ARTE E RESTAURO casi studio

THE WALL PAINTINGS OF THE GREAT MOSQUE OF IṢFAHĀN

NARDINI EDITORE

Michael Jung

NARDINI EDITORE IN CONSERVATION p. 132

GO TO CONTENTS

Michael Jung

THE WALL PAINTINGS OF THE GREAT MOSQUE OF IṢFAHĀN

with contributions by
Antonella Altieri, Paolo Cornale,
Fabio Frezzato *and* Claudio Seccaroni

NARDINI EDITORE

GO TO CONTENTS

ARTE E RESTAURO
casi studio

Editor of the collection
Claudio Seccaroni

THE WALL PAINTINGS OF THE GREAT MOSQUE OF IṢFAHĀN
Michael Jung
ISBN 978 88 404 0434 9

Publishing director: Andrea Galeazzi

Design, editing and layout: Claudio Seccaroni

Maps: Caterina Venditti

English texts revised by Helen Glanville and Francesca Glanville-Wallis

Credits and Sources for the figures: if not otherwise specified in the captions, the photographs, graphs and pictures are by the authors

GO TO CONTENTS

Ministero dei beni e delle attività culturali e del turismo

Soprintendenza speciale per il patrimonio storico-artistico ed etnoantropologico e per il polo museale della città di Roma

Museo Nazionale d'Arte Orientale 'Giuseppe Tucci'

ISTITUTO SUPERIORE PER LA CONSERVAZIONE ED IL RESTAURO

ENEA

Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

CSG PALLADIO

Istituto Culturale dell'Ambasciata della Repubblica Islamica dell'Iran - Roma

GO TO CONTENTS

Für meine liebe Frau Anna

GO TO CONTENTS

Contents

Preface

...A few [buildings] illustrate the heights of art independently, and rank Iṣfahān among those rarer places, like Athens or Rome, which are the common refreshment of humanity.

Byron 1992 (reprint): 196

We present here in a comprehensive essay the mural paintings of the Masjid-i Jum'a, the Great Mosque of Iṣfahān. Several books and numerous papers have already been written about the history, the architecture, the tile-work, the restoration and the archaeological excavation of this magnificent edifice. The wall paintings, too, have been partly published in short contributions and preliminary reports, but as yet in no exhaustive study.

The fragments of the pre-Seljūq mosque, that are published here, were brought to light in several campaigns of the Italian IsMEO Mission during the seventies under the direction of the charismatic figures of Umberto Scerrato and Eugenio Galdieri, and are quite modest in terms of quantity and pictorial refinement. But to put it in the words of Ernst Grube "wall painting is of considerable significance for the development of painting as an art form in Islam … and every small fragment that survives therefore warrants special attention."[1] Moreover our fragments of the paintings are more than just testimonies of this genre, they are also a reminder of the long and changeful history of the building and of Iṣfahān itself.

We are rather pleased to also present chemical and physical analyses of the paintings and plaster, investigations into the mosque requested a long ago by Oleg Grabar.[2] The paintings of only few sites of the first Islamic period have as yet been examined with the help of the natural sciences, so our research may provide good material for comparison for new studies, and a stimulus for scientific research in this field.

In the second part of our paper we shall deal with the wall paintings of the post-Seljūq mosque. This rough division between pre- and post-Seljūq paintings, is due to our lack of knowledge as to their date. Only the paintings of the *gāv-chāh* can in fact be dated without any doubt. In addition to a short summary of these paintings, known through Galdieri's restoration, we also publish fragments excavated in the area of the Muẓaffarid madrasa and depictions of mosques and handprints probably of a more recent date.

[1] Grube 1978: 26.

[2] Grabar 1990: 11.

GO TO CONTENTS

The botanical characterization of some iconographic elements depicted complements our study, whereas the short outline of the main building phases of the Great Mosque will help the reader to gain a simplified and clear overview of the intricate building history of the Masjid-i Jum‘a introduces the book.

Fig. 1 – view of the courtyard and the South *iwān* of the Great Mosque of Iṣfahān.

Acknowledgements

We are grateful above all to the late Umberto Scerrato, who kindly entrusted me with the recommencement of the work in Iṣfahān, to the Directors of the Italian-Iranian Mission Fariba Saiedi Anaraki (Iranian Cultural Heritage, Handicrafts and Tourism Organization, ICHHTO), and Bruno Genito (Istituto Italiano per l'Africa e l'Oriente, IsIAO), to Maria Vittoria Fontana, head of the Islamic Section of the IsIAO Centro Scavi in Rome and to the late Eugenio Galdieri, who gave precious information about their work in the mosque (1970-1978), to Giovanna Ventrone, who first drew my attention to the fragments discovered in sector 190 of the mosque, to the former Attaché Culturale of the Italian Embassy in Tehran, Felicetta Ferraro, for her constant practical support and the delicious dinners at her residence, to the restorers conservators Fariba Khatabakhsh, Roxana Jabalameli, Behzad Babaei (ICHHTO) and Anna Valeria Jervis (Istituto Superiore per la Conservazione e il Restauro, ISCR), to Akram Abasi, Amir Rechtegrani, Maria D'Angelo, Patrizia La Piscopia, Gabriella Manna, Giulio Maresca, Amelia Olimpo, Rocco Rante, Luigi Ricci, Danilo Rosati, Martina Rugiardi, Shabnam Juzdani and Mithra Shateri for their great and friendly help during the work in Iṣfahān, to Jean-Pierre Haldi and Silvia Quercetti, for their precious bibliographical help made in Swiss libraries and at the Pontificio Istituto di Studi Arabi e d'Islamistica at Rome, to Mahnaz Esmaeili for her philological help, to Mohsen Yazdani (Istituto Culturale dell'Ambasciata della Repubblica Islamica dell'Iran, Rome), Lucia Tito (CBC Conservazione Beni Culturali, Rome) and Riccardo Zipoli (Università Ca' Foscari, Venice) for providing a rare publication, and to Helen Glanville (LAMS-CNRS,UPMC, Universités de Paris-Sorbonne) and Lucia Burgio (Science Section, Conservation Department, Victoria and Albert Museum, London) for useful advice and information.

A short outline of the main building phases of the Great Mosque

Michael Jung

This short compilation is based mainly on the studies published by Albert Gabriel,[1] André Godard,[2] Eugenio Galdieri, Umberto Scerrato, Oleg Grabar and by the short contribution given recently by Abdullah Jabalameli.[3] It does not contain anything new, but its brief – I do hope clearly – arranged schedule may help the reader to better comprehend the chronological sequence of the building activities, and our tentative allocation of the mural paintings.

In the Sasanian period monumental buildings, possibly a Zoroastrian fire temple, a palace and/or a Nestorian Episcopal church (?) were built in the settlement Yahūdīyya neighboring Yavān, in a spot where Arabs from the nearby village of Tīrān built

circa 156H / 772–773
: the first mosque, a flat-roofed prayer-hall with arcaded court, during the caliphate of the ‘Abbāsid caliph al-Manṣūr

circa 225–226H / 840–841
: a second ‘Abbāsid mosque of the same type is built in the time of the caliphate of al-Mu‘taṣim, the mosque is of much greater size and rotated by ca. 15° to better match the *qiblī* direction

after 295H / 908
: during the caliphate of al-Muqtadir (reign 295–320H / 908–932) building of annexes probably lying outside the mosque proper

before 368–369H / 979–980[4]
: an additional arcade is built around the court in the Būyid period

[1] Gabriel 1935.
[2] Godard 1936a.
[3] Jabalameli 2011.
[4] After Grabar (1990: 46f.) the Būyid intervention occurred between 374–375H / 985 and 431–432H / 1040. The author was not in any case aware of the showing up of a new source, that of Abū l’ Shaykh (274–369H / 887–980), cf. Arioli 1979 and Scerrato 2001: XXXVIII.

GO TO CONTENTS

before 374H / 985
the presence of one of the first *manārah* (minarets) in Iran is recorded

later on a double minaret is recorded framing a gate, which opened to the *sūq* of the dyers

441H / 1050
during the siege of Iṣfahān by the Seljūqs under the Sulṭān Ṭughril the mosque is stripped of its wood and so the ceiling was damaged (or destroyed)

between 479–511H / 1086–1118
major transformations in the period of the Great Seljūqs:

479–480H / 1086–1087
a square domed room on the *qiblī* side built by Niẓām al-Mulk under the reign of Sulṭān Mālik Shāh

481H / 1088–1089
a square domed room built on the North side by Tāj al-Mulk still under Sulṭān Mālik Shāh

before 511H / 1118
probably before this year (of the death of the Sulṭān Muḥammad Tapar) introduction of four *iwāns*[5]

in 515-516H / 1121–1122
after the fire set by the Bāṭinīds (Ismā'īlis), construction of the North-East gate

710H / 1310
great stucco *mihrāb* of the Ilkhānid Uljāitū in the oratory on the West side of the courtyard

768H / 1366
construction of a *madrasa* on the North-East side and of rooms between the North *iwān* and the domed room of Tāj al-Mulk with a monumental gate (area 475) under the Muẓaffarid Kutb al-Dīn Shāh

[5] I follow here Grabar's suggestion, 1990: 56-8, and not the proposals of Godard 1936a: 226-8, 279.; Scerrato 1972: 72f.; Galdieri 1984: 44 and fig. 88d [but provided with a question mark]; Id. 1996: 431; Blair, Bloom 2001: 368; Babaie, Haug 2007; Russo 2009: 129; Genito 2011: 62. etc., who attributed the four-iwān mosque to the time of Sulṭān Sanjar (reigned between 511–552H /1118–1157) and after the fire recorded in the inscription set on the North-East gate. This fire may have had in fact a minor, more circumscribed, impact for the mosque than usually assumed. The Italian Archaeological Mission in fact did not find during its excavation any trace of a fire. Cf. a propos also Matheson 2001: 101.

GO TO CONTENTS

851H / 1447
winter-hall built by the Tīmūrid Sulṭān Muḥammad, gate in North-West sector of the court (area 479)

880H /1475–1476
the restoration of the mosque under the Aq-qoyūnlū Sulṭān Ūzūn Ḥasan concerns particularly the South *iwān* embellished with *muqarnas* squinches, this *iwān* and the facades of the courtyard are decorated with glazed tiles. Probably in the Aq-qoyūnlū period, building of the two minarets flanking the South *iwān*

938H / 1531–1532
restoration under the Ṣafavid Shāh Ṭahmāsp, they also concern the South *iwān*

between 984–995H / 1577–1587
during the reign of Shāh Muḥammad Khodābandeh building of a Ka'ba-like building in the courtyard, a platform raised upon four pillars in a square water basin for ablution

992H / 1584
building of the South-West hall under the reign of Shāh 'Abbās

1070H / 1659–1660
restorations under Shāh 'Abbās II, they also concern the South *iwān*

1083H / 1673
pavement of the courtyard

1092H / 1681
building of the *majlesī* oratory

1093H / 1682
renovations commissioned by Shāh Sulaymān; the decoration of the inner part of the North *iwān* and of the upper part of the East *iwān* probably belongs to this period

1112H / 1700–1701
restoration of the West *iwān* commissioned by Shāh Sulṭān Ḥusayn; arrangement of a two-storied recess at the northern end of North *iwān* called *Shāh-Nashīn* built in an uncertain time, but possibly Ṣafavid or Qājār

GO TO CONTENTS

1139H / 1726–1727
restoration under Shāh Ashraf Hotak as testified by an inscription in the Muẓaffarid *madrasa*

1199H / 1784
wall paintings in the *gāv-chāh* executed in the time of the Zand ruler ‘Alī Murād Khān

1218H / 1803–1804
restorations of the South-East *riwāq* under the reign of the Qājār Fath ‘Alī Shāh

***

Activity of the Italian Archaeological Mission

1390–1398H / 1970–1978
restoration activity by the IsMEO (Istituto per il Medio ed Estremo Oriente) Mission under the direction of Eugenio Galdieri

1392–1398H / 1972–1978
excavation by the IsMEO Mission under the direction of Umberto Scerrato

1420H / 1999
reopening of the work of the Italian Archaeological Mission of the IsIAO (former IsMEO)

in 1424H / 2003
start of the Joint Iranian-Italian ADAMJI Project (= *Archaeological Digital Archive of the Masǧid-i Jom‘e Iṣfahān*), directed by Bruno Genito and Fariba Saiedi Anaraki.

The wall paintings of the pre-Seljūq mosque

Michael Jung

Even more important is the question of the pre-Seljūq work in the Masjid-i-Jāmiʿ of Iṣfahān. It is the most interesting, and, in its loveliness of some parts, the most beautiful of Persian buildings.

Schroeder 1967: 954

Introduction to the research of the excavated fragments

The Masjid-i Jumʿa at Iṣfahān is well known and celebrated not only for its splendid architecture, but also for its magnificent coat of colourful tiles covering, since the fifteenth century, the façade of the court (figs. 1-2). Thanks to the archaeological mission of the *IsMEO* in the years 1972 to 1978 headed by Umberto Scerrato (fig. 3), we know that the mosque, which proceeded the Seljūq reshaping of the monument in the 11th century, had also been adorned with a colourful decoration.[1] At that time, the artistic techniques used were not tiles but stucco work and wall paintings, closely linked together. Here, we would like to give an account of the proceedings of the research on the findings made during the excavation, to present some new observations, and to outline its limitations.

As we have previously discussed[2], the typologies of the paintings discovered and there presented, are here further refined and enriched with respect to former publications, including also items not included previously. So we shall again briefly discuss the several types, their motifs and, when possible, the technique of their execution. We try to propose an – admittedly rough – chronological attribution, and search for comparisons with other works in Iran and elsewhere. There follows, a thorough report of the scientific investigation of some of the samples brought to Italy for study, that allows an in depth characterization of the materials used for such paintings. The fragments of wall paintings uncovered by the excavation in the Great Mosque of Iṣfahān, represent quantitatively only a small part of the objects brought to light, but they surely can be counted among the most significant findings with regard to

[1] For a short outline of the building phases see pp. 11-14, or the summary of the history and chronology of the mosque in Grabar's fine book, 1990: 43-60.

[2] Jung 2010: 112.

GO TO CONTENTS

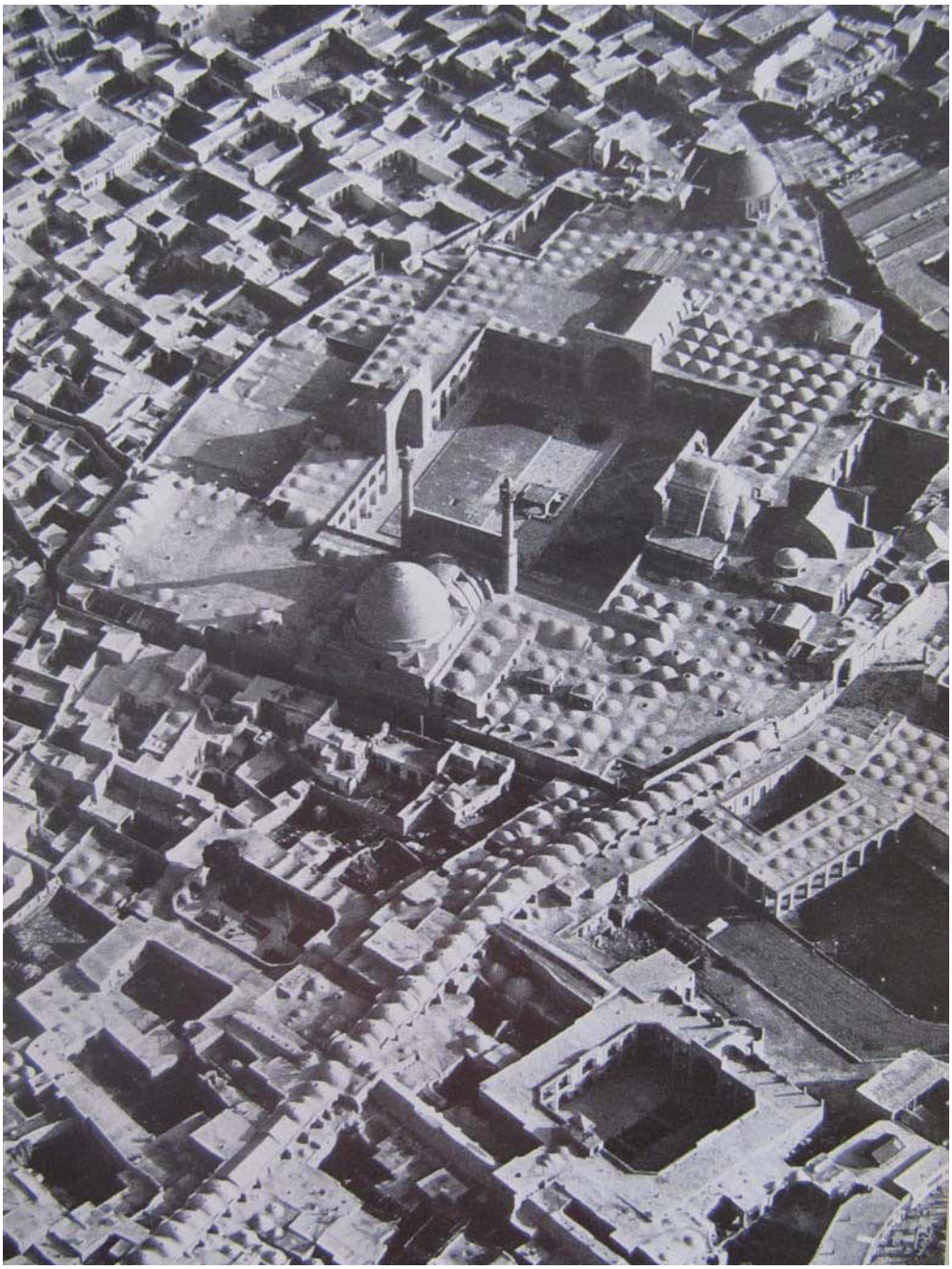


Fig. 1 – aerial photography of the Great Mosque (after Scerrato 2001: fig.1).

Fig. 2 – tile work covering the wall of the South *iwān* going back to the work commissioned by the Aq-qoyūnlū Sulṭān Ūzūn Ḥasan in 880H / 1475–1476.

their age, the rarity of findings of mural painting of this period, and the numerous scientific insights, which the few fragments have allowed.

The inventory of the findings actually comprise only 104 inv. numbers. Some of these anyway are actually comprised of more than one fragment, and in some cases a rather large number of small and smaller fragments. To begin, first a word about the nature and of the limitations of our information, and of this study. The IsMEO excavation in the Great Mosque had unfortunately been abruptly suspended on account of the Islamic Revolution in 1978. The inventory of the findings had therefore been stopped at a given moment or finished, sometimes hurriedly. Though the storage of the enormous number of finds (over half a million finds in over 5000 wooden boxes) (figs. 4-5) had been exemplary, and in fact permitted in the year 1999 a rapid recommencement aimed at the archiving of the discovered material, a loss of some of the items was unavoidable. This applies also to the fragments of wall paintings. For example, we do not know the whereabouts of a beautiful item (inv. 152, fig. 57) published on a poster for the exhibition *Antica Persia* held at the *Museo Nazionale d'Arte Orientale* in Rome in 2001, nor of the fragments excavated by Eugenio Galdieri in 1970. These latter fragments were apparently not included in the general inventory. The directors of the IsMEO missions, Umberto Scerrato for the archaeological one, Eugenio Galdieri for the project of restoration, have passed away, as

GO TO CONTENTS

have other meritorious Iranian and Italian members of that team. And they took away with them all the intimate knowledge of the mosque, its restoration, its excavation and its findings. Fortunately, they did leave precious writings (published or only hand-written) which were essential to our work. However, it has often been impossible to connect their notes and the entries of their diaries to the actual findings stored in wooden boxes, and kept away for over two decades.

The year of excavation of the various fragments is therefore often not traceable. In any case it appears that the fragments of wall paintings were chiefly

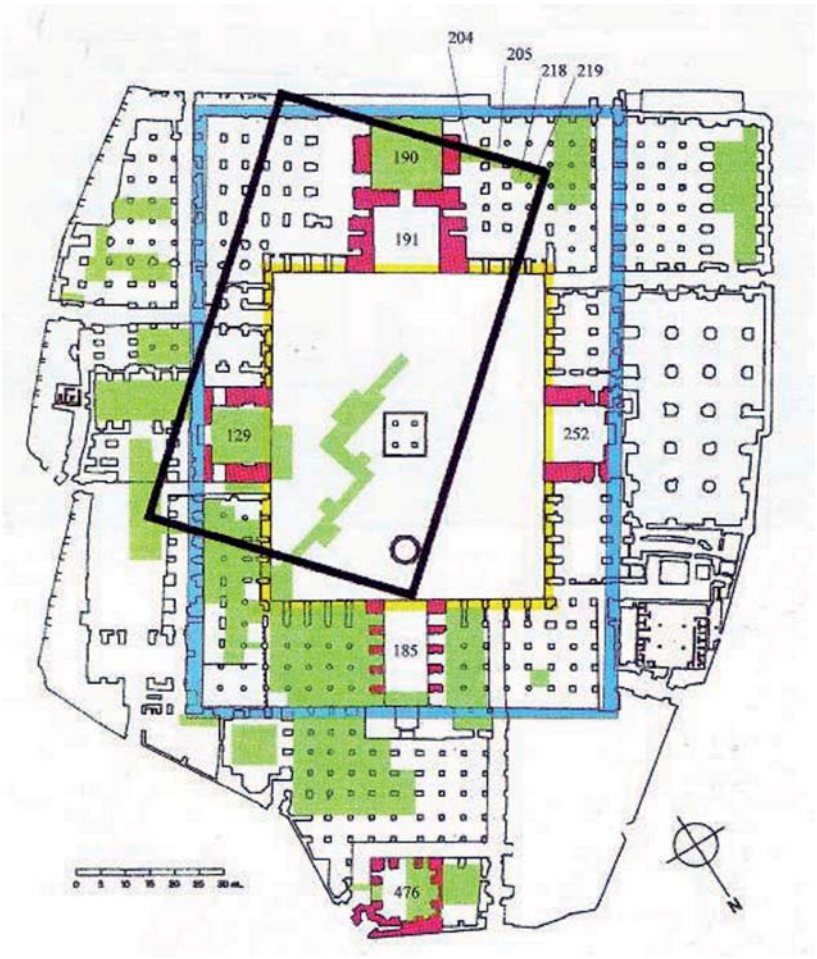


Fig. 3 – plan of the principal building phases of the mosque
in black: the first ʻAbbāsid mosque built ca. 156H / 772–773 under the caliph al-Manṣūr (dimensions hypothetic)
in blue: the second ʻAbbāsid mosque built ca. 225–226H / 840–841 in the period of the caliph al-Muʻtaṣim
in yellow: contraction of the court in Būyids period before 368–369H / 979–980
in red the interventions of the Great Seljūq between 478 and 511H / 1086–1118
in green: the sections excavated by the Italian Mission between 1972 and 1978
(plan after Scerrato 2001: XXXVII, fig. 2, design by Danilo Rosati).

GO TO CONTENTS

Fig. 4 – view of the laboratory in the Muẓaffarid *madrasa* with the workshop of the restorers and the piles of boxes with findings of the Italian excavation.

Fig. 5 – the restorer Behzat Babbei and the archaeologist Rocco Rante taking photographs of wall paintings.

found in the years 1973, 1976 and 1977. It occurs sometimes that one inventory number corresponds to different fragments, which may moreover belong to different typological groups. This fact is due to their being inventoried in this way during the excavation in progress. In such cases, the inventory numbers were further differentiated by myself, with a hyphen and additional numeration (e.g. inv. 8065-1).

In this study we considered all the fragments of wall paintings actually found in the boxes in storage, or known to us thanks to photographs or referred to in published or un-published texts. Fragments were also taken in account that were found in storage during my last mission at Iṣfahān, coming from the sector 112 which is beyond the limit of the second 'Abbāsid mosque, but within an area dating back to the Muẓaffarid period or later. These fragments had not been considered in our previous publications.

As is the case with the stuccoes unveiled in the same sections and archaeological layers of the mosque as the paintings, these were in fact an integral part of the mosque in its most ancient building phases. Furthermore, they seem to belong to its most essential area; that is the sanctuary-*ḥaram,* embellishing once the *qiblī* wall. In previous contributions, we have already questioned whether the mural paintings (and the stuccoes) were exclusively or predominately used in the *ḥaram*, as only very few fragments of paintings were discovered outside this area. Some may surely argue against this supposition, taking into account the band of stucco decoration found in the North-West corner of the North *iwān* i.e. on the opposite side of the mosque with respect to the *qiblī* wall.[3]

The fragments of wall paintings of Iṣfahān unveiled by the Italian Mission belong to the most ancient Islamic wall paintings discovered up to now in Iran[4] (fig. 6 and tab. 1), so it is fair to briefly recall here shortly the history of the research and their finding.

---

[3] Galdieri 1984: 41, figs. 37-8, pl. 65. The stucco decoration seems in fact quite similar if not identical to that of the *qiblī* wall of the first mosque. Galdieri saw a "link between these fragments and the early mosque ... or even a pre- or proto-Islamic building ..." We think that this finding is rather puzzling as it is in an area (sector 404) outside the presumed perimeter of that first building phase of the mosque. Scerrato (1973: fig. 6, 1974: 477) suggested that these stuccoes of the North *iwān* would probably have belonged to the 10th century mosque. But can we really suppose that the rebuilders of the mosque imitated so closely the decoration of the earlier building?

[4] See also the short review in Jung 2010: note 1. We may also add here Nāṣir-i Khusraw's story (221f.) about his paintings on the exterior wall and the *miḥrāb* with vermillion and a blue mineral of the mosque of Falaj (in the region of Falaj al-Aflāj situated to the North of the 22 parallel of Saudi Arabia) in 443H / 1051. As far as we know the first mention in the sources of a painted decoration in a mosque of Greater Iran goes back to the description given by al-'Utbī (d. 427 H /1035-6 or 431H / 1039-40), when speaking of the building of the mosque *'Arūs al-Falāk* (Bride of Heaven) at Ghaznī commissioned by the Ghaznavid Maḥmūd in 416H / 1026, he wrote that "on every square marble slab were traced a red golden miḥrāb, bistred with lapislazzuli, with arabesque of the colours of the gillyflower and the rose ..." (after the Italian translation of Bombaci 1964: 32. I did not find any mention of a painted *miḥrāb* in Reynold's translation from the Fārsī version of the text, 1858, cf. the on-line text: chapter L). We shall return shortly to al-'Utbī's text, when we speak about the gilded paintings of the Great Mosque at Iṣfahān.

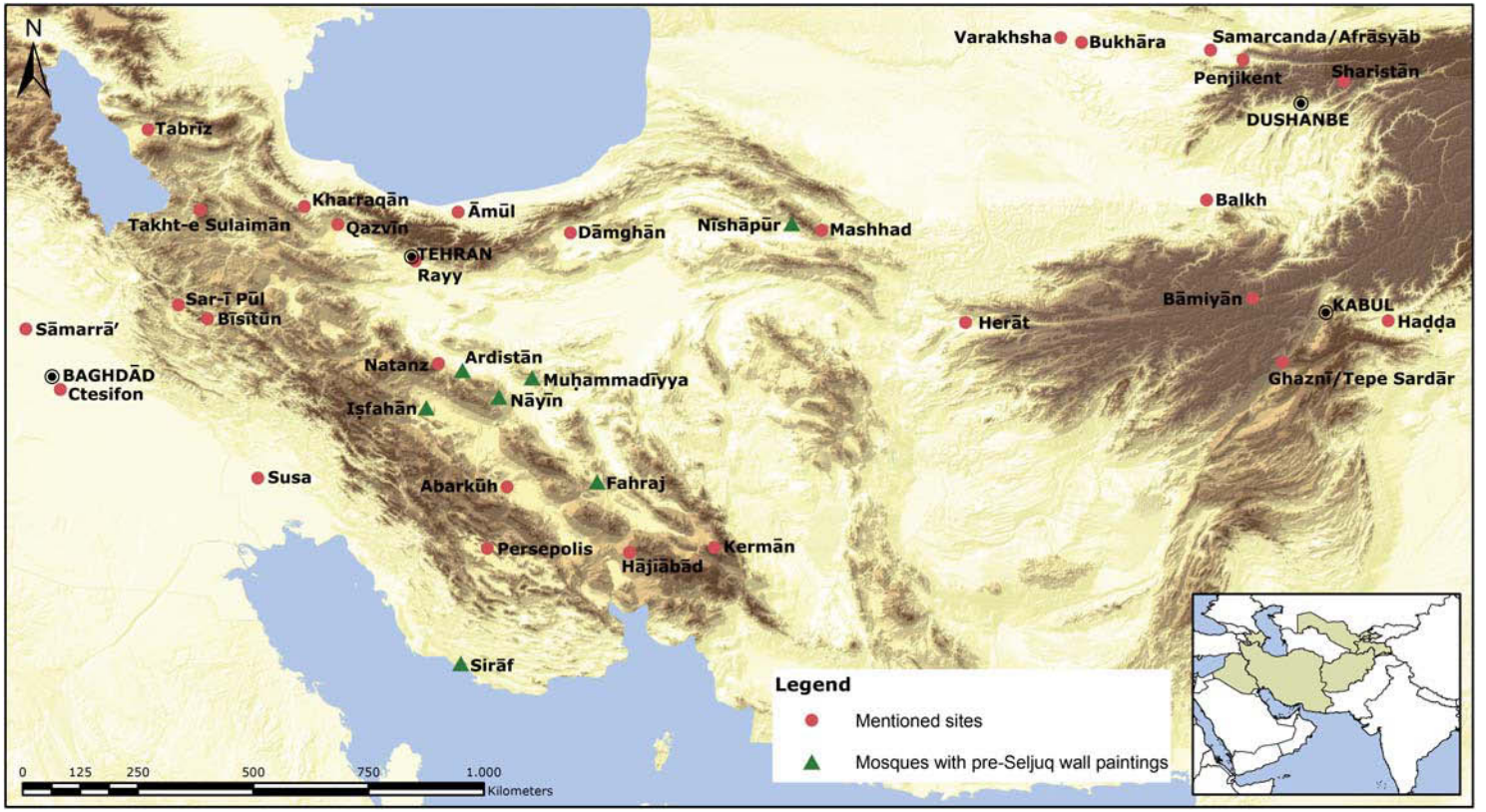


Fig. 6 – map of the mentioned sites and mosques with pre-Seljūq wall paintings.

Table 1 – Overview of pre-Seljūq wall paintings in Iranian mosques

Site	Monument	Dating of paintings	Colours	Motives	Bibliography
Fahraj	Great Mosque	between 9th and 10th cen.	red, blue, ochre and black on whirte plaster	red painting covering false doors, red medallion on a pillar	Zipoli, Alfieri 1977: 68, 73, pls. XIV, XXI, XXII; Finster 1994: 189f., fig. 74; Holakooei, Karimy 2015
Sirāf	Great Mosque (2nd building phase)	ca. 850 or possibly earlier	red and pink plaster		Whitehouse 1969: 44; 1970: 8
Ardistān	Great Mosque	first years of second half of the 9th cen.	on white plaster	geometric decoration: series of squares within rectangular field	Godard 1936b: 288, fig. 186; Fontana 2002: 73, pl. 31
Nāyīn	Great Mosque	2nd phase of Būyid period, 10th cen.	white, light and dark blue, red, light green and gold	scroll ornaments like wavelike tendrils of the 2nd style of Sāmarrā', spiral form pattern of blossoms	Finster 1994: 218-221, pls. 33, 2; 40, 2; 41,1-2, 42, 1-2; Fontana 2002: 73f., fig. 32, pl. 33
Nīshāpūr	Mosque of the Qanāt Tepe	not later than 10th cen.	red, white, yellow, green and black	floral and leafy ornaments as blossoms of lotus and ivy leaves within geometric pattern	Wilkenson 1986: 264-7, figs. 4.8; Finster 1994: 226f., fig. 117
Nīshāpūr	small structure with *miḥrāb* at Sabz-i Pūshān	2nd half of 8th or 9th cen.	red, black on white plaster	over pearl-strings circles, scroll ornaments with acanthus leaves and lily-shaped blossoms	Wilkenson 1986: 243f., figs. 3.43-4; Finster 1994: 227f.
Muḥammadīyya	Masjid Sar-i Kūcha (2nd building phase)	middle of 11th cen.		Kufic inscriptions	Finster 1994: 207-9, pl. 28: 1-2; Fontana 2002: 75, pls. 39a-c.

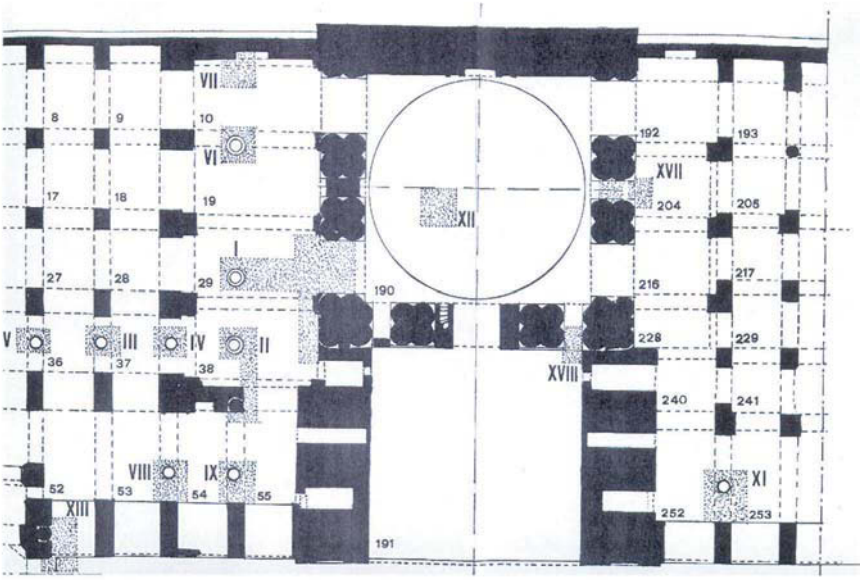


Fig. 7 – plan of the trenches excavated by Eugenio Galdieri in 1970 (detail, from Galdieri 1972).

Fig. 8 – the excavated section 190. In the background the oblique *qiblī* wall with the rectangular *miḥrāb* of the first ‘Abbāsid mosque. In the centre to the right the remains of a Sasanian column (after Scerrato 2001: XXXIX, fig. 5).

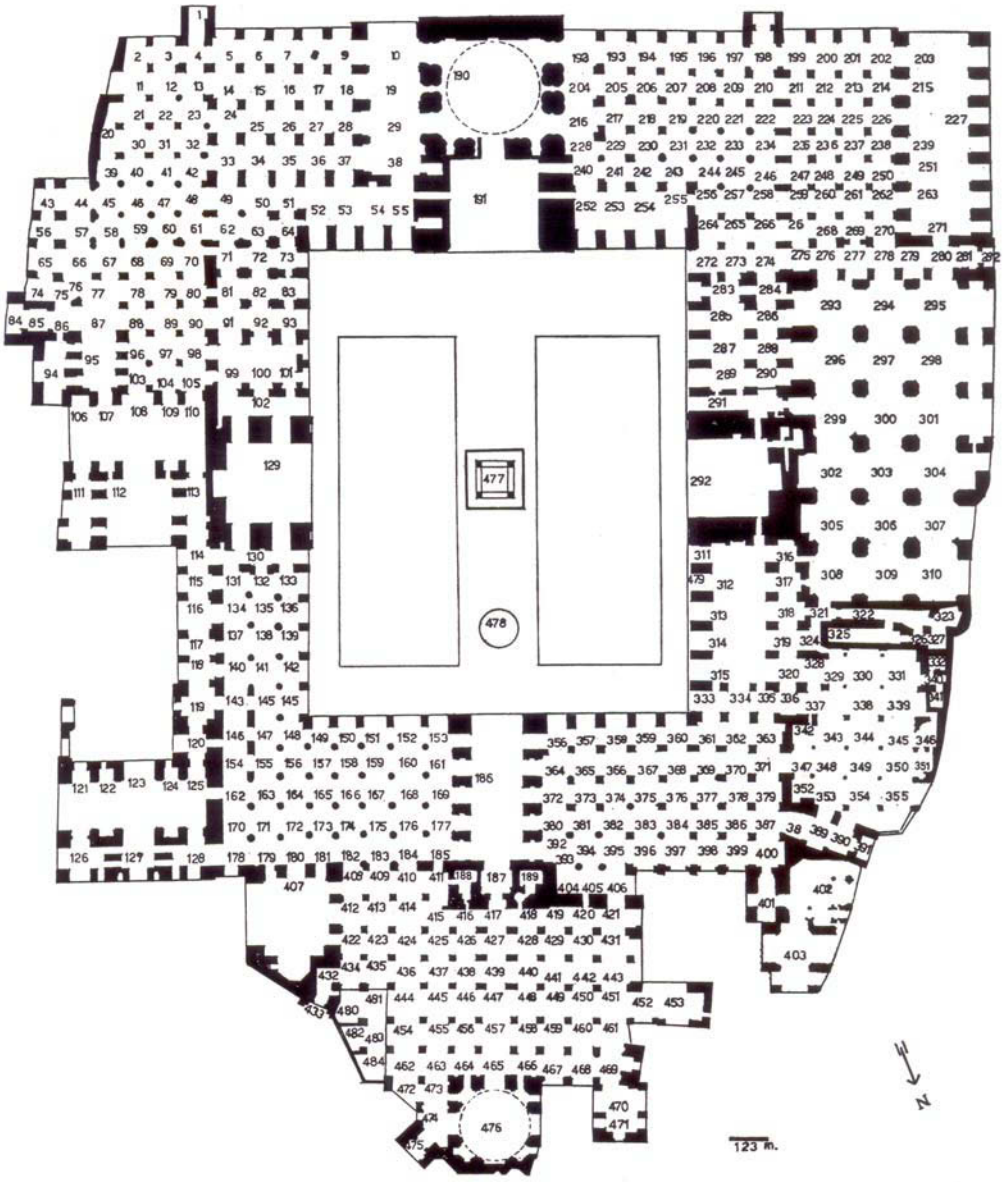


Fig. 9 – plan of the mosque with conventional numeration adopted by Ernst Schroeder (1967: plan in front of p. 954).

