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Pentelic Marble in Central Italy: Isotopic Testing of Neo-Attic Furniture<sup>1</sup>

309 One of the most vivid demonstrations of the long-distance operations of the Roman marble trade is the Mahdia Shipwreck, whose cargo is now in the Bardo Museum, Tunis. This boat full of marble architectural elements, furniture, and sculpture went down off the Tunisian coast near Mahdia around 80 BCE. The provenance of the marble has been determined on the basis of cathodoluminescence and stable isotopes of carbon and oxygen.<sup>2</sup> Most of the decorative and architectural marble proved to be Pentelic. The figural sculpture was divided between Paros and Pentelikon. It was concluded that the the marble in the cargo was loaded at Piraeus and intended for Italy.

The decorative marbles are excellent examples of the Neo-Attic tradition in ancient art.<sup>3</sup> The term, which is considered of doubtful utility by some scholars,<sup>4</sup> might be summed up as works of art of the Hellenistic and Roman Imperial periods that take up elements from earlier times in an eclectic spirit and that aim for the clarity of Classical Athenian art. It is thought that the original source for Neo-Attic sculpture was Athens, and several pieces are signed by Athenian sculptors. Components of the Neo-Attic style also come from Asia Minor and Italy.<sup>5</sup> It is believed that in the Augustan period (31 B.C.-14 A.D.) many sculptors moved to central Italy, where the primary market for this sort of marble product lay.

Italian researchers have provided further confirmation of the relationship between Pentelic marble and Neo-Attic decoration through multimethod testing of furniture and sculpture in the Capitoline Museums, Rome.<sup>6</sup> These writers consider the Pentelic objects they identified to be Athenian production made for export to Italy.

## Methodology

Over a period of years, we have sampled and tested neo-Attic furniture to shed light on where such sculpture was produced. Powder samples from several examples in the Museum of Fine Arts, Boston were examined with a

mass spectrometer at Harvard University (Tables 1-2).<sup>7</sup> In addition, powder samples from objects in museums and sites in Rome and Ostia and from private collections were examined with a mass spectrometer at the University of South Florida. The ratios of delta C13 and delta O18 were plotted against the PDB standard (Table 3). The results were compared with the data base of Norman Herz at the University of Georgia, the data base of Carlo Gorgoni of the University of Modena,<sup>8</sup> and the diagrams of Moens, De Paepe, and Walkens. As in most provenance investigations making use of stable isotopes, there were a multitude of possible identifications for the marble of each object. Selection of the most probable source was based on the object's macroscopic characteristics and art historical and archaeological considerations, in addition to its isotopic signature.

Several other neo-Attic pieces from the Museum of Fine Arts, Boston were studied at the University of Ghent. In this program, some of the samples were solid chips, and petrographic tests could supplement the isotopic work (Table 4).<sup>9</sup>

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### Test Results and Interpretation

Pentelic marble craters decorated with Bacchic figures formed part of the Mahdia ship's cargo. Two fragments of Bacchic vases in the Museum of Fine Arts, Boston belong to this tradition, and both have vine leaves so much like those used on the Mahdia craters that they too were probably made by Athenians. On one of the Boston pieces, Mercury brings the child Bacchus to the nymphs.<sup>10</sup> The Boston fragment, which was bought in Rome, is Pentelic marble (Table 2, HI 716, Fig. 3), and, according to Dagmar Grassinger, it dates from the late Republican period (50-25 B.C.). It was probably made in Athens and exported in a finished state.

The other Boston vase fragment, a calyx with a satyr mask, also comes from Italy but seems slightly later (Table 2, HI 717; Fig. 4).<sup>11</sup> The drill channels separating the lobes of the vine leaves recall a crater in the Vatican dated by Grassinger to 10-1 B.C.<sup>12</sup> In this case, the sculptor had moved to Italy, since he uses marble from Carrara.

