are formed in the rock, which are enlarged by dripping water - which is usually enriched with carbon dioxide from the air - as limestone is water and acid soluble. If these fissures are wide enough, sand and stones can also be carried along, further accelerating this process. Thus, over millions of years, huge cave systems like the Lurgrotte are formed, estimated to be around 3 - 4 million years old. However, caves are not rare in Austria; over 10,000 are known, almost half of them in Styria. However, only 25 of these caves are accessible to visitors.

The predominant limestone in the Lurgrotte also occurs in metamorphic form; through tectonic activity, the limestone is transformed into marble at high temperature and pressure (several hundred degrees and 300 - 400 kbar). Due to various elements dissolved in the stone, such as lead, iron, or silver, the limestone or marble is colored and appears blue-gray, silvery, or reddish-brown. When eroded by water, fascinating, almost organic-looking formations are created.

The dripstones, for which the Lurgrotte is known, also consist of limestone. In the case of dripstones, the limestone is dissolved by acidic water seeping through cracks in the rock. When this water drips or flows into a cavity, part of the limestone deposits in a ring shape on the cave ceiling, initially forming delicate limestone tubes, called stalactites. Over time, the ends of these tubes close, causing the limestone to deposit on the outside, forming the characteristic pointed shape of stalactites or ceiling cones. The limestone component that falls to the ground with the water droplet forms the stalagmites there. Therefore, for every stalactite hanging from the ceiling, there is a counterpart growing up from the ground. How exactly the two parts behave in terms of growth rates and shape depends on various factors, such as temperature, flow rate, saturation, and the nature of the substrate, and is difficult to predict. Despite the low average growth of only about 1 mm³ per year, which is roughly the size of a grain of salt, stalagmites and stalactites can sometimes merge to form a dripstone column or pillar. The age of the dripstones can be estimated, to some extent, based on their size. Theoretically, it would also be possible to determine their age through the decay of certain radioactive isotopes. However, this dating method, called the Uranium-Thorium method, is not applied in the Lurgrotte for two reasons. Firstly, material would have to be taken from the middle of the dripstone by means of a core drilling, which is not compatible with the status of the Lurgrotte as a natural monument. Secondly, the dating horizon of this method is limited to about 500,000 years, which is simply too short for the sometimes ton-heavy and meter-thick dripstones in the Lurgrotte.

Although the dripstones themselves are very stable - they are made of solid limestone - they can be easily damaged or broken. This is because the material is very brittle and sensitive to bending stress. In addition, fats and acids, such as those found on human skin, attack the limestone, causing discoloration and preventing further growth of the dripstone, which is why touching the stones is strictly prohibited.

Tours in the Lurgrotte: "Prince" Tour: approximately 1 hour, within the season (April - October) every full hour (Note: changes to tour times are possible in the pre- and post-season, please check the times on the website!). The first kilometer of the system is traversed, up to the landmark of the Lurgrotte Peggau, an almost 4-meter-high, free-hanging stalactite, the "Prince". This part is electrically illuminated and easy

to walk - sturdy footwear is still advantageous. A jacket is also recommended as the temperature in the cave remains constant at approximately 10°C and the humidity is over 95%.

"Blocksberg" Tour: approximately 2 hours, dates are announced on the website (short-term cancellations due to high water levels in the rear part of the cave reserved!). Additionally, the second kilometer is traversed, which is unlit (flashlights are provided) and partially in poor condition - surefootedness required!). This part is largely in its natural state, and the tour passes by huge dripstones, up to the Blocksberg, an almost 40-meter-high cave dome.

Adventure Tour: approximately 5-7 hours, only possible in winter (December - March) as the risk of flooding is too high in summer. Only with prior registration - ticket sales from June! The system is traversed up to the municipal boundary of Peggau-Semriach (approx. 4.5 km). Special equipment (helmet, headlamp, overalls) is provided. Only with helmet lamps, the old, partially destroyed tour path is followed. After several climbing passages and a rappelling action, the so-called "Windloch" is reached after about 3 hours, a small dome somewhat off the beaten path. The return journey is partly through the melting brook. Videos from previous tours, as well as further information, are linked on the website.

