kermesquaderni

ESRARC 2015

7th European Symposium on Religious Art, Restoration & Conservation

Proceedings book

Edited by

Oana Adriana Cuzman, Rachele Manganelli Del Fà

NARDINI EDITORE

FMK
Fakulta masmediálnej komunikácie
Faculty of Mass Media Communication

kermesquaderni

ESRARC 2015
7th European Symposium on Religious Art, Restoration & Conservation
Proceedings Book

kermesquaderni

go to contents

Cover book images (clockwise from top left):

Horologion (Ceaslov), 1825, presenting verrucous excrescences (detail).

Belarusian icon "Guiding Virgin" of 17th century (during the process of restoration).

Bioremoving of protein layer from papier-mache sculpture surface by novel Protease. Cristo Crocifisso e Deposto *(18th century), Museo Diocesano di Palermo, Italy.*

Swat Valley - Buddha carved into the rock partially destroyed during the Taliban occupation (R. Sabelli 2012).

The Crucifixion *attributed to Balletta (15th century), Santa Maria Nuova, Viterbo, Italy.*

Michael's dispute over the body of Moses*, on chamber tomb of Sucevita Monastery, Romania.*

ESRARC 2015
7TH EUROPEAN SYMPOSIUM ON RELIGIOUS ART, RESTORATION & CONSERVATION
PROCEEDINGS BOOK

Edited by
Oana Adriana Cuzman, Rachele Manganelli Del Fà

ISSN 2036-1122 ISBN 978-88-404-4372-0

This volume was printed by Michal Vaško - Vydavateľstvo (zakazky@vmv.sk) for Nardini Editore, in Prešov, Slovakia, May 2015

go to contents

kermesquaderni

NARDINI EDITORE

ESRARC 2015

7th European Symposium on Religious Art, Restoration & Conservation

Proceedings book

Edited by
Oana Adriana Cuzman, Rachele Manganelli Del Fà

kermesquaderni

go to contents

go to contents

INTRODUCTION

Dear conference participants, dear conference proceedings readers!

EUROPEAN SYMPOSIUM ON RELIGIOUS ART RESTORATION & CONSERVATION is a touring conference, which is always held in prominent European towns. We are honoured to get trust of Dr. IulianaRusu, the conference founder and father, and to be able to organize it this year. The Faculty of Mass Media Communication University of SS. Cyril and Methodius in Trnava assumed the organization of this year's event from the Italian city Florence, where 6th year of the conference took place. Thus, Trnava is a continuator and host of 7th year, dating from 4th-6th June 2015. The conference develops the topics dealing with socio-spiritual value of sacral art, conservation and restoration of religious cultural heritage, as well as the importance of sacral sights for tourist industry.

Sacral sights, being the part of cultural and spiritual heritage, require special interdisciplinary approach due to their preservation for future generations. When it comes to conference topics, it connects historians, theologians, specialists in the field of art, restoration, media and marketing communication, as well as other representatives of church, politics, social and cultural communities.

We have prepared a fruitful program for all participants. It includes professional talks of preservationists, restorers and marketers; experience sight-seeing of the oldest free royal town, outdoor lecture in the ruins of an important monastery complex of St. Katarina, Holly Mass, music concert or wine testing of the best regional wines.

We wish to thank to the Archbishop's Office in Trnava for borrowing exclusive premises for the conference – Marianneum Hall. We really appreciate personalities, who took auspices over this event, who are as follows: Archbishop of Trnava J.E. Mons. Ján Orosch; Chairman of Trnava Region Dr.h.c. Ing. Tibor Mikuš, PhD; and Mayor of Trnava JUDr. Peter Bročka, LLM.

Dear participants, we wish you a pleasant stay.
Dear readers, we wish you inspiring and enlightening reading.

Dana Petranová

go to contents

A - SOCIO-SPIRITUAL VALUES OF THE RELIGIOUS ART

RESTORATION OF RELIGIOUS WORKS: A MODEL FOR TEACHING CONSERVATION

Laura Baratin[1] , Benedetta Fazi[1] , Michele Papi[1] , Maria Paola Salvarani[1]

[1]School of Conservation and Restoration, DiSBeF, University of Urbino, Italy,
laura.baratin@uniurb.it; benedettafazi@yahoo.it; papimichele@hotmail.com; mpsalvarani@gmail.com

ABSTRACT

The season of restoration sponsored by the Archdiocese of Urbino-Urbania-Sant'Angelo in Vado, Italy in collaboration with the Carlo Bo Urbino University has recently introduced an unprecedented learning experience and laboratory that is strengthened by the collaboration with the Superintendency and the Municipalities of Urbino and Sant'Angelo in Vado. According to Cesare Brandi, restoration comes from the need to restore objects from the decay of the culture of our country. These items must be rediscovered with a renewed awareness that they are indeed products of Art, and bearers of universal values. Restoration work is closely related to this recognition of the value of art, in terms of its aesthetic, historical and poetic aspects. It is by identifying the object as a work of art that one may understand the meaning that binds it to the operator. Understanding art as such makes the historical context of human expression visible through its aesthetic qualities.
It is through this awareness that restoration becomes science, and thus able to identify and understand the object as a work of art. The ability to save new works, such as those described in this paper, which would inevitably fall into decay and neglect, is seen as an opportunity for students to compete their education, by working with a complete work of art: from the early stages of knowledge and analysis through to the intervention choices, with the support of their teachers, the Superintendency and the Religious Authorities, and the final exhibition of the same.

Keywords: conservation, restoration, religious, cultural heritage

INTRODUCTION

Throughout the long process of protection in Italy, theoretical and organizational, namely the guidelines of intervention procedures have been defined, to which all the different Entities and Institutions must contribution according to the responsibilities and functions.
The Italian example of synergy between the Archdiocese of Urbino, Urbania and Sant'Angelo in Vado, Carlo Bo Urbino University and its School of Conservation and Restoration, the Superintendency for the Historical, Ethnic and Anthropological Artistic and Cultural Heritage of Marche Region and Urbino and Sant'Angelo in Vado municipalities, is the result of "modulated" organisation of the intervention processes, where all the parties concerned contributed with a complete integration system.
The Archdiocese of Urbino, Urbania and Sant'Angelo in Vado supplied the "raw material", consisting of a number of works of art that required restoration but for which funding was not available.
The University of Urbino with its School of Conservation and Restoration made every effort to ensure that the educational curricula of students focused on structures that, on one hand belonged to the territory, but were seen as seemingly marginal proof of a neglected culture, that was however of fundamental importance in terms of reconstructing the artistic fabric of Marche Region.
After approving each project, the Superintendency supervised how interventions were carried out. Urbino and Sant'Angelo in Vado Municipalities supported the initiative at all times, and helped to publicise the final events to the community.
This was a "model" of cooperation between different institutions: the central model, right from the start of the activities of the School that, in addition to complying with the regulatory requirements of the educational curriculum - students work on objects, 80% of which are classified as cultural heritage - intends to demonstrate that synergy between different entities is indeed possible by developing "inexpensive" concerted actions to protect the cultural heritage.
The works, that were selected by the institutions together with teachers and restorers with the prior approval of the Superintendency, are examined in order to assess the interventions required and define the costs of the
materials that are slowly refunded according to agreements between different entities. After completing all the necessary formalities, these

works become part of the laboratory curriculum, and ongoing dialogue is ensured between specialists in different fields of artistic historical research, documentation and diagnostics, and the restorers, the Project Management and the Entities to whom the works belong and students.

METHODS

Two very important restoration works will be discussed. The works of art in question are *Christ at the Column* (Figure 1), a wooden work of art by Giovan Battista Urbinelli[1], dating to the mid XVIIth century, from the Ecclesiastical Museum of Santa Maria *extra muros* of Sant'Angelo in Vado, in the province of Pesaro-Urbino (ITA), and two paintings, the *Washing of the feet* (Figure 2) and the *Crossing of the Red Sea* (Figure 3) by Antonio[2] and Ludovico[3] Viviani. These two paintings date to between the late XVIth and early XVIIth centuries and come from the Urbino Albani Diocesan Museum (ITA).

As regards the methods of intervention, a historical-artistic and technical analysis was carried out, to assess the state of conservation, and to plan the restoration project.

The analysis is the most important aspect of the process to study and understand the work of art, because it is thanks to this analaysis that the actual project is developed.

By analysing the studies and interventions carried out, the methods and results of the restoration interventions will be summarised hereunder.

The wooden work of art, *Christ at the Column* (Figure 1), which is moulded and painted on both sides, represents an almost life-size figure of Christ (156 cm high), leaning against a column with his hands bound behind his back. Although the Christ, whose face expresses suffering, is in upright position, it recalls the image of Christ on the cross.

The full relief painting technique of this work of art differentiates it from other three-dimensional paintings on wood, which are painted only on one side. This type of work of art may above all be found in Umbria and Marche regions.

From a technical point of view, the wood variety was analysed by taking a micro-sample which was analysed under a scanning electron microscope. This confirmed that the wood was fir. The preparation layers are gypsum and animal glue and the painting technique used is a tempera magra (pigment mixed with animal/fish glues) applied in background and transparent layers.

After examining the state of preservation, which was recorded by means of data sheets and detailed photographic and graphic documents, the restoration works were started.

By way of example, the phases of the interventions used to restore the work of art which is on display today are described.

The first step was to consolidate the parts of the colour that had lifted with acrylic resin in emulsion. The stucco of previous restoration works were then removed in order to clear the cracks and disconnected areas in order to permit structural restoration. It was necessary to disassemble the disconnected parts in order to carry out the fresh restoration works. The painting was cleaned by hand using brushes and absorbent sponges. It should be noted however that some parts were cleaned with chemical solvents. Gaps in the painting film were then filled with traditional materials, namely Bologna gypsum and rabbit skin glue. Watercolours were used to repair the painting, using the chromatic selection technique.

The iconography of the two paintings on canvas, the *Washing of the feet* (Figure 2) and the *Crossing of the Red Sea* (Figure 3), clearly come from the Old Testament and the Gospels. An analysis of the painting technique, confirmed that the works of art were carried out by two different artists, and indeed Antonio Viviani died before the paintings were completed and his brother Ludovico was asked to finish the works of art. This produced in differences in style in the cycle in the same decorative project[4].

The works of art are on a vegetable textile support consisting of a single canvas. The canvases very probably come from the same piece, since they are of the same height. The canvases are fixed to a rectangular frame consisting of four slats joined by a vertical wooden crosspiece. The paint film consists of oil and pigments as does the underlying primer.

The visual and non-invasive examinations carried out by ultraviolet fluorescence analysis confirmed that the paint surface was entirely covered by a thick layer of loose deposits that made it impossible to see the work of art properly, as well as damaged and extremely darkened finishing layers. The paint surface had also been retouched with oil paint over the gypsum stucco and animal glue. Very visible reticular cracking caused by drying was also found. The restoration focused above all on removing loose and cohesive deposits from the surface of the painting.

The textile support was subjected to controlled heat and humidity, to reduce the deformation of the canvas and lower the cracks on the preparation and paint layers. The layers were then

consolidated by means of layer of synthetic resin in solution. The gaps in the paint layers that it was possible to fill in terms of size and location, were filled with a gypsum stucco and animal glue and then painted over with watercolours using the line technique. The chromatic uniformity of the painting was restored by retouching in paint colours.
The painting was finally protected by spraying synthetic resins in solution on the surface.

OUTCOMES

After being restored, the works of art were returned to the community and once again included amongst the works of art of worship or simply enjoyed for their historical importance and beauty. In order to involve the citizens, the School of Restoration and Conservation with the collaboration of the Diocese and the municipalities, presents the restorations at organised events. During these events the works of art are displayed and are "described" by the students who carried out the restoration works. The restored works of art represent the opportunity to publicise the work carried out by the School through publications. Particularly worthy of note is the Collection of art studies published by the Fabbrica of Urbino Cathedral, above all the book *Restoration for teaching art* and the book *The Canticle of the Holy Family.*

CONCLUSIONS

The Urbino School of Conservation and Restoration has set itself the goal of restoring works of art that could otherwise not be restored, without competing with restoration companies in the area.
The procedure used to analyse the works of art cannot be coded because each work of art has specific requirements. The scientific analyses carried out must indeed be assessed according to the answers sought. Most of the analyses are carried out to answer doubts as to the execution technique, and in some cases may help to date the works of art and understand previous interventions. The collaboration of professionals with different skills and expertise is therefore essential for the success of the works. In conclusion, it is important to reiterate that one of the characteristics of the School is to maintain good relationships of collaboration with the local authorities at all times.

BIBLIOGRAPHY

[1] D. Tonti, S. Bartolucci. Il restauro per una didattica dell'arte, 8 (2013).
[2] Centro Studi della Cattedrale di Urbino. Il cantico della Sacra famiglia, (2014).
[3] A. Aldrovandi, M. Picollo. Metodi di documentazione e di indagini non invasive sui dipinti. Collana I Talenti, 6 (2003).

NOTES

[1] G.B. Urbinelli was born in 1605, it is said in Fermignano (Negroni 1993, p. 111); the scarce criticism on Urbinelli is useful since it contains essential definitions that qualify him, bringing him closer to Federico Barocci (Urbino 1535-1612), Claudio Ridolfi (Verona 1570 c. - Corinaldo 1644) and the school of Emilia-Romagna, taking into account not only stylistic elements, but also the location of the paintings obtained from direct commissions in that area... he died in 1663 and was buried at the Cathedral of Urbino (Negroni 1993, page 93; the date 10.23.1693 is corrected to 1663, as shown on page 111).
[2] Antonio, also known as "the Sordo" (Deaf man) (Urbino, 1560-1620), and is the oldest of the Viviani brothers. His training comes from the school of Federico Barocci, and he is considered to be one of its most famous students.
[3] Ludovico Viviani (Urbino? - 1649), like his brother he attended the school of Federico Barocci. His works are distinguished from other Baroque paintings due to the influence of the Venetian Claudio Ridolfi.
[4] "The restoration works made it possible to recover these two invaluable paintings which, on the basis of stylistic analogies, iconographic consistency and documentary evidence, may be considered as part of the cycle of paintings of the chapel of the Holy Sacrament of the Urbino Cathedral "(Bartolucci, 2013, page 38).

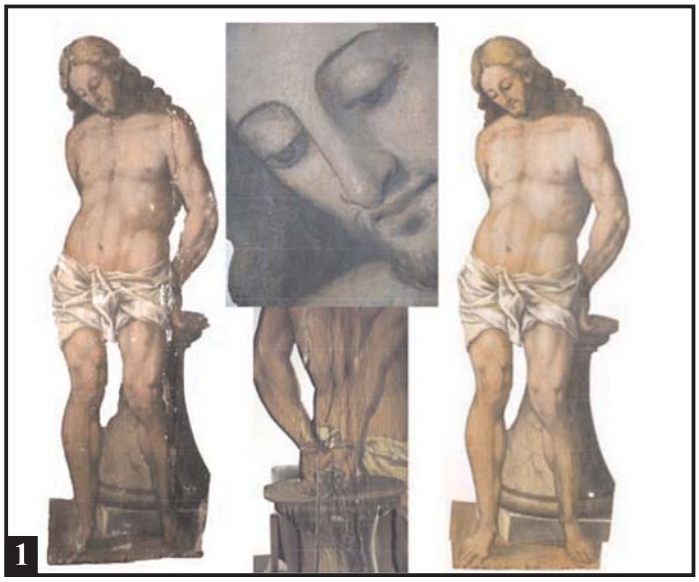


Fig. 1 – *"Cristo alla Colonna"* before, during and after restoration

Fig. 2 – *"La lavanda dei piedi"*, during and after restoration

Fig. 3 – *"Traversata del Mar Rosso"* before, during and after restoration

DEVOTIONAL ART CONSERVATION STRATEGIES AND MONITORED ABANDON

Giannini Cristina[1], Bracci Susanna[2]

[1]Department of Literature and Conservation of Cultural Heritage, University of Naples II, S.M. Capua Vetere, (Caserta) Italy cristina.giannini@unina2.it – dotcrigianni@gmail.com

[2]Institute for Conservation and Valorization of Cultural Heritage (ICVBC-CNR), Sesto Fiorentino (Florence), Italy s.bracci@icvbc.cnr.it

ABSTRACT

The conservation history of religious artworks raises different problems from those illustrating non-Christian themes, such as classical, mythological or allegorical subjects. A religious painting, like an ewer, a vase or a cabinet, is built to be used. No matter if its use could lead to a rapid degradation of the materials from which it was made of. Its use and "abuse" required frequent restorations, among which the repainting is perhaps the more common operation. Dealing with worship, lacunas, *patina*'s partial removing and aesthetical restoration can turn into an ethical *dilemma*.
A second, most pressing and remarkable issue is that a number of artworks inspired by devotion are located in isolated places which have been abandoned in the last decades. Both social and economic changes causing migration of people to different human and urban landscapes, nevertheless the development of unilateral tourism flows, has changed the life expectancy of sacred art. This paper investigate these topics through different examples: the Bacchereto polychrome *Pietà* modelled in clay (Tuscany) and the cycle with *Histories of Saint Biagio* conserved in a Chapel near Piedimonte Matese (Caserta).

