

ΕΥΡΩΠΑΪΚΟ ΚΕΝΤΡΟ ΒΥΖΑΝΤΙΝΩΝ ΚΑΙ ΜΕΤΑΒΥΖΑΝΤΙΝΩΝ ΜΝΗΜΕΙΩΝ
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EUROPEAN CENTER OF BYZANTINE AND POST-BYZANTINE MONUMENTS
EPHOREIA OF BYZANTINE ANTIQUITIES OF THESSALONIKI

**8ο Συνέδριο
Διεθνούς Έπιτροπής
για τή Συντήρηση τών Ψηφιδωτών (ICCM)**

**ΕΝΤΟΙΧΙΑ ΚΑΙ ΕΠΙΔΑΠΕΔΙΑ ΨΗΦΙΔΩΤΑ:
ΣΥΝΤΗΡΗΣΗ, ΔΙΑΤΗΡΗΣΗ, ΠΑΡΟΥΣΙΑΣΗ**

Θεσσαλονίκη 29 Ὀκτωβρίου - 3 Νοεμβρίου 2002



**VIIIth Conference
of the International Committee
for the Conservation of Mosaics (ICCM)**

**WALL AND FLOOR MOSAICS:
CONSERVATION, MAINTENANCE, PRESENTATION**

Thessaloniki 29 October - 3 November 2002

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VIIIth CONFERENCE

OF THE INTERNATIONAL COMMITTEE

FOR THE CONSERVATION OF MOSAICS (ICCM)

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Παρουσιάζοντας τὸ πρόγραμμα καὶ τὶς περιλήψεις τῶν ἀνακοινώσεων καὶ τῶν πινακίδων τοῦ 8ου Διεθνούς Συνεδρίου τῆς Διεθνούς Ἐπιτροπῆς γιὰ τὴ Συντήρηση τῶν Ψηφιδωτῶν (ICCM) μὲ χαρὰ σὰς καλωσορίζω στὴ Θεσσαλονίκη.

Κατὰ τὴ διάρκεια τῆς τελευταίας δεκαετίας τὸ ἐνδιαφέρον τοῦ ICCM ἦταν στραμμένο πρὸς τὴν *in situ* συντήρηση τῶν ἐπιδαπέδιων ψηφιδωτῶν, θέμα στὸ ὁποῖο ἀφιερώθηκε τὸ συνέδριο στὴ Λευκωσία (1996) καὶ κατὰ μεγάλο μέρος τὸ συνέδριο στὴν Arles/Saint-Romain-en-Gal (1999). Ἡ *in situ* συντήρηση προβάλλεται ἰδιαίτερος καὶ στὸ φετινὸ συνέδριο περιλαμβάνοντας καὶ τὰ ἐντοίχια ψηφιδωτά. Εἶναι ἡ πρώτη φορὰ πού σὲ συνέδριό μας δίνουμε ἰδιαίτερη βαρύτητα στὰ ἐντοίχια ψηφιδωτά. Ἡ ἀπόφασή μας αὐτὴ ὀφείλεται βέβαια σὲ μεγάλο βαθμὸ στὴν πόλη πού μᾶς φιλοξενεῖ. Ἡ Θεσσαλονίκη, παρὰ τοὺς σεισμοὺς καὶ ἄλλες καταστροφές πού ἀνὰ τοὺς αἰῶνες ὑπέφερε, διατηρεῖ ἀκόμη ἕνα ἀπὸ τὰ καλύτερα σωζόμενα σύνολα ἐντοίχιων ψηφιδωτῶν στὸν κόσμο. Αὐτὰ κατὰ κύριο λόγο διατηροῦνται *in situ*, καθὼς μέχρι σήμερα διακοσμοῦν τμήματα τῶν κτηρίων γιὰ τὰ ὁποῖα δημιουργήθηκαν.

Ὅπως δηλώνεται στὸν τίτλο "Ἐντοίχια καὶ Ἐπιδαπέδια Ψηφιδωτά: Συντήρηση, Διατήρηση, Παρουσίαση", στὸ συνέδριο θὰ ἐξεταστοῦν ἐπίσης, ὅπως πάντα, ἐπιδαπέδια ψηφιδωτά καθὼς καὶ ἄλλα σχετικὰ μὲ τὰ ψηφιδωτά ζητήματα. Οἱ προτάσεις γιὰ παρουσίαση ἀνακοίνωσης ἢ πινακίδας ἢ καὶ γιὰ ἀπλὴ συμμετοχὴ στὸ συνέδριο ἦταν ἰδιαίτερα πολλές καὶ μποροῦμε νὰ ποῦμε ὅτι ποτὲ πρὶν δὲν εἶχαν ἐκπροσωπευθεῖ τόσες χώρες σὲ μία ἀπὸ τὶς συναντήσεις μας. Ἡ ἴδια ἡ Θεσσαλονίκη καὶ τὸ ἐνδιαφέρον πρόγραμμα πού καταρτίστηκε ἀπὸ τὰ μέλη τῆς Ὄργανωτικῆς Ἐπιτροπῆς μποροῦν ἀσφαλῶς νὰ θεωρηθοῦν ὁ κύριος λόγος πού

προσέλκυσε τόσους ειδικούς στη φετινή συνάντηση. Ὡς πρόεδρος τοῦ ICCM, ὥστόσο, θέλω νὰ πιστεύω ὅτι στη δημοσιότητα τοῦ συνεδρίου συνέβαλε ἐπίσης ὁ ἀκόλουθος παράγοντας: Μὲ τὸ πέρασμα τοῦ χρόνου, οἱ συναντήσεις τοῦ ICCM ἔχουν ἀναγνωριστῆι ὡς μία σημαντικὴ συνάντηση εἰδικῶν, στὴν ὁποία μποροῦν νὰ συζητηθοῦν ἢ συντήρηση καὶ ἡ παρουσίαση τῶν ψηφιδωτῶν καθὼς καὶ ἄλλα σχετικὰ ζητήματα, καὶ αὐτὸ προκαλεῖ ἰδιαίτερη ἱκανοποίηση κατὰ τὴν 25ῃ ἐπέτειο τῆς ἴδρυσης τῆς Ἐπιτροπῆς μας.

Θὰ ἤθελα μὲ τὴν εὐκαιρία αὐτὴ νὰ εὐχαριστήσω τὸ Ὑπουργεῖο Πολιτισμοῦ τῆς Ἑλλάδας, ὑπὸ τὴν αἰγίδα τοῦ ὁποίου πραγματοποιεῖται τὸ συνέδριο, καθὼς καὶ τὸ ICCROM, καὶ ἰδιαίτερα τὸν Γενικὸ Διευθυντὴ Dr. Nicholas Stanley-Price (μέλος ἐπίσης τοῦ ICCM) γιὰ τὴν ὑποστήριξή του. Εἶμαι ἰδιαίτερα εὐγνώμων στὴν δρ. Εὐτυχία Κουρκουτίδου-Νικολαΐδου, Διευθύντρια τοῦ Εὐρωπαϊκοῦ Κέντρου Βυζαντινῶν καὶ Μεταβυζαντινῶν Μνημείων, καὶ στὸν καθηγητὴ Χαράλαμπο Μπακιριτζῆ, Ἐφορο τῶν Βυζαντινῶν Ἀρχαιοτήτων Θεσσαλονίκης (μέλος ἐπίσης τοῦ ICCM), ποὺ προσφέρθηκαν νὰ φιλοξενήσουν τὸ συνέδριο. Ἐπίσης, εὐχαριστῶ τὸν δρ. Νικόλαο Μίνω, Διευθυντὴ τῆς Συντήρησης Ἀρχαιοτήτων, τὴν δρ. Μαρία Φουντούκου, Διευθύντρια τῆς Ἀναστήλωσης Βυζαντινῶν καὶ Μεταβυζαντινῶν Μνημείων καὶ τὴν δρ. Ἐλένη Γκίνη-Τσοφοπούλου, Ἐφορο τῶν Βυζαντινῶν Ἀρχαιοτήτων Ἀθηνῶν, γιὰ τὴ συνάντηση στὴ Μονὴ Δαφνίου. Ἡ μεγάλη συμμετοχὴ ὁμιλιῶν στὰ ἑλληνικὰ ἐνθαρρύνθηκε σὲ μεγάλο βαθμὸ ἀπὸ τὴ γενναιόδωρη βοήθεια τοῦ Getty Conservation Institute, ποὺ ἔκανε δυνατὴ τὴν ταυτόχρονη μετάφρασή τους. Εἶμαι βαθιὰ ὑποχρεωμένος στὴ Jeanne Marie Teutonico (Associate Director of the Getty Conservation Institute, GCI), ποὺ πῆρε τὴν πρωτοβουλία γιὰ τὴ δυνατότητα αὐτὴ. Περισσότερο, ὥστόσο, εἶμαι εὐγνώμων στὰ μέλη τῆς Ὄργανωτικῆς Ἐπιτροπῆς τοῦ συνεδρίου, στὴν Ἐφορεία Βυζαντινῶν Ἀρχαιοτήτων Θεσσαλονίκης, στὸ Εὐρωπαϊκὸ Κέντρο Βυζαντινῶν καὶ Μεταβυζαντινῶν Μνημείων γιὰ τὴ σκληρὴ δουλειά τους στὴν ἐκπόνηση αὐτοῦ τοῦ προγράμματος.

Ὅλοι μποροῦμε νὰ προσβλέπουμε σὲ μία ἑβδομάδα γόνιμων πα-

ρουσιάσεων και συζητήσεων, καθώς επίσης και στις ενδιαφέρουσες επισκέψεις στα έντοια ψηφιδωτά τῆς Θεσσαλονίκης καὶ τῆς Μονῆς Δαφνίου.

ΔΗΜΗΤΡΙΟΣ ΜΙΧΑΗΛΙΔΗΣ

OPENING SPEECH BY THE PRESIDENT
OF THE INTERNATIONAL COMMITTEE
FOR THE CONSERVATION OF MOSAICS

In presenting the program and the abstracts of the papers and posters of the VIIIth International Conference of the International Committee for the Conservation of Mosaics (ICCM), it gives me great pleasure to welcome you all to Thessaloniki.

During the last decade or so, the policy of the ICCM has been towards the *in situ* conservation of floor mosaics, a theme to which the Nicosia (1996) and, to a large extent, the Arles/Saint-Romain-en-Gal (1999) conferences were dedicated. *In situ* conservation features prominently in this year's conference too, but it has now been expanded to include wall mosaics. In fact, this is the first time that we give wall mosaics serious consideration during one of our conferences. Our decision to do so was, of course, largely prompted by the city that is hosting the conference: Thessaloniki, despite the many earthquakes and other disasters she has suffered, still preserves one of the best collections of wall and vault mosaics in the world. These, in their vast majority, are *in situ* since they still decorate the parts of the buildings they were invented for.

As it is implicit in the title "Wall and Floor Mosaics: Conservation, Maintenance, Presentation", the conference will, as always, also examine floor mosaics as well as a variety of other mosaic-related topics. The requests for presenting a paper or a poster or simply participating at the conference have been overwhelming, and it can be claimed that never before have so many countries been represented at one of our meetings. Thessaloniki herself and the interesting program devised by the local members of the Organizing Committee can certainly claim to be the main factor that attracted so many specialists to this meeting. As President of the ICCM, however, I would like

to think that another factor has also contributed to the popularity of this conference: Over the years, the meetings of the ICCM have been recognized as an important forum at which the conservation and presentation of mosaics, as well as other related matters, can be discussed - and this is particularly gratifying on this, the 25th anniversary of the foundation of our Committee.

I would like to take this opportunity to thank the Hellenic Ministry of Culture under whose auspices the conference is taking place, as well as ICCROM, in particular its Director-General Dr. Nicholas Stanley-Price (and ICCM Board Member) for its support. I am especially grateful to Dr. Eutychia Kourkoutidou-Nicolaidou, Director of the European Centre of Byzantine and Post-Byzantine Monuments, and Prof. Charalambos Bakirtzis, Ephor of Byzantine Antiquities of Thessaloniki (and ICCM Board Member), for offering to host the conference. I am also grateful to Dr. Nikolaos Minos, Director of Conservation of Antiquities, Dr. Maria Fountoukou, Director of the Restoration of Byzantine and Post-Byzantine Monuments and Dr. Eleni Gini-Tsofopoulou, Ephor of Byzantine Antiquities of Athens, for the meeting at Daphni monastery. The large participation of Greek-speakers has been encouraged, to a great extent, by the generous help of the Getty Conservation Institute that has made possible simultaneous translation, into and from Greek. I am deeply indebted to Jeanne Marie Teutonico (Associate Director of the Getty Conservation Institute, GCI) who first spoke to me about this possibility. Most of all, however, I am grateful to the members of the Organizing Committee, the Ephoreia of Byzantine Antiquities of Thessaloniki and the European Centre of Byzantine and Post-Byzantine Monuments for all their hard work in putting this program together.

We can all look forward to a week of stimulating papers and discussions, as well as to some unique visits to the wall and vault mosaics of Thessaloniki and Daphni.

DEMETRIOS MICHAELIDES

ΧΑΙΡΕΤΙΣΜΟΣ ΠΡΟΕΔΡΟΥ ΤΟΥ ΕΥΡΩΠΑΙΚΟΥ ΚΕΝΤΡΟΥ ΒΥΖΑΝΤΙΝΩΝ ΚΑΙ ΜΕΤΑΒΥΖΑΝΤΙΝΩΝ ΜΝΗΜΕΙΩΝ

Ἡ Θεσσαλονίκη, πόλη πού κοσμεῖται μέ ψηφιδωτά –αὐτὴ τὴ ζωγραφικὴ τῆς αἰωνιότητος– ἀπὸ τὴν παλαιοχριστιανικὴ καὶ βυζαντινὴ ἐποχὴ, ὑποδέχεται μέ ἰδιαίτερη χαρὰ τὸ 8ο Συνέδριο τῆς Διεθνoῦς Ἐπιτροπῆς γιὰ τὴ Συντήρηση τῶν Ψηφιδωτῶν (ICCM).

Τὸ Εὐρωπαϊκὸ Κέντρο Βυζαντινῶν καὶ Μεταβυζαντινῶν Μνημείων (EKBMM), πού ἐδρεῖται στὴ Θεσσαλονίκη καὶ περιλαμβάνει μέσα στὶς δραστηριότητές του συντήρηση ψηφιδωτῶν σὲ μνημεῖα ἐκτὸς Ἑλλάδας (ὅπως π.χ. στὰ ψηφιδωτὰ δάπεδα τῆς Βασιλικῆς τοῦ Ἁγίου Λῶτ στὴν Ἰορδανία, τοῦ ναοῦ τοῦ Καθίσματος στὰ Ἱεροσόλυμα κ.ἄ.) πιστεύει ὅτι οἱ ἐργασίες τοῦ Συνεδρίου ἐντάσσονται στοὺς σκοποὺς τοῦ Κέντρου καὶ γι' αὐτὸ μέ ἰδιαίτερη προθυμία συμμετέχει στὴ διοργάνωσή του, πιστεύοντας ὅτι οἱ ἐργασίες του θὰ συμβάλλουν στὴν προώθηση τῆς ἔρευνας γιὰ τὴ συντήρηση καὶ ἀνάδειξη τῶν ψηφιδωτῶν. Χαιρετίζει τὰ μέλη τοῦ Συνεδρίου καὶ εὐχεται γόνιμες ἀνακοινώσεις καὶ συζητήσεις γιὰ τὴ συντήρηση, τὴ διατήρηση καὶ τὴν ἀνάδειξη τῶν ἐντοιχιῶν καὶ ἐπιδαπέδιων ψηφιδωτῶν, πού σώζονται στὰ Μνημεῖα, ἀλλὰ καὶ πού συνεχῶς ἀποκαλύπτει ἡ ἀνασκαφικὴ ἔρευνα σὲ ὅλη τὴν εὐρύτερη περιοχὴ τῆς Μεσογείου.

Ἐπιτρέψτε μου νὰ ἀναφερθῶ λίγο περισσότερο στὰ Βυζαντινὰ ψηφιδωτά, καθὼς ὁ φορέας πού ἐκπροσωπῶ ἀσχολεῖται μέ αὐτὸ τὸ χῶρο. Ἡ χριστιανικὴ ζωγραφικὴ, πού ἐπιζητοῦσε νὰ ὑπερβεῖ τὸν κίνδυνο τῆς εἰδωλολατρείας, ἀλλὰ καὶ τὴν ἀπαγόρευση τοῦ Μωσαϊκοῦ Νόμου τῆς εἰκαστικῆς παράστασης τοῦ Θεοῦ καὶ τῆς ἀναπαράστασης τοῦ ἀνθρώπου, βρῆκε στὴν τεχνικὴ τοῦ ψηφιδωτοῦ τὸ πιὸ κατάλληλο ὑλικὸ γιὰ τὴν ἀποκαλυπτικὴ καὶ ποιμαντικὴ μορφολογία καὶ λειτουργία της. Τὸ ἄδρὸ σχέδιο πού ἐπιβάλλει ἡ τεχνικὴ, οἱ χρωματικὲς διαβαθμίσεις, ἡ θριαμ-

βευτική λάμψη τοῦ χρυσοῦ συνεργοῦν στό νά ἀποδίδεται μέ τήν εἰκαστική μορφή ἡ βεβαιότητα τῆς σαρκώσεως τοῦ Λόγου καί τῆς παρεμβολῆς Του στήν ἱστορία, καθῶς καί τῆς κατὰ χάριν θεώσεως τοῦ ἀνθρώπου χωρὶς τόν κίνδυνο νά ἀλλοιωθεῖ ἡ θεολογική ἀλήθεια.

Αὐτῆς τῆς λαμπρῆς καλλιτεχνικῆς παράδοσης τὰ ἔργα, μέ τίς πολλαπλές πνευματικῆς προεκτάσεις, καλεῖστε, Κυρίες καί Κύριοι τοῦ Συνεδρίου, νά διακονήσετε.

Τὸ Εὐρωπαϊκὸ Κέντρο Βυζαντινῶν καί Μεταβυζαντινῶν Μνημείων (ΕΚΒΜΜ) εὔχεται ἀγαθὴν τὴν καρποφορία.

ΝΙΚΟΣ ΖΙΑΣ

ADDRESS BY THE PRESIDENT OF THE EUROPEAN CENTRE
FOR BYZANTINE AND POST-BYZANTINE MONUMENTS

Thessaloniki, a city graced with mosaics -that eternal art form- from the Early Christian and Byzantine periods, is delighted to host the 8th ICCM Conference.

Headquartered in Thessaloniki, its activities including the conservation of mosaics in monuments outside Greece (such as the mosaic floors in the basilica of St Lot in Jordan and in the Kathisma in Jerusalem), the European Centre for Byzantine and Post-Byzantine Monuments (EKBMM) believes that the conference fall within its aims and purposes and is therefore very willingly helping to organize the conference, in the belief that the proceedings will give an impetus to research into the conservation and presentation of mosaics. The European Centre for the Byzantine and Post-Byzantine Monuments welcomes the conference participants and looks forward to fruitful papers and discussions on the conservation, maintenance, and presentation of the mosaics that survive on the walls and floors of monuments and which are constantly being discovered by excavations the length and breadth of the Mediterranean.

I should like to say a little more about Byzantine mosaics, as the institution I represent is involved in this field. Christian art, striving to transcend the risk of idolatry, as also Mosaic Law's proscription of the visual portrayal of God and the representation of the human form, found in the technique of mosaic the most appropriate medium for its apocalyptic and pastoral morphology and function. The simple design which the technique demands, the subtle gradations of colour, and the triumphant lustre of gold work together to render in visual form the certainty of the incarnation of the Word and its intervention in history, as also of humankind's theosis by grace, without the risk of distorting theological truth.

It is to the works of this splendid artistic tradition, with their numerous spiritual ramifications, that you, ladies and gentlemen, are invited to render service.

The European Centre for Byzantine and Post-Byzantine Monuments hopes your efforts will bear glorious fruit.

NIKOS ZIAS

ΠΡΟΛΟΓΟΣ

Είναι γεγονός ότι τὰ Συνέδρια και τὰ Δελτία (Newsletters) τῆς Διεθνoῦς Ἐπιτροπῆς γιὰ τὴ Συντήρηση τῶν Ψηφιδωτῶν (ICCM) ἔχουν καθιερώσει τὰ τελευταῖα χρόνια νέα ἤθη στὴ συντήρηση τῶν ψηφιδωτῶν. Τὸ 8ο Συνέδριο τῆς Διεθνoῦς Ἐπιτροπῆς γιὰ τὴ Συντήρηση τῶν Ψηφιδωτῶν (ICCM), ποὺ πραγματοποιήθηκε ἀπὸ τὶς 29 Ὀκτωβρίου ἕως τὶς 3 Νοεμβρίου 2002 στὴ Θεσσαλονίκη, στὴν αἴθουσα συνεδρίων τῆς Ἐταιρείας Μακεδονικῶν Σπουδῶν, ἦταν ἀφιερωμένο στὰ ἐντοίχια και ἐπιδαπέδια ψηφιδωτὰ και εἰδικὰ σὲ θέματα συντήρησης (conservation), διατήρησης (maintenance) και παρουσιάσῃς των (presentation).

Ἡ συντήρηση (conservation) τῶν ψηφιδωτῶν και ἡ παρουσίασή τους (presentation) εἶναι δύο αὐτοτελεῖς ἐργασίες. Οἱ στόχοι ὁμως τῆς μιᾶς ἐπηρεάζουν τὶς μεθόδους τῆς ἄλλης. Αὐτὸ ἦταν και ἓνα ἀπὸ τὰ διδάγματα τοῦ προηγούμενου 7ου συνεδρίου στὴν Arles / Saint-Romain-en-Gal (1999) μὲ θέμα «Συντηροῦμε γιὰ νὰ παρουσιάσουμε;» (Les mosaïques: Conserver pour présenter? – Mosaics: Conserve to display?). Ὡστόσο, στὴ διαδικασία τῆς ἀλληλεπίδρασης τῶν δύο αὐτῶν ἀρχῶν ὑπαισέρχεται ὀλοένα και περισσότερο μία τρίτη ἀρχή, αὐτῆς τῆς διατήρησης (maintenance), ἡ ὁποία ὄχι μόνον ἐπηρεάζει τὶς ἄλλες δύο ἀλλὰ διευρυνόμενη τείνει νὰ ὑποκαταστήσει ἀκόμη και αὐτὴ τὴ γενικὴ ἐννοια τῆς προστασίας (protection). Ἡ συντήρηση (conservation), ἡ προστασία (protection) και ἡ παρουσίαση (presentation) τῶν ψηφιδωτῶν, ἀπασχόλησαν τὸ 5ο συνέδριο τῆς Διεθνoῦς Ἐπιτροπῆς γιὰ τὴ Συντήρηση τῶν Ψηφιδωτῶν (ICCM) τὸ 1993 στὸ Faro-Conimbriga. Δέκα χρόνια ἀργότερα τὸ θέμα ἐπανέρχεται δραματικότερο ἔχοντας ἀντικαταστήσει τὴν προστασία (protection) μὲ τὴ διατήρηση (maintenance).

Οἱ ἀνακοινώσεις τοῦ 8ου συνεδρίου κατανεμῆθησαν ἀπὸ τὴν ἐπι-

στημονική επιτροπή του σε τέσσερα θέματα και στα πρακτικά δημοσιεύονται με τη σειρά της έκφωνήσεώς των¹. Οί ανακοινώσεις του πρώτου θέματος αναφέρονται στην «Ίστορία και θεωρία» τῶν ἐπεμβάσεων πού στόχο ἔχουν τή διάσωση τῶν ψηφιδωτῶν ἀπό τή φθορά λόγῳ τοῦ χρόνου καί τῶν ἀνθρώπων. Οί ἐπεμβάσεις στα ψηφιδωτά εἶναι γνωστές ἀπό τοὺς ἀρχαίους χρόνους καί ἐξετάζονται σέ συνάρτηση μαζί τους (A:7 καί A:8). Οί διάφορες ἐπεμβάσεις ὁμῶς τῶν νεωτέρων χρόνων, κυρίως ἀπό τὸν 19ο αἰ. καί ἐντεῦθεν, συσχετίζονται μὲ συγκεκριμένα ἰδεολογικά ρεύματα πού ἐπικρατοῦσαν κάθε ἐποχή (A:2, A:3, A:5, F:1). Οί ἐνδιαφέροντες αὐτοὶ συσχετισμοὶ στόχο ἔχουν τὴν ἀναζήτηση τοῦ ἀρχικοῦ ψηφιδωτοῦ πίσω ἀπὸ τὶς ἐπεμβάσεις (A:6). Ὡστόσο, ὀρισμένες ἐκ τῶν νεωτέρων ἐπεμβάσεων ἔχουν συνδεθῆ τόσο πολὺ μὲ τὰ ἀρχικά ψηφιδωτά ὥστε γίνονται ἀποδεκτὲς καί τυγχάνουν τοῦ σεβασμοῦ μας (B:8).

Γνωρίζοντας τοὺς τρόπους κατασκευῆς (A:1, A:4) καί τὸ ἱστορικὸ ἐνὸς ψηφιδωτοῦ, συμπεριλαμβανομένων καί τῶν μεταγενεστέρων ἐπεμβάσεων σέ αὐτό, τὸ κατανοοῦμε καλλίτερα ὡς ἀνθρώπινο ἔργο καὶ ὄχι μόνον ὡς ἔργο τέχνης, ἀξιολογοῦμε καλλίτερα καὶ ἐπιλέγουμε καλλίτερα τρόπους ἐπέμβασης σέ αὐτό πού συντείνουν στὴν προστασία τῆς αὐθεντικότητάς του καὶ ὄχι μόνον τῆς καλλιτεχνικῆς του προσωπικότητας. Ἄς μὴν μᾶς διαφεύγει ὅτι τὸ πρῶτο στάδιο προστασίας ἀποτελεῖ ἡ γνώση ἀπλῶς καὶ μόνον τῶν ψηφιδωτῶν καὶ στὸ θέμα αὐτὸ ἡ Ἐκπαίδευση τῆς Κύπρου εἶναι πρωτοπόρος (A: 9).

Μὲ τὶς ἀνακοινώσεις τοῦ δευτέρου θέματος «Συντήρηση/ Conservation» ὀρίζεται τὸ σημερινὸ πλαίσιο τοῦ ὅρου ὡς μία σοβαρὴ χειρουργικὴ ἐπέμβαση μὲ ἀποκολλήσεις ψηφιδωτῶν, μεταφορὲς σέ ἀποθήκες καὶ σέ Μουσεῖα, ἐπανατοποθετήσεις *in situ* ἢ σέ τελάρια κλπ. Ἡ μέθοδος αὐτὴ δέχεται σήμερα κριτικὴ ἐπειδὴ γίνεται αἰτία νὰ ἐξαφανισθοῦν στοιχεῖα τῶν ψηφιδωτῶν πού συνθέτουν τὴν αὐθεντικότητά

1. Οί παραπομπές πού ἀκολουθοῦν γίνονται στὶς ἀνακοινώσεις σύμφωνα μὲ τὴν ἀρίθμησή τους στὸν πίνακα περιεχομένων.

του – δηλαδή στοιχεία της κατασκευής των, του συσχετισμού τους με τα κτήρια στα όποια ανήκαν, και της ιστορίας τους που διαβάζεται μέσα από τις φθορές και τις επιδιορθώσεις τους. Οί περιπτώσεις συντήρησης ψηφιδωτών που παρουσιάσθηκαν στη Θεσσαλονίκη αφορούν σε ψηφιδωτά που αποκαλύφθηκαν και συντηρήθηκαν με αποκόλληση και επανατοποθέτηση σε φορητά πλαίσια κατά την εκτέλεση μεγάλων αναπτυξιακών τεχνικών έργων, π.χ. στο Ζευγμα της Τουρκίας (B:2, C:8) όπου κινητοποιήθηκε μεγάλο ανθρώπινο δυναμικό και τεχνογνωσία, η σε διαμόρφωση αρχαιολογικού χώρου με πρόθεση ύψηλης επισκεψιμότητας στον Λίβανο (B:1). Συντήρηση επίσης με αποκόλληση και επανατοποθέτηση δέχθηκαν τα έντοιχια ψηφιδωτά στη Μονή Δαφνίου στην Αθήνα (B:9), επειδή η θέση τους σε κατακόρυφους τοίχους ή θόλους τα καθιστά πιο εύαλωτα σε περίπτωση σεισμικών δονήσεων.

Είναι αυτονόητο ότι τέτοιου είδους επεμβάσεις με τόσο σοβαρές επιπτώσεις καλόν είναι να επιχειρούνται μία φορά. Την επόμενη φορά είναι πιο δύσκολες, πιο καταστρεπτικές, και όταν επαναλαμβάνονται υπάρχει κίνδυνος να χαθῆ τὸ ψηφιδωτὸ και νὰ μείνουν οί ψηφίδες.

Ὡστόσο, ὅς μὴν λησμονοῦμε ὅτι οί επεμβάσεις συντήρησης στὰ ψηφιδωτὰ ἐπέτρεψαν και ἐπιτρέπουν νὰ γίνονται παρατηρήσεις και νὰ ἐξάγονται συμπεράσματα για τὴν κατασκευή τους και για τὰ παλαιὰ ὑλικά που χρησιμοποιήθηκαν. Οί πληροφορίες αὐτὲς ἐπιτρέπουν τὴν πληρέστερη γνώση τῶν ψηφιδωτῶν, ἐνίστε ὀρθότερες χρονολογήσεις (B: 4), βελτιώνουν τὶς μεθόδους και τὰ ὑλικά συντήρησης και ἀντλῶντας διδάγματα ἀπὸ τὸ παρελθὸν δημιουργοῦνται οί προϋποθέσεις για περιορισμὸ τῶν επεμβάσεων στὸ ἐλάχιστο (B: 3).

Ἐπειδὴ οί επεμβάσεις συντήρησης ψηφιδωτῶν συνεχίζουν νὰ βρίσκονται σὲ χρήση συχνὰ ὡς ἡ μόνη λύση, και μάλιστα ἐνίστε προτιμῶνται διότι παρουσιάζουν μεγάλη ἀπορροφητικότητα κονδυλίων, οί σχετικὲς μέθοδοι συνεχῶς βελτιώνονται με ἔρευνες σὲ ἐπιμέρους θέματα, ὅπως π.χ. αὐτὸ τῆς σύστασης τῶν κονιαμάτων (B: 7) και τῶν φορητῶν κατασκευῶν (B: 6). Τὸ κεφάλαιο τῆς συντήρησης τῶν ψηφιδωτῶν ἔχει πολλὴ δουλειὰ και μέλλον διότι σὶς ἀποθῆκες βρίσκονται

ἀποκολλημένα ἑκατοντάδες καὶ χιλιάδες τετραγωνικά μέτρα ψηφιδωτῶν δαπέδων πού ἀναμένουν τὴ συνέχιση τῆς διαδικασίας συντήρησής των.

Εἶναι γεγονός ὅτι σήμερα ἡ διατήρηση (maintenance) τῶν ψηφιδωτῶν δαπέδων προτιμᾶται τῆς συντήρησής των (conservation) στοὺς ἀρχαιολογικοὺς χώρους (B: 5, C:7) καὶ αὐτὸ εἶναι τὸ τρίτο θέμα τοῦ συνεδρίου. Ἡ διατήρηση (maintenance) νοεῖται ὡς εἶδος προληπτικῆς συντήρησης μὲ συνεχῆ παρακολούθηση, φροντίδα, μέριμνα καὶ ἐπισκευές τῶν ψηφιδωτῶν *in situ*. Ἡ διατήρηση (maintenance) διατηρεῖ ζωντανὰ πολλὰ στοιχεῖα τοῦ ψηφιδωτοῦ, δὲν εἶναι δαπανηρῆ, εἶναι συμβατὴ πρὸς τὴ μέθοδο ἔρευνας, τὸν χαρακτήρα καὶ τὴ σιγαλιὰ τοῦ ἀρχαιολογικοῦ χώρου. Χρειάζεται ὅμως συνεχῆ ἀπασχόληση ὀλιγάριθμου προσωπικοῦ (C: 6), φιλικοῦ ὅμως καὶ συνδεδεμένου μὲ τὸ ἀντικείμενο. Στὰ θέματα ἐκπαίδευσης προσωπικοῦ ἡ Τυνησία εἶναι πρωτοπόρος (C: 9).

Ἡ διατήρηση (maintenance) ἀποκτᾶ σήμερα τέτοια εὐρύτητα πού ἐπεκτείνεται καὶ στὰ ψηφιδωτὰ πού ἔχουν συντηρηθῆ μὲ τὴ μέθοδο τῆς ἀποκόλλησης καὶ τῆς ἐπανατοποθέτησης (C:5), ἐπειδὴ ἀκριβῶς καθυστερεῖ τὴ γήρανσή τους καὶ τὴν ἀνάγκη γιὰ μία δεύτερη συντήρηση. Τὸ πλαίσιο τῆς ἐπίσης διευρύνεται περιλαμβάνοντας στὰ μέτρα διατήρησης (maintenance) τὴν κατάχωση, τὰ στέγαστρα καὶ τὴν περιοδικὴ παρουσίαση τῶν ψηφιδωτῶν *in situ*, πού προβλέπω ὅτι στὸ μέλλον θὰ γενικευθῆ. Μελέτες σὲ ἐπιμέρους θέματα, ὡς π.χ. ἡ ρύθμιση τοῦ μικροκλίματος/εὐκρασίας στοὺς στεγασμένους χώρους πού στεγάζουν ψηφιδωτὰ *in situ* (C:10), ἔχουν ὡς ἀποτέλεσμα τὴ βελτίωση τῶν μεθόδων τῆς διατήρησης (maintenance).

Ἐπειδὴ ἀκριβῶς ἡ διατήρηση (maintenance) εἶναι μέθοδος συμβατὴ μὲ τὸ ἀρχαῖο, ἀπαραίτητη εἶναι ἡ προηγούμενη καλὴ γνώση τῆς τεχνικῆς τοῦ ψηφιδωτοῦ (C:1). Ἀρχειοθέτηση σχετικῶν πληροφοριῶν μὲ συμβατὲς ἢ ἠλεκτρονικὲς μεθόδους (C:2) ὁδηγεῖ στὴν καλλίτερη ἐφαρμογὴ συγχρόνων τεχνολογικῶν μεθόδων (C:3) καὶ στὴν ἐπινόηση ἔξυπνων πρακτικῶν, ὡς π.χ. τρόπος κατακόρυφης φωτογράφισης ψηφι-

δωτῶν (C:4), πού πάντοτε ἐνδιαφέρουν ὄσους ἀσχολοῦνται μέ τὰ πράγματα.

Ἐνῶ ἡ συντήρηση (conservation) καί ἡ διατήρηση (maintenance) ἔχουν ἀποδέκτη τὸ ψηφιδωτό, ἡ παρουσίασή του (presentation) ἀπευθύνεται στὸν ἄνθρωπο. Ἡ παρουσίαση (presentation) τῶν ψηφιδωτῶν εἶναι μία σύνθετη ἐργασία, θεωρητική καί πρακτική, πού ἐξαρτᾶται ἀπὸ πολλοὺς παράγοντες. Ὅποσodήποτε ἐπηρεάζεται ἀπὸ τίς μεθόδους τῆς συντήρησης (conservation) ἢ τῆς διατήρησης (maintenance) πού δέχθηκε τὸ ψηφιδωτό. Ἐνα ψηφιδωτό πού δέχθηκε συντήρηση (conservation) εἶναι ἔτοιμο νὰ μετατραπῆ σὲ μουσειακὸ ἀντικείμενο εἴτε ἐντὸς εἴτε ἐκτὸς Μουσείου (D:3, D:4) καί ἡ δαπάνη τῆς συντήρησής του νὰ ἐνταχθῆ σὲ μεγάλα ἀναπτυξιακὰ προγράμματα (D:5) χάνοντας ἕνα μέρος τῆς αὐθεντικότητος καί τῆς μαγείας του, κερδίζοντας ὁμως μία εὐπρεπὴ παρουσίαση (presentation) γιὰ μεγάλο χρονικὸ διάστημα. Ἀντίθετα, ψηφιδωτὰ πού δέχονται τὴ μέριμνα τῆς διατήρησης (maintenance) συνεχίζουν νὰ λειτουργοῦν ὡς ἀρχαιολογικὰ εὐρήματα in situ (F:2, F:3, F:4) καί νὰ παρουσιάζονται ἐντὸς τῶν ἀρχαιολογικῶν χώρων, ἢ εὐπάθειά τους ὁμως παραμένει καί γι' αὐτὸ ἔχουν ἀνάγκη συνεχοῦς φροντίδας. Ἡ διαφοροποίηση αὐτὴ ἀνάμεσα σὲ ψηφιδωτὰ πού δέχθηκαν συντήρηση (conservation) καί σὲ ψηφιδωτὰ πού δέχονται μέτρα διατήρησης (maintenance) ἀπαιτεῖ καί διάκριση ρόλων μέ κυρίαρχο τὸν συντηρητὴ στὴν πρώτη περίπτωση, τὸν ἀρχαιολόγο στὴ δεύτερη (D:1).

Ἀπὸ τὰ περιεχόμενα τοῦ τόμου αὐτοῦ τῶν πρακτικῶν διαπιστώνεται ὅτι ἡ αὐθεντικότητα τῶν ψηφιδωτῶν, τῶν ἀρχαιοτήτων γενικότερα, μέσα σὲ ἕναν κόσμο πού εὐκόλα καί συνεχῶς μεταμορφώνεται λόγω τῆς ἠλεκτρονικῆς τεχνολογίας ἀποτελεῖ ἀξία, τὴν ὁποία παραλάβαμε καί ὀφείλουμε νὰ παραδώσουμε στὴν ἐπόμενη γενιά. Γι' αὐτὸ καί σήμερα ἡ προστασία τῶν ἀρχαιοτήτων, μέσω τῆς συντήρησης (conservation), τῆς διατήρησης (maintenance) καί τῆς παρουσίας

(presentation), χρηματοδοτείται όσο ποτέ άλλοτε με αποτέλεσμα όμως ένιότε ή ανάγκη για απορροφητικότητα τῶν κονδυλίων αὐτῶν νά ξεπερνᾶ τις ἀνάγκες τῶν ἀρχαιοτήτων γιά προστασία, τὸ μέσον νά μετατρέπεται σέ σκοπὸ καὶ οἱ ἀρχαιότητες σέ διακοσμητικὲς ρέπλικες. Ὅσον ἀφορᾶ τὸν τρόπο ἢ τοὺς τρόπους προστασίας τῆς αὐθεντικότητας τῶν ἀρχαιοτήτων ἀπάντηση δὲν ἔχει δοθῆ. Πιθανὸν οἱ γνωστοὶ παραδοσιακοὶ τρόποι καὶ ἡ ὑπερχρηματοδότηση νά μὴν ἐπαρκοῦν καὶ νά φαντάζουν οὐτοπικοί. Ἴσως τότε νά χρειάζεται κάτι ἀναντικατάστατο: π.χ. ἡ παρατηρητικότητα τοῦ ἐπιστήμονα (D:2) ἢ κυρίως ἡ εὐαισθησία τοῦ καλλιτέχνη (D:6), πὺ μποροῦν νά ἀντιπαραταχθοῦν μὲ τὴ ζωντάνια τους στὴ φυσικὴ φθορὰ τοῦ χρόνου.

X. ΜΠΑΚΙΡΤΖΗΣ

FOREWORD

It is a fact that in recent years the ICCM's conferences and newsletters have established new standards in the conservation of mosaics. The eighth conference, which was held between 29 October and 3 November 2002 in the conference hall of the Society for Macedonian Studies in Thessaloniki, was dedicated to wall and floor mosaics, more specifically to questions of conservation, maintenance, and presentation.

The conservation and the presentation of mosaics are two entirely separate processes. The aims of one, however, influence the methods of the other, as we learnt at the previous conference in Arles and Saint-Romain-en-Gal in 1999, the theme of which was, 'Mosaics: Conserve to display?'. But a third principle is intruding more and more into the process of the interaction of these two, namely that of maintenance, which not only affects the other two but is gradually expanding to replace even the broad concept of protection. The conservation, protection, and presentation of mosaics were discussed at the fifth ICCM conference at Faro - Conimbriga in 1993. Ten years later, the subject returned in a more dramatic form, with maintenance taking the place of protection.

The scientific committee divided the eighth conference into four thematic sessions and the papers are published here in the order in which they were read. The papers in the first section concern the 'History and theory' of procedures designed to rescue mosaics from damage caused by the passage of time and by human actions. Procedures have been carried out on mosaics since ancient times and are examined here in relation to one another (A:7, A:8). However, the various interventions of more modern times, mainly from the nineteenth century onwards, are connected with the specific ideological trends prevailing at any one time (A:2, A:3, A:5, F:1). The point of these

interesting correlations is to try to find the original mosaic behind the interventions (A:6). However, ancient interventions and some of the more modern procedures have become so closely associated with the original mosaics that they are accepted as 'authentic' and indeed enjoy our respect (B:8).

When we know how a mosaic was made (A:1, A:4) and its history, including the later interventions it has undergone, we have a better understanding of it as a human work and not just as a work of art; we are better able to evaluate and select ways of treating it that help to protect its authenticity and not just its artistic persona. Let us be aware that the first stage of protection is knowledge, pure and simple, of the mosaics, and in this respect the training offered in Cyprus is ground-breaking (A:9).

The papers in the second section, 'Conservation', define the modern context of the term as a serious surgical intervention that involves detaching and lifting mosaics, transporting them to storerooms and museums, and replacing them in situ or on frames. This method is under criticism today because it tends to obliterate aspects of the mosaics' authenticity—for instance, details of their construction and design, of their relationship with the buildings to which they belonged, and of their history, which is revealed by the damage they have suffered and the repairs they have undergone. The cases of conservation that were presented in Thessaloniki concern mosaics that were uncovered and conserved by being detached and then replaced on portable frames in the course of major technical development projects—for instance at Zeugma in Turkey (B:2, C:8), where considerable human resources and technical expertise were mobilized—or in the development of an archaeological site in Lebanon with a view to attracting a high volume of visitors (B:1). The wall mosaics in Daphni Monastery at Athens were also conserved by the detachment and replacement method (B:9), because their location on vertical walls or in vaults renders them more vulnerable in the event of an earthquake.

It goes without saying that interventions like these, with such a serious

impact, should be undertaken only once. The second time, they are more difficult, more destructive, and when they are repeated there is a risk of losing the mosaic and being left with the tesserae.

All the same, let us not forget that conservation procedures on mosaics facilitate observations and make it possible to draw conclusions about how they were constructed and about the old materials used in the process. The information acquired leads to fuller knowledge of the mosaics, sometimes to more accurate dating (B:4), and improves conservation methods and materials; and learning from the past makes it possible to limit intervention to the bare minimum (B:3).

Since conservation procedures on mosaics are still employed frequently as the only solution—and indeed are sometimes preferred, as they tend to absorb a considerable amount of funding—the methods used are constantly being improved by research into such specific questions as the composition of the mortar (B:7) and the portable structures (B:6). The whole issue of mosaic conservation is far from resolved and there remains much work to be done, because there are hundreds, indeed thousands, of square metres of mosaic floors waiting in storerooms for the process of their conservation to continue.

The fact is that the preference nowadays is for maintaining rather than conserving the mosaic floors on archaeological sites (B:5, C:7), and this is the third topic of the conference. Maintenance is understood as a kind of preventative conservation with constant monitoring, care, and repair of the mosaics in situ. Maintenance keeps many aspects of the mosaic alive, it is not costly, and it is compatible with the research method, the character, and the silence of the archaeological site. But it does demand the constant attention of a small staff (C:6) that is friendly towards, and closely associated with, the object. In questions of staff training, Tunisia leads the field (C:9).

Maintenance is so widely practised these days that it extends even to mosaics that have been detached, conserved, and replaced (C:5), precisely because it slows the ageing process and postpones the need for a second

conservation. The scope of maintenance is also expanding to include burial, sheltering, and the periodical presentation of the mosaics in situ, which I suspect will become more common in the future. Studies of such associated subjects as the regulation of the microclimate and proper temperature in the covered spaces that house mosaics in situ (C:10) help to improve the maintenance methods.

Precisely because maintenance is a method that is compatible with ancient objects, a previous good knowledge of mosaic technique is essential (C:1). Archiving relevant information by conventional or electronic means (C:2) leads to the better implementation of modern technological methods (C:3) and to the invention of such ingenious practices as, for instance, photographing mosaics from above (C:4), which are always of interest to those concerned.

While the target of conservation and maintenance is the mosaic, its presentation is directed at people. The presentation of mosaics is a complex task, both in theory and in practice, and depends on many factors. It is certainly influenced by the conservation or maintenance methods that have already been applied to the mosaic. A mosaic that has been conserved is ready to be turned into a museum object, either inside or outside a museum (D:3, D:4), and the expense of the conservation has to be factored into major development projects (D:5). The mosaic loses some of its authenticity and magic; but it gains a decent presentation for a long period of time. By contrast, mosaics that receive the care and attention of maintenance continue to function as archaeological finds in situ (F:2, F:3, F:4) and to be presented on the archaeological sites; but they remain frail and therefore need constant care. This distinction between mosaics that are conserved and mosaics that are maintained also demands a differentiation of roles, primarily that of the conservator in the first case and the archaeologist in the second (D:1).

The contents of this volume of conference proceedings clearly show that the authenticity of mosaics, and of antiquities more generally, in a world that

is constantly changing thanks to electronic technology, is a quality which has been handed down to us and which we have an obligation to pass on to the next generation. This is why the protection of antiquities, through conservation, maintenance, and presentation, is now being funded as never before—with the result, however, that the need to absorb these sums of money sometimes proves greater than the antiquities' need for protection, the means becomes an end in itself, and the antiquities themselves turn into decorative replicas. As for how the authenticity of the antiquities should be protected, well, the jury is still out. Perhaps the familiar, traditional methods and the overfunding will not be enough and will seem utopian. It may be that something irreplaceable will be required: for instance, the observant eye of the scientist (D:2) or, even more, the sensitivity of the artist (D:6), which can pit their vitality against the natural ravages of time.

CH. BAKIRTZIS

A. ΘΕΜΑ 1Ο: ΙΣΤΟΡΙΑ ΚΑΙ ΘΕΩΡΙΑ
THEME 1ST: HISTORY AND THEORY

FEDERICO GUIDOBALDI, CLAUDIA ANGELELLI

**I RIVESTIMENTI PARIETALI IN MARMO (INCRUSTATIONES)
LA TECNICA DI FABBRICAZIONE E POSA IN OPERA
COME BASE DEL PROGETTO DI CONSERVAZIONE**

RÉSUMÉ

Les revêtements pariétaux en marqueterie de marbres polychromes représentent une évolution des pavements en opus sectile et en effet les premiers sont décidément plus tardifs et réalisés par des techniques évidemment différentes. La statique joue dans ces deux techniques un rôle différent et impose, dans les revêtements des parois, l'emploi des systèmes de fixage et des corniches horizontales de soutien, qui seraient inutiles dans les pavements. Pour en affronter correctement soit l'étude, soit les opérations de restauration, est donc opportun connaître les méthodologies antiques d'exécution, qui sont toujours très peu étudiées. Dans cette communication on propose l'analyse de quelque cas concrets, qui vise à compléter les connaissances précédemment acquises sur cette matière.

I rivestimenti a commesso di marmi policromi venivano nell'antichità chiaramente distinti. Quelli destinati ai pavimenti si indicavano infatti come *sectilia* o, più precisamente, *sectilia pavimenta* (Vitr. De Arch. 7.1; Suet. Caes. 46) oppure, alla greca, *lithostrota* (Plin. N.H. 36:184), mentre quelli destinati alle pareti si chiamavano *incrustationes* e *crustae* era il nome che si dava alle singole lastrine (Per un repertorio completo delle fonti cfr. Becatti 1969:123-128).

La differenza di denominazione proveniva certo da una decisa ed evidente differenza delle tecniche impiegate, anche se il mestiere del *marmorarius* e quello del *crustarius* non sempre sono differenziabili tra loro (fig. 1) (Becatti 1969:152-153. Sulla lastra rappresentata a fig. 1 cfr. anche Guidobaldi-Guiglia Guidobaldi 1983:121-122).

Oggi tuttavia l'utilizzazione indifferenziata del termine *opus sectile*, peraltro non antico, per i rivestimenti sia pavimentali che parietali, ha indotto

una parallela sovrapposizione nell'interpretazione delle due tecniche di esecuzione, con effetti certamente negativi e non dissimili da quelli che si sono ottenuti a suo tempo includendo in un unico capitolo il mosaico pavimentale e quello parietale.

Questa "globalizzazione", che si spinge ancora oltre quando si applica, come tuttora si vede, lo stesso criterio nel restauro del mosaico ed in quello del *sectile*, si può combattere, a nostro parere, solo ricostruendo ed interpretando, nel massimo dettaglio possibile, le tecniche antiche di esecuzione nelle loro reali differenziazioni: solo su questa base si può comprendere che cosa si deve conservare per non perdere importanti informazioni e si possono calibrare le metodologie di conservazione più efficaci e più corrette dal punto di vista culturale.

La tecnica della preparazione e della posa in opera dei rivestimenti marmorei in effetti non è molto studiata – e questo giustifica appunto una nuova analisi – ma comunque esistono alcune trattazioni in proposito (Cozza 1974-1975: 96-98; Bruto-Vannicola 1990: 322-323; Giuliani 1990: 143-145) tra le quali le più recenti e le meno sintetiche prendono giustamente come punto di partenza l'aspetto che anche a noi sembra più importante e cioè quello della presa della malta sul marmo.

E' ovvio infatti che un procedimento nel quale si tende a saldare un piano rigido e poco poroso sopra un altro preesistente per mezzo di uno strato di malta deve tener presente che quest'ultima, per fare presa e funzionare dunque da vero legante tra i due, non debba essere sigillata e quindi privata del contatto dell'aria (e dell'anidride carbonica) quando è ancora fresca e appena applicata.

Questo problema si superava abbastanza facilmente nei *sectilia pavimenta*: in quel caso si potevano infatti (fig. 2) prefabbricare capovolte le formelle composte con le singole *crustae*, poi si potevano poggiare sulle giunzioni degli elementi di rinforzo (fette di anfore, o elementi piatti di marmo o pietra) e sul tutto si poteva gettare della malta che faceva presa sul marmo perché "respirava" dall'altro lato (Guidobaldi 1994: 49-55).

Le formelle si ponevano poi in opera su uno strato di sottofondo di malta già preparato - e cioè in parte indurito (ma ancora plastico) - e quindi la presa doveva avvenire solo tra malta e malta ed era certamente più forte e rapida di quella ottenibile direttamente sul marmo.

Qualche problema poteva semmai presentarsi nel caso di pavimentazioni realizzate con semplici lastre rettangolari (ovviamente di marmi policromi, nel caso del *sectile*) disposte in filari: in questo caso la mancanza di una prefabbricazione non implicava necessariamente l'applicazione preliminare di

uno strato di malta sul retro e quindi, se le lastre venivano poste in opera senza particolari accorgimenti, la presa poteva essere meno completa. In effetti non è raro osservare che le lastre omogenee hanno una aderenza mediocre.

Nel caso delle *incrustationes* i presupposti sono identici ma la realtà è assai più problematica e per questo vale la pena parlarne più in dettaglio. La differenza è evidente: la superficie su cui si deve applicare l'*incrustatio*, in questo caso, è verticale, e quindi, poiché la malta è fluida, una stesura preliminare del sottofondo da porre sulla superficie per un preessiccamento parziale non è proponibile.

Come si operava allora? Vediamolo in dettaglio, partendo dallo zoccolo che è anche tecnicamente il punto di partenza, poiché la posa in opera deve avere una successione verticale, cosa che non si verifica nei *sectilia* pavimenta.

Gli zoccoli potevano essere di altezza e struttura piuttosto variabile (Per la variabilità delle altezze degli zoccoli cfr. il repertorio in Guidobaldi 1994). Se ne trovano anche di particolari, con cornice a terra (Cfr. Villa Adriana, Valle di Tempe, *cubiculum* VT5: Guidobaldi 1994: 215, tav. LXIV), ma in genere sono fasce continue ed omogenee senza elementi decorativi verticali e sono composte con lastre, marmoree o litiche, per lo più di un solo colore con giunti verticali a contatto. L'altezza poteva essere variabilissima, tra i 20-30 cm e oltre un metro, ma all'interno di un singolo ambiente restava in genere costante per tutto il perimetro. Lo zoccolo era impostato a terra, al di sotto del livello pavimentale previsto ed era posto in opera prima del pavimento. Riteniamo opportuno ribadirlo poiché alcuni studiosi hanno sostenuto (de Vos 1979: 112) che fosse normale eseguire prima il rivestimento pavimentale e poi quello parietale: fatto questo che può verificarsi invece soltanto quando il rivestimento delle pareti appartiene ad una seconda fase rispetto al pavimento.

Una volta impostato lo zoccolo se ne controllava la verticalità ed il distanziamento (in genere di 4-8 cm) dalla parete e se ne fissavano le terminazioni superiori sul muro con l'uso di grappe a L che erano alloggiare col tratto corto in appositi fori nello spessore della testa della lastra e col tratto più lungo in larghi fori praticati nel muro (fig. 4), entro i quali si contrastavano nella posizione richiesta con zeppe di marmo (fig. 3); ulteriori grappe a T, anch'esse infisse nel muro a distanza regolare, assicuravano il collegamento tra due lastre contigue. Collocate le lastre, si gettava la malta per riempire lo spazio tra rivestimento e muro ma anche per fissare le lastre al muro stesso. Per ottenere ciò era necessario che la malta facesse presa sul marmo (oltre che sul muro) e ciò non poteva certo verificarsi se la gettata era effettuata in un'unica soluzione. E' dunque ovvio che la malta fosse gettata a piccoli strati intervallati nel tempo per farla "respirare" e facilitare la presa parziale¹.

Questo registro inferiore della decorazione era sempre sottolineato e concluso da un elemento lineare continuo, per lo più in contrasto cromatico e quasi sempre differenziato anche nel tipo di aggetto. Le tipologie più frequenti erano le seguenti:

A) cornice modanata, che costituisce in genere anche il raccordo con arretramento del piano della decorazione (fig. 5, a). Le cornici potevano essere sia spesse sia assai più piccole e di poco spessore;

B) cordolo con cornice aggettante a profilo semicircolare, che per lo più non comporta variazioni dello spessore del rivestimento dei registri superiori (fig. 5, b)²;

C) semplice listello in contrasto cromatico più o meno accentuato, non aggettante o, anzi, rientrante rispetto al profilo verticale del rivestimento (fig. 5, c).

Il caso A, che è decisamente più frequente, anzi quasi caratterizzante della prima e media età imperiale, comporta un ispessimento del rivestimento nel suo insieme, in corrispondenza dello zoccolo, la cui superficie resta distanziata da quella del muro di supporto anche notevolmente (non sono insoliti spessori della malta anche di 5-8 cm).

Nelle tipologie B e C, che troviamo – soprattutto la B – più frequente principalmente nella tarda età imperiale, lo spessore della malta è ovviamente più contenuto.

Al di sopra dello zoccolo, che poteva essere anche duplicato, si svolgevano i veri e propri partiti decorativi, in genere assai semplici nei registri più bassi e sempre più complessi in quelli superiori.

La tecnica di esecuzione era, in fondo, la stessa che abbiamo visto per lo zoccolo.

Al di sopra della cornice, che poteva anche essere fissata con grappe, si svolgevano le lastre o i pannelli, rigorosamente paralleli alle pareti ma che potevano intenzionalmente contenere elementi in rientranza o in aggetto, soprattutto le fasce decorative, come si nota, ad esempio, a Ostia, nella *domus* di Amore e Psiche (fig. 6, a), ma anche cornici multiple a diverso aggetto, come nel teatro di Benevento (fig. 6, b).

Le grappe erano poste come distanziatori soprattutto nella parte alta dei registri ed anche nei profili verticali, mentre si trovavano più di rado in basso

1. Questo si può riscontrare facilmente, ed è già stato recentemente sottolineato nella trattazione della Bruto e della Vannicola (Bruto-Vannicola 1990, 332) che è la più ampia sull'argomento. In effetti anche le gettate successive, come abbiamo già visto, non sempre si distinguono facilmente, specialmente negli zoccoli di altezza limitata.

2. Caratteristica di questi cordoli, che erano posti in opera di taglio, è la profondità nettamente maggiore rispetto allo spessore.

e, soprattutto, nei casi in cui si poteva disporre di un solido piano d'appoggio orizzontale. La stabilità, come si nota in parecchi casi, era data dal peso, che ovviamente era tanto più notevole quanto lo era l'altezza delle lastre. Ma anche in questi casi era la presa della malta il problema più importante e lo vediamo in particolare nell'aula absidata di Piazza Armerina (fig. 7), ove l'asportazione delle lastre del primo registro ha permesso di osservare una situazione del tutto particolare. Qui infatti è evidente che le colate di malta non solo erano successive ma anche erano intervallate da gettate di pozzolana non legata e, dunque, incoerente, che serviva evidentemente a far "respirare" la malta, facilitandone la presa. Questa pozzolana, una volta rimosse le lastre, è caduta, lasciando in corrispondenza un vuoto in forma di catenaria, dalla caratteristica forma "a festone". Questo esempio dimostra l'esistenza di varianti, anche assai particolari, nella tecnica di posa in opera delle lastre di rivestimento. Nella malta di preparazione, tra l'altro, si vedono spesso alcuni frammenti di lastre annegati nella malta stessa ma affioranti con una delle facce piane. Della funzione di questi frammenti, della quale non troviamo menzione in Bruto e Vannicola, Giuliani dà una puntuale e convincente interpretazione, ben esplicitata anche graficamente (fig. 3). Sembra in effetti assai probabile che, prima della posa in opera delle lastre, i citati frammenti venissero incollati con mastice sul retro di esse, ciò evidentemente per rendere "irregolare" la superficie delle lastre ed offrire ulteriori punti di presa per la malta che doveva essere colata nell'intercapedine³. Le lastre lisce ed omogenee erano più frequenti, come già detto, nei registri più bassi e ciò forse anche a causa dei problemi di aderenza che potevano presentare e che si controllavano certo meglio ai livelli più bassi⁴. Comunque, sempre per migliorare la presa non di rado si gettava la malta separatamente, prima nelle pannellature centrali e poi nelle partizioni verticali, ottenendo così una migliore aerazione. Nei registri superiori si ponevano infatti, di preferenza i pannelli con disegni più articolati, che si impostavano perlopiù su cordoli o, comunque, su modanature orizzontali anche semplici, con funzione di rompitratta⁵. Tali pannelli erano prefabbricati e quindi recavano sul retro già uno strato di malta che aveva fatto

3. Un programma di analisi per la ricerca e l'individuazione dei citati mastici è in corso di realizzazione presso l'istituto per la Conservazione e la Valorizzazione dei Beni Culturali, sezione di Roma.

4. E' facile constatare ciò in molti casi in cui la preparazione è rimasta a nudo.

5. In diversi casi si è potuto osservare che i cordoli sono allestiti su malta ben differenziabile dalle altre per il colore pressoché bianco: non essendo state finora eseguite analisi, non si può dire quale sia la composizione (gesso, grassello, etc.), che però doveva avere una funzione specifica, che cercheremo prossimamente di stabilire.

presa sul marmo e si era ben consolidata anche a causa dell'irregolarità del retro e della presenza degli elementi di rinforzo. Questi potevano essere elementi fittili, ricavati in genere da pareti di anfore, o frammenti di lastre marmoree o litiche. Tali elementi, che dovevano anch'essi essere fissati con mastici o altri collanti⁶ avevano una disposizione piuttosto regolare, secondo disegni coerenti con quello del *sectile*, ma in certo qual modo invertiti, poiché erano a raggiera se la figura era chiusa (a cerchi concentrici, a rombi concentrici, ecc.) ed erano a cornici se la figura era a raggiera. Si vede comunque assai chiaramente che quanto più il disegno era articolato con elementi sottili tanto più esse erano fitte e posta a coprire l'intera superficie sia a tratti paralleli che a stuoia⁷.

Assicurare la presa di tali pannelli, dal retro irregolarissimo, doveva essere relativamente facile e veniva comunque coadiuvata dalle grappe che pure erano presenti.

Questi pannelli prefabbricati dovevano essere oggetto di produzioni anche intensive e specializzate. Certo Roma era un centro per la produzione di quelli marmorei (specialmente a base porfiritica), ma per quelli di vetro, certo assai più preziosi - come quelli, celebri, di Kenchreai (Ibrahim-Scranton-Brill 1976) o anche per altri esempi⁸ - dobbiamo pensare all'Egitto come centro di produzione.

Abbiamo in questo caso anche la prova inequivocabile della prefabbricazione con malta applicata sul retro dei pannelli ed includente tratti rettilinei di terracotta tagliati per lo più da corpi cilindrici delle anfore; interessantissima è anche la prova della inclusione in telai lignei a coppie di pannelli disposti faccia contro faccia. Certo le variazioni della tecnica nel tempo erano notevoli ed anche quelle geografiche dovevano essere differenziate, ma proprio perciò ci preme qui osservare che tutti questi elementi conservati al di sotto della superficie decorativa sono pieni di informazioni tecniche e cronologiche che non possiamo distruggere.

Ricordiamo infatti che gli elementi di supporto o di rinforzo, specialmente i frammenti di anfore che possono essere classificate almeno approssimativamente anche dalla semplice osservazione degli impianti o delle superfici, possono essere elementi di datazione e così anche le variazioni di

6. Si veda a tale proposito Becatti 1961, 184; per analisi più recenti cfr. anche Ponti-Sinibaldi 2004.

7. Per un repertorio assai variato della disposizione di tali elementi nei sottofondi parietali si veda ancora una volta Guidobaldi 1994, *passim* e Guiglia Guidobaldi 2004.

8. Come quelli recentemente scoperti nella villa tardoantica di Faragola, presso Ascoli Satriano (Foggia): Volpe-De Felice-Turchiano 2005, pp. 64-68, fig. 12-18.

tecnica, le tipologie delle grappe e dei frammenti inclusi il tipo di gettata della malta e qualunque altro aspetto tecnico può essere elemento non trascurabile per una migliore comprensione del manufatto dal punto di vista storico, culturale, stilistico e persino economico.

Distruggere tutto questo per ripristinare i soli marmi esterni su nuovi supporti "tecnologicamente avanzati", come oggi si tende a fare, è una operazione colpevole e, peraltro, ingiustificata.

Abbiamo visto infatti che il problema reale per la conservazione delle *incrustationes* parietali è quello della presa della malta: allora basterà ripristinare o rinforzare l'aderenza con mezzi anche moderni ed il rivestimento potrà restare o tornare al suo posto senza gravi problemi di conservazione, a patto che sia riparato dalle infiltrazioni d'acqua.

E' proprio su questo punto che vorremmo soffermarci per concludere. E' provato che la scarsa aderenza della malta al marmo può essere sufficiente comunque ad una prolungata sopravvivenza solo se non intervengono fattori fortemente interferenti. A parte i terremoti o i veri e propri cedimenti, la causa che ha comportato nel tempo le perdite maggiori nel campo del *sectile* parietale è certamente l'infiltrazione d'acqua tra marmo e parete, ovviamente causata dalla inefficienza o dalla perdita delle coperture. L'effetto devastante della trasformazione in ghiaccio con il ben noto rigonfiamento che può facilmente rompere la resistenza delle grappe e far cadere al suolo interi pannelli è ovvio e intuitivo. E' probabile che ciò si sia verificato più volte nel passato e magari con effetti anche disastrosi nel caso di edifici ancora frequentati e di rivestimenti che giungevano a notevole altezza.

Si può facilmente immaginare che effetti possa avere su una folla di fedeli il crollo dall'alto di un registro di rivestimento parietale del peso di qualche tonnellata.

Certo non si vuole con questo attribuire alla caduta delle *incrustationes* il decremento demografico dell'alto medioevo nelle città!

Qui si vuole però supporre che l'esperienza diretta di qualche vero crollo e/o la previsione di tali possibili crolli, abbia spinto coloro che erano preposti ai monumenti, a smantellare ciò che restava ancora in situ ed era esposto o era stato esposto ad infiltrazioni d'acqua. Questa interpretazione spiega, a nostro parere e almeno per Roma, la scarsissima sopravvivenza delle *incrustationes* antiche e tardo antiche che sarebbero in parte crollate (come nel caso dell'aula ostiense di Porta Marina) e in parte rimosse e spiega pure la sopravvivenza di quelle superstiti che sono sempre in edifici che, presumibilmente, non hanno mai cessato di essere in funzione e non sono mai stati privati di una manutenzione di base, come, ad esempio, S. Sabina, il Battistero Lateranense,

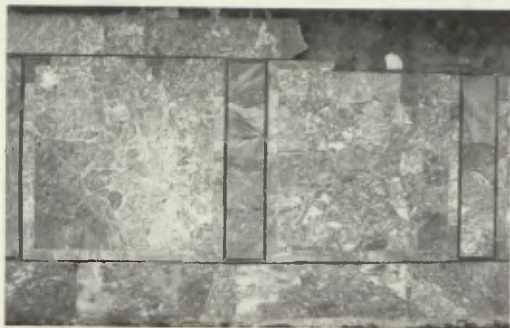
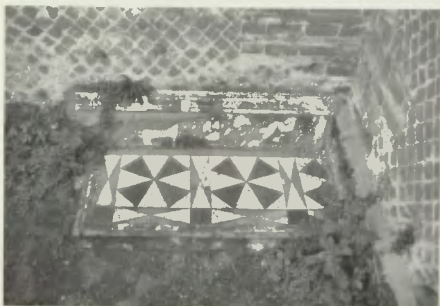
S. Sofia di Costantinopoli e, in parte, il Battistero Neoniano di Ravenna conservino ancora una discreta e tangibile testimonianza delle *incrustationes* che un tempo le adornavano.

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4. Ostia, *Capitolium*, interno della cella. Sulle pareti sono ben evidenti i fori per l'alloggiamento delle grappe metalliche usate per il fissaggio delle lastre marmoree di rivestimento.



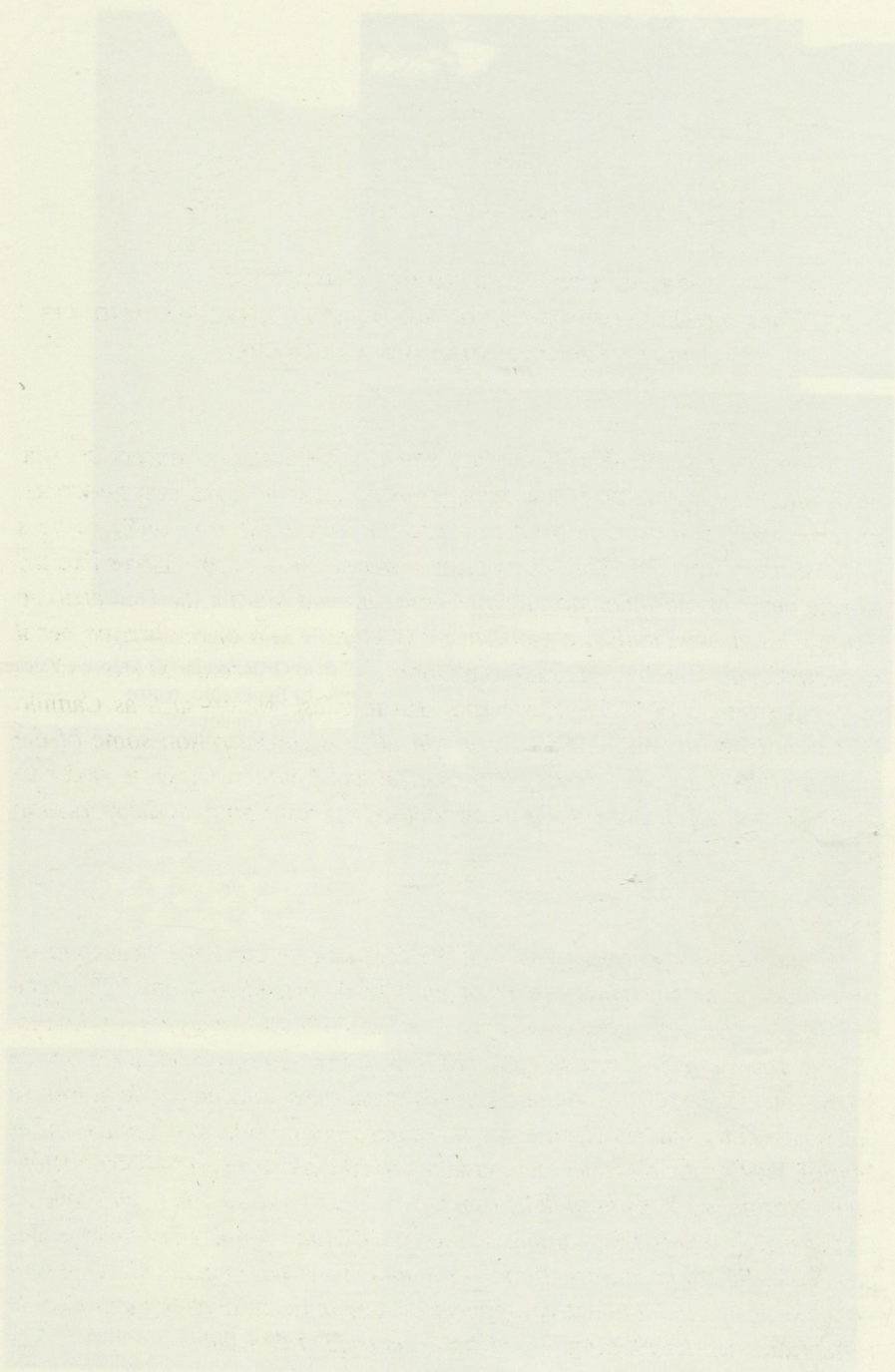
5. a) Villa Adriana, edificio a tre esedre;
b) Ostia, *domus* IV, 3, 4;
c) Ostia, cortile del Dioniso
(foto Guidobaldi).



6. a) Ostia, *domus* di Amore e Psiche;
b) Benevento, teatro
(foto Guidobaldi).



7. Villa di Piazza Armerina,
"basilica" (foto Guidobaldi).



ANDREA PARIBENI

**METODOLOGIE E PRATICHE DI INTERVENTO
NEI CANTIERI DI RESTAURO MUSIVO DELL' ITALIA CENTRO MERIDIONALE
NELLA SECONDA METÀ DEL XIX SECOLO**

SUMMARY

From the half of the 19th century some of the Italian restorers became more interested to the problems of methods in the mosaic restoration works. In some cases papers of normative character were written in order to be a guide in the restoration works of mosaic surfaces. By reading sources like the Norme per il restauro dei mosaici by Camuccini and Marini, the Dell'artificio pratico dei mosaici antichi e moderni by Gaetano Riolo or the Norme per il restauro dei mosaici by Edoardo Marchionni, or studying some papers written by great scholars of architectural and artistic conservation such as Camillo Boito and Giacomo Boni, this paper will take in consideration some of the most important mosaics restored in Central and Southern Italy, in order to verify the real application of these new methods of restoration in the workshop practice.

RÉSUMÉ

Pendant la deuxième moitié du XIXème siècle en Italie beaucoup de restaurateurs des mosaïques révèlent un regard particulière pour l'approche méthodologique dans les travaux sur les décorations musives pariétales. Quelquefois cet esprit amenait à la réalisation des textes qui ont pour but de fournir des règles pour la restauration des mosaïques. Par moyen de la lecture des manuels tel que les Norme per il restauro dei mosaici par Camuccini et Marini, Dell'artificio pratico dei mosaici antichi e moderni par Gaetano Riolo ou les Norme per il restauro dei mosaici par Edoardo Marchionni, ainsi que de l'analyse des textes des Camillo Boito et Giacomo Boni - spécialistes des problèmes liées à la conservation des monuments et des oeuvres d'art - il sera possible de vérifier l'effective application des telles nouvelles méthodes de restauration sur les mosaïques de l'Italie centrale et du Midi.

La rivisitazione critica degli interventi di restauro, condotti in Italia e altrove a partire dalla metà dell'Ottocento su monumenti e manufatti artistici, oltre a fornire preziosi elementi per la conoscenza delle condizioni in cui sono pervenute tali opere e delle trasformazioni che esse hanno subito nel corso del tempo, permette altresì di seguire i primi passi, talora incerti e impacciati, che proprio in questo periodo vennero intrapresi nella formazione di una moderna metodologia del restauro (D'Andrade 1981; Bertelli - Mazzei eds. 1986; Conti 1988). Un tratto caratteristico che accomuna diversi episodi di ricomposizione e conservazione di monumenti e opere d'arte di età classica, medievale e moderna registratisi grosso modo nella seconda metà del XIX secolo, è costituito proprio dall'alto grado di consapevolezza del proprio ruolo e del proprio operato dimostrato dai responsabili di tali interventi - fossero essi architetti, artisti e artigiani pratici di specifiche tecniche esecutive, funzionari a vario livello dello Stato: non di rado, difatti, coloro che eseguivano o sovrintendevano ai lavori di restauro, non consideravano la propria azione circoscritta alla semplice restituzione filologica e artistica dell'opera d'arte su cui intervenivano, ma rivendicavano per loro stessi la necessità di un approccio metodologico di indole generale, tale da costituire un fondamento, il più possibile sistematico e adattabile a diversi casi contingenti, per la prassi operativa. Tale atteggiamento si tradusse in alcuni casi in vere e proprie elaborazioni normative che sarebbero servite da guida nell'esecuzione dei lavori di conservazione e ripristino a venire (Torresi (ed.) 1996). Va da sé che l'emergere di questa nuova esigenza metodologica non servì da sola a garantire qualità e correttezza dei singoli interventi; ma è comunque già significativo il fatto che tale esigenza fosse avvertita, così da fungere in un certo senso da spartiacque tra interventi di restauro caratterizzati da un certo grado di cautela e rispetto per l'opera d'arte e ricostruzioni di stampo puramente ingegneristico e talvolta anche speculativo come quelle, per fare un esempio, subite dal Fondaco dei Turchi a Venezia nel 1875 ad opera di Federico Berchet (Sagredo-Berchet 1860; Boscarino 1986; Schulz 1995), oppure, per restare nell'ambito della tecnica musiva, come i crudi e devastanti rifacimenti, attribuibili all'operato di Giovanni Moro, dei mosaici medievali di Milano (Cassanelli 1995; Andreescu-Treadgold 1997a), Ravenna (Andreescu - Treadgold 1990), Torcello (Andreescu-Treadgold 1997b; Andreescu-Treadgold 1998) e Venezia (Cutler - Dale 1993; Andreescu-Treadgold 1999; Andreescu - Treadgold 2000).

Proprio Venezia si dimostrò terreno estremamente sensibile e vivace nel dibattito sulla conservazione e la tutela dei monumenti: lo dimostra, tra gli altri, la pubblicazione delle *Osservazioni intorno a restauri interni ed esterni*

della *Basilica di San Marco*, il celebre pamphlet composto nel 1877 da Alvise Pietro Zorzi con il sostegno economico e culturale dello stesso John Ruskin, il quale non solo determinò un profondo mutamento di opinione nei confronti dei restauri della facciata meridionale della basilica marciana appena portati a compimento da Giovan Battista Meduna e in un primo momento esaltati per le loro qualità statiche ed estetiche, ma pose pure le premesse per un radicale ripensamento dei criteri sino ad allora seguiti in materia di conservazione dei monumenti (Zorzi 1877; Robotti 1976; Dalla Costa 1983).

Molti altri sono gli interventi, spesso proposti da personalità di primo piano della cultura artistica italiana, su tali problematiche: basterà ricordare, per un panorama generale, la documentata relazione di Giovan Battista Cavalcaselle sulle procedure per la conservazione delle pitture medievali scaturita nel 1874 a seguito dei tormentati lavori di restauro degli affreschi di S. Francesco ad Assisi (Rinaldi 1997); i temi toccati da Camillo Boito ne *I restauratori* (Boito 1884), la conferenza da lui tenuta in occasione dell'Esposizione di Torino del 1884, o il consultivo sul dibattito nel mondo del restauro, sovente aspro e concitato, tirato quasi al finire del secolo da Luca Beltrami in un suo famoso articolo pubblicato sulla *Nuova Antologia* (Beltrami 1892).

Riflessioni generali sulle metodologie di restauro, oltre a costituire argomento per scritti scientifici o divulgativi, furono spesso materia per rapporti ministeriali – come fu il caso per la succitata relazione del Cavalcaselle – stilati da ispettori e collaboratori del Ministero della P.I. in funzione di future sistemazioni legislative e normative della materia: in altra occasione, ho avuto modo di segnalare e brevemente commentare un lungo e articolato scritto di Giacomo Boni, composto presumibilmente alla fine del 1891, dal titolo *Attribuzioni e funzionamento degli Uffici Tecnici Regionali per la Conservazione dei Monumenti*, che rimase inedito e venne riutilizzato in seguito come canovaccio per successive circolari normative (Paribeni 1994: 235-238, 259-260). In esso non mancano raccomandazioni circa gli interventi di conservazione dei pavimenti marmorei e musivi e dei mosaici parietali, nei confronti dei quali il futuro archeologo del Foro Romano, formatosi sui ponteggi di Palazzo Ducale e a stretto contatto con le tormentate vicende del cantiere di restauro della basilica marciana, aveva sviluppato una particolare sensibilità.

Oltre a normative come queste, certamente esemplari per rigore e coerenza espositiva ma di carattere molto generale, esiste un certo numero di relazioni tecniche che hanno invece come tema esclusivo la metodologia da seguire per la conservazione e il restauro dei mosaici. In questo contributo ne

verranno esaminate in particolare tre, relative al periodo prescelto – vale a dire dalla metà dell'Ottocento fino ai primissimi anni del secolo successivo – e tutte nate da contesti di cantiere, ovvero da interventi di restauro su specifici monumenti, le cui problematiche avevano permesso agli autori di elaborare modelli di comportamento cui in futuro altri restauratori, impegnati in casi consimili, avrebbero potuto proficuamente attenersi.

Il primo caso in ordine cronologico è offerto da un testo allegato ad una nota indirizzata nel novembre del 1848 da Giuseppe Pio Marini, architetto della Reverenda Fabbrica di S. Pietro, al Ministero del Commercio e dei Lavori Pubblici. Tale nota, attualmente conservata presso l'Archivio di Stato di Roma (Camerlengato, Titolo IV, Parte II, Busta 186), accompagnava relazioni, stati di avanzamento e altri documenti relativi ai restauri al mosaico absidale di Sant'Agnese fuori le Mura (Delpini Filippi 1989); questo restauro si inseriva in una campagna di consolidamenti e "risarcimenti" dei mosaici delle chiese paleocristiane e medievali di Roma, condotta tra il 1820 e il 1848 ca. dallo Studio del Mosaico del Vaticano sotto la direzione di Vincenzo Camuccini e Filippo Agricola, tra non poche difficoltà e rallentamenti, anche con lo scopo dichiarato di procacciare nuovi mezzi di lavoro e di sussistenza per quegli operai e quei mosaicisti "male adatti al genere minuto di mosaici decorativi" allora particolarmente in voga (Delpini Filippi 1989; Pastorino 1995). Proprio a causa di questi inconvenienti, che influirono negativamente in special modo sulla buona riuscita dei lavori al Mausoleo di S. Costanza avviati nel 1834, venne stilata questa normativa che sarebbe dovuta servire da guida per l'esecuzione dei restauri nella attigua chiesa di Sant'Agnese: il testo, articolato in nove punti, si mantiene peraltro su un tono abbastanza generico, occupandosi principalmente di definire criteri di ottimale organizzazione del cantiere di restauro, mediante una funzionale ripartizione dei compiti, e fornisce solo pochi dettagli su metodologie da attuare e materiali da impiegare. Un dato interessante è però offerto dalla esplicita richiesta ai mosaicisti di fornire cartoni e disegni preparatori per le parti di mosaico che andavano integrate; tali materiali dovevano inoltre essere tassativamente sottoposti all'approvazione del direttore dei lavori.

Il secondo esempio che ho scelto ci porta in Sicilia, dove nel corso della seconda metà dell'Ottocento vennero eseguiti diversi restauri sui mosaici dei principali edifici di età normanna (Guttilla 1990; Maniaci 1994; Tomaselli 1994). Anche in questo caso il fervore e l'interesse sorto attorno ai mosaici di Palermo e Monreale derivava da un impegno di più ampio respiro per il ripristino dei monumenti medievali dell'isola, cui non erano estranee finalità politiche legate al consolidamento delle strutture amministrative e di governo

del novello stato unitario. Protagonista di una serie importante di interventi fu Rosario Riolo che giovanissimo, prima di divenire "capo musicista della Real Cappella Palatina", aveva eseguito ex novo nel 1840 alcuni pannelli lungo l'ala nord della Cappella per rivestire la sezione di muro rimasta a nudo dopo la rimozione di un palchetto ligneo di epoca borbonica; il risultato ci appare ora, come sottolinea Ernst Kitzinger, "un pastiche di forme pseudomedievali" (Kitzinger 1992: 19, 21), ma anche all'epoca alcuni dei restauri, compiuti negli anni '70 dallo stesso Riolo alla Palatina o da Giuseppe Bonanno Zuccaro alla Martorana prima e alla Palatina poi, si attirarono la perplessità quando non le critiche dichiarate di studiosi e cultori d'arte, soprattutto stranieri. È nota ad esempio la polemica, suscitata dall'esternazione di Ernest Renan in un reportage relativo ad un suo soggiorno in Sicilia pubblicato nel 1875 dalla *Revue des Deux Mondes*, a proposito dei lavori di restauro in S. Maria dell'Ammiraglio dove, per lo scrupolo filologico di riportare il monumento alle sue originarie forme medievali, non si esitava a sacrificare le decorazioni barocche (Renan 1875: 244; Kitzinger 1990: 24-26). Forse anche per rendere giustizia al buon nome del padre, la cui profonda conoscenza del mosaico medievale acquisita in anni di lavoro sui ponteggi delle chiese siciliane era stata sfruttata da altri studiosi come il Buscemi, Gaetano Riolo, professore di disegno alla regia scuola tecnica parallela di Palermo, pubblicò nel 1870 un opuscolo dal titolo *Dell'artificio pratico dei mosaici antichi e moderni*. L'opera (Riolo 1870a) si presenta come una esposizione storico critica dello sviluppo dell'arte musiva dai suoi primordi in avanti, in cui a considerazioni di tono estremamente generico si affiancano annotazioni specifiche, relative ad esempio alle modalità di rinvenimento del mosaico di Piazza della Vittoria, venuto fortuitamente alla luce solo due anni prima nei lavori di allestimento di una macchina pirotecnica per celebrare la visita di Umberto e Margherita di Savoia. Gaetano Riolo si sofferma in particolare sulla composizione dell'intonaco per l'allettamento delle tessere adottato dai "mosaicisti bizantini" e sulla proprietà che esso aveva di mantenersi a lungo fresco e umido, riferendo che alcune analisi chimiche erano state tentate su frammenti di intonaco del duomo di Cefalù inviati dal padre all'Istituto di Chimica dell'Università di Palermo per cercare di ricavarne la formula; dato che l'esito di tali indagini non era stato particolarmente fruttuoso, Gaetano Riolo volle ripetere l'indagine affidandola a Domenico Amato dell'Istituto Superiore di Perfezionamento di Firenze, il quale individuò nel composto calce, magnesia, acido carbonico e acido fosforico (Riolo 1870a: 8-9); l'intonaco ottenuto dall'impasto di calce con quest'ultimo acido aveva difatti la proprietà di non indurire immediatamente. Con l'aggiunta di olio di lino, ingrediente attestato nella fattura dei mosaici

romani a partire dal XVII secolo, i moderni musivari attendevano a nuove composizioni o intervenivano nel risarcimento di stesure musive compromesse dall'usura del tempo.

Ancor più del testo, che ad esempio non fa menzione della tecnica dello stacco dalla parete delle porzioni di mosaico da restaurare adottata nei cantieri siciliani della seconda metà del XIX secolo, sono le tavole illustrative a corredo dell'opuscolo a fornire qualche spunto di interesse: si possono notare le riproduzioni, minuziose nella resa delle sagome e delle gradazioni cromatiche, delle tessere tanto lapidee che vitree (fig. 1, numeri 3-3bis-6-7-8); gli accorgimenti nella preparazione dell'intonaco di fondo e nell'allettamento delle tessere (fig. 1, num. 1-1bis); gli strumenti adoperati per il taglio degli smalti – una martellina a due tagli con lungo manico ligneo (fig. 1, num. 4) – e delle pietre – la cd. zeppa, costituita da un puntone di ferro conficcato per mezzo di cunei di legno in una cavità praticata al centro di una basetta di pietra calcarea (fig. 1, num. 5); quelli infine per la stesura dello stucco o mastice romano – la spatola doppia segnata num. 10 – e per il posizionamento delle singole tessere – la spilletta con appiglio ricurvo (fig. 1, num. 11) preferita dai mosaicisti siciliani rispetto alle cd. mollette, sorta di pinze impiegate solitamente dalle maestranze romane e venete.

Solo un rapido accenno è riservato invece alle tecniche del *sectile* pavimentale e delle tarsie in marmo e pietre dure, per le quali l'autore rimarca il ruolo della tradizione siciliana (Hills 1999), all'epoca inappuntabile per la precisione e perfezione meccanica dei tagli ma assai meno felice per la scelta e la varietà del repertorio di motivi geometrici; forse anche a sopperire a questa lacuna, Gaetano Riolo compose tre anni dopo le *Regole pratiche per la scompartizione della superficie dei poligoni e cerchi mediante costruzioni simmetriche*, un manuale destinato in primo luogo alle scuole tecniche e di disegno (fig. 2), ma che poteva riuscire utile anche ad artisti e decoratori (Riolo 1873).

Di altro tenore è il terzo esempio di questa breve carrellata: si tratta delle *Norme per il restauro dei mosaici*, un piccolo manoscritto redatto da Edoardo Marchionni, Direttore dell'Opificio delle Pietre Dure dal 1876 fino al 1923. Il nome di Marchionni, tra i tanti meriti, è indissolubilmente legato alla grande impresa del restauro dei mosaici della cupola e della scarsella nel Battistero di S. Giovanni a Firenze, condotti dal 1898 al 1907 (Ponticelli 1950-1951; Giusti 1994); e proprio a quell'impresa, che segnò un punto di svolta cruciale per la storia dell'Opificio dopo il durissimo attacco alla sua legittimità come ente statale mosso pochi anni prima, da un padre della conservazione quale Camillo Boito, sulle pagine della *Nuova Antologia* (Boito 1889), si riallacciano le dense

e nitide pagine di questo manoscritto, che ho già avuto modo di presentare, grazie alla cortesia e alla disponibilità della direzione dell'Opificio delle Pietre Dure, in un colloquio AISCOM di qualche anno fa (Paribeni 1996).

Marchionni, nella prefazione al manoscritto, datata 4 agosto 1921 e certamente posteriore alla stesura delle Norme, rievoca brevemente i momenti precedenti l'inizio delle campagne di restauro dei mosaici fiorentini: l'opportunità offerta dal "magnifico ponte a quattro piani" rizzato già dal 1886 su disegno di Luigi Del Moro, futuro Direttore dell'Ufficio Regionale per i Monumenti della Toscana; le sue prime titubanze di fronte alla proposta di dirigere i restauri del mosaico; i dubbi espressi dal Ministero circa l'opportunità di conferire tale incarico ad un ente che non vantava precedente esperienza nel restauro musivo; il restauro di prova, consentito dal Ministero, "limitato soltanto all'ultimo anello ornativo che circonda la lanterna della cupola"; e intanto l'idea, che si faceva strada nella mente di Marchionni, di un "sistema più radicale", sperimentato personalmente e sottoposto all'approvazione della Commissione ministeriale, formata da Arturo Faldi e Alfredo D'Andrade (Marchionni 1921; Paribeni 1996, 476). Il seguito è storia nota: ottenuto il plauso incondizionato da parte delle autorità ministeriali i lavori proseguirono in un primo tempo alacramente (l'anello ornamentale è completato nell'ottobre del 1899, il primo registro nell'agosto del 1901), quindi più lentamente per le difficoltà imposte dall'opera e per alcune critiche piovute addosso al Marchionni a causa di personali e disinvolute restituzioni dell'iconografia delle scene figurate compiute senza un rigoroso controllo delle fonti storico artistiche; anche per questo motivo nel 1904 venne posto alla direzione artistica del restauro Arturo Viligiardi, già impegnato nei lavori di S. Paolo fuori le mura, il quale, come dimostra la serie di tre pannelli con la morte di Caino, le istruzioni di Dio a Noè e la costruzione dell'Arca, riprendendo probabilmente indicazioni del Venturi, si rifece a modelli miniati offerti dagli Ottateuchi della Vaticana (Ponticelli 1950-1951: 249-250, 52-53; Paribeni 1996: 477).

A parte queste perplessità di ordine storico artistico, unanime fu l'ammirazione per il risultato tecnico ed estetico di questi restauri, nel cui cantiere si formarono abili operai e tecnici, come Aretafilo Merlini, che prestarono poi la loro opera in altri lavori commissionati all'Opificio in quel torno di tempo: ricordo solo i mosaici del Battistero di Albenga, per la cui protezione proprio D'Andrade, che in qualità di commissario aveva potuto apprezzare la bontà del metodo di Marchionni, richiese l'intervento dell'Opificio (Marcenaro 1993, 286-298; Paribeni 1996: 477).

Il testo del manoscritto non si addentra però nella ricostruzione delle

varie fasi di questi o di altri restauri, bensì, con l'ausilio di preziosi documenti grafici (fig. 3), si propone come un prontuario per il tecnico restauratore chiamato alla conservazione dei mosaici parietali e pavimentali. Maggior spazio, come è lecito attendersi, viene lasciato alla metodologia d'intervento sui mosaici parietali, di cui vengono indicate le più comuni cause di deperimento, dovute per lo più ad alterazioni fisico-chimiche dell'impasto per mezzo del quale il mosaico aderisce alla parete, la cui azione può essere aggravata da determinati eventi traumatici (sismi, violenti spostamenti d'aria, ecc.). Una volta conosciute le cause di deperimento e individuati i campi entro i quali è necessario o auspicabile un intervento e tenendo presente i limiti propri ad ogni azione di ripristino o di restauro di un'opera di interesse artistico della quale si vuole mantenere inalterata l'autenticità, Marchionni passa a descrivere le varie fasi di intervento sul mosaico parietale mediante una tecnica di asportazione della zona da restaurare in laboratorio e da ricollocare quindi *in situ* senza la perdita di alcuna delle prerogative dell'opera d'arte originaria. Lo stacco, operato per frammenti tra i 70 e gli 80 cm², si eseguirà con un incollaggio di una serie di carte di diverso spessore, attaccate con un composto di acqua, destrina (colla vegetale), farina di grano, miele e gesso senza presa, su cui si tracceranno punti e linee di riferimento per la futura ricollocazione del frammento; si praticherà quindi il taglio e l'asportazione dalla parete, previo meticolosissimo lucido colorato, specialmente delle parti attraversate dal taglio che potrebbero perdere qualche tessera. Seguirà la pulitura del rovescio del mosaico adagiato su una superficie ricurva e quella della superficie muraria da cui il frammento è stato distaccato, sulla quale verranno innestati chiodi di rame ad estremità ripiegata collegati tra loro da un filo anch'esso di rame, creando in tal modo una sorta di scheletro per il nuovo intonaco; tale intonaco, composto da cemento a lenta presa, calce e sabbia ben lavata, verrà allettato sulla muratura e un poco anche sul retro del mosaico che verrà quindi applicato alla parete. Atteso che il cemento abbia fatto presa, si passerà al distacco del supporto cartaceo con bagni successivi di acqua (Marchionni 1921, ff. 7v-11v).

Nell'insieme, il metodo delineato da Marchionni, pur con alcune peculiarità operative, si richiamava, nell'asportazione e nei tagli, ad analoghi procedimenti adottati da Botti nel trasporto degli affreschi del Camposanto di Pisa - del 1856 - e della Cappella degli Scrovegni a Padova - dal 1868 al 1871 (Conti 1988: 303) - mentre, nel campo del mosaico, il distacco dei pannelli dalla parete era stato già effettuato, come abbiamo visto sopra, da Rosario Riolo nella Cappella Palatina a Palermo, con la principale differenza che i pannelli musivi da staccare venivano assicurati a liste di tavola veneziana

invece che a successivi strati di carta (Riolo 1870b: 15-16). Più particolare è la realizzazione di un telaio con traverse incrociate (fig. 4), alle cui giunture è posto un tassello di legno azionato da una vite, il cui scopo era quello di poter determinare le reciproche posizioni e livelli di punti del mosaico distaccato presi a intervalli regolari, in modo da rispettare, all'atto del riposizionamento del frammento in parete, le diverse profondità ed emergenze della tessitura musiva volute dall'artista (Marchionni 1921, 12v-13r). Altri accorgimenti sono suggeriti per la preparazione in laboratorio - entro casseformi di legno piene di sabbia a grana sottile leggermente cementata - di integrazioni di mosaico, fatte sia con tessere antiche che moderne, o per il risarcimento *in situ* di limitate porzioni di mosaico. Un'ultima sezione del manoscritto riguarda le tecniche per l'asportazione di mosaici pavimentali rinvenuti in aree di scavo, in previsione di un loro ricovero in ambienti museali o in laboratori di restauro, effettuata per scavo del terreno sottostante - con distacco del mosaico e del sottofondo pavimentale - oppure per strappo del solo tessellato, ottenuto con l'incollaggio al pavimento di una tela solidale ad un rullo ligneo formato da due dischi collegati da assi poste a breve distanza l'una dall'altra: facendo ruotare lentamente il rullo, attorno ad esso si avvolge il mosaico che in tal modo può essere agevolmente trasportato in un locale idoneo per la conservazione e il restauro (Marchionni 1921, 19r-24v; Paribeni 1996: 480, 485, fig. 8; Michelucci 2001: 12). Concludono lo scritto alcune considerazioni generali sulla natura e i fenomeni di deterioramento delle pavimentazioni ad *opus sectile* (Marchionni 1921: 24r-27v).

Tenuti presente i limiti di fondo che la tecnica di restauro a strappo comporta, quali la inevitabile imprecisione dei tagli con conseguente perdita di tessere originali, la dilatazione nella tessitura musiva provocata dal distacco della sezione e la perdita di dati archeologici dovuta all'alterazione dello strato di allettamento (Guidobaldi 1992; Iannucci - Fiore - Muscolino 1992; *Mosaicos* n° 5 1994; Ardovino 1994), si può dire che i metodi seguiti da Marchionni costituirono comunque un importante punto di riferimento per la pratica di restauro dell'epoca, come del resto attesta il buon livello complessivo dei lavori nel battistero di S. Giovanni (Ponticelli 1950-1951: 248-249; Giusti 1994: 298; Boskovits 2001: 178, 189): gran parte del merito per un tale giudizio qualitativo va però riconosciuto alle maestranze che lavorarono all'Opificio e che, sotto la direzione di Marchionni, seppero raggiungere un altissimo grado di abilità pratica. Tale abilità era però conseguenza di un intendimento del restauro come operazione mimetica, perfettamente dissimulabile nel corpo dell'opera originaria: un intendimento tipico dell'epoca, oggi non più condivisibile, e non condiviso già allora da Giacomo

Boni ad esempio nelle sue vibrato prese di posizione nei confronti dei restauri allora condotti sui mosaici di Parenzo - esemplarmente prese a modello da Marchionni nella prima parte delle sue Norme; per il Boni il rispetto del monumento andava osservato astenendosi quanto più possibile da qualsiasi intervento innovativo e, in ogni caso, armonizzando e non assimilando l'elemento di restauro con quello originario (Boni 1894: 359-364; Paribeni 1996: 481). Proprio nella seconda parte del suo articolo sui mosaici di Parenzo, che, non a caso, non ritroviamo tra le citazioni riportate dal Marchionni, Boni sollevava molte perplessità sulle tecniche di distacco dalla parete dei mosaici da restaurare, ritenendo al limite un espediente preferibile quello adottato negli anni '70 per i mosaici di S. Giusto a Trieste, per la conservazione dei quali fu ristrutturata la parete senza distaccare da questa i mosaici, ma semplicemente ricoprendoli con uno spesso strato di carte e assicurandoli ad una centinatura lignea (Boni 1894: 359-364; Bernardi 1996).

Curiosamente, quindi, un intervento di restauro come quello di Marchionni, concepito programmaticamente secondo linee direttive care a Boni, se ne distanziava poi nella esecuzione pratica, non osservandone gli atteggiamenti più rigorosi riguardo al rispetto dell'autenticità dell'opera d'arte e dei suoi materiali costitutivi. Tale distanza è il frutto del compromesso, forse inevitabile, tra il purismo delle teorie conservative di ascendenza ruskiniana e le esigenze di chi voleva il monumento restituito nello splendore e nella completezza originari.

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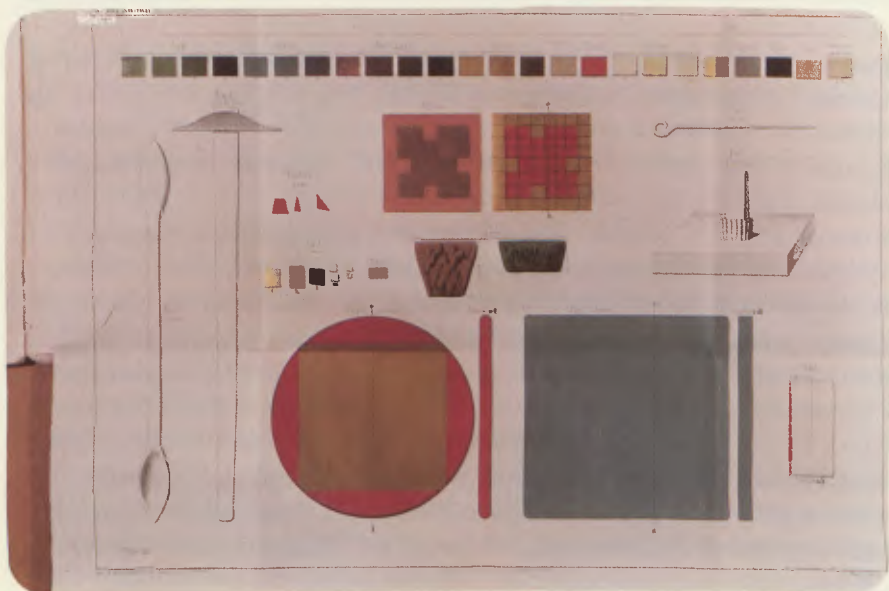
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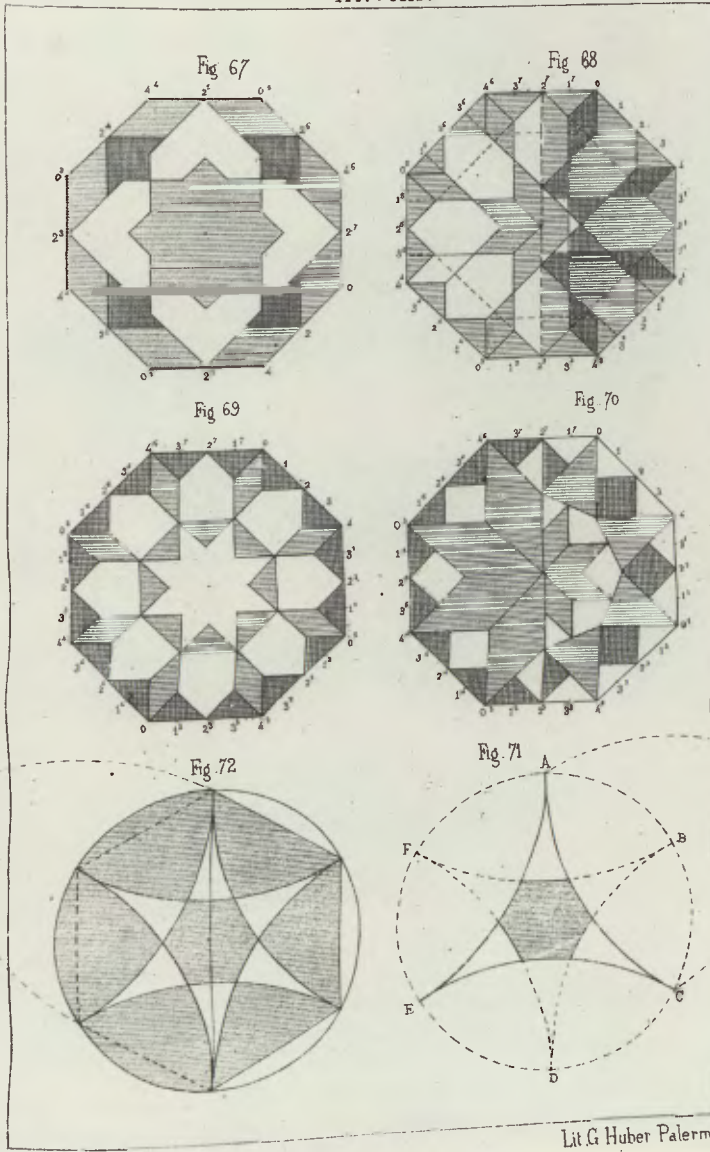
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FIGURE



1. G. Riolo, *Dell'artificio pratico dei mosaici antichi e moderni*,
tavola cromolitografata (da Riolo 1870a).

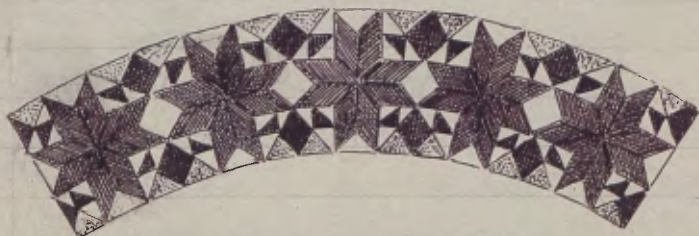
TAV. XII.



Lit. G. Huber Palermo

2. Regole pratiche per la scompartizione della superficie dei poligoni e dei cerchi. Tav. XII (da Riolo 1873).

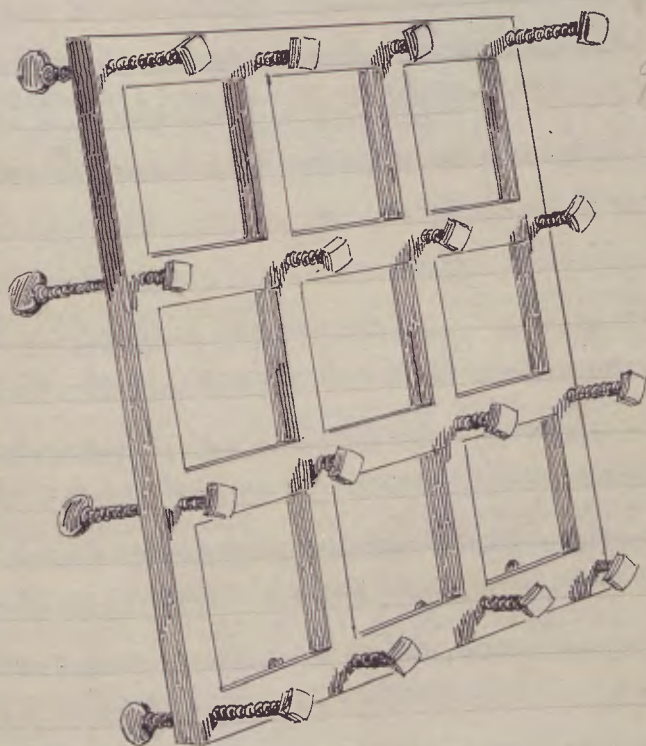
*il giallo ed il bianco si alternano fra loro
contrapponendosi per colore, tagliati*



*quasi esclusivamente in triangoli, losanghe
quadrati e rettangoli ciascuno in varie
grandezze disponendosi in fregi e pannelli
ad ornamento di fonti battesimali, pulpiti*

3. E. Marchionni, Norme per il restauro dei mosaici, fol. 24 v. Firenze, Archivio Storico Opificio delle Pietre Dure (da Paribeni 1996).

crociate alle cui congiunture un tassello
di legno potrà avanzarsi ed allontanarsi
per mezzo di una vite, lo presenterà alla



Superficie dell'impronta di carta facendo
avanzare ogni tassello a toccarla ottenendo

4. E. Marchionni, Norme per il restauro dei mosaici. fol. 12 v. Firenze, Archivio Storico Opificio delle Pietre Dure (da Paribeni 1996).

ANGELO MARIA ARDOVINO

**IL CASO DEL MOSAICO DI ALESSANDRO DI POMPEI:
SGUARDO SULL'IDEOLOGIA SELETTIVA DELLA CONSERVAZIONE
NELL'OTTOCENTO,
E RIFLESSIONI PER IL RESTAURO DI MOSAICI GIÀ RESTAURATI.**

SUMMARY

This survey relates a joint archive research and an object reading of the "Mosaico di Alessandro" from the "Casa del Fauno" in Pompeii. This survey shows how the mosaic in 1843 was removed with all preparatory layers, and transferred with them to the Museo Nazionale of Naples. In today's layout the original stratification is still integral part with the mosaic surface. The operation happened after a dispute between two parts, one made up of soprintendente Avellino and the famous Swiss (from Canton Ticino) architect Bianchi, the latter preferred leaving the mosaic at the Casa del Fauno, and the other of Director of Fine Arts Academy Niccolini, who wanted to take the mosaic to Museum, and place it into the floor. Accordingly the author examines the ideological elements of this two different leanings, and their reflex on the safeguard of archaeological heritage.

RÉSUMÉ

La mosaïque de la "Casa del Fauno" à Pompéi, dite "Mosaico di Alessandro", a été fouillée en 1831 et détachée en 1843, et tout de suite portée par chemin de fer à Naples, au Museo Nazionale. Les données d'archive et la directe analyse du monument révèlent que la mosaïque a été emportée avec toutes ses couches de préparation, en très peu de jours, selon une technique très intéressante, et qu'elles sont encore au-derrrière des tesselles. Les choix d'emporter la pièce, et de la conserver placée à paroi avec ses couches, sont l'issue casuelle du combat, au milieu de la bureaucratie bourbonnienne, entre le parti des archéologues et celui des artistes. Le premier, qui était enraciné dans la soprintendenza et avait à sa tête M. F. Avellino et M. P. Bianchi, un

architecte tessinois qui travaillait à Naples, défendait la valeur du monument; l'autre, dont le chef était M. Niccolini, directeur de l'Accademia di Belle Arti, voyait la mosaïque comme modèle pour les peintres et voulait la placer dans le pavement du Musée. Aucun des deux partis a vaincu sa bataille.

Il "Mosaico di Alessandro" al Museo Archeologico di Napoli è tra i mosaici più noti dell'antichità, tanto che non citerò neppure l'abbondantissima letteratura artistica ed archeologica. Nel novembre 2000 il mio amico Stefano De Caro, allora Soprintendente di Napoli, mi commissionò una consulenza sul suo restauro, che è stata lo spunto per un'osservazione diretta e, soprattutto, per uno sguardo alla sua storia, ricavata dagli archivi della soprintendenza archeologica di Napoli, che esiste dall'epoca del Regno dei Borboni. Era infatti necessario, per arrivare ad una diagnosi sullo stato di conservazione, capire se, seguendo una tecnica pompeiana ben attestata sulle pitture, era ancora sul suo allestimento originale, e più in generale, quali trattamenti avesse subito. Ma la ricerca sui documenti di archivio è diventata un'occasione per comprendere le scelte ideologiche che stavano dietro quelle conservative, oltre che per avere conferma di una tecnica raffinata, diversa dalla nostra, su cui vale la pena di riflettere.

Il Mosaico di Alessandro, detto nei documenti della prima metà del 1800 "Grande Mosaico Pompeiano", a testimonianza eloquente dello straordinario impatto che l'opera ebbe nella cultura del tempo, o più semplicemente G.M.P., fu scavato nel 1831 e lasciato *in situ* fino al 1843. All'atto della scoperta era già incompleto, tanto che subito pensarono che fosse stato rovinato dal terremoto del 63 d.C., e che i Pompeiani non avessero saputo come iniziare il suo rifacimento. Ipotesi ragionevole, perché il mosaico era un'opera eseguita su un cartone vecchio di secoli che non era facile ricostruire. È perduto il disegno fatto al momento dello scavo, forse eseguito da Pietro Bianchi, architetto ticinese finito a Napoli, che gioca un ruolo notevole in questa storia, ed è pure perduto un disegno del Marsigli, pittore noto per la sua amicizia con Vincenzo Bellini, eseguito qualche tempo dopo. Esso è descritto il 23/2/1843 in una lettera del Niccolini, potente direttore dell'Accademia di Belle Arti, altro personaggio chiave di questa storia, che afferma che il disegno documentava un restauro antico ad intonaco colorato. Perduta quindi la documentazione più antica, non sappiamo se tra il momento della scoperta e quello dell'asportazione dal terreno vi furono consistenti perdite. Disegni eseguiti nel 1843, in occasione dell'asportazione, che si ritengono del Mastracchio, lo mostrano incompleto, ma in condizioni simili all'attuale. Molti studi hanno già notato che alcuni

piccoli lacerti, cioè frammenti con le tessere connesse tra loro, in particolare sotto la grande lacuna sotto l'immagine di Alessandro, appaiono in collocazione sospetta e frettolosa. In piccole zone, soprattutto lungo i bordi, è possibile sospettare una ricollocazione di tessere singole; ma, nel complesso, la maggior parte del tessellato appare in posizione originale.

Nel sopralluogo del 20/11/2000 ho accertato delle lesioni che attraversano il manto, che appaiono di formazione recente, e dei sollevamenti. I fenomeni non sono gravi, ma sono in atto, e sono stati confermati anche da termografie, cui però ho preferito l'esame autottico, ampiamente sufficiente. La visione diretta mostra pure che la medesima tempera grigia ha ricoperto uniformemente ogni genere di lacuna, sia nella scena figurata, sia nella cornice, cioè il campo a listelli con ombre che chiude la scena, sia nel margine esterno, cioè il campo a tessere bianche che raccordava la composizione musiva con la parete. Lo stesso esame fa' vedere che la cornice ed il margine sono eseguiti in una tecnica diversa, con tessere molto più grandi di quelle usate nella scena figurata. Ciò non è raro ma, in questo caso, è lecito sospettare che si possa trattare di un'integrazione, o chiedersi, se invece sono pertinenti all'opera, se furono rimosse in solido con essa o in un altro momento. Solo l'intervento di restauro vero e proprio, potrà chiarire questo dubbio, alimentato, come vedremo, da polemiche tra antichi avversari del 1843 di cui non conosciamo l'esito. Il restauro permetterà anche di capire se il mosaico stia su un supporto realizzato in travi di legno a croce, che reggono uno strato cementizio ed uno di scaglie di ardesia. Tale sistema infatti è ben documentato per le pitture staccate a Pompei negli stessi anni, e d'altra parte l'ardesia risulta già nel verbale dello stacco, datato 24/10/843, in cui si parla, con la terminologia tecnica napoletana del tempo, di lastre di "pietra arsa". Ma veniamo a quanto ci dicono i documenti.

In breve la storia del monumento è la seguente:

- a. Nel 1831 viene scavato e lasciato *in situ* nella Casa del Fauno.
- b. Nel 1843 viene asportato dalla Casa del Fauno e trasferito a piano terra del Museo Nazionale.
- c. Tra 1844 e 1845 si susseguono direttive senza esito per sistemarlo a pavimento in una sala a piano terra del Museo.
- d. Nel 1855 viene sventato un tentativo di colmare le lacune con una pittura ad olio.
- e. Dopo il 1920 viene trasferito, e collocato a parete, al primo piano, dove sta tuttora.

Per quanto riguarda la prima fase, gli indizi sono dapprima molto lacunosi. Dagli atti della fine del 1842 apprendiamo però che si è sviluppato un

grande dibattito sulla sua conservazione e la sua possibile asportazione, perché ch'è chi ritiene dannosa la permanenza *in situ*. In realtà il dibattito appare strumentale, perché ci sono due partiti che si scambiano tiri mancini. Così ci sono tecnici che fanno denunce sul grave stato di degrado e subito dopo le ritrattano, esperti chiamati apposta da Roma che prendono le distanze e chiedono di tornarsene a casa, alti funzionari, come il colonnello Visconti, il primo a proporre il distacco, che chiedono di essere esonerati. Il tono freddo della burocrazia borbonica non riesce a nascondere tutto ciò. Le testimonianze vanno quindi lette criticamente, non dimenticando che ci sono due partiti, uno dei quali, che prevarrà, legato al potentissimo Niccolini, l'altro che fa capo al Bianchi. Il soprintendente Avellino appoggia il Bianchi, ma si adegua alle decisioni del Ministro Santangelo, favorevoli al Niccolini. In questo clima l'accertamento delle cause del degrado avviene in mezzo ad accuse roventi e scarsamente attendibili, dalle quali però risultano con chiarezza questi punti:

1. Nei dodici anni di permanenza nel terreno i tecnici sono preoccupati per l'umidità, che fronteggiano applicando dei "ventilatori", altro termine tecnico napoletano, che indica dei cunicoli sotterranei che avevano lo scopo di far circolare l'aria nel massetto, per prosciugarlo. Che si tratti di cunicoli superficiali, e non di opere più profonde è ipotizzabile a causa dell'altimetria della Casa del Fauno, in cui il mosaico stava ad una quota più alta rispetto ad altri ambienti vicini, dai quali poteva essere facilmente aggredito, e dal fatto che il progetto proponga di sfruttare i ventilatori per facilitare lo stacco. Ciò non prova che l'umidità fosse causa di degrado, ma è fuori dubbio che gli operatori la ritenessero tale.
2. Per lungo tempo sulla superficie musiva viene condotta una manutenzione da "pavimento moderno", con pulitura ad acqua ragia e stesura di cera. Anche ciò viene indicato tra le cause del degrado e dell'offuscamento dei colori. In realtà i due prodotti sono innocui, perché non reagiscono chimicamente con le tessere o con il carbonato di calcio della preparazione; non a caso venivano comunemente usati sui pavimenti migliori delle case patrizie. Tuttavia la loro azione combinata all'aperto, o comunque in un ambiente non correttamente confinato, può aver provocato piccoli stress locali, se alla rapida deidratazione, provocata dall'acqua ragia, fosse seguita una troppo tempestiva applicazione di cera, che avrebbe sigillato una situazione di mancanza di umidità impedendole di riequilibrarsi in modi e tempi naturali.
3. Le guide ed i custodi bagnavano il mosaico per renderlo più appetibile

ai visitatori. Il fenomeno è spesso stigmatizzato, ma, a meno che non si voglia presumere una sua iterazione tale da provocare ristagni permanenti, è irrilevante.

