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THE OLD AQUEDUCTS OF THE VALLEY OF LOGULENTU (SASSARI, SARDEGNA)

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Abstract
The work consists of a detailed study of ancient aqueducts found in the limestone ridges of the valley of *Logulentu*, near, accessed by road from Sassari going to Sorso. As already mentioned, the cavities appear to be gods of the ancient aqueducts probably 800' times. There are about four, three of which are in good of condition of stability while a cavity and the third aqueduct is carved out of a natural cavity, very landslide. All have horizontally with a maximum height of 1.70 m. The first and fourth aqueduct have a length around 30 m while the second and the third does not exceed 6 m. Each well, except the excavated cavity using the natural flow of water present on the bottom, even quite substantial, which went on to form numerous trays calcite. This is evident from the considerable dripping stalactites on the ceiling and the concretion at the end of the cavity and on the sidewalls. In the first aqueduct water level appears to be around 50 cm. Aqueduct No. 1 presents a recess on the left wall, just before the duct to constrict; instead, the fourth has three rooms on the left wall. At the end of the river aqueduct, where does the water and begins a remarkable concretion calcite, there is a drain hole. They are very interesting from the point of view of wildlife as have been observed bats, spiders and amphibians.
Keywords: Ancient aqueduct of Sassari, photographic, topographic and biospeleologic documentation.

Riassunto
Nel territorio della città di Sassari si trovano potenti sequenze calcaree solcate in tempi recenti da uno spiccato reticolo idrografico che ha modellato questo territorio. Le valli vicine alla città sono state spesso adoperate per la loro grande presenza di acque sotterranee che hanno alimentato negli anni sorgenti e mulini disposti lungo le valli. All'interno di una di queste, la valle di Logulentu, in posizione rilevata vi è una villa molto bella risalente a fine settecento o inizi ottocento a cui sono associate una serie di strutture sotterranee che ne alimentavano le pertinenze. Formata da due grandi ed adornati vasconi, insieme ad un ornamentale borceau ed alla villa, la tenuta era interamente alimentata da una serie di gore e canalette aeree, che ricavavano l'acqua da quattro cunicoli scavati nella roccia. Gli acquedotti, probabilmente più antichi dell'insediamento ottocentesco, sono a sezione quadrangolare o con volta a botte, hanno dimensioni comprese tra i 4 ed i 35 metri di "profondità". Tre dei quattro acquedotti sono tuttora attivi e al loro interno sono ancora osservabili le rigogliose sorgenti e le stupende concrezioni che l'acqua scorrendo ha generato. All'interno di questi ipogei è inoltre possibile osservare i segni degli scalpellini e l'affascinante vegetazione che ha sommerso la maggior parte delle strutture.
Parole chiave*: antico acquedotto di Sassari, documentazione fotografica, topografica e biospeleologica.*

Geographical context

The territory of the city of Sassari, in the geomorphological point of view, is a survey of Miocene carbonate; the boundaries of this karst plateau are marked by three deep valleys that have always interested people for their wealth of water and easy to access.
The whole plateau of Sassari, currently set at an average altitude of 200m, included in what is called "*Fossa Sarda*", geological structure that began relaxing in the Oligo - Miocene, which has been filled by carbonate rocks and marl formed during a period of stasis where the basin was completely filled semigraben.
The stratification and the fossil record suggests that in these areas there were different cycles of evolution of the sedimentary basin (Oggiano et al., 2000).
This area is located in the northeastern outskirts of the plateau where the city of Sassari rises, in the left bank of the valley of *Logulentu*.
Within the valley are always interfaced to the many agricultural realities of the citizens of Sassari; this valley has also hosted numerous water mills to grind grain or olives are grown and have always varied food crops.
In the valley flows the *Rio Logulentu*, small stream on a seasonal basis, a tributary of the *Rio Ottava*, a large tributary that flows through the plain of *Predda Niedda* and *San Giovanni*, and then joins the *Rio Mannu*, the largest river of *Nurra* with its 65 km of river canal.
The fluvial valley has a curved shape to the North with often high walls covered by thick vegetation is often difficult to access to the failure to clean the land.
Among these contexts opens the garden and the orchard of a now abandoned house dating back to the end of 700' early 800'.