Keywords: wortship, sacral art, monitored abandon, conservation

GENERAL OVERVIEW OF THE TOPIC

Religious mural painting produced in Southern Italy from the late Gothic to the XV century is mostly anonym and situated in foothill areas between Campania and Molise. The cycle representing *History of Saint Biagio*, conserved in a chapel near Piedimonte Matese is almost unknown and for years closed to the public. These frescos are highly interesting for both iconography and appearance which testify the influence of artists working on the east Italian coast. Absolutely extraordinary for this area is the technique, carried out according with the most precise canons of Cennini's *Libro dell'Arte*. Totally abandoned to degradation after a restoration executed in late Nineteenth century, the fate of the cycle is its disappearance (Fig. 1-2).
Greater fortune took a terracotta sculpture, who dates back to the first middle of the XVI century and whose artistic quality is actually modest. It is conserved in Bacchereto an ancient a village not far from Florence (Fig. 3).
The sacred image has always been considered miraculous and until today it is object of popular devotion. According to the source, in 1885 the sculpture burned and was split into more than 300 pieces. 110 fragment were rescued and assembled in a rudimentary way; the sculpture was restored without any critical conservation method. In 2006 a city committee linked to the parish church sponsored a new restoration. The work was entrusted to Laura Kraus Ley supported by a diagnostic campaign conducted at ICVBC.
These two pieces of religious art are still conserved in the original context, serving both worship and artistic appraisal. However, the different socio-economic conditions of the regions where they were realized seem to indicate with a good deal of confidence that those located in poverty areas are lost in the memory, even if sacred. In Italy we are dealing with hundreds of square meters of frescos and mural paintings for those the only and last resource is what we call a "monitored abandon". Only few objects belonging to the religious patrimony, sometimes liturgical pieces of lesser importance, daily used in the exercise of worship can be saved. Our task is to fight to maintain the memory of the past in a country where there is no overall programming for Cultural Heritage.

ARTISTIC AND CULTURAL EVALUATION

Built between late XIV and early XV century, the chapel dedicated to San Biagio was commissioned by a local aristocratic family mentioned as Iacobuttis. It belonged to the guild of weavers and

carders whose protector is Saint Biagio. Moreover, at that time Piedimonte counted a Domenican convent and a Ducal palace. In 1926 the chapel was declared national monument but definitely abandoned. It is well known that to conserve a work of art means to create a suitable environment around it using specific targets and methodologies. Neglected by tourist flows, the chapel was closed and assaulted from the high external humidity. The small rectangular room, entirely depicted in fresco, has undergone a chemical process of sulfation whose result is the destruction of most of the surface. The restoration carried out by the end of the last century for which no documentation is available, can be considered questionable. No structural action was done to eliminate the humidity infiltrations coming from the apse of the chapel and the result is evident. Most of the plasters, the sinopie, in view after the falls of plaster as well as the fragments of paintings are covered with moulds which are spreading quickly over the walls (Fig. 1). Any basic guideline of conservation was disregarded: assessment, monitoring and correct diagnosis as well as appropriate intervention strategies.

After this restoration, the chapel, an extraordinary living artistic handbook preserving even traces of gilding and graffiti on plasters, was closed. A terrible waste in a period where the economic crisis is every day more reducing resources devoted to conservation.

This conference is the right venue to underline that a similar fate is condivised by a popular cycle depicted in the famous Basilica of Sant'Angelo in Formis near Caserta. Dating back to the XI century, these paintings are considered by scholars the oldest example of painted wall conserved in Italy after those of Castelseprio dating back the beginning of the X century. Although they have been published since 1860 by german art-historians such as H.W Schulz and F.Z Kraus and recently rediscover by Alessandra Perriccioli the two restoration which they have undergone (respectively 1869-1902 and 1997) had regrettable results.

The apse with the *Christ Triumphans* was definitely remade, an imitation of the true original aspect optically disturbing and incoherent with the neutral treatment of the other gaps. To this must be added that the infiltration of moisture, visible to the naked eye, in the entire lower part of the apse are destroying all traces of the incisions, sketches and ultramarine pigments (Fig. 4).

Quite different are the history and the life expectancy of the terracotta sculpture carried out by an anonyme master active in Tuscany at the middle of the XVI century. If not for its aesthetical result, thought-provoking but not stunning, and of course overrated in reason of its devotional value, this work is a dramatic example of the typical fate of any polychrome religious sculpture; independently from the material - wood, terracotta, papier-mache, cork or stone- any piece of devotion has been restored countless times.

We should consider that what conservation forbids is required by religion. A sculpture is not protected from the hand and lips of devotes, from temperature range in non-air conditioned as well as from sun light and candles smoke. Most of religious artworks have been reassembled, reintegrated and repainted as soon as they showed to lose their moving original appearance.

The consciousness of these facts, together with the knowledge of the immaterial value of the object, makes the job of the conservator a gentle technical interpretation of the materials they have to deal with.

INVESTIGATIONS AND METHODS

The conservator made a rigorous work, fit with the codes of ethic in restoration. When the terracotta was reconstructed after the1885 fire, many integrations were made using materials incongruous with the original. These additions have been saved as evidence of the historical restoration and only the iron pins have been replaced with equivalent resin. As usual the bigger problem to deal with is the cleaning. According with the diagnostic analysis carried out on samples taken from the more significant areas (Fig.3), the polychrome coating was very stratified. Only in Christ's loincloth 11 layers of repainting were detected. In order to answer questions on the original materials an integrated analytical methodology was followed. Documentation and observation with optical microscopy (OM), SEM-EDX analyses, spectrophotometry and the analyses of 8 samples have highlighted old restorations in gypsum on the back of the sculpture and the evidence of ultramarine mixed with zinc and glue on the mantle of the Virgin Mary. On the mantle of Christ of the external layer is made evidence of cinnabar; ocher and white lead are on the mantle of Christ, while the sampling of the leg of Christ showed the simple use of ocher. A single fragment of terracotta conserved residues of the original painting.

OUTCOMES

According with the investigations, it was decided to bring the polychrome to an intermediate step

between the original and the repaintings done in the past. The alternative would have been to leave in view of a nude sculpture with a few fragments of the original polychromy.

CONCLUSIONS

If we do not want to see the slow, inevitable loss of our sacred art, the only perspective is emphasized by the main topics of this Symposium: giving social perspectives to our religious art, maybe according with a new marketing of sacral sites as universal cultural heritage.

BIBLIOGRAPHY

[1] G. Bonomo. Gli affreschi della cappella di San Biagio, Piedimonte Matese, http://pm2010.altervista.org/chiese_e_monumenti.html

[2] F. Navarro, F. Maglione. Alvaro Pirez d'Evora ed alcuni aspetti della pittura tardogotica a Napoli e in Campania. Bollettino d'Arte, 6 ser. 78 (1993) 55-76.

[3] F. Maresca. Proposte di confronto tra i cicli tardogotici campani di Piedimonte Matese, Sant'angelo d'Alife e l'area marchigiana. In: "Ottant'anni di un Maestro. Omaggio a Ferdinando Bologna", Napoli, (2006) 165-169.

[4] C. Cennini. Libro dell'Arte, 1400 ca. F. Brunello (ed), Vicenza, (1975).

[5] C. Giannini. Materiali e procedimenti esecutivi della pittura murale, Padova, (2009).

[6] H. W. Schultz. Denkmäler der Kunst des Mittelalters in Unteritalien, II, Dresden, (1860) 170-182.

[7] F. X. Kraus. Die Wandgemälde von Sant'angeloin Formis. Jahrbuch der Königlichen preussischen Kunstsammlungen, 14 (1893) 84-100.

[8] A. Perriccioli Saggese. Sant'Angelo in Formis, Montecassino e l'Abate Desiderio. In: "Lungo l'Appia", Napoli, (2009) 93-102.

Fig. 1 – Chapel of Saint Biagio, Genesis Scenes, detail: in evidence sinopia, lacune and pictorial fragments.

Fig. 2 – Chapel of Saint Biagio, sinopia remained in sight after the fall of the painted plaster

Fig. 3 –Bacchereto, Pietà

Fig. 4 –Sant'Angelo in Formis, apse, Christ Triumphans

ELIADE'S THEORY OF ESCAPE FROM TIME APPLIED TO CHURCH BUILDINGS

Jakubovská Viera

Constantine the Philosopher University in Nitra, Faculty of Arts, Department of Philosophy, Hodžova 1, 949 01 Nitra, Slovakia, vjakubovska@ukf.sk

ABSTRACT

In this paper, we focus on the church building as a place of escape from profane time into sacred time, and we also examine it as a symbol of the Church. We follow from the division of time into profane and sacred, and the fact that a human being has a tendency to escape from profane time into sacred time. There are numerous forms of escapes; however, people use the following two in particular: transformation of time as an effort to transform the events and situations into the general ones, breaking free from the individual, and elimination of time within the meaning of making a return to the original – the early beginnings. Things, objects and phenomenon receive a new attribute – the adjective "sacred, holy". This has to do with the effort and ability to cross the everyday events and change them into special, exceptional and sacred. This human property is referred to as "transcendence" and it is inherent to man independently of whether we understand it in philosophical or theological terms. One of the ways to implement this "crossing" of profane time is to spend time in prayer in a church building (a synagogue, mosque). We explore the church building as a place with sacred time and as a symbol of the Church.

Keywords: transcendence, profane time, sacred time, church building as a symbol.

INTRODUCTION

The sacred and the profane are two different existential situations people personalized with and accepted in the course of history. The sacred is easily realized, because it is seen as something completely different from the profane. The sacred not only includes the personified beings, which we call gods or spirits; the sacred can also include a stone, tree, piece of wood, and the moment of devout prayer or worship. Each object can transform into something different, however, it will remain what it is because it is part of the environment that surrounds it. A sacred stone remains a stone, and from the profane viewpoint it is no different from other stones; however, its immediate presence changes into supernatural to those who view it as sacred [1]. The boundaries we set between the sacred and the profane are a result of our intellectual creative efforts. People create symbolic classification systems, which help them understand the world. In addition, as *homo significant*, the human beings add meaning to the surrounding objects and phenomena. The sacred is an experience of a different kind than the natural, everyday experience [1].

HUMAN ABILITY TO TRANSCEND

Man has the ability to transcend, which means they are able to break away from the real world in their thoughts and approach something higher, divine and supernatural. On the one hand, it is a human ability, on the other hand, it is also the property of something higher, existing in the sacred world, or sacred time (for example, God as a transcendent being, the church building as as a symbol of the Church etc.). The term *transcendence* is a concept we encounter in philosophical and philosophical-theological systems. The meaning of the term *transcendence* or *to transcend* is derived from the Latin word transcendere, which means "to cross". When discussing transcendence, we refer to the "*train of thought leading outside the immediate world*" [2]. This expression is peculiar to philosophy and theology. Transcendence is associated with moving to a higher type of being. In the Cambridge Dictionary of Philosophy, we read the following: "*Some kind of being, like God, can be described as transcendent in a sense that it is not only greater, but incomparably greater in any kind of perfection*" [3]. The understanding of transcendence is associated with the procedure of vertical ascent. At the lower end of the vertical line there are the immediate things (the earthly world), or immanent existence (final, temporary, changeable), and above there is the transcendent being, which is characterized by infinity, perfection and permanence and cannot be reached by sensory perception [2]. This is how the relationship between the two forms of existence is

understood in classical metaphysics and religion.

PROFANE AND SACRED TIME

The conceptual and causal analysis of the profane and sacred, which is linked with the human being, actions, time and space, has confirmed that based on the theory of the sacred introduced by M. Eliade, time and space can be divided into two types: profane and sacred. Profane time is associated with finality and death, it is limiting, sometimes crushing, and it leads from creation to destruction. Sacred time participates in the universal, it is associated with timelessness and, being cyclic, it includes the option to return to a specific event and relive it [1]. There is a boundary between profane and sacred time. This boundary can be crossed. It was crossed both by the archaic and modern man. The archaic man used various rituals to cross the line between profane time and timelessness, i. e. sacred time. Similarly, the modern man escapes from profane time with all kinds of advanced information technology, virtual reality, the Internet and digitization [4]. Compared to the archaic man, the change does not occur only in the methods of escape from the final temporality, but also in terms of understanding time itself. There are various forms of individual experience and measurement of time. The forms of experiencing time reflect the different levels of reality (social, psychological and others), which brings about the so-called "nesting doll" effect [5]. These two different levels of reality make the modern man move from one level to the other. As physical and spiritual beings and thanks to their "spiritual existence", people are able to distance and separate themselves from the ordinary daily life, i.e. the specific and obvious context they live in. This ability or activity is associated with spiritual activity. As noted by K. Novotný [6], the process on the one hand involves distancing, singling oneself out, deflection and shaking off the obvious human position in the real world; on the other hand, it is an activity that requires some sort of effort and a specific spiritual activity. J. Patočka examines these efforts in context of the history of philosophy and philosophy of history in the form of "concern for the soul" [7].

TRANSITION FROM PROFANE TO SACRED TIME

We hold that one of the causes that drives man to escape from profane time to sacred time is the fear of death [8]. Man is trying to participate in something that is not significantly limited by time, something that does not remind us of the end and, on the contrary, something that makes him return to the newly relived, but already familiar events or experiences. In the context of the archaic man and his life, M. Eliade singles out two basic types of escape from time: transformation and elimination. The first type is characterized by the transformation of profane time and the second one by the elimination of profane time [9]. In the archaic times, the transformation of profane time was happening on the non-conscious level – it was not a targeted or institutionalized process. The process could only be examined ex post. In the mind of the nation, only those events were preserved that have been transformed by means of the myths. In their own structure, they had to correspond to the mythical archetypal actions, otherwise they were rejected and forgotten. If they matched the mythical model, they were permanently included into the collective memory. In this context, T. Alliband talks about the so-called "Eliade's razor" [10]. Only the things capable of being reduced to generality, i.e. those containing the archetypes and categories instead of specific people and actions, can be transformed into the archaic and contemporary myths [11]. The transformation of time is possible because sacred and profane time is based on human experience. The experience of man in profane time is linked to a particular individual and it is connected with experiencing individual life, individual experience and personal passage of time, i.e. it has an existential dimension, including the beginning (birth) and the end (death). Through the transformation of time, the religious man tries to break free from profane time, whose basic breakpoints (birth, death) have already been set in advance. Therefore, the endeavor to participate in the universal and timeless is also an endeavor to make it into the general consciousness, or collective memory. The concept of transformation of time would not be possible without the finality of the profane, i.e. if the profane time were not divided into the beginning and the end [12].

The second way to escape from profane time is elimination. The essence of elimination is the desire to escape from profane time. M. Kováč [13] argues that the elimination lies in the destruction of the lethal pressure of time through ritual integration with the initial state of timelessness. In elimination, it is important to return to the original, basics and archetypes [12]. Elimination is the escape from time, in which we leave the linearity of time and highlight the cyclic nature of existence. Sacred time is the time of the origin, it represents the birth, the early beginnings. To make the return to the early beginnings

possible, elimination must be sequential. If we want to understand the early beginnings, this process must be carried out by means of participation, elimination and recovery of time [1].

THE CHURCH BUILDING AS A SYMBOL AND TRANSCENDENCE

In his phenomenological analysis of the church building, L. Hanus follows from the claim that the church building is the most typical, famous and ordinary everyday phenomenon. Its ordinary nature is linked with the fact that we are connected with the church building throughout our lifetime. This happens during the major holidays in the ecclesiastical year, family events, daily routine, work and holidays. Profane time is filled with daily responsibilities and worries. On the other hand, we spend the festive days in the church building, we meet there as a big family "*God's people taking part in the Communion, the Word of God*" [14]. What is also interesting is the way he compares a house (dwelling) and the church building. Our house is "*our little home*" , and the church building is our "*big, common home*" [14].

Despite the fact that the church building is part of everyday life for a Christian, it is also something special, unique, extraordinary, and the time spent in it is also extraordinary. It is a very special moment – a person is set free from everyday worries and responsibilities, he/she comes to the church building and listens to the sermon or prays. To name the act in which the sacred manifests itself, Eliade suggests the term *hierophany*. The history of religion can be viewed as an accumulation of hierophanies, or manifestations of the sacred reality. The most elementary hierophany is the manifestation of the sacred in an object (rock, tree etc.). To a Christian, the ultimate manifestation is the incarnation of God in Jesus Christ.

Even the very place where religious buildings are built implies that these are no ordinary, but exceptional buildings. They are located "in the middle of the world" - axis mundi (the *Latin* axis - axis, plane, coordinate; mundi - world). Eliade uses this term [1] and translates it as the axis, the center of the world. It is a place where one "encounters transcendence". The middle of the world (axis mundi) connects the three levels of cosmos - the earth, the heaven and the underworld [15]. All sacred buildings are connected with it.

The church building is a symbol of the Church, a sign of the spiritual, sacred character; it is also a sign of something transcendental. In each symbol, there is a "cross-link" from one time to another (from the profane to the sacred) through physical objects (e.g. the cross), which assume the function of a symbol and become the carriers of spiritual messages. We see an object that embodies the message. The symbol materializes the ideas. Sacred art is symbolic. The symbols are created by man. According to A. Marin [16] this act is "*primal, spontaneous, elementary and existential in the truest sense of the word*." Unlike the church building (the "House of God"), a synagogue is a unique type of cult place, it is the "congregation house". The community members meet in it to worship. Unlike Christian worship, it is not a priestly worship, but a lay one. It consists of reading, teaching and prayer. The synagogue becomes a local sanctuary; it is the meeting place for the community, thus God's presence is in the very meeting. For Muslims, it is the mandatory personal piety, which can be done anywhere provided that the praying person is facing Mecca. Once a week, on Friday, the prayer is also performed actively with the participation of the whole community. At a mosque, the collective prayer is accompanied by a sermon. As a divine sanctuary, the mosque is a sacred meeting place for the Muslim community [17].

