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## High-resolution thermography applied to archaeological monuments: the example of the *Pomponio Hylas columbarium* (Rome)

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**ABSTRACT.** — The so-called *columbaria* are underground environments of differing size, built in masonry and vaulted, with walls subdivided into *aediculae*, or architectural vertical parts of different type with, generally, a niche where *ollae* and cinerary urns were deposited.

Placed in the area of the Scipionis sepulchre, near the Appia and Latina streets, the Pomponio Hylas *Columbarium*, dated to the first half of the 1<sup>st</sup> century A.D., although with additions of the Flavian period, is partially excavated in rock and built in *opus cementicium* tiled with brick.

The interest of these buildings, particularly widespread for the burial of people of less wealthy groups, lies especially in their stucco or painted decorations.

In the field of Cultural Heritage, high-resolution thermography applied to archaeological monuments is of great interest, because it allows us to acquire data concerning thermal dynamics, structural peculiarities and the physical state of the constituent elements, in order to define proper conservative restoration.

The present work reports results of investigations carried out on the central *aedicula* of the Pomponio Hylas *columbarium*.

**RIASSUNTO.** — I cosiddetti colombari sono ambienti sotterranei di varia grandezza, costruiti in muratura e coperti a volta, con pareti suddivise in edicole o partiti verticali architettonici di vario tipo, con in genere una nicchia dove erano deposte le olle e le urne cinerarie.

Situato nell'area del sepolcro degli Scipioni, in

prossimità della via Latina, il Colombario di Pomponio Hylas, databile alla prima metà del I sec. d.C., anche se con aggiunte del periodo flavio, è parzialmente scavato nella roccia ed è costruito in opera cementizia rivestita di mattoni.

L'interesse di questi edifici, particolarmente diffusi per la sepoltura di persone o gruppi meno facoltosi, sta soprattutto nella decorazione a stucco o dipinta.

Nel settore dei Beni Culturali, l'impiego della termovisione è di grande interesse perché permette di acquisire tutta una serie di dati riguardanti la dinamica termica, le caratteristiche strutturali e difettologiche e lo stato fisico di conservazione dei materiali costitutivi.

Nel presente lavoro vengono riportati i risultati delle indagini effettuate sull'edicola centrale del suddetto colombario, allo scopo di ottenere una completa mappatura termica, verificare le eventuali superfici critiche, gli aspetti strutturali e fornire le informazioni necessarie per definire l'intervento di restauro conservativo.

**KEY WORDS:** *Columbarium, Pomponio Hylas, Rome, High-Resolution Thermography*

### INTRODUCTION

The *Columbarium* is a typical sepulchre, very widespread in Rome, used by those who could not afford the luxury of great funerary monuments, but who wished their ashes to be properly preserved.

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The Pomponio Hylas *Columbarium*, situated between the Appia and the Latina streets near the Aurelian walls, in the area of the Scipionis Sepulchre, was discovered by Pietro Campana in 1831. The monument is dated to the first half of the 1<sup>st</sup> century A.D., as testified by inscriptions with the names of Celadio (a *libertus* of Tiberio) and Paesuzza (a weaver of Ottavia, niece of Claudio and first wife of Nerone), although some additions of the Flavian period were made. The rectangular room is partially excavated in rock (4×3 metres) and built in *opus cementicium* tiled with brick.

A native staircase leads to a niche, in which a mosaic panel of glassy tesserae is surrounded by a cornice with a framework of shells and motifs interlaced, with the names (in the genitive form) of Pomponio Hylas and his wife Pomponia Vitalinis [*Cn (aei) Pomponi Hylae and Pomponiae Cn (aei) l(iberae) Vitalinis*]; below the inscription there are two griffons facing a cithern.

To the right is the sepulchral room leading to a wall, with a very large apse. In the centre is an *aedicula* of brick and plaster, with a niche framed by two pillars surmounted by architrave and tympanum. The apse is decorated with paintings of clusters of grapes around other female figurines, two winged. Other human figures, among vegetal motifs and a little Pegasus, are painted on the overhanging arch. The architrave and tympanum are decorated with paintings representing a Dionysian scene, and perhaps a satyr between two tritons.

On the arch overhanging the niche with the cinerary urns, two deceased persons (the man with a roll in his hand), indicated on the marble lid as Granius Nestor and Vinileia Hedone, are painted.

They were the first owners and occupiers of the sepulchre, and not Pomponio Hylas, who was probably also buried in it later.

The right wall is adorned with an architectural part ending with a triangular tympanum *aedicula*; the left wall has two *aediculae*, longer than the others, framed

by pillars and overhung by an architrave and a triangular tympanum with rectangular loculi. These *aediculae*, placed on the underlying architectural part, probably added during the Flavian period, are decorated with paintings and plaster mouldings on the architrave and tympanum: the right with ornamental motifs, the left with a painted scene (perhaps the Ocno torment) and an Achilles group with the centaur Chiron, present on the tympanum.

The cinerary urn of Pomponio Hylas and his wife, stolen during Medieval age, is currently in Amalfi (Staccioli 1986; Coarelli 1988).

