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Proceedings of IV International Congress of Speleology in Artificial Cavities
Italy, Genoa, September 29th / October 1st



EDITORS

Stefano Saj, Carla Galeazzi

Michele Betti, Francesco Faccini, Paolo Madonia





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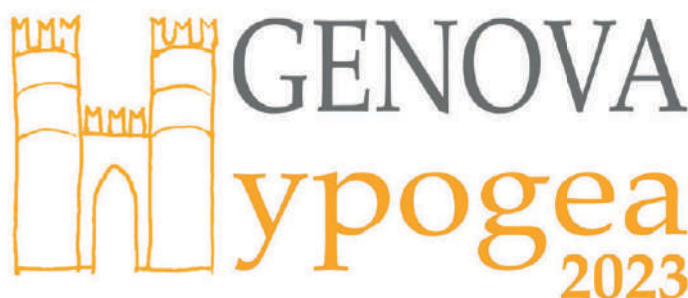


PROCEEDINGS OF IV INTERNATIONAL CONGRESS OF SPELEOLOGY IN ARTIFICIAL CAVITIES

HYPOGEA2023

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GENOA, ITALY

PALAZZO DUCALE, SALA MINOR CONSIGLIO
Piazza Matteotti 9, Genova



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The hypogeum of San Gavino a mare in Porto Torres (Sassari, Sardinia, Italy): preliminary epigraphic, glyptographic and speleological investigations

Giuseppe Piras^{1,*}, Pier Paolo Dore²

Abstract

The study analyses the hypogeum complex of San Gavino a mare in Porto Torres (Sardinia, Italy) and the homonymous small church adjacent to it, a site locally known to have been the burial place of the three Christian martyrs Gavino, Proto and Gianuario, immediately after their decapitation that probably took place in 303 AD under the emperors Diocletian and Maximian. Geological, and speleological features of the hypogeic complex are surveyed. In addition, a preliminary investigation is made of the epigraphic evidence and graffiti found not only in the hypogeum's rock walls, but also in the internal walls of the room behind the presbytery area of the church¹.

Keyword: epigraphy, glyptography, San Gavino a mare, Balai.

Introduction

The toponym Balai is currently used to indicate the long strip of coastline in the north-eastern sector of the municipal territory of the city of Porto Torres (Sassari, Sardinia, Italy), which extends for just over 2 km and includes, as natural and monumental elements that distinguish its landscape, the beach of the same name, some natural sea caves and two small churches, closely linked to the cult of the Christian martyrs Gavino, Proto and Gianuario. It is precisely the site where one of these places of worship stands, the church today dedicated to S. Gavino a mare (also commonly known as 'di Balai vicino' to distinguish it from another one, located 2.2 km to the east and known by the appellation 'di Balai lontano'), that is the subject of the present study and to which the first documentary evidence of the place name of this locality is connected.

Today's name Balai would, in fact, derive from the ancient form *Balagay* or *Baragai*; the first variant of the toponym is mentioned in the *Inventio corporum sanctorum martyrum Gavini, Prothi et Ianuarii*, the drafting of which has been variously assigned by scholars to a period between the first half of the 11th and the 14th century, which constitutes the *lectio IX* of an *Officium* of the three martyrs contained in a volume printed in Venice on 30 May 1497 (Piras, 2019: 57, footnote 79), while the second variant is related to the surname *de*

Baragai mentioned in card 299 (datable between 1154 and 1170) of the *Condaghe di San Pietro di Silki* (Piras, 2019: 74, footnote 86). Specifically, it is a surname that can be classified in the category of *Herkunftsnamen*, i.e., surnames formed directly from toponyms or ethnic names, which suggests that a small settlement with the name *Balagay* or *Baragai* may have existed in Late Antiquity. An important reference for tracing the origin of the toponym *Balagay* is certainly its use in Arab sources of the 10th-13th centuries and its association in Catalan, French and High-Provençal languages with the word used to indicate the broom plant (Piras, 2019: 74-80, footnote 86).