GO TO CONTENTS

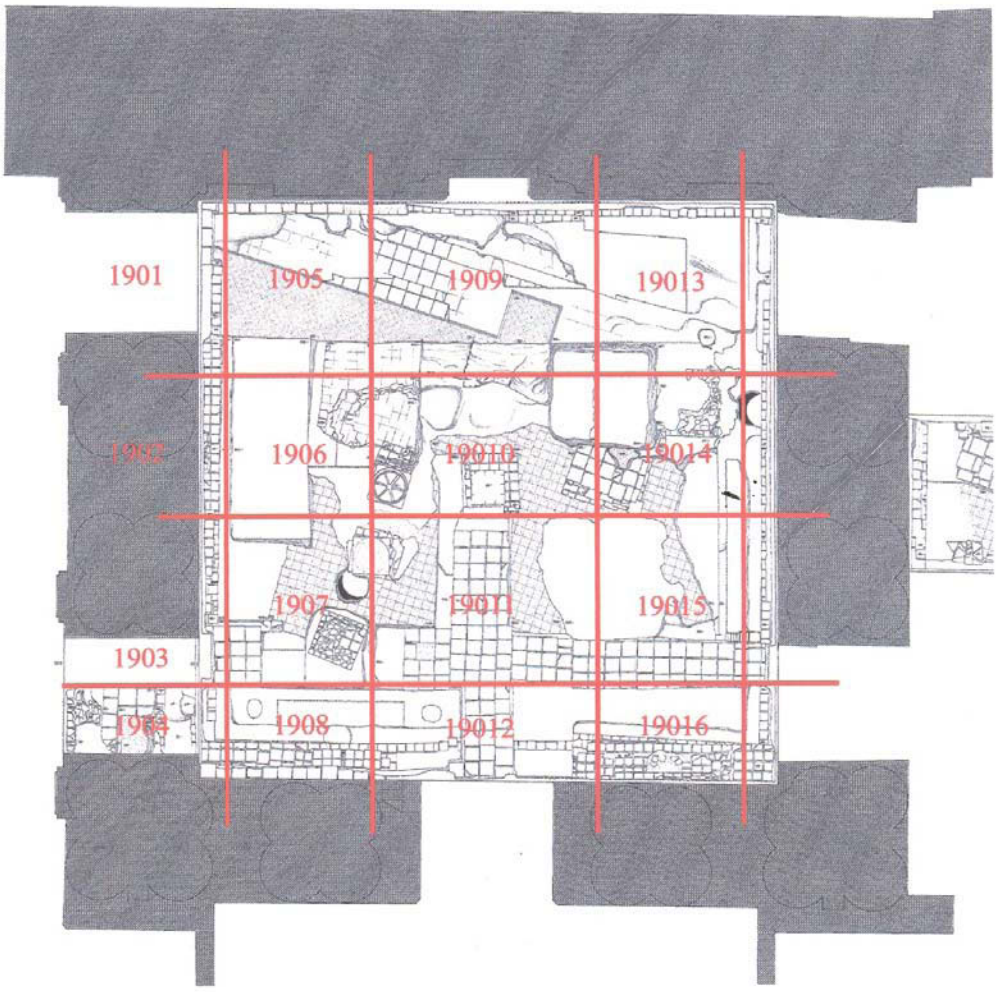


Fig. 10 – plan of section 190 and its subdivision in unites during the digging (after *Excavation* … 2002: 6, design by Nicola Olivieri and Danilo Rosati).

The earliest information referring to findings of mural paintings in the Great Mosque in Iṣfahān were obtained by the excavation of small test trenches conducted under Eugenio Galdieri's direction in 1970. Two small fragments were found respectively in the test trenches XII (= sector 190) and I (mainly sector 29).[5] (figs. 7, 9) The number of discovered fragments increased considerably during the excavation of sector 190 (placed under the dome of Niẓām al-Mulk, figs. 8, 10) undertaken by Umberto Scerrato and his team.

[5] Galdieri 1972: 374-5, note 2; Mocchegiani 1972, diary (hand written): 4. The fragments are labelled G-1 and 2 in our inventory. The n. of the sectors corresponds to Erich Schroeder's subdivision and numeration of the ground plan of the mosque published in the *Survey of Persian Art* II (1967 [reprint]: plan in front of p. 954), whereas the sectors TC match the squares of the IsMEO excavation within the courtyard of the mosque.

GO TO CONTENTS

Their unearthing is briefly mentioned in the preliminary reports of the research published in the *IsMEO* Activities[6], and described in Maria Vittoria Fontana's meticulously handwritten diaries. The fragments found were in a very fragile and perishable condition and were about to crumble. For the most part, the fragments were small or medium-sized pieces of plaster, only in some cases were larger pieces discovered (but only up to 22 x 18,5 cm) (fig. 11).

Fig. 11 – pieces of plaster painted with lapis lazuli.

Part of the finds were restored by Raimondo Boenni, then in charge of restoration for the archaeological mission. Information on the first restorations, interesting also with regard to painting techniques, are found in a small hand written leaflet kept as a photocopy among the records of the mission. It had probably been written by the late Raimondo Boenni himself for didactic reasons. His notes were compared with the actual restorated fragments. In the restoration process, the first step had been to remove the earth in which the fragments of painting were embedded. The paintings were then bound with *Paraloid B72*. The most significant fragments were then mounted onto chipboard, protected with padding and placed into wooden boxes and stored in the depot of the *Centro Scavi* after the interruption of the excavation caused by the political upheaval.
Unfortunately, Scerrato's information on the paintings is rather scant as the scholar had been more interested in the stucco decoration. It is limited only to a few lines and photographs. Nevertheless, he expressed two hypotheses that were rather remarkable, which our research could confirm. The first is the pre-Seldjūq date of the paintings found in sector 190. The second is the sub-

[6] Scerrato 1973-78; see also Id. 2001: XXXVI-XLIII.

GO TO CONTENTS

division of the decorative system of the wall into two distinct zones. The lower one of the plinth embellished by stuccoes, and the upper one by paintings.
When the archeological mission returned to Iṣfahān after an interval of over twenty years, we considered the restoration, the documentation and the study of the paintings as one of the priority tasks. It had already been ascertained, during the short mission in 1999, that the finds kept in the depot of the mosque had not undergone serious damage. During a second mission in 2002, and a year later in 2003, within the framework of the joint Italian/Iranian ADAMJI project (= *Archaeological Digital Archive of the Masjid-i Jom'e Iṣfahān*)[7], we could begin the examination of the state of preservation of the fragments, and set up a program of research. This program was scheduled in the following steps: sorting of the fragments, inventory, cleaning and restoration, filing and digital cataloging, study, scientific analysis and publication, and finally exhibition, or appropriate placement of the items in a depot to guarantee a correct conservation.
The fragments were found kept in over twenty wooden boxes in the storeroom of the mosque behind the East *iwān* and included a certain number of small and a large quantity of tiny and minute pieces. A large part of the material had been carefully packed and labeled indicating the provenance of the find and the date of its discovery. Other finds had obviously been packed in a hurry (due to the sudden closure of the excavation) and had been given scant descriptive indications. Some of the fragments – still embedded in earth – were probably put into the wooden boxes immediately after their unearthing. Moreover, a check made by the restorer Behzad Babaei revealed that all the paintings, including those that had already been restored in the past, necessitated a thorough restoration or at least a clean-up. Consequently the finds were cautiously and provisionally cleaned – when possible given the extreme delicate state of their conservation – removing the dust and dirt. Mr. Babaei then undertook the task of beginning a more thorough cleaning of the paintings, continued later on by Mrs. Fariba Khatabakhsh[8] and Mrs. Roxana Jabalameli, who also compiled a fine graphic and photographic documentation of their work, which allows one to follow all phases of their intervention. As part of our work, we also endeavored to recompose with the various fragments a part of the ornamental composition, to make a virtual reconstruction of part of the decoration of the *qiblī* wall, not an easy task, which was only to a certain – modest – degree, fruitful.[9]

---

[7] The Joint Iranian-Italian ADAMJI Project (= *Archaeological Digital Archive of the Masǧid-i Jom'e Iṣfahān*), had been directed by Bruno Genito (*Istituto Orientale di Napoli*) and Faribah Saiedi Anaraki (*Iranian Cultural Heritage, Handicrafts and Tourism Organization*). For general premises of the project, cf. Genito, Saiedi, eds. 2011.
[8] Fariba Khatabakhsh had made a CD of their restoration work, furnished with photographs and designs, cf. Khatabakhsh 2004.
[9] We followed the examples given by the *Istituto Centrale per il Restauro* in Rome at the San Francesco Basilica in Assisi. There the restorers and art historians recomposed the frescoes heavily damaged and crumbled by the earthquake in 1998. Anyway, we must here underline that the starting point at Assisi had been quite different as many of its frescoes were well known and extremely well recorded before the seism, cf. *Guida* … 2001.

GO TO CONTENTS

All fragments found were recorded, the inventory completed and a catalogue of all the items accomplished. Furthermore, a registration card was conceived, which would allow one, in the future, to enter all the data into the central data base of the Archaeological Archive of the Masjid-i Jum'a at Iṣfahān.
In parallel with this scheduling, we proceeded to read the field diaries written by the archaeologists concerning the sectors where fragments of painting and stucco emerged. The aim of this two-fold research was to find information, which could have helped to anchor the fragments within the stratigraphic framework of the excavation. This reading revealed in fact important information. Nevertheless, we must confess that it was rather difficult, more often than not impossible, to identify the actual fragments with those described in the diaries and to verify precise matches.
Samples of the paintings were furthermore taken to Italy in 2002 to undergo diagnostic analysis in agreement with the Iranian authorities, in order to obtain information about the composition of the pigments used, the plaster, and the general state of conservation**.** Their examination was begun by Anna Valeria Jervis of the ISCR,[10] and has been continued by a team from the laboratory of ENEA (*Italian National Agency for New Technologies, Energy and Sustainable Economic Development*) through XRF analysis, and yielded interesting clues on the techniques used by the painters.[11]
On various occasions during the work in progress we were already able to propose the first preliminary results of our research in meetings, conferences and an exhibition.[12]

The refined typology of the wall paintings

After the checking of all the wall paintings and their inventory, it is now possible to propose a new refined typology of the paintings. The paintings can be divided into different groups based on stylistic, chromatic and technical grounds. This refined typology differs in some respects to that proposed in our former contributions. Some new fragments were in fact found between the other stored finds of pottery etc., or pictured (but no longer found) in a photograph of the Mission which had hitherto not been considered. Furthermore, the progress of our research brought forth some further modifications.

---

[10] Jervis 2003.

[11] The Italian Mission had reached a second agreement with the Iranian authorities, which – we hoped – would have allowed us to expand our research in the near future. Samples were already chosen in the *Iṣfahān Research Center,* so that the analysis to be carried out in Rome would have covered all of the identified groups. As yet, unfortunately, this undertaking is still waiting to be put in practice.

[12] Lectures on the wall paintings of the Masjid-i Jum'a were given by the author at the National Museum of Iran, Tehran (2005), at the Faculty of Conservation, Art University Iṣfahān (2006), at the *6th International Congress on the Archaeology of the Ancient Near East,* Rome (2008) and at the *7th International Congress on the Archaeology of the Ancient Near East*, London (2010). Some of the findings were presented to the public at the exhibition *A.D.A.M.J.I. (Archivio Digitale Archeologico della Moschea del Venerdì di Iṣfahān) dallo Scavo all'Archivio*, National Museum,Tehran (2005), cf. the published papers Jung 2010; Jung et alii 2011; 2012.

GO TO CONTENTS

Besides the partial renaming of some types, there are other major modifications and additions with respect to the former typology. These are as follows: a new type IX, *Naturalistic plant relief*, unfortunately present with only one fragment as far as is known (and only through a photograph). As a result, the *Miscellaneous* group is now assigned the order number X (formerly IX). Another new group is XI *Plant ornaments* of the sector 112 excavated in 1976 and not considered in our previous contributions. The overwhelming part of the fragments comes from section 190, i.e. the *miḥrāb* area of the former and actual sanctuary under the dome built by Niẓām al-Mulk. An area about 15 x 15 m wide surrounded by eight heavy and articulated piers. Exceptions are types X, *Miscellaneous*, and XI, i.e. the fragments of sector 112 excavated in 1976. Another fragment has been found between pottery shards of sector 446, i.e. in the NE part of the Great Mosque on the opposite side of the courtyard with respect to the *ḥaram*, and in fact, like sector 112, outside the boundaries of the 'Abbāsid and Būyid mosque. We have found no written information relating to the provenance of the unique fragment of type VIII, *Plant-like relief*, but several circumstances seem to suggest that it also comes from sector 190. All in all, only a modest number of fragments of the mural painting was found compared with the large quantity of stuccoes. Puzzling is the uneven distribution of the various types of the fragments excavated within sector 190. We do not know if this is due to the unfavorable conditions of preservation, which led to the irregular allocation.

Table 2 – Types of the excavated wall paintings

Type		Sector	Colours of the ornaments	Colour of the background
I	Epigraphic bands in Kufic script on blue background	190	between ocher and rosy within red outline	blue
II	Epigraphic bands in Kufic script on white background	190	blue within black-olive outline	white
III	Bands of pearl-strings	190	red, blue, white. black-olive	white
IV	Linked three-lobed arches	190	white within blue outline, blue	red-orange
V	Blue ornaments on hard plaster	190	blue within black-olive outline	white
VI	Geometric and/or vegetal-like decorations	190	blue, red, gold, black	
VII	Relief scrollwork	190	gold, sky-blue, dark blue, white	red, black
VIII	Vegetal-like relief	190	blue, traces of gilding	blue
IX	Naturalistic vegetal relief	190	red	blue
X	Miscellaneous	190, 204-5, 218-19, 446	blue, red, red-brown, brown, ocher, white, black, gold	
XI	Vegetal ornaments	112	ocher, brown, black, pink, white	ocher

N.B. not always it is possible to distinguish clearly between ornament and background, for instance in groups VI, VII, in which foreground and background are intimately interwoven.

GO TO CONTENTS

Short description of the different types

Types I and II are among the most interesting ones. They are epigraphic bands, and were part of the pictorial decoration of the *qiblī* wall. If they really belong to the two most ancient phases going back to the ‘Abbāsid commission, they constitute possibly the earliest remains of calligraphic friezes in Iran, in existence. A decorative device (and far more than a simple ornament), which would also become the major element of Islamic architectural decoration in Iran.[13] As far as we know, up to now the calligraphic friezes of the Masjid-i Jum‘a at Nāyīn built in ca. 350H / 960, were considered to be the most ancient ones preserved in Iran.[14]

Type I – Epigraphic bands in Kufic script on a blue background

Fragments of type I seem to come mostly (if not all) from the western half of sector 190 and from the stratum Ic (figs. 12-16). On the basis of the diaries, the inventory and other information, one may narrow down the provenance for some of the fragments to squares 1906 or 1907, or still more probably to 1901-2 of sector 190. The colour of the bands of type I is difficult to define. It oscillates in fact between ochre and a rosy colour within a red outline and against a blue background.[15] Its Kufic script with its straight characters and right angles also present curvilinear elements. Unfortunately, no part of the script band is legible and only one fragment (inv. 8028, fig. 12) gives us some clue about the form of the characters. One can at least recognize the compact shape of the letters, which are closely huddled together, and the apex of one shaft provided with a thorn-like top turned to the left. This last motif presents the most ancient decorative motif of the Kufic script.[16] A comparison to the Iṣfahān script appears to be the inscription[17] of the cistern al-‘Anazīya near al-Ramla written in 172H / 789 in the early ‘Abbāsid period. Might this paleographical comparison help us to date hypothetically type I of our wall painting also to this early period, i.e. to the first mosque built ca. in 156H / 772? Quite singular are the curvilinear shapes of the other fragments. Are they part of letters, or rather of some ornamental device? The plaster of only one fragment (inv. 8059), which we assigned cautiously to this type, remained visible. All the other fragments were embedded by the former restorers in wooden boards. The plaster of this

[13] We do find the first example of an epigraphic frieze, executed in mosaics, already in the oldest remaining Islamic monument, the dome of the Rock in Jerusalem, built by the Umayyad caliph ‘Abd al-Malik and completed in 71H / 691.

[14] Finster 1994: 209-22 with bibl.

[15] The Koranic verses in golden letters of the decoration of the Great Mosque of Medina built in 88–90H / 707–709, no longer in existence, were also placed against a blue background. According to the reconstruction proposed by Sauvaget, based on Ibn ‘Abd Rabbīhi’s description, the marble bands of the wall decoration had two painted bands: the second one was *painted with red unguent*, whereas the fourth one presented *a band of five lines from the Qurān in gold on azzure background*, cf. Sauvaget 1947: 78-81, fig. 3; Creswell 1989: 45, fig. 24. The text was written by the first known monumental calligrapher, Sa‘d, cf. *Calligraphy* ...: 1711.

[16] Grohmann 1957 and 1971: 95-113.

[17] Grohmann 1971: 93, pl. IV, 2.

Fig. 12 – inv. 8028, Type I.

Fig. 13 – inv. 8056, Type I.

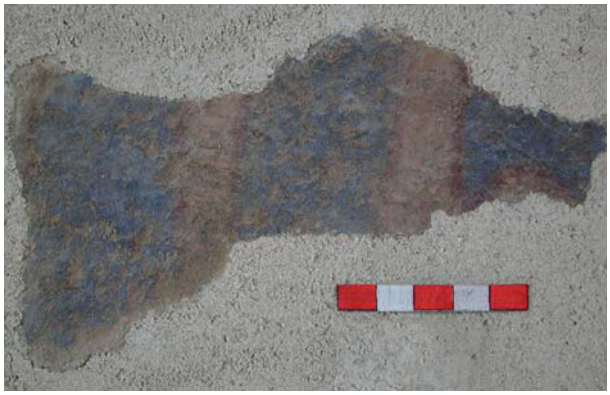


Fig. 14 – inv. 8054, Type I.

Fig. 15 – inv. 8050, Type I.

Fig. 16 – inv. 8055, Type I.

fragment (inv. 8059) consists of earth mixed with straw, as in most of the items of wall painting excavated in sector 190. We attempted a re-composition of the fragments inv. 8050, 2135, 8030 (fig. 17) and propose that the paintings of type I and III (Bands of pearl strings) belong to one and the same decoration, though we have to specify that the pearl string of the two fragments (on the right side of the photograph) does present somewhat different dimensions, and does not match precisely.

Type II – Epigraphic bands in Kufic script on a white background

The wall paintings of type II were found in the eastern sector of the hall (figs. 18-24). They have blue characters within a black-olive green outline against a white background. The characters of this type may have different dimensions, thicker and slimmer ones exist in fact side by side. The blue characters are framed by black olive outlines possibly drawn first to provide the form of the character to be filled, in a second step, by the blue colour (see inv. 8033, fig. 18).[18] Some of the fragments of this type present straight lines cut into the plaster. These cuts could possibly have provided an indication for the horizontal band running as a kind of preparatory drawing for the scripture to be painted (inv. 8040, 8042 and 8044, figs. 20-22).[19]

The epigraphic bands of type II are distinguished from type I on account of their colour-scheme, their calligraphic style, and the more careful and somehow graceful execution. The loops of its characters are written as an ogee with an elevated peak, and the letters are provided with hook-like notches. Whereas the ogee-form design with elevated peak is well known from other inscriptions,[20] I could not find any comparable script for the pattern of hook-like notches. We do not know if it is possible to better define the script belonging to group II and to find close comparisons, given the poor evidence provided by our few fragments.

As yet, we cannot decide whether the scripts of types I and II belong to one and the same phase of execution. Their different scriptural style would suggest a negative answer.

A definite statement is also handicapped by the fact that all but one of the fragments found belonging to type I had previously been restored and fixed upon wooden supports. This circumstance makes an analysis today of the plaster below the pictorial film, difficult; such an analysis would have allowed for the recognition of common features and characteristics between the supports of the two groups. The fact that the fragments of both types I and II were found in different sectors of the hall, and the quite different script, seems in any case to indicate that they belong to different phases.

---

[18] In this case the blue is painted partially over the black outline.

[19] The use of incisions to prepare the actual painting is documented in the Umayyad floorpaintings at Qaṣr al-Ḥayr al-Gharbī/Syria, cf. Schlumberger 1946: p. 92, and note 2 at p. 90.

[20] See e.g. the inscription on the *Veronica of san Iodorico*, made before 349H / 961 in Iran or Central Asia, now kept in the Louvre, in *Calligraphy* ...: pl. 981.

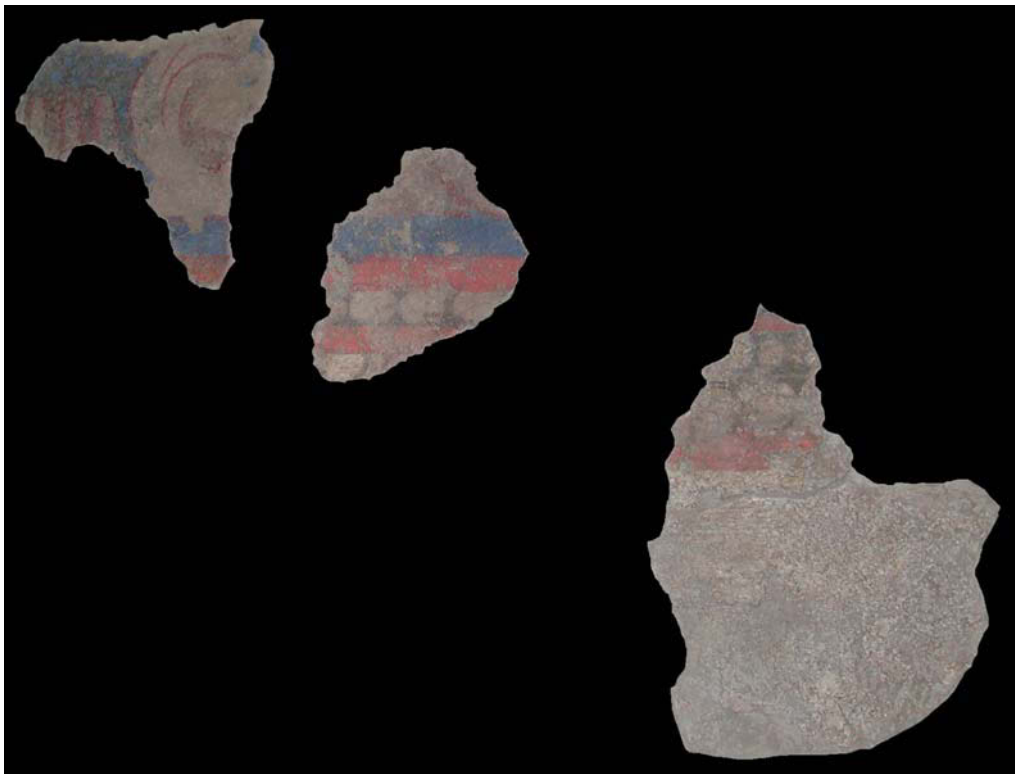


Fig. 17 – hypothetical re-composition of fragments of types I and III (inv. 8050, 2135, 8030).

Figs. 18–19 – inv. 8033, Type II.

Fig. 20 – inv. 8040, Type II.

Fig. 21 – inv. 8042, Type II.

Fig. 22 – inv. 8044, Type II.

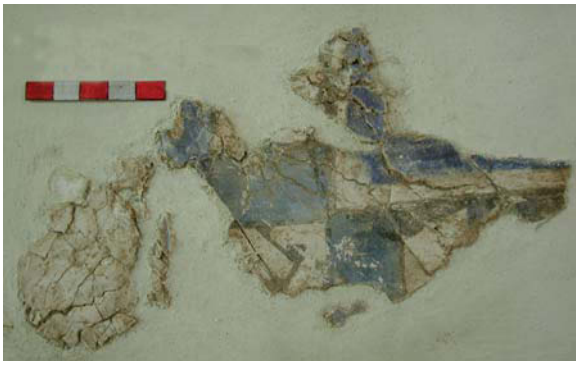


Fig. 23 – inv. 8043, Type II.

Fig. 24 – inv. 8045, Type II.

Type III – Bands of pearl-strings

The type is characterized by red or blue bands of pearl-strings (figs. 25-27). Most likely, the pearl-string paintings all came from the western half of the sector 190/stratum Ic. The pearl-strings were already a typical element of the Sasanian ornamental repertoire.[21] The motif is in any case also frequently used in Central Asia, and has a Buddhist religious meaning as has been pointed out by

[21] On this rather common ornament pattern in Islamic wall (and floor) painting, see my bibl. notes in Jung 2010: note 6. For the examples from Italy, we may add here the numerous paintings with this motif on wood found in the cathedral of Cefalù, Aurigemma 2004. See further the stuccoes of Khirbet al-Mafjar, in Hamilton 1959: 212, fig. 155, the Masjid-i Ta'rīkh of Balkh, in Adle 2011: figs. 14, 17 or the marble slabs of Ghaznī dated to the 12th century, cf. e.g. Bombaci 1966: pl. XLI, fig. 142; Rugiadi 2012: 1127, 1154 and 1193. The motif is still found in 12th century Qarākhānid wall paintings in the citadel of Samarqand, cf. Karev 2005: 64, figs. 18, 20-1.

Fig. 25 – inv. 8022, Type III.

Fig. 26 – inv. 2135, Type III.

Fig. 27 – inv. 8029, Type III.

Fig. 28 – *qiblī* wall of first mosque with stucco decoration (after Scerrato 2001: XLI, fig. 8).

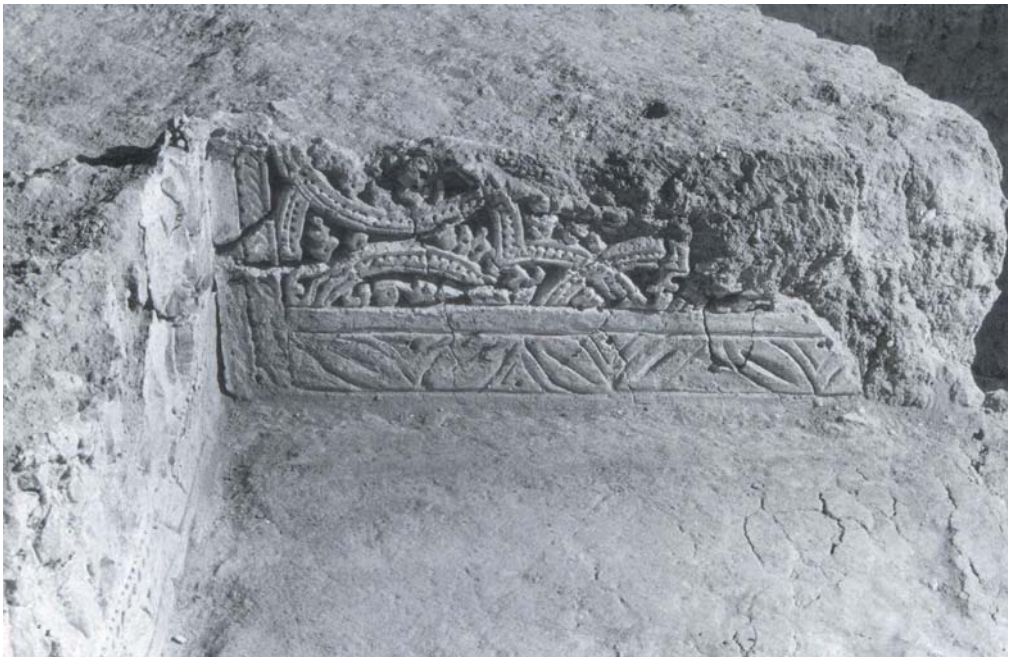


Fig. 29 – the *miḥrāb* of the first mosque with its intricate pattern of pearl-strings (after Scerrato 2001: XL, fig. 7).

Esin,[22] who also quotes the expression *yinçu monçuk tizigi* (a row of pearls and gems) in Turkish texts connected with auspicious localities. The same pearl-string pattern also appears in the stucco decoration of the *qiblī* wall of the mosque (fig. 28). As with the stucco pearl ribbons of the ancient *miḥrāb*, the painted bands of stylized beads not only formed and framed pictorial panels. They were endowed with their own decorative autonomy in such a way as to fashion complex intertwining geometric compositions. Employed in stucco and in painting, the pearl-string ribbons probably also had the task to create a kind of inter-weaving, so as to merge the decorations produced in the two different techniques in one and the same extended decorative system. This of course only in the case (which we presume) that these paintings and stuccoes belonged to one and the same period, or at least lived side by side for some time. Significant is the case of inv. 8022, here the pearl-strings not only run in a straight-line, but are also bent as is the case of the stucco pearl-strings of the *miḥrāb*. (figs. 25, 29) The same fragment presents deep incisions, which may be an indication for a (planned?) overpainting. An important item is inv. 2135 (fig. 26), as above the pearl string, are visible what appear to be probably characters of group I (i.e. epigraphic bands in Kufic script on blue background). This may prove that the fragments of group I and III are part of one phase. If the fragments of inv. 5058 belong to this group, they would further demonstrate that the plaster of this type consisted of earth mixed with straw as do most of the fragments of wall painting found in sector 190.

The pearl-string ornament was also widely diffused in Sāmarrā', painted so in the Jawsaq al-Khāqānī palace (referred to in more recent publications as Dār al-Khilafa) built by the same caliph al-Mu'taṣim, who commissioned the second mosque at Iṣfahān, in circa ca. 225–226H / 840–841. Here again we find used the pearl-string ornament used (held to be reproductions of mother-of-pearl), strung together between red borders as in our mosque.[23] Rather frequent is its use in stucco work in Sāmarrā', too.[24] Given that the stucco *miḥrāb* at Iṣfahān, is dated presumably to the first 'Abbāsid mosque built ca. 156H / 772–773 during the time of the caliph al-Manṣūr, we may also assign the paintings to this earlier period. This suggestion finds support in our tentative attribution of the epigraphic band of type I.

[22] Esin 1973/74: 84. On the motif in pre-Islamic time, see also Seyrig 1940: 303-7, Scerrato, 1994, on Sasanian textiles, and the substantial research on this motiv also beyond this time in Eastern Turkestān, Compareti 2003. See also the beautiful photographs in Bussagli 1963: p. 44-5 with stories of Rustam from Penjikent, hall 41 [of the first half of 8th ca.] p. 86, and the reliquary of Kuca [probably 3rd-5th cen.], or the numerous figs. and pls. of central Asian wall paintings with pearl-strings from Ajina Tepe, Balalyk Tepe, Penjikent, etc., in Silvi Antonini 2003: passim.

[23] Herzfeld 1927: pls. XII-XIV, see also Hoffmann 2008: 111, fig. 2.

[24] Herzfeld 1923: 16f., and passim with numerous figs. and pls.

Fig. 30 – inv. 2131, Type IV.

Fig. 31 – inv. 2132, Type IV.

Fig. 32 – inv. 2142, Type IV.

Fig. 33 – inv. 8005, Type IV.

Type IV – Linked three-lobed arches

A continuous sequence of linked three-lobed arches constitutes principally type IV (figs. 30-36). The arches are formed by white volutes with a blue outline in reserve spared against a red-orange background. The same scrolls encircle fields with curvilinear outlines within the arches. In the fields is the design of a stylized plant ornament in blue: a small rhomb placed between two symmetrically placed scrolls developing from a three pointed leaf. We may call the ornament a kind of *fleur-de-lis*. The right orientation of the pattern

Fig. 34 – inv. 8009, Type IV.

is suggested by the shape of the arches and by the position of a graffito cut into a fragment of this decoration (fig. 32). In a former contribution[25] I proposed the reading of the two letters of the graffito with سو (=sū) and the translation with *side* or *direction* (if it were not the abbreviation of a proper name). I furthermore cautiously suggested that it may therefore have given some indication of a technical nature to the craftsmen who were engaged to produce the subsequent pictorial layer at a later moment in time. Mahnaz Esmaeili however, cautiously suggests its reading with مس, possibly as a sort of shortcut of the *basmalla* (the saying *In the name of God, the Most Gracious, the Most Merciful*.[26] A number of very thin plaster flakes of this type seems to show a somewhat different pattern (fig. 34). All fragments of this group were found in the eastern half of room 190, and come from stratum Ic.

One fragment of this group (inv. 2132, fig. 31) presents a number of marks scratched deeply into the painted surface. This damage caused by some kind of sharp tool, was probably made in order to provide a rough surface for a new layer of wall painting. In contrast, we detected cuttings behind the painted layer on fragments of inv. 8009 (fig. 35).

[25] Jung 2010: 114.

[26] Oral communication. My thanks go to her friendly help and advice.

Fig. 35 – inv. 8009, Type IV, view of the back of the fragments.

Fig. 36a-b – hypothetical reconstruction of ornamental setting of type IV. Graphic by Behzat Babaei.

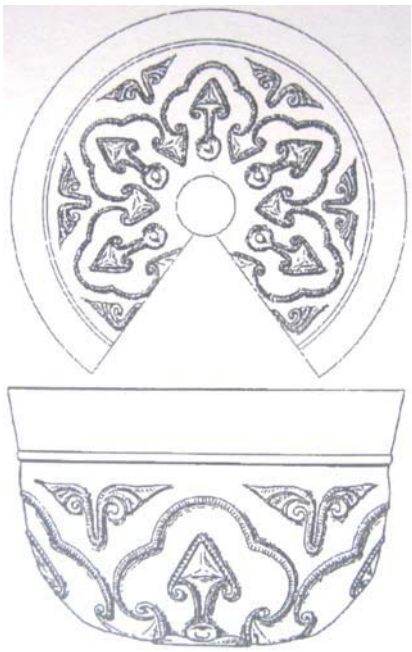


Fig. 37 – three-lobed arch in Niẓām al-Mulk's dome (after Galdieri 1972: photo 190.E).

Fig. 38 – glass bowl, Iran 9th-10th century (after Kröger 1999: fig. 1, p. 199).

Fig. 39 – re-used marble slab in the sanctuary at Pīr-ī Falizvān at Ghaznī (after Bombaci 1966: pl. XXVIII, fig. 107).

Thin layers of whitewash (thickness 2 mm) are further details for the relative chronological position of this type: the paintings of type IV were therefore not the last ones made, but had a subsequent layer on top of them. The pictorial layer of inv. 8005 had been placed directly upon an earthen plaster (fig. 33).
The pattern of this wall decoration of *Linked three-lobed arches*, which appears at first glance standardized, presents in fact somewhat different measurements. This seems to prove that the pattern was not copied meticulously from one and the same form, for example from cartoons, but carried out rather freely, creating a quite similar, but not identical nor repetitive,

GO TO CONTENTS

nor monotonous design.[27] In the attempt to reconstruct the pattern of the composition, we tried to join together the better preserved fragments. Our restorer, Behzad Babaei, converted this hypothetical reconstruction ino a graphic. His design gives an approximate idea of the ornamental setting of type IV (fig. 36a-b). The arrangement of the three-lobed arches on one strip on its own may be wrong. It could be that the arches were also arranged in several overlapping strips (fig. 39).[28]

The motif of the three-lobed arch (= trefoil arch) is quite interesting. The design appears first in Gandhāran art, which developed between the 1st century B.C.E. and 4th–5th centuries C.E.[29] In Islamic architecture the three-lobed arch was already used as decorative motif in Umayyad architecture as found in the desert residences at Qaṣr al-Ḥayr al-Gharbī[30] and Khirbat al-Mafjar[31] of the 8th century. It is also found in Sāmarrā' stucco work and at Sīrāf[32], and it later became a characteristic element of the Seljūq architecture of Iṣfahān, for example it is found in both cupolas of the Masjid-i Jum'a, built respectively by Niẓām al-Mulk in 479–480H / 1086–1087 and by Taj al-Mulk in 481H / 1088–1089. One could say that the painted three-lobed arch of the 'Abbāsid period in the mosque anticipated the ones actually built of Seljūq architecture (fig. 37). Far fetched, but inviting, may be to seek lastly the origin of our painted pattern in a stylized combination of a variant of the *Tree of Life* with curled spirals, which replaces the Sasanian double wing as proposed by Kröger for glass vessels, rock crystals and the like (fig. 38).[33] We may further note that the combination of three-lobed arch and the *fleur-de-lis* pattern is also found on marble slabs of Ghaznī dated to the 12th century. Sequences of three-lobed arches are here alternated with this floral pattern, or encompass interlaced palmettes and *fleu-de-lis* (fig. 39).[34]

---

[27] Schlumberger takes for granted the pouncing technique for transferring an image from one surface to another used by Umayyad artists, cf. 1946: 102, note 3. After Karev (2005: 47) "probably, the painters directly copied the images on the walls of old, abandoned buildings and the pages of unburned books in order to create their own "database" of images; according to G.V. Shishkina, the faces of the personages in the Red Hall in Varakhsha [45 km West from Bukhara] ... seem to have been carefully cut from the wall after the palace was abandoned and were not intentionally damaged."

[28] Like the three-lobed arches on a re-used marble slab in the sanctuary at Pīr-ī Falizvān at Ghaznī arranged in two rows, see Bombaci 1966: pl. XXVIII, fig. 107 [see here fig. 39] or the dado panels illustrated in Rugiadi 2012: 1164, 1170.

[29] See e.g. the arches discovered at Haḍḍa in Barthoux 1933: 38-40, figs. 24-5, 28, 138; see also Taddei, Verardi 1978: 133, when discussing this motif found at the Buddhist site of Tepe Sardār; Faccenna, Filigenzi 2007: 86, pl. 51.

[30] Schlumberger, Le Berre 1986: pls. 43.b, 68.a.

[31] Cf. Hamilton 1959: 167-9, see also Rugiadi 2012: 1295f. with bibl. notes, when speaking about the motif frequently used in Ghaznavid art, especially on marble slabs excavated by the Italian Archaeological Mission at the palace of Mas'ūd III in Ghaznī/Afghanistan, see further Bombaci 1966: 8f.

[32] A stucco fragment from the Great Mosque shows two intersecting trefoil arches, cf. Whitehouse 1968: 20, pl. VIIIa.

[33] Cf. apropos Kröger 1999: 199f., fig. 1 showing a glass bowl from Iran of the 9th-10th centuries.

[34] See e.g. Rugiadi 2012: 1125, 1164, 1170.

Type V – Blue ornaments on hard plaster

In this type, rhombus-, hook- and stylized flower-like shaped ornaments in blue within a black outline are painted against a white background on a particularly hard plaster (figs. 40-43). In one case the ornaments are arranged in a radial composition. The floral pattern recalls lotus-like trefoils like those cited by Dimand[35] deriving from Sasanian art. The hard plaster of these paintings differs strikingly from the mud support more commonly utilized. Though the fragment inv. 8041 (fig. 42) is attached to a wooden board, we suppose that this item, too, belongs to the type V. Because at least a part (if not all?) of these fragments were found in the same context as the group with *blue letters* (type II), i.e. in the *pit column L1* in the eastern sector of the domed hall, is why some could suggest that types II and V may be part of the same decoration. In any case, the plaster is completely different, having been in the former case earthen plaster.

Fig. 40 – inv. 8011, Type V.

Fig. 41 – inv. 8010, Type V.

Fig. 42 – inv. 8041, Type V.

Fig. 43 – inv. 2141, Type V.

[35] Dimand 1937: 323 and fig. 28.

Fig. 44 – inv. 2134, Type VI.

Fig. 45 – inv. 2136, Type VI.

