

Conclusion

The combination of scientific methods (isotopic analysis and grain size measurements) and optical analysis illuminates the interaction of local and imported white and gray marbles in North Eastern Algeria. Each of the three Algerian sources for architectural marble dominated the market in their immediate neighborhood. Marble from Mt. Filfila and Cap de Garde was able to penetrate their neighbors' home territories to some degree, while travertine from Mahouna apparently remained more local. Cherchel in the royal period had access to the best products of Rome and the Carrara quarries, but some architectural elements were made of Filfila marble. In the late second century Proconnesian marble was imported to Algeria, and Proconnesian designs were reproduced in the marble of Mt. Filfila.

John J. Herrmann Jr., Donato Attanasio, Robert H. Tykot, Annewies van den Hoek Aspects of the Trade in Colored Marbles in Algeria

Quarries and artifacts of colored marble in Algeria have been sampled and their stable isotopes of carbon and oxygen analyzed. These laboratory data have been supplemented by macroscopic observations of color and structure. In many cases it has been possible to attribute the marble of artifacts to quarries in Greece, Turkey, Tunisia, and Algeria itself. In some cases macroscopic and isotopic data contradict one another, and in others it seems possible that the marble came from currently unknown quarries.

Keywords: quarries, stable, isotopes, Mahouna, Aïn Smara, *alabastro a pecorella*.

Background and methodology

In the nineteenth century Algeria was celebrated for its quarries of colorful marble, and these quarries have continued in use under the management of Enamarbre, the Algerian national marble company. The team of Antonelli, Lazzarini, Cancelliere, and Dessandier has provided scientific data on some of the quarries and has identified artifacts made of their marble at Djemila¹. We have also undertaken surveys of the Enamarbre quarries, which in geological terms produce true marble, calcite-alabaster, and travertine, and have sampled artifacts in many archaeological sites and museums. Analysis of the samples is underway at the University of South Florida (USF) and the Istituto di Struttura della Materia of the Centro Nazionale di Ricerche (CNR) at Rome. The ratios of stable

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1. F. ANTONELLI *et al.*, *On the White and Coloured Marbles of the Roman Town of Cuicul (Djemila, Algeria)*, «Archaeometry», 52, 2009, pp. 575-96.

isotopes of carbon and oxygen are being determined, grain size is being measured, and EPR analysis is in progress. Since testing is still incomplete, this report will be based primarily on isotopic results and will deal with sites other than Djemila. It should be noted, moreover, that optical evidence is often valuable and even decisive in identifying colored marble.

At the moment we have extensive isotopic results for the quarries of Bou Hanifia, Mahouna, and Aïn Smara, and a single sample for Kristel, which is augmented by several other samples provided by Antonelli and co-workers² (FIG. 1). In our isotopic diagrams we also include Norman Herz's data on quarries of colored marble at Chemtou and Djebel Ichkeul in Northern Tunisia (FIGS. 3-4). Chemtou produced the famous *giallo antico*, and Djebel Ichkeul produced a somewhat similar yellow breccia, which has rarely, if ever been identified in an ancient context. There are, however, signs of ancient work at the quarry. In general, isotopic evidence on these and most other quarries of colored marble is still in short supply, and the question of their variability has yet to be confronted. Antonelli and co-workers have questioned the reliability of carbon and oxygen isotopes for colored alabaster/travertines³. Our experience so far has been that the quarries are generally consistent isotopically but can have very distant outliers.

Centers of the marble trade and quarrying

Colored marbles imported from Eastern quarries play their greatest role at Cherchel, which is conspicuous for its large, monolithic column shafts. Cherchel has shafts of *africano* (*marmor luculleum*) from Teos⁴ and shafts of *breccia corallina* (*marmor sagarium*) from Vezirhan, both in Turkey⁵ (FIG. 1). Illustrations of these and other famous types of marble are available in recent literature⁶ and on

2. *Ibid.*, pp. 582, 584, fig. 7.

3. *Ibid.*, pp. 585, 587, fig. 10.

4. J.-M. BLAS DE ROBLÈS, C. SINTES, *Sites et monuments antiques de l'Algérie*, Aix-en-Provence 2003, p. 281, quoting from reports of A. BALLU.

