Characterisation of White Marble Objects from the Temple of Apollo and the House of Augustus (Palatine Hill, Rome)

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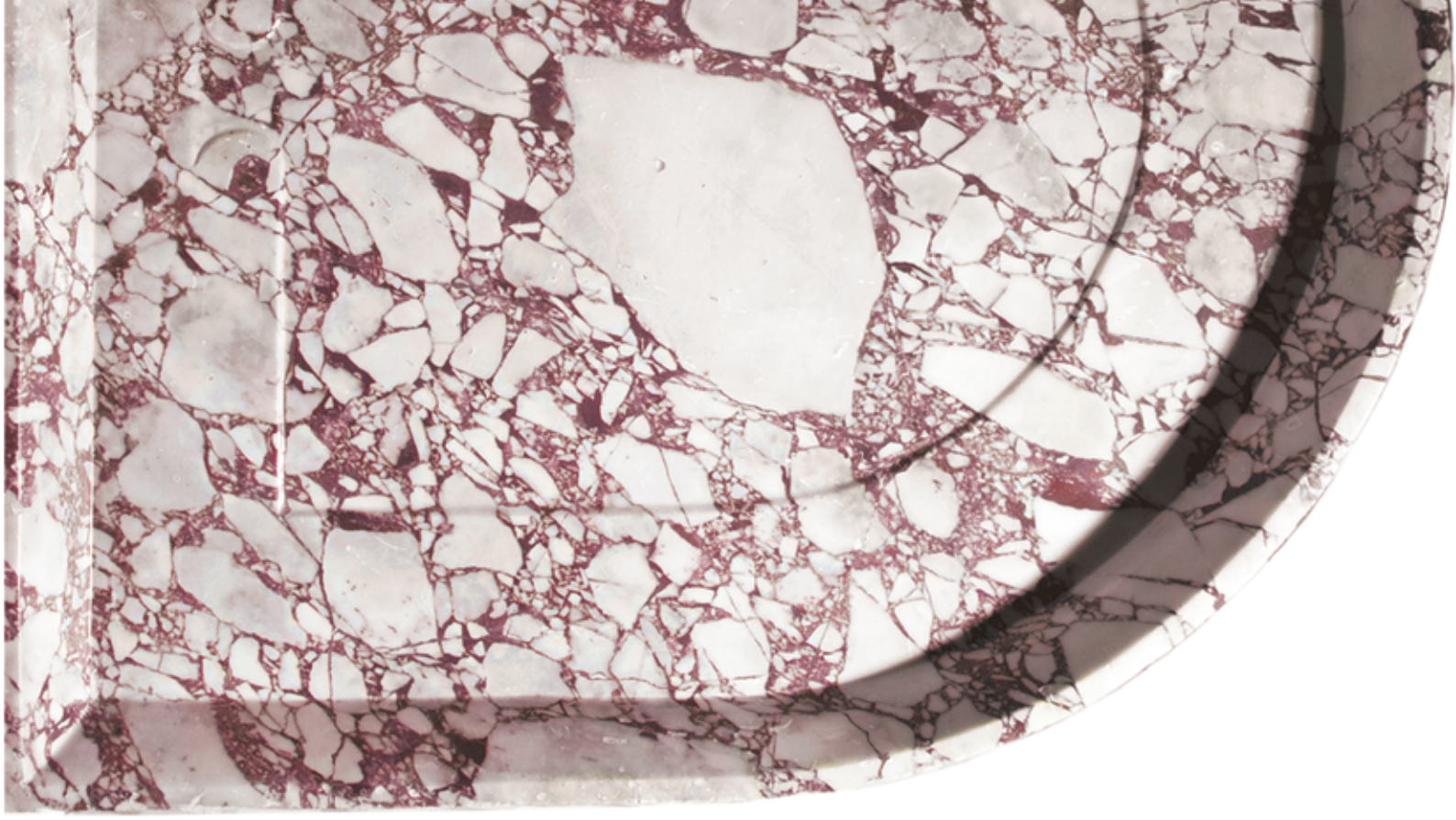

