

ALABASTRO A PECORELLA, AÏN TEKBALET, and BOU HANIFIA, ALGERIA:
A PRELIMINARY REPORT
J. J. Herrmann Jr., A. van den Hoek and R. H. Tykot

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J. J. Herrmann Jr., A. van den Hoek and R. H. Tykot

Abstract

Alabastro a pecorella, a vividly colored and strongly patterned travertine widely diffused in Roman Imperial times, is generally believed to come from quarries at Aïn Tekbalet in Algeria. A trip to these quarries, however, made it clear that this cannot be their place of origin. A visit to the quarries of Bou Hanifia, also in western Algeria, on the other hand, made it evident that this was, in fact, the source. Analysis of stable isotopes of carbon and oxygen of the samples collected at Bou Hanifia is underway and the few available results are presented. Optical inspection is the basis for assigning a number of previously unrecognized artifacts in Algeria, Tunisia, and Sardinia to Bou Hanifia, and it is possible to support one of these attributions with isotopic analysis. Artifacts from Aïn Tekbalet are proving more difficult to identify with confidence.

Keywords

Alabastro a pecorella, Algeria, Bou Hanifia, Aïn Tekbalet, onyx marble, alabaster-travertine, Cherchel, Timgad, Hippo Regius, Djemila, stable isotopes.

Introduction

An ornamental stone with vivid markings predominantly of red and white with subordinate areas of brown and yellow was used extensively in Roman Italy and in small quantities elsewhere in the Empire. The stone was highly prized for decorative panels in the Renaissance and Baroque periods (Gnoli 1971, 195; Lazzarini 2009, 462, 470, fig. 8). A spectacular example is an ancient column shaft in the Museo Capitolino, Rome (Fig. 4) (Bertoletti 2002, 386, cat. no. 88). The patchy patterns were thought to resemble sheep's wool, leading to the name "alabastro a pecorella." The stone, which could be termed onyx marble, calcitic alabaster, or travertine, has such distinctive optical characteristics that visual evidence has been considered sufficient for reliable identification, and it has not yet been the subject of archeometric study. In 1971, Raniero Gnoli recognized that the stone came from Algeria and ascribed it to the quarries of Aïn Tekbalet in western Algeria near Oran (Fig. 1)¹. His views

have been followed by scholars ever since (Gnoli *et al.* 1997, 149; Lazzarini 2002, 244).

In the effort to understand Algeria's place in the international marble trade, the authors made trips by to Algeria in 2005, 2006, and 2008. The quarries visited were, primarily those managed by Enamarbre (Entreprise Nationale du Marbre, Spa), which has been in charge of Algeria's principal marble sources since the country's independence from France. The company's brochure gave an idea of the range of products available, but extraction is not currently taking place in their quarries.

Quarry inspection

A trip to Aïn Tekbalet in 2008 revealed that these once-famous quarries produce a banded travertine or onyx marble that does not resemble alabastro a pecorella. The colors are different, and the wooly-looking patterns of alabastro a pecorella are absent. Long white and beige strata predominate (Figs. 2-3). Orange, brown, beige, and rust-red lines separate the gray and white bands. There are also some areas of convoluted formations. All surfaces visible in the quarry were modern, but at least one irregular slab preserves ancient pick marks along one edge. The quarries are thought to have been used in antiquity, and were heavily exploited in the Middle Ages² and again in the 19th century, when it was called "Algerian onyx"³. Beautiful pieces of the stone were used by sculptors, such as Charles Cordier⁴. The finest veins of the stone seem to have been exhausted by the early 20th century⁵.

A visit to the quarries of Bou Hanifia (ancient Aquae Sirenses), which is also in western Algeria near to the city of Mascara (Fig. 1), revealed, on the other hand, the characteristic colors and patterns of alabastro a pecorella, and on the basis of macroscopic examination alone there can be no doubt that this was the source of that stone (Fig. 5).

The Bou Hanifia area has two quarries of travertine-alabaster, Sidi Sliman and Douar Klerma, but only the latter presents alabaster a pecorella, or what might be called the "export version" of the travertine-alabaster of Bou Hanifia. Amid debris and modern blocks (Fig. 7) lie dozens of ancient blocks shaped with pick and pointed chisels (Fig. 5). The blocks are parallelepiped (i.e., more or less rectangular prisms), at times with beveled facets. The

1. Gnoli 1971, 195. On the baths, see Fevrier 1978, 67-70.

2. Playfair 1895, 81, 270-1 (mosques and museum at Tlemcen), 278

3. Comynet 1854; Hull 1872, 149-150; Eassie 1876, 506-507; Winearls Porter 1907, 38, 44-45; Merrill 1908, 259, 281-284; Meunier 1919, 282.