5. L. LAZZARINI, *The Origin and Characterization of breccia nuvolata, marmor Sagarium and marmor Triponticum*, in *ASMOSIA V: Interdisciplinary Studies on Ancient Stone* (Boston 1998), ed. by J. HERRMANN, N. HERZ, R. NEWMAN, Boston 2002, pp. 58-67.

6. R. GNOLI, *Marmora romana*, Roma 1971, II ed. 1988; G. BORGHINI (a cura di), *Marmi antichi*, Roma 1997.

the Internet⁷. Column shafts also came to Cherchel from Greece: *portasanta* (*marmor chium*) from the island of Chios, and *cipollino verde* (*marmor carystium*) from Carystos, Euboea (FIG. 1). Shafts of *giallo antico brecciato* (*marmor numidicum*) came from Chemtou, Tunisia. A *labrum* of *pavonazzetto* (*marmor docimium*) from Turkey is in the Cherchel museum's courtyard. Cherchel's status as the capital of the Mauretanian kingdom favored by Augustus and later as capital of the province of *Mauritania Caesariensis* undoubtedly explains the abundance of large, colorful column shafts and other prestigious artifacts found there.

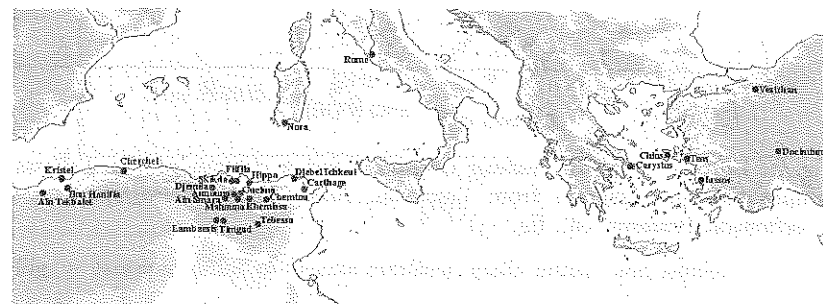


Fig. 1: Map of quarries and sites discussed.

Far inland at Tebessa there is another impressive group of large, colored column shafts imported from the Aegean. Tebessa's famous third-century temple has shafts with a leathery tan surface⁸, but the dull color must be due to weathering caused by sandstorms over the centuries. Their layered green cores and their isotopic ratios confirm that they are *cipollino verde* from Carystos (USF 9368) (TAB. 2, FIG. 2).⁹ Tebessa also preserves shafts of *portasanta* and *breccia corallina*. In spite of their dull, weathered surface, isotopic testing confirms that the latter do, in fact, come

7. See, for example, http://www.musnaf.unisi.it/risultato_inv.asp?order=1.

8. S. LANCEL, *L'Algérie antique de Massinissa à saint Augustin*, Paris 2003, pp. 131, 135.

9. L. LAZZARINI, U. MASI, P. TUCCI, *Petrographic and Geochemical Features of the Carystian Marble, "cipollino verde", from the Ancient Quarries of Southern Euboea (Greece)*, in *ASMOSIA III. The Study of Marble and Other Stones Used in Antiquity* (Athens 1993), ed. by Y. MANIATIS, N. HERZ, Y. BASTAKOS, London 1995, pp. 161-9.

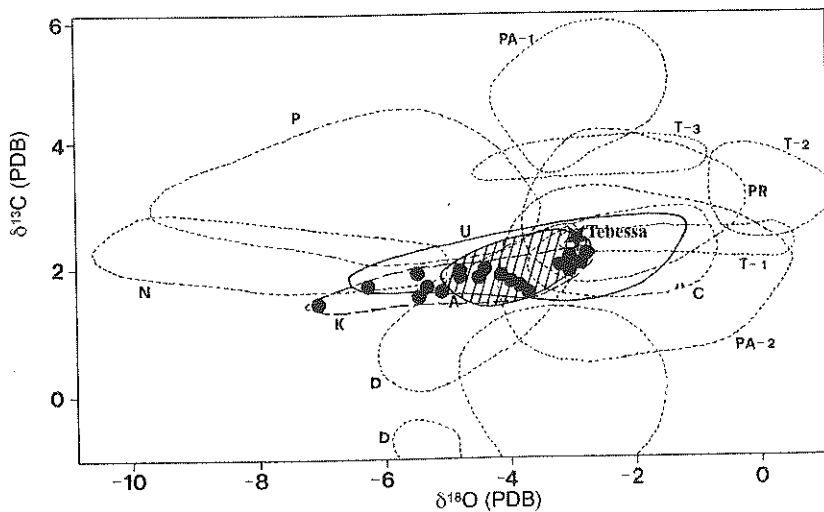


Fig. 2: Isotopic ratios of *marmor carystium* and a column of the Tebessa temple (isotopic diagram from Lazzarini, Masi, Tucci, *Petrographic and Geochemical Features*, cit., fig. 13).