The Mahdia shipwreck contained a group of splendid marble candelabra,<sup>13</sup> and Boston has the base of a highly similar piece, which was found in Rome and is also made of Pentelic marble (Table 4, no. 5; Fig. 5).<sup>14</sup> It was probably carved in Athens in pre-Augustan times, since its delicate, prickly acanthus is like that of the Mahdia pieces and unlike acanthus produced in Augustan Italy.<sup>15</sup>

Two smaller-scale candelabra bases of the Augustan period represent neo-Attic production on Italian soil and appear to be products of the same workshop. One base, which was recently returned to Italy by the Museum of Fine Arts, Boston, has Mercury, Bacchus, and Diana on the three sides and is made of Carrara marble (Table 4, no. 9; Fig. 6).<sup>16</sup> A similar base in Boston with

a Victory on each side is made of Pentelic marble (Table 4, no. 15; Fig. 7).<sup>17</sup> In this second case a transplanted Athenian made use of an imported piece of his native marble. These bases lack the monumentality of the previous candelabrum and are probably after about 20 B.C.

Although not represented on the Mahdia shipwreck, marble tables are among the most splendid neo-Attic products. An example in the Museum of Fine Arts, Boston was excavated in a villa just outside Pompeii (Table 4, no. 16; Fig. 8).<sup>18</sup> The Pentelic supporting slabs (*trapezophora*) are decorated with monsters, grapevines, and acanthus foliage. Robert Cohon has dated the table to 50-20 B.C. by comparison with the capitals of the inner propylon at Eleusis, near Athens, of ca. 49 B.C.<sup>19</sup> The vegetation on the Boston table is looser and sloppier than that at Eleusis, and this drop in quality might reflect the sculptor's migration from Athens to central Italy. Poor work, on the other hand, could have been produced in Athens, and the *trapezophorus* might equally well have been carved there.

A pair of Pentelic marble *trapezophora* with lion-griffins in the Oratorio of Santa Barbara, S. Gregorio, Rome belong to Robert Cohon's "Imperial Group", which tends to simplify earlier designs (Table 3, USF6655; Fig. 9).<sup>20</sup> While the Imperial Group is found almost entirely in Italy, one detail may reveal a special connection of this piece with Athens; smooth three-pointed buds emerge on stems at the base of the foliage. Buds much like these are used under the volutes of the contemporary Corinthian capitals from the Odeon of Agrippa (built 20-10 B.C.) in the Athenian Agora.<sup>21</sup> The detail suggests that the sculptor came from Attica and may even have carved the piece there.

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Fragments of two other table supports with winged, one-legged monsters were formerly in the Museum of Fine Arts, Boston.<sup>22</sup> These tables also belong to Cohon's Imperial Group and are less closely connected with Athens in material and style. One fragment with a winged goat is medium grained marble, and its isotopic signature indicates that it is Proconnesian or more probably Paros 2 (Table 1, HI 260; Fig. 10).<sup>23</sup> The curls of hair on the goat's forehead are rendered with emphatic drill holes, a technique that is characteristic of Italy from late Julio-Claudian times onward. A table fragment with a rabbit on one side and vines on the other came from Italy and has previously been identified as Pentelic.<sup>24</sup> The origin of its marble, however, is uncertain (Table 1, HI 254; Fig. 11). Its isotopic signature lies beyond the limits of the Pentelic field, and it could have come from the Proconnesus or Paros 2, which produces some marble with fine grain (mgs < 1 mm.).<sup>25</sup> The soft, gray shadows in the fragment favor an attribution to Paros. A lobed leaf suggests that the carver was Greek.<sup>26</sup> The loose style suggests work in Italy.