Overview of geology and speleology

The coastal area concerned by the study consists of a limestone cliff that belongs to the territory of Porto Torres, an inhabited centre located on the north-western coast of Sardinia and overlooking the Gulf of Asinara. Geologically, the Turritana plain was formed by the intense fracturing that occurred during the opening of the Sardinian-Corsican basin, when shallow-water sediments filled the great rift known as the '*Fossa Sarda*' (Sardinian Trench). On the north-western slopes of this trench lies the territory of Porto Torres, filled by a sequence of shallow-water marly-carbonate sediments, subsequently affected by nu-

¹ Although conceived as a single unit, this article is divided into five paragraphs: §§ 1 and 3-5 are by Giuseppe Piras, § 2 by Pier Paolo

Dore. The English texts are translated by Dr. Giovanni Ferrandu, to whom the authors extend their sincere thanks.

¹ Centro Studi Basilica di San Gavino di Torres, Porto Torres, Italy

² Gruppo Speleo Ambientale Sassari, Italy

* Reference author: Giuseppe Piras - inonis2910@gmail.com

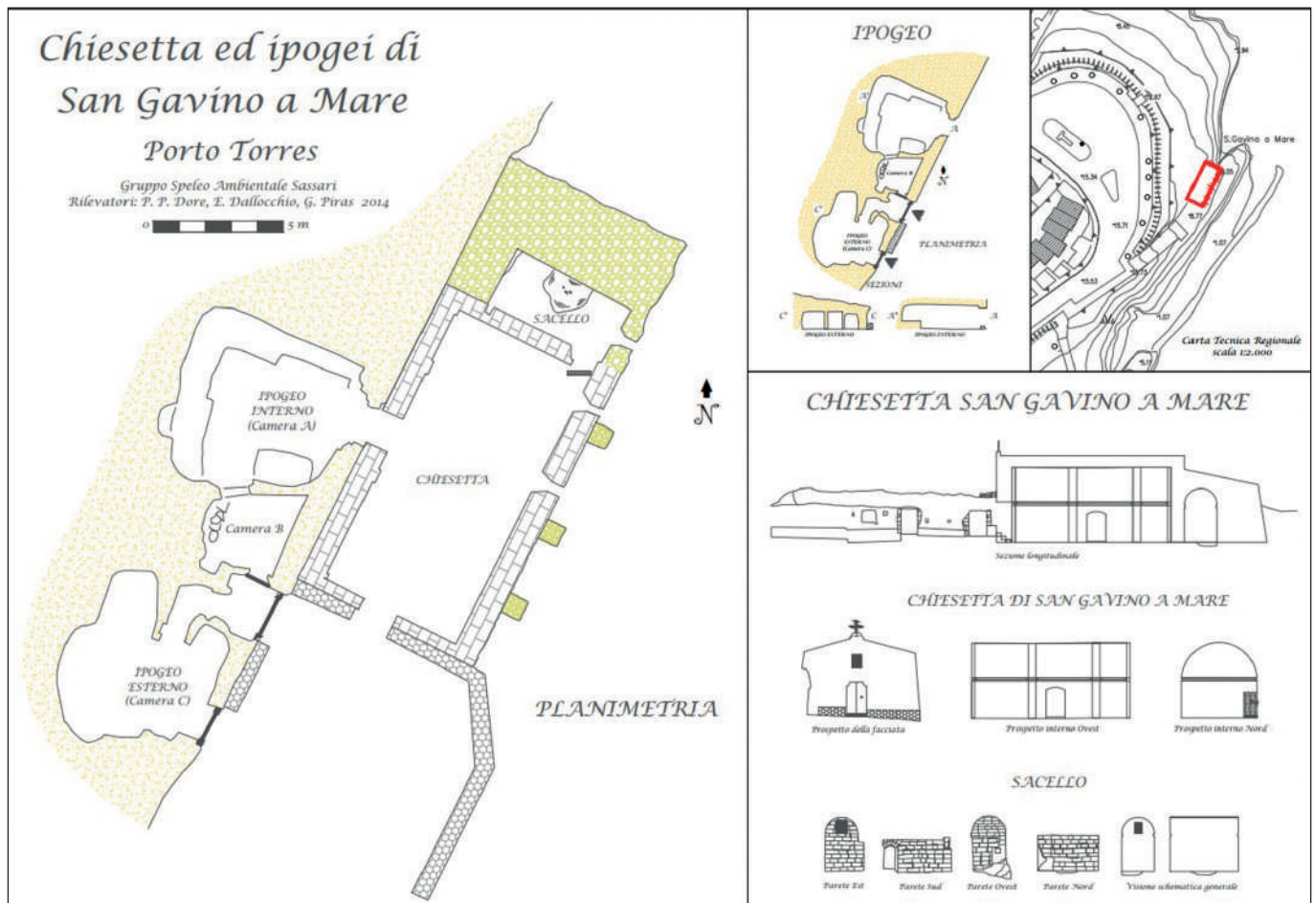


Fig. 1 – Front view of the church with one of the entrances to the hypogeum (photo G. Piras, P.P. Dore).

merous secondary tectonic processes. Two main lithologies have been distinguished in the sector studied, representing different sedimentation environments. In the western part, up to the beach of Scoglio Lungo, outcrops are mainly biocalcarenes composed mainly of algal nodules, very porous, where numerous small karst manifestations are present. To the east, along the promontory, the composition of the sedimentary rock changes, becoming richer in clay and turning into marl, often arenaceous, where karst phenomena are mainly set into fractures (Funedda, 2000). From a geomorphological point of view, the survey area consists of a karst plateau without watercourses, set on the Miocene sedimentary formation, bordered towards the sea by a very jagged cliff coast. The area also features riversides zones, crevasses and karst-erosive forms filled and camouflaged by Pleistocene formations consisting of red sands and Holocene colluvial deposits. The Turritan karst had an ancient genesis, testified by the presence of Plio-Pleistocene deposits found within some cavities. During this period there were important eustatic variations, linked to Pliocene glacial cycles, which generated the different levels in the karst system; these eustatic variations are evident along the coastline, where it is still possible to recognise traces of ancient grooves flying (Martini, 2000). In the caves of the upper level, we often find continental, or beach deposits related to the Tyrrhenian period that testify to an earlier karstification. In the