4. Called to my attention by Anne-Marie Durand. See http://commons.wikimedia.org/wiki/File:Negre_du_Sudan_Charles_Cordier_Musée_d'Orsay.jpg.

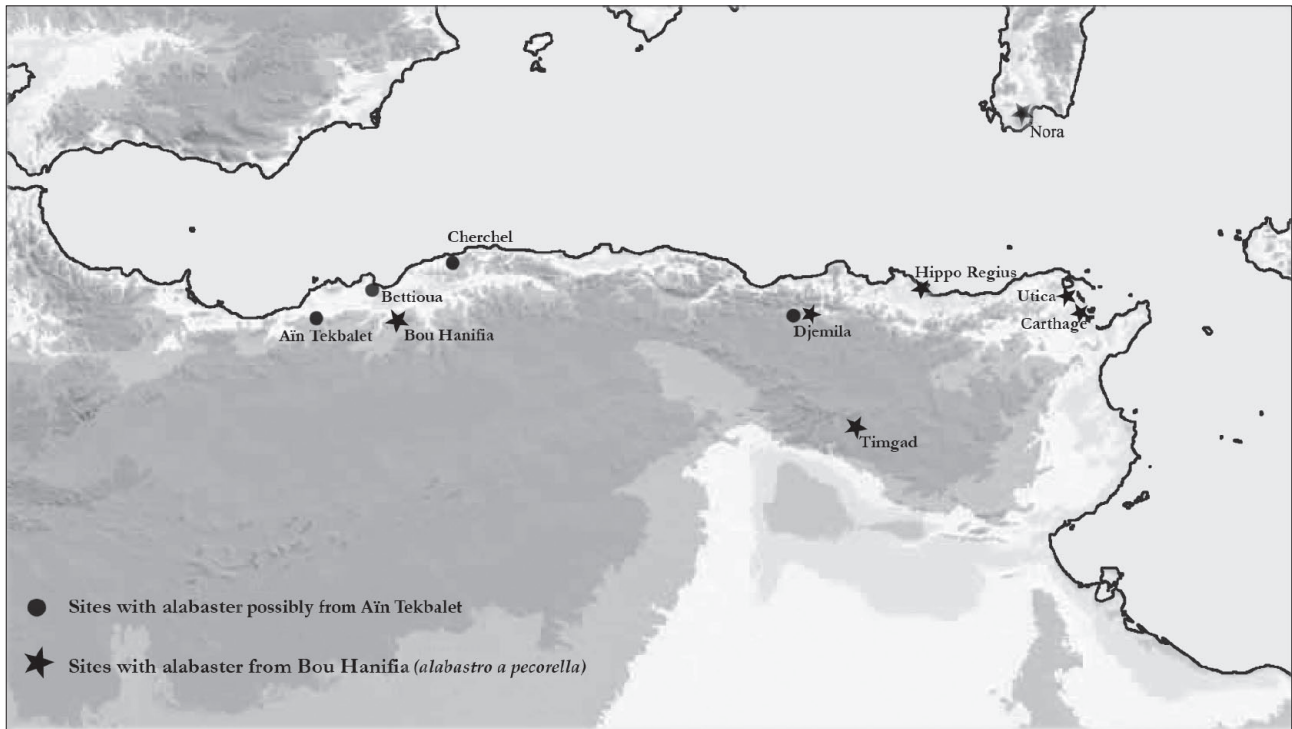


FIG. 1. Map of sites in NW Africa with alabaster probably or certainly from western Algeria.



FIG. 2. Quarries of Aïn Tekbalet, Algeria.

workmanship is generally careful and regular, and in one case a yellow zone was partially chiseled away, apparently with the intention of producing a more completely red-and-white block (Fig. 6). Many of these carefully squared blocks have broad bands of red, black, and yellow rather than the distinctive wooly patterns of *alabastro a pecorella*. A modern block displays large many-layered centralized patterns with a dominant presence of white and

yellow-orange (Fig. 8). At the entrance to the quarrying area at Douar Klerma is a large roughed-out sarcophagus with double-sloped lid. Within the quarries there are also some amorphous blocks, which are shaped with a pick.

