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APHRODISIAS AND THE REGIONAL MARBLE TRADE. THE *SCAENAE FRONS* OF THE THEATRE AT NYSA

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Abstract

This paper presents the case of the theatre at Nysa and discusses the provenance of its marble architecture. The results of archaeometrical analysis indicate the use of imported marble from Aphrodisias and Denizli for the reconstruction of the *scaenae frons* in the late 2nd century A.D. This study case evidences that Aphrodisian marble was exported for construction purposes on regional level in the Imperial period.

Keywords

Nysa, Aphrodisian marble, regional marble trade, import of marble façade

The Carian city of Aphrodisias was renowned for its marble sculpture tradition whose development was considered directly influenced by the local marbles resources. The so-called City quarries, located only 2 km north of the city centre have been traditionally considered the main marble source for both sculpture and urban architecture¹. Inscribed signatures of Aphrodisian sculptors on statues found in Rome and North Africa further determine to consider Aphrodisias as place of origin for a so-called school of sculptors active across the Roman Empire². The assumption that the local marble resources were extremely abundant lead further to the interpretation that this Carian city was also a centre of craftsmen tradition specialised in architectural decoration, that, similar to the statuary, was an export product of the city. This postulate was based primarily on stylistic analysis of ornamental decoration, but rarely underpinned by archaeometrical investigation proving the actual distribution³.

Recent research focused on the ancient marble quarries shed a new light on these assumptions: The intensive quarry survey that D. Attanasio, M. Bruno und B. Yavuz conducted in the region of Muğla lead to the identification of the ancient quarry district of Göktepe, situated 40 km southwest from Aphrodisias well outside of its territory. Further archaeometrical studies evidenced that Göktepe's white and black varieties of fine-grained marble were the main source for Aphrodisian sculptors whose statuary was exported to Rome and North Africa⁴.

The local marble resources of the territory of Aphrodisias were also subject of systematic survey that resulted in the discovery of eight new quarries. L. Long, member of the Aphrodisias Regional Survey studied them and calculated both the quarry output volumes and the total amount of marble used in city's largest construction projects. A comparison of these estimations indicated that the local marble sources were barely sufficient to meet local demand. Therefore the Aphrodisian marble could not have been an export product of the city⁵.

My paper is focused on the *scaenae frons* of the theatre at Nysa, whose marble architectural decoration shows evident analogies to the ornamentation of the Tetrapylon of Aphrodite Sanctuary at Aphrodisias and was traditionally connected to the activity of Aphrodisian craftsmen (see below). The contribution is based on the results of newly conducted archaeometrical analysis combined with observations regarding the development of the Imperial building industry and offers a new interpretation to the importance of the local Aphrodisian marble resources.

Nysa. The regional and local marble sources

Nysa (Sultanhisar, Turkey) was located at the border between Caria and Lydia, on the north side of the Meander valley some 70 km east of the Ionian city of Ephesos and 40 km west of Aphrodisias. Two of its neighbouring historic regions – Caria and South Ionia

1 First described by ROCKWELL 1996; PONTI 1996. See also LONG 2012.

2 For the signatures see DNO 4208-4217; 4249-4264.

3 SQUARCIAPINO 1943; HEILMEYER 1970, 97-101, 168-171. Indeed, the archaeometric investigation of the architecture of the Severan Basilica at Leptis Magna informed the use Aphrodisias marble and revealed the import of Proconnesian material, BIANCHI *et al.* 2009.

4 ATTANASIO *et al.* 2009; see also YAVUZ *et al.* 2009.

5 LONG 2012.



Fig. 1. Local quarry of Nysa. Abandoned block at the quarry

– abounded in marble sources that were consequently used as construction material for the local urban adornment. The high incidence of marble sources was determined by the geology of these regions whose boundaries nearly coincided with the geologic unit of the Menderes-Massif and also included a part of the Attic-Cycladic-formation⁶.

As the geological settings indicate, Nysa had marble sources in its proximity. An ancient quarry district was identified ca. 2 km west of the city near the modern village of Eskihsar⁷. Tool traces on the quarry faces and remains of the quarry output – e.g. blocks and large-size column drums – clearly testify to ancient extraction of construction material (Fig. 1). Both macroscopic observations and chemical investigation indicate that the local quarry of Nysa provided two varieties of medium-grained marble of different colour: white and a blue-grey, respectively. Both marble varieties show



Fig. 2. View of the theatre from the South

a characteristic ferruginous patina that makes them easy to recognize with the naked eye. This distinguishing petrographic feature can be observed in the marble architecture of Nysa, as exhibited by the columns of the Hellenistic Agora and those of Ionic Hall of the Gerontikon⁸. The use of the local marble for construction projects of Hellenistic time indicates that the local quarries were the primarily source of building material for the city of Nysa in its early construction phase⁹.