slab furrows it is also often possible to observe holes of lithodorous organisms that colonised the coasts of Sardinia during the last interglacial. The high escarpments and morphological data have allowed interesting palaeogeographical reconstructions, first of all, the erosive escarpment, corresponding to the old Tyrrhenian grooves flying located at about 5.5 metres from the present sea level, in some cases, this groove is very evident; another less pronounced groove between 8 and 9 metres has also been identified, which could be due to a previous interglacial; interspersed by the erosive plain at around 6/7 metres. On the other hand, the present-day thrust furrow is very pronounced, indicative of a longer eustatic stasis, which has deepened further at submarine karst resurgences, due to the action of seawater/freshwater mixing. The groundwater network was reconstructed not only by direct exploration of the cavities, but also by sampling from the various boreholes carried out by the Turritan municipality (Dore *et al.*; 2020).

The karstification of the Turritan coast had previously been studied and made known by an excellent publication published in 1983 by Mucedda and Cossu of the Gruppo Speleologico Sassarese. The publication described all 17 cavities found from the Scoglio Lungo to the Torre di Abbacurrente (Mucedda 1984, 1996). A further study by the writer then led to the discovery of a further three cavities, bringing the number to a total of 20 caves. The karstic processes that have acted in



Tab. 1 – Cartographic surveys of the survey site (graphics P.P. Dore, E. Dallochio, G. Piras).

the formation of these cavities are manifold; most of the caves were formed in the low-solubility carbonate marls, settling exclusively on fractures. Coastal cavities are therefore to be considered originally meso-carstic and deepened by epigenetic pseudocarst processes, which through the action of seawater and the solid components transported in it, such as sand and pebbles, caused these cavities to be shaped by coastal erosion. A basic aspect of this Turrigan sector is the presence of a deep groove of present-day flow, also very visible in some caves, formed mainly by hyperkarst. In carbonate areas, in fact, submarine resurgences create a layer of freshwater that, due to its density, floats above seawater; the anionic exchanges between these waters make this horizon highly aggressive to calcium carbonate salts, creating the splendid beating furrows visible almost everywhere in the area.