from Vezirhan (USF 9362-3) (TAB. I, FIG. 3)¹⁰. These prestigious imported marbles testify to Tebessa's importance, presumably in Severan times.

Elsewhere large colorful shafts make only sporadic appearances. Single shafts of *marmor carystium* appear at *Hippo Regius* and Announa. Shafts that seem to be *breccia corallina* appear at Skikda and Announa, but isotopic testing indicates that neither comes from Vezirhan. The shaft in Skikda (USF 10948a-b) is a fairly good isotopic match for quarries at Kristel on the coast of Western Algeria, while the source of the Announa shaft (USF 10859) is unknown (TAB. I, FIG. 3)¹¹. A shaft at Cherchel looks like *broccatellone*, a variety of *marmor sagarium* from Vezirhan¹², but its isotopes seem to contradict this (USF 9316) (TAB. I, FIG. 3). If the iso-

10. USF 9362 appears in LANCEL, *L'Algérie antique*, cit., p. 213. For data on *breccia corallina*, see LAZZARINI, *The Origin and Characterization of breccia nuvolata*, cit., p. 59, tab. 1.

11. A few broken plaques of marble from Kristel seem to appear in the courtyard of the Cherchel museum.

12. Pointed out by Matthias Bruno: personal communication. On *broccatellone*, see LAZZARINI, *The Origin and Characterization of breccia nuvolata*, cit., pp. 58-63.

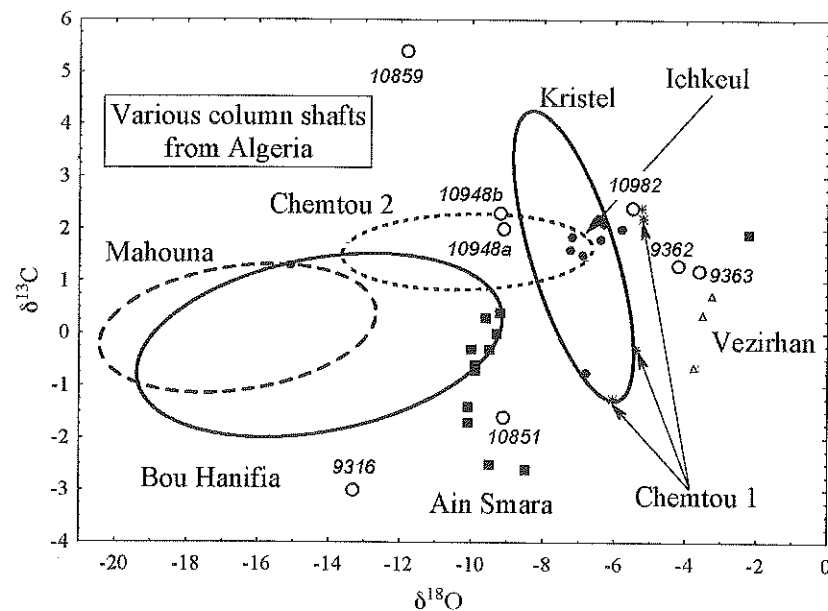


Fig. 3: Isotopic ratios of *breccia corallina*, *giallo antico*, and similar.

topic evidence can be trusted, these shafts may have been quarried in North Africa as substitutes for the famous Asiatic stones.

In spite of Algeria's proximity to Chemtou, *marmor numidicum* column shafts are rare, and this scarcity testifies to the tight imperial control over these prestigious products. In addition to the examples at Cherchel, shafts traditionally identified as *giallo antico* are found in a temple in Khemissa, where they appear in the unusual form of drums rather than monoliths (USF 10851) (TAB. I, FIG. 3)¹³. There is not a close isotopic match with Chemtou, but this may be due to a lack of quarry data. *Marmor numidicum* is used for the earliest known artifact in colored marble in Algeria: a Corinthian capital found at Constantine, datable about 130-30 BCE¹⁴.