A Pentelic support for a circular fountain basin in the Montemartini Museum at Rome makes use of an Attic decorative vocabulary (Table 3, USF5468, Fig. 12). The lobed leaves at the top of the shaft can be seen in Neo-Attic candelabra (Fig. 5). The massive acanthus leaves with bending tips appear on Athenian marble thrones.<sup>27</sup> One detail, however, indicates that a sculptor was a native of Asia Minor rather than Athens. The intervals between

the lobes of the acanthus leaves have the shape of a heart, a detail seen in capitals at Hierapolis and in the Bull's-Head Basilica at Ephesus.<sup>28</sup> This case of Asiatic craftsmanship within a Neo-Attic workshop is not unique: an Asiatic sculptor produced a Neo-Attic table of Docimian marble, a fragment of which is in a private collection.<sup>29</sup>

Small capitals for basin supports were made of Carrara marble, even when they clearly stand in the Attic tradition stylistically and typologically. A small "chalice capital" from a basin support in the Ostia Museum has lobed leaves with undulating borders (Table 3, USF5475; Fig. 13).<sup>30</sup> As noted above, this foliage is characteristic of Athenian decoration from late Hellenistic times through the Roman and Early Byzantine periods. The sculptor was clearly Greek even though he used Italian marble.

Two other Carrara marble chalice capitals for basins at Ostia also belong to the Attic tradition (Table 3, USF5476-7).<sup>31</sup> They are decorated with smooth "water leaves", as are many chalice capitals made for architectural purposes in Athens. The Ostian capitals, however, do not resemble the Athenian examples closely and need not have been made by transplanted Greek carvers.

A colonnette-like pillar with ivy decoration in a private collection is a garden ornament, like many Neo-Attic decorative marbles (Table 3, USF5484; Fig. 14). Although it is Pentelic marble, the pillar is carved in an illusionistic style of the early Flavian period in Italy.<sup>32</sup> The use of Pentelic for this typically Italic object may reflect Pentelic marble's prestige in Flavian times.<sup>33</sup>

This series of tests provides new evidence of the importance of Pentelic marble for neo-Attic furniture in late Republican and early Imperial Italy. Stylistic analysis suggests that virtually all pieces of Neo-Attic furniture datable before ca. 20 B.C. are Pentelic and were sculpted in Attica.

From middle Augustan times onward, Neo-Attic furniture was also made of Carrara marble and must have been carved in Italy—initially at least by immigrant sculptors. Some workshops seem to have used both Pentelic and Carrara marble. Finished products in Pentelic marble apparently continued to arrive in Italy. Stylistic analysis indicates that sculptors from Asia Minor worked in Neo-Attic workshops making use of Athenian designs and Pentelic marble.

In Julio-Claudian times in Italy other white marbles make their appearance in Neo-Attic furniture: Paros 2 has been identified in these tests.

Pentelic marble continued to be used for garden ornaments into the Flavian period of the later first century A.D., even when the type and style were entirely Italic.

### Key to marble quarries in Tables and Figures

Aph = Aphrodisias, C = Carrara, Ch = Chemtou, D = Dokimeion, De = Denizli, Do = Doliana, Dj = Djebel Ichkeul, E = Ephesus, He = Heraclea, Hy = Hymettus, Ia = Iasos, M = Mani, N = Naxos, Pa-1 = Paros 1 (Marathi), Pa-2 = Paros 2 (Chorodaki, Lakkoi), Pe = Pentelikon, Pr = Proconnesus, S = Sounion, T-1 = Thasos Fanari, T-2 = Thasos Aliko, T-3 = Thasos Vathy (dolomitic), U = Ushak

Harvard#	Museum and #	Title/description	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$
HI-254	MFA Boston S1236	trapezophorus foot w. rabbit	3.20	3.38
HI-260	MFA Boston 28.893	trapezophorus w. winged goat	1.92	2.02

Table 1a – Marble furniture analyzed by Nikolaas van der Merwe, Robert Tykot, and Richard Newman (N. van der Merwe et al., 1995, Table 1): Isotopic values.