4. Vengono tirati in ballo gli insetti, che solleverebbero le tessere. Ma ciò può essere un effetto del degrado, non la causa.
5. Sul manto musivo viene spesso lamentata la presenza di "bollicine". Esse spariscono dopo il trasferimento a Napoli. Probabilmente si tratta di piccoli sollevamenti, cui si è posto rimedio prima del trasferimento. Il Belliazzi, autore dello stacco, nel suo progetto propone di fissarli con mastice, dopo averli ripuliti dal gesso (il ché prova che erano stati fatti dei rialtamenti su gesso); anche l'Avellino conferma nella sua relazione al ministro l'avvenuto uso del mastice, come assicuratosi dal Niccolini, già a Pompei. Da ciò risultano due fasi di lavoro a Pompei, una, occasionale, durante le manutenzioni *in situ* dal 1831 in poi, con rialtamento di tessere isolate su gesso, ed una appositamente effettuata prima del distacco. Non so se abbiano veramente usato, come scrivono, questo "mastice"; di sicuro hanno usato il gesso, ben visibile nelle crepe colorate; per risolvere questi dubbi serve un esame più dettagliato della superficie.

A leggere i carteggi si ha l'impressione che più degli errori di manutenzione o dell'umidità di risalita, che spesso a Pompei assume forme preoccupanti, ma che non sembra il problema principale degli ambienti più alti della Casa del Fauno, meno che mai dopo l'alleggerimento del terreno con dei fori di ventilazione, la causa principale dei sollevamenti vada ricercata nelle escursioni di umidità e di temperatura su un manufatto che aveva già subito un trauma sismico ed uno di scavo; ciò non era sfuggito a Vincenzo Raffaelli, mosaicista romano figlio del più noto Giacomo, fatto invitare dal Bianchi, che propone un intervento di mantenimento in loco - non certo di conservazione *in situ* - basato sul trasporto su un supporto artificiale moderno, forse in vista di un progetto, cui lavorava il Bianchi, di sistemare la Casa del Fauno come un monumento ricoperto e completo in tutte le sue parti, mosaico compreso: una musealizzazione *in situ ante litteram*. Il Raffaelli però, accortosi di essersi schierato contro il partito vincente del Niccolini, chiede congedo e torna a Roma.

Il distacco avviene a Pompei tra il 24 ottobre, in cui viene redatto il verbale di inizio delle operazioni, ed il 3 novembre, in cui il ministro ordina il trasporto a Napoli. Verosimilmente, è chiuso il sabato successivo al 24 ottobre, come prescritto nel verbale, e cioè il 28. Le operazioni descritte nel verbale corrispondono a quelle a suo tempo proposte dal Belliazzi, tranne

l'assottigliamento del massetto nell'elevata percentuale di 5/6, che dagli atti non pare approvata. Sta di fatto che, stando ad un consuntivo di dicembre, il mosaico viene, dopo l'interposizione di uno strato di carta e stoffa, ricoperto di gesso, che sarà rimosso a Napoli. Il gesso dà sufficiente rigidità alla faccia superiore, e ciò permette di inserire lateralmente una cassaforma, e di infilare, sfruttando la via aperta dai condotti "ventilatori", al di sotto del massetto, o di buona parte di esso, spezzoni di ardesia e quindi tavole. Al di sotto del tutto vengono disposti "ordigni", cioè macchine capaci di sollevare in solido il mosaico e trasportarlo fino alla stazione, perché da ordini del Santangelo apprendiamo che il mosaico arriva a Napoli su un carro ferroviario speciale, fatto venire apposta da Maddaloni.

Nel verbale non ci sono accenni ad un supporto artificiale posto sotto l'ardesia ed i legni serviti nel taglio. È tecnicamente possibile che maestranze esperte abbiano potuto mettere in opera un ulteriore supporto anche nei 5 giorni a disposizione, purché esso fosse già stato predisposto in anticipo. Ma è possibile che l'ardesia e le tavole sovrapposte agli "ordigni" siano state l'unico supporto del massetto durante il trasferimento, oltre al fondo della cassa.

Questa ipotesi appare la più probabile ad una prima lettura del carteggio successivo al trasferimento a Napoli. Il Niccolini ha vinto, e sceglie la stanza a pian terreno in cui collocare il mosaico lasciando al Bianchi, sconfitto, l'onere di movimentarlo all'interno del Museo secondo le sue indicazioni: ma la Sovrintendenza organizza la resistenza all'attuazione totale del suo progetto, che prevede la sistemazione a pavimento. Già il rapporto dell'Avellino del 25 gennaio, al di là degli elogi formali, ricorda al ministro che le perplessità sulla riuscita del trasferimento, che egli aveva sostenuto fino all'ultimo indebolendo così la propria posizione nei confronti del Niccolini, in realtà erano state in origine condivise da questi, e lascia intendere che abbia sottratto la documentazione dell'intervento. Poi, nei due anni successivi, c'è tutto un carteggio confuso in cui l'obiettivo della pavimentazione del mosaico si disperde in una ridda di notizie su lavori di ogni genere nella stessa sala. Si ha come l'impressione di una resistenza passiva, in cui si distinguono Bianchi e Bonucci, che vanifica il progetto, finché le note sui lavori si interrompono e della sistemazione a pavimento non si ha più notizia. Un procedimento disciplinare promosso dal Quaranta nel 1855 contro il custode Scognamiglio, che aveva preso la libertà di condurre integrazioni pittoriche ad olio nelle lacune (che per decisione ministeriale vengono prontamente rimosse e sostituite con una coloritura neutra a tempera) assicura che a quella data il progetto di porre a pavimento il mosaico non era stato realizzato, e che, anzi, non se ne parlava più. La Sovrintendenza aveva quindi ottenuto la sua rivincita

contro l'Accademia, ed il mosaico era stato sistemato a parete. Forse è allora che viene realizzato il supporto definitivo, sfruttando l'ardesia già in opera il momento dello stacco.

Al momento attuale non pare significativo, per le sorti del monumento, il passaggio successivo, il trasferimento degli anni '20 del XX secolo da terra al primo piano.

La maggiore lacuna nella documentazione riguarda le tessere della cornice a listelli con ombre e del margine esterno bianco. Lettere sempre più indispettite del Niccolini, nel 1845, a difesa del suo progetto della sistemazione a pavimento, che evidentemente vede iniziare a sfumare, parlano della necessità di completare il margine consegnando al Belliazzi dei pezzi di mosaico bianco, aggiungendo che se non ce ne fosse abbastanza andrebbero prese un po' di tessere a Pompei. Ciò a prima vista lascerebbe pensare che il margine non sia stato staccato, ma potrebbe trattarsi soltanto di una necessità di completamento di una superficie maggiore dell'originale, voluta dal Niccolini e osteggiata da Avellino e dai suoi. Quanto alla cornice, in una prima ipotesi progettuale di stacco, che il Niccolini fa il 15 marzo 1843, si parla di possibilità di mantenere *in situ* almeno su tre lati le "fasce", ma di dover staccare almeno un lato del "fregio", perché altrimenti non ci sarebbe spazio sufficiente per lo stacco. Cosa sia in realtà avvenuto gli atti non dicono; ma potrà appurarlo il restauro.

In ogni caso dagli atti appare un distacco *in solido*, di un'amplissima superficie, grazie anche agli "ordigni" del Genio Borbonico. Un piccolo tassello operato nella lacuna principale lungo il bordo del tessellato il 20/11/2000 conferma la documentazione di archivio. Dopo uno strato superiore di gesso dipinto a tempera grigia, è apparso uno strato di calce al quale sono applicate direttamente le tessere, assolutamente omogeneo e non distinguibile in strati più raffinati di allettamento e più grossolani di preparazione, ed un massetto originale, di calcestruzzo estremamente duro, con una forte presenza di materiale rosso, o pozzolanico o frutto di tritume laterizio. Gli strati preparatori romani stanno ancora al loro posto, almeno in parte, quindi sono effettivamente stati asportati *in solido* con il manto musivo. Degno di nota che la loro distribuzione non corrisponde per nulla alla tripartizione vitruviana in *statumen, nucleus e rudus*; ma ciò non è una grande sorpresa.

A questo punto si possono fare alcune considerazioni. Nell'ambiente napoletano della prima metà del 1800 non c'era una cultura della conservazione *in situ*, che del resto con i consolidanti d'allora non era possibile, e quindi non poteva neppure svilupparsi una cultura della manutenzione generalizzata; c'era però quella del mantenimento *in situ*. Lo

dimostra il progetto di Bianchi di rendere la Casa del Fauno una sorta di Museo di se stessa. Ed il mosaicista romano Vincenzo Raffaelli aveva anche trovato il sistema adeguato per la tecnologia del tempo, cioè l'asportazione con riposizionamento su pannello artificiale. Tradotto in termini moderni, c'era una nascente attenzione ai valori di contesto, e la posizione della soprintendenza ha cenni di autentica modernità. Ma le cose andarono diversamente, e ciò fu un dramma per Pompei, e non solo per i mosaici.

Se non c'era una metodologia della conservazione, quella dell'asportazione è eccellente. Il Genio Militare impiega "ordigni", che non sono descritti, ma che è facile leggere come dei martinetti collegati a grandi sciabole, sfrutta i cunicoli di aerazione, i cosiddetti "ventilatori" praticati per asciugare il terreno, e mette in opera un sistema di sollevamento in solido perfetto. Le tecniche che sono venute dopo, lo strappo a rullo, l'asportazione per segmenti, la ricomposizione del manto dopo averlo spezzettato, sono state un regresso. Il mosaico così resta praticamente nelle sue condizioni iniziali. Mi piacerebbe che molti restauratori oggi avessero lo stesso coraggio nel tentare un'operazione del genere. In più va sottolineato che il mosaico arriva a Napoli per ferrovia, con un carro venuto dal Casertano; sono passati meno di quattro anni dalla "Napoli - Portici", la prima ferrovia italiana ed il Regno possiede una rete di più linee, mentre altrove il treno è considerato strumento dei Demonio.

Quel che però è più interessante è il contrasto tra la Soprintendenza, che a suo modo difende i valori di contesto di Pompei e si preoccupa delle sorti materiche del pezzo, vanificando i tentativi di metterlo a pavimento, e l'Accademia. Il Niccolini vuole il mosaico nel pavimento del museo perché persegue una visione dell'opera d'arte, che affonda le sue radici nel Rinascimento, in cui essa è modello per gli artisti. Per questo vuole riproporlo in piano, per ottenere una percezione visiva più corretta, oltre che per seguire una moda del tempo, seguita da altri musei ottocenteschi. In realtà le controindicazioni sono evidenti (maggiore possibilità di danni, rilavorazione del manufatto per conglobarlo in un pavimento moderno, ecc.), e non a caso la Soprintendenza si oppone. Si può dire che si scontrano da un lato una visione tradizionale dell'opera d'arte, modello degli artisti ed oggetto di contemplazione statica, dall'altro una più moderna, di mantenimento del bene nel suo contesto e di prudenza nella sua esposizione. In una parola, di tutela. Oggi noi abbiamo tutti fatto una chiara scelta tra questi due modelli, e ci rammarichiamo che l'Avellino, il Bianchi, il Bonucci abbiano perso la battaglia della tutela, ottenendo solo una parziale rivincita. Ma il rammarico è ancora maggiore se si pensa alla sorte successiva di Pompei, condannata da una visione selettiva ad amputazioni delle sue cose migliori, mosaici o pitture, e

quindi all'abbandono del resto.

La principale consolazione è che le tecniche di asportazione adottate nella vecchia tradizione pompeiana hanno permesso, sulle pitture e sui mosaici, la permanenza delle preparazioni originali, e quindi possibilità di studio che altrove ci sono negate. Ciò favorirà anche l'intervento di restauro, che si sta organizzando. In realtà i piccoli problemi riscontrati, sollevamenti e lesioni, originano probabilmente solo dal fatto che per 150 anni si è tenuto in verticale un pavimento di notevole peso senza aver bilanciato bene il carico. Non è certo un problema insolubile; e da un punto di vista formale, grazie anche alla decisione di grande valore filologico del 1855 di rinunciare alle integrazioni mimetiche ed adottare una tinta neutra nelle lacune, ci troviamo davanti ad un' "immagine consolidata" di tutto rispetto. Certo, lo stato attuale dell'integrazione, in "grigio soprintendenza", come scherzosamente si dice, può essere migliorato, perché la sua totale uniformità, nella cornice, nel margine, nel campo figurato tanto all'interno della scena quanto nelle lacune esterne, è eccessiva, e disturba e trae in equivoci il fruitore. Qualche leggera variazione cromatica dovrebbe essere preferibile, ma senza guastare la visione tradizionale di quello che, bene o male, è uno dei pezzi più noti ed amati di tutta l'arte antica.

Nota

Questo saggio è comparso in forma di preprint in *I mosaici. Cultura, Tecnologia, Conservazione. Atti del convegno di Studi, Bressanone 2 – 5 luglio 2002, a cura di G. Biscontin e G. Driussi (Scienza e Beni Culturali XVIII, 2002, Venezia 2002, pp. 33 – 38. Viene qui ripresentato in forma definitiva, tenuto conto di osservazioni e suggerimenti.*

A testo già chiuso l'amico Antonio Varone, noto studioso e funzionario pompeiano, mi ha dato una notizia che per mia colpa ignoravo, e di cui lo ringrazio. Pochi anni dopo il trasporto del Mosaico a Napoli, la soprintendenza riuscì a realizzare il progetto di mettere una copertura sulla Casa del Fauno, per farne quello che oggi si chiamerebbe "il museo di se stessa". Ma arrivò l'ordine dal ministro, il manufatto fu demolito, la Casa ritornò ad essere un rudere tra i ruderi, da cui asportare selettivamente le cose migliori. L'Accademia aveva vinto, e le conseguenze nefaste di questa vittoria si vedono tuttora.

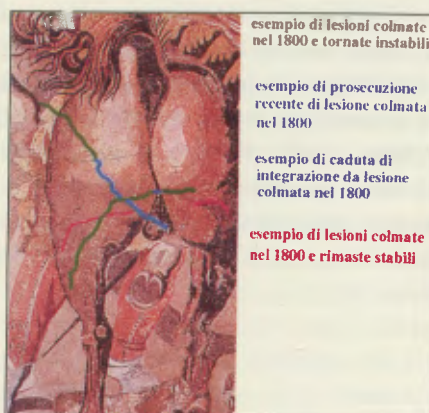
FIGURE



1. Mosaico di Alessandro. Insieme.



2. Mosaico di Alessandro. Differenti tipi di lesioni.



3. Mosaico di Alessandro. Schema della stratigrafia dei supporti.

CLAUDIA TEDESCHI*, CETTY MUSCOLINO

**IL PAVIMENTO MUSIVO DI SAN VITALE:
NUOVE OSSERVAZIONI RIGUARDANTI L' AULA OTTAGONALE**

*Soprintendenza per i Beni Architettonici e per il Paesaggio per le province di Ravenna, Ferrara, Forlì, Cesena e Rimini – Ministero per i Beni e le Attività Culturali, Italia

SUMMARY

The last restoration was done in 1999, to determinate the conservation of floor mosaics. This restoration has brought attention, once again, to the different levels of floors in the basilica of S. Vitale, and their past restorations. Furthermore, a specific floor mosaics technique from the 16th century has been highlighted by further studies directly on site. This technique is a sample of other mosaics in Tuscany from the same historical period.

RÉSUMÉ

A l'occasion de la dernière intervention, exécutée en 1999 pour constater l'état de conservation des pavements en mosaïque, on a encore une fois fixé l'attention sur l'histoire des restaurations relativement aux niveaux de pavement de la basilique de San Vitale. En outre, les études et les approfondissements en chantier ont permis de reconnaître une technique du XVI siècle, tout à fait particulière, qu'on peut rapporter à d'autres exemples toscans de la même époque.

L'ultimo intervento eseguito sui pavimenti di S. Vitale (fig. 1), promosso dalla Soprintendenza per i Beni Architettonici e per il Paesaggio di Ravenna, nell'ambito di una ricognizione e determinazione dello stato di conservazione, ha posto in luce problematiche e contributi di interpretazione da riferire alla storia dei restauri del pavimento.

Inoltre, tutta la serie dei lacerti rimossi nei primi decenni del Novecento,

provenienti dal corridoio anulare, sono stati oggetto di tesi di fine corso da parte di alcuni studenti della Scuola per il Restauro del Mosaico. I frammenti sono stati studiati e restaurati per poter essere restituiti alla comunità ravennate, data l'impossibilità fino ad ora di essere pubblicamente fruiti, poiché conservati all'interno del matroneo della Basilica di S. Vitale, oggi non visitabile. Per brevità richiesta, in questa sede si pubblicano solamente i dati della pavimentazione dell'ottagono centrale.

I lavori, hanno potuto mettere in evidenza una particolare tecnica artistica pavimentale Cinquecentesca. Tale lavorazione, risulta essere un progetto decorativo che ha interessato non solo la pavimentazione ma anche le decorazioni parietali di rivestimento delle superfici murarie.

Il pavimento oggi visibile, si presenta ricco di materiali; questi ultimi, in parte provengono dalle precedenti superfici musive relative sempre alla basilica. Il restauro conservativo, attraverso una serie di studi analitici e incrociati, ha offerto la possibilità di chiarire i processi di realizzazione del pavimento Cinquecentesco e di ipotizzare meglio le trasformazioni delle quote pavimentali, con le relative decorazioni. A questo proposito, le osservazioni tratte dai lavori di cantiere, unite a quelle storiche e grazie anche ad un validissimo supporto fotografico e digitale, che ha permesso la precisa restituzione di ogni dato, hanno reso la possibilità di rintracciare preziose notizie della pavimentazione originale di VI secolo; i risultati ottenuti offrono, una complessa visione storica e, soprattutto una nuova chiave di lettura del pavimento.

L'ottagono centrale, suddiviso in otto spicchi, di cui sei realizzati ad intarsio marmoreo tra il 1538 e il 1545 e due a mosaico di VI secolo (fig. 2 e 3), è il risultato tecnico di una operazione, iniziata alla fine degli anni Venti, che vede una assimilazione di fasi temporali diverse unite dentro un unico nuovo contesto.

Infatti, la pavimentazione Cinquecentesca, per effetto dei continui allagamenti dovuti al problema di abbassamento del livello del suolo, era stata rialzata di circa 80 centimetri dalla quota originale di VI secolo (Iannucci 1997: 69-87).

Durante i lavori del 1929, documentati da una relazione di scavo, (Bartoccini 1932: 133-141) e da accurati rilievi a colori, eseguiti da A. Azzaroni, che riguardarono la riduzione della quota pavimentale, venivano rilevati due spicchi realizzati, secondo l'informazione del Ricci, nel 1702 a imitazione delle decorazioni cinquecentesche. Dei due spicchi del Settecento oggi non vi è più traccia, in quanto proprio nel '29, subirono un trattamento diverso dal resto della pavimentazione del Cinquecento. In effetti, mentre per

quest'ultimo si attuò un distacco organizzato razionalmente, data l'intenzione consapevole di un successivo ricollocamento, per le due porzioni più tarde si optò per uno smontaggio di ciascuna lastra e una dispersione del materiale.

Nonostante la grande sensibilità e rispetto dell'*elemento storico* di quegli anni, gli spicchi del Settecento furono sacrificati in quanto sostituiti dai pochi lacerti musivi di VI secolo (poi ampiamente ricostruiti), ritrovati sotto durante il recupero della quota originale. In secondo luogo non vennero considerati materiale storico degno di essere conservato.

Malgrado questa scelta, oggi ardua e discutibile, i lavori si eseguirono con molta cura e abilità tecnica.

Il distacco, al posto dello strappo, fu una metodologia idonea e fu utilizzato probabilmente a causa dell'ottimo stato di conservazione della malta sottostante; infatti, l'esame autoptico del sottofondo ha rilevato, ancora oggi, una forte coesione e adesione alle lastre soprastanti.

A differenza di quanto riportato dalla relazione dei lavori del Bartoccini, le misure rilevate delle sezioni distaccate non sembrano essere di piccole dimensioni: le tracce delle sezioni individuate attraverso l'affioramento di una malta cementizia testimoniano appunto il contrario.

In generale, l'intervento conservativo ha consentito di guardare questa pavimentazione con un'ottica differente: non il pavimento di S. Vitale, ma *la tarsia marmorea cinquecentesca* di S. Vitale, che intimamente si lega ad altri esempi italiani dell'epoca.

Molte delle lastre di marmo bianco furono lavorate secondo una tecnica molto in voga durante il Cinquecento. Una lavorazione emersa in maniera evidente solo dopo l'operazione di pulitura.

L'aspetto formale del pavimento, al termine della sua realizzazione, doveva essere abbastanza diverso da come oggi lo percepiamo: infatti, molte lastre, furono incise, scavate e riempite successivamente con uno stucco colorato rosso e nero, secondo precisi decori. Tutto il pavimento presenta lastre di questo tipo con incisioni che spesso riprendono le decorazioni della chiesa antica (fig. 4).

Simulazioni eseguite tramite l'uso di software hanno restituito la pavimentazione in un giusto equilibrio cromatico e hanno evidenziato un diverso impianto decorativo rispetto a ciò che oggi è possibile vedere.

La tecnica è accuratamente descritta dal Vasari (Vasari 1988: 57): racconta come fu usata magistralmente nel Duomo di Siena per opera di Domenico Beccafumi.

Le lastre venivano considerate in un primo momento come una superficie su cui disegnare dove l'artista con un pennello profilava il suo progetto.

Successivamente lo scultore incavava con i suoi ferri tutti i tratti che il pittore aveva disegnato e infine con

una mistura di pegola nera bollita o asfalto, e nero di terra si riempiono tutti gli incavi che ha fatto lo scarpello; e, poi che la materia è fredda e ha fatto presa, con pezzi di tufo vanno levando e consumando cio che sopravanza, e con rena, mattoni ed acqua si va arrotando e spianando tanto, che il tutto resti ad un piano, cioè il marmo stesso ed il ripieno; il che fatto resta l'opera in una maniera ch'ella pare veramente pittura in piano, ed ha in sé grandissima forza con arte e con maestria.

Il fatto che la pavimentazione fu realizzata con marmi di diversa tipologia non rappresentava un problema; è sempre il Vasari ad informarci che venivano impiegate lastre di tre qualità cromatiche diverse per meglio esaltare il chiaroscuro delle forme disegnate. E' chiaro che i diversi marmi bianchi utilizzati in S. Vitale non devono assolvere a questo scopo; scorgiamo più un atteggiamento alla base che promuove il reimpiego dei materiali, testimoniato frequentemente da moltissime lastre in cui compaiono segni inequivocabili di una prima lavorazione.

Il riutilizzo dei materiali non riguarda solo gli elementi lapidei: nello spicchio n° 3, ma anche in altri, piccole porzioni di mosaico sono state usate come elementi decorativi.

Da una approfondita analisi macroscopica è emerso che i frammenti di mosaico provengono da precedenti impianti decorativi.

Il riconoscimento è stato possibile fissando tre parametri di riferimento macroscopici: lo studio dell'aspetto (le tessere nella forma e nel colore), della struttura (la malta nella granulometria e nel colore) e dell'iconografia. Sono stati così identificati 11 gruppi. Il confronto con i mosaici di VI secolo e medievali relativi alla basilica, ne ha accertato la provenienza: la maggior parte dei frammenti appartengono al programma di restauro medievale, mentre una piccola parte è da riferire ai mosaici di VI secolo. Ad una osservazione accurata è stato possibile riconoscere i brani figurativi: parti di volatili, pavoni, o elementi geometrici. Brani che bene si accordano, peraltro con la descrizione del pavimento di S. Vitale dell'erudito Gian Pietro Ferretti del 1525, (quindi prima dei lavori di risistemazione), in cui specifica la presenza di mosaici decorati con figure di oggetti e di animali costruiti con smalti rossi, verdi gialli e altri colori (Ferretti s.d.: ms.).

Le piccole porzioni di mosaico erano state allettate nella pavimentazione

dèl Cinquecento dopo essere state "segate" in piccoli quadrati. Tracce di questa operazione sono state rinvenute nelle pareti dei frammenti musivi che abbiamo potuto analizzare in più punti dove la malta interstiziale mancava (fig. 5).

Come già detto sopra, i piccoli lacerti musivi furono prelevati dalla pavimentazione precedente e vi è la certezza che gli artefici del pavimento Cinquecentesco conoscessero bene il piano musivo di VI secolo (di cui mantennero l'impianto decorativo), testimoniato anche dalla pianta del Sangallo il Giovane, conservata all'interno degli Uffizi a Firenze, dove bene si evince l'antica divisione del pavimento originale (Foschi 1997: 59-68). Inoltre, le porzioni di mosaico "segate" fanno presupporre alcune considerazioni:

- 1) furono ricavati da pezzi di mosaico più grandi;
- 2) i pezzi segati erano in buone condizioni;
- 3) la dimensione fu scelta non casualmente;
- 4) gli scarti furono recuperati e le tessere sciolte dalla malta più antica.

Infatti, in tutta la superficie si possono scorgere queste tessere: il materiale musivo presente proviene esclusivamente dal pavimento più antico.

L'aspetto dimensionale è stato rapportato a quello di altri elementi sempre presenti nello stesso spicchio. Sono stati allestiti alcuni riquadri di calcare nero con all'interno delle lettere scavate e riempite con del metallo, (dell'antica iscrizione argentea riportata da Andrea Agnello?), (*Liber Pontificalis*: 321-322). Le lettere occupano perfettamente l'area centrale dell'elemento calcareo e questo fa presupporre che la scelta dimensionale dei quadrati "segati" abbia seguito quella degli elementi con le lettere incise.

Una ultima considerazione a carattere più generale si riconduce al programma iconografico dell'intero ottagono: lo studio della distribuzione dei materiali musivi utilizzati ha posto in evidenza una preziosità e qualità maggiore nelle parti situate davanti l'area presbiteriale. Infatti, man mano che si procede verso l'abside sia gli spicchi che le fasce divisorie aumentano il loro pregio (fig. 6). Il culmine si raggiunge nello spicchio n° 1, posto davanti l'altare in cui sono state impiegate tessere a lamina metallica dorata insieme a smalti colorati.

In conclusione, si può capire come la risistemazione cinquecentesca abbia portato a termine un progetto realizzato mediando il passato attraverso una ripresa di motivi sia iconografici (i decori) che materici (i mosaici antichi reimpiegati). Il tutto venne rifuso attraverso l'uso di una tecnica pavimentale molto in voga in quel periodo realizzata quasi completamente con materiale di "seconda mano".

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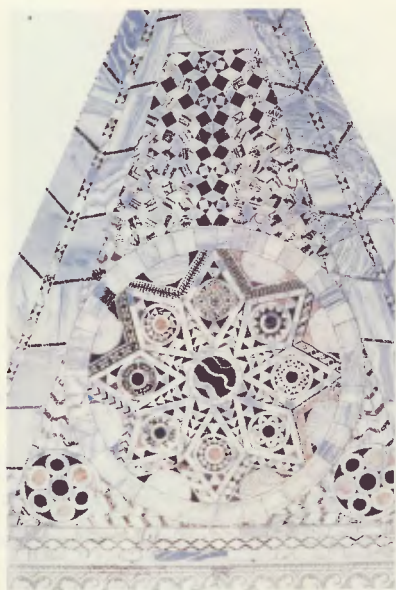
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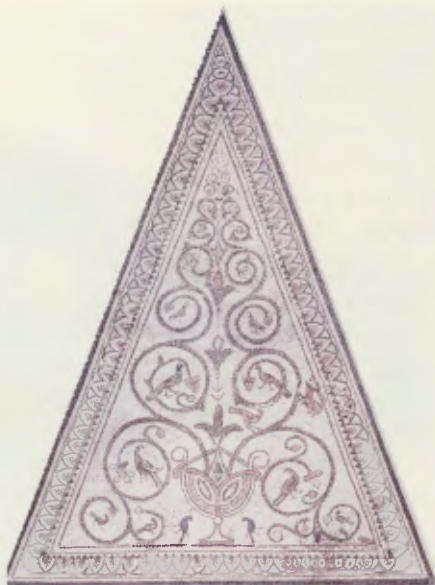
FIGURE



1. La basilica di San Vitale – Inquadramento urbanistico-architettonico.



2. Spicchio n° 3 eseguito con tecnica mista.



3. Spicchio n° 5 eseguito con tecnica musiva.



4. Spicchio n° 3 – particolare a luce radente della tecnica a "niello" cinquecentesca.



5. Spicchio n° 3 – incisioni della dentatura della sega utilizzata per tagliare i piccoli lacerti quadrati in mosaico.



6. Particolare della decorazione nella partitura dello spicchio n° 1.

JOHN STEWART, STEVE COSH

**PROTECTION OF *IN SITU* MOSAICS:
LESSONS FROM ENGLAND 1738 – 1939**

SUMMARY

Over the past few centuries attempts to preserve mosaics in situ in England have included removal from site, reburial or exhibition in situ under a protective structure. Well into the nineteenth century mosaics were regarded as curiosities. Although the owner of land on which a mosaic was discovered may have valued the find and even provided a protective structure, mosaics were viewed either by visitors as souvenirs or objects of suspicion and were stolen, vandalized, or once interest waned, lost through neglect. A survey of such protective buildings over mosaics in situ reveals that the majority has been lost through a variety of factors, such as poor construction, inadequate management, or loss of interest in the site. In a few rare cases, successful protection of mosaics has been provided for almost two hundred years, when these sites have been well managed and maintained.

CONSERVATION INTERVENTIONS OVER THE CENTURIES

The mosaic heritage of antiquity has suffered significant loss as a result of ignorance, poor maintenance, or wanton neglect. It has been estimated that 75% of mosaics that have been recorded in Britain have since perished. (Johnson 1997, a modern perspective is offered in Ling 1997).

Mosaics that survive in Britain, as elsewhere, are a result of four distinct types of intervention employed over the past few centuries:

Lifting and removal from their site

The removal of mosaics, in particular those considered to be of greater art historical interest, has long been common. This may have secured mosaics which would otherwise have been lost if left unprotected *in situ*, or destroyed by development (fig.1). However, damage incurred during the lifting process,

often followed by heavy restoration, has greatly compromised the authenticity of many ancient pavements. Equally important, they have been detached from the three-dimensional architectural context of which they were part. Removal to museums has not always conferred protection. Many mosaics have suffered from poor museum conditions (Cosh 1999).

Presentation *in situ* without a protective structure

Other pavements have been left *in situ* in order to present them as part of the site. Yet exposure to environmental agents of deterioration ultimately caused progressive degradation, which is rapid in harsh climates. Even when these mosaics are lifted and relayed on solid new supports, deterioration of their stone and ceramic tesserae continues.

Presentation *in situ* within a protective structure

In the colder regions of central and northern Europe there has long been recognition of the need for protection of mosaics exhibited *in situ* (A gazetteer of protective structures largely on western European/Eastern Mediterranean archaeological sites is provided in Schmidt 1988). Greater appreciation of the value of mosaics in their original context, combined with a better understanding of their vulnerability to deterioration, has resulted in the construction of many protective structures. These have taken the form of:

- protective "enclosures", with roof and lateral walls
- "shelters" consisting of a roof with an open structural frame
- less common are archaeological "crypts", with cover provided by new structures for other functions built over archaeological features below modern street level.

In certain circumstances protective structures may well ensure relatively good preservation of mosaics, but in others they may create environments which cause unforeseen forms of deterioration (Stewart 2001). In addition, such structures can be expensive to design, build, and maintain. Maintenance may be poor, causing indirect damage.

Reburial *in situ*

It is acknowledged that reburial can be an effective means of preserving archaeological sites if properly specified (Stewart 2004). Mosaics and other ancient architectural surfaces lie at the interface of the buried and exposed environments, and it is at this interface that deterioration occurs, resulting in the loss of the ancient material. Reburial of mosaics can prevent or mitigate these processes.

Protection of mosaics by means of cover buildings and reburial are of particular interest in that they are based on the principle of *preventive conservation*, creating a protective environment in which the causes of deterioration are diminished (Nardi 1994). This requires less direct intervention in the fabric of ancient pavements and consequently a greater degree of authenticity can be preserved. *Remedial conservation*, in contrast, entails the use of new materials and often heavy interventions to repair the effects, but not the causes, of deterioration.

There has been little objective appraisal, however, of the effectiveness of protective structures and reburial. This is a preliminary attempt to evaluate historical protective structures in England, where all but one Romano-British sites with mosaics presented *in situ* are located.

This review covers a period of two centuries, beginning with the first recorded protective structure built around 1738 (Appendix 1). Buildings erected after the Second World War have been excluded, as they are distinguished by more substantial construction, expressive design and greater organizational support (Appendix 2). However, this does not necessarily mean that these latter structures are entirely successful on conservation grounds or are immune from problems due to poor maintenance¹.

The majority of the historical information presented and interpreted here has been gathered over a period of many years, notably for the production of the corpus of Roman Mosaics of Britain².

STRUCTURAL DESIGN AND MANAGEMENT

The design of early protective structures on archaeological sites in England followed a vernacular tradition. They were simple, functional and economical, using local materials. The two buildings over mosaics at Great Witcombe in Gloucestershire erected around 1819 are typical of the type (fig. 2). New walls were invariably built upon the remains of Roman walls, so new foundations were not required. The basic structure was of masonry, wood, or a combination of the two. Roofing was either of stone slates or thatch on a wooden frame.

1. A condition survey of *in situ* mosaics in England and their cover buildings is currently in progress (2003–2004) by Karen Horton, MA candidate at the Institute of Archaeology, University College London. This is sponsored by English Heritage.

2. D. S. Neal and S. R. Cosh, *Roman mosaics of Britain. Volume I: Northern Britain (incorporating the Midlands, East Anglia and Scotland)*. London: Society of Antiquaries, 2002. Volumes II – IV are in the course of publication. The detailed references to historical records in this paper are provided by Cosh (Cosh 2002: 4–8).

Lastly, a report written by Charles Thomas has provided supplementary detail (Thomas 2001).

Later structures sometimes employed more modern materials. The large enclosure of Brading Roman Villa, built around 1908, consists of an iron frame with walls and roof of corrugated iron.

Some of these structures were very flimsy. A few were either intended to be temporary, but de facto became permanent, at least for the duration of their life.

Purely utilitarian in nature, they had no interpretative pretension. Most had small roof spans and, on sites with several mosaics, there were often two or three buildings covering parts of a single Roman villa, thus misrepresenting the volume of the ancient structure (fig. 3).

All but four of the historical structures under consideration here were erected in rural contexts. Development pressures in towns were such that most mosaics encountered were removed or destroyed. A notable but rare urban example is the Billingsgate Bath and House in the ancient City of London (fig. 4). Discovered during demolition works for the construction of the new Coal Exchange along the Thames waterfront in 1848 (Rowson 1996)³, the new building on the site accommodated the ancient remains in its cellar: *Mr Bunning, the excellent City architect, took pains to preserve them, and they are visible to such visitors to the Exchange as may ask for them ... the money expended was most wisely laid out (The Builder, June 11, 1859, p. 389).*

There was no legal mechanism in place to safeguard ancient monuments in England until the Ancient Monuments Protection Act of 1882, and this primarily concerned prehistoric monuments. Its powers were also extremely limited. The revised Act of 1900 encompassed Romano-British and later historical sites. Private ownership of ancient monuments was enshrined in these laws. However, owners were given the opportunity to confer guardianship of the site to the State, without loss of land title. Deliberate State intervention to place a preservation order on an ancient monument only became law in 1913 (Saunders 1983).

Cover buildings over mosaics would have been commissioned by the landowner or leaseholder on whose property the mosaic was found. The impetus to protect and present these mosaics *in situ* was undoubtedly due to their personal interest. This may have been genuinely antiquarian, or motivated by financial potential. Some structures were built to control access and charge admission fees to a curious public, as well as protect the valuable resource from vandalism. For example, when a mosaic was found in York in

3. The Coal Exchange building was demolished in 1967 for road widening and replaced by a modern structure.

1814, the occupier *very laudably formed an erection over it in order to preserve for public inspection this curious relic of antiquity ...* His motives were not so generous after all, for when this venture proved unprofitable, the structure was used as a stable. The mosaic was "rescued", probably by shovelling, and consequently could not be restored (Cosh 2002: 11).

There was clearly recognition that presentation *in situ* required some form of protective structure. Vandalism and theft of mosaic tesserae often appear to have been the most important concerns, and these are cited in historical texts. Before the erection of permanent cover buildings at Bignor Roman Villa in West Sussex in the south of England, the excavator of the site wrote in 1812 that one mosaic was secured *from intruders by a high thorn fence and from nightly deprivations by the erection of a Hovel in which one of ... [the tenant farmer's] sons can sleep*⁴.

TWO EXEMPLARY SITES

The Roman villa Bignor and that at Chedworth, in Gloucestershire in the west of England provide two case studies worthy of fuller consideration.

The mosaics of Bignor Roman Villa date from the fourth century A.D. There are four early structures over its mosaics, built between 1811-1818, following the excavation of the site by Samuel Lysons. The earliest buildings are of stone with thatched roofs, with the last structure built of brick and a slate roof (figs. 5, 6). They are the oldest surviving archaeological site structures in the United Kingdom, and may well be the oldest in Europe⁵.

Yet not all of the mosaics found at the beginning of the nineteenth century at Bignor were presented within enclosures. Other excavated mosaics were reburied to ensure their preservation. The mosaic of the north corridor was only re-excavated in 1976, and exhibited within a modern extension added to the early nineteenth-century buildings.

Of equal importance to the successful preservation of the mosaics is the sustained maintenance of the cover buildings over two centuries, by a single family. Farmer George Tupper was the first to discover the villa, and his descendants have maintained it continuously since.

Chedworth Roman Villa also dates largely from the fourth century. It was discovered in 1861 and excavated by James Farrer, the uncle of the Earl of

4. Letter of 25 May 1812 from John Hawkins to Samuel Lysons.

5. In addition to other early surviving cover buildings in England (Appendix 1), the following early structures are found on the Continent: Hüfingen, Germany 1821; Zofingen, Switzerland 1831; Orbe, Switzerland, 1841; Schmidt, *op. cit.*

Eldon who owned the land. As with Bignor, it contains one of the largest collections of ancient mosaics displayed *in situ* in Britain. Some of these were selected for presentation and protection under two enclosures (figs. 3, 7). Parts of a bath house, without any mosaics, were also protected by a semi-enclosure, open on one side. Similar to Bignor, those mosaics that were excavated but not to be presented to the public were reburied. A recent condition survey has confirmed their survival.

An account written shortly after the discovery of the cite relates: *Three substantial wooden sheds serve to protect the pavements and baths; and to enter two of these it is necessary to obtain the key from an intelligent custodian, who devotes much of her time to the preservation and protection of the interesting relics* (Grover 1868)⁶. The custodian in this case represents the management complement to the protective structures.

Chedworth remained the property of the Eldon Estate until 1924, when it was purchased through public subscription by the Bristol and Gloucester Archaeological Society (fig. 8). The Society donated the villa to the National Trust, then a young conservation charity, founded in 1896. It has since been continuously maintained by the Trust. The original buildings survive, in slightly modified form.

Chedworth and Bignor demonstrate a remarkable early sensitivity to the requirements of *in situ* mosaic preservation and management, not only by presentation under protective structures, but also by means of reburial. Indeed, the very cost of protective structures may have resulted in the decision to rebury some mosaics on both sites; or, they may have been considered insufficiently interesting or preserved to merit presentation. However the deliberate act of reburial is certainly as significant as the construction of the protective cover buildings.

PERFORMANCE OF COVER BUILDINGS

There are currently nine sites in England which present mosaics *in situ*, under cover buildings erected before the mid-twentieth century, and one within a twentieth-century successor (Appendix 1). An assessment of the performance of these historical structures needs to take into account the level of protection they have actually afforded.

Within these surviving structures, some or all mosaics have been lifted and relaid *in situ*. As a result the *tessellatum* has generally been well preserved, but

6. The third structure at Chedworth is actually of masonry, and not of wood. This account may either be incorrect, or describe a temporary structure subsequently replaced in stone.

relaying has been at the expense of the integrity of the mosaic structure and its aesthetic appearance. Since there are scant records to explain the decision to lift and relay these mosaics, it is impossible to determine whether environmental conditions within the structures actually stabilized or worsened their condition. The decision to lift and relay a mosaic may have been based on a desire to restore their "solidity" as structural pavements. Some mosaics were lifted as late as the 1970s, when this practice was still actively promoted.

On some sites, however, a number of mosaics do survive with very little intervention. This has certainly resulted in the preservation of the archaeological, aesthetic and structural integrity of the composite *tessellatum* and *substratum*. Consequently, they have greater significance to us today.

The preservation of these pavements demonstrates the ability, at least in these cases, for relatively simple enclosures to preserve mosaics *in situ*, if these structures are maintained. In the case of Bignor Roman Villa, such protection has lasted for almost two centuries. In contrast, even in moderate Mediterranean climates, mosaics excavated and left exposed to the elements without a high level of maintenance can disappear in just a few decades.

SURVIVAL OF PROTECTIVE COVER BUILDINGS

This survey of historical cover buildings erected in England between 1738 and 1939 has revealed that the great majority of them has completely disappeared (Appendix 1). At least twenty-one buildings and sites have been lost. Only ten survive. Historical records reveal diminishing interest, poor maintenance, change of ownership, flimsy construction, and other failures in the management of the ancient resource. In most cases, the mosaics they were intended to protect have vanished as well.

One typical example is the Roman mosaic from Preston, near Weymouth in Dorset. In 1871, some nineteen years after its discovery, a small building was erected over it. Visitors were encouraged. Yet when interest declined, the building became a hen house. The mosaic then suffered damage by "thieves"; it was flooded when the nearby stream burst its banks and finally the roof collapsed. Needless to say the mosaic does not survive (Cosh 2002: 5).

At Thruxton Roman Villa in Hampshire, a mosaic was discovered in 1823, and it was protected by a cover building. In 1841 the site was sold to the charitable Hospital of St John the Baptist. Interest must have waned, for the building was demolished, and masonry from the villa used to build a new chapel. The actual location of the villa was forgotten for some decades, and when the mosaic was eventually rediscovered, having incurred further damage, it was lifted and taken to the British Museum (Henig-Soffe 1993).

Of course, the historical circumstances of these unfortunate sites will never be fully known. The detailed history of ownership and management of each site has been beyond the scope of this initial study. However, in the case of Chedworth and Bignor Roman villas dedicated ownership and maintenance of the protective structures have guaranteed reasonable or very good preservation of the ancient fabric. The survival of the other sites may be due to similar good management, with a measure of good fortune.

The relative historical significance of mosaics on these sites has not been considered in this survey. Certainly, all of the mosaics are significant in terms of their iconography and relationship to each site. Yet had these mosaics been discovered today, is it beyond doubt that most would not be presented under new protective structures. Other considerations, such as management constraints, would have led to conservation through recording and reburial⁷.

This review is primarily about protective structures. However, deliberate reburial of mosaics has been cited. It was estimated in 1980 that 10% of recorded mosaics found in Britain had been reburied (Johnson 1997). The most famous example is the great Orpheus pavement, at Woodchester in Gloucestershire, excavated in the 1790s. The largest mosaic in Roman Britain, it has been periodically exposed for public viewing, so its general preservation is known (Mann 1963). The rate of deterioration of other reburied mosaics cannot be so easily ascertained, due to the lack of accurate records at the time of their initial discovery. But it is indisputable that they would not have survived at all, if left exposed.

CONCLUSION

Archaeologists, conservators and site managers in the United Kingdom now acknowledge that long-term exposure of archaeological mosaics without adequate protection will lead to eventual loss. Yet the decision to present mosaics *in situ* under protective structures bequeaths a heavy responsibility to future generations. This study shows how mosaic pavements are put at risk if there is not a sustained commitment of interest and financial resources to maintain protective structures of adequate design. The best conservation option for a specific mosaic can be determined only by an assessment of its significance, its condition, and other factors (Demas 2002). This is the basis of sound archaeological site management. If this does not happen, the losses

7. It is common today for archaeological sites in the United Kingdom to be reburied after excavation. This may also allow modern development over unexcavated sites, where appropriate (Corfield-Hinton-Nixon-Pollard (eds.) 1998; Nixon (ed) 2004).

presented in this historical study may still occur today.

When a decision is made to preserve a mosaic and its associated remains by means of a protective structure, the design of the new building must be the outcome of a process which takes into full consideration the conservation requirements of the features to be protected (Teutonico 2001).

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Gazetteer of mosaics discovered and protected with structures *in situ* in England 1738 – 1939

Site and mosaics	Date of discovery	Date of construction of protection	Type of construction	Current status of protection	Current status of mosaics	Comments
Great Weldon Northamptonshire One mosaic	1738		Unknown	Lost	Lost	
The Minster, Lincoln Lincolnshire One mosaic	1793		'shed' in the centre of the cloisters	Lost Demolished c19th	Set in floor of the Minster library	Shed demolished as it was unsightly, in the middle of the Cloisters.
Scampton Lincolnshire One mosaic			Unknown	Lost	Lost Destroyed by frosts in 1815-1816	Cover building to protect mosaic from visitors, who continued to remove tesserae.
Horkstow Lincolnshire One mosaic	1796		Unknown		Lifted in 1927. Now in Hull and East Riding Museum	Archaeologists William Fowler and Samuel Lysons convinced landowner to erected a cover building over the mosaic.
The Prison Dorchester Dorset	1809		'shed'	Lost	Lost?	
Bignor West Sussex 8 mosaics	1811	1812-1818	Masonry with thatched roofs (3) Brick with tile roof (1)	In use	<i>In situ</i>	In continuous ownership by the Tupper family, farmers, since discovery of mosaics. Pavements not presented under buildings were reburied.
Micklegate Bar	1814		Unknown	Lost	Lost	Occupier built protective structure to

York, Yorkshire One mosaic						charge visitors entry; when this proved unprofitable, it was used as stable. The mosaic was 'rescued' (probably shovelled up), but could not be restored.
North Leigh Oxfordshire 1 mosaic	1813-15		Stone masonry and wood with corrugated iron roof	In use Restored 1908	<i>In situ</i>	Second cover building lost. In state guardianship since 1952.
Great Witcombe Gloucestershire 3 mosaics	1818-19	c1820 c1909	Stone, originally with thatch (now tile) roofs	In use	<i>In situ</i>	Original buildings in near ruinous condition and replaced c1909. In state guardianship since 1919.
Cron dall Hampshire 1 mosaic	1817			Lost	Lost	Mosaic destroyed by souvenir hunters. Farmer removed building in 1855 as it obstructed ploughing.
Halstock Dorset Two mosaics	1817 c1818			Lost (demolished)	Remains buried <i>in situ</i>	First mosaic was largely destroyed by treasure hunters; remains of both presumably reburied. Only second mosaic may have been sheltered.
Thru xton Hampshire One mosaic	1823		Stone with thatched roof?	Lost (demolished)	Remains buried Rediscovered c1899 and moved to the British Museum	
Bramdean Hampshire 2 mosaics	1823		Stone	Lost (collapsed before 1900)	Lost Attempt to lift mosaics c1873 unsuccessful; tesserae discarded	Sheep housed in building may have caused damage that prompted lifting of mosaics.
Pitney Somerset	1828-9		'substantial shed'	Lost (by 1836)	Lost Destroyed by farmer on whose	

Lethay Green Dorset One mosaic	1834			Temporary structure	Lost	land they stood. Lifted before 1845. Relaid in dairy of Sherborne Castle. Lost	
Whatley Somerset One mosaic	1837 1848				Lost	Mosaic suffered at hands of visitors.	
Aldborough Yorkshire 3 mosaics	1832 1846 1848			Check	In use	<i>In situ</i>	Mosaic found in 1832 eventually lifted and moved to site museum. In state guardianship since 1952.
Billingsgate London 3 mosaics	1848	c.1849		Masonry, followed by reinforced concrete	In use until 1967, replaced	<i>In situ</i>	Within basement of Coal Exchange building, demolished 1967 due to street widening; new structure erected.
Preston Dorset One mosaic	1852	1871		Brick with slate roof	Lost	<i>In situ?</i>	Mosaic damaged by visitors taking souvenirs; interest waned, and neglect set in. The building was used as a hen- house, damaged by vandals, its roof collapsed and it was flooded by a nearby stream.
Barton in Fabis Nottinghamshire One mosaic	c1856			Brick	Lost	Lost? Reported to have been 'boarded over'	Mosaic was severely damaged by visiting souvenir hunters.
Apethorpe Northamptonshire Probably 1 mosaic	1859			'shed'	Lost (survived c1920)	Lost??	
Carisbrooke Isle of Wight	1859			Shed over finest mosaic	Lost	Few survive <i>in situ</i> (excavation of 1973)	

Wadfield Gloucestershire 1 mosaic	1863 1894-95	c1896	Stone/concrete block with stone slate roof	In use		<i>In situ</i>	In private ownership.
Chedworth Gloucestershire 6 mosaics	1864-67	c1867	Stone and wood with slate roofs	In use		<i>In situ</i>	Maintained on the estate of Lord Eldon; purchased and given to The National Trust in 1922. Mosaics not presented under cover buildings were reburied c1867.
Ithen Abbas Hampshire 3 mosaics	1878		Open wooden fame with corrugated iron roof over one mosaic	Lost		Mosaics reburied <i>in situ</i>	
Brading Isle of Wight 4 mosaics	1880-82	C1882? Rebuilt 1908	Iron frame with corrugated iron roof and cladding 'shed'	In use		<i>In situ</i>	Buildings to be replaced by new structure c2004. In continuous ownership. Now charitable family trust (Oglander Trust).
Gayton Thorpe Norfolk Probably 2 mosaics	1922			Lost		Lost	
Folkestone Kent 1 mosaic	1924		See photo Wooden	Lost		Lost	Building built by Folkestone Borough Council. The site was lost to coastal erosion.
Newport Isle of Wight 3 mosaics	1926	????	Check	In use		<i>In situ</i>	Owned by Isle of Wight County Council.
Rudston Yorkshire 3 mosaics	1933-37		Wooden shed	Lost		Mosaics lifted in 1962 and moved to Hull and East Riding Museum.	Poor condition of the building and mosaics prompted removal of them from site.
St Albans Hertfordshire	1930ff	1939 c1950	Steel frame with brick/concrete	In use		<i>In situ</i>	Other smaller mosaics found on site were lifted and removed to the site

FIGURES



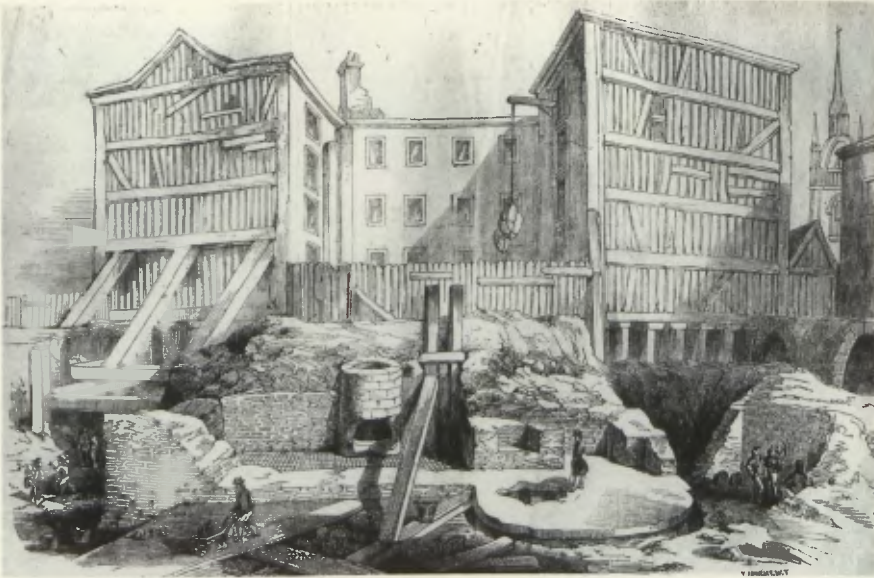
1. Excavation of the Bucklersbury mosaic in the City of London, lifted and removed for the construction of a new building (London Illustrated News 1869).



2. Protective structures over mosaics at Great Witcombe, Gloucestershire, erected 1819 and subsequently modified (© Crown copyright, NMR).



3. Chedworth Roman Villa, Gloucestershire, first half of the twentieth-century, general view of protective structures over mosaics.



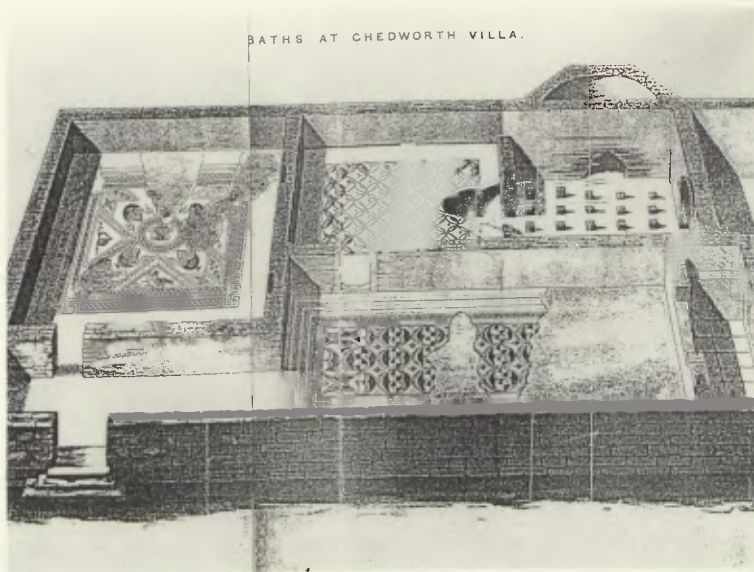
4. Billingsgate Roman House and Bath House, City of London, discovered 1848 (London Illustrated News 1848).



5. Bignor Roman Villa, the Venus mosaic after discovery
(Richard Smirke 1812).



6. Bignor Roman Villa, the protective structure over the Venus mosaic, erected soon after its discovery.



7. Chedworth Roman Villa, view of the West Bath House, 1868 (J. W. Glover).



8. Chedworth Roman Villa, Visit by Bristol and Gloucester Archaeological Society 1885 (Bristol and Gloucester Archaeological Society).

HENRY MAGUIRE, ANN TERRY

**THE WALL MOSAICS IN THE CATHEDRAL AT POREČ:
ISSUES OF RESTORATION**

RÉSUMÉ

Cet article est le compte rendu d'une étude faite en collaboration, des mosaïques murales dans la cathédrale d'Eufrasius à Poreč en Croatie. Les mosaïques ont été réalisées au sixième siècle et restaurées au dix-neuvième siècle. La première partie porte les interventions sur les mosaïques pendant les dix-huitième et dix-neuvième siècles. La seconde partie examine des détails choisis des mosaïques pour déterminer ce qui est d'origine, et ce qui est du dix-neuvième siècle. Bien que plusieurs parties de la surface des mosaïques ont exigé quelque intervention, la plupart des détails iconographiques sont authentiques.

This paper reports on a collaborative study of the wall mosaics of the cathedral in Poreč (fig. 1). These mosaics date to the mid-sixth century, but were restored in the late nineteenth century. Our study is based both on recently found restoration documents (Terry and Muhlstein 1998; Muhlstein 2002), and on examinations of the mosaics from scaffolding during three campaigns (1997, 1999, 2000). Our method was to make tessera by tessera studies of small, selected areas, or sondages, involving minute examinations of cubes, setting beds and setting techniques. We identified five phases of work in the mosaics (sixth century, eighteenth century, two in the late nineteenth century, and twentieth century repairs), and we also made discoveries about the mosaic making of these phases. We published three preliminary reports, and are currently producing a final report (Terry and Maguire 1998, 2000, 2001).

This paper focuses on selected aspects of the restorations: interventions of the eighteenth century, the general range of restoration procedures in the

19th century, the trial restoration by the Neuhauser Institute in 1887, and finally, the comprehensive restoration by Pietro Bornia from 1890 to 1900. Though we have no direct records, several sources suggest that the mosaics were repaired in the 18th century, evidently in conjunction with documented renovations of the cathedral. The best example of mosaic from this period is the head of Damian from the north apse (fig. 2), which was refurbished probably in 1748-1749. This head is easily differentiated from its halo, both by the suture that separates them, and also because the face lies along a different surface than the halo, one which is recessed and less planar. The face of the saint is a composite of settings, but here we call attention to the centre of the face and neck. These areas are not original, nor are they from the hands of the 19th century restorers, but instead have the trademarks of 18th century mosaics. The setting pattern is haphazard in the extreme, as seen especially at the base of the saint's nose, where erratically set cubes lie in an inconsistent and gritty plaster. Other repairs may have been carried out in the 18th century as well. According to the documents and pre-restoration descriptions, the mosaics of the main apse were considerably patched with painted plaster in areas of damage or loss. One conspicuous patch was in the central medallion at the top of the triumphal arch (fig. 1), which now holds a lamb. Prior to the restoration, the medallion had a Christogram which written descriptions date to sometime between 1741 and 1858. Finally, patches of old and worn painted plaster still survive in the north apse, which was never fully restored, and where areas of a painted border can still be seen to cover original tesserae *in situ* (Terry and Maguire 2001: figs. 26-27).

The late 19th century restorations, unlike those of the 18th century, are copiously documented. The documents, found in the state archives of Austria, are from the *Ministerium für Kultus und Unterricht* (Ministry for Church Affairs and Education) and related agencies. Tom Muhlstein transcribed them from their original *Kurrentschrift* into modern German, and a CD of the transcriptions has been published (Muhlstein 2002). Gabriella Bernardi has also worked with and published some of the restoration documents (Bernardi 1997). The documents discuss a range of procedures used to repair and consolidate the mosaics. As a result, in any given area it is usually impossible to make a simple dichotomy between "unrestored" and "restored", or between "old" and "new". In each case the degree of intervention lies on a continuum, somewhere between completely untouched at one extreme, and totally fabricated at the other. At the less intrusive end of this spectrum was the patching of small holes, either with the original cubes that had become loose, or with new ones. Both appear in combination on the face of Zacharias' box,

where several original old gold cubes are patched into the surface on the lower right, while three patches nearby use new gold cubes (Terry and Maguire, 1998: fig. 35). Copper nails used to affix the mosaics back onto the wall required the removal of a few tesserae. More seriously, we encounter the removal of whole sections of varying size from the wall surface in order to repair them and reset them in new plaster. This technique preserved the original design, and sometimes original tesserae, but it also flattened and denatured the fabric of the mosaic. Most radically, entirely new tesserae were set on entirely new beds. We see both of the last-named procedures on the triumphal arch (fig. 1). The areas above the red line were removed and restored on the basis of partly ruinous originals, as pre-restoration photos demonstrate (Muhlstein and Terry: figs. 18-19). Areas beneath the red line, which were fully lost, are a complete confection. All of these practices were employed by the late nineteenth-century restorers in the Eufrasiana, in varying degrees and combinations and with varying levels of skill. For them, restoration was more of an art than a science, involving the practitioner's experience, judgement, instincts and budget.

We turn now to examine the trial restoration of 1887, by the Albert Neuhauser Firm of Innsbruck. The mosaicist, Luigi Solerti, used various procedures, as sketched out by the documents (Terry and Muhlstein 1998: 1049-1050; Terry and Maguire 2000: 160-162). In a number of places, he lifted sections of mosaic completely off the wall, cleaned them, removed the decomposed setting bed away from the wall, and then reset the tesserae onto a new bed. Elsewhere, he filled in areas of missing or poorly preserved cubes, by scraping the original setting bed off the wall and applying a new bed of Portland cement in which he arranged tesserae according to his sense of the existing design. Solerti's restoration, ultimately, was not well received, as noted in the records of the Ministry. The conservator Count Franz Coronini was frank, reporting in a letter that Solerti's work was "painful to behold". The documents are not fully explicit as to why; we learn indirectly that the technique and colours, particularly blue and gold were at issue (Bernardi 1997: 1013-1026). Some areas restored by Solerti were subsequently worked on by Bornia. The left foot of the angel Gabriel (fig. 3) is exceptionally complex, since Solerti remade it twice and then Bornia reworked it. From examining the tesserae and setting beds, we know that Bornia also replaced much of Solerti's gold.

But in spite of Bornia's re-restoration, enough of Solerti's work remains to fill in the gaps left in the documents. The following characteristics of Solerti's work are distinct both from the original work of the 6th century and

also from Bornia's later restoration. In addition to leaving very obvious sutures in inappropriate places (Terry and Maguire 1998: fig. 12), a large percentage of the colours of tesserae used by Solerti are found nowhere else in the mosaics, particularly the greens (fig. 3). Moreover, the type of glass used was more opaque, dense and much more highly glossed than most of the glasses used in the later restoration. Solerti also cut tesserae into long rectilinear shapes, which, when grouped tightly, mimic the look of brickwork. Solerti set tesserae together very closely, so that one does not always see very much of the setting bed (fig. 3). Other tell-tale clues involve cutting tesserae into shapes to fit a design, rather than fitting pre-cut cubes into a design. In the north acanthus cup, Solerti fashioned the beige tips of the leaves into claw-like points by curving one side of a triangular cube. As the acanthus cup on the south side demonstrates, the original mosaicist used either triangular cubes set on end at the tip of a leaf, or square cubes placed obliquely. Furthermore, Solerti also cut tiny triangular cubes and fit them in intricate patterns to fill interstices, where the sixth-century mosaicist would have used a square cube at an angle, or a simple triangular cube.

The restoration documents, though voluminous, reveal less than expected about precisely which parts of the mosaics were restored in what way. Only close examination from scaffolding can determine the authenticity of the mosaics, as well as reveal the practices used by both the original mosaicists and the restorers.

The second part of this paper will look at selected details of the mosaics to see how much is original and how much is nineteenth century work. This is the puzzle set to us by the clever late nineteenth-century restorer. First, we will explain briefly how we were able to distinguish the two phases, sixth and nineteenth century. The clearest indicators were the tesserae themselves. We can see the distinctions in fig. 4, which reproduces a section of the jeweled band beneath the Visitation. The space between the jewels is punctuated by two discs of white marble. Nearly all of the tesserae in the red jewelled band to the left of the white discs are old, while nearly all those to the right are new. The old cubes are irregular in shape, have uneven surfaces, and are more varied in hue. The new red tesserae, on the other hand, are more evenly cut, have crisper edges, and show less variety in hue.

Two other means of distinguishing between the sixth and the nineteenth century phases are the setting bed and the setting technique. Generally speaking, the hallmark of Bornia's restoration is a pinkish setting bed and a highly regular setting technique. The original setting bed, on the other hand, has a grey or greyish white plaster, perhaps having accumulated more dirt over

time. The old setting technique is markedly irregular. The tesserae vary in height, giving the mosaic fabric a pronounced rippling surface. The cubes are often set askew, or at slight angles to each other, which, together with the odd shapes of many original tesserae, can create a jumbled appearance. Another distinctive feature of the old tesserae is that they now project well above the surface of the mortar. Many of these features can be seen in fig. 4, at the left side of the jeweled band, where the setting of the cubes is comparatively irregular. The right side, by contrast, is much more even. We can also see, especially in the greens making up the rectangular jewel, how the original tesserae project a good deal above the level of the setting bed.

Our study of the mosaics showed that both the restorers and the original sixth-century mosaicists could make "mistakes" - that is, create anomalous compositions. This was apparent, for example, in the case of the twelve busts of female saints on the intrados of the apse arch. Some of these portraits are extremely well preserved. For example, the face and hair of Agathe are set entirely with original cubes in the original grey-white setting bed (fig. 5). There is only one small patch of restoration, on the right side of her hair, where Bornia reset old tesserae in a new pink plaster. Agathe's veil, collar, and robe are also set with old cubes in the old grey plaster, except for some cubes of new purple glass and some patches of new gold tesserae, especially in her robe. The least well preserved saints are Filicitas and Basilissa, who were extensively restored by the firm of Neuhauser.

Most of the female saints have a halo of white light running along the length of their shoulder, in some cases on both sides, but in other cases on the left side only (as in the case of Agathe, fig. 5). Sometimes the light is rendered by two or more rows of white tesserae, the inner ones continuous, and the outer one broken to suggest the effect of rays. In other saints, the light is rendered by one to three lines of unbroken tesserae (as seen in Agathe, fig. 5). One of the saints, however, presents an exception. In the case of Tecla (Terry and Maguire 2000: fig. 20), the halo on her left shoulder has been attached to her veil, so that a line of grey-white cubes flows continuously from her hair to her sleeve. Examination of this portrait showed that the representation of the halo on Tecla's left shoulder as a continuation of her veil is probably a misunderstanding introduced by the restorers, for in this section the tesserae are all cubes of newly cut marble set in a fresh pink plaster.

The portrait of Agathe presents another anomaly, in that the line of pearls at the top of her collar continues up the left-hand side of her neck, as far as her necklace (fig. 5). Since she is the only one of the female saints to have this feature, we examined this area closely and discovered that the strip of jeweled

collar that goes up the side of her neck is made up of original tesserae set in the original grey plaster. Therefore, this feature is a "mistake" of the sixth-century artists, rather than of the nineteenth-century restorers.

One of the most anomalous features of the present mosaics is found in the Annunciation which, as we have found from the documents, was located in one of the most extensively remade sections of the apse mosaics. In the mosaic of the Annunciation as it is now, the Virgin wears a long purple robe decorated with two broad gold bands that descend from her shoulders to her feet (fig. 6). Over this garment, she wears a curious light blue, diaphanous veil that covers the top and the back of her head and also the upper part of her body as far down as her waist. The question is, did the restorers invent this strange-looking veil, or is it authentic?

On examination, we found that the Virgin's hair contains mostly old tesserae set in a bed that is predominantly composed of the original poorly preserved grey plaster, except for a new patch at the upper right side. The blue tesserae that delineate the veil in this area are entirely old. The gold halo, on the other hand, is one hundred percent new, both in the cubes and the setting. The restorers often had to replace the old gold cubes, because these were especially subject to deterioration. The old gold cubes were a sandwich, with a layer of amber coloured glass beneath, a layer of gold leaf in the middle, and thin layer of translucent glass on top. In the course of time, most of the old gold cubes had lost their translucent top layers and their gilding, leaving only the brownish glass that had originally supported the gold leaf. So these old gold cubes were often replaced. The Virgin's robe is set with a mixture of old and new cubes, but once again the gold in the bands is entirely new. We also discovered that most of the pale blue glass cubes used to delineate the diaphanous veil in this region are original; there are also sections of the original plaster bed under the veil on the right side of her chest.

It appears, then, that the distinctive diaphanous veil is authentic, even though it is an unusual feature in depictions of the Virgin. It is tempting to see this garment as a reference to the famous veil of the Virgin that had been kept as a relic in the shrine of the Blachernai at Constantinople since the fifth century.

In general, it can be said that the Bornia restoration was painstaking. In most of the areas that we examined, he proceeded by patching rather than by wholesale replacement. Even in those areas that belong to the rejected Neuhauser restoration, such as the Annunciation, up to 50 per cent of the tesserae are original, although they were reset. For the most part, the fabric of

the mosaics is a careful mixture of the old and the new, but with the old generally predominating. Only in the case of the gold tesserae, which, as we have seen, deteriorated more than the other colours, did the restorers go in for wholesale replacement. It is the visual prominence of this replaced gold that gives to the mosaics their new and mirror-like appearance today. But most of the iconographic details that are framed by this gleaming gold ground are authentic.

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FIGURES



1. Main apse, basilica of Eufrasius.



2. Head of Damian, north apse.



3. Left foot of Gabriel from the Annunciation.



4. Red border beneath the Visitation, detail.



5. Agathe.



6. Virgin of the Annunciation.

KATERINA MAVROMICHALI

ΑΡΧΑΙΕΣ ΕΠΕΜΒΑΣΕΙΣ ΣΕ ΨΗΦΙΔΩΤΑ

SUMMARY

Ancient interventions on mosaics. A study that focuses on ancient interventions on mosaics and by extension on the attitude of the ancients towards issues of protection, conservation, maintenance and restoration. Presentation of examples deriving from various mosaic complexes, both from private and public areas, within a broad time span, based on source references as well as on investigation on the spot with personal observations from various archeological sites.

RÉSUMÉ

Anciennes interventions sur les mosaïques. C'est une étude qui se concentre aux anciennes interventions sur les mosaïques et en même temps sur la manière qu'on faisait face aux problèmes de la protection, conservation et restitution. Les exemples proviennent des endroits publics et privés couvrant une vaste période historique. La documentation se base sur les sources écrites et sur la recherche in situ.

Η συγκεκριμένη εργασία αναφέρεται στο θέμα των επεμβάσεων που γίνονταν στα ψηφιδωτά κατά την αρχαιότητα και κατ' επέκταση στη στάση των αρχαίων σε θέματα προστασίας, συντήρησης και αισθητικής αποκατάστασής τους. Τόσο μέσα από βιβλιογραφικές αναφορές όσο και από προσωπικές παρατηρήσεις σε αρχαιολογικούς χώρους παρουσιάζονται παραδείγματα επεμβάσεων σε μεγάλα ψηφιδωτά σύνολα, σε ένα ευρύ χρονικό φάσμα, σε χώρους ιδιωτικού και δημόσιου χαρακτήρα, στη Δήλο, στους Φιλίππους, στο Δίον, στην Αντιόχεια, στην Τυνησία, στην Ιορδανία και στην Κύπρο.

Στο Δίον (Παντερμαλής 1993: 195-198· Παντερμαλής 1997· Παντερμαλής 1999) ήρθαν στο φως σπίτια της ακμής της πόλης στα αυτοκρατορικά

χρόνια, όπως η οικία του Ευβούλου ή του Ζωσά, τα οποία βέβαια δεν εκπροσωπούν το συνηθισμένο σπίτι του απλού πολίτη. Τα τετράστιλα αίθρια και οι αυλές συνιστούν τους πυρήνες γύρω από τους οποίους συντάσσονται στοές και δωμάτια. Αναβρυτήρια και πηγάδια έκαναν πιο ευχάριστη τη διαμονή, ενώ τα ψηφιδωτά δάπεδα και ο γλυπτός διάκοσμος φαίνεται ότι δεν αποτελούσαν εξαίρεση στον κανόνα και συμπλήρωναν την αίσθηση πολυτέλειας στους ιδιωτικούς χώρους.

Στη λεγόμενη "οικία του Ζωσά" αρκετά δωμάτια καλύπτονταν με ψηφιδωτά. Η καθημερινή χρήση, ωστόσο, τα έφθειρε και αναπόφευκτα γίνονταν συχνά επιδιορθώσεις σε πολλά σημεία. Παρατηρούνται πολυάριθμες επεμβάσεις, συμπληρώσεις εμφανείς μέσα από τη χρωματική διαφορετικότητα των νέων ψηφιδών ή από τη χρήση διαφορετικού υλικού, όπως για παράδειγμα ένα "μπάλωμα" από 6 μικρά κομμάτια σχιστόπλακας αραιά τοποθετημένα μέσα στο κονίαμα (εικ. 1), ή μέσα από την ξεκάθαρη διαφορετική ροή των ψηφιδών, την πιο αραιή και πρόχειρη ψηφοθέτηση.

Στο Δίον έχουν εντοπιστεί και ανασκαφεί έως τώρα ένδεκα δημόσιες και ιδιωτικές θέρμες, από τις οποίες διακρίνονται για το μέγεθος και την πολυτέλειά τους οι μεγάλες θέρμες κοντά στη νότια είσοδο της πόλης, απέναντι από τα ιερά. Χτίστηκαν γύρω στο 200 μ.Χ. στο πλαίσιο ενός ευρύτερου προγράμματος κατασκευής νέων δημόσιων κτιρίων, καθώς ο αστικός πολιτισμός των αυτοκρατορικών χρόνων έφερε σε πρώτη γραμμή το ενδιαφέρον για την υγιεινή και την περιποίηση του σώματος.

Στο μεγάλο συγκρότημα των θερμών του Δίου αναπτύσσονταν εκτενείς ψηφιδωτές επιφάνειες. Στο ψηφιδωτό δάπεδο, που κοσμεί την είσοδο των θερμών, διακρίνονται συμπληρώσεις των κενών με ψηφίδες διαφορετικής σύστασης και χρωματικής απόχρωσης σε σχέση με το πρωτότυπο και επιπλέον ο τρόπος ψηφοθέτησης είναι διαφορετικός, δεν είναι τόσο πυκνός όσο της αρχικής φάσης.

Οι Φίλιπποι (Γούναρης – Βελήνης 1996: 719-733) είναι ένας άλλος χώρος με μεγάλα ψηφιδωτά σύνολα σε κτίρια ιδιωτικού και δημόσιου χαρακτήρα. Την 4^η πολεοδομική νηίδα, εμβαδού 1400 τ.μ., κατά την πρώτη χριστιανική φάση, που τοποθετείται από νομίσματα του Λικινίου και του Μεγάλου Κωνσταντίνου στο πρώτο μισό του 4^{ου} αιώνα, καταλάμβανε μία οικία που στο μεγαλύτερο τμήμα της ήταν διώροφη. Αρκετοί χώροι της οικίας καλύπτονταν από ψηφιδωτά δάπεδα. Η οικία αυτή καταστράφηκε, σύμφωνα με τα ανασκαφικά δεδομένα, στις αρχές του 7^{ου} αιώνα, συνεπώς οι επεμβάσεις που παρατηρούνται στα ψηφιδωτά πραγματοποιήθηκαν στο μεσοδιάστημα.

Στο μικρό τρικλίνο της οικίας, σε αίθουσα που αναπτύσσεται στο βό-

ρειο τμήμα, το ψηφιδωτό δάπεδο κοσμείται με επαναλαμβανόμενες και αλληλοσυνδεόμενες πέλτες, που ανά τέσσερις σχηματίζουν στροβίλους. Οι συμπληρώσεις στο δάπεδο αυτό έχουν γίνει αυθαίρετα, χωρίς να γίνεται προσπάθεια να αποκατασταθούν τα διακοσμητικά μοτίβα. Έχουν χρησιμοποιηθεί για τις συμπληρώσεις εν είδει "μπαλώματος" κεραμικά στοιχεία σε συνδυασμό με λευκές και μαύρες ψηφίδες.

Στο μεγάλο τρικλίνιο της οικίας, μπροστά από τη δυτική είσοδό του, αναπτύσσεται *tabula ansata* με τριόστιχη επιγραφή αποσπασματικά σωζόμενη (τω ευτυχει ...), που υποδεχόταν φιλόξενα τους συμποσιαζόμενους (εικ. 2). Στην επιγραφή που έχει κατασκευαστεί με μαύρες και λευκές ψηφίδες έγιναν συμπληρώσεις με αδρό *opus sectile* χρησιμοποιώντας λευκά μαρμάρινα κομμάτια.

Σε μία δεύτερη οικία των μέσων του 3^{ου} αιώνα, στη λεγόμενη νησίδα του ναλουργείου, το δάπεδο που περιέβαλε το *impluvium* ήταν καλυμμένο με ψηφιδωτά. Λόγω όμως της έντονης χρήσης παρουσιάστηκαν φθορές, με ιδιαίτερη έμφαση νότια της εισόδου της οικίας και βόρεια του *impluvium*. Συμπληρώθηκαν τα κενά σε μία πρώτη φάση με μαρμαροθέτημα και σε μία δεύτερη φάση με αρκετά μεγάλες πλάκες μαρμάρου.

Σε ένα ακόμα δάπεδο παρατηρούνται πολυάριθμες επεμβάσεις. Πρόκειται για το ψηφιδωτό δάπεδο στη λεγόμενη αίθουσα του μεγάλου κλιβάνου, το οποίο στην αρχική του φάση κατά τον 3^ο αιώνα ανήκε πιθανώς σε δημόσιο κτίριο που καταστράφηκε αργότερα στον 4^ο αιώνα από πυρκαγιά και μετεξελιχθηκε σε εργαστηριακό χώρο.

Ο κεντρικός ψηφιδωτός πίνακας στο συγκεκριμένο ψηφιδωτό καλύπτεται από ποικίλα γεωμετρικά διακοσμητικά μοτίβα εγγεγραμμένα σε ρόμβους και τετράγωνα και πλαισιώνεται από μία ζώνη με τρέχουσα σπείρα: ακολουθούν τρεις απλές ταινίες, λευκού και κοκκινωπού χρώματος. Πιθανότατα λόγω έλλειψης υλικού ένα τμήμα της κοκκινωπής ταινίας που καταστράφηκε συμπληρώθηκε με ψηφίδες κιτρινωπού χρώματος. Γύρω από το σημείο αυτό είχαν υποστεί φθορά και οι ταινίες λευκού χρώματος, οι οποίες συμπληρώθηκαν με λευκές ψηφίδες, η ψηφοθέτηση όμως, όπως δείχνει η ροή των ψηφίδων, είναι διαφορετική, πιο αραιή, έρχεται διαγώνια και διαφοροποιείται από το υπόλοιπο ψηφιδωτό. Σύμφωνα με τα στοιχεία της ανασκαφής οι παρατηρούμενες διαφοροποιήσεις ανήκουν στην ίδια χρονολογική φάση.

Στη Δήλο (Bruneau 1972: 99-101) επίσης υπάρχουν αρκετά παραδείγματα αρχαίων επεμβάσεων σε ψηφιδωτά, ορισμένα εκ των οποίων είναι τα ακόλουθα:

1. Στο ψηφιδωτό της οικίας F (Bruneau 1972: 197-201, αρ. 136, εικ. 113-

- 117) οι επεμβάσεις έχουν χαρακτήρα επιδιορθωτικό. Στο συγκεκριμένο δάπεδο, το οποίο είχε κατασκευαστεί με βότσαλα, διακρίνονται εκτενείς συμπληρώσεις των κενών εν είδει "μπαλώματος" με κεραμικά θραύσματα και ψηφίδες ασβεστολιθικής σύνθεσης σε ανοιχτόχρωμο *opus tessellatum* (εικ. 3).
2. Συναντούμε επίσης επεμβάσεις με χαρακτήρα διακοσμητικό. Για παράδειγμα στην *οικία των προσωπείων* (Brienne 1972: 256-260, αρ. 217, εικ. 204-210), στη λεγόμενη *αίθουσα του αμφορέα*, η ψηφιδωτή σύνθεση απεικονίζει δύο φυτικά μοτίβα με έναν αμφορέα και ένα πτηνό ανάμεσά τους. Ο αμφορέας και το μικρό πτηνό είναι προσθήκες μεταγενέστερες, όπως υποδηλώνεται κυρίως από τις ψηφίδες που χρησιμοποιήθηκαν στη δεύτερη φάση, οι οποίες είναι κατά πολύ μεγαλύτερες σε σχέση με αυτές που περιβάλλουν τους ρόδακες. Επίσης, σε ορισμένα σημεία οι γραμμές οριοθέτησης των δύο φάσεων ξεχωρίζουν λόγω της ελικοειδούς τους κατεύθυνσης. Αξίζει να σημειωθεί ότι στον χώρο αυτό μόνο στο περίγραμμα του αμφορέα δεν χρησιμοποιήθηκαν λάμες μολύβδου, σε αντίθεση με τα υπόλοιπα διακοσμητικά μοτίβα, όπου εκεί διακρίνεται η χρήση τους. Όσον αφορά στην ερμηνεία της προσθήκης αυτής, οι περισσότεροι ερευνητές της αποδίδουν έναν χαρακτήρα προσωπικό, με διάθεση διακοσμητική. Ίσως μνημονεύει μία νίκη του ιδιοκτήτη, ίσως ο ιδιοκτήτης επιθυμούσε μία ανανέωση στον εσωτερικό διάκοσμο της οικίας και τον εμπλούτισε με ένα διακοσμητικό μοτίβο που υπαγόρευε η "μόδα".
 3. Στη Δήλο συναντούμε και μία άλλη κατηγορία επεμβάσεων. Πρόκειται για την αφαίρεση ψηφιδωτών πινάκων και, πιο συγκεκριμένα, των εμβλημάτων. Οι εμβαλλόμενοι αυτοί πίνακες, λόγω της κατασκευαστικής τους ιδιαιτερότητας και της ευδιάκριτης αυτοτέλειάς τους, ήταν αρκετά εύκολο να αποσυνδεθούν από την υπόλοιπη ψηφιδωτή επιφάνεια και να μεταφερθούν, για να χρησιμοποιηθούν ως πίνακες αυτόνομοι, όπως ένα έργο ζωγραφικής. Οι αφαιρέσεις εμβλημάτων υποδηλώνουν ότι ορισμένα σπίτια της Δήλου δεν καταστράφηκαν, αλλά εγκαταλείφθηκαν και είτε οι ιδιοκτήτες τους μετακόμισαν εκούσια συμπεριλαμβάνοντας στα πολύτιμα υπάρχοντά τους τους ψηφιδωτούς πίνακες είτε κάποιοι αυθαίρετα τα αφαίρεσαν, για να τα εκμεταλλευτούν. Γραπτές πηγές αναφέρουν παραδείγματα συστηματικής εκμετάλλευσης οικιών σε συνάρτηση με τη γενικότερη λεηλασία των ελληνικών πόλεων και την εισροή της ελληνικής τέχνης στη Ρώμη και ειδικότερα με την έντονη συλλεκτική δραστηριότητα και την αναπτυσσόμενη διακίνηση έργων τέχνης (Μπούνια 1999: 41-45). Έχουμε

αρχετά παραδείγματα αφαίρεσης εμβλημάτων στη Δήλο, μεταξύ των οποίων και στην *Οικία των Κομωδών* (Bruneau 1972: 172-178, αρ. 72,73,75, εικ. 84-91).

Τα έργα αυτά με την απόσπαση από την αρχική τους θέση, για να επαναχρησιμοποιηθούν σε άλλο χώρο, χάνουν την ταυτότητά τους και την αρχιτεκτονική τους συνάρτηση. Έτσι, ο σύγχρονος ερευνητής συναντά δυσκολία στην έρευνα, καθώς δεν είναι σε θέση να γνωρίζει τον αρχικό τους προορισμό.

Στο πλαίσιο της αποκόλλησης ψηφιδωτών πινάκων με στόχο την επανάχρησή τους σε έναν άλλο χώρο αναγνωρίζοντας την αισθητική τους αξία εντάσσεται μία περίπτωση ψηφιδωτού από την *N. Αγκιάλο Μαγνησίας* (Παπανικόλα-Μπακιριτζή 2000: 219). Πρόκειται για ένα τμήμα παράστασης από δάπεδο λουτρού από την αίθουσα του ψυχρού (*frigitarium*), όπου μέσα σε πράσινο κάμπο εικονίζεται σύμπλεγμα σμέρνας με αστακό. Το συγκεκριμένο ψηφιδωτό ως προς την τεχνική του διαφοροποιείται από την τεχνική του υπόλοιπου ψηφιδωτού, αλλά και ως προς τη θεματολογία του πρόκειται για μία παράσταση που ξεφεύγει από τα γνωστά θέματα των άλλων ψηφιδωτών που αποκαλύφθηκαν στην περιοχή. Πιθανότατα, λοιπόν, μεταφέρθηκε από κάπου αλλού και τοποθετήθηκε σε δεύτερη χρήση στον χώρο του λουτρού. Μέσα από τα ανασκαφικά δεδομένα προκύπτει ότι ο χώρος αυτός είχε μία διάρκεια ζωής από την εποχή της ρωμαιοκρατίας έως τους μέσους παλαιοχριστιανικούς χρόνους, οπότε και έγινε η ενσωμάτωση του ψηφιδωτού, το οποίο από άποψη τεχνικής και στυλιστικής ανάλυσης τοποθετείται χρονικά στον 1^ο – 2^ο αιώνα μ.Χ.

Μία άλλη περίπτωση είναι το *ψηφιδωτό του Θησέα στην έπαυλη του Θησέα, στην Πάφο της Κύπρου* (Michaelides 1992: 47-48, Daszewski – Michaelides 1989: 52-63, Baratte 1980: 81-85). Τα αρχαιολογικά δεδομένα μαρτυρούν ότι το δάπεδο κατασκευάστηκε στο τέλος του 3^{ου} ή στις αρχές του 4^{ου} αιώνα μ.Χ. Το δάπεδο, το οποίο απεικονίζει την πάλη του Θησέα εναντίον του Μινώταυρου μέσα στον λαβύρινθο της Κρήτης, υπέστη ζημιές, ίσως σε έναν από τους σεισμούς του 4^{ου} αιώνα μ.Χ. (το 332 μ.Χ. και το 342 μ.Χ.) και αποκαταστάθηκε αργότερα, ίσως στο τελευταίο τέταρτο του αιώνα.

Οι επιδιορθώσεις στο ψηφιδωτό, οι οποίες από ό,τι φαίνεται έγιναν από εξειδικευμένους εργάτες με καλλιτεχνικές ικανότητες, μαρτυρούνται βασικά, εξαιρώντας τις διαφορές στο υπόστρωμα, από τις τεχνοτροπικές διαφορές και από κάποιες αποκλίσεις από την αρχική σύνθεση.

Τα πρόσωπα και το πάνω μέρος των σωμάτων του Θησέα και της Κρήτης είναι κατασκευασμένα εκ νέου. Στο πάνω μέρος του μεταλλίου, ανάμε-

σα στην Αριάδνη και την Κρήτη, σημειώθηκαν αλλαγές: το άσπρο φόντο αντικατέστησε τα πρόσωπα των Αθηναίων ομήρων, που παρακολουθούσαν την πάλη πίσω από τους βράχους. Διατηρούνται ακόμα ίχνη των προσώπων κοντά στην Αριάδνη. Η προσωποποίηση του Λαβύρινθου και η Αριάδνη ανήκουν στην αρχική φάση του ψηφιδωτού και διατηρούν ακόμα τα χαρακτηριστικά της ελληνιστικής παράδοσης, ενώ τα πρόσωπα του Θησέα και της Κρήτης τεχνοτροπικά βρίσκονται πιο κοντά στη βυζαντινή παράδοση. θυμίζουν τα πρόσωπα των χριστιανών αγίων, που απεικονίζονται στα ψηφιδωτά και τις τοιχογραφίες των παλαιοχριστιανικών εκκλησιών.

Η μαστοριά και η επιδεξιότητα του τεχνίτη, όπως και η πιστή παρακολούθηση του σχεδίου, κάνουν δυσδιάκριτες τις επισκευές εκ πρώτης όψεως. Υπάρχουν όμως κάποια στοιχεία που μαρτυρούν τις επιδιορθώσεις, όπως οι διαφορές στη σύσταση των κονιαμάτων του στρώματος ψηφोधέτησης, μικρές διαφορές στις αποχρώσεις και στη δομή των νέων ψηφιδών, η πιο πυκνή ψηφोधέτηση, η διαφορετική ροή των νέων σειρών και η τοποθέτησή τους ορισμένες φορές σε χαμηλότερο επίπεδο σε σχέση με τις υπόλοιπες.

Οι επεμβάσεις στο μέταλλο του Θησέα αποδεικνύουν ότι ο ιδιοκτήτης της οικίας πρέπει να έχει μία ιδιαίτερη συναισθηματική σύνδεση με το ψηφιδωτό αυτό, ώστε να λάβει την απόφαση να γίνουν τόσο δαπανηρές εργασίες "συντήρησης". Είναι εμφανές ότι οι εργασίες αυτές δεν είχαν μόνο επιδιορθωτικό χαρακτήρα ούτε μοναδικό σκοπό να προστατέψουν απλώς το ψηφιδωτό από την επέκταση της φθοράς, όπως συμβαίνει σε άλλες περιπτώσεις. Αφορούσαν τη συνειδητή διατήρηση και συντήρηση ενός έργου που εκτιμούνταν ιδιαίτερα και την πιστή αποκατάσταση των φθορών με βάση την αρχική σύνθεση, χωρίς όμως να διστάζουν να αλλάξουν κάποιες μικρές λεπτομέρειες προς όφελος του συνόλου.

Παράλληλα βέβαια με τα δάπεδα που αντιμετωπίστηκαν με πνεύμα ενιαίο από τη μεριά των "συντηρητών" στην αρχαιότητα, κυριαρχούν τα πολυάριθμα παραδείγματα, όπου στις επεμβάσεις διακρίνεται μία εμφανής άρνηση όσον αφορά στην επαναφορά ή τη διατήρηση του αρχικού ύφους της σύνθεσης. Αυτή η άρνηση υποδηλώνει είτε έλλειψη δεξιοτήτων από τη μεριά των τεχνιτών είτε έλλειψη του κατάλληλου υλικού, έλλειψη ενδιαφέροντος για την αποκατάσταση του αρχικού σχεδίου ή οικονομική αδυναμία.

Στο πλαίσιο αυτό ψηφιδωτά σύνολα στο Παλέζμο, στην Όστια, στην Αντιόχεια και την Τυνησία, σε χώρους ιδιωτικού και δημόσιου χαρακτήρα, παρουσιάζουν άφθονα παραδείγματα αρχαίων επεμβάσεων, γεγονός που δηλώνει ότι οι αρχαίες επεμβάσεις δεν αφορούν μεμονωμένες περιπτώσεις, αλλά είναι ένα γενικό φαινόμενο, το οποίο προκύπτει μέσα από την καθημερινή χρήση των χώρων και την αναπόφευκτη φθορά τους.

Στην *Piazza della Vittoria* στο Παλέομο (Camerata – Scovazzo 1975: 231-273, εικ. LIV-LXIII, Baratte 1980: 81-85), σε έναν χώρο όπου πιθανότατα προοριζόταν για την τέλεση λατρευτικών δραμένων σχετιζόμενων με τον θεό Διόνυσο και τοποθετείται χρονικά στον 3^ο αιώνα μ.Χ., το ψηφιδωτό παραθέτει δύο εικόνες, μία ολοκληρωμένη και μία αποσπασματική. Ένα μεγάλο τμήμα διατηρείται χωρίς αλλοιώσεις στη σύνθεσή του, ενώ ένα άλλο τμήμα, στο κέντρο κυρίως του πίνακα, παρουσιάζει έναν ανορθόδοξο συνδυασμό μοτίβων της αρχικής φάσης της σύνθεσης με μεταγενέστερες επεμβάσεις. Χαρακτηριστικά είναι ορισμένα παραδείγματα, όπου ενώ αρχικά υπήρχαν απεικονίσεις συμπλεγμάτων με γυναικεία μορφή πάνω σε πτηνό, με την Ευρώπη πάνω στον ταύρο, με τον Βελλεροφόντη και τον Πήγασο κ.ά., μετά την επέμβαση το κεντρικό τμήμα των συμπλεγμάτων καλύφθηκε με ανοιχτόχρωμες ψηφίδες σε απλό *opus tessellatum* και αποτέλεσε το φόντο για γεωμετρικά μοτίβα οδηγώντας κατ' αυτόν τον τρόπο σε παράδοξα αποτελέσματα (εικ. 4).

Οι επεμβάσεις αυτές παρουσιάζουν ενδιαφέρον όσον αφορά στην πιθανή σύνδεσή τους με τις φθορές που προκάλεσε στο κτίριο σεισμός στα τέλη του 4^{ου} αιώνα και οδηγούν σε μία σειρά προβληματισμών σχετικά με τον τρόπο αντιμετώπισης της συγκεκριμένης κατάστασης. Η παρουσία των διακοσμητικών μοτίβων αποδεικνύει ότι ούτε οι τεχνίτες ούτε ο χρηματοδότης έκριναν αρκετή μία απλή συμπλήρωση των κενών. Από την άλλη πλευρά δεν θεώρησαν σκόπιμο να αφαιρέσουν τα παλαιά κομμάτια και προέκυψαν παράδοξοι -ως προς τις σημερινές αισθητικές αξίες- συνδυασμοί, που οδήγησαν αρκετούς μελετητές στην άποψη ότι πρόκειται για εσκεμμένη καταστροφή παγανιστικών θεμάτων από τους χριστιανούς (Levi 1942: 37 κ.ε.). Η ερμηνεία αυτή μπορεί να αποκλειστεί βέβαια αφενός διότι οι επιδιορθώσεις δεν περιορίζονται μόνο στις μορφές αλλά διακρίνονται και σε άλλα σημεία της σύνθεσης και αφετέρου διότι η χριστιανική συμβολογία χρησιμοποίησε αρκετά συχνά την παγανιστική εικονογραφική κληρονομιά, προσδίδοντας απλώς διαφορετικά νοήματα στις παραστάσεις.

Η πιθανότερη εκδοχή είναι ότι κατά τη διάρκεια του 4^{ου} αιώνα, όταν το κτίριο είχε χάσει την αρχική του σημασία, στηρίχθηκε πάνω στο ψηφιδωτό δάπεδο, περιμετρικά του κεντρικού ορθογώνιου πίνακα, ένα κιγκλίδωμα, οι βάσεις του οποίου κατέστρεψαν ανεπανόρθωτα το ψηφιδωτό. Επίσης, η ομοιόμορφη χρήση κιτρινωπών ψηφίδων για τον κάμπο, ερυθρών και καστανών για την απόδοση των διαφόρων διακοσμητικών μοτίβων, υποδηλώνει ότι οι επιδιορθώσεις πραγματοποιήθηκαν κατά την ίδια χρονική περίοδο.

Πολυάριθμες περιπτώσεις επεμβάσεων συναντά κανείς και στην *Όστια* (Becatti 1961: 69, no 94, πίν. CLXXIII•124 κ.ε., no 228, πίν. LXVIII•221, no

415, πίν. CXXXXVII), στην Ιταλία. Για παράδειγμα, σε διάφορα ψηφιδωτά δάπεδα στο *Foro delle corporazioni* διακρίνονται είτε στον κάμπο είτε πάνω στις ίδιες τις μορφές της κεντρικής σύνθεσης συμπληρώσεις των κενών με ψηφίδες λευκές, μαύρες, μεμονωμένα ή σε συνδυασμό διαμορφώνοντας ζατρίκιο, σε μία προσπάθεια του τεχνίτη, ακόμα και εάν η εργασία του ήταν σε άμεση εξάρτηση με το διαθέσιμο υλικό, να αποφύγει μία συμπλήρωση με ουδέτερο χαρακτήρα, όπως αντίθετα συμβαίνει στην *Insula delle pareti gialle*, όπου για τα πολυάριθμα κενά του δαπέδου τόσο στην κεντρική σύνθεση όσο και στις ζώνες πλαισίωσης χρησιμοποιήθηκαν ψηφίδες ως επί το πλείστον λευκές, μεγαλύτερες και με αραιότερη ψηφοθέτηση, χωρίς καμία εξάρτηση από το αρχικό σχέδιο, δίδοντας την εντύπωση ενός "μπαλώματος". Τέλος, σε έναν από τους χώρους των θερμών που καλύπτονταν με ψηφιδωτά, σε παράσταση με απεικόνιση έφιππου έρωτα, τα κενά καλύφθηκαν με έναν συνδυασμό υλικών, με μεγάλα μαρμάρινα θραύσματα διαφόρων τύπων, με ανάκατες λευκές και μαύρες ψηφίδες και με κεραμικά θραύσματα.

Πολυάριθμα παραδείγματα επεμβάσεων ποικίλου χαρακτήρα παρουσιάζονται και στους αρχαιολογικούς χώρους της *Τυνησίας*. Ιδιαίτερο ενδιαφέρον παρουσιάζουν ορισμένα ψηφιδωτά δάπεδα που αποκαλύφθηκαν στο κτήμα *Boujemaa (Utique)* (Alexander - Ennaifer - Duliere 1974: 87-89, no 241, πίν. XLVII) το 1970, καθώς πέρα από ορισμένες επεμβάσεις εμφανούς επιδιορθωτικού χαρακτήρα διακρίνονται κάποιες διαφοροποιήσεις, που θα μπορούσαν να αποδοθούν και σε τεχνίτες διαφορετικών εργαστηρίων στο αρχικό στάδιο κατασκευής του ψηφιδωτού.

Σε ένα από τα δάπεδα του χώρου αυτού, σε μία σύνθεση από κυκλικά, τετράγωνα και ορθογώνια πλαίσια με εγγεγραμμένα φυτικά και γεωμετρικά μοτίβα στο εσωτερικό τους, διακρίνονται εκτενείς επιδιορθωτικές συμπληρώσεις με ψηφίδες διαφορετικής σύστασης και χρωματικής απόχρωσης, αγνοώντας τα αρχικά διακοσμητικά μοτίβα, τα οποία, όπου είχαν φθαρεί, συμπληρώθηκαν είτε με λευκές κυρίως ψηφίδες σε ένα απλό *opus tessellatum* είτε αντικαταστάθηκαν από κάποιο άλλο μοτίβο, όπως για παράδειγμα απλό οδοντωτό μοτίβο σε σημείο όπου αναπτυσσόταν αρχικά μαιάνδρος.

Στο κέντρο της σύνθεσης ένα από τα κυκλικά μοτίβα παρουσιάζει διαφορές σε σύγκριση με τα υπόλοιπα κυκλικά μοτίβα: η ζώνη πλαισίωσης κοσμείται με απλό μαύρο οδοντωτό μοτίβο αντί για πλοχμό και το φυτικό μοτίβο στο κέντρο έχει καρδιόσχημες αντί για ελικοειδείς απολήξεις. Οι συγκεκριμένες διαφοροποιήσεις θα μπορούσαν να αποδοθούν σε διαφορετικό εργαστήριο.

Η *Αντιόχεια* είναι ένα ακόμα μέρος με πολλά και αξιόλογα ψηφιδωτά

και προσφέρει πολλά παραδείγματα επεμβάσεων, που εμπλουτίζουν με τον ιδιαίτερο σε ορισμένες περιπτώσεις χαρακτήρα τους τη συγκεκριμένη καταγραφή. Συναντούμε μία νέα κατηγορία επεμβάσεων, τις προσθήκες στην ψηφιδωτή διακόσμηση ενός χώρου με στόχο την προσαρμογή της ψηφιδωτής επιφάνειας σε ένα νέο αρχιτεκτονικό πλαίσιο. Τα δύο παραδείγματα που ακολουθούν είναι αντιπροσωπευτικά της συγκεκριμένης περίπτωσης (Levi 1947: 156 κ.ε., 127 κ.ε.).

Ο κεντρικός διάδρομος μίας οικίας διαμορφώθηκε εκ νέου με το υπόλοιπο τμήμα της οικίας. Το αρχικό ψηφιδωτό που κοσμούσε τον διάδρομο ήταν μικρότερων διαστάσεων σε σχέση με το μεταγενέστερο και αποτελούνταν από τέσσερις ψηφιδωτούς πίνακες με απεικονίσεις των τεσσάρων εποχών. Σε μία δεύτερη φάση προστέθηκαν άλλοι πέντε πίνακες. Ο ένας πίνακας έφερε γεωμετρικά μοτίβα και οι άλλοι τέσσερις πιθανώς δεν έφεραν παραστάσεις. Ακόμα είναι ορατός ο πρόχειρος και τραχύς χαρακτήρας της σύνδεσης των δύο τμημάτων, τόσο στη διακοπή του πλοχμού ανάμεσα στον τέταρτο πίνακα με την προσωποποίηση του Χειμώνα και τον κεντρικό γεωμετρικό πίνακα όσο και στο ευρύ ανοιχτόχρωμο πλαίσιο του διαδρόμου.

Σε δεύτερη οικία η λεπτομερής παρατήρηση της ψηφιδωτικής σε συγκεκριμένο τμήμα του ψηφιδωτού όπως επίσης και της τοιχοποιίας μας οδηγούν στο συμπέρασμα ότι το αρχικό σχήμα του κυρίως χώρου ήταν αψιδωτό. Σε μεταγενέστερη φάση επεκτάθηκε ο χώρος και το σχήμα μετατράπηκε σε ορθογώνιο. Με στόχο να καλυφθεί το κενό διάστημα που προέκυψε στο δάπεδο, προστέθηκε ένας ορθογώνιος ψηφιδωτός πίνακας με γεωμετρικά μοτίβα.

Στην οικία της "Θαλάσσιας Θεάς" (Levi 1947: 349 κ.ε.), σε τέσσερα κυκλικά μετάλλια με εγγεγραμμένα πρόσωπα στο εσωτερικό τους συναντούμε μία εσκεμμένη καταστροφή των προσώπων και την εισαγωγή ακανόνιστων μαρμάρινων πλακών στη θέση τους για την κάλυψη των κενών. Τα αίτια της καταστροφής δεν είναι γνωστά. Θα μπορούσαν να έχουν χαρακτήρα ιδεολογικό, όπως σε ανάλογες περιπτώσεις επί Εικονομαχίας ή να έχουν κάποια σχέση με αλλαγές στους ενοίκους, ιδιοκτήτες της οικίας.

Ένα τελευταίο παράδειγμα από την Αντιόχεια προέρχεται από την "Οικία του Φοίνικα" (Levi 1947: 351 κ.ε.). Στην περίπτωση αυτή, στη ζώνη πλαισίωσης του ψηφιδωτού διακρίνεται μία αρχαία επέμβαση που αλλοιώνει τον αρχικό χαρακτήρα της σύνθεσης. Ένα κενό στη ζωφόρο που κοσμεύεται με αιγάγρους επισκευάστηκε με επιμέλεια, αλλά με ένα στυλ πιο σκληρό και με μία σημαντική διαφοροποίηση στην εικονογραφία. Κάθε κεφαλή αιγάγρου ορίζεται στο κάτω μέρος από ένα ζευγάρι φτερών σε αντίθεση με το αρχικό σχέδιο, όπου οι κεφαλές ήταν ανά δύο ομαδοποιημένες. Όπως φαί-

νεται και από άλλα παραδείγματα, μία τροποποίηση αυτού του είδους δηλώνει ότι το ζητούμενο δεν ήταν τελικά η συνοχή στη σύνθεση και ότι για τους τεχνίτες και για τους εντολοδόχους μία τέτοια αλλαγή ήταν κάτι απολύτως φυσικό και αποδεκτό. Ωστόσο, σύμφωνα με άλλους μελετητές (Baratte 1980 : 81-85) δεν πρόκειται για μεταγενέστερη επέμβαση και η διαφοροποίηση αυτή θα μπορούσε να αποδοθεί, όπως και στην περίπτωση του ψηφιδωτού της Τυνησίας, στην παρουσία τεχνιτών διαφορετικών εργαστηρίων, στο αρχικό στάδιο κατασκευής του ψηφιδωτού (εικ. 5).

Μία διαφορετική κατηγορία επεμβάσεων συναντά κανείς στα *επιδαπέδια ψηφιδωτά που κάλυπταν συχνά τις χριστιανικές ταφές* μέσα στον χώρο της εκκλησίας (Dunal 1976: 29 κ.ε.). Σε αυτήν την περίπτωση η επέμβαση έχει να κάνει με τη βίαιη προσαρμογή ενός μεμονωμένου ψηφιδωτού πίνακα σε ένα ήδη διαμορφωμένο δάπεδο. Η συγκεκριμένη περίπτωση είναι ιδιαίτερη, καθώς πρόκειται για μία αναγκαία τροποποίηση του δαπέδου και παράλληλα διαπιστώνεται ότι δεν δίσταζαν στις περιπτώσεις αυτές να καταστρέψουν είτε ολοκληρωτικά είτε μερικά έναν ψηφιδωτό πίνακα, για να εισάγουν μία διαφορετική ψηφιδωτή σύνθεση. Υπάρχουν παραδείγματα τέτοιων επεμβάσεων σε πολλά μέρη, όπως για παράδειγμα στην Αλγερία, στη Σικελία και αλλού.

Μία ακόμα κατηγορία είναι οι επεμβάσεις με *αίτια ιδεολογικού χαρακτήρα*. Πολυάριθμα ψηφιδωτά δάπεδα υπέστησαν αλλοιώσεις κατά την περίοδο της Εικονομαχίας. Είναι γνωστό ότι κατά τον 8^ο αιώνα το ανατολικό τμήμα της βυζαντινής αυτοκρατορίας αντιμετώπισε μία πολιτική και θεολογική κρίση που είχε σχέση με τη λατρεία των εικόνων. Ορισμένοι ενάντιοι της λατρείας των εικόνων προχώρησαν έως και στην ίδια την καταστροφή τους. Κατά την περίοδο αυτή καταστράφηκαν πολλές παραστάσεις είτε αυτές ήταν σε ψηφιδωτά, σε τοιχογραφίες ή σε φορητές εικόνες και σε πολλές περιπτώσεις αντικαταστάθηκαν από συμβολικές απεικονίσεις με μία έμφαση σε νατουραλιστικά τοπία με ζωικές μορφές και πτηνά, όπως για παράδειγμα στην Κωνσταντινούπολη. Στην ίδια χρονική περίοδο εκδηλώνεται ένα ανάλογο, όχι πανομοιότυπο, φαινόμενο εικονοφοβίας και παρατηρείται στα ψηφιδωτά δάπεδα εκκλησιών της ιστορικής Παλαιστίνης, της Συρίας και της Αραβίας, οι οποίες από το 636 μ.Χ. τέθηκαν υπό Ισλαμική κυριαρχία.

Στη σημερινή *Ιορδανία*, στην πλειονότητα των εκκλησιών, τα ψηφιδωτά που έφεραν εικονιστικές παραστάσεις εσκεμμένα αλλοιώθηκαν. Πορτρέτα ευεργετών-δωρητών, κλασικές προσωποποιήσεις, σκηνές κυνηγιού, σκηνές από την αγροτική και την ποιμενική ζωή, νειλωτικές σκηνές, αλλά και τα μεμονωμένα ζώα και πτηνά που γέμιζαν τα κενά στις γεωμετρικές συν-

θέσεις, αφαιρέθηκαν προσεκτικά, ολοκληρωτικά ή μερικά. Τα κενά που προέκυπταν συμπληρώνονταν συνήθως είτε με τις ίδιες ψηφίδες ανάκατα τοποθετημένες είτε με νέες μεγαλύτερων διαστάσεων, χωρίς χρωματικούς περιορισμούς. Η ποιότητα του αποτελέσματος ήταν σε άμεση εξάρτηση με τη δεξιοτεχνία του τεχνίτη.

Στην εκκλησία του Αγίου Στεφάνου στο *Umm al-Rasas* (Piccirillo 1993: 36 κ.ε.) για παράδειγμα, η σύνθετη ψηφιδωτή επιφάνεια δέχθηκε πολυάριθμες επεμβάσεις. Αφαιρέθηκαν όλες οι ανθρώπινες και ζωικές μορφές και αντικαταστάθηκαν από ένα πολύχρωμο *opus tessellatum*. Στο βόρειο παρεκκλήσι της εκκλησίας στην ακρόπολη του *Ma'in* (Piccirillo 1993: 198 κ.ε.), μία παράσταση με δύο ζωικές μορφές αντικαταστάθηκε στο μεγαλύτερο τμήμα της, χωρίς κάποια λογική, από ένα μικρό δέντρο και έναν αμφορέα, μέσα από τον οποίο αναπτύσσονται κλαδιά αμπέλου· στην επέμβαση διατηρήθηκε μικρό τμήμα των πίσω άκρων μίας εκ των δύο ζωικών μορφών (εικ. 6).

Με την επισκόπηση αυτή διαπιστώνεται ότι οι αρχαίες επεμβάσεις στα ψηφιδωτά καθορίζονται κάθε φορά από διαφορετικούς παράγοντες και παρουσιάζουν μία ποικιλία όσον αφορά στον χαρακτήρα τους, όπως για παράδειγμα συμπληρώσεις κατασκευασμένες με προσοχή και ιδιαίτερη φροντίδα, με σεβασμό προς τον αρχικό διάκοσμο • συμπληρώσεις πρόχειρες και αυθαίρετες, οι οποίες έρχονται σε αντίθεση με το υπόλοιπο τμήμα του ψηφιδωτού διακόσμου, όχι μόνο από άποψη ποιότητας και υλικών, αλλά και της ίδιας της λογικής της σύνθεσης • προσθήκες στην ψηφιδωτή διακόσμηση με στόχο την προσαρμογή της ψηφιδωτής επιφάνειας σε ένα νέο αρχιτεκτονικό πλαίσιο • αποσύνδεση ενός ψηφιδωτού πίνακα με στόχο την επανάχρησή του σε έναν νέο χώρο • επεμβάσεις που χαρακτηρίζονται από έλλειψη ενδιαφέροντος από τη μεριά του τεχνίτη να αποκαταστήσει τις φθορές σύμφωνα με το πρωτότυπο σχέδιο • χρήση διαφορετικών υλικών σε σχέση με τη φάση κατασκευής για τη συμπλήρωση των κενών • κακοτεχνίες • επεμβάσεις με χαρακτήρα επιδιορθωτικό • επεμβάσεις με χαρακτήρα διακοσμητικό • επεμβάσεις με αίτια ιδεολογικά κλπ.

Τα ψηφιδωτά, όπως βέβαια και οι τοιχογραφίες, που διακοσμούν τους χώρους ενός οικοδομήματος, είναι εικαστικά έργα μεν, άμεσα όμως συνδεδεμένα με το αρχιτεκτονικό τους πλαίσιο. Ο χαρακτήρας των ψηφιδωτών, ωστόσο, ενέχει μία ακόμα διάσταση, η οποία συνδέεται με την καθημερινή χρήση τους και τις αναπόφευκτες φθορές που αυτή προκαλεί σε ολόκληρη την επιφάνειά τους· καθιζήσεις, εξάρσεις, αλλοιώσεις μεταβάλλουν την όψη του ψηφιδωτού και δύσκολα μπορούν να αποκατασταθούν, ώστε να ανακτήσει η ψηφιδωτή επιφάνεια την αρχική της μορφή.

Στο πλαίσιο αυτό, καθώς στην αρχαιότητα τα ψηφιδωτά δεν είχαν μό-

νο διακοσμητικό ρόλο αλλά καταρχήν πρακτικό, η "συντήρηση" και διατήρησή τους ήταν σε άμεση συνάρτηση από τον τύπο του ψηφιδωτού, εάν είχε δηλαδή απλά γεωμετρικά μοτίβα ή σύνθετες εικονιστικές παραστάσεις, από την ποιότητα και την αξία της παράστασης, από τη μακροχρόνια χρήση του κτιρίου σε συνδυασμό πιθανώς και με υποκειμενικούς παράγοντες, όπως η συναισθηματική σύνδεση του ιδιοκτήτη με τον ψηφιδωτό πίνακα, αλλά και τα αισθητικά κριτήρια και το μορφωτικό επίπεδο των ιδιοκτητών. Από την άλλη πλευρά βέβαια ήταν σε άμεση εξάρτηση με τα διαθέσιμα οικονομικά και τεχνικά μέσα, το απαιτούμενο υλικό, τα εργαστήρια και τους ψηφοθέτες που διέθετε κάθε περιοχή. Η παρουσία έμπειρων τεχνιτών και η εύκολη πρόσβαση στο απαραίτητο υλικό διαδραμάτιζαν αναμφισβήτητα αποφασιστικό ρόλο. Αντιθέτως, το ζήτημα της ακριβούς στυλιστικής απόδοσης και αισθητικής αποκατάστασης, όπως επίσης και ο σεβασμός στην αρχική σύνθεση, διαδραμάτιζαν δευτερεύοντα ρόλο, όπως μαρτυρούν τα σωζόμενα παραδείγματα. Βέβαια, από την άλλη μεριά δεν λείπουν και παραδείγματα ψηφιδωτών που έχουν αντιμετωπιστεί με πνεύμα ενιαίο και όπου η πιστή αισθητική αποκατάσταση των φθορών αποτελεί βασικό σκοπό των εργασιών "συντήρησης" και αποκατάστασης.

Γενικότερα, το θέμα των αρχαίων επεμβάσεων στα ψηφιδωτά δεν επισημαίνεται συχνά από τους μελετητές λόγω των αντικειμενικών δυσκολιών που συναντά κανείς τόσο στον εντοπισμό των επεμβάσεων αυτών όσο και στο πέρασμα από την απλή παρατήρηση στην εξαγωγή κάποιων συμπερασμάτων. Θα ήταν, ωστόσο, ενδιαφέρον για τη μελέτη του αρχαίου ψηφιδωτού να αντιμετωπιστεί το συγκεκριμένο θέμα πιο συστηματικά στο πλαίσιο μιας διεπιστημονικής συνεργασίας αρχαιολόγων και συντηρητών, έχοντας ως βάση τα παραδείγματα που προέκυψαν από παλαιότερες ανασκαφές και καταγράφοντας αυτά που προκύπτουν από τις σύγχρονες ανασκαφικές έρευνες, καθώς πολλές φορές ο χαρακτήρας των επεμβάσεων δεν είναι απλώς επιδιορθωτικός, αλλά παράλληλα ενέχει στοιχεία που αφορούν στην ίδια την χρήση των χώρων και μπορεί να εξεταστεί και να ερμηνευθεί σε ένα ευρύτερο πλαίσιο ιστορικό, ιδεολογικό, ανθρωποκεντρικό.

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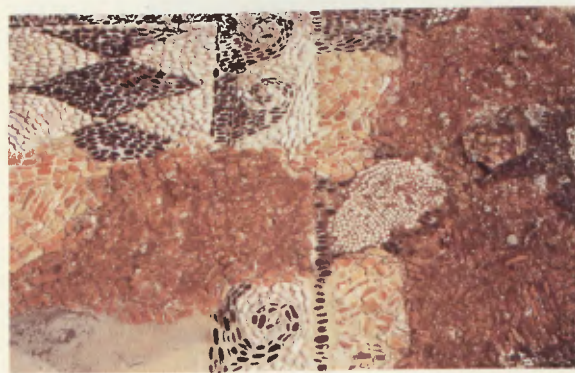
ΕΙΚΟΝΕΣ



1. Δίον, ψηφιδωτό δάπεδο στην "οικία του Ζωσά".



2. Φίλιπποι, ψηφιδωτό δάπεδο στο μεγάλο τρικλίνιο της οικίας στην 4η πολεοδομική νησίδα.



3. Θήλος, ψηφιδωτό δάπεδο στην "οικία F".



4. Ιταλία, ψηφιδωτό δάπεδο στην Piazza della Vittoria στο Παλέρμο.



5. Αντιόχεια, ψηφιδωτό δάπεδο στην "οικία του Φοίνικα".



6. Ιορδανία, ψηφιδωτό δάπεδο στο βόρειο παρεκκλήσι της εκκλησίας στην Ακρόπολη του Ma'in.

JOSÉ MARIA BLÁZQUEZ MARTINEZ

MOSAICS OF ROMAN SPAIN RESTORED IN THE ANTIQUITY

A great number of Hispanic mosaics were restored in the Antiquity. We have gathered some of them in this paper.

Mosaics of *Augusta Emerita*

The capital city of Lusitania, since its founding in 25 B.C. with veterans from the Cantabrig Wars, had always been an important centre for the arts, both mosaics and sculptures. The most abundant collection of mosaics restored in the Antiquity comes from *Augusta Emerita*.

