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AN INTERIM REPORT ON THE QUANTITATIVE ANALYSIS OF PLASTER FRAGMENTS FROM
THE EXCAVATIONS AT OPLONTIS, VILLA A

(Taf. CLXXIII, Abb. 1–3)

Abstract

Este análisis cuantitativo considera los fragmentos de fresco excavados por *The Oplontis Project* entre 2006 y 2009 y contribuye al intento de reconstruir la villa de Oplontis. Los frescos son importantes porque pueden ser fechados con mayor precisión que la cerámica, por ejemplo. Nuestro análisis cuantifica fragmentos con discernibles pigmentos y esquemas decorativos de acuerdo a las categorías estilísticas de la pintura Romana en Pompeya. Cada fragmento que surgió de las quince zanjas excavadas en estos cuatro años fue fotografiado y medido a fin de encontrar la superficie. Las medidas son simplificadas con el uso de *AutoCAD*. El programa arquitectónico y la computadora convierten rápidamente la información visual en datos numéricos y reducen el error humano.

La verificación de la superficie de un determinado pigmento, esquema decorativo, o estilo contribuirá más fácilmente a reconstruir un medio bidimensional-comparado a los típicos métodos arqueológicos que utilizan medidas de volumen por tradición. Mi informe comunica el sistema aplicado por miembros de *The Oplontis Project* que producen estos datos útiles y presenta las conclusiones iniciales derivadas a Oplontis.

Los Romanos utilizaban el material de demolición producido a partir de la destrucción de una estructura cercana para elevar el terreno. Nuestras excavaciones revelaron numerosos depósitos de este tipo que contenían fragmentos de frescos. La información preliminar del análisis cuantitativo revela que hubo construcción en Oplontis mucho después del terremoto de 62 d.C., quizá hasta el momento de la erupción de Vesuvio. Además, es posible que el terremoto destruyese menor cantidad de pinturas antiguas de lo considerado tradicionalmente. Esto permite concluir que la reconstrucción fue promovida por deseos humanos.

Nuestro sistema para cuantificar superficie puede ser aplicado por cualquier arqueólogo que requiera este tipo de datos. El método no se limita a Oplontis. Es útil para los esfuerzos de actualización y reconstrucción en cualquier contexto arqueológico.

My quantitative analysis of the numerous plaster fragments excavated by the Oplontis Project between 2006 and 2009 contributes to the ongoing efforts to reconstruct Villa A in present-day Torre Annunziata, Italy (for a plan of Oplontis, Villa A see J. R. CLARKE'S Abb. 1 in this volume)¹. Frescoes are especially important because they can be stylistically dated to a few decades versus the century-long life of pottery of the period, for example. In particular, the study compliments preliminary conclusions concerning the dating of the villa, based on the walls of the Second, Third, and Fourth Styles still *in situ* and on studies conducted on foundations around Villa A. Our analysis considers the total amount of painted plaster remains that emerged from the fifteen trenches executed in Villa A through 2009 (see Abb. 1 and Appendix 1). This report reiterates the information presented in poster format at the 11th Annual AIPMA International Colloquium at Selçuk, Turkey.

¹ Under the direction of Drs. J. R. CLARKE and M. L. THOMAS (University of Texas at Austin), and in collaboration with the Soprintendenza Archeologica di Pompei, Oplontis Project participants aim to execute a comprehensive study and to produce the definitive publication on the Villa of *Poppaea* at Oplontis. The publication will include a database, high-resolution photographs, an interactive 3-D model, and original essays based on the research executed by members of the Oplontis Project.

In addition to relaying the conference presentation, this publication offers me the opportunity to thoroughly communicate the data necessarily reduced to visual templates – bar graphs and pie charts – upon the poster. I will provide the precise surface area for each plaster type in a given trench. This offers a more persuasive account of the applicability of a system that accurately and conveniently produces the surface area for archaeological remains with two-dimensional properties.

In order to quantify fresco remains, members of the Oplontis Project categorized every fragment of painted plaster discovered in excavations according to colour and/or decorative pattern². Thus far, we identified a total of thirty distinct colours and patterns. We assigned the thirty categories to the following stylistic classes: First Style, Second Style, Third Style, Fourth Style or Indeterminate. The indeterminate class refers to colours or patterns that span multiple stylistic classes. The stylistic classes we employed correspond to A. MAU's classification of Roman wall paintings at Pompeii and to more recent re-evaluations of Roman decorative preferences³. (See Appendix 2).