Description of Stations:

1. The cave system is approximately 15 km long and traverses the mountain on several levels. It is a through cave; there are 2 entrances (Peggau and Semriach), which are connected by a 5.2 km long passage. The temperature in the cave is consistently 10°C year-round, with humidity over 95%. The water temperature is 8 - 10°C. In the water, there are small crustaceans approximately 2 cm long. Various small creatures can be found in the cave, such as cave woodlice, cave spiders, springtails, and millipedes. Additionally, cave shrimp can be found around water sources.

The only vertebrates present in the cave are bats; these hibernate here from October to April. Currently, 12 - 14 species hibernate in the Lurgrotte, with a total population of 6000 - 7000 individuals.

The stream that flows through the Peggau tour section - the Schmelzbach - originates approximately 1.8 km from the Peggau entrance in a 12-meter-long fissure in the rock; the exact source of the water has not been determined to this day, and it is suspected to come from several surface inflows.

2. The Lurgrotte is entered through a wide-open rock portal through which the Schmelzbach originally flowed, with such abundance that it was able to operate a silver smelter - hence the name Schmelzbach - and later a saw directly in front of the cave entrance.
3. After passing through the ante-chamber, visitors can view an original cave bear skeleton at the descent to the stone bridge; the bones are from the cave and the surrounding area. The bear itself likely lived about 20,000 years ago and stood approximately 1.6 meters tall at the shoulder and weighed 600 kg, roughly the size of a modern grizzly bear. However, the displayed specimen is rather small for a cave bear; the largest specimens had a shoulder height of over 1.9 meters and weighed up to 1500 kg.
4. At the first large stalactite, one can observe swirl pots, potholes, and karst formations on the walls and ceiling, which were eroded solely by flowing water and carried sand and gravel. The surrounding rock is approximately 400 - 350 million years old and comes from the Devonian period.
5. The Baldachin is a mighty dripstone formation that gleams in colorful hues due to the inclusion of various elements such as iron, lead, manganese, and silver. The staircase to the left of it leads to the Marble Passage. Here, the white-yellow banding of the blue-gray limestone is particularly striking. The hands mounted on the side of the Baldachin were created in 1972 by "Timm

Ulrichs," a German artist, in the hope that they would merge together. The whole thing was meant to be a homage to Michelangelo's fresco "The Creation of Adam" in the Sistine Chapel.

6. Through the two tunneling passages, one reaches the Siegeshalle, a large cavern where the first encounter of the exploration groups from Peggau and Semriach was celebrated in 1924. Hanging from the ceiling since the centennial flood of 1975 is an old lampshade that was washed further back. It marks the former high water mark.
7. Beneath a sky full of thin, translucent dripstone tubes, one can admire the "Three Peaks," named after the distinctive Dolomite peaks in honor of the first explorer - the South Tyrolean cave explorer Max Brunello.
8. The path now leads past the Bell and the Elephant's Head.
9. Further on to the Tyrolean Hat. The names of the dripstones serve as orientation markers for cave exploration.
10. In the Rain Grotto, it "rains" here all year round. Here, a shaft leads to the surface, the so-called "Angerleitenschwinde." It is supplied by a sinkhole with water. The water flow is approximately 10 - 40 l/sec., with a temperature of approximately 8 - 10 degrees.
11. The "Prinz" is the largest free-hanging stalactite in the first kilometer, measuring 3.7 meters in length and weighing approximately 3 tons. The designation stems from its original resemblance to a crown or throne; however, the spikes responsible for this were broken off after the 1975 flood and are unlikely to regrow.
12. With that, the electrically illuminated guided section ends after 1000 meters. The path now leads back through the partly 20-meter-high Crocodile Gorge. The name derives from the scale-like structure of the surface.
13. The second guided section - another 1000 meters - is only traversed with flashlights. The passage to Semriach, approximately 5.5 km, was partially destroyed and silted up in 1975.

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