The *Annius Bonus* mosaic (fig. 1)

This mosaic, on the subject of Bacchus and Ariadne, is one of the latest in the Lusitanian capital and is dated in the year 400. Its style points to the artistic trends of the Late Antiquity, matured in Copt art. The craftsman of this splendid work of art was called, according to modern reading, *Annius Bonus*. In the opinion of A. Blanco (1978: 34, Pl. 26-27a; Álvarez 2001: 140-141; Blázquez 1993: 321-324; Krelinger 1993: 420, Pl. 227a; Gómez Pallares 1997: 74-75, Pl. 21), the legs and head of the panther, the Maenad's leg as well as some of the inner part are old restorations.

Cosmological mosaic (fig. 2)

This mosaic is the masterpiece of Hispanic mosaic art, dated in the times of the Antonines or the Severi. It has been assumed to be the craft of an Alexandrian or Syrian artist. In the lower section of the picture, water deities are depicted, intermingled with personifications of seafaring and commerce; in the middle *Mons, Nix, The Seasons and Aeternitas*, and at the top, the celestial sphere.

According to A. Blanco (1978: 35-38, Pl. 36, 38, 39; Blázquez 1993: 380-385; Lancha 1997: 223-229, Pl. CVI-CVII) they are antique restorations: "the

face and chest of *Eufrates* with its own tesserae; part of *Copiae* and the greenish background; some of *Natura*; *Mons'* forehead; scattered spots of the background; the mortar filling, both in the picture and in the rest".

House of the amphitheatre

A 3rd c. mosaic with Venus and Cupid which suffered significant restorations in the Antiquity. According to A. Blanco (1978: 44, Pl. 73) "the old restorer was careless in the completion of the missing parts of the mosaic. In the eastern side he restored the steps, but omitted the grape picker; his fellow on the southern side was left headless and many vine leaves were replaced with ivy".

According to Ms. Trinidad Nogales, curator at the Museo Nacional del Arte Romano de Mérida (National Museum for Roman Art in Merida), there are restorations in the background of a ladder climbed by a youth; in the two vases with birds and in the lower part of the winepress.

El Hinojal (fig. 3)

It's one of the large villas near *Augusta Emerita*, dated in the 4th c. According to A. Blanco, in the nereid mosaic "the bull's head was restored in the Antiquity without redesigning it, likewise with the upper part of the white background, on which an oblique cross was added".

In the same villa of El Hinojal, a mosaic is decorated with the theme of a hunter spearing a boar. Through comparison with a scene in a mosaic in Antioch, depicting a very similar figure with the name on it, the hunter could well be Adonis. According to A. Blanco (1978: 52, Pl. 94a, 95-96; Guardia 1992: 228-229, Pl. 96) the torso, the left arm and part of the hunter's head, as well as the tree trunk and the boar's snout are antique restorations. All of it rather unsuccessfully. Restorations appear in the border, on the left hand side of one of the Seasons (*Viranus*).

Some other mosaics from *Augusta Emerita*, and from the 4th c., also showing restorations, are the mosaic of the Seven Wise Men, in the background (Alvarez 1990: 69-79, Pl. 32-38; Guardia 1992: 206-212, Pl. 85-87), and dating from the same epoch, that of *Marianus* the hunter, with restorations on the body of the animal (Alvarez, 1990: 82-83, Pl. 39-42; Gómez Pallarés 1997: 64-67, Pl. 16-17).

A mosaic was also made out of reset fragments, such as the picture of Bacchus and Ariadne (Blanco 1978: 34, Pl. 27a).

Itálica (Seville)

In a mansion in Itálica, in the so-called Casa de la Exedra, an oblong mosaic set with pigmies and cranes was found, the theme being a copy of the border of Neptune's mosaic. The mosaic had been heavily restored. Its importance lies in that it clearly shows the method sometimes used by mosaicists in the making of their mosaics (Blanco y Luzón 1978: 45-46, Pl. XXa).

Mosaic of Carmona (Seville)

This important town of the Baetica played a crucial role in the civil war between Caesar and Pompey, and it was the strongest city of the region with its impressive gates from Caesar's times, built over another from the times of the Barcas (BC II, 19). A fragment of mosaic from the time of the Severi set with bolts of lightning, was clumsily restored in one side (Blázquez 1982: 36, Pl. 16).

Cordova

In the capital city of Baetica, Colonia Patricia Corduba, several mosaics restored in the Antiquity appeared, dating from the late 2nd c., or early 3rd c.

Three are kept in the Archaeological Museum in Cordova. One depicts a bearded head crowned with vine leaves, possibly a representation of Autumn. The filling of the neck and the right temple are restored (Blázquez 1981: 30).

In another one the forehead and part of the body of a young man inside a medallion, as well as part of the face and the breast, are remade (Blázquez 1981: 27, Pl. 12). In a third medallion with Europe and the bull, the forehead, part of the face, the neck and the breast of Europe, and part of the bull's forehead are old restorations (Blázquez 1981: 27, Pl. 12).

A paved surface decorated with a Bacchic thyasus was discovered in this Andalusian city. In the central medallion with Bacchus's head there are antique restorations in the hair, face and chest of the god, and on the frame, too (Blázquez 1981: 29-30, Pl. 16).

Tres Juncos (Cuenca)

A mosaic from this town with a geometric pattern shows a rectangular chequered patch inside (Blázquez 1982: 57, Pl. 39).

Complutum (Madrid)

In a mosaic from the Roman villa of El Val, dated in the 4th c., the whole of the charioteer's right side of the neck is rebuilt.

Mosaic of Quintana del Marco (León) (fig. 4)

In the 4th century villa of Quintana del Marco, decorated with splendid mosaics amongst which the one of Hylas and the Nymphs stands out, in one of the acanthus-voluted borders, the top ones in artistic quality of those found in Hispania, a square shape with Solomon's knot on a white background was inlaid in the Antiquity, causing an ugly clash with the delicate flower decoration (Blázquez, López Monteagudo, Mañanes y Fernández Ochoa 1993: 37, Pl. 13).

Los Quintanares (Soria)

During the Late Empire, the Castilian Plateau got covered in villas with splendid mosaics. One of the most important villas is Los Quintanares, in which a superb medallion was found, depicting *Abundancia* in a bust, one of whose hands had already been remade in the Antiquity (Blázquez y Ortego 1983: 16-19, Pl. 1).

Soto de El Ramalete (Navarre) (fig. 5)

The South of the Basque land became scattered with villas in the Late Empire. Among the most important of them is Soto de El Ramalete, world famous for its mosaic of the hunter *Dulcitus*, which presents a restored area under the hind legs of the doe (Blázquez y Mezquiriz 1985: 64, Pl. 39; Id. 1993: 227-231; Guardia 1992: 104, Pl. 35). Three mosaics from the Roman villa of Liedena were restored in the antiquity. They were found in the peristyle. One of them is set with Solomon's knots inside a curved cross. The second surface is covered in quatrefoil rosettes. The third one in the West side of the peristyle is decorated with meandering swastikas and squares (Blázquez y Mezquiriz 1988: 36-41, Pl. 24-26).

Pompaelo (Navarre)

This city, founded by Pompey during the Sertorian War (Plut. Sert. 21), has yielded a mosaic with Teseus and the Minotaur dating from the 2nd c., with antique restorations in Teseus's body (Blázquez y Mezquiriz 1985: 56-58, Pl. 36; Blázquez 1993: 403).

Arroniz (Navarre)

In the mosaic of the Muses of Arroniz (Navarre), from the Late Empire, the top right angle of the Muse Melpomene has been rebuilt (Blázquez y Mezquiriz 1985: 18, Pl. 6, 50; Blázquez 1993: 41; Lancha 1997: 180-181, Pl. E).

Cabezón del Pisuerga (Valladolid)

This town in Valladolid bore a mosaic with Homeric theme, two warriors engaged in a fight, dated in the middle 4th c. Remains of other mosaics, at least two small pictures, maybe three, can be noticed in one of the borders (Neira y Mañanes 1998: 36-46, Pl. 35-36).

Villa del Prado (Valladolid)

Two kilometres away from the city of Valladolid lies the villa del Prado, decorated with a mosaic depicting Diana the huntress surrounded by the four Seasons. Old restorations can be found in a flower on the shoulder of the embodiment of Spring, as well as in the crown of this Season and the fruits in the landscape of the central picture of Diana (Neira y Mañanes 1998: 51-52, Pl. 37-38; Blázquez 1993: 342-350).

Pedrosa de la Vega (Palencia)

The villa of La Olmeda, from Theodosius times, is decorated with splendid mosaics: Achilles in Esquiros, surrounded by a border set with portraits; the whole of the right side of the portraits is restored (Lancha 1997: 187-190. Also other portraits: Palol y Cortés 1974: 42-55, Pl. LXXXVII-XLIII; Cortés 1996: 93-93-99). And a hunting scene in which the shields of some hunters seem to have been restored in old times (Palol y Cortés 1974: 55-61, Pl. LVI-LVIII, LX-LXI; Cortés 1996: 105; Guardia 1992: 150, Pl. 22.49).

Quintanilla de la Cueva (Palencia) (fig. 6)

A last mosaic also from Palencia and from the Late Antiquity might be remarked: it was found in Quintanilla de la Cueva, and it depicts the well-known theme of Leda and the swan. The face and neck of Leda and part of the neck of the swan were remade in the Antiquity (Cortés 1996: 400; Guardia 1992: 141-143, Pl. 51).

In general, restorations of mosaics in Hispania are frequent, but crude.

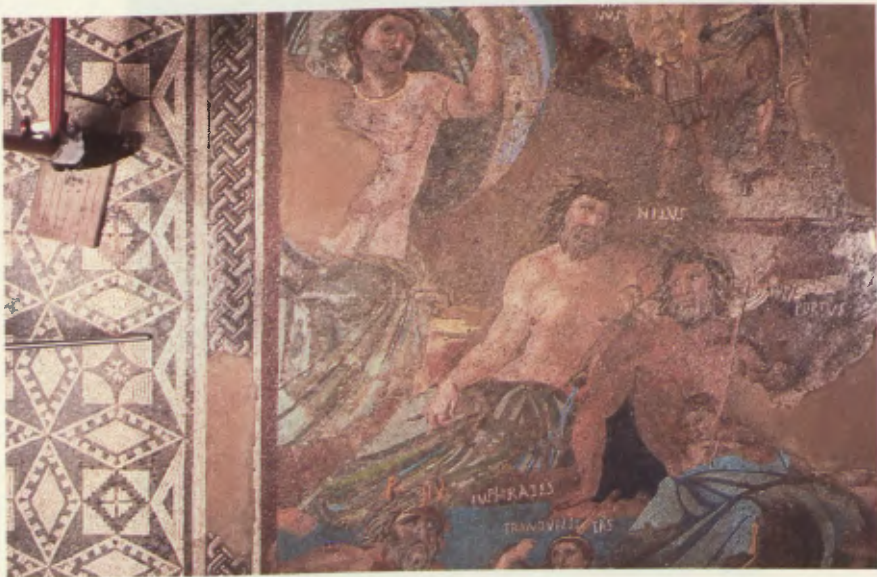
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FIGURES



1. The Annius Bonus mosaic (Mérida).



2. Cosmological mosaic, Natura (Mérida).



3. El Hinojal (Mérida).



4. Quintata del Marco (León).



5. Soto de El Ramalete (Navarra).



6. Quintanilla de la Cueva (Palencia).

CHRISTOS ARGYROU

**MOSAICS THROUGH TEACHING HISTORY AND ART
IN SECONDARY EDUCATION OF CYPRUS.
REALITIES AND PERSPECTIVES**

ΠΕΡΙΛΗΨΗ

Οι μαθητές της δευτεροβάθμιας εκπαίδευσης της Κύπρου, κατά τα έξι έτη των σπουδών τους, έχουν την ευκαιρία να γνωρίσουν μέσα από τα σχολικά βιβλία και άλλα εποπτικά μέσα, όπως ψηφιακοί δίσκοι και το διαδικτυο, τον ψηφιδωτό πλούτο της αρχαιότητας και του μεσαιώνα. Παράλληλα, γνωρίζουν για τα ψηφιδωτά που παρήχθησαν στην Κύπρο από τους ελληνιστικούς χρόνους μέχρι και την πρωτοβυζαντινή περίοδο. Η γνώση απλώς και μόνο των ψηφιδωτών αποτελεί ένα πρώτο στάδιο προστασίας τους. Τα σχολικά βιβλία της Κύπρου, παρά τις ικανοποιητικές πληροφορίες που δίνουν με μορφή κειμένου και εικόνων για τα ψηφιδωτά, χρhζουν ολίγων προσθηκών, οι οποίες θα πληροφορούν τους μαθητές για θέματα διατήρησης, συντήρησης και προστασίας των ψηφιδωτών. Σε ένα εκπαιδευτικό σύστημα σαν το σημερινό, το οποίο κινδυνεύει να χάσει την ανθρωπιστική του διάσταση, καλείται ο εκπαιδευτικός και αρχαιολογικός κόσμος να συμβάλει με τρόπο ώστε να ευαισθητοποιήσει τους μαθητές – αυριανούς πολίτες για την ανάγκη της διατήρησης των ψηφιδωτών και τη θέασή τους ως μνημείων πολύτιμων για την ιστορική μας αυτογνωσία.

INTRODUCTION

The wonderful, in students' eyes, world of mosaics parades through the pages of the school books of Cyprus giving them the chance to get familiar with this so important field of history and art. Consequently, this paper aims to present the way the mosaics are presented today to the students, to express questionings and to formulate some conceptions for the much possible better development of this issue in the didactic practice and its perspectives.

During their six-year attendance in Secondary Education students of

Cyprus, aged 12 to 18 years, cope with the mosaics of antiquity and medieval times, through the lessons of history primarily and of art secondarily.

The mosaics through the school books and other visual means

History text books for the Greek Secondary Education of Cyprus are publications of the Pedagogical Institute and the Textbook Publishing Organization of the Ministry of National Education and Religious Affairs of Greece¹ and they are treating, for the issue we are concerned about, the historical and cultural evolution of Hellenism as a whole at the late Antiquity and Medieval era. Publications of the Curriculum Development Unit of the Ministry of Education and Culture of Cyprus² cover the local history of Cyprus. Greek and Cypriot books are usually taught in parallel. In both groups of books are included chapters dedicated to art, including painting. In the sub-chapters of the painting in Greek editions one meets from very brief references to detailed analysis of the wall and floor mosaics of the Hellenic world, dated back to the Hellenistic age (Tsaktsiras and Tiverios 2002: 301-303, Mastrapas 2000: 150, 223), and to the late Byzantine period (Mastrapas 2000: 265, Tsaktsiras and Tiverios 2002: 57, 130, 228-233), while in Cypriot editions the mosaics of Cyprus, dated to the Hellenistic, Roman and early Byzantine times are specifically presented (Pantelidou, Protopapa and Gialourides 1997: 72, 73, Pantelidou, Chatzikosti, Christou and Protopapa 1990: 148-153, 158-160, Pantelidou and Chatzikosti 2001: 19-23).

A general World Art History, a Cypriot publication, which is consisted of two volumes, gives to the students of Gymnasium through the lesson of art an aesthetical and iconographic description of ancient and medieval mosaics.

In almost all the books a general definition of the mosaic is given in an epigrammatic way and with some representative examples in a chronological order. The description, however, of the mosaic art with synoptic expressions and with no explanations, creates in students' minds a vague

1. Lampros Tsaktsiras and Michalis Tiverios, *History of the Ancient Times to 30 B.C.*, A' Gymnasium, Athens 2002 (23rd ed.). Lampros Tsaktsiras, Zacharias Orphanoudakis and Maria Theochari, *Roman and Byzantine History (146 B.C. – 1453 A.D.)*, B' Gymnasium, Athens 1999 (18th ed.). Antonis Mastrapas, *History of the Ancient World: From the Prehistoric East Civilizations to the Justinian Era*, A' Lyceum, Athens 2000.

2. Angeliki Pantelidou, Kalliopi Protopapa and Savvas Gialourides, *History of Cyprus for Gymnasium*, Nicosia 1997, Angeliki Pantelidou, Konstantia Chatzikosti, Iakovos Christou and Kalliopi Protopapa, *History of Cyprus: From the Neolithic to the Roman Period*, A' Lyceum, Nicosia 1990. Angeliki Pantelidou and Konstantia Chatzikosti, *History of Cyprus: the Byzantine period*, B' Lyceum, Nicosia 2001.

conception about mosaics³.

In certain books the definition is accompanied by well enough detailed mosaics' descriptions of a specific period and their content, historical or theological if it concerns church mosaics, is discussed. Moreover, their aesthetical dimension is underlined and a stylistic analysis is attempted, as the example in the history book *History of Cyprus – Byzantine Era*, of the second class of Lyceum, publication of Curriculum Development Unit, in the pages of which the early Byzantine wall mosaics of Cyprus, those of Panagia Kanakaria and Panagia Angeloktisti, dated back to the 6th century AD (Megaw 1974: 74-76 and Foulis 2004: 23-28), and that of Panagia Kyra (first half of the 7th century AD) (Megaw 1974: 76), are described in details and they are accompanied by the equivalent visual material (fig. 1). As especially in the case of Angeloktisti students are asked to compare the face of Virgin with the opposite of the empress Theodora from San Vitale in Ravenna, in order to detect their stylistic resemblance (fig. 2).

The descriptions of mosaics in school books are usually based on specialized studies. In this way terms of archaeology and art history, such as "tesserae", "mandorla", "decorative borders", "Virgin Hodegetria", "schematization", are transferred to the school pages, the children's vocabulary is enriched and their description ability is improved. However, the explanation of the archaeological and artistic terms is required from the educator, something that is not always attainable because of the pressing school timetable and Curriculum, but mainly because of the cognitive inadequacy in art and archaeology issues of the teaching staff, most of whom are not alumni of History and Archaeology departments, but of Philology, Philosophy, Pedagogical Sciences and Psychology. It is useful therefore, as a first stage, for a glossary to be incorporated with explanations of these terms used in school books or to be accompanied by a teacher's book helping teachers in the teaching of art and archaeology issues and special subjects about mosaics. Of course the much more ideal suggestion would be a series of training seminars of the teachers in art and archaeology topics and in our case an organization of special seminars about mosaics addressing to the teaching world.

Pictures of several mosaics representations are published in school history books favouring thus the teaching of the lesson in a visualized way (fig. 3). Our

3. Andreas Ladommatos, *World History of Art – Aesthetical Evaluation of Art Works: From the Dawn of Art to the Roman period*, A' Gymnasium, Nicosia 1995. Elena Meletiou and Kostas Kafkarides, *World History of Art – Aesthetical Evaluation of Art Works: Byzantine Art*, B' Gymnasium, Nicosia 1999.

students, living in a world bombed by icons, learn now through pictures, even if this many times goes against the word. This inevitable reality, which is considered into account by the modern pedagogical theory (Freedberg 1989, Voros 1989 and 1990, Charalambopoulos 1990, Dalkos 1990 and 1991, Antoniadis 1995: 64-65, Skouros 1997: 120-123, Makris 1999: 492, Mavroskoufis 1999: 51-52, Mastrapas 2001: 33 and Sakka 2001) must be exploited by teachers and in the case of mosaics, as mosaics offer themselves for impressive pictures. Consequently, mosaic representations accompanying the text of history books, must at first be explained with sufficient and detailed descriptions and then students must be asked to describe and comment these representations. Mosaics representations are used as well for decorative purpose, either in internal pages (fig. 4) or in front covers (fig. 5). The teacher should also underline the importance of the function of mosaic representations in the time they were made.

With the introduction of *Eniaio Lykeio* (Unified Upper Secondary School) in Cyprus, our lyceums offer today special history classrooms equipped with multimedia (television, video, overhead projector, slides projector, computers, internet) for the visualization of the lessons. The Curriculum Development Unit produced a CD ROM⁴ used to teach students the *Cypriot Art in Antiquity* (fig. 6). In this multimedia are included Roman and Hellenistic mosaics of Cyprus and they are presented to students in a pleasant way, as students have the opportunity to travel through the map of Cyprus and to choose in topographic plans of ancient cities dwellings and other buildings hosting mosaics. The mosaics are presented through a rich photographic material with zooming possibilities of their details and they are accompanied by explanatory texts.

For the best visualization of the lesson, in collaboration with archaeological and other institutions, in the case of Cyprus with the Department of Antiquities and the Pedagogical Institute, a creation in every school unit of slide archives of photos with the mosaics taught to students is needed.

Constructive details and information for the technology of wall and floor mosaics are almost absent from the school books. An exception is the book of first class of lyceum *History of Cyprus – From Neolithic to Roman Era*, a publication of the Curriculum Development Unit of the Ministry of Education and Culture of Cyprus, in which, apart from the descriptions of the roman mosaics, an entire page is dedicated to the function of the local workshops and the constructive methods of mosaics, with excerpts from the archaeological

4. Curriculum Development Unit of the Ministry of Education and Culture of Cyprus, *Cypriot Art in Antiquity*, (CD ROM), Nicosia 2000.

publications of professors Demetrios Michaelides and Wiktor Daszewski (Michaelides 1987: 52-58 and Daszewski – Michaelides 1989: 14).

If the references to constructive methods of mosaics are very few, the references to conservation techniques, maintenance and proper presentation of them do not exist at all. However, one could ask himself rightfully at this point: Does the pupil need to acquire specialized knowledge about mosaics? The answer, though, is quite simple: Certainly the pupil neither will be specialized, nor he will become a young archaeologist or restorer. But through some specialized information he will learn, understand and show concern on some aspects, as a thoughtful citizen is obliged to do concerning mosaics protection matters and other monuments as well. School can play a substantial role in this direction. It is important the pupil, more than ever today, to realize that mosaics and the monuments in general must be conserved in a way that secures their historicalness and that arbitrary or exceeding interventions can harm beyond repair the mosaics and misquote their initial form.

Of course through such a wide approach of mosaics, as monuments and not only as artifacts, teaching should free itself from school classrooms and with programmed visits and educational excursions should get students, with the assistance of archaeology, closer to the teaching object. This of course can be combined with the activity of archaeological clubs that exist and work successfully in gymnasiums and lyceums of Cyprus (fig. 7).

In these educational and *ad loc* visits, archaeology can have a great contribution. By organizing educational programs, inspired by archaeologists, teaching mosaics will stop being another boring and cheerless school lesson of history or art, but it will succeed much desired, according to the pedagogical terminology, joy of learning.

Creative projects, such as the construction of a mosaic with paper or even with original material, would reinforce much more the concern of the learners and would help them to acquire a much more tangible reality for mosaics (fig. 8).

CONCLUSIONS

The simple knowledge of mosaics is a first stage of their protection. The school books of Cyprus, despite their sufficient and satisfactory information they give in text and pictorial form about wall and floor mosaics, they are in need of a few additions that will inform students about conservation, maintenance and protection of mosaics.

In an educational system that is at risk to lose its human character because of the technocratic society which feeds and directs it, the educational and archaeological world is asked to contribute in a way that it will sensitize the

students- tomorrow citizens for the necessity of maintenance of mosaics and their view as valuable monuments for our historical self-awareness.

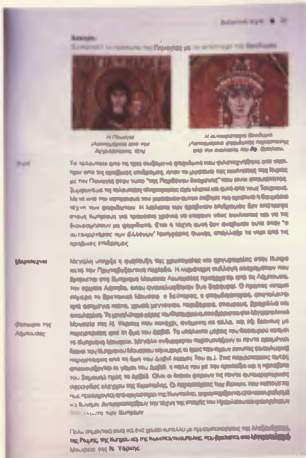
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FIGURES



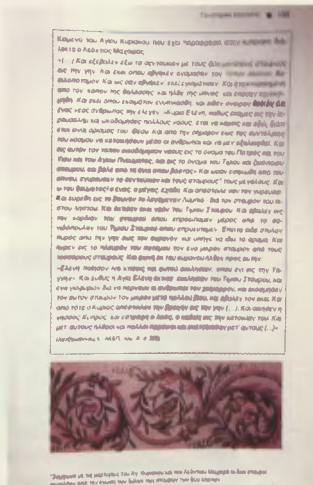
1. Mosaics of the House of Dionysos, late 2nd/ early 3rd century AD. Page from the history text book *History of Cyprus: From the Neolithic to the Roman Period*, A' Lyceum, Nicosia 1990.



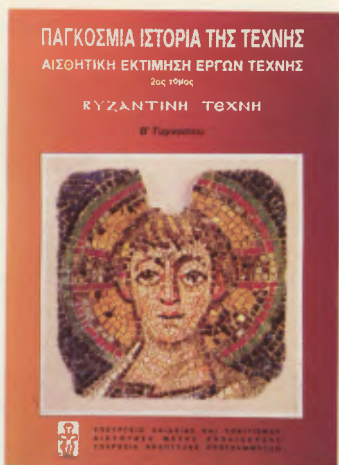
2. Stylistic comparison of Virgin from Panagia Angeloktisti, Kiti (6th century AD) and empress Theodora from S. Vitale, Ravenna (6th century AD). Page from the history text book *History of Cyprus: the Byzantine Period*, B' Lyceum, Nicosia 2001.



3. Musicians. Mosaic, Museo Archeologico Nazionale di Napoli, 3rd century B.C. Page from the history text book *World History of Art – Aesthetical Evaluation of Art Works: From the Dawn of Art to the Roman Period*, A' Gymnasium, Nicosia 1995.



4. Detail of Mosaic decoration from the House of Dionysos, late 2nd/ early 3rd century AD. Page from the history text book *History of Cyprus: From the Neolithic to the Roman Period*, A' Lyceum, Nicosia 1990.



5. The Child from Panagia Kanakaria, Lythrankomi (6th century AD). Front cover of the art history text book *World History of Art – Aesthetical Evaluation of Art Works: Byzantine Art*, B' Gymnasium, Nicosia 1999.



8. Mosaic representation of the Child copying the mosaic from Panagia Kanakaria, Lythrankomi, made by a student. Material used: paper.



6. CD ROM *Cypriot Art in Antiquity*, Nicosia 2000.



7. A lyceum's archaeological club studying a mosaic floor of the House of Eustolios, Kourion.

B. ΘΕΜΑ 2Ο: ΣΥΝΤΗΡΗΣΗ
THEME 2ND: CONSERVATION

KRZYSZTOF CHMIELEWSKI

**CONSERVATION OF BYZANTINE FLOOR MOSAICS FROM SHHIM IN LEBANON.
TECHNIC AND AESTHETIC PROBLEMS, PRESENT STATE AND
PROSPECTS IN THE FUTURE**

SUMMARY

Since 1966 Polish archeological mission (Warsaw University in co-operation with Direction Général des Antiquités from Beirut and Institut Français d'Archéologie du Proche-Orient) has worked in Shhim 30 km south from Beirut. On the site are well preserved ruins of Roman temple from 2nd century, village from Byzantine period and remains of walls of Christian basilica. Here, under thick layer of earth, floor mosaics were found. On the basis of the Greek inscription the mosaic was dated for the 5th century. After cleaning the whole mosaic was conservated "in situ". During the second excavation campaign a second, earlier mosaic was found on the bema and was necessary to make transfer of upper layer of mosaic. In 1999 mosaic from the central and a part of the inscription were stolen. After investigation the police found the stolen mosaic from the central nave. The part with the inscription has not been recuperated.

The little village of Shhim lays in the Chouf mountains between Beirut and Saida (ancient Sidon). Here, in 1996, the Warsaw University in co-operation with Direction Général des Antiquités from Beirut and Institut Français d'Archéologie du Proche-Orient started archeological excavations. Since that time archeological and conservational works are conducted every year in the summer. Apart from archeologists and students of archeology also conservationists and students of conservation from the Faculty of Conservation in the Academy of Fine Arts work there.

On the archeological site, placed on a hillside, there is a small Roman temple from the 2nd century and a number of contiguous buildings. In the

Byzantine period (4-5th centuries) quite a big village grew around the temple. Its inhabitants produced olive-oil. In the building ruins archeologists found a number of well-preserved stone oil-presses. That seems to confirm that in the period it was the centre of agricultural production.

Also at that time a church was built. Today only fragments of its walls and columns are preserved. However, on the basis of those remains the original shape of the church was reconstructed. It was a basilica, a form typical for early Christianity: central nave with two aisles, with apses on the East. In the central nave there was protruding and elevated bema. On the bema, under ciborium a marble altar was placed. Outside the church there was a small narthex. The whole building was covered with a roof supported by a wooden construction.

Discovery of the mosaic

During the first archeological campaign fragments of the floor made of small tesserae were found. At the beginning it was difficult to determine how big the remaining mosaic was and what kind of representations there were. Only after removing the layer of soil, stones and broken roof-tiles it turned out that almost the whole mosaic was preserved, both in the naves and on the bema.

After this surprising discovery it was necessary to protect, then to clean the mosaic. All tesserae lying free were collected and sorted out. Around the borders of greater lacunae of the mosaic - which were most susceptible to further degradation - gypsum supports were made. The dust had been swept, however the mosaic was still covered by a layer of dirt adhering to the surface of the tessers.

First, we applied cotton compresses soaked with water with a detergent on small fragments of the mosaic. After a few minutes the dirt was softened. Thus it was easy to clean the area with the use of brushes and sponges. Moreover, the compresses prevented water from getting between the tesserae (fig.1).

After cleaning the whole mosaic rich decoration became visible: ornamental motives, zoo-morphic and floral-vine scroll, baskets filled with fruit, birds, goats, fish and a lioness (figs. 2-3). These representations are typical of the early Byzantine mosaics in Syria. On the basis of the Greek inscription the mosaic was dated for the 5th century (fig. 4).

The mosaic was made in the opus tessellatum technique. On the foundation made of irregular stone slabs a 3 cm thick layer of lime mortar was laid. Colourful tesserae were laid in the lime mortar. The size of the cubes is (on average) 1.0 x 1.0 x 1.0 cm. Technological research shows that most cubes were

made from natural stones - lime stones. Some of the red cubes were made from ceramics, and some of the dark blue and yellow from coloured glass. In the mortar, apart from calcium carbonate and sand, a small addition of gypsum and charcoal black were identified.

General condition before restoration

The state of preservation was different in different parts of the church. Parts on the bema were in the worst condition. Many damages were probably caused by an earthquake and the collapse of parts of the walls. Heavy stones and columns struck the earth and seriously damaged the mosaic. In many places the surface caved in and numerous lacunae were created.

After the roof of the basilica had been damaged the mosaic was no longer protected from the rain. Rains can be very strong in the Chouf Mountains in the winter. Moreover, water from the adhering hillside flowed over the mosaic. It caused further damage, first of all by weakening the mortar. The worst situation was in the south aisle. Between the mortar and the stone foundation many empty spaces were created.

In the north aisle the stony wall was on the brink of collapse. It was because of the pressure of the soil from the hill. Therefore, before uncovering the mosaic the wall had to be strengthened. Stone blocks were first put apart, then put together again.

The mosaic is best preserved in the central nave. Here, during the first stage of conservation, it was enough to take care of protection: certain borders were fortified, lime was injected in a number of places.

Conservation works

The original idea was to create an archeological park once the excavations and conservation works were finished. We assumed that it would be possible to shelter the mosaic. Thus our general assumption was to conserve the mosaic *in situ*.

Because in the south aisle the mortar was seriously damaged we decided to roll the mosaic, remove the old mortar and to place the mosaic (unroll it) onto new mortar. On the surface of the mosaic we placed two layers of cotton gauze, and one layer of canvas. As glue we used polyvinylalcohol. We made a roller from two metal barrels additionally fortified with layers of cardboard. Onto that roller we rolled parts of the mosaic which were consecutively cut off the ground (fig. 5). We removed the old mortar and on the stone foundation (stone slabs) we put then new mortar made from lime and sand with the addition of Primal AC 33. Onto the new mortar we unrolled the mosaic, then

we removed cotton gauze and canvas. We decided to level only those places, which were most deformed. Small lacunae were reconstructed with the use of original tesserae (fig. 6). Bigger lacunae were only filled with mortar.

During the second excavation campaign a second, earlier mosaic was found on the bema. That lower layer of mosaic chronologically corresponds to other parts of the building. The upper mosaic was made 100 years later, in the 6th century. To uncover the original mosaic it was necessary to remove the younger one. Its surface we divided into a considerable number of smaller and bigger pieces. We made a detailed documentation - drawings and photos. We stuck a layer of cotton gauze and linen cloth onto the cleaned surface, using as glues polivinylalcohol.

Then, with the use of saws, knives and chisels we cut the pieces of mosaic through the layer of mortar. Thus the whole upper mosaic was removed from the area of the bema. The back side of each fragment was cleaned, then we put a layer of new sand and lime mortar.

Thus secured fragments are stored, they wait for further conservation.

Because after a few archeological campaigns an exhibition was planned we made transfers of three fragments onto new mobile support. These are fragments with the lioness, birds and goats. The mosaics were stuck into new lime and sand mortar and then glued to wooden boards. The boards were framed in aluminium. As binding medium between the boards epoxyde resine was used.

Theft of the mosaic

The year 1999 was tragic for the mosaic in Shhim. Every year after the excavation season the whole mosaic was protected with plastic foil and covered with sand. The archeological site was guarded by a group of soldiers. In 1999, in the winter, the military post was closed. No other security measures were taken, nobody guarded the mosaic during 6 months. When we came to Shimm in the summer it turned out, that the mosaic from the central nave (about 9 square meters) and a part of the inscription were stolen. The theft was discussed in the media. After a month long investigation the police found the stolen mosaic from the central nave. It is kept in magazines in Saida. It was cut indolently into two parts and rolled. Its present state is tragic. The part with the inscription has not been recuperated.

What next?

Because of financial difficulties it is not certain whether the planned archeological park in Lebanon will be opened. Part of the mosaic lays in the

open air in the basilica. Fragments removed from the bema are stored, they are waiting for further conservation. Similarly the stolen parts, which were recuperated. Their conservation will be very difficult. From the conservationist's point of view it is necessary to take strategic decisions as to what is going to happen to the monuments of art in Shhim. If money is found and the park will be created, it will be possible to build a roof over the mosaic, the stolen fragment from the central nave will be restored and laid back in the basilica. It will be possible to finish the conservation of smaller fragments from the bema and exhibit them in the church.

We hope that the exposition, opened two months ago in the palace in Beitenndina and devoted to our excavations will attract funds and enable us to continue our work. However, the decision has to be taken by the Lebanese side.

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FIGURES



fig. 1



fig. 2



fig. 3

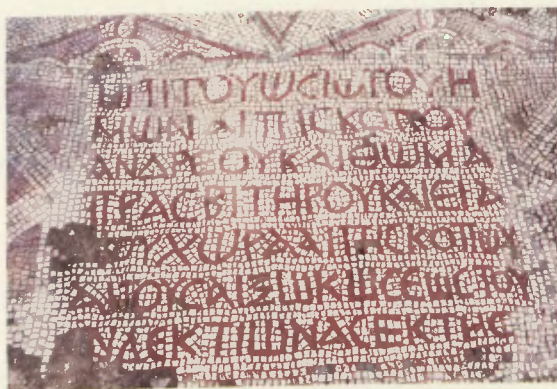


fig. 4



fig. 5



fig. 6

ANTONIO CASSIO, ROBERTO NARDI, KRISTIAN SCHNEIDER

ZEUGMA MOSAICS RESTORATION PROJECT

SUMMARY

From the site of Zeugma, Turkey, 800 m² of ancient mosaics have been removed prior to inundation by an artificial lake. The technical treatment adopted for the reapplication of the mosaics are discussed in detail, describing methods and materials used.

PREMISE

Before starting with the description of the technical operations carried out at Gaziantep for the restoration of 800 m² of polychrome mosaics coming from the site of Zeugma, the following premises have to be made:

The so called Zeugma Project, started in the summer 2000 thanks to the support of the PHI, Packard Humanities Institute; it has been a large program, characterized by the realization of numerous activities in contemporary, all coordinated in one common strategy. A great part of these activities have been carried out on site, during and after the archaeological excavation, during and after the inundation of the site by the water of the dam reservoir, while a part has been carried out in a laboratory at Gaziantep Museum.

This last part concerned the restoration of 800 m² of mosaic. It has been an exclusively technical restoration treatment. The specific themes of removal from the site and reapplication are presented by C. Kılıçık and the present paper. The papers of G. de Felice and R. Nardi present the documentation and general strategy on site, during and after the excavation, the principles and the methodologies.

The second premise regards one of the authors of the present paper, Antonio Cassio, whom we express all our gratitude for the enthusiasm and the generosity with which in every moment of this long project he has participated at all technical phases, passing to us younger conservators his vast experience and competence.

INTRODUCTION

Zeugma is the name given to two cities, Apamea and Seleucia, founded by Seleucus I (312-281 BC) on opposite banks of the Euphrates in south-eastern Anatolia, Turkey. The two cities were linked by a bridge, for which they were named Zeugma, which means bridge in Greek.

In the first century BC, the two cities came under Roman control. The IV legion was posted in this region to control the bridge, the only stable crossing of the Euphrates for hundreds of kilometres.

For 200 years, the cities were an important trade link between the Roman and Parthian empires. At its peak, Zeugma had between 50,000 and 75,000 inhabitants and covered more than 2000 hectares on the west bank.

As the power of the Roman Empire waned in the 3rd century AD, the city was sacked and burned (AD 252) by the Sassanids.

The site was identified in the 1970s by the German archaeologist Jörg Wagner. Research excavation, conducted by David Kennedy of the University of Western Australia, Catherine Abadie-Reynal, Professor at the University of La Rochelle, and the Turkish Ministry of Culture - Gaziantep Museum, took place during the 1980s and 1990s.

During the same period, Zeugma was affected by a major regional hydroelectric project, which involved the construction of various dams. One of these, the Birecik dam and its reservoir, would submerge 30% of the surface of the ancient city during the summer of 2000. The flooding was scheduled to take place in two phases, the first (June 2000) would submerge the so-called Area A; the second (end of October 2000) would submerge the so-called Area B.

In May 2000, partly due to exceptional finds of movable objects and of two villas richly decorated with frescoes and mosaics, the efforts of a local newspaper editor in Gaziantep [1] manage to attract the attention of the international press, and an appeal for Zeugma rapidly circles the globe. The Packard Humanities Institute (PHI), based in California, responds to the appeal, immediately offering the economic and human resources to organize and co-ordinate a rapid action plan with the Turkish Ministry of Culture (TMC).

Due to these funds the CCA Centro di Conservazione Archeologica of Rome was assigned the restoration of 800 m² of mosaic. The present paper describes the conservation and restoration treatment of the mosaics, treatment started in the winter 2001 and now completed.

The facilities

During fall 2000 - funded by PHI under the technical supervision of GAP

(The Great Anatolia Project) - the construction of 2 new laboratories was undertaken at the Museum of Gaziantep and finished in 3 months time. They were designed ad hoc to meet the needs of mosaic and fresco restoration with a minimum disposal of money. One large working area, a temporary storage area, a kitchen, an office and a toilet made up the internal division. A sufficient quantity of natural and artificial light, large passages in all working and storage areas, a well distributed power plug network and in the case of need a forced air-suction system were part of the design.

The two laboratories were divided by a large (4,80 meters) corridor, which was used as open air working area. Right behind the second lab a sandblasting room was constructed which was used for the cleaning of the reverse sides of the mosaics.

Recovery and recognition

In December 2000 almost one month was spent to recover the nearly 700 m² of mosaics removed from Zeugma prior to the PHI project, which were still piled in the museum garden and in the subterranean museum deposit.

During the early stages of the project the underground storage was completely reorganized. The different archaeological collections were divided by material category and stored in different locations, while in the main space of the deposit ready-made iron shelves were installed to be used for the mosaics storage.

The material outside in the museum garden had been covered best as possible with some heavy plastic sheeting, but not protected from frost, moisture from the ground, and - due to the resulting damp conditions under the plastic covering - from microbiological attack (fig. 1). The fragments were transported to the main laboratory and spread on the ground. A first recognition was carried out trying to establish the identity, the number of fragments and the extension of the single mosaics. Once identified they were divided by single pavement and stored in the re-organized storage room.

It became immediately clear that one year storage in open-air conditions had taken its toll on the already compromised conservation conditions of the mosaics. Numerous microbiological attacks had occurred on the materials used to detach the mosaics - glues, canvas covering, and timber panels - making them fragile or weak. In addition the extreme temperature conditions (-5 to +45 °C) had hardened the polyvinyl glues employed resulting in the loss of tesserae, detachment of entire sections of mosaic still in place from the canvas, etc.

Restoration of mosaics removed from the site during the excavations prior to the PHI project

As a premise to the description of operations of restoration of the mosaics from Zeugma we have to say that they have been transmitted to us in a multitude of conditions, both of detachment as of conservation. So it will be easier to depart with the description of the objectives and only successively come to the description of the single operations.

The final result of the treatment is to have the mosaic applied on panels of about 1 m², cut following the composition outlines of the original design. In this way the single panels are easy to move and to store, while when reassembled they restore the integer image of the mosaic floor. The panels are made of a sandwich structure of aluminium honeycomb in between two layers of glass fibre reinforced epoxy resin, covered with a lime based brick powder mortar (*coccipisto*) functioning as a remounting layer for the tesserae.

The succession of the operations can be synthesized as follows:

- Verification of the adherence of the tesserae to the temporary support, which is the canvas covering applied during the removal from site;
- Documentation;
- In the case of need transfer of the tesserae on clay in order to integrate the lacunae caused by the operations of detachment and the lack of adherence of the applied canvas, and successively reapplication of a new cotton gauze covering with colla pasta/wheat flour glue;
- Partial or complete removal of the preparatory layers from the reverse side of the tesserae;
- Application of the single fragments on lightweight sandwich panels;
- Removal of the canvas/cotton gauze covering and integration of sporadic lacunae using original tesserae;
- Mending of the lacunae resulting already existing on site with lime mortar;
- Cleaning of the surfaces;
- Reconstitution of the mortar filling between the tesserae;
- Surface protection.

The first operation is the verification of the adherence of the canvas covering applied during the removal of the mosaic from the site: often it is necessary to apply a temporary layer of clay to the reverse side of the tesserae, remove the old canvas covering and apply a new covering made of a double layer of cotton gauze using colla pasta/wheat flour glue to glue it to the tesserae. This operation while on one side augments the work time necessary, permits to check the conservation condition of the tessellatum and if necessary

to proceed with preliminary operations of restoration. In the case of fragments detached in dimensions excessively big the fragment is subdivided in smaller pieces of dimensions adequate for reapplication.

In the next phase the fragments are turned around and the reverse side of the tessellatum is cleaned from the remaining original mortar, if it results cracked or inconsistent. The objective is to create a levelled, stable surface, ready to receive the mortar of the new setting bed layer. This operation is carried out by hand, using chisels and three different types of pneumatic instruments able to reach different types of finishing. In the majority of cases, as the original mortar is cracked and seriously compromised the cleaning of the reverse sides is continued right down to the level of the tessellatum. Only in rare cases, where the conservation conditions of the mosaic permit it, the cleaning removes just the deeper, preparatory layers (*rudus* and *statumen*) and the layers of armed concrete applied during or after the removal from site, while leaving the original setting bed layer in direct contact with the tesserae untouched. For the removal of the concrete layers diamond enforced cutting blades mounted on electrical angular cutters are used. With these a 5 by 5 cm mesh is cut into the concrete and then the thus created concrete cubes are demolished by hand using chisels or air compression tools. The final passage in the cleaning of the reverse sides is sand blasting at 4 atmospheres using fine abrasive materials.

The methods of application of the mosaic to the panel are of two types, depending on the fact if the original application layer has been removed or not: application from the front (which means the sandwich lightweight panel is prepared on the floor and the tessellatum is applied face up) or from the reverse side (which means that the tessellatum is face down and the sandwich lightweight panel is applied on top). Due to the heavily compromised state of the original mortar the method used in the majority of cases has been the application from the front.

Let's see the technical operations executed to reapply the detached fragments to the sandwich lightweight panels:

- *Preparation of the lightweight panel outlining the dimensions of the single fragments:* once all the fragments are cleaned and ready for application, they are assembled temporarily face down on a single sandwich lightweight panel of the dimensions of the entire mosaic. The lightweight panel is assembled using epoxy resin and glass fibre bolts with which a sufficient number of standard lightweight panels (measuring 146 x 300 cm). The thickness of the panels used is in

dependence of the thickness of the tesserae of the mosaic to apply. Normally lightweight panels of 25,4 mm are used. On this unique panel the outlines of the single fragments are traced, the single fragment number and all references needed for the application. The panel is then divided cutting along the traced outlines with a jig saw.

- *Preparation of the adherence layer for the mortar with gravel and epoxy resin:* the lightweight panels, once cut, receive a layer, which will guarantee the adherence between the panel and the lime-based mortar of the new setting bed for the tesserae. The adherence layer is made of gravel of volcanic mineral earth (pozzolana) glued on the panels with epoxy resin. The gravel of volcanic origin substitutes the traditional stone gravel for a question of overall weight. An experiment carried out using three different gravel types – stone, gravel, expanded clay (LEKA) with small granulometry and volcanic mineral earth gravel – has led to the following results: 30% difference in weight between the stone gravel and the other two materials used. The choice finally fell on the volcanic gravel because it combined the advantages of minor weight, with being easily to provide as of local extraction, together with an excellent adherence function. An analysis of eventual soluble salts resulted negative confirming the suitability of the material.

- *Application of the fragments from the front on lime-based mortar:* the thus prepared panels are ready for application. Following the planning of the succession of the single panels to apply the application starts with the central panel of the mosaic positioned according to its collocation in the mosaic on a timber working table stretched over the floor. Being in direct contact with the floor limits the vibrations during the beating and other work phases. The lightweight panel is framed with stripes of wood and metal fixed to the underlying timber panel layer. The framing stripes are of the same height for the complete mosaic, based on the height of the lightweight panel, the depth of the tesserae and of the mortar necessary. The depth varies from mosaic to mosaic from a minimum of 2,5 to a maximum of 5 cm. At this point the mortar is applied. It is a hydraulic mortar made of the following components:

Mortar for the application from the front and the reverse (measure unit 2 litre):

Parts	Component	Notes
1	Marble powder	Not sieved
1	Volcanic earth (pozzolana)	Not sieved
1	Brick powder	Not sieved
0,5	Hydraulic lime (Lafarge)	-
1	Lime putty	-
3%	Acrylic emulsion (Primal AC33)	Pure

The application of the mortar is carried out with the utmost care to compress and thoroughly work the material with spatula and trowels in order to obtain a very compact layer, neatly applied to the lightweight panel and absent of voids or air bubbles (fig. 2).

- Mounting of the fragments on the panels: the fragments, placed face down, are slightly wetted and then covered with the "buiacca", a liquid mortar with the function to penetrate the spaces in between the tesserae and to function as a connection between the tessellatum and the new setting bed (fig 3).

The "buiacca" has the following composition:

Parts	Component	Notes
1	Marble powder	Not sieved
1	Volcanic earth (pozzolana)	Not sieved
1	Brick powder	Not sieved
0,5	Hydraulic lime (Lafarge)	-
1	Lime putty	-
6%	Acrylic emulsion (Primal AC33)	Pure

The thus prepared fragment is positioned on a compressed wood fibre panel, turned front side up and then posed on the new setting bed. At this point the fragment is pushed into the lime-based mortar with the help of modified, heavy finishing trowels. This operation is repeated until the tessellatum is perfectly aligned with the elements in timber and iron making up the frame prepared for the mounting.

- *Removal of the canvas/cotton gauze covering*: the removal of the canvas applied for the detachment and of the cotton gauze applied after the integration on clay is executed by the creation of a humid chamber obtained through hot water vapour pushed under a polyethylene sheet put on top of the fragment. After about one hour the hot vapour has dissolved the glue to a point, where a gentle removal of the covering is possible; this is followed by a patient, mechanical operation of removing the remains of glue on the mosaic surface (fig. 4).
- *Integration of sporadic lacunae and mending of antique lacunae with mortar*: the troubled history, which these mosaics have passed through from their removal from site, the transport to the museum and their storage there has caused a considerable number of detachment of tesserae, more or less recovered between the single layers of mosaic. These lacunae, normally small but present in great number, have been closed after an accurate documentation using the original tesserae recovered. The lacunae present at the moment of excavation (individuated by the scarce photographic documentation available) have been mended with mortar.

Once the mounting of the first fragment is complete, the process proceeds with the successive ones, mounting about two or three fragments a day. After mounting the last fragment the mosaic is left untouched for about a month giving the mortar the time to set up and harden (figs. 5 - 6).

At the end of the repose for letting try out and set up the mortar the final finishing is carried out: the cleaning of the surface, the reconstitution of the mortar filling between the tesserae and the surface protection.

- *Cleaning*: this operation is carried out using chemical and/or mechanical systems according to the kind of surface deposits present. In the case of carbonized surface deposits cellulose fibre poultices soaked with ammonium carbonate (30 g/l), EDTA (25 g/l) and a detergent (Neodesogen 10 cc/l) are applied. The chemical cleaning is followed by a mechanical finishing using plastic brushes - operated by hand or by an electric, modified, low velocity angular cutter or by a drill driven by compressed air - and scalpels. The water used for scrubbing the surfaces and the successive rinsing is immediately removed together with the dirt and the chemical substances applied by an industrial vacuum cleaner.
- *Reconstitution of the mortar filling between the tesserae*: in the case that the mortar filling between the tesserae has been lost, a new layer of liquid mortar is applied by brush and then, having partly set up,

removed with the help of sponges. These operation can be limited to the zones, where the mortar filling has been effectively lost without being applied on the whole surface of the mosaic.

Mortar for the reconstitution of the filling between the tesserae:

Parts	Component	Notes
1	Marble powder	Sieved
1	Volcanic earth red (pozzolana)	Sieved
1	Volcanic earth black (pozzolana)	Sieved
1	Brick powder	Sieved
All the components are mixed and then jointed with hydraulic lime (Lafarge) in a 1,5 filling: 1 hydraulic lime		

Surface protection: once the mortar applied between the tesserae has set up on the clean surface a protection layer of 1,5% of acrylic resin (Paraloid B72) in acetone is applied by brush.

In the case of floors for which it has been decided to leave a layer of original mortar of the setting bed, part of the mounting process is carried out from the reverse side according to the following procedure:

- *Levelling:* the original setting bed of the mosaic, covered with canvas/cotton gauze and face down, is levelled in order to obtain an even mortar layer of continues depth. If this is not realisable through levelling the original mortar layer the even level is obtained by applying a mortar similar to the one used for the new setting bed, levelling out the reverse side to a uniform depth.
- *Consolidation:* before the application of the lightweight panel the original mortar and the eventual new mortar used to level out the reverse side, are consolidated using acrylic resin emulsion (Primal AC33) until saturation.
- *Application of the lightweight panel:* once the consolidation has been completed and the eventual new mortar has completely dried out and hardened, the lightweight panel is applied – mosaic still face down – using epoxy resin mixed with sieved sand.

Once the epoxy resin has set up, the mosaic complete with its lightweight panel is turned around. Now the mounting of the other eventual fragments proceeds using the method of application from the front with all the other operations just described. It is important to specify that mounting from the

reverse side is applicable only on a single fragment, no matter if this is an entire floor or the central scene of a mosaic, around which then the other fragments of the mosaic are mounted using the method from the front. So while the method from the front allows with a single coherent method to mount an entire floor, the method of mounting from the reverse side has to accept, or the application of the whole floor in a single piece (with all its inherent problems), or the mounting using a mixed technique with the central fragment mounted from the reverse side and all the others mounted from the front.

CONCLUSIONS

A mosaic removed from site is an artefact to which has been imposed an irreversible operation: it has been separated from its original context of appurtenance (site/monument), stripped of some of its original parts (original preparation layers), radiated in its evidences left by time and in its relations with the architectural life, to which it belonged (irregularities in the levels, historic traces).

On these premises, taking into account the radical transformation from architectural-archaeological element into an object stripped of its antiquity in order to assume a new nature, the conservator/restorer has to plan his recovery treatment. The artefact has changed its physical state and hence the guidelines to follow for the conservation treatment have to reflect this change.

The reference points to keep track of are:

- The conservation of the historical and technical data contained;
- The chemical and physical compatibility of the materials used to recreate a setting bed for the tessellatum and the complete reversibility of the treatment;
- The logistic concerns of handling, moving and storing the mosaic in a safe and practical manner;
- The presentation giving the possibility to appreciate the surface as close as possible to their true essence.

These have been the principle constraints we referred to during the project.

We conserved the historical information still present through the documentation: the data, which would have been lost through the operations of removal from site first and restoration after, or the ones which have been lost, have been tracked and archived through all the forms of documentation available (see paper of G. de Felice).

We believe that we have respected the criteria of material compatibility between ancient and restoration materials employed by applying the

tesselatum on a setting bed made of cocciopisto, similar to the original support the mosaics had on site. Reconstructing a layer of lime-based mortar we have reproduced the conditions of chemical and physical interaction between the materials similar to the original ones. This assures the durability in time with the full respect of the ancient materials and reaches the objective of complete reversibility of the treatment and reproduces a visual effect equivalent to the original one.

We believe to have resolved the logistic concerns by applying the mosaics on supports, which are light, rigid, stable, following the outline of the geometric and figurative design of the mosaics themselves, in small fragments in a way that permits to handle them easily without the risk of damage. The relatively low weight of the single fragments will facilitate all operations of storage, transport, assemblage for display and disassembling for eventual maintenance operations.

Finally we believe that we have replied to the necessities of presentation by adopting mimetic cutting lines, which follow the design outlines of the composition. This solution restores once assembled in the final destination a visual unity, which is indispensable for the correct fruition of the mosaic surfaces.

But maybe the element which has characterized more than anything else the restoration treatment of the mosaics from Zeugma, is the complete reversibility of the materials and techniques used and the absolute transparency of the operations carried out thanks to the documentation and to the diffusion of information on the project.

FIGURES



1. Mosaics stored in the Gaziantep Museum garden.



2. Application of mortar on a lightweight panel.



3. The mosaic fragment is set on the fresh mortar.



4. The canvas covering is removed.



5. The second panel is fit to the first one.



6. The final panel is being prepared with buiacca.

LIVIA ALBERTI *, CETTY MUSCOLINO **

**THE CONSERVATION OF THE MOSAICS OF SAN VITALE
IN RAVENNA, ITALY, 1989-1999:
CONSTRUCTION TECHNIQUE AND TREATMENT METHODOLOGY**

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SUMMARY

The conservation of the wall mosaics of the church of San Vitale in Ravenna was carried out by the same team of conservators from 1988 to 1999. The project brought a much better knowledge of the mosaics through the study of the original materials used and the construction techniques. While some of the initial treatment practices were continued throughout the project, others evolved and were reconsidered in the light of the initial results of the treatments and of the theoretical and technical developments in the field of conservation.

RÉSUMÉ

La restauration de mosaïques pariétales de l'église de San Vitale à Ravenne a été effectuée par la même équipe de conservateurs-restaurateurs de 1988 à 1999. Le projet a apporté une bien meilleure connaissance des mosaïques à travers l'étude des matériaux originels utilisés et des techniques de construction. Certains types de traitements mis au point initialement ont été conservés pendant tout le projet, alors que d'autres ont évolué et ont été reconsidérés au vue des premiers résultats et pour prendre en compte l'évolution théorique et technique du domaine de la conservation.

The conservation of the 6th-century wall mosaics located in the presbytery and in the apse of the church of San Vitale in Ravenna was carried

out over a ten year period under the supervision of the Soprintendenza per i Beni Architettonici di Ravenna. The total surface area of the mosaics, excluding the presbytery vault which was not treated, is approximately 400 square meters and consists of a variety of different materials (glass, marble, limestone, ceramic, mother of pearl) used to obtain an extremely rich palette of colours. The importance of this project stems from the significance and authenticity of the work of art, and from both the quantity of information obtained through the study and documentation of the mosaics, and from the development of the intervention methodology over the years.

A. CONSTRUCTION TECHNIQUE

An important component of the conservation project was the collection of information which increases our knowledge of both the materials used and the order in which images were executed, and which has also implications for the dating of the mosaics (Muscolino-Alberti 2001).

Tessellatum

The examination of the tessellatum revealed that a large variety of materials and colours were used for the execution of the mosaic.

The location of the different kinds of materials was documented graphically.

In the apse, where the earliest mosaics are found, only glass paste tesserae (including those with silver and gold leaf of the best quality) and mother-of-pearl tesserae were used, with the exception of the small areas added later in the Justinian panel, which use also second quality gold and stone tesserae, and some details in the two columns of the three-arch window which are made with ceramic tesserae. In the presbytery, no mother-of-pearl tesserae were found, but limestone, marble and ceramic were also used to make tesserae, in addition to another type of lower quality gold leaf tesserae.

A particular type of tesserae was also found principally in the apse, and to a lesser extent in the presbytery, made by cutting discs from white glass cylinders of different diameters. These small discs, sometimes divided into four parts, were rarely found in the mosaics and their use decreased as the work proceeded (fig. 1).

The study of the tessellatum also brought about the discovery of the particular method used to insert the mother-of-pearl discs. Since they were too thin to be used alone as tesserae, so another material was applied on the reverse side to increase their thickness. This mixture of organic materials was probably applied to the back of the tesserae with a spatula, while it was still soft

and adhesive. Once the paste had hardened, the mother-of-pearl discs could then be imbedded in the fresh lime.

Justinian panel

The study of the Justinian panel has provided some important information: the head of the Emperor, which is original, was however made *in situ* when the rest of the panel had already been finished for some time. This was done perhaps in substitution of an older, less satisfying version, or because it was carried out after the arrival of an official portrait of the emperor. The four figures on the right of Justinian also were added *in situ* to the already completed mosaic later, probably to replace the portraits of officials that were no longer important to represent. During this last original revision, that concluded the work, some of the tesserae materials used, namely white and pink stones for the faces, and the second quality of gold tesserae for the background, were otherwise only found in the presbytery, the last major phase of the work (figs. 2 and 3).

Construction phases

A key element in understanding the construction process of the mosaics, from a purely technical point of view, was the investigation of the joins in the bedding layer, and the anomalies in the *tessellatum*.

The preparatory mortar layers were studied and were found to be the same throughout the whole decorative cycle.

Detailed observation showed that the artists could keep the lime bedding layer fresh for a considerable amount of time, probably due to the environmental conditions existing inside the church and to the fact that the bedding layer was composed of pure lime putty with no aggregates which speed up the setting time.

In fact, joins resulting from fresh bedding layer mortar being applied next to an already set area, were only found along two major divisions of the surfaces: the vertical separation between apse and presbytery, and a horizontal division running along the walls of the whole presbytery and of the entrance arch, at the base of the openings of the gallery. These two divisions separate the three major construction phases, which probably do not correspond to a change in the mosaic workshop, but rather reflect a considerable length of time having passed between one phase and the next (fig. 4).

Within each of these three phases, more subtle divisions can be seen, generally corresponding to the borders between different subjects of the decoration (fig. 4). In these cases, the join between two bedding mortars is

much less detectable as the first mortar was still soft when the tesserae were inserted in the second mortar in an area adjacent to the seam, resulting in their normal, close and straight positioning. At San Vitale, it seems that the size of a "giornata", here corresponding to a single mortar application but several days of work, was determined not by the time necessary to complete a section of the mosaics, but by the need to accommodate the complete figures or panels of the preparatory painting, which were executed all at one time in fresco technique. In fact no synopia, as a design guide, was ever found on the lime and straw preparatory layer below the bedding layer.

Concerning the organization of the worksite, the examination of the *tessellatum*, especially in areas of repetitive decorative details and elements, showed that different artists worked on the same bedding area at the same time, as some elements are executed in different ways, using slightly different colours. These "changes of hands" were detected rather regularly at certain heights and are thought to correspond to the floors of the scaffolding (fig. 4).

Summary of construction chronology

Our investigations indicate the following construction phases:

- The work probably started on the half dome of the apse where Bishop Ecclesius, known to have started the construction of the basilica, is represented as the person presenting the model of the church;

- The decoration was then applied on the walls of the apse where the two large historical panels are located. They contain the representation of the Byzantine court and of other persons whose heads were later substituted;

- The work proceeded with the presbytery vault, and then down along the walls where it stopped for some length of time at the base of the windows of the gallery. Perhaps at this time the scaffolding set on the brackets of the gallery was taken down, and a new scaffolding was built from the floor;

- The work was completed with the lower part of the presbytery and with the revision of the four figures on the right side in the Justinian panel, including the insertion of Massimianus as the bishop that dedicated the basilica.

All the mosaics were probably executed between 540-550 AD (Andreescu-Treadgold 1997).

B. CONSERVATION TREATMENT

The intervention methodology was initially defined during the first campaign (Alberti-Tomeucci 1990) when the entrance arch to the presbytery was conserved, and it was presented at the 1990 ICCM conference in Palencia (Alberti-Tomeucci 1994). The methodology proved to remain largely valid in

the following years, however parts of it were modified to respond to the different needs presented by new surfaces, and also more generally to reduce the use of organic products, to increase the use of lime-based mixes, and to keep the interventions to a minimum.

Cleaning

After a detailed study of all the mortar repairs and fills carried out during previous restorations, it was decided to remove them all, with the exception of re-integrations carried out with tesserae, and the large pictorial re-integrations. Substances deposited or applied to the surface, such as dust and dirt, smudges of tempera colours, glues, and all the small and medium mortar fillings and mortars covering the tesserae around the large painted in-fillings, were removed in order to expose all the original mosaic surfaces and bring back their brightness. Removal of surface dirt deposits was carried out using an ammonium carbonate solution, applied with compresses of paper pulp over "Kleenex" paper tissues, which were left in place on average for 20-45 minutes, or very short periods of time over "Kleenex" only, in the case of slightly soiled surfaces. In the last phase of the project (1996-1999), ammonium bicarbonate was substituted, preferred for its milder action and less basic pH.

To complete the cleaning of tesserae as well as to remove previous mortar repairs which hid a very large number of tesserae, a careful mechanical cleaning of the tesserae surfaces was then carried out using scalpels, small chisels and glass fibre pencils.

In areas where the glass paste showed fractures associated with soluble salt efflorescences, cleaning with distilled water was performed to remove the salts from the tesserae, and to prepare the glass for the consolidation treatment.

Surface consolidation

Overall, the surface condition of the mosaics was found to be fragile and tesserae made of almost all the types of materials were found to have deteriorated in at least some areas. Consolidation treatments were only applied to degraded materials, and not across the whole mosaic surface.

Consolidation of the metallic leaf tesserae was carried out both before and during cleaning, using the acrylic resin Paraloid B72 (Rohm & Haas), at 4% solution in acetone for re-adhesion of the cartelline before cleaning, in the case of almost all the silver leaf tesserae. A more concentrated solution was used during cleaning in the case of reattachment of the cartelline of some of the gold leaf tesserae.

After cleaning, several of the glass paste tesserae exhibited micro fractures

due to crystallization cycles of soluble salts (Fiori-Donati 1990), and had a whitened appearance due to the fractures that disrupted the refractive properties of the tesserae.

These were consolidated one by one with BS44 (Wacker Chemie), a mixture of silanes and siloxanes with a low percentage of organic component. This served to improve the cohesion of the glass, saturate the colours of the tesserae by filling the micro-fractures that had produced the "whitening" effect, and should prevent further deterioration of the tesserae from the solubilization of their most soluble components, by impeding water penetration.

The choice of both Paraloid B72 for re-adhesion of the cartelline and of BS44 were made during the first campaign and their use was maintained throughout the project. Unfortunately BS44 is no longer available commercially, and the substitute proposed by Wacker Chemie, BS1702, requires further testing.

On the other hand, the treatment methodology for the consolidation of disaggregating marble tesserae was modified over the length of the project, from the use of an acryl-silicon resin (a mixture of Dri-Film 104 (GE) and Paraloid B72), to use of the ethyl silicate -OH (Wacker Chemie).

Likewise, on reassessment of the condition of the limestone tesserae, early consolidation with the acryl-silicon resin was discontinued altogether, as it was judged that the deterioration was no longer active. These changes in treatment methodology reflect a more general change in approach to conservation treatments in recent years towards minimum intervention and use of inorganic materials.

Re-adhesion of loose tesserae

In many areas, the bedding layer of the mosaics was no longer able to hold the tesserae and consequently consolidation treatment was also carried out on it. Every single tessera was touched, and all the moving or completely detached ones were marked.

The detached tesserae were re-bedded using a hydraulic mortar, while the moving ones were re-adhered with an acrylic resin emulsion, a 30% solution in water of Primal AC33 (Rohm & Haas).

At the beginning of the project acrylic resin 360 HV (Lascaux) was also used to reset tesserae before being substituted by a hydraulic mortar. However to re-adhere the moving tesserae, regretfully no alternative method to the use of Primal AC33 was found over the years. Consequently the use of the acrylic resin emulsion, a material very different from the original bedding layer, which also might make the surface somewhat impermeable, has been continued in the

most controlled and limited way possible.

Scientific research should be carried out to identify a better material for re-establishing the cohesion of the mortar bedding and to find a mainly inorganic material, vapour permeable, having both good consolidating and good adhesive power. Lime-based products possess a good number of the required characteristics for such surface treatment, but they present the difficulty of controlling the subsequent surface whitening. Products such as ethyl silicates in aqueous phase, for example Syton X30 (Dupont), were not in use in the field at the time, but might give good results in cases like this.

Grouting of mortar layers

Since the beginning of the project, detached mortar layers were consolidated and re-adhered to the walls with proprietary hydraulic grouts, which changed over time due to new product developments. Self-made grout formulations, often satisfactory to fill detachment voids, were not used because they could not be made fluid enough to penetrate into the widespread thin cracks.

In the case of wide detachments on non-vertical surfaces, threaded ceramic pins designed by CNR of Faenza for this purpose (Fiori 1989) were inserted and grout injected to anchor the mortar layers to the vaults.

Reintegration

The question of how to reintegrate lacunae, and more generally how to present the work, led to much debate before a final agreement could be reached.

The reintegration method that was chosen is a response to this specific work of art that required a complex and detailed work of unification. For both aesthetic and conservation reasons it was decided not to leave the lacunae empty, but to follow more the line of the many previous reintegration interventions on the mosaics by reconstructing the missing parts. The reintegration method developed therefore aimed at giving the appearance of an irregular, articulated mosaic surface, which removed the visual distraction of the lacuna while being recognizable at close range and easily reversible. A binder-rich mortar was applied and modelled with moulds and spatulas and painted with the same colours and tones of the tesserae, including the gold and silver ones. Early on, this was done with water colours protected with a thin coat of Paraloid B72 and later on using fresco technique.

The most difficult reintegrations at San Vitale, mainly the largest ones or the ones involving partial reconstruction of faces, were all carried out only

after completion of a preliminary study recording the traces of preparatory painting and bedding mortar edges remaining on the bedding layer. This was done to produce a graphic reconstruction of the missing tesserae, which was then used as the guide for reintegration.

Only in two cases did faces need reintegration, and for each a different choice was made: for St. Matthew Evangelist's face in the scene with the angel, the lacuna was consolidated but not reintegrated, and it remains the only lacuna unfilled in San Vitale; Massimianus's face, treated during the last campaign, was reintegrated using the method of moulded mortar (figs. 5 and 6). Several reasons prompted this second choice: the figure was closer to the public view, the lacuna was easier to treat, being a frontal representation, and finally the conservators had acquired greater ability after years of experience.

For the chromatic integration of the gold leaf tesserae, which were usually treated with colours only, in the Historical Panels they were recreated with the application of gold leaf on moulded mortar, then toned down and protected with a thin coat of Paraloid B72 mixed with pigment. This was done owing to the importance of the golden luminosity in the area and the closeness to the viewer.

The theoretical problem of whether it is proper or not to restore the golden and silver effect to the original deteriorated tesserae, has been sporadically debated, but not yet sufficiently discussed to consider carrying out this type of intervention. At San Vitale, where the cartelline and the gold or silver leaves were lost but the glass paste remained, it was decided not to intervene, even if, especially in the frames and silver halos, the loss of the metal leaf leads to a loss of light and colour which has an important impact on the reading of the decoration.

However, re-gilding was done exceptionally in one area previously reintegrated in the nineteenth century, by Felice Kibel, using new gold leaf tesserae. There, the loss of the gold leaves left exposed the bright red tesserae bases from the nineteenth century. This colour made the decorative scheme unreadable, and consequently, the red glass tesserae bases were re-gilded.

CONCLUSION

The work presented here was concluded four years ago. This presentation provides a good opportunity to summarize, consider and draw lessons from ten years of work. Unfortunately, the work on the mosaics of San Vitale is not completed, as the mosaics of the vault of the presbytery are yet to be studied and conserved. This final area, which consists of a key mosaic surface at the junction between the apse and the presbytery, could provide opportunities to

better understand the construction process of the whole mosaic decoration, and to revise the knowledge of the presbytery walls.

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FIGURES



1. The Empress Theodora after restoration; the circular white tesserae are made from white glass cylinders of different diameters, the same material cut into four parts is used for the face; the darker circular tesserae are made of mother-of-pearl.



2. The Emperor Justinian after restoration; due to a different orientation of the gold tesserae, the join between the two phases of execution of the panel and of the head is visible inside the halo.



Original mosaic



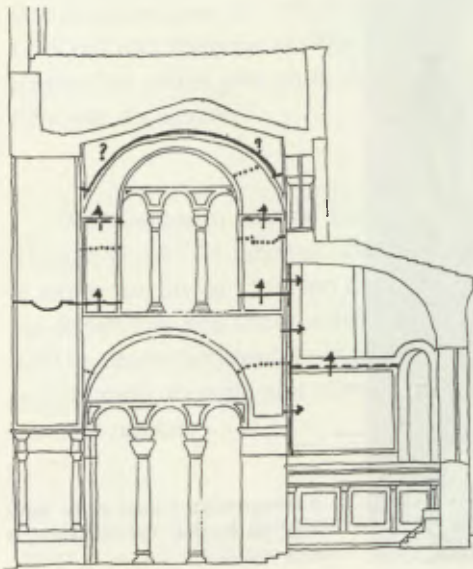
Later mosaic reintegration

Area detached and relaid



Join in the original bedding layer

3. The two original sections of mosaic of the Justinian panel that have been added later to the already completed mosaic.



BASILICA OF SAN VITALE



Main joints in the bedding layer, "phases"



Joints in the bedding layer between different subjects of the decoration, "giornate"



Levels of anomalies in the tessellatum, "changes of hands"

4. Graphic documentation of bedding mortar joints, and "changes of hands" in the tessellatum.



5. Massimianus's head in the Justinian panel; moulded mortar reintegration during the operation.



6. Massimianus's head in the Justinian panel; after the reintegration intervention.

LUCREZIA UNGARO, MASSIMO VITTI

**IL RESTAURO DEI MOSAICI GEOMETRICI
DEI MERCATI DI TRAIANO A ROMA***

SUMMARY

The restoration of the geometric mosaics decorating the eleven tabernae of the Grande Emiciclo at the Trajan's Markets in Rome permitted to suggest that the black and white mosaics do not date back to the age of Trajan. They were made at the beginning of the 3rd century A.C. and were part of a wider restoration project of the Trajan's Markets carried out during the Severian age.

RÉSUMÉ

La restauration des mosaïques géométriques qui décorent les onze tabernae du Grande Emiciclo aux Marchés de Trajan à Rome a permis d'établir que les mosaïques en noir et blanc ne remontent pas à l'époque de Trajan. Elles ont été réalisées au début du troisième siècle après J.C. et elles faisaient partie d'un projet plus vaste de restauration des Marchés de Trajan pendant l'époque des Sévères.

Nel cosiddetto Grande Emiciclo, allo stesso livello di quello del *Forum Traiani*, vi sono 11 tabernae, ciascuna dotata di un ingresso che si apre verso la strada che divide i Mercati dal Foro di Traiano (fig. 1). Queste tabernae, le cui dimensioni non sono perfettamente uguali ma oscillano intorno ai 3,35 x 2,20 m, erano pavimentate in mosaici geometrici in bianco e nero, mentre le pareti erano decorate con affreschi in secondo stile, attualmente anch'essi in corso di restauro.

* L'argomento è frutto di studi congiunti; in particolare la prima parte è opera di Massimo Vitti, mentre la seconda di Lucrezia Ungaro.

I vani in questione vennero scoperti in occasione dei lavori condotti da Corrado Ricci negli anni compresi tra il 1926 e il 1934; da quell'epoca non sono stati condotti restauri sistematici, ma si è intervenuto con restauri estensivi e globali sulle pavimentazioni musive soltanto nell'ambito dei lavori giubilari del 2000.

Le *tabernae* erano pavimentate con tessere bianche di palombino e nere di selce, delle dimensioni di 1,5-1,7 cm, posizionate in modo da definire disegni geometrici. Sebbene i mosaici non si conservino completamente, le porzioni pervenute permettono di ricostruire il motivo decorativo di ciascun ambiente.

Per quanto concerne il degrado dei pavimenti musivi, tutte le superfici apparivano molto sporche e presentavano un deposito superficiale; alcune zone erano particolarmente fessurate ed esfoliate, e limitatamente ad alcuni casi si è potuta notare la formazione di una crosta calcarea molto dura concentrata nelle zone accanto alle pareti. Il manto musivo era in alcuni punti distaccato dallo strato d'allettamento, particolarmente sui bordi (fig. 2).

In tutti gli ambienti risultano presenti alcune integrazioni ad opera di precedenti restauri eseguiti con tessere antiche. Si è constatato che i diversi tipi di integrazione sono sempre riconoscibili e sono evidenziati, in alcuni casi, da una profilatura con lamina in piombo e in altri semplicemente dal diverso colore della malta.

In particolare per alcune *tabernae* sono state osservate le seguenti situazioni:

1. Sulla superficie del pavimento musivo della *taberna* 1 abbiamo rilevato alcune parti "ingrignite", forse traccia di esposizione della superficie lapidea al fuoco.
2. Nella *taberna* 2 si è evidenziata un'integrazione eseguita sicuramente con tessere antiche, ma che non segue il disegno originario e risulta ad un livello superiore rispetto alle tessere originarie.
3. Infine la *taberna* 8 presentava una problematica tutta particolare a causa della presenza di una forte risalita di acqua dalla pavimentazione e dalla parete di fondo del vano. Tale condizione ambientale ha compromesso lo stato di conservazione del mosaico esistente, formando una patina biologica omogenea e compatta che non permette per ora l'identificazione del motivo geometrico. Le infiltrazioni d'acqua hanno determinato e favorito la crescita di piante infestanti anche tra le tessere e la malta d'allettamento (fig. 3). Per questo motivo si è deciso, durante la campagna di restauri, di limitare l'intervento alla pulizia superficiale e al trattamento intensivo, sia della superficie, sia del sottofondo, con opportuni biocidi.

In generale lo stato di conservazione della malta d'allettamento, attualmente a faccia a vista per via della mancanza del tappeto musivo, non era particolarmente degradato se non in alcune zone concentrate lungo le soglie e sui bordi, tanto da conservare ancora le impronte delle tessere sulla malta. Ove la malta di allettamento si è deteriorata risulta visibile lo strato di malta di sottofondo, che si trova ad una quota molto più bassa del piano di calpestio originale. Questa situazione ha creato delle grosse cavità, che hanno dato luogo a depositi di varia natura, favorendo il degrado della malta e la crescita di piante infestanti.

La prima operazione di restauro effettuata sul pavimento musivo è stata quella di rimuovere con scope di saggina tutto il deposito (terriccio, foglie, escrementi animali, ecc.) facendo attenzione a non procurare ulteriori perdite di materiale musivo, particolarmente decoeso sui bordi. Si è proceduto quindi ad un consolidamento delle tessere dei bordi, eliminando la vecchia stuccatura di cemento e ricollocando le tessere distaccate dal sito originario con malta idraulica (calce, pozzolana e sabbia) e Primal AC33. Inoltre si è provveduto a consolidare la malta tra le tessere tramite imbibizione di Primal AC33 diluito al 5% in acqua (fig. 4). Successivamente si è proceduto al lavaggio del pavimento musivo con acqua, seguito da impacchi di polpa di cellulosa imbibita con una soluzione di carbonato d'ammonio ed E.D.T.A., nell'intento di riportare la superficie lapidea ad un maggiore livello di leggibilità, nel rispetto, però, della patina originaria delle pavimentazioni (fig. 5). Dove maggiore risultava il distacco tra il mosaico e lo strato d'allettamento, l'intervento è consistito nell'apertura di piccoli fori con trapano a mano tra gli interstizi più larghi delle tessere e iniezione con piccole siringhe di PLM-SM, una malta specifica da iniezione, per raggiungere e riempire i vuoti tra le tessere e la malta. Per ovviare alla esfoliazione e alla fessurazione delle tessere si è provveduto al loro consolidamento tramite l'applicazione a pennello di silicato di etile. Il trattamento finale delle superfici lapidee dei mosaici è consistito nell'applicazione a pennello di Paraloid B72 disciolto in 3% di acetone come protettivo.

Per la risarcitura degli strati di malta d'allettamento è stato deciso di colmare le zone dove era in vista il sottofondo, senza ricoprire lo strato di allettamento ancora integro, in modo da permettere la leggibilità di quelle parti ove era ancora presente l'impronta delle tessere musive. Come fase preliminare, lo strato d'allettamento è stato consolidato mediante applicazione di Primal AC33 diluito in 5% di acqua, prestando particolare attenzione alle zone che conservano le impronte delle tessere. Per il riempimento delle cavità si è proceduto alla preparazione di un primo strato

di sottofondo realizzato con malta (calce idraulica, pozzolana, sabbia) insieme a cocciopesto di granulometria 2/3 cm. Successivamente, dopo che la malta si era asciugata, si è effettuato il riempimento finale di tutte le superfici con un impasto di malta e graniglia di cocciopesto fino a 1 cm di granulometria portandosi così al livello dello strato d'allettamento originario. Al fine di ottenere l'uniformità di colorazione con la parte originale si è deciso di aggiungere, nell'ultimo strato della malta, dell'inerte ricavato frantumando la malta dello strato originario precedentemente rimossa perché decorsa. Si è cercato di rendere più unitaria possibile la presentazione finale, ma è comunque distinguibile la malta d'integrazione da quella preesistente.

Per quanto concerne la *taberna* 8, l'intervento di restauro è in programmazione per il 2003 in quanto l'acqua di risalita presente nell'ambiente è inspiegabilmente e repentinamente scomparsa. Per cui, sebbene si fosse pensato in un primo momento di procedere all'asporto del mosaico e successivamente di alletterlo su un pannello di aerolam, si è ritenuto metodologicamente più corretto, vista la nuova situazione ambientale, provvedere al restauro conservativo sul posto ed eventualmente intervenire di nuovo qualora si ripresentassero i fenomeni di risalita dell'acqua.

Massimo Vitti

L'intervento di restauro ha prodotto anche notevoli risultati scientifici che sono stati presentati dettagliatamente al VII convegno AISCOM svoltosi a Firenze nel 2001 (Ungaro-Vitti 2001). Si ritiene comunque utile riproporli sinotticamente in questa sede in modo da completare il quadro dell'intervento di restauro condotto sui mosaici delle 11 *tabernae* del Grande Emiciclo.

La conclusione scientifica più rilevante è stata la constatazione che i mosaici geometrici non sono contestuali alla fabbrica dei Mercati di Traiano, cioè gli inizi del II sec. d.C., come finora ritenuto prima dalla Blake (Blake 1936) e successivamente dalla Morricone (Morricone 1967). Tale deduzione deriva dall'analisi di diversi dati:

1. Nella *taberna* 6, al di sotto dell'attuale pavimentazione musiva, sono stati riscontrati i resti di un altro mosaico geometrico documentato anche nel corso della campagna di rilievo 1985-1987 (fig. 6).
2. Le dimensioni di tutte le tessere oscillano tra 1,5 e 2,5 cm, superando quindi la misura di 1 cm, usuale nei mosaici del I e gli inizi del II sec. d.C. a Roma.
3. La resa dei motivi geometrici non è accurata: si notano disuguaglianze metriche nella resa di ogni singolo elemento geometrico.
4. Infine la relazione stratigrafica tra alcuni tappeti musivi e gli affreschi

che decorano le *tabernae* indica che i mosaici sono successivi all'epoca di Traiano perché contestuali alla seconda stesura degli affreschi.

Si ritiene quindi che i mosaici possano essere datati al III sec. d.C., più precisamente all'età dei Severi, sia perché sono in fase con il secondo strato di intonacatura eseguita agli inizi del III sec. d.C. (Ungaro 1993, p. 191), sia perché le caratteristiche tecniche si confanno maggiormente alla datazione proposta. Infine, per quanto riguarda il motivo decorativo, sebbene i confronti più stringenti siano con i mosaici della *Domus Tiberiana* databili agli inizi del I sec. d.C., il motivo di squadre e quadrati della *taberna* 2 perdura anche nel III sec. d.C., come attesta il confronto con il mosaico della Caupona del Pavone ad Ostia (Becatti 1961, p. 176, n. 325, tav. XXXVI). Si può quindi dedurre che i mosaici geometrici dei Mercati di Traiano vennero probabilmente realizzati agli inizi del III sec. d.C. riprendendo forse solo in parte i motivi dei sottostanti mosaici. Tali interventi si inseriscono in un programma di restauro più generale sui Mercati di Traiano realizzato agli inizi del III sec. d.C. ad opera di un *procurator fori traiani*, a seguito di un incendio (Pani 1995).

Per concludere, vorremmo infine ricordare gli interventi di restauro che sono stati eseguiti recentemente sulla pavimentazione musiva monocroma del Piccolo Emiciclo (fig. 7). Tale pavimentazione presenta la particolarità di essere stata messa in opera su di uno spesso strato di cocchiopesto, a sua volta allettato su di un piano in opera spiccata. Come abbiamo già rilevato in altra sede, tale particolarità costruttiva non deve riferirsi a due fasi pavimentali distinte ma costituisce una soluzione tecnica finalizzata alla perfetta impermeabilizzazione delle superfici scoperte dei Mercati di Traiano, il cui uso è attestato anche nella villa di Adriano a Tivoli (Ungaro-Vitti 2001, pp. 404-405). I restauri hanno permesso inoltre di rilevare, contrariamente a quanto si era ritenuto in un primo momento (Ungaro-Vitti 2001, pp. 400 e 405), che non vi sono due livelli pavimentali musivi. Si tratta, infatti, di un unico livello pavimentale realizzato, però, con tessere di grandi dimensioni (alt. almeno 3-4 cm), fuori dall'usuale, che testimoniano ancora una volta l'impiego di materiali di prima qualità e sovradimensionati all'interno del cantiere traiano.

Lucrezia Ungaro

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FIGURE



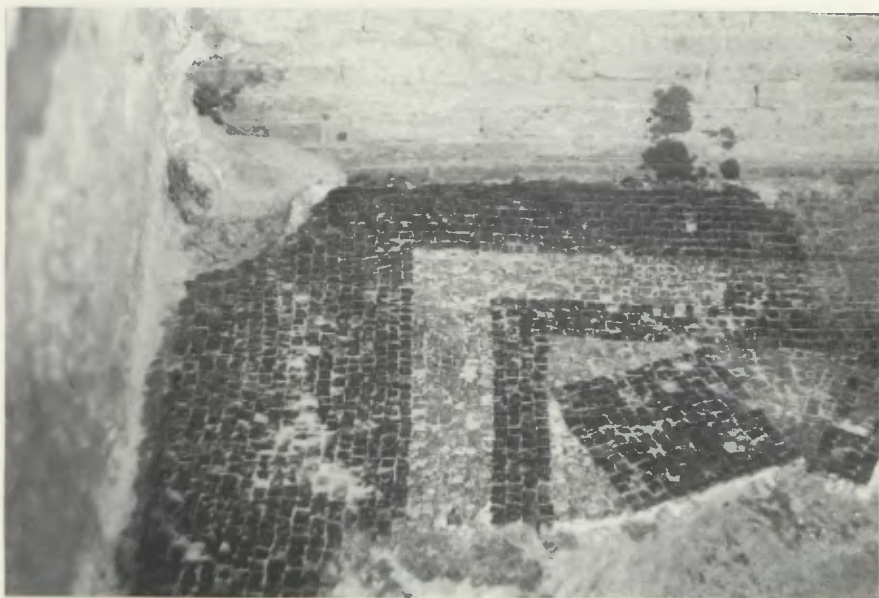
1. Panoramica generale del Grande Emiciclo con le *tabernae* in cui sono conservati i mosaici (M. Vitti).



2. Particolare delle concrezioni in calcaree nella *taberna* 1 (Archivio Mercati di Traiano).



3. Lo stato di conservazione del mosaico della *taberna* 8 nel 2002 con evidenti fenomeni di risalita d'acqua (M. Vitti).



4. Consolidamento della malta tra le tessere della *taberna* 6 con PRIMAL AC 33
(Archivio fotografico Mercati di Traiano).



5. Impacchi di carbonato di ammonio e EDTA sul mosaico della *taberna* 2
(Archivio fotografico Mercati di Traiano).



6. Tracce di una pavimentazione musiva sottostante all'attuale mosaico nella *taberna* 5 (Archivio fotografico Mercati di Traiano).



7. La pavimentazione musiva nell'area del Piccolo Emiciclo intorno alla volta dell'Aula di Testata Nord (M. Vitti).

ARJA KARIVIERI*

**FLOOR MOSAICS IN THE EARLY CHRISTIAN BASILICA IN ARETHOUSA:
CONSERVATION, MAINTENANCE AND PRESENTATION**

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SUMMARY

This paper presents the conservation of the mosaic and opus sectile pavements in the Early Christian basilica in Arethousa, Paliambela, in Central Macedonia that has been executed between the years 2000 and 2003, as well as a future plan for the conservation, maintenance and the future treatment of the pavements and the site based on the information received during the field work between 2000 and 2003. Different aspects concerning the iconography, preservation, and consolidation of the pavements are discussed.

RÉSUMÉ

Cet article présente la conservation des mosaïques et des revêtements de sol en opus sectile dans la basilique chrétienne à Arethousa, Paliambela, dans la Macédoine centrale qui a été exécuté entre les années 2000 et 2003, aussi bien qu'un futur plan pour la conservation, le maintien et le futur traitement des revêtements de sol et de l'emplacement basés sur l'information reçue pendant les travaux sur le terrain 2000-2003. Des différents aspects au sujet de l'iconographie, de la conservation, et de la consolidation des revêtements de sol sont également discutés.

This paper presents the conservation of the *opus sectile* and mosaic pavements in the Early Christian basilica in Arethousa, Paliambela, in Central Macedonia which has been done between the years 2000 and 2003, as well as a future plan for the conservation, maintenance and the future treatment of these

pavements and the site based on information gained during the field work between 2000 and 2003.

I wish to take the opportunity to express my warmest thanks to the 9th Byzantine Ephoreia and Professor Charalambos Bakirtzis, the Ephor of Byzantine Antiquities in Thessaloniki, conservators Nikos Pitsalides, Johanna Kangas, Athanasia Spyridou, Nikos Benos-Palmer, Savvas Vatidis, Maria Fallia and Riikka Kõngäs, the local people and our workers in Arethousa and Vrasna, our excavation staff, archaeologists, field assistants, and volunteers who have participated in the field project between the years 1999 and 2003, as well as the directors of the Finnish Institute at Athens, Prof. Olli Salomies and Dr. Leena Pietilä-Castrén, the staff and the board of the Finnish Institute at Athens, the Finnish Cultural Foundation and the Niilo Helander Foundation for all their generous help and support during these years.

The site was found in 1994 while preparing a new forestry road. The main part of the church in Arethousa was excavated in 1994 and 1995 by the Classical Ephoreia under the direction of Polyxeni Adam-Veleni (Adam-Veleni 1998). When the central and southern aisles of the church were excavated, *opus sectile* panels and geometric mosaics were found in the main nave and rich figurative mosaics with peacocks, deers, fishes and birds were revealed in the narthex (fig. 1). The mosaics were photographed and general plans were drawn before the floors were covered with a layer of sand mixed with earth.

The Finnish Institute at Athens has continued excavations and conservation work in the Paliambela locality in Arethousa between 1999 and 2003 under my direction (see further: Karivieri 2001; Karivieri 2002; Karivieri 2003; Blackman 2001) (fig. 2). The excavation has been concentrated in the area south-west and north-west of the church, as well as in the northern part of the church, to reveal the over-all plan of the building. Another aim of the project has been to document and consolidate the pavements and walls which had been found since 1994, and to make a future plan for the conservation, preservation and the maintenance of the site in co-operation with the 9th Byzantine Ephoreia, the International Committee for the Conservation of the Mosaics, and the Greek Ministry of Culture.

The first phase for the conservation of the pavements started in 2000, when the floor mosaics and *opus sectile* panels found in 1994-1995 were cleaned and documented. A preliminary conservation and consolidation has been made continuously during four field seasons. The conservation has been financed in 2000 and 2001 by the Niilo Helander Foundation, in 2002 and 2003 by the Finnish Cultural Foundation.

The apse and the choir of the church are decorated with *opus sectile*

panels, the rest of the main aisle with four panels made of rough pieces of marble, the narthex with *opus tessellatum* floors (fig. 1), and the room south of the eastern part of the narthex with a floor consisting of an *opus tessellatum* emblema surrounded by irregular slabs of schist-stone, terracotta, and marble (figs. 2 and 3). The *opus sectile* floors are largely destroyed in the eastern part of the apse and the choir. The preserved *opus sectile* pavement in the apse consists of hexagonal slabs of marble divided by triangular pieces of dark local schist-stone and larger slabs of marble. The preserved part of the *opus sectile* pavement in the choir has been divided into smaller units. In the southern corner, smaller rectangles of marbles surrounded by triangles of local dark schist-stone alternate with large square slabs. A similar composition can be seen, for example, in the central plan church in Amphipolis. East and north of this panel large white marble slabs are surrounded by a row of narrow slabs of schist-stone (fig. 1).

The main nave of the church was decorated with geometric mosaic panels made of coarse pieces of marble, local black schist-stone and spolia from inscriptions, surrounded by large marble slabs (fig. 1). The northernmost two panels had central circular medaillons in *opus tessellatum*. The eastern panel has a red six-petalled rosette in the centre, and the western panel included a crater surrounded by a laurel wreath. Unfortunately, the western medaillon was stolen already during the first excavation in 1994. The south-western mosaic panel, with a large lozenge in the centre, was partly destroyed by a bulldozer in 1994 while levelling the terrace for a dirt road, when the ruins were revealed. The south-eastern panel has a square set on edge and a circle. These four panels were surrounded by rows of large rectangular slabs of white marble.

The centre of the narthex in the church was embellished with a figurative mosaic floor in *opus tessellatum* (fig. 1), depicting two peacocks on either side of a fountain, surrounded by a network of hexagons filled with fishes and birds, symbolizing the fauna of water and air, as well as vegetal motifs and, in one case, figs. The terrestrial life is symbolized by a dog and another running animal. The peacock medaillon is framed by a two-strand guilloche and surrounded on both sides by a network of nine intersecting octagons, consisting of four elongated hexagons and a central square filled with a square set on edge and a small rectangle. The outer corners and edges of the network have triangles, and in the four corners of the peacock medaillon additional hexagons are filled with one fish, a circle and two heart-shaped leaves. The size of the network with octagons at the western side of the medaillon had been miscalculated and the hexagon in the central octagon flanking the medaillon had been reduced while the animal motif had been replaced by a geometricized

floral motif. The central panel with the octagon network is surrounded by a three-strand guilloche and a vine pattern flanked by birds. The two main entrances to the central room, in the north-west and south-west are marked by an acanthus motif flanked by two birds.

The floor mosaic in the north-western room of the narthex, by the entrance, represents two deers flanking a cantharos in the central rectangular emblema (fig. 1). A vine growing from the cantharos is decorated with three birds and five bunches of grapes. This emblema is surrounded by a broad braid and an ivy tendril border. The north-eastern room of the narthex was decorated with a geometric pattern of red circles, surrounded by a wave pattern and an ivy tendril border. The previously unknown north-eastern part of the geometric mosaic floor in the north-eastern room of the narthex was uncovered in 2001 (cf. figs. 1 and 3).

A new mosaic floor with a completely new design was revealed in 2002 in the entrance of the north aisle, adjacent to the room with the geometric mosaic (fig. 3). It has a central emblema with a vase and a surrounding geometricized border in *opus tessellatum*, surrounded by irregular schist-stone, terracotta and marble slabs, with tesserae as filling in the *lacunae* between these slabs.

In situ conservation has been chosen as the method of conservation in Paliambela instead of the detachment of the floor mosaics, since it is the best possible method to maintain all the historical evidence visible on the mosaic surface. Traditional materials and techniques of conservation were used during conservation. Since traces from previous times can be seen on the surface of the mosaic pavements in Paliambela, this historical evidence visible on the mosaic surface has been maintained in accordance with conservation norms. The layers that make up a floor have been saved, as far as possible. The interventions have been kept to a minimum: priority has been given to those methods and materials, and those interventions which can ascertain the future preservation of the mosaics in a best possible way.

The preserved pavements in the church were cleaned, photographed and their condition was documented in 2000, when the refilling of the year 1995 had been removed. The practical work was directed by conservator Nikos Pitsalides from the 9th Byzantine Ephoreia and the documentation report was written by Johanna Kangas. The *opus sectile* and mosaic panels in the main aisle and the choir were drawn in scale 1:20, and these drawings were utilized for the condition report. For this first documentation, the mosaic panels were numbered from 1 to 9, starting from the apse (fig. 2).

The main problem in the *opus sectile* panels of the apse and the choir is the loss of consistency and adhesion of one or more of the preparatory layers. This has happened at various levels, from the deepest foundation layers to the

uppermost surface layers where the marble slabs are set. The preserved *opus sectile* panels were treated, because it could otherwise be a problem for later preservation, and a preliminary consolidation was made. The south-eastern area of the central nave has lost its *opus sectile* floor, only the bedding being partly visible.

The preliminary consolidation of the *opus sectile* panels, and the cleaning and consolidation of the *opus tessellatum* mosaics in the narthex was made in 2000. Pavements were reinforced with lime-based mortar (4 parts of sand, 2 parts of lime and 1.5 parts of black cement). The cracks and the hollows were wetted with a sponge and cleaned, all loose material, roots and plants were removed by using wooden sticks, spatulas and scalpels. Then the mortar was put in the hollow or the crack until the hollow was filled slightly over the floor surface, tamping the mortar continuously to fill the hollow completely. When the mortar had dried out, the surfaces were smoothed with a sponge, the remains of mortar and dirt on the surface were removed, and finally the mosaic was cleaned with water and soft brushes.

The *opus sectile* panel in the apse, nr. 1, was drawn in scale 1:1 and a pre-consolidation was made. The marble pieces were loose, since the underlying mortar has mostly disappeared and it has been replaced by earth. The preserved part of the floor and its borders were consolidated. The *opus sectile* floor, nr. 2, in the western part of the choir had similar problems as the floor nr. 1. The original mortar had partly disappeared and it had been replaced by earth, which caused lacking cohesion for part of the slabs. Another problem is the cracking of the large marble slabs flanking the mosaic panels in the whole main nave, as well as flaking of the local schist-stone which has been used in the floors of the church. Plants and roots had caused part of the damage, by moving the slabs and changing the height of individual pieces. A preliminary treatment was given to this *opus sectile* floor, and it was refilled. This pavement was uncovered August 2002 in order to make a more accurate documentation of the panels and a conservation plan for the year 2003 for a consolidation of the pavement.

A new consolidation of the *opus sectile* floor nr. 2 was made in June 2003 by conservators Savvas Vatidis and Maria Fallia with the help of conservator Riikka Kõngäs who made the drawing in scale 1:1. The new consolidation was started by removing the protective layer, cleaning, and documenting the condition of the pavement after the intervention of the year 2000: the condition of both the modern and ancient mortar was checked. Mortar samples were made with different combinations of lime, sand, white cement, and brick powder; for the new interventions, a mortar consisting of 4 parts of sand, 2

parts of lime, 1.5 white cement, and some black and ochra for the colour was chosen, to be compatible with the mortar used in 2000. This combination was chosen not to create tension between the mortars of different interventions. In the southern part of the *opus sectile* floor, nr. 2A, the schist-stone triangles that lie higher up were raised, the mortar of 2000 was removed mechanically, and new mortar was added before the triangle was put back in the original position (fig. 4). Schist-stone triangles that were found lying loose in the surrounding area, south of the apse and above the walls, were put in the place of missing triangles around the square slabs in nr. 2A in order to make the design more complete. The gaps in the mortar bedding surrounding the *opus sectile* were filled and the edges were finished. The schist-stone slabs and small marble pièces in the western edge of the pavement were raised and a new attachment was made for a fragmentary square slab of white marble (fig. 4).

The bedding of the *opus sectile* pavement in the eastern part of the choir, where the original pavement is missing, was cleaned, photographed and drawn in scale 1:20 in 2003, as nr. 11 (fig. 5).

The deer mosaic in the south-western part of the narthex (figs. 1 and 2), nr. 7, sinks from the north-eastern side to south-west, which had caused new damage after the excavations of 1994-1995, when heavy rains in the sloping terrace caused finer material to move to the lowest part of the narthex: the *lacuna* in the central part of the western side had become larger, and tesserae had lost cohesion when the mortar bedding was damaged. The mosaic floor and the border of the large *lacuna* were consolidated in 2000.

The condition of the peacock mosaic (figs. 1 and 2), nr. 8, in the central room of the narthex seems to be quite stable: in comparison with the photos from 1994 and 1995, no significant changes could be noticed. The only problematic parts are the edges of the mosaic in the entrances. A new part of the mosaic was found in the entrance to the room with the deer mosaic, having a vine border. It seems that earthquakes have caused large furrows through the room, and minor cracks in the same direction. These cracks were cleaned and filled with mortar, when the whole mosaic was consolidated in 2000.

In 2000, it took two days to refill the paved area with pure sand and plastic sheets, and the work was supervised by conservator Nikos Pitsalides. The filling was begun by first spreading a layer of pure sand above the mosaics, then a plastic sheet above the first sand layer and a new layer of sand. Another plastic sheet was placed on the second sand layer, and it was covered with a third layer of sand. The height of the filling was ca. 20-30 cm.

In 2001, conservator Athanasia Spyridou documented in scale 1:1 the central medaillon with peacocks in the narthex, some of the surrounding

hexagons with animal figures, and the deer emblema in the lateral room. She checked the consolidation of the previous year, and repaired the damages caused by roots. Heavy raining had caused some damage in the western part of the deer mosaic, which is located on the lowest level of the terrace. Some tesserae had lost their cohesion and a new consolidation was made. The area was refilled with pure sand and plastic sheets, as in 2000. The height of the new filling was ca. 30-40 cm.

The partly excavated geometric mosaic in the eastern room of the narthex (fig. 1), nr. 9, had some cracking and minor roots, which were treated and the mosaic was partly consolidated in 2000. The consolidation of the mosaic was finished in 2003 (fig. 3). The floor was uncovered, and the cleaning and cutting of the roots was begun from the southern part of the mosaic. The cracks were filled with a red mortar consisting of 3 parts of sand, 0.5 white cement, 2 parts of brick powder, 1 part of marble powder and 1 part of lime. The roots in the south-western part of this floor go very deep below the floor level, and there is also a depression with cracking: the roots were cut and petrol injected to the remaining part of the root, and the cracks were filled with mortar. After drawing and photographic documentation, the floor was covered again.

Conservator Athanasia Spyridou continued the conservation work in 2001 during a three-week period. The condition of the large panel with coarse pieces in the central nave, nr. 5 (figs. 1 and 2), was documented after the re-filling of the year 2000 had been removed. All damage produced during the winter period was noted. Initial cleaning was done using soft brushes. Detached tesserae were cleaned and consolidation was done by attaching the tesserae to their original places after the supporting layer was repaired and the *lacunae* filled with mortar. The mortar consisted of 2 parts of lime, 0.5 part of white cement, 6 parts of white sand, some crossed ceramics and water.

Consolidation was carried out following these steps: hollows were located, cleaned out, the roots were removed mechanically and petrol was injected in the thicker roots to prevent their growth, the mortar was introduced, and the access points were closed. This was followed by cleaning. This new surface consolidation was carried out especially where the parts had lost their cohesion or materials were detached and loose tesserae were re-set. Materials are compatible with the old ones and the chosen colour matches especially the rosette medaillon, i.e. the mortar is salmon-coloured, lighter than the dark red colour in the central rosette. The next phase was the treatment of borders, treatment of *lacunae*, such as the large lacuna in the western border of the panel, and then the final revision phase. The central medaillon with a six petalled rosette in *opus tessellatum* was drawn in scale 1:1. The different phases

of the conservation work were documented with photos.

Athanasia Spyridou and Nikos Benos-Palmer executed the consolidation of panels nrs. 3, 4 and 6 (figs. 1 and 2) in 2002, following the same method as used for the panel nr. 5: removing the sand filling above the mosaics, documenting the condition of the mosaics, cleaning the mosaics mechanically, removing loose material, roots and plants, filling the hollows with mortar, closing the access points, cleaning the surface, drawing and taking photographs, refilling the area, and documenting the procedure.

The most problematic of these panels was nr. 6, which was partially damaged already in 1995, when the central emblema was stolen. The consolidation of the floor required more time than the others, since the panel had several *lacunae* and two deep, crossing furrows, probably caused by an earthquake.

Part of a new mosaic floor (fig. 3), nr. 10, was found in 2001 and it was revealed in 2002. A preliminary cleaning, documentation, drawing and photographic documentation was made in 2002. This floor has a central emblema with a vase and a surrounding, geometricized border in *opus tessellatum*, surrounded by irregular schist-stone, terracotta and marble slabs, with tesserae as filling in the *lacunae* between these slabs. The size of the floor is 2.28 m (NW-SE) x 3.75 m (NE-SW). The largest roots on the surface were removed and others injected with petrol, before covering the pavement with a protective layer of sand.

A conservation plan was made last winter for a consolidation mosaic nr. 10, which was carried out in June-July 2003 (fig. 3). When the protective layer had been removed, the pavement was cleaned mechanically, roots cut, and petrol injected to the roots below the floor level. Mortar for the consolidation of nr. 10 was chosen, similar to the one used for the consolidation of mosaic nr. 9, consisting of 3 parts of sand, 0.5 white cement, 2 parts of brick powder, 1 part of marble powder and 1 part of lime. The *lacunae* and cracks were filled, loose tesserae attached, the edge of the northern border was set. A layer of secondary, red mortar on the surface of the eastern part of the *opus tessellatum* mosaic was left *in situ* as a piece of evidence for the mosaic's ancient history. In the south-eastern corner of the mosaic, a cover tile was left on the spot where it had fallen down when the roof of the church collapsed. The cover tile had caused considerable damage to the *opus tessellatum* mosaic; the area surrounding the tile was cleaned, cracks and *lacunae* filled with mortar, and the loose tesserae were attached (fig. 3: lower right corner). The central part of the mosaic nr. 10 with *opus tessellatum* was documented by drawing in scale 1:1 and the details were photographed.

The remains of the walls attached to the mosaic pavements are in fairly

good condition, so generally they will not cause additional problems for the preservation of the mosaics. The only part which is more sensitive, is the wall nearest to the mosaics nrs. 5 and 10 (cf. fig. 2), since the wall is inclining in its upper part towards the main nave and the mosaic nr. 5 (fig. 6: wall structure to the left). Some consolidation of the masonry has already been executed. The walls of the southern aisle were made higher to protect the ruins and the mosaics in the main nave (fig. 6: right). The hollow made by the bull-dozer in the western part of the main nave was refilled to support the adjacent wall and the mosaics. A preliminary treatment of the walls with a traditional method was made in 2002 to increase the cohesion of the structure. The consolidation and the restoration of the walls is being planned for the year 2004 in cooperation with the 9th Byzantine Ephoreia.

Protection, either permanent or temporary, depends on future maintenance plans. The site has been open to the public during the field work, and after the refilling of the ruins with a thick layer of sand, the site is accessible, but surrounded by a fence (fig. 6). A maintenance plan can be made in the future by training local people to control the preservation and condition of the site, building a protective shelter for the mosaics and the ruins. It must be emphasized that the whole site needs maintenance. The geographical and topographical position outside the village of Arethousa, the climate, possibility of surveillance and other factors should be considered. Exposing and displaying the mosaics and their surroundings would be the best solution, but the regular care-taking of the site should be guaranteed. When the site is protected and the long-time preservation of the site ascertained, the site will be available for future studies, and for the public.

A protective roof or shelter will protect mosaics from the weather and also allow them to be easily seen. The new roof should be designed so that it does not have an adverse aesthetic impact on the site. When the basilica area is displayed and protected with a shelter or roof, this solution should be seasonally adjusted. One solution could be that the mosaics could be open for the public during the summer season, from June/July to August/September, which is the high season for tourist activities in the area. The mosaic floors could then be covered after the summer season, in September, and will thus be protected throughout the winter, as the winter season in northern Greece can be fairly rough: the temperature can fall below zero and the average temperature in January and February is about 5 degrees Celsius. The basilica area should be covered carefully for the winter-time under the guidance of the conservators, in order to protect the pavements and other surrounding structures.

The second protective measure which is suggested is water drainage. The

site is situated on a sloping terrace of the mountain. Rainwater will need to be drained away from the mosaic pavements and away from the basilica area. A third protective measure is to close the traffic on the dirt road north of the basilica, to protect both the basilica and the surrounding archaeological area against the effects of traffic and the carekeeping of the road that can cause serious damage to the wall constructions, mosaics, and the structures that are still lying under surface in the surrounding area.

The educational principle of informing the public about the on-going excavations and on-site conservation should be noted. This has been done for example by allowing access to visitors to the site, but still not allowing them into the basilica area. When the mosaics are open for the public in July and August, the site will need a guard and it can only be open for the public during day-time. Setting up information boards about the site, which will contain explanations about the on-going procedures, will also be a way to inform local people and tourists. A web-site will be made about the project, where the conservation treatments could be presented. This will inform also those who cannot visit the site physically.

The best solution for the suggested protective shelter of the mosaic floors will be planned and built following the recommendations and wishes of the 9th Byzantine Ephoreia, the International Committee for the Conservation of Mosaics, and the local authorities.

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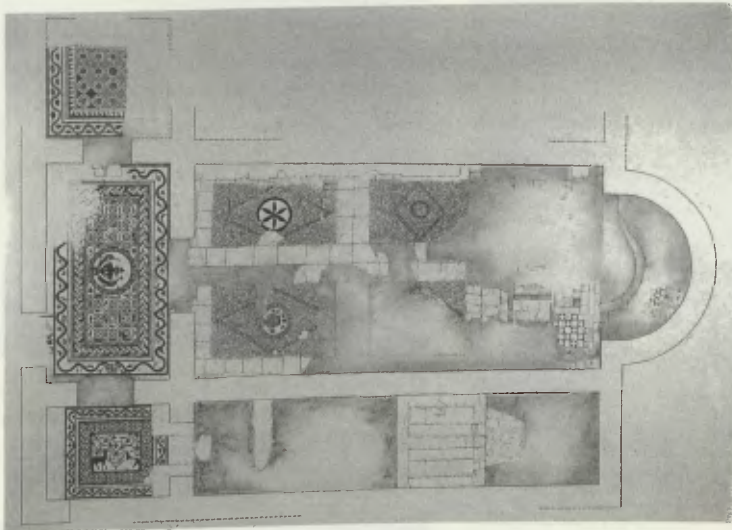
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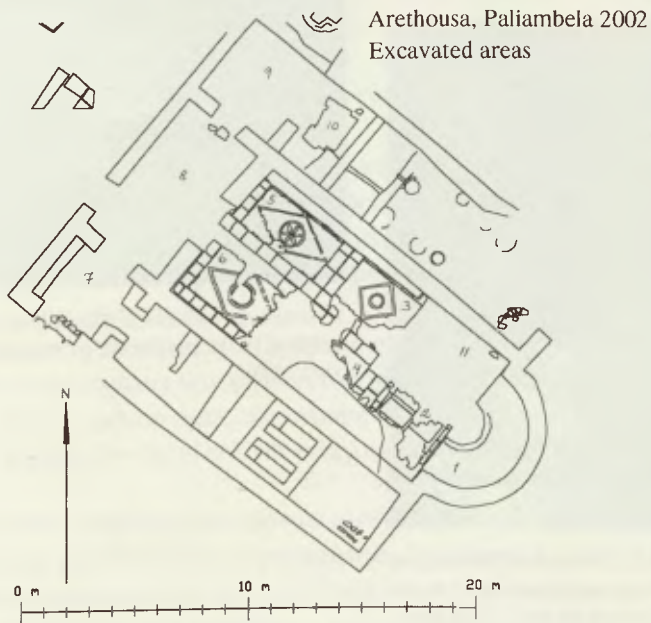
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FIGURES



1. Arethousa, Paliambela, general plan with mosaics and opus sectile pavements after the first excavations (Adam-Veleni 1998, fig. 2).



2. Arethousa, Paliambela 2002, situation plan (Carita Tulkki 2002), with pavement nrs 1-11.



3. Arethousa, Paliambela. Mosaic pavements nrs. 9 and 10 after consolidation, from south-east (Photo: Arja Karivieri 2003).



5. Arethousa, Paliambela. The bedding of the opus sectile pavement in the eastern part of the choir, from south-west. (Photo: Arja Karivieri 2003).



4. Arethousa, Paliambela. The opus sectile pavement in the choir after the new consolidation, from south-east. (Photo: Arja Karivieri 2003).



6. Arethousa, Paliambela. The main nave and the narthex after the re-filling of the pavements, from north-west. (Photo: Arja Karivieri 2003).

DEMETRIOS CHRYSOPOULOS, ELISAVET ANAMATEROU

**ΕΠΑΝΑΤΟΠΟΘΕΤΗΣΗ ΨΗΦΙΔΩΤΟΥ *IN SITU* ΜΕ ΤΗ ΜΕΘΟΔΟΛΟΓΙΑ
ΤΩΝ ΦΟΡΗΤΩΝ ΚΑΤΑΣΚΕΥΩΝ ΣΕ ΟΠΛΙΣΜΕΝΟ ΚΟΝΙΑΜΑ**

Τη δεκαετία του '60 δύο γεγονότα κρίθηκαν σημαντικά για τη συντήρηση των ψηφιδωτών στην Ελλάδα: η κατάργηση του τιμιεντοκονιάματος και η τοποθέτηση των ψηφιδωτών σε φορητές κατασκευές από αλουμίνιο από τον Ι. Κολέφα. Η εξέλιξη της τεχνολογίας τα επόμενα 20 χρόνια, η παραγωγή νέων υλικών, οι δυσκολίες στην κατασκευή των φορητών πλαισίων, καθώς και οι νέες δεοντολογίες που άρχισαν να εμφανίζονται σταδιακά στη συντήρηση, ανάγκασαν τους συντηρητές να στραφούν σε πιο συμβατές μεθόδους ως προς τις επεμβάσεις και τις μεθόδους κατασκευής των ψηφιδωτών. Βάσει των δεδομένων αυτών και με την εξέλιξη της επιστήμης της συντήρησης άρχισε η έρευνα, η συνεργασία με ιδρύματα – εργαστήρια, καθώς και η οργάνωση σεμιναρίων επιμόρφωσης για την εφαρμογή των νέων μεθόδων.

Βασικός στόχος και προϋπόθεση ήταν να προσεχθεί ιδιαίτερα α) η αισθητική εικόνα των ψηφιδωτών, β) η διατήρηση των ιστορικών τους στοιχείων, όταν αυτό ήταν εφικτό (προσχέδια, στρώμα ψηφοθέτησης κτλ), γ) η απόλυτη εφαρμογή των τεμαχίων μεταξύ τους και δ) η αντοχή και αποτελεσματικότητα των κατασκευών.

Οι αντιδράσεις τα τελευταία 15 χρόνια σχετικά με την αισθητική αποκατάσταση και παρουσίαση των ψηφιδωτών ήταν αρκετά έντονες και δικαιολογημένες. Στην παρούσα όμως περίπτωση η αισθητική παρουσίαση αφορά τη γενική εικόνα του έργου και την εύκολη πρόσβαση του παρατηρητή σε αυτό.

Έτσι το 1990, μετά από δύο χρόνων έρευνα, αποφασίστηκε η κατάργηση των πλαισίων αλουμινίου και εφαρμόστηκε (Χρυσόπουλος 1994) η χρήση οπλισμένου κονιάματος με πλέγματα ανοξείδωτα που κυκλοφορούν στο εμπόριο. Τα πλέγματα αυτά διατίθενται σε διαφορετικά μεγέθη κενών και διαμετρήματος.

Κατασκευή τελάρων αλουμινίου με την παλαιά μέθοδο

Η διαδικασία συντήρησης ψηφιδωτού τεμαχίου

Η αλουμινένια κατασκευή, στην οποία δένεται ανοξείδωτο πλέγμα, ακολουθεί το σχήμα και τις διαστάσεις του τεμαχίου. Προηγείται στρώμα κονιάματος πάχους 1 εκ., τοποθετείται το ανοξείδωτο πλέγμα μαζί με την κατασκευή αλουμινίου και απλώνεται δεύτερο στρώμα κονιάματος, ώστε να καλυφθεί.

Η κατασκευή του πλαισίου παρουσίαζε αρκετά προβλήματα λόγω της αδυναμίας του αλουμινίου να καμφθεί ώστε να ακολουθήσει ακριβώς τις περιμετρικές λεπτομέρειες του τεμαχίου, ιδιαίτερα όταν ο τεμαχισμός του ψηφιδωτού συμπεριλάμβανε πολύπλοκα σχήματα.

Θα θέλαμε να προσθέσουμε ότι λόγω της δυσκολίας του πλαισίου να ακολουθήσει το σχήμα του τεμαχίου, συνήθως το πλαίσιο τετραγωνιζόταν για περισσότερη ασφάλεια, όταν υπήρχαν μεμονωμένα σπαράγματα που δεν εφάπτονταν μεταξύ τους, προσδίδοντας έτσι στο έργο και στον θεατή αντιαισθητική εικόνα. Ένα ακόμα μειονέκτημα της μεθόδου ήταν ότι στα σημεία κοπής του μετάλλου καταστρεφόταν η ανοδίωση, με αποτέλεσμα ο ασβέστης που περιέχεται στα κονιάματα να το διαβρώνει.

Νέα μέθοδος

Φορητές κατασκευές με ανοξείδωτο πλέγμα

Η κατασκευή γίνεται ως εξής:

Περικλείουμε περιμετρικά το ψηφιδωτό με φύλλο μολύβδου πάχους 1 χιλ. και πλάτους 4 εκ. Εμποτίζουμε καλά με νερό την πίσω πλευρά των τεμαχίων (σε περίπτωση διατήρησης του αρχαίου κονιάματος) μέχρι να κορεστεί από νερό και προσθέτουμε κονίαμα. Στα 2 εκ. κονιάματος περίπου πάνω από τις ψηφίδες τοποθετούμε το πλέγμα που έχει κοπεί, ακολουθώντας τις διαστάσεις και το σχήμα του τεμαχίου. Στη συνέχεια προσθέτουμε το υπόλοιπο κονίαμα.

