

HYPOGEA2015

*International Congress of Speleology in Artificial Cavities
Italy, Rome, March 11/17, 2015*



Unfortunately, the tour to "Sabina Underground", scheduled for the 16th of March has had to be cancelled for reasons beyond our control. In its place a visit to the "Gallicano and Tivoli Roman Bridges" has been organised for that day. We apologise for any inconvenience caused and thank you for your patience.



PROGRAM OF THE GUIDED TOUR "GALLICANO AND TIVOLI" ROMAN ACQUEDUCTS AND BRIDGES ITINERARY MARCH 16, 2015

Duration: from 8.00 to 16.00

Difficulty: *speleological techniques not required; equipment: helmet with LED light and boots.*

Individual participation fee: euro 40; reservation at registration is required

The participation fee includes: transfer by coach and daily insurance

The fee does not include: meals

Every Italian remembers the story of the geese of the Campidoglio. However, even Gallicano nel Lazio has a similar story to tell: a cockcrow woke up the citizens who were sleeping during a night siege, betrayed the invaders and saved the town from the conquest. As a sign of gratitude, the name of the town resembles and remember the one of the cockerel (in Italian "gallo"). According to the other version, less picturesque but probably more reliable, Gallicano was named after a nobleman who lived in one of the numerous patrician villas built after the Roman conquest in 417 b.C., in the area where the town rises up nowadays. The territory of Gallicano is crossed by the remains of as many as four ancient Roman aqueducts which descend from the upper Aniene valley:

ANIO VETUS (272-270 A.C.)

AQUA MARCIA (144-140 A.C.)

AQUA CLAUDIA (38-52 D.C.)

ANIO NOVUS (38-52 D.C.)

The Anio Vetus and Novus drew their waters directly from the river while the Aqua Marcia and Claudia were filled with the purest of spring waters, which flowed down these ancient artificial channels for dozens of miles, all the way to Rome. A large portion of their route was underground, but they also crossed the distinctive narrow valleys and deep ravines found in the area supported by the arches of mighty bridges, many of which are still standing. Five of these bridges are easily reached along a charming walking itinerary which also runs past other local archaeological sites, all couched in a truly remarkable natural landscape.

The itinerary comprises the natural 'cut' in the tufa bed called the Tagliata di S. Maria di Cavamonte and the renowned **Amato bridge** that spans it, built between the 2nd and 1st century BCE and recently restored. A bit further ahead are the ruins of some of the most important Roman aqueducts. Despite the fact that the aqueducts ran underground for the majority of their lengths, there are still traces of the many bridges built to carry the channels over deeply-eroded gorges in the tufa substrate. The finest example of all is **Ponte Lupo**, with a 115 meter span rising to 30 metres height.

A visit to the remains of the Anio Vetus, Aqua Marcia, Anio Novus and Aqua Claudia aqueducts in the Prenestine area is a fascinating itinerary.

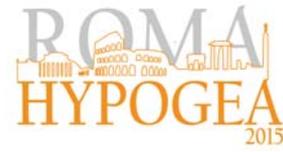
These aqueducts provided almost 70% of the city's water supply and got their water from the upper Anien valley. Having run parallel for a long stretch of the valley as far as the Tiburtine plain, they were then divided by the hills of the Prenestine countryside to re flank again past the Alban Hills and follow the Via Appia and the Via Tuscolana to Rome. Their route which was a long one given the need to maintain a constant incline to allow the water to flow naturally, was for the most part underground, but crossing the valley the aqueducts emerged from underground to become some striking artificial bridges.

At the 30th kilometre of the road to Poli, we come across an old semidestroyed mill, following the traces of an ancient Roman flagstoned road we come to the bridge of the Mill on the Mola gully. This was part of the Anio Vetus, was built between 272 and 269 B.C. by the censors Manius Curius Dentatus and Fulvius Flaccus and consisted of a dual order of 22 arches some 156 metres long and 24.5 metres high. The bridge, in opus mixtum, had a four-meter incline as can be seen from the last three arches.

Continuing along the path we come across the Aqua Marcia which is hidden in thick vegetation. This was used to cross the Mola gully across the St. Peter bridge. It was 90 metres long and 19 high and was built by the praetor Quintus Marcius Rex in 144 B.C.