Harvard#	Museum and #	Isotopic matches (pref. underlined)	Reason for pref.
HI-254	MFA Boston S1236	Pa-1?, <u>Pe</u> , Pr, Th-3, My	fine grained
HI-260	MFA Boston 28.893	C, <u>Pa-2</u> , Pr,Th,U, De-1,He,Ia,M,My,S	grayish, coarse grained

Table 1b – Marble furniture analyzed by Nikolaas van der Merwe, Robert Tykot, and Richard Newman (N. van der Merwe et al., 1995, Table 1): Isotopic matches and quarry assignment.

Harvard#	Museum and #	Title/description	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$
HI-716	MFA Boston 01.8213	fragment of crater w. Hermes	2.63	5.09
HI-717	MFA Boston 01.8215	frag. of vase with mask & grapes	2.74	2.86

Table 2a – Marble furniture analyzed by Nikolaas van der Merwe and Robert Tykot (N. van der Merwe et al., 1999): Isotopic values.

Harvard#	Museum and #	Isotopic matches (pref. underlined)	Reason for pref.
HI-716	MFA Boston 01.8213	<u>Pe</u> , Th-3, N, U, E-2?, Ch-1	fine grained, white
HI-717	MFA Boston 01.8215	<u>C</u> , Th3?,N?,Hy,M, Do2, Pr, U, He, De1, My, Aph2	fine grained, probable Italian find-spot

Table 2b – Marble furniture analyzed by Nikolaas van der Merwe and Robert Tykot (N. van der Merwe et al. 1999): Isotopic matches and quarry assignment.

USF#	Museum and #	Title/description	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$
5468	Rome, Capitoline MC3560	basin support w. acanthus leaves	2.6	5.2
5475	Ostia Museum, 17622	chalice capital	2.1	2.1
5476	Ostia Museum, 17578	chalice capital	2.3	1.5
5477	Ostia Museum, 17579	chalice capital	2.0	2.2
5484	Collection A	ivy decorated colonnette	2.3	7.1
6655	Rome, Oratorio S. Barbara	unbroken table support	2.6	5.4

Table 3a – Furniture and architectural decoration in fine-grained white marble analyzed by Robert H. Tykot: Isotopic values

USF#	Museum and #	Isotopic matches (pref. underlined)	Reason for preference
5468	Rome, Capitoline MC3560	<u>Pe</u> , Pr-2, Th-3, Ch-1, E-2, U	fine grained white
5475	Ostia Museum, 17622	<u>Ca</u> , Pa-2, Pr-1, U	fine grained white
5476	Ostia Museum, 17578	<u>Ca</u> , Pa-2, Pr-1, T-1, U	fine grained white
5477	Ostia Museum, 17579	<u>Ca</u> , Pa-2, Pr-1, U	fine grained white
5484	Collection A	N, <u>Pe</u> , Pr-2	fine grained white
6655	Rome, Oratorio S. Barbara	<u>Pe</u> , Pr-2, Th-3, Ch-1, E-2, U	fine grained white

Table 3b – Furniture and architectural decoration in fine-grained white marble analyzed by Robert H. Tykot: Isotopic matches and quarry assignment

Sample #	MFA #	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$
5	96.702	2.669, 2.678 (mean 2.674)	-6.299, -6.386 (mean -6.343)
9	1992.310	1.879, 1.879 (mean 1.879)	-1.678, -1.779 (mean -1.729)
15	59.687	2.536, 2.504 (mean 2.520)	-4.862, -4.872 (mean -4.867)
16	1980.201	2.495, 2.481 (mean 2.488)	-7.815, -7.839 (mean -7.827)

Table 4a – Neo-Attic marble sculptures in Boston analyzed by Luc Moens and Paul De Paepe (J. J. Herrmann et al., 2000, p. 261-2): Isotopic values.

Sample #	MFA #	Maximum grain size	Accessory minerals	Other
5	96.702	1.1 mm.	Dolomite	
9	1992.310	0.6, 0.6		Mg
15	59.687			
16	1980.201			

Table 4b – Neo-Attic marble sculptures in Boston analyzed by Luc Moens and Paul De Paepe (J. J. Herrmann et al., 2000, p. 261-2): Petrographic analysis.