Most colored marble in Algeria takes the form of facings for

13. S. GSELL, C. A. JOLY, *Khamissa, Mdaourouch, Announa*, Alger-Paris 1914-22, p. 65; BLAS DE ROBLES, SINTES, *Sites et monuments antiques de l'Algérie*, cit., p. 217.

14. F. RAKOB, *Numidische Königsarchitektur in Nordafrika*, in H. HORN, C. RÜGER (Hrsg.), *Die Numider: Reiter und Könige Nördlich der Sahara*, Cologne-Bonn 1979, pp. 169, note 101; 470; pl. 43.

Table 1: Architectural decoration in colored marble in Algeria: *breccia corallina*, *giallo antico*, and similar*.

USF lab #	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$	MGS	Probable quarries	Location	Inv. #	Description
9316	-3,0	-13,3		Unknown	Cherchel, Place des Martyres		<i>Broccatellone</i> column shaft
9362	1,3	-4,2		<u>Vezirhan</u> (<i>breccia corallina</i>)	Tebessa, Basilica		<i>Breccia corallina</i> shaft, south colonnade, 3 rd from east
9363	1,2	-3,6		<u>Vezirhan</u> (<i>breccia corallina</i>)	Tebessa, Museum (exterior)		Fragmentary column shaft of <i>breccia corallina</i>
10851	-1,6	-9,1	0,2 mm	Ain Smara, <u>Chemtou I</u>	Khemissa, Old Forum, temple at west	JH #9	Uniform yellow column drum
10859	5,4	-11,8	1,0 mm	Unknown	Announa, deposit below S. Church	Col. 38	<i>Breccia corallina</i> type shaft; \varnothing 46,5 cm
10948a	2,0	-9,1	4,0 mm	<u>Kristel</u>	Skikda, Theatre	Col. 38	<i>Breccia corallina</i> type: angular grayish clasts in red matrix
10948b	2,3	-9,2	4,0 mm	<u>Kristel</u>	Skikda, Theatre	Col. 38	<i>Breccia corallina</i> type: angular grayish clasts in red matrix
10982	2,4	-5,5	very fine	<u>Chemtou I, D.</u> <u>Ichkeul, Kristel</u>	Cherchel, route Nationale, route Revolution		<i>Giallo antico brecciato</i>

* Abbreviations in the tables: MGS = maximum grain size; JH = J. Herrmann list of samples; USF = University of South Florida. Preferred quarries are underlined.

Table 2: Architectural decoration in colored marble in Algeria: various marbles.

USF lab #	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$	MGS	Probable quarries	Location	Inv. #	Description
9348a	-0,8	-13,4		Mahouna, Bou Hanifia	<i>Hippo Regius</i> , seafont villa, basin		Red alabaster revetment panel in fountain
9348b	-0,8	-13,2		Mahouna, Bou Hanifia	<i>Hippo Regius</i> , seafont villa, basin		Red alabaster revetment panel in fountain
9351	0,9	-15,1		Mahouna, Bou Hanifia	Announa, Temple with huge capitals		Red-orange plaque lying next to a revetment plaque <i>in situ</i>
9368	2,6	-2,9		<u>Carystos</u> (<i>cipollino</i>)	Tebessa, Temple, SE column shaft		Green layered marble with tan weathering layer (<i>cipollino</i>)
10844	1,3	-3,7	0,3 mm	Lassos? Vezirhan?	Khemissa, Temple of Neptune	JH #2	Revetment plaque at base of wall, pink and white marble
10853	1,7	-12,2	0,6 mm	Bou Hanifia	Khemissa, Baths by New Forum	JH #11	Triangular rose and white plaque, "calcaire metamorphique"
10891	-2,1	-9,8	1,5 mm	Unknown <i>rosso brecciato</i>	Lambèse, Capitulum, podium		Red marble plaque speckled with white and black
10895	-0,9	-9,5	1,5 mm	Unknown <i>rosso brecciato</i>	Lambèse, near Aesculapius Temple	JH #2	Thin red marble plaque speckled with white and black
10992	1,9	-4,9	fine	<u>Chemtou I</u> , D. Ichkeul, Krist.	<i>Hippo Regius</i> , seafont villa		Yellow panel in 10-column courtyard, Quartier des Villas
10993	-0,3	-18,4	1 mm?	<u>Mahouna</u>	<i>Hippo Regius</i> , seafont villa	JH #3	Yellow and white panel in 10-column courtyard, Quartier des Villas