RESULTS

This paper deals with the relationship between profane and sacred time, the fact that humans tend to escape into sacred time, and the forms of such escapes. We link the time spent in the church building (mosque, synagogue) with sacred time. Even the post-modern man has a tendency to avoid the finality and temporality, i.e. profane time, for example through time travel or virtual reality etc.

CONCLUSIONS

The church building is a symbol of the Church and an expression of transcendence – the sacred. It is a place where man can move away from the everyday world into the sacred one. He/she frees himself/herself from everyday reality, comes closer to God and transcends. God is approached through objects, processes and phenomena. For example, through prayer, richly decorated altars, frescoes, paintings and the church building itself as an architectural structure.

BIBLIOGRAPHY

[1] M. Eliade. Posvátné a profánní. OIKOYMENH, Praha, (2006), ISBN 80-7298-175-7.

[2] M. Marcelli. Transcendencia a imanencia. In: “Filozofia a umenie žit”. Iris-FF UKF v Nitre, Nitra, (2014) 175-191, ISBN978-80-8153-026-5.

[3] R. Audi. The Cambridge Dictionary of Philosophy. Cambridge University Press, Cambridge, (1995).
[4] L. Zimanová. The Possibility of Escaping from Time. In: "Anthropology, rchaecology, History and Philosophy", International Multidisciplinary Scientific Conferences on Social Sciences and Arts SGEM 2014, 1-10 September 2014 Albena, Bulgarian Acadeny of Sciences, Albena (2014), 865-872, ISBN 978-619-7105-29-2.
[5] S. Gálik. Filozofia a médiá. IRIS, Bratislava, (2012). ISBN 978-80-89256-86-0.
[6] K. Novotný. Kacířství v Patočkově konceptu péče o duši. In: "Filozofia a umenie žit"'. Iris-FF UKF v Nitre, Nitra, (2014) 10-16, ISBN978-80-8153-026-5.
[7] J. Patočka. Péče o duši I. OIKOYMENH, Praha, (1996) 185.
[8] K. Jakubovská. Mystická smrť v tradícii ukrajinského kozáctva. In: "K problému univerzálnosti a aktuálnosti fenoménu "mystickej smrti"". Ksiezy Mlyn Dom Wydawniczy Michal Koliński, Lódź, (2013) 189-226, ISBN 978-83-7729-189-4.
[9] L. Zimanová. Niektoré príčiny desakralizácie v estetike (Some Causes of Desacralisation in Aesthetics). XXXII International Colloquium on the Management of Educational Process - proceedings of abstracts and electronic version of reviewed contributions, 22 May 2014, Brno, Univerzita obrany Brno, Univerzita obrany, (2014) 1-6, ISBN 978-80-7231-958-9.
[10] T. Alliband. Quest for the structure of the sacred. In: "Kritika & Kontext", Bratislava (1998).
[11] P. Kováč. Katedrála v Chartres. Eminent, Praha, (2007) 305.
[12] M. Eliade. Mýtus o věčném návratu. OIKOYMENH, Praha, (1993), ISBN 80-8524-51.
[13] M. Kováč. Mircea Eliade ako filozof dejín. In: "Kritika & Kontext", Bratislava (1998).
[14] L. Hanus. Kostol ako symbol. Lúč, Bratislava, (1995) 383, ISBN 80-7114-141-0.
[15] V. Jakubovská, L. Zimanová. Filozoficko-estetické reflexie profánneho a sakrálneho. UKF, Nitra, (2013) 86, ISBN 978-80-558-0489-7.
[16] A. Marin. 1/1998 Zborník, 1/98, (1998) 39-40.
[17] A. Chateleta, B. P. Grostier. Svetové dejiny umenia. In: "Maliarstvo, sochárstvo, architektúra". Lúč, Bratislava, (2001)784, ISBN 80-7181-937-9.

ARCHANGEL MICHAEL'S DISPUTE FROM THE BODY OF MOSES IN BIBLICAL TEXT AND PICTURE

Melniciuc Puică Ilie[1]

[1] Faculty of Orthodox Theology, University of "Al. I. Cuza", Iassy, Romania, bradeail@gmail.com

ABSTRACT

Canonical text of Jude v.9, with background in Jewish pseudepigraphical writings, shows the dispute from Moses body between Michael and devil. Painters pointed in their moralizations artifacts the fate of deathly Christians, under the dispute between good and evil. The implicit Archangel' recognition of God sovereign judgment, call to respect the memory of ancestors and their burial place. Michael wise attitude, attested by this canonical epistle, became a paradigm from pious leaders, on relation with peoples and Church. Under Church observance Bible and religious painting could educate their believers in moral and esthetic fields.

Keywords: pseudepigraphical writing, Moses body, Archangel, chamber tomb, Sucevita monastery

INTRODUCTION

In the Jewish and Christian traditions, we find, next to a canonical Bible text, a 'deutero-canonical' literature (or 'apocryphal') and pseudepigrapha, who 'rewrite' biblical traditions. The phenomenon of rewriting could reflect the very high fluidity of traditions "scriptural' collected by the communities at that time. Jude's epistle, ascribed in New Testament canon, raise many questions about the Jewish non-canonical background, even Church recognize his moral value from orthodox perspective and doctrine. In 25 verses, ideas and texts from presudepigraphical 1 Enoch and Assumption Moses are mixed with moral exhortations.

CANONICAL TEXT OF JUDE REFLECTED IN PICTURE

According Jude v.9 the dispute between Michael and devil consist in an interchange of speech in order to convince. When devil in a malicious way try to accuse and judge, using blasphemy, the angel of the Lord replies to the charges of Satan: 'LORD rebuke you' Jude v.9. The words occur only in Zech. 3:1-2, when the slander is charged by devil against Joshua body defeat angel. Michael would not take the law into his own hands as the apostate false teachers were doing in Jude v.9 [1].

The background of Canonical New Testament text of Jude v.9

This reference to Michael word was said by Origen (*De Principiis* III.2.1) and Gelasius of Cyzicus (*Historia Ecclesiastica* 2.21.17) to be founded on a Jewish work called 'The Assumption of Moses' (As. Mos.), the first part of which was lately found in an old Latin translation at Milan [2]. 'Since Jude v.9 contains a passage which corresponds almost word for word to Gelasius'quotation concerning the quarrel between Michael and the devil, it can safely be assumed that Jude v.9, too, goes back to the lost ending of As. Mos.' [3].

The Christian comments about Jude v.9 or Deut. 34:6 often treat the dispute between good and evils spirits concerning better the soul and less body of Moses, even the greek term *soma* is cited in Jude v.9. This conception is based on judeo-christian believe that on death soul ascend into heaven and the body must buried [4].

Because Moses mediate the divine mercy from Israelite' sin of disobedience at the waters of Meribah Kadesh (Num. 20:12; Deut. 32:51), God not allowed him to enter in the Promised Land. Scholars have suggested God buried Moses secretly and without a grave marker to prevent the grave from becoming a shrine or a place of worship [5].

Deuteronomy records Moses' death and explains that God was in charge of the funeral arrangements and burial, but makes no mention of Michael's dispute with Satan. The burial customs specified in Jude v.9 make confusion with Joshua death affirmed in Zech. 3:1, but there is nothing there about Moses' body, or Michael, or a dispute about the body. Others scholars, again, make confusion to a rabbinical comment on Deut. 34:6, where Michael is said to have been made guardian of Moses' grave.

According Deut. 32: 49-50 God announced to Moses that he was to die at Mount Nebo, even Deut. 34:.5-6 remind us: 'So Moses the servant of the LORD died there, in the land of Moab, at the

command of the LORD. He was buried in the valley in the land of Moab, near Beth-peor; but no one knows his burial place till this day yet his burial took place in the valley of Beth-peor'. It is not surprising that God was involved directly in view of the secrecy surrounding his burial location, for if humans had buried him, surely someone must have known where.

Targum (Pseudo-) Jonathan translate Deut. 34:6 in this manner: 'Moses, the servant of the Lord, was gathered in the land of Moab by the kiss of the Word of the Lord', covering the historicity of sacred text with mistical and celestial overtones. His deathbed has been prepared by the angels (Michael and Gabriel) and a golden deathbed it is, adorned with precious stones.

Targum Onkelos from Deut. 34:7 express the presence of Samael (the angel of death) who fight with prophet to yield his soul. Because Moses refuse the messenger, God himself negotiate the place of his soul: in glory near the Throne, as recompense from his faithful leadership.

In Philo or Josephus [6] the angels do not participate at this stage, although there may be a hint in the As. Mos., of which the ending is famously lost, that the archangel Michael was sent to take care of his corpse (11.7).

Sifre Deut. §357 remind us about the Angel of Death who fails to fetch the soul of Moses ends without result, because he can't find any trace of Moses, soul or body [7]. In *Pseudo-Philo God* says to Moses: 'I will take you from here and lay you down to sleep with your fathers, and I will give you rest in your resting place and bury you in peace. All the angels will mourn over you, and the heavenly hosts will grieve. But no angel nor man will know your sepulchre in which you will buried' [8]. (LAB 19.12).

In Moses' case jewish pseudoepigraphica emphase the assumption of prophet, as in Enoch or Abraham, with soul and body, as new being or monad.

Spiritual being arround Moses body

A syntesis of defunct respect in Christian world, are linked the Scripture with picture, in iluminated manuscripts or in painting artefacts. The canonisation process of Bible text, ended in 4th century AD have adopted apocryphal writtings from Second Temple Judaism. Searching a guide from canonical picture, as will be Hermeneia of Dionisie from Furna, painters have oscilate between biblical scene and originals representations. Three samples of pictural art are discussed below.

1. The first part of *Bibles moralisees* (cca 1233), kept in Oxford Bodleian Library, (Bodley 270b), on fol. 93v preserve the cycle of story about Moses acts described in Deuteronomy. In the iluminated manuscript folio, on top right medalion is picted the adormition of Moses. Three angels deposed his body in tomb, under vigilent God survey and blessing (Fig. 1).
2. In *Russian icon Michael the Archangel and biblical scenes*, (c. 1410), (Fig. 2) on top right is represented the scene of dispute from Moses body. This biblical cycle dedied to Michael surprised by one moment of dispute against devil: the admonition fom Jude v.9 who represent the spiritual forces in front, with Moses body in middle of scene. Michael are coloured garments; devil spirit is represented in black colour (Fig. 3)
3. Michael dispute from Moses body on *Sucevita monastery*

The dispute of Michael' archangel with Devil from Moses' body is depicted in Humor and Sucevita burial chamber (Fig. 4). The painting in tomb chamber from Sucevița trace the biblical account described in Exodus, Numbers and Deuteronomy books, the entered text inspired used not word for word the painting of Pentateuch scenes. The existence of a collection of biographical type texts for major biblical figures (Abraham, Moses, Elijah) may be the answer to the freedom the painter details or avoid certain scenes from the canonical sequence of events.

Among the 41 scenes from the life cycle of Moses, we find some that are strung from sources other than the Bible. Thus, there is the scene of "Joshua Navi finding Moses dead", reflecting the Num 34.5 interpolated text; at "The Israelites complained to Moses" whose incipit is for Deut 34.8, we found a deviation from the canonical text. The "fight with the devil angel body of Moses" scene has damaged inscription, with damaged text, hard to decipher it [9].

In the dispute between Satan and the archangel Michael regarding the burial of the body of Moses, the latter did not personally reject the devil's malicious slander. Whatever is the reason for the dispute, Satan lost the battle. The dispute expressed in Jude v.9 word "the Lord rebuke thee" are verbal aspects, symbolized in Sucevita painting by Michael spear used with right hand against the devil situated on Moses foot. The Moses tomb, situated between two mountains, is visited by five devils spirit, without garments. Only phylacteries on forehead reveal the death men religion. Moses has a quiet full face, a golden halo across his head and folded hands over red garment. Moses name is inscribed in heaven, on

stars place.
Under eastern Orthodox or Catholic influence, the princes and boyars of Moldavia and their families would benefit from the right to be buried in the church as a consequence of patronage. This highlights Michael's role in funerary iconography, while the issue of salvation, intercession and responsibility is also represented' [10]. Any slander brought against the faithful dead, such as the challenge posed by Satan against Israel's great leader, is seen by Jude as a challenge to God's honor. Ieremia Movila, the founder of Sucevita Monastery, on tomb stone from burial chamber has text this message in Slavonic:
'This tombstone was made embellished by the lord Gabriel, former stolnic for the deceased, just and pious, loving Christ, our Io Jeremia Movila Voevode prince, by the grace of God, lord of the land of Moldova. May his memory be eternal and happy rest. In the year 7114 (1606) on June 30'.
The Supreme Judge is presents as the one who protect the good name of the faithful, in life and in death. The righteous at least continue to exist post-mortem by means of their good name [11]. Jude's readers are thus assured that God protects the integrity of the faithful dead.
The conclusion of Moses life cycle, as perfection through virtue, can be also the conclusion from Suceviţa cycle: "made us afraid of one thing: the fall of friendship with God' [12].

CONCLUSIONS

The admonition from Jude v.9, in Church moral interpretation, became a source to keep the god name and pious remember from deceased. Michael's message against devil, recorded in As. Mos. and canonized in Jude v.9, is advertising from careful evaluation of moral and social acts, because only God can't mistake in His judgment. The biblical message about Michael' dispute from Moses body is expressed in few Christian pictures. In three special scenes it was showed that believer man live after death in spiritual sense, only in relation with God.

BIBLIOGRAPHY

[1] R. Bauckham. Jude Peter. Word Biblical Commentary, vol. 50, Word Book, Waco (1983) 60.
[2] J. D. Charles. Jude's use of pseudepigraphical source-material as part of a literary strategy. New Testament Studies, 37 (1991) 130-145.
[3] J. Tromp. The Assumption of Moses: A Critical Edition with Commentary. Brill, Leiden, (1997) 152.
[4] K. R. Lyle. Ethical admonition in the Epistle of Jude. In: "Studies in Biblical Literature 4", Peter Lang, New York, (1998) 67.
[5] S. J. Hafemann. Moses in the pocrypha and pseudepigraphica: a survey. Journal for the Study of the pseudepigraphica, 4 (1990) 79-104.
[6] J. D. Tabor. Josephus, Ant. 1.3.4, §85. Returning to the Divinity: Josephus's portrayal of the disappearances of Enoch, Elijah and Moses, Journal of Biblical Literature 108 (1989) 225-238.
[7] W.F. Smelik. The lost tomb of Moses revisited: Targum Pseudo-Jonathan on Deut 34.5-6. In: "The Targums in the light of traditions of the second temple period", T. Legrand & J. Joosten (eds.), Brill, Leiden, (2014) 141-172.
[8] H. Jacobson. A commentary on pseudo-philo's liber antiquitatum biblicarum with Latin text and English translation. AGJU, 31, Brill, Leiden, (1996) 247.
[9] C. Costea. „... Ziua în stâlp de nor..." Despre viaţa lui Moise la Suceviţa. In: "Movileştii: istorie şi spiritualitate românească", vol. 3, Sf. Mănăstire Suceviţa, Suceviţa, (2013), 31-33.
[10] M. Crăciun. Apud ecclesia: church burial and the development of funerary room in Moldavia. In: "Sacred Spaces in Early Modern Europe", Will Coster, Andrew Spicer (eds.), Cambridge University Press, Cambridge, (2005) 161.
[11] S. J. Joubert. When the Dead are Alive! The Influence of the Living Death in the Letter of Jude. HTS Teologiese Studies / Theological Studies, 58 (2002) 576-592.
[12] Sf. Grigorie de Nyssa. Viaţa lui Moise. In: "coll. PSB vol. 29", IBMBOR, Bucureşti, (1982) 91.

Fig. 1 - Bibles moralisées
http://warburg.sas.ac.uk/vpc/VPC_search/mirror_subcats.php?cat_1=14&cat_2=53&cat_3=112&cat_4=3405&cat_5=3117&p=1

Fig. 4 - Michael dispute from Moses body, on chamber tomb of Sucevita monastery

Fig. 2 - Russian icon Michael the Archangel and biblical scenes, (c. 1410)
http://en.wikipedia.org/wiki/Archangel_Michael_in_Christian_art

Fig. 3 – Detail of Russian icon Michael the Archangel and biblical scenes

TEMPLE AS A TRANSITION BETWEEN THE SACRED AND THE PROFANE SPACE

Zimanová Lucia[1]

[1] Constantine the Philosopher University in Nitra, Faculty of Arts, Department of philosophy, Hodžova 1, 949 01 Nitra, lucia.zimanova@ukf.sk

ABSTRACT

In this article we focus on conceptual and relational analysis of the profane and sacred space with emphasis on temple as a place of transition between them. Chaos is representation of something unknown, what is beyond "our world", what does not apply any schedules from which it is possible to have a concerns, because there is a risk of the unknown. Cosmos is on the opposite side occupied territory, which is known to people, it is "our world", which has own law, is governed by rules and for man it is a familiar place. The difference between profane and sacred space leads us to reflect on them and take a question if they can coexist together. Through the hierophant is the homogeneous space re-created into an inhomogeneous space, which means that there is a space in which is border between chaos and cosmos. Hierophant creates a fixed point, which becomes a transition between profane and sacred space. Around this place are formed buildings, temples, and life takes place in "our world". These points are imago mundi - the image of the divine world and they are located immediately near to break, "fixed point". In fixed point are reflected all three cosmic levels (earth, haven and underworld). We can say that the center of the world is what links the profane and the sacred space. Between profane and sacred space is forming correlation, although they have different perception of reality. Their relationship is symbolized by the middle of the world, the break, in which we find as secular as well as sacred at the same time. We will not see these two types of space as an absolute dichotomy. Although there are fundamental differences in experience and specific of religious and non-religious, the fact is that without initial homogeneous space could not be allocated sacred space.