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CONTENT

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CHARACTERISATION OF WHITE MARBLE OBJECTS FROM THE TEMPLE OF APOLLO AND THE HOUSE OF AUGUSTUS (PALATINE HILL, ROME)

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Abstract

The provenance of the marbles of eleven artefacts collected in the temple of Apollo and the house of Augustus at the Palatine Hill archaeological excavations in Rome has been determined using a multi-method approach that includes petrography and isotopes of carbon and oxygen. Two samples are from fragments of statues, one of which is likely the Apollo statuary representation; the other samples are from architectural elements (columns, capitals, plates and cornices). The marbles of the Augustan complex represent the first example of a change in the taste for building materials of monumental architecture at the Palatine Hill in the Augustan age; their introduction started the "marmorisation" process in the area. In this transition, it is especially important to determine if the marble artefacts that were subjects of a religious cult were originals from Greece or copies that were carved during the building of the Augustan complex. In order to discriminate between these two possibilities, it is necessary to identify the geographic location at which the marbles considered were quarried.
In our selection of samples, isotopic and petrographic results indicate that most of the architectural elements are quite unambiguously made of marble of Italic provenance (i.e. Carrara marble), while the fragments of statues, which have a relation to a religious cult, seem to have Greek origin.

Keywords
white marble, provenance, Palatine Hill

Introduction

The complex of Augustus on the Palatine Hill has been the subject of many recent studies that have aimed at reconstructing the changes of the first house of Augustus, also known as the house of Octavian (41–36 BC), and the renovation of the whole area at the time of the construction of the Temple of Apollo (36–28 BC)[1].

Augustus, in his 50 years of uninterrupted government, carried out a policy of *nova magnificentia*, which consisted of the construction of new buildings in marble or the use of marble as a decoration applied to a Roman concrete construction (the "marmorisation" process of the main monuments of Rome). The new buildings' exterior let Augustus say before his death, "I found Rome brick, and left it marble" ("Urbem … sit gloriatus marmoream se relinquere, quam latericiam accepisset"; Svetonio, Libro 2 (Divus Augustus) Paragrafo 28). However, in addition to the use of marbles for the public buildings (*publica magnificentia*), Augustus directed his aspirations to *privata luxuria*, expressed not least by the use of marbles.

During the archaeological excavations between 1957 and 1974 on the complex of Augustus at the Palatine Hill, several items, most of them in white marble, were unearthed. Many objects are architectural elements such as columns, capitals, plates and cornices in different states of preservation. A certain number are fragments of statues, and one of them may be the representation of *Apollo Palatinus*.

The Carrara provenance of the marbles of the Augustan complex was previously determined by several authors[2] on the basis of ancient classical texts; Servius (ad Aen. 8.720: "de solido marmore effecto, quod adlatum fuerat de portu Lunae") informs us that the temple was built in Carrara marble. An archaeometric characterisation of the main monuments of the Augustan period, including a few samples from the house of Augustus and the temple of Apollo, has actually documented the extensive use of Carrara marble[3].

1 HEKSTER, RICH 2006; ZINK 2008; 2012; ZINK, PIENING 2009; PENSABENE, GALLOCCHIO 2011, 2013.

2 LUGLI 1952; BAUER 1969; CARETTONI 1966-1967; GROS 1993.

3 BRUNO *et al.* 2002.

Other historical sources inform us of the origin of the great statue of *Apollo Palatinus,* probably placed inside the *cella* of the temple, which was probably brought to Rome by Octavian after the victory of Actium (31 BC); the sculpture was attributed to Scopas "the Parian" and, therefore, must have been carved in a Greek marble. No archaeometric data of this marble existed previously in the relevant literature.

The present study aims to characterise a selection of white marble artefacts collected in the temple of Apollo and the house of Augustus at the Palatine Hill archaeological excavations. The identification of the marble provenance was carried out using a multi-method approach that includes petrography and carbon and oxygen stable isotope analysis, which is considered an effective way for determining the origin of ancient marbles, as the relevant archaeometric literature has largely demonstrated. The results shed light on the use of marble during the beginning of the "marmorisation" process in Rome.

