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SPRING CATCHMENTS, WATER TRAILS, BASINS AND FOUNTAINS IN A PLACE OF WORSHIP: THE SANCTUARY OF APOLLO MORITASGUS AT ALESIA (ROMAN GAUL)

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In French-speaking literature, the category of «water-sanctuaries» has long brought together very diverse sites on the mere basis of the presence of hydraulic structures within the enclosure of the sanctuary and has been heavily criticized lately for its vagueness. However, it can still be useful as a typological category if one restricts its scope by only considering the importance of one or more water catchments in the development and the spatial organization of the sanctuary.

The water system in a sanctuary can indeed evolve over time and reveal, along with new possibilities in the field of hydraulics, a change in the concept of the cult itself and in the ritual staging of divine power. The sanctuary of Apollo Moritasgus at Alesia, a great place of worship of Roman Gaul on which we have worked since 2008, reflects such developments in its hydraulic networks and structures.

I. GEOHYDROLOGICAL AND HISTORICAL CONTEXT

The locality called «La Croix-Saint-Charles» is at the eastern end of the Mont Auxois. A series of gently sloped terraces descend to the Penneville Pass, at the geological interface between the Bathonian limestones (hydraulic) that form the upper plateau, and the Bajocian clay marl with *ostrea acuminata* (impervious) just below. This interface determines an aquifer level, which spills out, at the foot of the small slope —it does not exceed 3 m in height— where the sanctuary of Apollo Moritasgus is lo-

cated, through several neighbouring springs: the «Fontaine du Cloutier» (Pernet, Toutain, 1916), or the one known as the «Fontaine de la Porte» which supplied Alise hospital as early as 1667 (Vidal, Petit 2010; Cazanova *et al.*, 2012). The central terrace of the Croix-Saint-Charles is the only point of the plateau itself where the water springs out, through multiple veins and veinlets —other springs are situated on the flanks of the oppidum but not at its summit— and it is certainly one of the reasons why a sanctuary was established there.

The Roman sanctuary was preceded by a large ditched enclosure and wooden structures dated to the La Tène period, in which, as far as we know, water does not seem to be an object of particular concern. The ditch was filled up in the early 1st century BC and to the best of our knowledge the site was then abandoned: no traces of activity are to be found until the renewal of the site in the first decades of the 1st century AD. The first traces of ritual activities linked to the water springs appear at the end of the reign of Augustus or Tiberius.

II. PHASES OF THE WATER CATCHMENT SYSTEM AND HYDRAULIC NETWORKS

Water catchments at the foot of the slope

The last campaigns made it possible to specify the phasing of the hydraulic structures and installations of the sanctuary, from the first Roman developments to the late changes (Fig. 1). While the temple itself, an octagonal fanum with a centred ground plan, was probably built around the reigns of Nero or Vespasian, it now appears more clearly that several hydraulic networks were already functioning before the construction of this one. These follow —or even condition— the main axes of the sanctuary.

Water was collected alongside the slope, for about 200 m from the «Fontaine de la Porte» up to the presumed location of the «Fontaine du Cloutier». While water was at first channelled near the temple itself —even before its construction— it was then sought further and further away to the north, and finally to the southwest as well in the last decades of the 2nd century AD.

Figure 1. MAIN PHASES OF THE HYDRAULIC NETWORK OF THE SANCTUARY: 1. EARLY DRAINS AND BASINS 2. «FISHBONE» NETWORK 3. FANUM/BATHS (RED) & WOODEN NETWORKS (BLACK)
(T. TERRASSE & O. DE CAZANOVE)



In the central area, at the foot of the hill, there are two types of water catchment systems:

- Basins installed by notching the slope. The water was visible as soon as it came out of the ground.
- Deep trench channels that go deeper into the hill. Water would then remain invisible - sometimes for several dozens of meters - before appearing into the open.