Keywords: profane, sacred, space, tample

INTRODUCTION

The foundation for Eliade's archaic ontology is sacrum, sacred. The term was defined in E. Durkheim's and R. Otto's works in the early 20th century. For Eliade, sacred is a form of psychic experience through which he explains phenomena and things that cannot be explained any other way. He is convinced that every religion at its core is a testimony to the sacred manifested in the religious experience [1]. Basic terms Eliade works with within hic archaic ontology, besides sacrum – sacred, are profanum – profane, hierophany, kratophany, numen – divine, cosmogony, intersection, fixed point, theophany, evocatio – evocation, imago mundi – image of the world, axis mundi – centre of the world, and consecration.

THE SACRED AND THE PROFANE SPACE - HIEROPHANY

Eliade explains the difference between the sacred and the profane space by the way of hierophany, meaning appearance of the sacred. Hierophany is tightly bound with religious experience, through which terrestrial objects and phenomena are seen as sacred. Profane space becomes sacred via hierophany and kratophany, kratophany being the appearance of divine power at a certain area or place. While hierophany can occur naturally and afterwards only be discovered or invoked by means of a ritual, kratophany does not inevitably occur. Sometimes, hierophany is derived from kratophany, the divine power being manifested directly, i.e. god or gods are demonstrating their effect on people. The sacred space, though, is not set by a person himself or herself; he or she is uncovering it.

The sacred space differs from the profane space in that it is non-homogenous, real, there is order, and intersections can be found. On the contrary, the profane space is homogenous, compact, and most of all it represents chaos. Homogenous space is a space without fastening point, which is there to provide a sign that a person can inhabit the space, being safe from any danger. Hierophany disrupts the homogeneity of profane space and creates a non-homogenous, sacred space. The sacred is demonstrated through signs – theophany – as something divine and holy. If this sign does not reveal itself, archaic man is able to invoke it through rituals [1].

Theophany and evocation are also connected with

7th European Symposium on Religious Art, Restoration & Conservation
Trnava, 4th-6th June 2015

hierophany and with direct manifestation of the sacred at a certain place. Theophany is an appearance of the divine, not being the actual hierophany or kratophany. It is bound with myths and legends, thus being places where something supernatural occurred, or myths that warn us not to practise certain kinds of behaviour and desecration. This supernatural can be invoked through ceremonies and certain operations. However, evocatio is not only the evocation, but a challenge as well; a challenge to discover the sacred and with it the centre of the world, the fixed point. "Fixed points" are also present in the profane space. Although they are not transcendence of the sacred, they enclose equally strong meaning for the profane man. They are permanent, giving people assurance that they belong somewhere, giving their actuality some value and therefore giving the value to existence. Example of such a "fixed point" can be someplace a person grew up and continues to return there [21].

TEMPLE AS AN INTERSECTION BETWEEN THE SACRED AND THE PROFANE SAPCE

Temple is a typical example of the transformation of the profane space into the sacred space. It is an imitation of the celestial source. It represents the intersection of hierophany and crossing of all three levels (earth, heaven and underworld). This can be sensed by a religious man as well as a non-religious one. For a religious person a temple portrays a reflexion of the antithesis of the profane and the sacred space. It is not only imago mundi, but a "terrestrial imitation of transcendent model" as well [1]. The role of a temple is re-sanctification, sacralisation of the world it represents. At the same time, it deepens the ontological difference between the cosmos and the sacralised contents, thus between the world of gods and ours, which we have to sacralise to free if from chaos. The temple itself is imago mundi, image of the gods' world, which transcends into our world through the temple.

As an example of the transformation of profane to sacred, and vice versa, we have Cathedral Basilica of Our Lady of Chartres. Its foundation and miracles connected to the cathedral itself have been a subject of lively discussions for centuries now. The most widespread story, founded on a number of historical sources, tells a tale of the reconstruction of the Cathedral, beginning in 12th century. During the reconstruction, a fire destroyed predominant part of the original cathedral. Fires were not unusual at those times, yet this particular one had been linked to a local relic – Blessed Virgin Mary's tunic. The fire was supposed to symbolise her anger and loss of love for the Chartres Cathedral. By this gesture, she left the cathedral and took the relic with her. Undergoing such a strong religious experience was not a rarity in middle ages. A fire symbolised a reverse hierophany – a place is not sacralised anymore, it lost its original religious meaning. The burnt down temple became a symbol of abandoning a place, now bearing no religious relevance. If the Chartres Cathedral was destroyed and left without its relic, religious people would interpret it as Virgin Mary's loss of goodwill towards Chartres, therefore punishing them for their sins. Believers presumed the fire destroyed the Virgin Mary's tunic as well [2].

Sources dated to this period depict a miracle – the rescue of Virgin Mary's tunic by few brave people who entered the burning cathedral and carried the tunic into Fulbert's crypt. Iron door protected the tunic as well as the rescuers. Therefore, when they came out of the cathedral, it was obvious this deed would be considered a miracle and a reason to restore the cathedral; the divine power reappeared and re-consecrated the place by saving the relic and the rescuers [2].

Virgin Mary's tunic was not the only thing to symbolize appearance of the sacred in the cathedral. In the crypt, with surface area resembling underground temple, stood a well with healing water, sought after by many travellers. Also, in the cathedral, there was a wooden statue of Virgin Mary, destroyed during the French Revolution. Both these symbols are the main topic for art historians; the well in particular, dating back to Roman era. Therefore being a demonstration of the sacred with deep tradition, according to the people of Chartres it had been consecrating the town and its surrounding for centuries [3]. Holy well, Virgin Mary's tunic and the wooden statue of Virgin Mary were evidence of intersection for religious people, connecting our world with the God's one. There was no doubt this was the place where cosmic levels were crossing. However, the Chartres' labyrinth raises even more interest than dried out holy well or Virgin Mary's tunic.

Despite many myths surrounding the labyrinth in the gothic cathedral, art historians remind that labyrinths were typical embellishments of many churches during the early middle ages. Origin of this custom lies with Roman customs of building an entrance to the house behind the labyrinth supposed to discourage evil spirits from entering [2]. This custom is found to also be linked to

cathedrals. Labyrinth situated right behind the entrance could represent the transit from profane to sacred world and, at the same time, barrier to keep the evil outside. Some unverified theories state that at a certain time of the day, the circular shape of labyrinth blends with the light coming through a rosette on the west side of the cathedral. Supposedly, this symbolises connection between the terrestrial and the celestial world. This notion was so rooted that for a long time no doubts were raised against it. Supported by very similar perimeters of the rosette, with 11,9 meters, and the labyrinth, with 12,9 meters, this opinion stood unquestioned[1]. In reality, though, inclination of the light and distortion of the rosette's reflection will never allow for the colourful reflection from the west façade to perfectly match with the labyrinth [4]. There are two opinions considering the Chartres' labyrinth which we could incline to. Either it has a deeply mystical origin or it is a part of architecture rooting back to Roman Empire which lasted into the early middle ages.
Similar labyrinths were found in cathedrals across Europe, but reconstructions eliminated them. Chartres' labyrinth was supposed to find the very same fate, for a very profane reason: children and adults alike used the labyrinth as a playground during services, inevitably disturbing them. Jean Baptiste Souchet commented upon this fact in 17th century [2]. However, due to the lack of finances to install new flooring, the labyrinth was spared.

RESULTS

Notional and causal analysis of profane and sacred space was given in the article. Their relationship was examined through the terms hierophany, kratophany, intersection, fixed point, theophany, evocatio (evocation), imago mundi (image of the world) and axis mundi (centre of the world). A temple was analysed as an example of the transition between the sacred and the profane world. Cathedral Basilica of Our Lady of Chartres was examined, based on historical sources, from the viewpoint of sacral manifestations, which is linked to Virgin Mary's tunic, the well with healing water and the wooden statue of Virgin Mary.

CONCLUSION

Differences between the sacred and the profane world exist. Division of the sacred space is connected to religious experience. Man gives meanings to objects and space, and they are becoming sacred for him. In this context we consider hierophany a display of the sacred. Religious person perceives the profane world as short on order, as unreal world without true existence. A relationship is built between the profane and the sacred. While religious person wants to be as close as possible to the centre, hierophany, and the sacred, non-religious person does not perceive them or give them meaning. A temple is a place where the sacred world meets the profane world and the sacred is manifested through various phenomena, relics, legends, fables etc.

ACKNOWLEDGEMENTS

The contribution is a component presenting of results of research task UGA n. II/7/2015 "The current views on secularization and their criticism" solution on the the Department of Philosophy at the Faculty of Arts, Constantine the Philospher University in Nitra.

BIBLIOGRAPHY

[1] M. Eliade. Posvátné a profánní, OIKOYMENH, Praha (2006).
[2] P. Kováč. Katedrála v Chartres. Eminent, Praha, (2007).
[3] R. Branner. Chartres Cathedral. Norton Critical Edition, W W Norton & Co Inc, (1969).
[4] J. Saward. The Chartres Cathedral Labyrinth - FAQ's. Dostupné online [http://www.labyrinthos.net/chartresfaq.html, cit 25.7. 2013, (2009).
[5] R. Schaeffler. Filosofie náboženství. Academia, Praha, (2003).
[6] R. Schaeffler. Náboženská kreativita a sekularizace v Evropě od osvícení. In: "Dějiny náboženského myšlení IV". OIKOYMENH, Praha, (2007).
[7] T. Alliband. Quest for the structure of the sacred. In: "Kritika & Kontext". Bratislava, (1998).
[8] J. Komorovský. Archaická ontológia v religionistickej koncepcii Mirceu Eliadeho. Filozofia, 50 (1995) 585-592.
[9] M. Eliade. Mýtus o věčném návratu. OIKOYMENH, Praha, (1993).
[10] M. Eliade. Dejiny náboženských predstáv a ideí. OIKOYMENH, Praha, (1995).
[11] M. Kováč. Mircea Eliade ako filozof dejín. In: "Kritika & Kontext". Bratislava, (1998)
[12] G. Buss. "Hlad po transcendenci" Křesťanský pohled Charlese Taylora na sekulární věk. In: "Salve – revue pro teologii, duchovní život a kulturu". Krystal OP, s.r.o, Praha, (2009).
[13] C. H. Taylor. Sekulární věk. Filosofia, Praha, (2013), ISBN: 9788070073933.
[14] J. S. Stedman. The concept of belief in The Elementary Forms. In: "On Durkheim´s

elementary forms of religious life". Routledge, New York, (2002).
[15] I. P. Culianu. Dualistické gnóze Západu. Agro, Praha, (2008).
[16] H. De Dijn. Veda a náboženstvo. In: "Kritika & Kontext". Bratislava, (2011), ISNN 1335-1710.
[17] B. Horyna, H. Pavlincová. Dějiny religionistiky. Nakladatelství Olomouc, Olomouc, (2001).
[18] E. W. Paden. Bádání o posvátnu. Náboženství ve spektru interpretací. Ústav religionistiky Filozofické fakulty Masarykovy unviersity v Brně, Brno, (2002), ISBN: 80-210-2977-3.
[19] C. H. Taylor. Subtílne chápanie západnej modernity. In: "Kritika & Kontext". Bratislava, (2011), ISNN 1335-1710.
[20] P. Židek. Eliade z pohľadu slovenskej teológie. In: "Kritika & Kontext". Bratislava, (1998).
[21] J. AL-Ali. Mediálna gramotnosť- predpoklad pre šírenie kultúrnych tradícií. Konštantínove listy. 6 (2013) 161-167.
[22] V. Jakubovská, L. Zimanová. Filozoficko-estetické reflexie profánneho a sakrálneho. UKF, Nitra, (2013) 86, ISBN 978-80-558-0489-7.

NOTES

[1]According to The Chartres Cathedral Labyrinth - FAQ's, author Jeff Saward. Petr Kováč states similar labyrinth perimeter, i.e. 12,855m.

B - CONSERVATION AND RESTORATION OF RELIGIOUS CULTURAL HERITAGE

TECHNICAL RESCUE WORKS ON THE CONSTRUCTION OF THE SAINT ANNE'S CHURCH IN WARSAW AS AN OPPORTUNITY TO STUDY THE TECHNIQUE, TECHNOLOGY AND ICONOGRAPHY OF THE XVIII CENTURY MURAL PAINTINGS.

Katarzyna Górecka[1]

[1] Academy of Fine Arts in Warsaw, Faculty of Conservation and Restoration of Art, Wybrzeże Kościuszkowskie 37, 00-379 Warsaw, Poland, katarzyna_gorecka@wp.pl

ABSTRACT

The paper discusses the necessity of comprehensive approach to a monument on the example of the conservation work carried out in the Saint Anne's academic church in Warsaw. It is important to save the material substance together with the cultural context of the object, which requires full understanding of its iconography and religious content. The Saint Anne's church was built on the slope of the Vistula river in the XVth century. It was a temple of the Friars Minor Order. From the beginning such a location of the building caused a lot of construction problems. The necessity of recent rescue works (in 2013) in the nave of the church was an opportunity for conservation and restoration of the polychrome decoration, dating from the XVIIIth century, created by one of the monks, Valenty Zebrowski. The works on the construction became an occasion to carry out researches on the technique and technology of the paintings, as well as on their iconographic and religious message. During conservation works the iconography of the scenes was correctly interpreted, repaintings were removed and missing pieces of the original composition reconstructed in a new way.

Keywords: baroque mural painting, Valenty Żebrowski, iconography, emergency technical works

INTRODUCTION

St. Anne's church in Warsaw was founded by princess Anne of Masovia in 1453 for the Minor Order Friars brought from Cracow. A small gothic building was expanded in the XVIth century by adding of a huge nave. In the XVIIth century the building was increased and obtained a new vault. The present furnishing and decoration of the church dates from the XVIIIth century. Between 1743 and 1750 one of the monks - Valenty Zebrowski accomplished a mural painting decoration in the church interior based on the extensive iconographic and religious program. The artist was born in Lubawa in the early XVIIIth century. He joined the monastery and became a painter of many monastic churches in Poland. He died in 1765.

The mural paintings from the St. Anne's church were renewed several times; in the XIXth century most of them were repainted. The church, as one of the few in Warsaw, wasn't destroyed during II World War. Although the roof of the building was damaged by the fire, the ceiling and walls have survived. In the 70's of the XXth century the damaged paintings were restored and missing elements were reconstructed [1].

The church building due to its location has been always exposed to structural problems caused by the subsiding of the Vistula escarpment. In the 50's during the construction of the WZ (East-West) road running along a tunnel close to the church and over the bridge to the other side of the Vistula, the slope stability has been disturbed. The foundations of the church and vault structure began to break due to the subsiding of the north - eastern part of the chancel. Immediate intervention prevented the temple from collapsing. The ground around the building was reinforced with columns and the foundation was encircled by a concrete wreath. The state of the building structure is constantly monitored. Recently new cracks on the ceiling and walls have been noticed. The slope movements have been diagnosed by inclinometers placed 20m below the ground level.

In the years 2010 - 2013 r. some brick elements got loose in the widow lintels and dangerous delamination of the plaster on the north wall was observed. A serious structural rupture of the wall ran along the north facade (in the last span). In the upper part of the wall appeared a structural dissection of the brick wall above the window in the second storey. The rupture was more than 1 cm wide and reached approximately 45 cm into the wall, the loose wall moved forward and downward. Repeatedly fixed stucco elements and cornices broke again.

MATERIALS AND METHODS

Technical rescue works on the building construction

Conservation and restoration of the painting

The rescue works have been undertaken on the northern wall of the church nave in December 2013.The acoustic researches and infrared detection of the cracking and delamination of the plaster were executed [2]. The heterogeneous wall structure (numerous repairs, an old church window and buttress) have contributed to the serious structural cracks. The works undertaken in 2013 consisted of the hanging of the window lintel by introducing a system of the anchors fastened by a steel beam placed on the vault ceiling. In this way the wall burden was reduced. A part of the wall was re- bricked. The stucco elements were removed, consolidated and re-glued in the same place. The crevices and cracks of the walls were filled with the mortar of reinforced durability. A special committee was appointed to work on the project of the slope movement stabilization.

The conservation works on the mural paintings were also carried out. The surface of the paintings was cleaned from dust and dirt. The old patches and cement putties were removed. The original polychrome by Valenty Zebrowski was uncovered from repaintings and retouchings. The technique and technology of the paintings were diagnosed with the use of chemical analyses. The traces of the original drawing (on preserved plaster surface) were read by the UV induced fluorescence method. The scenes were identified and the reconstruction of the missing parts of the composition was carried out.