Rectilinear quarry-rough blocks of *alabastro a pecorella* are also known at Rome; one example, which is also finished with the chisel, came from the Fiumicino canal and now lies in the Piazzale dei Marmi at Ostia⁶. Another

5. Meunier 1919, 282. Called to my attention by Anne-Marie Durand.

6. Called to my attention in 2009 by Matthias Bruno (Bacini Leotardi 1989, 55, cat. no. 82; Pensabene 1994, 113, fig. 139, cat. no. 49, inv. 36774).

rectilinear block, which has a modern polishing on all but one side, is in the Vatican (in the room in front of the Apoxyomenos).

The Douar Klerma quarries follow a multitude of relatively short veins through the low mountain (Fig. 7). In the quarries' walls are innumerable small areas of pick marks, which probably reflect testing to determine whether the stone was worth extracting.

At Sidi Sliman, which lies a few km to the west, there is a storage area containing largely modern blocks of a crystalline travertine with gently undulating bands of pink, orange, gray, and white. On a low hill above the storage area is a platform of similar ancient blocks shaped with the chisel. They are placed over a block or the top of a quarry front cut with a heavy pick. At a distance of about 200 m is a small ancient quarry with dozens of rectilinear and beveled blocks shaped with the pick and in some cases finished with the chisel. In this undisturbed ancient area the surfaces of both blocks and quarry fronts have a uniform dull brown color. This brown surface could either be the color of the stone or the result of many centuries of wind-blown sand.

Sampling and testing

Solid samples of the stone were taken with steel chisels at both Aïn Tekbalet and Bou Hanifia. At Aïn Tekbalet the samples were extracted at intervals of ca. 50 m, both vertically and horizontally. The quarries at Douar Klerma were short and irregular gulleys (Fig. 6), and high-quality alabastro a pecorella was rarely visible in the quarry fronts. Many of the samples were taken from blocks abandoned in the gulleys. At Sidi Sliman, samples came primarily from modern and ancient blocks. The location of each sample was described and photographed, and its GPS position was recorded. 26 samples were taken at Bou Hanifia and 20 at Aïn Tekbalet. The samples are in the course of examination with a mass spectrometer at the University of South Florida (USF). The ratios of $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ are plotted against the PDB standard.

At the time of this report only 9 test results from Douar Klerma, which include 2 samples presented to us in 2006 by Enamarbre, were available (Table I). This preliminary group of results tends to indicate that the isotopic characteristics of the area is relatively compact. $\delta^{13}\text{C}$ ranges from 0.4 to -0.9, and $\delta^{18}\text{O}$ ranges from -10.7 to -16.4. Maximum grain size (MGS) was measured on the surface of the stone rather than on thin sections, leading to a wider range of grains to choose from and a surprising range of variations: 1 mm to 7 mm. The Douar Klerma isotopic field, it should be noted, does not overlap the fields for other alabaster-travertines already known⁷.

Products and exportation: Bou Hanifia

Finished ancient artifacts made of stone from Bou Hanifia can be identified on an optical basis in Algeria itself. Alabastro a pecorella is rare though widespread. Panels remain place in the Large Baths at Djemila of 177-192 AD, and fragments are displayed in the museum at the site⁸. The small columns flanking the niches in the triumphal arch at Timgad are alabastro a pecorella (Fig. 9). Although the columns have been pieced together and reinstalled in modern times, the fragments themselves are ancient⁹. Fragments of alabastro a pecorella veneering are incorporated in the floor of the Timgad Museum.

The limited isotopic data available at present is useful in confirming the presence of alabastro a pecorella in the basin of a fountain at Hippo Regius near the eastern border of Algeria. The fountain was added to a house on the seafront of Hippo in a phase datable between 280 and 330 AD (Laverne 2005, 135; Blanchard-Lemée 2005, 143). The veneering of the basin includes three colorful panels separated by gray-and-white streaked marble from the local quarries of Cap de Garde. The colored panels have patterns that are not typical of alabastro a pecorella of the type familiar from Italy, but the red and white color scheme and rounded spots of one of the panels is close enough to make an origin in Bou Hanifia very likely (Fig. 10). The other two panels have large many-layered, centralized blotches, one red and white and the other yellow and white (Fig. 11). Isotopic analysis of the red-and-white blotchy panel (not illustrated) supports its assignment to Bou Hanifia (Tables I and II). The similarity of the yellow and white panel (Fig. 11) to a block in the Douar Klerma quarry (Fig. 8) makes it very likely that this panel too came from that source. These uncharacteristic patterns and colors may in part be due to cutting the stone at a different angle, but they also seem to represent qualities of the stone that were considered less desirable and hence less worthy of shipment to Italy.