In 2011-2012, we excavated one of these catchment basins (1939 basin, internal dimensions approx. $3,5 \times 2.2\text{m}$): there are two stone walls and the beginning of a third —later cut by a water channel— while the eastern wall has disappeared. Was it completely salvaged, so that only its robber trench remains? It is possible, but the parallel with the so-called «wooden pool» excavated by Espérandieu in 1909-1910 —which also has only three walls— could imply that there were one or several wooden walls: a nearby parallel can be found with the third state of the «Fontaine Saint-Pierre» at Bibracte, dated to the 2nd quarter of the 1st century AD (Barral, Richard, 2009). Anyway, in a pit under the bottom of the basin, a homogeneous series of coins, the Lyon altar issues from the last years of the Principate of Augustus, and associated material —a bell, Samian ware, «honey jars»— allow us to surmise a religious activity at the time of Tiberius, such as coins thrown into the water, and a disuse of this basin around 40 AD. The water must have sprung out, or rather seeped out, depending on the season, of the stone walls which were not grouted. It flowed through a sinuous drain, made of limestone plates arranged in a gable form. We do not know in which direction it was flowing downstream.

Early drains and basins

Several phases of drains are dug directly into the marl soil (Fig. 1), while the later ones are above this level but still use clay so that the bottom of the drain is impervious. The drains coming from the main catchment area drain off the water and channel it down the slope, perhaps to avoid a soggy soil. These drains also belong to the first phase. The later ones

more closely resemble overflows or actual water channels and can be linked with the second phase during which large basins were built.

The first basin, 3300, is dug into the marl soil and harvests runoff water thanks to the filtering nature of the dry stone with which it was built. No other type of water supply could be identified, although there might have been a water channel higher up. This structure belongs to the earliest phase of the Roman sanctuary. Since the oldest structures were completely levelled and truncated by later earthworks, it is hard to know how these wells and basins appeared in the open. In any case, this first well/cistern was then filled —with rubble and bones of sacrificed animals (dated by radiocarbon between 48 BC and 60 AD)— then partially cut when another hydraulic structure, 1890, was built against its northern wall. Shallower and wider, this structure is probably a basin that has been levelled, or a cistern/water tank. Its walls are built using the same dry-stone technique which allows the harvesting of the runoff water in the clay marl that surrounds the basin.

Typologically, this structure has other parallels in the sanctuary: they are all dug up deep into the impervious clay and encased in dry stone walls, and correspond to the initial period of the Gallo-Roman sanctuary, around the first half of the 1st century AD.

The «fishbone» network

Some of the basins are then filled up, and the 1890 basin is also probably broken by a North-West pipe that crosses it diagonally and flows into a straight channel that comes from the catchment area. This «fishbone» system belongs to a subsequent phase of the hydraulic network of the sanctuary (Fig. 1): it is consistent, straight and typologically coherent (stones and slabs of limestone, impervious grey clay at the bottom). Its function is to merge the different water catchment systems of the sanctuary in order to send water in an area further downhill. While we are now certain that this network predates the temple itself, the hydraulic structure it supplies could not be identified: we may assume that it was a large basin near the original pathway to the sanctuary. Geomagnetic prospecting will resume in order to follow this network to a wider extent in its downstream part.

In the same phase, the South-West angle of the 1939 basin is perforated by a water channel. This water channel is laid out at the bottom of a deep trench, covered with slabs resting on rectangular stones. It is straight for about 20 meters, with a West-East orientation. It then likely merges with the 2168 channel, at an angle of approx. 30 degrees. These two water channels share similar characteristics in terms of water catchment systems, straightness of the segments and junction type. Indeed, one or two water channels —also straight— merge into this network in a wedge shape, before turning towards the East at the same angle. It should be noted that this «fishbone» network follows —or even determines— the two major axes of the sanctuary.

The *fanum*/baths network

The sheer magnitude of the hydraulic network predating the temple reveals, in any case, that water is at the centre of the construction project as soon as the first ritual activities begin anew in the Roman era. The construction of the *fanum*, around Nero's or Vespasian's reign, modifies the orientation of the first hydraulic networks (Fig. 1): while the water catchment themselves do not change, a series of junctions between the previous sections and the new network are made, so as to convey the water to the temple or more precisely under it and towards the bath area downstream and further to the north east. To this end, some of the previous catchments are reused and merged into the great water channel of the *fanum*: a junction between these two networks can be seen immediately before the underground arched opening below the peripheral gallery of the *fanum* (Fig. 2).