Sample #	MFA #	Title/description	Preferred quarry
5	96.702	candelabrum with nude youths	Pentelikon
9	1992.310	candelabrum with 3 gods	Carrara
15	59.687	candelabrum with Victories	Pentelikon
16	1980.201	Table base from Pompeii	Pentelikon

Table 4c – Neo-Attic marble sculptures in Boston analyzed by Luc Moens and Paul De Paepe (J. J. Herrmann et al., 2000, p. 261-2): Description and quarry attributions.

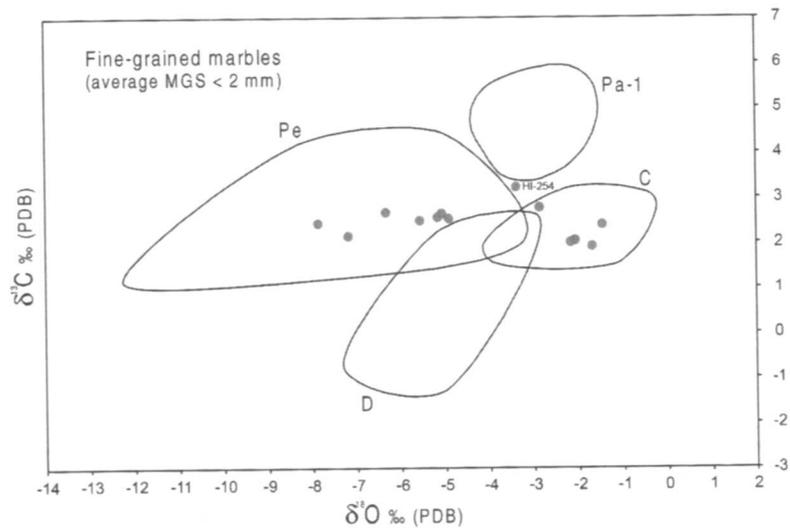


Fig. 1 – Isotopic results for fine-grained marbles. Diagram: C. Gorgoni et al., 2002, fig. 5b.

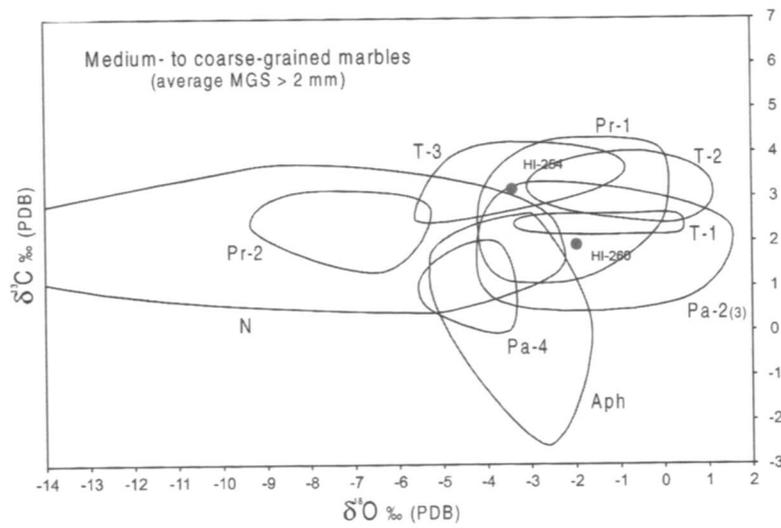


Fig. 2 – Isotopic results for fine- to medium-grained marbles. Diagram: C. Gorgoni et al., 2002, fig. 5b.



Fig. 3 – Crater fragment with Hermes and the baby Bacchus, 100-50 B.C. Museum of Fine Arts, Boston, 01.8213. Pentelic marble.

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Fig. 4 – Calyx fragment with a Bacchic mask, 10-1 B.C.? Museum of Fine Arts, Boston, 01.8215. Carrara marble.