The Theatre at Nysa. Construction phases and construction materials

The theatre took a prominent position within the topography of Nysa, a city built on the south slopes of the Mesogis-mountain and along the ravine of the stream Tekkecik. In spite of this topographic peculiarity that imposed the realisation of tunnels, bridges and vaulted subtractions,

6 For a detailed description of these geologic formations see CRAMER 2004, 16-19. 131-134, Fig. 138. 139. 143.

7 M. Kadioğlu indicated the position of the quarry and accompanied me 2009 to a brief survey of the exploitation area, KADIOĞLU 2016, fig. 1.

8 TOMA 2015.

9 Nysa is a Hellenistic foundation. On the history of Nysa see KADIOĞLU 2006, 6-8. On the Agora Halls see RUMSCHEID 1994.



Fig. 3.
Blocks from the
analemma-walls



Fig. 4.
The restored *columnatio*
of the *proskenion*

the urban settlement had an orthogonal street system¹⁰. The theatre was situated at the north of the city and leaned with its *cavea* against the mountain slope (Fig. 2).

The theatre comprised of a semi-circular *cavea* disposed concentrically to the *orchestra*, a *proskenion* and a stage building with a three-storied *scaenae frons*. A detailed description of the architectural remains of the theatre is part in the monograph of the monument that

M. Kadioğlu published 2006¹¹. Therefore this paper will focus only on the construction materials and primarily on the marbles used for the adornment of the different construction phases of its *scaenae frons*.

The mention of a theatre by Strabon (geogr. 14, 1, 43) and few architectural items unearthed during the excavation indicate that its construction began in Late Hellenistic-Early Imperial time¹². On the other hand, the preserved architectural decoration evidences that

10 For new plan of the urban settlement see KADIOĞLU 2011, Fig. 1.

11 KADIOĞLU 2006.

12 KADIOĞLU 2006, 92-97. 141.



Fig. 5. The column architecture of the 1st storey (excepting the shaft). The upper profile of the architrave is carved separately

the *proskenion*, the stage building and *scaenae frons* were built during the 2nd century A.D. when they also underwent renewal and restoration. In his study of the theatre, Kadioğlu could distinguish two Imperial time construction phases: one during the Hadrianic period and a second phase dating in late Antonine-early Severan time (180–200 A.D.). The preserved architectural elements allow only the reliable reconstruction of this latter phase; the Hadrianic time construction activity is mainly evidenced by the stylistic features of the architectural decoration of the *proskenion* and few architectural elements reused in the later phase¹³.

The construction material used for the rows of seats and stairs of the *cavea* and for the *analemma*-walls is, according to macroscopic examination, a medium-grained marble covered with a ferruginous patina.

13 The lack of epigraphic or literary sources impedes any assumptions on the reasons for the renewal of the *scaenae frons*. Nevertheless, as Kadioğlu presumes, a natural phenomenon, maybe the earthquake that affected Asia Minor in the second half of 2nd century A.D., might have been the cause of destruction of the Hadrianic time theatre façade. For the Hadrianic phase see KADIOĞLU 2006, 98-115. 141; for the late Antonine-early Severan time phase, see KADIOĞLU 2006, 116-138. 141.



Fig. 6. Reused cornice (see the denticules on the upper torus carved to a basis of the 1st storey of the *scaenae frons*)

The marble of the theatre seats is white-grey coloured whereas the material of the *analemma*-walls includes in addition to this white-grey marble, also a grey-bluish variety (Fig. 3). These petrographic features (colour, grain size, patina) suggest the local origin of the marble; the EPR and isotopic analysis conducted on samples from two *analemma*-blocks demonstrate that this marble was quarried locally (see below, Table 1 and 2). White-grey and grey-bluish marble blocks of small, irregular form are also used for the *opus-mixtum* and *opus incertum*-facing of the *proskenion* and of the building stage¹⁴. It can be inferred that the bulk of the marble used for the construction of the theatre was of local origin and that the local quarries were still exploited in the Imperial time.