The complex of Augustus on the Palatine Hill: historical setting

Recently, the Augustus Complex in the Palatine Hill has been the subject of much research aimed at distinguishing the stages of development of the first house of Augustus, the so-called house of Octavian (41–36 BC), and the restructuring of the area as a whole at the time of construction of the temple of Apollo (36–28 BC). The archaeological study of this area during the great excavations of Carettoni (about 1957–1974) revealed four groups of white marble items, whose sampling was designed to show the use of the marble in private/public contexts, such as the house of Octavian, and public ones, such as the Temple of Apollo and the Portico of the Danaids.

The first group of remains found in excavations consists of small architectural elements, belonging to a mixed Corinthian-Doric architectural order, which we have attributed to the facade of the house of Augustus in its first realisation. The facade of the Octavian house was organised around three main doors and two minor doors in the typical patterns of the late-Hellenistic theatre scenes. It was possible to reconstruct an architectural prospect articulated in indentations, in correspondence with the doors, and in ledges, in correspondence with the pilasters and columns to the sides of the doors. It has two floors; the first, with Doric cornices and Ionic elements, and the second, with only Ionic cornices. The walls had to be covered with slabs on which was engraved an isodomic structure. The excavations brought to light small entablature elements that likely belong to this feature. Of these, we have sampled an element of an Ionic frame (CA_4 and CA_5), a ceiling plate with a rhombus-shaped decoration (CA_3), a cladding slab with an engraved isodomic structure (CA_7) and a covering plate with a lintel (CA_9).

The second group consists of hundreds of fragments of statues; this collection includes two fragments of heads (one of which is 44 cm high, and retains the left eye and part of the hair), a foot and many fragments of drapery (one of which belongs to a left shoulder). We know from the literature (Prop. 2.31.15-16) that in the temple of Apollo there were three cult statues clothed in a long chiton: the statue of Apollo (work by Scopas – Plin., Nat. Hist., 36.25, perhaps coming from the sanctuary of Apollo Rhamnus in Attica), the statue of Diana with the torch (by Thimoteos) and their mother Leto (by Kephisodotos). These were gigantic sculptures, around 4.80 m high, which were brought to Rome as spoils of war. There were other statues in the temple; one of Sybilla squatting in front of Latona, another of Apollo behind the altar and probably many more, including sculptures from the fronton (according to Pliny, Nat. Hist., 36.13, Parian marble works of the archaic sculptors Bupalos and Athenis from Chios) and acroterium (including the *quadriga del Sol*), probably made of different materials, marble or gilded bronze. The temple was gigantic – pseudo-peripteral with six columns on the front 14 m high, built on a high podium. The ancient sources inform us that that Luni marble was used for such a temple. This can provide evidence that the extraction of gigantic blocks in the quarries for the construction of temples occurred from the first Augustan period. So we are able to contend that the management of the quarries of Luni was under the control of the state in the early Augustan age. The largest fragment of the head and the fragment of the foot, which may belong to the statue of Apollo, are exhibited in the Museo Palatino[4]. Their marble has been identified in the history of the studies as Parian and Pentelic, respectively. Hundreds more fragments of statues lie piled in a warehouse under the projecting foot of the temple.

Large fragments of the third group (17 at least) come from the filling of the subterranean compartments of the temple of Apollo and from neighbouring areas. They belong to the higher part of the architecture: fragments of bases, capitals, grooved drums, a large cornice with shelves, a lintel and the portal frame; they were attributed to the temple[5]. We sampled an element of an angular column from this group (CA_1).