Fig. 5 – Candelabrum base, 50-30 B.C. Museum of Fine Arts, Boston 96.702. Pentelic marble.

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Fig. 6 – Candelabrum base, 20 B.C.-14 A.D. Formerly Museum of Fine Arts, Boston 1992.310. Carrara marble.

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Fig. 7 – Candelabrum base, 20 B.C.-14 A.D. Museum of Fine Arts, Boston 59.687. Pentelic marble.

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Fig. 8 – Table support with griffin grotesques from Pompeii, 50-30 B.C. Museum of Fine Arts, Boston, 1980.201. Pentelic marble.



Fig. 9 – Table support with lion-griffin grotesques, Oratorio of S. Barbara, S. Gregorio al Celio, Rome, 20-1 B.C. Pentelic marble.

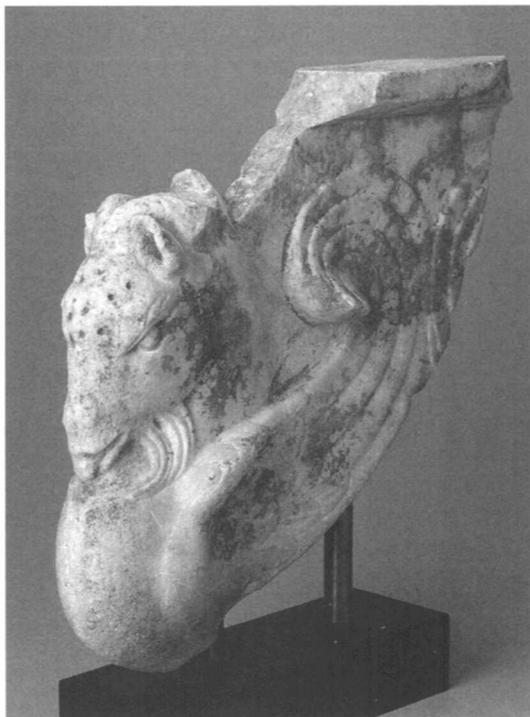


Fig. 10 – Table support with goat grotesques, 40-90 A.D. Formerly Museum of Fine Arts, Boston, 28.893. Paros 2 marble.



Fig. 11 – Table support with vines, first century A.D. Formerly Museum of Fine Arts, Boston, S1236. Possibly Paros 2 or Proconnesian marble.



Fig. 12 – Basin support, 40-1 B.C. Museo Capitolino, Centrale Montemartini, Rome. Pentelic marble.

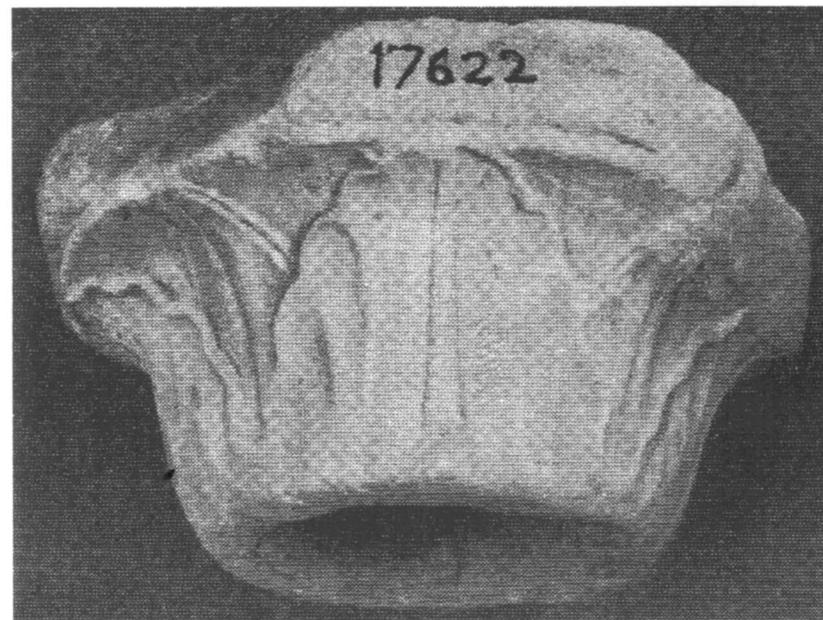


Fig. 13 – Basin support, 20 B.C.-80 A.D. Ostia, Museum, 17622. Carrara marble.