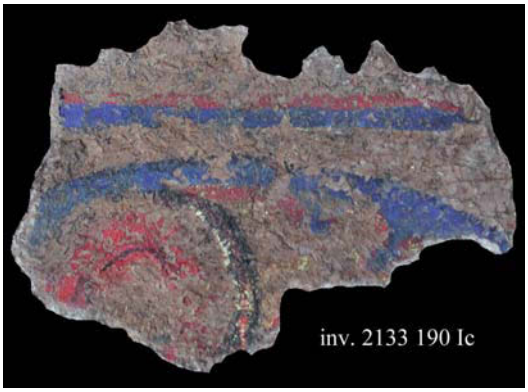


Fig. 46 – inv. 2133, Type VI.

Fig. 47 – inv. 8019, Type VI.

Fig. 48 – inv. 8021, Type VI.

Fig. 49 – inv. 8031 Type VI.

Type VI – Geometric and/or plant-like decorations

Geometric and vegetal decorations belong to this type (figs. 44-51). The patterns are painted in splendid blue, red, black and gold. Unfortunately the very poor conservation conditions of this type do not allow one to reconstruct the design pattern of these beautifully coloured fragments, though in some cases

Fig. 50 – inv. 8052, Type VI.

Fig. 51 – inv. 8020, Type VI.

we may speculate and recognize stylized plants, maybe symmetrically arranged lotus flowers, half-palmettes or ribbons. The pattern found on inv. 8052 (fig. 50), a kind of half-palmette rising out of a curved stem, echoes vaguely the abacus decoration of a capital which probably originated from al-Raqqa dated to the late 8th century,[36] although the comparison may be far-fetched. The pattern of n. 2136 (fig. 45) is a split palmette (often called in English *winged palmette* even if that wrongly suggests its origin from the Sasanian pair of wings).[37] Most likely, the fragments of this type were found in the western half of the domed room 190.

A very particular technique characterizes the next three groups of our typology. The painted relief work is in fact moulded around a mud core, a technique that is as far as we know as yet unique, and detected nowhere else in Iran. We decided to not to include these kinds of ornaments within the class of stucco, but of mural painting, as by definition stucco-work is generally classified as being composed primarily of lime and gypsum (alone or mixed).[38] One may ask why it has been developed and adopted in view of the stucco technique of the dado zone? Was it just a whim of local artists to imitate stucco work?

[36] Dimand 1937: 323, figs. 40, 42; Kennedy 2011: 42.

[37] Kröger 1999:194, on the wing motif see also Dimand 1937: passim.

[38] Cf. the definition of stucco work in Cordaro et al. 1978: 63-70. On these grounds we considered the pieces with red pearl strings in relief silhouetted by a blue background as stucco decoration (inv. 2138-40). Unfortunately I could not find these items – known to us only through photographs – in the deposit among the fragments of wall painting, stuccoes or elsewhere. Judging from the photographs they appear in any case to be stuccoes after the definition given by Cordaro.

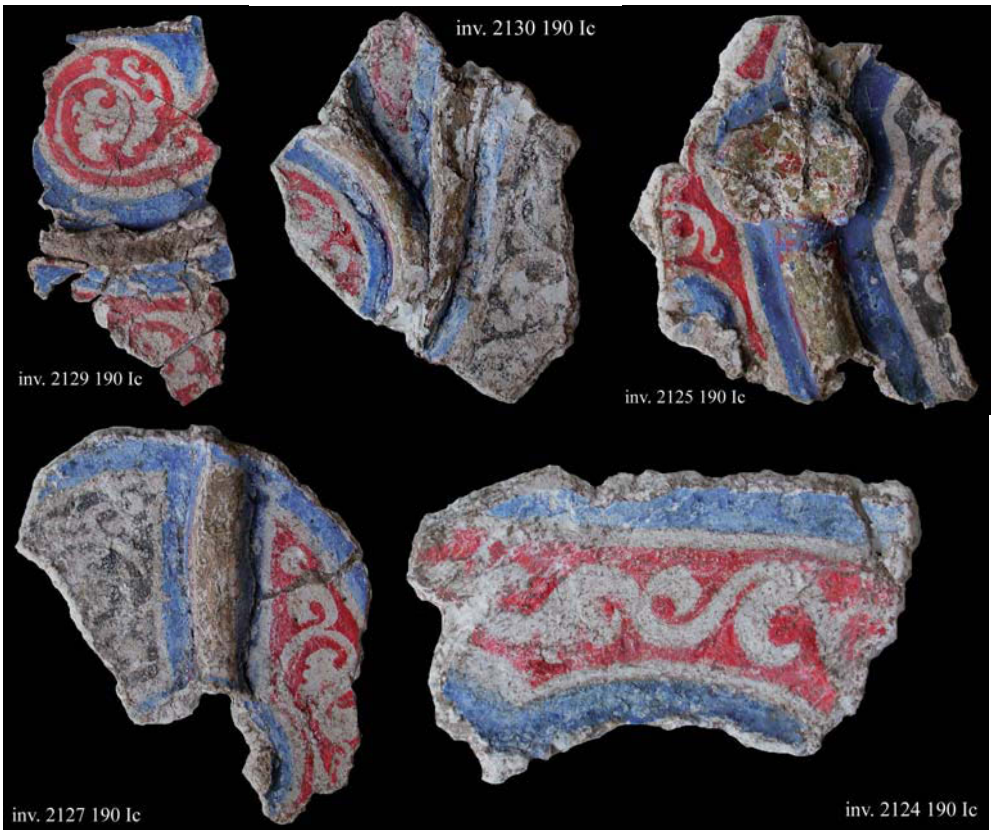


Fig. 52 – inv. 2129, 2130, 2125, 2127, 2124, Type VII.

Type VII – Relief scroll work

The decoration of type VII comprises beautiful gilded relief scrollwork and squashed spherical or heart shaped elements (buds, fruits probably pomegranates) modeled around an earthen core (figs. 52-55). The vegetal ornament in relief has fleshy stems. It is outlined by a sky-blue band against a background in which are set white abstract floral designs and curled leaves within red or black fields. At the border of fragment inv. 8005 (fig. 55) can be seen the remains of a new layer of plaster. All fragments of this type come from the eastern half of the domed room 190.

The pomegranate ornament has a long history in Iranian art. The oldest depictions may go back to the early 3rd millennium Elamite seals from Susa;[39] we frequently find this fruit in brooches from Luristān (8th-7th centuries B.C.E.).[40] and on frankincense burners.[41] Well known are the Sasanian stuc-

[39] Pope, Ackerman 1967: 2680f., fig. 894d.

[40] See the examples in the *Museo Nazionale d'Arte Orientale*, Rome, in D'Amore, Lombardo (*forthcoming*).

[41] D'Amore 2001: entry 89: 63-5.

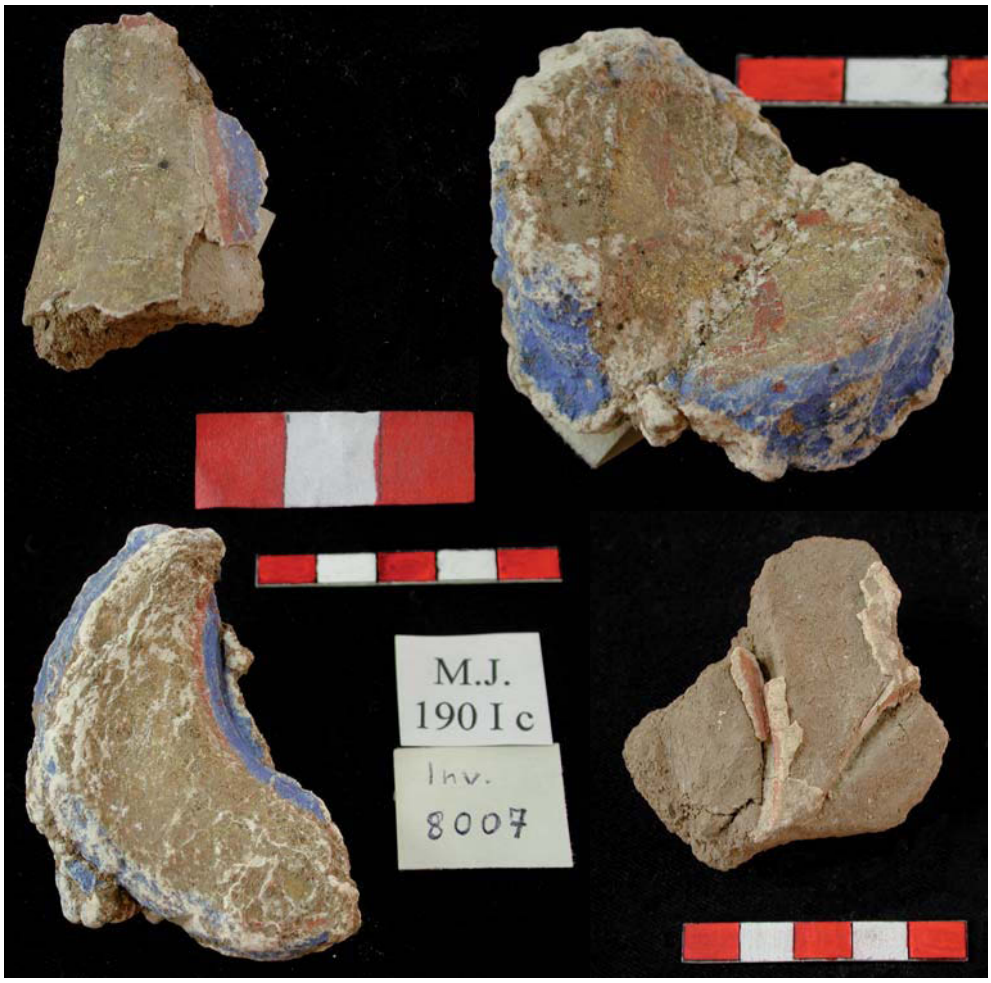


Fig. 53 – inv. 8003 (up, left), 8008 (up, right), 8007(bottom, left), 8001 (bottom, right), Type VII.

coes with depictions of this fruit, which were also gilded.[42] We do not know, whether its frequent depiction in Islamic time well beyond the Umayyad peri-

[42] Kröger 1982: 67f., 217-9, figs. 32-3, pls. 21, 38.5 et passim. After Herodotus (VII, 41.3) the 10.000 "invincible" of the Achaemenid elite troops had golden or silver pomegranates on their spear-shafts instead of a spike, cf. the representations of these soldiers with their spears in the reliefs of the east side of the *Apadana* (6th-5th cen. B.C.E.) in Persepolis or of Dareus I' palace in Susa (5th cen. B.C.E.) in Ghirshman 1982: figs. 190 and 218. Nice is the little story told by the Roman author Claudius Aelianus (Var. I, 33) on the extraordinary great pomegranate presented by Nisus as gift to the Achaemenid Artaxerxes. See also the dancing female holding up a pomegranate on a gilded silver vase kept in the Museo Nazionale d'Arte Orientale, inv. 8542, dated to the 5th-6th centuries C.E. Scerrato 1974: 196f. fig. 3. Best photograph in *Antica Persia* … 2001: 144.

GO TO CONTENTS

od[43] still held any symbolic meaning as it did in earlier times. But like the floral and vegetal decoration of the other types and of the stucco work, the scrolling stems, pomegranates, flowers, grapevine shoots remind one of the luxurious fertility of nature and lastly the *Garden of Eden* - paradise – as do also the mosaics of the Great Mosque in Damascus. In paradise as described in the Qur'ān "… are two [other] gardens – … in both of them are two springs, spouting … in both of them are fruit and palm trees and pomegranates" (Sūra al-Raḥmān, 55: 62, 66, 64).[44] In this sense Öney, too, interprets the paintings of pomegranate trees in the first mausoleum of Kharraqān built in Seljūq period in the years 459–460H / 1067–1068, and the pomegranates on tombstones of Ahlat (East Turkey, province of Bitlis) as symbols of eternal life and paradise.[45]

Fig. 54 – inv. 8063, Type VII.

Fig. 55 – inv. 8005, Type VII.

[43] Cf. the stucco work in the bath of Khirbat al-Mafjar, Grabar 1959: 321, fig. 256 or the examples in Nīshāpūr in Wilkenson 1986: p. 145, fig. 1.164, p.173, fig. 1.201, pl. 6 etc.

[44] The pomegranate is still mentioned twice in the Sūra al-An'ām, 6: 99, 141.

[45] Öney 1979. On the painting of Kharraqān, see also Stronach, Cuyler-Young 1966: 11, fig. 10, pl. XIVd, who would like to recognize a pomegranate tree also in a brick design of the portal of the Būyid Jūrjīr mosque at Iṣfahān, ibid.: 12, note 63.

Fig. 56 – inv. 8066, Type VIII.

Type VIII – Plant-like relief

Only one fragment of this type was found kept in the storeroom of the mosque (fig. 56). It shows a relief vegetal-decoration painted blue, possibly with tiny traces of gold. Thick fillets of rectangular section form the ramifications of this stylized plant. The colours are very deteriorated and appear to have been applied upon a very thin plaster layer adhered to a muddy floating coat. Though we do not have any written source relating to its provenance, we suppose that the item comes from sector 190.

Type IX – Naturalistic vegetal relief

Whereas the fragment of type VIII above, probably presents a stylized vegetal decoration, in this case we have a decoration, which is aimed at a naturalistic rendering of a spreading vine with bunches of grapes and tendrils (fig. 57). Traces of red painting were visible on the stem and the bunches, when the piece was photographed. The plant is silhouetted by a blue background. The fragment had been found in the eastern part of sector 190. Another fragment with a similar bunch is reported, in Maria Vittoria Fontana's diary, to have been discovered "at North of the central area [of sector 190] in front of pillar 2." Vine ornaments were very fashionable in Hellenistic, Early Christian and Early Islamic art.[46]

[46] See for examples Dimand 1937: 294 et passim.

Fig. 57 – inv. 152, Type IX (photo by Umberto Scerrato).

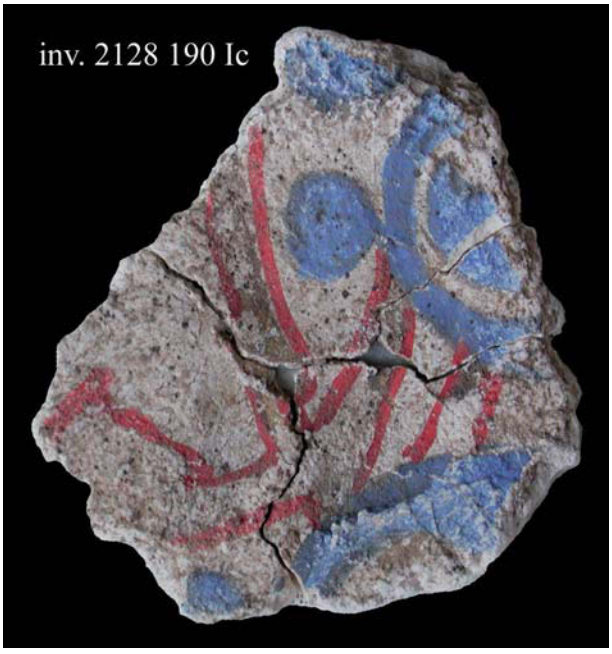


Fig. 58 – inv. 2128, Type X.

Type X – Miscellaneous

All fragments of painting (often of tiny size and/or heavily broken), which could not be clearly defined or inserted at this point into one of the above groups, are included in this type under the heading *Miscellaneous* (figs. 58-59). The fragments are in part monochrome, but several items show that they

Fig. 59 – inv. 8025, Type X.

were decorated by some kind of a polychrome pattern. One piece shows for example a kind of pearl string pattern, which is quite different from those of type III. Several of the fragments are embossed and may have once edged the border of the paintings (fig. 59). I think they are not to be identified with "a few hard plaster plugs, also painted, probably used to join bricks," mentioned by Scerrato,[47] which may refer rather to the "imprints" between the Seljūq brick-work (see below). It is noticeable that the material of this group is quite varied. The painting presents various techniques and plaster types (earth or hard compact plaster), too. Some of the fragments have also two or more painted layers, providing evidence of different phases of decoration of the *qiblī* wall.

Chronological attribution and search for comparisons

It is almost certain that the wall paintings excavated in the Great Mosque in sector 190 belong to a pre-Seljūq period, for these fragments belong to a stratigraphic context placed below the layer Ib of this sector (fig. 60). This layer Ib could be identified as the Seljūq pavement[48] made of baked bricks (ca. 42 x 42 cm) sealing the fill layers of Ic below it. Therefore the Seljūq

[47] Scerrato 1976: 595.

[48] Ibid.: 595. See also 1973: 418, where Scerrato already states that the fragments of paintings and stuccoes discovered in that year in the western half of sector 190 may belong to the pre-Seljūq mosque.

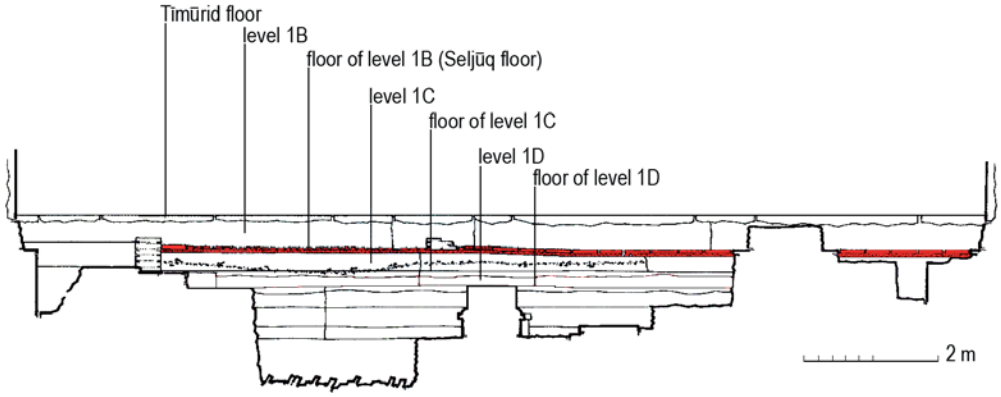


Fig. 60 – section of sector 190. IB represents the Seljūq pavement, in red (after *Excavation…* 2002: 7, design by Nicola Olivieri, elaboration by Danilo Rosati and Claudio Seccaroni.

pavement, belonging to the building period of the dome above commissioned by Niẓām al-Mulk in 479–480H / 1086–1087, presents a *terminus ante quem* for items excavated below it. Mostly all pictorial findings derive from this *miḥrāb* area of the ancient and later sanctuary below this Seljūq dome.[49] We may ask whether the concentration of findings in this area is only accidental or if it could reflect a deliberate choice.[50] In comparison, stucco decoration approachable to those of sector 190 were found also in area 129 (East *iwān*) and in area 404 (in North *riwāq* adiacent to the North *iwān*). Were in certain periods wall paintings only in this distinguished part of the *ḥaram*?

The wall paintings can be attributed to different periods. The distinct pictorial styles, different techniques used and traces left by the artists, when preparing a new layer of painting, bear in fact witness of several phases. As yet it has not been possible to date the paintings more precisely. They may belong to the 'Abbāsid period (to the one of al-Manṣūr, 156H / 772–773, or that of al-Mu'taṣim, 225–226H / 840–841)[51] and/or to other phases, like the extension in the time of the caliphate of al-Muqtadir (reign 295–320H / 908–932) or the intervention on the façades of the courtyard at the time of the Būyids (before 368–369H / 979–980).[52]

[49] On the siliceous-paste pottery discovered below the Seljūq pavement, see Rugiadi 2010, Namdari, Rugiadi 2011. The *miḥrāb* of the first mosque is built on a rectangular plan, a characteristic trait of ancient mosques of the Iranian-Mesopotamian area, like those of Dāmghān, Sāmarrā' or Nāyīn, cf. Wilkenson 1986: 79.

[50] As far as we know only two fragments of wall paintings (of type X, Miscellaneous) were excavated in the sectors 204-5, 218-219 areas adjacent to the richly decorated with stucco *qiblī* wall of the first 'Abbāsid mosque.

[51] As recorded by Abū Nu'ayim: I, 17

[52] After al-Māfarrūkhī's information on the mosque (81-6), who wrote during the time of Malik Shāh (ca. 480H / 1087 according to Minovi 1937: 27f.) the Great Mosque of Yahūdīyya was founded by Arabs from Tīrān in the third quarter of the 8th century, rebuilt in 225–226H / 840–841 during the caliphate of al- Mu'taṣim and extended under the caliphate of al-Muqtadir (295–320H / 908–932). In Scerrato's opinion the work under al-

GO TO CONTENTS

The different types of the paintings and the evidence of re-painting (different layers, whitewash, scratches), are a mirror of its evolution through time. Ideological reasons, new functions of the mosque or changes of taste could have brought forth new commissions, and a removal of older decoration to give way to new paintings (fig. 61). But there could have been – more simply – also external reasons like natural disasters such as earthquakes, which caused damage to the mosque and its decoration, and caused its repainting. Various authors, in fact, refer to earthquakes in the 9th and 10th centuries at Iṣfahān. One may therefore contemplate this possibility. The early sources report earthquakes in the town in 238H / 853 and in 346H / 958.[53] In Ambraseys' opinion however, these sources are rather late with respect to the mentioned dates of the supposed destruction or damage of Iṣfahān, and are lacking substantial and more detailed information on the presumed events. On these grounds, he doubts their reliability and states that "The available long-termed historical and recent instrumental information confirm that whenever an earthquake has been felt in Iṣfahān, it has been when a serious shock had been occurred at some considerable distance from the city, in which case some slight movement of the ground was felt which occasionally caused concern, but rarely serious damage."[54] A serious seism is attested at Iṣfahān for the year 745H / 1344–1345.[55]

The rather poor structural condition of the mosque, which led to movements of the upper parts of the mosque such as, for example, the motion of the pillars in every direction,[56] which latterly required the intervention of the Italian restorers, depended in any case on the precariousness of its foundation. The latter is not placed on virgin soil but is grounded on a web of pre-existing (pre-Islamic) structures as revealed by the test trenches of the Italian Mission in many places. In the case of sector 190, it had been a Sasanian building of which one column with a rich stucco decoration, a foundation of a second one and traces of a floor had been unearthed.[57] So one cannot exclude that movements of the soil (with or without seismic activity) would have also caused damage to the walls and their respective decorated coating.

Muqtadir "... for which the year is given, 908, refers mainly to extensions to annexes lying outside the mosque proper," cf. Scerrato 1974. 476f. The information provided by Abū Nu'ayim (I,17), who wrote a half century earlier (336-430H / 947–1038) about the Great Mosque, match only roughly to that given by al-Māfarrūkhī, cf. also Grabar 1990: 45-9. After Scerrato (2001: XXXVIII) the Būyid transformation should have happened before the death of the writer Abū l-Shaykh in 368–369H / 979–980; with regard to this opinion Scerrato quotes Arioli's contribution (1979: 64f.).

[53] Ambraseys 1979: 56-60, 67 with a discussion of the dates and bibl. sources.

[54] Ibid.: 67.

[55] Ibid.: 60. The stooped columns of the southeastern hall (of Muẓaffarid date) are after Beheshti the result of earthquakes and the bombardment during the Iran-Iraqi war, 2003: 92. Mousavi (2009: 127), too, reports several earthquakes in the last 900 years.

[56] Galdieri 1973: 41f.

[57] Id. 1977: 454, fig. 7. On pre-mosque buildings unearthed and a probably late Sasanian inhumation tomb under the mosque, see also Scerrato 1976: 593f.

GO TO CONTENTS

Fig. 61 – inv. 8048, side view. Fragment showing two distinct layers. The re-decoration had been carried out on a new mud plaster and a new fine gypsum coating.

It is probable that these pre-Islamic structures were part of the ancient settlement of Yahūdīyya neighbouring Yavān.[58] It cannot be excluded that Sasanian buildings of this settlement and their decoration had some influence on the ornamentation of the 'Abbāsid mosques, (for instance the pearl-string pattern in painting and stucco, or the stylization and composition of the stuccoes).[59]
Another reason for a re-painting may have been the deterioration caused by humidity. In fact, within the area of the mosque were scattered numerous wells[60] and in the city quarter where the mosque is located, the water is found at a depth of only 6-7 m.[61] We know from the excavated baths in Sāmarrā' and Nīshāpūr, that the humid environmental condition there led to continued re-plastering and re-painting of the walls.[62]
Could one of the many disorders happening in these centuries such as factional strife, seizures and plundering of the town,[63] have also brought some damage to the mosque, as in fact happened laterly with the setting fire to the mosque or parts of it in 515H / 1121 by the Bāṭinīd?[64]
Another far-fetched hypothesis appears to explain the thin layers of whitewash discovered upon some fragments, which will nevertheless be men-

[58] After Golombek's reconstruction of pre- and early-Islamic Iṣfahān, the Sasanian fortifications and the church under the mosque were placed at Yavān, 1974: 22-3, fig. 2.
[59] For pre-Islamic traditions in techniques and iconography dating from the Parthian and Sasanian period in Islamic wall paintings, see e.g. Gray 1979: 313-6. See also Adle's short discussion of the Iṣfahān stuccoes compared with decorations of late Sasanian-early Islamic buildings, 2011: 599 and fig. 26.
[60] Galdieri 1973: 41f. on "The presence of water in the subsoil," with epigraphic references; Scerrato 1975: 538 wrote that "... the systematic exploration was begun of the numerous wells with which the excavation area is riddled: up till now about thirty of them have been investigated."
[61] Galdieri 1977: 60, note 11.
[62] At Nīshāpūr one fragment presented up to 23 different phases, cf. Wilkenson 1986: 271 and Appendix: 291-309; at Sāmarrā' were found up to 16 different layers, see Leisten 2003: 149.
[63] For an overview of the town's history, see Lambton 1973.
[64] See Ibn al-Athīr: X, 420, Wiet 1940: 133f. After Rashad (2002, 3rd. edition: 289) the mosque had been burnt down and all older building elements had been destroyed, but no traces of any fire had been found by the Italian archaeologists, cf. Scerrato 1976: 395 and also Matheson 2001: 101.

GO TO CONTENTS

tioned here. In the sources we find records of outbreaks of the plague (pest or another kind of epidemic) in Iṣfahān in 324H / 936, 344H / 955–956[65] and 423H / 1031–1032.[66] In European Medieval times one of the precautions against the plague had occasionally been the whitewashing of the walls to disinfect them, which in fact (as we hope) did save human lives in that time, but also efficiently protected in some cases the underlying wall paintings.[67]

In our opinion, the paintings of type I (with epigraphic bands on blue background), and of type III (bands of pearl-strings), belong to the first mosque built in al-Manṣūr's time, ca. 156H / 772–773. At any rate, we base our assumption only on the reappearance of the pearl string pattern in the decorative framework of the stucco work of the first mosque.[68] As already mentioned above, this ornamental pattern is not only used as a frame for other kinds of ornaments, but is also employed in intertwined compositions like those of the *miḥrāb* stucco. Our attempt to re-compose a kind of "mosaic" with some of the fragments enabled us to connect those of the pearl-strings decoration with others belonging to the epigraphic band of type I.[69]

The co-existence in a work of art of text and picture has a long tradition in Iran, going back to Achaemenid time (cf. e.g. Darius inscription in Bīsītūn, 522–521 B.C.E.).[70] One wonders what the relationship had been between the calligrapher and the painter and their cooperation in planning and executing the mural paintings in Iṣfahān. Calligrapher and painter were clearly differentiated professions with a remarkably different social status in Islamic society (at least in the first centuries of Islam), with a general subordination of painting to calligraphy.[71] Close collective labor as in more recent royal workshops of book making and book painting (*kitābkhāna*)[72] as active at least from the Ilkhānid period, seems in any case likely. In more recent Islamic periods, calligraphists of manuscripts were also engaged in making monumental epigraphs, and book painters in accomplishing mural paintings.[73] Who were the painters, calligraphers and stucco plasterers of the Great mosque? Were

---

[65] Kremer von 1877: 492 with sources. On the plague in Islamic countries, see Dols, 1974; Conrad 1982 with extensive bibliography.

[66] Ibn al-Athīr: IX, 290.

[67] For an example cf. the wall paintings of the *Aula Gotica* (made after 1234) of the monastery SS. the Quattro Coronati in Rome. I am grateful to Claudio Seccaroni for this information.

[68] Best pictures as yet in Scerrato 2001: figs. 6-10.

[69] The intertwined stucco pearl strings in the Great Mosque of Nāyīn built in 349H / 960, where they embellish the massive columns, present a comparison of the Būyid period, cf. Flury 1930; Pope 1967 (reprint), III: 1270-5; VIII: pls. 265, B, 268, C.

[70] On the inscriptions and the relief on the cliff of Bīsītūn, see Schmitt 1990, Luschey 1990. Still older is the rock relief showing Anubanini and Ishtar at Sar-ī Pūl going back to the Old Babylonian period, which are dated 2000/1930 B.C,E., see Seidl 1985: 301-2, pl. 183.

[71] Cf. e.g. Arnold 1965: 1-11 et passim, but cf. also Porter's contribution on the *Theory of the Two Qalams* (though dealing with a later period and mainly on book painting), 2000.

[72] Porter 1992: 149-61. For the collective work involved in the production of manuscripts, one can distinguish the calligraph (*khoshnevis*), the painter (*naqqāsh*) and the gilder (*moẓahheb*) etc.

[73] Ibid.: 154, 158f.

they local or, as often was the case in this Islamic period, migrating artists and their workshops?[74] This is suggested for example by the very similar repeated pattern of intersecting circles formed by quatrefoils of the lowest strip of the Iṣfahān stucco dadoes (of the 156H / 772–773 mosque) with a decoration found at the Umayyad site Khirbet al-Mafjar (built between 105 and 125H / 724–743 during the reign of the caliph Hishām).[75] We must also recall here Ya'qūbī's information that it was precisely our caliph al-Mu'taṣim when founding the new capital Sāmarrā' in 221H / 836, who asked from all parts of his kingdom "for workmen, masons, and artificers, such as smiths, carpenters, and all other craftsmen to be sent … and for marble workers …"[76]

It is also worth mentioning Galdieri's finding of a thin fragment of plaster painted in bright red and blue in his test trench XII (within sector 190), for which the scholar suggested an interpretation of a chromatic test carried out in the workshop.[77]

The different decorative types of paintings and the re-paintings may also be due to restoration to refashion the decoration according to the prevailing taste. This statement is linked with other interesting questions: who commissioned the wall decoration? Who set the illustrative program of the paintings (and the stuccoes), and who decided on the choice of the texts, and lastly, was there any model for our paintings?

We see that one type of our paintings still clearly reveals its Hellenistic heritage (type IX), whereas others present the development towards the pure abstract Islamic ornament, the arabesque (type VI, VII). Quite particular is type VII (*Relief scroll work*). Here we find side by side a naturalistic and an abstract depiction of vegetal forms. This type displays in exemplary fashion the change of taste and style, the gradual dissolving of the ancient art tradition, and the development of a new genuine style (which had nevertheless its roots in Sasanian art).

A word about the character of the mosque. In his beautiful book about the Great Mosque, Grabar sustained the thesis, also on the grounds of its "*constant diachronic evolution*", that the building was "more than a mosque" and became "from the fourteenth century on (and perhaps earlier) the shrine of a city, the place where the community, whatever its components, kept a record of its operative practices and beliefs, where it gathered and behaves in the various ways required by its ethos."[78] Considering, besides the obvious role of Iṣfahān as a political, administrative and commercial center, the precious pigments such as gold and lapis lazuli used for the paintings, the painstaking execution (of the stuccoes), and the several phases of execution of the paintings, we may argue that the edifice was of super-regional importance also in

[74] On this phenomenon, see e.g. Baer 1974.
[75] Hamilton 1959: pls. VI, 1; XXXIV, 5; Baer 1974: pl. 53D.
[76] Ya'qūbī: 258, the English translation is from Creswell 1989: 331.
[77] Galdieri 1972: 374f., note 2.
[78] Grabar 1990: 13, 73 et passim.

GO TO CONTENTS

the preceding pre-Seljūq period, with possibly an outstanding religious, social and political significance. In comparison to the use of gilding and lapis lazuli, we may quote here al-'Utbī's description of the celebrated mosque *'Arūs al-Falāk* (Bride of Heaven) at Ghaznī commissioned by the famous Ghaznavid ruler Maḥmūd in 416H / 1026: "As far as the gilding is concerned, it is enough for you [to know], that the artists/artisans of Ruṣāfa would have lacked the melting pot and [to them] would have fallen an unbearable task. Not only were sheets of gold (ziryāb) melted down, but [also] bars of red gold, melted down from the images of the smashed idols and from the Buddhas which had been removed. They were exposed to fire having been divinities of the infidels, and beaten with hammers having been adored … A miḥrāb of red gold had been traced on every square marble slab, shaded with lapis lazuli, with arabesques with the colours of the gillyflower and the rose …"[79]

Our view of the distinguished position of the Iṣfahān mosque already by the pre-Seljūq period is corroborated also by the presence of a tall *manāra* (= minaret) on its *qiblī* side, one of the earliest minarets reported from Iran, mentioned by al-Muqaddasī (writing before 374H / 985).[80] He mentions further at/near/in the *ziyādah* (= outer perimeter wall/annex) of the mosque a beautiful tree similar to the mythical *wāq-wāq* tree

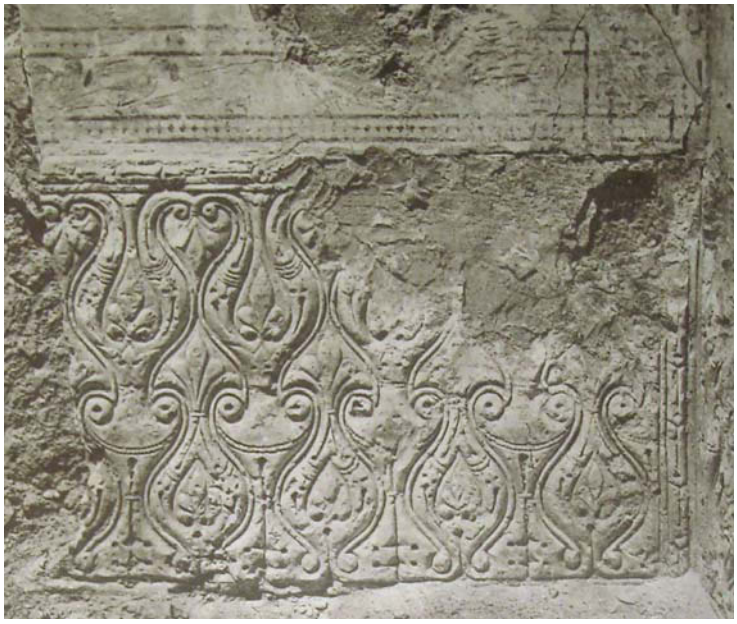


Fig. 62 – Sāmarrā', stucco dado with Sāmarrā' ornament type 158 below painted wall (after Herzfeld 1923: 104f., pl. LVI above).

[79] After Bombaci's Italian translation from the Arabic version, 1964: 31f.

[80] al-Muqqadasī: 388f. (Arabian text).

[بزيادة جامع اليهوديه شاجر ذ كروا انه يشاكل الواقواق].[81] Nāṣir-i Khusraw visited Iṣfahān in 444H / 1052 and mentions in his *Sefer Nameh* our Mosque in the center of the town, as a "beautiful great Friday mosque" [مسجد ادينه بزرک نيکو].[82] In other words the pre-Seljūq mosque may not have merely been a "popular mosque" as sustained by some Iranian scholars.[83]

The relationship between the painting and the stucco decoration of the mosque is interesting. The wall decoration of the *qiblī* was most likely composed of a lower, about 1-1.1 m high dado section embellished by stuccowork, and an upper section with the paintings. Such an arrangement we do also find at Nīshāpūr and Sāmarrā'. At Sāmarrā' the only *in situ* mural painting found is set upon stucco dadoes with Sāmarrā' ornament type 158[84] (fig. 62). Some patterns, such as the bands of pearl-strings, are found in both sections at Iṣfahān. The pearl-strings frame in the stuccowork panels is about 0.52 cm wide.

The subdivision of wall decoration into rectangular panels is quite typical for the 'Abbāsid period as seen for example at Nīshāpūr[85] or al-Raqqa[86], the stuccoes of which have much in common with the Iṣfahān ones. May we deduce the presence of similar wide panels as the stucco ones in the painted decoration of the Great Mosque? The pearl-string pattern had perhaps been used to interweave both kinds of ornaments, the stuccoes and the paintings, in order to create one overall decorative system. We also have to here draw attention to the polychrome painting of the stuccoes of the *qiblī* wall as reported by Umberto Scerrato.[87] Julia Gonnella has recently raised the question about the colouring, or not, of the 'Abbāsid stuccoes, namely of those from Sāmarrā', Raqqa and Kharāb Sayyār. She reports in fact that stuccoes from these sites were whitewashed as if to imitate [unpainted] marble.[88]

Our paintings seem to be, all in all, simpler and more carelessly executed than the (preserved) stucco decoration of the dadoes. Wilkenson noticed in Nīshāpūr the same difference between the dado decoration (which may also be painted there) with an approximate height of 1 m and the upper part of the walls. His explanation is quite simple, but plausible: "Seated on a rug … on the smooth plaster floor … one was best able to appreciate detail and ornament in the decoration on the first meter of the wall." [89]

---

[81] Ibid.: 397; on the *wāq-wāq* tree, see Baltrušaitis 1993: 144-59; Scerrato 1991 with bibl.

[82] Nāṣir-i Khusraw: 252, Farsi text on p. 92.

[83] As by Abdullah Jabalameli [speaking about the 'Abbāsid phases of the mosque], friendly oral communication given during a conference at the mosque in 2002.

[84] Herzfeld 1923: 104f., pl. LVI above and Leisten 2003: 138-40, fig. 87, pl. 50.

[85] Wilkenson 1986: passim.

[86] Meinecke 1999: passim.

[87] Scerrato 1973: 41. For example red coloured pearl-strings were set between blue ribbons.

[88] Gonnella 2013: 95-7.

[89] Wilkenson 1986: 86f.

The analysis of the pigments employed to embellish the Iṣfahān stuccoes would be very useful. The use of identical or similar compositions could reveal whether both works (i.e. stuccoes and painting) were carried out by the same workshop and at the same period. Chemical spot tests and scanning electron microscopy with energy dispersive X-ray analysis (SEM-EDX) of the stuccoes and wall paintings of the decoration of the Pīr-i Hamza Sabzpūsh's tomb in Abarkūh (Central Iran) built in the Seljūq period in the 12th century, showed for example that wall painting and stuccowork in that monument were accomplished in different periods.[90]

The subdivision of the decoration in two sections, the stuccowork below and the paintings above, lying upon one another, seems to be an echo of an architectural ornament, which exhibits the structural relations between a dado layer and a superimposed wall. In most cases the decoration in Iranian architecture is quite independent from the architecture below. Ornament and structure play a separate role, the decorations "cover", "conceal" the building,[91] rather different from the canon of the Western architecture, where the ornament embellish and emphasize the proportions and relations of the structural elements.