RESULTS

Technique and technology of the painting by Valenty Zebrowski

Reconstruction of the missing parts methodology

The mural paintings by Valenty Zebrowski date from 1750 to 1764. They were carried out in secco technique on the lime mortar with coarse quartz filler. The artist's palette consists of the following pigments: ocher, red iron oxide, smalt, white limestone, black wood and green earth. This is the third in order of the painted decorations of the church interior. Under the XVIII-th century plaster some relics of the earlier polychromes were discovered. Owing to the UV induced fluorescence photos the original composition of the scenes was discovered. The method is based on the phenomenon of fluorescence emission by various materials. Therefore, even if the painting has not been preserved, the traces of the painting binder absorbed by the plaster surface are still visible in the UV light [3].

In part of the painted cartouches some lost elements of the composition have been identified. The painting presents a sitting woman with a landscape in the background. Her head is surrounded by an aureole, with her face turned to the left, right hand resting on the heart while the left one is placed on an open book and points to a piece of text. The cartouche pole is painted in tones of blue - gray, "en grisaille" resembling a relief in stone.

In the UV light some unknown elements of the composition became visible: a broken column, books and volutes surrounding the cartouche. The scene is crowned with a Latin sentence, written on the band above: "GLORIA EIUS REQUIESCET". This quotation from the Book of the Wisdom of Sirach (in translation reads: WILL BE REST IN HIS GLORY Sir. 14.27).

The sentence is a kind of blessing for the sage who by virtue of Wisdom will find favour in the eyes of the Lord. The painting used to be interpreted as a personification of Wisdom, but it could also present the prophetess Deborah, the only woman who led the Israelites in the Age of Judges.

A special wisdom of the woman was suggested by accompanying attributes: books and scrolls of the scripture. This interpretation fits the iconographic program of the entire interior painting, where the heroes from the Old Testament are presented in the cartouches. During the restoration work old reconstructions and retouching were removed. The scene regained its true message and original artistic expression [4].

CONCLUSIONS

The most important conclusions are:

- conservation and restoration work should be accompanied by a full recognition of the iconographic content and sacral meaning
- reconstruction should be based on the source and in-depth studies of the polychrome relics
- particular fragment of the wall paintings cannot be interpreted in isolation from the whole monument and its cultural context
- even engineering and technical works on the monument can be an opportunity for research and better understanding of the religious and iconographic meaning.

ACKNOWLEDGEMENTS

The author wishes to express her thanks to Marta Gościcka MA in Conservation and Restoration of Art for her support in conducting of the conservation project and to M. Sc. Eng. Grzegorz Osowicki, responsible for the masonry works on the church construction, for his technical assistance. The conservation works on the stucco elements and cornices were carried out by Architraw Company, Krzysztof Olszowski MA and Piotr Gałecki MA. The works presented were supported by the Municipal Office of Warsaw.

BIBLIOGRAPHY

[1] D. Kaczmarzyk. Kościół Św. Anny, PWN, Warsaw, (1984) 204-221.
[2] E. Grinzato, P. Bison, S. Marinetti, V. Vavilov. Nondestructive evaluation of delaminations in fresco plaster using transient infrared thermography. Research in Nondestructive Evaluation. 5 (1994) 257-274.
[3] J. Rogóż. Zastosowanie technik nieniszczących w badaniach konserwatorskich malowideł ściennych. UMK, Toruń, (2009) 24-50.
[4] E. Panofsky. Studies in Iconology: Humanistic Themes in the Art of the Renaissance. Harper & Row, New York, (1972) 5–9.

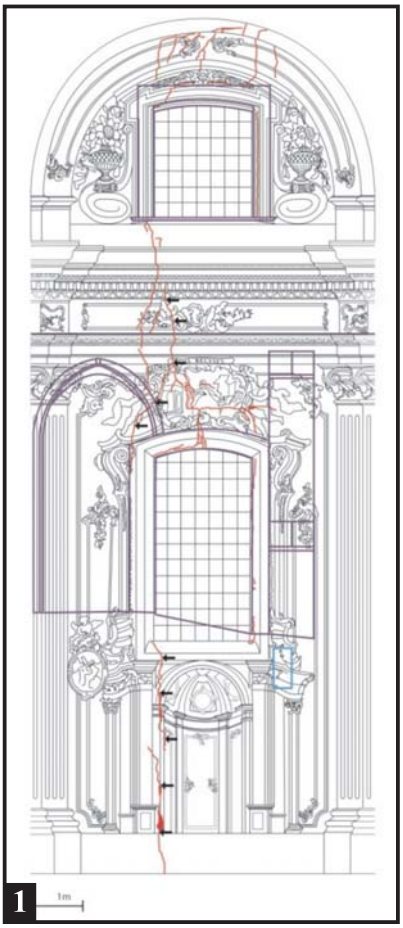


Fig. 1 – Cracking of the north wall, by B. Rabiej

Fig. 2 – Removing of the old reparation.

Fig. 3 – UV light investigation.

Fig. 4 – Cartouche, state after conservation and reconstruction of the missing elements.

PAINTING TECHNIQUES OF ROMAN MURAL PAINTING, NAPLES, ITALY

Hidaka Midori[1]

[1]Tokyo University of the Arts, 12-8 Ueno-park Taito-ku 110-0007 Tokyo, Japan, makadih3531@gmail.com

ABSTRACT

This study focuses on painting techniques of blue pigment in mural paintings of an archaeological site near Naples. A tympanum (*Room 1*), murals of two rooms with apses (*Room 7, Room 10*) and a small space between two apses (*Room 9*) in the excavated area are all decorated by mural paintings. The paintings are thought to be painted between 3rd-5th century [1], which still remains as a matter of research. The author carried out a documentation survey in-situ and a chemical analysis in laboratory, in order to understand precise state of material used in the mural paintings of each *Rooms*. Analyses revealed that those mural paintings differ in particle size of pigments and the structure of painting layers, which indicates the difference in painting manual.

Keywords: mural painting, painting technique, fresco

INTRODUCTION

Somma Vesuviana is an archaeological site in a little village near Naples. The mural paintings can be found in four *Rooms*. (1) A tympanum is placed in the southern end of *Room 1*, and there are plant and fruit patterns decorated on its surface. (2) *Room 7* is an apse in which images from myth were depicted. Although the detailed information cannot be known, there is another painting under the top-most painting. (3) *Room 10* is placed in the nourth-western side of *Room 7*. Also in this *Room*, there are two different strata of mural paintings. Imitation pattern of marble stone decorates the the top-most stratum, and plants with birds are painted on underlying stratum. Although the *Room* shows traces of later modification of structure in upper part of walls, mural painting is still observable and less restored than in other *Rooms*. (4) *Room 9* is the small space between *Room 7* and *Room 10*, nearly rectangular in its ground plan. Although half of the mural painting had collapsed, plant pattern, linear frame and depiction of human can be observed.

Depiction of plant pattern and linear frame is in common to the four mural paintings, though according to close observation in-situ, depiction by blue pigment presumed to be different in its material and the technique of application. Author assumed that the paintings are depicted following different manuals. After examination in-situ, samples were taken from blue surface of four mural paintings in the site, in order to understand the components of material and the detail structure of painting layer. Concerning *Room 7*, since most part of the painting was determined to be repeatedly restored, research spot was chosen from the north pillar of which the decoration belongs to underlying stratum, where original painting was thought to be most well-preserved. While in *Room 10*, analyses were done both on the top-most painting layer and on the underlying painting layer. During analyses in laboratory, the classification of painting techniques was exmined. The classification into three types of painting techniques was shown by the author through analysis of Romanian mural paintings from 17th century [2]. The aim of this analysis was the verification of correspondence of the classification to Roman mural painting. The criterion for classification is the distribution of calcium and pigment component in the pigment layer.

METHODS

After close observation of the mural paintings in-situ using protable microscope (SUGITOH TS-8LEN-50WT) and analysis by XRF (X-ray fluorescence analyzer), the author has taken 13 samples from four spaces decorated with mural paintings: *Room 1*, *Room 7*, *Room 9*, *Room 10*. The samples were analysed under following equipments:

1. Analysis by detecting elements

XRF (X-ray fluorescence analyzer) was applied to detect elements contained in mural paintings.

2. Analysis by elemental mapping images

Small amount of samples taken from the mural paintings are put into epoxy resin, and polished after its solidification in order to observe sectional structure. Then, SEM (Scanning electron microscope) is applied on the cross-section samples to take elemental mapping images. This research process gives important information for understanding structure of pigment layer.

OUTCOMES

The mural paintings basically consist of two supporting layers of lime mortar and pigment layers. Pigments used in the paintings are presumed as follows: yellow ochre, carbon black, iron-oxide red, earth green, lime white, azurite and lapis lazuli.

Concerning blue pigments, the analyses revealed several facts that suggest the difference between four mural paintings. Firstly, two kind of blue pigments were found by XRF analysis (Fig. 1): one contains Cu as main element, which thought to be azurite; the other contains Na, Si, Al, Ca and S, which thought to be lapis lazuli. The former were found in *Room 1* and in the upper stratum of *Room 10*, the latter was found in *Room 7*, *Room 9* and lower stratum of *Room 10*. Azurite was the most popular blue pigment in European mural painting before the widespread use of smalt, despite its weakness to alkali which gives limits to the methods of the application to wall. Lapis lazuli has always been treated as valuable and precious pigment, can be applied by any technical method, while has a complicate procedure in its preparation and purification from stone.

Secondly, adding to the clear difference in chemical composition of the material, the states of the blue pigments were not equal to each mural painting: particle size of blue pigment in lower stratum of *Room 1* was approximately 5~40μm, 30~50μm in lower stratum of *Room 7*, 60~80μm in *Room 9*, and in *Room 10*, 80~180μm in lower stratum and 10~50μm in upper stratum (Fig. 2). In *Room 1* and in lower stratum of *Room 7*, particle sizes were quite minor and there were no under layer of earth pigment, but in *Room 1* they succeeded to create fine light blue colour by forming thick layer of azurite, while in *Room 7* the depictation is not very clear and dense, even tinged in pale grey might be because of the absence of under layer and the finess of particle.

Blue pigments such as azurite and lapis lazuli are used in bigger particles than other pigments in order to keep its colour. When it grained into too fine particle, it easily changes to transparent greysh colour. Because of this reason, it is not easy to get sufficient coatability only by a blue pigment and it is normal to use black underlayer for optical effect. Though in this study, only some of the samples from *Room 9* and top-most stratum of *Room 10* had underlayer of earth pigment (yellow ochre or carbon black) between plaster and blue pigment layer.

Thirdly, each pigment layers are consisted of single pigment except in *Room 10*. Only in the lower stratum of *Room 10*, two or three pigments are mixed to form colour of light red or deep green.

Putting together all those information above, lower stratum of *Room 7* and *Room 9*, lower stratum of *Room 10*, upper stratum of *Room 10*, differ in material and procedure of application.

Lastly, concerning examination of the classification of painting techniques, analysis by SEM showed characteristic structure of pigment layer of *Buon-fresco* technique and *Mezzo-fresco* technique (Fig. 3). In *Buon-fresco* sample, there is no detection of calcium (main component of mortar) in the pigment layer, though a thin layer of calcium observes on the topmost surface. Samples of *Mezzo-fresco* technique, show calcium content in whole layers, which means that the pigment was sufficiently mixed with calcium before its application. The third technique is *Secco* technique, which calcium content can be found only in supporting layer and the pigment layer is totally separated from the supporting layer. From 13 samples analysed in this study, *Secco* technique sample has not observed.

CONCLUSIONS

The mural paintings found in one archaeological site of Somma Vesuviana are decorated with common iconography, while showed clear differences in chemical composition of material, the state of blue pigment, process of application. The analyses indicate that those paintings are depicted by the pigments produced from different recipes, and that probably painted in different periods.

Further analyses are expected in order to verify this hypothesis. The author is preparing to perform an analysis of XRDF (X-ray diffractometer equipped with x-ray fluorescence analyzer) for next step.

BIBLIOGRAPHY

[1] M. Aoyagi, C. Angelelli, S. Matsuyama. La Villa di Augusto a Somma Vesuviana (NA) alla luce delle più recenti ricerche archeologiche (campagne di scavo 2002-2008), AMOENITAS I., (2010) 177-219.

[2] M. Hidaka, K. Hidaka, J. Miyata. Technique of the mural paintings of the Hospital Church in Horezu Monastery. European Journal of Science and Theology, 11, June (2015) 241-252.

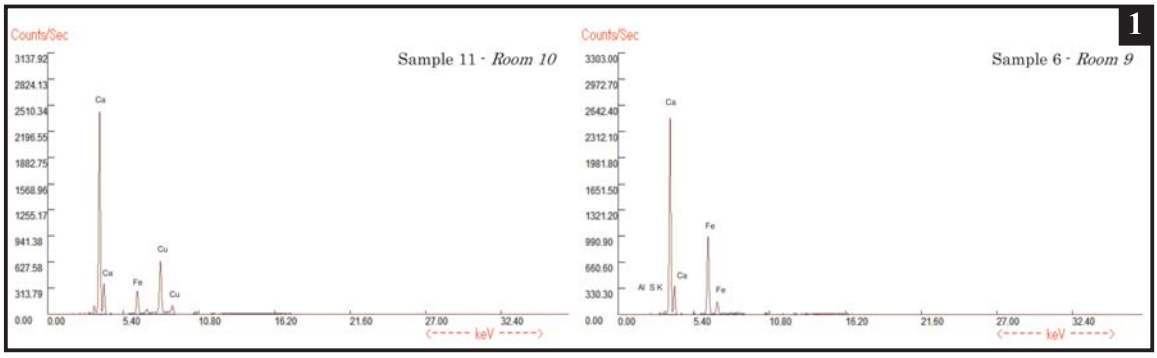


Fig.1 - XRF results which show contain of Cu (left) and Al, S, Si, Ca, etc. (right)

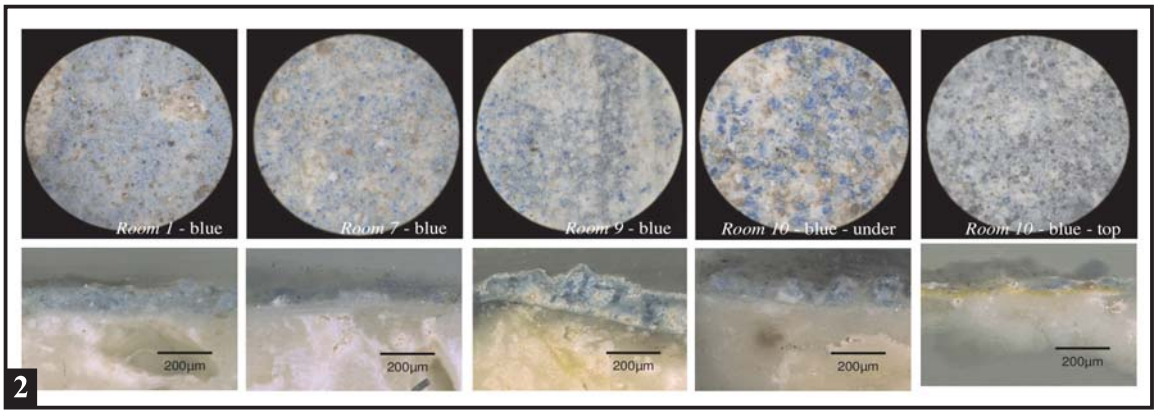


Fig. 2 - Microscope images which shows difference in particle size of blue pigment

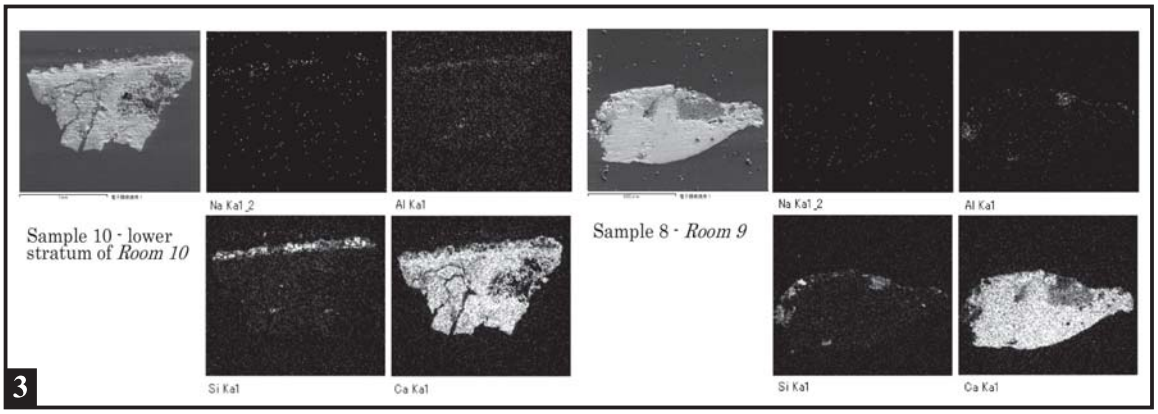


Fig. 3 - Elemental mapping images which show *Buon-fresco* technique (left) and *Mezzo-fresco* technique (right)

SPECTROSCOPIC STUDY OF AN ARMENIAN MANUSCRIPT FROM THE BIBLIOTECA UNIVERSITARIA DI BOLOGNA

Keheyan Yeghis[1], Baraldi Pietro[2], Agostino Angelo[3], Fenoglio Gaia[3], Aceto Maurizio[4]

[1]CNR, c/o Dipartimento di Chimica, piazzale Aldo Moro, 5 - Rome, Italy, yeghis.keheyan@uniroma1.it
[2]Dipartimento di Chimica, Università degli Studi di Modena e Reggio Emilia, via Campi, 183 - 41100 Modena, Italy, pietro.baraldi@unimore.it
[3]Dipartimento di Chimica, Università degli Studi di Torino, via P. Giuria, 7 – 10125 Torino, Italy, angelo.agostino@unito.it
[4]Dipartimento di Scienze e Innovazione Tecnologica, Università degli Studi del Piemonte Orientale, viale T. Michel, 11 – 15121 Alessandria, Italy, maurizio.aceto@mfn.unipmn.it

ABSTRACT

The *manuscript of Edessa*, a XVII century Armenian manuscript kept at the Biblioteca Universitaria di Bologna (Italy) as ms. 3290, has been thoroughly studied both from the artistic-historical and the diagnostic point of view. Non-invasive measurements have been carried out *in situ* with portable instruments in order to evaluate the pictorial materials used to decorate this beautiful codex, lavishly illuminated with full-page miniatures. The results of the analysis suggested that at least three different painters contributed in its illumination.