Το πλέγμα που συνήθως χρησιμοποιούμε είναι διαμέτρου 1,2 χιλ. και τα διάκενά του 1,2 εκ. x 1,2 εκ. ή 1 εκ. x 2 εκ. Το πλάτος του μολύβδου που περικλείει το τεμάχιο αποφασίστηκε να είναι 4 εκ. για δύο λόγους: 1) αισθητικά είναι πιο αποδεκτό διότι δίνει την αίσθηση της ύπαρξης του στρώματος ψηφοθήτησης (supra nucleous) και του υποστρώματος (nucleus) και 2) το κονίαμα έχει τις απαραίτητες φυσικομηχανικές αντοχές και μικρότερο βάρος. Στην περίπτωση που αφαιρείται το αρχαίο κονίαμα τελείως, μπορούμε να ελαττώσουμε το πάχος του κονιάματος σε 3 εκ., ώστε να έχουμε λιγότερο βάρος.

Μολονότι η κατασκευή είναι ελαφρύτερη, οι μηχανικές αντοχές είναι μεγάλες.

Η νέα μέθοδος είναι πολύ πιο απλή, βασίζεται στις ίδιες αρχές της μηχανικής που αφορά γενικά τα σπλισμένα κονιάματα, παρέχει την απόλυτη εφαρμογή των τεμαχίων μεταξύ τους και τα ανοξείδωτα πλέγματα που χρησιμοποιούνται δεν προσβάλλονται από τον ασβέστη.

Εφαρμογή της μεθόδου σε ψηφιδωτό δάπεδο

Όταν πρόκειται για ενιαία ψηφιδωτή επιφάνεια δαπέδου και όχι για σπαράγματα, η διαδικασία που ακολουθείται είναι η εξής: αφού ολοκληρωθεί ο καθαρισμός της πίσω πλευράς, γίνεται συναρμολόγηση των τεμαχίων και πριν "ριχτεί" το κονίαμα, τοποθετείται μεταξύ τους φύλλο χαλκού, ώστε να έχουν την καλύτερη δυνατή εφαρμογή μεταξύ τους. Το φύλλο χαλκού χρησιμοποιείται στις εσωτερικές ενώσεις επειδή είναι εύπλαστο και λεπτό, ενώ περιμετρικά τα τεμάχια περικλείονται με φύλλο μολύβδου.

Μετά από δύο ημέρες αφαιρούνται τα φύλλα μολύβδου (περιμετρικά) και χαλκού (εσωτερικές ενώσεις) και σε δέκα ημέρες τα τεμάχια γυρίζονται από την κανονική τους όψη, ώστε να αφαιρεθούν τα υφάσματα και να καθαριστεί η επιφάνεια από κόλλες και οποιεσδήποτε άλλες μεταβολές παρουσιάζει η επιφάνειά τους.

Το κονίαμα που χρησιμοποιούμε στην κατασκευή των φορητών ψηφιδωτών είναι αρκετά ανθεκτικό σε αντίξοες συνθήκες με πολύ καλές φυσικομηχανικές αντοχές και αντιδράσεις, έχει πλαστικότητα και είναι συγχρόνως αντιστρέψιμο. Χρησιμοποιείται στη συντήρηση των ψηφιδωτών δαπέδου από το 1977 με άριστα αποτελέσματα και συμπεριφορά. Περιέχει άμμο λατομείου, ψημένη άργιλο σε τρίμματα και σκόνη, θηραϊκή γη και ασβέστη.

Επανατοποθέτηση *in situ*

Στην επανατοποθέτηση *in situ* ή σε εκθεσιακό χώρο τα τεμάχια συναρμολογούνται πολύ εύκολα, ιδιαίτερα όταν δεν έχουν αφαιρεθεί αρμοί όπως και στην προκειμένη περίπτωση. Η μέθοδος επανατοποθέτησης είναι απλή και εύκολη και ακολουθείται η εξής διαδικασία:

Εφόσον έχει ολοκληρωθεί η ανακατασκευή των υποστρωμάτων της υποδομής που θα δεχθούν το ψηφιδωτό, απλώνουμε άμμο πάχους 3 εκ. περίπου και αποθέτουμε τα τεμάχια σε αυτήν, ώστε να εξαλειφθούν οι τυχόν μικροανωμαλίες του τελευταίου στρώματος. Συναρμολογούμε και κλείνουμε τους αρμούς.

Η μεθοδολογία αυτή θεωρείται ιδανική σε περίπτωση ύπαρξης προγενέστερου ψηφιδωτού, όπως στη συγκεκριμένη περίπτωση, όπου ένα από τα τεμάχια της επιλογής μας κρίθηκε ιστορικά αναγκαίο να μην επανατοποθετηθεί, αφήνοντας έτσι ορατή την κατώτερη φάση. Με τον τρόπο αυτό επίσης

γίνεται εύκολη η μεμονωμένη μεταφορά των τεμαχίων σε εκθεσιακό ή εργαστηριακό χώρο.

ΣΥΜΠΕΡΑΣΜΑΤΑ

Συνοψίζοντας βλέπουμε ότι:

1. Με τη μέθοδο αυτή τηρείται η Χάρτα της Βενετίας σχετικά με τα υλικά και την αντιστρεψιμότητά τους.
2. Αποδίδεται καλύτερα η γενική και η ιστορική εικόνα του ψηφιδωτού.
3. Γίνεται πιο σωστή αισθητική αποκατάσταση, παρουσίαση.
4. Η διαδικασία κατασκευής είναι πιο απλή.
5. Περιορίζεται ο χρόνος κατασκευής.
6. Και το κυριότερο: δεν εφαρμόζονται τοξικά υλικά επικίνδυνα για την ανθρώπινη υγεία.

Στα επιπλέον πλεονεκτήματα μπορούμε επίσης να προσθέσουμε:

- A. Την απόλυτη εφαρμογή των τεμαχίων μεταξύ τους.
- B. Τη μη κάλυψη με κονίαμα του προγενέστερου ψηφιδωτού για την τοποθέτηση των τεμαχίων.
- Γ. Δυνατότητα ένα από τα τεμάχια της επιλογής μας να μην επανατοποθετηθεί, για να είναι ορατή η προγενέστερη φάση.

Τελειώνοντας θα ήθελα να προσθέσω ότι αν τα τεμάχια δεν εφάπτονται μεταξύ τους και βρεθούν σε διάσπαρτα σπαράγματα, μπορούμε να αφήσουμε περιμετρικά 2 εκ. κονίαμα, βελτιώνοντας έτσι την γενική εικόνα του έργου και προφυλάσσοντας συγχρόνως τα τεμάχια από πιθανά κτυπήματα και απώλειες ψηφίδων στις παρυφές του.

Το ψηφιδωτό της σημερινής παρουσίασης που χρονολογείται τον 2ο μ.Χ. αι. επανατοποθετήθηκε στο Πραιτώριο, στον αρχαιολογικό χώρο της αρχαίας Γόρτυνας στην Κρήτη.

ΒΙΒΛΙΟΓΡΑΦΙΑ

Χρυσόπουλος 1994: Δ. Χρυσόπουλος, Το ψηφιδωτό, Αθήνα 1994, σ. 105.

ΕΙΚΟΝΕΣ

ΠΑΛΑΙΑ ΜΕΘΟΔΟΣ

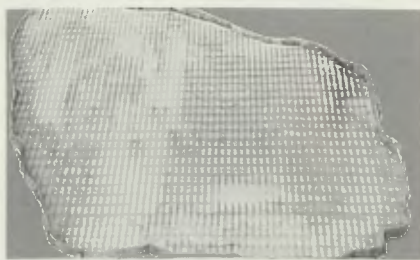


Πλαίσιο με αλουμινοκατασκευή. Πλήρωση πίσω πλευράς με κονίαμα.

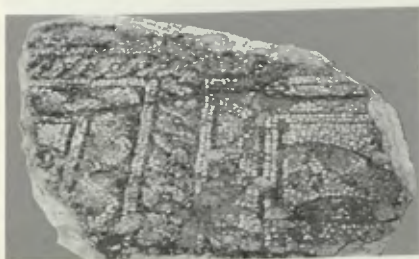
ΦΟΡΗΤΕΣ ΚΑΤΑΣΚΕΥΕΣ ΜΕ ΑΝΟΞΕΙΔΩΤΟ ΠΛΕΓΜΑ



Εφαρμογή τελικού στρώματος κονιάματος.



Εφαρμογή ανοξείδωτου πλέγματος.



Μετά την ολοκλήρωση των εργασιών
συντήρησης.



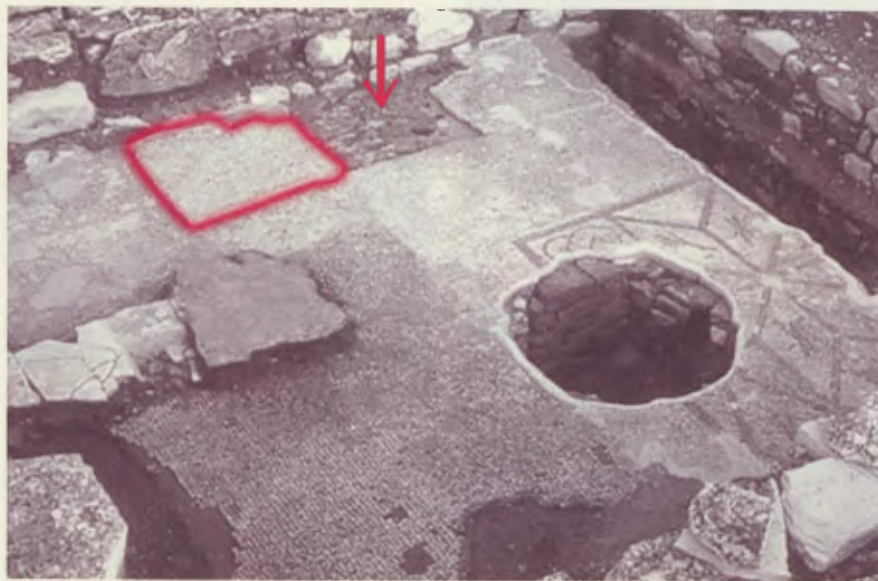
Μεθοδολογία επανατοποθέτησης “εν ξηρώ”.



Προγενέστερη φάση



Τεμάχιο επιλογής



Τελική φάση επανατοποθέτησης *in situ*.

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**ANALYTICAL AND MICROSCOPIC TECHNIQUES FOR THE STUDY
OF MORTARS FROM THE FLOOR MOSAICS OF THEBES, GREECE.**

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SUMMARY

This project focuses on the contribution of the microscopic techniques in the study of archaeological mosaics. Although mortars were usually neglected in the study of mosaics, their valuable contribution to the archaeological research has been recently acknowledged as a necessary part of the archaeological and conservation research. The information gained provides an important archaeological, historical, and technological contribution to our understanding of the subject.

RÉSUMÉ

Ce projet est axe sur la contribution des techniques microscopiques utilisées pour l'étude des mosaïques archéologiques. Bien que les mortiers soient d'habitude négligés dans l'étude des mosaïques, il a récemment été reconnu que l'étude de ce matériel forme un élément essentiel de la recherche dans les domaines de l'archéologie et de la conservation. Les informations ainsi obtenues sont une contribution importante pour améliorer les recherches archéologiques, historiques et techniques en vue d'une meilleure compréhension du sujet en question.

INTRODUCTION

Mosaics are considered to be among the most durable types of decorative art that have survived from the antiquity. They appear first in the Greek world in the form of pavements using natural pebbles set in a layer of mortar. The most familiar form, composed of small near cubic pieces of stone (known as tesserae) set into mortar, was developed in Hellenistic period between the third and second centuries BC (Dunbabin 1999: 1).

Their appearance, however, varies enormously, ranging from plain monochrome floors through simple black and white designs, to the most elaborate of polychrome geometric patterns, floral and vegetal motifs, and to figured scenes. These, in turn, range from simple designs to highly ambitious narrative compositions (Ling 1998: 13).

Despite the changes that followed the development of mosaic patterns through ages, the basic structural character of mosaics and the technical method of laying them remained almost the same, with only minor changes through the centuries. The main changes concerned the type of materials used and the technology applied for the constructions of mosaics through ages.

Archaeological mosaics are composite structures, involving artistic, archaeological, historical, architectural and technological issues, which their systematic study, as an art with its own special characteristics, is something relatively new and it is dated since the 1960s (Dunbabin 1999: 3, Michaelidis 2001: 8).

Today, it is well recognized that mosaics should always be studied regarding their initial function, which is closely linked to their architectural context, as an essential constituent of the buildings. Mosaics should always be connected to the building/monument where they have been laid, as well as to their architectural form and function. For example, floor mosaics, despite their artistic patterns, serve a practical function, which is to provide a durable,

smooth surface to be walked on and therefore, their performance characteristics are very important issues.

Although mortars were usually neglected in the study of mosaics, their valuable contribution to the archaeological research has been recently acknowledged (Puertas et al. 1994, Schafer and Hilsdorf 1993). The study of original mortars is a necessary part of the conservation research as it provides a wide range of information concerning their characterization and classification, raw materials used, physicochemical properties, the estimation of their preservation condition, as well as the development and selection of new conservation mortars. Moreover, the elaboration of the technological parameters of mortars may contribute to their dating.

One of the main questions on mosaic and mortars' technology is related to the type of mosaic mortars found, their raw materials and their proportions within the original mortar mixtures. The answer to the above questions helps to the classification of excavated mosaics and provides all necessary information for the production of new, compatible mortars, for conservation purposes.

In order to tackle the above questions, there is a large number of analytical techniques available, covering all the field of analytical chemistry and mineralogy. The majority of those provide analytical results of high accuracy, whilst their analytical methodology and derived outcomes from the analysis of historic mortars are discussed in detail in many papers (Jedrzejewska 1960, Cliver 1974, Stewart et al. 1981, Charola et al. 1984, Newton et al. 1987, Alessandrini et al. 1992, Alvarez et al. 2000 etc.).

From the available techniques, petrographic analysis by optical (OM) and scanning electron microscopy, coupled with elemental analyzer (SEM/EDX) and X-rays diffraction analysis (XRD) usually provide solid information and therefore, they were used in this work.

Microscopic examination techniques, together with mineralogical analysis, are used in this project in order to study the microstructural and compositional characterization of three different types of floor mosaic mortars from the archaeological area of Thebes, in Central Greece. The project mainly focuses on the contribution of microscopic and mineralogical techniques to the technological study of mosaic mortars.

Further elaborations of the derived results provide evidence concerning the chronological classification of different mosaics' parts, estimation of the provenance of original raw materials, mortars' production technology and preservation condition, as well as the development of appropriate conservation methodologies.

METHODOLOGY

As in archaeological mortars there was not followed a standard preparation procedure and, craftsmen were preparing the setting-bed for tesserae in portions, usually presenting some variability to their proportions and properties. This must always be taken into account both during sampling and the interpretation of the analytical results. Hughes and Callebaut (1999) discuss several aspects and limitations on sampling of historic mortars, which aim to improve the quality and reliability of the conclusions derived by their analysis.

In this study, a large number of sufficient quantity of mortar samples was collected from three different floor mosaics found in the archaeological area of Thebes, which were named: TH-KAD, TH-KEB and TH-PIN, coming from Kadmeio, Kevitos and Pindarou street respectively. Samples were collected from different fragments and areas of mosaics, in order to ensure representativeness of setting layer. Before any other action, samples cleaned, by removing depositions such as soil, dust, and any other organic or inorganic material that could cause contamination.

The classification of the collected samples was initially achieved by their appearance (colour and tint) followed by a more detailed examination and description of the samples carried out under stereomicroscope. Stereomicroscope allows extracting some first information on mortars constituents, their mix quality and, their preservation condition. The type and the shape of aggregates, the mix quality and distribution of the binder into the inner mass, as well as the potential presence of any organic inclusions (animal hair, wood fibers) are some of the data that may help to classify different types of mortars.

Mortar samples of the different mosaic pavements were embedded in polyester resin and, thin and polished sections for petrographic examination were prepared. Petrographic examination of thin sections were carried out in transmitted light, in crossed and parallel Nichols, while polished sections were studied in reflected light under optical microscope. Polishing and grinding were achieved using a non-aqueous lubricant, in order to prevent the washing away of water-soluble constituents of the samples.

Examination of polished sections in reflected light was used for the determination of the different types of aggregates, their shapes and granular distribution, as well as, air voids and micro-cracks, the amount of binder within the mortar mass and, also for the estimation of the original mix proportions of raw materials. Reflected light was also used to determine particular areas of interest for further study by scanning electron microscope (SEM).

Petrographic examination of thin sections allowed a more detailed examination of the samples matrix. The information yield concerned the type and quality of binder matrix, type of setting products, the identification of the type, size, and granular distribution of inert aggregates and pozzolanic additives, as well as the study of binder composition and production technology (Elsen et al. 2001, Hughes 2001).

Polished sections, were examined under SEM coupled with energy dispersive X-ray analyser (EDX), using secondary electron emission, in order to collect information on the microstructure and chemical composition of both the binder and aggregates, as well as the size, shape and distribution of aggregates. Microscopical examination of cross and thin sections has always to complement a chemical analysis when evaluating the chemical composition of historic mortars (Lindqvist et al. 1994). Finally, an estimation of pores and voids volume was achieved.

Additionally to the petrographic examination, mineralogical analysis of the mortars was carried out by x-ray diffraction (XRD) in order to identify the binder type (hydraulic or non-hydraulic), phases formed during the setting, the type of aggregates and, the presence of any alteration products. Finally, granular distribution of mortars constituents, after their mechanical separation, carried out using DIN sieve series.

Further to the above, petrographic analysis of thin sections may contribute to the determination of the sources and the provenance of raw materials, whereas different varieties of stones may be identified and distinguished, based on their optical and mineralogical properties. In addition, composition and microstructure of lime inclusions may provide clues for their origin, and for the assessment of the composition and provenance of raw materials (limestone) initially burned for their production (Hughes 2001).

Finally, the results of previous work in the field of systematic study of ceramics' technology and provenance (Whitbread 1986 and 1989, Day 1989, Kilikoglou, 1994) are useful for the study of ceramics' inclusions into lime mortars, in order to correlate ceramic production of a specific geographic area to the mosaics (and mortars) production at the same region.

RESULTS

Examination of freshly cut surfaces of samples using stereo-microscope, as well as of cross and thin sections under optical microscope, in reflected and transmitted light, gave information on the raw materials used, the amount of binder within the mortars, the microstructure of samples and, boundary reactions between mortar constituents.

The main constituents of the three types of samples are non-hydraulic lime, large to fine grains of natural calcareous aggregates and, small to medium-grained fragments of crushed-ceramic aggregates. Aggregates are well embedded in the calcite-based cementing material in all the samples. Lime paste is richer in the areas containing small particles of aggregates.

Distribution of medium or large lime lumps through the mortar mass is also observed. Their presence in the mortar is taken to indicate that the mortar was mixed with poorly slaked lime putty, containing relict material. This results weakness in binding properties of lime and decreases the amount lime that may react with pozzolanic additives, like ceramic powder.

The ceramic fragments mixed into the mortars are brown-yellow and reddish (fig. 1). The colour of ceramic fragments is attributed to their composition and firing process. Ceramic fragment contain large amounts of both ceramic and calcareous inclusion. Of all the samples, those of TH-Keb were distinct by having a greater amount of fine- and medium-sized aggregates and ceramic fragments, along with a greater amount of binding material, as illustrated in the granular distribution diagram (fig. 2).

Concerning the technology and composition of ceramic aggregates, three or more types of ceramics have been used as raw materials, all containing a large amount of ceramic inclusions. The unvitriified ceramic microstructure along with the presence of calcitic fragments into their mass, lead to the conclusion that they were produced from low-fired pots. The presence of high concentration of magnesium in all ceramic fragments is also remarkable.

Examination of the sample matrices by SEM focused on the binder and the ceramic fragments/binder interface as well as on the study of microstructure and the estimation of air voids. The information gained concerns the crystallization and adherence of lime to the entire mass of the mortar, the firing technology of ceramic fragments, and, finally, in combination with EDX, the formation of hydraulic phases, such as calcium alumino-silicate hydrate compounds at the lime-ceramic interface, by reactions that take place between the ceramic and lime (figs. 3 and 4).

The addition of fine ceramic fragments favours their reaction with lime and potentially, leads to the formation of hydraulic phases within the mortar matrix. The formation of hydraulic phases within the mortar causes an increase on the mortars' strength.

According to the XRD results, the main mineralogical forms detected in all samples are calcite, quartz, illite, muscovite, albite and kaolinite. Calcite is attributed to the use of calcareous aggregates, while additionally, it is formed during the calcinations of the lime binder. Quartz, and other clay minerals are

some of the typical phases detected in ceramics. Further this, the presence of some apparently amorphous compounds such as Calcium Aluminum Hydrate (CAH) and Calcium Silicate Hydrate (CSH), to the diffraction spectra, gives a cementitious character to the mortars, increasing their strength. These compounds are formed during the hydration process of the binder through a complicated chemical mechanism and are responsible for the essential properties of the mortars (Mishara 1982). Examination of thin sections (fig. 5) indicates also interface reactions between the lime and the finer fractions of ceramic.

From the evaluation of all the analytical data, together with microscopical examination, it was estimated that there are some differences in the binder/aggregate ratio. Samples TH-Pin and TH-Kad were characterized as meagre, with a binder/ aggregate ratio of between 1: 4,5 and 1: 5,5 by volume whilst, TH-Keb seems to be more rich in binder, having a ratio at about 1: 3,5 (table 1). Thus, mortars are characterized from moderate to weak and consequently, this explains, up to a point, their vulnerability to weathering phenomena and their poor preservation condition.

CONCLUSIONS / DISCUSSION

Microscopical examination techniques provide some valuable information in the field of mosaic studies, concerning archaeological, technological and historical issues. When they are combined with chemical analysis, may easily multiply the derived outcomes.

From the elaboration of the above-presented results, one can conclude that mosaic mortars studied were all produced from local materials. Based on the high concentrations of magnesium into ceramic mass, a correlation to the local pottery could be easily achieved. Lime lumps found into binder indicate that lime putty used was locally produced and it was poorly slaked, containing relict material.

It is obvious that crafts persons were using raw materials from the local area. The first task of the craftsmen was to assemble their materials, usually from local or regional sources, close to their working area, which they were mixing on the ground, without using pre-prepared raw materials. This would explain, up to a point, the presence of soil amounts into the mortar matrix. The choices available to them varied according to the period at which they were working, their geographical location and their economic means or those of their clients.

Despite the fact that mortar samples are characterized as moderate to weak, the overall quality of mosaic mortars must be considered regarding their

initial role, which was to serve as a setting layer for floor mosaics consisted by large tesserae.

Careful petrographic examination of the ceramic inclusions found into mosaic mortars, like those described in thin sections, may provide indications for the location of ceramic production, integrating the geological and ethnographic information already known. Differences in the technology of manufacture technology and their effect on mortars' properties are also distinguished.

Estimation of binder/aggregates ratio was achieved based on the granular distribution of mortars constituents, combined with data derived from microscopical examination of thin sections. In addition, microscopical examination of mosaic mortars is able to provide reliable matching of different historical phases and/or later interventions, helping on the dating of mosaics according to technological criteria.

Regarding conservation related issues it is very important to keep in mind that any conservation actions should focus on the preservation of mosaics in accordance to their initial function and their architectural context, as a constituent part of the buildings and the archaeological site.

Finally, conservators must always remember that there are not recipes for ideal conservation methods and repair mortars and that the main directives derive each time from the special needs of each monument. In order to avoid repeating past failures, research on conservation mortars should be carried out on both new and ancient mortars.

Acknowledgements

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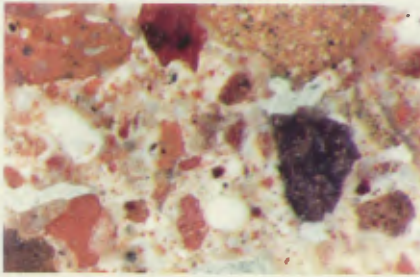
Whitbread 1989: I. K. Whitbread, "A proposal for the systematic description of thin sections towards the study of ancient ceramic technology", in: *Proceedings of the 25th International Symposium of Archaeometry*, Y. Maniatis (ed), Elsevier, Amsterdam (1989), pp. 127-138.

TABLES

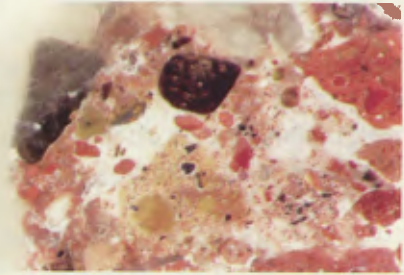
Sample	Binder	Type of Aggregates	Mineralogical Composition	Aggregates Size	Binder/Aggr. Ratio per volume
TH KAD	Lime + ceramic powder	Calcareous	Calcite	0 ~ 8mm	1: 4,5
		Ceramic fragments	Quartz, illite, muscovite, albite, kaolonite		
TH PIN	Lime + ceramic powder	Calcareous	Calcite	0 ~ 10mm	1: 5,4
		Ceramic fragments	Quartz, illite, muscovite, albite, kaolonite		
TH KEB	Lime + ceramic powder	Calcareous	Calcite	0 ~ 8mm	1: 3,5
		Ceramic fragments	Quartz, illite, muscovite, albite, kaolonite		

TABLE 1. Summary of analytical data and technological information derived from the study of different mosaic mortars.

FIGURES



a

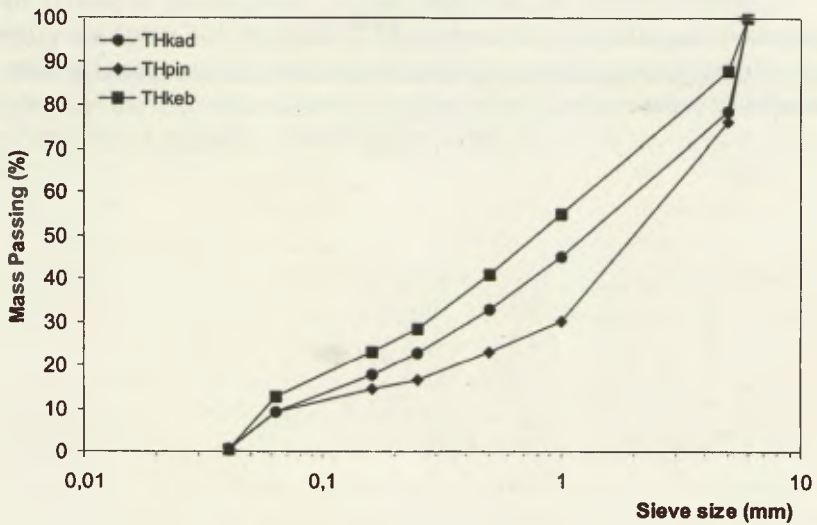


b

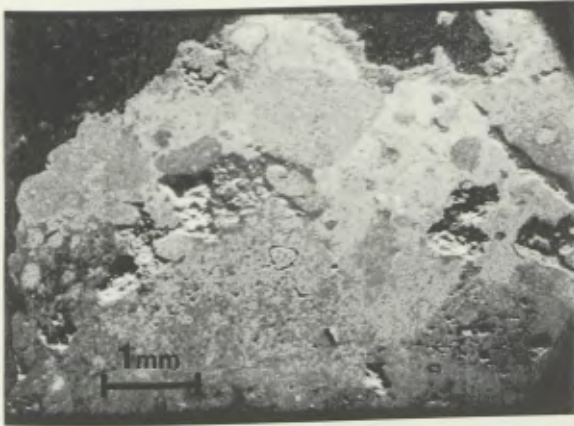


c

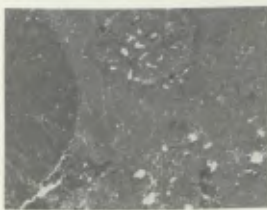
1. Cross section pictures of samples TH-Pin (a), TH-Keb (b) and TH-Kad (c), magnification (50x). Different types of ceramic fragments, containing large amounts of ceramic and calcareous inclusion, were mixed within the mortar mass. Lime binder is well embedded around small size aggregates.



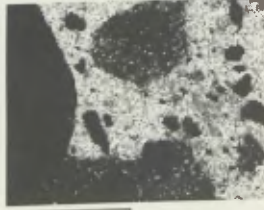
2. Granular distribution of mortars' constituents, after their mechanical separation.



3. Scanning electron microscope microphotograph of TH-Keb sample. Mortar microstructure, aggregates distribution and pore voids are presented.

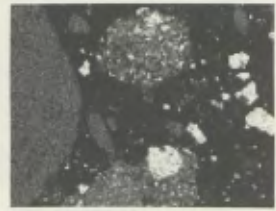


SE Image



60um

Ca mapping



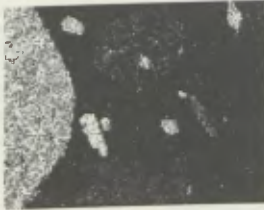
60um

Si mapping



60um

Al mapping



60um

Mg mapping



60um

Fe mapping



60um

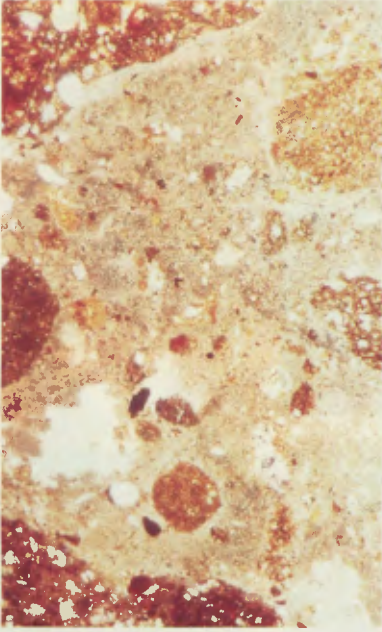
K mapping



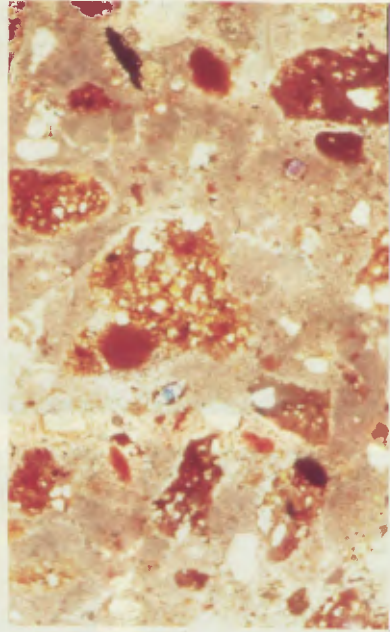
60um

Na mapping

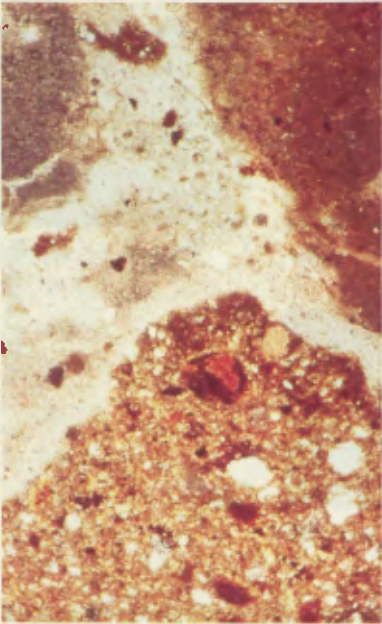
4. Sample TH-Keb. Scanning electron microscope microphotograph and X-rays mapping of main elements detected within mortars' matrix.



a



b



c

5. Thin section microphotographs of samples TH-Pin (a), TH-Keb (b) and TH-Kad (c) respectively, magnification (50x). Distribution of binder within aggregates and interface reactions between the lime and ceramic fragments are indicated.

PAULA ARTAL-ISBRAND*, ALISA VIGNALO**

**THE WORCESTER HUNT MOSAIC:
A SIXTY-EIGHT-YEAR TREATMENT HISTORY**

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SUMMARY

The Worcester Hunt mosaic, excavated at Antioch in 1935 and brought to the Worcester Art Museum in 1936 has since enjoyed a central location in the Museum's main hall. This paper discusses the excavation and long treatment history of the mosaic, and presents the challenges that conservators encountered during the latest conservation campaign, which also included the installation of the mosaic's border. The materials and techniques used to conserve the mosaic are described, and issues such as presentation are addressed as well.

RÉSUMÉ

La mosaïque de Chasse d'Antioche, trouvée à Antioche en 1935 et rapportée au musée de Worcester en 1936 a été placée dans une position centrale du haule principale du musée. Ce bulletin décrit l'excavation et le long traitement de la mosaïque au cours de la dernière campagne des restaurations. L'installation du contour de la mosaïque faisait aussi parti de cette campagne. Les matériaux et techniques utilisées pour conserver la mosaïque sont décrits et les questions de présentations y sont aussi adressées.

I. INTRODUCTION

From 1932 to 1939 the Worcester Art Museum in Worcester, Massachusetts, participated in an archaeological excavation of the ancient city of Antioch in modern-day Turkey (Kondoleon 2000: 5). This expedition was a collaborative effort of five institutions including Princeton University, which led the excavations, the Musée du Louvre, Harvard University, the Baltimore Museum of Art, and the Worcester Art Museum. The excavated material mainly consisted of mosaics. Two thirds of the finds were divided among the sponsoring institutions, and one third was left in Antakya, where it now forms the core of the Hatay Archaeological Museum.

This paper focuses on one mosaic from Antioch in the collection of the Worcester Art Museum referred to as the *Worcester Hunt* Mosaic (fig. 1). Dating from the 6th century CE and measuring 75 m², this stone mosaic was the floor of a reception hall of a wealthy villa in Daphne, located in the outskirts of Antioch. The colourful pavement represents a wild beast hunt: in the center of the mosaic stands a proud hunter at rest, possibly representing the owner of the villa, surrounded by four scenes of hunters on horseback and on foot in the act of confronting tigers, bears, leopards, and lions. These scenes are surrounded by a cream-coloured background made of tesserae arranged in a shell pattern. The inward-facing border represents a stylized plant garland interspersed with waterfowl, hunters and wild animals. It is set against a dark-gray background.

Soon after the mosaic's arrival at the Worcester Art Museum in 1936 it was embedded in the floor of the Museum's main entrance hall, the Renaissance Court, without its damaged border. It became an extension of the Museum floor on which visitors could walk and dance during Museum events. The *Worcester Hunt* mosaic's extensive restoration and treatment history, including the most recent treatment, are described in this paper.

II. EXCAVATION AND INSTALLATION AT THE WORCESTER ART MUSEUM

The *Worcester Hunt* mosaic was discovered on May 14, 1935 less than a meter below the surface (figs. 1-2) (Campbell 1935: 251). The mosaic's border was very damaged when found. The field diaries indicate that the layer of stratum directly in contact with the mosaic's surface incorporated fragments of charcoal. This implies that the destruction of the villa, which occurred during the devastating earthquake of 526 CE also involved fire. This damage is visible on parts of the mosaic's surface where the otherwise cream-coloured tesserae have discoloured to a pinkish-orange tone.

Once the mosaic was completely cleared of dirt by the archaeologists,

small losses were filled with cement, and the fragile outer edges of the mosaic as well as the edges of large areas of loss were strengthened with this material as well (Campbell 1934: 160). Then the pavement was divided into nine sections, which were faced with cloth and paper attached with animal glue to ensure that tesserae stayed in position during lifting. Each section was covered with boards of approximately similar size and shape, and the mortar bedding layer directly underneath the pavement was dug away while the mosaic section was supported with small wooden blocks. Wooden poles were slowly inserted to support the mosaic section from underneath, and tied with ropes to the boards on top. The section was then raised, turned over, and taken flat to the storehouse. The remains of the ancient mortar substrate were chipped away until the back sides of the tesserae were completely exposed. The mosaic sections were then backed with reinforced concrete in the following manner. First, retaining walls along the edges of the mosaic sections were built up, then a grid of iron rods (spaced 25 cm apart) and iron wire mesh were placed on the exposed underside of the mosaic section and, finally, a layer of concrete 7 cm thick was poured over this arrangement. The concrete not only backed the mosaics but also filled the larger areas of loss within the tessellatum. Charles Rufus Morey, Chair of the Antioch Committee during the expedition, proudly described a mosaic at the end of this process as an "indestructible monolith" (Morey 1936: 27). The weight of a large concrete-backed mosaic section ranges from 800-1000 kg. After the concrete had cured, the facing was removed from the front by soaking with hot water, and the surface was cleaned of burial accretions by scraping and often sanding with stones. The technique of lifting and backing of Antioch mosaics during that period is similar to the one described by R. Hafez (Hafez 1977).

A year later the *Worcester Hunt* mosaic sections, along with other mosaics allotted to the Worcester Art Museum were packed in wooden crates between straw mattresses and sawdust for better protection during the trip to America by boat. They arrived at the Worcester Art Museum on October 1, 1936.

The mosaic sections were removed from the crates, and placed into the floor of the Museum's Renaissance Court onto a bed of sand. They were installed without the border. Five Italian mosaic artists living in New York City were hired to restore the ancient mosaics. They filled the joins between the mosaic sections and the lacunae in the pavement using a combination of ancient and new tesserae, trying to be consistent with the style and colour palette of the ancient designs (compare fig. 3 to fig. 2). Unfortunately, they used ancient tesserae from the damaged border fragments during their reconstruction work. In spite of their efforts, they were not always accurate.

For example, while all human heads in the mosaic are three-quarters frontal, one restored head was created in profile (figs. 3, 5). The colours of the restoration tesserae were not always consistent with the original colours either, although the documentation states that those restorations were touched up with oil paints to match the original surrounding area of the mosaic¹.

Before a permanent railing was built around the mosaic in the 1990's, it was protected from wear and tear with numerous coatings. Museum records indicate that there were at least nine campaigns of coating application and removal between 1936 and 1978. The coatings used on the mosaic included poly-vinyl acetates, hard paste waxes, methyl methacrylates, and polyurethanes. The cleaning agents used at different times consisted of methanol, xylene, acetone, petroleum naphtha, carbon tetrachloride, bleach as well as commercial detergents and paint strippers. In addition to these cleaning agents abrasive tools such as wire brushes and pumice stone were used.

III. THE 2001-2004 CONSERVATION TREATMENT

The museum's attitude in respect to the mosaic has shifted from considering the mosaic a decorative part of the museum's landscape, to valuing it as an art object in the Museum's collection. The mosaic's history and importance to the museum, especially in regard to its appearance have influenced decision-making. The following is a discussion of the latest conservation treatment and how conservators have attempted to balance treatment goals for the mosaic with the needs of its physical context.

The treatment has been a team effort primarily involving the authors, under the supervision of Lawrence Becker, with the assistance of numerous other employees and volunteers. Treatment began with a two-phase plan: to remove modern cement filling losses within the tessellatum and to remove the yellowed polyurethane coating applied in 1978². Then the border sections were added. The final phase consisted of filling lacunae and making aesthetical compensations.

A. Cement Removal

Cement removal was accomplished mechanically with masonry chisels, steel micro-tools, scalpels, and rawhide mallets (fig. 4). Cement, generally flush

1. 1950's Conservation Summary on the Treatment of the *Worcester Hunt* Mosaic, Worcester Art Museum Archives.

2. Lawrence Becker, formerly Chief Conservator at the Worcester Art Museum, is presently Head Objects Conservator at the Metropolitan Museum of Art, New York.

with the tessellated surface, was reduced to the depth of the tesserae (approximately 1/2 cm). There was a significant degree of risk in this process, particularly in areas where cement had flowed over tesserae. Great care was taken against breakage and abrasion, and therefore work progressed slowly.

B. Polyurethane Coating Removal

The conservators tested appropriate solvents and cleaning methods to determine a safe method for the removal of the polyurethane. Acetone proved to be the most successful solvent to break down the cross-linked coating, but it required a long contact time to be effective. Tests were carried out using acetone in a gelling agent -hydroxy propylmethyl cellulose- and allowing this to remain for two or three hours in contact with the polyurethane. This gelling agent, like methylcellulose, has been commonly used as an adhesive. Conservators had two concerns regarding this approach. One was that if the material was inadvertently allowed to dry on the tessellated surface, it might adhere, shrink, and possibly lift out original material. Also, given the enormity of floor space, it would be time-consuming to ensure that all the gel was cleared away from the surface after every application. Mixing the solvent into gel was another lengthy step that the conservators preferred to avoid.

Rather than institute a gel system cleaning approach, a more straightforward method was devised. Cotton pads were saturated with acetone and covered with a polyethylene film. Ethanol was added at the edges to slow evaporation and temporarily seal the polyethylene to the mosaic. The pads were easy to manipulate and allowed conservators to work in well-defined segments. The pads remained in place for two hours, after which they would be slowly lifted away as the polyurethane was cleared with acetone-moistened cotton swabs (figs. 4-5). Conservators were highly conscious of their safety and that of the Museum's public due to the prolonged and daily contact with solvents in an enclosed space. In addition to respirators and gloves, conservators utilized a portable elephant-trunk fume cart, which drew fumes away from the working area and through an organic solvent filter (fig. 4).

C. Addition of the Border

As mentioned above, the border sections of the mosaic had not been installed at the Museum since their arrival in 1936. It is fortunate that the remains of the four border sections were not discarded after being used as a source for restoration tesserae. Unfortunately, they had been stored in an exterior lightwell, and subjected to climate changes and flooding until they were put into a Museum art storage room in 1995.

Despite the fragmentary state and the damage the border sections suffered since their arrival at the Worcester Art Museum, it was decided to install them with the rest of the mosaic. Except for one piece it was not possible to install all the fragments in their original position since there was only space for expanding the mosaic on two sides; the other two sides had to be kept free for public access. In consultation with curator Christine Kondoleon, the fragments were placed on opposite sides of the central section (fig. 6). Priority was given to arranging the border fragments in the order that would most accurately reproduce the border's repeating scroll. In order to accommodate the border sections, the Renaissance Court's flagstone floor on two sides of the mosaic's central panel was removed. The fragments were then installed on a bed of sand in a similar manner to how the central panel was installed in 1936.

D. Aesthetic Compensation

The protocol developed by conservators regarding filling lacunae in past conservation treatments of Antioch mosaics at Worcester Art Museum was continued for the treatment of the *Worcester Hunt* mosaic (Artal-Isbrand, Nunberg 1999). The compensation, in addition to being reversible, was designed to be "honest" and visually harmonious. In areas of large loss such as in the mosaic's border, where the placement, size, and colour of tesserae could not be predicted, a dark-coloured recessed lime mortar fill was laid, consistent with the colour of the dark gray background in the border. In areas where the design could be predicted, imitation tesserae were laid. The imitation tesserae are made of plaster, set into the losses with bulked and pigmented acrylic resin, and painted with acrylic colours. One major challenge was to visually unite the borders to the central panel, due to the great disparity in their histories at the Museum. It was especially important that the interface between the borders and the central panel appeared continuous and well integrated. The modern tesserae that had been painted with oil paints by the mosaic artists in 1930 to adjust their colour to that of the surrounding ancient tesserae were painted with acrylic paints.

Conservators had to evaluate the advisability of coating the mosaic again. The mosaic does not require the same kind of durable protection and frequent maintenance that it did when it withstood public use. The purpose of a coating would now be for purely aesthetical reasons, i.e. to saturate its colours. While it was decided not to coat the central panel of the mosaic because no coating proved to be satisfactory at improving its appearance, the weathered border panels, on the other hand, were coated with a low solution of Paraloid B-72 which aided in bringing back the vivid colours of the tesserae.

There was debate among conservators and curators over whether restorations of the 1930s should remain in the central panel, and if by doing so the "honest" presentation approach would be compromised. While in many locations it is obvious where modern tesserae end and ancient begin, it is much less clear elsewhere. In many instances it was tempting to remove them from locations where the mosaic artists obviously invented designs. But conservators decided that it was best to leave the restorations intact because there would be a high risk of damage to ancient tesserae if conservators tried to remove these restorations. Instead, to clarify these issues, didactic panels clearly explain and illustrate the history and conservation to the museum visitor.

IV. CONCLUSION

Conservation treatment of the *Worcester Hunt* has resulted in a dramatic change in its appearance (fig. 6). The removal of the yellowed coating and the replacement of the small losses with restoration tesserae in the central panel have allowed the hunting scene to come alive again, giving the museum visitor a greater appreciation of the colour and the modeling of the figural elements. The mosaic has also been greatly transformed by rejoining the border to the central panel. The various filling techniques applied in the fragmentary border successfully integrate the sections visually. Curators and conservators believe that they have met their goal of rendering the mosaic's presentation in a way that is both reasonably accurate to its original state as well as respectful of its physical context within the museum setting.

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The authors would like to acknowledge the Samuel H. Kress and Andrew W. Mellon Foundations for funding their travel to the ICCM conference in Thessaloniki. They would also like to thank the volunteers and interns who spent numerous hours working on the mosaic: Deborah Diemente, Emily Egan, Elizabeth Hermann, Judith Jungles, Christina Manolis, Christina Marcus, Anya McDavis-Conway, Corine Norman, Abita Raj, Robin Osten, and Marjorie Peairs. And finally, many thanks to Valentine Talland, Head Objects Conservator at the Isabella Stuart Gardner Museum, for lending their fume cart for this project.

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FIGURES



1. *Worcester Hunt* mosaic after excavation in 1935.



2. Detail of mosaic after excavation.



3. Same detail as in fig. 2 after the 1936 restoration by mosaic artists.



4. Conservation team in 2002 chiseling out cement fills and removing a polyurethane coating.



5. Detail of mosaic during removal of polyurethane coating.



6. Mosaic after addition of the borders.

DEMETRIOS CHRYSOPOULOS*

**ΠΡΩΤΕΣ ΣΩΣΤΙΚΕΣ ΚΑΙ ΚΑΘΟΛΙΚΕΣ ΕΠΕΜΒΑΣΕΙΣ
ΣΤΑ ΕΝΤΟΙΧΙΑ ΨΗΦΙΔΩΤΑ ΤΗΣ ΜΟΝΗΣ ΔΑΦΝΙΟΥ
ΜΕΤΑ ΤΟΥΣ ΣΕΙΣΜΟΥΣ ΤΗΣ 7ΗΣ ΣΕΠΤΕΜΒΡΙΟΥ 1999**

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Υπεύθυνος Τομέα ψηφιδωτών
Επίκουρος καθηγητής Τεχνολογικού Εκπαιδευτικού Ιδρύματος Αθηνών

SUMMARY

First aid and general interventive conservation of the Daphni Monastery mosaics after the September 7th, 1999 earthquake. The earthquake of September 7th, 1999 had serious repercussions upon Daphni Monastery, a famous Byzantine monument. The first steps sought to rescue the sections in danger of collapsing. Consolidation and protective acing was applied to all these surfaces. Detachment of the mosaic surfaces was carried out where deemed necessary. The lifting of the mosaics took place mainly in the area of the four arches of the dome's columns. Apart from the danger of the mosaic collapsing, it was necessary to construct steel supports to consolidate the dome and generally the monument.

Ιστορική αναδρομή

Είναι γνωστό και δεν χωράει καμία αμφιβολία ότι το σημαντικότερο μνημείο από την εποχή της μεγάλης βυζαντινής Τέχνης 11ος – 12ος αι. είναι η Μονή Δαφνίου. Η θέση του κτηριακού συγκροτήματος βρίσκεται στα μέσα περίπου της αρχαίας Ιεράς Οδού που ένωνε την Αθήνα με την Ελευσίνα. Στο ίδιο μέρος ήταν και το ιερό του Δαφνίου Απόλλωνα κατά την αρχαιότητα.

Όταν με διατάγματα των αυτοκρατόρων απαγορεύτηκε η αρχαία θρησκεία, οι χριστιανοί κατέλαβαν τον χώρο των παλαιών κτηρίων και ίδρυσαν μία Βασιλική για να προσελκύσουν στη νέα θρησκεία αυτούς που πήγαιναν

ακόμα στην Ελευσίνα για τα Ελευσίνια μυστήρια. Επειδή η θέση είχε στρατηγική σημασία, γιατί από εκεί ήταν το πέρασμα προς την Αθήνα, οχύρωσαν τον χώρο με τείχος.

Κατά την περίοδο 7ου, 8ου και 9ου αι. δεν υπάρχουν πληροφορίες για το Δαφνί. Το μοναστήρι εγκαταλείφθηκε και ερημώθηκε. Το 1100 ένας άγνωστος ακόμα, αλλά σπουδαίος χριστιανός ήρθε στο Δαφνί, καθάρισε τα ερείπια της παλαιάς βασιλικής και έχτισε καινούργιο ναό, τον οποίο κόσμησε με θαυμάσια ψηφιδωτά και πολύχρωμα μάρμαρα. Ο νέος ναός κτίστηκε σε οκταγωνικό ρυθμό.

Το 1205 κατέλαβαν τη Μονή Φράγκοι. Μετά το 1458 οι Τούρκοι το παρέδωσαν πάλι στην Ορθόδοξη Εκκλησία γιατί τους βοήθησε να διώξουν τους δυτικούς παρείσακτους. Το 1955 περνά στην Αρχαιολογική Εταιρεία Αθηνών και το 1960 στην Εφορεία Βυζαντινών Αρχαιοτήτων.

Τα ψηφιδωτά της Μονής Δαφνίου αποτελούν ένα μοναδικό δείγμα μνημειακής ζωγραφικής με βαθιές καταβολές στην κλασική παράδοση, όπως μας είναι γνωστή από τα χειρόγραφα της Αναγέννησης των Μακεδόνων. Ο ναός κτίστηκε στο τελευταίο τρίτο του 11ου αι. με μια πολύ ανεπτυγμένη αίσθηση της κομψότητας των αρχιτεκτονικών γραμμών. Το στολίδι αυτό της βυζαντινής τέχνης δυστυχώς χάνει ένα μεγάλο μέρος των περιτεχνων ψηφιδωτών του λόγω συνεχών και έντονων σεισμικών δονήσεων που σημειώθηκαν στα τέλη του 19ου αι.

Σεισμική δραστηριότητα

16η Αυγούστου 1886, αναφέρεται ο πρώτος σεισμός σχετικά με το μνημείο και τα επακόλουθά του. Στα αρχεία της 1^{ης} Εφορείας Βυζαντινών Αρχαιοτήτων αναφέρεται: "κατέπεσε πλήθος ψηφιδων". Από το 1886 μέχρι και σήμερα το μνημείο ταλαιπωρείται σταδιακά άλλοτε λιγότερο και άλλοτε περισσότερο από επαναλαμβανόμενες σεισμικές δονήσεις, όπως το 1889, 1893, 1894, 1979, 1981, 1988.

7η Σεπτεμβρίου 1999. Νέος σεισμός πλήττει και πάλι από τα ΒΔ τον Νομό Αττικής και ιδιαίτερα την Αθήνα, με σοβαρές συνέπειες και στη Μονή Δαφνίου (εικ. 1). Θεωρείται μία από τις ισχυρότερες σεισμικές δονήσεις, η οποία προκάλεσε αναπόφευκτα τις περισσότερες ζημιές στο κτήριο και στα ψηφιδωτά σύμφωνα με τα σημερινά δεδομένα.

Επεμβάσεις

Οι πρώτες σε μεγάλη έκταση επεμβάσεις αναφέρεται σύμφωνα με τα αρχεία ότι έγιναν το 1891 με αποτοιχίσεις των ψηφιδωτών που είχαν διασωθεί. Το 1892 γίνεται επανατοποθέτηση του Παντοκράτορα και των Προφη-

τών από τον Ιταλό Νοβο. Οι εργασίες συνεχίστηκαν μέχρι και το 1897 με καθολικές επεμβάσεις στο σύνολο των παραστάσεων. Από το 1888 μέχρι και το 1997 εκτελούνται διάφορες εργασίες που περιλαμβάνουν πότε σωστικές και πότε καθολικές επεμβάσεις (αποτοιχίσεις).

Σημερινή κατάσταση διατήρησης ψηφιδωτών

Το ρήγμα που δημιουργεί τους συνεχείς σεισμούς στην Αττική διέρχεται από τη Μονή Δαφνίου με φορά από ΒΔ προς ΒΑ. Οι συνέπειες της παρουσίας του ρήγματος και η φορά που ακολουθεί προκάλεσε μαζί με τη βορειοανατολική πλευρά του μνημείου περισσότερες και εντονότερες καταπονήσεις στα ψηφιδωτά του βορειοανατολικού και βορειοδυτικού τόξου, στο βορειοανατολικό ημιχώριο με τον Ευαγγελισμό και την παράσταση του Ιωνά στον πρώτο πεσσό στο νότιο τμήμα του θόλου, στο χορό των προφητών. Επίσης προκλήθηκαν ρηγματώσεις στο σύνολο των παραστάσεων, δημιουργία μικροκενών μεταξύ των υποστρωμάτων σε 26 διαφορετικά σημεία και πτώση ευτυχώς μικρών τμημάτων και ψηφίδων, κυρίως στο βορειοανατολικό και βορειοδυτικό τόξο.

Επεμβάσεις και εργασίες που πραγματοποιήθηκαν μετά τον σεισμό του 1999

- Φωτογραφική και σχεδιαστική τεκμηρίωση όλων των ψηφιδωτών επιφανειών του ναού (εικ. 2).
- Αρχαιοθέτηση όλου του ιστορικού των ψηφιδωτών και των επεμβάσεων που πραγματοποιήθηκαν από το 1889 μέχρι σήμερα.
- Καθαρισμός των επιφανειών με απιονισμένο νερό.
- Στερέωση των υαλομεταλλικών ψηφίδων του κάμπου και γενικά όλων των ρηγματώσεων.
- Επικόλληση υφασμάτων για την προσωρινή προστασία και συγκράτηση των παραστάσεων.
- Κατασκευή ξυλότυπων και γύψινης φόρμας για την αποτοίχιση των τεσσάρων εσωραχίων τόξων. Για την κατασκευή της γύψινης φόρμας έγινε ειδική μελέτη, ώστε κάθε τεμάχιο που θα αποτοιχιζόταν, να απομακρύνεται με το αντίστοιχο τμήμα της φόρμας (συνολικά αποτοιχίστηκαν τέσσερα τμήματα) και η φόρμα να παραμείνει στη θέση της (εικ. 3).
- Αποτοίχιση των τεσσάρων εσωραχίων τόξων (εικ. 4). Στα εσωράχια των τόξων των τεσσάρων πεσσών του θόλου, κρίθηκε αναγκαίο και αποφασίστηκε η άμεση αποτοίχιση δύο τμημάτων ανά τόξο στα κοίλα σημεία τους για δύο βασικούς λόγους: α) τις βαθιές και εκτεταμένες ρωγμές, πτώση τμημάτων τους και ολική αποκόλληση

από την τοιχοποιία του κοίλου τμήματος του ΒΑ τόξου, που ήταν έτοιμο να καταρρεύσει και β) τα φορτία που θα έφεραν οι ειδικές κατασκευές στα εσωτερικά των τόξων για τη στήριξη του μνημείου θα συνέθλιβαν τις ψηφίδες. Το βάρος του θόλου που φέρουν οι τέσσερις πεσσοί υπολογίζεται στους 400 τόνους.

- Εκπόνηση μελέτης για την αποτοίχιση του προφήτη Ιωνά και της διακοσμητικής ταινίας του 11ου πεσσού.
- Αποτοίχιση δύο τμημάτων από την παράσταση του προφήτη Ιωνά (εικ. 5) και το διακοσμητικό από τον 11ο πεσσοί. Οι αποτοίχισεις αυτές αποφασίστηκαν διότι οι πεσσοί είχαν υποστεί ανεπανόρθωτες βλάβες. Ειδικά ο πεσσοί του Ιωνά που μετακινήθηκε κατά 3 εκ. περίπου.
- Επικόλληση υφασμάτων στους πεσσοί του θόλου για την προστασία των επιφανειών από τις μεταλλικές περιδέσεις που τοποθέτησε η Διεύθυνση Αναστήλωσης Βυζαντινών Μνημείων.
- Ανίχνευση των επιφανειών με γεωραντάρ σε συνεργασία με την Αναστήλωση Βυζαντινών Μνημείων, για τη διαπίστωση και την ακριβή θέση των κενών μεταξύ υποστρωμάτων και μνημείου σε έκταση και βάθος (εικ. 6).
- Σύνταξη μελέτης και τεκμηρίωση για την αποκατάσταση 26 μεμονωμένων τεμαχίων που προτάθηκε να αποκολληθούν, επειδή έχουν μετακινηθεί ως προς τον οριζόντιο άξονά τους (εξάρσεις).
- Σύνταξη γενικής μελέτης που αποτελείται από 5 τεύχη και περιλαμβάνει την πριν των σεισμών κατάσταση, τις σωστικές επεμβάσεις και τη συντήρηση και αποκατάσταση των ψηφιδωτών.

Θα ήθελα να τονίσω ότι από την αρχή βασική μας γραμμή ήταν οι όσο το δυνατόν λιγότερες αποτοίχισεις, εφόσον αυτό ήταν εφικτό συνυπολογίζοντας φυσικά και τα στατικά προβλήματα του κτηρίου σε συνεργασία με τη Διεύθυνση Αναστήλωσης Βυζαντινών Μνημείων. Όπου μας ζητήθηκε, όπως και στην περίπτωση του πεσσοί του Ιωνά και όπου κρίναμε εμείς απαραίτητο, τότε μόνο έγιναν αποτοίχισεις. Όλες οι υπόλοιπες ψηφιδωτές επιφάνειες θα συντηρηθούν *in situ* με ενέματα, εφόσον προηγηθεί έρευνα και ανάλυση των κονιαμάτων του κτηρίου και των ψηφιδωτών για την εξακρίβωση της πλήρους συμβατότητας μεταξύ τους.

Τελειώνοντας θα ήθελα να ευχαριστήσω του άξιους από κάθε άποψη συναδέλφους μου και συνεργάτες για την πολύτιμη βοήθεια που μου πρόσφεραν μέχρι σήμερα στο δύσκολο αυτό έργο. Τους ευχαριστώ πολύ.

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ΕΙΚΟΝΕΣ



1. Κατάρρευση τμήματος και ρηγμάτωση στο ΝΔ τόξο.



2. Σχεδιαστική αποτύπωση των τμημάτων προς αποκόλληση σε κλίμακα 1:1.



3. Εφαρμογή της γύψινης φόρμας στο εσωράχιο τόξο.



4. Αποτοίχιση τμήματος εσωραχίου τόξου.



5. Προετοιμασία για την αποτοίχιση τμήματος από την παράσταση του Προφήτη Ιωνά.



6. Ανίχνευση με γεωραντάρ για τη διαπίστωση και την ακριβή θέση των κενών μεταξύ των υποστρωμάτων.

C. ΘΕΜΑ 3Ο: ΤΕΚΜΗΡΙΩΣΗ ΚΑΙ ΔΙΑΤΗΡΗΣΗ
THEME 3RD: MAINTENANCE AND DOCUMENTATION

ANGELO MARIA ARDOVINO, ELISABETTA GAGETTI, SARA MASSEROLI

**UNA SCHEDA COME STRUMENTO CONOSCITIVO DI TECNOLOGIE ESECUTIVE
E DI SUCCESSIONI DI RESTAURI NEL MOSAICO ANTICO**

SUMMARY

For the archaeologist to know better the execution technologies of mosaics and recognize old restorations is quite necessary, both as a preliminary to iconographical, functional and chronological analysis, and as a prerequisite to lead new restorations consciously. As an instrument for such knowledge, we worked out a form which we experimentally used in the study of about seventy Roman mosaics from Cremona, Brescia and Bergamo. The results we obtained are explained by case studies. By the systematical employment of our form we succeeded in recognizing, by autoptical examination only, possible cut lines and, therefore, the technique by which the mosaic was taken up, and to detect integrations in lacunae, which can be divided into primary and secondary. The systematic employment of our form could allow us to recognize, simply through an autoptical examination, not only the technique of the mosaics but also the integrations of the lacunae.

RÉSUMÉ

Il faut que les archéologues connaissent mieux les technologies d'exécution des mosaïques et qu'ils reconnaissent les anciennes restaurations. C'est une étape préliminaire pour n'importe quelle analyse iconographique, fonctionnelle ou chronologique, ainsi qu'une connaissance nécessaire avant de commencer sérieusement une nouvelle restauration. Voilà pourquoi nous avons créé un instrument, une fiche que nous avons employée en voie expérimentale pour l'étude d'environ 70 mosaïques romaines en provenance de Cremona, Brescia, Bergamo. Les résultats qu'on a obtenus sont expliqués par des études de cas. En employant notre fiche systématiquement, nous avons réussi à reconnaître, tout simplement à travers un examen autoptique, la technique employée dans la mosaïque, ainsi que toute intégration aux lacunes.

Il presente contributo si propone di portare all'attenzione degli studiosi del mosaico una ricerca da tempo avviata, i cui risultati, in attesa di una complessiva pubblicazione, sono stati via via anticipati nel corso di convegni e incontri svoltisi in Italia, fino al recente Convegno di Studi "Scienza e Beni Culturali" tenutosi a Bressanone, ai cui Atti (Ardovino, Galletti, Masseroli 2002) si rimanda per una più ampia trattazione degli spunti qui presentati.

La ricerca che illustriamo nasce da una necessità molto viva in archeologia: comprendere meglio la tecnica di esecuzione dei mosaici e contemporaneamente riconoscere i diversi interventi che essi hanno subito nel corso del tempo, come premessa all'analisi di iconografia, funzione, cronologia e come guida consapevole per nuovi interventi di restauro.

L'obiettivo è la conoscenza filologica del manufatto attraverso il suo esame analitico, che isola la fase originale del mosaico dagli interventi antichi successivi, di pentimento, di rifacimento e di manutenzione, per tentare di ricostruire la tecnica e la maniera delle officine. Questo obiettivo è però raggiungibile su ciascun mosaico in misura inversa agli interventi che esso ha subito: mentre è relativamente semplice condurre l'analisi tecnica sui nuovi ritrovamenti, ciò è molto più difficile sui mosaici che in passato hanno subito trattamenti snaturanti, di strappo, di spianamento delle superfici, di distruzione della preparazione, di integrazione mimetica delle lacune e magari di rifacimento tessera per tessera. Appare quindi prioritario imparare a distinguere, già con il solo esame autoptico, il moderno e anche a calarsi nella sua logica, per valutare quanto riproponga, o conservi, elementi tecnologici antichi, nella tessitura, nella tridimensionalità originale, nelle sopravvivenze di allettamenti e preparazioni. Nonostante l'estrema varietà delle metodiche di asportazione del mosaico dal terreno e di integrazione, alle volte si può arrivare a risultati sicuri. D'altra parte, inevitabilmente, saranno sempre meno i mosaici nuovi da studiare e sempre più quelli vecchi da riesaminare; conviene dunque munirsi di adeguati strumenti critici, sviluppando la sensibilità filologica verso obiettivi tecnici.

A tale scopo, abbiamo realizzato una scheda che, dopo una prima parte di dati generali identificativi del manufatto, enuclea i principali aspetti tecnici che l'osservatore deve individuare: livello della superficie del manto musivo, tessitura, densità delle tessere per decimetro quadrato, caratteri significativi delle tessere - materiale, colore e forma - caratteristiche degli strati di preparazione; segue la descrizione dei restauri identificati: tecnica di intervento, linee di taglio, natura del supporto artificiale e degli strati di interposizione, trattamento delle lacune (per una più dettagliata illustrazione della scheda e dei risultati del suo impiego nell'esame di singoli lotti di materiali

si veda Ardovino, Gagetti, Masseroli 1998).

Dopo una prima applicazione sperimentale su un lotto di mosaici cremonesi, in parte illustrati da Lynn Pitcher in questo stesso volume, la scheda è stata impiegata per lo studio di un numero significativo di pavimenti musivi di età romana nei territori di Bergamo, Brescia e Cremona. Tra i circa settanta mosaici esaminati, che presentano materiali e tecniche piuttosto omogenei, compaiono numerosi esemplari rinvenuti nel corso di scavi condotti nell'Ottocento e nella prima metà del Novecento con metodo non stratigrafico. I pavimenti sono stati in alcuni casi soltanto prelevati dal luogo di rinvenimento, per poi rimanere a lungo in magazzini o depositi; altri, come gli esemplari di vecchio rinvenimento delle *domus* dell'Ortaglia a Brescia (notizie relative al rinvenimento in Mirabella Roberti 1975: 12-17; recenti scavi condotti dalla Soprintendenza per i Beni Archeologici della Lombardia, ancora inediti, hanno indagato un nuovo vasto settore del complesso residenziale, presentato preliminarmente in *Domus di età imperiale* c.s.; sui risultati dei nuovi scavi e sulla musealizzazione delle strutture conservate si veda anche il contributo di F. Rossi e F. Morandini in questo stesso volume), sono stati distaccati, restaurati e ricollocati su pannelli di supporto nella loro originaria posizione; nella maggior parte dei casi, però, i pavimenti risultano distaccati, restaurati, anche più volte, e musealizzati. Le operazioni di prelievo e restauro, eseguite tra gli anni Cinquanta e Settanta del Novecento per lo più dalla Ditta Bernasconi di Como, sono documentate poco e male. Proprio l'esigenza di riconoscere tali interventi, che in alcuni casi forniscono un'immagine fuorviante del manufatto, per progettare correttamente il suo nuovo restauro, ha condizionato dapprima la scelta del campione, poi ampliato anche a pavimenti di recente scoperta. Questi ultimi sono mosaici generalmente restaurati o in corso di restauro *in situ*, il cui esame è interessante soprattutto per la possibilità che offre di individuare modalità ricorrenti nella posa delle tessere e, più in generale, di ricostruire le tecniche antiche di realizzazione (è questo per esempio il caso di alcuni mosaici bresciani appartenenti al complesso delle cosiddette *domus* di Santa Giulia, scavati, restaurati *in situ* e resi visitabili all'interno dell'ex monastero di San Salvatore-Santa Giulia, attuale sede del Museo della città di Brescia; si veda al riguardo Gianfranceschi, Lucchesi Ragni 1998: 20 e, per la pubblicazione dell'intero complesso residenziale, Brogiolo, Rossi c.s.).

Su un pavimento sottoposto a restauri non documentati il riconoscimento degli interventi che ne hanno mutato l'aspetto parte dall'individuazione dei tagli praticati durante il prelievo dal terreno e le operazioni successive. Nella ricomposizione finale delle sezioni del mosaico queste linee di taglio sono

dissimulate, ma è possibile individuarle attraverso l'esame analitico della superficie del manto musivo. Si tratta in alcuni casi di vere e proprie linee riconoscibili per la presenza di un interstizio più ampio tra due file di tessere; più frequentemente però le giunzioni sono costituite da strisce di una o più file di tessere ricollocate, talvolta in modo non esattamente corrispondente alla situazione originale. Esempio eloquente è un grande mosaico appartenente a una villa romana rimessa in luce nel 1960-1961 a Brescia, in via San Rocchino, recuperato e restaurato da Edoardo Bernasconi (per una trattazione più approfondita sullo scavo, sui restauri e sulla parziale musealizzazione dei pavimenti della villa di via San Rocchino, nonché per immagini illustrative delle osservazioni condotte sulla superficie dei mosaici, sul retro del manto musivo, sulle preparazioni si rimanda ad Ardovino, Galletti, Masseroli 2000, con bibliografia precedente). Sul manto musivo si individuano strisce distinguibili per il livello della superficie, leggermente più alto, per il differente colore della malta, per anomalie della tessitura, per la minore densità delle tessere. In queste aree le tessere sono state evidentemente ricollocate dal restauratore per "ricucire" lacerti separati dopo il recupero, eseguito a rullo, e riallettati, in fase di restauro, su supporti distinti. La posizione dei tagli così individuati è stata confermata dai dati raccolti nel corso del nuovo restauro del pavimento, condotto nel 1998.

L'esame delle linee di taglio è dunque fondamentale per ricostruire le vicende del mosaico dal momento del rinvenimento a quello della presentazione finale. Ad esso strettamente connesso è il riconoscimento delle integrazioni delle lacune; queste, quasi inevitabilmente presenti in pavimenti da scavo all'atto del rinvenimento (lacune primarie), sono spesso aggravate dai danni che il mosaico subisce nel corso del distacco (lacune secondarie) o anche successivamente, rimanendo in attesa di sistemazione definitiva (i problemi connessi ai diversi tipi di lacune del mosaico, al loro trattamento antico e moderno, alle scelte che guidano gli interventi di integrazione sono stati recentemente discussi dagli addetti ai lavori nel corso di una Giornata di Studi preceduta da un Forum informatico; si veda al riguardo Foschi, Lugari, Racagni 2003). Significativo esempio di quest'ultimo caso è uno dei mosaici della già citata villa bresciana di via San Rocchino, rimasto per anni provvisoriamente allestito su un pannello in cemento - sul quale è visibile l'impronta della tela impiegata per lo strappo - e soltanto recentemente restaurato, con notevoli perdite soprattutto ai margini del lacerto, come chiaramente denuncia il confronto con la fotografia di scavo (fig. 1-2). Altre lacune vengono provocate dalla successione di interventi di restauro non felici: l'individuazione di almeno tre vecchi restauri su un mosaico bresciano da piazza Tebaldo Brusato,

ricostruiti attraverso l'esame della superficie musiva, è confermata dal confronto tra l'immagine di scavo, quella relativa alla prima esposizione e quella dello stato attuale, che ripropone il manto musivo come si presentava prima dell'ultimo intervento (un più completo esame del mosaico, corredato da immagini di dettaglio, in Ardovino, Galletti, Masseroli 2002).

I restauri del passato procedevano quasi sempre a integrazioni mimetiche non segnalate delle lacune, ma la distinzione tra parti originali e integrate è possibile attraverso l'analisi del manto musivo. Indicativa al riguardo è la malta di integrazione visibile negli interstizi tra le tessere, di norma distinguibile per colore e granulometria, ma l'elemento più rivelatore è il livello, più alto rispetto all'intorno, dell'intera integrazione, realizzata dal diritto in un secondo tempo, dopo il riallettamento del mosaico dal rovescio. Altro indizio di integrazione si ha quando le tessere aggiunte differiscono da quelle originali per materiale, colore, grado di usura, o anche per le loro dimensioni che, insieme all'ampiezza degli interstizi, determinano variazioni di densità misurabili. Di eccezionale importanza è infine l'analisi della tessitura, le cui anomalie (fig. 3) possono rivelare interventi moderni anche più arbitrari della mera integrazione di lacune: tra i mosaici esaminati si è spesso verificata la tendenza a "completare" i motivi o a regolarizzare i margini dei lacerti, per favorirne una presentazione più leggibile. Si riscontrano inoltre suture tra lacerti in origine non contigui, o addirittura totali rifacimenti. Un caso limite (fig. 4-5) è quello del mosaico rinvenuto nel 1820 a Brescia tra via Callegari e via Calini in ottime condizioni, oggi rifatto tessera per tessera sul disegno antico nel pavimento della cella centrale del *Capitolium* bresciano, mentre un lacerto avanzato dell'originale è esposto nel museo di Santa Giulia (l'interessantissima storia del mosaico del *Capitolium* è ricostruita, sulla base dell'esame analitico del manufatto e della documentazione d'archivio, in Galletti, Masseroli 2001, con bibliografia relativa).

Se i risultati dell'esame del manto musivo non mancano, nel caso di vecchi restauri è invece quasi sempre impossibile trarre indicazioni dalla preparazione originale: essa è stata in genere tanto più accuratamente eliminata, durante la pulizia del tessellato dal retro, quanto più interessante e pregevole il pavimento era ritenuto. Di fatto ne abbiamo trovato resti, inglobati nel pannello di supporto, soltanto in alcuni battuti, come quelli della *domus* cremonese di via Cadolini, sottoposti a un restauro meno accurato di quello riservato ai tessellati, nei quali infatti non v'è più traccia di preparazione (maggiori dettagli in Ardovino, Galletti, Masseroli 1998: 505 e fig. 2).

Nella maggior parte dei vecchi restauri esaminati il manto musivo è

riallettato su supporti in cemento armato; generalmente lo strato di allettamento è costituito da malta, ma non mancano casi di allettamento delle tessere direttamente nel cemento. Meno usuali sono pannelli di supporto in altri materiali, per esempio il truciolato impiegato per il restauro di un pavimento bresciano, il cui strato di allettamento, rimasto adeso al manto musivo nel corso del recente smontaggio del vecchio restauro, sembra essere cemento.

Considerata dunque la quasi totale perdita delle preparazioni originali, conviene focalizzare le ultime osservazioni sulla tessitura. La disposizione delle tessere, variabile a seconda della forma e delle dimensioni delle stesse e in rapporto alla presenza di motivi decorativi e alla loro tipologia, sembra seguire criteri in generale riconoscibili. Il caso più semplice è rappresentato dalle cornici a fasce monocrome, in cui le tessere si dispongono in file parallele alla cornice stessa, mentre le più ampie campiture monocrome, sia nel margine sia nel campo del pavimento, presentano spesso tessitura "a spina di pesce". Un'altra convenzione riscontrata riguarda i bordi del tessellato: mentre la "finitura" a contatto con le pareti dell'ambiente è ottenuta con tessere triangolari che rettificano il margine del pavimento, il raccordo del mosaico con soglie di passaggio è costituito da una o due file di tessere parallele alla soglia stessa. La presenza di tessere così disposte è particolarmente significativa nel caso in cui non sia nota l'articolazione dei vani, poiché questo tipo di tessitura suggerisce la localizzazione dei passaggi tra i diversi ambienti, come si è verificato nella villa bresciana di via San Rocchino, dove una cornicetta di questo tipo è l'unico indizio della posizione originale di una soglia in pietra, rinvenuta in giacitura secondaria (fig. 6) (per maggiori indicazioni in merito si veda Ardivino, Galletti, Masseroli 2002: 145 e fig. 9). Le anomalie riscontrabili nella tessitura di un pavimento musivo devono dunque essere osservate con grande attenzione non soltanto nel caso di mosaici oggetto di vecchi restauri, in quanto segnale, talora assai evidente, di interventi, anche antichi, subiti dal tessellato.

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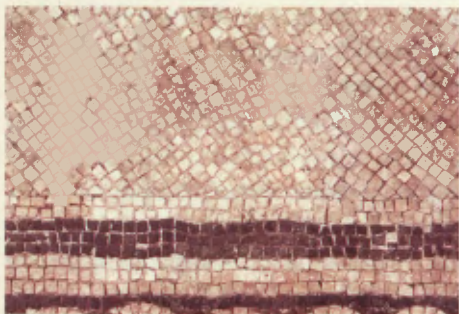
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FIGURE



1. Brescia, via San Rocchino. Mosaico con peltai in corso di scavo (Archivio Soprintendenza per i Beni Archeologici della Lombardia).



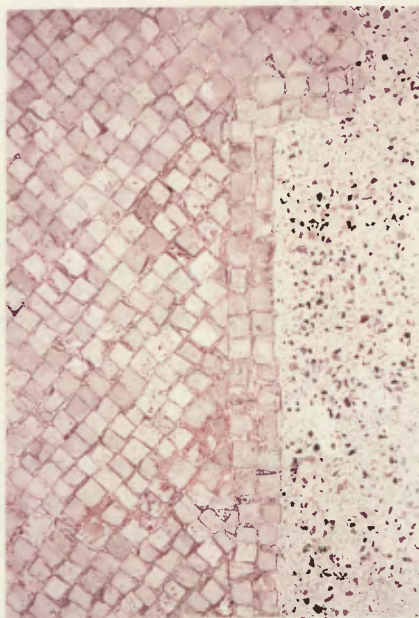
2. Brescia, Santa Giulia – Museo della Città. Il mosaico con peltai da via San Rocchino nella presentazione attuale dopo il restauro (foto E. Gagetti).



3. Brescia, Santa Giulia – Museo della Città. Particolare del mosaico con maschere da via San Rocchino nella presentazione attuale dopo il restauro: si notino le anomalie della tessitura (foto E. Gagetti).



4. Disegno ottocentesco del mosaico rinvenuto a Brescia tra le vie Callegari e Calini (da *Intorno vari antichi monumenti scoperti in Brescia, Brescia 1823, tav. IV*).



6. Brescia, Santa Giulia – Museo della Città. Mosaico con peltai da via San Rocchino: particolare della cornice che circondava una soglia oggi perduta (foto E. Gagetti).



5. Brescia, Capitulum, cella centrale. Rifacimento del mosaico rinvenuto a Brescia tra le vie Callegari e Calini (foto E. Gagetti).

TATIANA CLEMENTI

**UNA BANCA DATI COMPUTERIZZATA PER IL MOSAICO:
RISULTATI DEL TEST SUI PAVIMENTI ROMANI DI PADOVA (ITALIA)**

SUMMARY

Recently a group of study co-ordinated by prof. Francesca Ghedini of the University of Padova has worked for the development of a data bank for mosaics on processing support, which has reached this year the stage of operating prototype.

The present paper intends to briefly illustrate the first results obtained, in the hope that such computerized catalogue system can be adopted by the greatest number of institutions, offering a contribution to the restoration, safeguard and management of the archaeological assets.

RÉSUMÉ

Un groupe de recherche coordonné par le prof. Francesca Ghedini de l'Université de Padoue, s'est récemment activé pour développer une banque de données informatique sur la mosaïque, qui cette année a atteint le niveau d'un prototype opératif.

La relation ici présentée a pour but d'illustrer les premiers résultats obtenus, dans l'espoir que ce système de catalogation informatique puisse être adopté par le plus grand nombre possible d'institutions, apportant ainsi une contribution considérable à la restauration, à la sauvegarde ainsi qu'à la gestion du patrimoine archéologique.

La documentazione sui mosaici e sui rivestimenti pavimentali si è notevolmente accresciuta negli ultimi decenni e alle numerose scoperte ha corrisposto una straordinaria fioritura degli studi e delle ricerche.

Recentemente la professoressa Francesca Ghedini dell'Università di

Padova e il suo gruppo di studio hanno lavorato alla creazione di una banca dati per il mosaico su supporto informatico, un progetto, di cui è stata antesignana la Scuola francese ma che è il primo nel suo genere in Italia, che è stato presentato dalla prof. Ghedini e dalla dott. Tatiana Clementi al VII Colloquio AISCOM tenutosi nel 2000 a Pompei (Ghedini, Clementi 2001: 661-672).

Il sistema in questione può essere un valido aiuto per la salvaguardia e la valorizzazione del patrimonio musivo, in quanto da un lato, mettendo a disposizione un numero considerevole di informazioni utili alla ricerca, facilita lo studio e la conoscenza dei materiali, e dall'altro, grazie ai dati riguardanti la conservazione, si propone come strumento per la tutela dei beni archeologici. Esso offre inoltre gli indubbi vantaggi di uniformare il linguaggio (ad esempio riguardo alla tipologia degli edifici, alla tecnica esecutiva, agli schemi e ai motivi decorativi) e di essere facilmente consultabile e aggiornabile.

La banca dati ha raggiunto quest'anno il grado di prototipo operativo e per verificarne la funzionalità e la praticità le notizie sui pavimenti scoperti a Padova sono state inserite nel programma informatico¹.

Il presente intervento intende illustrare i primi risultati ottenuti, nella speranza che la catalogazione informatica qui presentata possa essere adottata dal maggior numero possibile di Istituzioni, contribuendo sia alla conoscenza sia alla gestione del patrimonio musivo di epoca antica.

A questo proposito, la prima parte della relazione è focalizzata sulle informazioni a carattere storico-artistico ricavabili dall'uso della banca dati, mentre la seconda è rivolta ad alcune considerazioni riguardanti le problematiche della conservazione.

Il *corpus* dei pavimenti e dei mosaici di Padova non ha ancora ricevuto una pubblicazione esaustiva, sebbene i rinvenimenti, tra editi e inediti, si aggirino intorno al centinaio e per quanto alcuni studiosi se ne siano occupati (cfr., ad esempio, Brusini 1952-1953: 169-193; Tosi 1978: 103-116; Corso 1982: 83-119; Zovatto 1963: 12, 44-48; Donderer 1986: 165-172; Porta 1995: 231-244).

La quantità e la qualità dei dati a disposizione sono d'altra parte spesso scoraggianti, in quanto non solo le relazioni meno recenti sono sommarie, ma

1. Il mio grazie più sentito alla dott. Angela Ruta Serafini, ispettrice presso la Soprintendenza Archeologica di Padova, che, oltre a permettere la consultazione degli archivi, è stata prodiga di consigli e costantemente disponibile nel fornire informazioni, e al dott. Girolamo Zampieri, direttore del Museo Archeologico di Padova, che mi ha consentito di visionare di persona sia i mosaici esposti sia quelli conservati nei depositi.

la continuità di vita della città ha ostacolato l'effettuazione di scavi estensivi, per cui i recuperi spesso sono stati, e sono, occasionali e di emergenza, con una conseguente difficoltà nella comprensione dei contesti archeologici. Tenendo conto quindi del fatto che le informazioni sono assai disomogenee e spesso lacunose, si è sentita più che mai la necessità di una raccolta che fosse il più possibile sistematica.

La prima sezione della banca dati riguarda i contesti di ritrovamento dei rivestimenti musivi: la distribuzione topografica, gli edifici e gli ambienti di pertinenza.

Le considerazioni sulla topografia si basano fondamentalmente sulle piante associate a ciascun mosaico, che ne indicano la posizione all'interno della città. Per quanto riguarda Padova romana, i pavimenti venuti in luce sono una fonte di informazione fondamentale e preziosa non soltanto del fatto che i quartieri residenziali si estendevano in modo speculare in entrambi i settori urbani definiti dall'ansa e dalla controansa del fiume Brenta, ma anche che la loro occupazione è stata contemporanea e continua (Clementi c.s.).

Ad un secondo livello di analisi, prendendo in esame i contesti architettonici e la destinazione degli ambienti, la banca dati ha agevolato l'evidenziazione del fatto che gran parte dei mosaici di *Patavium* proviene da residenze private e che almeno una decina di pavimenti di pregio sono attribuibili con un certo margine di sicurezza ad ambienti di rappresentanza, come testimoniano in alcuni casi le notevoli dimensioni, in altri la decorazione e la ricchezza dei materiali impiegati. Un solo rivestimento pare attribuibile ad un cubicolo: presenta infatti dimensioni ridotte e l'ornato è suddiviso in due parti diseguali, con ogni probabilità corrispondenti all'alcova e al *procoeton*. Altri casi testimoniano come anche ambienti di passaggio, corridoi e criptoportici, potessero essere ornati da tessellati e stesure a commessi laterizi.

L'esame delle informazioni desumibili dalla seconda sezione della banca dati, focalizzata sui rivestimenti in sé, rivela come i percorsi di ricerca si moltiplichino.

Riguardo alle considerazioni cronologiche, è necessario purtroppo rilevare che la maggioranza dei pavimenti è datata su base stilistica, e quindi incerta: avere a disposizione nella scheda informatizzata le informazioni sui mosaici (non solo patavini) datati in base a criteri archeologici si rivelerebbe pertanto di fondamentale importanza per la revisione delle cronologie.

Pur non escludendo, quindi, che si possano rivedere alcune datazioni, è comunque evidente che gli esemplari di *Patavium* interessano un arco temporale assai ampio, esteso tra la fine del II sec. a.C. e la fine del V sec. d.C. (alla prima metà del VI sec. d.C. si datano solamente i pavimenti del complesso

cristiano di S. Giustina), e si concentrano tra il I sec. a.C. e il I sec. d.C., periodo a cui corrisponde grosso modo lo sviluppo e la monumentalizzazione della città romana; i pavimenti più tardi del I sec. d.C. non sono molti e con ogni probabilità tale diminuzione rispecchia la progressiva contrazione urbanistica.

Per quanto concerne le tipologie attestate, è indubbio che i cementizi decorati da tessere costituiscano il gruppo più antico: gli scavi ne hanno restituiti numerosi, per lo più ascrivibili al I sec. a.C., ma non manca un esempio della seconda metà del I sec. d.C. che ci informa sul perdurare di questa tecnica e quindi indirettamente getta luce sul conservatorismo della committenza. Oltre ai cementizi, i tessellati sono di gran lunga i più diffusi, sebbene siano conosciute ed impiegate anche altre tipologie, come documentano i pavimenti con stesura a commessi laterizi con inserito un pannello realizzato in tecnica diversa (in tessellato o a lastre), quelli in lastre (*sectilia*) e quelli in cubetti di cotto.

Un'osservazione interessante riguarda l'accostamento tra cementizi e tessellati, attestato sin dalla metà del I sec. a.C. e in voga ancora nella prima metà del I sec. d.C., forse per un gusto antiquario dei padroni di casa, che intendevano suggerire con l'utilizzo di pavimenti *retro* l'antichità della propria abitazione.

Per quanto riguarda l'analisi della decorazione, facilitata dall'uso della banca dati, emergono l'indubbia predominanza della soluzione coprente, sebbene non manchino casi di soluzione accentrata e giustapposta, e la predilezione per schemi geometrici semplici e assai diffusi, basati su un repertorio vasto e ben consolidato, i cui moduli appaiono contenuti e in armonia con le dimensioni dei pavimenti.

I bordi, piuttosto bassi, sono di preferenza decorati da fasce monocrome e trecce, per quanto siano comuni anche il meandro (in particolare quello di svastiche a giro semplice e quadrati) e le linee semplici punteggiate, mentre i campi sono ornati soprattutto da reticolati e punteggiati. I motivi vegetali si possono solitamente ricondurre a schemi geometrici vegetalizzati come, ad esempio, i racemi a volute, le ghirlande e i nastri con foglie, e la decorazione figurata viene subordinata a quella geometrica (non è comunque escluso che in futuro si scoprano mosaici figurati più complessi). In linea con tale sobrietà, l'utilizzo di tessere di colore diverso dal bianco, dal nero e dal rosso è piuttosto raro.

Un altro percorso di indagine interessante, e che pare ribadire quanto già emerso sulla sostanziale coerenza della cultura musiva di *Patavium*, è quello riguardante il programma decorativo dei pavimenti appartenenti al medesimo

contesto edilizio: si riscontra infatti una indubbia omogeneità e mentre in alcuni casi i motivi sono assai simili ma non identici, in altri è documentato addirittura l'impiego degli stessi schemi geometrici.

Concludendo, quanto messo in luce finora non lascia dubbi sul gusto della committenza patavina, improntato ad una notevole sobrietà: non sono documentate partizioni particolarmente complesse, policromie accese, motivi figurati particolari. Le decorazioni dimostrano una tenace persistenza e una severità ornamentale continua, rigore e omogeneità caratterizzano l'intero apparato decorativo delle abitazioni.

E' rilevante anche osservare come non vi siano pavimenti che si discostano nettamente dagli altri per ricchezza e bellezza e tale mancanza di eccessi sontuari fa pensare che la volontà di autorappresentazione fosse limitata.

In definitiva la decorazione dei mosaici testimonia che la classe abbiente di *Patavium* non riteneva di buon gusto sfoggiare ricchezze e ricercatezze eccessive, ma la cronologia degli esemplari conosciuti, la quale raggiunge addirittura il V sec. d.C., prova anche che, pur nell'ambito di una certa sobrietà, l'*élite* cittadina non ha mai rinunciato ad abbellire le proprie abitazioni con pavimenti di pregio, un dato che ci illumina indirettamente sulla prosperità di *Patavium* e sul perdurare della tradizione musiva.

Quanto scritto finora intende essere un'esemplificazione di alcuni dei numerosi percorsi di studio per i quali la banca dati proposta può essere di aiuto: come già enunciato, infatti, alla salvaguardia del patrimonio musivo contribuisce senza dubbio anche la diffusione delle conoscenze sui materiali e sui loro contesti.

Sempre nell'ambito della tutela, le informazioni contenute nella banca dati possono venire impiegate in un progetto globale per la gestione dei beni archeologici di un determinato territorio: tra i dati più utili a questo fine si annoverano senza dubbio le piante della località / città associate ai rivestimenti musivi, situate nella prima sezione di ogni scheda, le quali, oltre a fornire, come visto, spunti per gli studi sull'urbanistica, consentono anche di verificare le aree che rivestono maggiore interesse (fig. 1).

Un secondo aspetto legato alla valorizzazione dei mosaici riguarda la loro conservazione e quindi lo sforzo di preservarli per il futuro.

A questa problematica è dedicata un'intera sezione della banca dati (fig. 2): è necessario puntualizzare, tuttavia, che non essendo questo proposto uno strumento rivolto in modo specifico ai restauratori (sarebbe necessaria una banca dati *sui generis*), i criteri di ricerca sono piuttosto generali. Ci sembra, comunque, che rispondano a più esigenze, ed inoltre è lasciato ampio spazio a

descrizioni e note.

Tra le voci che possono essere sottoposte a ricerca rapida (e alle quali corrisponde una "lista valori") vi sono lo stato di *conservazione*, che permette di verificare l'effettiva consistenza dei manufatti, e il *luogo di conservazione*, che indica se il mosaico si trova *in situ* o *ex situ*, e in questo caso se è stato trasferito in un museo, in Soprintendenza o in un'altra sede.

E' stata inoltre creata una "anagrafica" grazie alla quale per ciascun luogo di conservazione, soprattutto se pubblico, è specificato l'indirizzo, il numero telefonico e il nome del responsabile a cui rivolgersi, sia esso un conservatore, un soprintendente o altro. Quest'ultima informazione è finalizzata a facilitare la comunicazione tra operatori ed interessati e a dare un rapido accesso ai materiali; a tal fine si sono inserite anche le voci concernenti l'ubicazione esatta dei materiali (sala espositiva, magazzino ...) e il numero di inventario.

Nel caso di Padova, si è verificato che i rivestimenti musivi scoperti in epoca meno recente sono in gran parte conservati, *ex situ*, ai Musei Civici agli Eremitani, esposti in una delle sale della sezione archeologica, e in alcuni casi si è riscontrato purtroppo che lo strappo ha interessato solo le parti esteticamente più valide del pavimento. Numerosi ritrovamenti degli ultimi decenni, invece, sono stati lasciati *in situ*, quando possibile fruibili dal pubblico, un dato che testimonia un crescente rispetto per i contesti.

Le voci che possono interessare maggiormente coloro che si occupano della conservazione e del restauro sono concepite sotto forma di "testo", ossia come pagine nelle quali si possono inserire le informazioni sotto forma discorsiva, e riguardano principalmente gli interventi antichi, quelli moderni, gli elementi di reimpiego. Nelle descrizioni, quando possibile, si segnalano le strategie, gli strumenti, i supporti, i materiali e i prodotti adottati. I commenti sulle applicazioni tecnologiche e le problematiche incontrate possono essere inserite anche nello spazio lasciato alle note.

Ad ulteriori considerazioni, ad esempio sull'adeguatezza dei depositi e sulle garanzie offerte dalle aree archeologiche per prevenire l'alterazione e il deterioramento dei manufatti, è riservata la voce sull'esposizione al rischio.

In questo modo si è pensato di mettere a disposizione il maggior spazio possibile alle informazioni sugli interventi del passato, alle notizie sulle ultime operazioni e alle valutazioni degli esperti.

E' opportuno sottolineare che questa sezione della banca dati è un terreno di incontro privilegiato tra le competenze dell'archeologo e quelle del restauratore e che tanto la corretta compilazione delle voci quanto la loro consultazione implica un dialogo tra queste due figure: esso non può essere che proficuo per entrambe le parti.

Ai fini della conservazione si possono inoltre rivelare assai utili alcuni dati inseriti nella sezione dedicata al mosaico in sé, come quelli riguardanti la sua preparazione (inclusa l'analisi petrologica), i quali comprendono sia l'allettamento, e quindi le malte, sia gli altri strati correlati al manufatto (fig. 3), e quelli, altrettanto preziosi, aventi per oggetto i componenti del rivestimento (tessere, lastre o altro) e i materiali impiegati (fig. 4).

La nostra banca dati, pertanto, può essere anche considerata come uno aiuto per porre a confronto tecniche e metodologie, permettendo, ad esempio, di verificare rapidamente quali siano le varie, ed eventualmente le migliori, procedure di intervento su mosaici realizzati con determinati materiali.

Dal momento, inoltre, che ogni scheda è corredata dalle immagini digitali del rivestimento, è possibile anche inserire le fotografie del manufatto prima e dopo le operazioni di conservazione / restauro.

Il caso di Padova, per quanto concerne le tecniche di conservazione, rispecchia lo straordinario sviluppo degli ultimi decenni: in passato, infatti, numerosi pavimenti conservati ai Musei Civici hanno subito e lucidature estese e restauri piuttosto invasivi e non reversibili, mentre attualmente si osservano interventi di conservazione preventiva e di mantenimento più cauti e rispettosi.

Naturalmente ancor oggi le diverse strategie tengono conto delle differenze tra frammenti decontestualizzati, esposti in un museo, ed esemplari che a tutti gli effetti fanno parte di un complesso archeologico, e devono quindi essere fruibili all'interno di un quadro complessivo. A questo proposito si ricorda che, sebbene sia stato indispensabile strappare i notevoli mosaici scoperti presso Palazzo Zabarella (Ruta Serafini, Michelini 1996: 7-17), i pannelli sui quali sono stati montati sono stati lasciati in mostra all'interno dell'edificio, consentendo così il recupero del dato topografico.

In conclusione, la banca dati presentata non vuole essere una mera raccolta di informazioni, ma intende offrirsi come uno strumento a tutto tondo, duttile e veloce, utilizzabile da un lato in molteplici percorsi di ricerca di ambito storico-artistico e di ambito più propriamente tecnico-scientifico, dall'altro come sussidio per le strategie di tutela.

Il nostro lavoro intende pertanto rivolgersi al maggior numero possibile di utenti, non solo archeologi, ma anche amministratori, conservatori e restauratori, nella convinzione che, per raggiungere l'obiettivo comune della valorizzazione e della salvaguardia del patrimonio musivo, sia di fondamentale importanza tanto far conoscere ed apprezzare i beni archeologici, quanto evitarne il deterioramento e trasmettere questa preziosa eredità alle generazioni future.

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FIGURE

DATABASE mosaici EDIFICIO

AMBIENTE RIVESTIMENTO

Nazione: Italia Località: Padova


Tipologia: edificio residenziale


Descrizione: Il complesso, affacciato sulla strada che conduceva al Brenta, presenta quattro diverse fasi cronologiche. La prima si colloca tra la fine del II sec.a.C. e l'inizio del I sec.a.C.

Ubicazione dello scavo: via Zabarella, Palazzo Zabarella

Datazione precisa:

Datazione approssimata: metà del I sec.a.C. Criteri di datazione: archeologici

Pianta della Località:  C:\Immaginidb\PA\Zabarella.jpg

Pianta dell'Edificio:  C:\Immaginidb\PD\Zabarella pianta.jpg

1. Pagina della banca dati relativa al contesto architettonico del mosaico, nella quale è compresa.

DATABASE mosaici EDIFICIO

AMBIENTE RIVESTIMENTO CONSERVAZIONE

Oggetto conservato: Conservato in:

Descrizione oggetto conservato:

Luogo di conservazione:

Responsabile: Tel.:
Stato:

Ubicazione: N° inventario:

Stato di conservazione:

Restauri antichi: Elementi di reimpiego:

Restauri moderni: Esposizione al rischio:

Note:

[http://www.museiroma2.it/mosaici/](#)

2. Pagina della banca dati relativa alla conservazione.

DATABASE **mosaici** **EDIFICIO** **AMBIENTE** **RIVESTIMENTO**

Nome del rivestimento

Data del ritrovamento

Posizione

Rapporti stratigrafici con le murature

Scansione

Immagine del rivestimento

Seleziona

Descrizione

Tipo di preparazione

Analisi petrologica

Spess. della preparazione (metri)

Quota del rivestimento (m)

Fascia

Conservazione **CONSERVAZIONE**

BIBLIOGRAFIA **TAPPETO**

3. Pagina della banca dati relativa al mosaico, nella quale figurano le voci riguardanti la preparazione.

TESSERE: Campo **RIVESTIMENTO** X

Materiale	Colore	Provenienza
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

4. Pagina della banca dati relativa alle componenti del rivestimento.

GIULIANO DE FELICE *

**THE DOCUMENTATION DURING CONSERVATION
OF THE MOSAICS OF ZEUGMA, TURKEY**

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SUMMARY

The work of documentation carried out on the mosaics of Zeugma is based on the consideration that the analytical quality the relief practice entails makes graphic documentation an instrument of knowledge of ancient monuments, exactly in the same way as the longstanding "confidence" with the manufacture, that the very process of restoration develops, produces a deep knowledge of its nature.

The documenting procedures of the mosaics of the Zeugma project were worked out on the basis of premise that the necessity of recording all restoring intervention is warranted by the transformations every monument undergoes in the process of restoration and were elaborated relying on a wide use of computer and digital instruments.

The necessity of documenting all restoring intervention is warranted by the transformations every monument undergoes in the very process of restoration. The documentation of the state of the monument before the preservative intervention and of the preservation operations which are carried out on the monument itself allows the restorer to save a huge amount of data, which restoration would otherwise render invisible or cancel altogether. All restoring intervention indeed constitutes a great opportunity of study, in that it implies the possibility of carrying out tests concerning the intrinsic features of the manufacture. It also allows one to study the changes the manufacture has undergone in the course of history, from the moment of its realization to the phases of its transformation into an archaeological find.

The documenting procedures of the mosaics of the Zeugma project were worked out on the basis of these premises, in order to organize mapping in the best possible way; mapping itself was processed by the conservators while restoration was being carried out, with the aim of recording and rendering immediately intelligible data as diverse as:

- features concerning technology and modalities of realization (e.g. use of different materials and colours, traces of preparatory drawings), which are relevant to historic and artistic studies;
- earlier restorations and remakings, or historic and archaeological data, regarding the life of the manufacture and of the containing site;
- instances of destruction and traumatic events, or elements concerning the history of the manufacture's obliteration (post-depositional processes);
- restoration which was carried out, in order to give evidence of the intervention methodology that was used, as well as of the operations of preservation which were carried out.

The documenting techniques which have been set up were elaborated relying on a wide use of computer and digital instruments. This warranted speed and versatility of management were rendered necessary by the huge amount of data which were produced in the course of the restoration project of the Zeugma mosaics. The project entailed the movimentation and treatment of a wide quantity of mosaics (about 700 square metres), adding up to about 500 fragments, which were carried out by a great number of conservators over a long period of time. The whole project implied also a great use of materials and facilities covering a wide working field (2 labs for 250 square metres in all).

Video and photo documentation

The photographic documentation which has been realized is basically made up of "yard" photos, documenting the preservation state of the mosaics, as well as the various intervention operations. Approximately 3000 shots constitute a wide data bank, which not only testifies to the memory of the manufactures, but is also relevant in terms of divulgation and teaching methodology. The final photographic documentation, on the other hand, required the intervention of professional photographers, due to the need for professional equipment connected with difficulties in shooting manufactures which cover an area bigger than fifty square metres. Digital video documentation too is made up essentially of shooting covering the various stages of the different intervention methodologies. This will not be shown here,

due to the long-lasting montage it needs.

Graphic documentation

While video shooting and photos are a relevant part in the documentary archive of this project, graphic documentation constitutes the most demanding and significant component of the archive itself.

The decision to entrust the recording of all the preservation interventions which were carried out on the Zeugma mosaics to drawings is basically grounded on the qualities which characterize the graphic language as universal, immediate and synthetic. Such qualities perfectly meet the needs for clear and effective documentation of all the properties of the restored objects, as previously mentioned.

The method used

The entire documentation was managed on a local network which was made up of two PCs of average power, using a software for CAD vectorial drawing and raster graphics for the creation of the final mappings. An A3 format printer allowed for the colour printing of documents – even of large format – while the printing of smaller and monochromatic documents was carried out with an A4 laser printer. The photos of the lab activities and those supporting drawings were taken with a compact digital camera, and with a Digital Video videocamera.

The main operational difficulty in the realization of drawings to be used as a basis for the mapping consisted in the absence of any sort of documentation (sketches, measurements, etc.) for most of the mosaics. It is clear enough that it is not easy at all to draw something you have never seen, which is cut into panels for the most part and set with the mortar on the back in sight, when you have no possibility of following the phases of montage on new bearings.

The only possible way of drawing the mosaics was to proceed, one panel at a time, from the back, during the cleaning of the backs themselves, while the restoration was being carried out. Through the integration of what was visible from the back of the panels with the few photos at our disposal it was possible to single out the fundamental geometric elements, and realize a first draft by turning the drawing over. This procedure made it possible to provide the graphic bases to record the operative interventions on the mosaics immediately. By connecting the different drawings the relief of the mosaic as a whole was realized, at least as far as its fundamental components were concerned (fig. 1).

After drawing the mosaic frames and panels, blocks which contained the geometrical filling patterns (braids, meanders, perspective cubes, etc.) were

inserted. The separate geometrical components were drawn on the basis of vertical photos of detail and measurements, and were later multiplied by the exact number of their occurrences.

It was necessary on the other hand to wait for the final mounting to be able to check the mosaics' real dimensions and complete the pattern with those elements which had turned out to be illegible from the back, such as especially complex geometrical patterns or figured panels. The use of CAD drawings warranted the handling of all the operations of overturning, assembling and reorganization.

In particular, as far as figured panels are concerned, it turned out that we could not proceed from the back to the drawing, due to the variety of the tesserae's chromatic effects and the complexity of the drawings themselves. As a consequence, figured *emblemata* were drawn once they had been turned over, "unveiled" and cleaned only, whereas the most urgent mapping were dealt with by making use of sketches, or photos which had been taken before removal, if available, that were used as a basis.

These drawings were carried out following three steps (fig. 2):

1. Orthogonal photography, which was realized with a digital camera at its highest resolution. For the bigger figured panels a series of photos was prepared, which was followed by recomposition by means of a special software.
2. Vectorialization of raster images with different layers, in order to highlight the difference between the outlines and the essential traits of the figures, and their details.
3. Re-elaboration by software of treatment images until the final graphic format is achieved.

Elaboration of a standard method

The drawings which have been realized by making use of the above described method provide the basis for the documentation of the mosaics' history, from the moment of their removal from the site to workmanship in Gaziantep museum. To this purpose, a pattern was worked out; it was made up of four tables, each in turn subdivided into sub-tables, in order to avoid overcrowding elements, devoted to the various elements to be documented (fig. 3).

One table is given up to the analysis of ancient techniques (fig. 4) (use of tesserae made of glass paste, changes in texture of tesserae, ancient polishing, use of preparatory drawings) as well as to the floor's life (ancient restorations); another table is devoted to the removal from the site.

The following table is given up to the preservation state. In the drawings devoted to the preservation state all pathologies the mosaics underwent in the course of their life and in their condition as finds are included; whereas for the mosaics which were already under restoration and had been previously stored in a museum, separate headings have been set, in order to document their special preservation conditions. Lastly, table four concerns the preservation interventions which have been carried out (fig. 5).

From the mosaics drawings it was possible to reconstruct the original appearance of the mosaic floors, by integrating the areas covered with geometrical decorations which were missing by means of a sort of "virtual restoration", as a form of support to documentation, which makes the object "visible" "as it actually was" – or, at least, "as it probably was" – without any alteration of the original object (fig. 6). The integration with the excavation documentation allowed the elaboration of tridimensional reconstructions of the original settings in which the mosaics were placed, pointing to a museum-to-come which will offer a faithful reconstruction of the setting.

Conclusions

In order to draw the Zeugma mosaics it was constantly necessary to understand the features of composition of the different elements which were figured; in particular, it was important to understand the geometry and modules which were needed to realize the geometrical patterns. These, in turn, showed great fantasy and structural complexity, together with an extraordinary executive accuracy. Finally, we needed to understand how the mosaic workers used colours. Drawing the Zeugma mosaics, then, similarly to any archaeological find, has turned out to be a form of interpretation of reality, and every table which has been produced can be considered as the result of a synthesis which followed accurate analysis of the object, with the peculiarity of being a "drawn up", and not "written", report.

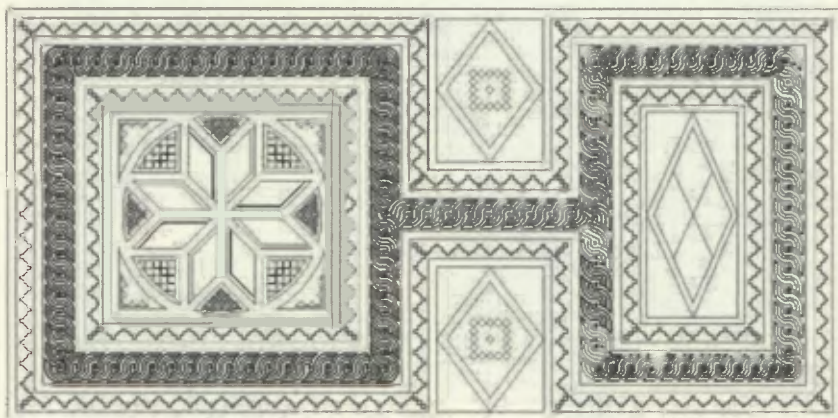
The use of digital instruments and computer application allowed us to rationalize and co-ordinate many restorers' work, which was carried out over a long stretch of time and on a considerable quantity of mosaics; the use of computer tools allowed us to manage easily a great quantity of images, to work out versatile drawings, which can be printed on any scale, any colour or trait, etc.

Computer application to documenting activity allowed us to achieve relevant increases of productivity, which did not imply the distortion of a method of relief which was based a priori on methodologically consistent foundations, thus avoiding the risk of erroneously identifying the computer

product (the drawing in our case) with the end of the work itself. In spite of the enormous development of computer applications in the field of archaeological research, relief and documentation, we cannot rely nowadays on instruments so intelligent as to be able to substitute the relief phase, and, even if we could one day, we would be made to ask critically to what extent they represent a commodity rather than a distortion of the correct, however slower, analytical method.

As a final remark, the work of documentation which has been realized is founded not so much on a blind faith in the possibilities computers offer, which are likely to continue to astonish and enchant us in the future, as on faith in the expressive potentialities of drawing, which have been previously mentioned. Above all, it is based on the consideration that the analytical quality the relief practice entails makes graphic documentation an instrument of knowledge – as well as description – of ancient monuments, exactly in the same way as the longstanding "confidence" with the manufacture, that the very process of restoration develops, produces a deep knowledge of its nature.

FIGURES



1. Achilles mosaic: drafting of geometrical patterns.



2. Achilles mosaic: from orthogonal picture to raster image.

Plate 1a	Plate 1b	Plate 1c	Plate 2	Plate 3a	Plate 3b	Plate 3c
Historical analysis	Historical analysis	Ancient restorations	Previous interventions	Condition	Condition	Condition
Glass paste tesserae	Traces of preparatory drawing on reverse (Black)	Use of original or similar tesserae to reconstruct the motifs	Numbering of fragments due to removal from the site (museum)	Lacunae	Insoluble surface deposits	Scratches
Changes in texture and dimensions of tesserae in areas with inscriptions	Traces of preparatory drawing on reverse (Yellow)	Use of original or similar tesserae, without reconstructing the motifs	Cement fillings	Cracks	Iron oxide	Damage due to mechanical stress
Original polishing	Traces of preparatory drawing on reverse (Red)	Use of tesserae that differ from the original, reconstructing the motifs			Copper oxide	
Polishing due to ancient restoration		Use of tesserae that differ from the original, without reconstructing the motifs			Burned areas	
		Use of different materials for tesserae (marble)			Microbiological growth	

Plate 3d	Plate 4a	Plate 4b	Plate 4c	Plate 4d	Plate 4e	Plate 4f
Condition	Conservation 2000-2002 Reapplication on new support	Conservation 2000-2002 Treatment of lacunae	Conservation 2000-2002 Surface consolidation	Conservation 2000-2002 Cleaning	Conservation 2000-2002 Finishing	Conservation 2000-2002 Surface protection
Decohesion	Panels, final numbering	Lime mortar fillings	Filling between tesserae with hydraulic mortar	Mechanical, with water	Surface polishing with plastic brushes	Applying Paraloid B72 1.5%
Disaggregation of tesserae	Re-laid from the reverse side	Re-laid tesserae	Applying Paraloid B72 on glass paste	Chemical and mechanical		
Disaggregation of glass paste tesserae	Re-laid from the front side					
Exfoliation						
Surface Corrosion						

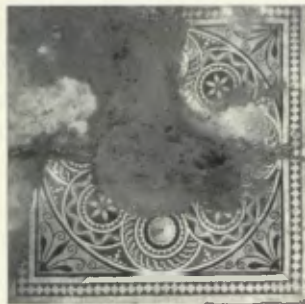
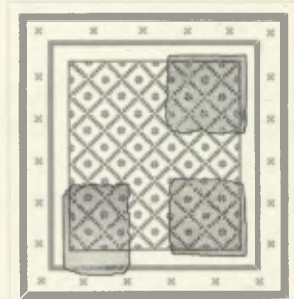
3. Pattern of the plates used for documentation.



4. Daedalus and Dionysus mosaic: plate 1b, documentation of preparatory drawings on reverse side.



5. Eros and Psyche mosaic: plate 4c, documentation of preservation interventions.



6. Geometric mosaics from baths: virtual reconstruction of geometrical patterns.

NICKY DAVIDOV*, JACQUES NEGUER*

**MOSAIC CONSERVATION PLANNING BASED ON RECTIFIED PHOTOGRAPHY
AND STANDARD PC SOFTWARE
THE CASE: KATHISMA PROJECT, JERUSALEM, ISRAEL**

*Israel Antiquities Authority, Jerusalem, Israel

SUMMARY

During the last five years the progress of commercial hardware and software has provided a faster, cheaper, and more accurate way to carry out graphic conservation documentation. Two very important steps were done in this period to reach a completely different level of accuracy and quality of the graphic recording.

RÉSUMÉ

Durant les cinq derniers années le développement du software et hardware nous à permis d'effectuer vite des travaux graphiques de documentation à un prix relativement bas. Cet article représente le sommaire de l'expérience acquise durant le projet de conservation du site de Kathisma à Jérusalem, Israël.

The Church was discovered in 1992 near the Monastery of Mar Elias, when the highway between Jerusalem and Bethlehem was being widened and a bulldozer accidentally uncovered and damaged a mosaic floor. The remains of a Byzantine-period church are located in an ancient olive grove within the southern municipal borders of Jerusalem, on land owned by the Greek Orthodox Patriarchate. The church was built in the 5th century and restored in the 6th century. In the 8th century, it was converted into a mosque, and was destroyed shortly thereafter.

The size of the building and its sophisticated, octagonal plan indicate that this has been a church of great importance. A flat, protruding rock (the "seat") is the focal point, surrounded by two octagonal hallways: the inner one served

as a walkway (*ambulatoria*) from which the worshippers could view the stone seat; the outer hallway was divided into rooms and four chapels. Nearly all the rooms of the church were paved with coloured mosaics; some had been added in the 8th century. The mosaics are in many shades of red, yellow and green in a variety of floral and geometric designs.

The first excavations were very limited (October 1992 – February 1993). Only one section of the western part of the church was uncovered, and after that the mosaic floors were re-covered.

Renewed excavations in 1997 revealed almost all the mosaic floors and a big part of the building.

During these two excavation campaigns conservation works were not performed except for first aid. Recording and conservation documentation were not done except a few hand drawings of mosaics and a preliminary report - overall photographs and overview of the general conservation problems of the site.

The last excavation campaign, directed by Mrs. R. Avner (IAA) continued two seasons - 1999 and 2000/2001. After the end of the excavations it was decided to develop this very important site for tourism and pilgrimage. The partners in the project are The Greek Patriarchate of Jerusalem, The East Jerusalem Development Company (Ministry of Tourism) and the Israel Antiquities Authority.

The Master plan involves:

- Landscape Architectural planning
- Architectural planning
- Planning of the construction of a huge dome for roofing (around 50 m diameter)
- Conservation and restoration planning.

Scope of the Conservation project:

- Conservation of the existing structures
 - Restoration of the supporting walls
 - Conservation of the plasters
 - Conservation of the mosaics
- 450 sq. meters of mosaics are preserved in the site.

The Conservation plan involves:

- Recording of the mosaics (photography and rectified digital photography used for creation of base-maps)

- Assessment report of the physical conditions (the data were mapped on the base-maps using AutoCAD software giving us the possibility to work in scale and calculate surfaces and quantities for the planning)
- Intervention planning (using the same base-maps and method).

The project implementation was done by the Art Conservation Section of the Conservation Department of the Israel Antiquities Authority with the participation of a team of Greek conservators.

The first and very important step of the digital recording process is creating the base map of the object. The precision and accuracy of rectify photographs define to a great extent the quality and accuracy of the further documentation process - data collection, analyzing, conservation planning. Taking rectify photographs on the field is an operation that needs it's own planning and decision taking. How to perform rectify photo recording depends on the specific conditions on the site and the available resources.

A *Rectify photograph* in this sense is an image taken or/and developed in a way to avoid any perspective distortions, using standard equipment and software. This is not orthophotograph, where also optical aberrations (distortions) are avoided using special equipment and software.

For taking a rectify image the lens axis has to point perpendicular to the center of the object's plane. The film's plane has to be parallel to the object's plane.

The main problem is that the object is placed horizontally on the floor and very often it is large. Some system must be built to elevate the camera above the site and take vertical, orthogonal photographs of the floor. If the distance between the camera and the object (*object distance*) is not sufficient the field has to be divided into a couple of sectors. After taking a rectify picture of each sector, the images have to be assembled to a complete mosaic image. A fixed focal length lens is preferable over a zoom, since the scale of the photo will be the same for fixed elevation above each sector.

Taking photographs in daylight can be problematic. Some parts of the system (the camera or a tripod leg) may cast a shadow on the mosaic. An early morning or a late afternoon photograph could be a solution. Night photography with flashes to illuminate the mosaics can also be used.

The object distance and focal length of the lens define the area taken in one frame. In order to reduce the optical distortion, the wide-angle lens used should have a focal length not wider than 35 mm (135-type camera). Because the optical distortion is stronger in the periphery of the frame the subject area must be calculated always about 20% less.

For planning rectify photography recording or constructing some device for this purpose is very important to calculate in advance the object distance needed to catch a determinate area or vice versa. The formula is:

$$H[m] = \frac{FL[mm]}{Fr[mm]} Ob[m]$$

H - object distance (camera elevation)

FL - lens focal length

Fr - frame dimension (length or width)

Ob - object dimension (length or width)

The next table with pre-calculations could be very helpful for fieldwork:

$K = \frac{FL[mm]}{Fr[mm]}$			Lens Focal Length[mm]				
			35	50	65	90	105
Frame Dimensions	135-type Camera	24mm	1.4	2.1	2.7	3.8	4.4
		36mm	1.0	1.4	1.8	2.5	3.0
	Middle Format Camera	6cm	-	1.0	1.2	1.7	2.0
		7cm	-	-	1.0	1.4	1.7
		9cm	-	-	-	1.1	1.3

The final product from rectify photography recording is digital image. Also the further work - final rectification, scaling, mapping, etc. is digital process that can be of various precision required. The image precision can be defined thereby: sufficiently sharp outlines of every single tessera. Image resolution is defined on one side by the camera ability and on the other side by the size of the object area taken. The resolution of a digital camera is known, but if normal photographs are taken, the resulting negatives or slides need to be scanned. So the resolution of the scanner has to be considered.