Flowing under the consecrated temple, it must have been considered an exclusive privilege of the divinity: only its downstream part was appropriate to profane use in the thermal complex built at the same period. *Mutatis mutandis*, the situation is similar to that of the sanctuary of Jebel Oust in Roman Africa (in Tunisia), where the hot spring gushing out from a 6-meter depth under the temple remained inaccessible. Only in its downstream part did it supply a bathhouse (Ben Abed, Scheid, 2003).

Another water channel, also flowing in a West/East direction (Fig. 1), is made of narrow stones laid on edge: due to the absence of dating ma-

Figure 2. DETAIL OF THE ARCHED OPENING BELOW THE FOUNDATIONS OF THE TEMPLE AND ITS GALLERY (J. VIDAL)



terial, we were not able to integrate it in our phasing with certainty, but its orientation towards the bath area indicates that it was built afterwards to supply the baths or the fountain to the south. In any case, the catchment point for this pipe is located further away from the initial catchment area and loosely follows a contour line along the slope. It has a very gentle slope and the remaining segment shows that it started at least from the north-west corner of the sanctuary: there must have been a desire to increase the available water flow, probably for the baths, either because the needs had increased, or on the contrary because the initial catchments had become less durable and their flow had decreased over time. Another spring was thus sought out further to the west of the slope.

The baths at «La Croix Saint-Charles» have a semi-symmetrical axial ground plan, common in the north-western provinces (Cazanove

et al., 2012). The palestra and the bathing complex do not stand out in any way: they are purely functional and not curative. However, we cannot but notice the relatively small size of the complex, which did not require a large volume of water and could not accommodate many bathers. The entrance was to the north, from the Roman road heading towards the centre of Alesia. A flight of steps provided access down to the level of the two porticoes —probably multi-storied— which symmetrically framed the palestra. A bare wall closed it uphill, while the centre of the eastern side was occupied by the cold pool of the frigidarium, framed on both sides by the *apodyteria*, according to a well-documented pattern —especially in Ribemont-sur-Ancre, baths dated to Trajan's reign which bear strong similarities in their ground plan with those of «La Croix Saint-Charles» (Bayard & Cadoux, 1982). The dressing rooms will only be enlarged and equipped with apses in Severan times. The *frigidarium-tepidarium* axis ends with the *caldarium*/service room, so that the *praefurnium* of the *caldarium*, below the hot pool, is at the end of the bath complex. The only element of dissymmetry is introduced by the *laconicum*, a rotunda inside a square whose hypocaust was raised in a later phase.

The baths remained in use for a long time. Stratigraphy clearly shows that they predate the Flavian portico that aligns against them to the south. In addition, radiocarbon datings made on micro carbon residue trapped in the wall plaster give a *terminus post quem* around 70 AD. Finally, an analysis of the mortars reveals the homogeneity of their «recipes» which confirms the probable contemporaneity of the various parts of the complex. As a result, the baths, like the octagonal temple, must be dated from the Nero-Vespasian era. Chronologically and topographically speaking, they do not represent a mere addition, relegated to the periphery of the sanctuary: they clearly belong to it, as an essential and early element. As for the abandonment of the complex, it must be situated in the second half of the 4th century —or, less likely, in the beginning of the 5th century— as established by the recent archaeomagnetic analysis of the *praefurnium* of the *caldarium*, carried out by Philippe Lanos from the University of Rennes. They are still frequented while the sanctuary itself shows no (or little) signs of activity.

The late wooden networks, manholes and settling basins

In addition to this better understanding of the early phasing of the sanctuary, the latest excavations have uncovered a late phase of the hydraulic network (Fig. 1), with wooden pipes from the late Flavian or the Antonine period and a large water channel, also made of wood, precisely dated to the spring of 186 AD through dendrochronology.