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with square travertine blocks. The bridge, which has a central arch flanked by other small arches, was later faces with opus mixtum during the reign of Titus and still later strengthened with buttresses under the Severe emperors and Diocletian.



From Web

On the road from S. Vittorino to Gericomio a small path lead to the St. Anthony bridge, which belonged to the Anio Novus and spans the Acqua Raminga gully. This grandiose bridge was 125 metres long and 33 high and was built by Claudius in 52 A.D. with square tufa and calcareous ashlar blocks and has one wider arch flanked by six other arches on the northern side and two smaller arches on the southern side. There are traces of brickwork used to reinforce the bridge in the 4th and the 5th centuries A.D. when some even smaller arches were added.

One of the most important, and impressive, remaining bridges in the area of Rome is the Ponte Lupo, just south of the road to Poli. It is a massive and confused mass of original stone and concrete repair, 115 metres long and 30 metres tall. The evidence show that this bridge carried the Aqua Marcia. This colossal structure, was originally built in 144 BC out of cut-stone quarried from the tufa slopes on the valley's left bank near the bridge. The only remains of the structure are the two tall arches that are clearly visible at the stream. A century later the bridge had deteriorated badly enough to necessitate almost complete replacement. Agrippa, rather than shoring up the original structure, replaced all but the two central stone archways. Agrippa's engineers were the first in Rome to use concrete in the construction of aqueduct arches and they built a bridge that was too airy for this material. Nero's engineers were to repeat the mistake in the next century. Within a few decades Agrippa's work was again shored up by adding encasing walls. Titus found it necessary to repeat this in 79 AD. Hadrian found it necessary to add a few encasing walls and buttresses, but nothing as dramatic as the former repairs. Caracalla's repairs of 212 AD were more substantial, and the bridge required only minor repairs less than a century later. The resulting work is a conglomeration of construction techniques and materials that, while not following Vitruvius' admonition that structures should be beautiful, was certainly strong and useful.

Technical note

There was a limit to the height to which the Romans built the arches over which aqueducts were carried. It is possible for a tall pillar to fold sideways in the middle during a high wind or if subsidence had taken place at the base. If one pillar gave way, it could cause a progressive collapse of the whole series of arches.

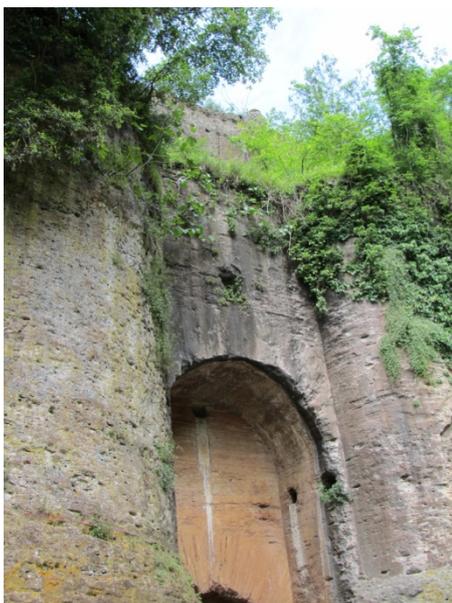
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The Roman solution was to limit the height of the arches to about 21 metres. When they worked near this limit they made the pillars very massive, and the arches between them narrow. If a greater elevation was required, the Romans built the arches in two tiers, the pillars of the upper resting directly on those of the lower. The arches of the lower tier could be made simple and not very heavy, their sole purpose being to brace the pillars from each side. They consisted of the solid wedge-shaped stones which formed the arches themselves and shaped stone forming a level top course above the arch. The structure above the upper tier was exactly like that on a single-tier aqueduct.

When the aqueduct had to cross a deep valley, for some reason the engineers had decided not to use a siphon, and then the same principle (multi tiers) might be used. This technique does not appear to have been used near Rome, probably because it was not necessary to do so.



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We thanks for allowing the visit: Mario Galli, Marina Pennini, Principe Urbano Barberini, Comune di Galliciano nel Lazio, Azienda Agricola di Passerano, Università Agraria di Passerano

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