As for the hypogeum of San Gavino a mare, it is evident that its genesis is in an erosive esplanade at about 5 m above sea level (fig. 1), although traces are scarce, the fracturing of the main room indicates a possible genesis from a natural cavity that was then completely excavated by hand. The hypogeum currently consists of three distinct rooms. The first room is the most external to the church and is currently closed by two large metal gates ("Chamber C"); it consists of a room with two small extensions and a small

corridor that currently communicates with a small window in the second room ("Chamber B"), a smaller room in which there is also an old fireplace, probably a remnant from a period when hypogea were used by fishermen. Chamber C is irregularly shaped and has two deep niches; the main room is about 5 metres in length and from it a narrow corridor runs in the North direction leading to a second external entrance, which is also closed, and to a small window with a grille that connects Chamber B. Quadrangular in shape and smaller in size (2.5x3.0m), this room is used today as a hallway by the monks and is connected to the third and final Chamber A. The latter is certainly the most important room as, in fact, it is directly connected to the church, but is also the room where the statues of the saints are brought for adoration for about a month. This chamber measuring 7.6 x 5.5 m has an average height of 2.5 m and features large side seats, a small altar, and a large votive niche, as well as being the one with the most inscriptions (fig. 2).

The church

The church of San Gavino a mare or 'di Balai vicino' lays its foundations on a cliff overlooking the sea, near the beach of Balai (Tab. 1). It was erected in this



Fig. 2 – Photo of the main room where the martyrs are placed (photo G. Piras, P.P. Dore).

place because, according to hagiographic tradition, the three martyrs Gavino, Proto and Gianuario were buried in the hypogea adjacent to it, excavated in the rocky ridge, immediately after their beheading, which probably took place in 303 A.D. during the persecution of Christians by the emperors Diocletian and Maximian, by order of the *praeses provinciae Barbarus*. According to the tale of the *Passio sanctorum martyrum Gavini, Proti et Ianuarii*, a document containing the stories of the three martyrs (an edition can be found in Zichi, 2013⁵), datable to a period between the second half of the 11th and the beginning of the 12th century, Proto, a presbyter of the Christian community of the colony of *Turris Libisonis* (today Porto Torres) and Gianuario, his deacon, preached the word of Christ despite the persecutory edict promulgated by the emperors. For this reason, the governor Barbaro had them imprisoned and tortured, entrusting them to the soldier Gavino, who, fascinated by their faith, converted, freed the two and went to turn himself in to the governor. He was thus beheaded on 25 October and two days later, on 27 October, Proto and Gianuario were also decapitated.

The small church, originally dedicated to *Sanctu Gavinu scapichatu* (or *San Gavino Descabeçado*), i.e. 'Saint Gavino decapitated' (Piras, 2019: 36-37 and 71-72, footnote 84) as this site was most probably

also the *locus martyrii* of the three martyrs (on this proposal cf. Piras, 2019: 57-60, footnote 79), it has a single barrel-vaulted nave supported by doubleaux arches (on the architectural structure see, among others, Spanu, 2000: 123; Piras, 2013: 25). It faces north due to the conformation of the rock on which it was built. It was built using ashlar of local organogenic limestone, except for the outer face of the end wall facing east, made of trachyte slabs, and the outer face of the back wall, made of well-squared ashlar larger than the rest of the masonry. Mistakenly, based on an indication by canon Giovanni Spano (Spano, 1856: 147, note 1), the structure we see today has been assigned in the past to the mid-19th century. (e.g., Masala, 1988: 258, footnote 43), while in reality its oldest depiction so far found is included in a triptych preserved in the church of S. Giovanni in Bonorva (Sassari, Sardinia, Italy), a painting datable between the second half of the 17th and the beginning of the 18th century (Piras, 2019: 36-37 and 70-71, footnote 83). The existence of a room of worship or a martyr's memorial chronologically prior to the present building is confirmed by the aedicule that came to light below the altar during archaeological investigations carried out in the church in 1980 (Mastino and Vismara, 1994: 100; Manconi, 2001: 40).



Fig. 3 – Fragments of red plaster on the west wall of chamber A (photo G. Piras, P.P. Dore).