This large-scale upgrade of the hydraulic network sheds a new light on the evolution of water management in the sanctuary and reveals interesting changes in techniques: while the previous hydraulic networks were essentially made of stone (rubble, slabs, trench fill) and clay (sealing the bottom of the pipe) and rarely used wood except perhaps for the catchment areas: these late networks, from the construction of the portico —which serves as a monumental entrance to the sanctuary— onwards, are characterized by the consistent, if not constant, use of wood. The last network, dated from the reign of Commodus, has been remarkably preserved: a deep trench - probably between 4 to 5 meters below the ancient ground level - runs through the sanctuary from west to east: it is made up of regular sized wooden beams cut in half (approx. 4/4,4m long, 25 cm wide and 15 cm thick), assembled by means of iron sockets (called «frettes» or «emboîtures» in French-speaking literature) seamed into the wood. These wooden beams are then precisely adjusted with an adze as water flows to correct its course (Fig. 3).

Figure 3. A JUNCTION OF THE WOODEN CHANNEL, WITH AN IRON SOCKET IN THE MIDDLE (A. GOUVERNEUR)



The wooden channel is framed by limestone blocks and large covering slabs which are in turn covered by smaller slabs and limestone rubble filling the trench and protecting the water channel itself. A wooden post used to wedge the long wooden beam was also found near the western well. All in all, this system, more sophisticated than the previous ones, allows for a better control of the slope and thus a better management of the flow itself: in this regard, it is quite similar to a stone aqueduct since its slope is approx. 0,5%. Such a low slope can only be explained by the need to convey water from a catchment point located at a much lower altitude than the previous ones, which obviously requires a technical change.

This network of wooden channels is accompanied by a series of manholes, set at an equal distance from one other. At ground level, they appeared as squared holes about 80 cm wide, opening onto dry stone-walled wells at the bottom of which wooden basins were installed. We found two of these basins, very similar in their dimensions (Fig. 4): their squared casing is assembled from four oak planks, with the shorter ones shoved into slots carved out in the larger ones¹⁴. Three other oak planks form the bottom of the structures: they most likely served as settling basins. Since the water flows at a much slower speed than in the other channels, it fills up with deposits, including clay, all along its course: the settling basins then allow suspended solids in the water to settle, thereby reducing the turbidity of the water. The wooden pipes conveying the water were inserted into notches carved in the upper part of the casing of the basins and jutted out slightly from the side. The drains are located at a slightly lower height than their supply, so that the velocity of the flow would not increase, allowing the water to settle. The manholes built above these basins made it possible to climb down¹⁵ inside the wells and clean them periodically in order to get rid of the accumulated deposits and ensure the proper functioning of the network. Inside these wells, two short galleries provide access to the first meter of the channel on both sides of the wooden basin and give the workers more elbow room. Judging by the amount of clay

¹⁴ The wooden basin found in 2018 also bears traces of pitch caulking in its corners.

¹⁵ Although no such feature could be identified, openings resembling putlog holes can be seen on the walls.

Figure 4. THE MANHOLES OF THE «COMMODIAN» NETWORK AND THE WOODEN SETTLING BASINS (O. DE CAZANOVE)
(ON THE LEFT, 3000 BASIN = $1,08 \times 0,66 \times 0,44$ M / ON THE RIGHT, 3350 BASIN = $1,08 \times 0,81 \times 0,46$ M)



deposits that obstructed the first pipes, we can surmise that the distinctiveness of this late hydraulic network is explained by a will to make it more durable than the previous ones, on the one hand by limiting the areas to maintain and, on the other hand, by integrating in its design a series of manholes providing access to it without having to dig up the trench again.