In order to quantify the recovered pieces, Oplontis Project members photographed every fragment on a flat surface. The fragments were photographed adjacent to a scale using a camera stand to ensure consistency. We then imported these digital photographs into *AutoCAD* and re-scaled the images so that their virtual dimensions were equivalent to their actual dimensions. Once we established the proper dimensions in model space, we were able to trace the perimeter of each fragment with a closed polygon and calculate the enclosed area of each polygon. In this way, we have been able to quickly and efficiently discern the total surface area of plaster fragments for any given trench, stratigraphic level, colour, pattern, and/or painting style with great accuracy.

Appendix 3 contains the total surface area for each identifiable pigment/pattern in every trench excavated by the Oplontis Project in the course of four seasons. At the most elementary level, the presence of plaster fragments indicates a disturbance in the form of a Roman-era deposit. Roman builders frequently employed deposits of demolition material such as roof tiles, masonry, stucco, and stone alongside other waste material in order to raise the ground level, terrace, or fill voids. The size of a deposit within a given context communicates the extent of a demolition event.

The traditional volumetric analysis of deposits offers a vague notion of the size and nature of the demolition in question. The cubic area of bricks, rubblework, concrete and other construction material allows archaeologists to posit the size and sometimes origin of a demolished wall, portico, colonnade, or some other three-dimensional structure. However, discerning the volume of fresco fragments within a deposit offers no correlative data for the purpose of reconstruction. The cubic area of painted remains does not readily translate into a visualization of the original material product in question – a spanning decorative surface.

But compiling the total surface area of painted plaster within a deposit contributes two dimensions to the puzzle. Combined with the identification of pigments and patterns, this strategy can potentially help isolate the decorated walls and rooms associated with any given demolition deposit. The Oplontis Project has already begun this venture when a fragment of a Third Style fresco emerged from a Roman-era deposit in trench OP3. J. R. CLARKE identified the piece as a remnant from room 8⁴.

Although the data present in Appendix 3 provides all the adequate information for a quantitative analysis, the data can be converted into visual formats. Bar graphs and pie charts facilitate quick consumption of the raw data. Moreover, with charts and graphs we can set parameters to isolate and accentuate the findings for expert and lay audiences alike (Abb. 2 and 3).

For example, the X-axis of each bar graph represents the thirty verifiable colours and patterns listed in Appendix 2. We can add or subtract this number to adhere to future changes in the stylistic assessment of the frescoes at Oplontis. More significantly, the Y-axis communicating the total surface area in square meters for each colour/pattern can be manipulated to conform to the amount of material discovered in future

² I would like to thank R. GEE, T. LIDDELL, I. VAN DER GRAAFF, L. CLINE, P. VELLETT and N. GALLOWAY for their contributions to this study.

³ The thirty colours and patterns and their classification were revised numerous times with the guidance and advice of J. R. CLARKE.

⁴ Thomas – Clarke 2009.

excavations. Each pie chart quantifies the percentage of the total surface area by class for each trench. The categories of colours and patterns presented can also be changed to contend with future discoveries.

This particular quantification can easily adhere to various situations and variables beyond Oplontis, particularly at archaeological sites that require the distillation of copious amounts of raw data. As it stands, the quantitative analysis reinforces the theory that a significant destruction event preceded a large-scale reconstruction which included wall paintings. This reconstruction likely included the replacement of many Third Style wall paintings, as the data displays a marked spike in the Third Style deposits even in an analytical construct dominated by indeterminate fragments and Fourth Style remains. Moreover, the lack of Fourth Style fragments found in construction/destruction deposits throughout the villa versus the large amounts of Fourth Style paintings *in situ* support a scenario of long-term, widespread reconstruction occurring at the time of the eruption of Mount Vesuvius.

Needless to say, I streamlined the amount of information gathered by the Oplontis Project for the purpose of expediency. Forthcoming publications will assess all finds stratigraphically and will cross-reference other datable material objects unearthed during excavation. The compilation will also include the length, width, depth, and nature of all strata in question. The complete assessment will be published in the upcoming *Villa A at Torre Annunziata, Italy. The Archives, Excavations, and Studies of the Villa of Poppea at Oplontis* by the American Council of Learned Studies.

APPENDIX 1: OPLONTIS PROJECT TRENCHES, 2006–2009

| | | | |
|----------|----------------|------|-----------------------|
| OP 1 | Room 92 | 2006 | |
| OP 2 | Room 92 | 2007 | omitted |
| OP 3 | Room 92 | 2007 | |
| OP 4 | Room 96 | 2007 | |
| Saggio 1 | Room 92 | 2007 | labelled IT 1 on plan |
| Saggio 2 | Room 80 | 2007 | labelled IT 2 on plan |
| OP 5 | Room 92 | 2008 | |
| Fossa A | Room 55 | 2009 | |
| OP 6 | Room 54 and 58 | 2009 | |
| OP 7 | Room 68 | 2009 | |
| OP 8 | Room 70 | 2009 | |
| OPK 1 | Room 80 | 2009 | |
| OPK 2 | Room 20 | 2009 | |
| OPK 3 | Room 56 | 2009 | |
| OPK 4 | Room 32 | 2009 | |

APPENDIX 2: THIRTY CATEGORIES OF PLASTER

The following thirty categories represent recurring, verifiable colours and patterns found on plaster fragments unearthed by the Oplontis Project. For the purpose of this analysis, the categories are placed under five distinct classes. These thirty categories do not represent an absolute template for filing remains from other archaeological sites. Rather, our classifications are fluid and constantly being redefined by members of the Oplontis Project.