* Abbreviations in the tables: MGS = maximum grain size; JH = J. Herrmann list of samples; USF = University of South Florida. Preferred quarries are underlined.

pavements and walls. Facing slabs of *giallo antico* and a few other widely used stones from Greece have been reported at Djemila¹⁵. A small yellow plaque at *Hippo* was tested isotopically and proved to be *giallo antico* (USF 10992) (TAB. 2, FIG. 4). Some Algerian centers were apparently richer in imported stones than Djemila. A variety of *crustae* from Greece and Asia Minor is preserved on the interior walls and in the courtyard paving of the Cherchel museum¹⁶ and in the floor of the Timgad museum¹⁷. These fragments were probably collected from excavations and cemented into permanent displays when the museums were created. A few fragments in Timgad seem to be *rosso brecciato*, a red marble with black and white spots from Iassos, Caria, Turkey, and two more such plaques were found at nearby *Lambaesis*. Their isotopic ratios, however, seem to contradict a provenance from Iassos and fall in the field for Aïn Smara (USF 10891, 10895) (TAB. 2, FIG. 4)¹⁸. No red stone like this is known at the latter quarry. Pink and white marble plaques in the temple of Neptune ("temple des eaux") at Khemissa come close isotopically to Iassos and Vezirhan, without resembling either unambiguously (USF 10844) (TAB. 2, FIG. 4)¹⁹.

Algeria is especially rich in quarries of calcite-alabaster or onyx marble, termed travertine in its less translucent form. Red and white *alabastro a pecorella* is famous for its use in Italy, and small quantities were exported to Tunisia, Egypt, and Spain²⁰. Fragmentary plaques of *alabastro a pecorella* also appear in the theatre of

15. *Marmor carystium, marmor thessalicum, marmor scyreticum, lapis laedaemonius*: ANTONELLI *et al.*, *On the White and Coloured Marbles*, cit., pp. 577-85.

16. *Verde antico, cipollino verde, portasanta, breccia di Skyros; breccia corallina, africano, bigio antico; giallo antico, breccia gialla*. A *rosso antico* cornice is in the West Baths at Cherchel.

17. *Verde antico, cipollino verde, portasanta, breccia di Skyros; breccia corallina, pavonazetto, rosso brecciato, africano, giallo antico*.

18. C. GORGONI, L. LAZZARINI, P. PALLANTE, *New Archaeometric Data on rosso antico and Other Red Marbles Used in Antiquity*, in *ASMOSIA VI, Interdisciplinary Studies on Ancient Stone*, (Venice 2000), ed. by L. LAZZARINI, Vicenza 2002, pp. 199-206.

19. For a description of the sanctuary and its cult statue, see GSELL, JOLY, *Khemissa, Mdaourouch, Announa*, cit., pp. 85-98; P. L. MACKENDRICK, *The African Stones Speak*, Chapel Hill 1980, p. 218; LANCEL, *L'Algérie antique*, cit., p. 142. A *cipollino verde* plaque was also seen in the Khemissa temple.

20. L. LAZZARINI, *The Distribution and Re-Use of the Most Important Coloured Marbles in the Provinces of the Roman Empire*, in *ASMOSIA VII (Thasos 2003)*, ed. by Y. MANIATIS, «BCH» suppl., 51, 2009, pp. 459-84.