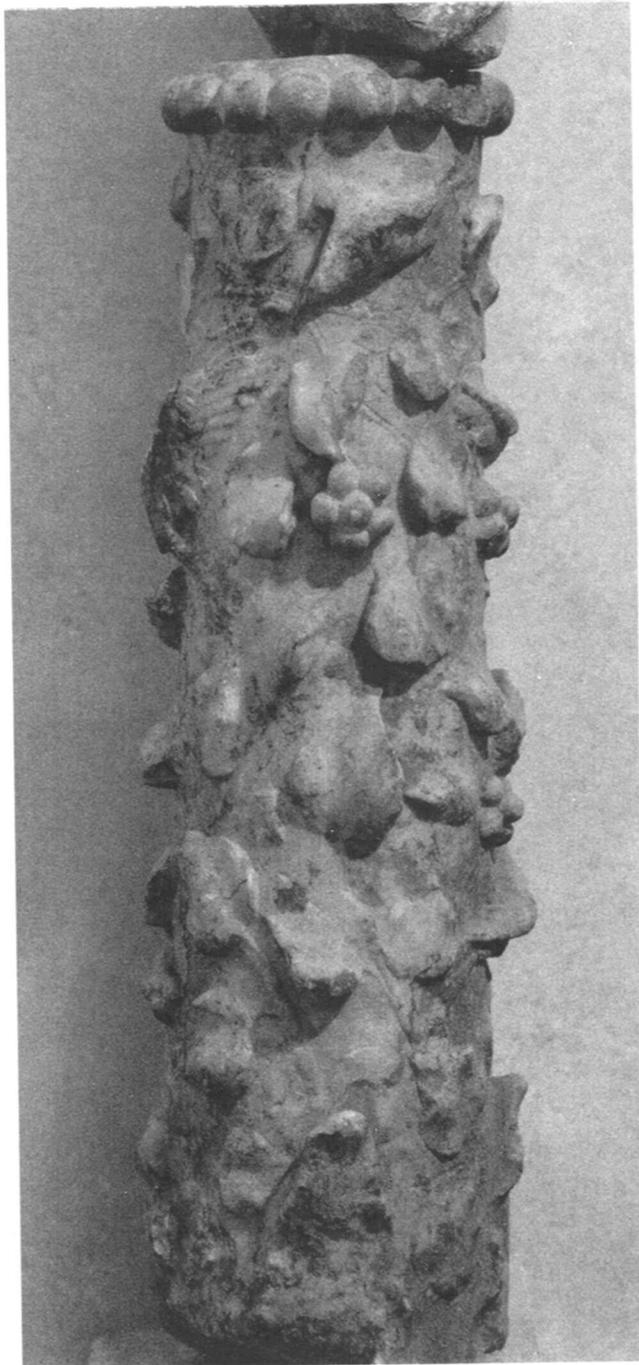


Fig. 14 – pillar decorated with ivy, 60-80 A.D., private collection, Pentelic marble.

## Abstract

Fourteen pieces of Roman furniture connected with the theme of Neo-Attic style are analyzed. The sculptures come from museums in Boston and central Italy and from private collections. Pentelic, Parian and Carrara marble are identified on the basis of ratios of stable isotopes of carbon and oxygen, supplemented in some cases by petrographic analysis and in others by optical identification of grain size. Stylistic analysis is used to explore the questions of exportation from Athens to Italy, production in Italy by immigrant sculptors, and the use of various marbles by workshops in Italy.