#### APPLIED METHODOLOGY

Thermographic study was carried out according to the cooling method, on the central *aedicula* of the absidal wall, using a Marconi TICM II Long Wave (8-13 microns) thermocamera with thermic resolution of 0.016 °C, and 8 cadmium and mercury telluride sensors cooled under purified air at 250 atmospheres (Guidi *et al.*, 1997).

#### RESULTS AND CONCLUSIONS

A photographic and architectural survey (figs. 1, 2) of this monument was made to compare these images with thermographs, providing a thermal map of all areas showing anomalous thermal behaviour.

As the archaeological site is an underground environment, closed from the outside, it was not possible to operate in optimal conditions. Before thermographic analyses, microclimatic conditions were verified (ambient temperature 11°C, relative humidity approx. 70%).

The state of preservation of the monument is sufficiently good, because phenomena such as capillarity, water infiltration and condensation are absent, and mortars seem to be well attached to the tiles.

Some local cracks were observed on the



Fig. 1 – Central aedicula of Columbarium

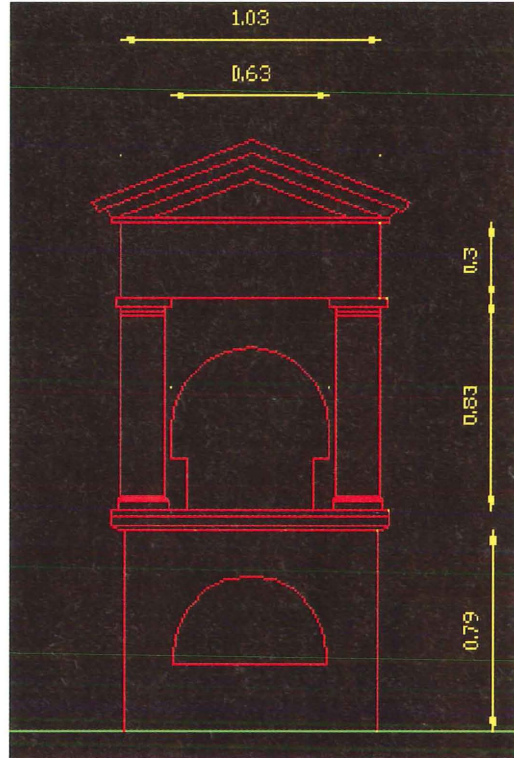


Fig. 2 – AUTOCAD-processed map

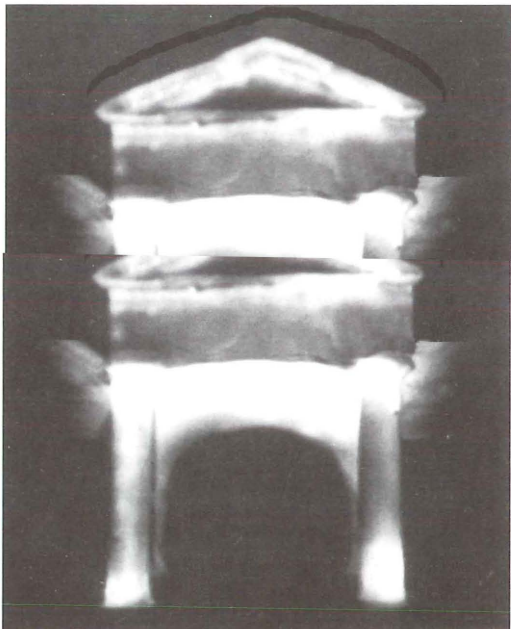


Fig. 3 – Black-and-white thermographic reconstruction

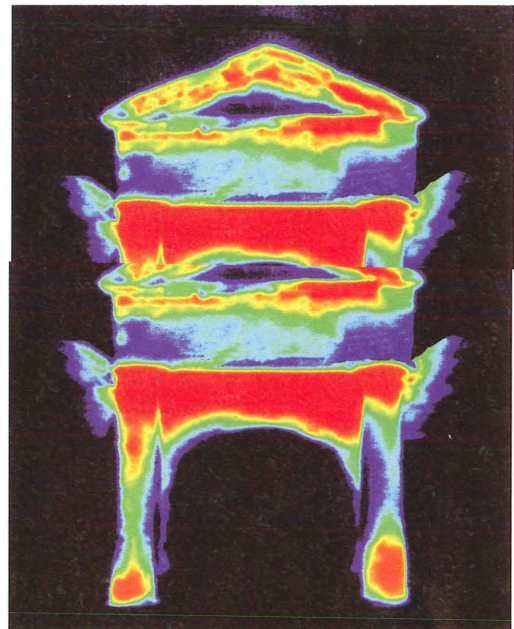


Fig. 4 – False-colour thermographic reconstruction

plastering, mainly on the upper part of the *aedicula*.

The central part of the *aedicula* do not present particular anomalies in the behaviour of the thermal materials, although the areas of attack on the pillar shafts of the capital and the bases (DT 12÷17°C), show problems of cohesion.

These peculiarities are clearly visible in the black-and-white (thermometric scale: DT 9÷20°C) and false-colour reconstructions. In particular, white-red colours correspond to warmer zones, and grey-dark-blue ones to colder ones (figs. 3, 4).

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