The hypogaeum

Chamber A

From the west side of the worship hall, it is possible to access the hypogaeum that, according to hagiographic tradition, would have housed the bodies of the three martyrs of *Turris Libisonis* (Piras, 2019: 57-60, note 79). Three rooms of the hypogean complex, originally communicating with each other, have been preserved and have undergone continuous tampering over time, as shown by the comparison between the current situation and the one described in the 19th century by Vittorio Angius and Giovanni Spano (Angius, 1847: 652; Spano, 1856: 123-125, 138-144 and 145-147). Of the three hypogean chambers, inserted in the context of the eastern necropolis of *Turris Libisonis* or perhaps of that pertaining to the small settlement of *Balagay* (or *Baragai*), to be identified as the *locus depositionis* of the remains of the three martyrs is the one directly connected to the small church by a door. The chamber, with an irregular trapezoidal plan, can be interpreted as a funerary hypogaeum of the Roman period (cf., among others, Mastino and Vismara, 1994: 100; Poli, 1997: 201; Spanu, 2000: 125; Manconi, 2001: 40), and presents along two sides of the wall a seat spared in the rock bench, a base of a rectangular structure made of trachyte and limestone blocks (perhaps an ancient

altar) on the south side and a niche on the west side. Inside this apsidiole, which was probably excavated for liturgical purposes, considering the existence of an altar built in front of it until recent times (Spano, 1856: 147), traces of painted plaster have been found: more precisely, two evident fragments of red plaster (fig. 3) on top of a Latin cross carved in relief in the rock and another small ochre-coloured fragment preserved in the apsidal basin. As Spano already pointed out in 1856, what remains of the painted plaster film that must have covered the walls of the chamber can also be seen in other places: on the west wall, above an aedicule, a large section of yellow ochre can be seen with a brown band running underneath, and a circular plaster fragment in black and red can be seen at the bottom of the north wall (Piras, 2019: 61-62, footnote 80). In the centre of the chamber, with a structural function, was a column with an Ionic capital placed in an inverted position (Botteri, 1978: 110), elements removed in the 1980s to make the room more accessible to worshippers and now unfortunately missing. In the rock walls, quadrangular holes can be seen in which wooden beams were inserted in the past to support shelves.

The central role played by the hypogean complex in the popular devotion towards the three martyrs of *Turris Libisonis* and its frequentation over the centuries are confirmed by the graphic testimonies left by the worshippers who went to the *locus depositionis* of Gavino, Proto and Gianuario to pay homage to them, to pray, to implore intercession for requests for support or to thank them for the assistance they had been granted. Past the door connecting with the cult room, on the north wall of the chamber, 36.5 cm from the northeast corner and 100.5 cm above the seat, is scratched a *signum* (h 8 cm) in which one could recognise a *chrismon* with a particular shape (Piras, 2019: 63, footnote 81). Continuing along the wall, towards the west, about 130 cm from the christogram, four signs are visible that can perhaps be interpreted as mason's marks (fig. 4): the first has a 'herringbone' shape (a vertical rod of 11.5 cm with two arrows at the upper and lower extremities), the second (5 cm from the first) is a vertical segment (h 13 cm) with two hooks at the top and intersected at the bottom by a St. Andrew's cross (its shape is similar to a late 15th-century mason's mark found in the basilica of San Gavino in Porto Torres and attributable to the work of the master craftsman *Zazius*; cf. Piras, 2016: 34-36), the third (10 cm from the second) is a cross on Golgotha (h. 7 cm), the latter being represented with a triangle (the sign was already in Piras, 2005: 410; Piras 2019: 62, footnote 81), the fourth is a segment with two opposite arrows at the extremities. At 10 cm from the cross on Golgotha is another sign, possibly related to a devotional context: a lowercase letter *h*, approximately 19 cm long (the measurement is partial because part of it is concealed by a film of plaster that must have covered the walls of the hypogaeum), which we also find on the west wall inside the niche, associated with other letters. Above these five signs, an inscription was painted on the rock with a red pigment in a later period than the