[90] Karimy, Holakooei 2012.

[91] See e.g. only the Achaemenid architectural decoration, where "... relief sculptures [are] covering surfaces ... without regard to structural design. The walls are treated like curtains" (Pope 1976: 1260). A counter example is the famous tomb of Ismā'īl the Sāmānid at Bukhāra (d. 295H / 907). Here brick bonds in horizontal and vertical courses form a decoration inseparably melted together with the built architecture showing with their ornamental pattern the organic texture of the building.

Figs. 1-2 – details of oxen form the wall paintings in the *gāv-chāh*.

The wall paintings of the post-Seljūq mosque

Michael Jung

As discussed above, we have roughly divided the wall paintings of the mosque into two broader groups: pre- and post-Seljūq. Whereas the first group of paintings is chronologically defined by its stratigraphic position below the Seljūq layer and spatially confined for the most part to sector 190, the second comprises pictural decorations of various sectors of the mosque and belongs to different periods executed after the Seljūq period. No traces of mural painting of the Seljūq time were detected. Generally, extant Seljūq mural paintings are rare.[1] The paintings of the second post-Seljūq group include fragments excavated by the Italian IsMEO Mission in sector 112, and mural paintings still in place. The paintings in the *gāv-chāh* area belong to the Zand period (18th century), whereas the paintings of the mosques and the handprints are difficult to date, but may be attributed to more recent periods.

The excavated mural paintings of sector 112

Type XI of our typology

A number of painted fragments (figs. 3-6) was excavated outside the actual borders of the 'Abbāsid mosque in sector 112, i.e. in the area of the South *iwān* of the Muẓaffarid *madrasa* built in 768H / 1366[2] under Sultan Kutb al-Dīn Shāh Maḥmūd (figs. 7-8). During the excavation, remains of a polylobate pillar in fired brick were found in this spot. According to Scerrato[3] it had been part of modifications made outside the mosque in Būyid time.

[1] Some fragments were published in the *Survey of Persian Art*, one from Rayy with a court scene kept in the Teherān Irān Bāstān Museum (inv. 183), Morgenstern 1967: 1375, fig. 508; another one, probably coming from the same site and once part of the Heerameneck collection at New York, depicting a meeting in front of some building, ibid.: 1376, fig. 509; standing men and horsemen slaying a snake are painted on a fragment in the Metropolitan Museum (accession n. 52.20.1), ibid.: pl. 554A; and another fragment at the Fogg Art Museum, Cambridge, Mass, (inv. 1935.23) is figuring characters of the Shāhnāma of Firdūsī, ibid.: pl. 554B. The best preserved Seljūq wall paintings are in the first mausoleum of Kharraqān built in the years 459–460H / 1067–1068, Stronach, Cuyler-Young 1966: 10-2, figs. 9-10, pls. XIII-XV, Öney 1979. In the sources we hear of paintings in the Seljūq palace of Herāt built by Tughān Shāh, son of Alp Arslān (454-464H / 1063-1072), with portraits of the prince and war elephants, ʿAwfī: 88-9. More evidence we have from the Seljūq mural painting in Anatolia, cf. Fontana 2002: 105-7 with bibl.

[2] The date is given in the great inscription running inside the *iwān* of the *madrasa*, cf. Godard 1936a: 238, fig. 157.

[3] Cf. Scerrato 1976: figs. 8, 9.

GO TO CONTENTS

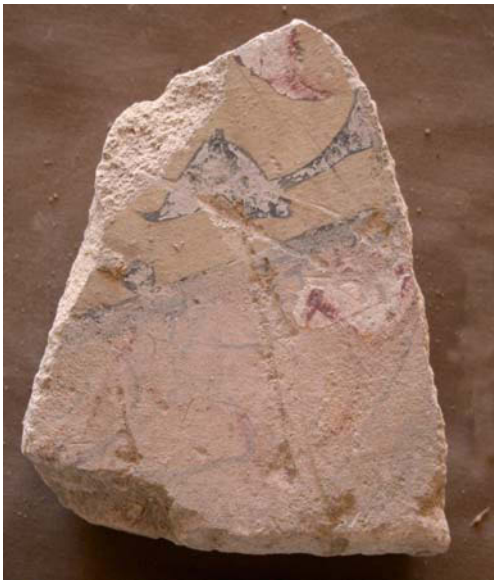


Fig. 3 – inv. 8079, Type XI.

Fig. 4 – inv. 8082, Type XI.

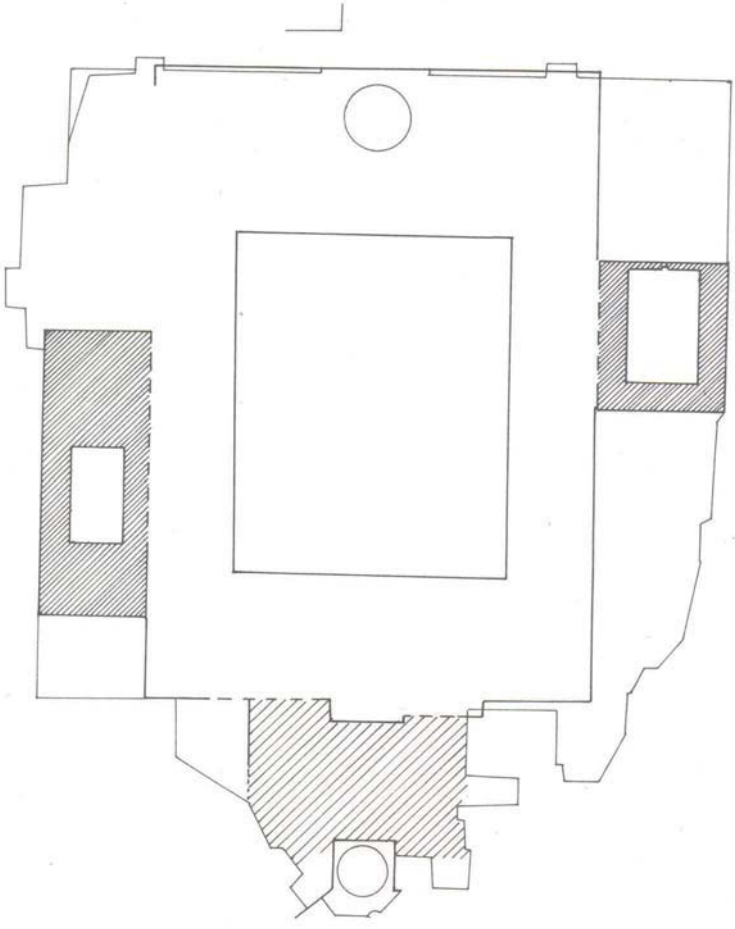
Fig. 5 – inv. 8078, Type XI.

Fig. 6 – inv. 8080, Type XI.

GO TO CONTENTS

Fig. 7 – the Muẓaffarid *madrasa*, view of the courtyard and the area excavated below of the today floor.

Fig. 8 – plan of the mosque with late Ilkhānid and Muẓaffarid interventions. The hatched field on the left corresponds to the Muẓaffarid *madrasa* (after Galdieri 1984: 152, fig. 88f).



After al-Māfarrūkhī[4] and Abū Nu'ayim,[5] buildings such as lodgings for guests, a library and other charitable institutions surrounding the mosque were built in 307H / 919 by Abū 'Alī ibn Rustam under the caliphate of al-Muqtadir. The paintings of type XI may well have been part of one of these structures. They were attributed by the excavators to stratum Ic (which is not identical to stratum Ic of sector 190). On the other hand, we do read that the excavation seems to have reached the stratigraphic layer Id in the courtyard of the *madrasa*, which appears to be – in contrast – datable to the Ṣafavid period.[6] So we must leave open the question of their chronological attribution. The decoration – as far as discernible – consists of floral patterns with slender twigs and leaflets. A brown disc may picture a fruit such as a pomegranate. The plaster of this group of fragments is very hard and compact. Two of the fragments present two layers of paintings (inv. 8078-79, figs. 3, 5).

Two paintings of mosques and hand-prints

A depiction of a mosque is engraved and partly painted in red on one of the pillars of the North *iwān* (figs. 9-10). The picture measures ca. 80 x 140 cm. It is made on a plaster layer above the Seljūq one, and had been beneath more recent re-plastering. The Seljūq layer is recognizable thanks to a small rectangular "window" found nearby that had not been re-plastered and left uncovered by the restorers, which lays bare the Seljūq brickwork with its characteristic "imprints" (marks in gypsum between adjacent bricks).[7] The mosque depicted shows a court mosque. One can distinguish the *ṣaḥn* and the *riwāqs* with three aisles to the right and left of the court and with two in the *riwāq* opposite of the *ḥaram*. Their bays, indicated by squares with inscribed chevrons, were intended by the executor of the graffiti to probably be covered by domes. The *ḥaram* is vaulted by a slightly pointed bulbous-shaped dome flanked by two high and slim minarets provided with balconies. A small domed pavilion-like structure is within the courtyard and may indicate that the represented mosque is a sanctuary with a tomb or a kind of shrine in the center. However it could also simply be a picture of the Masjid-i Jum'a at Iṣfahān itself. Indeed, in the courtyard, of our mosque is a square brick structure, a platform raised upon four pillars connected with flat pointed arches within a square water basin for ablution. It had been built by Shāh Muḥammed Khodābandeh, father of Shāh 'Abbās the Great in imitation of the Ka'ba around which the would-be Ḥajj pilgrims used to practice the appropriate rituals before leaving for Mecca. A stepped structure is in the right lower corner of the courtyard of the picture.

---

[4] al-Māfarrūkhī: 62f., see also Browne 1901: 437f.
[5] Abū Nu'ayim: I, 17.
[6] Cf. Curatola 1995: 91.
[7] Cf. Galdieri 1972: 373, fig. 2.

GO TO CONTENTS

Fig. 9 – a mosque engraved and partly red painted on one of the pillars of the North *iwān*.

GO TO CONTENTS

Fig. 10 – detail of fig. 9.

GO TO CONTENTS

We find quite similar features, a pavilion-like building and a stepped structure in a courtyard, in another picture of a mosque (figs. 11-12), to which Eugenio Galdieri drew my attention. In one of his visits to the *National Museum of Oriental Art* in Rome he kindly endowed me with two photographs taken by him many years ago of a picture painted on a pier of the mosque. I later had the possibility to visit the site of the painting myself, but only rather briefly as the pier is situated in the *maqsūra* of the female prayers and unfortunately I did not have the possibility to take photographs. The picture is painted in red on the pier facing sector 229 in the prayer hall on the right side of the southern dome. The figure depicted seems to be a combination of a mosque, possibly the same building as the one described above, and a *miḥrāb,* because the courtyard has the appearance of a prayer niche. A mosque lamp is suspended by a chain, on both its sides are two rectangles bearing the name *Allāh*. The depiction of a mosque lamp within a prayer niche in stucco, on tiles or on prayer rugs is quite frequent.[8] It stands for the *nūr illāhi*, the "celestial light of God." Again we find a bulbous-shaped dome, here on a high drum, flanked by two minarets. Two candle-holders are placed on both sides of the pavilion-like building in the courtyard, underlining its character as a shrine.

Finally, we have to also briefly mention the handprints found in the North *riwāq* (figs. 13-14). They are printed in red on two plastered brick columns on the cavetto below a kind of annulet. Figures or objects of hands are quite common in Islamic material culture. Often they are considered as apotropaic signs, as amulets, as Fāṭima's, Muḥammad's or 'Alī's hand.[9] In our case they may be a reminder of the martyrdom of al-'Abbās ibn 'Alī, son of 'Alī ibn Abī Ṭālib, the fourth caliph of Sunni and the first Imām of the Shiite Muslims.[10] In the battle at Karbalā' (61H / 680) 'Abbās, half brother of Ḥussein, while trying to bring water from the Euphrates river to Ḥussein's camp, was struck from behind by his enemies and both his arms amputated.

[8] The first depictions of this motiv may be those of the already mentioned mausoleum of Kharraqān (see note 1). Quite early is also its figure sculpted on a marble tomb at Ghaznī dated 503H / 1109, cf. Giunta 2003: 121-3 with note 5 on other examples, pl. XXXVII, 2.

[9] Cf. Grohmann 1914: 44-6, figs. 106f. and Kriss & Kriss-Heinrich 1962 under the key-words "Hand, Handamulette, Hand der Fatima" etc.

[10] As supposed by Fariba Saiedi Anaraki during our visit of the *riwāq*.

Fig. 11 – mosque painted in the sector 229 hall at the right side of the southern dome (photo by Eugenio Galdieri).

GO TO CONTENTS

Fig. 12 – detail of mosque (photo by Eugenio Galdieri).

Figs. 13-14 – red handprints on two columns of North *riwāq*.

The wall paintings of the *gāv-chāh*

During the restoration work of the Italian Mission in 1973, Eugenio Galdieri's team came upon and discovered paintings in the *gāv-chāh* area in a small dome in the passageway between sectors 325 and 322 (fig. 15). The pictures

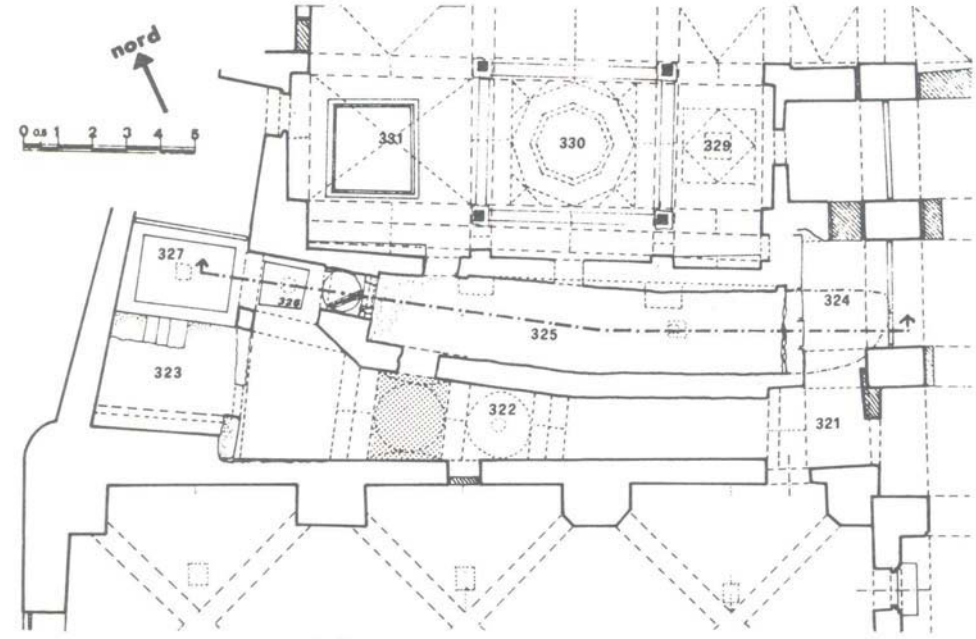


Fig. 1.

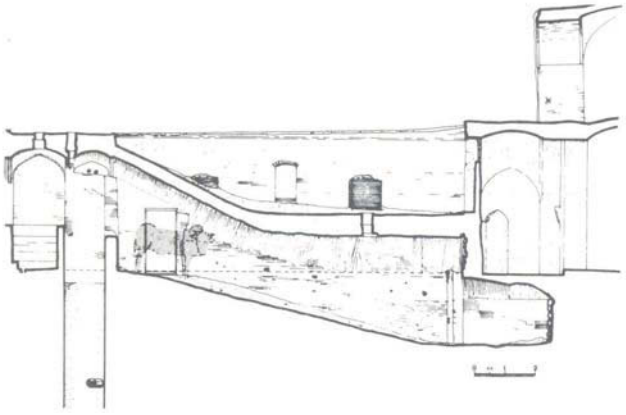


Fig. 2.

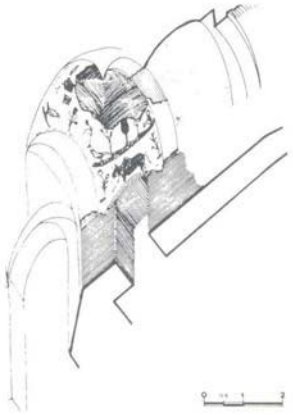


Fig. 3.

Fig. 15 – above: plan of ablutions hall (sectors 329–331), the vaulted room of the *gāv rāh* (325) and the domed passage-way between 325 and 322, shaded in the plan. Below at the left: section of the sector 325 with the sloping path *gāv rāh*. Below at the right: the painted vault (after Galdieri 1977: figs. 1-3).

GO TO CONTENTS

Fig. 16 – *gāv-chāh*, the ceiling.

had long been hidden under a thick layer of lampblack and grease (figs. 16-24). They are quite unusual paintings indeed for a mosque and for Islamic wall paintings in general. To complete our panorama on the wall paintings of the Great Mosque, we give here a short summary of Galdieri's[11] and Grube's[12] contributions provided with new colour photographs taken during our last missions at Iṣfahān.

The *gāv-chāh* is part of the area in the mosque where water was collected and conserved for the ritual ablutions, the cleaning and sanitation. A *gāv-chāh* is a mechanical device to pull water from a well (*chāh*) with the help of animals, mostly oxen (*gāv*), which drag the water skins down a sloping path (*gāv rāh)* to fill a catch basin (*hawz*).[13] The paintings are executed on a layer of *khagil* (our familiar mud and straw plaster) applied over the vault of unbaked clay. The pictorial composition consists of two landscapes facing each other on opposite sides of the vault, whereas the paintings in the centre of the dome are lost except for a lively painted bunch of tulip-like flowers (figs. 16-17). An ox is presented in both sceneries. The landscapes are formed by silhouette-like trees, bushes, tufts of grass and flowers (figs. 18-22), all animated by simple, but

[11] Galdieri 1977.

[12] Grube 1978.

[13] On this typical hydraulic device see the bibl. notes in Galdieri 1977: note 9. We got to know a quite similar facility in Ṣan'ā' in Yemen, cf. Lewcock 1983: 300-2, fig. 15.9, photo 15.53-6. It is part of the Ṭalḥha mosque complex. All mosques reserved to men in Ṣa'da' in Yemen have such well ramps (called mirna'/marāni'), cf. Niewöhner-Eberhard 1985: passim.

GO TO CONTENTS

nice, figures of four birds: nightingales. The protagonist is however the humped ox. He is depicted twice, during his work pulling water from the well (figs. 2, 18), and finding well-deserved rest between the plants (figs. 1, 19). The well and storage tank are rendered in a schematic way, and the lines connecting them with the ox represent the ropes essential for the animal to lift the water.

Fig. 17 – *gāv-chāh*, detail of the ceiling with tulip-like flowers.

Fig. 18 – *gāv-chāh*, detail with the ox drawing the water bucket out of the well with the help of ropes going down the sloping path.

Fig. 19 – *gāv-chāh*, detail with the ox finding its rest in a flower garden.

Fig. 20 – *gāv-chāh*, detail with the landscape with trees, flowers and one of the nightingales.

Fig. 21 – *gāv-chāh*, detail of landscape.

The colour range of the animals and plants is mostly grey, black and white with only few traces of green and orange-red on a white background.
Though stylistically modest and only a work of "popular art," the pleasing pictures are interesting for the history of Iranian painting, for its setting within (or quite close) to a religious complex, and for the subject, a scene of daily life, of humble work done by modest animals and not the common wellknown scenes of court life, hunting, polo playing or battlements. By reason of the character of the pictures, which do not find close comparisons in Iranian painting, its dating had been only approximately assigned to the Qājār or late Ṣafavid period until Sima Bahramī[14] could decipher the inscription in a cartouche over a bird in the landscape with the water-pulling ox (fig. 23). The inscription gives us the name of the painter, Mīr Ghāsem Husseinī, and the date 1199H / 1784, so it had been executed during the time of the Zand ruler 'Alī Murād Khān (1196–1199H / 1782–1785) (fig. 24).

[14] Bahramī 1995: 193f.

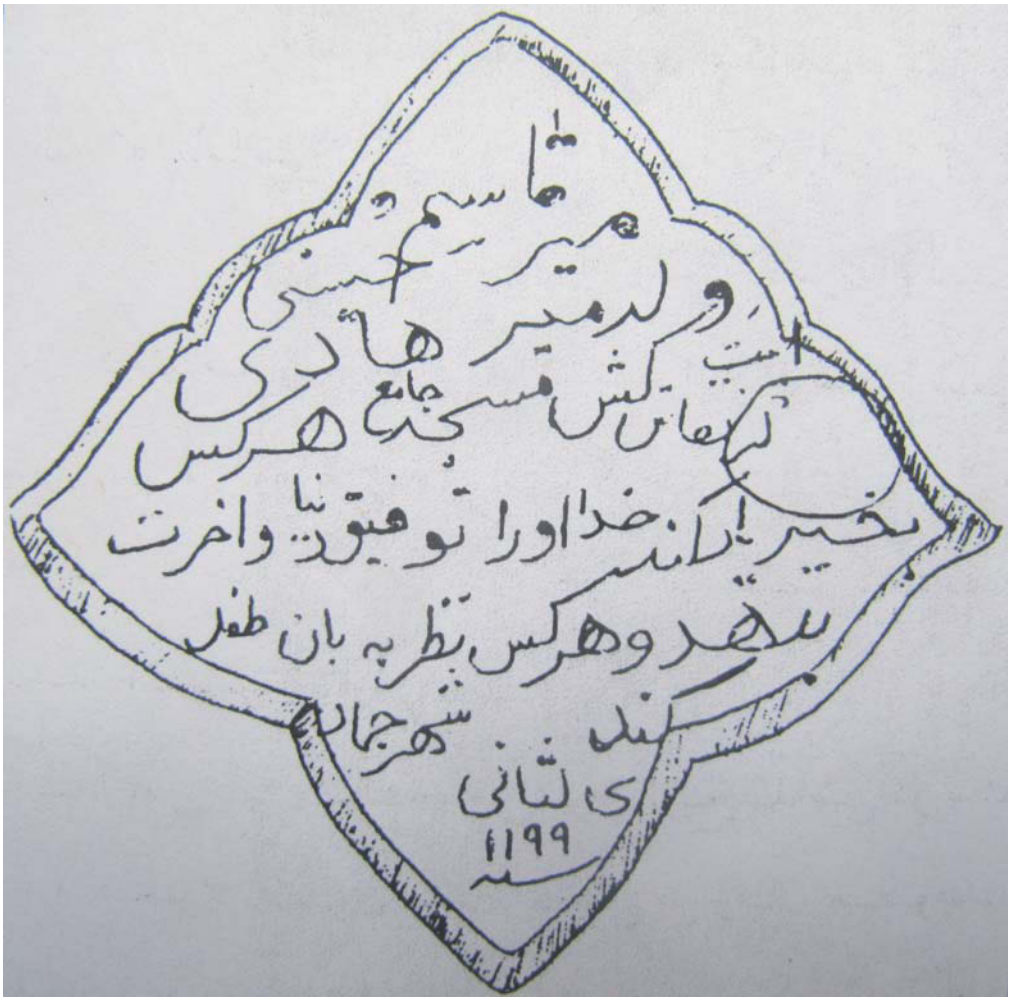
GO TO CONTENTS

Fig. 22 – *gāv-chāh*, detail with a nightingale.

Fig. 23 – cartouche over a bird in the landscape with the working ox with the name of the artist and the date of execution (after Bahramī 1995: fig. on p. 194).

Fig. 24 – sketch of the cartouche (ibid.). The text inside runs: "Mīr Ghāsem Husseinī son of Mīr Hādī is the painter of the Friday mosque. Whoever feels gratefulness for him, god give reward to him in this life and in the afterlife … [the last part is non readable; after the translation of Mahnaz Esmaeili].

GO TO CONTENTS



GO TO CONTENTS

Materials and painting technique of the wall paintings of the pre-Seljūq Iṣfahāni Mosque

Paolo Cornale, Fabio Frezzato, Michael Jung, Claudio Seccaroni

Do you not see that Allāh sends down rain from the sky, and We produce thereby fruits of varying colours? And in the mountains are tracts, white and red of varying shades and [some] extremely black. And among people and moving creatures and grazing livestock are various colours similarly…

Sūra Fāṭir (35: 27-28).

An important analytical investigation had already been previously carried out by means of non-destructive methodologies on a large number of fragments from wall paintings. The results from this preliminary investigation have been already published,[1] and they were consistent with what is known on the subject of wall-paintings from the Islamic world and Central Asia, between the 5th and 9th centuries, and with the sporadic information available from ancient written Islamic sources.

Some of the results from the previous study, required further in-depth investigation. For instance the binding media, the full sequence of the painting layers, the arsenic presence under the gold leaf previously detected by means of XRF analysis, and the characterization of the organic film covering the gold leaf.

Therefore, the same fragments investigated through non-destructive XRF analysis, and six further fragments, have been inspected and photographed with a digital microscope.[2] The images thus acquired provided – again non-destructively – additional valuable information on the technique of execution, and the sequence of the layers.

At this point it was appropriate to continue and deepen the research on four of the fragments studied previously, necessarily making use of micro-destructive methods of investigation, the only ones able to reveal the whole stratigraphic sequence, and the composition of the organic fraction.[3]

---

[1] Jung et al. 2012.

[2] *DinoLite AM7013MZT* digital polarized microscope was used.

[3] The analytical research has been carried out by *CSG Palladio s.r.l.* (Vicenza). The scientific apparatus included: optical microscope *Nikon Alphaphot-2 POL N-57*; environmental scanning electron microscope

GO TO CONTENTS

All samples investigated (fig. 1), and the methods adopted for this investigation, are summarized in table 1.

Sample/Type	Non-destructive investigations	Micro-destructive investigations
1 (type IX)	digital microscope	mineralogical-petrographic on thin cross-section; GC-MS
3 (type VI)	digital microscope	cross-section; GC-MS
4 (type II)	digital microscope	mineralogical-petrographic on thin cross-section; cross-section
5 (type X)	digital microscope	-
6 (type VI)	digital microscope	cross-section
8010 (type V)	digital microscope	-
8014 (type II)	digital microscope	-
8024 (type X)	digital microscope	-
8025 (type X)	digital microscope	-
ceramic fragment	digital microscope	-

Table 1 – investigations performed on the samples.

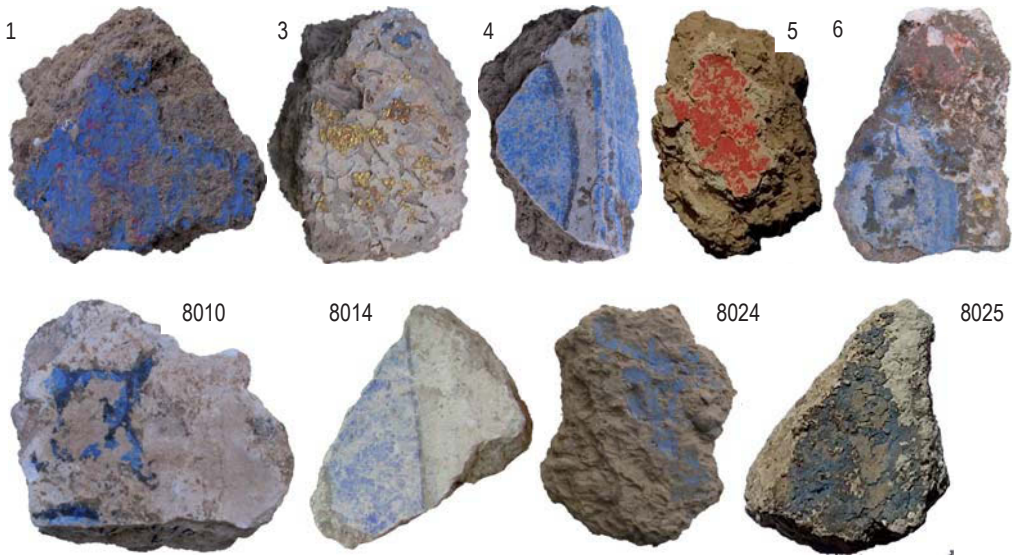


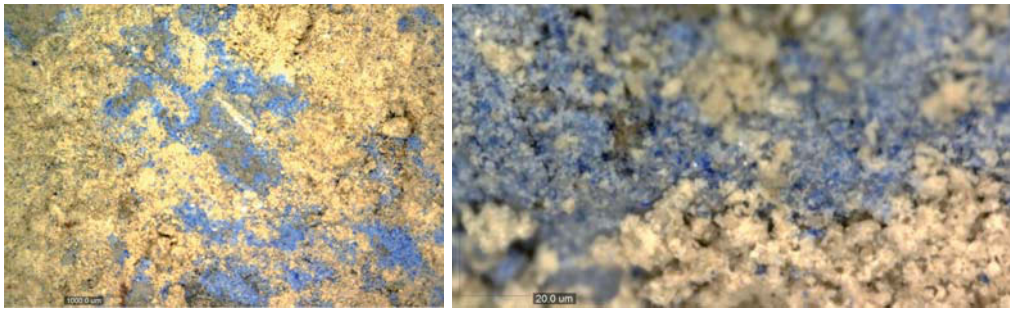
Fig. 1 – investigated samples (pictures are not in scale).

(ESEM) *Quanta 200* (FEI Company, USA); *iS10* FTIR spectrometer coupled with a *Continμum* micro-FTIR, including a silicium Slide-On ATR objective, a diamond crystal *Smart Orbit* and a Spectra-Tech *Micro Compression Diamond Cell* (Thermo Scientific, USA); GC-MS equipment *Trace GC Ultra* coupled with *ISQ* mass spectrometer (Thermo Scientific, USA).

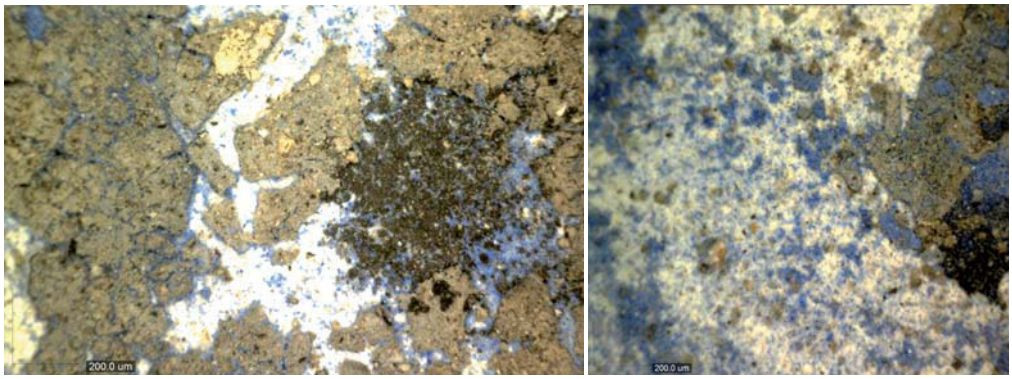
GO TO CONTENTS

Digital microscope observations

On two of the samples (1 and 8010), the painted layers have been applied directly onto the mud plaster, without a gypsum coating (figs. 2-5). In sample 1, the inner discontinuous layer is white, probably consisting of white lead (lead detected through XRF and ESEM); on top of this, a discontinuous red layer consisting of cinnabar/vermilion is visible (figs. 6-7), and then a very discontinuous black layer, with a final blue layer made of ultramarine blue. In sample 8010 the red layer is absent.
The same sequence of a lapis lazuli layer over a black discontinuous priming over a white discontinuous layer also characterizes fragments 8024 and 8025 (figs. 8-10). On fragment 8025 (figs. 9-10) the particles of the black layer seems to be coarser than in the analogous fragments.
In sample 8010 the same stratification of a lapis lazuli layer over a black layer, has been generally applied directly over the mud plaster, even if in some cases there are traces of a gypsum layer, perhaps due to local fillings, in order to smooth the surface (figs. 4-5).

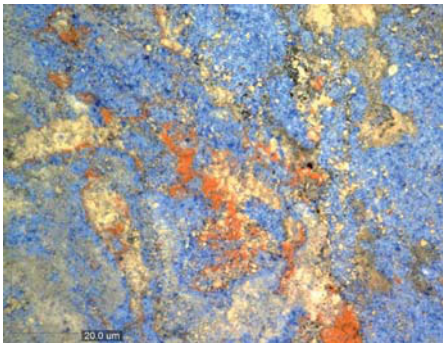


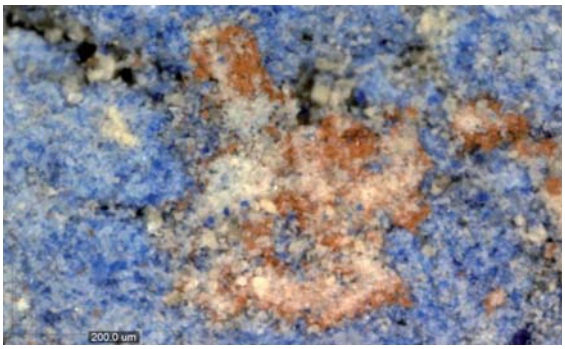
Figs. 2-3 – details of sample 1, showing the absence of a gypsum coating between the painting layers, consisting in lapis lazuli, and the mud plaster.

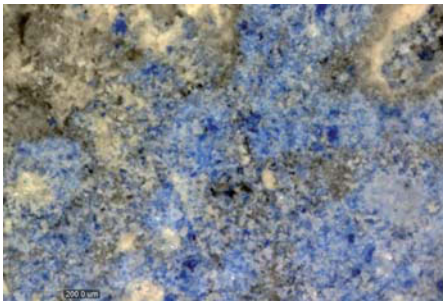


Figs. 4-5 – details of sample 8010, showing the absence of a gypsum coating between the painting layers, consisting in lapis lazuli, and the mud plaster.

GO TO CONTENTS





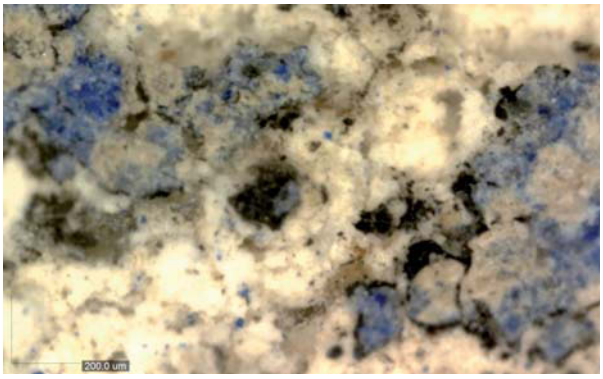


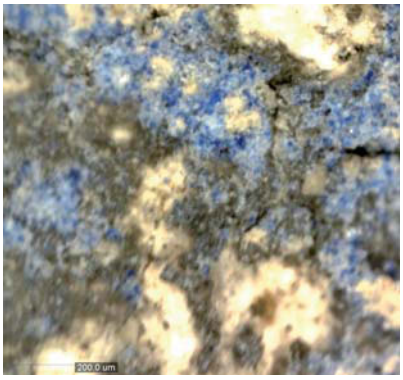
Figs. 6-7 – details of sample 1, showing a red layer under the lapis lazuli.

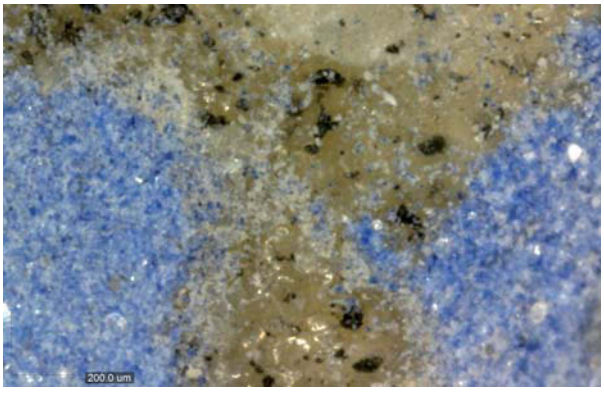
Fig. 8 – detail of sample 8024, showing a black layer under the lapis lazuli.

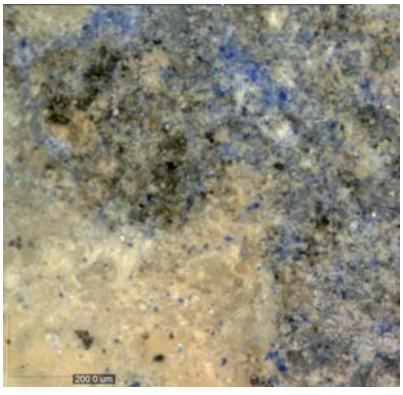
Figs. 9-10 – details of sample 8025, showing a black layer under the lapis lazuli.

Figs. 11-12 – ceramic fragment (not numbered) with remains of painting (black and blue layers) over the glaze.

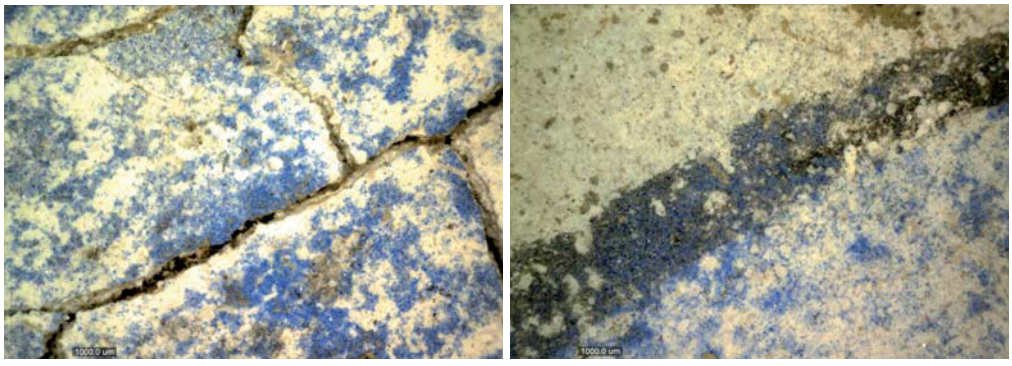




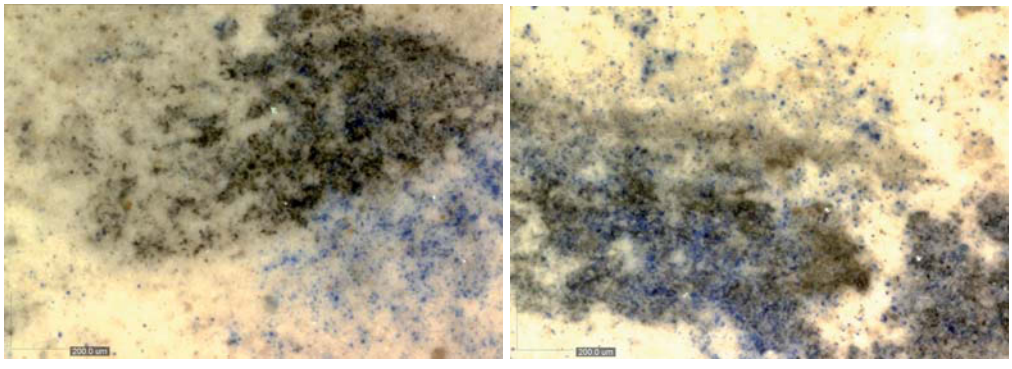




Again, we found a black layer under a lapis lazuli blue layer on an unnumbered sample in a fragment of glazed pottery with traces of paint (figs. 11-12). The presence of this double stratification seems to exclude the possibility that this sample pertains to a fragment of a bowl used for colours.
In contrast, when blue paint pertains to decoration rather than to flat monochrome painting, lapis lazuli has been applied directly over a finely smoothed gypsum surface (samples 6 and 8014), following black painted contours and overlapping them partially (figs. 13-16).
Sample 4, a painted corner fragment on a gypsum coating, is decorated on two adjacent faces. On the main face, with a blue decoration over a white ground, lapis lazuli has been applied directly over the smoothed gypsum coating (as in samples 6 and 8014), contoured by a previously applied black line. In contrast, on the lateral face painted with monochrome flat blue colour, the lapis lazuli covers a black layer.
In terms of the other colours found, cinnabar/vermilion (sample 5) also seems to have been applied onto a white layer, over the finely smoothed gypsum coating (fig. 17).