The fourth group is related to a few large fragments of fluted columns in Giallo Antico and fragments of Ionic capitals that we can attribute to the Portico of the Danaids. Furthermore, a fragment of large cornice, which probably comes from the Aedes Caesarum on the west side of the temple of Apollo, may be considered part of this group. A

4 TOMEI 1997, 47, Nos. 26, 27.

5 CARETTONI in TOMEI 2014, 305-306.

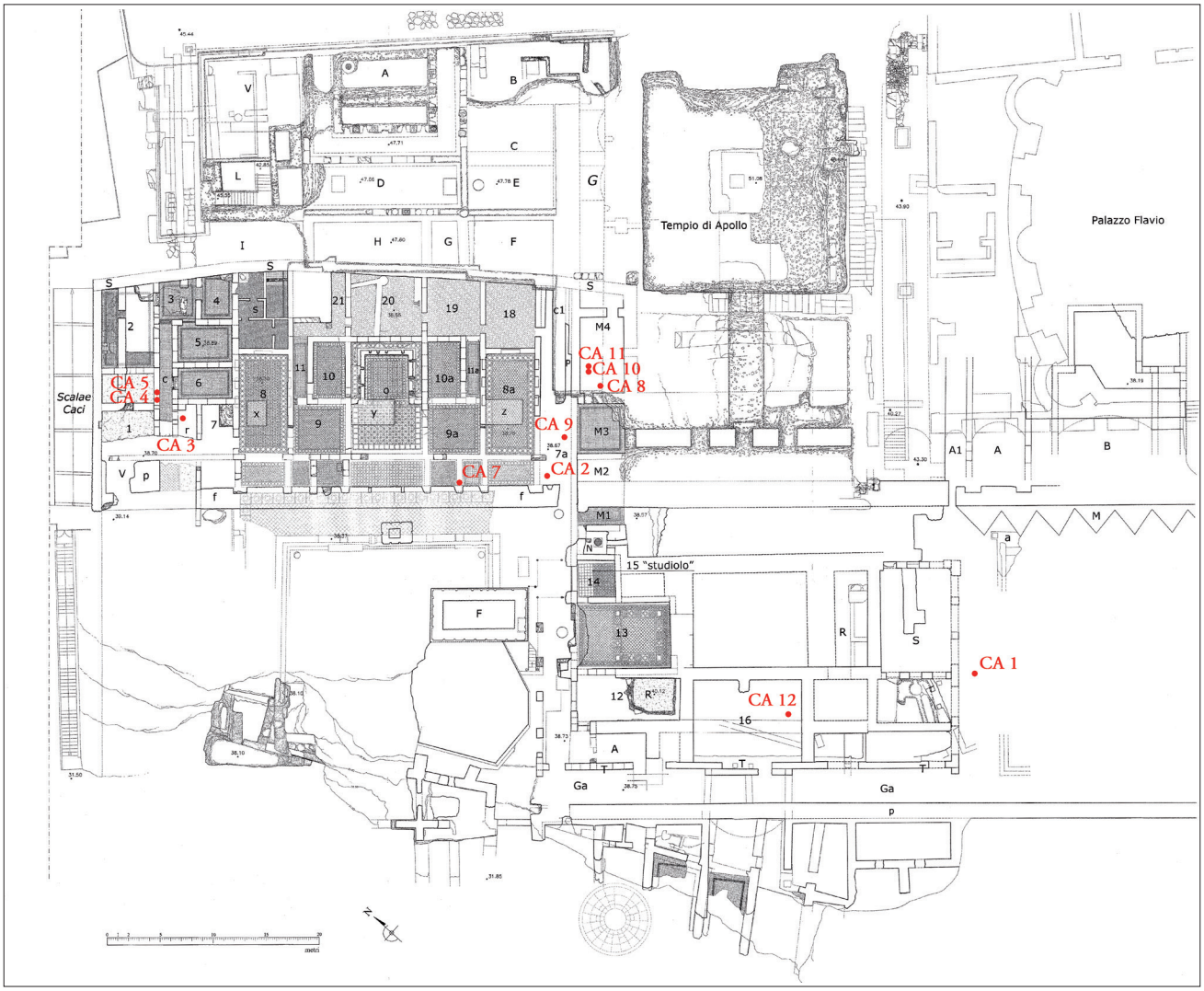

Fig. 1. Detail of the planimetry of the Palatine complex and location of samples (modified from TOMEI 2014)

large colonnaded square adjoined the temple, on whose eastern flank faced the Greek and Latin libraries. In the square, we recognised the porticus Danaidum known by sources and reproduced in the Sorrento Base, from which we know that it was equipped with Ionic colonnades. We attributed to the portico one fragment of fluted shaft in Giallo Antico and two fragments of ancient Ionic capitals, which we found in the warehouses (CA_10, CA_11).