The practical question is: If the camera resolution is known what is the limit of the *object distance* (camera elevation above the mosaic) or what is the largest size of the object area taken according to the specific lens used? The graph (fig. 1) describes our experience gained by using different kind of photo-equipment and different systems for camera elevation above the site.

Several systems for elevating the camera above the mosaic were successfully implemented in Israel. According to the specific conditions of the

sites we used standard photo-devices, self-constructed systems or machines, described below:

- Tripod with an arm (fig. 2).

A high tripod with an arm and inverted head allows the camera to shoot towards the ground. The tripod's legs are placed out of the field of view.

Advantage: It is a standard photo-device. There is no need to build a new system.

Disadvantage: The maximal camera height is not bigger than 2 - 3.5 m.

- Cherry picker or Crane with boom.

Advantage: A standard machine, very comfortable and fast to use. Huge object distance could be reached.

Disadvantage: Expensive, useful only when the site can be reached by truck.

- Tower (hydraulic lift).

This device is used in building industry. It is comparatively light and can be moved into the site and placed on the mosaic. *Advantage:* Up to 8 m height can be reached. *Disadvantage:* The viewpoint is aside of the axis and an optical perspective correction is needed (shift lenses or view camera).

- "Big Boom" construction (fig. 3).

Advantage: Light, easy to install on the field, up to 5.5 m height. There aren't legs, which can cast a shadow on the photographed area.

Disadvantage: The camera viewfinder is not usable. The photographed area must be pre-calculated.

- "Trolley" construction.

The method is usable for roofed mosaic floors. A rope is fixed on the roof construction and allows moving the camera along the mosaic.

Advantage: Very light construction.

Disadvantage: The camera viewfinder is not usable. The photographed area must be pre-calculated.

- Fast method with monopod and remote control (fig. 4).

Advantage: A very fast method. Extremely light equipment.

Disadvantage: The camera viewfinder is not usable. The photographed area could be approximately pre-calculated with anticipation of a possible camera displacement.

As the viewpoint is never ideal the image is more or less perspective-distorted.

That's why it has to be rectified thereafter. First of all - approximate rectification with a raster image processing software like PhotoShop and then

a precise perspective correction and scaling with AutoCAD applications. In order to help successive rectification operations at least 4 targets should be positioned near the edges of the object and be photographed. The relative distance between all points should be recorded. An alternative would be to mark typical points of the mosaic and to measure the relative distance between them.

THE CASE KATHISMA

The used equipment was a 135-type camera with 35 mm and 50 mm lenses. Most of photographs were taken from crane with very long boom. A high ladder was also used for a few mosaics. The photographs were scanned with film scanner with its maximal resolution 2700 DPI. Quadrangular of 4 typical points was marked for each mosaic and precise scaling and rubber-sheeting rectification was done with AutoCAD application.

Once the base-map image is ready a B&W draft copy has to be printed for fieldwork. A large image could be divided to several sectors for printing. Also two or more copies of one base-map could be used. Conservation problems must be mapped on the draft copy using different colours for recording of any phenomenon. Then the data from each draft copy are transferred to AutoCAD file (fig. 5). Respectively each phenomenon is mapped on different layer with a different colour or pattern. Intervention actions are mapped on a different file (fig. 6) using the condition report file as a master drawing. Respectively every action is mapped on a different layer with a different colour or pattern.

We have a standard table with number and description of each conservation problem and another one with intervention actions. The layers in both AutoCAD drawings are named with the corresponding number from the tables. Colours and patterns used into the drawings are not standardized. Very often a visual Glossary is added to the documentation for better understanding of the phenomenon. Additionally a mosaic outline and lacunae are traced on the drawing on different layers. This is necessary in order to extract quantity data from AutoCAD drawings useful for planning of the conservation works. The table below shows extracted data and planning of working days and material needs.

Locus#	Condition level	Tess. area [M ²]	Room area [M ²]	Perimeter [M]	Conservation works	Working days	Work Cost [NIS]	Materials Cost [NIS]
L1	3	1.6	3	8	lifting, new support	30	16500	3000
L119	3	6.3	9	12.6	lifting, new support	90	49500	9000
L70	1	4.3	6	33	consolidation, integration	12	6600	300
L56	1	0.5	1.5	4.4	consolidation, integration	6	3300	100
L114	1	1.5	1.5	10.7	consolidation	3	1150	150
L206	3	1.4	3	19.8	lifting and relay	18	9900	200
L27	3	17.3	10	49.6	lifting and relay	60	33000	600
L4	3	2	10	9.5	lifting and relay	60	33000	600
L58	3	5.7	8	23.2	lifting and relay	48	26400	500
L254	2	38.4	70	35.7	consolidation, grouting	200	110000	2000
L247	2	2.5	2	13	first aid, covering	2	1100	50
L273	2	2	2	11.5	first aid, covering	2	1100	50
L275	2	1.6	2	6.7	first aid, covering	2	1100	50
L267	1	2.5	5	10	consolidation	10	5500	200
L268	2	27.4	25	39	consolidation, grout	75	41250	1200
L292	1	10.5	13	27.2	consolidation, integration	40	22000	600
L89, L66	2	54.2	50	35.3	consolidation, clean.	200	110000	2200
L54	1	13	14	15.2	consolidation, clean.	28	15400	700
L73	2	16.5	25	22	consolidation, integration	100	55000	1300
L98	1	6	7	16.2	consolidation, clean.	22	12100	300
L244, L245	2	43	50	39	lifting, new support	600	330000	40000
L256	3	4.5	2	15.5	lifting and relay	12	6600	200
L21	2	14.2	14	18.5	lifting and relay 20%	56	30800	600
L10, L16	3	44.4	50	41.7	lifting and relay 40%	500	275000	8000

Rectify photo recording provides effective, fast and relatively cheap input of the object image into the computer-aided recording system. On the other hand such a system provides some advantages and possibilities - more precise data collection, additional data for conservation planning, analyzing and monitoring. Unfortunately the hardcopy is not the best way of shearing digital graphic documentation. The best possibility of viewing and analyzing documentation remains on the monitor for several trained persons.

The Kathisma project is very complex and involves different kind of experts and institutions. That's why we decided to prepare an HTML presentation. This layout allows combining photographs, drawings and text. The documentation can be viewed interactively by many computer users, non-specialist in digital processing.

Documentation procedure (step - by - step)

A. Creating base-maps from Rectify photographs:

1. Taking photographs from above in the field
 - Planning the rectify photo-recording

- Preparing the site - first aid, cleaning
 - 2. Scanning or importing the image into the computer.
 - 3. Digital rectification and assembling to complete images.
 - 4. Importing the image in AutoCAD application, performing additional precise scaling and rectification.
 - 5. Saving the colour image and converting the attached image to B&W.
- B. Condition report.
- 1. Printing a draft copy for fieldwork.
 - 2. Mapping the conservation problems on the draft copy.
 - 3. Transferring the assessment data from the draft copy to the AutoCAD file.
- C. Intervention planning.
- 1. Tracing the mosaic image outlines and lacunas.
 - 2. Mapping the intervention actions on a different AutoCAD file.
 - 3. Extracting quantity data from the AutoCAD file useful for planning the conservation works.
- D. Output - Hard copy, computer presentation.

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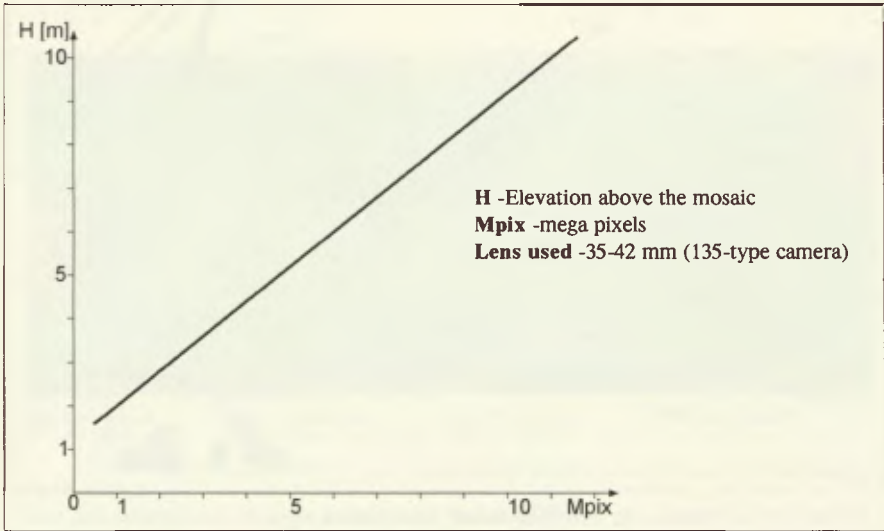
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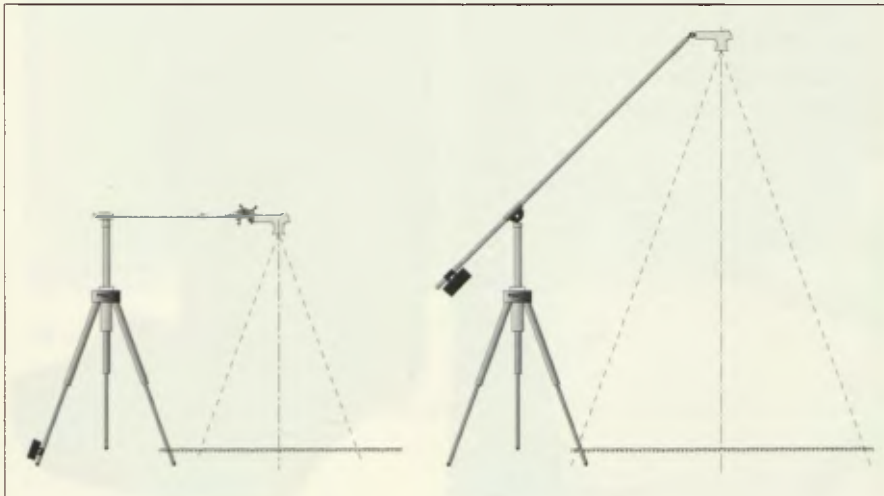
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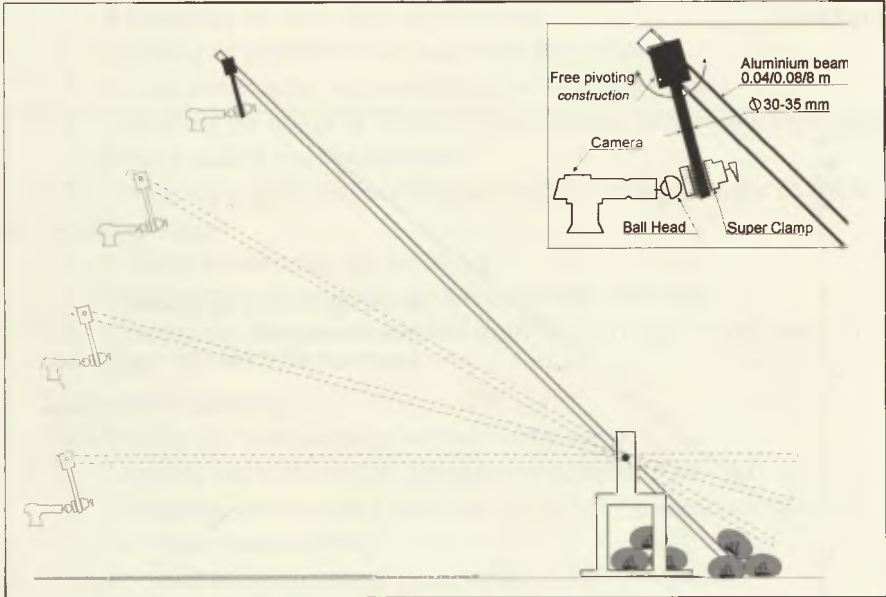
FIGURES



1. Correlation between the camera resolution and the maximal camera elevation.



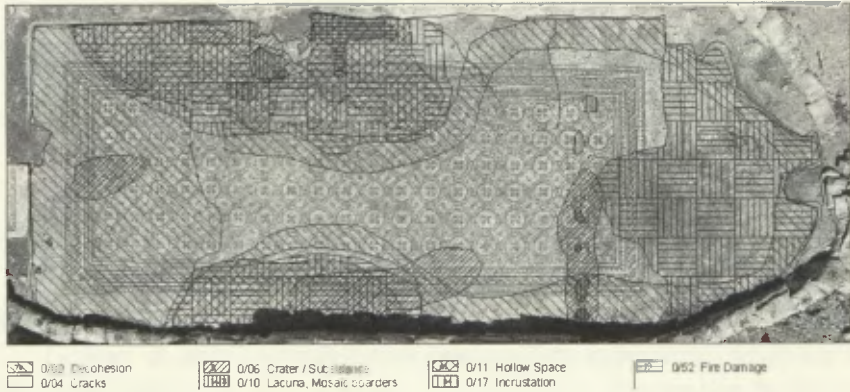
2. A high tripod with an arm and inverted head.



3. "Big Boom" construction.

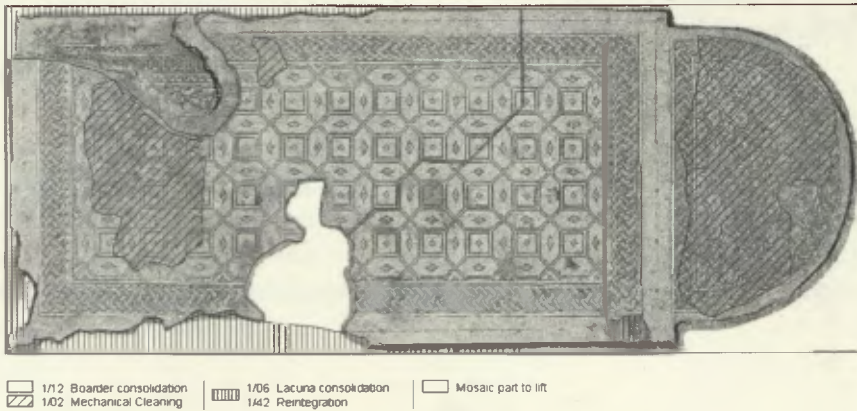


4. Fast method with monopod and remote control.



5. L-66 mosaic

AutoCAD drawing with mapped conservation problems. Every phenomenon is mapped on a different layer with a different colour or pattern.



6. L-245 mosaic

AutoCAD drawing with mapped intervention actions. Every action is mapped on a different layer with a different colour or pattern.

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MAINTENANCE ET PRÉSENTATION *IN SITU* A SAINT ROMAIN EN GAL

RÉSUMÉ

Le sujet de cette communication concerne une expérience menée sur le site archéologique de Saint Romain en Gal pour la présentation in situ de mosaïques déposées il y a une trentaine d'années. L'absence d'abris ne permettant pas la réintégration à titre permanent des pavements prélevés, l'atelier a proposé le principe d'une exposition saisonnière pour un ensemble de cinq mosaïques appartenant à l'une des habitations du site. Le propos est de présenter cette solution alternative, en précisant ses modalités techniques et les incidences en termes de maintenance.

SUMMARY

This paper treats of an experience carried out on the archeological site of Saint Romain en Gal, for the in situ display of mosaics which were removed thirty years ago. As the lack of shelters on the site doesn't allow to reinstall permanently any lifted pavement, the workshop proposed the principle of the seasonal relaying of a group of mosaics coming from the same domus. This alternative measure is here presented from a technical angle and brings out the maintenance conditions.

INTRODUCTION

Le site archéologique de Saint Romain en Gal

Le site de la Plaine, à Saint Romain en Gal, fait partie des faubourgs romains de Vienne implantés sur la rive droite du Rhône. Bien que l'existence de ce secteur résidentiel ait été connue depuis longtemps, notamment grâce aux nombreuses mosaïques découvertes depuis plus de trois siècles, c'est le

projet de construction d'un lycée, en 1967, qui a occasionné la fouille du site, et révélé, sur plus de 3 ha, les vestiges d'un quartier urbain dont l'installation remonte au Ier siècle avant J.-C. (Prisset 1994). L'importance de la découverte a entraîné le déplacement de l'implantation du lycée, puis l'acquisition du site par le Département du Rhône en 1970; la décennie suivante a permis d'élaborer un projet de mise en valeur comprenant l'évaluation et la protection du site, la création d'un atelier de restauration de mosaïques, la mise en place d'une équipe archéologique, la restauration et la présentation des vestiges, ainsi que l'aménagement d'un musée de site.

La réalisation de ce programme s'est concrétisée par la création simultanée -en 1981- de l'atelier de restauration de mosaïques de Saint Romain en Gal (Chantriaux 1983-1992) et d'une équipe départementale d'archéologues; en 1983, le site est classé Monument Historique; en 1988, à l'issue d'un concours lancé par le Conseil Général du Rhône, le projet des architectes Philippe Chaix et Jean-Paul Morel est retenu et le musée, à l'issue de sa construction co-financée par le département du Rhône, le Ministère de la Culture et la région Rhône-Alpes, est ouvert au public en 1996 (Chaix et Morel 1999, Savay-Guerraz 2000). Les collections présentées en exposition permanente s'organisent autour d'une vingtaine de pavements issus des deux rives du Rhône, regroupant des découvertes anciennes et une partie des mosaïques livrées par les fouilles récentes.

Un cas de réenfouissement

Après la découverte du site, tous les pavements mis au jour ont été déposés, entre 1968 et 1974, hormis une mosaïque de bassin située en limite de fouille, partiellement comprise dans l'enceinte du site (Lancha 1981a); l'angle dégagé sur une surface de 4 m² environ a été maintenu *in situ* et immédiatement réenfoui après le repérage de son décor: un dauphin, des poissons et des crustacés évoluant sur un fond marin. Son redégagement effectué en 1989 pour compléter la documentation établie en 1968 a alors donné lieu à une expérimentation (Chantriaux 1994). Deux modes de réenfouissement ont été testés par l'atelier sur une période de deux ans: sur la moitié de sa surface, la mosaïque a été recouverte d'une couche de sable de 50 cm d'épaisseur, avec, pour l'autre moitié, la protection supplémentaire d'un géotextile appliqué sur le *tessellatum*. Alors que l'état de la première partie était sain, la seconde a révélé sous le géotextile le développement d'un réseau de fines racines et des colonies de fourmis (fig. 1). Ce constat a entraîné la modification du mode de réenfouissement: afin d'éviter la rétention d'humidité apportée par le géotextile au contact du *tessellatum*, une première couche de

sable lavé de 15 cm d'épaisseur a d'abord été étendue sur la mosaïque avec un géotextile placé au-dessus, le tout étant recouvert par une deuxième couche de sable de 35 cm d'épaisseur.

La maison aux cinq mosaïques: projet d'abri permanent

Lors de la programmation muséographique, une partie des mosaïques du site a été sélectionnée pour être présentée en exposition permanente. Parallèlement, il était prévu que soit reposées à leur emplacement d'origine un groupe de mosaïques provenant d'une habitation de 500 m² située au coeur du site: la *Maison aux cinq mosaïques* (Lancha 1981b et Prisset 1994). Deux d'entre elles provenant des pièces de réception présentent un décor figuré polychrome: des représentations de *Xenia* pour le *triclinium* et des motifs de fleurons pour le salon adjacent, les trois autres dont le seuil et le péristyle présentant un décor géométrique noir et blanc. L'objectif de replacer cet ensemble dans son contexte d'origine, intégré au concours d'architecture, a donné lieu à des esquisses pour un abri permanent. Le projet des architectes lauréats, conçu dans une recherche d'unité avec le bâtiment du musée, visait à créer un volume léger et transparent traité avec les mêmes matériaux: verre et métal; sa structure consistait en une nappe tridimensionnelle reposant sur de minces poteaux d'acier situés sur le périmètre de la maison. La divergence des points de vue entre les différentes autorités, et surtout les problèmes de coût entraînés par la construction de l'abri et par les contraintes de sa maintenance n'ont pas permis l'aboutissement du projet, et les cinq mosaïques sont restées entreposées dans les réserves.

Une solution alternative à la présentation permanente

Le problème de la présentation de ces mosaïques s'est posé dans le cadre de la mise en valeur progressive des différents secteurs du site et de la programmation de l'aménagement de la *Maison aux cinq mosaïques*. L'absence d'abri permanent, les difficultés et les interrogations liées à un système de protections hivernales (efficacité aléatoire, lourdeur des contraintes de maintenance) ont conduit l'atelier à proposer une autre solution; celle-ci, exploitant les possibilités de déplacement apportées par les supports de nid d'abeille sur lesquels les mosaïques ont été remontées, consiste à les remettre en place de manière intermittente, en limitant leur présentation à la saison estivale. Cette proposition a donné lieu à une première expérience réalisée en 1998 pour les *Journées du Patrimoine*, à l'occasion desquelles l'une des mosaïques a été reposée *in situ* pendant deux semaines. Les résultats concluants de l'opération ont permis de la programmer pour les autres

pavements de l'habitation, après achèvement de leur restauration et à l'issue des travaux d'aménagement de la *Maison aux cinq mosaïques* en 2001.

Restauration et présentation des cinq mosaïques

La préparation des mosaïques à leur présentation s'est avérée complexe, en raison de l'état hétérogène dans lequel elles ont été rapatriées, incomplètement traitées par l'entreprise qui avait procédé à leur dépose puis à leur remontage sur nid d'abeille. La reprise des opérations par l'atelier s'est échelonnée sur plusieurs années, incluant le déplacement de certaines limites de panneaux pour la présentation démontable des pavements, et le traitement des zones lacunaires: les vides du *tessellatum* dans la mosaïque aux *Xenia* ont été comblés par un enduit de chaux dans lequel ont été gravées des empreintes de tesselles, afin de distinguer ces interventions des réfections antiques et des ajouts modernes datant de la restauration précédente. Quant au traitement des plages lacunaires, particulièrement problématique dans le cas de la mosaïque aux *Xenia* -détruite à 50% de sa surface-, il a été abordé avec la finalité d'une exposition à l'air libre et soumis à trois objectifs: la mise en valeur des parties de mosaïque subsistantes, la recherche d'un enduit plus résistant que les mortiers de chaux habituellement réalisés pour les présentations en musée, et celle d'un système de présentation adapté au démontage et au réassemblage des pavements. La solution retenue après de nombreux essais a consisté à appliquer dans les lacunes un revêtement composé de résine époxy et de charges minérales dont la tonalité grise s'accorde aux décors aussi bien polychromes que noir et blanc. Les trames géométriques sont matérialisées par des lignes coïncidant avec les limites de panneaux, deux valeurs de gris mettant en évidence la composition en quadrillage de bandes de la mosaïque aux *Xenia* (fig. 2).

Avant leur première remise en place *in situ*, les mosaïques ont fait l'objet d'une présentation temporaire au musée, dans le cadre des expositions-actualité produites par le pôle archéologique du Rhône. Intitulée: *Les couleurs sous la terre* (Behel 2000), cette exposition réalisée en collaboration avec l'équipe archéologique et l'atelier présentait les résultats des fouilles de la *Maison aux cinq mosaïques*, sous la forme de plans, de textes et de maquettes, autour des pavements disposés selon la configuration de l'état final de l'habitation daté du début du IIIe siècle après J.-C; l'exposition annonçait la prochaine présentation des cinq mosaïques sur le site.

Modalités de l'exposition saisonnière

Deux présentations saisonnières *in situ* ont déjà été réalisées, en 2001 (fig.

3) et 2002. La période d'exposition est limitée à cinq mois maximum: après les dernières gelées de printemps, soit à partir de la deuxième quinzaine de mai, jusqu'à début octobre, après les *Journées du patrimoine* généralement fixées à la fin du mois de septembre, les dates précises de mise en place et de démontage pouvant varier de quelques jours selon les aléas climatiques. L'installation des mosaïques est effectuée sur des supports métalliques préalablement placés à intervalles réguliers, au sol des différentes pièces (fig. 4). Les raccords des mosaïques aux murs des pièces sont comblés par des bandes rapportées de nid d'abeille sur lesquelles un revêtement minéral identique à celui des lacunes a été appliqué.

La mosaïque du seuil est une copie réalisée par l'atelier avec des tesselles taillées dans des calcaires blancs et noirs comparables aux matériaux d'origine. La solution d'un facsimilé a été justifiée par l'état de dégradation de l'original, qui rendait son exploitation problématique, et pour introduire la possibilité de marcher sur le seuil. Un panneau signalétique présentant la *Maison aux cinq mosaïques* a été placé par les archéologues devant l'entrée. Un autre est projeté pour apporter des informations complémentaires sur le principe de la présentation saisonnière des mosaïques et sur le cas particulier du seuil, afin de préciser qu'il s'agit d'une copie contemporaine, ce qui explique que le public puisse la fouler, contrairement aux originaux (fig. 5).

L'ensemble des cinq mosaïques représente 16 panneaux de surfaces variables (3 m² à 11 m²) et 20 bandes de raccord, le tout couvrant une surface de 130 m² pour un poids total de 3 500 kg, les panneaux les plus lourds pesant 300 kg. Leur transport est effectué avec un petit camion à plateau, par groupes de quatre panneaux. Les chargements et déchargements réalisés à l'atelier utilisent un chariot élévateur; sur le site, l'idée initiale de faire intervenir un camion-grue a été abandonnée en raison des dégâts que le passage d'un 25 tonnes aurait occasionnés sur les zones engazonnées. Des moyens plus légers sont donc utilisés, sous la forme de chemins de roulement modulables qui enjambent les murs des pièces et permettent de faire glisser les panneaux de mosaïque entre la maison et le plateau du camion (fig. 6).

Avant la mise en place des mosaïques, le *tessellatum* est revêtu d'un film de cire micro cristalline et les zones fragiles –tesselles conservées sur une faible épaisseur dans les décors figurés les plus fins– sont consolidées par une solution acrylique (Paraloïd B 72) diluée de 3 à 5% dans de l'acétone: cette protection superficielle, qui disparaît au cours de l'exposition estivale, est renouvelée pour la présentation suivante. Après leur démontage et avant leur rangement hivernal dans les réserves, les mosaïques sont rincées à l'eau déminéralisée. En 2001, les panneaux ayant été bâchés pendant une dizaine de jours en raison des

conditions pluvieuses et de la modification des modalités techniques de l'enlèvement (attente de la livraison des chemins de roulement remplaçant l'intervention initialement prévue d'un camion-grue), un léger développement de mousse a été constaté sur les revêtements appliqués dans les lacunes: ces zones ont fait l'objet d'un traitement antimousse à base d'ammonium quaternaire qu'il n'y a pas eu à renouveler en 2002. Chaque mosaïque est contrôlée et fait l'objet des mesures d'entretien nécessaires: celles-ci concernent essentiellement les bordures des panneaux endommagées lors des manutentions; les zones situées dans les revêtements de lacunes sont consolidées ou réparées par des reprises effectuées à la résine, et les tesselles ponctuellement détachées sont recollées.

En termes de maintenance, la présentation saisonnière des mosaïques de la *Maison aux cinq mosaïques* demande des moyens techniques légers, dont l'essentiel repose sur le principe de manutentions. Montage, démontage et mesures d'entretien mobilisent quatre personnes de l'atelier pendant huit jours, dont deux avec l'aide de trois autres personnes des services techniques du musée. L'opération représente un coût annuel de 12 000 euros.

CONCLUSION

L'opération présentée ici ne prétend pas constituer une solution modèle pouvant être généralisée pour régler les problèmes de présentation des mosaïques *in situ*. Elle correspond au cas particulier d'un site dont les mosaïques ont été déposées, à une époque où leur prélèvement constituait un moyen systématique permettant d'assurer leur sauvegarde. On peut d'ailleurs se demander dans quel état elles se trouveraient aujourd'hui si elles avaient été conservées *in situ*, au vu de leur degré de dégradation tel qu'il apparaît sur les clichés pris à leur découverte. Quoiqu'il en fût, la complexité de la situation actuelle –sous l'angle financier et scientifique– excluant jusqu'à nouvel ordre la mise en place d'abris, les mosaïques de la *Maison aux cinq mosaïques* étaient condamnées à rester en réserves. La solution d'une présentation *in situ* saisonnière est rendue possible à Saint Romain en Gal par la présence de l'équipe de l'atelier, qui peut intervenir à tout moment et auquel revient la conduite des opérations de mise en place et de démontage, ainsi que le contrôle de l'évolution de l'état des pavements. Dans ce but, une documentation de référence a été constituée sous la forme d'une couverture photographique très détaillée, et de la conservation en réserve d'un fragment de la mosaïque aux Xenia servant d'échantillon-témoin dont l'état peut être comparé à celui des pavements présentés *in situ*.

Nous sommes bien conscients que l'exposition à l'air libre des mosaïques

pose inévitablement le problème de leur conservation à long terme, bien que la période limitée de leur présentation sur le site réduise les risques de dégradations. Le rôle de l'atelier est de veiller à maintenir ces limites en intervenant rigoureusement aux dates prévues, le succès de l'opération auprès des visiteurs ayant déjà entraîné des tentatives d'allongement de la période d'exposition pour en faire bénéficier un public plus large. L'opération conserve d'ailleurs un caractère expérimental: elle peut ne pas être renouvelée si l'état des mosaïques l'exige. L'apport d'un abri sur les deux mosaïques à décor figuré, les plus fragiles, serait sans doute plus sécurisant, et c'est aussi à l'atelier de favoriser de futures décisions allant dans ce sens.

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FIGURES



1. Développement de racines sous le géotextile appliqué au contact du *tessellatum*.



2. Matérialisation du quadrillage de bandes dans les lacunes de la mosaïque aux Xenia.



3. Vue de la Maison aux cinq mosaïques depuis l'aile nord (exposition saisonnière été 2001).



4. Mise en place des panneaux de mosaïque sur des tubes métalliques (péristyle).



5. Seule la copie du seuil, sur laquelle stationne le groupe, est accessible. L'accès des autres mosaïques, visibles depuis le péristyle et l'extérieur de la maison, est protégé par des barrières.



6. Manutention des panneaux de mosaïque à l'aide de chemins de roulement modulaires.

JACQUES NEGUER*

**INTEGRATIVE MAINTENANCE PLANNING FOR THE ARCHAEOLOGICAL SITES
IN THE TERRITORY OF CAESAREA MARITIMA, ISRAEL
MAINTENANCE AND MONITORING MOSAICS PLANNING**

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RÉSUMÉ

Un experiment dans le domaine de la Planification Intégrée du Territoire de Caesarea Maritime en Israël fut le catalyseur de ce projet. Aujourd'hui nous avons un projet de gestion de l'entretien à longue durée pour le territoire et le site avec plus de 170 mosaïques.

Mots clé: Planification Intégrée, entretien des sites archéologiques, entretien des mosaïques, monitoring.

SUMMARY

The beginning of the project was an experiment in the field of Territorial Integrative Planning. Today is a running maintenance project with planning for many years forward for a site with 170 mosaic floors.

FOREWORD

Caesarea Maritima – a major archaeological site declared as a National Park, located on the Mediterranean coast in the center of Israel, has been one of the focuses of inter-disciplinary research action, conceived and initiated by IMED (Istituto del Mediterraneo), under the title of P.I.S.A.: a program of integrated development of archaeological sites, sponsored by the European Commission.

In the last phase of the research, the work shifted from analytical assessment to diagnostic assessment: remedies were sought for the "pathological" phenomena and conditions, strategies to deal with the crises and means to exploit the potentials and strengths. Consequently, proposed short, medium and long term interventions were formulated and prioritized in a

structured succession, according to a hierarchy of low, medium and high impact, levels of feasibility and opportunity. One of the short - term actions in the frame of the project was the creation of Integrative Conservation-Maintenance Planning on-site and extended to other archaeological sites and related resources in the territory (Chart No 1).

Principles of Integrative Maintenance Planning

The identification of a managerial procedure of action capable of reconciling all the aspects connected with the missions and management of the archaeological site, but especially of relating them positively to the external institutional, social and economic context, thus represent the wagger of the Research Action of the P.I.S.A. Project.

Using the experience of the conservation team of Caesarea and the principles of the integrated approach to management and development, an Integrated Maintenance Plan for Caesarea and for archaeological sites in the territory was elaborated (See Map 1):

- Ramat Hanadiv Park (owned by the Edmond de Rothschild Foundation)
- Shuni Park (owned by the Forestry & Land Development Fund – K.K.L./J.N.F.)
- Taninim Creek National Park (owned by the Nature and Parks Authority)
- Alona Park (owned by the Alona Regional Council)
- Caesarea Maritima National Park (N.P.A.).

The choice was done following the ancient water supply system of Caesarea. Ramat Hanadiv, Alona and Shuni are sites connected to the sources of water. Part of Taninim Creek is a National Park including a Roman dam built to supply water to Caesarea from two streams and used also for industrial purposes.

Three of the sites have mosaic floors in very different quality, quantity and condition levels:

- Ramat Hanadiv - Ein Tzur Roman Bath
- Shuni Park - Theatre, two abandoned archaeological fields
- Caesarea Maritima National Park.

Territorial Maintenance Planning involves different partners - local councils, foundations, authorities, etc., with the aim of common understanding and treatment of similar problems.

Principles of Preservation Maintenance Planning of satellite sites in the territory:

- Daily site monitoring is performed by the site manager
- Daily and seasonal maintenance is performed by the local maintenance team after special training
- Periodic maintenance is performed according to the Maintenance Plan by the Caesarea Maintenance team supported by local personnel
- In emergency cases, the site manager should send a report to Israel Antiquities Authority and receive additional help and expertise.

Reports and planning:

- Results of the daily monitoring are reported to the site manager
- The periodic maintenance is related to conditions reassessment – a basis for the next maintenance campaign
- Emergency cases are reported separately
- If the damage repairs need conservation intervention, a conservation plan should be done and the work should be accomplished by an additional conservation team (contractor)
- Expert committee does the monitoring of the site maintenance.

The principles of management of Integrated Maintenance Plan of the Caesarea site and the territory were elaborated in the frame of the P.I.S.A. Pilot Project.

The planning process was based on study of the resources (cultural, human and financial) and the needs of the territory, using an action plan.

Building the Maintenance Plan of Caesarea Maritima

The Maintenance Plan for Caesarea involves Preservation Maintenance Planning, Infrastructure Maintenance Planning and Long-term Conservation Planning based on unified management economic planning.

The existing core maintenance team in Caesarea and the possibility to provide expertise and to carry out conservation maintenance works, represent the base for the expansion of the Maintenance Plan over the territory. Training courses are planned for site managers and conservators.

The main point of the plan is the monitoring orientation of the planned actions. The principal goal of the monitoring is the safety of the visitors and the monuments. Special training of the persons responsible for site monitoring (in the same time as the maintenance planner) is requested.

Plans are made also for emergency treatment (risk preparedness) and actions to prevent vandalism and vandalism consequences.

The Maintenance plan of Caesarea Maritima is based on Integrated Management of Infrastructure Maintenance and Preservation Maintenance of

the archaeological site altogether with the Long term Conservation Plan (Chart No. 2). In fact, the activities are connected not only in time but also financially and the same manpower can be used some time for different tasks.

The Preservation Maintenance Plan of Caesarea is based on:

- Full inventory of the cultural resources
- Archaeological background and significance assessment of the resources
- Complete conservation documentation
- Experienced team of conservators supported by experts of the Israel Antiquities Authority (I.A.A.).

Principles of the Preservation Maintenance Plan of Caesarea Maritima:

- The Maintenance process is based on constant monitoring (see Chart No. 3)
- The person responsible for the monitoring is also involved in the maintenance and conservation planning of the site
- Maintenance is planned only for already conserved sites, or sites declared in good condition after survey
- Maintenance actions are divided to periodic, seasonal, daily and emergency performances (See sample in chart No. 4)
- The site is divided into sub-projects (see Map 2), every project having a plan for periodic treatment as a part of the Cyclic Maintenance Plan of Caesarea Maritima. The entire cycle of site maintenance is 3.5 years long (See the Gantt in Chart No 5).

Guidelines book (see chart No. 6)

The maintenance guideline book is the basic document for the maintenance performance. It contains all the information for the interventions, conditions and work reports, documentation and site maps. Simple instructions for every operation with the list of the necessary materials and instruments are included. In case of accidents instructions for first aid are added.

Long-term Planning for the Maintenance and Monitoring of Mosaics

During the excavations at Caesarea Maritima more than 170 mosaic floors were discovered (about 3500 sq.m). The date ranges from Herodian times to the Early Muslim period, and various levels of quality and technology are represented in the pavements. Half of them – 1500 sq.meters are exposed

(16 under shelters), 25% with surface protection and another 25% are back filed.

The maintenance planning is based on:

1. Complete computerized documentation of the mosaics, which includes:
 - Photo-recording Graphic recording
 - Recording of the physical condition
 - Recording of the intervention
 - Written documentation
 - Documentation of the mosaics strata
 - Recording of all the geometrical patterns.
2. All the mosaics are treated on some level:
 - Emergency treatment and re-burying
 - Emergency treatment and surface protection covering
 - Minimal intervention and backfill
 - Minimal intervention and surface protection
 - Minimal intervention and exposure
 - Full treatment and exposure
 - Full treatment and exposure under shelters
 - Lifting and relay on lime bed *in situ*.
3. Research
 - Salt testing of the mosaic and its environment
 - Microbiological and biological survey
 - Environmental data collection: T, RH, rain and aerosols
 - "Maintenance and monitoring mosaics" - research on ongoing Co-operation project between the Israel Antiquities authority and the Getty Conservation Institute.
4. Experience:

The conservation team has been working with the mosaic problems for the past seven years. The professional experience is the basis for the maintenance guidelines.

Procedures of mosaic maintenance (Chart No 7)

Based on all above the process of decision - making is as follow:

According to the Site Maintenance Gantt before the beginning of the mosaic maintenance of every sub-project general condition assessment with photo documentation of the problems of every mosaic is done. The working plan is based on the general recommendations from the guidelines book and the present condition of the mosaic in this moment. Gantt inside of the time

frame is added according to the specific priorities of the moment. The report will give recommendation for the next cycle. The assessment and the maintenance planning of the next sub-project should be ready before the end of the works on the precedent! In this way the planning adjustment will be in real time.

CONCLUSIONS

The Integrative Maintenance Project was difficult to implement because of the big amount of partners involved: The Conservation Department of the Israel Antiquities Authority involving the National Parks Authority, the Ministry of Tourism and the Labor Ministry. The project was implemented by The Conservation Department of the Israel Antiquities Authority the Caesarea Maintenance Project. For the first time we know how much the conservation maintenance of Caesarea costs - 20% of the whole budget for management and infrastructure maintenance.

Annual budget of the National Park Caesarea - \$ 700 000

Necessary addition for maintenance - \$ 140 000

These numbers are relevant for the future planning of other sites, since the Labor Ministry pays the cost of the manpower for maintenance.

The maintenance team should be composed by a team leader (conservator) and four technicians. The team leader should possess very good conservation skills, planning abilities and the capability to manage the maintenance of the site. Special training is needed for the monitoring of the site conditions – in fact this is the principal activity and the "Monitor man" is the central figure in the whole process of monitoring and maintenance!

The members of the team need training and basic conservation skills, each one of the team members should be specialized in one of following: mosaics conservation, stone conservation or frescoes and plaster conservation. The whole team should have training of buildings conservation and the necessary skills!

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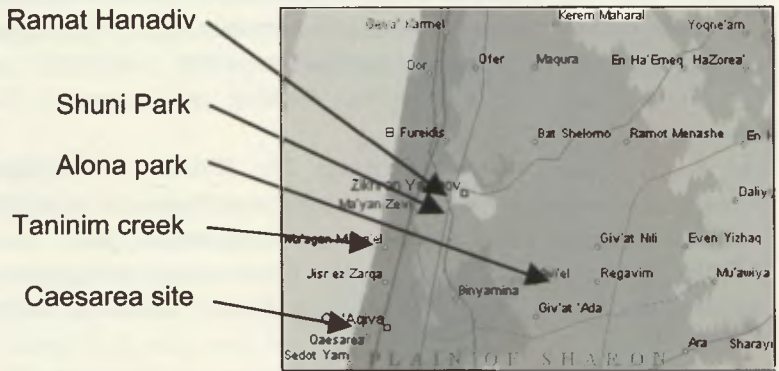
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MAPS

1-2. Map of Israel and map of the sites location.



CHARTS

Chart 1: Action planning.

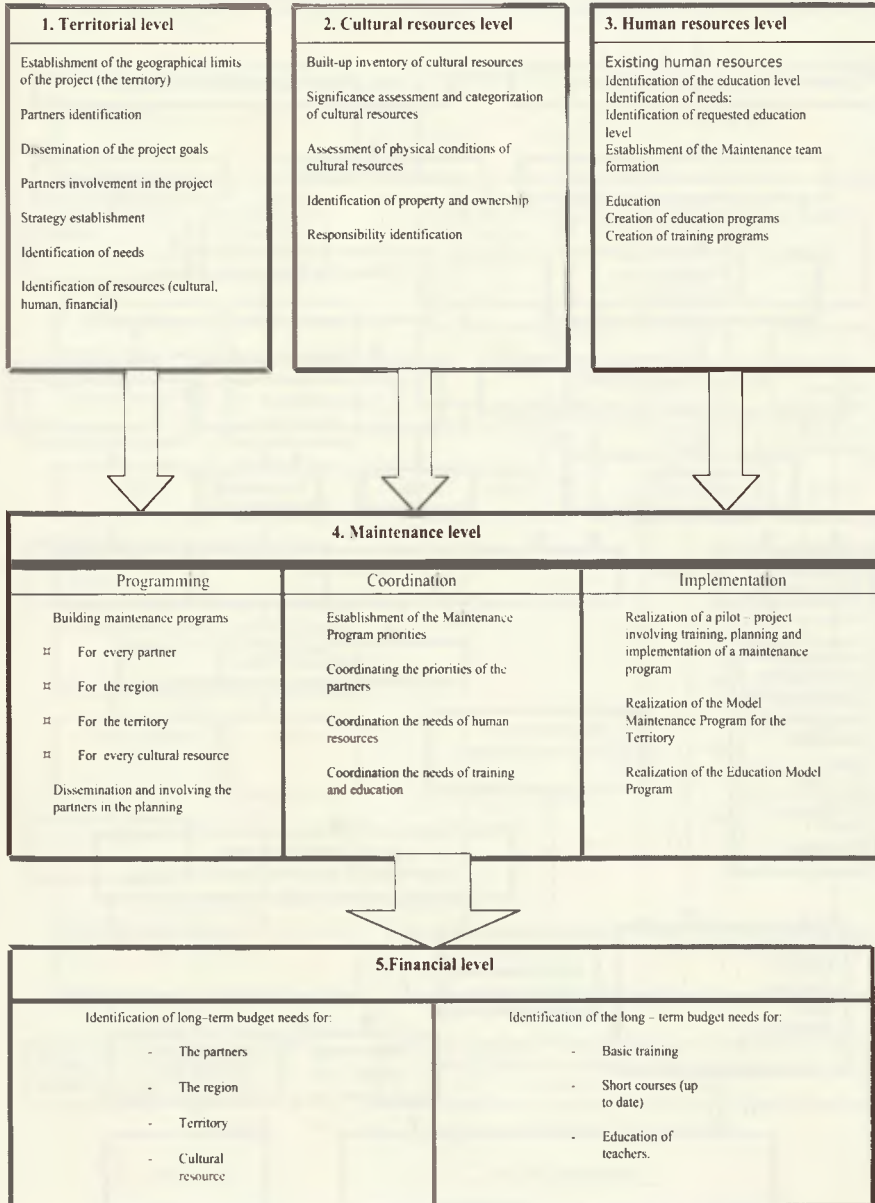


Chart 2: The Integrative Maintenance Planning - Caesarea Maritima.

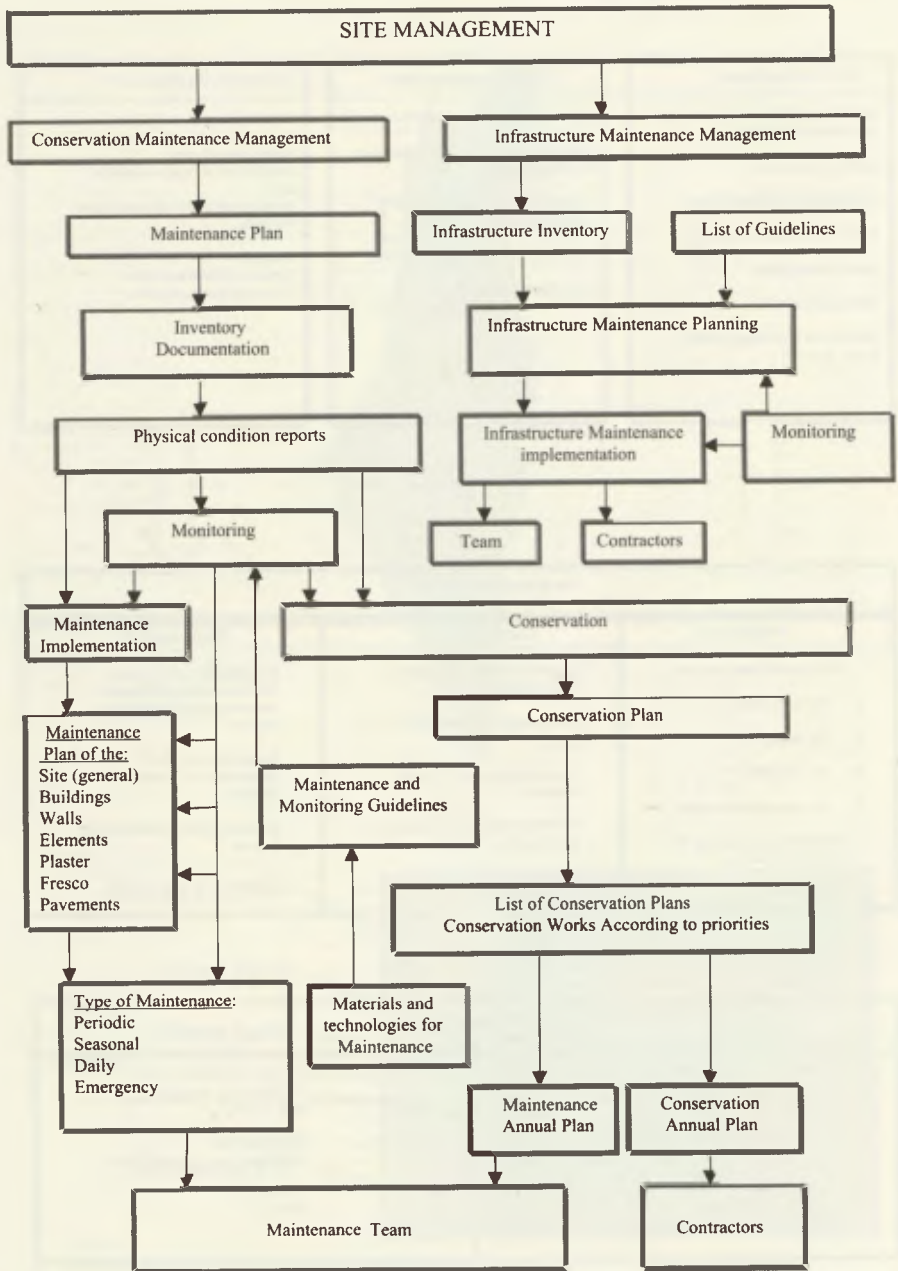


Chart 3: The monitoring process.

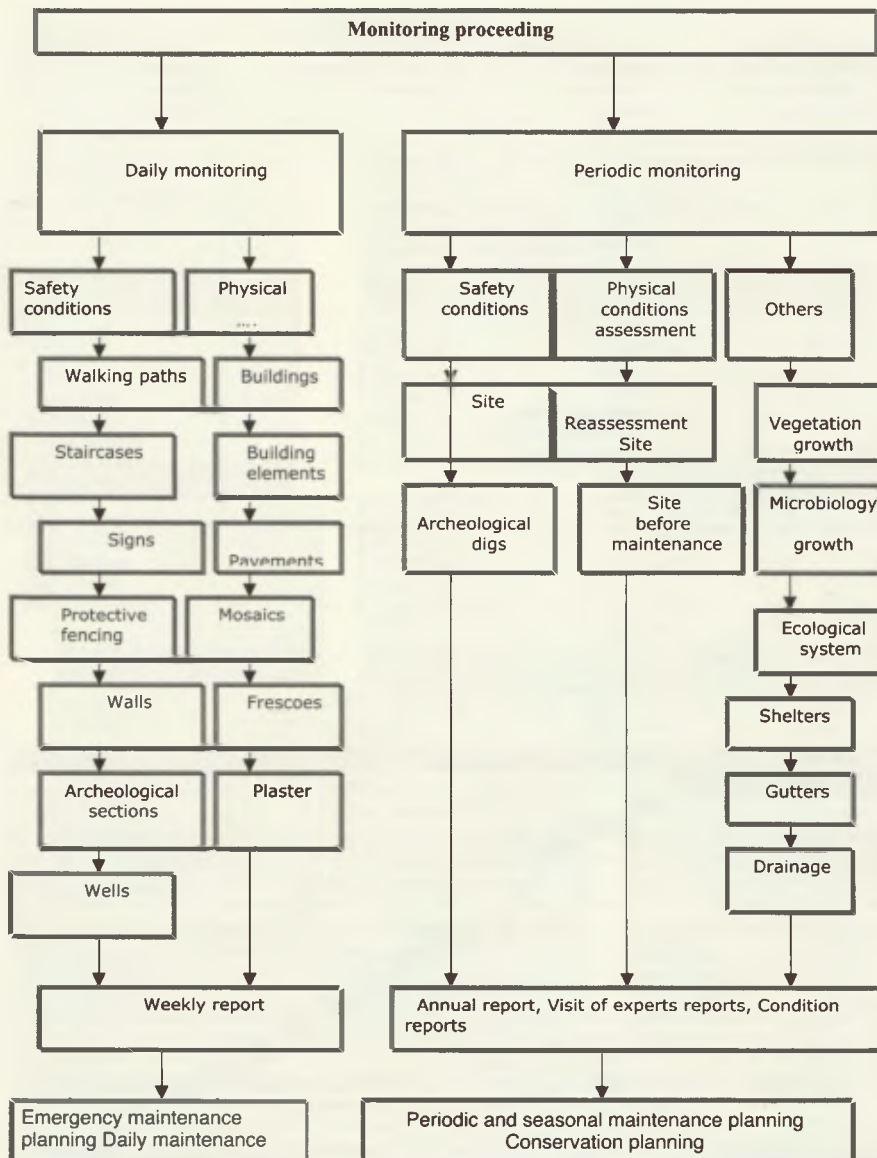


Chart 4: Caesarea Maritima Maintenance plan – sample.

Type of maintenance			
Saison performance	Periodic performance	Daily performance	Emergency performance
Herbicide treatment Cleaning vegetation Repair drainage Cleaning drainage Recover mosaics	<u>Repair walls:</u> Consolidation Pointing Joint filling Supports <u>Repair edges:</u> Mosaics Plaster <u>Lacunae repair:</u> Mosaics Plaster <u>Cleaning:</u> Site(general) Drainage Mosaics Plaster <u>Repair integration:</u> Integration plaster <u>Consolidation:</u> Mosaics Plaster	<u>Cleaning salts from:</u> Mosaics	<u>Repair after:</u> Flooding Vandalism Heavy rain

Chart 5: Gantt of the Cyclic Maintenance Planning.

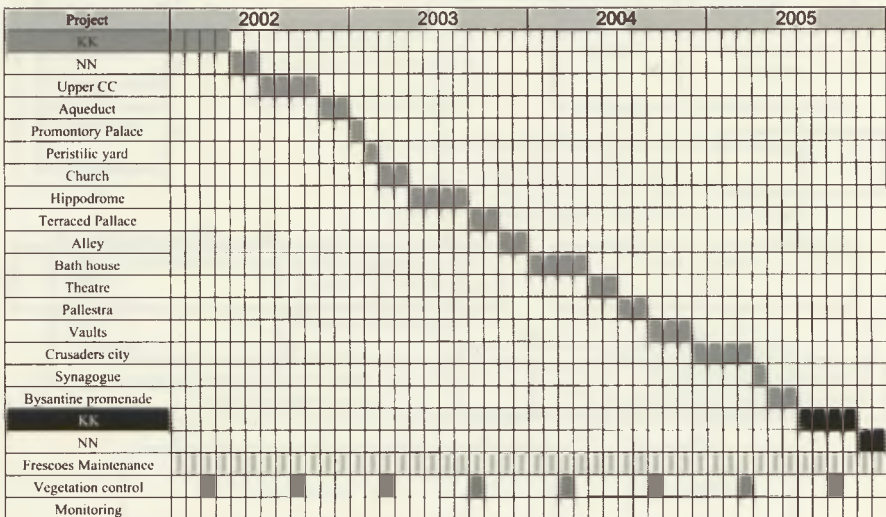
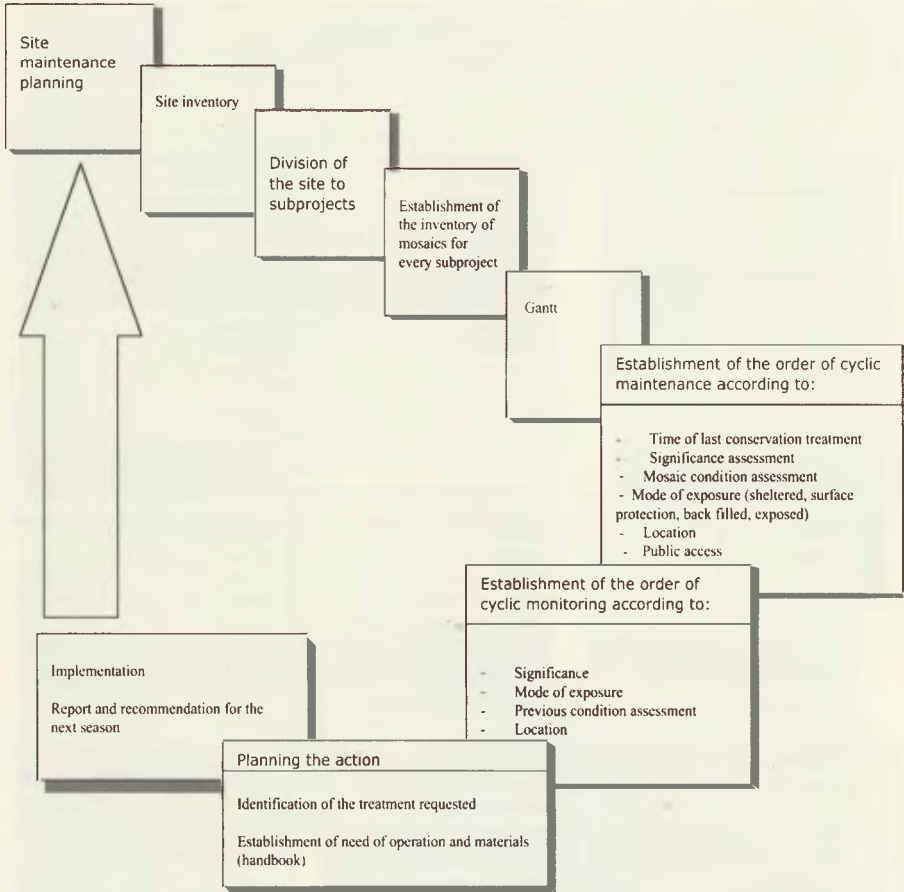


Chart 6: Structure of the Maintenance Guidelines book.

Maintenance Guidelines book		
Maintenance Buildings and building elements	Maintenance Mosaics Marble floors Maintenance Opus sectile Maintenance Plastered floors Maintenance Stone pavements	Maintenance Frescoes Maintenance Stuccoes Maintenance Plaster
<u>Repair of:</u> Copping Pointing Joint filling Drainage Stone elements	<u>Repair of:</u> Tesselatum Boards Lacunae Fills	<u>Repair of:</u> Boards Lacunae Fills Retouches
<u>Cleaning of:</u> Graffiti Drainage Gutters	<u>Cleaning of:</u> Mosaics Marble floors Opus sectile Plastered floors Stone pavements	<u>Cleaning of:</u> Graffiti Frescoes Stuccoes Plaster
<u>Supports for:</u> Walls Arches Vaults Archaeological sections	<u>Surface protection covering of:</u> Mosaics Marble floors Opus sectile Plastered floors Stone pavements	<u>Protection of:</u> Frescoes Stuccoes Plaster
Monitoring criteria	Monitoring criteria	Monitoring criteria
List of materials List of instruments	List of materials List of instruments	List of materials List of instruments
Guidelines for herbicide treatment, control and cleaning of vegetation		
Monitoring criteria for vegetation control		
List of herbicides, fungicides, instruments and protection measures		
Instructions for first aid and treatment in case of accidents		

Chart 7: Procedures for mosaic maintenance.



CHIARA ZIZOLA*

**CONSERVATION AND MAINTENANCE OF FLOOR MOSAICS
IN ARCHAEOLOGICAL AREAS**

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SUMMARY

In recent years, in the field of conservation and protection of excavation areas, there has been a growing conviction that preventive conservation – especially maintenance – is one of the most suitable tools for effective and extensive conservation, as it is the most practicable in cost-benefit terms. This discipline, which has only recently appeared on the conservation horizon, has its origins in antiquity. It offers a valid reply to the disproportion between the exigencies of conserving an ever-increasing amount of heritage and the growing demand for access by new generations of visitors.

In this article, techniques for the conservation and maintenance of mosaics in situ in archaeological areas will be discussed. This will be done by revisiting the sources and describing the modern techniques, proposing a methodological approach and supplying evaluations of the techniques, costs and results obtained. Archaeological mosaics displayed in museums, albeit numerous and not without maintenance problems themselves, will not be discussed, as they call for different conservation considerations and treatment techniques.

INTRODUCTION

Can it perhaps be said that a mosaic is eternal painting? Eternal, but not indestructible: eternal in the way that the works of man are not limitless and must be assured certain conditions in order to last truly. (Brandi, 1956: 93-100).

In recent years, in the field of conservation and protection of excavation areas, there has been a growing conviction that preventive conservation – especially maintenance – is one of the most suitable tools for effective and extensive conservation, as it is the most practicable in cost-benefit terms. This discipline, which has only recently appeared on the conservation horizon, has its origins in antiquity. It offers a valid reply to the disproportion between the exigencies of conserving an ever-increasing amount of heritage and the growing demand for access by new generations of visitors.

How can one reconcile the need for culture with the duty of preserving monuments for posterity? We will take a logical approach to this issue with facts and figures, comparing data taken from financial balance sheets and from some test cases in the field.

Prevention of damage, which calls for numerous technical activities and notably for strategic planning, is among the principal tools that can be used to preserve (as long as possible) *in situ* the material testimony of a past that is at the root of the historical memory of entire civilizations. This must occur in the context of a society with a vastly accelerated need for cultural consumption. The risk factors and the rate of deterioration have multiplied, for society has forgotten, in a rather suicidal collective amnesia, the ancient traditions of care, of continuity, and a sense of the duration of the creations of humankind.

The challenge is certainly titanic, and anyone involved in conservation realizes every day how feeble their weapons are, especially when they rely on radical restoration treatments and the use of so-called "miracle products" which are supposed to confer life eternal on materials. Objects are reduced to a state that could be defined as knowledgeable old age, in an unstable equilibrium between the primordial state of semi-aggregated material and the condition of worked form which reflects a former existence.

The high cost of this type of treatment and the short duration of its effects on the conservation of materials have led conservators to turn their attention to developing and mastering treatment techniques that – at the same cost – can lead to longer-term benefits for a greater number of monuments on display. Attention has primarily been paid to recovering the tradition of maintenance and care that has permitted the monuments of antiquity to survive to our day.

In this article, techniques for the conservation and maintenance of mosaics *in situ* in archaeological areas will be discussed. This will be done by revisiting the sources and describing the modern techniques, proposing a methodological approach and supplying evaluations of the techniques, costs and results obtained. Archaeological mosaics displayed in museums, albeit numerous and not without maintenance problems themselves, will not be

discussed, as they call for different conservation considerations and treatment techniques.

Preventive conservation and maintenance in ancient sources

"(...) And this you cannot deny, that no matter how large a building or how massive its walls, if it is not maintained it will deteriorate in a short time" (Averlino, 1972: Book I).

The need for prevention and maintenance for the survival of works – from the walls of buildings to their facings, as well as sculptural decoration – is well attested in the writings of Vitruvius, Pliny, Alberti's architectural treatises, Filarete and Renaissance recipe books.

The best-known quote about maintenance in modern times is still that of J. Ruskin, who stated in 1849: "The principle of modern times (...) is to neglect buildings first, and restore them afterwards. Take proper care of your monuments, and you will not need to restore them. A few sheets of lead put in time upon a roof, a few dead leaves and sticks swept in time out of a water-course, will save both roof and walls from ruin. Watch an old building with an anxious care; guard it as best you may, and at any cost, from every influence of dilapidation. (...) do this tenderly, and reverently, and continually, and many a generation will still be born and pass away beneath its shadow. Its evil day must come at last; but let it come declaredly and openly, and let no dishonouring and false substitute deprive it of the funeral offices of memory" (Ruskin, 1925: 356-357).

In ancient sources, indications of techniques for the maintenance of pavements are rare, whereas precautions to take to make durable works are described at length, together with the materials to be used and the main threats to their survival.

Pliny (Pliny the Elder, 1962) writes to this effect: "Open-air flooring was an invention of the Greeks, who roof their houses in this way, an easy method to use in regions with a warm climate, but unreliable wherever there is heavy rainfall and frost. It is essential that two sets of joists should be laid across each other, and that their ends should be nailed down to avoid warping. To fresh rubble should be added a third of its weight in pounded potsherds; and then the rubble, mixed with two-fifths of its weight in lime, should be rammed down to a thickness of one foot. After this, a final coat 4 1/2 inches thick must be applied to the rubble and large square stones not less than 1 1/2 inches thick laid on it. A fall of 1 1/2 inches in 10 feet should be maintained and the surface carefully polished with grindstones. It is considered impracticable to lay the wood floor with oak planks, because they warp; and furthermore, it is thought

advisable to spread a layer of fern or straw below the rubble so that the worst effects of the quicklime may not reach the planks. It is essential also to lay a foundation of round pebbles under the rubble. Tiled floors with a herring-bone pattern are constructed in a similar fashion".

Vitruvius (Vitruvius 1960: 203-204), in the section on outdoor paving, suggests insulating the mortar with oil in order to avoid frost damage: "In the open air, specially adapted kinds of floors must be made, because their framework, swelling with dampness, or shrinking from dryness, or sagging and settling, injures the floors by these changes; besides, the frost and rime will not let them go unhurt. Hence, if necessity drives, we must proceed as follows in order to make them as free from defects as possible. After finishing the plank flooring, lay a second plank flooring over it at right angles, and nail it down so as to give double protection to the framework. Then, mix with new broken stone one third of the quantity of pounded tile, and let lime be added to the mixture in the mortar trough in the proportion of two parts to five.

Having made the bedding, lay on this mixture of broken stone, and let it be not less than a foot thick when the beating is finished. Then, after laying the nucleus, as above described, construct the floor of large cubes cut about two digits each way, and let it have an inclination of two digits for every ten feet. If it is well put together and properly rubbed down, it will be free from all flaws. In order that the mortar in the joints may not suffer from frosts, drench it with oil-dregs every year before winter begins. Thus treated, it will not let the hoarfrost enter it.

If, however, it seems needful to use still greater care, lay two-foot tiles, jointed together in a bed of mortar, over the broken stone, with little channels of one finger's breadth cut in the faces of all the joints. Connect these channels and fill them with a mixture of lime and oil; then, rub the joints hard and make them compact. Thus, the lime sticking in the channels will harden and solidify into a mass, and so prevent water or anything else from penetrating through the joints. After this layer is finished, spread the nucleus upon it, and work it down by beating it with rods. Upon this lay the floor, at the inclination above described, either of large cubes or burnt brick in herring-bone pattern, and floors thus constructed will not soon be spoiled".

The passage given above is particularly interesting because, while supplying indications on the materials to use and how to put them into place, it also introduces the concept of a few maintenance activities to be carried out before the onset of winter (impregnation with oil once a year). It is perhaps the only such quote in the sources that is so precise about periodical maintenance. Moreover, certain procedures last up to the Quattrocento, as can be seen in

Alberti (Alberti, 1966: book III). In Chapter XVI on paving, he takes up the technique described by Vitruvius point by point and adds: "The work will be even more secure if between the packed rubble and the cement mixture one inserts tiles joined with lime mixed with oil".

Alberti, again, observes that "the lime mixed with oil protects the pavements from damage due to the elements" and "if a small crack forms in an outdoor pavement, fill it with sifted ashes mixed with oil, preferably linseed, and it will close up. Another excellent material for this purpose is clay thoroughly mixed with quicklime, baked in the kiln and immediately mixed with oil, so long as the crack has previously been perfectly dusted. The dust can be removed with brushes and blown out with a bellows".

In 1521, Cesare Cesariano, (Cesariano, 1981) in his edition of *De Architectura*, cites Vitruvius' notation about annual maintenance, and resolves the problem of frost protection by recommending soaking the pavement with a mixture of wax, turpentine and pine resin:

"Tamen Vitruvio pare voglia siano coperte tute le coniuncture nel tuto il pavimento quale sta sub divo: acio sia defendato da li gelicidii e coeleste pruine: per li hyemaly tempi: e questo sia fiendo per ciascuno anni: Ma io per cavarmi di tanta annuale feruitute: quando fusse bene exicato e como adusto dal Sole Ardentissimo: con la cera e terbentina e raxina di pino bene ferventissima iliniria saturissimamente epso pavimento in fino a tanto che la superficie restasse lucida e como vitrea: per che queste cose ho usato fare sopra le magne tessere di opera testacea: sopra la quale havea perfigurato li gnomonici horoligii e collocati in plano al modo havemo dimostrato li marmorei amussii. Et pertanto questa materia imbibita reice le coeleste passione ne mai se imbibite ne altra cosa sopra si applica: Et Questo in lo oppido di Villanterio agro papiense collocai in uno horto (...)"

A few years later, in Mons. Daniele Barbaro's 1556 edition of *De Architectura*, we find the following written about outdoor pavements: "(...) Similarly, it will be good to cover them with *amurca* (organic material resulting from the production of olive oil), or throw water over them in which lime has been slaked: and if you want to repair a broken terrace, take one part of crushed tiles and two of *bolo armeno* and mix fast on the fire, and having heated the terrace, throw this material over it and then spread it gently with a hot iron. Also, you can mix fresh white lime with marble dust in boiling water and let it dry. After doing this three or four times, mix it with milk and whatever colour you would like to have. And if you want to create a mosaic effect, put the material into forms, giving them whatever colour you like, but then add hot oil or a mix of the marble dust with *cacio* glue (caseinate), so long

as the glue is thinned with well-beaten egg white, then add the lime and mix well".

Both the materials and the techniques and tricks to prolong the life of pavements continue, with minor variations, throughout the sixteenth and seventeenth centuries.

Apart from the technical information, which is certainly most useful and illuminating for anyone working in the field of archaeological mosaics conservation, what emerges from these texts is the existence of an established approach to damage prevention and a stance in favour of continuous, planned maintenance. The purpose of the maintenance was to keep the artifacts working properly.

MAINTENANCE IN PRACTICE TODAY

Planning

Yet, in modern practice, what is maintenance exactly? In the etymological dictionary of the Italian language (Pianigiani, 1988), under "maintenance" one finds: "lat. Manutentiònem, composed of Månus – hand – and Tentiònem, formed from Tèntus, past participle of Tèneo – I hold, possess, a Conservation latinism, Security for the maintenance of the thing". In effect, the term "maintenance" is a synonym for conservation, as if to say that no conservation is possible without maintenance. Today, maintenance of mosaics is carried out to preserve the historical message of the material and always goes hand in hand with preventive conservation measures. It involves, as an irrevocable premise, the drafting of a detailed plan in which the information about the object, the context to which it belongs and the objective one wishes to obtain have been analyzed in order to define in detail the means, techniques, materials, resources, times and costs of carrying out the work.

In this analysis, however, we cannot stop at broad statements, but must go into the specialized details and have an in-depth knowledge of the condition of the materials, the mechanisms of decay and deterioration, and the active and passive agents of aggression present in the conservation environment.

Even before defining any objectives, the first step in building a maintenance program is thus to collect and process the data about the mosaic or mosaics one intends to preserve.

Every factor that can affect present and future conservation must be examined, as well as how such factors might interact. Below, we schematically list the data required to obtain a relatively complete picture of conservation conditions:

- number of mosaics and their location in the archaeological area: this

could be a single mosaic or a number of them, either close together or scattered throughout different sectors

- the area can be exposed, covered, open or closed to the public, with vegetation, arid, etc.
- typology and constituent materials: dimensions, materials in the bedding layers and nucleus, nature of the covering (marble, glass paste, potsherds, etc.)
- current condition of the mosaics: time elapsed since excavation and thus relative exposure to new environmental conditions; whether there are mosaics that have never been restored, or detached and put back *in situ*, if so, defining the time elapsed and materials used for restoration (if any); or mosaics left *in situ* without lifting, with materials similar to the composition of the originals
- condition of the original materials, and of any others used in conservation and restoration treatments, presence (if any) of ancient restorations. To gather this information, it will be indispensable to carry out a thorough documentation of the state of affairs, using both graphic and photographic techniques. The base maps obtained will later be used as a system to evaluate the effectiveness of maintenance operations and as a basic point of reference
- typology and characteristics of the conservation environment. Analysis and identification of environmental risk factors is essential for defining what needs to be done. Factors to examine are: exposure to environmental damage (rain, frost, insulation, roots, groundwater flooding, soluble salts, pollution, etc.); and to anthropogenic damage (foot traffic, theft, vandalism, improper behaviour), as well as studying the times of exposure and the periods of increased risk.

A sustainable maintenance program is not only based on data collected in the field. Logistical information must also be added to the technical data, including the available resources, both economic and human.

The principal characteristic of a maintenance plan is continuity – the repetition at regular intervals of specific practices using low-cost treatments. The operations deemed necessary must be planned with a calendar at hand, managed and checked. Timid and, we might add, praiseworthy efforts in this direction have been made by a few administrations, and are beginning to show visible results in the conservation of the works. Such results, however, do not make news like the major, flashy restorations that attract all the limelight. The latter are responsible for burying, with class (and also at enormous expense) the other efforts towards a radical change in a culture dedicated to

consumerism and not to the duration and growth of culture.

To recall the words of G. Urbani: "restoration is always a *post factum* intervention, i.e., merely able to repair damage but certainly not to slow it down or even less to keep it from happening. For prevention to be possible, what is needed is a technical movement to change traditional restoration into what has so far been only posited in theoretical terms as preventive conservation. Such an approach, which we shall call "planned conservation", is addressed of necessity to individual heritage items and the environment in which they exist and which is responsible for all the possible causes of their deterioration. Its objective is thus the control of such causes and slowing down – as much as possible – the rate of deterioration processes, intervening at the same time and if necessary with maintenance treatment appropriate for the various types of materials (Urbani, 2000a; 104).

Maintenance techniques

The casuistry of mosaics is vast, and every mosaic must be studied case by case in relation to its context, so here we will limit ourselves to discussing the broad outlines of the operations possible in a maintenance project.

To maintain the artifacts, one must have at least the minimum material conservation conditions. In other words, one must first work directly on the mosaics to re-establish the physical and chemical equilibrium of the constituent materials. Minimal interventions for structural consolidation of detachments (using materials similar to the original ones), cleaning organic deposits from the surfaces, extracting soluble salts, weeding, removing roots (if any), stuccoing lacunae with lime mortar and reinforcing the mosaic edges – all these operations permit the artifact to interact with the environment, so long as the latter is controlled and safe. The environment must thus also be set up for conservation, including rainwater drainage, temporary or permanent coverings – directly on the mosaic if possible or above it if it must be visible – walkways to control foot traffic, non-invasive barriers against handling, and surveillance to avoid vandalism and theft.

Maintenance follows these interventions as a subsequent and necessary phase, and not as an autonomous intervention in itself. Thus, we will define the elements that make up a conservation treatment, departing from the premise that maintenance ultimately means conservation, even from a strictly linguistic perspective.

A project for mosaics conservation comprises:

- analysis of the current situation (see preceding paragraph) and documentation

- analysis of available resources and their allocation
- hands-on treatments limited to re-establishing the minimum conditions necessary to preserve the original materials, using materials that are both compatible with the original and reversible
- direct and indirect intervention on the mosaic's environment in order to contain or eliminate the appearance of damage or deterioration factors
- planned operations to maintain (maintenance) the effectiveness of environmental control systems and the results obtained, performed consistently at periodical intervals
- programs of public information, because "the work of art belongs to the spirit, to the universal conscience, and everyone must thus be allowed access to it" and "the ownership of a work of art (...) must be understood as custodianship, the most attentive custodianship, and one answers to the entire world" (Brandi, 1996: 282).

Maintenance interventions can be subdivided into "ordinary" maintenance, at intervals established according to a calendar, and "extraordinary" maintenance, dictated by the occurrence of infrequent or exceptional phenomena (earthquakes, floods, fires, hurricanes, etc.), which will certainly damage the works and the protection systems set up for them.

Ordinary maintenance is established to respond to known phenomena, and generally calls for all or a combination of the following operations:

- cleaning the surface of loose deposits with small brushes and vacuuming, and cleaning of more stubborn deposits with scalpels and vacuuming, especially in the spaces between the tesserae (fig. 1)
- damp cleaning with water and a surfactant having a bland biocide action (NeoDesogen at 2%), to be done with dampened synthetic sponges and stiff brushes
- manual weeding, including pulling out small roots
- chemical weed-killing
- application of a biocide for algae, moss and lichens
- checking the adherence of tesserae to the underlying layers and the mortar between them, with substitution of missing or damaged ones where necessary
- checking the compactness of the foundation mortars (both original and restored); infiltration of lime mortar into any detachments present and removal/substitution of unstable restoration materials
- checking mortar fills and substitution of any broken ones
- general survey of the surfaces, with particular attention to the

appearance of soluble salt efflorescence, alteration of the marble or glass-paste elements, lesions such as breaks, micro-fractures, scaling, which should be documented and linked to recent climatic events or other phenomena that had not been noticed previously temporary reburial with geo-textile bags filled with Leka grains or powder (Albini, Costanzi Cobau, Zizola, 1995: 491-500; Altieri, Laurenti, 1999: 727-733) (or else washed, large-grain pozzolana) when snow or frost are likely

- checking and cleaning of coverings and rainwater drainage, with removal of debris and leaves, replacement of unsuitable or inefficient or damaged elements
- checking the walkways and paths, with modifications if they do not function well
- updating information panels and replacement of damaged or illegible ones (table 1).

The frequency at which to perform these operations should be programmed on the basis of an analysis of the risk and environmental factors in any given context. Nevertheless, table 1 gives an indication of suggested intervals for these treatments (drawn from field experience), and the qualifications the staff should have for technical execution.

We pause here to consider the last part of the maintenance program, as someone might object that monuments are not preserved by maintaining visitor paths and facilities. And yet, even the most distracted individual might notice that where visitors are greeted with efficiency and interest, and guided toward comprehension and satisfaction of their expectations and intellectual and aesthetic curiosity, there is far less improper behaviour. Indeed, visitors reward such concern with greater care and attention, a humble desire to know more, which is expressed in the intention, confessed in an interior dialogue, to return to the place where they have understood and revisited a piece of history. Every monument of the past lives in the present by virtue of the capacity to extrapolate its meaning, as it is no longer in use, lived in or experienced. Therefore, to keep a monument alive and thereby preserve it, also means making an effort to help people enjoy its significance. Rough and neglected pathways, illegible or repetitive signage, faded by time and boring in content, are as damaging as a sudden frost. If frost can shatter mortar and injure tesserae, poorly managed information and visitor handling lead to loss of interest and ultimate oblivion, with consequences visible to all.

All the other operations, if performed regularly and consistently, slow the aging of the materials, prevent and reduce the risk of damage and avoid the danger of seeing the effect of conservation treatments come to naught.

Then there are the exceptional events that call for extraordinary maintenance – those not included in the regular program but dictated by emergencies. Such treatments must be carried out as soon as the need arises. One can speak of extraordinary maintenance when surfaces must be cleaned after high winds, or gutters must be repaired after collapsing under snow, and so forth. With even more dramatic events, more drastic prevention measures are called for, but these are emergency and first-aid treatments rather than maintenance.

To flesh out the outline given above, we will analyze the results of five current or proposed maintenance plans in archaeological sites that have different environmental conditions and characteristics. Comparison of the data obtained in the course of such experience will permit us to formulate a basic hypothesis about the time required for maintenance. Such a result must obviously not be taken as a specific operational prescription but as a reference point upon which to model, case by case, any drafting of a maintenance plan (Tables 2 and 3).

Those cases are referred to Masada, the Western Palace, Zippori, the building of the Nile (Costanzi Cobau, Nardi, 2003), Mamshit, the Byzantine church (Zizola, 2003), in Israel and two cases in Italy, in The *thermae* of the Cisiarii (Nardi, Zizola 1998: 17-21) and the Piazzale delle Corporazioni (Nardi, 2003).

In conclusion, we are convinced that "programmed conservation" is the only viable approach today to the preservation and conservation of the mosaic heritage, as it permits a distribution of resources to benefit the conservation and enhancement of a greater number of artifacts. Simple operations, performed with easily obtained, low-cost materials, help to extend the material's chances of survival, while at the same time assuring the fruition of the historical and aesthetic meaning it contains. Responding with drastic restorations once the damage has occurred implies high treatment costs and more interference with the original materials. Afterwards, needless to say, treatment will still be needed ever more frequently unless the mosaics are "protected" and regularly maintained.

As G. Urbani wrote in 1980 with regard to historic centres (and equally applicable to archaeological sites): "the advantages of a policy of programmed maintenance are such, and so many, that they impose a new rule of ethical conduct on specialists of traditional restoration, whereas none of the restoration charters formulated to date have touched on this aspect. Whenever one plans the restoration of a monument or isolated building, it must be obligatory that the decision to start work be taken only after calculating

whether, at the same cost, it would be more advantageous for that given historic centre to have one well-restored monument in a context of ruined buildings, or to make progress, however minimum, in the state of maintenance of the context itself – naturally also including the monument under consideration (Urbani 2000b: 35).

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Table 1

Operation	Min. annual frequency	Personnel
cleaning of loose surface deposits	4	Trained generic laborer
damp cleaning with water	2	Trained generic laborer
manual weeding	2	Trained generic laborer
chemical weed killing	1	Specialized laborer
biocide application	1	Specialized laborer
checking mortars in foundation and interstices	1	Specialized laborer
checking compactness of foundation mortar and eventual infiltration with hydraulic lime mortar	1	Specialized laborer
checking mortar fills and replacement of broken ones	1	Specialized laborer
general survey of surfaces	4	Specialized laborer
temporary reburial with geo-textile bags filled with Leka grains and powder	According to a calendar	Trained generic laborer
checking and cleaning of covering systems and rainwater drainage	2	Trained generic laborer
checking of walkways and paths	2	Trained generic laborer
updating of information panels and replacement of damaged or illegible ones	1	Trained generic laborer

Table 1. Suggested intervals for maintenance treatments (drawn from field experience) and the qualifications the staff should have for technical execution.

Table 2

Monument	Mosaics	Environmental conditions	Conservation conditions	Operations performed	working hours a year	working hours per m ² per year
Masada. Western Palace	polychrome geometric and black-and-white; total 20 m ² <i>in situ</i> ; last restoration 1994	- desert climate (abundant dust; high winds; driving rain) - vegetation absent	- semi-enclosed environment, with roof and walkways (vulnerable to dust and driving rain) - mosaic cannot be walked on	<i>dry dusting</i> : once every 2 weeks, 1 person, 1 hour; <i>cleaning with damp sponge</i> : once every 4 weeks, 1 person, 1.5 hours	40 hours	2 hours
Zippori. The building of the Nile	polychrome geometric and figurative; total 250 m ² <i>in situ</i> ; last restoration 1995.	- temperate climate - green area not bounded by trees	- semi-enclosed environment, with roof and protected visitor routes (vulnerable to driving rain) - mosaic cannot be walked on	<i>dry dusting</i> : once a week, 1 person, 8 hours; <i>cleaning with damp sponge</i> : once every 2 weeks, 1 person, 8 hours; <i>checking of mortars</i> : once a month, 1 person, 8 hours; <i>general survey</i> : once every 3 months, 1 person, 16 hours; <i>time available for extraordinary events</i> : 1 person, 40 hours.	824 hours	3 hours
Mamshit. The Byzantine church	figurative polychrome; total 80 m ² <i>in situ</i> ; last restoration 1999	desert climate (abundant dust; high winds; winter rain) no vegetation	- outdoors - direct seasonal reburial (four winter months); - mosaic cannot be walked on	<i>cleaning with damp sponge</i> : once every 2 months (for 8 months of the year), 1 person, 24 hours; <i>periodical seasonal reburial</i>	168 hours	2 hours

Table 2

				1 person, 24 hours, at beginning of winter; <i>uncovering and periodical seasonal cleaning:</i> 1 person, 48 hours, at beginning of summer		
Ostia. Baths of the Cisiarii	black-and-white figurative and geometric; total 260 m ² <i>in situ</i> ; last restoration 1995.	temperate climate, near the sea green area, bounded by trees	-outdoors, - partially protected by direct seasonal reburial (four winter months); - mosaic cannot be walked on	<i>dry dusting cleaning with damp sponge manual and chemical weed control periodical seasonal reburial and uncovering periodical general survey (including water drainage systems)</i> 1 person, twice a year, 180 working hours each time	360 hours	1.5 hours
Ostia. Piazzale delle Corporazioni	black-and-white figurative and geometric; total 1000 m ² ; <i>in situ</i> on cement; last restoration: 1970s.	temperate climate, near the sea green area, bounded by trees	outdoors; mosaic cannot be walked on	<i>dry dusting cleaning with damp sponge checking of mortar solidity and consolidation between tesserae manual weeding renewal of broken cement stuccoing periodical general survey (including water drainage systems)</i>	1500 working hours	1.5 working hours

Comparison of the data obtained in the course of field experience permits us to formulate a basic hypothesis about the time required for maintenance.

Table 3

Monument	Environmental conditions	Time required per m ² per year	Cost per m ² per year, calculated on an average cost of 15 € per hour
Masada. Western Palace (20 m ²)	Desert, roofing, walkways	1.5 hours	22.5 €
Zippori. The building of the Nile (250 m ²)	Green area, roof, walkways	3 hours	45 €
Mamshit. Byzantine church (80 m ²)	Desert, outdoors/ temporary reburial, walkway	2 hours	30 €
Ostia. Baths of the Cisiarii	Temperate climate. Outdoors, temporary reburial	1.5 hours	22.5 €
Ostia. Piazzale delle Corporazioni	Temperate climate. Outdoors	1.5 hours	22.5 €

Table 3. Comparative costs for maintenance according to five different cases.

1. Soprintendenza Archeologica di Ostia Antica, National Parks Authority of Israel.
2. The CCA has performed maintenance treatments on open-air mosaics at Ostia Antica – Baths of the Cisiarii and Piazzale delle Corporazioni; Israel – Masada, Bath House and Western Palace; Zippori – Nile Building (fig. 2-5).

FIGURES



1. Cleaning of loose surface deposits and damp cleaning with water.



2. Masada, the Western Palace.



3 Mamshit, the Byzantine church.



4. Ostia Antica, the Baths of the Cisiarii



5. Ostia Antica, Piazzale delle Corporazioni.

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INTRODUCTION

Zeugma is the name given to two cities, Apamea and Seleucia, founded by Seleucus I (312-281 BC) on opposite banks of the Euphrates in southeastern Anatolia, Turkey. The two cities were linked by a bridge for which they were named – "zeugma" meaning "bridge" in Greek.

In the first century BC, the two cities came under Roman control. The IV legion was posted in this region to control the bridge – the only stable crossing of the Euphrates for hundreds of kilometers. For 200 years, the cities were an important trade link between the Roman and Parthian empires. At its peak, Zeugma had between 50,000 and 75,000 inhabitants and covered more than 2000 hectares on the west bank. As the power of the Roman Empire waned in the 3rd century AD, the city was sacked and burned (AD 252) by the Sassanids.

The site was identified in the 1970s by the German archaeologist Jörg Wagner. Research excavation, conducted by David Kennedy of the University of Western Australia, Catherine Abadie-Reynal, Professor at the University of La Rochelle, and the Turkish Ministry of Culture - Gaziantep Museum, took place during the 1980s and 1990s.

During the same period, Zeugma was affected by a major regional hydroelectric project, which involved the construction of various dams. One of these, the Birecik dam and its reservoir, would submerge 30% of the surface of the ancient city during the summer of 2000. The flooding was scheduled to take place in two phases, the first (June 2000) would submerge the so-called "Area A"; the second (end of October 2000) would submerge the so-called "Area B" (fig. 1).

In May 2000, partly due to exceptional finds of movable objects and of two villas richly decorated with frescoes and mosaics, the efforts of a local newspaper editor in Gaziantep¹ manage to attract the attention of the international press, and an appeal for Zeugma rapidly circles the globe. The Packard Humanities Institute (PHI), based in California, responds to the appeal, immediately offering the economic and human resources to organize and co-ordinate a rapid action plan with the Turkish Ministry of Culture.

In a matter of days, after Area A had already been completely inundated, an operative structure was set up with support from the PHI and directed by the Turkish Ministry of Culture. It had three objectives: emergency archaeological investigation of Area B; conservation during excavation of Area B and of finds from previous campaigns at Zeugma; and publication of the scientific results. The operative structure included various entities:

- The Great Anatolia Project (GAP) to co-ordinate logistics;
- Oxford Archaeology Unit (OAU)² to co-ordinate the archaeological investigation;
- Centro di Conservazione Archeologica of Rome (CCA) to co-ordinate conservation.

The situation in June 2000

After long years of work, the dam is ready to stem the flow of the Euphrates. From May to October 2000, the water level begins to rise in the new basin at a rate of 20 cm a day, inexorably, day after day; The economic life of the dam is considered to be 100 years (GAP 2001: 29), after which time the lake will be so clogged with debris that the power station will be unable to function; Among the vast areas destined to be submerged are the entire city of Apamea, some 30% of the rest of Zeugma and Belkis, the inhabited village nearby. In Zeugma, the situation in June 2000 is as follows:

- 25% of the city will be entirely submerged (Area A);
- 15% will be in a fluctuating water zone (Area B), with continuous variations in water level subject to the workings of the dam;
- the remaining 70% of the city will be above the water (Area C);
- Area A was excavated by the Ministry of Culture of Turkey-Museum of

1. Mr. Aykut Tuzcu, editor of Sabah, the Gaziantep daily paper, whose appeal was taken up by the New York Times.

2. The excavation was done by the Oxford Unit, the Gaziantep Museum and the University of Nantes.

Gaziantep, University of Western Australia, University of Nantes. During two campaigns some 4000 movable objects, about 100 architectural elements, 700 m² of mosaics, and 250 m² of wall paintings were detached and removed from the site. Everything, without any selection criteria, was systematically detached from its original location;

- the structures still *in situ*, the trenches and the stratigraphy that had not been disturbed during excavation and detachment operations were sent underwater without any protection (fig. 2).

As for the detachment of the mosaics, in the interventions prior to May 2000:

- it was performed with very poor documentation, numbering or written reports;
- it was not performed by professional personnel, but by museum workmen and guards or dam workmen, with haphazard techniques;
- after detachment, the pieces of mosaic were piled outdoors in the garden of the Gaziantep museum;
- during all these operations, many mosaics were severely damaged. Some parts were lost altogether.

The conservation project

Given that every day after the dam was closed meant a 20 centimeter rise in the water level, the OAU archaeologists and the CCA conservators were asked to produce operative projects in a very short time and discuss them with staff at the Turkish Ministry of Culture. The plans were prepared, discussed, modified, approved and made operative in a week.

And in less than two weeks, thanks to the support of the PHI and the Turkish Ministry of Culture and the efficiency of the GAP, 120 archaeologists and 20 conservators arrived at Zeugma, completely equipped, ready to work.

In this extremely limited time, the GAP prepared a camp that could comfortably house 250 persons despite temperatures above 45 degrees C, set up the access and infrastructure needed for the excavation, and organized transport for all personnel involved; the ministry of culture and the archaeologists drew up the trench layout and the excavation schedule and transferred personnel; the conservators moved in personnel, materials and equipment, and set up an infrastructure on the site and laboratories for emergency field conservation; with the archaeologists, they arranged and discussed the work plans and tools for internal communication that would ensure that the conservation work proceeded smoothly during and after excavation without interfering with the archaeologists' work.

Basically, the conservation plan discussed and approved by the Turkish

Ministry of Culture was conceived to replace the previous practice of performing many unco-ordinated small restoration treatments with a global strategy based on principles of preventive conservation.

After a preliminary analysis, it was immediately clear that, given the situation as it was in June 2000 and considering that Area A (already excavated) was almost entirely under water without protection, all efforts should be concentrated on Area B.

There were three possible intervention options:

- topographic prospecting and survey of the archaeological structures visible in Area B and improvement of the reburial conditions, without starting new excavations;
- excavation of the area and systematic removal of the greatest amount of material and structures (as had been done up to that point);
- co-ordinated archaeological investigation and documentation with protection and reburial of the structures before inundation, including full recovery of movable objects and selective recovery of the structures.

A fourth option – asking the authorities for a considerable delay in closing the dam – was ruled out at the beginning, given the national priority of the operation and the long warning period that had passed without any strong reaction on the part of the scientific community.

The first option arises from the consideration that, based on the thermodynamic principles governing the decay of materials, where there is hygrometric stability, materials decay at an extremely slow rate. In the case of buried archaeological sites, structures and objects, after a period of relatively rapid transformation due to neglect and burial, they tend to reach an equilibrium that will preserve them over millennia (De Guichen 1984: 21). This consideration holds true both in the case of exposed sites and of sites under water (see the case of Baia near Naples). This consideration is also coherent with the recommendations of the ICCM, stating: "The fundamental premise of the preservation of mosaics is conservation *in situ* and/or its context" (Michaelides 2001: 13). This means that, in the specific case of Zeugma, if the site had been submerged in the same state that history had passed it on to us – i.e., buried – very little would have happened to the archaeological structures. As a result, the choice fell on option 3, which probably represented a halfway point between the needs of scientific investigation and the future protection and conservation of the site. Thus, the conservators' objective changed from preventing damage to containing it.

Thus it was decided to carry out an archaeological investigation in order to understand and document a portion of the city, chosen in view of the

constraints imposed by the rising water, the time required for the archaeological work and the subsequent protection and reburial. Starting from the ethical premise of leaving as much *in situ* as possible, the removal operations involved all the movable objects and any structures in precarious condition or ones that the Turkish Ministry of Culture had decided that they could not be preserved *in situ*.

In particular, the choice of option 3 meant that the following new strategy was implemented for Zeugma.

New strategy approved by the Turkish Ministry of Culture

All operations of conservation, restoration and protection are subject to a single co-ordination (TMC and CCA)

The conservation plan is geared to cover what was previously excavated (Area A) and what will be excavated prior to inundation (Area B)

The aim of the conservation plan is to protect finds and structures, facilitate their study, publication and presentation to the public

Finds and structures will be treated immediately during excavation

Systematic documentation of all structures

Selection of elements to detach on the basis of their condition and the possibility of protecting them *in situ*, the rate of the rising water and the opinion of the TMC

Respect for and protection of all original structures left *in situ*, without hierarchical distinctions

Maintenance of the site after excavation

Support for Gaziantep museum for the conservation and display of finds

Previous system

Each excavation group acted

There were no conservation plans, let alone allocation of resources

The rare restorations carried out were only cleaning for study purposes

No conservation treatment performed during excavation (except for detachment of the wall paintings and mosaics)

In the case of mosaics, documentation very poor (or not supplied to the TMC and conservators)

Systematic detachment of all mosaics and wall paintings with destruction of original structures and stratigraphy

Anything not detached was abandoned to the water without protection

Excavated areas and the site abandoned between one campaign and another

No attention to the final destination of the collections (museum and public)

Turkish restorers currently working at Zeugma included in the organizational chart

Use of the project for conservation training

Maintenance of a high international profile in the composition of staff

Their presence was intermittent and they had no formal or financial coverage

No training program was carried out

All groups had a distinct national character

Technical treatment performed

Bearing in mind the problem of the rising water level and always striving to follow the principal of minimal intervention, the methods used in the treatment were the simplest and most rapid possible, in order to achieve the best results in the least time.

All priorities and conservation requirements were discussed and planned with the archaeologists, on the basis of a division of responsibility and co-operation defined at the beginning of the project. The simplest preventive conservation measures for the finds were performed directly by the archaeologists, who were constantly provided with information and support by the conservators. More complex operations were done directly by the conservators.

The trench supervisors acted as an interface between the conservators and the archaeologists through a continuous exchange of technical information and through discussion of operative programs and the drafting and updating of priority plans.

The conservators produced weekly work plans for the archaeologists in order to facilitate planning of the archaeological investigation. These plans were based on predictions from the dam company about the water's rise, combined with the time needed for technical operations of conservation, protection and reburial.

As a rule, and obviously simplifying the facts, the conservators' efforts were focused on five principal objectives:

- assist the archaeologists during excavation in order to limit, as far as possible, mechanical and thermo-hygrometric stress on finds and structures during excavation and facilitate the reading of the structures by cleaning to enhance archaeological documentation;
- remove movable objects and threatened structures;
- reinforce archaeological structures to be left *in situ*, using consolidation and contact protection, and restore the lines of original burial, in order to reproduce a stable thermo-hygrometric environment that can resist

the rising water;

- implement a maintenance program for the shore of the so-called "fluctuation zone" of the water, which is constantly battered by waves;
- restore everything that was excavated and removed from the site during the excavation campaigns prior to the PHI project.

1. Assistance to the archaeologists during excavation

Excavation and cleaning

During the archaeological investigation, the archaeologists were given technical tips on how to avoid damage to surfaces and objects during their work. With temperatures ranging between 40° and 50° C, the structures and finds constantly ran the risk of rapid moisture evaporation, leading to violent crystallization of the soluble salts they contained.

To mitigate this phenomenon, the work areas were shaded, and if a mosaic was discovered, instructions were to leave a 10 cm layer of dirt over its surface. This layer was subsequently removed by the conservators during cleaning, which was performed with soft plastic brushes, synthetic sponges, a 2% solution of NeoDesogen in water and a vacuum for liquids. The cleaning was always done by groups of 6-8 people in order to reduce the time of exposure of the surfaces to heat and air and avoid the formation of insoluble layers on the mosaic surfaces (fig. 3).

Documentation

After cleaning, documentation was carried out in the form of drawings, photographs and videos, in both traditional and digital formats. All the mosaics and wall paintings were recorded through 1:1 contact on polyethylene sheets, tracing all the lines of the figures and geometric motifs. For the mosaics, the surveys thus obtained, together with the photographic documentation, were then used as the basis for developing base maps in AutoCad for documentation of their condition, past treatments and the current conservation operations performed. Casts of inscriptions and graffiti were taken in silicone.

In all, 2000 film images, 2500 digital images, 12 hours of video shots, 250 m² of tracings, 160 CAD plates and 25 silicone casts were done.

2. Removal from site of movable finds and mosaics

As a premise, a determining component in the approved project was the removal from site of all the movable finds and structures that – owing to their precarious condition or to the opinion of the TMC – could not be kept *in situ*.

The operation called for a great effort of co-ordination with the

archaeologists at work. It was either done directly by the conservators or, where possible, by the archaeologists, who had previously been instructed on what techniques and materials to use. All finds and detached mosaics were immediately taken to the laboratory and restored.

Of everything that was removed from the site, nothing has been left unfinished from the conservation point of view.

A total of 4000 finds and 160 m² of mosaics were removed from the site.

3. Protection of structures left *in situ* and reburial of the excavated areas

The primary consideration in deciding whether to leave a structure *in situ* or remove it was whether its condition offered a good prospect of success for protection and reburial before it was submerged. Before seeing the details of what was done, we should focus on the risks involved for the structures in the passage from open ground to the bottom of a lake.

This passage was characterized by an aggressive phase – the inundation – of extreme thermo-hygrometric instability, in the course of which the mechanical stress (wave action) affecting the archaeological structures was very great. Then followed the new, definitive state – below the water level – where the thermo-hygrometric stability was virtually total and the mechanical action of the waves virtually nonexistent. The true enemy to be dealt with was thus the phase of passage from open ground to lake bottom. Fortunately, it was very rapid, but still capable of destroying the archaeological structures through wave action that could undermine their stability – producing holes, washing away original material, rapidly soaking materials and causing their collapse. The following phase (when everything was already submerged) was less problematical from the conservation standpoint because the materials were again in a stable environment, close to 100% humidity. Given the water density and the thickness of the reburial materials, there were practically no thermal variations, just like the hygrometric variations. The water movement at depth had little influence, as the flow of 500 cubic meters per second was spread throughout the entire section of the lake – approximately 40,000 square meters – resulting in a nominal speed of 1.25 cm/s concentrated in the central area of the reservoir.

The so-called "fluctuation zone" was a different matter. This is a strip about three meters deep directly below the high water level. In this area, the water rises and falls continuously in relation to the workings of the dam, and it is also where mechanical wave action occurs. Potentially everything in this zone was threatened with destruction, so a specific plan for protection and maintenance was defined for the entire "fluctuation zone".

The solution devised to protect the structures before the inundation was as follows:

- consolidate supporting structures where necessary;
- apply a layer of about 5 cm of hydraulic mortar;
- rebury the areas under a layer of earth, river pebbles and stone, at least 50 cm thick.

The idea of applying the layer of hydraulic mortar came from the many cases in antiquity where sacrificial coatings or plaster were used on frescoes and floors, for reasons of health (epidemics), religion (censorship) or style (interior redecoration). Whenever we have had the occasion to remove these lime-based layers, we have found the surfaces beneath in pristine condition³. A "modern" verification of the method's efficiency came from analyzing the results of a similar covering applied in the late 1970s on 300 square meters of mosaics in Nora, in Sardinia⁴. Beneath the protective coating, once it was removed, the mosaics looked like as they had twenty-five years earlier. Another example is the protection of Phoenician funeral mosaics in Porto Torres, Sardegna, made in 1994 by ICCROM for the Soprintendenza Archeologica di Sassari.

Consolidation of unstable mosaic edges and tesserae

Before applying the surface protection layers over the tesserae, it was necessary to consolidate all the unstable areas. For this purpose, we used infiltrations of hydraulic lime composed of sifted stone dust, brick dust and Lafarge hydraulic lime (ratio 1:1). This operation was performed both to fix the loose tesserae to the bedding layer and to consolidate the edges of lacunae. Where the various preparatory layers had separated, they were injected with hydraulic mortar made with sifted brick dust and Lafarge hydraulic lime (ratio 1:1). Lacunae and edges were also reinforced with hydraulic mortar containing stone dust, applied and worked with spatulas, proceeding as follows:

- mechanical removal of accumulations of dirt and deep roots along the edges and in the lacunae, using scalpels and vacuuming up the deposits;
- stuccoing of edges and lacunae with a lime-based mortar (Lafarge hydraulic lime, slaked lime, sifted brick dust, limestone dust in a ratio of 0.5:0.5:1:1).

Surface protection prior to reburial

A coat of lime whitewash was brushed directly onto the cleaned and consolidated mosaic surface. This coat has the double function of further

3. Rome, Roman Forum, Republican houses; Rome, Cripta Balbi, basement floors; Zippori, Israel, house of birds and fish; Cesarea Marittima, Israel, baths on the sea.

4. Archaeological Superintendency of Cagliari. Roman Punic city of Nora. The treatment was performed for conservation purposes by Dr. Carlo Tronchetti in the late 1970s.

consolidating the mosaic surface and acting as a buffer between the original surface and the next protection layer, thus making the latter easier to remove in the future.

When this coat had dried, the protective layer was put on – a 5 cm thick layer of hydraulic mortar composed of Lafarge hydraulic lime, slaked lime, brick powder and stone dust in a ratio of 0.5, 0.5, 1.5, 0.5. This layer was extensively worked to obtain perfect adhesion to the surface beneath it and improve the carbonation process of the aerial components of the mixture. This new surface will protect the original from the mechanical action of the water and act as a sacrificial layer. At the same time, its hydraulic character will enable it to continue to set in contact with moisture and there will be a progressive improvement in its mechanical resistance. In this way, every exchange with the environment will occur on the applied layer and not directly on the original (fig. 4).

The choice of hydraulic mortar was dictated by its high resistance, its mechanical and hydraulic qualities, its durability and complete compatibility with the original surfaces (fig. 5).

Reburial of the excavated areas

All the trenches and structures were reburied with a double layer of materials: the first was composed of soil and sand and was about 50 cm thick; the second was also 50 cm thick on average and composed of river pebbles and stones.

The soil and sand applied in direct contact with the structures were dampened and packed to prevent shrinkage during the inundation. Particular care was taken in filling cisterns, covered rooms and irregularities in the terrain to prevent collapses that could damage pavements and building floors. These operations were done by hand, with wheelbarrows and shovels. Mechanical means were used as much as possible for the other reburial work. Generally, all the trenches were filled with a first layer of soil and sand about 50 cm thick, followed by a variable layer of pebbles and stones depending on the slope of the trench. A total area of 8700 m² was reburied, covering 19 excavation areas. The volume of materials used for reburial was 10,500 m³, equivalent to 630 truckloads of sand, pebbles and stone (fig. 6).

4. Post-Excavation Site Protection and Shore Maintenance program

A few months after the excavation ended, it was clear that in some areas the protection measures implemented during the excavation could not withstand the ongoing erosion in the fluctuation zone (383–385 meters). The energy built up by the waves was great enough to remove and/or disrupt the

heavy pebble covering (average stone size ranging from 10-20 cm in diameter) put in place when the excavation was closed. Furthermore, the wave action continued to disturb unexcavated zones on the shore, constantly bringing up archaeological remains. In some places, artifacts, such as wall plasters and mosaic floors protected during the excavation, were uncovered; while the protective lime-based mortar layer withstood the environmental threats quite well, the structures supporting the artifacts themselves proved to have little or no resistance to the erosion activity on the waterfront. The mud stone walls (Ashlar) started crumbling away, and the floors were often set on not reinforced ground undermined by the water. It was clear that further protection measures were necessary to minimize damage to the archaeological layers in the water fluctuation zone.

To improve the efficiency of the protection system set up in October 2000, the following measures were implemented: rows of woven plastic (nylon) bags filled with gravel (1-3 cm diameter) were arranged parallel to the shoreline. These were piled on each other according to the slope of the shore, between 2-4 bags high. The nylon bags do not last well outdoors as they are susceptible to UV radiation, so the uppermost row of bags was filled with gravel mixed with cement. Behind this barrier, heavy pebbles (10-20 cm diameter) were filled in up to the high water mark under storm conditions. Where the shoreline configuration allowed it, a double row of bags was arranged at 2-5 meters apart. The space between the two bag walls was filled with pebbles.

After a month, this solution also showed a weak point in the material of the bags. The plastic deteriorated very quickly, spilling the filler into the water and polluting the environment. It was therefore decided to move toward the local traditional canvas sacks which are completely biodegradable. The durability of those sacks was intended to be the time required for the gravel/cement mixture to dry up in its final location and shape.

The protective measures were put in place by local manpower, using tractors equipped with dump-load trailers under the supervision of conservation professionals. A total of 5000 bags and 85 truckloads – equivalent to 850 cubic meters – of pebbles were used. To maintain an area of 8000 square meters (the shoreline, 1.5 km) in good condition during the first year after excavation, 600 working days were required plus materials and machinery. This represented a total cost of \$20,000 US, i.e., \$2.5 per square meter per year. These data were confirmed during 2001-2002.

The maintenance will continue until evidence shows that, thanks to the measures taken, a new equilibrium has been achieved.

5. Restoration of material excavated and removed from site during the excavation campaigns prior to the PHI project

The key priority of the new Zeugma project was to keep pace with restoring new finds as they were excavated, while also treating what had been removed from the site during previous campaigns.

With regard to movable finds, this priority meant restoring some 1800 objects, including the famous bronze statue of Mars. For the mosaics, our first concern was to put them into adequate indoor storage (before rain and snow arrived) and begin a new sort of "archaeological excavation" in the mountain of fragments in order to reconstruct the context of their provenance and give the artifacts a "name and surname". The result was a list of about 700 square meters of mosaics, mostly polychrome, figurative and geometric, detached from the site with various methods and generally in drastic condition.

The restoration treatment was completed on March 2003.

Other initiatives

As mentioned earlier, one of the main objectives of the project approved by the TMC was to develop – parallel to direct conservation activity on the site and its artifacts – a further series of typical preventive conservation activities.

Some of these activities are still going on; some will continue on their own in the future. In any event, after three years we can evaluate the first results in both cases. Here are some of the activities:

Conservation initiatives:

- the Gaziantep museum, which is responsible for Zeugma, has been supplied with two perfectly equipped laboratories, covering a total of 250 square meters, for restoration of mosaics, wall paintings and movable objects;
- the same museum has been equipped with one storage area for movable finds and another for mosaics;
- an alarm system was installed in the storage depot and laboratories, and a climatic monitoring system was installed in the museum.

Information initiatives:

- the collection on display in the museum has been given special attention, with mosaics, wall paintings and finds constantly being added;
- all the restoration work performed during this period in the laboratories has been accessible to the authorities, the press and organized groups. Through lectures and guided visits, museum visitors have been informed about the progress of the work.

Training initiatives:

- in the course of 3 years, 10 Turkish technicians have been trained or given further specialization in mosaic restoration and 3 in metal restoration;
- a group of 6 Turkish workers has been organized for site maintenance;
- a procedure for hiring 3 Turkish technicians for Gaziantep museum is in process for restoration and maintenance of mosaics;
- two specialization courses were held for 5 Tunisian restorers from the Institute du Patrimoine de la Tunisie.

Awareness-raising initiatives:

- a seminar on preventive conservation has been held for staff of the GAP involved in territorial development and for functionaries of the TMC;
- there have been direct and ongoing contacts with local and national authorities and industrial groups to facilitate sustainable development of the Gaziantep museum facilities, the Zeugma archaeological park and cultural tourism in this rapidly developing region.

A final consideration is that we have tried both to maintain a high international profile for the project – with conservator-restorers from Brazil, France, Germany, Italy, Spain, and the United States – and also to strengthen the local, national component: the Turkish presence in the organization chart has grown from 20% at the beginning to 50% today.

CONCLUSIONS

The Zeugma project was an enormous challenge for the archaeologists and conservators, given the methodological, technical, climatic and organizational issues involved. While a project such as this required a strictly organizational effort from the practical and logistical standpoint, from the methodological standpoint, the choices adopted called for taking a position with regard to an ethical principle – *in situ* conservation. This approach had not been considered – more for environmental and conservation reasons than for methodological, let alone organizational ones.

This is certainly the issue that has elicited the most discussion, and will do so in the future: the choice of preserving what could be preserved *in situ* as a function of the possibility of providing efficient protection.

Permit me to clarify a couple of points that might help to settle the dust that has been raised about this project, or at least about the choice of following the principle of *in situ* conservation: it did not represent a systematic practice to be applied indiscriminately; rather, it involved replacing a practice used in an extreme way up to that time with a more flexible criterion, introducing a

selection criterion based on technical factors and, moreover, always subject to the judgment of the TMC – the authority responsible for the site.

Thus, it was not a question of applying a "rigid doctrine of *in situ* conservation", but rather of interrupting a "rigid doctrine of detachment".

Yet, I feel the most important thing to stress is that the primary goal of this program was to broaden the perspective and the final objective of the conservation treatment and the excavation itself, shifting the common focus from individual objects or pavements toward a more all-inclusive strategy.

Such a strategy is designed around the themes that characterize modern-day conservation: documentation, protection, training, information and – more generally – respect for the integrity of the archaeological heritage, with particular attention to developing local resources so that the accomplishments of three years' work will be sustainable in the future.

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FIGURES



fig.1



fig.2



fig.3

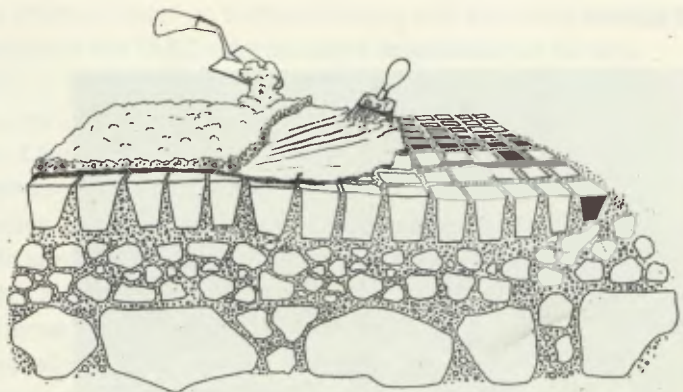


fig.4



fig.5



fig.6

THOMAS ROBY*, LIVIA ALBERTI**, AICHA BEN ABED***

**TRAINING OF TECHNICIANS FOR THE MAINTENANCE OF MOSAICS *IN SITU*:
A TUNISIAN EXPERIENCE**

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SUMMARY

To address the problem of the lack of trained personnel to care for in situ mosaics in Tunisia, a course of alternating training campaigns and practical work was carried out during 2001 for an initial group of ten technicians in the maintenance of mosaics. The trainees were provided with a documentation methodology based on written forms that guides their maintenance interventions and monitoring. Their training is part of a continuing effort to create regional maintenance teams for sites with mosaics.

RÉSUMÉ

Pour répondre au problème du manque de personnel formé à la conservation des mosaïques in situ en Tunisie, un cours alternant des campagnes de formation et des travaux pratiques a été offert en 2001 à un groupe de dix techniciens en charge de l'entretien de mosaïques. Les stagiaires ont reçu, sous la forme d'une série de fiches, une méthode de documentation qui encadre leurs interventions d'entretien et de contrôle. Leur formation s'intègre à un effort continu de développement d'équipes régionales d'entretien pour les sites comprenant des mosaïques.

INTRODUCTION

The Tunisian authorities have been faced in recent decades with a very dramatic situation regarding the conservation of mosaics, both those on sites and those detached and placed on reinforced cement supports and left in

various storerooms and other depositories. In the case of *in situ* mosaics in particular, the problem is due to a lack of maintenance, to poorly executed *ad hoc* interventions in response to damage, and to a lack of preventive measures to control visitor access and other threatening environmental factors. This situation results in large part from a lack of trained personnel at sites to carry out needed maintenance treatments and to prevent damage on a daily basis. Tunisia is far from being alone in needing such training, and attention has already been called to this issue at recent international meetings on mosaics, most recently in Nicosia, Cyprus, in June 2002 (Demas 2002), in Tunis in April 2001 (Blanc 2001) and at ICCROM, in Rome in November 1998 (Schmid 1999) and 1992 (Forum, 1992). However, until recently the training of technicians for mosaics' maintenance outside Europe has been done as an adjunct activity to the main task of having foreign conservators carrying out a conservation intervention (Blanc and Krougly 2003, Costanzi Cobau and Nardi 2003), rather than as the primary activity.

In the late 1990's, the Institut National du Patrimoine (INP) and the Getty Conservation Institute (GCI) began developing a strategy to address Tunisia's need for trained personnel within a wider program of mosaic conservation activities (Demas 2003 and Ben Abed 2003). While the INP would pursue training one or more conservators by identifying perspective candidates to enroll in existing professional conservator training programs outside Tunisia, the GCI would train people in Tunisia for a new job profile, "maintenance technician for *in situ* mosaics", who could in the meantime address many of the conservation problems facing *in situ* mosaics. The INP selected trainees for the course who were already employees, both short and long-term, in order to ensure their future employment. The employees were basically from two different backgrounds, the first being mosaicists from the Bardo Museum with many years of experience working on detached ancient mosaics and in the making of new mosaics, but with little experience working on *in situ* mosaics and with little formal education. The second group were younger, generally more educated employees, based at different sites as guards and general workers, but with little experience with mosaics.

When the training activities began in 1998 (Nardi 2003), the strategy was to create from these two types of employees a central maintenance unit that would work throughout the country. But this was modified later, after organizational changes at the GCI and a break in activity in 1999 and 2000, to a regional strategy with the aim to train groups of 7-10 technicians in different parts of the country to work on a daily basis on different sites in their region. The training resumed under new leadership in 2001, but with largely the same

group of trainees (Roby and Levin 2002: 21-24). Below are presented the approach and contents of the course carried out in 2001, including modifications made during and after it, while offering a preliminary assessment of both the course and the technicians' abilities and achievements.

Now in its second year with a second more homogeneous group of young trainees mainly from the central region of Tunisia, this collaborative training project should continue for at least several more years and in a third region of the country. At the same time, potential conservators have been identified by the INP for training abroad in the coming years who could eventually lead the work of the regional groups of technicians. In addition, a site management workshop is being planned for the near future for site directors in Tunisia in order to strengthen the institutional framework of the technicians' maintenance work.

TRAINING APPROACH

After a series of planning meetings and conversations with the Institut National du Patrimoine (INP) in 2000, a short course curriculum and a mosaic maintenance methodology was developed by GCI consultants and staff. The aim of the training was to create technicians capable of carrying out those basic interventions on a large-scale needed to improve the condition and prevent further loss of *in situ* mosaics. The maintenance of *in situ* mosaics requires regular inspection to assess present conditions, and then the planning and execution of stabilization treatments as needed. "Stabilization" is defined here as the re-establishment of structural integrity and prevention of further loss of material. To do this, the use of lime-based mortars is considered the simple and correct treatment approach. Therefore, a fundamental element of the course has been to teach the trainees about the nature and proper use of lime mortars. The trainees have been shown that lime mortars can be composed differently in order to be used for a variety of different operations and needs, from filling lacunae, to resetting individual *tesserae*, to grouting areas of bedding layer detachment. They have also been taught that lime mortar is a material very similar to the original materials of the mosaic, and that its use does not present any risks for the future conservation of a mosaic.

However, knowledge of lime mortars is not sufficient for those who will be trusted with the job of working on a mosaic, or other works of art. We have therefore attempted to instill in the trainees respect for a mosaic as a whole, and recognition of the importance of their work in conserving its integrity and authenticity. The first step in this process was to teach them to document the condition of a mosaic and the previous treatments carried out on it. Through

the careful observation needed to carry out this documentation, the trainees develop the capacity to assess the conservation problems first, and then to find the best choice of materials and treatments to address them. It has also been considered important to teach them to intervene only enough for the treatment to be effective without being excessive, while paying attention to the aesthetic impact of their work.