Figs. 13-14 – details of sample 6, showing a lapis lazuli layer over the gypsum coating; in fig. 14, the blue paint partially overlaps the black contour.



Figs. 15-16 – details of sample 8014, showing over the gypsum coating a lapis lazuli layer which partially overlaps the black contours.

Finally, for the gilding, the yellowish residues on the finely smoothed gypsum coating and under the gold leaf (fig. 18), seem to consist of orpiment (as indicated by the presence of arsenic detected with XRF).

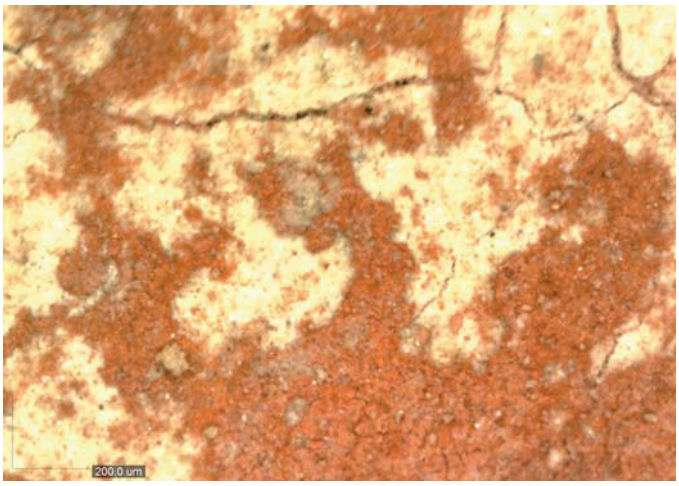
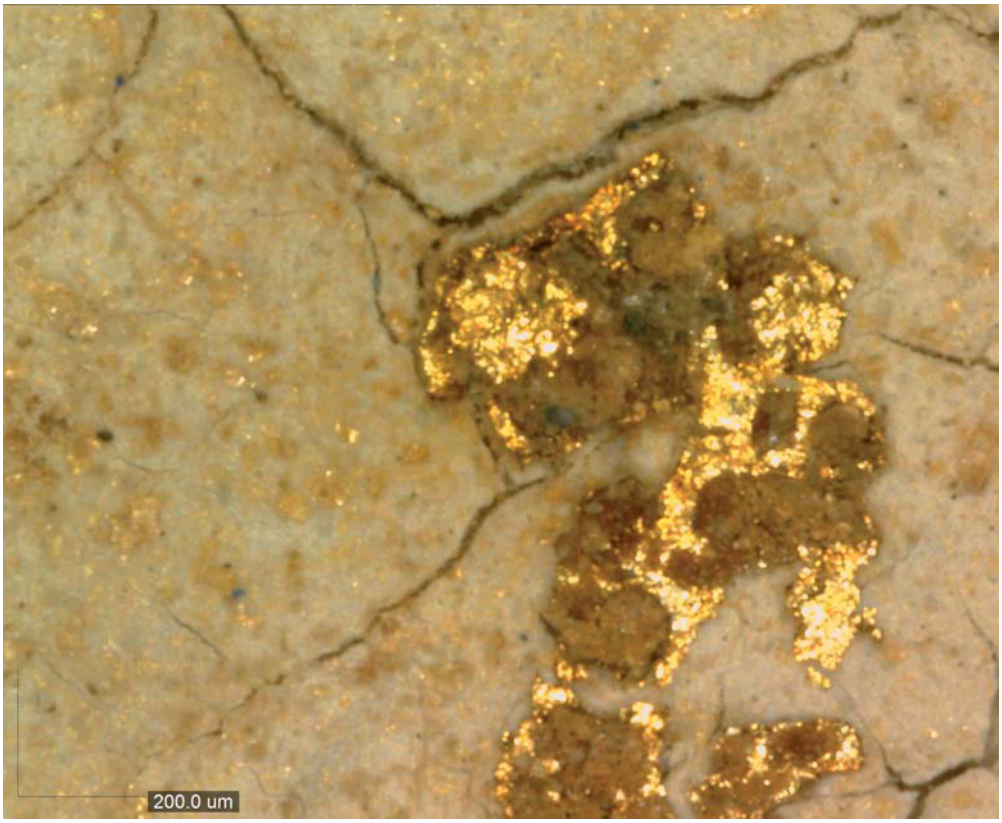


Fig. 17 – detail of sample 5, with a red layer applied on a white layer, over the gypsum finely smoothed coating.

Fig. 18 – details of sample 3, with traces of a yellow coloured layer containing arsenic between the gypsum coating and the gold leaf.



Plaster

The masonry of both the phases of the ‘Abbāsid mosque in Iṣfahān mosque consists in mud bricks bound with a fine layer of clayey mortar, then covered with the *kāhgil* (mud plaster[4] filled with straw and small quantities of mineral powder), a well consolidated technique found in all Central Asian sites,[5] and already documented in Sasanian sites.[6]

Vegetable fibres have probably been added to improve the mechanical properties. Plasters are brittle, but compact, even if in their structure numerous elongated vacuums are present. However, these cavities are due to the intrinsic nature of the plasters, and to the procedures used in their application.

The mineral fraction, analyzed in samples 1 and 4, consists in a raw clay mixed with a proteinaceous substance (the origin of which has not been identified by the GC-MS analysis carried out on the mud plaster of sample 3), and with sand almost exclusively composed of silicate crystals with small percentages of quartz and feldspar, fragments of metamorphic rocks, micas, siltstones, opaque minerals, pyroxene and rare epidotes. The particle size varies from the coarse silt class (1/16-1/32 mm) to the arenaceous class (1/4-1/8 mm), with a prevalence of the fraction of very fine arenaceous (1/4-1/8 mm). The sand is very well sorted and mixed with a binder/aggregate ratio of 1:1 by volume, which would seem to exclude that this aggregate was already naturally present in the clay deposit used for the preparation of the plaster, and supporting the hypothesis of a deliberate addition.

In sample 3, the most superficial layer of plaster [layer A], in addition to silicate clay, also contains minor percentages of calcium carbonate.

---

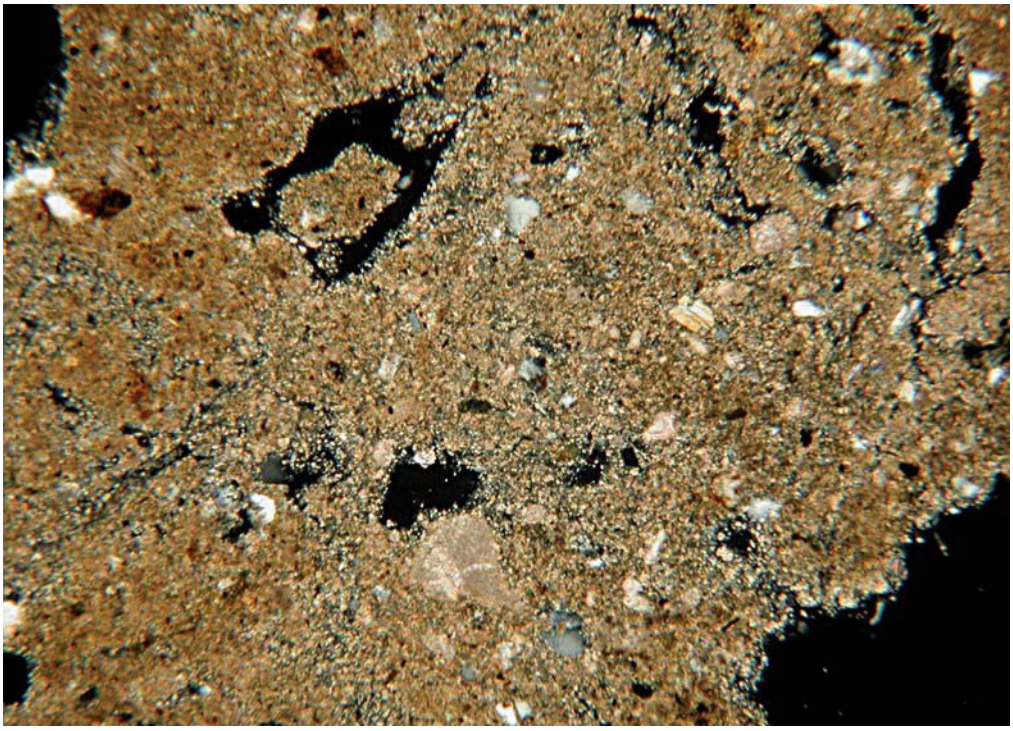
[4] Very rare are cases where a lime plaster has been applied instead of the mud plaster. The most important example is documented on the painted walls of Quṣayr 'Amra (Jordan), executed during the Umayyad period, only few decades before the pre-Seljūq decoration of the Iṣfahāni mosque. In depth information about the Quṣayr 'Amra paintings has been presented at the international conference “The Colours of the Prince. Conservation and Knowledge in Qusayr 'Amra”, held in Rome at the Istituto Superiore per la Conservazione e il Restauro on 23-24 October 2014 (postprints forthcoming).

[5] Straw as a filling material is generally also present in Byzantine lime plasters.

[6] The paintings at Hājīābād were carried out on a plaster consisting of mud and chopped straw (Azarnoush 1994: 179), at Susa a plaster consisting in tempered loam mixed with chaff is documented (De Waele 2004: 353), while at Ctesiphon it is stucco (ibid.: 369 and 377).

Fig. 19 – detail of the back of sample 3, with the mud plaster filled with straw (*kāhgil*) on view.

Fig. 20 – sample 1. Photomicrograph of a thin section of plaster under crossed polars showing textural features (photo CSG Palladio).



Final coating of the mud plaster

Typically, though not in all the samples, above the plaster there is a thin final white layer of gypsum which gives a finish to the surface, and acts as a ground for the application of the colours, with a thickness ranging between 0.5 and 2 mm. This combination of the mud plaster and the thin final white layer of gypsum is characteristic of much of Central Asian wall painting.

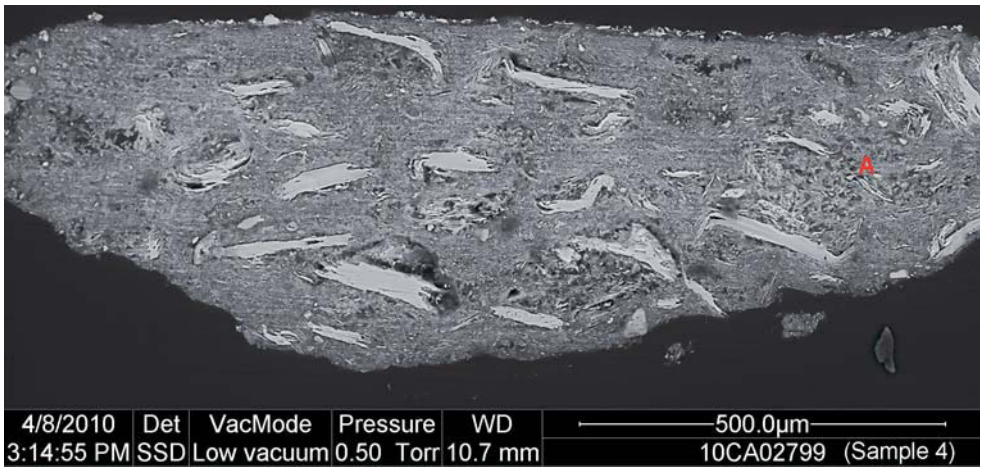


Fig. 21 – sample 4. ESEM image of the cross-section, showing fibrous particles of satin spar gypsum (sericolite) in the ground-layer (A) (photo CSG Palladio).

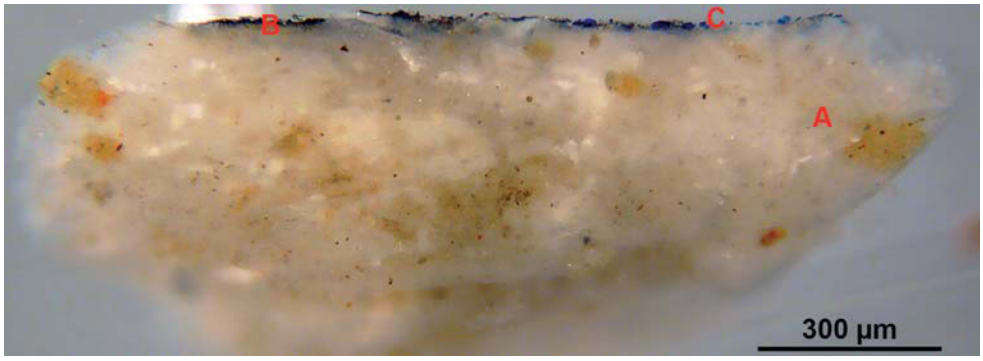


Fig. 22 – sample 4. Cross-section showing the ground-layer (A) interspersed with yellow masses of possible proteinaceous substances. The upper layer (C) consists of ultramarine blue obtained from lapis lazuli (photo CSG Palladio).

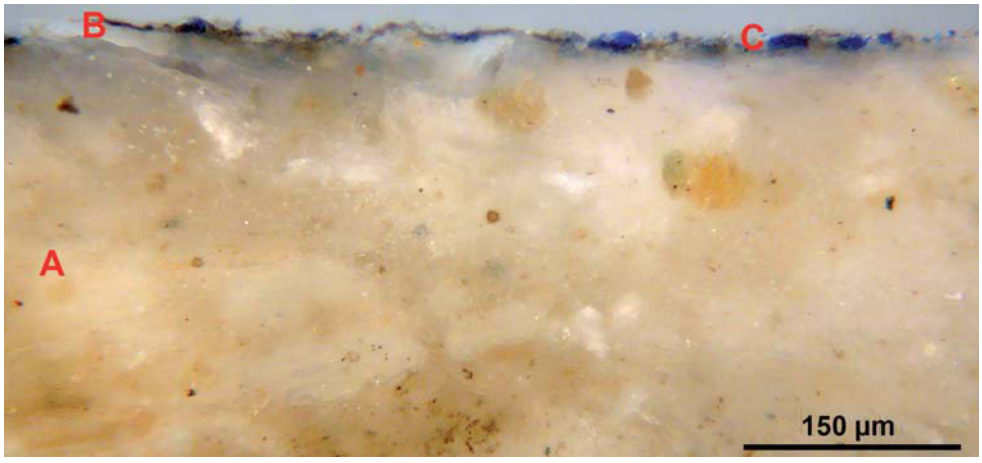


Fig. 23 – sample 4. Detail of the cross-section showing traces of the black contour (B) under the lapis lazuli (photo CSG Palladio).

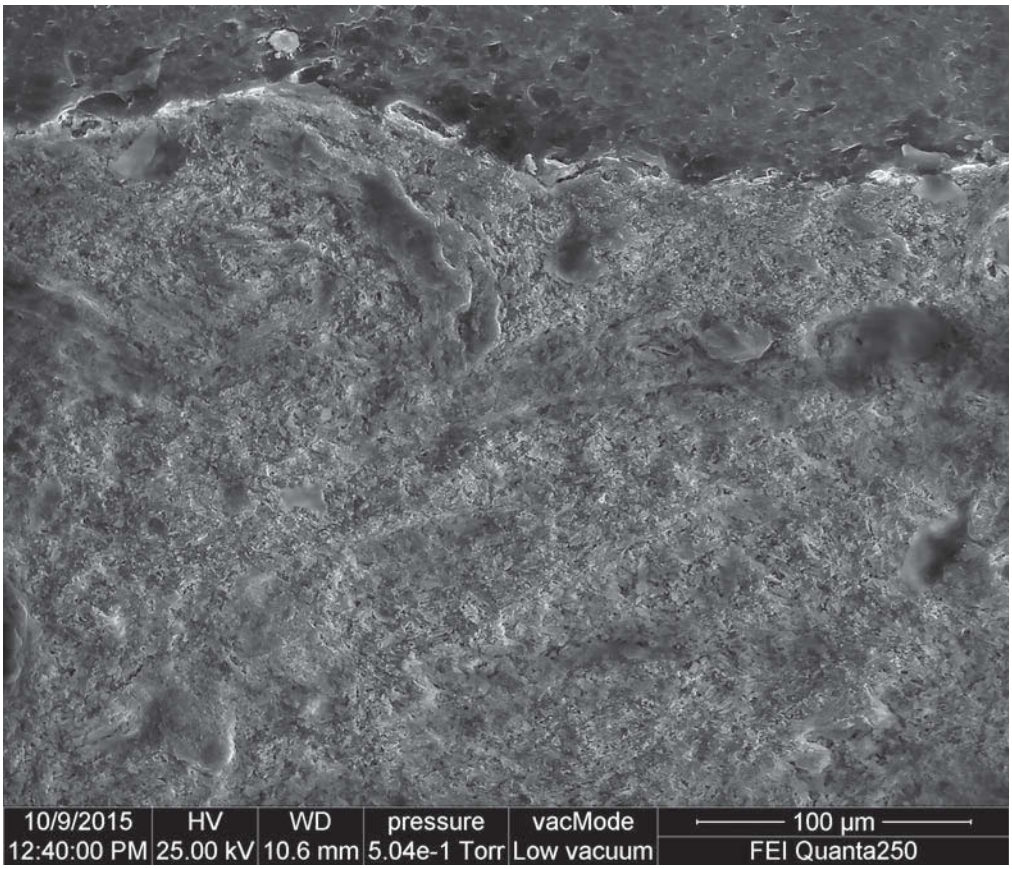


Fig. 24 – sample 4. Detail of the cross-section in GSE showing fibrous particles of satin spar gypsum (sericolite) (photo CSG Palladio).

This last layer of plaster has been investigated in samples 3, 4 and 6. In the first two, the matrix is made up of gypsum hemihydrate, while in sample 6 it is constituted by gypsum dihydrate. Despite the similarity in composition of the matrix in samples 3 and 4, significant differences can be observed.
In sample 3 the gypsum is accompanied by the presence of silicates and by a small percentage of lead, probably due to white lead. In sample 4 the final coating on the mud plaster (figs. 21-24) contains numerous fibrous aggregates of satin spar gypsum (sericolite), and several small yellow inclusions – characterized by greenish fluorescence between 440 and 490 nm – probably of organic nature (proteins?), as also showed by the ESEM image, where these areas are characterized by a lower brightness than that of the surrounding points. The presence of these small masses would seem to be due to an imperfect mixing of the ingredients.
The differences in thickness of the layer of gypsum in samples 3 and 4 are probably due to the type of decoration. In fact, in flat surfaces, without reliefs,

GO TO CONTENTS

the thickness is reduced (20-30 μm in sample 3), while it significantly increases where the surface is modulated by reliefs and/or edges (sample 4).
In some cases a redecoration has been carried out; reasons for this repainting (deterioration, change in aesthetic taste or some different ideological inclination of the period) are still unknown. However, in these cases, new mud plaster and its consequent finishing with the gypsum coating have been applied over the previous stratifications (fig. 25).
Proof of these refurbishments or modifications are new layers of mud plaster and their final white coating with gypsum, thin layers of whitewash (thickness ca. 0.5-2 mm), incisions scratched into the painted surfaces (possibly to guarantee a better hold for the succeeding decoration), or fragments whose sections show several pictorial layers.[7]

Fig. 25 – inv. 8048, showing a double stratificafion for the mud plaster and the top final gypsum coating.

Polychromy and coloured decorations

Polychromy and decorations have been carried out with only a few pure colours: white (prevalently *en reserve*, obtained by leaving the colour of the final gypsum coating on the mud plaster visible), blue (lapis lazuli), red (cinnabar/vermilion, ochre, or more rarely earths), gold, and very rarely black-olive green (only for some letter contours).[8] Black was also employed for the outlines of the decorations.

Blue

The only one blue pigment identified is lapis lazuli. Iran is not far from the lapis lazuli deposits in the Badakhshān province, in Afghanistan, the most im-

[7] One fragment analyzed from the mosque, revealed three pigmented layers (Jung 2010, note 12). In the Ṣafavid palace Čihil Sutūn (in the small hall P4) the Italian restorers of *IsMEO*, were able to distinguish up to seven superimposed pictorial layers (Mora 1968: 325, figs. 30-31).
[8] Green is generally also absent from the palette of Central Asian painters. Silvi Antonini 2003: 206, a (yellowish) green is reported from the Sasanian villa at al-Ma'arith (Ctesiphon) from the 6th-7th century, Morgenstern 1967: 1373, De Waele 2004: 369, 377.

GO TO CONTENTS

portant source for this pigment known at that time.[9] This pigment is very frequent in Near Eastern or Central Asian wall paintings dating between the 5th and the 9th centuries; in fact, its presence has been reported for Penjikent, Afrāsiyāb, Sharistān, Ajina, Bāmiyān, Kakrak, Kucha,[10] the Sasanian capital at Ctesiphon,[11] the Umayyad Quṣayr 'Amra in Jordan,[12] and the 'Abbāsid site of Sāmarrā'.[13]

In the homogeneous blue-coloured zones, where there are neither decorations nor white areas from which the blue colour was intentionally absent, lead is present, albeit in varying amounts. Careful observation at the ESEM, showed that on the surfaces of the samples the lead (previously detected by means of the non-destructive XRF investigations), does not belong to the surface layer, but is related only to the underlying white layers, which appear only within the abrasion of the blue paint; this implies that the element is associated to the white lead layer preparatory to the lapis lazuli application (samples 1, 8024 and 8025). On the contrary, in the samples where the blue is part of a black contoured decoration on a white background (samples 4, 8010, and 8014), lead was not detected, and the white is constituted by the gypsum finishing layer on the mud plaster.

Sample 6 seems to illustrate an exception, because in it the presence of small amounts of lead were detected. However, the sample contains touches of blue and red, and lead is present only under the blue layers, and the ESEM analysis showed residues of a layer of cinnabar/vermilion under the white layer.

This implies that we are probably in the presence of two different decorative phases: the first one represented by a bright red application, and the second one executed with a lapis lazuli application on a newly applied white ground.

The stratigraphical investigations showed that generally lapis lazuli has been applied in very thin layers. Moreover, these blue layers also contain calcium carbonate, in amounts apparently too high for natural impurities of the raw pigment. On the other hand, there is absolutely no doubt that the calcium carbonate present is not to be considered an indicator of *fresco* technique.

The GC-MS results of the proteinaceous and lipidic fractions in the pictorial layer (figs. 26-28) reveal the presence of egg, and it can therefore be assumed that this is the binding medium employed. The chromatograms also show peaks for pimaric and dehydroabietic acids, ascribable to a *Pinaceae* resin,[14] that might be present at the surface of the sample.

---

[9] For further considerations on this matter see below, in the paragraph *Discussion and additional observations*.

[10] Kossolapov, Kalinina 2007.

[11] De Waele 2004: 369.

[12] Pollak, Wenzel 1907: 200-2; García Bueno, Medina Flórez 2002: 141; oral presentation at the international conference "The Colours of the Prince. Conservation and Knowledge in Qusayr 'Amra" (cf. note 4).

[13] Burgio et al. 2007.

[14] Colombini, Modugno 2009: 16.

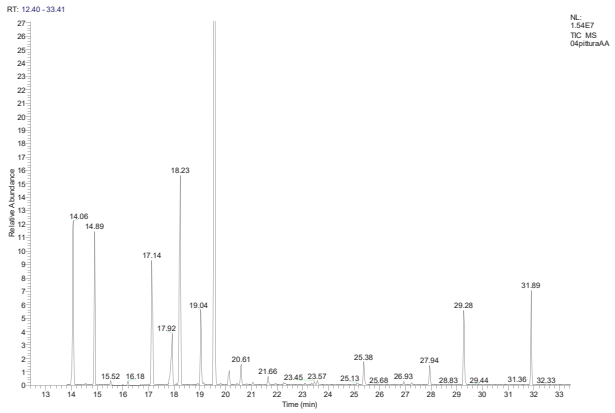


Fig. 26 – sample 4. Chromatogram of the amino-acidic fraction derivatized with MTBSTFA.

Sample	*Ala*	*Gly*	*Val*	*Leu*	*Ile*	*Pro*	*Ser*	*Phe*	*Asp*	*Hyp*	*Glu*
04 - paint layer	10.8%	13.2%	7.8%	15.4%	5.8%	8.8%	6.5%	4.5%	9.9%	-	17.3%
Time (min)	14.06	14.89	17.14	18.23	19.04	20.11	25.38	27.94	29.28	-	31.89

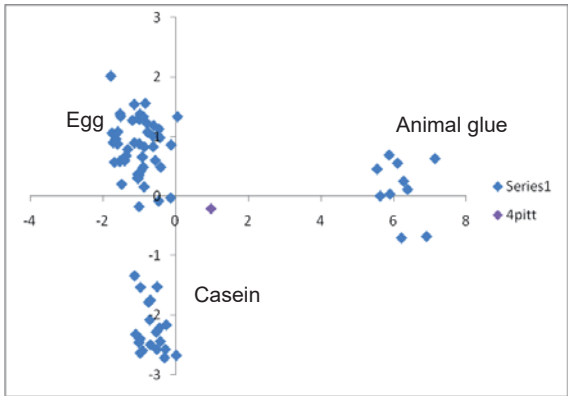


Fig. 27 – sample 4. Score plot of the amino-acidic fraction derivatized with MTBSTFA.

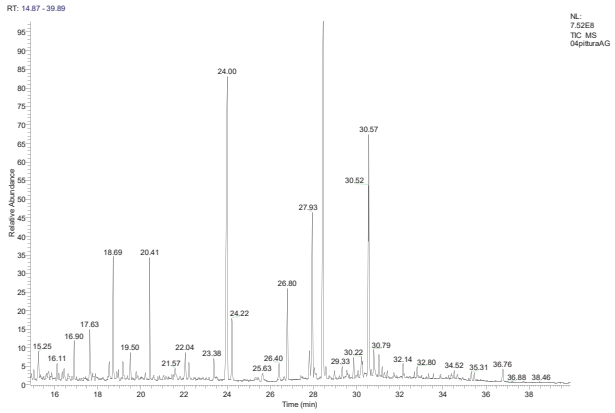


Fig. 28 – sample 4. Chromatogram of the acidic and neutral fraction derivatized with BSTFA.

Sample	*Lauric acid*	*Suberic ac.*	*Myristic ac.*	*Azelaic ac.*	*Sebacic ac.*	*Palmitic ac.*	*Oleic ac.*	*Stearic ac.*
04 - paint layer	3.2		10.1	4.5	3.8	30.2	7.1	33.1
Time (min)	16.90	-	20.41	19.50	22.04	24.00	27.93	28.42

Red

The red pigments detected were both iron based pigments (sample 8024 [fragment with a uniform dark red paint] and sample 2 [with red homogeneous preparation]), and cinnabar/vermilion (two fragments of the sample 8024 [one having a homogeneous red coating, the other with residues of different colours] and samples 5, 6 and 8048).

In addition to mercury, associated with the cinnabar/vermilion (mercury sulphide), lead was also frequently identified. In the two fragments of sample 8024, the presence of lead is unambiguously associated with a white layer underneath, which certifies a ground layer of white lead. It is to be noted that the fragments refer to sample 8024 (from the eastern half of sector 190/stratum 1c), and a white lead ground layer is present also in the fragment which has a homogeneous blue coating, but is absent in the fragment showing a uniform dark red colour. In samples 5 and 8048, the lead would

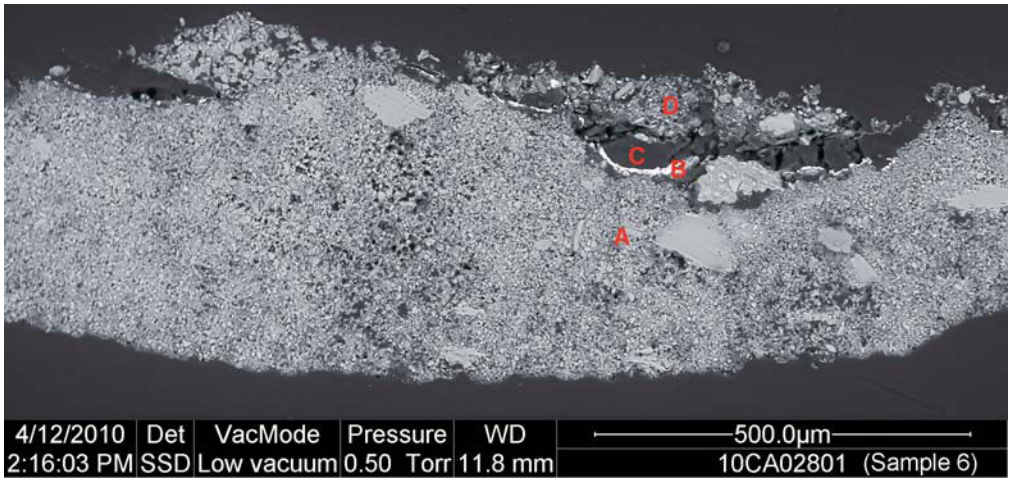


Fig. 29 – sample 6. ESEM back-scattered image of the cross-section (photo CSG Palladio).

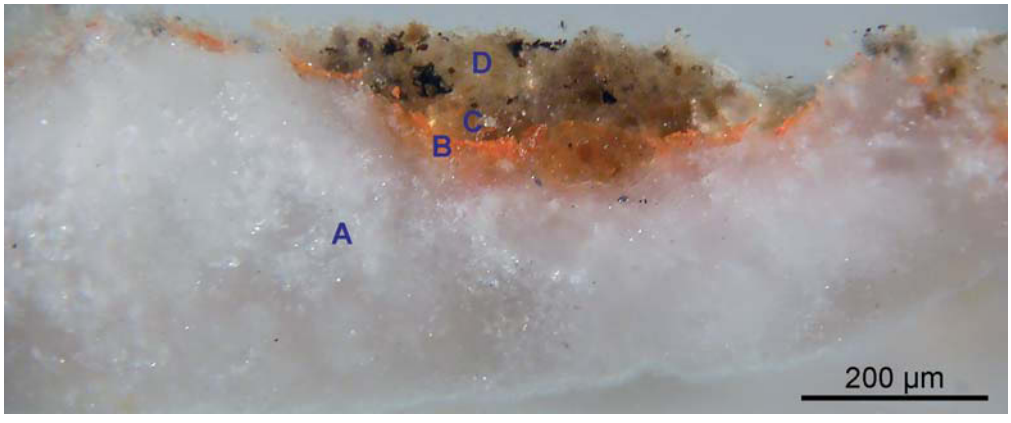


Fig. 30 – sample 6. Cross-section (photo CSG Palladio).

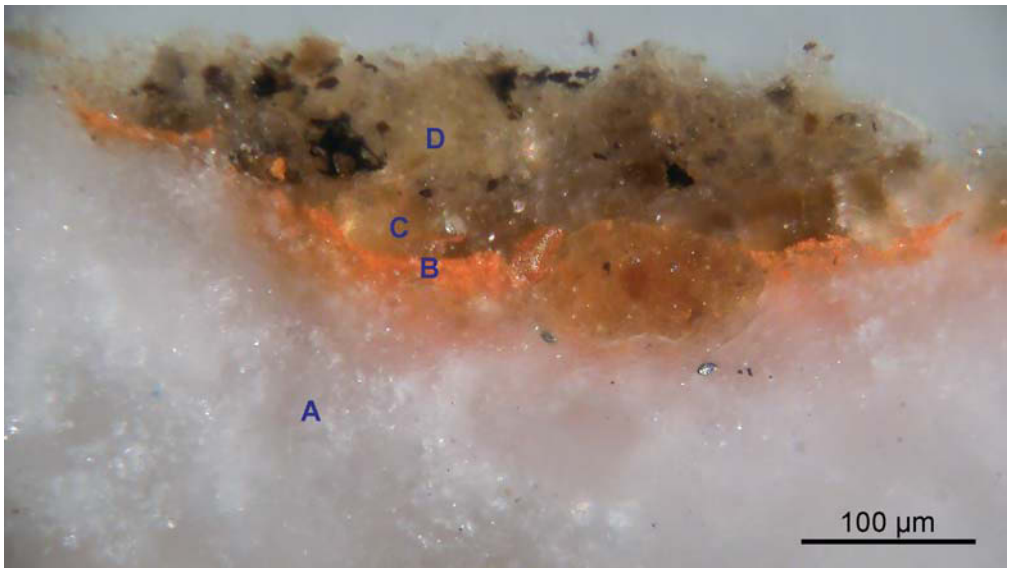


Fig. 31 – sample 6. Detail of the cross-section showing the red cinnabar-containing layer (B) above the gypsum layer (A) (photo CSG Palladio).

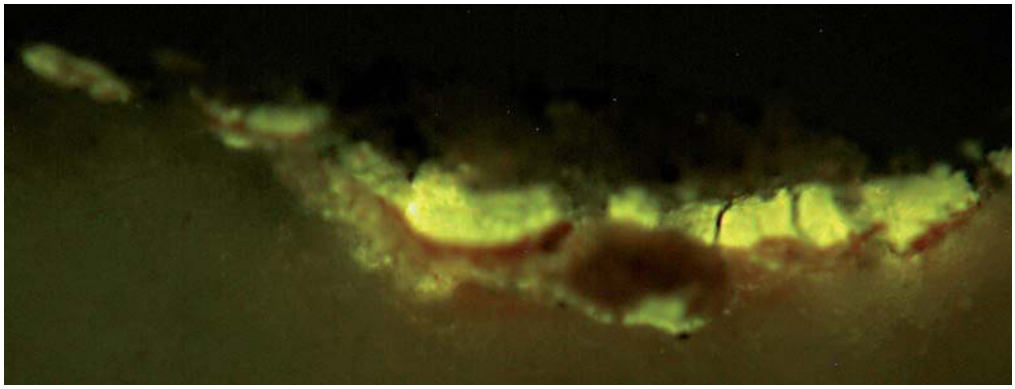


Fig. 32 – sample 6. The same detail under UV light showing an oil-resin based layer (C) above the cinnabar-containing layer (photo CSG Palladio).

not seem to belong to the cinnabar/vermilion; obviously, this hypothesis would require stratigraphic confirmation.

In sample 6 (figs. 29-32), in a discontinuous layer containing cinnabar/vermilion (0-70 µm), the FTIR spectrum of the right part of the layer shows absorption peaks/bands for esters from carboxylic acids not related to the polyester resin in embedding the sample in the cross-section, but related rather to the presence of lipids (fig. 33). A micro-fragment of red taken from the same sample before embedding it in polyester resin has been analyzed by FTIR using a diamond micro-cell in transmission mode. The resulting spectrum shows absorption peaks/bands for natural resins and lipids (oils?), but these com-

pounds are directly related to the material present above and under the red, characterized by a strong yellow fluorescence emitted under UV light between 440 and 490 nm, as can be seen in the microphotograph of the cross-section (fig. 32). It is not clear whether the mixture containing the natural resin corresponds to a varnish or to a mordant for gilding that has lost the metallic leaf above, and where now a brown layer (D) is visible, in which silicates, ochres, gypsum dihydrate and black carbon particles have been detected. One of the FTIR spectra obtained from the brown material, shows possible absorption peaks/bands for peptide bonds associated with the presence of proteinaceous substances.

Another element identified in some red paints, containing either cinnabar/vermilion or earth/ochre pigments, is arsenic (samples 2, 8024 and 8048). In general, the contents are low, therefore it could also relate to impurities associated with materials used in the paint layers. In the fragment with residues of different colours from sample 8024, arsenic, in significantly higher quantities, characterizes the composition of the background on which the decorations are applied. This feature may be due to the use of a white compound containing arsenic (arsenolite?) as a pigment, or a product of the degradation of pigments consisting of arsenic sulphides (orpiment, realgar and pararealgar),[15] a characteristic verified in correspondence with the preparatory layer of the gilding of the layers in the sample 3 (see *Gilding*, below).

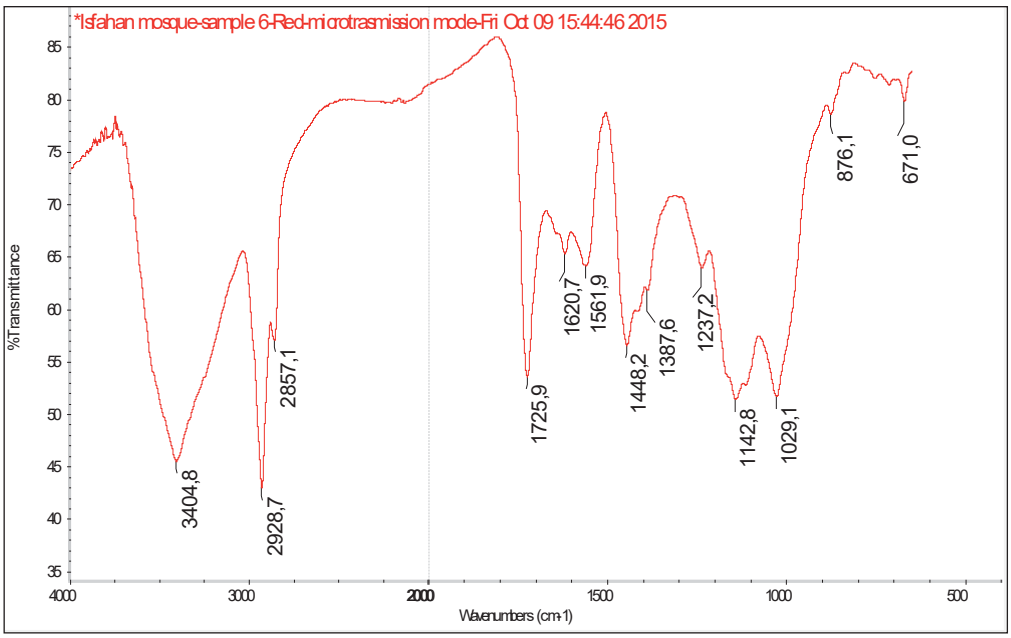


Fig. 33 – sample 6. FTIR spectrum of a micro-fragment of red. The absorptions at 2929, 2857, 1726, 1237 cm^{-1} are attributable to an oil-resinous substance.

