Excursion of the Frontinus Society to the Roman Canal in the Eifel
April 12 and 13, 2024

This excursion to the famous Roman Eifel aqueduct, hereafter called **Roman Canal**, already planned for 2020 and subsequently cancelled due to the corona pandemic, took place this past April. 41 participants enjoyed this wonderful two-day excursion and will have fond memories of these two days.

Friday April 12, 2024

At 14.00 hours the participants gathered at the council room of the city of Rheinbach situated at the edge of the old town. The Roman Eifel Canal info center together with the Glass Museum, and along with the town council chamber forms one unified area worth visiting.

Roman Canal information center

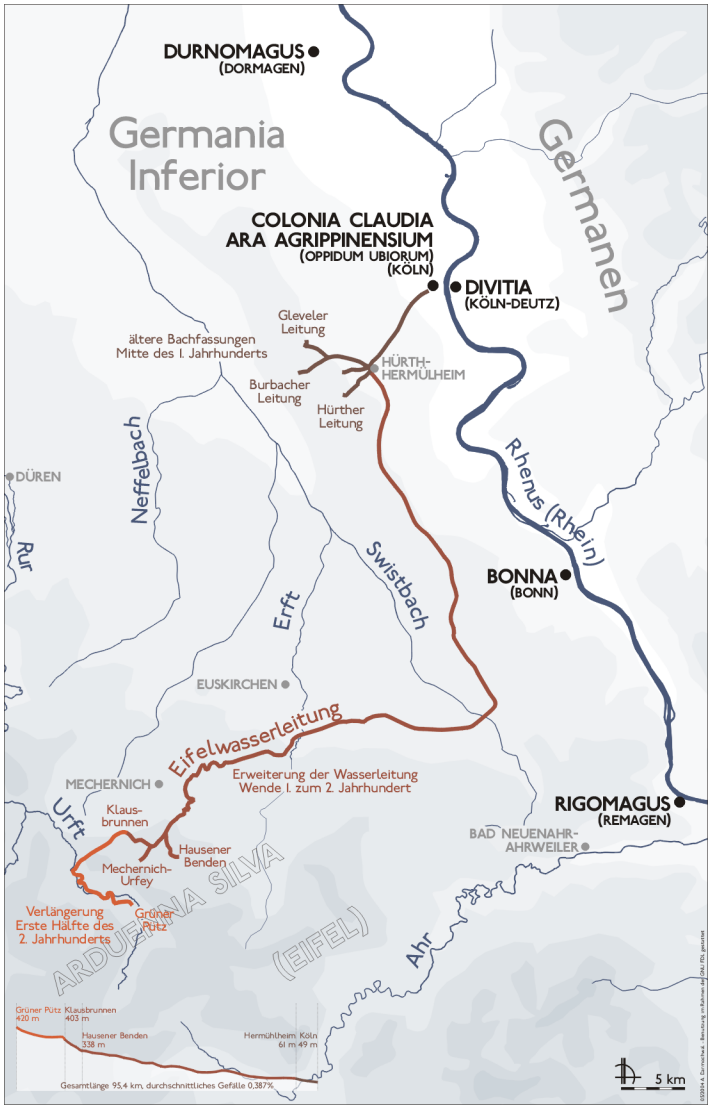
Introduction lecture by Klaus Grewe

Klaus Grewe shows a model of a Roman surveying instrument

The Roman Canal info center was founded by a group of people who joined their forces in 2008 to establish the "Freundeskreis Römerkanal e.V." (Society of the Friends of the Römerkanal e.V.); among them Professor Dr. Klaus Grewe and the present chairman of the "Freundeskreis Römerkanal" Lorenz Euskirchen.

The program began with an introduction by Klaus Grewe, the curator of the exhibition in the Roman Canal info center, followed by a guided tour. No one knows the Roman Canal better than Klaus Grewe as he worked on this Roman Canal for more than 50 years. He impressed the participants both by his profound knowledge, everlasting enthusiasm, and humorous notes. As a trained surveyor and engineer he can assess the high surveying skills of the romans who using the most simple means came to brilliant engineering solutions.

Klaus Grewe showed how the Roman Canal supplied the Roman city of Cologne with fresh water. The development of the Cologne water supply is closely connected with the history of how it became a city. Before 50 AD the roman town of Ubiorum (*oppidum Ubiorum*) was supplied by an aqueduct several kilometers long, bringing in water from the nearby foothills. However, from the moment that the city became a *colonia* in 80/90 AD with the title Colonia Claudia Ara Agrippinensium, and it became the capital of the new provinces of Lower Germany, the water supply to the city was restructured and a 100 kilometer long aqueduct was built from the Eifel that today we call the “Roman Canal”. The famous Sextus Iulius Frontinus was at that time governor of this new capital.