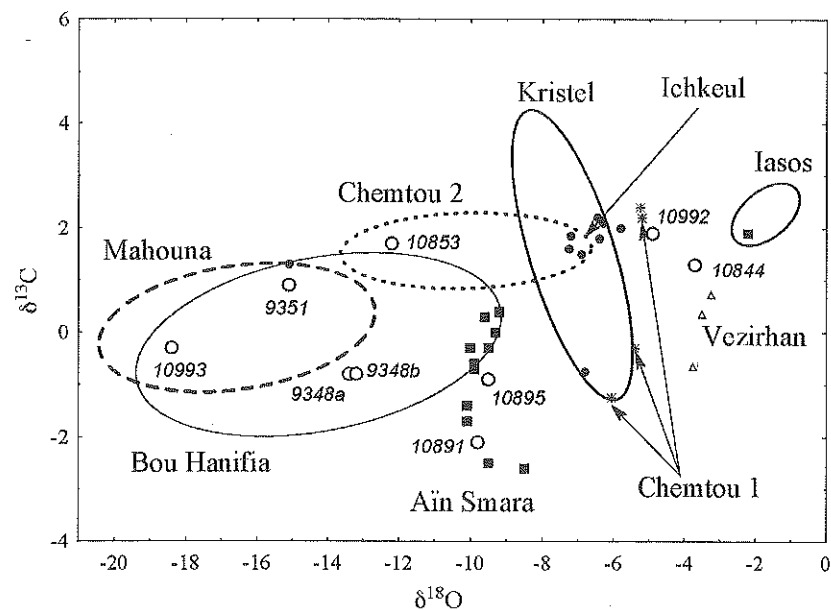


Fig. 4: Isotopic ratios of various colored marbles.

Nora in Sardinia²¹. Inspection of the Enamarbre quarries has revealed that this beautiful travertine comes from Bou Hanifia near Mascara rather than Aïn Tekbalet near Oran, as has been traditionally maintained²². Colonnets of *alabastro a pecorella* were used in the triumphal arch at Timgad²³. Facings of *alabastro a pecorella* may have been fairly widely used in Algeria. Fragmentary plaques of this stone are preserved at Djemila²⁴ and in the floor of the Timgad museum. Well-preserved panels appear in a fountain basin in *Hippo* (USF 9348) (TAB. 2, FIG. 4)²⁵, and a fragmentary rose-colored plaque at Khemissa also could be from Bou Hanifia isotopically (USF 10853, FIG. 4).

21. Pointed out by Matthias Bruno, personal communication, 2010.

22. J. HERRMANN, A. VAN DEN HOEK, R. TYKOT, *Alabastro a pecorella, Bou Hanifia, and Aïn Tekbalet*, in *ASMOSIA IX, Interdisciplinary studies on Ancient Marble (Tarragona 2009)*, Tarragona 2012.

23. Clearly recognizable in LANCEL, *L'Algérie antique*, cit., p. 128; HERRMANN, VAN DEN HOEK, TYKOT, *Alabastro a pecorella*, cit.

24. ANTONELLI *et al.*, *On the White and Coloured Marbles*, cit., pp. 577, 579, fig. 2b.

25. HERRMANN, VAN DEN HOEK, TYKOT, *Alabastro a pecorella*, cit.

A travertine with vivid contrasts of pink, brown, gray, and white is produced at Mahouana, and pink slabs from this quarry were used for facings in Eastern Algeria. A fragmentary pink slab in a temple at Announa and a yellowish pink alabaster slab at *Hippo Regius* have isotopic values compatible with Mahouana (USF 9351, 10993) (TAB. 2, FIG. 4). Architectural elements, such as altars, pedestals, and small columns, were also made of Mahouana travertine, but they tend to be much less colorful. Some are essentially white²⁶, while others have by pink, gray or greenish bands, as in a Tuscan column from Announa (USF 9388) (TAB. 3, FIG. 5). Several banded or layered marble objects resemble Mahouana travertine but, judging by their isotopic values, come from an unknown quarry or quarries (USF 10840, 10852) (TAB. 3, FIG. 5).

Among the formerly celebrated quarries of Algeria are those of Aïn Smara, near Constantine. The main variety of stone produced there is a honey-white layered travertine called *onyx dorée*. No signs of ancient work appear in the quarry, but a small column shaft in the Constantine museum and an altar at Skikda seem clearly to come from this source, judging by their isotopic ratios and macroscopic appearance (USF 10917, 10954) (TAB. 3, FIG. 5)²⁷. A very different alabaster from Aïn Smara seems to have been used in antiquity. A small region at Aïn Smara produces an unusual red, white, and black alabaster, a kind of grayish *alabastro fiorito*, which is locally called *brèche d'Afrique*. A fragmentary plaque at Khemissa resembles this stone and has isotopes that coincide with an outlier of Aïn Smara (USF 10845) (TAB. 3, FIG. 5).