[15] Daniels, Leach 2004.

Gilding

Gold leaf is only present in the palettes of paintings belonging to Types VI and VII. Sample 3 shows a complex stratigraphic sequence, the result of two successive phases of execution. Above the gypsum of the coating layer over the mud plaster, a very thin light yellow layer (up to 16 μm) is visible, consisting predominantly of an arsenic sulphide, probably orpiment yellow, as the chromatic affinity with gold in the layer E would lead us to assume, although the possibility that this was originally orange realgar cannot be excluded. In any case, what is seen now is a pigment largely faded, due to its transformation to arsenolite (As_2O_3). Together with the sulphide of arsenic, the EDX microanalysis has revealed a large presence of sodium chloride and phosphorus (1.34%), the presence of the latter more easily accountable by the presence of a phosphate, rather than that of a phosphoprotein, of which there is no trace in the FTIR spectrum of the layer.

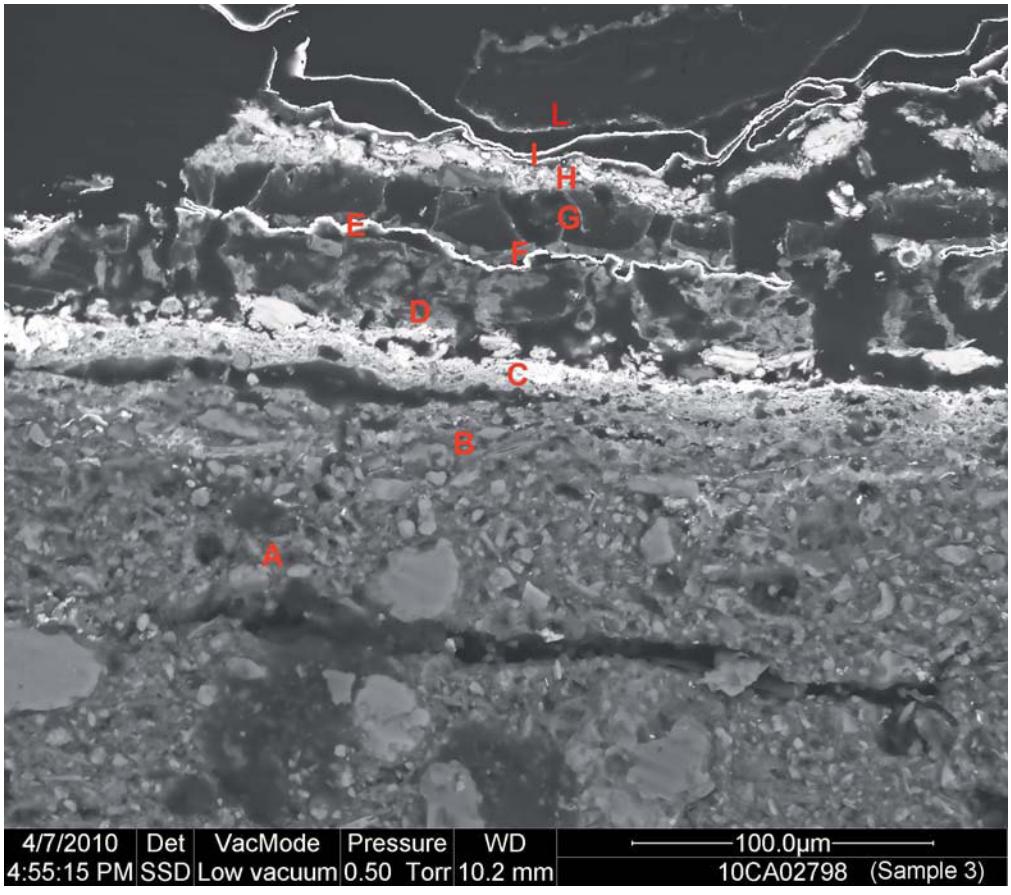


Fig. 34 – sample 3. ESEM back-scattered image of the upper part of the cross-section. Two overlapped mordant gilding treatments are visible (layers E and I) (photo CSG Palladio).

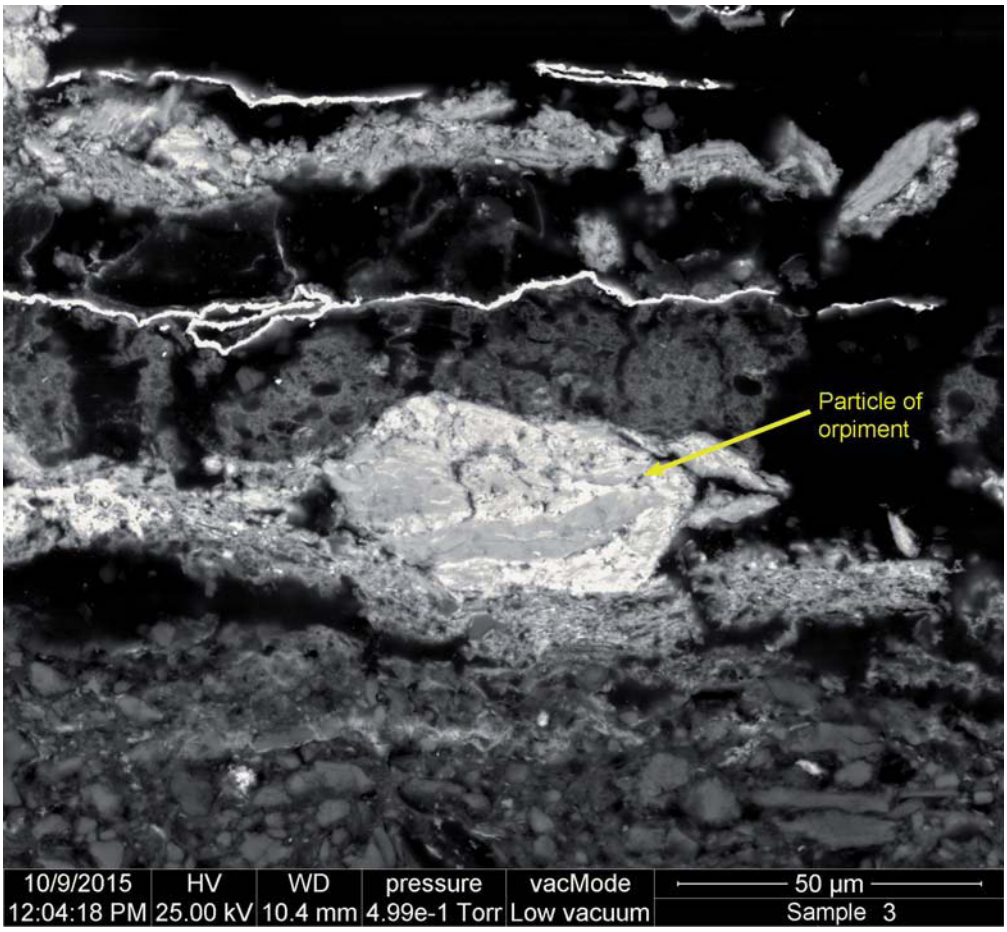


Fig. 35 – sample 3. ESEM back-scattered image showing a particle of orpiment in layer C (photo CSG Palladio).

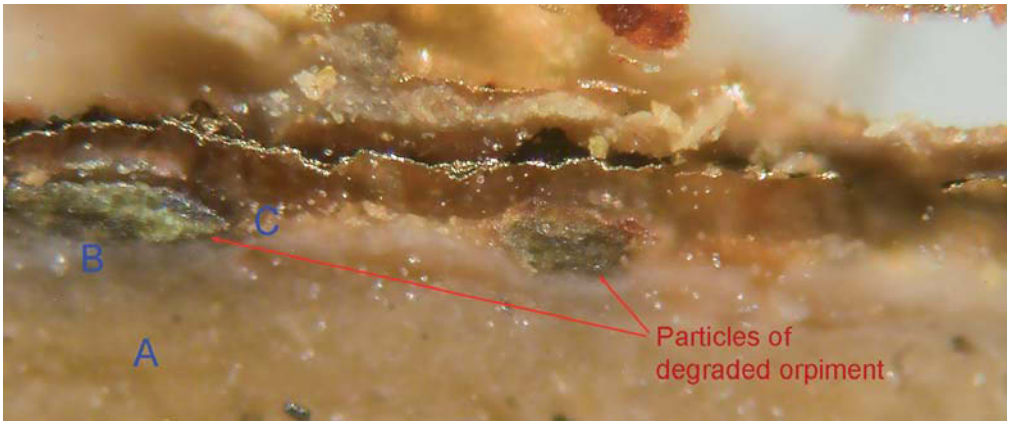


Fig. 36 – sample 3. Cross-section photographed in visible light showing two particles of degraded orpiment in layer C (photo CSG Palladio).

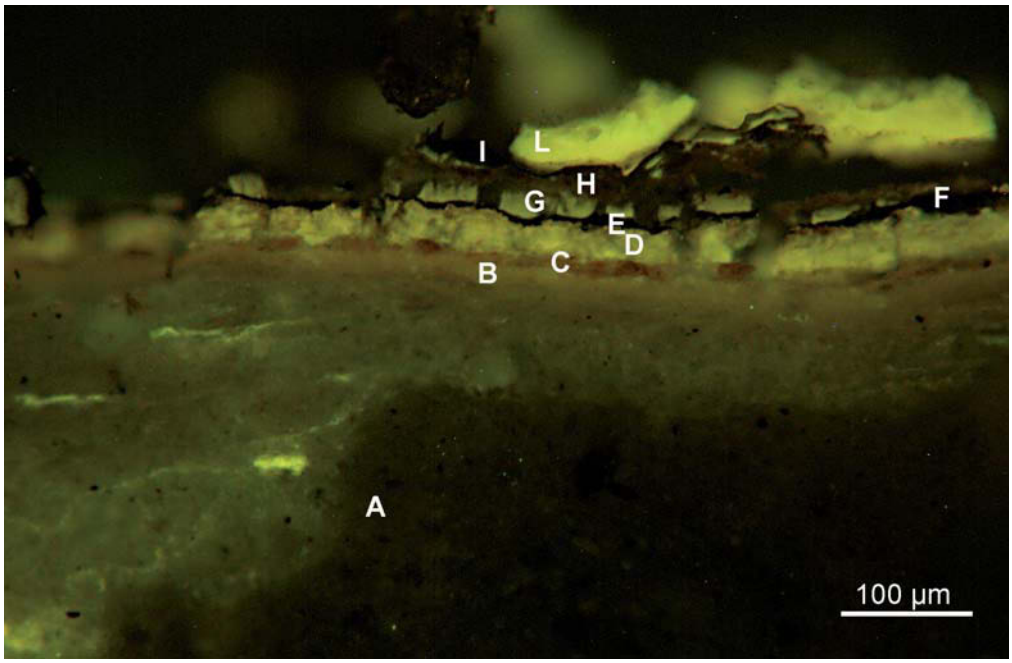


Fig. 37 – sample 3. Detail of the cross-section under UV light. The oil-resin based mordant layers (D, G) under the gold foils emit a yellow fluorescence. A strong fluorescence is also produced by the oleoresinous varnish on the surface (layer L) (photo CSG Palladio).

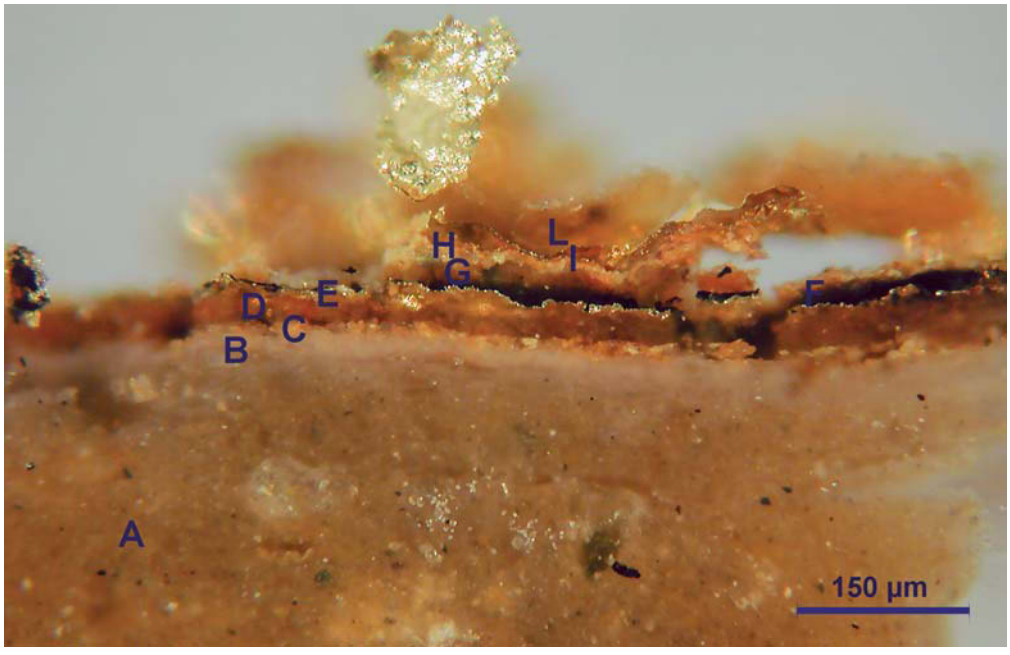


Fig. 38 – sample 3. The same detail photographed under visible light (photo CSG Palladio).

GO TO CONTENTS

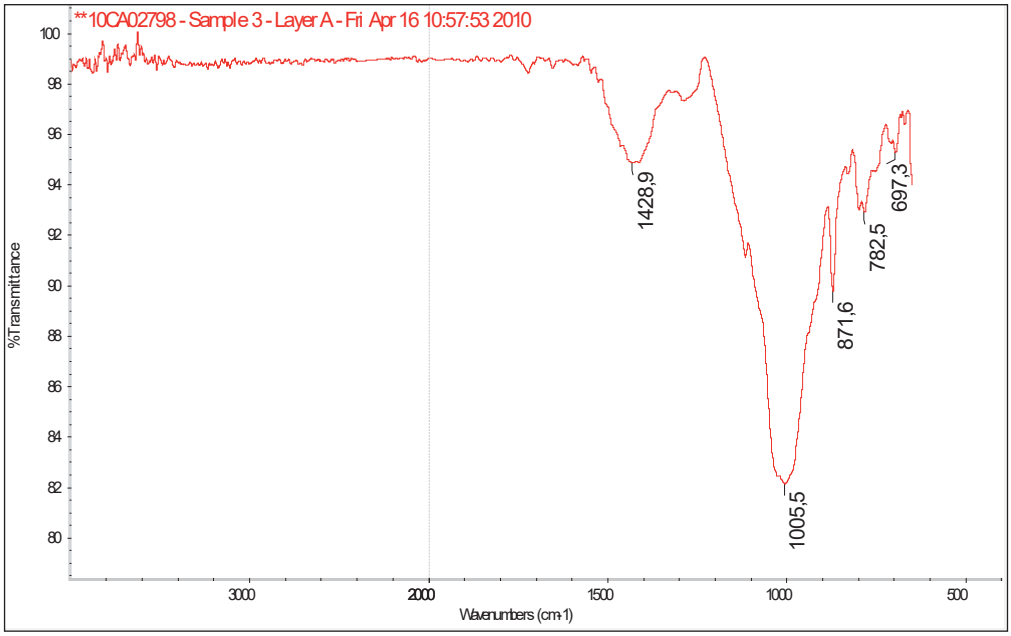


Fig. 39 – sample 3. FTIR spectrum of layer A. Strong absorptions in the region of silicates at ~1100-900, 800-780 cm^{-1}. Weaker absorptions of calcium carbonate at ~1430 and 872 cm^{-1}.

The arsenic layer C, which was yellow or orange, was used to tune the surface chromatically before applying – with a mordant consisting in oils and probable shellac (layer D; 16-32 μm) – the gold leaf (layer E; 0.75 to 1.5 μm) in which there is about 14.5% silver.[16] Above the gold leaf, blackish residues can be seen (layer F; 0-8 μm); they contain, among other things, resins and silicates. From this layer upwards, the layers belong to a subsequent phase of execution, which reflects, with certain differences that are not negligible, the stratification below. There is a resin layer (layer G; 20-28 μm) with spectral characteristics which are found in rosin, which are different from those shown in the spectrum of the mordant in the first execution phase (layer D) in which the peak of the carbonyl is shifted further to the left (layer E). Over the resin layer (G; fig. 42) there is a thin yellowish-orange layer (layer H; up to 12 μm) containing arsenic sulphides (orpiment and/or realgar), bound in oil. Above it there is gold leaf (I; 0.45 to 1.3 μm), which unlike that in the application, does not contain silver, if not in traces; the ESEM image clearly shows that the gold is actually composed of two leaves, probably in consequence of the proximity of the two piece of gold foil that overlap at the edge. Over the gold an oleo-resinous varnish has been applied (layer L). The micro-FTIR analysis carried out on this layer has produced spectra highlighting absorption peaks/bands attributable to oils and shellac (figs. 39-41).

[16] For the discussion about this high silver content, also previously detected in the previous not-destructive XRF measurements, in relation with Sasanian and 'Abbāsid coinage cf. Jung et. al. 2012.

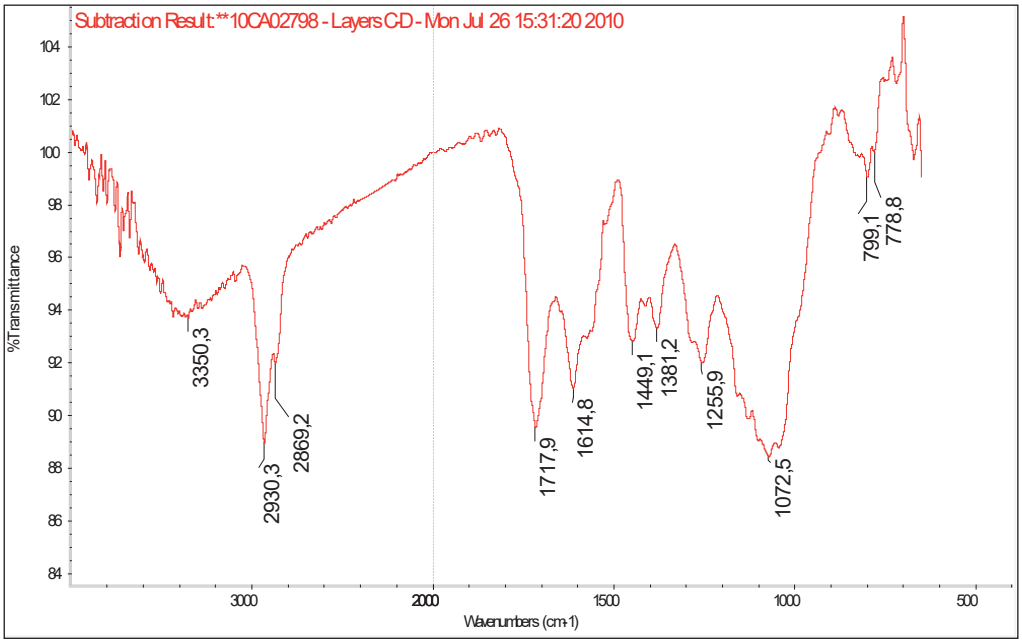


Fig. 40 – sample 3. FTIR spectrum of layers C and D after subtraction of the absorptions of the polyester resin embedding the sample. The main absorptions are relevant to silicates (~1100-900 and 778 cm^{-1}), but the intense band at 1718 cm^{-1}, along with minor peaks at 1449-1381 cm^{-1} and at ~1255 cm^{-1}, suggest the presence of a natural resin (probably shellac).

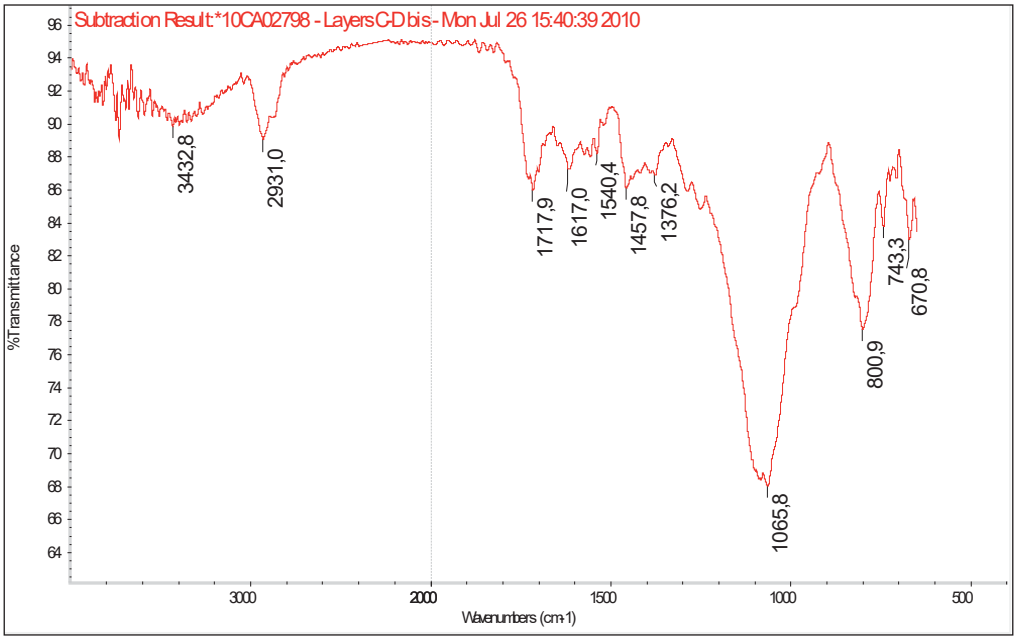


Fig. 41 – sample 3. FTIR spectrum of layers C and D (mainly layer C) after subtraction of the absorptions of the polyester resin. As in the previous spectrum absorptions of silicates and of a natural resin can be seen, but the strong absorption at 801 cm^{-1} indicates the presence of arsenolite.

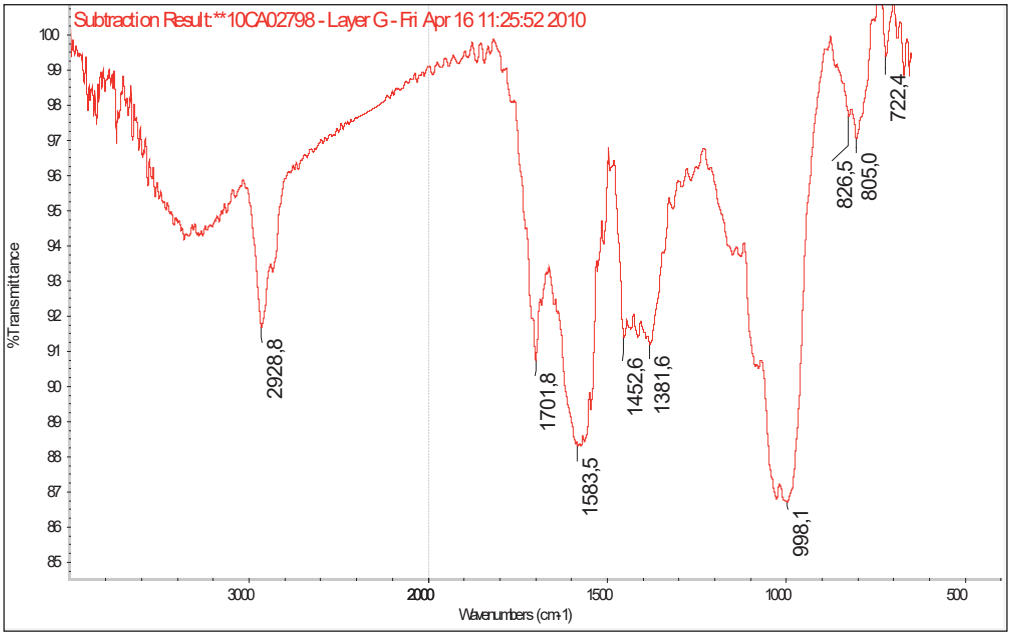


Fig. 42 – sample 3. FTIR spectrum of layer G after subtraction of the absorptions of the polyester resin. Beside the strong absorptions of silicates and carboxilates (perhaps derived from degraded lipids) the absorptions at 2930-2865, 1701, 1453 and 1382 cm^{-1} suggest the presence of rosin.

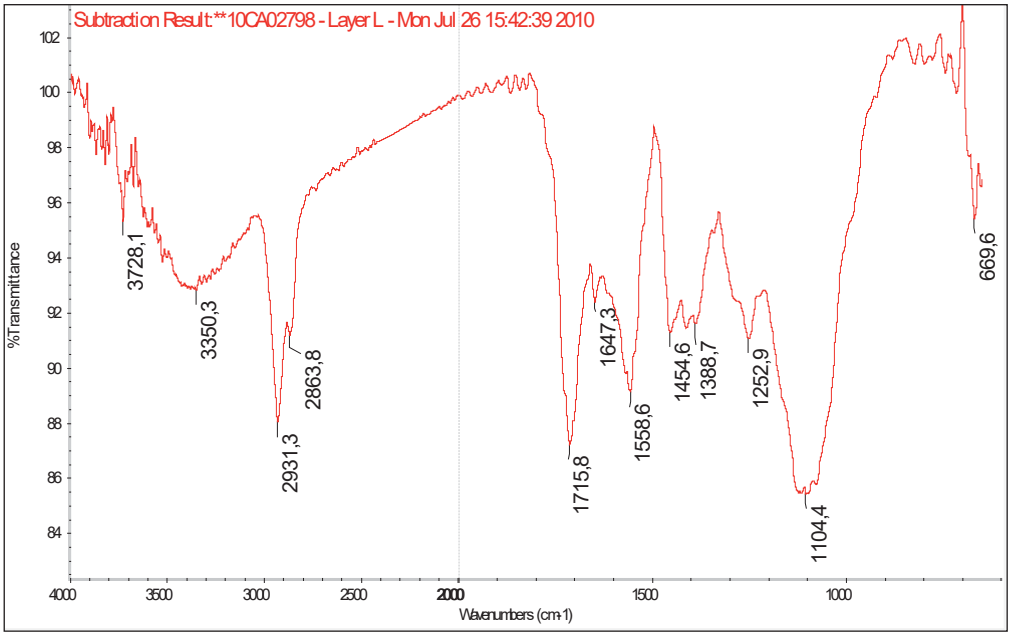


Fig. 43 – sample 3. FTIR spectrum of layer L after subtraction of the absorptions of the polyester resin. Intense bands of silicates and sulphates (1200-900 cm^{-1}), accompanied by absorptions relevant to shellac (2931-2864, 1716, 1454, 1389 and 1253 cm^{-1}) and to carboxilates (1559 cm^{-1}).

GO TO CONTENTS

Figs. 44-45 – sample 3. The fragment photographed before the embedding in polyester resin. The surface-looking side (44) shows some varnish residues over the gold foil. The rear side (45) shows the oil-resin mordant.

Discussion and additional observations

As has already been observed, the palette which has been identified is very basic, and functional to a specific kind of decoration, which does not recreate naturalistic images, but only calligraphic and ornamental patterns. There are only two colours (blue and red), white grounds, black contours, and (rarely) gilded patterns. For this reason the painters achieved a high degree of saturation in their colours, with pigments used pure. One should remember that blue (from lapis lazuli) and furthermore red (from cinnabar/vermilion), with black outlines and gold, were the basic materials for a sumptuous decoration in manuscripts or calligraphies painted on walls. For example, in the Seljūq phase of the Iṣfahānī Friday mosque, the cursive Koranic band around the South dome is picked out in cinnabar/vermillion set against a blue lapis lazuli background.[17] In the absence of gold, perhaps in a less wealthy situation, it could be substituted with ochre. For instance, the common colour schema in the mosques at Nīšāpūr is white, red, blue and yellow ochre.[18] On the other

[17] Blair 1992: 14; Giunta 2011: figs. 17a, b, 18.

[18] On the contrary, in secular contexts the palette is more wide and articulated. For example, in the famous paintings of the Tepe Madraseh (rooms S11/W2 and W20), dated by Wilkinson (1986: 159) for not later than the 10th century and generally nowadays dated to the 9th century, "The red was achieved mostly with cinnabar (mercuric sulphide); powdered lapis lazuli was used to create the intense blue of the broader framing bands set against pure white. The range of the palette, which also included black, yellow, and mixed colours such as blue-gray, dark earth red, a greenish yellow or sage green, and a pinkish buff … gray and red were outlined with black, blue and yellow with red." Wilkinson 1986: 169.

hand, gold is also rare on wall paintings from ex-Soviet Central Asia,[19] and in the Mogao Caves in Dunhuang.[20]
As stated above, on the fragments we studied, green is sporadic, as has already been remarked by Nathalie Lapierre with reference to wall paintings from ex-Soviet Central Asia.[21]
The pigments used for our paintings were chosen for the visual pleasure afforded by their colours, and the availability of these in Iran. We may presume that they did not have any symbolic connotation.[22]
As previously discussed, white paint is generally absent with the exception from the white grounds used as a finishing layer over the mud plaster. Such preparatory white finishing layers over the plaster are very frequent in Central Asian wall paintings. The alternative to gypsum is kaolin. However, gypsum

Fig. 46 – detail from the Ambassadors' painting, Afrāsyāb Museum, Samarqand (photo Faqsc1, from Wikipedia Commons).

[19] Lapierre 1990: 34.
[20] Gold leaf has been found only on the wall paintings of three caves dating from 8th to 14th century, while on the wall painting in one cave dating to the second half of the 9th century shell gold has been found. Wang Xudong, Fu Peng 2007: 116.
[21] Lapierre 1990: 34.
[22] The question if colours possess (-ed) a symbolic value in Islamic culture is rather complex. Sometimes one colour has in fact opposite meanings, e.g. the blue may have in Eastern Islam notions of good luck or infinity, whereas the "Arabs considered this colour magical, inauspicious and disturbing. Blue eyes are a source of bad luck", after Morabia 1986: 706. On colours in the *Qur'ān,* cf. Rippin 2001.

GO TO CONTENTS

is generally the norm in Islamic contexts.[23] Outside of this Islamic framework, referring to pre-Islamic Central Asian contexts, it is with gypsum that the white grounds were generally made for the wall paintings at Kara Tepe (3rd century), Toprak Kala (3rd century), Penjikent (7th–8th century), Afrāsyāb (7th century; fig. 46).[24] In any case, gypsum deposits are frequent in Iṣfahān Province.

The presence of satin spar gypsum (sericolite), identified inside the finishing white ground over the mud plaster in sample 4, could be evidence of the direct use of ground gypsum ore, without it having undergone baking in an oven. Perhaps, this apparently anomalous occurrence could be related to the morphology of this sample, which corresponds to an edge formed by the insertion of two flat surfaces, where the gypsum for the finishing layer would need a greater consistency, achievable through the addition of a filler; in this case the choice fell on a filler (the sericolite) totally compatible with the bulk, and it is possible that the two materials derived from the same ore. In any case, the presence of sericolite and the absence of anhydrite, underline that gypsum ores of good quality have been used directly, without the necessity of calcining them.[25]

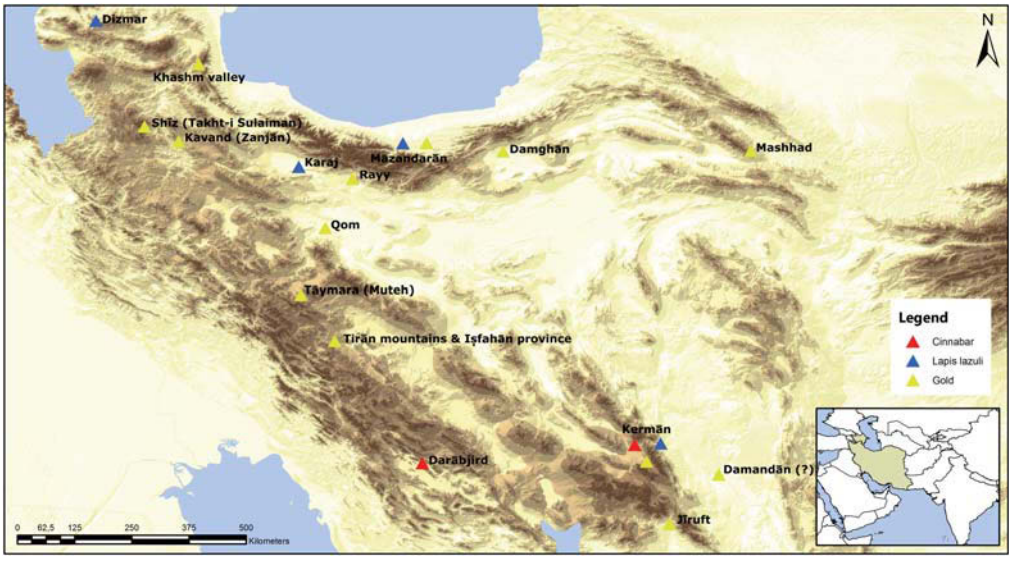


Fig. 47 – map of Iran and the neighbouring regions with the sites where gold, cinnabar and lapis lazuli occur or are mentioned in ancient written sources.

[23] In the 9th century wall paintings at the Masjid-i Jame of Fahraj, 35 km South-East of Yazd, the white ground, recognized as a paint layer, consists in huntite ($CaMg_3(CO_3)_4$). The abundant occurrence of this mineral in the Yazd Province could be explain the use of a local ore instead of the more frequent gypsum. Holakooei, Karimy 2015: 220-1.

[24] Lapierre 1990: 31.

[25] The use of a pure gypsum ore not calcined has been found in all the wall paintings from Central Asia investigated by Alexander Kossolapov and Kamilla Kalinina (2007: 90).

GO TO CONTENTS

As an alternative to the absence of lime or gypsum grounds in early Islamic contexts, a fairly frequent use of white lead has already been reported for the 'Abbāsid site of Sāmarrā',[26] while white lead grounds have been detected under the wall paintings from the oases of Kucha and Karashahr.[27] In the investigated fragments from Iṣfahān, white lead is never exposed to sight (see below).

Lapis lazuli and cinnabar/vermilion,[28] generally considered expensive pigments,[29] could be recovered directly from Iran or its neighbouring regions, and this was more economic than from other countries in Central Asia too (fig. 47). In the Islamic medieval world the high price which lapis lazuli could reach is testified by Abū 'l-'Abbās al-Tīfāshī, who attests that producing the pigment by grinding and refining the ore was a very remunerative profession in the first half of the 13th century, while one of the first authors who provides a recipe for the complex procedure for the purification of the pigment from the raw ore, is the Iran born alchemist Jābir ibn Hayyān (Geber), born in Iran in 102H / 721 C.E.[30]

Lapis lazuli deposits in the Kokcha River valley in the Badakhshān Province, in Afghanistan, had been exploited for millennia before the 'Abbāsid period. However, the kingdom of Badakhshān became Moslem, just a few years before the rise of the 'Abbāsid dynasty, in 117H / 736 C.E.

Other deposits are nowadays documented in Central Asia, specifically in Pakistan (Chāgai Hills, Western Balūchistān),[31] in the Pamir mountains (Lyadzhuar Dara, Tajikistān), and in Siberia (Irkutsk, near Lake Baikal).[32] There is no evidence for ancient exploitations of the second and the third site, but for Iranian artists ores from the former two sites could represent a very attractive alternative to the mineral from Badakhshān. Other sources for lapis lazuli are only documented in ancient written sources, but they have not been confirmed by findings of the ore. Ancient Egyptian texts speak of the presence of lapis lazuli ore at Serābit el-Khādim, in the South-West of the Sinai Peninsula, but it is probably a confusion with turquoise, abundant in this area.[33] More interesting, is the mention of Iranian sources in texts dated to the 14th century: Abū'l Qāsim, who wrote his treatise in Tabrīz during the Ilkhānid empire (668–704H / 1270–1305 C.E.), and Ḥamd Allāh Mustawfī of Qazvīn, the state accountant of Abū Sa'īd Khān (reigned 715-735H / 1316–1335 C.E.). Abū'l Qāsim mentions Kermān, Dizmār (Eastern Azarbāyejān Province) and Karaj (Alborz Province).[34] Mustawfī mentions Kermān, Dizmār

[26] Burgio et al. 2007.
[27] Kossolapov, Kalinina 2007: 90.
[28] For detailed information about lapis lazuli and cinnabar/vermilion in the Islamic Iranian world cf. Porter 1993.
[29] Al-Tīfāshī: 126.
[30] *De azulo faciendo*, Darmstaedter 1928: 78-9.
[31] Another Pakistāni occurrence has been recently reported for the Balūchistān. Porter 1993: 150.
[32] Herrmann 1968: 28.
[33] Nibbi 1981: 46.
[34] Abū'l Qāsim: 137.

and Māzanderān, instead of Karaj,[35] but it could refer to the same provenance, due to the proximity of the two provinces. In any case, modern scholars tend to exclude the veracity of the information about these sites, even if from a geological point of view (presence of metamorphic rocks) the occurrence of lazurite is possible for the regions of Dizmār and Māzanderān.[36] In any case, the occurrence of the mineral in Iran seems unquestionable, specifically in Zanjān Province.[37]

Coming back to wall paintings, the use of both lapis lazuli and azurite in the same later Iranian monument has also been occasionally documented, although it has not been ascertained if this differentiated use is due to different phases, or to economic motivations.[38]

The application of lapis lazuli over a black ground, mostly in extended areas, is aimed to improve the saturation of the blue, as lapis lazuli paint is not generally sufficiently opaque. Thus, the expedient of a black ground is very frequent elsewhere in Central Asia, for example in the Sogdian wall paintings at Pendjikent and Adjina Tepe.[39] It appears in samples with the blue layer over a black one (for example samples 8010 and 8024), that there is a white lead layer below this double stratification.

However, even if lapis lazuli is very frequent on earlier and contemporaneous Central Asian wall paintings with the exception of the wall paintings in Chinese Turkistān, where its absence has been underlined,[40] its use at Iṣfahān is not obvious, as the less expansive azurite could have been used in its place. In fact, due to the abundance of copper ores widespread all over Northern and Central Iran, azurite was easily found there.

For the red pigment consisting in mercury sulphide, it is impossible to establish if it originates directly from the ground mineral (cinnabar), or if it was manufactured (vermilion), from the reaction of mercury and sulphur. From a pictorial point of view, the use of vermilion instead of cinnabar was justified if a more pure pigment was required, with intense red hues and a greater colour saturation.