Map of the Roman Canal

Five water sources, either "Sickergalerien" or water extraction plants, that reached down to the groundwater aquifer, fed this long aqueduct. These sources are situated in the northern Eifel around 50 kilometers away from Cologne. The water from these sources is high in quality, taste and quantity. The Roman Canal had a length of 95,4 kilometers and delivered 20,000 cubic metre of water to Cologne every day. Considering that the ancient city had around 20,000 inhabitants around 100 AD, each citizen had available around 1,000 liters a day from this aqueduct. That is about ten times what a citizen in Germany consumes today. A large part of the water also served to flush the feces and sewage out of the city, which was important for good public health during this time. The ingenious planning of the line and the very short time to construct the aqueduct, which was completed in just three years, were impressive. The scheduling of the construction work and in particular the surveying services still demands our greatest respect today.

At the subsequent general meeting, the members of the Frontinus Society and other participants were informed about the society's activities of the last two years, such as the successful symposium at Budapest, the excursion to Würzburg and the online lectures that have all been very well received. The economic situation of the society is also very pleasing, giving the society the opportunity to put their statutory purposes into action.

Evening reception in the council room

The President of the Frontinus Society, Prof. Dr.-Ing. Hans Mehlhorn, reported further about the intensive discussion in the board and in the scientific advisory board about measures the society is taking to prepare the society for the future.

Our partner association, the "Freundeskreis Römerkanal" were so kind to invite us to a reception that evening, which also included a warm welcome from the First Deputy Mayor of the city of Rheinbach, Karl Heinrich Kerstholt. The reception buffet was most tasteful and was enjoyed by all, bringing together old and new friends in a cheerful atmosphere.

Saturday April 13, 2024

In the morning, we took the bus to visit the north Eifel and various technical monuments of the Eifel aqueduct. The participants were impressed and generally said:

- The landscape of the north Eifel is very scenic. Many participants said: "I have to come back one day to explore the area and to hike here."

- The archeological monuments are without exception in very good condition and well protected against influences from the weather and people. That is also a thanks, among other things, to the "Freundeskreis Römerkanal"!

Bus trip trough the Eifel

Station 1: So called Klausbrunnen, fountain room in Mechernich-Kallmuth

We first visited this fountain room, which is a good example of a beautifully reconstructed Roman spring catchment building. The rectangular building is 3.5 m deep in the ground in order to reach and tap the water-bearing layers. Water flowed through the openings in the foundation blocks and through the mortarless stone layers in the lower zone of the building. All this water was collected in a square basin and from here led in the closed waterline to Cologne. Just below the fountain room, another pipe from the so called "Grüner Pütz" in the Valley of the Urft, joined the waterline to Cologne.

Foutain room "Klausbrunnen" Mechernich Kallmuth

Station 2: Mechernich-Vollem/Urfey small aqueduct bridge

Although the bridge discovered at Vollem was one of the smaller structures of its kind, it had the advantage of being completely preserved. It measured 7.3 metres in length and 1.79 metres in width. The only arch had a passage width of 1.12 metres. The water pipe channel laid on the bridge had dimensions of 0.42 m clear width and 0.50-0.52 m clear height.

Aqueduct bridge Mechernich-Vollem/Urfey

It only became apparent when the findings were precisely measured that the two parts of the structure - the bridge and the *specus* - did not really fit together. The water pipe was neither exactly centred nor aligned with the bridge axis across the structure. Rather, it lay at an angle of 0.17 metres to the alignment of the substructure over the entire length of the bridge. This confirmed a suspicion that we had for a long time:

The aqueduct bridges were not built by the same people who built the water channel. A special team must have been working in advance to build the complex bridge structures, before the other team came to build the aqueduct channel.

At this very impressing aqueduct bridge Lorenz Euskirchen surprised us with a small snack that cheered us all up. Thank you very much – dear Lorenz!

Small snack, sponsored by Lorenz Euskirchen

At the stations throughout the "Roman Canal Hiking Trails" are identified with very good display boards and demonstration examples set up, some even for children. So you can, for example, at this station “explore” how the water flows through culverts of different sizes. Dr. Marie Theres Langer didn't miss trying out this hydraulic model.

Small hydraulic model

<u>Station 3: Mechernich-Eiserfey collecting basin</u>

Protective building

Mechernich-Eiserley - collecting basin

Here, too, is an exemplary protective structure that fits in very well with the landscape!

The Eiserfey reservoir was discovered in 1959 during the construction of a pipeline and subsequently investigated archaeologically. It is a circular basin with a clear diameter of 3.05 metres; its floor lies at 320.10 metres above sea level and around 2 metres below the current ground surface, which probably also corresponds to the Roman surface.

The curtain wall is 0.52 m thick and was made of carefully prepared greywacke stones; the floor is made up of brick slabs. The inner wall was covered with red waterproof plaster (*Opus signinum*). The wall crown was originally covered with transverse cut sandstone semicircular blocks, some of which are still found inside the pool.