The *proskenion* front was adorned with a rectangular Ionic *columnatio* ending with engaged half-columns. The material of Attic-ionic bases, of the architrave-frieze-blocks and of the cornices was according to macroscopic examination a medium-grained white marble; its geochemical characteristics suggest a provenance from the quarries of Miletus (see below table. 2). The monolithic shafts of the *columnatio* were carved of polychrome stones of different origins¹⁵. These decorative stones can be identified as ‘greco scritto’, *verde antico*,

14 KADIOĞLU 2006, 19 pl. 8, 5.

15 KADIOĞLU 2006, 172-174, kat. 7-16.



Fig. 7. Column shafts of the 1st storey of the *scaenae frons*



Fig. 8. Column shafts of the 2nd storey of the *scaenae frons*

breccia corallina from the Karaburun peninsula¹⁶, *giallo antico* and *pavonazzetto* (Fig. 4).

The three-storied *scaenae frons* was rectilinear and divided by five doors, each framed by column architecture designed as projecting *aediculae*. Its *columnatio* was erected on six podia each supporting two columns, a columnar disposition that was repeated in each of the three storeys¹⁷. The lower Corinthian order of the *scaenae* composed of Attic-Ionic bases, monolithic shafts and capitals carried an entablature including the sequence of an architrave, a frieze and a cornice (Fig. 5). Two aspects related to the marble architecture of the first storey call for a brief comment: One of the column bases shows on its upper torus four *denticules*; this is a clear reference that it was carved out of a cornice, reused as building material¹⁸ (Fig. 6). Second, unlike the front architraves that were carved of a single marble block, some of the lateral architraves of the *aediculae* have their upper profiles worked separately¹⁹. Both cases speak for the scarcity of marble the constructors had at their disposal.

The second order of the *columnatio* was composed in a similar manner as the lower order, but ended with Composite capitals. The main difference was that the second-storey-*aediculae* were crowned by pediments: a central broken pediment span over the two mid aedicule

and is framed by triangular and oval pediments at the sides. The order of the third storey was probably Corinthian, but due to the scarce number of preserved items it remains difficult to reconstruct it in detail.

The macroscopic investigation of the numerous preserved architectural items of the *scaenae* indicates that its architecture was predominantly white. So the material of the Attic bases, capitals, entablatures and pediments that was a medium-grained white marble with unobtrusive light grey coloured spots of both irregular form and appearance. The only visually distinctive elements of the *scaenae* were the monolithic shafts; the material of the first storey was indeed milk-white, but exhibited conspicuously dark-grey patterns. The shafts of the second storey had small black spots and partly yellow-reddish veins, whereas the ones of the third order showed irregular but extensive grey patterns (Figs. 7, 8).

The origin of these white and white-grey marbles can be determined with certain probability by statistical analysis of archaeometric data (table 2). Only the results of the provenance analysis of the monolithic shafts used in the first order of *scaenae* are conclusive. They were carved out of marble from Denizli, an ancient marble district situated about 70 km to the east of Nysa. The petrographic features of the remaining marble architecture of the theatre are rather unspecific; their isotopic and EPR-values are typical of many quarries scattered around in Caria and South Ionia. The marble of the architrave-frieze of the *proskenion* – built in the Hadrianic time – was probably quarried at the Bafa See district (Miletus and Heracleia), so was imported from the western coast of Asia Minor. The cornice of the podium and one Attic-ionic base of the first storey could be assigned by the statistical analysis to the Ephesian quarry district, which is also located west of Nysa. Nevertheless, the bulk of the white marble used for the entablature of the late-Antonine phase of *scaenae frons* was most probably of Aphrodisian origin. Even though in this particular case the

16 For the breccia corallina from the Karaburun peninsula see BRUNO *et al.* 2012, 568 f. Figs. 7-9.

17 For a detailed architectural description of column architecture of the 1st storey see KADIOĞLU 2006, 34. 195-197 (bases); 36. 198-204 (shafts); 37. 205-208 (Corinthian capitals); For the 2nd storey see KADIOĞLU 2006, 71. 280-282 (bases); 282-287 (shafts); 287 (composite capitals); For the 3rd storey see KADIOĞLU 2006, 306 (shafts); 307f. (capitals).