Materials and methods

A total of 11 white marble objects representing the four groups mentioned were sampled (Figs. 1 and 2). A multi-method approach based on petrography and isotopes was applied to characterise these samples. Petrography, carbon and oxygen isotopes are the most frequently used and useful techniques for discriminating the provenance of white marble. A diffractometer Bruker model Advance D8 operating in Bragg-Brentano geometry and equipped with a solid-state detector Sol-X was used to determine the mineralogical composition of the samples. Marble samples were thin sectioned to study the texture and the crystal boundary shape and to determine the maximum grain size under a polarising microscope (Nikon Mod. Eclipse LV 100 POL). Carbon ($\delta^{13}C$) and oxygen ($\delta^{18}O$) isotope ratios of marble were obtained from ~0.2 mg powder samples using the modified phosphoric acid method[6]. A Finnigan Kiel II Carbonate Device interfaced with a Finnigan MAT 252 mass spectrometer was used for the analysis. Isotope analyses on calcite are reported in the usual delta (δ) notation, which represents the relative deviation in part per mil (‰) with respect to an international standard (VPDB for both the carbon and oxygen isotopes). The analytical error is ± 0.1‰.

6 MCCREA 1950.

Fig. 2.
Pictures of the archaeological objects examined in this study: CA_1 Column of the eastern peristyle; CA_2 Fragment of statue; CA_3 Ceiling slab; CA_4 Frieze; CA_5 Frieze; CA_7 Imitation of *opus sectile*; CA_8 Moulding; CA_9 Erratic; CA_10 Capital; CA_11 Capital; CA_12 Fragment of statue (of Apollo)

Results and discussion

Table 1 summarises the experimental results by listing, for each sample, the macroscopic description, mineralogical-petrographical features, and oxygen and carbon isotope data of marble archaeological samples. Petrographic and mineralogical characterisation is displayed according to the commonly used indicators that facilitate provenance discrimination among white marbles. A selection of microphotographs in crossed polarised light is also shown in Fig. 3. All samples are pure calcitic white marbles with the presence, revealed in just a few samples, of traces of quartz as the main accessory mineral. The petrographic observation on the thin sections reveals that the artefacts are fine-grained marbles (MGS generally lower than or around 1 mm) with both a heteroblastic and homeoblastic grain-size distribution. The boundaries between grains are curved to straight or embayed, and four samples show some triple junctions. The marble presents a mosaic fabric, lineated or weakly lineated in the samples from the fragments of statues (CA_2 and CA_12). In these samples, some mica flakes were observed with the naked eye, but they were not observed in the thin sections. The stable isotope data are plotted in the diagram of Fig. 4, including the 90% probability ellipses of the most relevant quarries exploited in antiquity with fine grain size (<2mm)[7]. Carbon isotope compositions of the samples are relatively homogeneous, varying from +1.89 and +2.79‰ VPDB, whereas the oxygen isotopes display a wider range of values, from −4.77 to −1.13‰ VPDB. In particular, in the scatterplot diagram, the samples split into two different groups; one is located on the right part of the diagram, falling into the isotopic field of Carrara marble and consisting of the samples from the architectural elements. The second group consists of the samples from the fragments of statues; they show an oxygen isotope composition that is more negative than the other samples, falling into the isotopic fields of Docimian and Pentelic marbles.