INDETERMINATE

These are colours/patterns that span multiple periods and, therefore, do not lend themselves to diagnostic interpretation.

- (1) White
- (2) Black
- (3) Red ochre
- (4) Yellow ochre
- (5) Reed-backed white
- (6) Reed-backed ochre
- (7) Decorative stucco
- (8) Decorated varia

FIRST STYLE

The First Style does not play a role at Oplontis due to the fact that construction of the villa did not begin until after the demise the First Style.

SECOND STYLE

- (9) Cinnabar red
- (10) Egyptian blue
- (11) Light blue
- (12) Blue/Blue-green
- (13) Red porphyry decorated

THIRD STYLE

- (14) Porphyry red
- (15) Terra verde

FOURTH STYLE

- (16) Zebra-stripe
- (17) Zebra-stripe light green variation
- (18) Red ochre spatter
- (19) Red ochre spatter with yellow ochre on cream ground
- (20) Red ochre spatter with light green brushstrokes
- (21) Red ochre spatter varia
- (22) Orange-red ochre
- (23) Red porphyry spatter with green and white
- (24) Yellow ochre faux on cream ground
- (25) Cream/yellow ochre faux
- (26) Cream ground yellow ochre & dark red ochre border over violet
- (27) Yellow ochre decorated
- (28) Yellow ochre faux with stripes and red porphyry ground spatter
- (29) Light green brushstrokes
- (30) Variation with green brushstrokes

APPENDIX 3: TRENCH-BY-TRENCH RESULTS

2006 OP 1, Room 92

(7) Decorative stucco 77,66 square meters
(8) Decorative varia 0,25
(10) Egyptian blue 0,20
INDETERMINATE=102,66 2nd=0,20 3rd=0 4th=0,0 Total=102,86

2007 OP 2, Room 92

Modern disturbance; no Roman-era stratigraphy.

2007 OP 3, Room 92

(1) White 22,94
(2) Black 9,32
(3) Red ochre 5,57
(4) Yellow ochre 7,75
(5) Reed-backed white 14,72
(7) Decorative stucco 0,7
(8) Decorated varia 31,24
(9) Cinnabar red 1,86
(10) Egyptian blue 2,12
(12) Blue-green 2,06
(13) Red porphyry decorated 7,24
(14) Red porphyry 74,91
(16) Zebra stripe 55,28
(17) Zebra-stripe light green variation 6,10
(18) Red ochre spatter 8,87
(19) Red ochre spatter with yellow ochre faux on cream ground 3,83
(20) Red ochre spatter with light green brushstroke 16,60
(21) Red ochre spatter varia 9,58
(24) Yellow ochre faux on cream ground 12,44
(27) Yellow ochre decorated 3,65
(29) Light green brushstrokes 50,12
IND=91,71 2nd=13,28 3rd=74,91 4th=166,47 Total=346,37

2007 OP 4, Room 96

(1) White 9,46
(7) Decorative stucco 0,50
(8) Decorated varia 3,78
(13) Red porphyry 0,25
(22) Orange-red ochre 0,50
IND=13,74 2nd=0,25 3rd=0,0 4th=0,50 Total=14,4

2007 Saggio 1 (IT 1), Room 92

(1) White 69,30
(2) Black 119,70
(3) Red ochre 6,80

(4) Yellow ochre 6,75
 (5) Reed-backed white 13,10
 (8) Decorated varia 64,15
 (11) Light blue 7,35
 (12) Blue 1,52
 (14) Red porphyry 24,40
 IND=279,80 2nd=8,87 3rd=24,40 4th=0,0 Total=313,07

2007 Saggio 2 (IT 2), Room 80

(1) White 3,97
 (2) Black 0,21
 (3) Red ochre 0,53
 (4) Yellow ochre 0,13
 (5) Reed-backed white 0,90
 (7) Decorative stucco 1,18
 (9) Red cinnabar 0,23
 (14) Red porphyry 1,43
 (16) Zebra-stripe 10,25
 (23) Red porphyry spatter with green and white 11,23
 (28) Yellow ochre faux with stripes and red porphyry ground spatter 2,89
 (29) Light-green brushwork 18,40
 IND=6,92 2nd=0,23 3rd=1,43 4th=42,77 Total=51,35