18 KADIOĞLU 2006, 196, SF 200, kat. 92, fig. 33.

19 KADIOĞLU 2006, 42-44, fig. 47-53; pl. 17, 1-10; 18, 1. 2.



Fig. 9.
Comparison of the entablature of the 1st storey of the *scaenae frons* of the theatre at Nysa (above) and the one of so-called Tetrpylon at Aphrodisias (below)

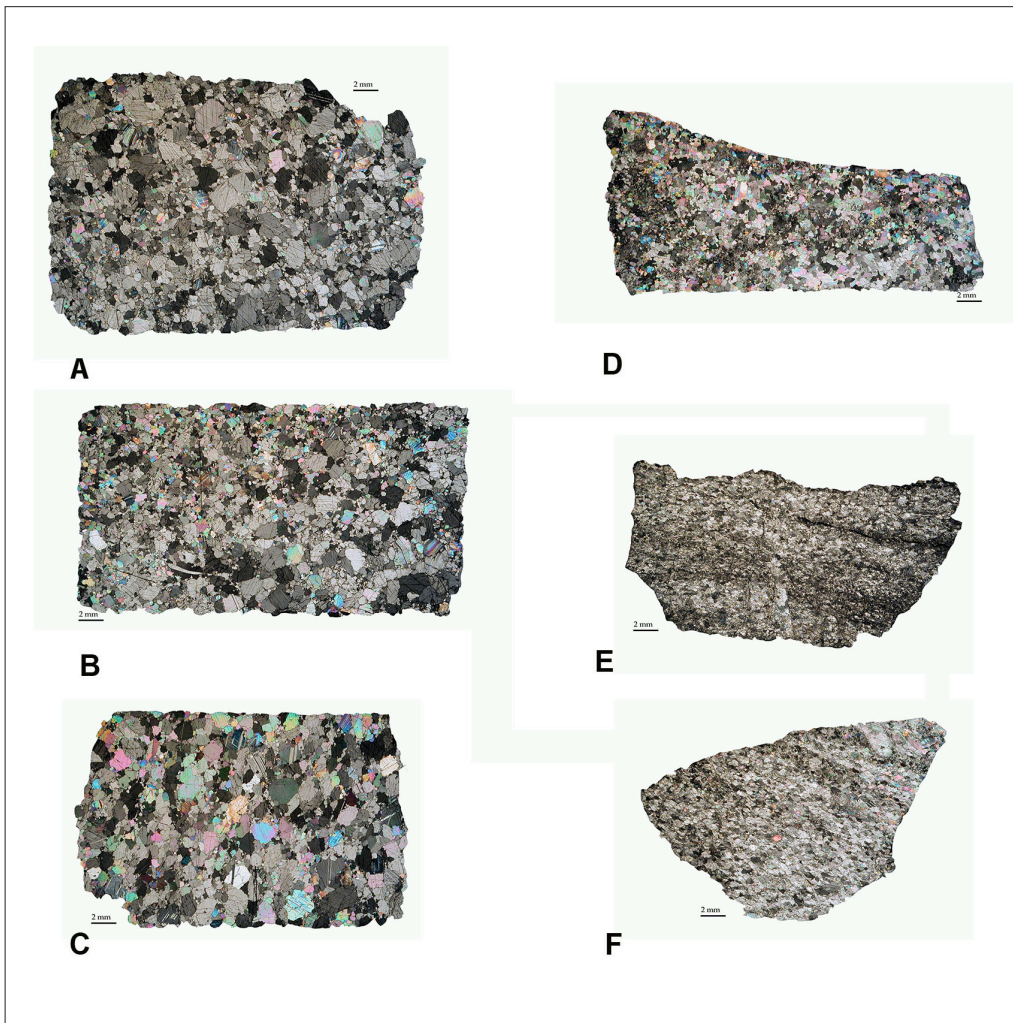


Fig. 10.
Thin sections of the samples.
A: Architrave-frieze of the *proskenion*
B: Architrave of the 1st storey of the *scaenae frons*
C: 1st storey of the *scaenae frons*
D: shaft of the 1st storey of the *scaenae frons*
E: block of the *analemma-wall*
F: quarry sample

quarry samples		$\delta^{13}\text{C} \text{ ‰}$	$\delta^{18}\text{O} \text{ ‰}$	Dol. %	Intens %	W %	MGS mm
1	local quarry	1,99	-9,26	0	129,65	61,3	1,05
2	local quarry	1,76	-10,34	0	118,15	52,9	0,90