It is evident that the architectural elements and the fragments of the statue have a different provenance; the former show the isotopic values and the petrographic features typical of Carrara marble; the archaeometric analyses, therefore, seem to confirm the previous attribution that

7 ATTANASIO, BRILLI, OGLE 2006.

Sample	Description	color	Q	Cal	Dol	Texture	Fabric	Calcite crystal boundaries	MGS	$\delta^{13}C$ PDB	$\delta^{18}O$ PDB
CA_1	Column of the eastern peristyle	white	±	only		HO	polygonal mosaic	curved±straight	0.8	2.29	–2.15
CA_2	Fragment of statue	white	++ +	only		HE	lineated, mosaic	curved±embayed	0.7	2.68	–4.77
CA_3	Ceiling slab	white		only		HE	polygonal mosaic	curved±straight, triple junctions	0.9	1.96	–2.74
CA_4	Frieze	white		only						2.09	–1.47
CA_5	Frieze	white		only						2.57	–1.26
CA_7	Imitation of *opus sectile*	white		only		HO	polygonal mosaic	curved±straight, frequent triple junctions	0.5	2.15	–1.13
CA_8	Molding	white		only		HO	polygonal mosaic	curved±straight, triple junctions	1.0	2.45	–1.23
CA_9	Erratic	gray		only		HE	polygonal mosaic	polygonal with triple junctions, straight	0.8	2.17	–2.03
CA_10	Capital	white		only		HO	polygonal mosaic	curved±straight	0.8	2.24	–1.66
CA_11	Capital	white	+	only		HO	polygonal mosaic	curved, sutured±embayed	0.8	1.89	–1.88
CA_12	Fragment of statue (of Apollo)	white	+	only		HE	mosaic/w-lineated	curved±straight± embayed	1.0	2.79	–4.70

Table 1. Macroscopic description, mineralogical-petrographical features, and oxygen and carbon isotope data of marble archaeological samples.
Key: Q = quartz, Cal= calcite and Dol = dolomite (detected by XRD), HE = texture heteroblastic, HO = texture homeoblastic, W- = weakly, MGS = maximum grain size (mm)

was based on historical considerations. The latter marbles, the fragments of statues (samples CA_2 and CA_12), are ambiguously identified as Pentelic and Docimian marbles; the overlap between the isotopic signature of such marbles can be partially solved taking into account petrographic data and historical-archaeological context; Docimian marble is fine-grained, as is Pentelic, but its fabric is completely different; the crystal boundaries are often sutured and include strained, often kinked, crystals indicating unstable conditions reached after quite brief metamorphic events[8]. However, the lineated or weakly-lineated fabric and the mica flakes observed in our samples are typical features of Pentelic marble and point to such an origin.

Conclusion

The elements of the entablature in white marble of the facade of the house of Octavian, petrographically and isotopically characterised in the present paper, and the columns in coloured marble placed in the peristyle of the house, offer one of the most ancient archaeological testimonies of marble use in residential construction, which is, so far, only documented for the 1st century BC by the relevant literature.

This study on the provenance of samples of white marble artefacts collected from the complex of Augustus on the Palatine Hill revealed that all of the marbles used for architectural elements (columns, capitals, plates and cornices) have the Carrara quarry district as the provenance of high probability, while the fragments of statues probably have a Greek origin.

The use of Carrara marble was introduced by Cesar's prefect Mamurra around the middle of the first century BC, but only under Augustus did it rapidly become a common building stone, especially for public edifices. This marble was also employed in private monuments; in Rome the oldest known artefacts made of Carrara marble are the Gaio Cestio pyramid (12 BC)[9] and the *Ara Pacis*[10], a monument erected in 9 BC by order of Augustus. The results of the present study seem to show that the use of Carrara marble in residential construction started just in the house of Augustus, so far documented primarily for the end of the 1st century BC. Afterwards, Carrara became one of the main marbles employed by the Roman aristocracy for sculpture and building purposes, following the example of the emperor. The extensive use of Carrara marble in the first house of Augustus