The mansion

Dating from 1750-1800 was the abode of *Cavalier Casabianca*, a wealthy landowner of Sassari, high-ranking military retired with a passion for remote places and solitary; became established in this beautiful valley then sparsely populated but accessible in a few minutes from the city of Sassari.
The mansion was originally composed of several tens

Fig. 1: view of the villa.
Fig. 1: veduta della villa.

of hectares of orchards and included a large part of the left side of the valley, where the river flowed from the bottom to the top of the rock.
Now completely abandoned it's possible to observe the magnificent block of family, now in danger, facing perpendicular to the valley (Fig. 1).
The house consists of two floors, a basement and an upper one, where you can still see the beautiful frescoes.
To the side of this property there is a beautiful neoclassical *borceau*, particularly beautified source and provided with small waterfalls, fed by aqueducts through a thin canal dug in the rocky ridge adjacent and below the orchard, it's possible to find two large tanks for the supply water, fed instead by other aqueducts carved into the rock.
One of the basins essentially acted as a reservoir for the irrigation of the magnificent orchard below while the large basin below was also used for water games and was embellished with a beautiful cross and a source below with dog's head (Fig. 2) that poured water into a garden.
All this is still today surrounded by a beautiful orchard now completely covered by vegetation that, however, did not entirely hidden charm of these places.

The aqueducts
Now going down a path through the dense trees, get to the back of the mansion *Casablanca*; on the left side of the house, it is possible to look at the beautiful neoclassical *borceau* that was powered by a water supply that had its water from inside the earth.
Following the canal, partly excavated in the rock and partly rebuilt with stones well positioned immediately, bring us to the identification of the first aqueducts, without doubt, the most abundant in the area, which supplied the house and some adjacent structures (Fig. 3).
Although there are several findings which suggest that the area already frequented by the Romans, it was believed should be traced back to '800 water systems. This is in accordance with the technique of excavation detected by numerous signs on the walls

Fig. 2: decorations of the bottom tank.
Fig. 2: decorazioni della vasca inferiore.

though, do not rule out a re-use of conducted oldest. In fact, the area is adjacent to the numerous canal for the supply of the Roman *Turris Libisonis* and the end of the ducts explored mainly quadrangular section. It turns with a barrel vault and in which significantly reduces the working face, the walls completely covered with calcium carbonate they hide the excavation techniques.
The aqueducts are hand-dug in the limestone ridge roughly oriented towards the South, South-West under the direction of natural fractures in the rock that were the primary indication in the direction of excavation.
All of aqueducts have canals for conveying water to the outside which over the years have been colonized by ferns and mosses.
The aqueducts were topographer, documented (Fig. 4), and there are still in place research on the various fronts of the valley.

Aqueduct No. 1
It is the largest of the aqueducts, it has 35 m long and crossed by a row of bricks 50 cm has almost completely clutter of water (Fig. 5). Inside it is necessary before to go bent down and after it's possible to go stand up. It's approximately height 1.80 meters and it's long over 27 meters completely cluttered with water that exceeds

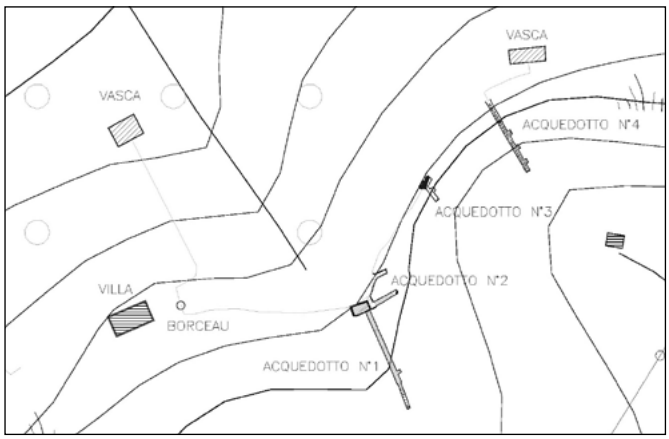

Fig. 3: plan of the works of the mansion.
Fig. 3: pianta delle opere della tenuta.

the knee and then up on a casting calcite and shrink for the last few meters, completely changing style.
At about 22 meters from the entrance there is a small niche carved on the left for the collection of a small source. The terminal part of the duct is concrete and rich in small pans overflow on which a film of water flowing perpetually.

Aqueduct No. 2
The smallest of the aqueducts has got an height from 8 m to 1.60 cm, at the bottom, and it's got a cross-section completely rectangular. Here water made some white calcitic concretions (Fig. 6).
On the right wall and the bottom was excavated a canal to carry water to a surge tank placed in front of the first aqueduct.
A short distance from this underground aqueduct is another small but very characteristic of a few meters and from which comes plenty of water is also conveyed by a canal side carved into the rock.

Aqueduct No. 3
Not far from the first aqueducts, upstream along the rock, hidden by vegetation there is a third aqueduct. Featuring the setting of a large fracture in the rock has had in recent times several internal collapse from the precarious shape and fracturing of the rock.
Entering with caution within the hypogeum then it's possible immediately observe the deep canal along the right side that once carried water outside the hypogeum. A few meters from the entrance, it is necessary to enter bent down in a T-branch that is located on the right (Fig. 7), which there are numerous accesses now completely dry as that of the main entrance.