Table 1. Experimental values of samples from the local quarries

Architectural item	Position	Values						Results				
		Isotopes		EPR			MGS mm	1. Choice				Orig.
		$\delta^{13}\text{C} \text{ ‰}$	$\delta^{18}\text{O} \text{ ‰}$	dol %	intens. %	W %		Orig.	dist. a.u.	rel. prob.%	abs. prob.%	
Arch. Frieze	<i>Proskenion</i>	2,41	-3,31	0	24,4	46,2	1,5	Miletus	4	50		
Cornice	Podium	1,97	-3,21	0	28,4	39,8	1,2	Ephesos 2	9,5	29		Miletus
Basis	<i>scaenae frons, 1st storey</i>	3,24	-4,43	42	206,1	54	1,8–2	Ephesos 1	5	93	43	
Shaft		2,00	-6,69	22	54,92	52,1	1,6	Denizli 1	2,1	80		
Shaft		1,56	-6,75	13	67,77	54,1	1,3	Denizli 1	0,6	90		
Shaft		2,27	-6,21	72	72,87	53,2	0,8	Denizli 1	8,3	59		
Shaft		2,49	-6,79	0	87,14	48,1	1,4	Denizli 1	6,5	68		
Arch.		1,63	-3,50	0	27,59	44,2	1,7	Aphrodisias	4,3	34		
Frieze		1,54	-2,69	0	33,63	57,2	1,75	Aphrodisias	1,9	54		
Frieze		2,06	-2,97	0	26,18	54,1	1,6	Heracleia	3,5	78		
Cornice		1,96	-2,82	0	45,23	51,2	2,5	Aphrodisias	4,6	38		Heracleia
Bl.		<i>Analemma</i>	1,12	-11,19	0	212,03	55,2	1,05	Nysa	18	98	
Bl.	0,19		-11,21	0	118,75	55,2	1,25	Nysa	15	91		

Table 2. Experimental values and results of the statistical analysis of the sampled from the theatre of Nysa

statistical probability of the provenance is rather low, additional archaeological information strongly corroborates this assignation. The ornamental decoration of the entablature of the *scaenae frons* shows evident resemblances to the entablature of the so-called Tetracylon of the Aphrodite-Sanctuary at Aphrodisias²⁰ (Fig. 9). This analogy was first observed by W.-D. Heilmeyer that interpreted it as the activity of the Aphrodisian craftsmanship at Nysa. Another argument in favour of the Carian origin of the marble comes from the monolithic shafts employed in the same order as the entablature; they were as well imported from the eastern part of Caria, from the district of Denizli located in the proximity of Aphrodisias (ca. 30 km east of the city).

The provenance analysis

During a research stay in Nysa 2009, Kadioğlu provided me with samples (drilling cores) taken during restoration work from different elements of the *scaenae frons* and of the *proskenion*. I was further allowed to take small

samples from architectural items of the Gerontikon, the Roman Bath and from the local quarry. For the permission to study and sample the marble architecture of Nysa I am grateful to prof. V. Idil, director of the Nysa excavation.

Each sample was subjected to a detailed minero-petrographical study, with microscopic examination of thin sections and to isotopic analysis of stable carbon and oxygen isotopes as well as electron paramagnetic resonance (EPR). The isotope ratios were measured at the Leibniz Laboratory in Kiel, the EPR-data and MGS at the Centro Nazionale delle Ricerche (Rome). I am deeply thankful to D. Attanasio for his advice and support in analysing the samples and interpreting the statistical discrimination.²¹

The geochemical analysis of the two samples from the local quarries of Nysa defines two of their features:

21 M. Kadioğlu also discussed the origin of the marble used for the *scaenae frons* of the theatre at Nysa (KADIOĞLU M. 2016, 714–716). He used therefore the experimental values of the archaeometric study included in my PhD thesis that he quoted partially. Nevertheless, the author missed to provide a statistical interpretation and to describe the methodology.

very low oxygen isotope values ($\delta^{18}\text{O}$ ‰) and a very high EPR intensity.

Except for the two samples from the *analemma*-walls that exhibit highly negative oxygen ratio ($\delta^{18}\text{O}$), and the homogeneous group of four samples of the shafts measuring similar negative oxygen values, the remaining samples show the usual range of both $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$. Most samples exhibit medium or sometimes high EPR intensity, with only three weak samples, all belonging to architectural elements of the entablature of the first storey.