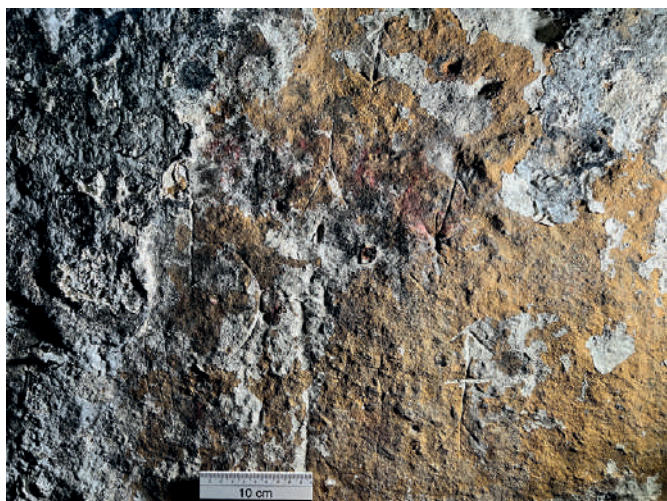


Fig. 4 – Four signs that can perhaps be interpreted as mason's marks and the lowercase h in the north wall (photo G. Piras, P.P. Dore).



Fig. 5 – The palmette with the two 'pilgrim's footprints' on either side (photo G. Piras, P.P. Dore).

graffiti. It is lacunose because it's under the plaster layer too, but four capital letters can still be identified (h 7 cm; total length 23 cm) of which the last three can be transcribed as follows: *DEO*.

In the centre of the north wall, two, possibly three, inscriptions with Greek letters were also found, inscriptions that are now missing at the two lateral ends and the lower margin, as they are also covered by plaster. They currently occupy an area of 18.5 cm in height and 65 cm in length, the characters were engraved into the rock and the grooves appear to still retain traces of rubrication. The largest letter measures 5 cm in height, the smallest 2 cm. The inscriptions are unpublished and still being studied by the writer. Moving towards the north-west corner, 50 cm from the inscriptions, other evidence related to the religious sphere is engraved: a stylised palmette (h 10 cm), a Christian symbol linked to martyrdom, and, on either side, two silhouettes of sandal insoles (fig. 5), better known by the name of 'pilgrim's footprints' (Piras, 2005: 410, footnote 125; Piras, 2019: 62, footnote 81), belonging to a typological variant similar in characteristics to the one found in the artificial caves of *Santorkaria*, near

the village of Laño (Province of Alava, in the Basque Country), hypogeum that took on the function of hermitages in the early and late Middle Ages (about a re-definition of the symbolic meaning and diffusion of the 'pilgrim's footprints', a specific category of graffiti not limited to Sardinia but extended in the medieval and post-medieval age to a large part of the West Europe, see Piras, 2012: 94-95 and 92-93, footnote 190 for the reference to the *Santorkaria* complex). At 25 cm from the palmette, it's a hooked cross (h 5 cm), a religious symbol (fig. 6), as a Latin cross (h 11 cm) scratched on the west wall. The Latin cross has a curious descending oblique tract grafted into the lower half of the lower arm, a detail found with the same characteristics in the monogrammatic cross scratched, not far away, on the wall. In the staurogram (h 7 cm), the tract is grafted at the point where the horizontal arm of the cross joins the semicircular lobe pointing to the right (fig. 7). Further on, 37 cm from the apsidiole and 126 cm from the rock bench below, a vertical rod (h 11 cm) is scratched on the wall, cut at the bottom by an oblique descending line slightly curved at its end. Inside the apsidiole, in addition to the above-mentioned cross on Golgotha (41.5 cm high), *excisa* (i.e. carved in relief) in the rock, there is a cross on the right side and a few characters below, including a lower-case *h*, perhaps forming a *titulus* that, at the current state of research, cannot yet be attributed to a specific alphabet, let alone be chronologically framed. On the left side of the niche two other signs, similar to each other, one of which (length 3 cm) is reminiscent in shape of a trident or, vaguely, of the lower part of the schematic petroglyphs representing inverted anthropomorphs found in some *domus de janas* from the Neolithic period in Sardinia, while the other (length 2.7 cm), compared to the first, lacks the central vertical stroke.