2008 OP 5, Room 92

(1) White 140,25
 (2) Black 229,15
 (3) Red ochre 15,14
 (4) Yellow ochre 13,01
 (5) Reed-backed white 1,00
 (7) Decorative stucco 184,35
 (8) Decorated varia 192,05
 (9) Red cinnabar 5,89
 (10) Egyptian blue 5,25
 (14) Red porphyry 64,99
 (15) Terra verde 6,13
 (16) Zebra-stripe 6,60
 (29) Light-green brushwork 0,40
 IND=774,95 2nd=11,14 3rd=71,12 4th=7,00 Total=864,21

2009 Fossa A, Room 55

(2) Black 0,07
 (14) Red porphyry 0,03
 IND=0,07 2nd=0,0 3rd=0,03 4th=0,0 Total=0,10

2009 OP 6, Room 54 and 58

(1) White 156,39
 (2) Black 72,31

(3) Red ochre 1,10
(4) Yellow ochre 9,02
(5) Reed-backed white 0,25
(7) Decorative stucco 58,3
(8) Decorated varia 23,86
(9) Red cinnabar 0,03
(14) Red porphyry 1,50
(16) Zebra-stripe 17,29
IND=321,23 2nd=0,03 3rd=1,50 4th=17,29 Total=340,05

2009 OP 7, Room 68

(1) White 0,58
(3) Red ochre 0,10
(4) Yellow ochre 0,45
(8) Decorated varia 0,30
(14) Red porphyry 0,48
IND=1,43 2nd=0,0 3rd=0,48 4th=0,0 Total=1,91

2009 OP 8, Room 70

(1) White 0,83
(8) Decorated varia 2,40
(9) Red cinnabar 0,15
IND=3,23 2nd=0,15 3rd=0,0 4th=0,0 Total=3,38

2009 OPK 1, Room 80

(1) White 131,25
(2) Black 235,95
(3) Red ochre 2,47
(4) Yellow ochre 7,89
(5) Reed-backed white 6,40
(7) Decorative stucco 2,71
(8) Decorated varia 28,09
(14) Red porphyry 4,95
IND=414,76 2nd=0,0 3rd=4,95 4th=0,0 Total=419,71

2009 OPK 2, Room 20

(1) White 44,20
(2) Black 0,14
(3) Red ochre 21,42
(4) Yellow ochre 0,28
(5) Reed-backed white 0,24
(7) Decorative stucco 2,56
(8) Decorated varia 7,78
(9) Red cinnabar 0,06
(14) Red porphyry 0,35
IND=76,62 2nd=0,06 3rd=0,35 4th=0,0 Total=77,03

2009 OPK 3, Room 56

| | | | | | |
|---------------------------|--------|-------------------|------|-------------------|--------|
| (1) White | 151,65 | | | | |
| (2) Black | 2,25 | | | | |
| (3) Red ochre | 4,06 | | | | |
| (4) Yellow ochre | 0,18 | | | | |
| (5) Reed-backed white | 4,94 | | | | |
| (6) Reed-backed red ochre | 2,05 | | | | |
| (7) Decorative stucco | 37,64 | | | | |
| (8) Decorative varia | 3,39 | | | | |
| (9) Red cinnabar | 0,18 | | | | |
| (14) Red porphyry | 8,64 | | | | |
| (18) Red ochre spatter | 1,50 | | | | |
| IND= | 206,16 | 2 nd = | 0,18 | 3 rd = | 8,64 |
| | | | | 4 th = | 1,50 |
| | | | | Total= | 216,48 |

2009 OPK 4, Room 32

| | | | | | |
|-----------------------|-------|-------------------|------|-------------------|-------|
| (1) White | 19,80 | | | | |
| (2) Black | 4,30 | | | | |
| (3) Red ochre | 1,43 | | | | |
| (4) Yellow ochre | 9,63 | | | | |
| (5) Reed-backed white | 7,33 | | | | |
| (8) Decorated varia | 10,29 | | | | |
| (9) Red cinnabar | 0,01 | | | | |
| (10) Egyptian blue | 0,04 | | | | |
| (14) Red porphyry | 4,10 | | | | |
| (15) Terra verde | 1,57 | | | | |
| IND= | 52,78 | 2 nd = | 0,05 | 3 rd = | 5,67 |
| | | | | 4 th = | 0,0 |
| | | | | Total= | 58,50 |

Bibliographie

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Abbildungen

- Abb. 1: Plan of Villa A at Oplontis, Courtesy of the Oplontis Project
Abb. 2: Quantitative Bar Graph for Trench OP3, Courtesy of the Oplontis Project
Abb. 3: Quantitative Pie Chart for Trench OP3, Courtesy of the Oplontis Project

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