---

[35] "The best mines of this stone are in Badakhshān, but there are mines also in Māzandarān, and others at Dīzmār in Ādharbāyiān, and there is also one in Kirmān." Ḥamd Allāh Mustawfī: 197.

[36] Herrmann 1968: 27-8.

[37] "The annual reports of the Iranian Ministry of Technology and Mining for the years 1959 and 1960 which report the occurrence of three lapis lazuli deposits, one in the Khamseh Mountains south-east of Shiraz, another near Zanjan in Azerbaijan, and a third in the mountains of Rudbar south of the Caspian." Brown 1991: 13. "On the question of Iranian lapis lazuli, there are two points that need to be stressed. First, there are most certainly at least two sources of lapis lazuli present in Iran, one from Khamseh (Zanjan), and the other from mount Rudbar Alamut (near Tafrish, also in Zanjan). These are well documented mines, though their antiquity has not been investigated." Good 2010: 34-5.

[38] On the painted decorations of Pīr-i Hamza Sabzpūš's tomb (12th century) at Abarqūh, lapis lazuli was used in the *mihrāb*, azurite elsewhere. Cf. Karimy, Holakooei 2012.

[39] Lapierre 1990: 37 and note 130.

[40] Lapierre 1990: 37; Wang Xudong, Fu Peng 2007.

In Iran the occurrence of cinnabar is well known and documented, namely from the neighborhood of Takht-e Sulaymān in the Afshar mountains, as in Yar Aziz, Shirmard, Qariyeh Zagh, and Zarshūrān,[41] and near Kermān. These last two sites are important, because in the former case the occurrence of cinnabar is concomitant with gold,[42] in the latter because it is already documented in ancient sources like Pliny the Elder.[43] A mercury deposit near Iṣṭakhr is furthermore mentioned in Ibn Ḥawqal's *Kitāb sūrat al-'arḍ* (written in 367 H/ 978).[44]
As far as the artificially produced pigment is concerned (vermilion), in the Arabic literature, its recipe is already referred to by the alchemist Jābir ibn Hayyān (Geber).[45] In addition, the production of vermilion had already been well established for some considerable time.[46]

Referring to arsenic, particularly abundant in sample 8024 and in sample 3, where it has been found together with the gilding, below the mordant layer, it probably relates to the use of a yellow pigment such as orpiment, added to enhance the effect of the gold foil applied above, as can be inferred, observing the cross-section under the microscope (fig. 36), by the yellowish colour of some particles in the layer, that could be the product of the degradation of orpiment, mostly converted into white arsenolite, identified by micro-FTIR analysis of the same layer (fig. 41). In any case, it needs to be remembered that arsenic has been frequently detected, as arsenic oxide, on the Umayyad wall paintings in Quṣayr 'Amra. In the latter occurrence, its use as a white pigment has been hypothesised, while the hypothesis concerning its presence resulting from the alteration of a yellow arsenic sulphide has been excluded.[47] However, these hypotheses do not seem convincing for the paintings we have investigated, because in the same painting, white lead and lime white were also detected, and there is no recurrent characteristic which can explain the undifferentiated use of these three white pigments. Perhaps, another possible explanation could be in the rough preparation of the surfaces to be painted with a diluted solution containing an arsenic compound (arsenic sulphide and/or arsenic oxide), in order to prevent and inhibit biodeterioration. For the 'Abbāsid Iṣfahānī wall paintings, this operation would be deemed more necessary where there was a greater use of organic binder (gilding), in addition to creating a yellow ground below the gold leaf.

---

[41] This is the only site where cinnabar is still extracted, cf. the website National Geoscience Database of Iran.
[42] "A little cinnabar (HgS), has been found yielded by a Tertiary sandstone at Zireh Shuran, one of the sites of gold in Iran, located south-south-east of Tabriz." Harrison 1968: 513; Stöllner 2004: 55-6.
[43] Pliny the Elder [XXXIII, 118]. "Iuba minium nasci et in Carmania tradit;" "Juba reports that cinnabar is also produced in Carmania." Pliny the Elder: 88-9.
[44] Ibn Ḥawqal: 295.
[45] *De cinabrio faciendo*, Darmstaedter 1928: 79-80.
[46] In China, vermilion was already made from its constituent elements around the 4th century B.C.E.
[47] Oral presentation at the international conference "The Colours of the Prince. Conservation and Knowledge in Qusayr 'Amra" (cf. note 4).

In the pre-Seljūq Iṣfahānī mosque decorations, calligraphic and ornamental patterns are outlined with black contours (rarely can it be observed that characters have outlines in blue or black- olive green [in some fragments of type II]). The practice of outlining with black contours is very frequent in Central Asian paintings and, as remarked by Nathalie Lapierre, the contours were reinforced after the application of colour.[48] At Iṣfahān we find a noteworthy absence of this final reinforcing of the contour, as can be immediately seen in figs. 15-16, where the overlapping of the blue pigment onto the black outline is evident.

In relation to some of the gilding[49] investigated in the fragments from the wall paintings in the Iṣfahānī mosque, the low purity of the metal has been emphasized.
Generally, the gold leaf was beaten from coins, so we have to investigate this hypothesis in depth. Before the Islamic conquest of Iranian regions, gold coinage was very rare.[50] The Arsacids (ca. 247 B.C.E.–224 C.E.) did not mint gold coins, except perhaps as ceremonial medallions. The Sasanians (224–651) occasionally minted gold; in fact, their gold *dīnār* was struck only by some Sasanian rulers, mainly for ceremonial purposes.[51] During the first centuries of ‘Abbāsid rulership, there were two parallel monetary systems. In the West this was generally gold (*dīnārs*), in Iraq and Iran silver (*dīrhāms*). An exception was Baghdād, where both metals were employed. In these centuries the mint for *dīnārs* was confined to the seat of the caliph (Wāsit, Baghdād [=Madīnat al-Salām], etc.) and the governorate of Egypt, provincial mints only striking silver and copper coins.[52] The fixed weight standard for gold coinage was abandoned in the period between the 9th and 13th centuries, both in Iran and in the West.[53] In contrast, the purity of the coins seems to

[48] Lapierre 1990: 37.

[49] Information about gilding techniques (mostly but not exclusively in miniature) in the Islamic world is found in *Umdat al-kuttāb wa'uddat ḏawī al-albāb* attributed to al-Mu'izz ibn Bādīs (406–454H / 1016–1062). Cf. Levey 1962: 32f., 37-9. Precious information about this field is also in a work on optics the *Kitāb al-manāẓir* written by Ibn al-Haytham (Alhazen) (d. ca. 431H / 1039), cf. the edition of his text, 1972.

[50] The following information in the text were mainly drawn from the entry “Coin and Coinage” in the *Encyclopaedia Iranica*, by Album et al. 1992.

[51] Göbl 1968: 28f. On the Sasanid mint in Iṣfahān, cf. Cereti 2004.

[52] So, also in the mint of Iṣfahān only silver *dīrhāms* and bronze coins were struck during the first centuries of Islam. Cf. the Iṣfahān mint record by M.L. Bates. The first known *dīnār* struck at Iṣfahān goes back to the year 293 H / 905-906 with the caliph's name al-Muktafī bi'llāh, cf. Miles 1975: 371, pl. 26 (9). In Miles' opinion, ibid. 369-70, *dīnārs* did not appear in Iran proper until about the year 220H / 835, whereas al-Tabarī reports that al-Ma'mūn struck *dirhams* and *dīnārs* called *rubā'iyyah* in Khurasān in the year 194H / 809-810, al-Tabarī: 46-7. Concerning al-Tabarī's information Fishbein, ibid.: 46, note 200, writes that no *dīnārs* have been found from Iranian mints before the reign of al-Mu'taṣim, so that “the text seems to project the circumstances of al-Tabarī's time back into the earlier period.” On the contrary Ehrenkreutz 1959: 142-3, diagram II, registers several “mintless” (= from not official anonymous mints) *dīnārs* struck by al-Ma'mūn before the year 293 H / 905-6. It would be rather interesting concerning our discussion to have the standard of fineness of al-Mu'taṣim Iranian coinage, during whose reign the second building phase of our mosque took place.

[53] Nègre 1978: 171-4.

GO TO CONTENTS

have continued to be guaranteed, even if meaningful reductions in the gold content have been measured in some coins. Usually, for official coinage, the standard of fineness was arbitrarily fixed by the ruler; however, it seems that the fractions of *dīnār* could be struck at a fineness lower than the standard fineness fixed for the *dīnār*.[54] It should however be said that the only Persian mints that have so far been studied in depth are those of Rayy[55] and Āmol,[56] and there is also a study of the mint in Azarbāyejān.[57] Because of discoveries of new material, all of these studies are now somewhat dated. In any case, if coins were used for the gold leaf used in the decorations of the ʻAbbāsid mosque in Iṣfahān, they would have had to be beaten elsewhere and, considering the wide circulation of this metal and the relatively small quantities required for the purpose, this would not have been a problem. In fact, if we consider that 4.2 gr is the average weight for the *dīnār*, 0.45 micron the thickness of the gold leaf measurable in the cross-sections, and 19.3 gr/cm^3 the gold density, this means that an area of about half a square meter of gold leaf can be obtained from each coin.

Obviously, gold content tended to be drastically reduced in periods corresponding to political or economical crisis. Ehrenkreutz[58] and Miles[59] underline the fact that in the Islamic world the *dīnār* was of a lower quality during the civil war between al-Amīn and al-Ma'mūn (193–198H / 809–813),[60] the period between the end of Ṭūlūnid and the beginning of the Ikhshīdid rule in Egypt (292–323H / 905–935), and in the Būyid period in Baghdād (333–447H / 945–1055) when we do have an extremely bad standard of finess.[61] For the Ayyūbid period in Egypt, Miles[62] points out the very low gold content in the *dīnār*, which falls below 90% under Saladin (564–589H / 1169–1193), but the Ayyūbid examples are too late for useful comparison to the pre-Selǧūq paintings. Could we hypothesize the use of baser gold coins (e.g. produced in the period of the ʻAbbāsid civil war), for paintings belonging possibly to the second ʻAbbāsid mosque (built in the period of al-Muʿataṣim (ca. 225–226H / 840–841), or to the Būyid intervention (before 368–369H / 979–980)? An alternative hypothesis could imply that gold leaf was beaten from smaller denominations and not from *dīnārs*. A less likely hypothesis is that electrum[63] coins were used to beat the gold leaf, however the use of electrum coins was

[54] Ehrenkreutz 1959: 130, 136.
[55] Miles 1938.
[56] Stern 1967.
[57] Pakhomov 1959-63.
[58] Ehrenkreutz 1959: 139, 142-3, 154.
[59] Miles 1965: 297-8.
[60] The poorest coins, obviously, were not struck by the ruling caliph, but by his opposing brother, al–Ma'mūn, in not official eastern mints, cf. Ehrenkreutz 1959: 143, diagram II. On al- Ma'mūn's coinage, cf. el-Hibri 1993.
[61] Ehrenkreutz 1959: 144-7, 154; 1963: 256.
[62] Miles 1965: 298.
[63] Electrum is a gold-silver alloy, often having a natural origin. For this reason gold percentage can vary widely. For example in natural occurring electrum nowadays in Western Anatolia, gold ranges from 70% to 90%.

GO TO CONTENTS

very limited in the Islamic world.[64] Similarly, any potential use of the Byzantine electrum *aspron trachy* can be firmly excluded as the wall paintings investigated pre-date the introduction of this coin in 1092, with the monetary reform by the emperor Alexius I Comnenus (1081–1118).
An alternative hypothesis for the provenance of the metal for the gold leaf from coinage, is that it directly derives from native gold or from gold objects. With reference to the former source, it is important to stress that the presence of native gold is also documented in the Province of Iṣfahān or not far from it (near Anārak, Ashin, Delijiān, Kuh Dam, Latif, Mehdī Ābād, Natanz, Zarin).[65] It is worth mentioning the gold mine of Muteh near Gulpāygān (ca. 160 km from Iṣfahān), which may be identified with the ancient mine of al-Taymara.[66] Several Iranian gold mines are known, which were exploited in the pre-modern period and may have been used also in the period which interests us (figs. 47 and 48).

Fig. 48 – midden of waste material resulting from gold panning at Taḫt-e Sulaimān (from Weisgerber 1990: pl. 6.6).

[64] Electrum *dīnārs* did circulate in eastern Khurāsān in the 11th-12th centuries. Hill 2000: 273.
[65] Cf. the website National Geoscience Database of Iran. Referring to Iranian sites where gold is known for certain to have been found in ancient times: "the river Hyktanis in Carmania (Kermān) is mentioned by Strabo to be rich in alluvial gold. Assyrian texts refer to gold deposits in Kavand (Zenjān). Other important deposits are mentioned by medieval historians near Damġān, Mašhad, in the Tīrān mountains near Iṣfahān, and near Taḫt-e Sulaimān in the western oil fields." Wulff 1966: 13. Cf. also Allan 1979: 111-3, map p. 114; Momenzadeh 2004: fig. 7, p. 17, Stöllner 2004: 54-5 et passim, and the brief notes on gold deposits in Iran and Central Asia, its extractions and processing in the Medieval Period in Jung 2009: 33f et passim.
[66] Mentioned by al-Māfarrūkhī: 18; Wertime 1967: 328-30, Pleiner 1967: 342-7, figs. 1-3.

GO TO CONTENTS

In relation to the latter possible source, the reference from al-'Utbī that the pagan gold idols and Buddhas of the conquered nations were melted for the gilding of the Great Mosque of Ghaznī is well known.[67]

Finally, many characteristics in the fragments, seem to point to at least two different phases, or more, in the 'Abbāsid decoration of the Masğid-i Jum'a at Iṣfahān. In fact, a few of them show a double stratification of mud plaster and gypsum coating, as though the wall had been prepared again for a new decoration. Moreover, in some fragments, different colours are superimposed and it is certain that this overlapping is not due to accidental overflowing of brushstrokes (this is the case of lapis lazuli layers covering cinnabar/vermilion layers in all the surfaces of the samples). In such situations, the absence of the gypsum coating layer of the mud plaster is even more meaningful, as it leads us to hypothesize the presence of less finished, not accurate, decorative phases linked to provisional decorations, compensation for damages, or coarse extensions. Finally, also the data concerning the gilding, lead us to infer that they have been applied in two different moments in time, because of dissimilar nature of the materials (gold leaf having different gold contents) and of the techniques of execution (different organic compounds for the adhesion of the gold leaf to its preparatory layers) detected.

[67] Bombaci 1964: 31f; see also, in this volume, p. 57.

GO TO CONTENTS

Botanical characterization of some iconographic painted elements

Antonella Altieri

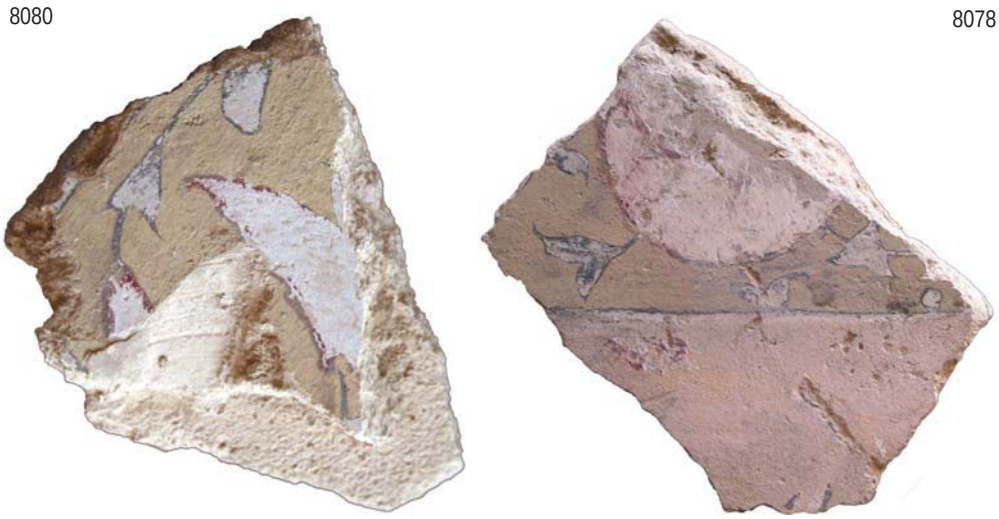
It is possible to discern from the fragments some of the recognized typologies of the original decorations of the wall paintings in the pre-Seljūq Iṣfahāni mosque, containing stylized vegetal elements, particularly types VII and IX. In some cases, despite their simplified and stylized appearance, it is possible to recognize the vegetable or plant represented.

Fig. 1 – fragments related to type VII, with stylized motives attributable to pomegranate flowers.

Type VII - Relief scroll work

Analysing the fragments of this type, due to their poor state of conservation, and the fact that only five of these fragments have preserved both the colour and a "white spiral" trace which is a decorative element on a red background, it was not possible to determine the exact typology of the vegetal decoration. In two of these fragments (fig. 1) a funnel shape is recognizable, as part of the white spiral, that reminds one of the *hypanthium*, coriaceous and reddish characteristics of the Pomegranate flowers (*Punica granatum* L. – Punicaceae).[1] With regard to the geographical area in which one finds the Pomegranate,

[1] Tutin et al. 1988, vol. II: 305.



Figs. 2-3 – fragments related to type XI, with stylized motives attributable to ivy (Hedera helix L.).

this extends over SW Asia; in Iran, Ahmad Parsa reports the following detailed distribution: "*Mont du Nord, de l'Ouest et du Sud, Palines forestières basses Caspiennes, Maindar de Bamposht, Saveh, Bandar.*"[2]

Type XI – Plant ornaments of sector 112

Only two of the ochre fragments have, as decorative painting elements, white leaves with a black edge. In fragment inv. 8080 (fig. 2), three of the five painted leaves have a leaf stalk, and the two other painted elements might be shoots. The morphology of leaves, as well as their different shapes occur in the *Hedera helix* L. This specie has "stems woody, climbing or creeping; leaves shining, dark green, dimorphic; leaves of the flowering shoots are narrowly elliptical to suborbicular-cordate, entire; those of the non-flowering shoots palmately 3 or 5 lobed".[3]

With regard to the geographical area, it extends over South-Western Asia,[4] in Iran, Ahmad Parsa reports the following detailed distribution: "forêt du Nord Bondar Djaz, Gorgan Ramian."[5] Finally, in only one fragment (inv. 8078, fig. 3), it seems possible to recognize an arrowhead leaf, along a thin stem between two other elements, but the painted characters are not enough to the species identification.

[2] Parsa 1948, vol. II: 620-1.
[3] Tutin et al. 1988 vol. II: 314.
[4] Pignatti 1982, vol. II: 162.
[5] Parsa 1948, vol. II: 870.

GO TO CONTENTS

Summary

Many questions remain open about the painted decoration of the mosque, which will probably never be answered. Although our documentation of the wall paintings of the Great Mosque is incomplete and full of gaps, and the results are often puzzling, the fragments that have survived permit a short but significant glimpse of the rich pictorial decoration of the Great Mosque of Iṣfahān. The analysis of this material provides some interesting clues:

1) The greater part of the excavated wall paintings seem to belong to the pre-Seljūq period, and thus are amongst the most ancient Iranian ones ever found.

2) The painted calligraphy is possibly the most ancient existing so far discovered in Iran.

3) The paintings can be assigned to several phases. They show different pictorial styles and techniques of execution. Several wall-fragments still show distinct layers of painting. Further research will perhaps indicate which periods the paintings can be assigned to, to the ‘Abbāsid ones (under the caliphs al-Manṣūr and al-Mu‘taṣim, during the 2nd–3rd centuries H / 8th–9th centuries) and/or to the Būyid phase during the 4th century H / 10th century.

4) The greater part of the painted fragments come from section 190, i.e. the *miḥrāb* area of the former and actual sanctuary, under the dome built by Niẓām al-Mulk. Yet we cannot know if this concentration in this particular area is due to its prominent position near the *miḥrāb,* or if it depends mainly on the circumstances of the excavation.

5) It will be necessary to devise, in collaboration with our Iranian colleagues, the best way to assure the conservation of the fragments for the future and to make them accessible to the public. We do hope that the small and rather fragile fragments will not share the unlucky fate of many of Sāmarrā’ paintings, as had been foretold by their own excavator, Ernst Herzfeld, who maintained that “Die Gemälde von Samarra werden nur in diesem Buch weiterleben [The paintings of Samarra will survive only in this book].”

GO TO CONTENTS

6) On account of the incompleteness of the findings, it is difficult to make any statement of possible precursors for the patterns of our paintings or of their reception afterwards.

7) Finally, thanks to the scientific investigations, we gained a great deal of information about the materials and the execution of these paintings and, consequently, have increased our knowledge of such an early and important moment in Islamic Art.

Michael Jung and Claudio Seccaroni

Fig. 1 – sector 190, below the dome of Niẓām al-Mulk.

Bibliography

1. Sources

Abū Dulaf, *al-Risāla al-ṯāniya* (written ca. mid-4th c. H / 10th c.).
= *Abū-Dulaf Misʿār Ibn Muhalhil's Travels in Iran [circa A.D. 950]*, Arabic Text with an English Translation and Commentary by Minorsky, V., Cairo, 1955.

Abū Nuʿayim, *Kitāb dhikr akhbār iṣbahān* (written in 421H / 1030)
= *Geschichte Iṣbahāns nach der Leidener Handschrift*, Dedering, S. (ed.), Leiden, 1931.

Abū'l Qāsim, *ʻArāyis al-jawāhir va nafāyis al-atāyb* (written in 700H / 1300-1)
= *The Book of gems and parfumes*, Afshār, I. (ed.), Tehran, 1966 [in Fārsī].

Abū'l Shaykh *Ṭabaqāt al-muḥaddīṯun bi-iṣbahānì* (written in the 2nd half of 4th c. H / 10th c.)
= Arioli 1979.

ʿAwfī, Sadīd al-Dīn, *Lubāb al-albāb* (completed in 618H /1221)
= Browne, E.G. (ed.), Leiden, 1903.

Claudius Aelianus (ca. 175–ca. 235 C.E.), *Varia Historia*
= *Claudius Aelianus his Various History*, translator T. Stanley, London, 1665.
http://penelope.uchicago.edu/aelian (retrieved: March 2, 2016).

Ḥamd Allāh Mustawfī (679–749H / 1281–1349), *Nuzhat al-qulūb*
= *The Geographical Part of the Nuzhat al-Qulūb*, Le Strange, G. (transl.), Frankfurt am Main, 1919.

Herodotus (484-425 B.C.), *Historiai*
= *Herodotus, with an English translation by A. D. Godley. Cambridge*, Harvard, 1920.
http://www.perseus.tufts.edu/hopper/text?doc=Perseus:text:1999.01.0126 (retrieved: March 2, 2016).

GO TO CONTENTS

Ḥudūd al-'ālam (written in 372H / 982)
= *The Regions of the World* "Ḥudūd al-'ālam" *A Persian Geographer 372 A.H.- 982 A.D. translated and explained by V. Minorsky, with the preface by V.V. Barthold*, by Bosworth, C.E. (ed.), London, 1970, 2nd ed.

Ibn al-Athīr (554–630H / 1160–1233), *al-Kāmil fī l'tā'rīkh*
= Tornberg, C.J. (ed.), Leiden, 1851-76.

Ibn al-Haytham (d. ca. 431H / 1039), *Kitāb al-manāẓir*
= *Opticae thesaurus*, Risner, F., Lindberg, D. (eds.), reprint of the original edition Basel 1572, New York-London, 1972.

Ibn Ḥawqal, *Kitāb sūrat al-'arḍ* (written in 367H / 978)
= *La configuration de la Terre [Kitab Surat al-Ard],* 2 vols. trad. et introduction par Kramers, J.H., Wiet, G., Paris, 2001.

al-Māfarrūkhī (d. ca. 474H / 1082), *Risālata maḥāsini iṣfahān*
=Ṭihrānī, J. (ed.), Tehran, 1933.

al-Muqaddasī (333–ca. 390H / 945–ca. 1000), *Aḥsan al-taqāsīm fī ma'rifat al-aqālīm*
= *Descriptio imperii moslemici, auctore … al-Moqaddasi*, de Goeje, M.J. (ed.), Bibliotheca Geographorum Arabicorum, III, Leiden, 1906, 2nd ed.

Nāṣir-i Khusraw (394–d. between 464 and 480H / 1004–between 1072 and 1088) *Sefer Nameh*
= Schefer, Ch., *Relation du voyage de Nassiri Khosrau. Célèbre poète et philosophe Persan, ca. 1003-1088 A.D.*, Paris, 1881 [reprint Amsterdam, 1970].

Pliny the Elder (23–79 C.E.), *Historia Naturalis*
= *Pliny Natural History*, Rackham, H. (transl.), vol. 9 (libri XXXIII-XXXV), Cambridge (Massachusetts)-London, 1961.

Qur'ān (=Tanzil.net – Quran Navigator on-line).

Strabo (before 60 B.C.–ca. 24 C.E.), *Geographica*
= *The Geography of Strabo*, vol. VII, Greek texts with facing English transl. by Jones, H.L., Harvard, 1932.
http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Strabo/15B*.html (retrieved: March 2, 2016).

al-Ṭabarī (224-310H / 839-923), *Tarīkh al-rusul wa al-mulūk* = *The History of al-Tabarī [Tarīkh al-rusul wa al-mulūk]- 31: The War between Brothers: the Caliphate of Muhammad al-Amīn A.D. 809-813/ A.H. 193-198/ Abū Ja'far al-Tabarī*, translated and annotated by M. Fishbein, Albany, 1992.

al-Tīfāshī (580–651H / 1184–1253), *Kitāb azhār al-afkār fī jawāhir al-aḥjār* = *Il libro delle pietre preziose*, Zilio-Grandi, I. (ed.), Venezia, 1999.

al-'Utbī (ca. 349–427H / 961–1036), *Kitāb-i-yamīnī* = *Kitab-i-Yamini, Historical Memoirs of the Amír Sabaktagín and the Sultán Mahmúd of Ghazna, Early Conquerors of Hindustan, and Founders of the Ghaznavide Dynasty*, Reynolds, R.J. (transl.). http://persian.packhum.org/persian/main?url=pf%3Ffile%3D21701010%26ct%3D0 (retrieved: March 2, 2016).

Ya'qūbī (d. 284H / 897-8), *Kitāb al-buldān* = *Aḥmad ibn Abī Ya'qūb al-Ya'qūbī, Kitāb al-Buldān*, de Goeje, M.J. (ed.), Bibliotheca Geographorum Arabicorum, VII, Leiden, 1892.

2. References

Adle, Ch.
2011 "La Mosquée Hāji-Piyādah/Noh-Gonbadān à Balkh (Afghanistan). Un chef d'oeuvre de Fazl le Barmacide construit en 178–179 / 794–795?", in *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres*, 2011,1 (janvier-mars): 565-625.

Afsaruddin, A.
2002 Entry "Garden", in *Enciclopaedia of the Qur'ān*, Leiden, vol. 2: 282-7.

Album, St., Bates, M.L., Floor, W.
1992 Entry "Coins and Coinage", in *Encyclopaedia Iranica*, London, vol. 6: 14-41. http://www.iranicaonline.org/articles/coins-and-coinage- (retrieved: March 2, 2016).

Allan. J.W.
1979 *Persian Metal Technology 700-1300 AD* (Oxford Oriental monographs, 2), Oxford.

Ambraseys, N.N.
1979 "A Test Case of Historical Seismicity: Isfahan and Chahar Mahal, Iran", in *Geographical Journal*, 145: 56-71.

Antica Persia
2001 *Antica Persia. I tesori del Museo Nazionale di Tehran e la ricerca italiana in Iran*, catalogue exhibition, Roma, Museo Nazionale d'Arte Orientale, 29 May-22 July 2001.

Arioli, A.
1979 "Notizie sulla Moschea Ǧāmi' di Iṣfahān in una fonte prosopografica del X secolo", in *Annali della Facoltà di Lingue e Letterature Straniere di Ca' Foscari*, 18 (Serie Orientale, 10): 61-9.

Arnold, Th.W.
1965 *Painting in Islam. A Study of the Place of Pictorial Art in Muslim Culture. With a New Introduction by B.W. Robinson…* (reprint of the edition of 1928), New York.

Aurigemma, M.G.
2004 *Il cielo stellato di Ruggero II. Il soffitto dipinto della cattedrale di Cefalù*, Milano.

Azarnoush, M.
1994 *The Sasanian Manor House at Hājīābād, Iran*, Monografie di Mesopotamia, Firenze, vol. 3.

Babaie, S., Haug, R.
2007 Entry "Isfahan. Monuments", in *Encyclopaedia Iranica*, London, vol. 14: 20-33.
http://www.iranicaonline.org/articles/isfahan-x3-mosques (retrieved: March 2, 2016).

Baer, E.
1974 "A Group of North Iranian Craftsmen among the Artisans of Khirbet el-Mefjer?", in *Israel Exploration Journal*, 24: 237-40.

Bahramī, S.
1995 "Kashf tārīkh jadīd naqqāshī gāvchāh masjid-i jum'a Isfahān", in *Āthar* 22-3: 185-95.

Baltrušaitis, J.
1993 *Il Medioevo fantastico. Antichità ed esotismi nell'arte gotica* (original title *Le Moyen-Âge fantastique. Antiquités et exotismes dans l'art gothique*, 1955), Milano.

GO TO CONTENTS

Barthoux, J.
1933 *Les Fouilles de Haḍḍa*, *I. Stupas et sites*, Mémoires de la Délégation Archéologique Française en Afghanistan, Paris, vol. 4.

Bates M.L.
Isfahan Mint Record, https://numismatics.academia.edu/MichaelBates (retrieved: March 2, 2016).

Beheshti, O.
2003 *Travel Guide to Esfahan Kashan and More*, Tehran.

Blair, Sh.S.
1992 *The Monumental Inscriptions from Early Islamic Iran and Transoxiana*, supplement to *Muqarnas*, 5, Leiden.

Blair, Sh., Bloom, J.
2001 "La moschea del venerdì di Isfahan", in Hattstein, M., Delius, P. (eds.), *Islam. Arte e Architettura*, San Mauro: 368f.

Bombaci, A.
1964 "La 'sposa del cielo'", in *A Francesco Gabrieli. Studi orientalistici offerti nel sessantesimo compleanno dai suoi colleghi e discepoli*, in *Studi Orientali*, 5, Roma: 21-34.

1966 *The Kūfic Inscription in Persian Verses in the Court of the Royal Palace of Mas'ūd III at Ghazni*, IsMEO Reports and Memoirs, vol. 5, Roma.

Brown, S.C.
1991 "Lapis Lazuli and its Sources in Ancient Western Asia", in *The Canadian Society for Mesopotamian Studies*, 22: 5-13.

Browne, E.G.
1901 "Account of a Rare Manuscript History of Isfahān, presented to the Royal Asiatic Society on May 19, 1827, by Sir John Malcolm and now described by Edward G. Browne", in *Journal of the Royal Asiatic Society*: 411-46, 661-704.

Burgio, L., Clark, R.J.H., Rosser-Owen, M.
2007 "Raman Analysis of Ninth-century Iraqi Stuccoes from Samarra", in *Journal of Archaeological Science*, 34: 756-62.

Bussagli, M.
1963 *La peinture de l'Asie Centrale. Le trésors de l'Asie*, Geneve.

Byron, R.
1992 *The Road to Oxiana* (reprint, first published 1937), London.

Calligraphy…
1967 "Calligraphy. An Outline History", in Pope, A.U. (ed.), *A Survey of Persian Art*, 2nd ed., Tokyo, vol. 4: 1707-42.

Cereti, C.G.
2004 "Some Notes on the Sasanid Coinage of Esfahàn and a Few Mint Signatures", Atti del Convegno Internazionale *La Persia e Bisanzio*, Roma: 309-26.

Colombini, M.P., Modugno, F. (eds.)
2009 *Organic Mass Spectrometry in Art and Archaeology*, Chichester.

Compareti, M.
2003 "The Role of the Sogdian Colonies in the Diffusion of the Pearl Roundels Pattern", in Compareti, M., Raffetta, P., Scarcia, G. (eds.*), Ēran ud Anērān. Studies Presented to Boris Ilich Marshak on the Occasion of His 70th Birthday*, Transoxiana Webfestschrift Series I. Webfestschrift Marshak 2003, http://www.transoxiana.org/Eran/ (retrieved: March 2, 2016).

Conrad, L.I.
1982 "Ṭā'ūn and Wabā' Conceptions of Plague and Pestilence in Early Islam", in *Journal of the Economic and Social History of the Orient*, 25: 268-307.

Cordaro, M., Nimmo, M., Rissotto, L.
1978 "Stucchi", in Anselmi, E. et al. (eds.) *Tecniche di esecuzione e materiali costitutivi.* Corso sulla Manutenzione di Dipinti Murali-Mosaici-Stucchi, DIMOS, I, 1, Roma: 63-85.

Creswell, K.A.C.
1989 *A Short Account of Early Muslim Architecture* (revised and supplemented by Allan, J.W.), Aldershot.

Curatola, G.
1995 "Notizia sui frammenti di "bianchi e blu" cinesi reperiti nella Masğid-i Ğum'a di Iṣfahān", in Bernardini, M. et al. (eds.) *L'arco di fango che rubò la luce alle stelle. Studi in onore di Eugenio Galdieri per il suo settantesimo compleanno*, Roma: 89-98.

D'Amore, P.
2001 "Il Periodo del Ferro", in *Antica Persia*, cit.: 39-75.

D'Amore, P., Lombardo, G.
Metalli del Luristan, Publication of the Museo Nazionale d'Arte Orientale, Roma (forthcoming).

Daniels, V., Leach, B.
2004 "The Occurrence and Alteration of Realgar on Ancient Egyptian Papyri", in *Studies in Conservation*, 49: 73-84.

Darmstaedter, E.
1928 "Liber Claritatis Totius Alkimiae Artis. Dem Arabischen Alchemisten "Geber" zugeschrieben. Bologna Cod. Lat. 164 (153)", in *Archeion*, 9: 63-80.

De Waele, A.
2004 "The Figurative Wall Painting of the Sasanian Period from Iran, Iraq and Syria", in *Iranica Antiqua*, 39: 339-81.

Dimand, M.S.
1937 "Studies in Islamic Ornament. I. Some Aspects of Omaiyad and Early 'Abbāsid Ornament", in *Ars Islamica*, 4: 293-337.

Dols, M.W.
1974 "Plague in Early Islamic History", in *Journal of the American Oriental Society*, 94: 371-83.

Ehrenkreutz, A.S.
1959 "Studies in the Monetary History on the Near East in the Middle Ages. The Standards of Fineness of Some Types of Dinars", in *Journal of the Economic and Social History of the Orient*, 2 (2): 128-61.

1963 "Studies in the Monetary History on the Near East in the Middle Ages II. The Standart of Fineness of Western and Eastern Dīnārs before the Crusades ", in *Journal of the Economic and Social History of the Orient*, 6 (3): 243-77.

Esin, E.
1973/74 "The Turk al-'Aǧam of Sāmarrā and the paintings attributable to them in the Ǧawsaq al-Ḫāqānī", in *Kunst des Orients*, 9 (1-2): 47-88.

Faccenna, D.
1981 "A New Fragment of Wall-Painting from Ghāga Šāhr (Kūh-i Ḫvāǧa-Sīstān, Iran)", in *East and West*, 31: 83-97.

Faccenna, D., Filigenzi, A.
2007 *Repertorio terminologico per la schedatura delle sculture dell'arte gandharica. Sulla base dei materiali scavati della Missione Archeologica Italiana dell'IsIAO nello Swat, Pakistan*, IsIAO, Reports and Memoirs, n.s. 5, Roma.

Finster, B.
1994 "Frühe iranische Moscheen. Vom Beginn des Islam bis zur Zeit salğūqischer Herrschaft", in *Archäologische Mitteilungen aus Iran*, Supplement, 19, Berlin.

Flury, S.
1930 "La mosquée de Nāyin", in *Syria*, 9: 43-58.

Fontana, M.V.
1998 Entry "pittura-Islam", in *Encyclopedia dell'Arte Medievale,* vol. 9, Roma: 545-54.

2002 *La pittura islamica dalle origini alla fine del Trecento*, Roma.

2005 Entry "Isfahan", in *Enciclopedia Archeologica*, *Asia*, Roma: 966-8.

Gabriel, A.
1935 "Le Masdjid-i Djum'a d'Iṣfahān", in *Ars Islamica*, 2: 7-44 (reprint 1968).

Galdieri, E.
1972 *Iṣfahān: Masğid-i Ğum'a.*1. *Photographs and Preliminary Report*, Roma.

1973 *Iṣfahān: Masğid-i Ğum'a.* 2. *The Al-i Būyid Period*, Roma.

1977 "A Newly Discovered Wall-painting from the Gav-chah in the Jami Mosque at Isfahan", in *Art and Archaeology Research Papers*, 11: 56-60.

1984 *Eṣfahān: Masğid-i Ğum'a.* 3. *Research and Restoration Activities, 1973-1978, New Observations*, *1979-1982*, Roma.

1996 Entry *"*Isfahan*"*, in *Enciclopedia dell'Arte Medievale*, Roma, vol. 7: 428-32.

García Bueno, A., Medina Flórez, V.J.
2002 "La campaña de restauración de las pinturas de 1996", in Almagro, A. et al. *Qusayr 'Amra. Residencia y baños omeyas en el desierto de Jordania*, Madrid: 138-44.

Genito, B.
2011 “The Italian Activity in the Masjed-e Jom‘e, Isfahan, in the 70s of Last Century”, in Genito, B., Saiedi Anaraki, F. (eds.), cit.: 61-81.

Genito, B., Saiedi Anaraki, F. (eds.)
2011 *ADAMJI Project. From the Excavation (1972-1978) to the Archive (2003-2010) in the Masjed-e Jom‘e, Isfahan*, Tehran.

Ghirshman, R.
1982 *Arte Persiana. Proto-iranici, Medi e Achemenidi* (original title *Perse-Proto-iraniens, Mèdes, Achéménides*, Paris, 1963), Milano.

Giunta, R.
2003 *Les inscriptions funeraires de Ġaznī (IVe–IXe / Xe-XVe siecles)*, Università degli studi di Napoli “L’Orientale”, Dipartimento di studi asiatici, series maior, VIII, Napoli.

2011 “The Saljuq Inscriptions of the Great Mosque, Isfahan”, in Genito, B., Saiedi Anaraki, F. (eds.), cit.: 89-116.

Göbl, R.
1968 *Sasanidische Numismatik, Handbücher der Mittelasiatischen Numismatik*, vol. 1, Braunschweig (translated by Severin, P. as *Sasanian Numismatics*, Braunschweig, 1971).

1983 “Sasanian Coins”, in *The Cambridge History of Iran*, Cambridge, vol. 3, part 1 (*The Seleucid, Parthian and Sasanian Periods*): 322-39.