8 GORGONI *et al.* 2002a.

9 STEINBY 1999; GORGONI *et al.* 2002b.

10 AMADORI *et al.* 1988.

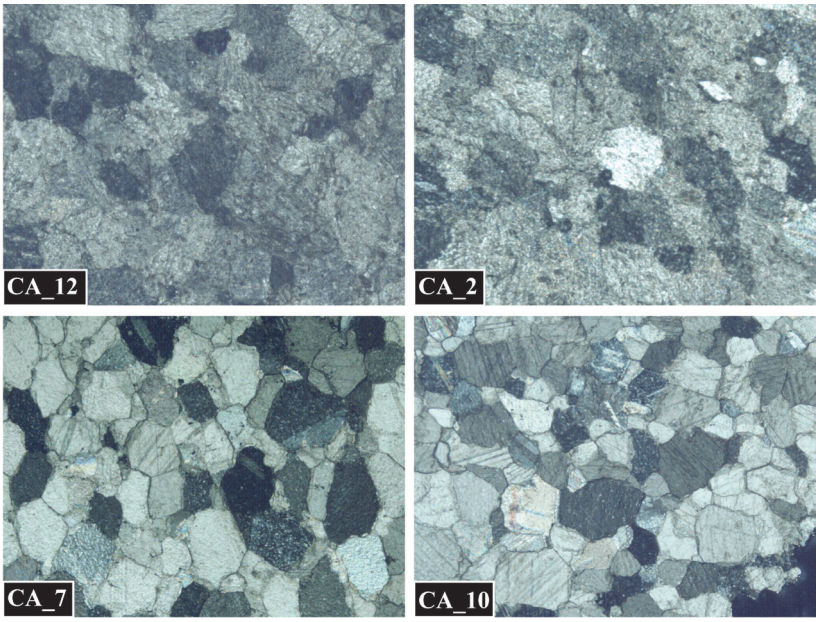

Fig. 3.
Microphotographs in crossed polarized light of thin sections of selected samples

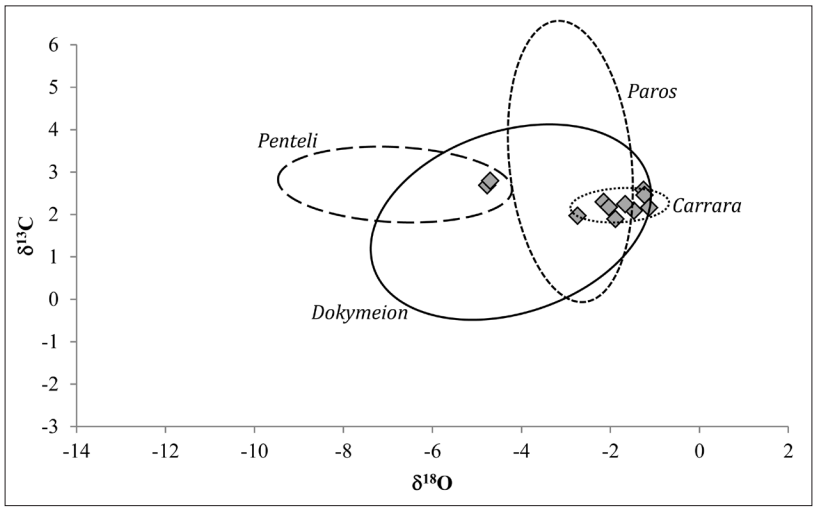

Fig. 4.
Scatterplot of the carbon and oxygen isotopic compositions (vs. VPDB standard) of the samples from the house of Octavian and Temple of Apollo, including the 90% probability ellipses of the most important quarries of the fine-grained marble varieties (ATTANASIO, BRILLI, OGLE 2006)

also confirms the hypothesis of direct imperial management of the quarries[11], which had probably been set up since the beginning of the Augustan period, on the basis of our findings.

The samples collected from the fragments of statues are probably composed of Pentelic marble.

During the Augustan period, both Pentelic and Docimian marbles seem to have been employed in Rome for propaganda purposes. As a consequence, the Greek origin for the fragments of statues may be more consistent with the archaeological information because, as previously mentioned, the statue of Apollo was perhaps considered a work by Scopas coming from the sanctuary of Apollo Rhamnus in Attica and brought to Rome as spoils of war.

11 PENSABENE 1998.

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