The analysis of the thin sections confirms the macroscopic observation indicating a medium-sized grain of the sampled marbles. The texture of the marbles is mostly heterogeneous, only the grain size shows small variation. Though lens-shaped recrystallization and even parts of weak recrystallization can be observed, no distinct propriety of the marbles can be detected (Fig. 10).

For the statistical provenance determination were considered only the following Turkish marble sites – Afyon, Aphrodisias, Denizli (1 and 2), Ephesos (1 and 2), Heracleia, Hierapolis, Miletus, Proconnesos (1, 2, Aksoy, Harmantaş). The methods of statistical analysis are those defined by Attanasio²². Except for the samples of the *analemma*-walls and those of the shafts that can be reliably assigned to the local quarry respectively to the district of Denizli, the provenance of the remaining is uncertain and requires interpretation based on additional archaeological information.

Aphrodisian marble and craftsmanship between marble trade and building industry

Both archaeometrical analysis and macroscopic observations allow to consider that the bulk of marble used for the material-consuming parts of the theatre – *cavea*, *analemmata* – was quarried locally. At the same time, they indicate that the local marble of Nysa was still extracted in the Imperial time, and that these local resources were not exhausted. Furthermore, the use of this marble for the Ionic order of the Hellenistic Agora Halls evidences that its geologic proprieties made it suitable for both architectural elements as for the fine-carved decoration.

Nevertheless, as archaeometrical analysis clearly indicated, the marble of the *proskenion's columnatio* and of the *scaenae frons* was imported. The marble used in the Hadrianic construction phase of the *scaenae frons* probably originated from South Ionia (Bafa See region and Ephesos), whereas the late Antonine-early Severan

phase was constructed with marble imported from the eastern part of Caria (Denizli and Aphrodisias). The choice of these two districts is not surprising, because Nysa is positioned along the road that runs through the Meander valley and connected the Carian hinterland with the Ionic cities on the Aegean Sea coast.

The import of prefabricated items can be assumed only in case of the monolithic shafts from Denizli and the coloured shafts used for the architecture of *proskenion*. In case of the remaining architectural items (bases, capitals and entablature) especially those made of Aphrodisian marble the import of the blocks to be carved on the site is rather probable. One argument to sustain this interpretation is the different treatment of the frontal and side architraves of the *scaenae frons* architecture. This technical observation reveals a necessary improvisation, because the imported marble has been scarcely calculated²³. The shortage of the imported construction material is also emphasized by the recycling of the cornice for the base (Fig. 6), and further by the fact that the back-side of architrave-frieze-blocks was hollowed out.

How is to explain the import of white marble from Caria to Nysa a city having its own white marble resources of comparable quality? And how is to interpret the export of local marble from Aphrodisias that could barely handle its own local demand of building material?

Even though the late Antonine-early Severan *scaenae frons* of the theatre at Nysa indicates that Aphrodisian marble was exported for building purposes on a regional level, this should not be considered a common export of a natural resource. The resemblances between the ornamental decoration of the entablatures of *scaenae frons* at Nysa and the so-called Tetracylon of the Aphrodite Sanctuary at Aphrodisias (Figs. 10, 11) are so evident, that it appears obvious that the column architecture at Nysa was the work of Aphrodisian craftsmen. In my opinion this is a case of importing a whole façade or rather a case of a specific implementation of an architectural project including both the supply of construction material and the craftsmanship²⁴. I propose to identify the complete construction of the *scaenae frons* as the work of a 'construction company' from Aphrodisias that fulfilled a specific building contract at Nysa, i.e. to build the *scaenae frons*. Though no written sources explain the contents of such contracts, the archaeological evidence indicates that they must have included the purchase of building material, the technical assemblage

22 ATTANASIO 2003; ATTANASIO *et al.* 2006, 61-68. 213-229.

23 For a similar case see the architrave-friezes of the theatre at Nysa-Scythopolis (FISCHER 1998).

24 The so-called export of the whole façade was identified both in case of Moesia Inferior (see TOMA 2012.) but also in Palestine (see FISCHER 1998).

of the *columnatio* and the carving of the ornamental decoration²⁵. That is why I chose to define it as a task of a ‘construction company’ and not of a group of wandering craftsmen accompanying a marble transport.

To conclude: The presented case of the *scene frons* at Nysa evidences that Aphrodisias did benefit economically from its local marble at least on a regional level, but not within the frame of an export of natural resources. The distribution of Aphrodisian marble was part of the marble building industry that developed in the Imperial period and was specialized on implementing complete column architectures.