III. SCENIC DESIGN OF WATER IN THE SANCTUARY

The water travels underground in the sanctuary of Apollo Moritasgus (for example under the octagonal temple) and is exceptionally visible. Only the «wooden pool», excavated by Espérandieu in 1909-1910 at the foot of the hill, was in the open and in use up to the 2nd century AD. Water would

only appear in the open in the downstream part of its journey: in front of the *paraskenia* or wings of the portico, with the basin of the horned god and the hexagonal aedicula, on the eastern side ; in the baths of course; finally in a small square pavilion added to the southwest corner of the baths towards the time of Hadrian, equipped with a monolithic basin in its centre. In this building, Espérandieu found in 1909 fragments of a female statue currently kept at the Musée d'Archéologie Nationale in Saint-Germain-en-Laye: the head, whose cylindrical headdress is adorned at its base with a double ribbon of cereal ears, as well as the left hand holding a snake. Espérandieu thought it was Hygieia or Ceres, but we are in fact dealing with the Gallo-Roman goddess Sirona, who shares the same iconography and is regularly associated with Apollo. Most importantly, she is mentioned in an inscription also found in 1909, 20 meters away near the «wooden pool». Its restitution is certain, with the crossed-D (Ϸ) transcribing the initial sibilant of the name Sirona, often written Thirona.

The aedicula itself appeared as a little nymphaeum, in which one could climb down a flight of steps. A parallel can be seen in the Nymphaeum of the Sablon at Metz (Möller, 1883), or —without stairs— the water catchment of the aqueduct of Cahors at the foot of the oppidum of Murens (Rigal, 2012), or a very beautiful little wooden complex recently excavated rue Fontgiève at Clermont-Ferrand (Martinez, 2014). All in all, in Alesia too water was made to appear as if it had been caught directly on top of a deep sinkhole, when water actually came from pipes. The Hochscheid fanum, in the Treviri territory, houses a very similar device (Habelt, 1975). In its first phase, Hochscheid, at the spring of the Koppelbach, still devoid of a peripheral gallery, is a simple, almost squared building. At its centre, the spring, gushes out in a basin approx. 1,30 m wide. Statues and inscriptions made it possible to identify that the nymphaeum was dedicated to Apollo and Sirona, who is adorned with a tiara and holds a snake. Another example of water conveyed in a basin at the centre of a *cella* to imitate an actual spring catchment can be found in the sanctuary of Hercules at Deneuvre in Lorraine (Moitrieux, 1992) where a domed device artificially increases the water pressure so as to make it gush out, bubbling, inside a stone basin —as if it were a spring— while the water is actually channelled from the north in a pipe.

The monolithic basin (internal dim. 71,5 × 72,5 × 41,5 cm) was slightly above the stone floor, weathered with footsteps, as proved by a circular hole (6 cm in diam.), just 4 cm below the edge, which housed a wooden pipe to supply water. The pressurized water sprung out in the basin, probably overflowing onto the pavement: there are carbonate deposits on the slabs and at the bottom of the walls.

From the «wooden pool» mentioned earlier came a wooden pipe —of which only iron sockets were found— which supplied the secondary channel merging with the main channel just before the small building: Sirona was thus present at both ends of the secondary pipe, unless of course the dedicatory inscription was simply moved. It is important to note that the water gushing in front of the statue of Sirona could only come from the secondary channel and not from the main one. The main one, in fact, ran inside a deep trench under the temple, apparently without being pressurized in pipes, and on a low slope (2-3 %). The secondary channel had a steeper slope (approx. 17 %) and was made of small wooden pipes. Water could therefore gush out because of the pressure.

In Alésia, the scenic design of water in the Sirona nymphaeum —and probably that of the «fountain of the horned god» (*Achelous*)— makes liberal use of special effects. In this complex arrangement, an interplay between technical (hydraulic) constraints and sound and visual effects (the perpetual noise and movement of water) creates an ambiguity, perhaps deliberate, between a spring and a fountain supplied by channelled water.

Contrary to what one might think, a spring in a sanctuary is not a fixed element, given once and for all (apart, naturally, from ground water variations). Water, by definition formless, is likely to be «reconsidered», «reorganized» in order to be adapted to new containers, new water trails, and a new setting of the cult.

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