Keywords: Armenian manuscripts, spectroscopy, colourants, non-invasive

INTRODUCTION

Italy was for centuries a destination, a place of passage and sometimes adopted land of Armenians: soldiers, pilgrims, monks, merchants, princes and have always lived in the Italian cities. Traces of this secular presence, discreet but tenacious, remain in archival documents, inscriptions, monuments, place names, traditions [1]. In this work we want to help enhancing a particular expression of the Armenian culture that, through more different modes, became heritage of the Italian State: the Armenian codices kept in public libraries. It is known that Italy owns a significant part of Armenian manuscripts survived after centuries of difficult and often tragic history (other large collections are in Yerevan Museum of Ancient manuscripts): the most remarkable collections are at San Lazzaro (Venice), at Biblioteca Apostolica Vaticana and Pontificio Collegio Armeno in Rome, while several minor collections are present in other cities. As for the dating, most of the manuscripts are in the range XVI-XVIII centuries, but other are datable down to the XIII century. The themes are mostly religious: bibles, rituals, etc. Many codices from XIII-XIV centuries are related to the passage or permanent presence of religious Armenians in Italy. The first religious Armenians in Italian cities had a church and domus and are known under various denominations: *Basilian monks* or *bartolomiti*. In the early 30's of XIV century, the Dominican Order founded the *Societas Fratrum Peregrinantium*, with the specific purpose of bringing the Catholic doctrine in the East. Religious Armenians who joined the union with Rome took various names (*Friars of Unity of St. Gregory the Illuminator*) and took the dress and the rules of St. Dominic. So it started a remarkable activity in Armenian translation of works of theology and scholastic philosophy. The Dominican Order is one of the main scriptoria, so in Italian libraries there are codices containing works of Catholic doctrine in Armenian language.
In the Biblioteca Universitaria di Bologna (BUB), three manuscripts of different origin are kept: mss. 3290, 3291 and 3292 [2]. These manuscripts are from the personal collection of Pope Benedict XIV (1740-1758), the Bolognese Cardinal Lambertini, who gifted them to his hometown. The three codices, particularly valuable for running and thumbnails, are linked to an important historical moment for Armenian Church. In fact, after a long internal turmoil, in XVIII century it emerged in a part of Armenian people the will of an official recognition of the current Catholic Church who had, consequently, its own hierarchy directly dependent on the Holy See; this aspiration became a reality in 1742 when the archbishop Ardzivian from Lebanon came to Rome to receive investiture from the Pope. In that occasion, he brought with him some codices, more or less valuable, to pay homage to important

personalities, not realising that these items were important assets. Pope Benedict XIV, who consecrated him with a lavish ceremony, received as a gift three among the most valuable codes, which are now among the treasures of BUB. In particular, the Gospel ms. 3290 deserves attention because of the motifs in embossed silver and a cross on a gold background on its binding, and its rich decoration on the pages: it is an extraordinary example, for the profusion of colours and the accuracy of the performance, of the Armenian miniature of XVI-XVII century. The codex lacks a true imprint; after the ritual formula "ended on the Gospel John," a date "a. 1144" was added by a different hand and several inks; this date is absolutely inconsistent with the constitutive elements of the manuscript, suggesting therefore the suspect that it was added on purpose of increasing the value of the codex by backdating it.

Decoration: the codex is lavishly illuminated, with great profusion of gold in the background of the full-page miniatures, framed in architectural profiles; also, in the margins of the figures characters are brightened by gold contours. Striped mirror: 80x50 mm; 23 lines, in two columns (mm 23+4+23), parchment; red ink on vertical lines of justification. At the beginning of the book there are seventeen scenes from the Christ life as the Resurrection and the Ascension (ff. 23v and 24r). The Magi and stars are represented in the right margin of f. 33.

Scripture: bolorgir (ancient lowercase writing used from XI century), in black ink by hand only; erkatagir (ancient uppercase letters) of different colours for initial words.

History of the manuscript: it is usually known as *manuscript of Edessa*; its origin is not known specifically but one colophon states that it was done in Armenorum year 593 and Christian year 1144 (593 + 1144 = 1737) in the Ephraim Syri monastery at Edessa (Armenian Mesopotamia, presently belonging to Turkey) and given to Pope Benedictus XIV in 1743.

Analysis of the manuscript: The interest in analysing Armenian manuscripts lies in the fact that a wide diversity of pictorial materials may be expected: the Armenian world, in fact, at different periods in its history has been in close contact with Latin, Byzantine, Islamic and even further east civilizations. Ms. 3290 has been studied with non-invasive analytical techniques in order to identify the colourants used in its decoration. This information is relevant for appreciating the value of the artwork and for identifying the various hands that worked for its decoration. Three different spectroscopic techniques were used: UV-Visible Diffuse Reflectance Spectrophotometry with Optic Fibres (FORS), Raman Spectroscopy and X-Ray Fluorescence Spectrometry (XRF). All measurements were performed *in situ* with portable instrumentations, in order not to cause any damage to the manuscript.

MATERIALS AND METHODS

UV-Visible Diffuse Reflectance Spectrophotometry with Optic Fibres (FORS)

FORS analysis was performed with an Avantes (Apeldoorn, The Netherlands) AvaSpec-ULS2048XL-USB2 model spectrophotometer and an AvaLight-HAL-S-IND tungsten halogen light source; detector and light source are connected with fibre optic cables to a 1.5 mm diameter probe. The spectral range of the detector is 200-1160 nm; the best spectra resolution of the system, calculated as FWHM, is 2.4 nm. The investigated area on the sample is 1 mm diameter. In all measurements the distance between probe and sample is 1 mm. The instrumental parameters are as follows: 10 ms integration time, 100 scans for a total acquisition time of 1 s for each spectrum. The whole system is managed by means of AvaSoft 8 dedicated software running under Windows 7.

Raman Spectroscopy

A Horiba (Villeneuve d'Ascq, France) MicroHR model portable spectrometer was used for Raman analysis. The modular system is composed by a MicroHR spectrometer with 1200 gr/mm grating, a Synapse model CCD detector with 1024x256 pixels, a Modular Head model analytical probe head containing both notch filter and edge filter and a video camera for visualisation of samples, a microscope objective (20x, 50x and 80x) held to probe head, a He-Ne laser (λ = 632.8 nm) with an output power of 20mW (reduced by attenuation filters to less than 1 mW on the sample) and two optical fibre bundles to convey laser radiation on the sample and Raman scattered light from sample to the detector. With this optical configuration the spectral resolution is about 4 cm-1.

XRF Spectrometry

XRF measurements were performed with an EDXRF Thermo (Waltham, USA) NITON spectrometer XL3T-900 GOLDD model, equipped with Ag tube (max. 50 kV, 100 μA, 2 W), large area SDD detector, energy resolution of about 136 eV at 5.9 keV. Analysed spot had an average diameter of 3 or 8 mm and was focused by a CCD camera, with a working distance of 2 mm. Total time of analysis is 240s. The instrument is held in position with a moving stage allowing

micrometric shifts, in order to reach the desired probe-to-sample distance; the stage is laid on a sturdy tripod. The obtained spectra have been processed with the commercial software WinAxil, derived by the academic software QXAS from IAEA.

RESULTS

The information available on the colourants used on Armenian manuscripts is rather poor if compared to manuscripts from other cultures. The scientific literature contains few studies, among which the most relevant are those by Orna *et al.* [3 and references therein]. With few exceptions [4] these studies date back to the '80 and early '90 and are entirely based on invasive methods, i.e. upon withdrawal of microsamples. Such procedures are usually harmless for the sampled artworks (samples of less than 1 mm are taken with a surgical scalpel) but are not allowed at present in Italy, so that only non-invasive, *in situ* analysis can be performed.

The results of non-invasive analysis on ms. 3290 are described in the following. First at all, the book shows a peculiar binding in which an Au/Ag alloy was used for the background, while the embossed decorations were made with the *niello* technique, a mixture of black Ag2S and CuS widely known in goldsmithry artworks. Some pages in the manuscript with no writing are thoroughly coloured; a yellow page resulted to be dyed with turmeric, while other purple pages were dyed with brazilwood. According to the difference with the colourants used for miniatures, it is possible that these folios had been inserted later, maybe in a restoration intervention.

The list of the colourants identified in the miniatures is resumed in Tab. 1. On the basis of the colourants present, it is possible to hypothesise that at least three different painters worked at the decoration of the manuscript:

1. the first painter, working on the miniatures of the first folios (1r-8r), used indigo for blue, vergaut (i.e. indigo + orpiment) for green and orpiment for yellow;
2. a second painter, who was at work on the subsequent miniatures (e.g. 16v-18r), used ultramarine blue for blue, verdigris for green and yellow ochre for yellow; the use of ultramarine blue, favoured by the relative proximity to the source of the pigment, the precious stone lapis lazuli whose mines were at Badakshan in Eastern Afghanistan, indicates a wealthy commissioner;
3. a third artist worked on the side decorations present in several instances, e.g. at ff. 126r, 266r, 304r: he used smalt for the blue and malachite for the green areas. The presence of smalt is coherent with the palettes identified in XV century Armenian manuscripts [4 5].

In addition, all artists used cinnabar for red areas and minium for orange areas, lead white and carbon black for respectively white and black areas, and Armenian cochineal for violet and pink areas, sometimes highlighted with cinnabar. Gold is widely used throughout the manuscript both as gold foil and as gold shell. Two different substrates seem to be present: at f. 3r it is an Au/Ag alloy above an organic glue, similarly to the tradition of Eastern miniature, while at f. 163r it could be Au with traces of Cu on a lead white substrate.

CONCLUSIONS

Non-invasive analysis allowed to gain information on the pictorial materials used to decorate ms. 3290. The manuscript is illustrated with plenty of precious colourants (lapis lazuli, gold, cinnabar, orpiment, etc.); three different painters can be recognised all through the artwork, and every painter chose his own palette, with concern mainly to blue and green colourants, maybe according to the possibilities given by the commissioners.

ACKNOWLEDGEMENTS

Authors are indebted with Dr. Biancastella Antonino, head of Biblioteca Universitaria in Bologna, for allowing us to perform the analytical study on the *manuscript of Edessa*. Thanks to Sheila Anderson for technical assistance.

BIBLIOGRAPHY

[1] G. Uluhogian. Luigi Ferdinando Marsili e il catolicos armeno Yacob 6. Julayec 1. Ad limina Italiae. Ar druns Italioy. In viaggio per l'Italia con mercanti e monaci armeni. Eurasiatica - Quaderni del Dipartimento di Studi Eurasiatici, vol. 37, B.L. Zekiyan (ed.), Editoriale Programma, Padova, (1996) 199-216.

[2] G. Uluhogian. Catalogo dei manoscritti armeni delle biblioteche d'Italia. Indici e cataloghi - Nuova serie, vol. 20, Istituto poligrafico e Zecca dello Stato, Libreria dello Stato, Roma, (2010).

[3] M. V. Orna. Pigment analysis. In: "Armenian Gospel iconography. The tradition of the Glajor Gospel". Dumbarton Oaks Studies, vol. 29, T. F. Mathews and A.K. Sanjian (eds), Harvard University Press, Cambridge, (1991) 48-51 and 227-230.

[4] L. B. Brostoff, Y. R. Khan, T. Ohanyan, F. Hengemihle. Technical study of a fifteenth-century Armenian illuminated Gospel from the Verin Noravank monastery. Studies in

Conservation, 55 (2010) 62-68.
[5] D. E. Cabelli, M. V. Orna, T. F. Mathews. Analysis of Medieval pigments from Cilician Armenia. In: "Archaeological chemistry", ACS Advances in Chemistry series, J.B. Lambert (ed), American Chemical Society, Washington D.C., 205 (1984) 243-254.

Colours	I painter	II painter	III painter
black	carbon black	carbon black	carbon black
blue	indigo	ultramarine blue	smalt
gold	x	x	x
green	indigo + orpiment	verdigris	malachite
orange	minium	minium	minium
pink, violet	Armenian cochineal	Armenian cochineal	Armenian cochineal
red	cinnabar	cinnabar	cinnabar
white	lead white	lead white	lead white
yellow	orpiment	yellow ochre	-

Tab. 1 - List of the colourants identified

XPS CHARACTERIZATION OF ANODIC OXIDES GROWN ON BRONZE ARTIFACTS EXPOSED TO SIMULATED ACID RAIN

Daniel Mareci[1], Iulian Rusu[1*], Marius Dobromir[2], Adrian Cailean[1], Romeu Chelariu[3]

[1] Gheorghe Asachi' Technical University, Faculty of Chemical Engineering and Environmental Protection, Bd. D. Mangeron 71, Iaşi, Romania, Corresponding author: rusu_julian@hotmail.com
[2] 'Alexandru Ioan Cuza' University, Faculty of Physics, 700065, Iasi, Romania
[3] Gheorghe Asachi' Technical University, Faculty of Materials Science and Engineering, Iaşi, Romania

ABSTRACT

In this work, X-ray photoelectron spectroscopy (XPS) analyses were performed in order to identify the surface composition of oxide films electrochemically grow on CuSn alloy and to verify whether anions from the simulated acid rain were incorporated into these oxide film. For this electrolyte, an oxide film surface enrichment in Cu and Sn was observed, being more pronounced in the case of polarization of +3V.

Keywords: bronze artifact, acid rain, anodic oxidation, X-ray photoelectron spectroscopy

INTRODUCTION

Bronze is an alloy with a wide application both contemporary and historic [1-4]. Since bronze it is an alloy frequently employed in works of art: sculptures, monuments, bells, etc.

Despite the various studies on corrosion and anodic formation on Cu and Sn, there is not report in the literature on the incorporation of electrolyte species during oxide formation on the bronze artifacts. Thus the objective of this work was to verify if other chemical species from electrolyte are incorporated into oxide film electrochemically grown on the bronze artifact.

EXPERIMENTAL

The bronze sample was taken from a fissured church bell built approximately 150 years ago. The bronze samples were abraded to a 4000 grit finish. Anodic oxidation tests were performed in naturally-aerated artificial acid rainwater [5]. Electrochemical anodic oxidation was performed using a potentiostat manufactured by PAR (Model PARSTAT 4000, Princeton Applied Research, Princeton, NJ, USA). A glass corrosion flow cell kit (C145/170, Radiometer, France) with a platinum counter-electrode and a freely adjustable Luggin capillary containing a saturated calomel reference electrode (SCE) was employed to perform the anodic oxidation. Subsequently, anodic polarization was measured at +1 and +3 V_{SCE}.

The microstructure of the surface films formed on the bronze samples after the anodic potentiodynamic polarization testing in simulated acid rain was analyzed by X-ray photoelectron spectrometry (XPS) with a PHI 5000 Versa Probe (Φ ULVAC-PHI, Inc., Japan/USA) instrument with monochromatized Al Kα radiation (1486.6 eV) as an X-ray anode at 25.4 W.

RESULTS AND DISCUSSION

Figure 1a shows the XPS spectrum artefact bronze obtained before polarization. The binding energy values and area of the peaks were tracked for Cu $2p_{3/2}$, Sn $3d_{5/2}$ and Sn $3d_{3/2}$ signals.

It can observe that the peak for Cu $2p_{3/2}$ signal is situated at 932.15 eV. It also appear one small peak for Sn $3d_{5/2}$ situated at 486 eV. In accordance with Ertl [6] the first peak is attributed to metallic copper (situated at 932.2 eV) and in accordance with Watts [7], the second peak is attributed to metallic tin (situated at 486 eV).

Figs. 1b and 1c show the XPS spectra bronze artifact, after treatment of polarization at 1V and 3V in simulated acid rain. In each case, the top spectrum was obtained after argon-ion sputtering for 1 min.

In this case, the peak for Cu $2p_{3/2}$ signal is situated at 933.15 eV with the 2574.35 area peak in arbitrary units. There are also appearing two peaks for: Sn $3d_{5/2}$ at 486.05 eV (1358 area value) and Sn $3d_{3/2}$ at 494.6 eV (1281 area value). In accordance with Parmigiani [8], the first peak is attributed to CuO (situated at 933.9 eV). In accordance with Shiratsuchi [9], the second and third peaks for tin are attributed to SnO2 (situated at 486 eV for Sn $3d_{5/2}$ respectively at 494.6 eV for Sn $3d_{3/2}$).