Another important aspect of the course has been the development of the technicians' capacity to plan and organize their work before beginning to intervene. The training has also provided the technicians with an understanding of how their work fits within the full range of conservation activities consisting of first-aid treatments, stabilization and maintenance, and restoration. And finally, the training has also established limits to their work: namely no detachment, no reintegration with tesserae, and no use of synthetic materials.

COURSE ORGANIZATION AND MAINTENANCE METHODOLOGY

With these general didactic aims in mind, a simple yet complete training was organized in four separate campaigns, totaling 18 weeks, first at Utica, north of Tunis near the coast, and then inland south of Tunis at Thuburbo Majus. During each campaign, the training combined lessons in the classroom together with practical training on site. The various subjects that were presented to the trainees in the classroom, for example how to create a base map for graphic recording, were then immediately carried out in the field, with guidance and supervision, in order for them to make the connection between the theoretical and the practical (figs. 1 and 2). During the months between the campaigns, the trainees were given practical work assignments in order to acquire further experience, and to verify their comprehension of the material and techniques presented to them.

A system of written documentation forms was developed for the course which provided a framework and methodology for the trainees' maintenance work and its documentation. By filling out the forms for each mosaic in their proper order from 1 to 6, and by carrying out the corresponding graphic documentation on different plans, the trainees follow a clear path of work in a logical and systematic way. The forms are composed as much as possible of different information to be checked off, in order to keep the amount of writing to a minimum, which is an important consideration given the educational level of the trainees.

- The first Form, entitled "Identification", requires providing basic information about the mosaic such as its location, dimensions, description, as well as assigning a unique identification number to the

mosaic which is used to label all additional forms and other documentation. The archeologist in charge of the site should be consulted in filling out this first form, as most of the information asked for should be known to him or her.

- The second Form, entitled "Previous Interventions", requires noting the different interventions carried out on the mosaic in the past which can be seen. This information is also recorded graphically on a plan of the mosaic, and photographically.
- The third Form, entitled "Condition", requires noting all the different deterioration phenomena, both structural and superficial, which can be observed. This important information is also documented graphically on plans of the mosaic, and photographically (fig. 3).
- The fourth Form, entitled "Intervention Plan", requires an appraisal of which type of interventions or treatments are needed, as well as an estimate of what materials, personnel and time those interventions require.
- The fifth Form, entitled "Interventions Carried Out" requires noting what interventions or treatments were done. This information is also documented graphically on a plan of the mosaic, and photographically.
- The sixth Form, entitled "Archive", requires noting what documentation work, either written, graphic or photographic, has been done for a mosaic each time that it is done, which is placed in an archive file together with the documentation itself (forms, plans, photographs) and stored on site for future reference.

These six forms complete the initial maintenance methodology, which is repeated the next time the mosaic is inspected, but beginning instead with the third Form, "Condition", as the information on the first and second Forms will be unchanged.

During the course the trainees were provided with a binder of materials, including descriptions and examples of the written documentation forms and types of graphic documentation, a glossary of mosaic documentation terms, and summaries of classroom lessons, that could function as a reference for their future work. This written material has been revised numerous times already, both during and after the first course, in order to make it more easily understandable by the trainees in response to their educational levels. The didactic and reference materials developed for the course should be considered still a work in progress, as among other changes, it is intended to augment the visual content as an additional learning aid.

The trainees were also provided with their own toolbox, containing all the

equipment needed to carry out their maintenance operations and its documentation, both during the course and in the future. Virtually all of the equipment and tools in the box are available in Tunisia and can therefore be easily replaced. By having their own toolbox, each trainee is given a greater autonomy and capacity to work at any given site. The tools and equipment provided allow the trainees to clean a mosaic safely with controlled amounts of water and soft brushing, air suction, and mechanically with scalpels and dental tools, without resorting to any chemical products or biocides. The tools and equipment provided also permit the trainees to carry out all the different stabilization treatments that can be done on a mosaic using lime mortars and grouts: resetting of loose *tesserae*, edging repairs, filling of lacunae, filling of *tesserae* interstices, and grouting of fractures and voids between bedding layers (fig. 4).

This training experience has shown that requiring the trainees to work alone on different mosaics in the months between training campaigns has been very important to their learning and development. This work helped them to understand that a different solution has to be found for each mosaic, and that the conservation process is not about learning a series of mortar recipes or formulas. Although not planned from the beginning, the fact that the trainees worked also at different sites with different conditions and conservation problems increased their learning as well.

FUTURE PROSPECTS

Although the formal training of the first group of trainees has finished in 2001, there are some aspects of conservation and maintenance work that are not clear to all of them. We realize that they need more experience and guidance, and we are committed to the continuing development of their skills as they continue to work on sites in the North-east region of Tunisia. Individually, they cannot all do everything that has been asked of them, and this relates to the different educational levels and age of the trainees, but they have learned to work as a team. And as such, their skills include the capacity to document their work by writing, drawing and photography, the manual ability to clean and stabilize a mosaic in most instances, and the capacity to determine the best solution for the conservation of a mosaic, in each case and within the limits of their work as we have defined them. They realize, however, that in some cases, the best solution will require the involvement and supervision of a trained conservator.

Given the poor condition of many *in situ* mosaics at sites in Tunisia and the numerous previous interventions carried out with various types and colours of repair mortars, both cement and lime-based, the trainees' practical

work at times required them to intervene beyond the level one would normally consider as maintenance work. Extensive stabilization treatments and the removal of many disfiguring previous repairs will often be required of the trainees, after which, the real work of maintenance can begin.

The extremely important job of the maintenance technician is the daily work of stabilizing mosaics and keeping them in good condition (fig. 5). Archaeological sites desperately need their work, but it requires institutional support and also the co-operation, guidance, support and input from the responsible archaeologist or site director, as well as other specialists in certain cases. To ensure the long-term sustainability of the technician's work, their activities need to be integrated within a management framework, and building up the INP's site management capacities is an important component of the project still in the planning stages.

The results of the trainees' work have already begun to garner institutional support in Tunisia, due in part to a formal presentation of their work to INP site directors on site, organized by the INP in June 2002. The occasion provided an opportunity to demonstrate to decision-makers both the validity of this approach to mosaic conservation, and the value of the trainees' work. Their accomplishments are however only the beginning of a long road of preserving Tunisia's mosaics for the future. Many more technicians and some trained conservators are still required, in addition to more resources, both financial and human, to manage archaeological sites.

A second group of trainees, employed mainly at sites located in the central region of Tunisia, such as Sbeitla, Dougga and Makthar, has just completed the first part of the course at the site of Makthar. This campaign, focusing on documentation, included a trainee from the first group as an additional instructor in order to begin the process of having some technicians training others. Two more campaigns focusing on stabilization treatments are planned for 2003, before beginning the course again in a different region the following year. Ultimately, it is hoped that all sites in Tunisia with significant collections of *in situ* mosaics will have maintenance technicians, trained in part by those already trained through this project. Although this training experience has already born fruit, some administrative obstacles remain, and further experiences are required to confirm whether it could be an applicable model in other regions of Tunisia, or in other countries.

Acknowledgements

The authors would like to acknowledge the contribution of past members of the project: conservator Roberto Nardi and staff of CCA, Rieti, and

conservator Francesca Pique (GCI) in 1998, and conservators Kathy Dardes (GCI) and Bettina Luccherini in 2000-2001. Conservator Elsa Bourguignon (GCI) currently assists the project. Taoufik Redissi, INP archaeologist responsible for the site of Utica, generously hosted the training course in 1998 and 2001.

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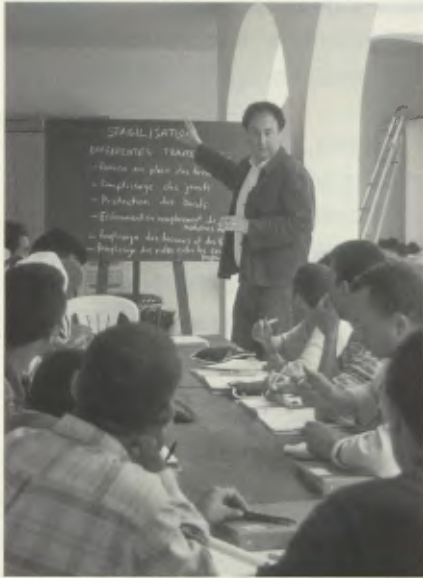
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FIGURES



1. Classroom teaching on site.



2. Practical documentation training on site.



4. Peristyle of the Maison de Neptune at Thurburbo Maius, trainee carrying out mortar filling of interstices after cleaning.



5. Peristyle of the Maison de Neptune at Thurburbo Maius after cleaning and stabilization treatments by the trainees.

FICHE N°3 - ETAT DE CONSERVATION

PHASE D'ETUDE

ID MOSAIQUE ___/___/___/___

CONDITIONS ACTUELLES D'EXPOSITION

- | | | |
|---|---|--|
| <input type="checkbox"/> En plein air | <input type="checkbox"/> Sous abri ouvert | <input type="checkbox"/> Réenfoie |
| <input type="checkbox"/> Sous une couverture amovible | <input type="checkbox"/> Dans un abri fermé | <input type="checkbox"/> Sujet à piétinement |

DETERIORATION STRUCTURELLE (Plan de l'état de conservation n° 1)

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> Lacunes | <input type="checkbox"/> Dépressions |
| <input type="checkbox"/> Fractures | <input type="checkbox"/> Décollements entre les couches de la mosaïque |
| <input type="checkbox"/> Soulèvements | |

DETERIORATION DE LA COUCHE SUPERFICIELLE (Plan de l'état de conservation n° 2)

- | | |
|---|---|
| <input type="checkbox"/> Tesselles ou plaques de pierre détachées | <input type="checkbox"/> Taches |
| <input type="checkbox"/> Tesselles ou plaques de pierre endommagées | <input type="checkbox"/> Incrustations |
| <input type="checkbox"/> Mortier des joints entre les tesselles endommagé | <input type="checkbox"/> Efflorescences |

DETERIORATION BIOLOGIQUE (Plan de l'état de conservation n° 3)

- | | |
|---|---|
| <input type="checkbox"/> Micro-organismes | <input type="checkbox"/> Dommages causés par des animaux, insectes inclus |
| <input type="checkbox"/> Végétation | |

DETERIORATION DES INTERVENTIONS SUR LA MOSAIQUE (Plan de l'état de conservation n° 4)

- | | |
|---|---|
| <input type="checkbox"/> Bouchages des lacunes endommagés | <input type="checkbox"/> Protections des bords endommagées |
| <input type="checkbox"/> Remplissages des joints entre les tesselles endommagés | |
| <input type="checkbox"/> Supports de mosaïque déposée et replacée endommagés | |
| Réenfoissement | <input type="checkbox"/> Végétation |
| | <input type="checkbox"/> Perte des matériaux de remplissage |
| | <input type="checkbox"/> Couches de séparation endommagées |

DETERIORATION DES INTERVENTIONS DE PROTECTION AUTOUR DE LA MOSAIQUE

- | |
|---|
| <input type="checkbox"/> Couverture amovible / abri ouvert / abri fermé endommagé |
| <input type="checkbox"/> Drainage inefficace |
| <input type="checkbox"/> Stabilisation des murs inefficace |

AUTRES OBSERVATIONS SUR L'ETAT DE CONSERVATION (*Etat des murs, présence d'arbre, etc.*)

ETAT GENERAL DE CONSERVATION DE LA MOSAIQUE

- | | |
|---|--|
| <input type="checkbox"/> Bon | DATE RECOMMANDEE pour le prochain contrôle : |
| (Aucune intervention nécessaire) | |
| <input type="checkbox"/> Moyen | DATE RECOMMANDEE pour l'intervention : |
| (Intervention nécessaire - remplir Fiche n°4) | |
| <input type="checkbox"/> Mauvais | DATE RECOMMANDEE pour l'intervention : |
| (Intervention immédiate nécessaire - remplir Fiche n°4) | |

REDIGE PAR

DATE

DENIS WEIDMANN *, FRED GIRARDET **

CONTRÔLE CLIMATIQUE DE MOSAÏQUES *IN SITU* SOUS ABRIS

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** Expert Centre pour la conservation du patrimoine bâti - MX - G Ecublens - Lausanne.

RÉSUMÉ

Recherche de stabilisation du climat dans un ancien abri de mosaïques in situ. Limitation de l'évaporation de l'humidité du terrain au travers de la mosaïque, par un système de ventilation régulée "intelligent". Utilisation de l'air humide de tranchées drainantes, renvoyé dans l'espace de visite. Enregistrement des évolutions climatiques.

SUMMARY

Attempt to climate stabilisation in an old shelter for in situ mosaics. Reduction of ground water evaporation through the mosaic by way of an "intelligent" ventilation system. Extraction of wet air from drain - trench, into the visiting room. Monitoring of climatic changes.

Situation générale - Causes des dégradations

La volonté de maintenir *in situ* un groupe de 9 mosaïques mises au jour et abritées aux XIX^e et XX^e siècles est liée à un programme de conservation générale et de mise en valeur de la grande villa gallo-romaine d'Orbe (fin du II^e siècle après J.-C.). La connaissance complète du site et des constructions auxquelles appartiennent les pavements a été acquise par un programme de fouilles méthodiques qui se poursuit depuis 1986. Les vestiges sont réenfouis après les investigations (Flutsch et al. 1997: 5 - 58).

Des analyses approfondies de l'état de conservation des mosaïques ont mis en évidence les facteurs de dégradation de divers composants des pavements, ainsi que leurs liaisons avec les variations des paramètres

climatiques dans les abris fermés, construits entre 1841 et 1935 (Flatt et al. 1997; Weidmann et al., 2003).

Un rôle prépondérant dans la dégradation et les décollements constatés est attribué aux nombreux cycles climatiques défavorables subis à l'intérieur des abris. Leur conséquence est une évaporation régulière de l'humidité du sous-sol, entraînant un dépôt de sels dans les niveaux superficiels des pavements.

Diverses interventions sont entreprises depuis 1997 pour la conservation des mosaïques elles-mêmes (déjointoyage, coulis et injections de liants adaptés à la situation physique ou chimique, etc) (Flatt et Girardet, 2000: 297 - 305; Fischbacher et al., 2003).

Une autre série d'interventions cherche à établir les conditions d'un maintien *in situ* durable des pavements visibles, limitant ou supprimant les facteurs de dégradation qui affectent les mosaïques, pour certaines depuis plus de 150 ans.

D'une manière générale, les phénomènes observés sont imputables aux cycles périodiques d'évaporation de l'humidité contenue dans le substrat de la mosaïque, favorisés par les propriétés capillaires des matériaux. Le régime de l'évaporation dépend des variations de la température et de l'humidité relative dans le volume de l'abri.

En dépit des drainages mis en place à la périphérie des abris, le taux d'humidité dans le sous-sol reste élevé (fig. 1 et Fischbacher et al., 2003, fig. 2) et peut atteindre 20% du poids des matériaux à 3 cm sous la surface de la mosaïque. L'atmosphère dans le bâtiment de protection est en revanche soumise à divers facteurs:

- influence du taux d'humidité relative à l'extérieur, lors des entrées d'air,
- les bâtiments ne sont pas climatisés, ni chauffés en hiver. La température intérieure suit donc avec un certain retard les variations de la température externe.

Premières interventions de réglage climatique

La structure des bâtiments a donc été modifiée pour augmenter l'inertie générale de l'abri aux variations extérieures de température, quotidiennes ou saisonnières.

Les mesures suivantes ont été prises, pour tous les abris inclus dans le site et notamment pour ceux du XIX^e siècle. Il s'agit de bâtiments en maçonnerie traditionnelle, aux murs de 60 cm d'épaisseur environ. Certains sont érigés directement sur les fondations gallo-romaines (figs. 2 et 3):

- calfeutrage des ouvertures et portes, suppression des ouvertures de

ventilation naturelle

- isolation thermique des plafonds et sous-toitures
- installation de vitrages isolants aux fenêtres, fermées en permanence
- suppression des éclairages zénithaux (verrières en toiture)
- installation de claustra et jalousies, évitant l'échauffement de l'intérieur par insolation directe. Il s'agit également d'éviter l'insolation directe des mosaïques elles-mêmes, source de dilatations thermiques importantes. L'éclairage naturel est complété par un éclairage artificiel
- installation de rappels de portes automatiques, pour diminuer le temps d'ouverture lors de l'entrée des visiteurs et limiter les échanges entre l'atmosphère de l'intérieur du bâtiment et l'extérieur.

Installation de réclage des flux d'humidité

Les interventions ci-dessus ont pour effet de limiter la ventilation naturelle des bâtiments et d'augmenter le taux d'humidité relative au-dessus des mosaïques. Mais cette augmentation n'est pas contrôlée, et elle est insuffisante pour limiter les phénomènes incriminés, dans la situation climatique du site d'Orbe.

Un dispositif expérimental de ventilations a donc été mis en place dans l'un des bâtiments (fig. 3), dans l'intention de maintenir dans l'espace de visite à l'intérieur des bâtiments un taux d'humidité relative élevé, limitant le transfert vers la surface de l'eau contenue dans la mosaïque et dans son substrat.

Ce résultat est obtenu schématiquement par les moyens suivants:

- prélèvement de l'air humide dans une tranchée drainante confinée établie à proximité de la mosaïque ou à sa périphérie, ce qui contribue à assécher progressivement le terrain et diminuer l'humidité pouvant s'évaporer au travers du pavement,
- rejet de cet air humide dans l'ambiance du bâtiment de protection; assurer un mélange de cette atmosphère.

Les flux sont activés par l'enclenchement de divers ventilateurs, par une tubulure qui relie les différents espaces. Des capteurs d'humidité et de température dans les divers espaces confinés alimentent en données un système de commande "intelligent". Ce dispositif optimise la gestion des ventilateurs, en fonction des besoins et des conditions existantes.

Les valeurs relevées sont enregistrées en permanence et les consignes de commande (valeurs limites souhaitées) peuvent être réglées à distance.

Résultats et effets obtenus

Les exemples de relevés donnés montrent la stabilisation obtenue, au cours de variations quotidiennes (8 à 15 octobre 2001, fig. 4) et au cours de variations saisonnières (octobre 2000 - mai 2001, fig. 5).

Dans ces exemples, le taux d'humidité relative recherché au-dessus de la mosaïque a été fixé entre 85 et 90%, ce qui a été respecté en règle générale au cours des deux premières années du fonctionnement de l'installation.

L'humidité des matériaux du sous-sol, observée dans la tranchée drainante qui s'étend le long de la mosaïque 5, est en diminution. Ceci met en évidence l'interception des eaux capillaires ascendantes et fait espérer une diminution des dépôts de sels dans la mosaïque.

Un taux inférieur à 70% ne devrait pas être atteint, en raison du risque accru de cristallisation des sels accumulés en surface de la mosaïque, qui peut difficilement être dessalée. Le taux d'humidité relative de 80 - 90% maintient les sels hygroscopiques en solution. Ceci confère à la mosaïque un aspect humide, qui en ravive les teintes.

Il n'a pas été observé de mouvement particulier des deux mosaïques soumises à ce régime (l'une d'elles repose sur une dalle indépendante du sous-sol, voir Fischbacher et al., 2003: 144-145). Le maintien d'un taux particulièrement élevé d'humidité a cependant quelques effets jugés compatibles avec la conservation des pavements:

- l'ambiance dans le pavillon de visite est celui d'une cave fraîche, dans la plus grande partie de l'année. Le temps de visite relativement bref (entre 5' et 15' selon les visiteurs) laisse ces conditions supportables pour les visiteurs les plus sensibles
- on a constaté le développement local d'un feutrage de mycélium microscopique en surface de l'un des pavements. Ce développement est facilement éliminé par un léger balayage occasionnel
- la diminution de la lumière naturelle diurne a inhibé les développements végétaux significatifs (algues, mousses). Les rares points de développement sont localisés sur les maçonneries et enduits environnants, alimentés par des humidités capillaires.

Le bilan favorable de cette expérience nous a convaincu de réaliser en 2002-2003 une deuxième installation de même principe, mais plus importante, dans le pavillon voisin, où la mosaïque no 8 (dite des Divinités) est en traitement conservateur, toujours *in situ*.

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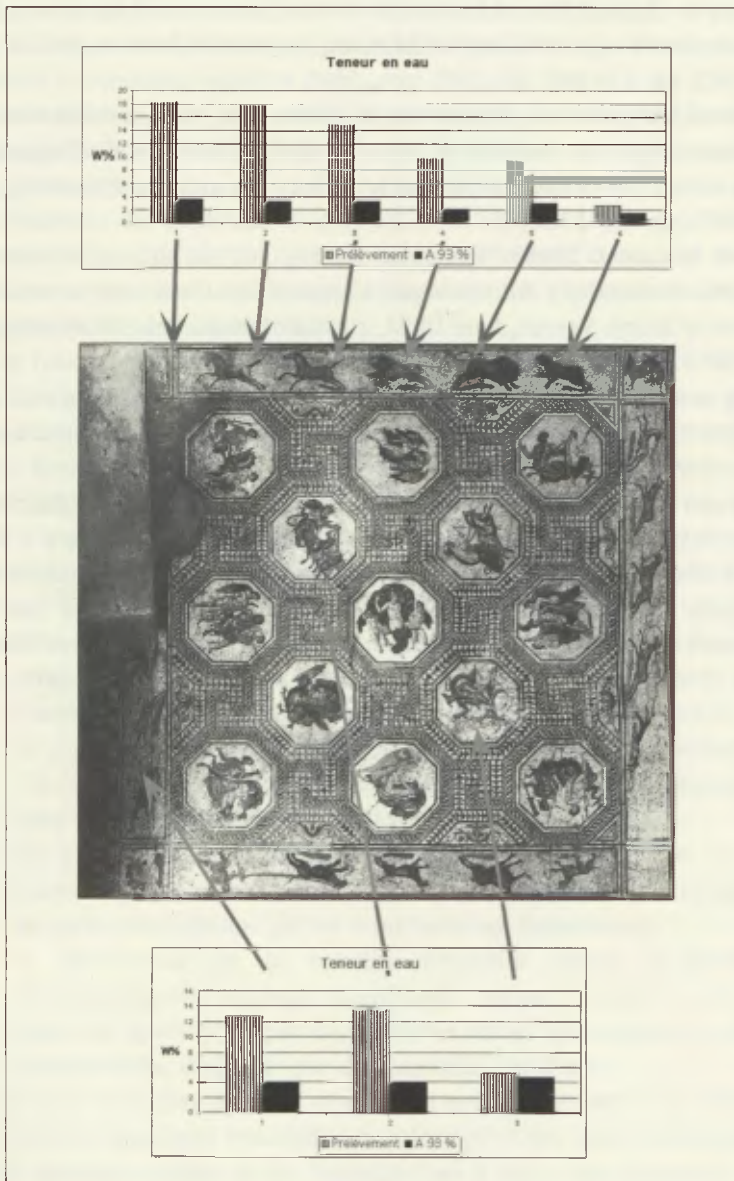
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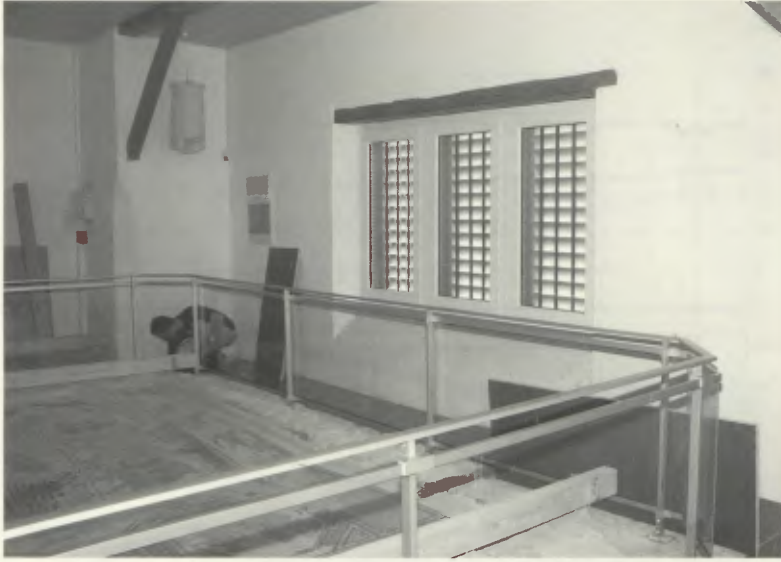
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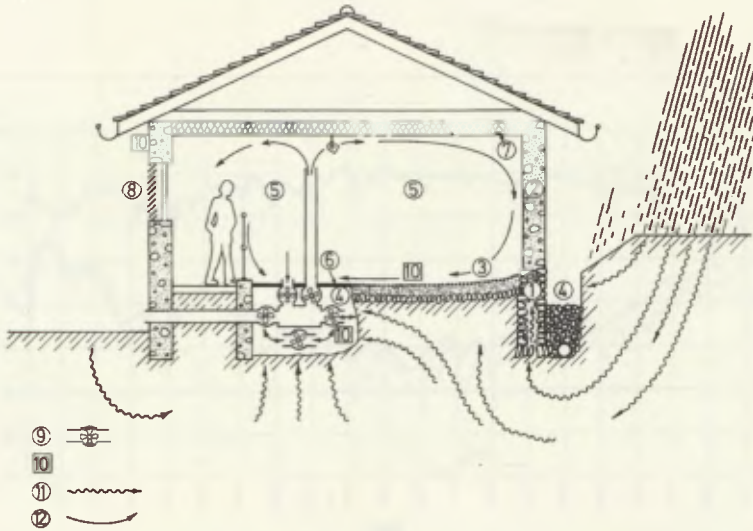
FIGURES



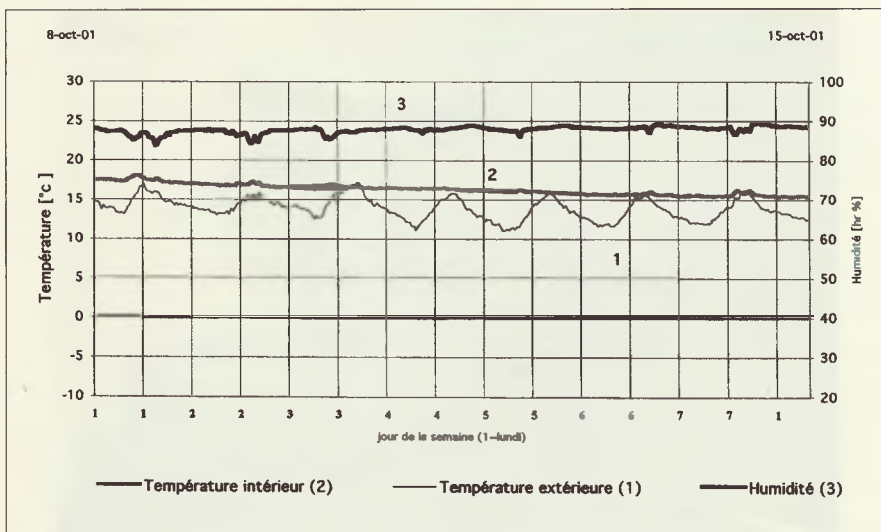
1. Colonnes de gauche: les taux d'humidité capillaire dans la mosaïque no 8 à environ 3 cm de profondeur, mesurés avant mise en place du contrôle d'humidité. La diminution des taux, de gauche à droite, est à mettre en relation avec l'abaissement du terrain environnant le bâtiment. Colonnes de droite: absorption de vapeur d'eau à 93% d'humidité relative.



2. Intérieur du bâtiment de protection (1862), adapté pour le contrôle climatique, avec verres isolants, jalousies fixes et plafond isolé. La tranchée drainante et confinée, à la périphérie des murs d'entourage de la mosaïque, est recouverte par des panneaux de bois.

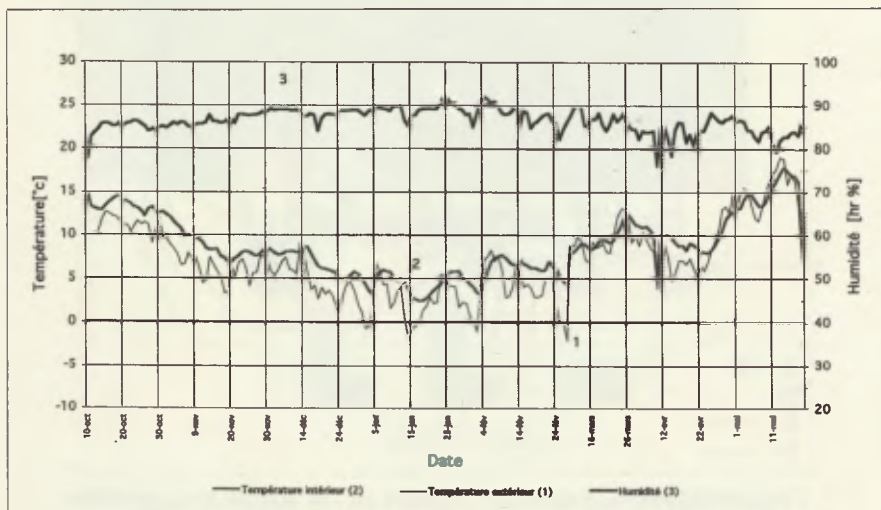


3. Coupe schématique et situation de la mosaïque no 7 de Boscéaz, avec installation de ventilation. (1) mur gallo-romain, (2) maçonnerie moderne, (3) mosaïque *in situ*, fragmentaire, (4) tranchée drainante, (5) espace de visite, (6) panneau de fermeture, (7) isolation, (8) jalousies - double vitrage, (9) ventilateurs, (10) capteurs humidité - température, (11) humidité capillaire, (12) mouvements d'air humide.



4. Enregistrement des températures et taux d'humidité (octobre 2001).

(1) température extérieure, (2) température à l'intérieur du bâtiment, (3) humidité relative dans le bâtiment.



5. Enregistrement des températures et taux d'humidité (octobre 2000 - mai 2001).

(1) température extérieure, (2) température à l'intérieur du bâtiment, (3) humidité relative dans le bâtiment.

D. ΘΕΜΑ 4Ο: ΠΑΡΟΥΣΙΑΣΗ
THEME 4TH: PRESENTATION

CLAUDIA ANGELELLI

**LES PAVEMENTS EN *OPUS SECTILE* DE LA VILLA ROMAINE
DE CAZZANELLO (TARQUINIA, VT):
LA RECHERCHE ARCHEOLOGIQUE ET LE PROJET DE CONSERVATION
ET RESTAURATION**

RÉSUMÉ

Les fouilles en cours d'exécution dès 1992 par l'Université de Tokyo sur le site de la grande villa maritime de Cazzanello ont permis de remettre au jour un nombre considérable de pavements en opus sectile. La collaboration très proche entre archéologues et restaurateurs a permis d'effectuer une analyse complète des pavements sans recourir au détachement, en limitant l'oeuvre des restaurateurs au nettoyage et à la consolidation.

Les fouilles de l'Université de Tokyo sur le site de Cazzanello¹, auprès de Tarquinia, commencées en 1992 et maintenant en phase de conclusion, ont remis au jour les restes d'une très grande villa maritime, dans laquelle l'étude préliminaire des stratigraphies a permis de reconnaître cinq différents phases, datées entre l'époque républicaine et l'antiquité tardive, et une fréquentation continue du site, qui se prolonge jusqu'au haut Moyen âge².

La plupart des structures survécues appartient naturellement aux phases plus récentes. Au début du III^e siècle remontent en effet le thermes, situées dans la partie sud-ouest du complexe (ce sont les pièces indiquées en planimétrie par les n.os de 45 à 61 et de 71 à 79: fig. 1), qu'on a pu bien dater sur la base des nombreux marques sur les briques encore *in situ*.

Les édifices qui se situent dans la partie centrale de la fouille – c'est-à-dire

1. Le site était déjà bien connu dans la littérature spécialisée: cf. Westphal 1830, 28-31; Bordenache Battaglia 1973-1974 et 1975 ; De Rossi 1968, 143-145; Brunetti Nardi 1981, 165-166; Carnabuci 1992, 98; Corsi 1998, 224, 244, 247; Corsi 2000-2001, 249-252.

2. Pour des comptes rendus des fouilles jusqu'au 1999 cf. Aoyagi 1993-2000 (les deux premiers volumes en japonais). Voir également Aoyagi-Foschi 1997; Steingraber 1999, Watanabe 1999, Imai 1999 et, plus récemment, Aoyagi-Angelelli-Imai Fujisawa 2002-2003.

la grande exèdre ouverte vers la mer (n.ros 37 et 38), la salle octogonale n.ro 40, la cour à portiques indiquée comme "*ambulacro 1*", la salle trilobé n.ro 1 – peuvent être génériquement datés, à ce moment, au IVE ou Ve siècle.

En général les murs de cette *villa*, qui avait une extension très grande et plus vaste par rapport à la surface de la fouille (4.000 m carrés environs), sont très peu conservés en élévation, surtout à cause de travaux agricoles qui ont bouleversé en profondeur le terrain jusqu'à l'entreprise de la fouille.

Il n'est pas surprenant, donc, constater que très souvent les pavements constituent ici la partie mieux conservée de l'ensemble décoratif; par conséquent, l'étude des pavements devient – dans ce contexte – fondamentale pour obtenir informations sur la chronologie, la fonction et l'importance de cette luxueuse résidence maritime.

"Indicateurs" de la richesse de la *villa* de Cazzanello sont les nombreux *sectilia pavimenta*³, qui ont été mis au jour dans le secteur occidentale du complexe. On a déjà présentés ces pavements au IX Colloque AIEMA de Rome⁴, mais la continuation des études a permis d'en préciser la date sur la base des données stratigraphiques, qui vont confirmer la chronologie déjà suggérée sur base stylistique.

Le premier groupe de pavements, daté entre le siècle av. J. C. et le I^{er} siècle, a été découvert dans les pièces n.ros 48 et 81. Ces *sectilia* avaient été couverts par des structures et des pavements d'époque successive, qui les ont abîmés mais même protégés des spoliations.

Le pavement remis au jour dans la partie sud de la pièce 81, réalisée en ardoise et calcaire blanc (peut-être de palombino), résulte très endommagé par un sondage exécuté pendant les années '60 du dernier siècle, réalisé sans poser aucune attention ni à la stratigraphie, ni à la conservation des structures. Très important, pour la reconstruction du dessin de ce sectile, a été l'étude des empreintes, qui a permis d'établir que ce pavement était constitué par des panneaux juxtaposés avec motifs décoratifs différents: "à damier", qui est le seul conservé même en plaquettes (fig. 2), "à isodomo listellato" (Guidobaldi 1985, 206-207) (c'est-à-dire avec des petites dalles rectangulaires bordées des filets, à simulation de l'*opus quadratum*) et à carrées dessinés par des filets (Guidobaldi 1985, 205-206)⁵ (fig. 3).

3. Voir, à ce propos, les considérations en Guidobaldi-Angelelli 2001.

4. Aoyagi-Angelelli 2005 (c.s.). Pour les pavements en mosaïque et en opus sectile de l'âge républicain tardive et du Haut-Empire voir aussi Aoyagi-Angelelli 2004.

5. On trouve le même motif dans quelques pavements à Pompéi et Herculaneum (Guidobaldi 1994, 140; Guidobaldi-Olevano 1998, 229, tav. 2, 5) et dans la villa romaine de Capo Castello (Ile d'Elba): Firmati 2001, 227, fig. 7 (avec chromatisme inversé).

L'emploi exclusif des matériaux "non marmoréens" indique pour ce *sectile* une date au I^e siècle av. J.C. (Guidobaldi 1985, 223; Guidobaldi 1994a, 452-462; Guidobaldi 2003, 18-22), qui est confirmée même pour la technique de mise en oeuvre du pavement, qui ne présente pas des éléments de support (terre cuite ou pierre) insérés dans le mortier de base. Toutes ces caractéristiques sont en effet typiques de la plus ancienne production en *opus sectile* (qui comprend l'époque républicaine tardive et l'âge augustéenne) (Guidobaldi 1985, 222; Guidobaldi 2003, 28). On peut d'ailleurs comparer ces pavements avec des autres exemples - celui de la *Villa* des Mystères à Pompéi, dans la salle homonyme, avec motifs à damier et à carrées bordés des filets (Guidobaldi-Olevano 1998, 228, tav. 2,3.); celui de la *villa* di Fabio Rufo à Pompéi, avec motif "à isodomo listellato" (Guidobaldi-Olevano 1998, 230, tav. 4, 1) - qui sont bien datés entre I^e siècle av. J.C.

Un autre *sectile*, qui appartient à la décoration d'une pièce détruite pour la construction des thermes, a été découvert au dessus du niveau de pavement de la pièce 48 (fig. 4). La marqueterie, réalisée par des matériaux mixtes (calcaires et marbres) se compose d'une large bande réalisée par la combinaison de triangles d'ardoise et hexagones de *palombino*⁶; cette bordure encadre un motif à rectangles bordés des filets avec une losange inscrite. Les matériaux employés sont le marbre pavonazzetto pour les rectangles, l'ardoise pour les losanges et le rosso antico pour les filets (Aoyagi-Angelelli-Imai Fujisawa 2002-2003, 202-205; Aoyagi-Angelelli 2004, 77-78).

La position stratigraphique suggère une attribution à l'époque augustéenne ou – au maximum – julio-claudienne qui semble aussi confirmée par les matériaux mixtes employés et par les autres aspects techniques de l'exécution. A ce propos il est intéressant de souligner que ni dans ce pavement, ni – naturellement – dans le précédent, on trouve les traces d'une éventuelle préfabrication. Ça confirme l'absence de cette technique d'exécution dans l'époque républicaine et augustéenne (il faut rappeler que les premiers exemples sont en effet ceux qu'on a trouvés dans la *villa* de Tibère à Capri). Une bonne comparaison pour le motif décoratif de notre pavement peut être en tout cas un des *sectilia pavimenta* de la domus dite "*des Pactumeii*" sur l'Aventin à Rome (Grandi-Olevano 1995, 366-367, figs. 5, 12).

6. Ces plaquettes appartiennent probablement à quelques pavements plus anciens, entièrement rédigés en calcaires, qu'on peut bien dater à l'âge républicain tardive (vers la moitié du I^e siècle av. J.C.): sur cet aspect cf. Angelelli 2000, 92-93; Angelelli, Aoyagi 2004, 72. L'utilisation de carreaux de remploi pour la création des *sectilia pavimenta* est d'ailleurs très fréquent, même dans le Haut Empire: cf. Guidobaldi-Olevano 1998, 240.

Dans la partie nord de la pièce 81 à été découvert un autre *sectile*, constitué par des éléments carrés d'un module de 35 cm (fig. 5). Le dessin est ici un peu plus compliqué. Dans le carré de base s'inscrit un octogone, dans lequel s'inscrit par diagonale une étoile à huit rayon; au centre de cette dernière il y a un motif à aile de moulin (pour la description détaillée de ce *sectile* cf. Aoyagi-Angelelli-Imai Fujisawa 2002-2003, 205-208; Aoyagi-Angelelli 2004, 77-78).

La qualité de ce pavement, réalisé avec deux marbres (*giallo antico et palombino*) est augmentée par l'inversion chromatique dans les éléments contiguës. La plupart de ce pavement se conserve en empreintes, par l'analyse desquelles on a pu établir l'homogénéité de la composition de ce *sectile*, qui a été entièrement réalisé par des éléments de module identiques et préfabriqués (les éléments de céramique et de marbre insérés dans le mortier de base nous en donnent la preuve).

Les données de la stratigraphie et l'emploi des marbres *bardiglio* et *giallo antico* (qui semble assez typique de la première période impériale)⁷ indiquent pour notre *sectile* une chronologie vers la moitié du I siècle.

Pour le schéma géométrique on n'a trouvé, jusqu'à ce moment, des comparaisons ponctuelles, à l'exception des carreaux réemployés dans le pavement de l'abbaye de *Farfa* (McClendon 1980, 158-161; Guidobaldi, Guiglia Guidobaldi 1983, 479-480, nt. 856), qui sont toutefois différents pour l'emploi de cinq marbres et pour l'articulation à peine différente du motif.

Le deuxième groupe de pavements, cohérent avec les structures plus récentes de cette *villa*, a été découvert dans les pièces 33 et 40. Ajoutons à ces derniers le pavement de la salle octogonale 53 (le *frigidarium* des thermes), réalisé par des grandes dalles (2,15 x 0,85-0,90 m) de *cipollino*, pour une large part conservé seulement en empreintes (fig. 5).

On peut attribuer ce pavement à la typologie récemment définie "à dalles homogènes" (Olevano 2000), c'est-à-dire réalisé par des dalles en pierre ou marbre de la même espèce géologique, arrangées de manière à recouvrir simplement le sol, sans créer dessins ou jeux chromatiques. Il faut souligner l'emploi du marbre *cipollino* - assez peu utilisé dans les pavements à cause de

7. On trouve souvent cette association chromatique dans la première âge impériale: voir, par exemple, les pavements en opus sectile, à module petit et moyen, de Luni (Zaccaria Ruggiu 1983, 28, tav. I, fig. 2), Lucus Feroniae (Bianchi-Bruno 2005, 736-737, figs. 1-2), Capri (Esposito-Betori 2001, 512, figs. 5-6), Ercolano (Guidobaldi-Olevano 1998, 238, tav. 17, 3 e 5), Saint-Romain-en-Gal (Lancha 1981, figg. 1, 84; Behel-Veysseyre 1996, 58), Tusculum (Valenti 2001, 580, fig. 6); encore, entre les sectilia à grand module, les pavements de Rome (Ungaro-Ponti-Vitti 2001, 566, figs. 1-2), Ostia (Guidobaldi 2001, 362, fig. 4), Carsulae (Angelelli 2001, 464-467, figs. 5-9).

sa fragilité le long des veines⁸ - qui est un des matériaux préférés dans la décoration architecturale de cette *villa* maritime, probablement pour sa couleur vert, qui rappelle évidemment l'eau de mer (Cf. Olevano - Arcidiacono- Guidobaldi- Trucchi 1989, 142).

Le pavement de la salle à abside 33 (fig. 6) est très mal conservé, parce qu'il a été très endommagé par le même sondage dont on a parlé à propos du premier pavement (Aoyagi-Angelelli-Imai Fujisawa 2002-2003, 224-226).

Ce *sectile*, qui est réalisé par des dalles rectangulaires de marbre blanc, bordées par des filets de porphyre rouge, peut être bien classé dans la catégorie définie "à isodomo listellato" et de laquelle on a déjà parlé.

L'analyse de ce motif décoratif, très fréquent dès l'Haut Empire à l'antiquité tardive, ne peut pas être utilisé comme appui chronologique. On a toutefois pu obtenir des informations plus ponctuelles après l'examen soit des caractéristiques techniques du *sectile*, réalisé avec marbres réemployés, soit de la stratigraphie située au dessus du pavement, qui contenait, en effet, quelques fragments de céramique. Toutes ces données nous suggèrent une chronologie tardive, qui est d'ailleurs cohérente avec les caractéristiques architecturales de la pièce 33.

Le pavement de la pièce 40 (fig. 7), une grande salle octogonale à niches, est réalisée par des simples dalles de marbres (blanc et gris régulièrement alternées dans l'octogone; blanc, gris et colorés - brèche de *Skyros*, *cipollino*, *verde antico di Tessaglia* - dans les niches) (Aoyagi-Angelelli-Imai Fujisawa 2002-2003, 226-229). Si dans la salle les dalles sont assez bien conservées, dans la plupart des niches les pavements sont survécus seulement en empreintes.

On a parlé de pavement à dalles, mais la présence d'un dessin - à octogones concentriques - obtenu par contraste chromatique nous permet en tout cas de le classer entre les *sectilia pavimenta*.

Depuis les premières campagnes des fouilles on a établi que cette *villa* sera renterrée à la fin des recherches archéologiques (Foschi 2000, 723). En effet soit sa position, placée dans une propriété privée à quelque dizaine de mètres de la plage et au dessus du niveau de la mer, soit le mauvais état de conservation de ses structures (conservées en élévation seulement par quelques dizaines de centimètres) avaient posé dès le début nombreuses questions sur les réelles possibilités de jouissance du site.

Pour ce qui concerne les pavements en *opus sectile*, on peut bien réaliser,

8. Voir sur cet aspect Salvatori, Trucchi, Guidobaldi 1988, 178-179. Autres exemples de pavements en dalles de *cipollino*: Villa Adriana (Guidobaldi 1994b, 112-113, n. 39, tav. II/1, XXXII, LVII); villa de Castro dei Volsci (Laurenti 1994, 202-203, fig. 6); complexe impérial près de S. Croce in Gerusalemme a Rome (Barbera 2000, 109, fig. 6).

du point de vue de la conservation, qu'on a pu obtenir presque toutes les informations possibles sans aucun enlèvement à leur place originaires. L'examen des *sectilia pavimenta* plus anciens a été possible dans les nombreuses lacunes ou dans d'autres trous qu'on a trouvés déjà pratiqués. L'analyse stratigraphique des couches archéologiques qui séparent les pavements a pu donc être conduite dans les zones déjà privées du revêtement marmoréen et dans les sections. On a donc réalisé une analyse complète du contexte sans la dépose des pavements, à laquelle on a souvent recours dans la fouille archéologique.

Naturellement c'est la particulière situation mise en évidence pendant la fouille qui a facilité l'analyse stratigraphique, mais il faut aussi dire que les *sectilia pavimenta*, avec ses motifs pour la plupart modulaires, peuvent être bien interprétés même si on dispose seulement de morceaux relativement petits.

Pour conclure, en tout cas, on peut affirmer que, en conditions favorables, on peut limiter au minimum les enlèvements et, par conséquent, la dépose et la repose des pavements, comme dans cet exemple de la villa de Cazzanello, où on peut dire que, avec une collaboration active et très proche entre archéologues et restaurateurs, on pourra laisser *in situ* tous les *sectilia pavimenta* – endommagés par le temps et par les hommes – en limitant l'oeuvre des restaurateurs au nettoyage et à la consolidation (Guidobaldi 1987; Guidobaldi-Lugari 2001; Ungaro-Vitti 2004).

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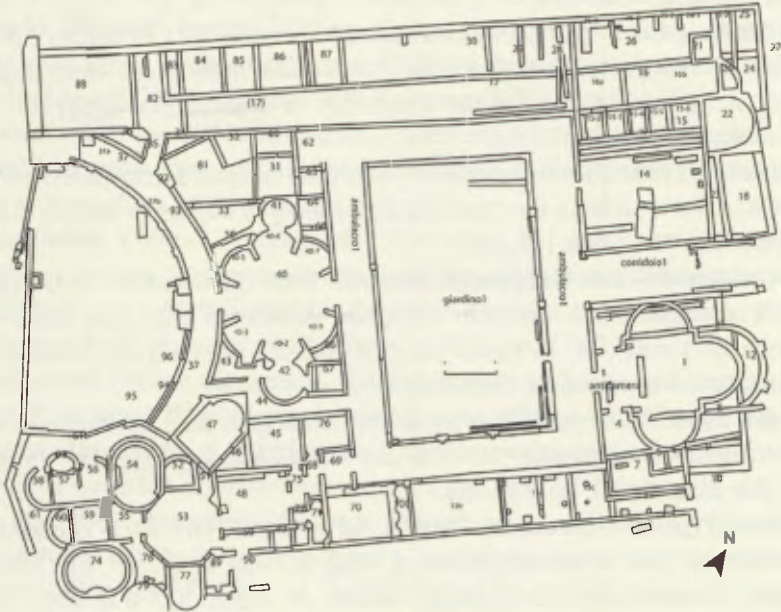
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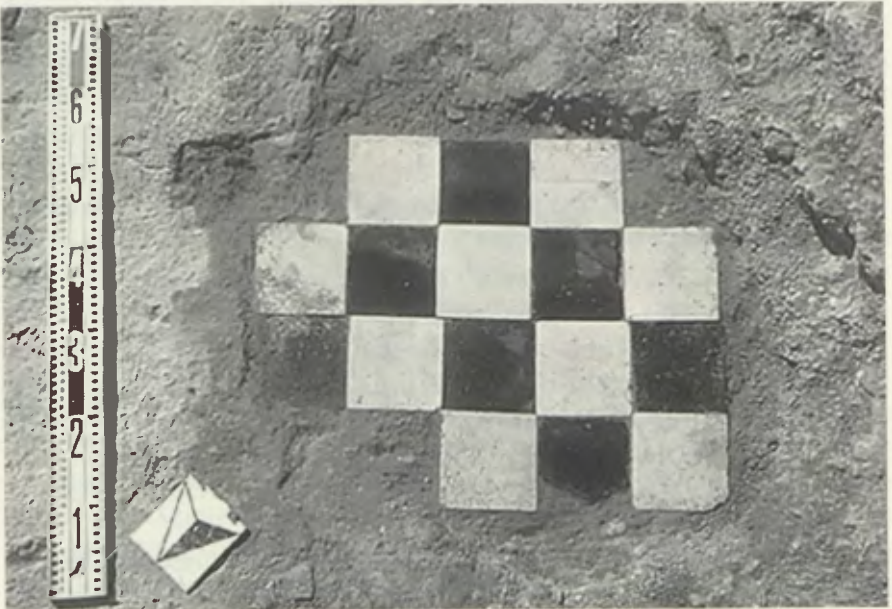
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FIGURE



1 Tarquinia, loc. Cazzanello. Plan de la villa romaine (Université de Tokyo, mise à jour 2001).



2. Pièce 81, partie sud: pavement en *opus sectile* (détail).



3. Pièce 81, partie sud: empreintes du pavement en *opus sectile* (détail).



4. Pièce 48: pavement en *opus sectile*.



5. Pièce 81, partie nord: pavement en *opus sectile*.



6. Pièce 33: pavement en *opus sectile*.



7. Salle octogonale 40: pavement en *opus sectile* (vue générale).

ELENA NENCINI

**STUDIO E PROGETTO DI RESTAURO PER I 34 LACERTI MUSIVI DEL
TRICLINIUM DEL PALAZZO DI TEODORICO A RAVENNA**

RÉSUMÉ

L'auteur a affronté l'étude et la reconnaissance des 34 lacerti de la mosaïque du triclinium du palais estimé être de Theodoricus en Ravenna. Un projet de reconstruction géométrique de l'entier pavement et de la position de différents fragments de la mosaïque a été étudié en vue de la remplacement de tous les fragments. Cinq lacerti, qui constituaient 1 panneau géométrique de la composition, ont été choisi comme project pilote pour l'entier travail et sur eux ont été fait l'intervention de restauration.

SUMMARY

This study is centred on the survey and the proposal of restoration and relocation of 34 mosaic fragments of the triclinium in the so called Theodoricus' palace at Ravenna. We propose a study and a project for the reconstruction of the measurements of the triclinium floors. The complete intervention of restoration, carried out on a whole geometric panel, formed by five fragments, constitutes the pilot project for the restoration of the whole floor.

IL COSIDDETTO PALAZZO DI TEODORICO A RAVENNA

Nel 1908 vicino alla chiesa di Sant'Apollinare Nuovo a Ravenna, in una zona dove, già dal XVI secolo erano stati rinvenuti reperti archeologici, venne alla luce un complesso palaziale, che mostrava sovrapposizioni dal I al VI secolo. Le campagne di scavo si succedettero fino al 1914, quando – dopo avere strappato solo una parte dei mosaici di maggiore pregio e studiato il complesso – si decise di ricoprire definitivamente lo scavo.

Le strutture emerse (fig. 1) si articolavano attorno ad un grande peristilio

rettangolare: nella parte settentrionale gli ambienti di rappresentanza, come l'Aula regia e il triclinium, a sud un complesso termale, a est un muro rettilineo vicino alla spiaggia e alla linea delle mura, la zona ovest e parte di quella sud non furono scavate (Maioli 1987: 211). Da subito fu chiaro che esistevano diverse fasi costruttive, ma la difficoltà di ricondurre ad una planimetria unitaria cronologicamente i numerosi pavimenti marmorei e musivi sovrapposti sussiste ancora oggi, per la difficoltà di rapportare le quote di scavo alle misure attuali del terreno di calpestio.

Il complesso palaziale fu identificato con il famoso palazzo di Teodorico, sulla base delle indicazioni date dalle fonti medievali, ma, sottolinea Maioli, se il palazzo "non è attribuibile con sicurezza a Teodorico, è munito certamente di ambienti di notevole ricchezza e con funzioni di rappresentanza, come la 'basilica' ed il triclinio; era certamente collegato all'acquedotto, come dimostra la presenza della fontana, e l'elevato numero di condutture per acqua; un suo settore era dotato di impianto di riscaldamento ed è possibile, anche se non sicuro, che sia anche da vedervi parte di un impianto termale che non era certamente destinato all'uso pubblico" (Maioli 1988: 85).

Il triclinium

Lo studio in oggetto – svolto come tesi finale all'interno della Scuola per il Restauro del Mosaico di Ravenna - ha affrontato l'analisi e la ricognizione del pavimento musivo del triclinium del cosiddetto palazzo di Teodorico a Ravenna, poiché su tale pavimento non era mai stato affrontato uno studio puntuale e sistematico.

Il triclinium si presentava come una grande aula triabsidata, con i muri delle tre absidi semicircolari all'interno e poligonali esternamente. Le tre absidi erano pavimentate in mosaico policromo a motivi geometrici, mentre la sala centrale del triclinium presentava un pavimento musivo a riquadri geometrici (fig. 2).

La composizione musiva raffigura al centro il riquadro con Bellerofonte che uccide la Chimera a cavallo di Pegaso, ai lati 4 rettangoli, nei due sul lato lungo due amorini dovevano reggere una corona con al centro un medaglione. Nei due rettangoli dei lati corti due amorini reggono invece una tabula ansata con un'iscrizione; negli angoli i busti delle quattro Stagioni.

Un'iconografia che ben si adatta a un triclinium, in particolare per quanto riguarda la scritta della tabula ansata, "Sume quod autumnus quod ver quod bruma quod estas alternis reparanti et toto creantur in orbe". Il pavimento si può così analizzare come un invito all'ospite a godere di tutti i frutti dati dalla natura, simboleggiata dalle quattro Stagioni negli angoli, ma anche dall'epi-

sodio centrale. Infatti il motivo di Bellerofonte e la Chimera è di chiara ispirazione classica, ma assume anche il significato di "potenza fuggatrice delle tenebre, vivificatrice della natura" (Ghirardini 1918: 65-66).

Berti propone una datazione al primo quarto del VI secolo, ma lascia perplessi: il mosaico del triclinium appare infatti di buona fattura, gli andamenti delle tessere sono regolari e ordinati, gli elementi stilistici, il mosaico può essere datato anteriormente al VI secolo, spostando quindi la datazione al IV o ai primissimi anni del V secolo, del resto Maioli riteneva forzate le datazioni "di alcune delle raffigurazioni, come lo stesso pannello con Bellerofonte" (Maioli 1987: 214).

STUDIO E PROGETTO DI RICOSTRUZIONE DEL PAVIMENTO MUSIVO DEL TRICLINIUM

Il carteggio, in parte inedito, tra Giuseppe Gerola, Sovrintendente ai Monumenti di Ravenna, e Gherardo Gherardini, direttore all'epoca degli scavi, insieme al diario di scavo dell'architetto Gaetano Nave e all'importante materiale del disegnatore Alessandro Azzaroni sono stati il punto di partenza e il fondamentale contributo per questo studio.

I 34 lacerti musivi del triclinium furono strappati nel 1912 senza pensare ad un futuro ricollocamento, non esiste quindi oggi nessun elemento certo per l'esatto posizionamento dei lacerti. La tesi in oggetto si è occupata proprio dello studio e del progetto per la ricostruzione delle misure del pavimento musivo del triclinium, tramite calcoli basati sulle misure reali dei 34 lacerti musivi, sulle foto di scavo e sulle piante disegnate da Alessandro Azzaroni, il disegnatore che seguì lo scavo. Azzaroni fece diversi disegni del triclinium di cui il più importante è sicuramente il disegno del 1909 (fig. 3). In basso a sinistra è riportato "Scala di 8 cm per metro". Quindi la scala di tale disegno è corrispondente a 1:12,5.

Oltre a questa Azzaroni disegnò una planimetria generale in scala 1:200 (SBAP, ADSR n.2607) e una pianta 1:200, incompleta, con uno schizzo a mano libera di due delle absidi trilaterate con alcune misure (SBAP, ADSR n.2605). Quest'ultima è molto importante perché è l'unico disegno contenente le misure delle absidi e del triclinium. Per verificare l'esattezza della grande pianta di Azzaroni sono stati realizzati i rilievi grafici a contatto in scala 1:1 di tutti i lacerti musivi su carta trasparente, quindi i rilievi sono stati fotografati inserendo nell'inquadratura la Color map della Kodak e successivamente informatizzati.

Le foto sono state portate in scala 1:10, che garantiva una buona lettura dei frammenti, di dimensioni molto diverse. Si è deciso quindi di mettere nella

stessa scala il particolare del pavimento centrale del triclinium della pianta di Azzaroni. Pianta e rilievi grafici sono stati quindi sovrapposti: ne risulta un disegno preciso, ma non esatto geometricamente. Era quindi impossibile utilizzare la pianta di Azzaroni per l'esatta ricollocazione geometrica dei lacerti musivi.

Il progetto di ricostruzione

La pianta di Azzaroni e le fotografie di scavo sono state quindi il punto di partenza per ricostruire i diversi riquadri geometrici attraverso le misure reali dei lacerti musivi esistenti e la riproposizione simmetrica dei motivi geometrici dei diversi lacerti (Nencini 2002: 135-137). Attraverso questi calcoli si è ipotizzato che le misure del pavimento siano di 676.6 x 603.6 cm (fig. 4). Tali misure sono molto vicine a quelle di Azzaroni perché il disegno n.2605 dell'Archivio disegni riporta 6.70 x 5.90 m.

Il quadrato e il rettangolo sono le figure principali di questo pavimento musivo che sorprende per la mancanza di simmetria, evidenziata dalla diversità di misure dei riquadri, contraddicendo il *modus operandi* di epoca romana regolare e simmetrico. Tali dati confermerebbero così la datazione ad un periodo più tardo in cui le regole compositive non venivano più seguite pedissequamente. Bisogna comunque tenere conto delle traversie legate alla storia di questo pavimento che possono avere creato traumi e dilatazioni del tessuto musivo.

Tale lavoro vuole quindi essere solo una delle possibili ipotesi ricostruttive, basata su un'analisi attenta e mirata dei lacerti musivi del triclinium.

Intervento di restauro

I 34 lacerti musivi provenienti dagli scavi del palazzo di Teodorico, dopo essere stati strappati nel 1912 e decontestualizzati, furono gettati su singole lastre di malta cementizia; che ha causato la parte più rilevante del degrado ed un peso eccessivo dei lacerti. Tali problematiche e la necessità di ipotizzare un progetto unitario di ricollocazione hanno portato alla decisione di rimuovere la malta cementizia, che ricopriva anche, in maniera invasiva, le tessere musive impedendo una corretta lettura della superficie.

Stato di conservazione

Al momento dell'intervento i lacerti apparivano molto degradati: dopo lo strappo infatti furono "fermati, intelaiati in legno, armati in ferro e solidificati con un impasto di cemento e ghiaietta fine" (Palatium 2001: 29). La malta

cementizia fu usata anche per stuccare grossolanamente la superficie musiva, penetrando negli interstizi e coprendo molte tessere: probabilmente il motivo di un intervento così brutale è da ricercarsi nel pessimo stato conservativo della malta originale al momento del ritrovamento "questo lacero avanzo di pavimento era giunto a noi friabilissimo, il sottosuolo, acquitrinoso più che altrove, l'aveva infracidito" (Palatium 2001: 42, vedi anche 35).

La malta originale non era visibile, sostituita completamente negli interstizi da malta cementizia, le superfici erano coperte da un deposito superficiale composto di polvere e guano, oltre a evidenti e spesse macchie di ruggine. La tessitura musiva era in alcuni casi completamente illeggibile.

Lo stato di conservazione dei lacerti al momento dell'intervento di restauro è stato quindi documentato da una campagna fotografica.

Operazioni di restauro

La prima operazione eseguita è stata una pulitura fisica con acqua deionizzata e Desogen al 2% per rimuovere il deposito superficiale, risciacquata con abbondante acqua deionizzata. Tale operazione ha permesso di leggere meglio la superficie musiva e di realizzare dei grafici a contatto 1:1 su cellophan. Inoltre ha permesso di effettuare l'analisi dello stato di conservazione e del degrado.

La superficie musiva dei lacerti è stata protetta con 3 strati di tela. Le tele sono state applicate con vinavil all'80%, scelta dettata dall'operazione successiva, il taglio in acqua per rimuovere la malta cementizia da retro, che necessita di una colla tenace, resistente all'acqua, motivo che ha portato ad escludere le colle animali.

Per rimuovere il cemento da retro a Ravenna è stato sperimentato con successo il taglio in acqua con una sega a disco diamantato che dà minori vibrazioni al mosaico rispetto ad altre operazioni e permette una maggiore sicurezza nella profondità del taglio. Si è deciso di volta in volta, a seconda delle condizioni dei diversi lacerti, la profondità del taglio. Sono stati effettuati dei tagli paralleli a 3 cm circa di distanza l'uno dall'altro.

Gli strati di malta cementizia sono stati poi rimossi meccanicamente con martello e scalpello da retro, portando alla luce i tondini di ferro da 6 mm, usati per armare la struttura. Dopo avere tolto la parte più consistente del cemento, il lavoro è proceduto solo su cinque lacerti musivi, che costituiscono un riquadro geometrico del pavimento e sono il progetto pilota per l'intero studio (fig. 4). Tramite l'utilizzo di mezzi meccanici, tra cui vibroscalpello e vibroincisore è stata rimossa la malta cementizia direttamente a contatto con la malta originale e con le tessere.

La malta originale ad un esame macroscopico si presentava in un discreto stato, il colore della massa è beige-rosato, con inclusi rossastri, grumi biancastri e puntature nerastre. Tra gli inclusi è possibile riconoscere del carbone (derivato probabilmente, per la scarsa quantità, da residui della calcinazione del calcare), dei calcinelli (calce mal carbonatata), dei frammenti di coccio pesto, in cui prevale il colore rosso-mattone, anche se sono presenti dei frammenti di laterizio giallo. Sono presenti anche delle modeste quantità di un aggregato sabbioso molto fine, in una percentuale che si può supporre del 20-30% circa. Dati confermati dalle analisi compiute dal Cnr-Irtec di Faenza (analisi termodifferenziali, termoponderali e diffrattometriche) su 3 campioni di malta: ne è risultato infatti che la malta simile era simile per tutti i campioni, debolmente idraulica, con un rapporto che varia da 1:1 a 1:1.5, composta principalmente da calcite e quarzo, con presenza di dolomite, anortite, K feldspato, miche.

Ricollocazione

Al momento dello strappo non fu segnata la posizione esatta dei lacerti per una futura ricollocazione, come per esempio si fa con i testimoni. Per essere certi della posizione esatta dei lacerti era necessario poter vedere il disegno della composizione e quindi rimuovere le tele, ma non avendo più il supporto di malta cementizia i mosaici erano diventati molto delicati e fragili, specie nelle zone dove non esisteva più la malta cementizia. Si è deciso quindi di stendere, sui 5 lacerti musivi presi in esame (fig. 5), una malta di sacrificio dello spessore di 2 cm circa, in rapporto 1:2 (composta da 6 parti di Lafarge, 5 di carbonato di calcio, 4- di polvere di mattone, - di frammenti di cocciopesto+ primal al 20%), rinforzata da una rete in fibra di vetro. Gli aggregati scelti hanno riproposto granulometria e colore simili alla malta originale. Lo scopo della malta di sacrificio è quello di isolare e proteggere la parte originale del mosaico anche nel caso di futuri interventi di restauro, inoltre ha fornito compattezza e solidità ai lacerti permettendo di girarli e di rimuovere le tele.

Una volta asciugata perfettamente la malta, è stato possibile girare i lacerti e rimuovere le tele, questa operazione è stata eseguita con acqua calda e spazzole per rimuovere il vinavil dagli interstizi e dalla superficie musiva.

La complessità e varietà del degrado della superficie musiva ha reso necessario l'utilizzo di diversi tipi di pulitura: dalla rimozione della malta cementizia con vibroscarpello e vibroincisore, all'uso di una pulitura meccanica eseguita con una microsabbiatrica (caricata con ossido di alluminio, granulometria 220), ad una pulitura con impacchi di bicarbonato d'ammonio in soluzione satura. Le macchie bruno-rosso sono state identificate grazie alle

analisi eseguite con il microscopio a scansione (SEM) abbinato al sistema a dispersione di energia (EDS): sono il risultato di un'incrostazione che si è formata con un lento processo nel tempo, ed un continuo apporto di soluzione e con l'evaporazione dell'acqua a cui si è aggiunto il ferro. Il tipo di macchia fa dedurre che tale incrostazione sia avvenuta quando i mosaici si trovavano in posizione orizzontale, poiché le macchie di ruggine sono localizzate. Sebbene queste macchie fossero state abbassate precedentemente tramite una pulitura meccanica, si presentavano ancora molto visibili, sono stati allora eseguiti degli impacchi localizzati di E.D.T.A. in soluzione satura, fino all'attenuazione del colore rosso-brunastro delle macchie.

Le tessere che si presentavano poco aderenti alla malta originale o scheggiate sono state fissate con Paraloid diluito in acetone al 70%.

La ricollocazione dei 5 lacerti musivi è avvenuta utilizzando un pannello di areolam (139 x 184.5 cm, spessore 2.5 cm), precedentemente preparato e pulito con acetone per eliminare lo strato di polvere. Tale operazione si è basata sulla ricostruzione della pianta della composizione musiva elaborata in questo studio (Nencini 2002: 135-137) e si avvalsa dell'impiego di una resina acrilica, Primal diluito in acqua deionizzata all'80% e polvere di marmo per dare resistenza alla malta.

Sulla superficie musiva apparivano diverse lacune e fratture poco profonde. Per restituire compattezza alla superficie musiva e per migliorare la lettura della superficie musiva interrotta dalle lacune si è deciso di reintegrare a malta incisa (Lafarge, carbonato di calcio 1:2 e Primal al 5%) e dipinta successivamente ad acquarello quelle porzioni della superficie musiva dove era possibile ricostruire il tessuto musivo, senza dare luogo a ricostruzioni di fantasia o a interpretazioni errate (fig. 6).

Dove non era possibile ricostruire il tessuto musivo si è deciso di eseguire delle stucature con una malta 1:2, a base di malta idraulica (Lafarge), aggregato giallo oro (granulometria 000) e Primal al 10%. Tale malta doveva accordarsi cromaticamente con la malta originale e con la superficie musiva. L'ultima operazione dell'intervento di restauro è consistita in un trattamento protettivo della superficie musiva con silicato di etile, trattamento che andrà ripetuto nel tempo ai fini della conservazione dell'opera stessa.

Il progetto di ricerca svolto è stato realizzato, sviluppato e elaborato attraverso l'utilizzo di mezzi e tecnologie informatiche; per rendere maggiormente fruibile in futuro tale materiale si è quindi deciso di organizzare una banca dati digitale, elaborata grazie all'aiuto dell'arch. Nicola Santopuoli.

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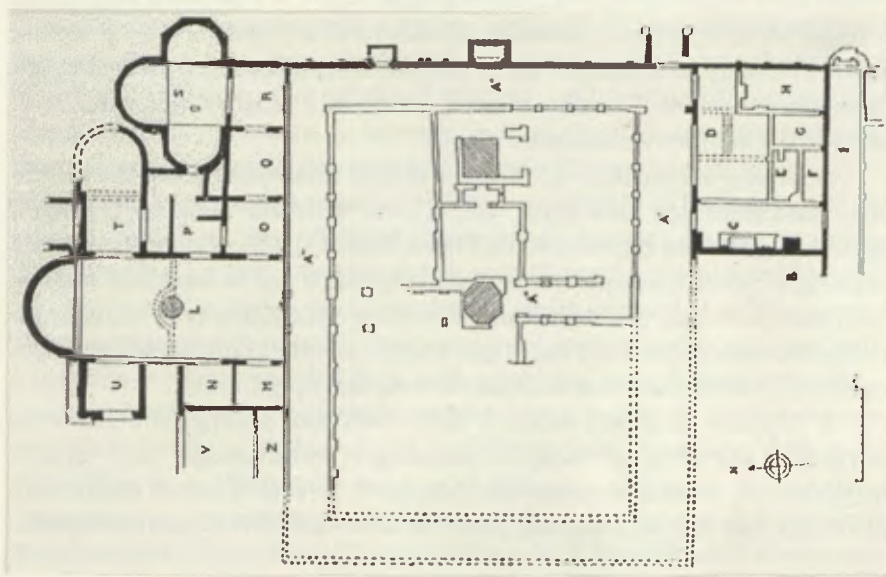
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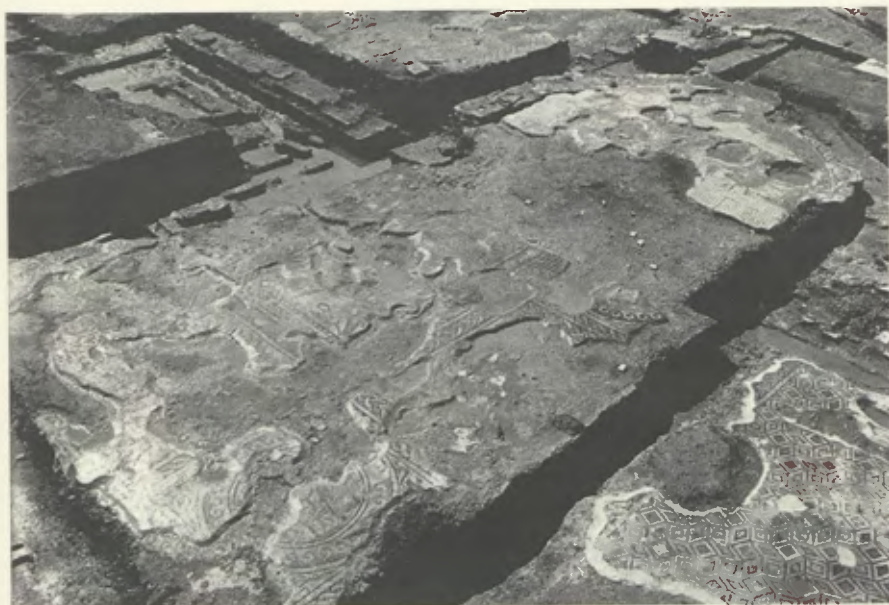
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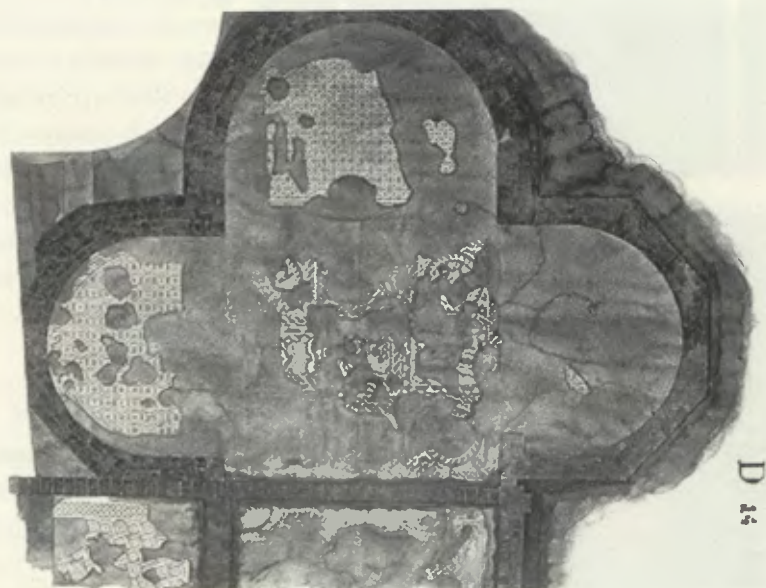
FIGURE



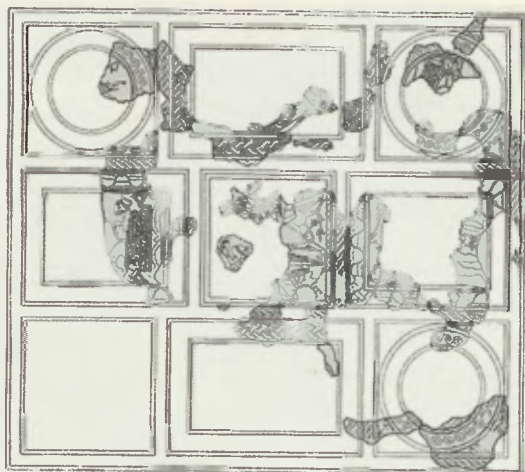
1. Pianta del complesso palaziale.



2. Il triclinium durante gli scavi del 1908-1914.



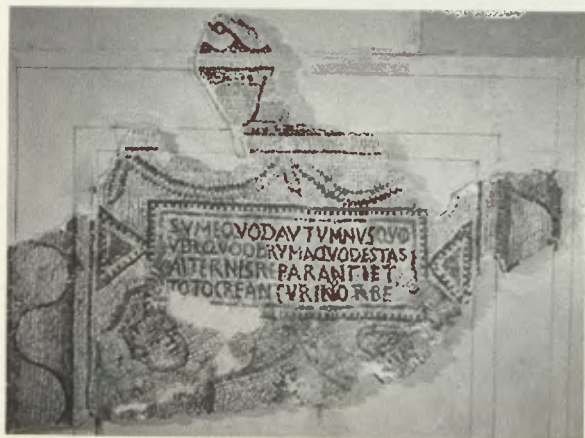
3. La pianta del triclinium disegnata da Azzaroni.



4. Ipotesi di ricostruzione geometrica del triclinium.



5. I cinque lacerti prima dell'intervento di restauro.



6. I cinque lacerti dopo l'intervento di restauro.

ANGELO PELLEGRINO, TONINO COSTABILE

**MUSEALIZZAZIONE DI UNA VILLA
CON MOSAICI A DRAGONCELLO (OSTIA)**

SUMMARY

Between 1981 and 1996 the Soprintendenza per i Beni Archaeologici di Ostia has led several excavation campaigns in the area of Dragoncello, once part of the Ostian territory, discovering many villae rusticae (rural villas) dating to the Republican and Imperial age. The villa here discussed has a rectangular plan with a central courtyard, surrounded by residential and productive quarters; two building phases are known, dating to the Augustan and the Antonine age. The residential area, in the southern wing, was paved with important mosaics, with figural and geometric patterns. The Project of Restitution and Musealization aims to create a green belt around the villa in order to separate and protect it from the surrounding urbanized area; to delineate a path for visitors with a light metallic structure; to protect the rooms with mosaic floors with structural glass panels, sheltering them from weathering agents and permitting their climatization. The Project comprises the positioning of a lift to allow aerial view of the archaeological area. A "cannocchiale ottico" will be provided, i.e. a covered corridor dug in the external slope of the area that will physically and visually connect this area with the nearly archaeological park of the rural villas.

RÉSUMÉ

Plusieurs fouilles, conduites, entre les ans 1981 et 1996, par la Soprintendenza per i Beni Archeologici di Ostia à Dragoncello (Acilia), dans l'ancien territorium Ostiense, ont permis de mettre au jour beaucoup de villae rusticae de l'époque républicaine et impériale. Une de ces villae, qui est objet de cet étude, présente un plan avec une centrale cour; autour de cette cour sont situées les pièces de la partie résidentielle et rustique. La maison eut deux phases de construction à rapporter à la première époque impériale et au II s.

après J.C. Les pièces de la pars dominica se trouvent dans la partie méridionale de l'édifice et sont décorées de belles mosaïques, une figurée e les autres avec dessins géométriques. Le projet de mise en valeur a prévu la réalisation d'une aire verte autour de le villa pour la protéger contre le contexte urbain, un parcours de visite réalisé avec matériel métallique, la couverture seulement des pièces décorées de mosaïques avec vitres structurales pour la protection contre les conditions atmosphériques. Enfin on a prévu aussi la construction d'un ascenseur pour la vision azimutale de l'aire archéologique. Pour la liaison piétonne et visuelle avec le reste du parc archéologique sera réalisé un "canocchiale ottico", consistant en un couloir couvert obtenu dans l'épaisseur du terre-plein qui environne la ville.

Numerose campagne di scavo condotte nel corso degli anni '80 e '90 nella località di Dragoncello ad Acilia hanno consentito di mettere in luce un comprensorio rustico di notevole estensione, costituito da fattorie e ville rustiche di età repubblicana ed imperiale. Uno di questi edifici (fig. 1a), scoperto nel 1981, era decorato da pavimenti musivi a tessere bianche e nere di pregevole fattura, databili entro un arco di tempo che va dalla fine del I sec. a.C. alla media età imperiale. Tuttavia tali mosaici, nonostante fossero stati coperti da pozzolana dopo la fine dello scavo, nel corso degli anni sono stati danneggiati sia dalle intemperie del tempo che da atti vandalici che hanno causato rigonfiamenti, distacchi e lacune. Per questo, nel 1996, per evitare l'ulteriore degrado della villa, si è dovuto procedere al distacco di tutte le superfici musive per sottoporle ad urgenti interventi di restauro; comunque è stato previsto anche il loro ricollocamento *in situ* mettendo, tuttavia, in atto tutte quelle misure che possano garantirne nel migliore dei modi la conservazione e la fruizione.

La villa, disposta su di un leggero declivio, è stata in passato notevolmente intaccata da lavori agricoli che hanno livellato il terreno raggiungendo in molti punti le fondazioni delle strutture e danneggiando gli stessi piani musivi.

Il complesso presenta una pianta (fig. 1 e 3) con peristilio centrale e ingresso sul lato meridionale, costituito da un portico di cui restano le basi di almeno cinque colonne o pilastri. Sul peristilio si aprono diversi ambienti tra i quali quelli del lato sud-orientale, decorati da pavimenti a mosaico bianco e nero geometrici e figurati, costituivano la parte residenziale; sul lato occidentale sono invece i vani termali, un *tepidarium con praefurnium* e il *caldarium*. A nord e ad est del cortile si estende la parte rustica con pavimento

in opera spicata lungo il quale sono diversi ambienti, alcuni dei quali di grande estensione, ed una cisterna.

Della villa sono state individuate due fasi costruttive.

La prima va riferita ad un periodo d'uso compreso tra la tarda età repubblicana e la prima metà del II sec. d.C. individuabile soprattutto nel settore orientale dell'edificio a carattere rustico.

Ad essa è da attribuire sicuramente il settore orientale dell'edificio a carattere rustico. Successivamente nella piena età imperiale, l'edificio, fu totalmente trasformato: vennero innalzati tutti i piani pavimentali e in particolare la parte sud-orientale fu dotata di un settore residenziale con ambienti decorati da mosaici (ambienti nn. 4-7) che prospettavano sul peristilio centrale.

Caposaldo cronologico, almeno come *terminus post quem*, di questa seconda fase, è la presenza diffusa e costante di bolli sui bipedali dell'impianto termale (130-155 d.C.) e di altri settori della villa, documentata con l'ultima indagine condotta nel 1996.

L'esecuzione di sondaggi di scavo ed il fortunato rinvenimento di bolli laterizi ha consentito un sicuro inquadramento storico artistico dei pavimenti musivi (fig. 1b) che, sostanzialmente, sono ancora inediti ma di cui in questa sede si fornisce una presentazione preliminare¹.

Mosaico del vano 1 (fig. 1b)

Il motivo base è costituito da rettangoli neri disposti diagonalmente in guisa da delimitare, con i lati lunghi, spazi quadrati bianchi e, con quelli brevi, altri quadrati bianchi più piccoli. Una delle soglie (lato nord) presenta un campo rettangolare all'interno del quale sono tre quadrati disposti nel senso delle diagonali; l'altra soglia del lato ovest è costituita da uno spazio rettangolare decorato da quattro losanghe nere con i lati concavi.

Si tratta di uno schema molto semplice che ebbe larga diffusione a partire dall'età augustea e fino al II sec. d.C. Nella prima età imperiale è attestato a Pompei (in versione più raffinata), ad Aquileia, a Licenza (villa di Orazio); ad Ostia è documentato in età adrianea nell'*insula* delle Muse, nell'*insula* delle Pareti Gialle, nell'*insula* di Bacco Fanciullo e in quella delle Volte Dipinte. Non mancano comunque confronti con mosaici dell'Italia settentrionale ed anche di ambito provinciale (Africa e Gallia).

1. Allo scopo di evitare inutili e noiose ripetizioni, per i confronti e la bibliografia precedente si fa riferimento a questi due studi: Pellegrino 2001; Gerlach-Pellegrino 2003.

Mosaico del vano 4 (fig. 1b)

Della superficie originaria si conserva circa la metà dei lati orientale e meridionale del vano.

Il campo figurato presenta all'angolo un cespo d'acanto dal quale si dipartono elementi vegetali che definiscono una mandorla e si incrociano in alto terminando in due campanule. Dal centro del cespo si distaccano due fusti stilizzati di albero (palma?) che si assottigliano gradualmente verso l'alto piegandosi nella parte terminale in due piccole volute; su queste poggia un grosso uccello volto a destra, forse una pernice. Al centro dei lati meridionale ed orientale sono raffigurati, con una certa dovizia di particolari, rispettivamente una pantera e un cavalluccio in corsa.

La decorazione è agevolmente ricostruibile anche nelle parti mancanti, almeno nelle sue linee generali: si deve immaginare uno schema generale con quattro mandorle angolari con uccello nella parte terminale e quattro animali, cioè un quadrupede al centro di ogni lato.

Il mosaico presenta una composizione concepita per linee diagonali, secondo un gusto documentato non solo per i pavimenti musivi, ma anche per le volte e i soffitti, e che cominciò a diffondersi dall'età adrianea trovando più larga applicazione dai primi decenni del III sec. d.C. Lo schema è stato qui realizzato con stile semplice ed elegante e per la scena figurata non esistono confronti precisi e puntuali, ma si possono suggerire solo generici, e comunque pochi, riferimenti. Per quanto riguarda Ostia si citano il mosaico del *frigidarium* delle terme dei Sette Sapienti e quello della sala tricliniare della schola del Traiano. Tuttavia le migliori analogie forse si riscontrano con due mosaici di Anzio, provenienti dalla villa dell'arco Muto, datati tra la fine del II e gli inizi del III sec. d.C. che, comunque, presentano una composizione più fitta ed articolata.

Il nostro pavimento, sulla base dei dati di scavo, si può datare intorno al terzo venticinquennio del II sec.d.C. ed è forse da considerarsi come uno dei più antichi esempi di questo genere di decorazione.

Mosaico del vano 5 (fig. 1b)

Il disegno presenta quattro serie di quadrati neri, disposti ciascuno lungo i lati di un ottagono bianco il cui centro è occupato da un quadrato nero. Il disegno è arricchito da sequenze coordinate di losanghe bianche orizzontali e verticali, triangoli bianchi e neri. La decorazione, pur nella sua semplicità, non è priva di elementi di interesse per cui la sua lettura visiva si basa sull'effetto della bicromia che consente di individuare figure nere su fondo bianco e figure bianche su fondo nero. Ciò è evidente soprattutto nel centrale dove si può

anche vedere una stella bianca ad otto punte inserita all'interno di una stella nera a sei punte; è anche possibile la lettura tridimensionale con figure di cubi obliqui e prismi.

Il motivo, molto comune, ebbe larga diffusione nel I ed anche nel II sec. d.C. ed è documentato soprattutto in Italia (Aquileia, Pompei, Roma, Ostia, etc.).

Mosaico del vano 7 (fig. 1b)

Il campo decorato è costituito da una serie di triangoli neri con i lati lunghi convessi combinati in guisa da delimitare ottagoni bianchi dai lati concavi, il cui centro è occupato da un quadratino orientato per le diagonali; le basi dei triangoli delimitano, invece, spazi quadrati bianchi.

Il motivo, pur nella sua semplicità, non ebbe larga diffusione. Ad Ostia, comunque, è presente nella *domus* dei Pesci e nel triclinio della schola del Traiano.

Come gli altri pavimenti della villa posti alla stessa quota (nn. 4-5), anche questo va riferito alla fase di ristrutturazione generale della villa, avvenuta dopo la metà del II sec. d.C.

A. P.

La soluzione al problema del ricollocamento *in situ* dei mosaici è prevista con la realizzazione del Piano di Riqualificazione del Quartiere di Dragoncello (fig. 2), inserito nel più vasto programma di lavoro per l'attuazione dell'articolo 11 della legge 493/93. Nel Piano citato un progetto prevede la musealizzazione e valorizzazione della *villa F*, vedi area cerchiata in fig. 2c, riportata alla luce in questo quartiere. La fig. 2 ci mostra lo stato attuale dei luoghi in cui si trova la villa, come si nota (foto 2a e 2b) la qualità dell'ambiente circostante è molto degradata. Ci sono edifici nuovi che prospettano su un arredo urbano completamente inesistente: in questa situazione possiamo ritenere che la musealizzazione e rivitalizzazione della *villa* è un sicuro elemento di riqualificazione dell'ambiente urbano. Nella planimetria generale (fig. 2 c), osserviamo lo stato corrente della località nella quale la villa è stata ritrovata e com'è organizzato il Piano di musealizzazione dell'area archeologica delle ville rustiche; nello stesso Piano si raggiungono tre obiettivi:

- Conservare *la villa F* per le generazioni future
- Consentire la visione ai visitatori
- Riqualificare le aree degradate (art. 11, L. 493/93) del Quartiere di Dragoncello.

La sistemazione dell'area archeologica della villa prevede, innanzi tutto, il completamento delle necessarie opere di restauro al monumento che ne consentano la conservazione nel tempo. La fase successiva sarà quella della costruzione del progetto di valorizzazione vero e proprio: la fig. 3 mostra in alto a *sx* la planimetria della situazione attuale e sotto il disegno della planimetria di progetto, che prevede la realizzazione di una duna artificiale di altezza adeguata che circonda l'edificio, necessaria per la formazione di un contesto ambientale consono alle esigenze museografiche del sito e rafforzato con la piantumazione di alberi autoctoni su ciascun lato del pendio della duna. La realizzazione, sul crinale, di un percorso di avvicinamento-allontanamento alla villa rustica (fig. 3 e 5) consentirà al visitatore un confronto tra il livello del piano di calpestio antico e gli attuali livello e paesaggio circostanti. Per consentire un'ulteriore visione ravvicinata della villa, alle pendici interne della duna artificiale, è previsto un percorso, ad una quota rialzata rispetto alla quota dell'edificio, che sarà realizzato con elementi modulari metallici grigliati per alleggerirne l'impatto visivo (fig. 3 e 5). Un elevatore idraulico (fig. 5a) consentirà una vista azimutale sull'intero edificio per la lettura "dal vero" della sua disposizione planimetrica. Alla quota della villa è invece previsto un percorso in elementi modulari metallici grigliati su pavimento "galleggiante" (fig. 3) per la visione ravvicinata dei mosaici.

Questa fase si concluderà con la ricollocazione *in situ* dei mosaici restaurati per i quali si è studiato un particolare sistema di musealizzazione in teche climatizzate di vetro strutturale (Natalucci-Pellegrini 1994, 167-174).

Il progetto di restauro e valorizzazione prevede inoltre la trasformazione in museo (Minissi 1980, 45ss) del Casale della Bonifica vicino l'area archeologica, per l'esposizione e conservazione dei numerosi oggetti rinvenuti nella campagna di Dragoncello e per consentire la fruizione al grosso pubblico dei reperti, altrimenti ammassati in qualche magazzino. Il museo sarà attrezzato con tutti i più moderni ritrovati della tecnica sia per la conservazione dei reperti che per la divulgazione delle conoscenze scientifiche (Minissi 1983, 48-50).

Annesso al museo sarà realizzato un centro multimediale a scopo educativo ed un punto di ristoro.

Per unire la villa all'edificio del Museo il progetto prevede la costruzione di un percorso pedonale. Il problema dell'interferenza prodotta dalla strada carrabile a servizio del quartiere, che attraversa l'area archeologica separandola in due parti, è stato risolto con il così detto "cannocchiale di collegamento visivo" (Minissi 1988, 68). Questo è un elemento architettonico

(fig. 5) che, nel separare funzionalmente il traffico pedonale e veicolare, assolve l'esigenza museografica di collegare, appunto, visivamente e spazialmente il museo alla villa.

A completamento della musealizzazione potrebbero destinarsi delle porzioni di terreno per la piantagione delle specie di cereali rinvenuti sul sito e coltivati in antichità nei dintorni della *villa F*.

Per la migliore conservazione dei beni archeologici, per venire incontro alle esigenze dei visitatori e per la fruizione del sito archeologico della *villa F* di Dragoncello è stato necessario fare ricorso all'uso di vari impianti tecnici. Riteniamo opportuno concludere facendo un breve cenno descrittivo dei più importanti. In particolare si prevede la realizzazione di

- un impianto di elevazione (fig. 5) per consentire ai visitatori di essere sollevati in alto rispetto al livello del terreno (circa 5 metri) per una visione azimutale del complesso; l'impianto sarà costituito da una piattaforma a sollevamento telescopico che in posizione inferiore torna al livello del terreno e non altera il profilo dell'ambiente circostante;
- un impianto per l'illuminazione generale costituito da lampade a luce calda che consentirà la fruizione del sito anche di notte;
- un impianto di illuminazione particolare con fibre ottiche per l'illuminazione all'interno degli ambienti dove sono presenti i mosaici: con le fibre ottiche è possibile inviare i fasci luminosi nelle direzioni desiderate; inoltre le fibre ottiche con la loro limitata emissione termica non alterano la temperatura e l'umidità all'interno delle teche;
- un impianto di climatizzazione estiva e invernale con aria filtrata per mantenere idonee condizioni di temperatura e umidità all'interno delle teche in vetro strutturale; in particolare durante il periodo invernale si potrà evitare sia la condensazione di vapore sui vetri a protezione dei mosaici che la conseguente mancanza di visibilità degli stessi. Infine si eviterà l'eventuale permanenza di strati di ghiaccio e/o neve.

Tutti i locali tecnici saranno ricavati all'interno della duna che li manterrà nascosti alla vista.

Tutti i percorsi presenti nell'area archeologica sono stati studiati per essere usati anche dai portatori di handicap e sono corredati di opportuni pannelli esplicativi per le informazioni ai visitatori.

Infine, a tutela dell'intera superficie dell'area della *villa F* sarà realizzata una recinzione in elementi modulari metallici grigliati galvanizzati, di altezza opportuna con due cancelli per consentire l'accesso pedonale e/o carrabile all'area archeologica.

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FIGURE



UFFICIO DI TENDENZA PER I BENI
ARCHIOLGICI DI OSTIA

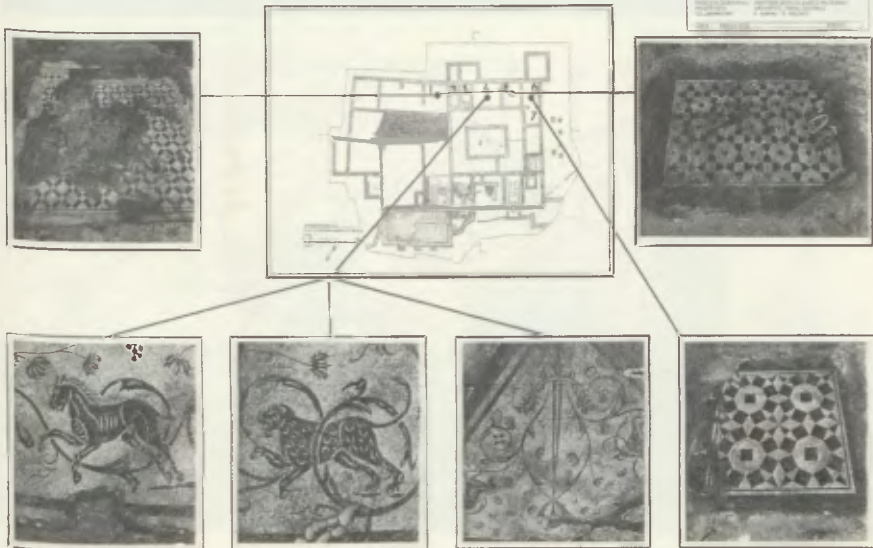


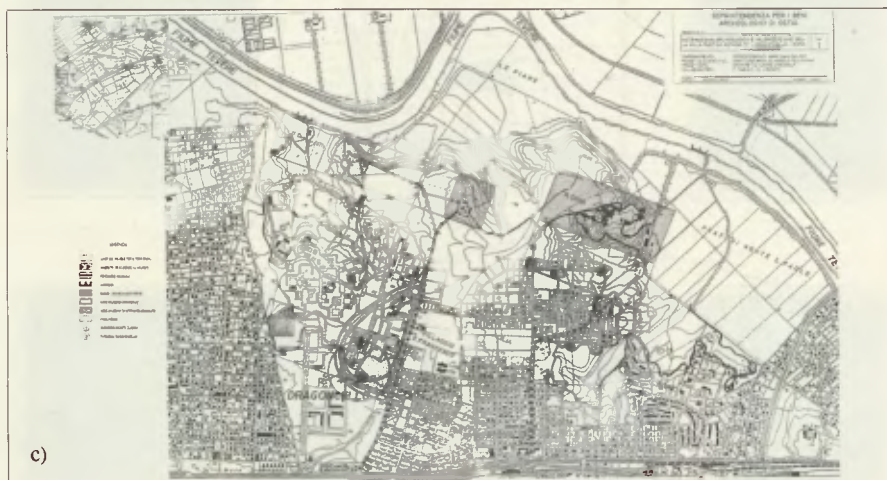
Fig. 1- Foto aerea della villa F a Dragoncello (Ostia) – ROMA e particolari dei Mosaici dei vani 1-4-5-6.



foto a)



foto b)



c)

Fig. 2 – Stato attuale dei luoghi: a) e b) foto del contesto urbano del quartiere di Dragoncello, in primo piano la *villa F*; c) Piano preliminare di valorizzazione dell'area archeologica delle ville rustiche di Dragoncello.

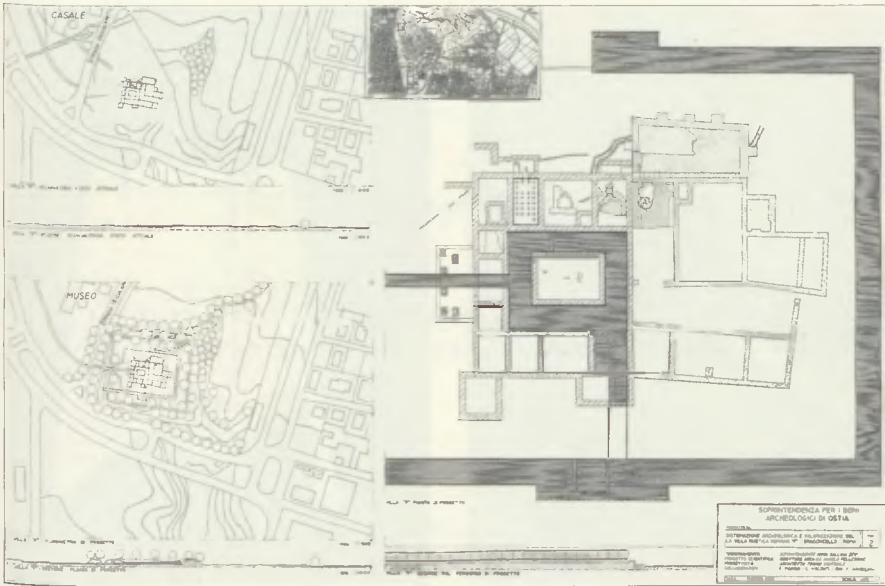


Fig. 3 – Progetto di conservazione e musealizzazione della villa F - A sx Planimetrie e Sezioni: in alto ante operam, in basso post-operam - A dx pianta post-operam.

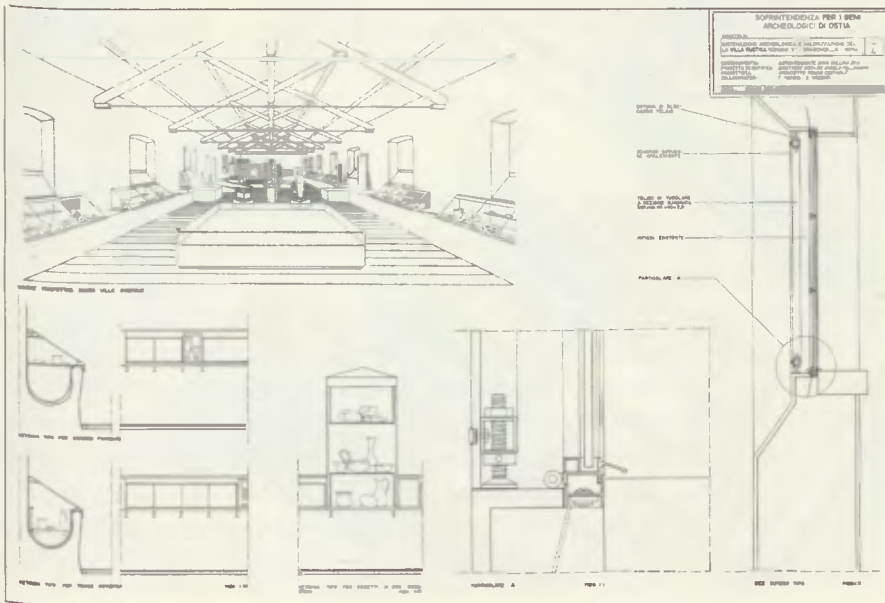
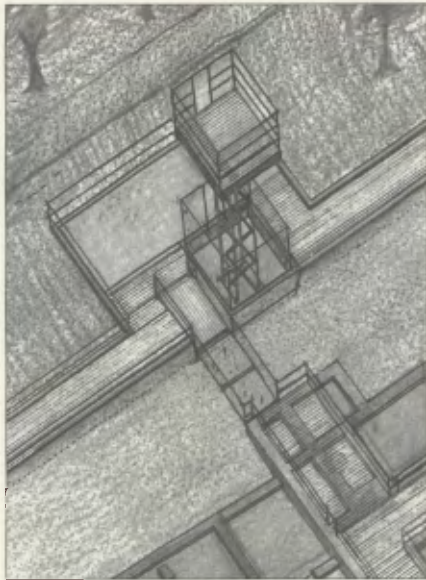


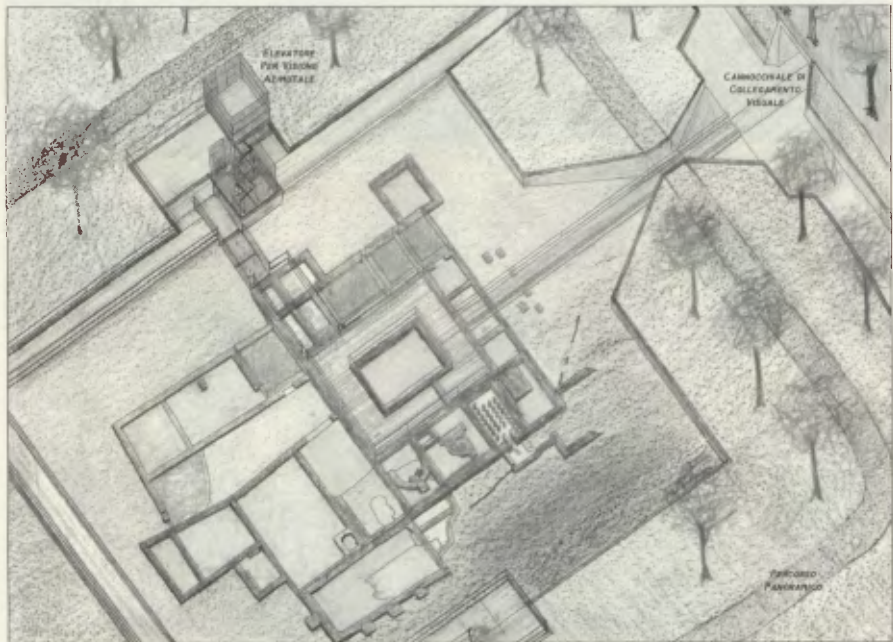
Fig. 4 - Progetto di conservazione e musealizzazione del casale: a sx- in alto, visione prospettica dell'allestimento interno del Museo; in basso, particolari costruttivi delle vetrine – A dx particolare tecnologico.



a)



b)



c)

Fig. 5 - Particolari: a) elevatore, b) cannocchiale ottico, c) schizzo planivolumetrico musealizzazione villa F.

FRANCESCA MORANDINI, FILLI ROSSI

**UNA CASA ROMANA AL MUSEO: SCAVO,
CONSERVAZIONE E ALLESTIMENTO DI UN GRUPPO IMPORTANTE
DI MOSAICI DA BRESCIA (ITALIA DEL NORD)**

SUMMARY

In the garden of the Lombard monastery of Santa Giulia, now the Brescia City Museum, archaeological excavations have brought to light two imperial Roman dwellings (I-IV century AD). About 25 rooms with decorated mosaic floors and painted walls, paved courtyards, stairs and fountains will become part of the museum's itinerary. The first restoration work was carried out in 1967-1970; after the latest excavations (2000-2001) the whole archaeological area (about 1000 sq m) will be subjected to further restoration and will be protected by a new building. Thanks to this construction, visitors will enter directly from the museum into the houses, on a raised walkway.

RÉSUMÉ

Dans le jardin du monastère lombard de Santa Giulia, maintenant Musée de la Ville, des fouilles archéologiques ont vu surgir deux habitations romaines de l'époque impériale (1er-2ème siècles). L'itinéraire romain du Musée sera enrichi par 25 chambres décorées avec mosaïques, fresques, cours pavées, escaliers et fontaines. Les premiers travaux de restauration furent exécutés entre 1967 et 1970: après la dernière campagne de fouilles (2000-2001) toute une partie du site archéologique (1000 mètres carrés environs) sera l'objet d'une nouvelle restauration et un nouveau bâtiment la protégera. Grâce à cette construction, les visiteurs pourront entrer directement du musée dans les maisons, à l'aide d'une passerelle.

LO SCAVO ED IL RESTAURO

Il complesso presentato in questa relazione è stato indagato parzialmente

per la prima volta e restaurato tra il 1967 ed il 1971. Lo scavo è stato ripreso e completato tra il 2001 ed il 2002 in vista della annessione di questo settore al *Museo della Città* di Brescia in Santa Giulia. Lo scavo del 2001 è stato preceduto da un rilievo completo e analitico dello stato di conservazione delle strutture già in luce; è stata elaborata una mappa del degrado che ha consentito, nella fase successiva di lavori, di programmare i restauri dei vari apparati decorativi e murari. Il progetto in questione mira sostanzialmente alla realizzazione di un intervento integrato di scavo, restauro *in situ* e musealizzazione all'interno del centro storico di Brescia, comparto urbano ad alta densità di presenze archeologiche relative in particolare all'età romana.

Sono emerse, nelle due diverse campagne di scavo, su un'estensione di circa 1000 mq, strutture riferibili a due edifici abitativi di età romana, due *domus* disposte su quote sensibilmente decrescenti da nord a sud. Le due case, entrambe prospicienti uno dei cardini maggiori della città romana, presentano *fauces* allungate che introducono in cortili, vero fulcro degli edifici (fig. 1).

La *domus* più a nord, detta di Dioniso, è caratterizzata da una corte centrale pavimentata con lastre di calcare locale; sul suo lato settentrionale era l'impronta di una fontana con doppia vasca rettangolare e vasca più piccola addossata, con nicchia e parete affrescata da scena nilotica. Dal cortile si accede al triclinio, vasto ambiente quadrangolare con finestra sulla corte, con mosaico pavimentale bicromo e pseudoemblema centrale policromo nel quale è raffigurato Dioniso che abbeverava una pantera.

Le pitture del triclinio, articolate su più registri, dei quali sopravvivono solo quelli inferiori, presentano uno zoccolo nero scandito da maschere teatrali e da cespugli con uccelli. Più in alto, sopra un tralcio di vite, *pinakes* su fondo giallo con paesaggi marini e pesci o con paesaggi campestri. A sud del cortile era un grande vano con pavimento a mosaico bianco e pareti affrescate e i resti di una scala che portava al piano superiore, la cui presenza è stata poi confermata da frammenti di affresco rinvenuti nel triclinio. Sempre sul cortile si apriva un altro vano con pavimento in battuto e intonaco bianco alle pareti.

Altri ambienti dovevano svilupparsi a nord della parte visibile, ma le scarse notizie deducibili dai giornali di scavo non consentono di immaginarne compiutamente lo sviluppo e la funzione.

L'impianto del complesso si data in linea di massima tra la fine del I e gli inizi del II secolo d.C. (*Le Domus dell'Ortaglia* 2003: 41-51). Poco leggibili le dinamiche della stratificazione sopra e sotto la *domus* a causa dei metodi seguiti all'epoca sia per lo scavo (individuazione dei muri perimetrali e sbancamento dei depositi interni, spesso con mezzo meccanico) sia per il restauro: i mosaici sono stati distaccati, restaurati, integrati e poi riposizionati

su nuovi vespai di bonifica. Quasi nulli ovviamente i dati relativi alla qualità e consistenza dei depositi sottostanti (fig. 2).

Il complesso, o almeno i suoi vani più significativi, venne coperto con una struttura che ha resistito fino ad oggi, i cui sostegni in ferro gravavano direttamente sulla rasatura artificiale dei muri antichi e gli affreschi furono consolidati e spesso pesantemente ridipinti ed integrati. Numerosi interventi di restauro eseguiti sulle murature hanno reso a volte impraticabile la verifica dei rapporti tra le singole parti.

Un intervento che oggi certamente non potremmo ritenere esemplare, in linea peraltro con le procedure comuni per l'epoca, accompagnato da interventi di restauro pesanti e poco sensibili alle logiche dei contesti ha fatto di questo nucleo abitativo, peraltro importante e significativo per i suoi apparati decorativi e per la tipologia degli ambienti, un insieme piuttosto rigido e spersonalizzato, fissato artificiosamente in una immagine nella quale è spesso difficile distinguere l'originale dal posticcio. Superfluo aggiungere che il tipo di copertura e la assoluta mancanza di attenzione ai dati di temperatura, umidità, illuminazione interne hanno notevolmente accelerato i processi di degrado, soprattutto delle pitture, in molti casi ormai assai meno leggibili rispetto al momento dello scavo.

Una situazione ovviamente diversa si è verificata nel settore oggetto del nuovo scavo (2001-2002), occupato da un'altra *domus* cresciuta in pratica in stretta adiacenza a quella più a nord e ugualmente accessibile dal *cardo* attraverso un lungo corridoio lastricato che portava ad una corte.

In questo caso le tecniche dello scavo stratigrafico, insieme alla presenza costante sul campo di restauratori, hanno consentito di registrare abbastanza fedelmente la complessità delle vicende subite dall'edificio, dalla sua prima costruzione attraverso i rifacimenti, le ristrutturazioni, i cambiamenti d'uso degli ambienti fino agli episodi più tardi di demolizione degli apparati di pregio e poi di crollo degli alzati e delle pareti e hanno permesso di recuperare le evidenze legate ai momenti finali di vita della casa, come i mosaici sprofondati dai piani superiori, le pareti ed i soffitti crollati sui pavimenti.

La rielaborazione di questi dati, lavoro, assai lungo, costoso e delicato, ha permesso di ricomporre un quadro piuttosto esauriente della *domus* nei suoi aspetti reali e più vari, dalle tecniche costruttive dei muri a quelle di esecuzione delle pitture e dei mosaici, fino alle dinamiche complesse delle risistemazioni e dell'abbandono degli spazi.

Questa seconda *domus*, che probabilmente conobbe una prima fase più antica con pianta articolata intorno ad un atrio quadrato con *impluvium*, subì in seguito numerose e complicate trasformazioni.

I vani erano disposti con schema ad L intorno ad un cortile rettangolare e ad un lungo corridoio su due livelli che collegava il settore meridionale a quello a nord. Almeno tre fasi (tra fine I e III secolo) sono leggibili nelle sequenze di pavimenti e di rifacimenti dei vani con un momento di più evidente fioritura, probabilmente nel II secolo, nel quale si verifica un vistoso rinnovamento negli apparati decorativi parietali e pavimentali ed un incremento significativo dell'uso di fontane ornamentali di vario tipo, presenti in numerosi ambienti di soggiorno della casa, evidente rimando ad una moda diffusa nell'epoca anche nelle regioni dell'Italia settentrionale (Bonini 2003: 80-83).

Due piccoli vani con ipocausto garantivano il riscaldamento della *domus*; sulla parte posteriore uno spazio scoperto, forse un giardino, e sicuramente un piano superiore del quale si conosce solo quanto suggerito da alcuni pavimenti crollati nei vani sottostanti.

Il settore NE di questa *domus* comprendeva alcuni vani già scavati e restaurati negli anni '70, in particolare un *oecus* con mosaico policromo articolato in tre zone separate a cui si accedeva attraverso un corridoio con mosaico decorato dal motivo di un *kantharos*, che ha subito lo stesso trattamento degli altri più ad W: i pavimenti sono stati staccati, restaurati e riposizionati in loco.

Verso sud, nel settore oggetto del nuovo intervento, sono disposti in sequenza altri vani, alcuni probabilmente riferibili alle fasi più antiche della *domus*, un piccolo raffinato ambiente con mosaico bianco e nero, uno con vasca in origine decorata da mosaico con paste vitree; un corridoio con mosaico di grosse tessere. Più a sud un vano con stelle di losanghe chiare e motivi vegetali e figurati, tra cui una brocca, con al centro una fontana, ed un altro con mosaico policromo con cornice a fondo scuro e crocette bianche ed emblema con cornice di meandro prospettico e motivi figurati ispirati al tema delle quattro stagioni.

A nord della corte con tipica parete dipinta a spesse fasce grigio-verdi, nello stile frequente nelle *ambulationes* o nei porticati, era un vasto ambiente con fontana centrale, pavimento in battuto e pareti dipinte a grandi campiture rosse e gialle con motivi vegetali, tratti di murature in argilla ed il crollo quasi integro del soffitto; più ad ovest l'ambiente decorato con zoccolo a finto marmo e grandi riquadri chiari bordati di profili rossi, utilizzato in epoca successiva al degrado dell'edificio come cantiere e deposito di calce.

Tornando verso sud si accedeva ad altri due vani, varie volte ridipinti e riattati, uno dei quali era un probabile triclinio aperto sulla corte, con un emblema di sectile su battuto, restaurato più volte in antico (*Le Domus*

dell'Ortaglia 2003: 53-88).

Le operazioni di restauro eseguite finora in questo settore sono consistite in pulitura, o meglio microscavo delle superfici, primo consolidamento e stuccatura dei contorni per i mosaici; dopo la costruzione del nuovo edificio di protezione saranno completati i consolidamenti *in situ* con infiltrazioni compatibili con i materiali della preparazione per mantenere inalterate le tracce di vita del monumento; si procederà alla integrazione delle lacune con stucature a base di calce per consolidare la struttura e attenuare il disturbo estetico nella lettura dell'insieme, ed alla protezione finale al momento dell'apertura al pubblico dell'area.

Per gli affreschi: quelli rinvenuti *in situ* sono stati puliti e consolidati; quelli nei livelli di crollo sono stati velati e disegnati per insieme e poi rimossi. Sono ora in corso le operazioni di restauro, svelatura, pulitura e consolidamento di questi gruppi con successivo posizionamento su pannelli da esporre lungo il percorso di visita del pubblico, in corrispondenza dei vani da cui provengono. Saranno ovviamente restaurate tutte le murature, in particolare quelle in argilla presenti nella cosiddetta "Sala della Fontana", che necessitano di interventi di trattamento mirato, delicati e ripetuti nel tempo, e che rappresentano una interessante anomalia nel contesto in esame.

Per la conservazione futura sono state pianificate opere periodiche di manutenzione, spolveratura delle superfici, rimozione delle crescite biologiche, controllo dell'efficienza dei sistemi di protezione e delle malte.

Il caso di queste *domus*, in conclusione, è peculiare sotto vari aspetti: in primo luogo rappresenta, attraverso i due diversi tipi di interventi svolti nel tempo ed ora accolti in una soluzione espositiva unica che costituirà parte integrante del percorso museale, due approcci radicalmente diversi al restauro del manufatto antico *in situ*: il primo (anni '70), di tipo estetico, che selezionava brutalmente all'origine, anche in assenza di reali motivazioni di ordine conservativo, decontestualizzando la struttura, determinandone la perdita di integrità e la personalizzazione, disperdendo in maniera irreversibile i segni del passaggio del tempo e quindi della storia del manufatto, pur ricollocandolo nel suo ambiente d'origine.

Il secondo approccio, adottato nell'intervento in corso, è quello storico-conservativo, che mira alla conservazione *in situ* del dato storico, della stratigrafia, delle trasformazioni occorse ai manufatti attraverso i secoli. Si cerca di rispettare il più possibile il delicato equilibrio del contesto archeologico così come viene evidenziato dallo scavo; non si seleziona a priori in quanto ogni evidenza può giocare un ruolo primario nel racconto del sito.

La presentazione al pubblico di queste due filosofie così diverse, ed il

coinvolgimento del pubblico stesso nella dinamica che porta ad una scelta di restauro che non è solo una proposta tecnica ma rappresenta un vero e proprio itinerario di conoscenza (il restauro sarà effettuato sotto gli occhi dei visitatori) sembrano certamente un aspetto interessante e nuovo dell'esperimento museale bresciano. L'altro elemento rilevante è rappresentato dall'attenzione indiscriminata riservata a tutte le strutture del contesto in esame, non solo i mosaici quindi, ma anche gli affreschi, i muri in tecnica povera, e perfino le tracce al negativo di quanto esisteva ed è stato asportato. Il restauro dovrà trattare come centrale ognuna di queste realtà. Ed il percorso di visita, come si vedrà nel testo che segue, recependo lo stesso tipo di approccio filologico e storico, potrà comunicare al pubblico il senso di una operazione di conservazione *in situ* e di valorizzazione di un complesso archeologico che ha le sue radici e le sue motivazioni nelle conoscenze prodotte dallo scavo (fig. 3).

Filli Rossi

LE DOMUS NELLA CITTÀ E NEL MUSEO DELLA CITTÀ

Per comprendere appieno la portata dell'intervento che si sta operando a Brescia, è opportuno e utile presentare le *domus* dell'Ortaglia nel loro contesto storico, urbanistico, ed infine museale.