Aqueduct No. 4
Completely hidden by a thick wall of bramble bush, there is a fourth and final water supply for the entire deep basin upstream of all. Entering bent down it is possible to go to many meters with few centimeters of water (Fig.8). Inside there are three niches with concretions, on the left side, which were excavated to allow for greater convergence of going underground waters; for every 27 meters of development it's possible to proceed with the utmost caution

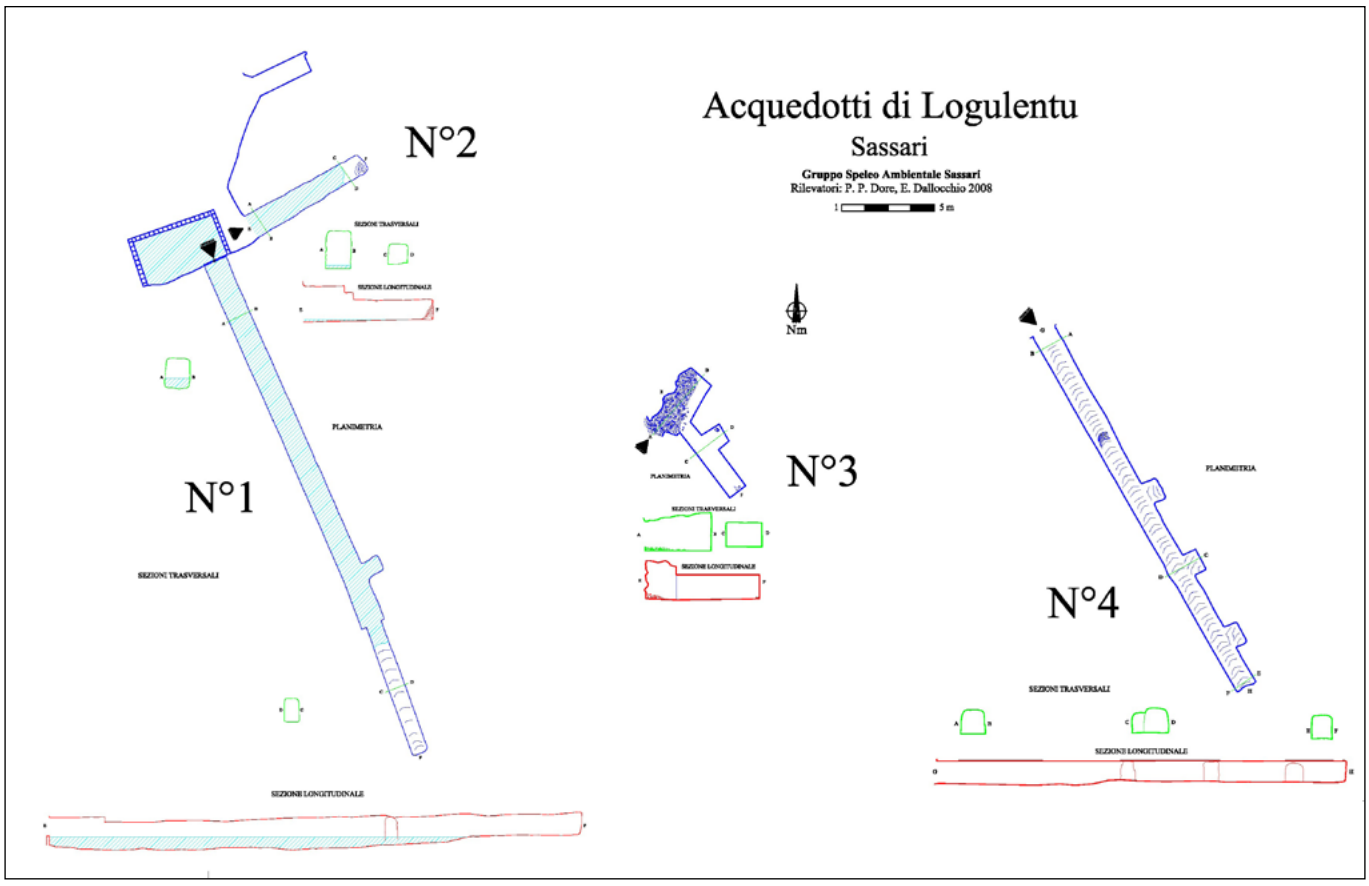

Fig. 4: plans of the aqueducts. *Fig. 4: planimetrie degli acquedotti.*

Fig. 5: view of the aqueduct No. 1.
Fig. 5: veduta dell'acquedotto n. 1.

Fig. 7: view of the aqueduct No. 3.
Fig. 7: veduta dell'acquedotto n. 3.

Fig. 6: view of the aqueduct No. 2.
Fig. 6: veduta dell'acquedotto n. 2.

Fig. 8: view of the aqueduct No. 4.
Fig. 8: veduta dell'acquedotto n. 4.

walking on magnificent overflow tanks that decorate the underground and making it especially bright.

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