BIBLIOGRAPHY

- ATTANASIO D. 2003: Ancient white marbles: analysis and identification by paramagnetic resonance spectroscopy, Rome.
- ATTANASIO D., BRILLI M., OGLE N. 2006: The isotopic signature of classical marbles, Rome.
- ATTANASIO D., BRUNO M., YAVUZ A. B. 2009: “Quarries in the region of Aphrodisias: the black and white marbles of Göktepe (Mugla)”, *JRA* 22, 312-348.
- BRUNO M., ELÇI H., YAVUZ A. B., ATTANASIO D. 2012: “Unknown ancient marble quarries of Western Asia Minor”, in *ASMOSIA IX*, 562-572.
- BIANCHI F., BRUNO M., GORGONI C., PALLANTE P., PONTI G. 2009: “The Pilasters of the Severan Basilica at Leptis Magna and the School of Aphrodisias: New Archaeometric and Archaeological Data”, in *ASMOSIA VIII*.
- DNO: KANSTEINER S., HALLOF K., LEHMANN L., SEIDENSTICKER B., STEMMER K., *Der Neue Overbeck*, Berlin 2014.
- FISCHER M. 1998: *Marble studies: Roman Palestine and the marble trade*, Konstanz.
- HEILMEYER W.-D. 1970: *Korinthische Normalkapitelle*, 16. Erg.-H. RM, Heidelberg.
- KADIOĞLU M. 2006: *Die scaenae frons des Theaters von Nysa am Mäander. Forschungen in Nysa am Mäander I*, Mainz.
- KADIOĞLU M. 2011: “Vorbericht über die Arbeiten im Gerontikon von Nysa am Mäander (2006–2009)”, *JdI* 126, 2011, 107-154.
- KADIOĞLU M. 2016: Der Gebrauch von Marmorsorten in der Architektur von Nysa und Teos, in T. ISMAELLI, G. SCARDOZZI, *Ancient quarries and building sites in Asia Minor* (Bari 2016), 711 – 723.
- LONG L. 2012: “Regional Marble Quarries”, in C. RATTÉ, P. DE STAEBLER (eds.): *The Aphrodisias Regional Survey. Aphrodisias V*, Darmstadt/Mainz, 165-201.
- MARTIN S. D. 1989: *The Roman Jurists and the Organization of the Private Building in the Late Republic and Early Empire*, Brussels.
- OUTSCHAR U. 1996: “Zur Baudekoration und typologischen Stellung des Tetracylons”, in C. ROUECHÉ, R. R. R. SMITH (eds.): *Aphrodisias Papers 3, JRA Supplemental Series*, 20 (Ann Arbor 1996), 215-224.
- ROCKWELL P. 1996: “The marble quarries. A preliminary survey”, in C. ROUECHÉ, R. R. R. SMITH (eds.): *Aphrodisias papers 3. The setting and quarries, mythological and other sculptural decoration, architectural development, Portico of Tiberius, and Tetracylon* (Ann Arbor 1996), 81-103.
- RUMSCHEID F. 1994: *Untersuchungen zur kleinasiatischen Bauornamentik des Hellenismus*, Mainz.
- SQUARCIAPINO F. 1943: *F. La Scuola di Afrodiasias*, Roma.
- TOMA N. 2012: “Marble trade in Moesia Inferior”, in *ASMOSIA IX*, 549-561.
- TOMA N. 2015: *Marmor und Monumentalisierung der urbanen Landschaft römischer Städte. Der Handel mit vorgefertigten Marmorbauteilen und seine Auswirkungen auf das römische Bauwesen und das Erscheinungsbild römischer Städte* (1.-3. Jh. n. Chr.) (unpubl. Diss. 2015, CAU-Kiel)
- TOMA N. 2018: *Standardization and mass customization of architectural components: new perspectives on the Imperial marble construction industry*, *JRA* 31, 2018 (forthcoming)
- YAVUZ B., ATTANASIO D., ELÇI H., BRILLI M., BRUNO M. 2009: “Discovery and preliminary investigation of the Göktepe marble quarries (Mugla, Turkey) and their role as an alternative Aphrodisias marble”, in *ASMOSIA VIII*, 93-109.

25 The legal frame of the contracts is known and studied see MARTIN 1989. For the modus operandi of such building companies specialized in marble architecture see TOMA 2018.