In recent years several teams of researchers have pointed to the superiority of strontium-isotope analysis as a method for provenancing calcite-alabaster/travertine¹⁰. In at least one case, the Sr isotopic results contradicted the Ca/O isotopic results, and the researchers preferred the Sr results (Antonelli *et al.* 2010, 585, fig. 10). In the case of the present analyses based on C and O isotopes, it seems very likely that the attribution of the panel in Hippo is correct. Not only do the isotopic ratios correspond to those of the Douar Klerma/Bou Hanifia quarries, but also the panel tested is part of a group that includes a panel attributable to Bou Hanifia on optical grounds.

Optical evidence indicates that pieces of alabastro a pecorella were also exported to Tunisia. Triangles of

7. Çolak and Lazzarini 2002, 38-40; Lazzarini *et al.* 2009; Antonelli *et al.* 2010, 585, fig. 10.

8. Gnoli 1971, 195; Antonelli *et al.* 2010, 577, fig. 2b, 4d (right middle).

9. Ballu 1910, 109-110: "Les colonnes des niches étaient en marbre rouge; nous en avons retrouvé des fragments".

10. Barbieri *et al.* 2010a, 2010b; Çolak and Lazzarini 2002, 40; Lazzarini *et al.* 2009; Antonelli *et al.* 2010, 585, fig. 10.



FIG. 3. Quarries of Aïn Tekbalet, Algeria.



FIG. 4. Column shaft of alabastro a pecorella, 1st-3rd century (Musei Capitolini, Rome, inv. col. 64).

the stone are used in an *opus sectile* panel in the “Horse Mosaic” in the Maison des Chevaux, Carthage, datable 300-320 AD¹¹. A plaque from Bou Hanifia also seems to be used in a panel of the *opus sectile* pavement of



FIG. 5. Ancient block of alabastro a pecorella in the quarries of Douar Klerma, Bou Hanifia, Algeria.



FIG. 6. Ancient block in the quarries of Douar Klerma, Bou Hanifia, Algeria. A yellow layer above the red was partially chiseled away.



FIG. 7. A sector of the quarries of Bou Hanifia, Algeria.

the Domus de la Chasse, Utica¹². Lorenzo Lazzarini has also noted the use of alabastro a pecorella in Dougga, Tunisia, and in Libya, Spain, and Egypt (Lazzarini 2009, 462, 470, fig. 8). Matthias Bruno has pointed

11. Dunbabin 1978, 253, no. 33dii, figs. 84-85, panel at upper right; Yacoub 1995, 320-321, fig. 163a.

12. Insula II, lot 5: Ville 1961-62.



FIG. 8. Modern block of alabastro a pecorella in the quarries of Bou Hanifia, Algeria.



FIG. 9. column of alabastro a pecorella flanking niche, triumphal arch, Timgad, late 2nd century.

out panels of alabastro a pecorella in the theatre at Nora, Sardinia¹³.

Products and exportation: Aïn Tekbalet

It seems highly probable that the onyx marble of Aïn Tekbalet was also used in Algeria during antiquity. Banded travertine with colors and markings similar to those of the quarries appear in the antiquarium of Betioua (ancient Portus Magnus) on the coast near Oran, in the museum of Djemila, in the West Baths, Cherchel, and the courtyard pavement of the Cherchel museum. The examples in the storage area in the West Baths include supports decorated with volutes (Fig. 12), in an elegant, archaistic style, of the first or 2nd century. An inscribed pedestal there mentioning *P. Aelius Peregrinus*, a magistrate of the time of Septimius Severus¹⁴ could also be stone from Aïn Tekbalet. Isotopic testing will be used to test some of these hypotheses.