Several slabs and an altar in the forum at Madaura in eastern Algeria are a type of alabaster with yellow, white, and gray bands that is visually similar to the Egyptian alabaster (*Alabastro cotognino*)²⁸ (USF 9460-1) (TAB. 3, FIG. 5). The Madaura artifacts have isotopic values that correspond to the new isotopic results for Aïn Tekbalet, and they probably came from that source. Macroscopic observation indicates that the white-brown-orange travertine quarried at

26. J. HERRMANN *et al.*, *Aspects of the Trade in White and Gray Architectural Marbles in Algeria*, in this volume, pp. 1315-30.

27. On contradictory results obtained by analyzing the C/O and C/Si isotopic ratios of alabasters from Aïn Smara and Mahouana, see ANTONELLI *et al.*, *On the White and Coloured Marbles*, cit., pp. 585, 587, fig. 10.

28. M. ÇOLAK, L. LAZZARINI, *Quarries and Characterisation of a Hitherto Unknown Alabaster and Marble from Thyatira (Akbisar, Turkey)*, in *ASMOSIA VI*, cit., pp. 38-40, fig. 14, tab. 1.

Table 3: Architectural decoration in colored marble in Algeria: yellow and white alabaster/travertine/onyx marble.

USF lab #	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$	MS	Probable quarries	Location	Inv. #	Description
9388	0,2	-18,6		Mahouana, Bou Hanifia	Guelma, Museum	Col.Guel001	Tuscan column, altar of Anstittii, Announa; banded travertine
9458	-1,1	-17,2		Mahouana	Announa, near house of Anstittii		Block of alabaster or banded travertine
9460	1,6	-6,7		Unknown	Madaura, Room South of Mairs Temple		Pavement slab, yellow alabaster
9461	3,2	-7,4		Unknown	Madaura, Forum		Pedestal with inscription, veined, alabaster-like marble
10840	3,4	-10,3	0,5 mm	Unknown	Guelma, near Museum entrance		Tear-drop-shaped column drum.
10845	2,1	-2,1	1,0 mm	Aïn Smara (<i>brèche d'Afrique</i>)	Khemissa, Temple of Neptune	JH #3	Pinkish, layered onyx marble
10852	4,7	-8,1	0,8 mm	Unknown	Khemissa	JH #10	Loose plaque 2,5 cm thick, onyx marble
10917a	0,7	-10,0	2,0 mm	Aïn Smara (onyx dorée)	Constantine, Museum garden		Onyx marble column shaft, between New Forum and Baths
10917a	0,3	-10,5	2,0 mm	Aïn Smara (onyx dorée)	Constantine, Museum garden		Yellow and white onyx column shaft, Ø 42 cm
10954	0,2	-10,4	3,0 mm	Aïn Smara (onyx dorée)	Skikda, Theatre	Inv. 50	Yellow and white onyx column shaft, Ø 42 cm Altar with pitcher and patera, yellow and white banded

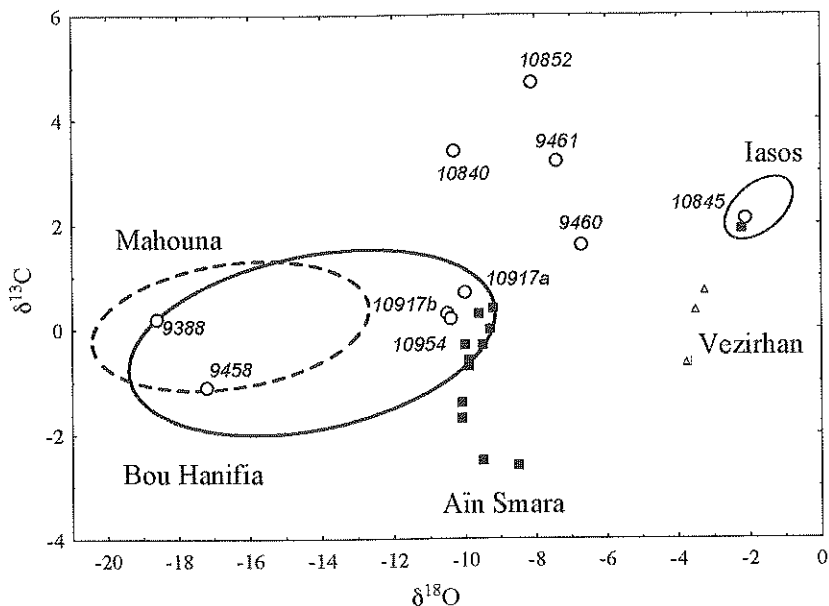


Fig. 5: Isotopic ratios of yellow and white alabaster/travertine/onyx marble.