An impressive example of calcium sinter is also on display here in the Roman Canal water channel. The Romans were aware that water deposits a lot of lime scale. This had the advantage that the water in the lead pipes in Cologne that flowed through the pipes was protected by this sinter layer and did not come into direct contact with the lead. The Romans already knew back then that lead-containing water was bad and detrimental to health.

Calcium sinter in the Roman Canal

<u>Station 4: Kakus Cave (Kakushöhle) and lunch in the Hauserbach Mill (Hauserbachmühle)</u>

Kakus rock

Before we had lunch in the restaurant "Hauserbach Mill" (Hauserbachmühle), we visited the Kakus Cave. The Kakus Cave is located in an 18 m high rock face made of travertine and tuff stone (kart stone), on a plateau about 150 m long and about 400 m above sea level. The kart stone was probably from the precipitation of lime from karst springs. A stream later eroded the limestone rocks which led to the formation of caves.

The cave has attracted people throughout time that used the cave and the plateau in a variety of ways. Finds prove that the Kakus Cave was occupied by Neanderthal people as well as Ice Age people. About 12,000 years ago, in the late Paleolithic, it was used by reindeer hunters. Klaus Grewe reported that he spent a long time of his professional life extensively surveying the cave and making three-dimensional complex measurements using modern surveying equipment.

Kakus Cave

After visiting the Kakus Cave, we had lunch in the Restaurant "Hauserbachmühle" where medieval mill technology and flour production can still be viewed. The hearty Eifel stew and the subsequent coffee and cake strengthened us for the next stations.

Lunch in the "Hauserbachmühle"

Station 5: Mechernich-Vussem aqueduct bridge

The Mechernich-Vussem bridge belongs to the medium size category of aqueduct bridges. During road work for the Vussemer sports field in 1959 the remains of the bridge could be investigated. The Romans shortened the aqueduct route through the valley by means of an aqueduct bypass bridge. After the 1959 investigation, the building could be partially reconstructed. The 80 meter long, ten meter high, aqueduct bridge

was constructed with ten to twelve pillars and carried the water channel 10 meters high over the valley.

Mechernich-Vussem - aqueduct bridge

Mechernich-Breitenbenden - joint line at the wall

Station 6: Mechernich-Breitenbenden Roman Canal outcrop

The outcrop near Mechernich-Breitenbenden shows several technical details that provide a very good insight into Roman technology of the aqueduct construction:

- In the vault are clear prints of the boards used to form the supporting arches.
- On the sides, the Roman mason marked the joints between the ashlar stones with a joint line. These decorative joints at this point are remarkable because nobody apart from the mason ever saw them - until the pipeline was cut during road construction in the 20th century, around 1900 years after it was built.

Station 7: Roman lime distillery Bad Münstereifel-Iversheim

In 1967 the construction of a water pipe led to an important discovery site near Bad Münstereifel-Iversheim. Clear traces of Roman masonry could be seen in the construction trench for the pipeline, and even the first investigations showed that these must have been the remains of lime kilns. The archaeological investigations led by Walter

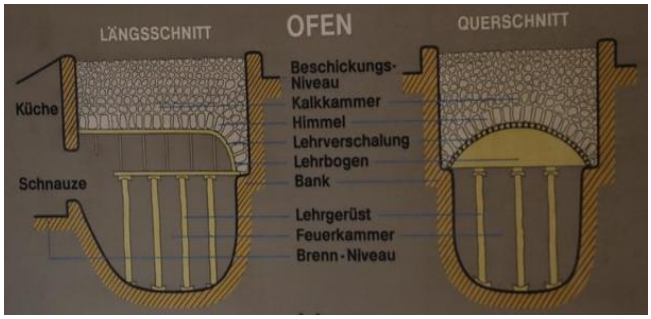
Sölter gradually brought to light a battery of kilns that could be combined to a veritable lime factory

Walter Sölter tried to use the remains of the buildings found to reconstruct those built by the Romans in order reconstruct the firing technology used on site. However, when he presented his results to the experts, some of them shook their heads in disbelief. However, he succeeded in finding partners among the modern lime burners for a burning experiment in a reconstructed lime kiln in Iversheim. The test ran day and night for a full week. The experiment was a spectacular event for the entire area and was followed with great interest by the press and local residents. The result was no less exciting, because it was now clear where and, above all, how the Romans made and used the important building material, quicklime that was produced throughout the Rhineland. Iversheim was a center of lime production in Roman times. The Roman lime factory Iversheim is now included in the UNESCO World Heritage List.

Bad Münstereifel-Iversheim - rpman lime distillery

lime kiln

Bad Münstereifel-Iversheim - ground plan



Bad Münstereifel-Iversheim - cross section

Figures: Horst Geiger and Lorenz Euskirchen

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