From Fig. 1c, the peak Cu $2p_{3/2}$ signal is situated at 934.2 eV with 6347 area peak value. In accordance with Capece [10] this peak is attributed to CuO (situated at 934.2 eV). For tin, signal of Sn $3d_{5/2}$ appear at 486.5 eV (982.6 area value) and signal of Sn $3d_{3/2}$ appear at 494.7 eV

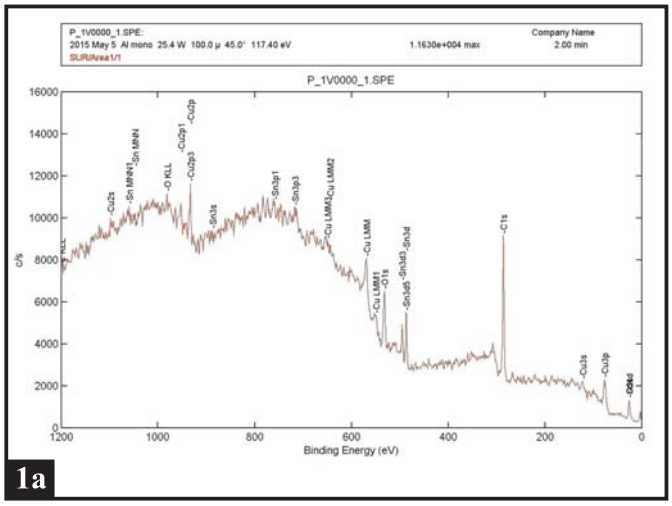
(963 area value). These last two signals are assigned to SnO_2 [9]. At 1 V, the peak area of CuO is about two times larger than the area of SnO_2. When the anodic polarization occurred at 3V, the peak area of CuO is about six times larger than the area of SnO_2.

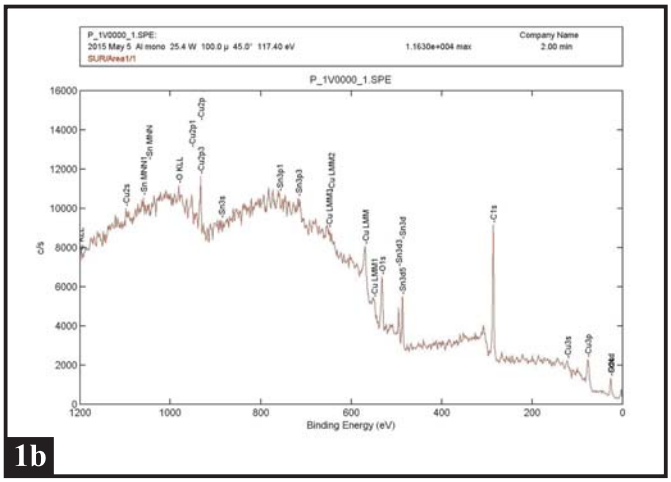
CONCLUSIONS

XPS was employed to investigate the surface composition of the anodic oxide films grown on the bronze artifact in simulated acid rain. For both polarization potentials, an anodic oxide film surface enrichment in Cu was observed. If SnO_2 areas remain roughly the same, with increasing polarization voltage from 1V to 3V CuO area grows twice and a half. No other species has been incorporated into the bronze artifact film grown in simulated acid rain.

BIBLIOGRAPHY

[1] D. Mareci, R. Chelariu, I. Rusu, N. Melniciuc-Puica, D. Sutiman. Electrochemical behaviour of some religious artefacts in simulated acid rain, Eur. J. Sci. Theol., 6 September (2010) 57-70.
[2] I. Rusu, D. Sutiman, G. Lisa, D. Mareci, N. Melniciuc-Puica. On the correlation between thermal analysis results and corrosion behaviour of some metallic religious artefacts. J. Therm. Anal. Calorim., 104 (2011) 423-430.
[3] D. Mareci, R. Chelariu, D. Sutiman, I. Rusu. Electrochemical characteristics of electrochemically patinated bronze. Eur. J. Sci. Theol., 7, December (2011) 121-129.
[4] D. Mareci, I. Rusu, B. Istrate, G. Bolat, C. Munteanu, R. Chelariu. Identification of bronze corrosion products in historic object. 6th European Symposium on Religious Art Restoration and Consevation (ESRARC 6), Firenze, 2014, O. A. Cuzman, R. Manganelli Del Fà & P.Tiano (eds.), Kermes Quaderni, Nardini Editore, (2014) 71-73.
[5] D. Mareci, I. Rusu, R. Chelariu, G. Bolat, C. Munteanu, D. Sutiman, R.M. Souto. Application of dynamic electrochemical impedance spectroscopy to the evaluation of the corrosion resistance of a historic bronze object in artificial acid rainwater. Eur. J. Sci. Theol., 9 December (2013) 189-199.
[6] G. Ertl, R. Hierl, H. Knozinger, N. Thiele, H.P. Urbach. XPS study of copper aluminate catalysts. Appl. Surf. Sci., 5 (1980) 49-64.
[7] P. H. Watts, J.E. Huheey. X-ray photoelectron spectroscopy of tin. II. Allotropes of elemental tin. Inorg. Nucl. Chem. Lett., 10 April (1974) 287-290.
[8] F. Parmigiani, L. E. Depero, T. Minerva, J. B.Torrance. The fine structure of the Cu2p32 X-ray photoelectron spectra of copper oxide based compounds. J. Electron Spectrosc. Relat. Phenom., 58 June (1992) 315-323.
[9] R. Shiratsuchi, K. Hongo, G. Nogami, S.Ishimaru. Reduction of CO_2 on Fluorine-Doped SnO_2 Thin-Film Electrodes. J. Electrochem. Soc., 139 April (1992), 2544-2549.
[10] F. M. Capece, V. Dicastro, C. Furlani, G. Mattogno, C. Fragale, M. Gargano, M. Rossi. "Copper chromite" Catalysts: XPS structure elucidation and correlation with catalytic activity. J. Electron Spectrosc. Relat. Phenom., 27 (1982) 119.





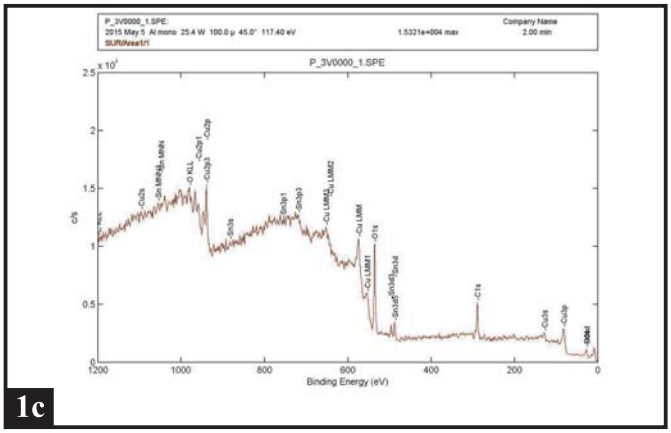


Fig. 1 - (a) XPS spectrum for bronze alloy: (a) before polarization, (b) after polarization at 1V, (c) after polarization at 3V.

SCIENTIFIC APPROACH IN CONSERVATION AND RESTAURATION OF AN OLD RELIGIOUS BOOK (CEASLOV, 1825)

Ardelean Elena[1], Tanase Catalin[2], Melniciuc Puica Nicoleta[1], Dunca Simona[2]

[1]Faculty of Orthodox Theology, "Alexandru Ioan Cuza" University of Iasi, Iasi, Romania, nicoletamelniciuc@yahoo.com
[2]Faculty of Biology, "Alexandru Ioan Cuza" University of Iasi, Iasi, Romania, sdunca@uaic.ro

ABSTRACT

The paper presents the investigations made in order to establish the proper conservation and restoration treatment in a particular case of an old book (Ceaslov, 1825). The investigations are focused on the cumulative degradation effect caused by the paper composition, humidity and presence of biotic agents.

Keywords: restoration conservation treatment, degradation, old book, paper

INTRODUCTION

The studied book represents a Horologion (Ceaslov) printed in Bucharest in 1825. The book belonged to a parish from the Northern part of Moldavia and it is part of the old books collection of the Suceava and Radăuţi Archbishopric, currently deposited at Sucevița Monastery. The studied Horologion is written in Romanian, in Cyrillic characters. The board is made of wood and the cover is made of brown leather (Fig. 1). The endpapers are made of industrially produced dark blue paper (probably added during a subsequent intervention). The support paper of the writing is manually obtained and the ink is typographical, black and red. Inside the text block we found a few different fragments of industrial obtained paper (Fig. 2), made of wood paste, glued with colophony from second half of the 20th century.

Because of the natural aging of the component materials, but especially of the influence of the improper microclimatic parameters and of the water infiltrations, the book presents several damages: severe dimensional modifications (Fig. 2-3), haloes, fragile areas, crackings, chromatic modifications. A very interesting phenomenon is represented by the presence of some hard verrucous excrescences in the haloes areas (Fig. 4-6). We should see that these excrescences not only appear on the text block but also on the subsequently inserted pages, although the latter differ both from the composition and production modality point of view. This phenomenon excludes the possibility that these excrescences were caused only by the paper composition.

In order to apply the right conservation and restoration treatments, several scientific investigations were made to establish both the composition of the component materials and the causes of the appearance of these verrucous excrescences.

MATERIALS AND METHODS

The identification of the type of cellulosic paste as well as of the gluing agent was made by specific coloration tests and by observations using optical microscopy.

The determination of the pH of the paper surface was made using a contact pH-meter. We measured the pH value from several areas of the book and on the endpaper surface, both in the affected areas and in the areas that do not present any modifications, in order to highlight the tinctorial particularities, the morphologic types and the microorganisms grouping ways.

The experiment stages for the identification of the microbiological agents present in the old books were: the sampling from the affected areas, sowing on specific culture media (agar, Sabouraud), the incubation (37°C, 48 hours for bacteria, 7-14 days for fungi), isolating the microorganisms, obtaining cultures.

The characterization of the developed cultures was made based on both macro morphological criteria (type of the colony, shape, edges aspect, colony profile, consistency, transparency/opacity and color), and on micro morphological criteria (the execution of smears from the pure cultures that were obtained, the Gram coloration and the examination with an Olympus microscope, with immersion objective, in order to highlight the tinctorial features, the morphologic types and the microorganisms grouping ways etc.) [1].

RESULTS AND DISCUSSIONS

The support paper of the writing is manually

obtained from textile fibers (Fig. 7), but it was proved that the cellulosic paste also contained wooden fragments and starch was used as a gluing agent (Figs. 8-9). The pH values are different on the endpaper; in the areas presenting haloes and excrescences the pH is of about 3.9-4.2 while in the halo free areas it is of 5.6-6.5. The pH values within the excrescences areas of the text book are of 4.3-4.9, while in the no excrescences areas these values are of 6.5-6.8.

We observed a good development of bacterial cultures around the samples deposited on the nourishing agar-agar surface. In case of the sample from the endpaper the developed culture presents a dry consistency, a rough surface (R type colony), with rizoidal edges, a slightly raised profile and of white color (Fig. 10a-c), while in case of the sample taken from the text block the developed colony is of S type, smooth, silky, with integer edges, a convex profile, of mucilaginous consistency and beige color (Fig. 11a-c).

The results of the micro morphological analysis of the bacteria stems isolated in pure cultures show that in case of the sample taken from the text block revealed the presence of the bacillar morphologic type, positive Gram, isolated and sporulated (with undistorted spores and sub-terminal position), while the isolated culture from the endpaper was represented by positive Gram bacils, isolated or grouped in diplo, unsporulated and encapsulated.

The microscopic preparations did not contain any hyphae, which mean that the verrucosities developed on the paper surface are not produced by fungi. In addition, the microbial load analysed by cultivation on artificial nourishing media was very low: nothing grew on the dilution plates of the inoculum, and on those where paper/leather fragments served as inoculum sources, occasionally grow yeast cultures and one case of *Penicillium* colony, possibly because of the contamination by the book handling. These results do not suggest yet a fungal attack.

The paper structure in a verrucous excrescences area analysed by the electronic microscopy shows proof of verrucous epispore conidia (Fig. 12), even if no fungal attack was identified on the paper surface.

CONCLUSIONS

1. The bacterial contamination was proved both in case of the samples taken from the text block and from the endpaper. The morphologic type identified in case of both samples was the bacillary, tinctorial positive Gram, the differences referring to the sporulation capacity (isolated stem in the text block) and the capsule forming (isolated stem in the endpaper);

2. No fungal attacks were signalled on the paper surface, but the results obtained by electronic microscopy in the excrescences area shows the existence of several verrucous epispore conidia within the paper structure;

3. We shall continue our researches in order to identify the mechanism that led to the appearance of this phenomenon;

4. We shall apply an adequate disinfection treatment and after this we shall repeat the biological investigations in order to check if the biological attack was stopped;

5. We must expand our observations over the rest of the documents from the old books deposit in order to identify other possible damages of this type.

ACKNOWLEDGEMENTS

This work was financially supported by a grant from the Ministry of National Education of Romania (PN-II-PT-PCCA-2011-3.2-1281, Grant No. 221/2012: Developing Non-conventional Materials and Cold Plasma Technique for Sustainable Solutions in Paper Heritage Conservation), which is gratefully acknowledged.

BIBLIOGRAPHY

[1] S. Dunca, O. Ailiesei, E. Nimiţan, M. Ştefan. Applied Microbiology. Tehnopress Publishing House, Iaşi, (2004) 45-68.

Fig. 1- Old book studied: Horologion (Ceaslov), 1825

Fig. 2 – Top edge

Fig. 3 – Fore edge

Fig.4 – A page with haloes and verrucous excrescences

Fig. 5 - Verrucous excrescences (detail)

Fig. 6 – Cellulosic fibers in a verrucous excrescence

Fig. 7 - Cellulosic fibers

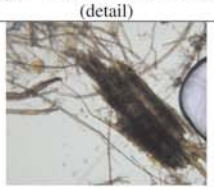


Fig. 8 – Wooden fragments

Fig. 9 – Starch granules

Fig. 10a - Area sampling for microbiological investigation (endpaper)

Fig. 10b - The development of bacterial culture for endpaper sample: R type colony, rough surface, with rizoidal edges, slightly raised profile, white color

Fig.10c - Isolated and in diplo bacilli, capsulated (endpaper)

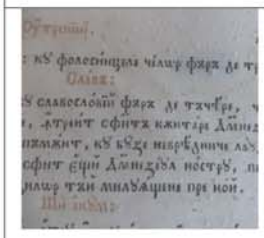


Fig. 11a - Area sampling for microbiological investigation (text block)

Fig. 11b - The development of bacterial culture for text block sample: S type colony, smooth, silky, with integer edges, convex profile, mucilaginous consistency, beige color

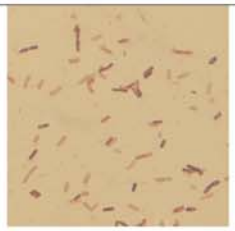
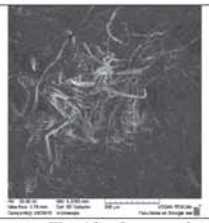


Fig. 11c - Isolated bacilli, sporulated (text block)



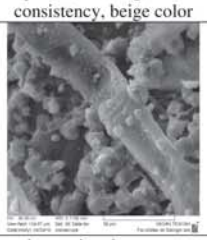


Fig. 12 – Images obtained using electronic microscopy; conidia with verrucous epispore

LITURGICAL RESTORATION: THE CASE STUDY OF INFANT JESUS OF PRAGUE FROM THE CHURCH OF ST. MARIA OF PROVIDENCE AT MACCHIA GIARRE (ITALY)

Parisi Cetty, Pelosi Claudia, Santamaria Ulderico, Pogliani Paola, Agresti Giorgia, Longo Sveva

Department of Cultural Heritage Sciences (DISBEC), University of Tuscia, Viterbo, Italy,
cettyena@hotmail.it, pelosi@unitus.it, santamaria@unitus.it, pogliani@unitus.it, agrestic@unitus.it, svevalongo@yahoo.it

ABSTRACT

This work presents the case study on the restoration of the Infant Jesus of Prague from Macchia Giarre (Catania, Italy), an interesting plaster cast dated to 1928, with votive-processional use whose relevance is mainly linked to its liturgical significance.
On 6 of January 2013 the statue was damaged during the traditional procession in honour of the Infant Jesus, making necessary an urgent restoration. On that occasion, the statue was investigated both from an historical point of view and also with modern technological instruments in order to gather information on the structure and on the materials. In particular the Infant Jesus of Prague was examined by computerized axial tomography. The materials used for restoration were characterized by X-ray spectroscopy in order to evaluate their suitability for the intervention.