Chamber B

A breach in the south wall of *chamber A* leads to another room, the dimensions of which are 3.5 x 3.4 metres. The room is the result of the construction in ancient times of the wall separating it from the church on the east side, while in modern times a small wall with a small window was erected to separate it from the rest of the hypogeum (extended towards the south and in direct communication with the outside on the east side) to protect the sacred place. Although the inspection of the inner walls of the chamber is not easy, by virtue of the reduced space in which to move, it was possible to identify the presence of a stylised palmette (h 6.5 cm) and a cross on Golgotha (h 11.5 cm), side by side, in the inner right jamb of the opening, at a height of 105 cm from the floor level. Continuing along the north wall, numerous mason's marks engraved deeply into the rock are visible. Among the various shapes can be recognised: a square with two internal diagonals (three census specimens); a triangle with the vertex pointing downwards, cut internally by an ascending oblique line and provided with a cross; two contiguous squares crossed by two diagonals with op-



Fig. 6 – 3D processing of the graffito depicting the hooked cross (photo G. Piras, P.P. Dore).



Fig. 7 – The stauogram on the west wall (photo G. Piras, P.P. Dore).

posite and converging courses; a hooked cross (more regular than the one in *chamber A*); a backwards *F*; an ‘arched’ *signum* (a mason’s mark very common in Europe from the early Middle Ages onwards); a monogram in relief formed by the letters *F* and *M*. Other signs can be found near the north-eastern corner of the wall, which is difficult to reach; among these, the letters *NA* (or *HA*) in an epigraphic Gothic script can be identified. On the south wall, at 107 cm from the ground, another lapidary mark (h 5.1 cm) that proposes a geometric pattern depicting a cross on Golgotha (the mount is a triangle) terminating at the top with a right-angled triangle facing left.

The sacellum

The back wall of the worship hall divides the presbyterial area from a rectangular, barrel-vaulted room made of limestone blocks (which can be accessed through a door), the function of which has not yet been clarified, perhaps a Roman cistern transformed into a sacellum in the early Middle Ages (Mastino and Vismara, 1994: 100; Manconi, 2001: 40), although underneath the thick layer of plaster that covered, until recent times, the ashlar of the masonry, there do not appear to be any traces of hydraulic mortar (Piras, 2019: 80-81, footnote 88). There are numerous epigraphic testimonies on the walls of the room, many of which are signatures left in the 20th century. The room was frequented, perhaps already in ancient times, as show the two Greek letters *rho* and *xi* with a horizontal straight tilde above the latter character, engraved deeply in the ashlar (w. 42 cm; h. 38 cm) inserted in the north-west corner, under the cornice that runs along the wall of the room. The two letters (h of the *rho* 15.2 cm; h of the *xi* 17.7 cm), the first capital (or, more likely, lower case, but with a bow high above the line of text) and the second lower case, both rather coarsely engraved, could be interpreted as the identity mark of a stone mason, expressed either as an abbreviation by truncation (indicated by the tilde) or, if ρ and ξ are considered numerals, as a ‘utility sign’ indicating the number 160.

In addition to the acronym $\rho\xi$ on the west wall, other graffiti were found on the remaining walls of the room, below the plaster film: among those worth mentioning, on the north wall, in an ashlar (30x63 cm; fourth row from the bottom, fifth ashlar from

the north-west corner) the inscription *Pedro Sis[co?]* / 1768 *Ioas*. Other signatures are reproduced on the east wall: in one ashlar (fourth row from the bottom, fifth ashlar from the south-east corner) two, possibly three, can be recognised, including the name *Blas* (Blaise in Catalan) and the year 1435 (or 1735). In the row above (fifth ashlar from the south-east corner) the inscription *Miorch* (or *Miurch*, as the third letter is not easily identifiable: the *M* being capital and the other characters lower case, the *titulus* could

be understood as a surname, a variant akin to the modern surnames Morch, Mörch, Mørch). The ashlar measures 60.5x30 cm while the total length of the inscription is 39 cm; the height of the letter *R* is 5.5 cm, that of the *H* 9 cm (Piras, 2019: 81, footnote 88). Finally, on the south wall, an inscription transcribed as follows: *O.S.D.C.I. / D.B. 1696*, engraved on the second ashlar (30x55 cm) from the edge of the door, inserted in the seventh row from the bottom of the wall face.

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