Aïn Tekbalet, whose isotopic data are not included in the Figures, was used in Western Algeria, Cherchel²⁹, and perhaps Djemila.

Conclusions

Our isotopic testing and visual survey are in some cases contradictory but in other cases the two methods agree and provide clear identifications of the quarries of origin. Some of the uncertainties may be resolved by the application of other scientific methods and by more extensive sampling of colored marble quarries in both Algeria and the East. Our preliminary results, in any case, make it clear that some cities of ancient Algeria had access to a wide range of elite marbles from Aegean sources, and numerous local quarries provided material for the grandiose building projects of second- and third-century Algeria.

29. MACKENDRICK, *The African Stones Speak*, cit., p. 207; HERRMANN, VAN DEN HOEK, TYKOT, *Alabastro a pecorella*, cit.

Federico Frasson Numidi in Liguria, Liguri in Numidia A proposito di alcuni episodi bellici del II secolo a.C.

Cavalieri numidici presero parte, come truppe ausiliarie, alla campagna militare che il console romano Q. Minucio Termo condusse contro i Liguri nel 193 a.C. Analogamente, coorti ausiliarie liguri furono impiegate dai Romani in Numidia nel corso della guerra contro il re Giugurta verso la fine del II secolo a.C. Le testimonianze delle fonti antiche (soprattutto Livio, Frontino e Salustio) riguardo ai Numidi in Liguria e ai Liguri in Numidia, analizzate in modo approfondito all'interno del loro contesto storico, sono significative da un lato per ricostruire l'equipaggiamento e le tattiche militari tradizionali dei Numidi, dall'altro per conoscere le attitudini dei guerrieri liguri.

Parole chiave: Numidia, Liguria, ausiliari, cavalieri, Giugurta.

I cavalieri, componente principale degli eserciti numidici¹, ebbero, com'è noto, un ruolo importante nel corso delle battaglie della seconda guerra punica, quando combatterono non solo negli eserciti

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1. Ampia la bibliografia sui cavalieri numidici: cfr. per esempio TH. A. DODGE, *Hannibal. A History of the Art of War among the Carthaginians and Romans down to the Battle of Pydna, 168 B. C., with a Detailed Account of the Second Punic War*, Boston-New York 1896³, pp. 23-4; ST. GSELL, *Histoire ancienne de l'Afrique du Nord* (= HAAN), Paris 1913-28, II, pp. 361-6; G. T. GRIFFITH, *The Mercenaries of the Hellenistic World*, Cambridge 1935, pp. 223, 227; RE, s.v. *Numidia* [F. WINDBERG], XVII, 2, Stuttgart 1937, coll. 1350-1; M. ROSTOVITZ, *Numidian Horsemen on Canosa Vases*, «AJA», L, 2, 1946, pp. 263-7; H. G. HORN, CHR. B. RÜCKER (Hrsg.), *Die Numider. Reiter und Könige nördlich der Sahara*, Köln-Bonn 1979, pp. 580-3, 640-1; D. HEAD, *Armies of the Macedonian and Punic Wars. 359 BC to 146 BC. Organisation, Tactics, Dress and Weapons*, s.l. 1982, pp. 145, 146 fig. 105; T. WISE, *Armies of the Carthaginian Wars. 265-146 BC*, Oxford 1982, pp. 13-5, 34, pl. A1; G. BRIZZI, *Annibale. Strategia e immagine*, Spoleto 1984, sez. ill. n. 10; ID., *Une coutume de guerre des Numides: réflexions d'après quelques épisodes des campagnes d'Hannibal*, «BCTH», n.s. 24, 1993-95 [1997], pp. 53-8; E. FENTRESS, *Berbers in Antiquity*, in M. BREIT, E. FENTRESS, *The Berbers*, Malden-Oxford-Melbourne-Berlin 1997 (rist. 2002), p. 34; P. CONNOLLY, *Greece and Rome at War*, London 1998², pp. 149-50; CHR. HAMDOUNE, *Les auxilia externa*

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