Le abitazioni si trovano nel quartiere nordorientale dell'antica Brixia, alle pendici del colle Cidneo, tra le mura urbiche ed il centro monumentale della città antica, del quale emergono ancora il tempio capitolino (73 d.C.), il santuario tardorepubblicano con il ciclo di affreschi presenti al suo interno, il contiguo teatro, il foro, la basilica e numerose abitazioni private dai ricchi apparati decorativi. Le *domus* erano raggiungibili tramite un *cardo*, in salita, dal *decumanus maximus*, e facevano parte di un esteso quartiere del quale sono state individuate in passato anche altre unità residenziali.

L'indagine estensiva di questa zona e i cospicui rinvenimenti in essa sono stati infatti resi possibili dalla presenza in essa del monastero di San Salvatore-Santa Giulia, fondato nella seconda metà dell'VIII secolo d.C. da Desiderio, duca di Brescia e futuro ultimo re del popolo longobardo. La struttura monastica, arricchita nel corso dei secoli di chiese e chiostri, venne ad occupare tutto il comparto nordorientale della città, sigillando i resti romani e sottraendo la zona quindi alle comuni dinamiche insediative dei centri storici, che spesso impediscono di recuperare le tracce più antiche dell'insediamento.

Già negli anni '50 del secolo scorso, al di sotto della chiesa longobarda di San Salvatore vennero individuati i resti della cosiddetta *domus* del Ninfeo, visibili oggi tramite delle griglie nel pavimento della chiesa stessa. Tra il 1980

ed il 1992 nei cortili del monastero furono scavati circa 60 ambienti con pavimenti a mosaico e pareti affrescate, disposti intorno a corti lastricate e raccordate da rampe e da scale; l'area è stata poi ricoperta ed è parzialmente visibile al pubblico; si sta procedendo ora alla pubblicazione dei dati relativi alle abitazioni (fig. 4).

All'interno del monastero dal 1998 è stato allestito ed aperto al pubblico il *Museo della città*, costituito da numerosi settori espositivi che "raccontano" la storia di Brescia dal IV millennio a.C. sino all'Ottocento, guidando i visitatori in un viaggio nel tempo che include anche la visita delle strutture del monastero stesso.

Tra i settori archeologici una sezione in particolare è dedicata all'edilizia residenziale privata; sono esposti in essa lacerti di pavimentazioni in tessellato ed in sectile, brani di pareti affrescate ed elementi scultorei. In quanto frammenti ormai avulsi dal loro contesto originario, è stata fatta la scelta di presentarli su piani leggermente inclinati che non rispettano assolutamente la posizione dei pavimenti ma consentono una vista ottimale dei motivi decorativi e delle tessiture.

Un campionario ridotto e riduttivo quindi di quanto si conosce delle antiche *domus* di Brixia. Questo perché le testimonianze più significative sono ancora *in situ* e perché è spesso destino delle abitazioni di età romana venire smembrate al momento della scoperta e venire presentate, con criteri per fortuna oggi dove possibile superati, per *membra disiecta*, costringendo il visitatore a cercare di avvicinare, almeno mentalmente, elementi che in antico convivevano e dialogavano.

Sin dal momento della stesura del progetto di ordinamento museale si aveva consapevolezza di questo limite. Venne allora avanzata l'ipotesi di annettere ai percorsi del *Museo della città* l'area archeologica dell'Ortaglia, contigua al monastero ed in particolare alla manica del chiostro rinascimentale nella quale era allestita la sezione delle *domus*. Portare nel Museo una casa romana nella sua tridimensionalità e fare entrare i visitatori in un brano di Brescia romana (Morandini 2001).

Furono allora effettuati dei saggi per verificare l'entità del deposito archeologico a sud delle strutture già portate in luce. La trincea mise in evidenza la perfetta continuità delle strutture ed il buon livello di conservazione. Si procedette quindi alla stesura di un progetto di fattibilità dell'ampliamento estensivo dello scavo e dell'annessione dell'area ai percorsi museali. Comune di Brescia, Fondazione CAB e Soprintendenza Archeologica, concordi nell'importanza di questa iniziativa, condivisero l'obiettivo e le modalità e, steso un documento di convenzione, procedettero all'avvio dei

lavori conferendo a questo progetto un significato speciale. Lo scavo e la restituzione al pubblico delle *domus* dell'Ortaglia costituiscono infatti la prima tappa di un progetto complessivo, denominato *Brixia*, di conoscenza, recupero e valorizzazione con apertura al pubblico dei principali siti della città antica.

Gli scavi recenti hanno permesso di individuare, come si è visto, una sequenza dinamica dall'età augustea all'altomedioevo, della quale si è cercato di dare conto attraverso gli strumenti dedicati al pubblico (pannelli di testo, rilievi, ricostruzioni tridimensionali).

Senza soluzione di continuità i visitatori del Museo, transitati nella sezione dedicata all'edilizia pubblica monumentale e nell'introduzione di quella dell'edilizia privata, potranno entrare in queste abitazioni, accompagnati dallo stesso linguaggio di comunicazione utilizzato per il resto del Museo.

L'area archeologica, secondo il progetto ideato dagli architetti (Giovanni Tortelli e Roberto Frassoni Architetti Associati), si presenterà come un unico vasto spazio di circa 1000 mq, interrotto solo in pochi casi da setti verticali di allestimento che aiutano a comprendere divisioni antiche e limiti di proprietà; un percorso aereo condurrà nella visita proponendo una conoscenza delle *domus* secondo quelli che dovevano essere i plausibili originari percorsi domestici.

Nella *domus* scavata in passato, denominata "di Dioniso", sarà possibile vedere agevolmente tutti gli ambienti che gravitano sul cortile lastricato, sia quelli più semplici, con pavimenti in cementizio bianco o in tessellato monocromo disposto in diagonale, sia il ricco triclinio databile alla prima metà del II secolo d.C., caratterizzato da uno schema bicromo a composizione geometrica con stelle di losanghe ed ottagoni all'interno dei quali sono riprodotti *kantharoi* con tralci di vite e grappoli d'uva. Al centro della sala è inserito uno *pseudoemblema* nel quale, con orientamento rovesciato rispetto alla soglia di accesso, al di sotto di una ghirlanda di frutti e foglie è raffigurato Dioniso, nudo, adagiato su una roccia, che abbeverava con un *rython* una pantera; nella mano sinistra tiene il tirso e tra i capelli, ai lati del volto, si vedono piccoli grappoli e foglie di vite (Morandini 2003a: 49-50) (fig. 5).

La visita della "*Domus delle Fontane*" ha inizio dagli ambienti che si trovavano tra il cuore della casa e il *cardo*, caratterizzati da pavimentazioni in malta biancastra arricchite da scaglie sparse di grandi dimensioni e piastrelle triangolari in marmi d'importazione, riconducibili al I secolo d.C. In adiacenza ad essi si trova anche un triclinio, poi defunzionalizzato, ascrivibile alla fase edilizia del II secolo d.C.; è caratterizzato dal pavimento in malta con al centro da un raro *emblema* realizzato in piastrelle marmoree bianche e nere e

racchiuso entro una cornice in cipollino secondo uno schema compositivo con motivo a girandola inserito entro un quadrato, ripetuto quattro volte alternando i colori; è riconducibile alla (Slavazzi 2003, 87-88). Alla medesima fase è inoltre da ricondurre un ambiente, affacciato verso il *viridarium* e caratterizzato dalla presenza al centro del pavimento di una vasca in marmo, ornato da un mosaico a schema geometrico, con stelle di losanghe, quadrati e rettangoli caricati da motivi figurati tra i quali si riconosce una brocca.

Le pavimentazioni più ricche per soluzioni compositive e cromie sono quelle appartenenti all'ultima fase che si registra nella stesura delle decorazioni della *domus*, circoscrivibile all'inizio del III secolo d.C. All'interno della cosiddetta Sala delle stagioni una fascia di tessellato nero con punteggiato di crocette bianche sulla diagonale delimita un pannello centrale a sua volta inquadrato da un meandro assonometrico e da una treccia a due capi, decorato secondo uno schema abbastanza noto soprattutto tra I e II secolo d.C.: si tratta di una composizione centrata attorno ad un quadrato, con quattro ottagoni adiacenti sui lati e quattro squadre poste sulle diagonali, adiacenti agli ottagoni; gli spazi di risulta sono losanghe e triangoli. Le ampie lacune nel mosaico consentono di riconoscere entro uno degli ottagoni la personificazione dell'Estate, con spighe tra i capelli, mentre la frutta di cui è caricata la squadra adiacente (pere, fichi e melagrane) lascia ipotizzare la raffigurazione dell'Autunno nel vicino ottagono, secondo modelli tipici dell'età severiana (Morandini 2003: 76-77). Nella Sala delle colonne il pavimento è costituito da tre tappeti giustapposti; quello centrale è decorato da uno schema tra i più diffusi, a stelle di otto losanghe determinanti quadrati, caricati da motivi vegetali, floreali, geometrici e vasellame; al centro della sala, in uno dei quadrati sulla diagonale di risulta della composizione, è riprodotta una maschera realizzata con tessere di modulo molto piccolo, rivolta verso l'ingresso, ritenuta un chiaro elemento di richiamo al mondo dionisiaco.

Il tappeto meridionale, di forma rettangolare, è costituito da una cornice con tralcio di boccioli di rosa che cinge uno schema di meandri a doppia T caricati di losanghe colorate con al centro il motivo del nodo di Salomone entro un cerchio inscritto in un quadrato. La zona settentrionale della sala è separata da quella centrale da una sequenza di riquadri rettangolari dei quali rimangono i due alle estremità, caricati rispettivamente da un ramo di melograno con frutti e probabilmente da uno di nespolo, ed uno di quelli mediani, con tralci di vite stilizzati entro due cornici mistilinee. Tra i riquadri si impostavano le colonne. Il tessellato è costituito da due file di esagoni policromi adiacenti (Morandini 2003: 77-79; Morandini, Slavazzi c. s.).

Una situazione particolare riflette un piccolo ambiente a pianta quadrata

di funzione ancora incerta, forse un *cubiculum* o studiolo, con tessellato a scacchiera bianca e nera in cui ogni scacco è caricato da due quadrati inscritti diagonalmente l'uno nell'altro. In accordo con la datazione degli affreschi ad esso pertinenti, rinvenuti in crollo, può essere datato al I secolo d.C. ed è significativo il fatto che tale ambiente sia stato mantenuto con la sua decorazione originaria sino all'abbandono della *domus*, per volontà esplicita dei proprietari che si sono avvicendati nel tempo all'interno della casa (Morandini, Slavazzi c. s.) (fig. 6).

Le strutture saranno viste dall'alto senza il contatto diretto con i visitatori, per motivi di tutela ma anche per garantire una vista ottimale soprattutto dei ricchi mosaici a pavimento. Il mantenimento della quota del Museo inoltre consente di non avere barriere architettoniche che spesso nelle aree archeologiche precludono la visita a persone con difficoltà deambulatorie.

Alcuni elementi di arredo delle *domus*, in particolare frammenti in pietra e marmo relativi agli apprestamenti idraulici ed alle architetture riconosciute, verranno proposti in prossimità della loro originaria collocazione; lo stesso criterio verrà applicato ai frammenti di pareti e soffitti affrescati che, recuperati in crollo durante lo scavo, hanno potuto essere rimontati su pannelli.

Questa scelta risponde alla volontà di avvicinare nuovamente nell'esposizione parti delle *domus* che in origine venivano percepite e vissute unitariamente e che le dinamiche seguite all'abbandono delle abitazioni hanno invece fatto giungere a noi separatamente.

Alle pareti testi e disegni ricostruttivi illustreranno l'importanza e le caratteristiche principali di questo brano di città antica, dedicando inoltre ampio spazio ad ogni singolo vano per meglio coglierne le peculiarità architettoniche e ornamentali, oltre che le azioni dinamiche delle quali porta ancora i segni.

L'unica apertura nell'edificio moderno a protezione delle *domus* è stata studiata in modo tale da consentire ai visitatori di percepire ancora la posizione delle *domus* all'interno della città antica; è stata progettata infatti proprio verso le mura urbane di età romana, ben visibili a poche decine di metri dall'area archeologica dell'Ortaglia.

Sempre all'interno dell'area archeologica è previsto uno spazio per i reperti recuperati durante lo scavo, sia quelli relativi alla costruzione ed alla decorazione della *domus*, sia quelli relativi alla vita che all'interno di esse si svolgeva. Verrà inoltre proposto un video costituito da ricostruzioni tridimensionali della città romana e delle *domus*, una sequenza diacronica della lunga vita di queste abitazioni (almeno quattro secoli), da dettagli degli

apparati decorativi e funzionali ed infine da riprese girate durante i lavori di scavo e restauro.

Un valore aggiunto a questo tipo di sistemazione museale sarà quello dei restauri effettuati durante gli orari di visita, un'occasione non così frequente per il pubblico; da parte del Museo questa scelta è stata sentita come importante momento formativo, base forte e significativa per la corretta formazione di una cultura del rispetto e della sensibilità per la città antica.

Francesca Morandini

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FIGURE



1. Veduta dell'area dell'Ortaglia in corso di scavo.



2. Operazioni di scavo e rilievo. In primo piano si vede il crollo di un pavimento a mosaico del piano superiore.



3. Domus di Dioniso in corso di allestimento.



4. Veduta aerea di Brescia con il monastero di Santa Giulia-Museo della città in primo piano. In basso a destra è possibile vedere l'area dell'Ortaglia durante lo scavo.



5. Domus di Dioniso in corso di allestimento; sullo sfondo è possibile vedere la proiezione del multimediale.



6. Domus delle Fontane in corso di allestimento.

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APPROACH TO CULTURAL HERITAGE OF THE GAP REGION IN TURKEY

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SUMMARY

The Southeastern Anatolia Project (GAP) is an effort for full-fledged and integrated socio-economic regional development based upon the principle of sustainable human development. The project envisages achieving this goal by developing the land, water and human resources in the Southeastern Anatolia Region which constitutes about 10% of Turkey's population and geographical area. The area, also known as the Fertile Crescent or Upper Mesopotamia, is known to be the cradle of civilization in human history and has hosted many civilization since prehistoric times.

INTRODUCTION

Southeastern Anatolia Project (GAP) (fig. 1)

The basic objectives of the GAP Project include the elimination of development disparities between the Region and other regions of the Country. By raising the life and income standards of the people, it is frequently cited in international platforms for its multi-sectoral and integrated approach to sustainable development.

The total cost of the GAP is 32 billion USD and financial realization rate of the project is around 50% by the end of last year (2002).

A development project and infrastructure activities that focus on the people are vital in order to eliminate the social and economic differences in the Region. With people at center of the planning activities, social and cultural heritage is carefully considered. Within the framework of GAP, it is vital that the cultural inheritance that began thousands of years ago will be protected,

evaluated and highlighted in terms of culture, history and tourism. Within the scope of sustainable development, which is the one of the objectives of GAP, cultural continuity is stressed in order to transfer this cultural inheritance to future generations. Many important archaeological sites, extremely rich in mosaics, excavated, under investigation or still untouched, are in this area.

An overview of the policy, of the implemented programs and of the future projects on archaeological sites of the Region will be given.

Departments of GAP Administration carry out documentation, restoration projects, environmental arrangement projects, urban planning and excavation and rescue activities in the areas that will be submerged under dam lakes in the Region. The GAP Administration ensures co-ordination regarding the activities carried out by the relevant universities and the other public institutions and agencies, expert teams supervised in a sound manner.

The GAP had originally been designed as a package of 13 projects which envisaged the construction of energy plants and irrigation schemes over the Euphrates and Tigris rivers. When the projects are completed there will be 22 dams and 19 hydraulic energy plants on the rivers. Today, in addition to dams, hydraulic plants and irrigation systems, the GAP has evolved into a massive-scale economic development effort also covering investment in such areas as rural, urban, and agricultural infrastructure, transportation, industry, education, health, housing, cultural heritage and tourism. It is a multi-dimensional regional development project that will bring changes that will substantially affect the whole country (fig. 2).

When the project is completed, 28% of the total water potential of the Euphrates and Tigris rivers which together flow more than 50 billion cubic metres water annually, will be taken under control. It will also be possible to irrigate 1.7 million hectares of land, and to produce 27 billion kWh of energy annually on an installed capacity of over 7.460 megawatts. The total land to be brought under irrigation in the GAP region will be 20% of the total irrigable land in the country (8.5 million hectares). The total hydraulic energy production in the Region will make up 22% of the total hydraulic energy potential of the country (118 billion kWh).

Irrigation projects are also a major component of GAP. When completed, an area equal to the size of what has been so far brought under irrigation by the State will be ready for irrigation. The agricultural and industrial potential created by GAP will multiply the economic output of the projected total population of 9 to 10 million by the year 2010, the expected completion date of the projects.

In 1985, the year accepted as the beginning of activities under the GAP

Master Plan, the GAP Region was estimated to have its per capita Gross Domestic Product (GDP) equalling to 47% of the national figure, according to maximum growth scenario of the Master Plan, the GDP of the Region is expected to have an annual rate of increase of 7.7%. Growth rates by sectors are given below:

- Gross Domestic Product (GDP) 7.7% (annual)
- Agricultural sector 4.9%
- Industrial sector 10.0%
- Construction sector 6.6%
- Services 9.0%

With the changing economic structure of the Region, GRP (Gross Rational Product) will increase 445%, per capita income will increase 209% and employment for 3.8 million people within the Region.

Approach to Cultural Heritage of the Region

A development project and infrastructure activities that focus on the people are vital in order to eliminate the social and economic differences in the Region. With people at the centre of planning activities, the social and cultural heritage is carefully considered.

Within the framework of GAP, it is vital that the cultural inheritance that began thousands of years ago will be protected, evaluated and highlighted in terms of culture, history and tourism. Within the scope of sustainable development, which is one of the objectives of GAP, cultural continuity is stressed in order to transfer this cultural inheritance to future generations. Departments of the GAP Administration carry out documentation, restoration projects, environmental arrangement project, urban planning and excavation and rescue activities in the areas that will be submerged under dam lakes in the Region. The area, also known as the Fertile Crescent or Upper Mesopotamia, is known to be the cradle of civilizations in human history and has hosted many civilizations since prehistoric times. The GAP Administration ensures co-ordination regarding the activities carried out by the Ministry of Culture, Ministry of Tourism, General Directorate of Foundations, relevant universities and other public institutions and agencies; expert teams from various universities also ensure that these studies are carried out and supervised in a sound manner.

In 1991, one year after its establishment, GAP Regional Development Administration (GAP-RDA) signed a protocol concerning the project of "Hasankeyf Historical and Archaeological Reserarch, Excavation and Rescue" with the Ministry of Culture. GAP-RDA signed a new protocol with the

Ministry of Culture regarding "The Research of Cultural Assets at Risk Due to the Waters of Birecik And Karkamış Dams". A separate protocol was also signed between GAP-RDA and Hacettepe University for "The Documentation of Stationary Cultural Assets in the Districts of Birecik, Halfeti, and Suruc".

Research has been undertaken in the area, including Birecik, Halfeti, Suruc, Bozova and Rumkale, and their historical significance and unique features have been studied and published. Their histories, plans, façades, interiors of buildings, architectural elements, and technical achievements have all been examined, as have the relevant texts and inscriptions. Particularly important historical monuments such as mosques, churches, caravansaries, Turkish baths, elaborate houses and cemeteries have all been studied in detail. Furthermore, comparative studies have been made between such monuments in Southeastern Anatolia and those in neighbouring regions, particularly Syria.

The social, economic, and development needs of the GAP Region will continue to be considered and evaluated. Development needs cannot be evaluated if historic works are ignored. Great emphasis is placed on preserving the cultural heritage of the Region and on protecting its valuable sites for the benefit of present and future generations.

CASE STUDY; ZEUGMA

GAP interfered for the area that would be inundated. With Packard Humanities Institute's (PHI) fundings, the largest rescue operation (ZAP 2000) ever was under way. PHI is a California based non-profit foundation established in 1987 to create tools for basic research in the humanities and to foster public interest in the history, literature, and music of the past.

Zeugma in History

Location

Zeugma is located in Southeastern Anatolia near the tiny village of Belkis, 10 km (6.2 miles) from the town of Nizip in the province of Gaziantep. The terrain is rocky, characterized by low-lying shrubs and the pistachio trees so typical of this region that produces 70% of the national harvest. This part of the country is the hottest part of Turkey; July alone sees 408 hours of sunshine with temperatures often reaching over 40 c / 104 Fahrenheit. Zeugma is resting amidst what historians have called the "fertile crescent" or "upper Mesopotamia", the cradle of ancient civilization. Southeastern Anatolia also has many other well known historic sites such as Mount Nemrud with its great monuments standing on the mountain, paying tribute to Antiochos and the gods. Harran, site of one of the world's first universities, and the beautiful old

city of Sanliurfa, home of Abraham and site of ancient Edessa (fig. 3).

The name Zeugma was given to a pair of towns built on opposite banks of the river Euphrates. They were founded by Seleukos I in 300 BC and he named the one on the west bank of the river "Seleukia" after himself, and that on the east bank "Apamea" after his wife Queen Apama. The twin towns acquired the name "Zeugma" (Greek for bridge or yoke) because a permanent bridge was built across the river at this point, linking the two towns.

Alexander the Great had built a pair of bridges at Thapsacus so that his army could cross the Euphrates. By the time his former general Seleukos, had established himself as ruler in the area, these bridges had been destroyed. Zeugma, therefore, was the only permanent bridge across the Euphrates for hundreds of kilometres, from the Taurus mountains to Babylonia, and as a result had great strategic importance. The Euphrates river was a natural boundary and Zeugma became a crossing-point and guard post. For the Seleukids it linked the areas of the kingdom which lay on both sides of the river. Lying on route from Antioch in the west and Seleukia-on-the-Tigris to the east.

Zeugma's importance can be traced over the centuries in many references in ancient literature.

Background of the Project

With the completion of the Birecik Dam, 30% of the known extent of Zeugma was inundated. Since 1992 excavation studies have been underway at Zeugma under the management of the Gaziantep Museum Directorate of the Ministry of Culture, General Directorate of Monuments and Museums.

Zeugma Archaeological Project 2000 (ZAP 2000) (fig. 4)

ZAP 2000 was conducted in area B. The site has been divided into topographical zones. Specific areas were targeted for large scale excavations. Under the Co-ordination (Administrative and Operational) and logistical support of GAP Administration, with the fund of PHI, under the permit and control of Gaziantep Museum, an international team of specialists mainly from Turkey, Italy, Britain and France worked to excavate, record and conserve the archaeology of this unique site. 120 archaeologists and conservation specialists from 11 different countries, with 250 laborers worked at the site 7 days a week. GAP Administration established the infrastructure of excavation centre and excavation site, and did events planning (fig. 5).

Overall, 19 excavation areas were opened across the 1 kilometre stretch of Area B. Among the many buildings found were houses, shops and workshops, 2 series of structure associated with different Christian ecclesiastical buildings

and the remains of possible temples. A cemetery site was discovered and extensive remains of the town's infrastructure, roads and drains as well as considerable evidence of the sophisticated system of water management. In total, the excavation has produced vast amounts of drawings and the thousands of written record sheets. More than 500 rolls of films were shot and 2376 digital images were produced. 45 mosaics were recorded and conserved; of these 22 were near-complete mosaics. 3 mosaics were lifted from site and these will be conserved and put on display in the future. Thousands of artifacts have been recovered. These range from simple objects associated with daily life, like many cooking pots, to the richly decorated, high status objects, such as a small bronze figurine. 1936 small finds have been recorded, including over a 1000 coins and a record-breaking number of clay seals.

After finishing excavation works, for post excavation studies 2 laboratories were constructed at Gaziantep Museum garden. Findings brought Zeugma's history to light and worked continued into the night as well.

The Zeugma archaeological Project 2000 (ZAP 2000) represents one of the largest and most ambitious rescue operation of its type ever undertaken and Zeugma was become a "passage" once again.

For the future of the project, it is planning to create a world class archaeological park at Area C which is not directly affecting from dam lake, and a new museum in Gaziantep, and also to give to possibility of scientific excavation at Area C.

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GAP RDA 2002: GAP Regional Development Administration "Status Report".

FIGURES



1. Southeastern Anatolia Project (GAP).

GAP Water Resources Development Projects

EUPHRATES RIVER	TIGRIS RIVER
1. KARAKAYA Dam/HPP	1. Diyarbakir - Karkisi
2. Lower Euphrates	2. Batman
3. Border Euphrates	3. Batman - Silvan
4. Suruc - Bazid	4. Gaziantep
5. Adiyaman - Kahla	5. Siirt
6. Adiyaman - Goksu - Araban	6. Gaziantep
7. Gaziantep	

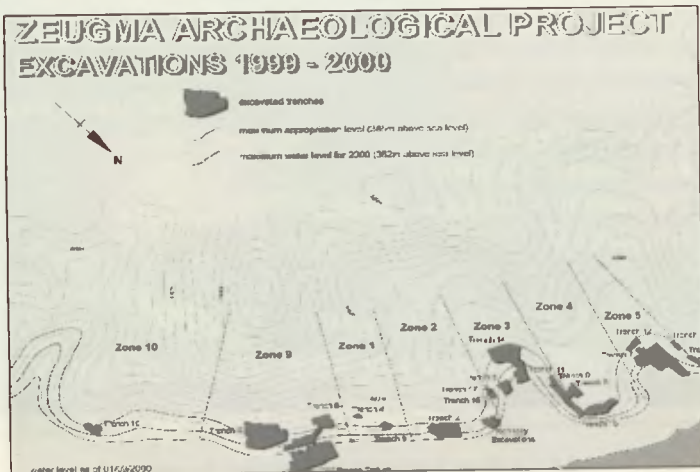
Total of 22 dams, 19 HPP

1.7 million ha, 7474 MW, 27 billion kWh

2. GAP Water Resources Development Projects.



3. "Centuries of history-the first Assyrian builders. Antiochus wedding. Sulla with the Parthians. Crassus in the storm and then the routine of the legions all hung in the air".
 Freya Stark, *Rome on the Euphrates*.



CHRISTOS ALAVERAS

**PICTORIAL INTERVENTION IN THE PRESENTATION OF THE MOSAICS
IN SAINT SOPHIA, THESSALONIKI**

ΠΕΡΙΛΗΨΗ

Εικαστική παρέμβαση στον τρόπο παρουσίασης των ψηφιδωτών της Αγίας Σοφίας: Ένα μέρος από τα ψηφιδωτά της βόρειας και νότιας πλευράς της καμάρας του ιερού βήματος της Αγίας Σοφίας είχαν με το πέρασμα των χρόνων καταστραφεί και στη θέση τους υπήρχε ένα κενό. Για να αποκατασταθεί αισθητικά και να συνδεθεί αρμονικά αυτό το κενό με τον περιβάλλοντα χώρο του, κατέληξα στην επανάληψη των ίδιων μοτίβων του ψηφιδωτού, με ζωγραφικό όμως τρόπο, έτσι ώστε να μένει αναλλοίωτη η αρμονία του σπουδαίου, λατρευτικά και αισθητικά, αυτού χώρου και παράλληλα να διαχωρίζεται η σύγχρονη παρέμβαση από το ιστορικό μνημείο.

SINTESIS

Intervencion artistica en una manera de presentacion de los mosaicos de la iglesia de Santa Sofia en Salonica (Grecia): Una parte de los mosaicos del lado norte y sur del arco del Santo Paso de Santa Sofia se habia destruido con el paso de los anos y en su lugar habia un espacio vacio. Para su restauracion estetica y acoplamiento armonico de este espacio con su lugar termine en una repeticion del mismo motivo del mosaico, pero de una forma pintada, asi de esa manera queda inalterable la armonia de este maravilloso templo y paralelamente se discierne la intervencion contemporanea del monumento historico.

I was born and grew up in the area around the Byzantine church of Hagia Sophia, so for me it symbolizes the very essence of the word "church". The passage of time and the ill effects of damp, wind, and other such factors, had destroyed a large area of mosaic in the barrel-vault of the sanctuary apse, leaving the wall bare and starkly at odds with its surroundings; so when I was

asked to consider what could be done to harmonize it with the rest of the barrel-vault I was faced with something of a quandary.

It is anyway very difficult, and rare, for different people to contribute to a work of art. But in this case I had been invited to work on a monument of particular spiritual and aesthetic importance — especially to me, who have lived my entire life just one block away from this church that was built in an age so distant from the twenty-first century.

My first thought was to visit this specific part of the church a number of times to experience the feeling of it, and then to think about how much I could do to help fill the empty space in the mosaics in the barrel-vault. I thus at least had an opportunity to spend time in an ambience that is little short of magical.

The area in question is reached by means of a brief ritual, for, having passed through a small doorway in the bell-tower, to the left of the main entrance, one climbs a shadowy, narrow staircase which comes out high up over the gallery, where there is a powerful sense of another age. Crossing this part of the church, one comes to the north side of the barrel-vault, which had quite a large area a little over three metres high from which the mosaic decoration was missing. The empty space on the south side was much smaller and indeed had no trace of any later intervention — in clear contrast to the other side, where the missing mosaicwork had been replaced with frescoes. Most of the frescowork, however, had not withstood the longstanding conditions, leaving only a few islets to bear witness to the passage of history upon the wall.

All kinds of thoughts crossed my mind as to how the empty space could be filled. To begin with, they all stumbled up against the problem of how to relate the new work to the existing mosaics. At the same time, on my increasingly frequent visits I was growing more and more familiar with the atmosphere created by the existing artwork. By degrees the image of the repeated motifs resolved itself in my mind and, as it is my habit to sketch the world around me, I started drawing the motifs, which are repeated, one giving way to another, in that space which was now beginning to imprint itself more and more clearly on my mind. This took me even deeper into the ambience. Colour made its way into my drawings in an increasingly meaningful dialogue with the mosaic motifs. And thus the sketches evolved into more specific proposals, in which I employed a vocabulary that was closely related to that of the mosaics, since I used dots to build up the chromatic forms. I made sure that the dots were consistent with an overall proposal that was chromatically and formally similar to the mosaic motifs, each motif being subtly different in colour and shape, a feature which I had already noted in the Hagia Sophia

mosaics themselves. I gradually arrived at some chromatic forms that persuaded me they could also work on the wall alongside the mosaics. Having secured the agreement of the Ephor of Antiquities, Mr Charalambos Bakirtzis, I started work on the wall, by stages at first, adding a few areas of colour all over the space and approaching it in a holistic way. This is generally advisable with any artistic activity, because the total effect of any work comes first and foremost from its overall composition, and any specific interesting—even very interesting—areas and details are liable to distort the nature of the composition if they are not integrated into the overall effect. More so in this particular case of a complex pattern of motifs each of which has to maintain by form and colours the dimensions that must not overstep their role in the overall harmony of the space. This has a certain special merit in a process like this, because artistic creativity as it evolves is an organic act which, the more integrated its development, the more visually acceptable the overall result will be.

As my work progressed, the palette became richer, while at the same time I remained focused on the functionality of the dots of colour inside the shapes that encompassed them (fig 1). When colours that produce another colour when mixed together are distributed in the form of random dots upon a surface, they give the impression of the same colour as when mixed together. So, for instance, an area of yellow and red dots looks orange. More yellow dots produce a lighter orange. A cooler shade can be achieved by adding dots of cooler colours, such as blue, white, or green. In this way a colour that conforms to the structural harmony may be retained, with a greater wealth of colour and texture added in such a way as to contribute to the overall effect without subverting it. One is not consciously aware of the range of colours from a distance; but I believe it adds to the overall effect. As a viewer, I have the impression that this is also a very positive factor with regard to the art of mosaic itself, for this too uses very small units—tesserae—which create an overall effect without in any way losing their own form.

For me this gives a sense of the individual subordinated within a collective consciousness. Although they are similar, the new motifs differ considerably from each other, though these differences too are not immediately apparent, because their relative similarity, repeated, increases and becomes co-ordinated in the repetition of the two different alternating motifs. So here again the discrete visual units are subordinated within an overall effect. Units which are themselves made up of other units, namely the aforementioned dots of colour.

So these dots of colour, which in mosaic correspond to the tesserae, in my work were dots made with the brush, which, although they bore no technical relationship to the mosaicwork, nonetheless followed the rhythm imposed by

the mosaic harmony of the space.

My entire approach to the overall forms was governed by respect for what the surviving mosaics indicated had existed previously, and this was why, in terms of structure, I employed the same layout and the same forms. As for the style, it was clearly different — as, I believe, an honest approach requires, for any contemporary action would not be true either to the original nor even to itself, nor yet to each viewer, if it pretended to be part of the old work. Thus, always within the context of harmonious co-existence with the surrounding decoration, I acted with considerable freedom and, apart from the fact that my work was done in painterly media (necessitating stylistic differentiation), I also used my own formal preferences. This was much more the case on the north side (figs. 2, 4), for on the south side the area devoid of tesserae was considerably smaller and also there were no additions later than the Byzantine period (fig. 3), which led me to a rather more mechanical approach, using identical motifs (always in painterly media, of course). This was because in smaller areas any differences are much more obvious, and also when it is not possible to develop and expand there is much less opportunity to unify.

During my three months in Hagia Sophia I worked alongside Ms Sophia Marmara's team of conservators, and I should like to thank them for their advice regarding the best choice of suitable materials to preserve my own work, as also the religious painter Mr Tassos Voutsinas for the same reason and for his help with certain technical difficulties. I also received some very positive help at a theoretical level from the archaeologist Ms Pelli Mastora in connection with my ideas about how a contemporary act of painting can be integrated into an inspiring and evocative historical space. And it would certainly be a grave omission not to say that Mr Bakirtzis's confidence in my work empowered and sustained my endeavours.

I should like, finally, to say how happy I am that the priests who officiate in Hagia Sophia have expressed their satisfaction with my work, as this confirms that my own artistic presence has become an integral part of the special harmony of this profoundly spiritual space.

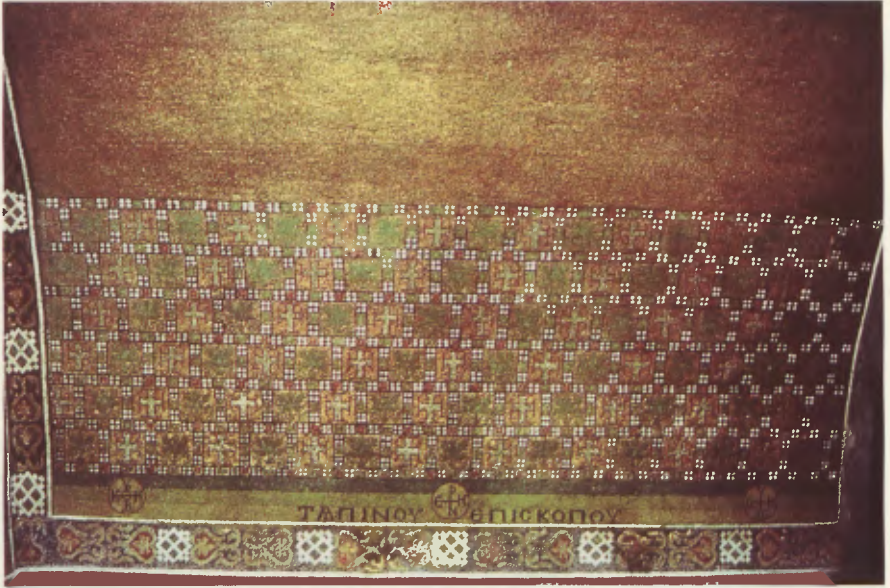
FIGURES



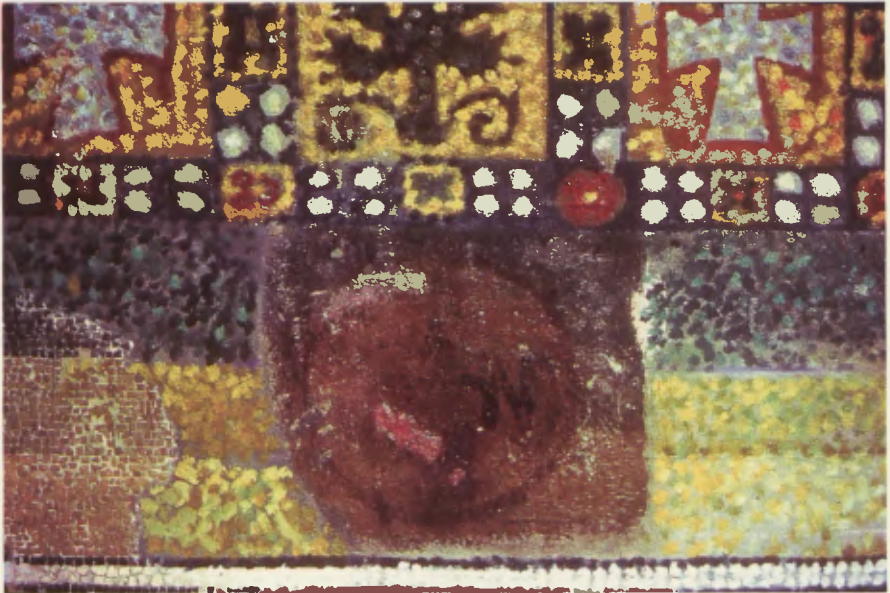
1. The basic motif.



2. North side of the barrel vault. Detail of the modern intervention and of the earlier restoration.



3. South side of the barrel vault.



4. North side of the barrel vault. Detail.

Ε. ΣΤΡΟΓΓΥΛΗ ΤΡΑΠΕΖΑ:
ΨΗΦΙΔΩΤΑ ΤΗΣ ΡΟΤΟΝΤΑΣ ΘΕΣΣΑΛΟΝΙΚΗΣ
ΣΥΝΤΗΡΗΣΗ, ΔΙΑΤΗΡΗΣΗ, ΠΑΡΟΥΣΙΑΣΗ

ROUND TABLE:
MOSAICS OF ROTUNDA OF THESSALONIKI
CONSERVATION, MAINTENANCE, PRESENTATION

ΕΙΣΑΓΩΓΗ

Ἡ συντήρηση τῶν ψηφιδωτῶν τῆς Ροτόντας εἶναι ἓνα μεγάλο ἔργο τῆς Ἀρχαιολογικῆς Ὑπηρεσίας τοῦ Ὑπουργείου Πολιτισμοῦ, τὸ ὁποῖο ξεκίνησε μετὰ τοὺς σεισμούς τὸ 1978 μαζὶ μὲ τὴν στερέωση τοῦ ἰδίου τοῦ μνημείου. Τὰ ὄρια τοῦ ἔργου αὐτοῦ καὶ ἡ ὀλοκλήρωσή του ἀπασχολοῦν σοβαρὰ τὴν Ἐφορεία Βυζαντινῶν Ἀρχαιοτήτων Θεσσαλονίκης, ἡ ὁποία ἐν ὄψει τοῦ Γ΄ Κοινοτικοῦ Πλαισίου Στήριξης (2000-2006) πρότεινε στὴν ὀργανωτικὴ ἐπιτροπὴ τοῦ 8ου Συνεδρίου τῆς Διεθνoῦς Ἐπιτροπῆς Συντήρησης Ψηφιδωτῶν νὰ συμπεριλάβει στὶς ἐργασίες του συζήτηση-στρογγυλὴ τράπεζα μὲ θέμα τὴ συντήρηση, διατήρηση καὶ παρουσίαση τῶν ψηφιδωτῶν τῆς Ροτόντας. Τὰ πορίσματα τῆς στρογγυλῆς τράπεζας θὰ ἀποτελέσουν τὸν ὁδηγὸ γιὰ τὴν ὀλοκλήρωση τῶν ἐργασιῶν αὐτῶν.

Στὴν στρογγυλὴ τράπεζα ἔλαβε μέρος ὁ καθηγητὴς Jean-Michel Spieser, ὁ ὁποῖος παρουσίασε τὶς ἀπόψεις του γιὰ τὴν χρονολόγηση τῶν ψηφιδωτῶν τῆς Ροτόντας καὶ τὸ εἰκονογραφικὸ πρόγραμμά τους συνοψίζοντας τὶς γνώμες ποὺ παλαιότερα εἶχαν διατυπωθῆ. Ἡ δρ. Εὐτυχία Κουρκουτίδου-Νικολαΐδου, ἔφορος τῶν Βυζαντινῶν Ἀρχαιοτήτων Θεσσαλονίκης, παρουσίασε τὶς μεγάλης ἐκτάσεως ἐργασίες συντήρησης τῶν ψηφιδωτῶν κατὰ τὴν πρώτη φάση 1978-1994. Τὴν ἀνακοίνωση τῆς Ε. Κουρκουτίδου-Νικολαΐδου συνέχισε ὁ Χ. Μπακιριτζῆς, ἔφορος τῶν Βυζαντινῶν Ἀρχαιοτήτων Θεσσαλονίκης (1997-) γιὰ τὶς ἐνταγμένες στὸ Β΄ Κοινοτικὸ Πλαῖσιο Στήριξης ἐργασίες συντήρησης τῶν ψηφιδωτῶν (1995-1999) ποὺ ἀκολούθησαν. Στὴ συνέχεια ὁ καθηγητὴς Νίκος Ζίας, πρόεδρος τοῦ Εὐρωπαϊκοῦ Κέντρου Βυζαντινῶν καὶ Μεταβυζαντινῶν Μνημείων, μὲ τὴν ιδιότητα τοῦ πρώην Διευθυντοῦ Βυζαντινῶν καὶ Μεταβυζαντινῶν Μνημείων καὶ πρώην Διευθυντοῦ Συντήρησης Ἀρχαιοτήτων τοῦ Ὑπουργείου Πολιτισμοῦ, παρουσίασε τὶς ἀπόψεις τοῦ δρ. Νικόλαου Μίνω, Διευθυντῆ Συντήρησης Ἀρχαιοτήτων καὶ Ἔργων Τέχνης τοῦ Ὑπουργείου Πολιτισμοῦ, ὁ ὁποῖος ἐνέταξε τὶς ἀρχὲς συντήρησης ποὺ ἐφαρμόσθησαν στὰ ψηφιδωτὰ τῆς Ροτόντας σὲ ἓνα εὐρύτερο πλαίσιο συντήρησης τῶν ψηφιδωτῶν στὴν Ἑλλάδα καὶ γενικότερα. Ὁ δρ. Roberto Nardi σχολίασε σειρὰ διαφανειῶν ποὺ ἔλαβε κατὰ τὴ διάρκεια προσκεκλημένης ἐπίσκεψῆς του στὴ Ροτόντα διατυπώνοντας τὶς ἀπόψεις του

για τὰ μέτρα συντηρήσης καὶ τεκμηρίωσης. Τέλος, ὁ δρ. Ἰωάννης Ἡλιάδης, ἠλεκτρολόγος/μηχανολόγος τοῦ Ὑπουργείου Πολιτισμοῦ, παρουσίασε τὶς ἀπόψεις του γιὰ τὸν τρόπο φυσικοῦ φωτισμοῦ τῶν ψηφιδωτῶν βάσει μετρήσεων ποὺ εἶχε κάνει.

INTRODUCTION

The conservation of the Rotunda mosaics is one of the major projects of the Ministry of Culture's Archaeological Service, and was initiated after the earthquake of 1978, together with consolidation work on the monument itself. The 9th Ephoreia of Byzantine Antiquities is deeply concerned with the scope of the project and its completion and proposed, with regard to the 3rd Community Support Framework (2000–2006), that the organizing committee of the 8th ICCM Conference include in the proceedings a round-table discussion of the conservation, maintenance, and presentation of the Rotunda mosaics. The round table's conclusions will serve as a guide for the completion of the work.

Professor Jean-Michel Spieser took part in the round table, giving his views on the dating of the Rotunda mosaics and their iconographical programme and summarizing the opinions expressed in the past. Dr. Eutuchia Kourkoutidou-Nikolaïdou, Ephor of Byzantine Antiquities in Thessaloniki, presented the extensive conservation work done on the mosaics during the first phase, 1978–1994, and was followed by the current ephor, Charalambos Bakirtzis, who spoke about the conservation work done subsequently under the 2nd Community Support Framework (1995–1999). In his capacity as former Director of Byzantine and Post-Byzantine Monuments and former Director of Conservation of Monuments in the Ministry of Culture, Professor Nikos Zias, President of the European Centre for Byzantine and Post-Byzantine Monuments, presented the views of Dr Nikolaos Minos, Director of Conservation of Antiquities and Art Works in the Ministry of Culture, who integrated the conservation principles applied to the Rotunda mosaics into a broader context of mosaic conservation in Greece and elsewhere. Dr Roberto Nardi commented on a number of slides he had taken during a formal visit to the Rotunda, giving his views on the conservation and documentation processes. Lastly, Dr Ioannis Iliadis, an electrical engineer in the Ministry of Culture, presented his views on the natural illumination of the mosaics based on his own calculations.

CH. BAKIRTZIS

JEAN-MICHEL SPIESER*

**REMARQUES SUR LES MOSAÏQUES
DE LA ROTONDE DE THESSALONIQUE**

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RÉSUMÉ

Cet article reprend la question de la datation des mosaïques de la Rotonde. Tout en soulignant les difficultés d'une datation sur des critères stylistiques, il essaie de montrer que les saints représentés dans la coupole, correspondant peut-être à une collection de reliques déposées dans l'église, conduisent plutôt à une datation tardive. Le programme d'ensemble de la coupole, comparé en particulier avec la description de la coupole de Saint-Serge de Gaza, semble davantage correspondre à ce que l'on pourrait attendre au début du VI^e siècle.

SUMMARY

This article deals again with datation of the mosaics of the Rotunda. It stresses the impossibility to get definitive conclusions using stylistic criteria. The saints represented in the dome – relics of them could have been deposited in the church – lead more toward a late datation. Also the overall program of the dome, compared with the ekphrasis of the dome of Saint-Sergius at Gaza, fits better with topics which are expected for the beginning of 6th century.

En acceptant de reprendre la question des mosaïques de la Rotonde, il m'avait d'abord semblé que je ne pourrais pas aller au-delà d'une simple présentation et qu'il faudrait me contenter de rappeler mes propres conclusions sur le sujet telles que je les avais formulées il y a une vingtaine d'années (Spieser 1984: 125-164), avec les arguments déjà opposés à ceux qui proposent des datations différentes. Mais il m'est vite apparu qu'il était possible d'élargir le débat, d'approfondir certaines réflexions et de proposer

quelques pistes différentes. J'ordonnerai ces remarques autour de trois thèmes, les aspects stylistiques, le "calendrier" – pour prendre une expression commode, mais il reste bien entendu que la mention des mois où sont commémorés les saints représentés ne suffit pas pour parler d'un calendrier – et, enfin, le programme décoratif de la Rotonde.

Pour le style, je ne ferai qu'ajouter quelques remarques à tout ce qui a déjà été écrit. Les motifs qui décorent la voûte de la niche sud de la Rotonde (fig. 1) étaient un élément essentiel de mon argumentation en faveur d'une date tardive, premier quart du VI^e siècle, proche en tout cas de la sculpture architecturale de Saint-Polyeucte (Spieser 1984: 135-141; *contra*: Torp 2001, dont l'analyse subtile mérite considération, même si je ne partage pas toutes ses conclusions et même si la question chronologique reste ouverte dans la mesure où H. Torp montre tout au plus que ces motifs et la manière dont ils sont disposés ne sont pas impossibles avant le VI^e siècle). Des observations récentes, faites à l'occasion des travaux qui ont suivi le tremblement de terre de 1978, ont mis en doute la possibilité de dater l'ensemble du décor de la Rotonde d'après les caractéristiques de cette niche. Les différences techniques dans le matériel utilisé, en particulier pour le mortier qui sert de support aux mosaïques, ont paru suffisamment importantes pour qu'on conclue à un écart chronologique important entre le décor de cette voûte et celui des voûtes voisines (Kourkoutidou – Nikolaïdou 1988: 46-47). Cette observation mérite d'être prise en considération et introduit un doute. Est-elle suffisante pour exclure la possibilité d'une contemporanéité ou d'une quasi contemporanéité? Nous ne savons pas assez des techniques utilisées, des ateliers, des habitudes de travail pour dire de manière définitive que la différence constatée implique un écart chronologique d'une génération au moins, sans même compter, comme il avait été souligné par E. Kourkoutidou – Nikolaïdou, qu'il conviendrait de pratiquer la même vérification sur d'autres parties du décor de la Rotonde. Il reste que, même si on admet le rapprochement avec le décor de Saint-Polyeucte, il n'est plus sûr, tout en restant possible, que cette voûte permette de dater l'ensemble des mosaïques.

Il est inutile de reprendre en détail tous les arguments déjà échangés plusieurs fois sur le style des saints représentés dans la coupole. On continuera toujours à opposer des visages comme ceux de Priskos (fig. 2), qui permettent une analyse les rapprochant de la sculpture théodosienne (par exemple Küllerich 1998: 42-44, avec les références antérieures en particulier à H. Torp qui est le premier à avoir développé cette argumentation), à des visages comme ceux de Philippos, Cosmas ou encore Thérinos qui se laissent moins bien analyser de cette manière. La difficulté de dater ces visages de la fin du IV^e

siècle avait déjà été soulignée par un rapprochement avec la célèbre tête d'Eutrope (Demus 1964) ainsi que par des rapprochements avec des diptyques (Brenk 1975: 154) ou par des considérations plus générales sur l'évolution stylistique à l'époque paléochrétienne (Spieser 1984: 152, n. 169). A ces remarques, j'ajouterai encore que, si on considère que des comparaisons de ce genre sont valides, il n'est pas impossible de rapprocher les deux zones d'ombre qui creusent les joues de certains visages vus de face, en particulier celui de Therinos (fig. 3), avec le modelé de la célèbre tête de Milan qui est souvent considérée comme un portrait de Théodora (fig. 4).

Il reste difficile d'aboutir à des conclusions chronologiques définitives par ce genre d'analyse. Ce doute ne concerne pas tant les analyses stylistiques en elles-mêmes que les conclusions, tant géographiques que chronologiques, que l'on veut en tirer. Il suffit de rappeler quelques points souvent répétés. Assigner une oeuvre à un moment précis de l'évolution d'une époque d'après de seules considérations stylistiques, c'est assimiler cette époque à un artiste dont on connaît suffisamment d'oeuvres pour suivre son évolution, période par période. Certes, les styles évoluent et on peut tracer une sorte de courbe idéale qui donne une image de cette évolution; mais ce ne sera qu'une courbe idéale sur laquelle, quand des données extérieures manquent, on ne peut placer, ni dans l'absolu, ni relativement, sauf à admettre des marges importantes, les oeuvres conservées. C'est d'autant plus vrai lorsque, comme pour les mosaïques, en particulier pariétales, un nombre infime de monuments sont conservés pour la période d'un peu plus de 120 ans dans laquelle on cherche à placer celles de la Rotonde. La seule démarche éventuellement possible serait de repérer des caractéristiques qui n'ont guère de chance d'exister avant une certaine date. Ceci donne du poids aux remarques qui tendent à abaisser la date des mosaïques de la Rotonde, mais il serait mal venu d'en faire un argument décisif. Il paraît donc raisonnable d'en rester à la conclusion que, d'un point de vue stylistique, rien, dans ces mosaïques, n'oblige à les dater de la fin du IV^e siècle, et, que, réciproquement, rien n'empêche de les mettre au VI^e siècle.

Des éléments plus décisifs sont à chercher du côté de ce que, approximativement, on peut appeler le problème du calendrier. La première tentative pour proposer une date du VI^e siècle pour ces mosaïques se fondait sur les saints représentés, en particulier sur les inscriptions qui les accompagnent et qui mentionnent le mois où ils étaient fêtés (Weigand 1939). On connaît les faiblesses de ce travail. Le manque de précision des dates de fête, l'ordre dans lequel les saints sont représentés montrent que le terme même de calendrier est inapproprié. Les inscriptions elles-mêmes, avec leurs abréviations, ne permettent pas d'attribuer de manière sûre les mosaïques au

VI^e siècle, tandis que les points communs relevés avec le calendrier liturgique romain ne suffisent pas pour conclure à un emprunt à ce calendrier, ni, a *fortiori*, pour en tirer des conclusions chronologiques (Feissel 1983: 103-110).

Mais la réflexion à ce sujet doit être poussée plus loin. On sait maintenant que le culte public des saints ne s'est développé que lentement. La fin du IV^e siècle marque un tournant et le rôle d'Ambroise est à considérer comme décisif ou, du moins, comme exemplaire des innovations qui s'introduisent alors (Brown 1981: 93 sqq; Spieser 1998). Cet écart entre la fin des persécutions et le culte des martyrs est attesté très clairement en Égypte, mais la situation n'y est pas fondamentalement différente de celle du reste de l'empire: le culte public des saints se développe au V^e siècle, à un moment où se multiplient aussi les inventions, à tous les sens du mot, de reliques comme en témoigne un texte de Šenouté (Papaconstantinou 2001: 370-371). Le regroupement même des saints figurés dans la Rotonde est curieux. On n'y trouve aucun saint local, ce qui serait attendu si ces figures avaient un rapport avec un calendrier thessalonicien de fêtes, mais un mélange de saints connus et d'autres peu connus, parfois impossibles à identifier (Léon soldat, Romanos prêtre [Torp 2002: 25-26 propose de l'identifier avec le diacre Romanos, martyr d'Antioche], Priskos soldat [Feissel 1983: 104, 106, 108]). Un saint égyptien, le joueur de flûte Philémon, est présent avec la mention du mois de mars, qui correspond à sa commémoration dans le synaxaire arabe, alors qu'il est commémoré en décembre dans le synaxaire de Constantinople (Papaconstantinou 2001: 201-202). A cause de ces caractéristiques, il devient vraisemblable d'appliquer à la Rotonde une hypothèse formulée à propos des théories de saints et de saintes figurés à Saint-Apollinaire-le-Neuf de Ravenne, à savoir que les images correspondent à une collection de reliques déposées dans l'église. D'autres témoignages, un poème d'Ennodius, des inscriptions qui attestent de tels ensembles de reliques dans des églises d'Espagne du VII^e siècle, viennent conforter cette interprétation (Deichmann 1958-1989: II, 3, pp.183-188). La Rotonde pourrait en être une attestation de plus. Un autre exemple est donné, à Ravenne, par la Chapelle archiépiscopale, qui remonte à l'évêque Pierre II (494-519) (Deichmann 1958-1989: I, p. 201): on y trouve l'attestation la plus ancienne, pour Ravenne en tout cas, d'une série représentations de saints et de saintes, dans des médaillons, il est vrai, mais on verra ci-dessous la parenté profonde avec le décor de la Rotonde, malgré cette différence. Leur présence est probablement aussi liée à celle de leurs reliques (Deichmann 1958-1989: II, 1, p. 199).

Compte tenu de cette lente diffusion du culte des saints, il paraît difficile et même impossible d'imaginer un tel groupement à l'époque théodosienne.

C'est en tout cas exclu si on admet l'hypothèse que ces images correspondent à des reliques; mais même s'il s'agit simplement de représentations de saints formant une sorte de cour dans la Jérusalem céleste autour du Christ présent au sommet de la coupole, la conclusion ne devrait pas être différente. Nous ne sommes toujours pas nécessairement amenés au VI^e siècle, mais ces considérations me paraissent exclure une date de la fin du IV^e.

La représentation de ces saints nous amène à une réflexion sur le sens des mosaïques qui existaient dans la Rotonde. La recherche s'était longtemps focalisée sur le motif de la *frons scaenae* et des saints placés devant ces bâtiments et n'a peut-être pas assez relevé le fait que cette coupole est une des rares dont nous connaissons à peu près le décor paléochrétien. Les vestiges suggèrent que la coupole représentait le Christ dans sa demeure céleste; on est proche, d'une certaine façon, d'une transposition dans la coupole du programme bien attesté dans les absides depuis la fin du IV^e siècle (Spieser 1998b). Comme j'ai essayé de le montrer, ce programme d'absides montre la présence du Christ dans l'église plutôt que sa Seconde Venue; les architectures de la Rotonde, interprétées comme une image de la Jérusalem céleste peuvent bien indiquer la continuité entre Terre et Ciel, entre l'église où les fidèles sont rassemblés et les cieux où Dieu est présent entouré de saints et d'une autre série de personnages, que ce soient des anges ou les Vieillards de l'Apocalypse (voir Lidov 1997-1998: 341-343, qui, pourtant conclut que c'est la Seconde Venue qui est représentée). Malheureusement, si l'on fait abstraction de la Rotonde, dont la date est à démontrer, on ne connaît pas de décor de coupole remontant au IV^e siècle. Il n'est certainement pas de bonne méthode de tirer trop de conclusions d'un exemple unique, mais je ferai volontiers l'hypothèse que l'exemple de Saint-Vital de Ravenne, où l'absence de toute mosaïque semble probable (Deichmann 1958-1989: II, 2, pp. 117-118) prouve l'importance traditionnelle de la représentation du Christ dans l'abside pour montrer, au sens le plus fort du mot, la présence divine dans le sanctuaire. Il me paraît difficile d'imaginer qu'une telle image pouvait être concurrencée par une représentation analogue dans la coupole. Au contraire, nous ne connaissons pas le décor primitif de l'abside de la Rotonde; nous ne connaissons pas non plus l'abside originelle d'un ensemble plus modeste, dont le rapprochement avec la Rotonde est à première vue paradoxal, mais qui, structurellement, pose la même question. En effet, la Chapelle archiépiscopale de Ravenne présente bien une petite coupole: la présence divine y est marquée d'une manière non anthropomorphique par le chrisme porté par des anges et entouré, sur les pendentifs, par les êtres de la vision d'Ézéchiël, gardiens du trône de Dieu. Sur les intrados des arcs qui la portent, des bustes de saints et de saintes constituent

une ronde de saints qui, à une échelle évidemment différente, sont dans la même position par rapport au chrisme et jouent le même rôle que les saints de la Rotonde par rapport au médaillon central de la grande coupole (Deichmann 1958-1989: I, pp. 204-206; *ibid.* II,1, pp. 203-204).

Le seul autre exemple qui pourrait, à ma connaissance, être invoqué, est le décor de Saint-Serge de Gaza, sans doute de peu antérieur à 536, tel qu'il est décrit par Choricus (Mango 1972: 60-68). L'abside est un des plus anciens exemples où la Théotokos remplace le Christ à cet emplacement, symptôme d'une évolution dans la conception même du décor (Spieser 1998b). Ici, c'est le décor de la coupole qui n'apparaît pas très clairement. Choricus ne décrit que le décor des voûtes (Choricus, *Laudatio* 47). On reconnaît sans peine les différentes scènes d'un cycle, qui commence avec l'Annonciation, jusqu'à l'Apparition aux Saintes Femmes (*ibid.*, 48-76). La description de Choricus ne contient aucun renseignement sur l'emplacement des images, sauf pour la fin du cycle où, au contraire, la scène n'est pas décrite avec précision: après avoir évoqué l'Apparition aux Saintes Femmes, il continue: "Il est porté vers le séjour qui est le sien escorté par un choeur céleste. Et ainsi il ne fait pas mentir les anciens prophètes qui entourent la partie centrale de la voûte" (*ibid.*, 76). Comme au début de sa description, Choricus emploie le mot *Ôrofoj*, ici sous sa forme féminine *Ńrof*, mais le sens ne fait pas doute et cette expression ne peut que désigner la coupole également suggérée par sa description de l'architecture (*ibid.*, 38-40). On comprend en général qu'une Ascension était représentée là (Mango 1972: 68 n. 67); l'absence de toute mention des apôtres pourrait être mise sur le caractère non systématique de la description, mais, dans les pages précédentes, les acteurs essentiels d'une scène paraissent toujours mentionnés. Clairement, la coupole ou le sommet de la coupole était occupé par un Christ dans un médaillon porté par des anges. Qu'il se soit agi ici d'une véritable représentation de l'Ascension ou non n'est pas essentiel. Il suffit de se souvenir de la signification ambiguë de certaines absides de Baouît et de diverses réflexions sur les représentations paléochrétiennes de l'Ascension (Van Moorsel 1986, Gkiolès 1981). Quelles que soient les différentes catégories de personnages représentés autour du médaillon central, aussi bien à Saint-Serge de Gaza qu'à la Rotonde de Thessalonique – on a suggéré des anges entre les saints et le médaillon central, ce qui nous rapprocherait encore de Gaza (Torp 2002: 13) – il apparaît de manière évidente que les deux programmes sont proches.

Similitude de programmes dans ses grandes structures ne veut pas nécessairement dire contemporanéité, mais deux autres constatations invitent à rendre significatif ce rapprochement: il semble, d'après les absides

conservées, que des saints, autres que les apôtres, n'apparaissent dans les programmes d'abside qu'au VI^e siècle (Spieser 1998b: 65), date qui nous rapproche aussi des médaillons de saints entourant la coupole dans la Chapelle archiépiscopale de Ravenne. Enfin les cygnes représentés dans la bordure de l'abside de Osios David sont clairement une copie un peu maladroite des cygnes qui ornent les architectures dans les panneaux 2 et 6 de la Rotonde (Spieser 1984: 157). Il paraît maintenant bien admis que la mosaïque de Osios David est proche, par sa date, de Saint-Vital de Ravenne. Compte tenu de la situation de ces cygnes à la Rotonde, il n'est sans doute pas absurde de penser qu'ils ont été utilisés à Osios David par quelqu'un qui avait eu l'occasion de les voir de près, c'est-à-dire au moment de leur mise en place, fût-ce une ou deux décennies auparavant.

Toutes ces remarques, en particulier sur la présence des saints, sur les grandes lignes du programme du décor me conduisent à penser qu'une date au début du VI^e siècle permettrait de mieux replacer le décor de la Rotonde dans une évolution du décor que la fin du IV^e siècle. Il conviendrait maintenant d'analyser ce décor, en particulier la grande frise des saints, plus en détail. C'est ce qu'a fait récemment H. Torp (Torp 2002) de manière très fouillée. Il faudrait beaucoup plus de place que ce qui est prévu ici pour discuter en détail ce riche article qui rend compte de détails auxquels on n'avait jamais prêté attention et pour lesquels H. Torp propose des interprétations souvent très fines et qui me paraissent souvent justes ou vraisemblables. Malgré cela, je ne pense pas que celles-ci permettent de situer ce décor de manière aussi précise qu'il ne le fait (Torp 2002: 27) dans les débats théologiques de la fin du IV^e siècle en y voyant une sorte de prise de position de Théodose I^{er} annonçant les décisions dogmatiques du concile de Constantinople en 381. En particulier, il me paraît impossible de dire que l'absence de toute allusion aux débats christologiques et mariologiques des conciles d'Ephèse (431) et de Chalcédoine (451) suffisent pour placer les mosaïques de la Rotonde avant ces deux conciles, d'autant plus que nous ne connaissons pas le décor de l'abside. Les relations entre images et dogmes sont plus complexes qu'une telle conclusion ne le présuppose.

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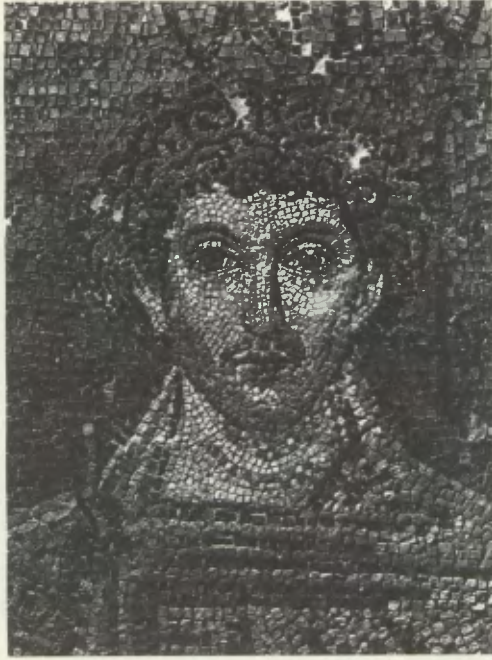
FIGURES



1. Rotonde de Thessalonique, voûte de la niche sud.



2. Rotonde de Thessalonique, Priskos.



3. Rotonde
de Thessalonique
Thierino.



4. Portrait de
Théodora (?),
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EUTYCHIA KOURKOUTIDOU - NIKOLAIDOU

**Η ΠΡΩΤΗ ΦΑΣΗ ΤΩΝ ΕΡΓΑΣΙΩΝ ΣΥΝΤΗΡΗΣΗΣ
ΤΩΝ ΨΗΦΙΔΩΤΩΝ ΤΗΣ ΡΟΤΟΝΤΑΣ (1978-1994)**

SUMMARY

The 1978 earthquakes, which struck Thessaloniki and seriously damaged its Byzantine monuments, had a terrible effect on the Rotunda and the mosaic decoration on its walls. Reference is made to the pathological problems which were found after the earthquakes; there is a description of the procedures followed in dealing with the in situ preservation of the mosaics in the dome and the removal and replacement of those on the barrel vaults of three of the eight large rectangular recesses formed between the pillars of the monument; mention is also made to the experience gained from the first phase of the conservation work on the Rotunda mosaics (1978-1994).

Η Θεσσαλονίκη υπήρξε κατά την παλαιοχριστιανική περίοδο ένα μεγάλο κέντρο παραγωγής εντοιχίων ψηφιδωτών, όπως μας δείχνουν τα σωζόμενα στα μνημεία της ψηφιδωτά σύνολα, υψηλής καλλιτεχνικής ποιότητας αλλά και υψηλού πνευματικού περιεχομένου, με κορυφαία τα εντοιχία ψηφιδωτά της Ροτόντας.

Οι σεισμοί του 1978 που έπληξαν την πόλη και τραυμάτισαν σοβαρά τα βυζαντινά μνημεία της, είχαν μια τρομακτική επίδραση και στη Ροτόντα. Από την πρώτη μέρα βλέπαμε να σταλάζουν στο δάπεδο του μνημείου χρυσές, ασημένιες και χρωματιστές ψηφίδες. Οι σεισμικές και μετασεισμικές δονήσεις έφεραν στο φως παλιές ρηγματώσεις στην οικοδομική μάζα και στα ψηφιδωτά, οι οποίες είχαν επικαλυφθεί, όπως βλέπουμε σε παλαιότερες φωτογραφίες, με την ευκαιρία του 9ου Διεθνούς Βυζαντινολογικού Συνεδρίου το 1953 στη Θεσσαλονίκη.

Ήδη πριν από τους σεισμούς του 1978 είχαν επισημανθεί ανησυχητικά στατικά προβλήματα στο μνημείο, τα οποία οφείλονταν, όπως έδειξε η στατική ανάλυση, από τη μια σε παλαιότερους σεισμούς της περιοχής και στη φυσική γήρανση του οικοδομικού υλικού και από την άλλη στη διατάραξη της αρχικής στατικής ισορροπίας την οποία προκάλεσε η διακοπή της συνέ-

χειας του κυκλικού κορμού του ρωμαϊκού κτιρίου, όταν διανοίχθηκε το ανατολικό τμήμα του για να προστεθεί η κόγχη του Ιερού Βήματος κατά την μετατροπή του σε χριστιανικό ναό. Για το λόγο αυτό είχε καταρρεύσει σε κάποια φάση το τμήμα του θόλου, πάνω ακριβώς από το διανοιγμένο τόξο του Βήματος, που καλύπτεται σήμερα από μια ζωγραφική απομίμηση του ψηφιδωτού, έργο του Ιταλού ζωγράφου Rossi στα 1889.

Για την κατάσταση αυτή του μνημείου που προκαλούσε ιδιαίτερη ανησυχία, είχε ήδη συσταθεί το 1977 μια διεπιστημονική επιτροπή για να μελετήσει το πρόβλημα, και εγκαταστάθηκε ένα σύστημα μετρήσεων. Οι σεισμοί όμως του 1978 μας πρόλαβαν. Οι δύο πεσσοί, δεξιά και αριστερά από τη νότια είσοδο και η μεταξύ τους κυλινδρική καμάρα, είχαν διαρραγεί κατά το μέσο τους και όλη αυτή η πλευρά του μνημείου ολίσθαινε με ταχύτητα προς τα νότια, πιεζόμενη από τις πλάγιες ωθήσεις του τεράστιου θόλου. Εσωτερικά, η τοιχοποιία με τις εκτεταμένες ρηγματώσεις, παρουσίαζε ξεκάθαρα συμπτώματα υπέρβασης της αντοχής της σε σύνθλιψη. Φυσικά δεν θα επεκταθούμε εδώ στα προβλήματα στερέωσης του μνημείου. Τα επισημαίνω μόνο για τον λόγο ότι η στατική ισορροπία του οικοδομήματος είχε επιπτώσεις στα εντοίχια ψηφιδωτά αλλά και ότι χρειάστηκε να χρησιμοποιηθούν δύο διαφορετικές μέθοδοι συντήρησης κατά την περίοδο 1978-1994.

Όπως όλοι γνωρίζουμε, τα εντοίχια ψηφιδωτά της Ροτόντας ομαδοποιούνται σε δύο σύνολα που διαφέρουν όχι μόνο στο εικονογραφικό τους περιεχόμενο αλλά και ως προς τη θέση τους στο μνημείο. Η διαφορετική θέση τους είχε καθοριστική επίπτωση και στη διαφορετική μέθοδο συντήρησης τους.

Το ένα μεγάλο σύνολο είναι τα ψηφιδωτά του θόλου με την παράσταση της Θείας Επιφάνειας στην κορυφή του και τη ζώνη με την Ουράνια Εκκλησία και τους μάρτυρες. Φυσικά το πνευματικό περιεχόμενο αυτής της παράστασης που έχει απασχολήσει πολλαπλώς τους ερευνητές αλλά και η αισθητική αποτίμηση της εκφεύγουν από την προβληματική της σημερινής συζήτησης.

Υστερα από λεπτομερή έλεγχο του ψηφιδωτού του θόλου διαπιστώθηκε ότι παρουσίαζε κατά περιοχές μεγαλύτερες ή μικρότερες αποκολλήσεις από την τοιχοποιία (εικ.1). Στη νοτιανατολική πλευρά οι αποκολλήσεις ήταν εκτεταμένες και μάλιστα είχαν δημιουργηθεί σε πολλά σημεία κενά 2-3 εκατοστών.

Σε συνεργασία της Εφορείας Βυζαντινών Αρχαιοτήτων Θεσσαλονίκης και της Διεύθυνσης Αναστήλωσης και Συντήρησης του Υπουργείου Πολιτισμού με τη διεπιστημονική ομάδα που είχε αναλάβει την επιστημονική ευθύνη της αποκατάστασης του μνημείου και με τη σύμφωνη γνώμη του Κε-

ντρικού Αρχαιολογικού Συμβουλίου, αποφασίσθηκε ότι η συντήρηση των εντοιχίων ψηφιδωτών του θόλου ήταν δυνατό να γίνει επί τόπου, παράλληλα με την ενίσχυση της τοιχοποιίας με εμποτισμούς και εγχύσεις ενέματος στις μεγάλες ρωγμές από την εξωτερική πλευρά του θόλου¹.

Η διαδικασία της επί τόπου συντήρησης των ψηφιδωτών του θόλου άρχισε τον Σεπτέμβριο του 1981, συνεχίστηκε κατά περιόδους ανάλογα με τις επείγουσες ανάγκες στα άλλα εντοιχία ψηφιδωτά και ακολούθησε, μετά την τοποθέτηση ασφαλών κριωμάτων εργασίας, τα εξής στάδια:

1. Στάδιο οπλισμού

Μετά τον καθαρισμό της επιφάνειας του ψηφιδωτού, έγινε οπλισμός με γάζα σε οριζόντιες και κάθετες λωρίδες, για να προστατευτεί από την πίεση και τους κραδασμούς που προκαλούσαν τα ενέματα στην τοιχοποιία από την εξωτερική πλευρά του θόλου.

2. Στάδιο εμποτισμού

Έγιναν εμποτισμοί με καζέατο. Για να εισχωρήσει το υλικό του ενέματος στην πίσω πλευρά του ψηφιδωτού, ο εμποτισμός έγινε με σύριγγες 20-60γρ. και με βελόνες παρακέντησης (εικ.2). Όπου η επιφάνεια του ψηφιδωτού ήταν "φουσκωμένη" λόγω της αποκόλλησης, έγιναν με πολλή προσοχή πρεσσαρίσματα. Πρέπει να προσθέσω ότι οι εμποτισμοί κρατούσαν μόνο 5-6 μήνες το χρόνο, λόγω της αυξημένης υγρασίας του μνημείου αλλά και των χαμηλών θερμοκρασιών του χειμώνα. Με την άνοιξη γινόταν πάλι έλεγχος της κατάστασης του ψηφιδωτού και συνεχιζόταν η εργασία.

3. Στάδιο αποκόλλησης-επανατοποθέτησης

Στο ψηφιδωτό του θόλου έγιναν αποτοιχίσεις μόνο σε πολύ περιορισμένα σημεία, όπου κρίθηκε ότι κινδύνευαν τα ψηφιδωτά από τη σαθρότητα των κονιαμάτων και από την εκτεταμένη απόσπαση τους από την τοιχοποιία, κυρίως στα χείλη των μεγάλων ρωγμών της τοιχοποιίας. Κατά τη διάρκεια των ενεμάτων της αναστήλωσης σε αυτές τις μεγάλες διαμπερείς ρωγμές υπήρχε συνεχής παρακολούθηση από τους συντηρητές ώστε να μη δημιουργηθεί πρόβλημα στο ψηφιδωτό. Η επανατοποθέτηση των μεμονωμένων αυτών σημείων που αποκολλήθηκαν ολοκληρώθηκε μετά την πλήρη στερέωση της τοιχοποιίας.

1. Την αναστήλωση του μνημείου είχαν αναλάβει οι καθηγητές της Πολυτεχνικής Σχολής του Α.Π.Θ., Ν. Μουτσόπουλος και Γ. Πενέλης. Η ευθύνη της συντήρησης των ψηφιδωτών είχε ανατεθεί στον αείμνηστο Γιάννη Κολέφα, καθηγητή στην Ανωτάτη Σχολή Καλών Τεχνών. Μαζί του εργάστηκαν οι συντηρητές Κ. Γεωργίου, Αλ. Καλλιοντζής, Σ. Μαρμαρά, Θ. Μπογδίτης, Θ. Παλούσης, Κ. Πάππας, Ν. Πιτσαλίδης και τα συνεργεία τους. Με τους συντηρητές συνεργάστηκαν στενά οι αρχαιολόγοι της Εφορείας Αρχαιοτήτων Δ. Ευγενίδου, Δ. Μαικροπούλου, Ε. Μαρκή και Αν. Τούρτα. Την εποπτεία του όλου έργου είχαν οι Έφοροι Αρχαιοτήτων Ε. Κουρκουτίδου-Νικολαΐδου και Χρ. Τσιούμη.

4. Στάδιο αισθητικής αποκατάστασης²

Το τελευταίο αυτό στάδιο της συντήρησης είχε στόχο αφενός τη χρωματική ενοποίηση των κονιαμάτων στα στεφανώματα και στις μεγάλες ρωγμές και αφετέρου τη χρωματική εξομάλυνση των διάσπαρτων μέσα στην επιφάνεια του ψηφιδωτού κενών που αντιμετώπισθηκαν κατά περίπτωση. Ωστόσο, η εργασία αυτή δεν προχώρησε κατά την πρώτη φάση που εξετάζουμε, ώστε να ολοκληρωθεί η στερέωση του ψηφιδωτού.

Τελείως διαφορετική υπήρξε η μέθοδος συντήρησης που ακολουθήσαμε για τα εντοίχια ψηφιδωτά στις καμάρες των τριών από τις οκτώ κόγχες που σχηματίζονται ανάμεσα στους πεσσούς, δηλαδή στη δυτική, στη νότια και στη νοτιανατολική κόγχη, στην πλευρά του μνημείου που παρουσίαζε το μεγαλύτερο στατικό πρόβλημα. Πλούσια διακοσμητικά θέματα, γεωμετρικά, φυτικά και ζωικά καλύπτουν τις καμάρες. Στην οργάνωση του διακοσμητικού θέματος ξεχωρίζει η νότια κόγχη που αντιστοιχεί στην κύρια νότια είσοδο του μνημείου. Πάνω σε ασημένιο φόντο κυριαρχεί ένας μεγάλος σταυρός που πλαισιώνεται από αστέρια, πουλιά, άνθη και καρπούς που δεν εντάσσονται σε καθορισμένα διάχωρα.

Τα ψηφιδωτά αυτά, όπως και η υποκείμενη τοιχοποιία, παρουσίαζαν μια επικίνδυνη κατάσταση λόγω των εκτεταμένων ρηγματώσεων. Η ανάγκη σωστικής επέμβασης στην τοιχοποιία με εμποτισμούς ήταν άμεση. Μετά τα πρώτα σωστικά μέτρα με υποστηλώσεις στις τρεις καμάρες, μελετήθηκε ο τρόπος της επέμβασης. Ο κίνδυνος να επιδεινωθεί η κατάσταση των ψηφιδωτών από την εκτόξευση του ενέματος εμποτισμού της τοιχοποιίας από τη μια και το μεγάλο πάχος των τοίχων από την άλλη (6,30μ.), που εμπόδιζε να γίνουν εμποτισμοί από την εξωτερική πλευρά των καμαρών, οδήγησε στην απόφαση της αποκόλλησης των ψηφιδωτών στις τρεις καμάρες και την επανατοποθέτηση τους μετά τη στερέωση της τοιχοποιίας. Η εργασία άρχισε τον Αύγουστο του 1979 και ακολούθησε αυστηρά προκαθορισμένα στάδια:

Το πρώτο στάδιο αποτελούσε η προετοιμασία που περιελάμβανε φωτογραφική και σχεδιαστική αποτύπωση πριν από τις εργασίες και σε όλες τις φάσεις και ακριβή τοπογραφική αποτύπωση³. Ακολούθησε ο καθορισμός των αρμών κοπής και σχεδίαση τους με τέμπρα. Μετά τον καθαρισμό του παλαιού οπλισμού τοποθετήθηκε νέος οπλισμός με τρία επάλληλα πανιά

2. Η αισθητική αποκατάσταση του συνόλου των ψηφιδωτών της Ροτόντας ανατέθηκε στη μουσειακή ζωγράφο Δ. Καμαράκη-Ζωίδου.

3. Η τοπογραφική αποτύπωση έγινε με την εποπτεία του καθηγητή του Α.Π.Θ. Ανθ. Παντέλα. Την εποπτεία του όλου έργου είχαν οι Έφοροι Αρχαιοτήτων Ε. Κουρκουτίδου - Νικολαΐδου και Χρ. Τσιούμη.

και χονδρό χαρτί. Πάνω σε κάθε στρώμα του οπλισμού σημειώθηκαν όλες οι μετρήσεις και τα σταθερά στοιχεία και ορίσθηκαν συντεταγμένες. Μετά την αφαίρεση των αρμών ακολούθησε το στάδιο της αποτοίχισης. Τοποθετήθηκαν καρφιά στις γραμμές ασφαλείας και απελευθερώθηκαν οι αρμοί από τα πανιά και το κονίαμα (εικ.3). Ακολούθησε η καθαυτή αποκόλληση του ψηφιδωτού. Κόπηκαν συνολικά 264 τεμάχια διαστάσεων 0,50 X 0,70μ. Η αποτοίχιση διήρκεσε 4-5 μήνες σε κάθε κόγχη.

Το επόμενο στάδιο αποτέλεσε η επεξεργασία των αποτοιχισμένων ψηφιδωτών. Τα τεμάχια των ψηφιδωτών τοποθετήθηκαν από την ανάποδη πάνω σε ειδικά κατασκευασμένους ξυλότυπους με την καμπύλη της καμάρας (εικ. 4). Οι ξυλότυποι περιορίστηκαν σε γυάλινη κατασκευή, μέσα στο ίδιο το μνημείο, ώστε να διασφαλισθούν ελεγχόμενες και με μικρές διακυμάνσεις τιμών συνθήκες θερμοκρασίας και υγρασίας που κυμαινόταν στους 85ο με 90ο. Μέσα στον χώρο αυτό έγινε η επεξεργασία της πίσω όψης του ψηφιδωτού. Αφαιρέθηκαν σταδιακά τα τρία στρώματα κονιάματος της υποδομής. Μετά το πρώτο ξεχόντρισμα με σουβλί έγινε ο καθαρισμός των αρμών με οδοντιατρικό τροχό. Ακολούθησε έλεγχος κάθε ψηφίδας και στερέωση. Για κάθε τεμάχιο απαιτούνταν 8-10 μέρες επεξεργασίας.

Στο διάστημα αυτό έγινε χημική ανάλυση των παλαιών κονιαμάτων και μικροσκοπική εξέταση για τον καθορισμό των υλικών σύστασης και των αναλογιών τους, ώστε να υπάρξει προσέγγιση της σύστασης του νέου κονιάματος της υποδομής του ψηφιδωτού (εικ. 5).⁴

Ακολούθησε το στάδιο της επανατοποθέτησης (εικ. 6). Μετά το αρμολόγημα της τοιχοποιίας και την επάλειψη του νέου κονιάματος τοποθετήθηκαν ειδικά καρφιά από τιτάνιο για τη συγκράτηση του κονιάματος, αντίστοιχα με τα παλιά σιδερένια καρφιά που είχαν οξειδωθεί. Η επανατοποθέτηση άρχισε από τον Φεβρουάριο του 1983. Μετά την επανατοποθέτηση και την ψηφοθέτηση στους αρμούς κοπής έγινε λεπτομερής καθαρισμός της επιφάνειας. Στη νότια καμάρα χρειάστηκε επιπλέον να γίνει στις ασημένιες ψηφίδες επικόλληση της λεπτής μεμβράνης υαλόμαζας που συγκρατούσε το φύλλο αργύρου.

Η αισθητική αποκατάσταση στις κόγχες αναβλήθηκε για να αντιμετωπιστεί ενιαία σε όλο το μνημείο.

Πριν κλείσω αυτή την αναφορά στις πρώτες εργασίες συντήρησης των ψηφιδωτών της Ροτόντας, θα ήθελα να τονίσω ότι κατά τη διάρκεια των εργασιών αυτών έγιναν πολύ σημαντικές παρατηρήσεις από τους συντηρητές

4. Η χημική ανάλυση των κονιαμάτων έγινε από τον χημικό Κ. Ασημενό.

για την τεχνική της ψηφοθέτησης, τη σύσταση και τις αντοχές των κονιαμάτων, τις θέσεις των καρφιών, το υλικό και το χρωματολόγιο των ψηφίδων. Πέρα από την καθαυτή χρησιμότητα τους οι παρατηρήσεις αυτές μας βοήθησαν να τις αξιοποιήσουμε για μια νέα επανατοποθέτηση των ψηφιδωτών στο ιστορικό τους πλαίσιο.

Πιο συγκεκριμένα, παρατηρήθηκαν σημαντικές διαφορές στο κονίαμα της καμάρας της νότιας εισόδου από τα κονιάματα των άλλων δύο καμαρών, που αφορούσαν στη διαφορετική σύνθεση του κονιάματος και ως επακόλουθο στη διαφορά αντοχής του. Στη νοτιανατολική και τη δυτική καμάρα παρατηρούνται κομμάτια από άχυρο, ξύλο και καλάμι μεγέθους μέχρι και 5 εκ. καθώς και μικρές πέτρες και όστρακα κεραμικά, ιδιαίτερα στο δεύτερο στρώμα. Αντίθετα, στη νότια καμάρα υπήρχε μόνο πολύ λεπτό άχυρο, μοιρασμένο στο δεύτερο και τρίτο στρώμα. Παρατηρήθηκε επίσης ότι το μέγεθος των ψηφίδων στη νότια καμάρα είναι μεγαλύτερο από τις άλλες κόγχες. Υπενθυμίζω επίσης ότι η σύνθεση του ψηφιδωτού της νότιας κόγχης είναι ενιαία χωρίς διάχωρα και τονίζει ιδιαίτερα τη νότια είσοδο και τον άξονα του κτιρίου B-N, εγκάρσια προς τον κύριο άξονα A-Δ των χριστιανικών ναών. Τα στοιχεία αυτά οδηγούν στο συμπέρασμα ότι το συγκεκριμένο ψηφιδωτό εκτελέστηκε όχι μόνο από διαφορετικό ψηφωτή, αλλά και σε διαφορετικό χρόνο από τα υπόλοιπα. Ο J.-M. Spieser χρονολογεί το ψηφιδωτό αυτό στις αρχές του 6ου αιώνα, στηριζόμενος στο "σασσανιδικό" μοτίβο των φύλλων στη βάση του μίσχου, υπόθεση την οποία αμφισβητεί ο Η. Τορν αναζητώντας τη σύνδεση των στοιχείων αυτών με το καλλιτεχνικό θεματολόγιο της ρωμαϊκής παράδοσης και ερμηνεύοντας τη σύνθεση ως ανεικονική παράσταση προσκύνησης του σταυρού ως πρόσωπο του Χριστού. Ανεξάρτητα όμως από την εικονογραφική ερμηνεία της σύνθεσης, μπορούμε να δεχθούμε ότι έγινε μετά τον υπόλοιπο ψηφιδωτό διάκοσμο, για να τονίσει τη νότια κύρια είσοδο, στοιχείο που συμφωνεί με την υποτιθέμενη "αναβάθμιση" της Ροτόνας σε μητροπολιτικό ναό της Θεσσαλονίκης, κατά τον 6ο αιώνα, σύμφωνα με την πρόταση του S. Curyć. Μια τέτοια διερεύνηση του προβλήματος εκφεύγει, ωστόσο, από τα πλαίσια της συζήτησης και το έθιξα μόνο για να τονίσω την ανάγκη στενής συνεργασίας ανάμεσα στους συντηρητές και τους αρχαιολόγους, όπου κάθε ειδικότητα προσφέρει τη δική της ματιά και τις δικές της γνώσεις για μια ολοκληρωμένη και αποτελεσματική παρέμβαση σε ένα μνημείο.

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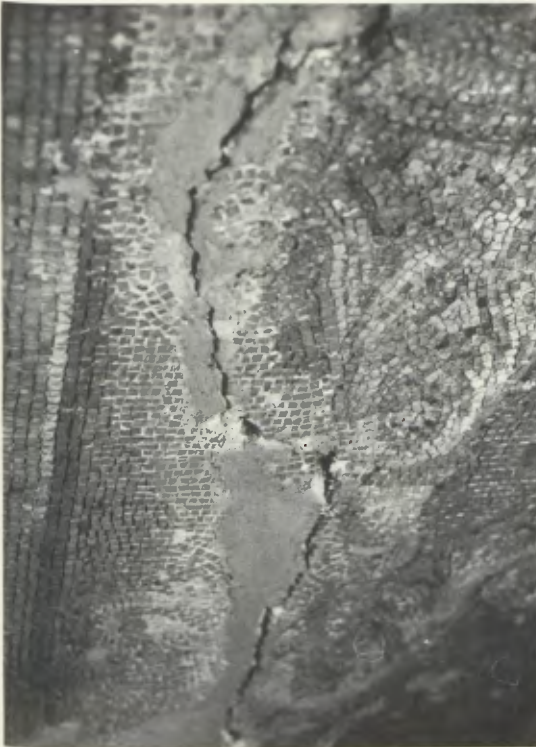
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ΕΙΚΟΝΕΣ



1. Ρωγμή στο ψηφιδωτό του θόλου.



2. Εμποτισμοί στο ψηφιδωτό του θόλου.



3. Αποκόλληση του ψηφιδωτού στην καμάρα.



4. Τοποθέτηση αποκολλημένου ψηφιδωτού σε ξυλότυπο.

Στάδιο επανατοποθέτησης

- Ανάλυση παλιών κονιαμάτων:

1ο στρώμα: 15% κεραμικό τριμμένο
10% άμμος
0,5% άχυρο
2ο στρώμα: 1% άχυρο
3ο στρώμα: δεν υπήρξαν στοιχεία

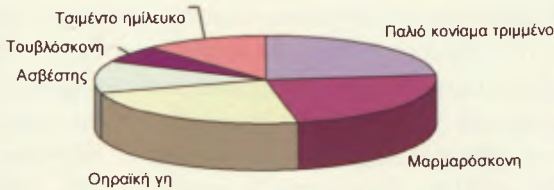
5. Σύσταση κονιαμάτων.

- Σύσταση νέου κονιάματος:



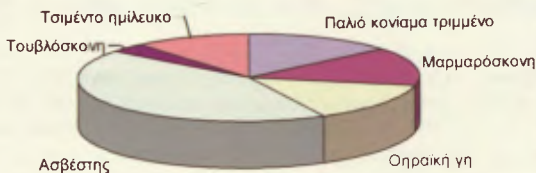
Πρώτο στρώμα

- 1 μέρος παλιό κονίαμα τριμμένο
- 2 μέρη μαρμαρόσκονη
- 1 μέρος θηραϊκή γη
- 1 1/2 μέρος ασβέστης
- 1/2 μέρος τουβλόσκονη
- 1/2 μέρος τσιμέντο ημίλευκο
- 1 χούφτα ψιλοκομμένο άχυρο



Δεύτερο στρώμα

- 1 μέρος παλιό κονίαμα τριμμένο
- 1 μέρος μαρμαρόσκονη
- 1 μέρος θηραϊκή γη
- 1/2 μέρος ασβέστης
- 1/4 μέρος τουβλόσκονη
- 1/2 μέρος τσιμέντο ημίλευκο



Τρίτο στρώμα

- 1 μέρος παλιό κονίαμα τριμμένο
- 1 μέρος μαρμαρόσκονη
- 1 μέρος θηραϊκή γη
- 3 μέρη ασβέστης
- 1/4 μέρος τουβλόσκονη
- 3/4 μέρη τσιμέντο ημίλευκο



6. Ελαστοποθέτηση ψηφιδωτών στις καμάρες

CH. BAKIRTZIS - P. MASTORA

Η ΣΥΝΤΗΡΗΣΗ ΤΩΝ ΨΗΦΙΔΩΤΩΝ ΤΗΣ ΡΟΤΟΝΤΑΣ (1995-1999)

ABSTRACT

Between 1995 and 1999 conservation of the Rotunda mosaics continued with the aim of consolidating the mortar bed on the masonry as firmly as possible and cleaning the mosaics thoroughly. This paper presents the conservation and documentation methods that were used.

Ἡ τελευταία συντήρηση τῶν ψηφιδωτῶν τῆς Ροτόντας ἄρχισε οὐσιαστικά μετὰ τοὺς σεισμοὺς τοῦ 1978 καὶ ἡ πρώτη φάση ὁλοκληρώθηκε τὸ 1994¹. Εἶχε στόχο τὴ στερέωση τῶν ψηφιδωτῶν στὸ σύνολό τους καὶ τὴ συνακόλουθη «αἰσθητικὴ» ἐμφάνισή τους. Κατὰ τὴν περίοδο αὐτὴ ὁλοκληρώθηκε ἡ συντήρηση τοῦ ψηφιδωτοῦ στὸ κέντρο τοῦ τρούλλου ὡς καὶ ἡ ἀπόσπαση καὶ ἐπανατοποθέτηση τῶν ψηφιδωτῶν στὰ ἐσωρράχια τῶν καμαρῶν σὲ τρεῖς κόγχες². Ἐχοντας ἀπομακρυνθῆ ἡ σκαλωσιὰ ἀπὸ τὸ μέσον τοῦ κτηρίου ἡ δευτέρη φάση συντήρησης τῶν ψηφιδωτῶν τῆς Ροτόντας συνεχίστηκε ἀπὸ τὸ 1995 σὲ περιμετρικὰ σημεῖα· δηλαδή, στὴν κατώτερη ζώνη τῶν ψηφιδωτῶν μὲ τὰ ὀκτῶ διάχωρα καὶ τὶς δεομένες μορφές στὴ βάση τοῦ τρούλλου, καὶ στὶς ἐσωτερικὲς ἐπιφάνειες τῶν φεγγιτῶν, ὅπως ἐπίσης καὶ στὸ ἐσωρράχιο τῆς καμάρας στὴ δυτικὴ κόγχη ὅπου συνεχίστηκε ἡ ἀποκάλυψη καὶ ἡ στερέωση τοῦ ψηφιδωτοῦ. Οἱ ἐργασίες στὴ φάση αὐτὴ ἐπικεντρώθηκαν στὴν καταγραφή τῶν ἀποτελεσμάτων τῶν στερεωτικῶν ἐργασιῶν τῆς προηγούμενης φάσης καὶ στὴ βελτίωση τῆς ἐμφάνισης τῶν ψηφιδωτῶν μὲ ὁμογενοποίηση ἐργασιῶν διαφόρων συνεργειῶν, ὑλικῶν καὶ μεθόδων. Ἡ περίοδος 1995-1999 συμπίπτει μὲ τὴ διάρκεια τοῦ Β΄ Κοινοτικοῦ Πλαισίου Στήριξης, ἀπὸ τὸ ὁποῖο οἱ ἐργασίες αὐτὲς χρηματοδοτήθηκαν.

1. Τὸ 1977, ἕναν χρόνο πρὶν ἀπὸ τοὺς σεισμοὺς, εἶχε γίνῃ ἐξέταση τῆς κατάστασης τῶν ψηφιδωτῶν ἀπὸ τὸν ζωγράφο-συντηρητὴ Γιάννη Κολέφα καὶ εἶχε διαπιστωθῆ ἄμεση ἀνάγκη συντήρησής τους.

2. Ε. Κουρκουτίδου-Νικολαΐδου, «Ἡ πρώτη φάση τῶν ἐργασιῶν συντήρησης τῶν ψηφιδωτῶν τῆς Ροτόντας (1978-1994)», στὸν ἴδιο τόμο, σελ. 447-456.

Το 1995 έγινε έλεγχος της στερεότητας του ψηφιδωτού και σέ συνεργασία με τη Διεύθυνση Συντήρησης Αρχαιοτήτων του Υπουργείου Πολιτισμού διαπιστώθηκε ότι το 1981-1994 ή στερέωση του υποστρώματος του με τη μέθοδο του έμποτισμού με καζεάτο υπήρξε ανεπαρκής διότι στο υπόστρωμα και μεταξύ των στρωμάτων του υποστρώματος εξακολουθούσαν να έντοπιζονται κενά. Η ύπαρξη των κενών οφείλεται στην ιδιότητα του καζεάτου να συρρικνώνεται μετά την αφυδάτωσή του. Επίσης, διαπιστώθηκε σέ μεγάλη έκταση αποκόλληση της ψηφιδωτής επιφάνειας από το στρώμα ψηφοθέτησης, πού οφείλεται στην αναποτελεσματικότητα του άσβεστόνευρου πού χρησιμοποιήθηκε ως ένέσιμο ύλικό για τήν ένίσχυση της συνοχής της ψηφιδωτής επιφάνειας με τó υπόστρωμα. Τέλος, έγινε αξιολόγηση της προκαταρκτικής «αισθητικής» εμφάνισης του ψηφιδωτού στην κατώτερη ζώνη στη βάση του τρούλλου. Διαπιστώθηκε ότι α) έπιχρωματισμός των άρμών του ψηφιδωτού κάλυπτε επίσης κατάλοιπα καζεάτου και γύψου πού δέν είχαν απομακρυνθί από τήν ψηφιδωτή επιφάνεια μετά τούς έμποτισμούς, β) τά χρώματα του έπιχρωματισμού άπλώνονταν με φαρδιά πινέλα με άποτέλεσμα νά καλύπτουν επιφάνειες με ψηφίδες και νά εισχωρούν στο «ούδέτερο» χρωματικά κονίαμα των «στεφανωμάτων» περιμετρικά των ψηφιδωτών. Η προκαταρκτική «αισθητική» εμφάνιση απέκρυπτε ξένα προς τó ψηφιδωτό ύλικά με άποτέλεσμα νά συγχέεται ή εικόνα ως αύτή διεσώθη μέσα στους αιώνες. Επιπλέον, τά έπιθετα ύδροχρώματα καταγοῦσαν τή λάμψη των ψηφίδων και ειδικότερα ó χρωματισμός των γεμάτων γύψο και καζεάτο άρμών μετέτρεπε τήν ανάγλυφη ψηφιδωτή επιφάνεια σέ επίπεδο και μουντό ζωγραφικό έργο. Ως εκ τούτου άποφασίστηκε νά συνεχιστούν οι έργασίες στερέωσης και λεπτομερής καθαρισμός του ψηφιδωτού.

Οί έργασίες στερέωσης και καθαρισμού άρχισαν τó 1996 και γίνονταν άντίστοιχα από δύο συνεργεία³. Οί έργασίες στερέωσης στόχευαν στη συμπληρωματική κάλυψη των κενών του υποστρώματος του ψηφιδωτού με τή μέθοδο του έμποτισμού ώστε νά διασφαλισθί πληρέστερη στερεότητα του ψηφιδωτού. Οί έργασίες καθαρισμού στόχευαν στην απομάκρυνση των νεωτερικών ύλικών – κατάλοιπων των προηγουμένων έπεμβάσεων συντήρησης και κυρίως του έπιχρωματισμού των άρμών και στην όσο τó δυνατόν αποκατάσταση της προσωπικότητας του ψηφιδωτού. Στις έργασίες καθαρισμού συμπεριλήφθηκε αποκάλυψη ψηφίδων καλυμμένων από νεωτερικά κονίαματα και άντικατάσταση χονδροειδών και χρωματισμένων κονιαμάτων σέ

3. Έπικεφαλής των εργασιών στερέωσης ήταν ó συντηρητής Νίκος Πιτσαλίδης και των εργασιών καθαρισμού (1995-1997) ή ζωγράφος-μουσειακός καλλιτέχνης Δήμητρα Καμαράκη.

φθορές μικρής και μεσαίας έκτασης εντός της ψηφιδωτής επιφάνειας με ασβεστοκονίαμα «ουδέτερης» απόχρωσης. Παράλληλα με τόν καθαρισμό γίνονταν εργασίες στερέωσης: συγκόλληση μεμονωμένων ψηφίδων που αποκολλούνταν κατά τόν καθαρισμό και τήν αντικατάσταση τών κονιαμάτων, και συγκόλληση τής γυάλινης επίστρωσης τών χρυσών και άργυρών ψηφίδων.

Τά δύο συνεργεία εργάζονταν ταυτόχρονα σέ διαφορετικά τμήματα τού ψηφιδωτού έως και τόν Αύγουστο τού 1998, όταν διαπιστώθηκε λόγω έντροπίας ή ανάγκη νά δοθῆ προτεραιότητα στίς εργασίες στερέωσης και νά οργανωθοῦν ἐκ νέου οί εργασίες ὥστε και ἡ στερέωση και ὁ καθαρισμός τού ψηφιδωτού νά ολοκληρώνεται ἀνά διάχωρο.

1. Ἔργασίες στερέωσης.

1.1. Στερέωση τού ὑποστρώματος τού ψηφιδωτού με τήν τοιχοποιία και στερέωση μεταξύ τών δύο πρώτων στρωμάτων τού ὑποστρώματος.

Οί εργασίες στερέωσης που ἀφοροῦσαν στόν ἐντοπισμό κενῶν στό ὑπόστρωμα με ἀκουστικό ἔλεγχο και τή διοχέτευση ἐνέματος με τή μέθοδο τού ἐμποτισμοῦ ἀρχισαν τό 1996 ἀπό τό ἄνω τμήμα τής κατώτερης ζώνης τού ψηφιδωτού (πρῶτο ἀπό πάνω δάπεδο τής σκαλωσιᾶς). Συνεχίστηκε ἡ χρήση τού καζεάτο ὡς ἐνέσιμου ὑλικοῦ ἕως τό 1998, ἐνῶ γιά τό φράξιμο τών ὀπῶν διοχέτευσης τού ἐνέματος και τών διαρροῶν τού ἐνέματος στήν ψηφιδωτή ἐπιφάνεια χρησιμοποιήθηκε πηλός, ὁ ὁποῖος σέ ἀντίθεση με τόν γύψο, που εἶχε χρησιμοποιηθῆ κατά τίς εργασίες συντήρησης τού 1981-1994, ἀπομακρύνεται εὔκολα χωρίς νά ἀφήνει λευκά στίγματα στούς ἄρμους μεταξύ τών ψηφίδων.

Τόν Ἰούλιο τού 1998 ἐφαρμόστηκε κατόπιν σχετικῆς συνεννόησης και ἐγκρισης τής Διεύθυνσης Συντήρησης Ἀρχαιοτήτων τού Ἰπουργείου Πολιτισμοῦ ἡ ἀντικατάσταση τού καζεάτο ἀπό τό ὑδραυλικό κονίαμα Ledan TB1. Ἡ ἀντικατάσταση θεωρήθηκε ἐφικτή καθῶς τά δύο ἐνέσιμα ὑλικά ἐφέροντο συμβατά μεταξύ τους και μποροῦσαν νά συνυπάρχουν στό ὑπόστρωμα τού ψηφιδωτού χωρίς ἀρνητικές ἀλληλεπιδράσεις. Ἡ ἀνάγκη ἀντικατάστασης τού καζεάτου, ὡς ἐνέσιμου ὑλικοῦ, ὑπαγορεύθηκε ἀπό τά ἐξῆς μειονεκτήματα που παρουσιάζει: α) πιθανότητα βιολογικῆς φθορᾶς (ἀποσύνθεση, προσβολή ἀπό μικροοργανισμούς) όταν διοχετεύεται σέ ὑπόστρωμα με ὑγρασία ἢ προσβάλλεται ἀπό εισερχόμενη ὑγρασία, β) πολὺ ἀργή στερεοποίηση μετὰ τή διοχέτευσή του στό ὑπόστρωμα και γ) μεγάλο ποσοστό συρρίκνωσης μετὰ τή στερεοποίησή του. Εἰδικότερα στή στερέωση τού ψηφιδωτού τής Ροτόντας τό καζεάτο ἐπέβαλε ἀργούς ρυθμούς ἐργασιῶν λόγω τής ἀργῆς στερεο-

ποίησής του και τόν υποχρεωτικό περιορισμό των εργασιών κατά τους θερινούς κυρίως μήνες, ενώ ιδιαίτερα αποτρεπτική για τη συνέχιση της χρήσης του είναι η ιδιότητα του υλικού να συρρικνώνεται και κατά συνέπεια να μην καλύπτει πλήρως τα κενά του υποστρώματος, γεγονός που επέβαλε συνεχείς επανελέγχους και συμπληρωματικό-επαναληπτικό έμποτισμό. Το ύδραυλικό κονίαμα Ledan TB1 παρουσιάζει σε αντίθεση με το καζεάτο τα εξής πλεονεκτήματα: α) γρήγορη στερεοποίηση (περίπου σε 4-5 ώρες) και β) πολύ μικρό ποσοστό συρρίκνωσης. Το Ledan TB1 μπορεί να χρησιμοποιηθῆ και τους χειμερινούς μήνες διότι παρουσιάζει άντοχή στην ύγρασία. Έπιπλέον, το Ledan TB1 απομακρύνεται εύκολα από την επιφάνεια του ψηφιδωτού αντίθετα με το καζεάτο, το οποίο όταν στερεοποιείται είναι δύσκολο να απομακρυνθῆ και δημιουργεί λεκέδες και θάμπωμα της ψηφιδωτής επιφάνειας. Το πλεονέκτημα της εύκολης και ανώδυνης απομάκρυνσης του Ledan TB1 από την ψηφιδωτή επιφάνεια είναι ιδιαίτερα σημαντικό εάν λάβουμε υπ' όψιν ότι κατά την εφαρμογή των ένεμάτων του 1981-1994 οί έγκροές του καζεάτου στην ψηφιδωτή επιφάνεια λέκκιασαν τους άρμους και την επιφάνεια των ψηφίδων και κατά κάποιον τρόπο όδήγησαν «υποχρεωτικά» στον έπιχρωματισμό του ψηφιδωτού προκειμένου να καλυφθοῦν οί λεκέδες που ἦταν δύσκολο να καθαριστοῦν.

1.2. Στερέωση του στρώματος ψηφοθέτησης και της ψηφιδωτής επιφάνειας.

Τὴν ἴδια περίοδο, τόν Ἰούλιο του 1998, αποφασίστηκε ἡ χρήση του άκρυλικού γαλακτώματος Primal AC33 ως ένεμα για τὴ συμπλήρωση των κενών που όφείλονται σε άποκόλληση του στρώματος ψηφοθέτησης από τὰ λοιπά στρώματα του υποστρώματος και τὴν αντιμετώπιση τῆς άποδυναμωμένης συνοχής μεταξύ ψηφιδωτής επιφάνειας και στρώματος ψηφοθέτησης. Το άκρυλικό γαλάκτωμα Primal προτάθηκε ως καταλληλότερο υλικό για τὴ συγκεκριμένη χρήση από τὴ Διεύθυνση Συντήρησης του Ἐρχαιοτήτων του Ἰπουργείου Πολιτισμοῦ, ενώ, όπως προαναφέρθηκε, ἡ χρήση άσβεστόνερου για τὴν αντιμετώπιση του προβλήματος αὐτοῦ τὸ 1981-1994 δέν βρέθηκε άποτελεσματική.

1.3. Συγκόλληση μεμονωμένων αποκολλημένων ψηφίδων.

Ἡ συγκόλληση μεμονωμένων ψηφίδων γινόταν αρχικά έως και τὸν Αὔγουστο τὸ 1998 παράλληλα με τὴς εργασίες καθαρισμοῦ του ψηφιδωτοῦ, διότι τὸ φαινόμενο τῆς άποκόλλησης των παρατηρήθηκε κυρίως κατά τὴν άπομάκρυνση του έπιχρωματισμοῦ και τὸν καθαρισμό των άρμων μεταξύ των ψηφίδων από νεωτερικά υλικά (γύψο και καζεάτο) και κατά τὴν άπο-

κάλυψη ψηφίδων κάτω από νεωτερικά κονιάματα περιμετρικά των όριων φθορών της ψηφιδωτής επιφάνειας. Η συγκόλληση των ψηφίδων στο στρώμα ψηφοθέτησης γινόταν με την έξης μέθοδο: α) αφαίρεση μέρους του κονιάματος στη θέση της αποκολλημένης ψηφίδας ώστε να δημιουργηθεί μικρή κοιλότητα, β) κατασκευή νέου άβεστοκονιάματος και τοποθέτησή του στην κοιλότητα που δημιουργήθηκε στο υπόστρωμα και γ) επανατοποθέτηση της ψηφίδας στη θέση της επί του νέου κονιάματος. Για την διασφάλιση της σταθερότητας της επικολληθείσας ψηφίδας το νέο κονίαμα άπλωνόταν εν είδει έμπλάστρου στους άρμους μεταξύ των ψηφίδων.

Η μέθοδος αυτή συγκόλλησης μεμονωμένων αποκολλημένων ψηφίδων κρίθηκε όχι ιδιαίτερα ίκανοποιητική, διότι, πέραν του ό,τι πρόκειται για χρονοβόρα διαδικασία, ήταν καταστρεπτική του υποστρώματος του ψηφιδωτού, το οποίο στις περισσότερες περιπτώσεις διατηρούσε ανέπαφο το αποτύπωμα της ψηφίδας, καθώς και του γραπτού προσχεδίου ή της χρωματικής προετοιμασίας. Επίσης προκαλούσε αισθητικό πρόβλημα καθώς δεν είναι ποτέ δυνατόν να επιτευχθεί απόλυτη όμοιότητα του νέου κονιάματος με το αρχικό κονίαμα ψηφοθέτησης. Άνομοιομορφία, άλλωστε, χαρακτηρίζει και τα κονιάματα που χρησιμοποιήθηκαν κατά την επέμβαση αυτή, διότι γίνονταν από διαφορετικούς τεχνίτες σε διαφορετικές χρονικές περιόδους. Επιπλέον, το νέο κονίαμα δεν περιοριζόταν μόνο στη θέση της αποκολλημένης ψηφίδας αλλά για την καλύτερη στήριξή της άπλωνόταν και στους άρμους των γύρω ψηφίδων με αποτέλεσμα την αύξηση της προσθήκης νεωτερικών κονιαμάτων στην ψηφιδωτή επιφάνεια, που συνεπάγεται την αλλοίωση της εμφάνισης του ψηφιδωτού. Για τους λόγους αυτούς αποφασίστηκε ή χρήση «κόλλας» για την επανατοποθέτηση των ψηφίδων και ως κόλλα χρησιμοποιήθηκε κατόπιν σχετικής σύστασης από τη Διεύθυνση Συντήρησης Αρχαιοτήτων του Υπουργείου Πολιτισμού το ακρυλικό γαλάκτωμα Primal. Η εφαρμογή της μεθόδου αυτής έχει ως έξης: α) καθαρισμός της "θέσης" (αποτυπώματος) της ψηφίδας στο υπόστρωμα με ψεκάσμο άερα, β) επάλειψη της κόλλας με πινέλο στην πίσω όψη της ψηφίδας και στο υπόστρωμα, γ) τοποθέτηση της ψηφίδας στο υπόστρωμα, έτσι ώστε να εφαρμόζει ακριβώς στο αποτύπωμά της (εικ. 1), δ) στήριξη της ψηφίδας με κολλητική ταινία για ένα είκοσιτετράωρο ώστε να στεγνώσει ή κόλλα.

1.4. Συγκόλληση της γυάλινης επίστρωσης των χρυσών και άργυρων ψηφίδων.

Στις περιπτώσεις που παρατηρήθηκε αποκόλληση της γυάλινης επίστρωσης των χρυσών και άργυρων ψηφίδων, είτε αυτή προκλήθηκε από φυσικά αίτια είτε από καταπόνηση των ψηφίδων κατά τον ύψρο και μηχανικό

καθαρισμό, έγινε άμεση συγκόλληση αυτής με χρήση της άκρυλικής ρητίνης Paraloid B72.

2. Έργασίες καθαρισμού.

2.1. Μηχανικός καθαρισμός των ψηφίδων και των άρμών μεταξύ των ψηφίδων. Αποκάλυψη ψηφίδων.

Προκειμένου να απομακρυνθούν τα νεωτερικά ύλικά (κατάλοιπα γύψου, καζεάτου και άσβεστοκονιάματος νεωτέρων και παλαιότερων έπεμβάσεων συντήρησης) που κατά τόπους κάλυπταν τους άρμους μεταξύ των ψηφίδων αλλά και μέρος της επιφάνειας των ψηφίδων έγινε καθαρισμός με νυστέρι και βουρτσάκι. Συχνά διαπιστώθηκε ότι το κονίαμα των παλαιότερων έπεμβάσεων κάλυπτε έξ όλοκλήρου μία ή περισσότερες ψηφίδες (εικ. 2) και έτσι παράλληλα με τον καθαρισμό έγινε αποκάλυψη ψηφίδων αλλά και μικρών τμημάτων των ψηφιδωτών κυρίως στην περίμετρο (εικ. 3).

2.2. Αντικατάσταση των κονιαμάτων που κάλυπταν μικρού και μεσαίου μεγέθους φθορές έντος της ψηφιδωτής επιφάνειας.

Οί πολυάριθμες μικρού και μεσαίου μεγέθους φθορές έντος της ψηφιδωτής επιφάνειας ήταν συμπληρωμένες με κονιάματα διαφορετικής σύστασης και απόχρωσης που προήλθαν από διαφορετικές περιόδους συντήρησης (χρωματιστά σκληρά κονιάματα της συντήρησης του 1952-1953, άσβεστοκονίαμα «ουδέτερης» απόχρωσης κατά τόπους έπιχρωματισμένο του 1981-1994). Όρισμένα από τα κονιάματα αυτά παρουσίαζαν σαθρότητα (διάβρωση του κονιαματος, κρακελαρίσματα και μικρές ρωγμές) και γενικά είχαν εφαρμοσθή επί των κενών της ψηφιδωτής επιφάνειας καλύπτοντας ένιοτε ψηφίδες ή τις άκρες ψηφίδων εύρισκομένων στις παρυφές (εικ. 4). Ός συνέπεια του μηχανικού καθαρισμού και της αποκάλυψης ψηφίδων αλλά και προκειμένου να εξαλειφθή ή χρωματική άνομοιογένεια των κονιαμάτων που άλλοίωνε την εμφάνιση του ψηφιδωτού έγινε απομάκρυνση αυτών και αντι-κατάστασή τους με άσβεστοκονίαμα ένιαίας «ουδέτερης» απόχρωσης (εικ. 5).

2.3. Υγρός καθαρισμός.

Γιά την όσο το δυνατόν απομάκρυνση των ύδροχρωμάτων που είχαν χρησιμοποιηθή τό 1981-1994 αλλά και των ρύπων και των έπικαθήσεων έγινε υγρός καθαρισμός με βουρτσάκια και σαπούνι «άρκάδι».

Έως τό τέλος του 1999 οί παραπάνω έργασίες στερέωσης και καθαρισμού είχαν όλοκληρωθή στα άνω 2/3 της ζώνης του ψηφιδωτού στη βάση του τρούλλου. Ειδικότερα, ή στερέωση του ύποστρώματος στην τοιχοποιία είχε

έπεκταθῆ και στό ὑπόλοιπο 1/3 τοῦ ψηφιδωτοῦ και στοὺς φεγγίτες. Τὴν ἴδια περίοδο ἔγιναν συμπληρωματικὲς ἐργασίες συντήρησης στό ψηφιδωτὸ τῆς καμάρας τῆς δυτικῆς κόγχης. Τὸ ψηφιδωτὸ εἶχε συντηρηθῆ κατά τὴν προηγούμενη περίοδο (1978-1994) μὲ τὴ μέθοδο τῆς ἀπόσπασης και ἐπανατοποθέτησής του σὲ νέο ὑπόστρωμα ἀσβεστοκονιάματος, πλὴν μικροῦ τμήματος αὐτοῦ στό δυτικὸ ἄκρο τῆς καμάρας, τὸ ὁποῖο μέχρι και τὸ 1998 καλυπτόταν ἀπὸ τοιχοποιία ποῦ εἶχε προστεθῆ μπροστὰ ἀπὸ τὸ τύμπανο τῆς κόγχης κατά τὴν περίοδο τῆς τουρκοκρατίας. Μετὰ τὴν ἀπομάκρυνση τοῦ ἄνω τμήματος τῆς τοιχοποιίας ἀποκαλύφθηκε τὸ ψηφιδωτὸ σὲ κακὴ κατάσταση διατήρησης και ἔγιναν ἄμεσα ἐργασίες *in situ* στερέωσης τοῦ ὑποστρώματος στὴν τοιχοποιία (ἐμποτισμὸς μὲ Ledan TB1) και τῆς ψηφιδωτῆς ἐπιφάνειας στό ὑπόστρωμα (ἐμποτισμὸς μὲ Primal). Ἡ σὲ δύο διαφορετικὲς χρονικὲς περιόδους συντήρηση τοῦ ψηφιδωτοῦ τῆς δυτικῆς καμάρας μὲ δύο διαφορετικὲς μεθόδους στερέωσης καθιστᾷ τὸ συγκεκριμένο ψηφιδωτὸ ἐνδεικτικὸ παράδειγμα σύγκρισης τῶν ἀποτελεσμάτων ἐκάστης μεθόδου (εἰκ. 6).

