This is an Earthcache with 2 waypoints in the city center of Leipzig. Take a tape measure or a smartphone with ruler app with you.

Sächsischer Marmor (GC84FF5)

Rochlitzer porphyry tuff, as the "Saxon marble" is actually called, is a volcanic rock, which was formed about 280 million years ago from silicic acid-rich magma. Acid lava is very viscous, so it can clog a volcanic vent. The pressure inside the volcano then increases until it comes to a huge explosion and gas, hot ash particles and lava erupt some kilometers high into the air. Due to the high density, the majority of this infernally hot mixture flows down the slope along the ground as a so-called "pyroclastic density stream", depending on the density and size of the particles, "ember cloud" or "ember avalanche" are very plastic terms. Pyroclasts, which account for more than 75% of a pyroclastic density current, are rock fragments of volcanic origin which were pulverized at the time of eruption or which were created by internal friction in a dense stream. Other components of the dense stream are fine crystals, pumice or glass fragments.

(A pyroclastic stream at the volcano Sinabung on Sumatra. © vulkane.net / Marc Szeglat)

A large part of this pyroclastic density current then settled over several eruptions waves with a thickness of up to 100 meters in the vicinity of the exploded volcanic vent loose to a cone-shaped mountain, today called “Rochlitzer Berg”. High heat in the density stream caused the individual components to be caked or welded together. Generally such solidified deposits are called Ignimbrite. If the constituents are relatively small, ie predominantly made of volcanic ash, it is called tuff. Since in our case not only ashes but also larger pyroclasts, so-called **Lapilli** (Italian for "little stones"), are contained, Rochlitzer porphyrtuff can also be called a lapillituff. Despite structural similarities, however, the term "porphyry" is fundamentally wrong, as porphyry arises from the cooling of liquid magma and its crystallization, rather than as a pyroclastic sediment.

Exposed blocks of reddish Rochlitzer porphyry clay were already processed into millstones in the Bronze Age, as the first evidence of quarrying in 1105 consecrated St. Kilianskirche applies in Bad Lausick. In the following centuries, the "Saxon marble" was used in many buildings and monuments (see also additional waypoints). Popular with sculptors is the stone, because it can be processed like soft stone. Fine sanding is also possible, but he does not let himself be polished. Its resistance to frost and other aggressions also speaks in favor of frequent use.

Waypoint 1 leads us into the modern age, to the house “Böttchergäßchen” of the “Stadgeschichtliches Museum Leipzig”. The new building, opened in 2004, impresses with its facade slabs of Rochlitzer porphyry. Due to the freshness of the façade, one can also look at the individual components of the Saxon marble. Answer here two questions:

1) Can you recognize Lapilli in the rock? Which color do they have? Which form outweighs and which maximum diameter can you determine?
2) Another type of inclusion in rocks is fossils, for example remnants or traces of animals or plant prints. If a living creature is buried in sand, mud, or clay, protected from decay, like a riverbed or seabed, it can mineralize over millions of years. This happens when more and more layers of sediment deposit over it, increasing pressure and squeezing mud and sand to stone.
Did you discover fossils when looking at the façade panels? Is that to be expected? Explain your opinion.


(Nahaufnahme mit Kluft/ Äderung am Eisenbahn-Obelisken)

At **waypoint 2**, the old town hall, we look at the clefts in the pillars, which we have already noticed in the facade panels as well. These clefts are natural narrow cracks in the rock and prone to weathering. Iron-containing compounds are removed there by penetrating water, the gap fades out. When the iron oxides are removed, a reddish border zone is formed. In the gap then the "wound" crystallizes again. Look at the clefts on the columns and answer the following questions:

3) What is the width of the most pronounced clefts?
4) Do you also discover crystal veins as on the close-up picture of the Railroad Obelisk above?
Optional) Like any Earthcache owner, I am happy about accompanying photos, for example from the additional reference points.

And now? Please send the answers to me BEFORE your write your log entry, preferably via the Message Center. You are allowed to log immediately after answering the questions. If something is wrong, I will contact you. If no replies are sent to a log entry, I will delete it without notice.

Note: Originally the cache was set up in 6 stations, but the restrictive rules for earthcaches in urban environments unfortunately did not allow for any more meaningful stations. For real Earthcache fans I have listed these reference points, also with short hints. I recommend their visit in the original order (ie first Extra 1 and 2, then WP 1 and 2 and finally Extra 3 and 4), but it is not necessary to answer the questions.

Sources and additional information (in German):
http://www.vulkane.net/vulkanismus/pyroklastische-stroeme-glutwolken.html
https://de.wikipedia.org/wiki/Rochlitzer_Porphyr
https://www.porphyrland.de/medien/dateien/porphyrlehrpfad_einzelseiten.pdf
https://www.skyscrapercity.com/showthread.php?t=1928825

Waypoint 1 - Haus Böttchergäßchen N 51° 20.503 E 012° 22.578

1) Can you recognize Lapilli in the rock? Which color do they have? Which form outweighs and which maximum diameter can you determine?
2) Did you discover fossils when looking at the façade panels? Is that to be expected? Explain your opinion.

Waypoint 2 - Altes Rathaus N 51° 20.450 E 012° 22.518

3) What is the width of the most pronounced clefts?
4) Do you also discover crystal veins as on the close-up picture of the Railroad Obelisk above?

Extra 1 - Eisenbahndenkmal N 51° 20.548 E 012° 22.888

The obelisk of the railway memorial was also built from Röchlitzer Porphyry. Compared to the waypoint 1, the stronger weathering is particularly noticeable.

Extra 2 - Nikolaikirchhof N 51° 20.428 E 012° 22.734

Nikolaikirchplatz is the location of several prestigious buildings where Saxon marble has been processed. The Nikolaikirche itself, the Alte Nikolaischule, the Predigerhaus and the Geschwister-Scholl-Haus.

Extra 3 – Fürstenerker N 51° 20.387 E 012° 22.677

The Fürstenerker is a modern copy of a part of the built in 1558 and destroyed in World War II princely house and also from Rochlitzer Porphyry.

Extra 4 - Obelisk am Mendebrunnen N 51° 20.304 E 012° 22.855

The obelisk at Mendebrunen is made of granite. In addition to the color other differences are noticeable: Granite is less porous, it contains no lapilli and no clefts. Unlike porphyry tuff, which is formed by above-ground volcanic activity, granites usually form by the crystallization of magma (molten rock) of the lower crust at a depth of more than two kilometers below the Earth's surface. Granite is therefore a so-called deep rock (plutonite).