Godard, A.
1936a “Historique du Masdjid-é Djum‘a d’Iṣfahān”, in *Athār-é Īrān*, 1 (2): 213-82.

1936b “Ardistān et Zawārè”, ibid.: 283-309.

1937 “Additions. Masdjid-é Djum‘a d’Iṣfahān”, in *Athār-é Īrān*, 3 (2): 315-27.

Golombek, L.
1974 “Urban Patterns in Pre-Safavid Iṣfahān”, in *Studies on Iṣfahān: Proceedings of the Iṣfahān Colloquium*, part I, *Iranian Studies*, 7: 18-44.

Gonnella, J.
2013 “Three Stucco Panels from Samarra”, in Blair, Sh., Bloom, J. (eds.) *God is Beautiful and Loves Beauty. The Object in Islamic Art and Culture*, New Haven-London: 79-101.

Good, I.
2010 "When East Met West. Interpretive Problems in Assessing Eurasian Contact and Exchange in Antiquity", in *Archäologische Mitteilungen aus Iran und Turan*, 42 (2): 23-45.

Grabar, O.
1959 "The Paintings", in Hamilton, R.W., cit.: 294-326.

1990 *The Great Mosque of Isfahan*, London.

Gray, B.
1979 "The Tradition of Wall Painting in Iran", in Ettinghausen, R., Yarshater, E. (eds.), *Highlights of Persian Art*, Boulder: 312-29.

Grohmann, A.
1914 *Göttersymbole und Symboltiere auf südarabischen Denkmälern*, Denkschriften der Kaiserlichen Akademie der Wissenschaften in Wien, phil.-hist. Kl., 58 (1). Abh. Wien.

1957 "The Origin and Early Development of Floriated Kūfic", in *Ars Orientalis*, 2: 183-213.

1971 *Arabische Paläographie*, II Teil, *Das Schriftwesen. Die Lapidarschrift*, Österreichische Akademie der Wissenschaften. Phil.-Hist. Kl. Denkschriften, 94 (2). Abh., Wien.

Grube, E.J.
1978 "A Newly Discovered Wall-Painting from the Gav-Chah in the Jami Mosque at Isfahan (part II)", in *Art and Archaeology Research Papers*, 12: 26-30.

Guida…
2001 *Guida al recupero ricomposizione e restauro di dipinti murali in frammenti. L'esperienza della Basilica di San Francesco in Assisi. Guide to the recovery, recomposition and restoration of shattered wall paintings. Experience gained at the Basilica in Assisi*, Roma.

Hamilton, R.W.
1959 *Khirbat al Mafjar. An Arab Mansion in the Jordan Valley*, Oxford.

Harrison, J.V.
1968 "Minerals", in Fisher, W.B. (ed.), in *The Cambridge History of Iran*, Cambridge, vol. 1 (*The Land of Iran*): 487-516.

Herrmann, G.
1968 "Lapis Lazuli: The Early Phases of Its Trade", in *Iraq*, 30 (1): 21-57.

GO TO CONTENTS

Herzfeld, E.
1923 “Der Wandschmuck der Bauten von Samarra und seine Ornamentik”, in *Die Ausgrabungen von Samarra*, vol. 1, Berlin.

1927 “Die Malereien von Samarra”, in *Die Ausgrabungen von Samarra*, vol.3, Berlin.

el-Hibri, T.
1993 “Coinage Reform under the ‘Abbāsid Caliph al-Ma’mūn”, in *Journal of the Economic and Social History of the Orient*, 36 (1): 58-83.

Hill, D.R.
2000 “Physics and Mechanics. Civil and Hydraulic Engineering. Industrial Processes and Manufacturing, and Craft Activities”, in Bosworth, C.E., Asimov, M.S. (eds.) *History of Civilizations of Central Asia*, vol. 4 (*The Age of Achievements: A.D. 750 to the End of the Fifteenth Century*), part II (*The Achievements*), Unesco: 249-74.

Hoffmann, E.R.
2008 “Between East and West: the Wall Paintings of Samarra and the Construction of the Abbasid Princely Culture”, in *Muqarnas*, 25: 107-32.

Holakooei, P., Karimy, A.-H.
2015 “Early Islamic Pigments Used at the Masjid-i Jame of Fahraj, Iran: A Possible Use of Black Plattnerite”, in *Journal of Archaeological Science*, 54: 217-27.

Jabalameli, A.
2011 “Masjed-e Jom‘e, Isfahan”, in Genito, B., Saiedi Anaraki, F. (eds.), cit.: 33-48.

Jung, M.
2009 “Dalla cava alla zecca. L’estrazione e la lavorazione dei metalli preziosi per la coniazione islamica nel Medioevo”, in Di Flumeri Vatielli, G., Giunta, R., Jung, M., *Le Monete Islamiche. Parte seconda e terza*, Museo Nazionale d’Arte Orientale ‘Giuseppe Tucci’, Documenti, La collezione numismatica, 2, Città di Castello.

2010 “Pre-selǧūq Wall-paintings of the Masǧid-i Jom‘e at Iṣfahān Excavated by the Italian Archaeological Mission, ADAMJI Project”, in Matthiae, P. et al. (eds.), in *6ICAANE*, *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East*, Roma 5-10 May 2009, Wiesbaden, vol. 3: 111-27.

GO TO CONTENTS

Jung, M., Moioli, P., Pierdominici, F., Seccaroni, Cl.
2011 "The Wall Paintings of the Masjed-e Jom'e, Isfahan: Work in Progress", in Genito, B., Saiedi Anaraki, F. (eds.), cit.: 151-65.

2012 "Techniques and Pigments Used for the Wall Paintings of the Masğid-i Jom'e at Isfahan. A First Preliminary Review", in Matthews, R., Curtis, J. (eds.), *7ICAANE*, *Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East*, London 12-16 April 2010, Wiesbaden, vol. 2: 405-23.

Karev, Y.
2005 "Qarakhanid Wall Paintings in the Citadel of Samarqand: First Report and Preliminary Observations", in *Muqarnas*, 22: 45-84.

Karimy, A.-H., Holakooei, P.
2012 "Decorations of Pīr-i Hamza Sabzpūš's Tomb in Iran", in *British Museum. Conservation Research Section, Nigel Meeks, and British Museum. Conservation Research Section. Historical Technology, Materials and Conservation: SEM and Microanalysis*, London: 156-8.

Kennedy, E.
2011 Entry "Capital". in Ekhtiar, M.D, et al. (eds.) *Masterpieces from the Department of Islamic Art in The Metropolitan Museum of Art*, New York: 42.

Kossolapov, A., Kalinina, K.
2007 "The Scientific Study of Binding Media and Pigments of Mural Paintings from Central Asia", in Kazuya Yamauchi, Yoko Taniguchi, Tomoko Uno (eds.), *Mural Paintings of the Silk Road. Cultural Exchanges between East and West*, Proceedings of the 29th Annual International Symposium on the Conservation and Restoration of Cultural Property, National Research Institute for Cultural Properties (Tokyo, January 2006), London: 89-92.

Kremer, Alfred von
1877 *Culturgeschichte des Orients unter den Chalifen*, Wien, vol. 2.

Kriss, R., Kriss-Heinrich, H.
1962 *Volksglaube im Bereich des Islam*, *II. Amulette, Zauberformeln und Beschwörungen*, Wiesbaden.

Kröger, J.
1982 "Sasanidische Stuckdekoration. Ein Beitrag zum Reliefdekor aus Stuck in sasanidischer Zeit und frühislamischer Zeit nach den Aus-

GO TO CONTENTS

grabungen von 1928/9 und 1931/32 in der sasanidischen Metropole Ktesiphon (Iraq) und unter besonderer Berücksichtigung der Stuckfunde von Taḫt-i Sulaimān (Iran), aus Nizāmābād (Iran) sowie zahlreichen anderen Fundorten", *Baghdader Forschungen*, 5, Mainz.

1999 "Vom Flügelpaar zur Flügelpalmette. Sasanidische Motive in der Islamischen Kunst", in Finster, B., Fragner, Ch., Hafenrichter, H. (eds.) *Rezeption in der Islamischen Kunst*, Bamberger Symposium vom 26.6.-28.6.1992, in *Beiruter Texte und Studien*, 61: 193-204.

Lambton, A.K.S.
1973 Entry "Iṣfahān, I. History", in *Encyclopaedia of Islam*, 2nd ed., Leiden, vol. 4: 97-105.

Lapierre, N.
1990 "La peinture monumentale de l'Asie centrale soviétique: observations techniques", in *Arts asiatiques*, 45 (1): 28-40.

Leisten, Th.
2003 "Excavation of Samarra, I. Architecture. Final Report of the First Campaign 1910-1912", *Baghdader Forschungen*, 20, Mainz.

Levey, M.
1962 "Mediaeval Arabic Bookmaking and its relation to early chemistry and pharmacology", in *Transactions of the American Phliosophical Society*, 52 (4): 3-79.

Lewcock, R.
1983 "The Buildings of the Sūq/Market", in Serjeant, R.B., Lewcock, R., *Ṣan'ā'. An Arabian Islamic City*, London: 276-302.

Luschey, H.
1990 Entry "Bisotun. Archeology", in *Encyclopaedia Iranica*, London, vol. 4: 291-9.
http://www.iranicaonline.org/articles/bisotun-ii (retrieved: March 2, 2016).

Matheson, S.A.
2001 *Persia. An Archaeological Guide*, Tehran (3rd revised reprint).

Meinecke, M.
1999 "'Abbāsidische Stuckdekorationen aus ar-Raqqa", in Finster, B., Fragner, Ch., Hafenrichter, H. (eds.), cit.: 247-67.

Miles, G.C.
1938 *The Numismatic History of Rayy*, in *Numismatic Studies*, 2, New York.

1965 Entry "Dīnār", in *Encyclopaedia of Islam*, 2nd ed., Leiden, vol. 2: 297-9.

1975 "Numismatics", in Frey, R.N. (ed.), in *The Cambridge History of Iran*, Cambridge, vol. 4 (*The Period from the Arab Invasion to the Saljuqs*): 364-77.

Minovi, M.
1937 "Note on Mafarrukhi's the Beauties of Isfahan", in *Bulletin of the American Institute for Iranian Art and Archaeology*, 5 (1): 27-8.

Momenzadeh, M.
2004 "Metallische Bodenschätze in Iran in antiker Zeit. Ein kurzer Überblick", in Stöllner, Th., Slotta, R., Vatandoust, A. (eds.), *Persiens Antike Pracht. Bergbau- Handwerk- Archäologie.* Katalog der Ausstellung des Deutschen Bergbau-Museums Bochum vom 28. November 2004 bis 29. Mai 2005, vol. 1, Bochum: 8-21.

Mora, P.
1968 "La Restauration des Peintures Murales de Čihil Sutūn", in Zander, G. (ed.), *Travaux de Restauration de Monuments Historiques en Iran*, IsMEO Reports and Memoirs, VI, Roma: 323-82.

Morabia, A.
1986 Entry "Lawn", in *Encyclopaedia of Islam*, Leiden, 2nd ed., vol. 5: 698-707.

Morgenstern, L.
1967 "Mural Painting", in Pope, A.U. (ed.), *A Survey of Persian Art*, 2nd ed., Tokyo, vol. 3: 1365-90.

Mousavi, A.
2009 "Ziegel, Kacheln und Kuppeln. Archäologische Stätten und Monumente im islamischen Iran (7.-20.Jh.n.Chr.)," in Stronach, D., Mousavi, A. (eds.) *Irans Erbe in Flugbildern von Georg Gerster*, Mainz: 110-55.

Namdari, M., Rugiadi, M.
2011 "The Emergence of Siliceous-paste in Iran. Some Evidence of a Dated Assemblage from the Domed Hall of Nizam al-Mulk, Masjed-e Jom'e, Isfahan", in Genito, B., Saiedi Anaraki, F. (eds.), cit.: 183-98.

Nègre, A.
1978 “Le monnayage d’or des sept derniers califes abbasides”, in *Studia Islamica*, 47: 165-75.

Nibbi, A.
1981 *Ancient Egypt and Some Eastern Neightbours*, Park Ridge.

Niewöhner-Eberhard, E.
1985 *Ṣa‘da. Bauten und Bewohner in einer traditionellen islamischen Stadt*, Beihefte zum Tübinger Atlas des Vorderen Orients, Reihe B, 64, Wiesbaden.

Öney, G.
1979 “The Interpretation of the Frescoes in the I. Kharragan Mausoleum near Qazwin”, in Proceedings of the 7th International Congress for Iranian Art and Archaeology, München 7-10 September 1976, *Archaeologische Mitteilungen aus Iran,* Supplement, 6, Berlin: 400-8.

Pakhomov, E.A.
1959-63 *Monety Azerbaĭdzhana*, 2 vols., Baku.

Parsa, A.
1943-60 *Flore de l’Iran*, 8 vols., Tehran.

Pignatti, S.
1982 *Flora d’Italia*, 3 vols., Bologna.

Pleiner, R.
1967 “Preliminary Evalutation of the 1966 Metallurgical Investigations in Iran”, in Caldwell, J.R., *Investigations at Tal-i-Iblis*, Illinois State Museum Preliminary Reports, 9, Springfield, Illinois: 340-402.

Pollak, J., Wenzel, F.
1907 “Die chemische Analyse der Farben”, in A. Musil, *Ḳuṣejr ‘Amra*, Kaiserliche Akademie der Wissenschaften, Wien, vol. 1 (texts): 200-2.

Pope, A.U.
1967 “Architectural Ornament”, in Id. (ed.), *A Survey of Persian Art*, 2nd ed., Tokyo, vol. 3: 1258-364.

Pope, A.U., Ackerman, Ph.
1967 “A Survey of Persian Ornament”, ibid., vol. 6: 2678-765.

Porter, Y.
1992 “Peinture et arts du livre”, in *Bibliotheque Iranienne*, 35, Paris-Tehran.

1993 “Shangarf et lâzhvard dans le monde iranien”, in *Res orientales*, 5 (*Circulation des monnaies, des marchandises et des biens*), Bures sur Yvette: 147-56.

2000 “From the “Theory of the Two Qalams” to the “Seven Principles of Painting”: Theory, Terminology and Practice in Persian Classical Painting”, in *Muqarnas*, 17: 109-18.

Rashad, M.
2002 *Iran. Geschichte, Kultur und Traditionen - antike Stätten und islamische Kunst in Persien,* Köln, 3rd ed.

Rippin, A.
2001 Entry “Colors”, in *Encyclopaedia of the Qur’ān*, Leiden, vol. 1: 631-5.

Rugiadi, M.
2010 “Processing Iranian Glazed Pottery of the Masjid-i Jum‘a in Isfahan (ADAMJI Project): Fritwares from the Foundations of Niẓām al-Mulk's Domed Hall”, in P. Matthiae et al. (eds.), in *6ICAANE*, *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East*, Roma *5-10 May 2009*, Wiesbaden, vol. 3: 173-90, Wiesbaden.

2012 *Decorazione architettonica in marmo da Ġaznī (Afghanistan)*, PhD thesis, Bologna.

Russo, S.
2009 *Architettura sostenibile. L’altopiano iranico. Fonte di civiltà e ispirazione*, Roma.

Sauvaget, J.
1938 “Observations sur quelques mosquées seldjoukides”, in *Annales de l’institut d’études orientales*, 4: 81-120.

1947 *La mosquée omeyyade de Médine*, Paris.

Scerrato, U.
1972 *Islam. Le Grandi Civiltà*, Milano.

1973-78 “Archaeological Mission in Iran. Isfahan, Masğid-i Ğum‘a”, in *East and West*, 23, 1973: 416-8; 24, 1974: 475-7; 25, 1975: 538-40; 26, 1976: 593-5; 27, 1977: 451-5; 28, 1978: 329.

GO TO CONTENTS

1974 “Nuove acquisizioni dei musei e gallerie dello stato. Roma. Museo Nazionale d’Arte Orientale. Arte iranica pre-islamica. Arte islamica”, in *Bollettino d’Arte*, 59 (3-5): 196-99.

1991 Entry “Albero Wāq-wāq”, in *Enciclopedia dell’Arte Medioevale*, Roma, vol. 1: 313-6.

1994 “Stoffe Sasanidi”, in Lucidi, M.T. (ed.), *La seta e la sua via*, catalogue exhibition, Roma: 78-82.

2001 “Ricerche archeologiche nella moschea del Venerdi di Isfahan della Missione Archeologica Italiana in Iran dell’IsMEO (1972-1978)”, in *Antica Persia*, cit.: XXXVI-XLIII.

Schlumberger, D.
1946 “Deux fresques omeyyades”, in *Syria*, 25: 86-102.

Schlumberger, D., Le Berre, M.
1986 *Qasr el-Heir el-Garbi*, Bibliothèque Archéologique et Historique, 120, Institut Français d’Archéologie du Proche-Orient, Paris.

Schmitt, R.
1990 Entry “Bisotun. Darius’s inscriptions”, in *Encyclopaedia Iranica*, London, vol. 4: 299-305.
http://www.iranicaonline.org/articles/bisotun-iii (retrieved: March 2, 2016).

Schroeder, E.
1967 “Standing Monuments of the First Period”, in Pope, A.U. (ed.), *A Survey of Persian Art*, 2nd ed., Tokyo, vol. 3: 930-66.

Seidl, U.
1985 “Babylonische und assyrische Flachbildkunst des 2. Jahrtausends v. Chr.”, in Orthmann, W., *Der Alte Orient*. Propyläen Kunstgeschichte, Berlin, vol. 18 (reprint): 298-309.

Seyrig, H.
1940 “Antiquités Syriennes, 32. Ornamenta Palmyrena antiquiora”, in *Syria*, 21: 277-337.

Silvi Antonini, C.
2003 *Da Alessandro Magno all’Islam. La pittura dell’Asia Centrale*, Roma.

Stern, S.M.
1967 “The Coins of Āmul”, in *Numismatic Chronicle*, 7: 205-78.

Stöllner, Th.

2004 “Prähistorischer und antiker Erzbergbau in Iran”, in Stöllner, Th., Slotta, R., Vatandoust, A. (eds.), cit.: 44-63.

Stronach, D., Cuyler-Young, T.
1966 “Three Octagonal Seljuq Tomb Towers from Iran”, in *Iran*, 4: 1-20.

Taddei, M., Verardi, G.
1978 “Tapa Sardār: Second Preliminary Report”, in *East and West*, 28: 33-135.

Tutin, T.G., Heywood, V.H., Burges, N.A., Valentine, D.H., Walters, S.M., Webb, D.A. (eds.)
1988 *Flora Europaea*, Cambridge, vol. 2.

Wang Xudong, Fu Peng
2007 “Summary *of the* Painting Materials of the Mogao Grottoes”, in Kazuya Yamauchi, Yoko Taniguchi, Tomoko Uno (eds.), cit.: 112-7.

Weisgerber, G.
1990 “Montanarchäologische Forschungen in Nordwest- Iran 1978”, in *Archäologische Mitteilungen aus Iran*, XXIII: 73-84.

Wertime, T.A.
1967 “A Metallurgical Expedition Through the Persian Desert”, in Caldwell, J.R. cit.: 327-39.

Whitehouse, D.
1968 “Excavations at Sīrāf. First Interim Report”, in *Iran*, 6: 1-22.

1969 “Excavations at Sīrāf. Second Interim Report”, in *Iran*, 7: 39-62.

1970 “Excavations at Sīrāf. Third Interim Report”, in *Iran*, 8: 1-18.

Wiet, G.
1940 “Inscriptions coufiques de Perse”, in *Mélanges Maspero*, III, *Orient Islamique*, Le Caire: 127-36.

Wilkinson, Ch.K.
1986 *Nishapur. Some Early Islamic Buildings and their Decoration*, The Metropolitan Museum of Art, New York.

Wulff, H.E.
1966 *The Traditional Crafts of Persia. Their Development, Technology, and Influence on Eastern and Western Civilization*, Massachusetts.

Zipoli, R., Alfieri, B.M.
1977 “La Moschea Ğami‘ di Fahrağ”, in *Studi Iranici*: 41-76.

3. Not published sources

Boenni, R.
s.d. *Note sul restauro degli intonaci* [*Notes on the restoration of the plasterwork*] (leaflet).

Excavation …
2002 *Excavation in the Masǧid-i Ǧum'a, The Work of the Italian Archaeological Mission of the IsIAO at Iṣfahān, in Collaboration with the Organization for the Conservation of the Cultural Heritage of the Islamic Republic of Iran*, *November-December 2002* (leaflet).

Fontana, M.V.
1973/1975-1977 *Diario dello scavo del settore 190* [*Site Notebook of Sector 190*].

Jervis, A.V.
2003 *Relazione tecnica del 2. ottobre 2003*, Istituto Nazionale della Grafica, prot. n° 1126/II. [= tecnical report on some of the fragments].

Khatabakhsh, F.
2004 *Plaster-moulding or Mud-muolding*, CD [report on the restoration in 2004].

Mocchegiani, C.
1970 *Giornale di scavo* [*Site Notebook*].

La moschea della congregazione a Iṣfahān, *rapporto preliminare sulla prima campagna di studi (6 giugno-16 novembre 1970),* 1. Centro Restauri dell'IsMEO.

Report of 4th mission - Digital Archive of Antiquities – Great Mosque of Iṣfahān Joint Iranian – Italian Mission – Winter 1382 (= 2004*) – Iṣfahān* [in Fārsī].

NARDINI EDITORE IN CONSERVATION

www.nardinieditore.it
info@nardinieditore.it

PERIODICI

KERMES. LA RIVISTA DEL RESTAURO *trimestrale*

BOLLETTINO DELL'ISTITUTO CENTRALE PER IL RESTAURO (ISCR) *semestrale*

ARKOS. SCIENZA E RESTAURO DELL'ARCHITETTURA *trimestrale (2003-2006) disponibile presso l'editore*

KERMESQUADERNI

Tecniche e sistemi laser per il restauro dei beni culturali, *a cura di Roberto Pini, Renzo Salimbeni*

I restauri di Assisi. La realtà dell'utopia (con CD-rom), *a cura di Giuseppe Basile*

Conservazione preventiva delle raccolte museali, *a cura di Cristina Menegazzi, Iolanda Silvestri*

The Painting Technique of Pietro Vannucci, called il Perugino, *a cura di Brunetto G. Brunetti, Claudio Seccaroni, Antonio Sgamellotti*

Villa Rey. Un cantiere di restauro, contributi per la conoscenza, *a cura di Antonio Rava*

Le patine. Genesi, significato, conservazione, *a cura di Piero Tiano, Carla Pardini*

Patrimonio monumentale. Monitoraggio e conservazione programmata, *a cura di Paola Croveri, Oscar Chiantore*

Impatto ambientale. Indagine sulle porte bronzee del Battistero di Firenze, *a cura di Piero Tiano, Carla Pardini*

Pulitura laser di bronzi dorati e argenti, *a cura di Salvatore Siano*

Raphael's Painting Tecnique: Working Pratique before Rome, *edited by Ashok Roy, Marika Spring*

Il Laser. Pulitura su materiali di interesse artistico. Attività sperimentale, *a cura di Annamaria Giovagnoli*

Sebastiano del Piombo e la Cappella Borgherini nel contesto della pittura rinascimentale, *a cura di Santiago Arroyo Esteban, Bruno Marocchini, Claudio Seccaroni*

Basic Environmental Mechanisms Affecting Cultural Heritage. Understanding Deterioration Mechanisms for Conservation Purposes, *edited by Dario Camuffo, Vasco Fassina, John Havermans*

Giambattista Tiepolo. Il restauro della pala di Rovetta. Storia conservativa, diagnostica e studi sulla tecnica pittorica, *a cura di Amalia Pacia*

Indoor Environment and Preservation. Climate Control in Museums and Historic Buildings, *edited by Davide Del Curto (*testi in inglese ed italiano)

Adele Cecchini, Le Tombe dipinte di Tarquinia. Vicenda conservativa, restauri, tecnica di esecuzione

Roberta Roani, Per la storia della basilica di Santa Croce. La "Restaurazione generale del Tempio" – 1815-1824

Science and Conservation for Museum Collections, *edited by Bruno Fabbri* (e-book)

GO TO CONTENTS

Caravaggio's Painting Tecnique, *edited by Marco Ciatti, Brunetto G. Brunetti*

Santa Maria Nuova a Viterbo. Nuove chiavi di lettura della chiesa alla luce del restauro della copertaura, *a cura di Manuela Romagnoli e Marcoi Togni*

Dopo Giovanni Urbani. Quale cultura per la durabilità del patrimonio dei territori storici?, *a cura di Ruggero Boschi, Carlo Minelli, Pietro Segala* (e-book)

Esrarc 2014. 6th European Symposium on Religious Art, Restoration & Conservation, *edited by Oana Adriana Cuzman, Rachele Manganelli Del Fà, Piero Tiano*

Elena Pecchioni, Fabio Fratini, Emma Cantisani, Atlante delle malte antiche / Atlas of the ancient mortars

Conservazione programmata. La chiesa della Discipliana di S. Croce in Verolanuova, *a cura di Barbara Scala*

Le Storie di San Giovanni al Museo S. Agostino in Genova, *a cura di Adelmo Taddei* (e-book)

Esrarc 2015. 7th European Symposium on Religious Art, Restoration & Conservation, *edited by Oana Adriana Cuzman, Rachele Manganelli Del Fà*

Quaderni del Bollettino ICR

Restauri a Berlino. Le decorazioni rinascimentali lapidee nell'Ambasciata d'Italia, *a cura di Giuseppe Basile* (in italiano, tedesco e inglese)

Speciali e Dossier di Arkos

AA. VV., Genova. Il restauro dei palazzi dei Rolli

AA. VV., Genova Capitale Europea della Cultura 2004. Le opere di rinnovamento della città

AA. VV., Duomo di Trento, Giubileo 2000: I restauri

Architettura e Restauro / Architecture and Restoration – *direzione scientifica dal 2014: Valentina Russo*

AA.VV., Dalla Reversibilità alla Compatibilità

AA.VV., Il recupero del centro storico di Genova

AA.VV., Il Minimo Intervento nel Restauro

AA.VV., La fruizione sostenibile del bene culturale

AA. VV., Il quartiere del ghetto di Genova. Studi e proposte per il recupero dell'esistente

Landscape as architecture. Identity and conservation of Crapolla cultural site, *edited by Valentina Russo*

Quaderni di Architettura *diretta da Nicola Santopuoli e Alessandro Curuni*

Federica Maietti, Dalla grammatica del paesaggio alla grammatica del costruito. Territorio e tessuto storico dell'insediamento urbano di Stellata

Il rilievo per la conservazione. Dall'indagine alla valorizzazione dell'altare della Beata Vergine del Rosario nella chiesa di S. Domenico a Ravenna, *a cura di Nicola Santopuoli*

Arte e Restauro
diretta da Andrea Galeazzi

Umberto Baldini, Teoria del restauro e unità di metodologia - Voll. I-II

Ornella Casazza, Il restauro pittorico nell'unità di metodologia

Roberto Monticolo, Meccanismi dell'opera d'arte. Da un corso di disegno per il restauro

Mauro Matteini, Arcangelo Moles, La chimica nel restauro. I materiali dell'arte pittorica

Il restauro del legno, *a cura di Gennaro Tampone* - Voll. I-II

Cristina Giannini, Lessico del restauro. Storia, tecniche, strumenti

AA.VV., Le professioni del restauro. Formazione e competenze

AA.VV., Conservare l'arte contemporanea

AA.VV., Archeologia. Recupero e conservazione

AA.VV., Restauro di strumenti e materiali. Scienza, musica, etnografia

Giovanna C. Scicolone, Il restauro dei dipinti contemporanei. Dalle tecniche di intervento tradizionali alle metodologie innovative

Bruno Fabbri, Carmen Ravanelli Guidotti, Il restauro della ceramica

Americo Corallini, Valeria Bertuzzi, Il restauro delle vetrate

Luciano Colombo, I colori degli antichi

Benedetta Fazi, Nuove tecniche di foderatura. Le tele vaticane di Pietro da Cortona a Urbino

Vishwa Raj Mehra, Foderatura a freddo. I testi fondamentali per la metodologia e la pratica

Francesco Pertegato, Il restauro degli arazzi

Giulia Caneva, Maria Pia Nugari, Daniela Pinna, Ornella Salvadori, Il controllo del degrado biologico

Cristina Ordóñez, Leticia Ordóñez, Maria del Mar Rotaeche, Il mobile. Conservazione e restauro

AA.VV., Teatri storici. Dal restauro allo spettacolo

Heinz Althöfer, La radiologia per il restauro

Paolo Fancelli, Il restauro dei monumenti

Maria Ida Catalano, Brandi e il restauro. Percorsi del pensiero

AA. VV., Ripristino architettonico. Restauro o restaurazione?

AA. VV., Restauro dei dipinti su tavola. I supporti lignei

Claudio Seccaroni, Pietro Moioli, Fluorescenza X. Prontuario per l'analisi XRF portatile applicata a superfici policrome

Monumenti in bronzo all'aperto. Esperienze di conservazione a confronto (con CD-rom), *a cura di Paola Letardi, Ilva Trentin, Giuseppe Cutugno*

Tensionamento dei dipinti su tela. La ricerca del valore di tensionamento, *a cura di Giorgio Capriotti e Antonio Iaccarino Idelson.*

Cristina Giannini, Roberta Roani, Giancarlo Lanterna, Marcello Picollo, Dizionario del restauro e della diagnostica

Manufatti archeologici. Studio e conservazione (CD), *a cura di Salvatore Siano*

Cesare Brandi, Theory of Restoration, *edited by Giuseppe Basile* (anche in edizione russa)

GO TO CONTENTS

La biologia vegetale per i Beni Culturali, Vol. I: Biodeterioramento e Conservazione, *a cura di Giulia Caneva, Maria Pia Nugari, Ornella Salvadori*

La biologia vegetale per i Beni Culturali, Vol. II: Conoscenza e Valorizzazione, *a cura di Giulia Caneva*

Lo Stato dell'Arte 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, *a cura di IGIIC*

Codici per la conservazione del patrimonio storico. Cento anni di riflessioni, "grida" e carte, *a cura di Ruggero Boschi, Pietro Segala*

La protezione e la valorizzazione dei beni culturali, *a cura di Giancarlo Magnaghi*

La teoria del restauro nel Novecento da Riegl a Brandi, *a cura di Maria Andaloro*

L'eredità di John Ruskin nella cultura italiana del Novecento, *a cura di Daniela Lamberni*

AA. VV., La dignostica e la conservazione dei manufatti lignei (CD)

Meteo e Metalli. Conservazione e Restauro delle sculture all'aperto. Dal *Perseo* all'arte contemporanea, *a cura di Antonella Salvi*

Marco Ermentini, Restauro Timido. Architettura Affetto Gioco

Leonardo. L'Ultima Cena. Indagini, ricerche, restauro, *a cura di Giuseppe Basile, Maurizio Marabelli*

Dendrocronologia per i Beni Culturali e l'Ambiente, *a cura di Manuela Romagnoli*

Valentina Russo, Giulio Carlo Argan. Restauro, critica, scienza

Marco Ermentini, Architettura timida. Piccola enciclopedia del dubbio

Consigli. Ovvero l'arte di arrangiarsi in cantiere e in bottega, // Tips. Finding your Way Around Sites and Workshops *a cura di Alberto Felici e Daniela Murphy Corella* (in italiano e in inglese)

I ruderi e la guerra. Memoria, ricostruzioni, restauri, *a cura di Stella Casiello*

Archeometria e restauro. L'innovazione tecnologica, *a cura di Salvatore Siano*

Arte e Restauro/Pitture Murali
direzione scientifica: Cristina Danti - Cecilia Frosinini

Alberto Felici, Le impalcature nell'arte per l'arte. Palchi, ponteggi, trabiccoli e armature per la realizzazione delle pitture murali

Il colore negato e il colore ritrovato. Storie e procedimenti di occultamento e descialbo delle pitture murali, *a cura di Cristina Danti, Alberto Felici*

Arte e Restauro/Fonti
diretta da Claudio Seccaroni

Ulisse Forni, Il manuale del pittore restauratore (e-book), *introduzione e note a cura di Vanni Tiozzo*

Ricette vetrarie muranesi. Gasparo Brunoro e il manoscritto di Danzica, *a cura di Cesare Moretti, Carlo S. Salerno, Sabina Tommasi Ferroni*

Susanne A. Meyer e Chiara Piva, L'arte di ben restaurare. La raccolta d'antiche statue (1768-1772) di B. Cavaceppi

GO TO CONTENTS

Salvatore Vacanti, Il piccolo trattato di tecnica pittorica di Giorgio de Chirico. Teoria e prassi del "ritorno al mestiere" (1919-1928)

Arte e Restauro/Strumenti

Vincenzo Massa, Giovanna C. Scicolone, Le vernici per il restauro

Maurizio Copedè, La carta e il suo degrado

Elena Cristoferi, Gli avori. Problemi di restauro

Francesco Pertegato, I tessili. Degrado e restauro

Michael G. Jacob, Il dagherrotipo a colori. Tecniche e conservazione

Gustav A. Berger, La foderatura

AA.VV., Dipinti su tela. Metodologie d'indagine per i supporti cellulosici

Chiara Lumia, Kalkbrennen. Produzione tradizionale della calce al Ballenberg / Traditionelle Kalkherstellung auf dem Ballenberg (con DVD)

Anna Gambetta, Funghi e insetti nel legno. Diagnosi, prevenzione, controllo

Arte e Restauro/Esperienze

Dario F. Marletto, Foderatura a colla di pasta fredda. Manuale

Pietro Segala, Inseguitor di fantasmi (e-book)

Arte e Restauro
e-book

Federica Dal Forno, La ceroplastica anatomica e il suo restauro. *Un nuovo uso della TAC, una possibile attribuzione a G.G. Zumbo*

Luigi Orata, Tagli e strappi nei dipinti su tela. Metodologie di intervento

Mirna Esposito, Museo Stibbert. Il recupero di una casa-museo con il parco, gli edifici e le opere delle colllezioni

Maria Bianco, Colore. Colorimetria: il sistema di colore Carlieri-Bianco

Il restauro della fotografia. Materiali fotografici e cinematografici, analogici e digitali, *a cura di Barbara Cattaneo* (disponibile anche su carta in stampa on demand)

Non solo "ri-restauri" per la durabilità dell'arte, *a cura di D. Benedetti, R. Boschi, S. Bossi, C. Coccoli, R. Giangualano, C. Minelli, S. Salvadori, P. Segala*

Cecilia Sodano Cavinato, Un percorso per la valorizzazione e la conservazione del patrimonio culturale. Il museo civico di Bracciano

Science and Conservation for Museum Collections, *edited by Bruno Fabbri*

Encausto: storia, tecniche e ricerche, *a cura di Sergio Omarini*

Science and Conservation for Museum Collections, *edited by Bruno Fabbri*

Fotografie, finitura e montaggio, *a cura di Donatella Matè, Maria Carla Sclocchi* (disponibile anche su carta in stampa on demand)

Valeria Di Tullio, Risonanza magnetica (NMR) portatile. Mappatura e monitoraggio dell'umidità nei dipinti murali

Nadia Francaviglia, Intervento in situ e manutenzione programmata. Il gonfalone processionale di Palazzo Abatellis

GO TO CONTENTS

Giuliana Labud, Il restauro delle opere multimediali

Pietro Librici, Il restauro delle diapositive di Amundsen. Le esplorazioni polari tra storia e conferenze pubbliche - *edizione italiana/english edition*

Dopo Giovanni Urbani. Quale cultura per la durabilità del patrimonio dei territori storici?, *a cura di Ruggero Boschi, Carlo Minelli, Pietro Segala*

Claudia Daffara, Pietro Moioli, Ornella Salvadori, Claudio Seccaroni - con la partecipazione di Ester Bandiziol, Attilio Tognacci, "Le storie di Ester" di Paolo Veronese in San Sebastiano. Studio dei processi esecutivi attraverso la diagnostica per immagini

Pietro Segala, Inseguitor di fantasmi (e-book)

Esrarc 2014. 6th European Symposium on Religious Art, Restoration & Conservation, *edited by Oana Adriana Cuzman, Rachele Manganelli Del Fà, Piero Tiano*

Antoniazzo Romano e la sua bottega. Studio dei processi esecutivi attraverso la diagnostica per immagini, *a cura di Chiara Merucci, Claudio Seccaroni*

Blu. Banca dati comparativa tra materiali moderni e antichi nel restauro dei dipinti - Progetto CE.R.MA. Quaderno 1, *a cura di Annamaria Giovagnoli*

Pietro Segala, Uscir di nicchia

Collana edita con l'OPD
Conservation Notebooks

La carta. Applicazioni laser, Pogetto TemArt, *a cura di Mattia Patti, Salvatore Siano*

I dipinti murali. Applicazioni di nanotecnologie e laser, Pogetto TemArt, *a cura di Mattia Patti, Salvatore Siano*

I tessili. Applicazioni laser e altre indagini per i materiali fibrosi, Pogetto TemArt

I dipinti mobili. Applicazioni sperimentali di sistemi laser per la pulitura, Pogetto TemArt

Collana edita con l'Associazione Giovanni Secco Suardo
Quaderni dell'Archivio Storico Nazionale e Banca Dati dei Restauratori Italiani
diretta da Giuseppe Basile e Lanfranco Secco Suardo

Restauratori e restauri in archivio – Vol. I: Profili di restauratori italiani tra XVII e XX secolo, *a cura di Giuseppe Basile*

Restauratori e restauri in archivio – Vol. II: Nuovi profili di restauratori italiani tra XIX e XX secolo, *a cura di Giuseppe Basile*

Collane edite con il Centro Conservazione e Restauro "La Venaria Reale"
dirette da Carla Enrica Spantigati

Archivio

Restauri per gli altari della Chiesa di Sant'Uberto alla Venaria Reale, *a cura di Carla Enrica Spantigati*

Delle cacce ti dono il sommo imperio. Restauri per la Sala di Diana alla Venaria Reale (con DVD interattivo), *a cura di Carla Enrica Spantigati*

Cronache

Restaurare l'Oriente. Sculture lignee giapponesi per il MAO di Torino, *a cura di Pinin Brambilla Barcilon ed Emilio Mello*

GO TO CONTENTS

Kongo Rikishi. Studio, restauro e musealizzazione della statuaria giapponese - Atti della giornata internazionale di studi

Il restauro degli arredi lignei. L'ebanisteria piemontese. Studi e ricerche, *a cura di Carla Enrica Spantigati, Stefania De Blasi*

Restauro in video
in collaborazione con la RAI e con la direzione di Massimo Becattini

Duccio e il restauro della Maestà degli Uffizi

Giotto e il restauro della Madonna d'Ognissanti

Guglielmo de Marcillat e l'arte della vetrata in Italia

Il Volto Santo di Sansepolcro

La vetrata di San Francesco ad Arezzo

Cimabue e il restauro della Maestà di Santa Trinita

GO TO CONTENTS