## Résumé

Quatorze éléments de mobilier romain de style néo-attique sont analysés. Ces sculptures proviennent de musées de Boston, d'Italie centrale et de collections privées. Du marbre pentélique, parien et de Carrare ont été identifiés sur la base des ratios d'isotopes stables de carbone et d'oxygène, complétés dans quelques cas par des analyses pétrographiques et dans d'autres par l'identification visuelle de la taille des grains. L'analyse stylistique est utilisée pour répondre aux questions de l'exportation d'Athènes en Italie, de la production en Italie par des sculpteurs grecs et celle de l'utilisation de plusieurs types de marbre dans les ateliers italiens.

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Keywords – marble, crater, table, candelabrum, basin, Pentelic, Parian, Carrara, Neo-Attic, Italy

Mots clés – marbre, cratère, table, candélabre, bassin, pentélique, Parien, Carrare, néo-attique, Italie

## notes

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5. T. Kraus, 1953, p. 52.
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7. N. van der Merwe et al., 1995; N. van der Merwe et al., 1999.
8. C. Gorgoni et al., 2002.
9. J. Herrmann et al., 2000.
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11. M. Comstock, C. Vermeule, 1976, cat. 313; D. Grassinger, 1991, p. 220.
12. D. Grassinger, 1991, cat. 50.
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14. M. Comstock, C. Vermeule, 1976, cat. 299; H.-U. Cain, 1985; M. Comstock, C. Vermeule, 1988, p. 113; H.-U. Cain, O. Dräger, 1994a, p. 252-3, fig. 23.
15. Compare W.-D. Heilmeyer, 1970, p. 61-63, pl. 12.
16. M. Comstock, C. Vermeule, 1988, cat. 312. Donated to Italy in 2006; see MFA press release of 28 September 2006: <http://www.mfa.org/about/sub.asp?key=82&subkey=3444>
17. M. Comstock, C. Vermeule, 1976, cat. 300; H.-U. Cain, 1985; M. Comstock, C. Vermeule, 1988, p. 113.
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## The Pilasters of the Severan Basilica at Leptis Magna and the School of Aphrodisias: New Archaeometric and Archaeological Data<sup>1</sup>

### Introduction and Historical Notes

Since 2001, the Università di Roma 3' Archaeological Mission at Leptis Magna (Tripolitania, Libya), directed by Luisa Musso, has been conducting a detailed survey on the use of architectural white and polychrome marbles in all public buildings of the ancient city. The research project intends to systematically analyze the process of 'marmorization' which occurred between the II and III centuries A.D. in a city that could not avail itself of local marble supplies, and was therefore compelled to import great quantities of it in order to complete the vast urban projects which totally transformed and enhanced the city throughout the middle and late Imperial periods, from Hadrian to Constantine. Until the reign of Trajan, the main construction material used in Leptis was a variety of local, travertine-like limestone quarried in the hills behind the city at a site known as Ra's el Hammam.<sup>2</sup>

Ongoing archaeological, architectural and stylistic studies are being integrated by archaeometric (i.e. mineropetrographic and geochemical) analyses in order to identify the provenance of the imported white and coloured marbles, extensively used in different monumental complexes of the Imperial city, and to obtain useful indications on the manner in which decorative motifs, craftsmen and workshops travelled to Tripolitania.

At the beginning of the 3<sup>rd</sup> century, Septimius Severus' grandiose plan of urban renewal radically transformed the original layout of the city with the construction of the Forum-Temple-Basilica complex along the axis of the new Colonnaded Street (Fig. 1), which connected the great Nymphaeum to the expanded harbour.

This project certainly represents the most significant example of the 'marmorization' process at Leptis.<sup>3</sup> By this means, Septimius Severus wished to enhance the new Imperial dynasty in his home town and at the same time express his appreciation to the local notables of the city, who were his power base in Tripolitania. In the past, the local aristocracy had been responsible for beautifying the city by financing great construction projects; under Septimius Severus these become an imperial prerogative.<sup>4</sup>