In the 19th and early 20th centuries it was widely believed that the Romans exported the onyx marble of Aïn Tekbalet to Europe¹⁵. It is nonetheless difficult to confidently recognize ancient examples of this stone on the northern shores of the Mediterranean. A slab in a pavement from the Horti Lamiani (1st century AD) in Rome might be the variant of this stone with convoluted veins¹⁶. The typical horizontal banding of onyx marble from Aïn Tekbalet resembles alabastro fiorito (Gnoli *et al.* 1997,

13. Matthias Bruno, private communication 2010. Verified by the authors in December 2010.

14. On this magistrate, see Klebs, Rohden, and Dessau 1897, 20, no. 165 (*P. Aelius Peregrinus Rogatus*); Benseddik 1997.

15. Hull 1872, 149-150; Eassie 1876, 506-507; Merrill 1908, 259, 281-284; Winearls Porter 1907, 38, 44-45.

16. Website of the Musei Capitolini: http://en.museicapitolini.org/var/museicivici/storage/images/musei/musei_capitolini/percorsi/galleria_fotografica/pavimento_di_alabastro_dagli_horti_lamiani/35361-1-ita-IT/pavimento_di_alabastro_dagli_horti_lamiani_sqlarge.jpg (accessed 17 April 17, 2010).



FIG. 10. Alabastro a pecorella and Cap de Garde marble in a fountain of a seafront house, Hippo Regius (Annaba), Algeria.

142-3), but its grayish tones and soft undulations are hard to parallel exactly. Isotopic testing, now under way on samples from Algeria, may eventually provide a basis for identifying the stone among the many other types of onyx marble/banded travertine imported into ancient Italy.

Conclusions

Optical evidence makes it clear that alabastro a pecorella was quarried at the Douar Klerma quarries of Bou Hanifia. This source also produced marble types with a different balance of colors and a variety of veining-patterns. Analysis of samples from Douar Klerma established a fairly compact field for ratios of stable isotopes of carbon and oxygen. Several previously unrecognized artifacts scattered throughout Algeria could be confidently identified by eye as alabastro a pecorella, and a group of marble plaques with uncharacteristic colors and veining at Hippo Regius could be identified as this stone with a combination of optical evidence and stable isotope analysis.

Inspection made it clear that the Aïn Tekbalet quarries produced alabaster-travertine but not alabastro a pecorella. It has so far proven difficult to confidently recognize stone from Aïn Tekbalet in ancient artifacts from Algeria or Italy.

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FIG. 11. Atypical alabastro a pecorella and Cap de Garde marble in a fountain of a seafront house, Hippo Regius (Annaba), Algeria.



FIG. 12. Fragmentary furnishing of onyx marble probably from Aïn Tekbalet, probably late 1st century BC, West Baths, Cherchel, Algeria.

for travel to Algeria and to the ASMOSIA conference in Tarragona. The Algerian Ministries of Culture and of Energy and Mines have been of enormous help in providing logistical support and access to quarries and ancient artifacts. Much assistance and information was also provided by the officials of Enamarbre. Discussions with Anne-Marie Durand on the early history of the Aïn Tekbalet quarries have also been helpful. Useful criticism and information came from an anonymous ASMOSIA reviewer.

USF number	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$	MGS	Quarry name/provenance	Sample number	Site/town
10158	-0.2	-14.3		provided by Enamarbre		Bou Hanifia
10159	-0.9	-13.9		provided by Enamarbre		Bou Hanifia
11339a	0.0	-13.9	1mm	Douar Klerma quarry	14	Bou Hanifia
11339b	0.4	-10.7	2.5mm	Douar Klerma quarry	14b	Bou Hanifia
11341a	-1.0	-15.2	3mm	Douar Klerma quarry	16	Bou Hanifia
11342	-0.6	-12.7	1mm	Douar Klerma quarry	17	Bou Hanifia
11347	-0.3	-15.7	7mm	Douar Klerma quarry	22	Bou Hanifia
11348	-1.0	-16.4	7mm	Douar Klerma quarry	23	Bou Hanifia
11351	0.7	-13.1	2mm	Douar Klerma quarry, Quartier Rouge	26	Bou Hanifia

TABLE I. Quarry samples from Bou Hanifia, Algeria: analyzed at the University of South Florida (USF).

USF number	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$	Quarry assignment	Site	Location of sample
9348a	-0.8	-13.4	BouHanifia	Hippo Regius	Red revetment panel in fountain, Quartiere de front de la mere, villa des notables romaines
9348b	-0.8	-13.2	BouHanifia	Hippo Regius	Red revetment panel in fountain, Quartiere de front de la mere, villa des notables romaines

TABLE II. Analysis of revetment panel, Hippo Regius, Algeria: analysed at the University of South Florida.

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