3. Τεκμηρίωση

Μὲ τὴν ἀναδιοργάνωση τῶν ἐργασιῶν συντήρησης τῶν ψηφιδωτῶν τὸν Ἰούλιο τοῦ 1998 δόθηκε ἰδιαίτερη βαρῦτητα στὴν ἀνάγκη και τὴ σημασία συνέχισης λεπτομεροῦς και συστηματικῆς τεκμηρίωσης τῶν ἐργασιῶν συντήρησης και διατήρησης και ἀκολουθήθηκε τὸ ἑξῆς πρόγραμμα τεκμηρίωσης:

3.1. Ἀναλυτικὴ περιγραφή τῶν τεχνικῶν και κατασκευαστικῶν χαρακτηριστικῶν τοῦ ψηφιδωτοῦ σὲ εἰδικὸ ἔντυπο. Συγκέντρωση και περιγραφή εὐρημάτων ἀπὸ τὰ ψηφιδωτὰ (ψηφίδες, καρφιά στήριξης τοῦ ὑποστρώματος και δείγματα κονιαμάτων τοῦ ὑποστρώματος) σὲ εἰδικὸ ἔντυπο.

3.2. Ἀναλυτικὴ περιγραφή τῆς κατάστασης διατήρησης τοῦ ὑπὸ συντήρηση τμήματος τοῦ ψηφιδωτοῦ: ἐντοπισμὸς και ἀξιολόγηση τῶν προβλημάτων συντήρησης, περιγραφή και ἐρμηνεία τῶν προηγούμενων ἐπεμβάσεων συντήρησης σὲ εἰδικὸ ἔντυπο.

3.3. Ἀναλυτικὴ καταγραφή τῶν σύγχρονων ἐργασιῶν συντήρησης σὲ ἡμερολόγιο. Συνοπτικὴ παρουσίαση τῶν ἐργασιῶν σὲ μηνιαῖο δελτίο συντήρησης.

3.4. Συγκριτικὴ μελέτη παλαιότερων φωτογραφιῶν τοῦ ψηφιδωτοῦ και τῆς σύγχρονης κατάστασης διατήρησής του ἀπὸ τὴν ὁποία προκύπτουν παρατηρήσεις γιὰ τὴν ἐξέλιξη τῶν χρόνιων προβλημάτων τοῦ ψηφιδωτοῦ (ἀπώλεια τῆς γυάλινης ἐπίστρωσης τῶν χρυσῶν και ἀργυρῶν ψηφίδων, ἀπώλεια μεμονωμένων ψηφίδων κ.ἄ.).

3.5. Σχεδίαση τοῦ ψηφιδωτοῦ και ὑπομνηματισμὸς τῶν ἐργασιῶν στὰ σχέδια. Ἀποτύπωση ὑπὸ κλίμακα (1:1) ὀρισμένων εἰκονογραφικῶν θεμά-

των τῶν ψηφιδωτῶν παραστάσεων.

3.6. Φωτογράφιση πρὶν, κατὰ τὴ διάρκειά και μετὰ τὸ πέρας τῶν ἐργασιῶν.

ΕΙΚΟΝΕΣ



1. Συγκόλληση ψηφίδας.



2. Λεπτομέρεια τοῦ ψηφιδωτοῦ πρὶν ἀπὸ τὸν καθαρισμό.



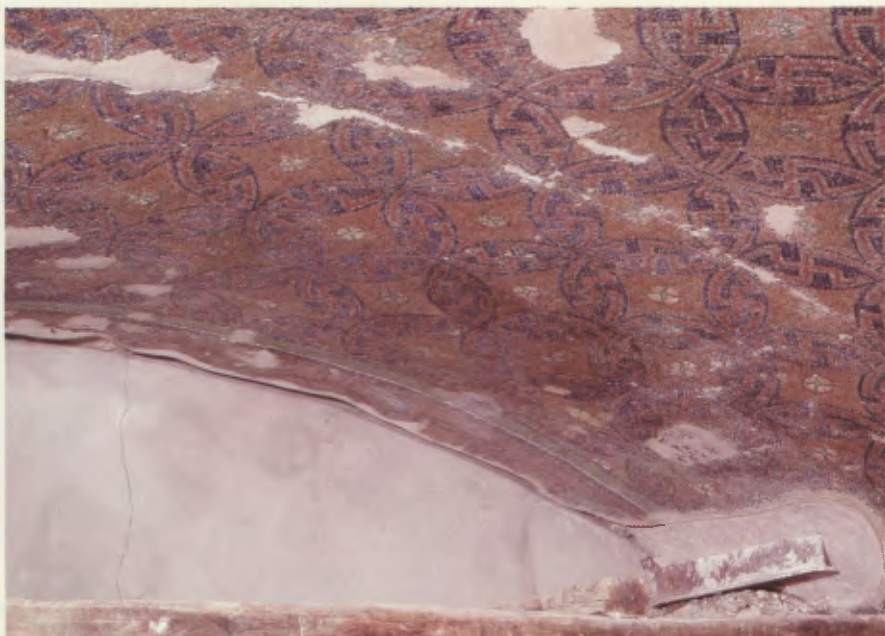
3. Λεπτομέρεια τοῦ ψηφιδωτοῦ μετὰ τὸν καθαρισμό και τὴν ἀποκάλυψη ψηφίδων.



4. Λεπτομέρεια του ψηφιδωτού πριν από τη συντήρηση.



5. Λεπτομέρεια του ψηφιδωτού μετά τόν καθαρισμό.



6. Τὸ ἀποκαλυφθὲν καὶ συντηρηθὲν τμῆμα τοῦ ψηφιδωτοῦ στὴν καμάρα τῆς δυτικῆς κόγχης.

ΙΟΑΝΝΙΣ ΙΛΙΑΔΙΣ

**ΤΟ ΦΥΣΙΚΟ ΦΩΣ ΚΑΙ ΤΑ ΨΗΦΙΔΩΤΑ ΤΟΥ ΤΡΟΥΛΛΟΥ
ΤΗΣ ΡΟΤΟΝΤΑΣ ΣΤΗ ΘΕΣΣΑΛΟΝΙΚΗ**

SUMMARY

The natural light and the mosaics in the dome of the Rotunda at Thessaloniki: This work examines the distribution of natural light on the mosaics in the dome of the Rotunda in Thessaloniki. Especially examines the distribution of natural light in the interior of the monument today, the effect on the lighting of the interventions that have been carried out in the building and the visual organization of the interior during the Early Christian era. It is proved that the level light in the area of the dome fluctuates. This depends on the season of year and the time of day. On the basis of this fact, it is proposed that the depiction of the martyrs in their respective positions was not accidental but was executed on the basis of the way in which they were illuminated.

ΕΙΣΑΓΩΓΗ

Ένα μνημείο της κλίμακας και της σπουδαιότητας της Ροτόντας (εικ. 1) είναι ανεξάντλητο και ακόμη και τώρα δεν παύει να θέτει ερωτήματα στους μελετητές, που δεν έπαψαν να ασχολούνται μαζί του εδώ και εκατό χρόνια.

Θέματα καταγωγής και χρονολόγησης του μνημείου καθώς και του ιδεολογικού περιεχομένου του διακοσμητικού συστήματος του τρούλλου δεν έχουν ακόμη πλήρως ερμηνευτεί. Τα τελευταία χρόνια έχουν διατυπωθεί προτάσεις που θέτουν εκ νέου το θέμα της καταγωγής του μνημείου (Μέντζος 1995: 338-363, Ξυγιάς 2000: 9-25, Μέντζος 2001-2002: 57-82). Βέβαιο όμως είναι ότι στα ψηφιδωτά του τρούλλου, αντί της ορθολογιστικής προοπτικής, έχουμε μία πλήρη θεμελίωση της "οπτικής τάξης" (Μιχαηλίδης 1980: 177-178; Σωτηρίου 1972: 191-203).

Τίθεται όμως το εξής ερώτημα: Πώς κατανέμεται το φυσικό φως στον τρούλλο, αφού τα μεγάλα παράθυρα βρίσκονται χαμηλότερα από τη γένεσή του;

Για να απαντήσουμε στο ερώτημα αυτό επιχειρήσαμε μια έρευνα, η οποία βασίστηκε αφενός μεν σε σειρά μετρήσεων της έντασης φωτισμού σε σταθερά σημεία του εσωτερικού χώρου του μνημείου, αφετέρου δε σε παρατηρήσεις της τροχιάς του ήλιου στις εποχές του έτους καθώς και της κατεύθυνσης των ηλιακών ακτίνων στον εσωτερικό χώρο της Ροτόντας.

Τα πρώτα αποτελέσματα της έρευνας δημοσιεύτηκαν το 2001 (Ηλιάδης 2001: 13-24). Σήμερα παρουσιάζεται το δεύτερο μέρος. Σε αυτό εξετάζεται:

1. Η κατανομή του φωτός ως συνάρτηση κτιρίου και χρόνου και
2. Ο προσδιορισμός –συνειδητός ή μη- ενός συστήματος "διαχείρισης του φωτός".

Αρχικά, λοιπόν, εξετάζουμε τη σημερινή κατανομή του φυσικού φωτός στον εσωτερικό χώρο, την επήρεια του φωτισμού από τις επεμβάσεις που έγιναν στο κτίριο και την οπτική οργάνωση του χώρου κατά την παλαιοχριστιανική περίοδο.

ΜΕΤΡΗΣΗ ΤΗΣ ΕΝΤΑΣΗΣ ΦΩΤΙΣΜΟΥ ΣΤΟ ΕΣΩΤΕΡΙΚΟ ΤΟΥ ΜΝΗΜΕΙΟΥ **Παρατηρήσεις**

Η μέτρηση (Τριανταφυλλίδης 1964: 9-14) της έντασης φωτισμού σε [Lux] πραγματοποιήθηκε με φορητό όργανο τύπου Minolta T-1M, εφόσον ήταν αδύνατη η εγκατάσταση δικτύου με αισθητήρες, ώστε η μέτρηση να γίνεται ταυτόχρονα.

Προκειμένου λοιπόν να ελαχιστοποιηθεί η πιθανότητα λάθους, έπρεπε να μειωθεί ο χρόνος μέτρησης. Για τον λόγο αυτό πραγματοποιήθηκαν μετρήσεις σε σημεία του εσωτερικού κυλινδρικού πυρήνα, τα οποία ανήκουν σε τρία διαφορετικά, ως προς το ύψος, επίπεδα. Συγκεκριμένα:

- α. Το πρώτο επίπεδο μέτρησης αντιστοιχεί στο χαμηλότερο πάτωμα της ξύλινης σκαλωσιάς, που έχει πλάτος 3μ. και ύψος 6μ. από το δάπεδο του μνημείου. Το επίπεδο αυτό επιλέχτηκε για τους εξής λόγους:
 - η πιθανότητα λάθους είναι ελάχιστη, εφόσον δεν υπάρχουν εμπόδια που θα αλλοιώσουν το αποτέλεσμα των μετρήσεων.
 - στην περιοχή αυτή παρατηρούνται οι περισσότερες αντανάκλασεις του φωτός.

Το αισθητήριο του οργάνου τοποθετήθηκε 2μ. ψηλότερα από το πάτωμα, δηλαδή στα 8μ.

- β. Το δεύτερο επίπεδο αντιστοιχεί στο κάτω όριο της ζώνης των μαρτύρων, η οποία απέχει από το δάπεδο 15μ. Το αισθητήριο τοποθετήθηκε 1μ. ψηλότερα, δηλαδή στα 16μ. Το επίπεδο αυτό, για λόγους προστασίας των εργαζομένων, καλύπτεται από πλέγμα που περιορίζει σημαντικά το φως στα ψηφιδωτά.

γ) Η τρίτη σειρά μετρήσεων πραγματοποιήθηκε στο τελευταίο επίπεδο εργασίας της σκαλωσιάς που απέχει 22μ. από το δάπεδο του κτιρίου. Το αισθητήριο όμως τοποθετήθηκε 2μ. ψηλότερα, δηλαδή στα 24μ. από εκεί που αρχίζει η δεύτερη ζώνη των ψηφιδωτών.

Συνολικά επιλέχθηκαν δεκαέξι (16) σημεία σε κάθε επίπεδο, κυκλικά στον πυρήνα με κατεύθυνση εκείνη των δεικτών του ρολογιού.

Εκτός των παραπάνω πραγματοποιήθηκαν μετρήσεις της καθέτου έντασης φωτισμού στο ΝΔ τμήμα του κυρίως χώρου και από το δάπεδο μέχρι το ύψος των 24μ. καθώς και στο μέσο του ύψους των μεγάλων παραθύρων. Όλες οι μετρήσεις πραγματοποιήθηκαν με ηλιοφάνεια.

Μετά από έναν κύκλο μετρήσεων και παρατηρήσεων διάρκειας δύο χρόνων διαπιστώθηκε ότι από μήνα σε μήνα ο φωτισμός δεν μεταβάλλεται σημαντικά. Διαπιστώθηκε όμως ότι ο φωτισμός στα ψηφιδωτά του τρούλλου μεταβάλλεται κατά τη διάρκεια της ημέρας και από εποχή σε εποχή. Συγκεκριμένα, σε ορισμένες περιοχές ο φωτισμός είναι πιο έντονος.

Για την οικονομία του χώρου παρουσιάζονται τα αποτελέσματα μόνο των παρατηρήσεων για κάθε εποχή του έτους. Η περιγραφή των συνθηκών φωτισμού αρχίζει από τον χειμώνα.

Χειμώνας

Το πρωί έντονη δέσμη φωτός εισχωρεί από τα παράθυρα του ιερού βήματος και κατευθύνεται προς τα ΒΔ διάχωρα της χαμηλότερης ζώνης του τρούλλου. Το τμήμα αυτό της ζώνης των μαρτύρων φωτίζεται πιο έντονα, σε σχέση με το υπόλοιπό της τμήμα.

Καθώς ο ήλιος μετακινείται, φωτίζεται σταδιακά πιο έντονα η βόρεια και, πριν από τη δύση, η βορειοανατολική περιοχή. Στη διάρκεια, δηλαδή, της ημέρας φωτίζεται πιο έντονα το ΒΔ διάχωρο, το Β και ελάχιστα το ΒΑ (εικ. 2). Η έντονη φωτεινότητα που παρατηρείται στα παραπάνω διάχωρα οφείλεται στο φως που διέρχεται από τα εκ διαμέτρου αντίθετα από αυτά παράθυρα. Στην περιοχή αυτή εικονίζονται: ένας αδιάγνωστος μάρτυρας, ο Ρωμανός (18 Νοεμβρίου), ο Ευκαρπίων (Δεκέμβριος), ακόμη ένας αδιάγνωστος, ο Ανανίας (Ιανουάριος), ο Βασιλίσκος (Απρίλιος) και ο Πρίσκος (Οκτώβριος) (Σωτηρίου 1972: 191-203, Γούναρης 1972: 201-226, Feisel 1983: 103-110, Παζαράς 1985).

Ο φωτισμός της δεύτερης και τρίτης ζώνης αυξομειώνεται: το πρωί και το απόγευμα γίνεται ελάχιστος, ενώ από τις 9 π.μ. έως τις 2 μ.μ. γίνεται μέγιστος. Παρατηρούμε όμως ότι η φωτεινότητα της μισής σχεδόν επιφάνειας του τρούλλου είναι πιο έντονη από την υπόλοιπη (εικ. 3), γιατί ορισμένες ηλιακές ακτίνες που ανακλώνται στις ποδιές των παραθύρων και κατευθύ-

νονται προς τον τρούλλο εμποδίζονται από τα δάπεδα εργασίας της σκαλωσιάς.

Από το αποτέλεσμα αυτό γίνεται πλέον φανερό ότι οι ποδιές των μεγάλων παραθύρων συμβάλλουν σημαντικά στον φωτισμό του τρούλλου (Μουτσόπουλος 1980: 355-375, Θεοχαρίδου 1991-1992: 73-75, Ηλιάδης 2001: 13-24).

Πριν από τη δύση του ήλιου παρατηρείται έντονη δέσμη φωτός στο ιερό, η οποία περνάει από το νότιο (N) παράθυρο. Την παλαιοχριστιανική όμως περίοδο ο φωτισμός του ιερού διέφερε, αφού το νότιο παράθυρο μέσα από το οποίο περνάει σήμερα το φως είναι μεταγενέστερο (Μουτσόπουλος 1980: 374).

Άνοιξη

Την άνοιξη παρατηρείται σημαντική καθυστέρηση στον πρωινό φωτισμό του εσωτερικού χώρου, εξαιτίας των οικοδομημάτων μεγάλου ύψους που ανεγέρθηκαν γύρω από τη Ροτόντα μετά το 1950.

Οι πρώτες ηλιακές ακτίνες μπαίνουν από το ανατολικό παράθυρο (Αξιμούθιο = 900) και στη συνέχεια από τα παράθυρα του ιερού. Από τις 9.00 και μέχρι τις 9.30 π.μ. παρατηρούνται έντονες δέσμες φωτός από τους φεγγίτες που βρίσκονται πάνω από την αφίδα του ιερού (εικ. 4). Την ίδια στιγμή η αγία τράπεζα φωτίζεται έντονα. Στη συνέχεια το φως εισχωρεί από το N, το ΝΔ και το Δ παράθυρο πριν από τη δύση του ήλιου.

Όσον αφορά στον φωτισμό της χαμηλότερης ζώνης του τρούλλου, βλέπουμε ότι φωτίζεται πιο έντονα το δυτικό τμήμα της ζώνης, το ΒΔ, Β και το Α (εικ. 5). Ο έντονος φωτισμός καλύπτει τώρα ένα μεγαλύτερο τμήμα της, στο οποίο εικονίζονται: οι μάρτυρες Κοσμάς και Δαμιανός (με μήνα εορτής τον Σεπτέμβριο) κ.ο.κ. μέχρι τον Φίλιππο (Οκτώβριο).

Όσον αφορά στον φωτισμό του τρούλλου, ισχύουν οι παρατηρήσεις εκείνες της χειμερινής περιόδου.

Στο διάστημα της ημέρας φωτίζονται ακόμη έντονα ο εσωτερικός χώρος και οι κόγχες του ισογείου. Την παλαιοχριστιανική όμως περίοδο οι κόγχες δεν φωτίζονταν άμεσα, αφού εξωτερικά υπήρχε ο κυκλικός περίβολος.

Καλοκαίρι

Το αξιμούθιο του ήλιου για το γεωγραφικό πλάτος της Θεσσαλονίκης υπολογίζεται στις 11.00 π.μ. και συμπίπτει περίπου με τον προσανατολισμό του ΒΑ παραθύρου. Λόγω όμως των οικοδομημάτων παρατηρείται επίσης σημαντική καθυστέρηση στον πρωινό φωτισμό του μνημείου, π.χ. ο ήλιος ανατέλλει στις 05.05 π.μ. και το φως φθάνει στο μνημείο στις 06.30 π.μ.

Ανάλογα με τη θέση του ήλιου φωτίζεται πιο έντονα την περίοδο του

καλοκαιριού το Ν διάχωρο, το ΝΔ, το Δ, κ.ο.κ. μέχρι το ΝΑ, το διάχωρο δηλαδή που βρίσκεται πάνω από το ιερό.

Ο έντονος φωτισμός παρατηρείται δηλαδή κατά τη διάρκεια της ημέρας σταδιακά σε ολόκληρη τη ζώνη των μαρτύρων (εικ. 6). Έτσι φωτίζεται ο Θερινός (με μήνα εορτής τον Ιούλιο), Κύριλλος (Ιούλιο), πάνω από το ιερό δεν σώζονται μάρτυρες, στο Ν διάχωρο ένας αδιάγνωστος, ο Λέων (Ιούνιο) και στο ΝΔ ο Φιλήμων (Μάρτιο), ο Ονησιφόρος και ο Πορφύριος (Αύγουστο).

Αντίθετα από ό,τι συμβαίνει στη ζώνη των μαρτύρων, η φωτεινότητα του τρούλλου τη μεγαλύτερη περίοδο της ημέρας - από 9.00 π.μ. έως 5.00 μ.μ. - είναι χαμηλή (εικ. 7). Αυτό οφείλεται στο γεγονός ότι το καλοκαίρι και κατά το παραπάνω χρονικό διάστημα το ανακλώμενο από τις ποδιές των παραθύρων ηλιακό φως εμποδίζεται από τα επίπεδα εργασίας της υπάρχουσας σκαλωσιάς περισσότερο από ό,τι στις υπόλοιπες εποχές.

Φθινόπωρο

Το Φθινόπωρο παρατηρούνται φαινόμενα φωτισμού ανάλογα με εκείνα της άνοιξης.

Η ΘΕΣΗ ΤΩΝ ΜΑΡΤΥΡΩΝ ΚΑΙ Ο ΦΩΤΙΣΜΟΣ

Από τις παραπάνω παρατηρήσεις διαφαίνεται ότι υπάρχει μια σχέση μεταξύ του σημείου απεικόνισης των μαρτύρων και του φωτισμού. Πιστεύουμε ότι παρουσιάζει ενδιαφέρον να διερευνήσουμε αυτή την εκδοχή.

Εάν θεωρήσουμε τον άξονα Ανατολή-Δύση, θα δούμε ότι αυτός διαιρεί νοητά τη ζώνη των μαρτύρων σε δύο τμήματα:

Στο πρώτο με βόρειο προσανατολισμό βρίσκονται οι μάρτυρες με μήνα εορτής το Σεπτέμβριο, Νοέμβριο, Δεκέμβριο, Ιανουάριο, Απρίλιο και Οκτώβριο, δηλαδή οι μήνες του Φθινοπώρου, του Χειμώνα και της Άνοιξης.

Στο δεύτερο τμήμα, με νότιο προσανατολισμό, εικονίζονται οι μάρτυρες με μήνα εορτής τον Ιούλιο (ο Θερινός και ο Κύριλλος), πάνω από την αψίδα του ιερού τρεις μάρτυρες που σήμερα δεν σώζονται, τον Ιούνιο (ο Λέων), το Μάρτιο (ο Φιλήμων) και τον Αύγουστο (ο Ονησιφόρος και ο Πορφύριος). Περιλαμβάνονται δηλαδή οι μήνες του Καλοκαιριού και της Άνοιξης.

Εάν θεωρήσουμε τον δεύτερο άξονα Βορρά-Νότο, βλέπουμε ότι αυτός διέρχεται από τον μάρτυρα Ανανία (με μήνα εορτής τον Ιανουάριο) και από τον Λέοντα (Ιούνιο) αντιστοίχως. Δίπλα στους μάρτυρες αυτούς εικονίζεται ο Βασιλίσκος (Απρίλιο) και ο Φιλήμων (Μάρτιο).

Με βάση τα παραπάνω δεδομένα προκύπτει ότι ο ψηφοθέτης απεικόνισε τους μάρτυρες σε περιοχές της ζώνης, των οποίων η φωτεινότητα εξαρτάται από την τροχιά και από το ύψος του ήλιου.

Στο συμπέρασμα αυτό καταλήγουμε παρατηρώντας τόσο τις φωτοσκιάσεις στα πρόσωπα των μαρτύρων όσο και στα αρχιτεκτονήματα. Ιδιαίτερα, ο ψηφοθέτης απεικόνισε τις φωτοσκιάσεις στα πρόσωπα με γκρι, καφέ και μαύρη ψηφίδα και πάντοτε από την αριστερή πλευρά, ακολουθώντας βέβαια την πορεία του φωτός στο εσωτερικό του μνημείου.

Αρχιτεκτονικές επεμβάσεις που επηρέασαν το φυσικό φωτισμό

α. Όπως αναφέραμε προηγουμένως, τα οικοδομήματα μεγάλου ύψους που ανεγέρθηκαν μετά το 1950 εμποδίζουν το ηλιακό φως να εισχωρήσει τις πρωινές και απογευματινές ώρες στο κτίριο.

β. Από την αναπαράσταση του εξωτερικού κυκλικού διαδρόμου (Μουτσόπουλος 1980: 371), του οποίου η στέγη έφτανε μέχρι την ποδιά των μεγάλων παραθύρων, προκύπτει ότι αυτός φωτιζόταν ελάχιστα σε σχέση με τον κεντρικό κυκλικό χώρο. Μεταξύ λοιπόν του περιβόλου (νάρθηκα) και του κυρίως χώρου υπήρχε μια αύξουσα διαβάθμιση του φωτός.

Σήμερα οι ισόγειες κόγχες και ο κεντρικός χώρος φωτίζονται πιο έντονα, λόγω του άμεσου ηλιακού φωτός που εισέρχεται από τα υπάρχοντα παράθυρα των κογχών. Για τον λόγο αυτό μειώνεται η ικανότητα παρατήρησης, εφόσον οι επισκέπτες βρίσκονται, ως προς τον τρούλλο, σε φωτεινότερο περιβάλλον.

γ. Εάν παρατηρήσουμε με προσοχή την εξωτερική επιφάνεια του κτιρίου της Ροτόντας, διακρίνουμε το περίγραμμα των φεγγιτών, οι οποίοι σήμερα είναι φραγμένοι. Συμπεραίνουμε, λοιπόν, ότι στο αρχικό στάδιο κατασκευής του κτιρίου υπήρχαν συνολικά στη βάση του τρούλλου δεκαέξι ημικυκλικά ανοίγματα (φεγγίτες). Άρα ο τρούλλος αρχικά ήταν "διάτρητος" και σχεδιάστηκε με την προοπτική να είναι έντονα φωτεινός.

Την περίοδο όμως που αρχίζει το πρόγραμμα της ψηφοθέτησης κλείνονται ένας παρά ένας οι φεγγίτες και μένουν ανοικτοί μόνον οκτώ.

Αργότερα, όταν ανακατασκευάζεται το ανατολικό τμήμα που κατέπεσε ίσως τον 11ο αι., κατασκευάζεται επιπλέον ακόμα ένας φεγγίτης πάνω από το τόξο του ιερού και στον κεντρικό άξονα ιερού βήματος-δυτικής εισόδου. Οι δύο άλλοι, δεξιά και αριστερά, κατασκευάζονται σε διαφορετική θέση από την αρχική τους και πλησιέστερα προς τον κεντρικό (Βελένης 2003: 51-62).

Οι διαστάσεις όμως των καινούργιων φεγγιτών διαφέρουν από εκείνες των αρχικών. Για παράδειγμα, το εσωτερικό πλάτος τους είναι 2.20μ. και το εξωτερικό 2.60μ., ενώ των αρχικών φεγγιτών είναι 3.90μ. και 3.50μ. αντίστοιχα. Επίσης το ύψος τους είναι 1.60μ. και 1.80μ., ενώ των αρχικών 1.75μ. και 1.95μ.

Παρατηρούμε ακόμη ότι το πάχος του εξωτερικού κυκλικού τοίχου α-

πό τις φωτιστικές θυρίδες έως τη στέγη μειώθηκε στο μισό. Θεωρώ ότι ένας από τους σημαντικούς λόγους είναι και ο εξής: εάν ο εξωτερικός τοίχος ήταν ισοπαχής μέχρι την κορυφή του τρούλλου (6,3μ.), τότε το φως θα περνούσε μέσα από τους φεγγίτες με μεγάλη δυσκολία.

Σήμερα στους φεγγίτες υπάρχει μόνο ένα μικρό ορθογωνικό παράθυρο, που ελάχιστα αφήνει να περάσει το φως.

ΓΕΩΜΕΤΡΙΚΗ ΣΥΜΜΕΤΡΙΑ ΚΑΙ ΟΠΤΙΚΗ ΟΡΓΑΝΩΣΗ ΤΟΥ ΧΩΡΟΥ

Από τη μελέτη των σχεδίων της Ροτόντας προκύπτει ότι η διάμετρος του κεντρικού χώρου είναι ίση με την απόσταση του πάνω ορίου της ζωφόρου των μαρτύρων από το δάπεδο, τριπλάσια του πλάτους του κυκλικού περιβόλου και τριπλάσια του ύψους των κογχών του ισογείου (εικ. 8).

Από την αναλογία αυτή καθορίζεται και η οπτική οργάνωση του χώρου (Ηλιάδης 2001: 13-24). Συγκεκριμένα, οι κατηχούμενοι που βρίσκονταν στον νάρθηκα (Σωτηρίου 1942: 17-175, 216-217, 357, Mainstone 1988: 227-228), του οποίου το επίπεδο φωτισμού ήταν χαμηλό, έβλεπαν μέχρι τη ζωφόρο των μαρτύρων και όχι ολόκληρο τον τρούλλο. Εάν, όπως εικάζεται, οι γυναίκες προσεύχονταν χωριστά από τους άνδρες, τότε καταλήγουμε στο συμπέρασμα ότι όλοι έβλεπαν τις ίδιες παραστάσεις των αρχιτεκτονημάτων.

Κατά συνέπεια οι κατηχούμενοι που περιοριζόνταν στον νάρθηκα δεν μπορούσαν να δουν τον χορό των αγγέλων και τη "Δόξα" του Κυρίου, γιατί ο ουράνιος θόλος θα τους αποκαλυπτόταν μόνο μετά τη βάπτισή. Έτσι, στο στάδιο της κατήχησης έπρεπε να ενταθεί η ελπίδα και η αναμονή, ότι μια μέρα θα μπορούσαν να δουν τον Χριστό, "το αληθινό φως".

Θερμές ευχαριστίες οφείλω στον κ. Χαράλαμπο Μπακιριτζή, Προϊστάμενο της 9ης Εφορείας Βυζαντινών Αρχαιοτήτων για τις διευκολύνσεις κατά τη διάρκεια των μετρήσεων και την παραχώρηση σχεδίων από το αρχείο της 9ης ΕΒΑ.

Στην κα. Δήμητρα Καμαράκη, Ζωγράφο-Ψηφιδογράφο, η οποία εργάστηκε από το 1994 έως το 1997 στην αισθητική αποκατάσταση του ψηφιδωτού διακόσμου της πρώτης ζώνης του τρούλλου της Ροτόντας, οφείλω θερμές ευχαριστίες για τις παρατηρήσεις της πάνω στη χρωματική κλίμακα των ψηφιδών που χρησιμοποιήθηκαν στο ψηφιδωτό του τρούλλου καθώς και στη χρήση του ζατρικίου στους ενδιάμεσους χρωματικούς τόνους στα πρόσωπα των μαρτύρων. Η ανάλυση της κας Καμαράκη περί της εναλλαγής φωτός-σκιάς στην απόδοση του όγκου της μορφής των μαρτύρων βοήθησε στην κατανόηση του συστήματος διαχείρισης του φωτός στο εσωτερικό του μνημείου.

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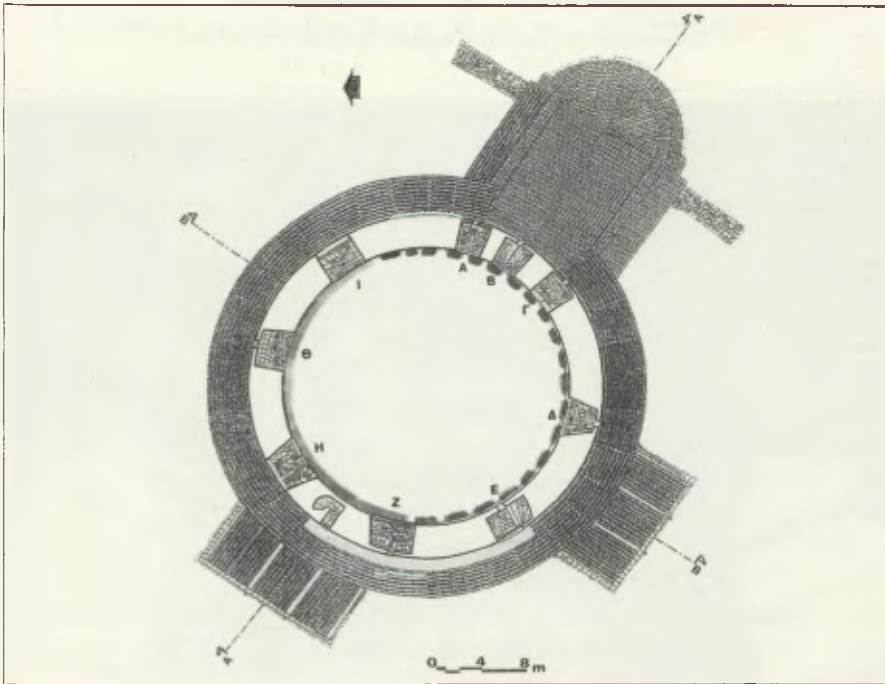
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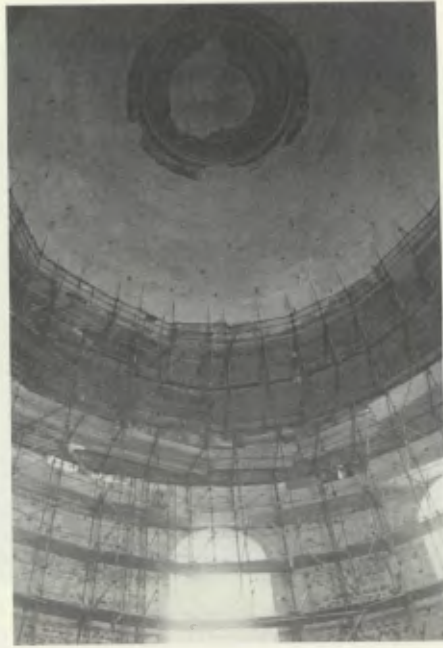
ΕΙΚΟΝΕΣ



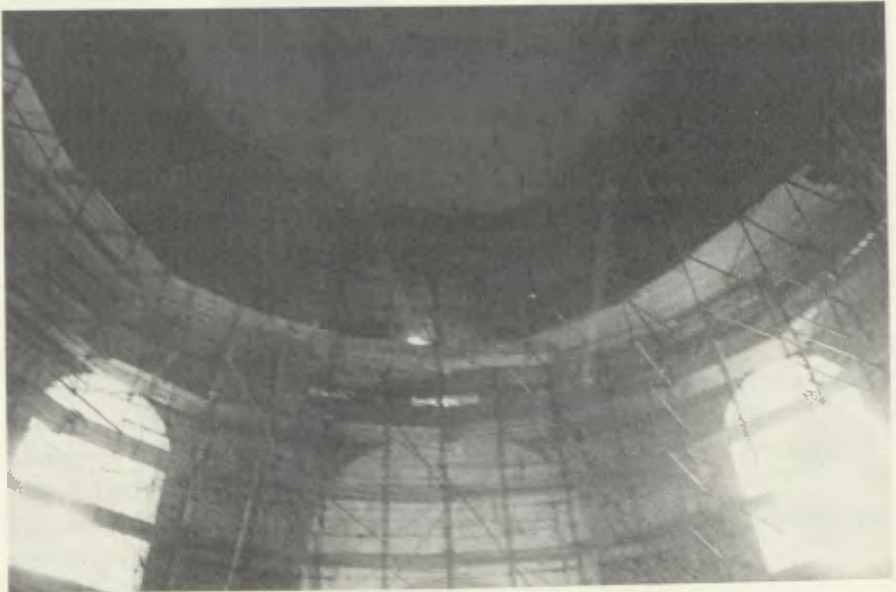
1. Ροτόντα. Άποψη από ΒΑ.



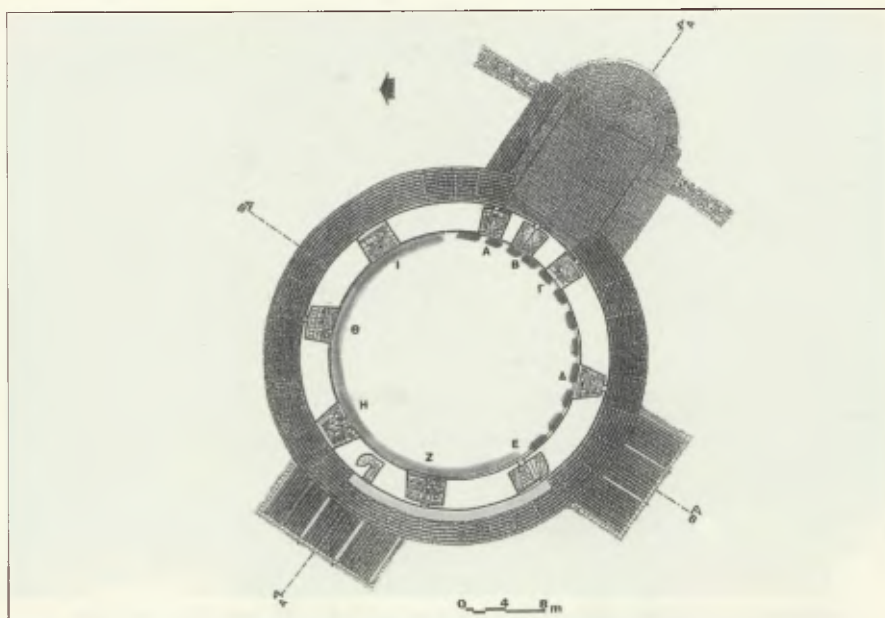
2. Κάτοψη στους φεγγίτες. Περιοχή με έντονο φωτισμό κατά τη διάρκεια του χειμώνα.



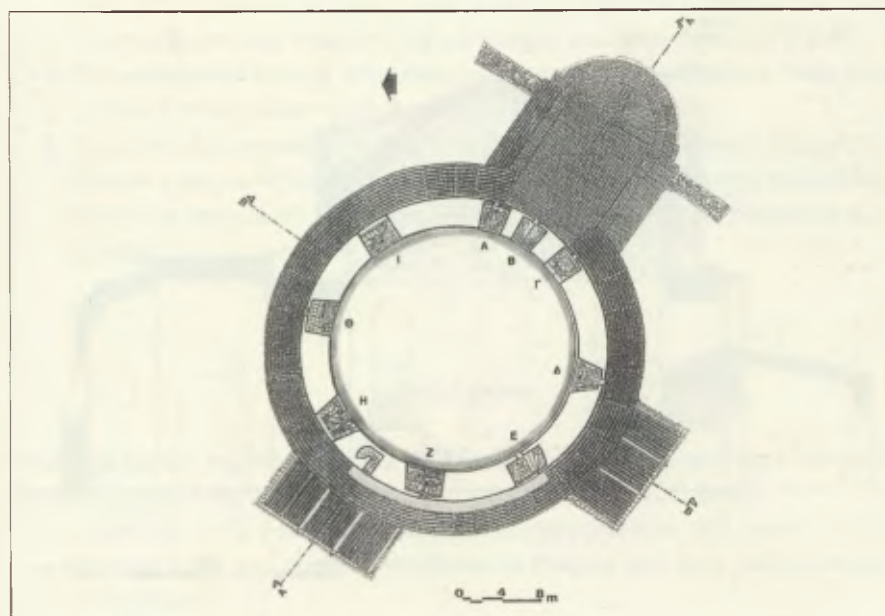
3. Ο φωτισμός του τρούλλου κατά τη διάρκεια του χειμώνα.



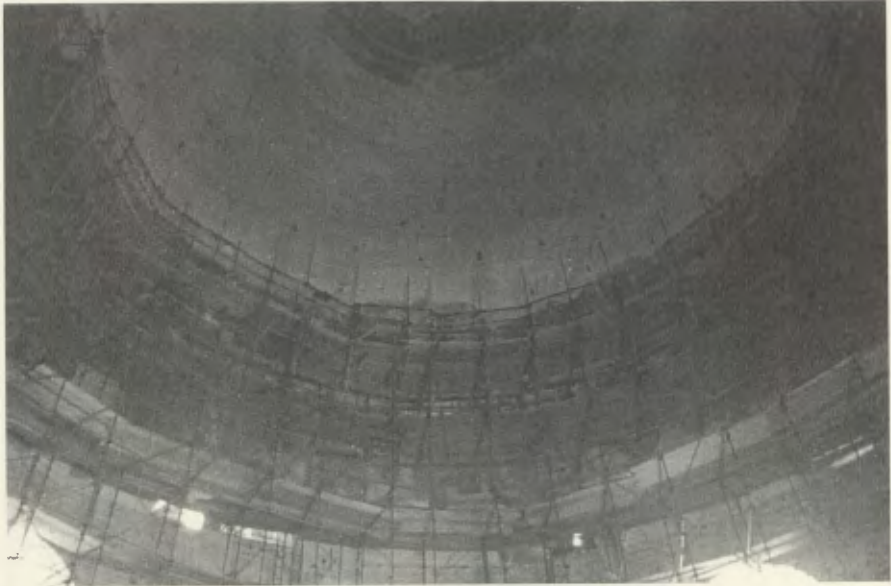
4. Δέσμες φωτός κατά τη διάρκεια της Άνοιξης (9 π.μ.).



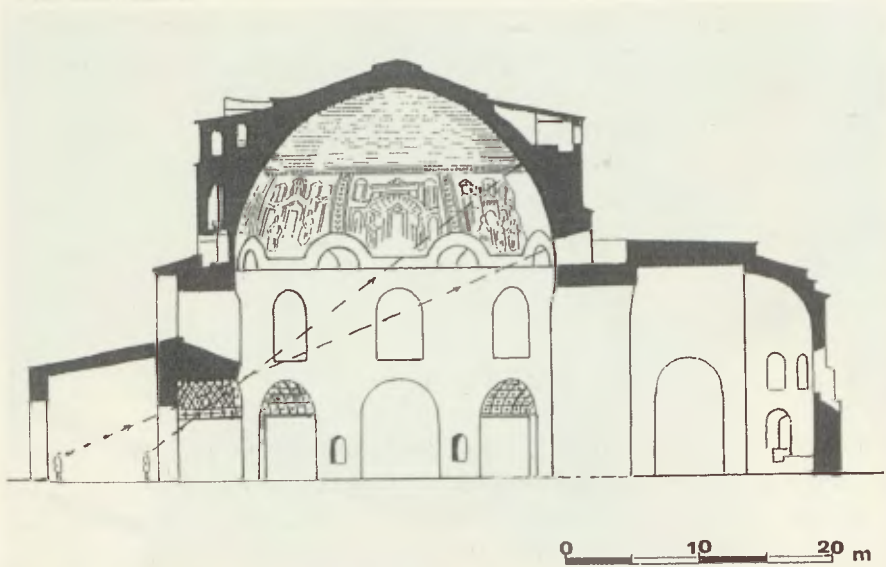
5. Κάτοψη στους φεγγίτες. Περιοχή με έντονο φωτισμό κατά τη διάρκεια της άνοιξης.



6. Κάτοψη στους φεγγίτες. Περιοχή με έντονο φωτισμό κατά τη διάρκεια του καλοκαιριού.



7. Ο φωτισμός του τρούλλου κατά την περίοδο του καλοκαιριού.



8. Τομή κατά μήκος. Οπτικό πεδίο κατηχουμένων.

ΣΥΜΠΕΡΑΣΜΑΤΑ

Μετά τις παρουσιάσεις των ανακοινώσεων και τη διαλογική συζήτηση μεταξύ των όμιλητών και του ακροατηρίου προέκυψαν τα ακόλουθα συμπεράσματα:

1. Τα ψηφιδωτά της Ροτόντας έχουν δεχθή μετά τους σεισμούς του 1978 έκτεταμένες σωστικής φύσεως εργασίες στερέωσης, συντήρησης και καθαρισμού σε ολόκληρη την επιφάνειά τους.
2. Οί συμπληρωματικές εργασίες στερέωσης και καθαρισμού θα πρέπει να περιορισθούν στις αναγκαίες και να ενισχυθούν οι εργασίες όμογενοποίησης της εμφάνισης των ψηφιδωτών.
3. Νά ενισχυθῆ και νά συστηματοποιηθῆ ἡ τεκμηρίωση των εργασιών. Στην τεκμηρίωση θα πρέπει νά συμπεριληφθῆ ἀποτύπωση των ψηφιδωτών σε λεπτομέρειες και στο σύνολό τους με ἀξιολόγηση παλαιότερων ἀποτυπώσεων και νέα καλή φωτογράφιση των ψηφιδωτών, πού ἀπουσιάζουν ἀπό τῆ διεθνή βιβλιογραφία και εἶναι πρώτη ἀνάγκη.
4. Νά καθορισθῆ τρόπος περιοδικοῦ ἐλέγχου των ψηφιδωτών, ὅπως και ρύθμιση κανονικῶν τιμῶν θερμοκρασίας και ὑγρασίας.
5. Ἐχοντας ἀποκρυστοποιηθῆ ὁ τρόπος φυσικοῦ φωτισμοῦ των ψηφιδωτών μπορεῖ αὐτός νά ἀποκατασταθῆ στην ὁλότητά του προσδίδοντας στα ψηφιδωτά ζωντανές ἐναλλαγές φωτισμοῦ και δυναμική παρουσία.

CONCLUSIONS

After the papers had been read, a discussion and exchange of views between the speakers and the audience produced the following conclusions:

1. After the 1978 earthquake, extensive consolidation and conservation salvage work was done on the Rotunda mosaics and their entire surface was cleaned.
2. Further consolidation and cleaning must be limited to what is absolutely

necessary and great attention must be paid to the task of unifying the appearance of the mosaics.

3. The work must be documented systematically, the documentation including drawings of entire mosaics and details there-of with an appraisal of earlier drawings and new, high-quality photographs of the mosaics. These are not available in the international literature and are a primary necessity.
4. A means of periodically monitoring the mosaics must be devised, as also of regulating normal levels of temperature and humidity.
5. Now that we understand the process of the mosaics' natural illumination, this can be restored in its entirety, investing them with a vibrant interplay of light and a dynamic presence.

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F. ΠΙΝΑΚΙΔΕΣ
POSTERS

MARIA DE FATIMA ABRACOS

**LES MOSAÏQUES ROMAINES DU MUSÉE NATIONAL
D' ARCHÉOLOGIE, LISBONNE**

SUMMARY

The Museu Nacional de Arqueologia keeps a collection of Roman mosaics mostly composed by the group of mosaics that came from the excavation campaigns of Estacio da Veiga performed in the Algarve between 1876 and 1880. This collection is also composed by the mosaics acquired by the first director of the Museum, Jose Leite de Vasconcelos, such as the Ulisses de Santa Vitoria do Ameixial mosaics, surveyed by Luis Chaves and also the mosaics of Torre de Palma, discovered in 1947 and surveyed under the supervision of Manuel Heleno by the team of Opificio delle Pietre Dure di Firenze restoration technicians, that also made the consolidation and setting on cement plates. And others, such as Martim Gil Orfeu's mosaic; the one of the dolphins of Pedrogao, Povoia de Cos (Alcobaca); the hipocampo mosaic of S. Sebastiao (Batalha). We have tried to find out what kind of intervention they have performed since their discovery, and at the same time we reflected over the conditions in which they find themselves in present.

**Les Mosaïques Romaines du Musée National d'Archéologie de Lisbonne
Estacio da Veiga et les mosaïques de l'Algarve**

Estacio da Veiga (1828-1891) a reuni une vaste collection de materiaux romains pendant les recherches qu'il a effectué pour elaborer la Carta Archeologica do Algarve. Parmi ces materiaux saillissent plus d'une demi - centaine de fragments de mosaïques, qui après plusieurs vicissitudes ont fini par former le noyau initial du Musée Ethnographique Portugais (1893), actuel Musée National d'Archéologie (fig. 1).

Les mosaïques romaines de la collection de Jose Leite de Vasconcelos

Jose Leite de Vasconcelos (1858-1941), fondateur de ce Musée, a acqui, tout au long de sa carrière comme Directeur du Musée, plus d'une dizaine de

fragments de mosaïques romaines, comme l'atteste le Livre des Registres. Ce sont, pour la plupart, des tableaux, qui ont été, le plus souvent, retirés aux mosaïques des sites archéologiques sans registres de contexte. Leite de Vasconcelos a cherché à les sauver en les acquérant pour le Musée où ils ont été exposés après avoir été consolidés et encadrés.

Luis Chaves et la dépose de la mosaïque de Ulysse de Sta. Vitoria do Ameixial, Estremoz, (Alentejo)

Les premières tentatives de dépose des mosaïques n'ont pas eu trop de succès parce-que ces dernières ont beaucoup perdu de leur aspect originel à cause des interventions auxquelles elles ont été sujettes. La mosaïque de Ulysse de Santa Vitoria do Ameixial en est un exemple.

Luis Chaves a écrit, à cet effet, quelques lignes sur la difficulté qu'il a eu à déposer la mosaïque de "Ulysse et les Sirènes", lors des fouilles de 1915-1916: "Au fur et à mesure que les fouilles avançaient, le nucleus était fixé avec des pieux laissant, de cette façon, les cadres ou superficies desordonnées beaucoup moins soutenus afin de provoquer la rupture à cet endroit, parce-que le cadre pouvait être facilement reproduit. L'imperfection du procès utilise, l'irrégularité hétérogène du massame du nucleus, qui se desagregait de la couche supérieure, où se fixaient les tessellae, n'ont pas toujours permit le bon succès de la tentative. Ainsi, la mosaïque a été divisée en plusieurs fragments dont certains étaient très lourds (...)" (Chaves 1956: 65).

La mosaïque a été très endommagée par l'utilisation de cette methode, comme on peut le voir sur la fig. 2.

Manuel Heleno et la dépose des mosaïques de Torre de Palma

Ce n'est que lors des années cinquante de notre siècle que l'on a pu assister, d'une façon plus scientifique, à la dépose des mosaïques et à leur fixation sur des supports, d'après les connaissances acquises auprès de l'équipe de restauration de Florence qui a été appelée pour procéder à la dépose et à la restauration des mosaïques de Torre de Palma. En mars de 1947, Manuel Heleno a eu connaissance de l'existence de vestiges de mosaïques qui ont été mis à découvert lors des travaux agricoles réalisés dans la propriété de Torre de Palma. Manuel Heleno a réussi à obtenir une autorisation pour faire venir, au Portugal, une équipe de techniciens italiens spécialisés dans la restauration et la conservation de mosaïques, afin de procéder à la dépose, à la consolidation et à la fixation des mosaïques de Torre de Palma au Musée Ethnographique Dr. Leite de Vasconcelos, à Lisbonne.

Les techniciens ont procédé à leur dépose, à leur consolidation et à leur

fixation sur des plaques de ciment. Les mosaïques des arcs fleuris, des pannetons de clé, des muses, des chevaux et un fragment de la mosaïque des sabliers du couloir de l'entrée de la domus de la villa, ainsi qu'un fragment de la mosaïque des coussins du péristyle ont été exposées au Musée, dans la salle consacrée à la villa romaine de Torre de Palma.

Les mosaïques du péristyle ainsi qu'une partie de la mosaïque du couloir et la mosaïque des étoiles, qui est très endommagée, sont restées dans le site archéologique après avoir été consolidées.

En 1982, du à la restauration du Musée on a procédé à la dépose des mosaïques qui étaient exposées à même le sol. Les mosaïques qui proviennent de Torre de Palma comme la mosaïque des chevaux et celle des Muses, ont été retirées de l'exposition. Par la même occasion, il a été décidé de revoir leur restauration. Ce travail a été donné aux techniciens de l'atelier de restauration du Musée de Conimbriga. Ils ont remplacé l'ancien support de ciment par un autre plus léger (Lancha - Beloto 1994: 28).

Lors du deuxième Colloque "Arqueologia do Nordeste Alentejano", en 1989, la Chapelle da Madalena à Monforte, qui a été restaurée et transformée en un petit Musée, a reçu et a commencé à exposer au public le plan, en relief, de la villa de Torre de Palma, certains matériaux en céramique, ainsi que la mosaïque des fleurs; la mosaïque des pannetons, un fragment de la mosaïque des sabliers et un fragment de la mosaïque des coussins du péristyle. Ces mosaïques y existent encore (Lancha - Andre 2000).

Une intervention dans l'ancienne collection de fragments de mosaïques encadrées

Le financement attribué par le IPPC dans la décade de 80 a permis non seulement de placer un support de résine léger sur la mosaïque des chevaux de Torre de Palma, mais aussi sur l'ancienne collection de fragments de mosaïques encadrées et provenantes de l'Algarve, de l'Alentejo et de l'étranger. Selon l'information des fiches d'inventaire du MNA, les mosaïques enregistrées dans le Livre des Entrées de Leite de Vasconcelos, avec les numeros: E8130 à E8133 proviennent de Balquis, Syrie.

En 1988, Carlos Beloto, ex-technicien restaurateur du Musée Monographique de Conimbriga a vérifié toutes les mosaïques qui existaient au MNA et a commencé une nouvelle restauration. Les cadres ont été retirés ainsi que leurs anciens supports.

Après avoir été nettoyées, les mosaïques ont reçu un nouveau support léger en résine avec une épaisseur de 1,5 à 2 cm. Ces dernières sont conditionnées dans la réserve du Musée, sur des rayons.

Les mosaïques sur support de ciment continuent demontées en plaques, qui sont empilées et gardées dans la réserve du MNA.

Les motifs décoratifs des mosaïques

Sur la plupart des mosaïques des sites archéologiques de notre pays prédominent les mosaïques décorées avec des motifs géométriques, mais les fragments de mosaïques déposés au MNA qui proviennent de la collection de Estacio da Veiga, arrachés aux tableaux originels pour être exposés dans les musées, comme il était habituel pendant le XIX^{ème} siècle, possèdent la plupart une décoration figurative. De l'Algarve: on a des fragments de mosaïque avec des poissons, des buccins, des bivalves, une seiche, un bateau, une cruche (fig. 3).

Les mosaïques qui sont entrées au MNA à l'époque de Leite de Vasconcelos sont des mosaïques de grandes dimensions et sont, en grande partie, des mosaïques figuratives, comme la mosaïque de Ulysse avec les Sirènes de Sta Vitoria do Ameixial, Estremoz; la mosaïque de Martim Gil, Leiria, décorée avec une scène orphique; la mosaïque de Povoia de Cos, Alcobaca, décorée avec une tête radiée; la mosaïque de Povoia de Cos, Alcobaca qui n'est décorée qu'avec des motifs géométriques et enfin la mosaïque de S. Sebastiao do Freixo, Leiria, décorée avec un hypocampe (fig. 4).

Les quatre mosaïques de Balquis (Syrie) sont figuratives: l'une représente une tête de dame avec une guirlande de feuilles; une autre laisse voir une figure masculine avec un dard dans la main; la troisième représente aussi une figure masculine avec un dard dans la main et la dernière montre une figure d'animal entourée de végétation (figs. 5, 6).

Les mosaïques de grandes dimensions

Quelques observations

Les lourdes mosaïques sur support de ciment continuent demontées en plaques qui sont empilées et gardées dans la réserve du MNA, comme celle de Martim Gil et de Povoia de Cos qui sont en pleine détérioration. Elles ont besoin d'une intervention immédiate. Il est impératif de remplacer le support de ciment par un autre qui soit synthétique et léger et de procéder au traitement du tessellatum.

Jusqu'à la décade de 50 du XX^{ème} siècle, la réponse au problème de sauvegarde des mosaïques était la dépose. Il n'y avait pas d'autre solution et les mosaïques s'accumulaient dans les musées et dans les ateliers de restauration. La réduction des registres d'entrées des mosaïques au MNA démontre bien le

changement d'attitude par rapport à cette matière. Les dernières entrées des mosaïques au Musée se rapportent aux mosaïques de Torre de Palma (1947/1948). Les mosaïques des chevaux et des Muses sont retournées à Torre de Palma pendant l'année 2003.

La conservation des mosaïques doit tendre à la préservation *in situ* pour mieux se comprendre son insertion ainsi que sa relation avec les aspects architecturaux. Après avoir fait l'étude des couches inférieures et après avoir procédé aux travaux de fouilles, ainsi qu'à la consolidation du lit de pose de la mosaïque et après avoir procédé au traitement et au placement du tessellatum sur un nouveau support, on doit restituer la mosaïque à sa situation originelle pour ne pas continuer à accumuler les mosaïques, sans contexte, dans les réserves des musées.

Nous sommes en train de faire le relèvement de toutes les mosaïques de la collection du Musée, à compléter les fiches d'inventaire, à faire la description des motifs et après nous procéderont à l'étude des parallèles et à leur intégration, quand possible, dans le contexte archéologique.

Bientôt, le Musée sera mis sur le chantier. La réserve sera structurée et certainement la restauration des lourdes mosaïques ne sera pas oubliée.

LES SOURCES

Musée National d'Archéologie:

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Photographies des mosaïques de l'Archive Photographique du MNA. Tous les photos sont de l'Archive Photographique du MNA, à l'exception des nos: 3, 5, 6, clichés de l'auteur.

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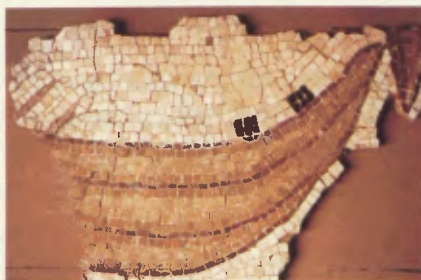
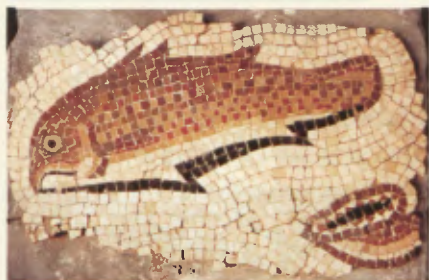
FIGURES



1. (A - B - C) - Fragments de mosaïques encadrées de la collection de Estacio da Veiga, provenants de Milreu, Algarve. MNA 18701 (0,41X0,29m), 18693 (0,48X0,30m) et 18700 (1,11X0,26X0,33m).



2. La mosaïque de Ulysse de Santa Vitoria do Ameixial. La mosaïque a été très endommagée à cause de la méthode de la dépose.



3. (A - B) - Fragments de mosaïques de Milreu (MNA18693 et MNA18701) avec un nouveau support léger.

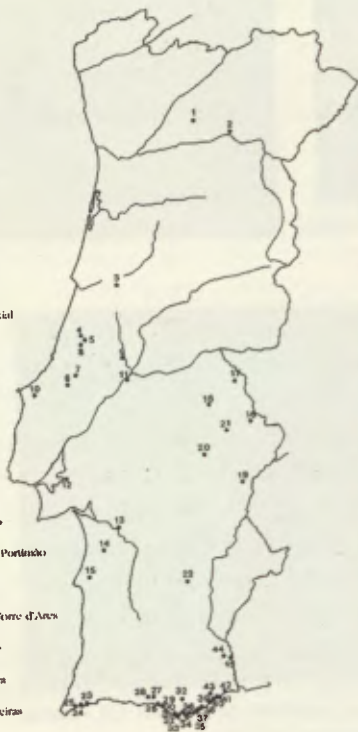


4. Fragment central de la mosaïque de Martim Gil, Leiria, décorée avec une scène orphique MNA54.



5. (A - B) - Fragments de mosaïques de Balquis. MNA-E8130 (0,69X0,59m); E8131 (0,66X0,46m).

- 1 - Vila real
- 2 - Tralhanz
- 5 - Coulmbriça
- 1 - Leiria
- 5 - Martin Gil
- 6 - Pedregão, Alcobaca
- 7 - Póvoa de Cox, Alcobaca
- 8 - S. Sebastião, Batalha
- 9 - Tomar
- 10 - Obidos
- 11 - Chamusca
- 12 - Barcelos (Góis)
- 13 - Alcácer do Sal
- 14 - Gírsulda
- 15 - Santiago de Cacém
- 16 - Arronches
- 17 - Arranhanha, Pombal
- 18 - Granja, Crato
- 19 - Bouça, Alentejo
- 20 - Santa Vitória do Amaral
- 21 - Torre de Palma
- 22 - Beja
- 23 - Lagos
- 24 - Bosco do Rio
- 25 - Praia da Salgada
- 26 - Cerro da Vila
- 27 - Loulé
- 28 - Bezena, Loulé
- 29 - Loulé Velho
- 30 - Amendoeira, Faro
- 31 - Faro
- 32 - Aljezur
- 33 - S. Francisco, Portimão
- 34 - Portimão
- 35 - Quinta da Boa Vista, Portimão
- 36 - Ferragudo, Portimão
- 37 - Torreão Velho
- 38 - Marim, Odiro
- 39 - Quinta das Antas e Torre d'Água
- 40 - Póvoa d'Algarve
- 41 - Fazenda da Trindade
- 42 - Cacilhas
- 43 - S. Domingos d'Assens
- 44 - Alentejo
- 45 - Memória das Laranjeiras



6. (A - B) - Fragments de mosaïques de Balquis. MNA-E8132 (0,70X0,55 m); E8133 (0,68X0,49m).

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**NUOVI PAVIMENTI MUSIVI DALLA VILLA DEI DOMIZI ENO BARBI
DI SANTA LIBERATA. RESTAURO *IN SITU* E CONSERVAZIONE**

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**Soprintendenza per i Beni Archeologici della Toscana

SUMMARY

The article concerns the plan of restoration in situ and the conservation of some wide portions of mosaic floors decorated in black and white discovered in the garden of the Domizi Enobarbi's Villa in Santa Liberata (Monte Argentario, Grosseto, Italy) - carried out during summer 2001.

CENNI STORICI

La denominazione di Domitiana positio (tramandata dall'Itinerarium Maritimum e quindi solidamente attestata nella media età imperiale) indica un approdo naturale, poi trasformato in struttura edificata intorno al 50 a. C. dalla potente gens Domitia, che da sempre è stato identificato con l'attuale promontorio di S. Liberata, nella parte nord del golfo di Porto S. Stefano (Monte Argentario, Grosseto) (fig. 1).

Il grande complesso di S. Liberata, costituito da residenza, impianto termale, grande peschiera, strutture produttive, magazzini e approdo attrezzato, e databile nelle parti più antiche alla tarda età repubblicana, ha subito nel tempo trasformazioni, distruzioni e rifacimenti, dovuti anche al passaggio fra diverse proprietà, che ne hanno purtroppo alla fine stravolto completamente l'aspetto e la sintassi strutturale. Basti pensare che attualmente l'intero complesso è ripartito fra due proprietà nettamente divise, che impediscono la continuità di percorso e spezzano definitivamente l'unità architettonica dell'insieme.

In una delle proprietà si trovano attualmente parte delle strutture residenziali, il grande criptoportico, che attraversa buona parte del complesso, resti delle strutture a mare, con avanzi di moli e banchine e le potenti sostruzioni della basis villae. Domina il giardino il lacerto mozzato della Torre di S. Liberata, costruita dai Senesi nel 1442, evidentemente reimpiegando molto materiale proveniente dagli ambienti abitativi della villa. In quest'area si sono succedute, praticamente senza soluzione di continuità, fasi di occupazione e frequentazione sino all'età moderna: è qui infatti che nel 1376 riparava papa Urbano V con i superstiti del naufragio avvenuto presso Talamone durante la navigazione da Avignone a Roma; è qui che sino alla metà del '700 ebbe sede una piccola guarnigione per l'avvistamento dei pirati barbareschi in quella stessa torre senese già riutilizzata nell'imponente sistema difensivo dello Stato dei Presidi sotto il dominio spagnolo.

La distruzione operata dall'impianto della torre stessa e da lavori agricoli ha causato notevoli danni alle strutture antiche, ma al tempo stesso la presenza della mole difensiva ha impedito che si potesse procedere a ulteriori grandi opere di rimaneggiamento dei terreni, o, ancor peggio, d'edificazione. Così, in occasione di lavori di risistemazione del manto erboso, sotto appena 30-40 cm di humus, sono affiorate notevoli porzioni di tre pavimenti musivi, che documentano la vita della prestigiosa residenza domizia dalle origini tardorepubblicane all'età adrianea. Si tratta chiaramente di ambienti destinati al soggiorno e al riposo (cubicula e vestibula), ripartiti da muretti divisorii in laterizio, di cui restano scarse tracce al livello di fondazione.

Nel 1981 M. Michelucci, nella relazione per il vincolo archeologico diretto, così notava: "Dei pavimenti in mosaico, delle decorazioni architettoniche in marmo e degli stucchi resta qualche testimonianza all'Antiquarium di Orbetello, ma i resti più considerevoli sono senza dubbio ancora interrati, essendo nella zona l'attuale piano di campagna almeno 1 metro al di sopra del piano di calpestio antico". E' evidente che trattandosi di una villa marittima l'architetto ha concepito una costruzione a più livelli, per adattare le strutture all'andamento della costa e che quindi non sempre il piano di calpestio antico si trova alla stessa quota. Del resto i mosaici ora rinvenuti sono pertinenti senz'altro alla zona residenziale, posta al culmine delle strutture, alta sul mare. Una delle porzioni (pavimento no 3), la più vicina all'attuale corpo della villa, risultava già indagata nei primi anni '50 del secolo scorso, dato questo attestato dalle numerose "fermature" di tessere eseguite con malta cementizia e da una fotografia conservata presso il Gabinetto Fotografico della Soprintendenza per i Beni Archeologici della Toscana – per altro edita in una nota sui decori musivi d'età romana a firma di Giulio

Ciampoltrini. Le altre due porzioni di mosaici non sembrano essere state indagate in tempi recenti.

I MOSAICI

Procedendo da nord, ai piedi della torre e in parte occultato o distrutto dalla stessa, è il pavimento più eccezionale dal punto di vista della decorazione (pavimento no 1, dimensioni 8 m²) e che forse aveva una notevole estensione, oggi non più calcolabile, dato che le fondazioni della torre vi insistono direttamente. Ciò che resta del vano decorato a mosaico, forse un grande corridoio di passaggio fra gli ambienti abitativi, mostra una complessa decorazione bicroma, in tessere bianche e nere (dimensione tessere cm 1x1x0,5) costituita da motivi in cui s'intrecciano elementi vegetali stilizzati (foglie, rosette, germogli), elementi geometrici (rombi, quadrati, circonferenze), e una panoplia semplice (scudo in bianco, attraversato da giavello a due punte in nero, e contornato da guillochis bianca in campo nero), ripetuta ai quattro vertici di un quadrato a cornice nera, entro cui è un nodo di Salomone complesso, delineato in bianco su fondo nero; la cornice esterna è in nero a due listelli paralleli, entro cui corre una fila di triangoli.

A sud del pavimento 1, sempre alla base della torre, emerge un'ulteriore porzione di pavimento musivo (pavimento 2, dimensioni 15 m²), a semplice bicromia, con tappeto interamente bianco e doppia cornice esterna in nero (dimensione tessere cm 0,5-0,7x0,7), la cui quota è lievemente inferiore (5-7 cm) a quelle del pavimento 1 e del successivo pavimento 3. Il pavimento 2 appartiene infatti sicuramente al periodo originario della villa, come denuncia anche lo stile e la dimensione delle tessere. Si notano inoltre alcune risarciture di porzioni di tessellatum, che appaiono con sicurezza poste in antico per restaurare lacune di modeste dimensioni. Le tessere usate per le lacune hanno dimensioni lievemente maggiori rispetto a quelle della messa in opera originaria.

Il terzo pavimento (pavimento 3, dimensioni 24 m²) presenta una decorazione bicroma in tessere bianche e nere (dimensioni tessere analoghe a quelle del pavimento 1) costituita da un complesso intreccio di motivi geometrici e vegetali stilizzati: ottagoni, e quadrati negli spazi di risulta, delineati in nero su fondo bianco; intorno ai quadrati è un cerchio di quattro pelte (in nero), che forma negli ottagoni quadrati con lato convesso; nei quadrati fra gli ottagoni, nodo di Salomone in bianco su fondo nero; nei quadrati a lato convesso motivo vegetale stilizzato in nero; doppia cornice in nero all'esterno.

Intervento conservativo del pavimento No 2

Il mosaico evidenziava la presenza di resti di una stratigrafia archeologica non manomessa: in particolare si trattava di uno stato di crollo/abbandono costituito da frammenti di laterizi di copertura, frammenti di intonaci -alcuni dei quali conservavano tracce dell'antica decorazione-, piccole lastre marmoree di rivestimento e bozze di pietra pertinenti le murature in elevato. Gli intonaci e la calce contenuta nello strato determinavano la formazione di un velo di calcare, dello spessore medio di 3-4 mm, che ricopriva tutta la superficie del tappeto musivo impedendo alle radici di intaccare le tessere e, allo stesso tempo, di conservare in buono stato il sottostante mosaico. Si rilevava tuttavia la coesistenza, in varie zone del tappeto musivo, di numerose e tenaci concrezioni dello spessore medio di 5cm: queste non erano altro che il risultato di una amalgama nel tempo dei materiali di crollo (laterizi, intonaci, calce, pietre).

Le operazioni di restauro, dopo una prima sommaria pulitura della superficie di tutto il pavimento, sono state precedute da un rilievo grafico in scala 1:50, con mappatura delle lacune e dei punti di distacco delle tessere per una successiva identificazione delle integrazioni e dei consolidamenti da eseguire.

A questa fase si è affiancata la documentazione fotografica dello stato iniziale di conservazione, nonché il recupero di tutte le tessere fuori collocazione. Altre tessere sono state recuperate nel corso degli anni dai proprietari e verranno riutilizzate nel prossimo intervento di integrazione delle lacune.

Successivamente si è provveduto a rimuovere meccanicamente, con l'ausilio di mazzuoli e scalpelli, i depositi compattati (calcare, antico intonaco e terra) dello spessore medio di 5 cm circa che si estendevano su un'area complessiva di circa 3m².

Una volta rimossi tali materiali si è cercato di pulire il tessellato dallo strato calcareo, in media spesso 4 mm, esteso sull'intera superficie musiva, con metodi chimici e non e con tempi controllati. Le operazioni di pulitura sono state effettuate mediante compresse di Sepiolite e Arbocel nella proporzione di 2:1 :

- Acqua deionizzata
- Soluzioni di carbonato d'ammonio (al 6%; al 10% e saturo)
- Soluzioni di EDTA tetrasodico (al 6%, al 20% e saturo)
- Soluzioni di EDTA bisodico (al 6%, al 10% e saturo)

I risultati negativi ottenuti utilizzando i metodi di pulitura sopra citati

hanno portato a dedurre che il metodo meccanico di pulitura AIRBRASIVE sarebbe risultato il più idoneo e il solo possibile in questo caso specifico. Lo strumento è stato usato in maniera graduata per settori là dove lo strato calcareo era più o meno tenace. Il materiale abrasivo utilizzato è stato ossido di alluminio di granulometria 220.

Nel corso di questa fase si è notato che lo strato calcareo si era depositato in maniera diversa in alcune zone. Terminata tale operazione si è constatato che queste zone erano restauri antichi differenziati rispetto al ductus originale da una disposizione più sommaria delle tessere, che ha permesso al calcare di ancorarsi tra gli interstizi. Le "nuove" tessere risultano inoltre di dimensioni maggiori rispetto le originali nonché di litotipi diversi.

Una volta liberato lo strato musivo dai depositi calcarei si è reso necessario un intervento straordinario di consolidamento locale delle tessere in particolar modo nella zona ovest del mosaico, dove sono le lacune più estese. Qui il manto musivo ha acquisito, nel corso del tempo, sviluppi di superficie tali da creare anche forti depressioni. Inoltre si sono formati diversi piani di sfaldatura tra il nucleus e il rudus, per tale motivo si è ritenuto opportuno lasciare in alcune zone lo strato calcareo rimuovendolo solo al momento in cui si procederà al consolidamento totale.

Dopo un'accurata pulitura delle lacune dal terriccio accumulato si è reso necessario un parziale risanamento del rudus dagli organismi macroscopici: radici di piante e vegetazione infestante. Dopo un'accurata scelta di un biocida che garantisse una stabilità per un certo periodo di tempo e non esercitasse azioni chimiche e fisiche nei confronti dei materiali lapidei (Glyfosate) si è provveduto a delle siringature nel terreno. Successivamente si è eseguito un consolidamento locale delle zone decoese mediante siringature di Acril 33 (1:3) per liberare le parti distaccate da eventuali accumuli di terra e per garantire una migliore aderenza della malta da iniezione. La scelta di quest'ultima è caduta su PLM-SM (malta da iniezione per i mosaici) usata in proporzione 1:4. Là dove non è stato possibile intervenire con tale malta, ovvero le zone perimetrali delle lacune, si è usata una miscela composta da grassello, polvere di marmo, pozzolana (1: 1 e $\frac{1}{2}$: $\frac{1}{2}$) applicata con spatole.

Là dove si presentavano superficiali attacchi di microflora (nelle zone perimetrali del mosaico, sottoposte ad una maggiore umidità a causa del giardino circostante) si è provveduto a rimuovere lo strato di muschi con una spatola di legno e successivamente con micro-impacchi di acqua ossigenata a 130 volumi per una totale rimozione. L'operazione di pulitura si è conclusa intervenendo con acqua deionizzata e bruschini per rimuovere la sporcizia di superficie.

Si sono poi evidenziati tre tipi di lacune presenti sulla superficie del mosaico, alcune integrabili mediante l'applicazione di tessere musive (recuperate al momento dello scavo e conservate oppure utilizzando materiale nuovo), altre mediante risarcimento con malta idonea:

- Lacune "minori": tali lacune rispecchiano l'accezione di lacuna mancata secondo Umberto Baldini sono state integrate utilizzando tessere musive antiche, considerando l'intervento come manutenzione ordinaria del mosaico. La malta di allettamento utilizzata era composta di: 1 parte di grassello di calce e 2 di polvere di marmo bianco botticino 000.
 - Lacune "maggiori": tali lacune interessavano fondamentalmente la zona ovest del mosaico e rispecchiavano la cosiddetta lacuna perdita. Si è posto il problema di una risarcitura perciò, rispettando i criteri di reversibilità e riconoscibilità, si è optato per una ricostruzione della tessitura, rispettando gli andamenti originali. Grazie a delle prime analisi che il laboratorio del CNR di Firenze ha condotto sui campioni di tessere musive originali è risultato che le tessere musive bianche sono in alberese mentre le tessere musive nere sono di un litotipo di origine vulcanica (in futuro il laboratorio provvederà a fornire un'analisi più dettagliata dei litotipi e delle malte di allettamento) si è perciò scelto di utilizzare tessere nuove in travertino per le integrazioni delle tessere bianche e tessere nuove in "basaltina" per le integrazioni delle tessere nere. La scelta è stata suggerita dalla colorazione di tali litotipi leggermente sottotono rispetto ai materiali originali. Tali lacune sono state segnalate da una fila di tessere in vetro trasparente dello spessore di 3mm.
- Tali trattamenti di natura consustanziale secondo lo schema proposto da Montanaro nel 1996, hanno lo scopo principale di attenuare il più possibile la percezione visiva di tali mancanze e di consentire una migliore lettura del manufatto. Un'opportuna documentazione grafica e fotografica garantirà il rispetto dei criteri di riconoscibilità.
- Lacune lungo i bordi del mosaico: per tali lacune si è ritenuto opportuno intervenire con un trattamento di natura non consustanziale, risarcendo con malta, in quanto non era intuibile l'estensione del manto musivo. La malta utilizzata era composta da: 1 parte di grassello di calce; 1 e 1/2 di polvere di marmo bianco botticino 000; 1/2 di polvere di marmo giallo oro 000; Acril 33 al 10% nell'acqua d'impasto.

Contemporaneamente ai suddetti interventi si è intervenuti con un consolidamento esteso a tutta la superficie del mosaico, mirato là dove si evidenziavano distacchi.

In tali zone, dopo la rimozione di alcune tessere dove fosse necessario, in

modo tale che la malta potesse raggiungere ogni punto interessato dal distacco, si è eseguito siringature di Acril 33 (1:3) per liberare le parti decoese da eventuali accumuli di terra e per garantire una migliore aderenza della malta da iniezione (PLM-SM usata in proporzione 1:4) iniettata tramite un tubicino di plastica flessibile (del diametro di circa cm 0,5) collegato ad una siringa.

Le lacune della malta interstiziale tra le tessere sono state integrate solo dopo una lunga e attenta operazione realizzata in modo puntuale solo dove mancava lo strato originale di malta bianca sottile, integrata con una malta nuova, di composizione simile (1 parte di grassello di calce, 2 di polvere di marmo bianco botticino 000).

Date le analisi, si è scelto un consolidante di origine acrilica: si è proceduto con il consolidamento delle tessere nere alterate e decoese applicando in maniera localizzata a pennello Acril 33 (1:15) fino a rifiuto.

La pulitura finale si è conclusa intervenendo meccanicamente, con l'ausilio di bisturi, in quelle zone dove si era ritenuto opportuno lasciare lo strato calcareo per operare solo al momento del consolidamento avvenuto. La rifinitura ha visto la pulitura di tutta la superficie con acqua deionizzata e spazzole morbide (fig.2).

Intervento conservativo del pavimento No 1

Al momento del primo sopralluogo (15/06/2001) il mosaico presentava problemi di sedimentazione calcarea diffusi su tutta la superficie con una maggiore concentrazione di depositi compattati (calcare, antico intonaco e terra), nella zona adiacente la torre, dello spessore medio di 5 cm circa, che si estendevano su un'area complessiva di circa 3m².

Su tutta la superficie si verificavano superficiali attacchi di microflora dovuti alla particolare situazione espositiva del mosaico e alla forte presenza di umidità dovuta anche al giardino circostante. Il mosaico si presentava come un frammento di un pavimento più grande, per tale motivo le tessere adiacenti i bordi risultavano pregiudicate nella loro stabilità. Ad una prima analisi, si notavano piani di sfaldatura tra il nucleus e il rudus; inoltre risultavano due lacune molto grandi e altre più piccole in prevalenza dovute alla presenza di radici sotto il manto musivo. Le tessere nere apparivano alterate e decoese su tutto il mosaico.

Effettuate le operazioni iniziali, le stesse del mosaico no 2, si è provveduto a rimuovere meccanicamente, con l'ausilio di mazzuoli e scalpelli, i depositi compattati. Una volta rimossi tali materiali si è cercato di pulire il tessellato dallo strato calcareo, in media spesso 4 mm, con metodi chimici e non e con tempi controllati. Le operazioni di pulitura sono state effettuate

mediante compresse di Sepiolite e Arbocel nella proporzione di 2:1 :

- Acqua deionizzata
- Soluzioni di carbonato d'ammonio (6%)
- Acqua Ossigenata a 130 Vol

Gli impacchi di carbonato d'ammonio sono stati fatti agire previa copertura con cellofan.

Scaduti i tempi si è provveduto alla rimozione degli impacchi e ad un accurato risciacquo delle sostanze impiegate: questa operazione è seguita all'asportazione meccanica dei depositi mediante bisturi.

Durante la fase di pulitura iniziale si è provveduto a rimuovere il terriccio intorno a bordi del frammento musivo ed è stata effettuata un'accurata pulitura delle lacune dal terriccio accumulato. Subito dopo si è intervenuti consolidando il nucleus sui bordi, sia del mosaico che delle lacune del mosaico, mediante iniezioni di Acril33 (1:3). Si è reso anche necessario un parziale risanamento del rudus dagli organismi macroscopici (radici di piante e vegetazione infestante) mediante applicazioni di un biocida (Glyfosate). Successivamente si è eseguito un consolidamento locale delle zone decoese mediante siringature di Acril 33 (1:3) per liberare le parti distaccate da eventuali accumuli di terra e per garantire una migliore aderenza della malta da iniezione (PLM-SM usata in proporzione 1:4) iniettata tramite un tubicino di plastica flessibile (del diametro di circa cm 0,5) collegato ad una siringa. La dove è stato necessario sono state rimosse alcune tessere in modo tale che la malta potesse raggiungere ogni punto interessato dal distacco. Le tessere sono state poi ricollocate nella loro sede originaria. A questo punto si è proceduto con il consolidamento delle tessere nere alterate e decoese applicando in maniera localizzata a pennello Acril 33 (1:15) fino a rifiuto.

Per l'intervento di integrazione delle lacune si sono seguiti gli stessi criteri di conservazione del mosaico no 2.

La malta di allettamento utilizzata per l'integrazione era, in questo caso, composta da: 1 parte di grassello di calce; 1 di polvere di marmo bianco botticino 000; 1 di sabbia di fiume.

Per quanto concerne le zone perimetrali al mosaico la malta utilizzata era composta da: 1 parte di grassello di calce; 1 e $\frac{1}{2}$ di polvere di marmo bianco botticino 000; $\frac{1}{2}$ di polvere di marmo giallo oro 000; Acril 33 al 10% nell'acqua d'impasto.

La pulitura finale si è conclusa con una pulitura di tutta la superficie con acqua deionizzata e spazzole morbide (fig.3).

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FIGURE



1. Una veduta di Santa Liberata negli anni Trenta del Novecento.



2. Il mosaico n°2 dopo l'intervento conservativo.



3. Il mosaico n°1 dopo l'intervento conservativo.

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**CONSERVATION, MAINTENANCE, AND PRESENTATION OF THE WALL MOSAICS
IN THE BASILICA OF ST DEMETRIOS, THESSALONIKI:
PRINCIPLES, METHODS, AND RESULTS**

ΠΕΡΙΛΗΨΗ

Ἡ ἐνίσχυση τῆς ὑλικῆς ὑπόστασης τῶν ψηφιδωτῶν τῆς βασιλικῆς τοῦ Ἁγίου Δημητρίου, ἡ διατήρηση τῆς αὐθεντικότητάς τους καὶ ἡ ἐξασφάλιση συνθηκῶν καταλλήλων γιὰ τὴν καλὴ διατήρησή τους ἀποτελοῦν τὶς βασικὲς ἀρχές τῶν ἐργασιῶν συντήρησης ποὺ διεξάγονται ἀπὸ τὴν Ἐφορεία Βυζαντινῶν Ἀρχαιοτήτων Θεσσαλονίκης.

SUMMARY

The basic principles behind the conservation work being carried out by the Thessaloniki Ephoreia of Byzantine Antiquities are to strengthen the materiality of the mosaics in the basilica of St Demetrios, to preserve their authenticity, and to ensure appropriate conditions for their proper maintenance.

The historicity of the Basilica of St Demetrios

The early Christian basilica of St Demetrios in Thessaloniki was burnt down in 1917 (Soteriou 1918, 13–15) and restored with extensive rebuilding in two stages, 1917–1939 and 1945–1949 (Soteriou 1952, 254–255; Anastelose, 17–24, 30–35). Since then, the basilica's function as a pilgrimage church has been facilitated by numerous modern interventions, such as a massive central heating system, the frescoing of the sanctuary apse, the installation of a lavatory outside the north-east corner etc.

In 1998, owing to the basilica's considerable historical and archaeological importance, the Thessaloniki Ephoreia of Byzantine Antiquities, with the support of the Church of Thessaloniki, began to uncover ancient parts of the basilica by removing modern plaster and exposing either the original masonry,

or old plaster, or even frescoes, which had been covered when the church was restored, either by accident or because they were considered unimportant. As a result, latent parts of the monument have been uncovered, the basilica's historicity has been revealed as clearly as possible, and its spirituality has been brought out. An important role is played in this transformation by the noted wall mosaics, which fall into two groups according to whether they date to before or after ± 620 (Soteriou 1952, 189–199; Xyngopoulos 1969, 12–31; Bakirtzis 1998, 47–63; Skedros 1999, 70–82).

The mosaics had been plastered over when the church was converted in a mosque in 1493, and uncovered in two periods: in 1907, when the monument was refurbished (Papageorgiou 1908, 321), and when it was restored (Soteriou 1918, 27–28; 1953, 198).

Conserving the mosaics

Work was carried out from 1998 to September 2002 and the following mosaics have been conserved: *St Demetrios with the Angels*; *St Demetrios with the Deacon*; *St Demetrios with the Restorers* (fig. 1); *St Sergios*; *St Demetrios Praying en buste* (Kanonidis & Mastora 1999, 67); *St George with Two Children*; and the mosaics in the intrados of the single-light and triple-light windows in the west wall of the basilica (figs. 2, 3). The mosaic of the *Dedication of Children to St Demetrios* is still being conserved (figs. 4, 5).

A. PRINCIPLES

In the course of the conservation work, the following principles were formulated, laid down, and developed.

1. To strengthen the materiality of the mosaics

The main objective of the earlier efforts to conserve the mosaics after 1959 (doc. No. 268/23.6.1959 in the archive of the Thessaloniki Ephoreia of Byzantine Antiquities) and in 1976–1977 (*AD* 1976, 265; 1977, 230) had been to strengthen their materiality¹. Consequently, their condition in 1998–2002 was not especially problematic, apart from the loss of individual tesserae and the presence of dirt and soot deposits.

2. To preserve the authenticity of the mosaics

Owing to the conservation methods and materials available in each

1. We do not know what conservation work was done on the mosaics after they were uncovered and during the restoration of the basilica.

period, and especially owing to a general perception, and treatment, of the mosaics as two-dimensional pictorial images, the earlier conservation work had added features that were alien to this particular art form and which to an extent weakened the mosaics' authenticity and cut them off from the building. The perception of the mosaics as two-dimensional images led to their "aesthetic restoration" and to their being presented as framed pictures hung on the basilica walls.

3. To ensure appropriate conditions for the proper maintenance of the mosaics

As far as the conditions for the maintenance of the mosaics are concerned, the restoration of the basilica ensured an environment that was free from damp and well ventilated, thus limiting the factors that cause mosaics to deteriorate. In recent years, the use of ventilated candelabra has also helped to reduce the amount of candle soot deposited on the mosaics. Nonetheless, the increased atmospheric pollution from the traffic on Ayiou Dimitriou Street is a permanent source of grime that settles on the mosaics, while the presence of large numbers of pilgrims and visitors in the basilica disturbs the interior environment.

B. METHODS

1. A detailed description was made of the mosaics' structural and stylistic characteristics, their condition, and the earlier conservation procedures. This minute description and its further scientific elaboration reveals the specific character of each mosaic and helps us to determine appropriate conservation methods. This process also makes it possible to pinpoint ancient interventions in the mosaics and distinguish them from the recent interventions. A search for evidence of earlier conservation (in 1959 and 1976–1977) and a comparative study of photographs of the mosaics in different periods and their present condition makes it possible to put together a case-history of their maintenance.
2. Interventions carried out on all the mosaics, only when considered necessary immediately or as a precautionary measure, namely:
 - i. Consolidation work
 - Consolidation by grouting the gaps located between the masonry and the substratum or between the setting bed and the substratum. The grout was composed of hydraulic mortar (Ledan TB1) and acrylic emulsion (Primal).

- Edging repair with lime mortar. The lime and cement mortar which had been used for this purpose on earlier occasions was removed, both because it covered parts of the mosaic surface and because it confined the mosaics of the *Dedication of Children to St Demetrios* (figs. 4, 5) and *St Demetrios with the Angels* within a rectangular frame, giving an erroneous impression of their original dimensions.
 - Fixing the isolated tesserae that had come loose from the setting bed with Lascaux Hydroground N. 750 glue. This method was employed mainly around the edges of damaged areas of the mosaic surface, where, through ignorance of the proper way to address the problem of loose isolated tesserae, mortar had been laid which covered tesserae and some parts of the substratum bearing traces of the underdrawing and also penetrated into the joints between the tesserae around the damaged areas. Fixing the isolated loose tesserae made it possible for all parts of the mosaics to remain visible - such as, for instance, the upper and lower parts of the scene of the *Dedication of Children to St Demetrios* (figs. 4, 5).
- ii. Cleaning the mosaic surface by mechanical means (mainly with dental probes, lancets, and soft brushes) and wet cleaning with small quantities of de-ionized water. Superficial additions made during previous attempts at conservation were removed (plaster of varying composition and hues daubed poultice-like over the mosaic surface, plaster covering damaged areas of the mosaic surface, nails, and glue), since they concealed the mosaics' structural features and marred their aesthetic appearance. The cleaning process also effaced isolated inconspicuous instances of earlier "aesthetic restoration", which were mostly poor-quality, arrogant, ill-considered interventions intent on making something old look new. Some of the earlier "restorations" were retained, no longer, however, as "aesthetic" restorations, but as reconstructions of ruined parts of the iconography - as, for instance, in the faces of the saint and the eparch in the mosaic of *St Demetrios with the Restorers* (fig. 1), because the faces are now imprinted in this form in the minds of pilgrims and visitors to the monument (Kanonidis & Mastora 1999, 67). By contrast, in the mosaic of the *Dedication of Children to St Demetrios* (figs. 4, 5), the painted "restoration" of 1977 was removed from the face and neck of the boy to the right of the saint and from the face of the woman (on whose ear a red earring had been arbitrarily painted) because they did not assist an

understanding of the iconography. Furthermore, their clumsy execution affected the balance of the design: the tip of the boy's nose had been rendered with a pronounced curve, which made the nose very long and hooked, and, by reducing the distance between nose and mouth, distorted the facial expression. Photographs taken before the mosaic was "restored" show a tessera which indicated that the tip of the nose was higher up and not necessarily hooked.

- iii. Exposing the original masonry, which has frequently been damaged by inappropriate procedures (such as the shallow groove chiselled into the wall around the *Dedication of Children to St Demetrios* (fig. 5) for electrical wiring). The masonry frequently preserves important data for a fuller historical and archaeological understanding of the mosaic.
3. Making a detailed record of the work carried out and relevant comments in a log-book, and photographing and drawing the mosaics before, during, and after conservation. All these data are used to compile a final report on the work, with photographs and drawings showing the damage and the restoration work.

C. RESULTS

1. We now have a fuller knowledge of the mosaics in the basilica of St Demetrios from a historical and archaeological point of view, with data relating to their creation and the interventions carried out in ancient and more modern times. One characteristic example of an ancient intervention is the painted restoration of damage due to the loss of small areas of the mosaic surface of the scene of a *Saint with Two Children* (fig. 6) above the saint's right hand and in the upper left part of the scene; as also the addition of the inscription: "Αγιος Γεώργιος (sic), St George, in the painted red band above the mosaic, which has also resolved the question of the identity of the saint portrayed here.
2.
 - i. The materiality of the mosaics is ensured for the next five to ten years. Large-scale interventions have been avoided because, since the mosaics are located in easily accessible parts of the basilica, it is possible to monitor and re-examine their condition at regular intervals.
 - ii. The mosaics are presented "warts and all", without embellishment or "aesthetic restoration", the blemishes being part of their history. By removing alien elements from the surface of the mosaics we

respect their artistic character and restore the role of the colour and shape of the tesserae in the composition, of the spaces and joints between the tesserae, and of the chromatic relationship between the mosaic surface and the substratum, where the underdrawing is frequently visible. We also uncovered areas around the surviving edges of the mosaics which had been plastered over during earlier conservation work: part of a blue band, for instance, around the mosaic in the single-light window in the west wall (figs. 2, 3). This painted band is part of the substratum of the mosaic, which projects above the mosaic surface and surrounds it. In other words, it is a structural and stylistic feature which was originally visible and should not have been concealed during the earlier restoration work. Another result of this intervention is the clearer presentation of specific stylistic features of the mosaics, such as iconographical details that were not rendered with tesserae either originally or at some later stage, but with paint - as, for instance, in the *Dedication of Children to St Demetrios*, in the sky above the hill, in the garment of the boy to the right of the saint, and in the area between the right-hand column of the ciborium and the boy's garment (fig. 5).

- iii. The removal of modern plaster from around the fragmentary mosaics of *St Demetrios with the Angels* and the *Dedication of Children to St Demetrios* (fig. 5) and the exposure of the original masonry of the restored basilica means that the mosaics are no longer presented as isolated fragmentary pictures hung on the walls of the church, but complement the Early Christian building, which they, together with frescoes, marble incrustation, and architectural reliefs, have adorned down the centuries. The exposure of the original masonry and an examination of its surviving features has assisted an investigation of the structural and chronological relationship between the mosaics and parts of the frescowork on masonry close to the mosaics, which to an extent allows us to roughly estimate the order in which the various aspects of the basilica's decoration were carried out, thus bringing out the monument's historicity. For instance, during the recent conservation work it was found that the *Dedication of Children to St Demetrios* had replaced fresco decoration which extended over the entire west wall of the south aisle and the spandrels of the south colonnade; and that the south colonnade (all but the west pilaster)

had been rebuilt and the frescowork on the spandrels had been renewed on two occasions after the mosaic was constructed, leaving the mosaic visible, however.

3. The history of the conservation of the mosaics together with an investigation of their current state and the environmental conditions, has made it possible to diagnose the chronic and temporary problems involved in their maintenance and to establish standards for pre-emptive and therapeutic conservation in the future. A comparative study of the mosaics' current state and the drawings (The church of St. Demetrios 1985, 118-119) and photographs of them in 1908-1917 (Fred Boissonnas 1989, pl. 26, 27, 30-32) found that most of the gaps due to loss of the mosaic surface do not constitute recent damage, but were caused before the Turks plastered the mosaics over or when the mosaics were being uncovered. A diagnosis of the problems involved in maintaining the mosaics was helped by removing the plaster with which the damaged areas had been filled during the previous conservation work, for it then became possible to investigate what kind of damage was in question and thus to consider how it had been caused. It was found that most of the damage was due to the fact that single tesserae and small areas of the mosaic surface had become detached from the substratum; while in a much smaller number of cases there was damage to the substratum itself - for instance, loss of parts of the mosaic surface together with part of the setting bed or total loss of parts of the mosaic (i.e. of the mosaic surface and the substratum). The loss of isolated tesserae was the main form of damage noted during the recent conservation work, and consequently future investigation should focus on the reasons for this problem and how best to address it. A tracing of the mosaics showing the detached tesserae that were fixed in place during conservation will make it possible to monitor the phenomenon in the future.

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FIGURES



1. St Demetrios with the restorers.



6. St George with two children, detail.



2. Mosaic in the single-light window in the west wall, before conservation.



3. Mosaic in the single-light window in the west wall, during conservation.



4. The dedication of children to St Demetrios, before conservation.



5. The dedication of children to St Demetrios, after conservation.

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I MOSAICI PAVIMENTALI DEL VI SECOLO DELLA CATTEDRALE DI BARLETTA

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SUMMARY

The excavations in the years 1993/1994 inside Barletta Cathedral during the restoration of the building have undoubtedly highlighted that the area of the paleochristian basilica underwent several remakes previous to the present building above the Late-Roman cathedral, but essentially gothic in its prevailing outlook.

Nowadays, after finishing the complex excavation, we are aiming at turning the whole area into a museum, keeping mosaics in situ and intervening with a soft restoration which allows at its best the safeguard of the mosaic and its preparatory layers.

Gli scavi effettuati negli anni 1993 e 1994 all'interno della Cattedrale di Barletta, durante il restauro dell'edificio, hanno rivelato la presenza di un edificio sacro paleocristiano ricoperto da mosaici databili al VI secolo. L'area della basilica paleocristiana ha subito svariati rifacimenti precedenti la costruzione dell'attuale, soprastante cattedrale di impianto tardoromanico, ma fondamentalmente gotica nel suo aspetto prevalente. Al momento attuale, concluso il complesso scavo, si sta lavorando per la musealizzazione dell'intera area. Si prevede di conservare in situ i mosaici e di intervenire su di essi con un restauro estremamente contenuto che consenta al massimo grado la salvaguardia dei mosaici e degli strati preparatori.

Lo scavo

L'area sottostante la Cattedrale di Barletta è stata interessata, a partire dal 1993, da uno scavo sistematico che ha messo in luce una complessa stratigrafia (fig. 1) di cui di seguito si riassumono i principali ritrovamenti:

1) La fase più antica è quella relativa alle tombe di età romana del tipo "a grotticella" databili al III – IV sec. a.C.; ne sono state trovate quattro, di cui solo una è stata possibile indagare stratigraficamente. 2) Al disopra delle tombe è stata rinvenuta una basilica databile al VI secolo, alla quale va riferito il pavimento musivo oggetto del presente intervento. 3) Il pavimento musivo si presenta distrutto in più punti da tombe a fossa databili tra il VII e l'VIII secolo (fig. 2); il sepolcreto altomedioevale continuò probabilmente ad essere utilizzato; più tardi la basilica paleocristiana venne definitivamente abbandonata. 4) In un'epoca compresa tra la seconda metà del X e la prima metà dell'XI secolo l'edificio paleocristiano venne del tutto abbandonato e sostituito da una basilica "preromanica", più ridotta nelle dimensioni, il cui elemento caratterizzante è costituito da un pavimento in mattonelle di cotto dalla superficie in rilievo. Esse sono assemblate in maniera del tutto casuale, non sembrano comporre alcun disegno di senso compiuto; si può ipotizzare un riutilizzo di cui al momento è difficile definire il dettaglio, ma che trova una conferma nella presenza in una zona adiacente di un pavimento in tessellato composto da grandi tessere (circa cm. 8 di lato) in calcare bianco. 5) Nel XII secolo l'area venne abbandonata definitivamente, interrata e si diede inizio alla costruzione dell'attuale cattedrale. 6) Nel XVI secolo tutta l'area della basilica paleocristiana venne scavata, al disotto della cattedrale attuale e vennero ricavate nello spessore una serie di camere mortuarie. Esse distrussero pressoché completamente il pavimento musivo della navata centrale e gran parte di quello delle navate laterali con tutte le sovrapposizioni sopra descritte.

La basilica paleocristiana

La fase di occupazione del sito successiva a quella delle tombe di età romana ha permesso di riconoscere nelle rovine emerse una basilica databile al VI secolo. Di questo edificio sono stati rinvenuti gran parte della muratura d'ambito destro, l'abside nella sua quasi totale interezza, le murature di alcuni ambienti annessi oltre che quelle di alcune suddivisioni interne; le fondazioni di alcuni plinti su cui si impostavano gli elementi - pilastri o colonne, i rinvenimenti non hanno fornito elementi certi - che tripartivano la basilica e i vasti brani di mosaico pavimentale hanno permesso di ricostruire con precisione relativa l'originario aspetto del monumento. Si trattava di una basilica orientata, con una sola abside, lunga circa metri 29 e larga circa 20.

Essa è divisa in tre navate di otto campate: la centrale misura metri 8,50 circa, le laterali 4,40 circa. Nel fondo della navata centrale sono state rinvenute tracce di murature che farebbero pensare all'esistenza di ambienti recintati definiti probabilmente da colonne e pilastrini con plutei o transenne negli intercolumnni. La basilica è databile al VI secolo come viene suggerito dal ritrovamento, nelle murature, di mattoni recanti il monogramma di San Sabino, vescovo di Canosa, secondo quanto riferito dalla tradizione, tra il 514 e il 566, e di mattoni decorati da motivi a ruota raggiata e a margherita con sei petali del tutto analoghi ad altri in uso a Canosa in monumenti sabiniani.

Il mosaico pavimentale

Il mosaico pavimentale della basilica segue l'articolazione degli spazi e, pur nella sua estrema lacunosità, aiuta a definirne l'iconografia. I motivi decorativi, in massima parte geometrici, con più rari inserti fitomorfi, sono usuali e tutti assimilabili alla tradizione musiva romana; essi sono stati identificati anche alla luce del repertorio di Balmelle (Balmelle - Blanchard-Lemée 1985)¹ (fig. 3-4). I resti più cospicui sono quelli della navata destra. Qui, nello spazio compreso tra la terza e la sesta campata, per una lunghezza di circa 12 metri, è conservata, con vaste lacune, una composizione, delimitata da una cornice a treccia, con grandi cerchi secanti che determinano nei punti di intersezione stelle a quattro punte; al centro di ciascun cerchio è presente un quadrato, decorato da un fiore a quattro petali, attorniato da quattro esagoni decorati da losanghe, da nastri, da nodi variamente intrecciati.

Nel fondo della navata destra, all'interno del vano adiacente alla zona presbiteriale, sono stati rinvenuti quattro frammenti di un pannello, delimitato da una cornice a pseudomeandro costituito da quadrati di tre diverse dimensioni decorati all'interno da nastri, nodi e fiori quadripetali.

La navata centrale conserva pochi brani frammentari che permettono di individuare un pannello con motivi di cerchi intrecciati che determinano agli incroci losanghe; un pannello con quadrati e cerchi accostati; un pannello con quadrati e rettangoli che si intersecano; in corrispondenza del presbiterio sono infine presenti una cornice stilizzata ed elegante a girali terminanti con una foglia stilizzata e una cornice con racemo a volute. Della navata sinistra si conserva soltanto una cornice a calice che si sviluppava lungo il lato interno del colonnato. Si conservano infine alcuni frammenti dei piccoli pannelli sottostanti gli intercolumnni. Quello in corrispondenza della quarta campata,

1. L'individuazione dei motivi è stata effettuata da Cassano e da Giuliani (si veda bibliografia). Va notato che non sempre le descrizioni delle due studiose coincidono.

tra la navata centrale e quella destra, ora non più visibile, è decorato con un motivo di cerchi secanti; i quattro frammenti pertinenti ai pannelli ubicati tra navata centrale e navata sinistra sono decorati da motivi a squame o a pelte (fig. 5), tranne il pannello del settimo intercolumnio, decorato da una losanga inscritta in un rettangolo, e quello dell'ottavo, decorato da ottagoni racchiudenti nastri, accostati a piccoli quadrati.

Tecnica di esecuzione

I mosaici sono in opus tessellatum. I decori geometrici sono realizzati con tessere, di 1cm per lato circa, rosse, bianche, rosa, gialle, grigie, nere. Le analisi mineralogiche², condotte tramite diffrazione di raggi X su polverri (PXRD) e microscopia ottica (MO) su sezioni sottili, hanno permesso una prima caratterizzazione dei materiali costitutivi delle tessere:

- Le tessere rosse, frammenti di manufatti in cotto, sono di due differenti tipologie, quelle di colore rosso più intenso sono caratterizzate dalla presenza di rocce ignee, pirosseni e fossili; le meno rosse sono costituite principalmente da quarzo, feldspati, calcite e pirosseni; le differenti colorazioni possono inoltre essere attribuite alle diverse temperature di cottura (1000° C. nel primo caso, 800° C nel secondo) cui sono state sottoposte le materie prime.
- Le tessere bianche sono costituite prevalentemente da calcari bianchi locali; tuttavia in alcuni casi sono state individuate tessere costituite di marmo pentelico e di marmo lunense, naturalmente di reimpiego.
- Le tessere rosate e le tessere gialle sono costituite dagli stessi calcari, con una piccola percentuale in ossidi di ferro.
- Le tessere grigie sono costituite anch'esse di calcare locale, a volte debolmente dolomitizzato.
- Le tessere nere sono costituite di calcari carboniosi.

Dall'analisi di un frammento erratico delle dimensioni di 16 cm x 12 è stato possibile studiare la composizione e la successione degli strati preparatori (fig. 6).

La classica stratigrafia, tipica dei mosaici pavimentali romani, composta dalla sovrapposizione di 4 strati, statumen, rudus, nucleus, letto di posa, in questo caso viene ridotta alla presenza di tre strati:

- lo strato più profondo (assimilabile allo statumen), è costituito da un alto

2. Le analisi mineralogiche, di cui si darà notizia in altra, più estesa pubblicazione, sono state eseguite presso il Dipartimento Geomineralogico dell'Università degli Studi di Bari dal prof. Rocco Laviano coadiuvato dalle laureande Vittoria Rodriguez e Maria Teresa De Lucia.

strato di terreno vegetale di spessore variabile e comunque steso al di sopra del banco di roccia affiorante al fine di livellarlo; nel solo frammento erratico sono stati rinvenuti, al suo interno, frammenti di materiale ceramico e di laterizi;

- lo strato superiore, grossomodo assimilabile al nucleus, alto circa 6,5 cm, è di fattura molto disomogenea. In alcuni punti infatti si distinguono al suo interno delle stratificazioni, molto irregolari, che però, a nostro avviso, vanno considerate come sovrapposizioni di malte pressoché simili messe in opera nello stesso momento. Questo strato è composto di calcite, quarzo e feldspati; le differenze al suo interno sono determinate da un diverso rapporto tra inerti e leganti. Sono inoltre presenti nell'impasto inclusi di varia grandezza e natura (cotto, marmi).
- L'ultimo strato, di allettamento delle tessere, è una malta di colore chiaro a granulometria fine con spessore molto sottile ed irregolare, costituita soprattutto da prevalente calcite con quarzo e scarse quantità di feldspati. Quest'ultimo strato, che nel mosaico romano solitamente ha uno spessore di circa 1,5 – 2 cm e nei mosaici più tardi uno spessore variabile tra 1 cm (area archeologica in via D'Azeglio a Ravenna del V – VI secolo) e 3,5 cm (area archeologica di Santa Croce a Ravenna, V – VI secolo), dovrebbe avere la funzione di assicurare le tessere al sottofondo; in questo caso è molto sottile, è distribuito in maniera irregolare e sembra pertanto avere prevalentemente una funzione estetica, di riempimento tra le tessere, piuttosto che meccanica. Ciò è confermato dal fatto che molte delle tessere sono inserite direttamente nello strato sottostante, che le ingloba in maniera irregolare a causa delle loro diverse dimensioni che variano tra 0,7 mm e 2 cm circa.

Stato di conservazione

La superficie era ricoperta da polvere e terra che, a causa dell'alto tasso di umidità presente nell'ipogeo, si erano compattate e rendevano illeggibili vasti brani della decorazione (fig. 7). Il preliminare intervento di pulitura ha evidenziato la scarsa adesione delle tessere al piano di allettamento; la malta interstiziale si presentava disomogenea e, nelle mancanze, si era accumulato del terreno assimilabile al materiale di riempimento utilizzato per la preparazione del sottofondo della chiesa preromanica, costituito prevalentemente da terra bruna con pietrisco minuto e compatto.

I mosaici si presentavano estremamente frammentari; lungo le lacune molte erano le tessere mobili o del tutto distaccate, nonostante fossero state eseguite, contestualmente allo scavo, delle stuccature provvisorie di

contenimento risultate non più funzionali oltre che del tutto inadeguate alla metodologia di restauro prevista. Molte tessere erratiche sono state rinvenute nel terreno accumulatosi nelle lacune.

Le stucature provvisorie sono state rimosse poco per volta; si è così evidenziato uno spinto degrado non solo delle zone perimetrali, bensì di tutto il mosaico. Le tessere avevano perso l'adesione al letto di posa ed erano tenute insieme solo dalla terra che, in molti casi, si era accumulata tra gli strati preparatori e le tessere; situazione questa che rendeva ancora più precaria la staticità del tessellato, sensibile a qualunque sollecitazione meccanica anche di minima entità.

Il degrado sopra descritto, più evidente nella navata destra e nel più consistente frammento della navata centrale, sembrerebbe causato dall'apertura delle numerose tombe a fossa, che hanno intaccato il mosaico in profondità, fin nel sottofondo costituito di terreno, rendendolo estremamente fragile. È probabile che l'ampiezza delle aree esposte - pareti verticali delle tombe a fossa - abbia accelerato o, in alcuni casi, innescato processi continui di evaporazione e reidratazione del terreno che si accompagnano a cicli di solubilizzazione e cristallizzazione dei sali in esso contenuti. La bassa resistenza alla compressione del terreno vegetale, enormemente peggiorata dall'apertura delle tombe e la disgregazione degli strati del sottofondo hanno provocato deformazioni sotto forma di subsidenze, cedimenti, spancamenti. Il mosaico della navata destra presenta un accentuato cedimento longitudinale - 20 cm. circa nel punto più depresso - tra la terza e la sesta campata. Cedimenti, visibili sottoforma di profonde fratture, sono presenti lungo tutto il muro d'ambito della navata destra in prossimità del banco di roccia affiorante. Questi fenomeni sono probabilmente collegati alla disomogeneità degli strati preparatori del mosaico che, in prossimità della controfacciata e della parete destra, poggiano su un banco di roccia affiorante, mentre la restante parte è posata sul suolo colmato da uno strato di terreno in assenza di un vero e proprio statumen. Sulla superficie musiva in più punti si è rilevata la presenza di spesse e dure concrezioni di colore biancastro dovute a riprecipitazione del carbonato di calcio prodottesi nei continui cicli di solubilizzazione e cristallizzazione.

Nella navata meridionale sono state inoltre rinvenute delle alterazioni superficiali, di colore grigio-scuro, prodotte verosimilmente dall'accensione di fuochi; le tessere, oltre ad essere ormai irreversibilmente alterate nella cromia, tendevano a sfaldarsi (fig. 8).

Il restauro

L'intervento sui mosaici si colloca in un più ampio ed articolato progetto di recupero e di allestimento museale di un'area archeologica il cui valore consiste nella ricca e fortemente significativa storia del riutilizzo di un sito che, in un arco di più di mille anni, accompagna l'evoluzione e la definitiva affermazione di Barletta quale centro di grande importanza in ambito regionale. L'importanza delle testimonianze archeologiche è pari a quella delle emergenze di carattere decorativo (pavimenti musivi, mattonelle di cotto in rilievo) e il progetto di allestimento tiene conto dell'intero contesto; lo stesso restauro tiene conto delle peculiarità tecniche del mosaico e attribuisce agli strati preparatori l'importanza che essi meritano in quanto testimonianza della storia materiale. La presenza, al disotto dei mosaici, di consistenti brani degli strati preparatori perfettamente interpretabili nella loro peculiarità tecnica, sebbene gravemente compromessi e di difficile recupero ha, fin dall'inizio, suggerito le linee di intervento e la conseguente scelta del restauro *in situ*, stante l'estrema, e ben nota agli addetti ai lavori, esiguità di testimonianze stratigrafiche conservate *in situ*. Ancor oggi, non solo in un passato più o meno recente, si può dire, sfugge agli operatori del settore, l'importanza della conservazione globale dei pavimenti musivi e si sacrifica all'istanza estetica (peraltro anch'essa negata dagli orrendi raddrizzamenti delle originarie ondulazioni delle tessere) quella storica, con il separare tessere e strati rendendoli incomprensibili nella loro inscindibile interconnessione. Un altro risultato di questo modo di procedere è quello di avere ormai scarsissime testimonianze della tecnica di esecuzione dei mosaici pavimentali medioevali.

La presentazione del sito archeologico si avvale di un progetto di musealizzazione che tende, da un lato, a far convivere le complesse stratificazioni e presenze senza semplificazioni di sorta, dall'altro a facilitare la lettura dei materiali antichi, senza confusioni, con l'utilizzo di materiali del tutto moderni e tecnologici. La necessità di creare un percorso che permettesse la completa fruibilità della zona archeologica ipogea e la conservazione dei pavimenti decorati preservandoli dal calpestio è stata raggiunta attraverso una separazione netta dei piani di lettura tra le strutture moderne e i materiali rinvenuti nello scavo. La frammentarietà del mosaico e la presenza costante del sottofondo a vista, hanno suggerito un intervento morbido e rispettoso non solo del mosaico, ma anche dello strato preparatorio. Si è scelto di non operare alcun "abbellimento" delle lacune e gli stessi strati di terreno, in più zone visibili, sia al disotto del mosaico, sia come riempimento tra la basilica paleocristiana e quella preromanica, sono stati lasciati a vista e, in un certo senso, esaltati dalla sistemazione museale. L'esigenza di conservazione del sito

nella sua globalità ha suggerito di orientarsi verso una pratica del minimo intervento che ha accompagnato tutte le operazioni di restauro utilizzando tecniche e materiali tradizionali. Le ampie zone in cui il sottofondo del mosaico è a vista sono state semplicemente pulite dai materiali incoerenti sovrapposti e fissate, dove necessario, con una miscela di resine acriliche del tipo già sperimentato in archeologia preistorica (Archeofix, Bresciani).

Le tombe a fossa sono state colmate sottolivello con pietrisco a granulometria fine, di colore chiaro; in questo modo le tombe risultano perfettamente riconoscibili e viene di esse attenuato il forte impatto visivo.

Interventi eseguiti

È stata effettuata una pulitura preliminare a secco con spazzole; successivamente il tessellato è stato lavato con nebulizzatori manuali per la rimozione della terra e dello sporco che si erano depositati in superficie. Gli spazi interstiziali sono stati liberati dalla terra che si era accumulata là dove la malta originale era, a causa del degrado, ormai inesistente.

In seguito sono state rimosse le stuccature di contenimento dei bordi, eseguite come pronto intervento durante lo scavo, procedendo per piccole porzioni al fine di evitare che le tessere, ormai distaccate dal piano di posa, perdessero la loro collocazione originaria. Contestualmente a questa operazione si è effettuato il consolidamento dei distacchi di profondità con iniezioni di malta idraulica fluida (PLM M). Per il ristabilimento dell'adesione delle tessere al letto di posa, dove necessario, rimosse le tessere mobili di cui era certa l'originaria collocazione, si è ricostruito uno strato di allettamento con malta a base di calce idraulica e sabbia di fiume. Sul resto della superficie è stata iniettata della malta fluida, avendo cura che penetrasse e fissasse le tessere al fondo. La pulitura definitiva è stata eseguita con impacchi di soluzione satura di carbonato di ammonio ed EDTA, seguita da più lavaggi con acqua deionizzata (fig. 9). Le lacune più piccole del mosaico erano colme di terra nella quale sono state rinvenute tessere distaccate; in questi casi esse sono state ricollocate, con una ricostruzione accettabile stante la limitatezza della loro dimensione. Si è così ottenuta una migliore leggibilità della decorazione oltre che una migliore possibilità di conservazione. Nella navata sinistra erano presenti depressioni della superficie tessellata colme di terra in cui lo strato preparatorio si presentava del tutto disgregato. In questi casi si è proceduto alla rimozione delle tessere, previa garzatura, e ad un riallettamento delle parti distaccate su un nuovo strato di malta, conservandone l'andamento irregolare. Nelle zone in cui la malta interstiziale era perduta è stata stesa una malta fluida data a pennello,

cromaticamente raccordata all'originale mediante un'accurata scelta degli inerti (fig. 10).

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FIGURE



fig. 1



fig. 2



fig. 3



fig. 4

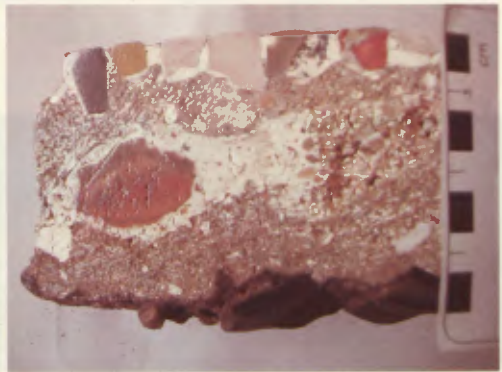


fig. 6



fig 5

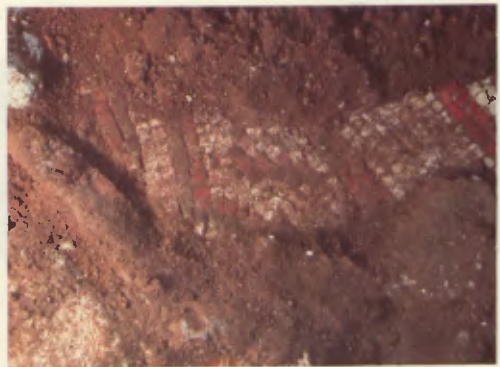


fig. 7



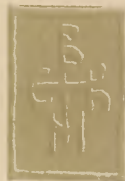
fig. 8



fig. 9



fig. 10



ΕΥΡΩΠΑΪΚΟ ΚΕΝΤΡΟ ΒΥΖΑΝΤΙΝΩΝ ΚΑΙ ΜΕΤΑΒΥΖΑΝΤΙΝΩΝ ΜΝΗΜΕΙΩΝ
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