Keywords: plaster casts, liturgical restoration, Infant Jesus of Prague, computerized axial tomography, X-ray spectroscopy

INTRODUCTION

This paper presents the case study about the restoration work performed on a plaster cast representing the Infant Jesus of Prague [1], at present stored in the church of St. Mary of Providence at Macchia Giarre (Catania, Italy). The little polychromatic statue is dated back to 1928 and it is used as processional-votive object (Fig. 1).
The statue can be considered as belonging to cultural heritage with religious interest. It is property of the church, like many other religious objects in Italy, and this imposes further reflections when a conservative intervention has to be engaded in.
The present study was also focused on the typology of material used for the statue. In fact, plaster was widely used for the sculptures due to its availability, durability and easiness to use, even if it was considered a material of low quality especially concerning its low stability to water and scarce resistence to rubbing.
However plaster was and is still widely used especially for creating sculptures, models and skecteches [2].
The category examined in this work belongs to the plaster casts with devotional use, and is characteristic of the liturgies and ecclesiastical apparatus in Christian Catholic Church. In fact, the Christian statuary is generally made of plaster works, especially if the statues are not artistically relevant but have a large diffusion. The Infant Jesus of Prague, object of this paper, is a relevant example of this kind of statue and its spread is certified throughout the Italian territory by BeWeb online database [3]. Moreover, the case study of the Infant Jesus of Prague of Macchia Giarre is also an example of how the conservation requirements could be in conflict with the devotional needs. In fact, the statue during the traditional procession in honour of Infant Jesus, on 6 of January 2013, fell off and was seriously damaged. So, it was necessary to make an urgent intervention to restore the function of the statue. On that occasion some investigations were performed in order to deepen the knowledge of the internal structure of the statue, through computerized axial tomography (CAT), and of the restoration materials, such as the gold leaf, through X-ray spectroscopy (XRF). The conservative intervention was necessarily carried out taking into consideration both the materials and the devotional use of the object. So the restoration of such a kind of artework needed to reach a compromise between the aestethic and liturgical requirements.

MATERIALS AND METHODS

The CAT was performed by a Dual Energy SOMATON instrument supplied by Siemens in the University General Hospital of Messina (Italy). The investigation was carried out by Dr. Sveva Longo under the supervison of Prof. Marcello Longo. The instrument used in the

present work can be described as multislice axial tomography system.
X-ray fluorescence (XRF) spectroscopy was performed by means of a Surface Monitor instrument supplied by Assing. The XRF spectra were obtained with the following experimental conditions: Mo tube operating at 25 kV voltage and 300 μA beam current; scan time 60 s; distance 95 mm. The XRF analysis was performed on the commercial gold leaves used for the restoration. Both pure and "French" (also known as false gold), gold samples were examined.
The restoration was performed to reconstruct the damaged parts of the statue and also to re-integrate the surfaces by applying a new gold leaf to re-establish the precious decorations that were destroyed by a previous unsuitable intervention (Fig. 2-3).
The re-construction of the gold decorations was performed by taking into account the archive photographs and also the comparison with another statue having the same typological characteristics.

RESULTS

CAT analysis allowed for revealing the presence of various materials inside the statue. In particular, wood and paper pieces, jute fibers, and metal parts were found. The CAT images showed that the statue is made of seven distinct parts: the head, the shoulders, the bust, the two side draperies, the hands and the base, probably obtained with a mould.
Subsequently the different parts were joined together by means of two wooden boards that go through the entire height of the artefact (Fig. 4). The junction points were finished with stucco (Fig. 5). The hands and the draperies of the Infant Jesus garments are fixed only by stucco. The interior of the statute, apart from the head, is empty. The CAT images highlighted the presence of a further unhomogeneous casting that appears lighter in comparison with the gypsum cover, but with radiopaque appearerance similar to that of stucco. This phenomen is visible also in the side draperies. It can be supposed that the further casting was performed to give more resistence and thickness to the outer layer and to incorporate the wood boards that join the different parts of the statue. The CAT investigation revealed the elements of the recent unsuitable restoration, such as: metal pins, external stuccos, interior hemp lining. The painting layer is quite homogeneous on the surface with a reduced thickness in the lower area of the Infant garment.
The CAT images highlight that the gold decorations are lacking, confirming their removal during the 2007 restoration. At last, the statue still has some traces of the fracture that need to be repaired.
The XRF analysis revealed that the pure gold leaf is made of gold with traces of copper (Table 1) whereas the "French" gold leaf is made of copper and zinc (brass alloy) with traces of iron.
This result clearly shows that the "Franch" gold leaf has a much lower quality and resistence to enviroment or protective treatments in comparison with the pure gold one.

CONCLUSIONS

The restoration of the Infant Jesus of Prague was the occasion to study the history and use of plaster casts with a liturgical function and also how the scientific investigation can supply aid to the restoration itself.
The CAT analysis was very useful because allowed for obtaining information, in a totally non-invasive modality, on the execution techniques and on the preservation state.
The XRF was useful to characterize the composition of commercial materials used in restoration and consequently to evaluate the time resistance also in view of future maintenance interventions. The importance of this study is to better combine art, faith and science. A trio inseparable but closely related to the goods liturgical Italians, especially those used processional.

ACKNOWLEDGEMENTS

The authors would like to thank the Parrish priest of the St. Mary of Providence church, Don Mario Fresta; Dr. Agata Blanco of the office for ecclesiastic heritage in Acireale diocese; the Director of the neuro-radiology center in the General Hospital at Messina (Italy), Prof. Marcello Longo.

BIBLIOGRAPHY

[1] P. Beitia. Gesù Bambino di Praga, storia e spiritualità. Gribaudi editore, Milano, (2009).
[2] C. Pelosi, D. Fodaro, L. Sforzini, A. R. Rubino, A. Falqui. Study of the Laser Cleaning on Plaster Sculptures. The Effect of Laser Irradiation on the Surfaces. Optics and Spectroscopy, 114 (2013) 917-928.
[3] BeWeb database, http://www.chiesacattolica.it/beweb/UI/page.jsp?action=home.

Fig. 1 - The Infant Jesus of Prague in the Church of St. Mary of Providence (Catania, Italy), 123 cm high

Fig. 2-3 - Photographs taken during the removal of the old restoration

Fig. 4 - Side view obtained by CAT analysis with the evidence of the wood boards

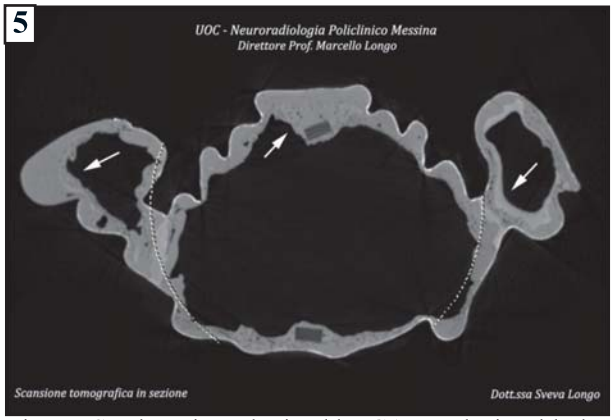


Fig. 5 - Section view obtained by CAT analysis with the evidence of the wood boards and the gypsum joints

Sample	Cu	Au	Zn	Fe
"French" gold	900 (Kα)	-	165 (Kα)	33 (Kα)
Pure gold	39 (Kα)	522 (Kα)	-	-

Tab. 1 - Results of the XRF analysis reported as cps (counts per second) of the elements detected in the examined samples.

NON-INVASIVE INVESTIGATION OF A 15TH CRUCIFIXION IN THE CHURCH OF *SANTA MARIA NOVA* IN VITERBO (ITALY)

Agresti Giorgia, Lanteri Luca, Pelosi Claudia, Santamaria Ulderico

[1]Department of Cultural Heritage Sciences (DISBEC), University of Tuscia, Viterbo, Italy,
agresti@unitus.it, llanteri@unitus.it, pelosi@unitus.it, santamaria@unitus.it

ABSTRACT

This paper reports the results of the documentation and non-invasive analysis performed on a wall painting representing the crucifixion and attributed to Francesco d'Antonio Zacchi, also known as *Balletta*, an important 15th artist operating in Viterbo (Italy). The wall painting is located in a chapel on the right wall of the church of *Santa Maria Nova*, one of the oldest churches in Viterbo with a great religious relevance for the local parishioners. The documentation and the diagnostic analysis were performed in 2014 on the occasion of the last conservative intervention promoted by Rotary Club and founded by the Bank of Viterbo. The intervention was aimed at cleaning the wall paintings by removing the old restoration materials and the dirt and sooty layers obscuring the crucifixion.
The documentation was made by 2D and 3D systems. The analysis was performed through non-invasive techniques such as: ultraviolet fluorescence digital photography, video microscope acquisitions, X-ray spectroscopy. Fourier transform infrared spectroscopy was also applied, but only on the superimposed materials that should be removed during the conservative intervention. The application of these non-invasive techniques allowed to identify the pigments used for the painting and to make hypothesis about the execution technique. Moreover the analysis highlighted the presence of non-original interventions and materials.

Keywords: wall paintings, crucifixion, *Balletta*, 2D and 3D documentation, X-ray fluorescence spectroscopy, video microscope acquisition, Fourier transform infrared spectroscopy

INTRODUCTION

Santa Maria Nova in Viterbo (Italy) is one of the oldest churches of the town; in fact it was built in the 11th century in the same place where in 380 A.D. the descendants of Hercules constructed a church named of *S. Maria Nova* [1]. The church of *Santa Maria Nova* had a great relevance for the municipality of Viterbo because it was seat of the Town Councils due to the lack of a Town's hall. The rectory of *Santa Maria Nova* was abolished by the Pope in 1567 and the church was subjected to the jurisdiction of the cathedral of Saint Lowrence. During the centuries the church underwent various and sometimes invasive interventions that changed the original structure, for example the side chapels with the paintings were walled up in the 18th century [2]. However, at the beginning of the 20th century the Society for Conservation of Monuments in Viterbo, performed a great intervention on the church with the aim at restoring the original structure and the paintings [2-3].
The Romanesque façade of the church maintains, on the leaft side, a beautiful stone pulpit from which Saint Thomas Aquinos preached in 1267 [4]. The interior of the church is made of three naves divided by six couples of columns with beatuful capitals [5]. The extraordinary painted wooded ceiling was recently restored and deeply investigated on the occasion of the conservative intervention allowing for establishing new datings of the different wood elements [6]. Along the side walls of the naves, four chapels with beautiful and relevant paintings can be admired, three of which have been recently subjected to conservative intervention. The first chapel on the right side, object of the present work, shows a crucifixion with the Virgin, St. John the Baptist, St. Ambrose that recommends a knelt clergyman, and St. Antony the Abbot (Figure 1). The identification of the clergyman in Nino Aldobrandini allowed for supposing a sepulchral use of the chapel, also knows as Aldobrandini or St. Ambrose chapel [5].
The wall paintings of the Aldobrandini chapel were attributed to local artist Francesco d'Antonio Zacchi, also known as *Santa Maria Nova*, operating in Viterbo during the 15th century. In the arch (about 80 cm deep) seven clypei, inside decorated frames, are painted with benedictory Christ, and the saints Lowrence, Paul, John the Baptist, Michael, Peter and Stephen. In the side posts of the arch the saints Catherine of Alexandria and Barbara are painted [5].
Recently the Rotary Club of Viterbo promoted the conservation of the wall paintings in the Aldobrandini chapel with the funding of the Bank

of Viterbo and the support of the Superintendece and the University of Tuscia. In fact, the bad state of preservation of the paintings required a conservative intervention aimed at removing the materials superimposed to the surface such as dirt, salt efflorescence, old restoration altered mixtures, etc. Before starting the conservation of the wall paintings, a careful documentation and some diagnostic analysis was performed in order to investigate the composition of constuent materials and to support the restoration work. Due to the relevance of the paintings especially for the parrich priest and for the parishioners, only non-invasive techniques were used, in particular: 2D and 3D documentation, ultraviolet photography, video-microscope acquisitions, X-ray fluorescence spectroscopy. Only concerning the materials to be removed from the surfaces, Fourier transform infrared spectroscopy was applied as micro-invasive technique.

METHODS

Ultraviolet (UV) fluorescence photographs were taken using a Nikon D90 camera and Sylvania Blacklighte Blue F15W/BLB-T8 tube lamps positioned at 45° as regards the surface to be examined. In front of the camera lens, the Kodak Wratten gelatine filter 2B (light yellow, absorbing the UV radiation under 390 nm) was placed in order to block the reflected UV and to attenuate the blue dominant typical of the ultraviolet photographs.

2D and 3D documentation was carried out by photogrammetric systems and specific software.

The video microscope acquisitions were performed by a Dino Lite AM 413 system equipped with a zoom objective from 20 to 200 magnifications, directly connected to a computer for the acquisition and processing of the images.

X-ray fluorescence (XRF) spectroscopy was performed by means of a Surface Monitor instrument supplied by Assing. The XRF spectra were obtained with the following experimental conditions: Mo tube operating at 25 kV voltage and 300 μA beam current; scan time 60 s; distance 95 mm.

Fourier transform infrared (FT-IR) spectroscopy was performed by using a Nicolet Avatar 360 system. For each sample 128 scans were recorded in the 4000 to 400 cm^{-1} spectral range in diffuse reflection modality (DRIFT) with a resolution of 4 cm^{-1}. Micro-samples were ground with spectrophotometric grade KBr (1 % sample in KBr) in an agate mortar. As background the spectrum of the KBr powder was used.

RESULTS

The UV photography of the wall paintings, compared to the visible one, gives information about the state of preservation of the surface, allowing the distinction of the restored areas (Figure 1).

The black background behind the cross, for example, seems to have no fluorescence probably due to restoration materials that don't exhibit this property. A yellow fluorescence can be observed in the haloes and may be associated to the mixture (*missione*) used to stick the metal leaf. The white areas show a light blue fluorescence probably to the use of an organic binder to apply the pigments. The cross appears red, under UV, in the bottom part and yellow-orange in the upper part. This can be explained with the probably application of restoration materials in the upper part of the painting, especially in correspondence of the black background.

The video microscope acquisitions are useful to study in detail the morphological characteriristics of the surfaces. In total eight points were acquired each at 2 magnifications (20x and 200x). The points were chosen in accordance with the restorers to deepen the knowledge of the surfaces in some specific areas of the paintings, in particular the dark blue background and the haloes. The acquisition from the dark blue background showed the presence of a brown layer under the blue, this last one is characterized by blue and green particles. The presence of blue and green grains allows supposing the use of azurite as painting pigment. Black bright grains are also visible on the surface probably associated to restoration materials.

The acquisitions from the haloes highlight the presence of brown materials that can be supposed attributable to the mixture (*missione*) used to stick the metal leaf that appears almost completely lacking. In the magnified images of the haloes the can be also observed.

The results of the non-invasive XRF spectroscopy are summarized in Table 1. As usual in wall paintings, calcium (Ca) is present in all examined points, sometimes associated to struntium (Sr), with higher counts in the white and pink areas, due to the use of calcium carbonate white as pigment. Iron (Fe) has also been revealed in all measured points with greatest quantities in yellow and red areas. This result points out the presence of yellow and red ochre as pigments and iron based compounds in the setting layers. In the Angel garments lead (Pb) was also detected suggesting the presence of lead based pigments (lead white and lead oxide). High counts of Pb

have been found in the point X9 in a brownished part of the garment of St. John. This finding can be related to an altered lead based pigment, probably lead white transformed in plattnerite. Mercury (Hg) was detected in the bright red areas suggesting the presence of vermilion. At last, the presence of high counts of copper (Cu) in the background of the crucifixion shows the use of azurite as pigment. Azurite was also used in other part of the painings as in the St. Lowrence halo. Azurite was necessarily applied by a secco technique due to the peculiar properties of this pigment.

FT-IR spectroscopy confirmed the presence of azurite in the blue background of the crucifixion, mixed with malachite, applied by protein binder. The dark grey layer behind the cross contains also calcium oxalate, and polysaccharide resin. In different parts of the paintings, sulphate and nitrates were detected, especially in the lower part of the chapel.

The careful documentation by photogrammetric systems allowed obtaining a digital model containing all possible information on the painting (analysis, state of preservation, etc.).

CONCLUSIONS

This paper reported the main results on the study of the wall paintings by *Santa Maria Nova* in the first right chapel of the church of *Santa Maria Nova* in Viterbo. The study was possible thanks to the conservative intervention performed in 2014 and promoted by the Rotary Club of Viterbo. The diagnostic investigation, carried out in accordance with the restorer and with the functionary of the Superintendence, demonstrated very useful to characterize the pigments, the binders especially in case of azurite that was applied by a secco technique, and the superimposed materials which needed to be characterize in order to decide their removal from the surfaces. This last focus is of particular relevance in the field of sacred art due to the significance of particular chromatic effect and of the final appearearence of the paintings.

ACKNOWLEDGMENT

The authors would like to thank the Rotary Club of Viterbo that promoted the work, the Bank of Viterbo that founded the project, the conservator Emanuele Ioppolo, the Parrish priest of the church, Don Angelo Gargiuli, and Dr. Giannino Tiziani functionary of the Superintendence.

BIBLIOGRAPHY

[1] A. Scriattoli. Viterbo nei suoi monumenti. Agnesotti, Viterbo (1988) 188-195.
[2] A. Muñoz. Il ripristino della chiesa di S. Maria Nuova di Viterbo e il S. Francesco di Vetralla. Bollettino d'arte, vol. VI (1912) 121-146.
[3] S. Valtieri, E. Bentivoglio. Viterbo nel Rinascimento. GB EditoriA, Roma, (2012) 192-200.
[4] F. Bussi. Istoria della città di Viterbo. Bernabò e Lazzarin, Roma, (1742). Ristampa Anastatica, Forni, Bologna, (1967).
[5] F. Ricci. Viterbo, Chiesa di S. Maria Nova. In: "Conoscere per conservare, percorsi culturali e didattici nella Tuscia", S. Rinaldi (ed), Aracne Editrice, Roma, (2008) 93-101.
[6] M. Romagnoli, M. Togni (Eds.). Santa Maria Nuova a Viterbo. Nuove chiavi di lettura della chiesa alla luce del restauro della copertura. Kermes Quaderni, Nardini Editore, Firenze, (2013).

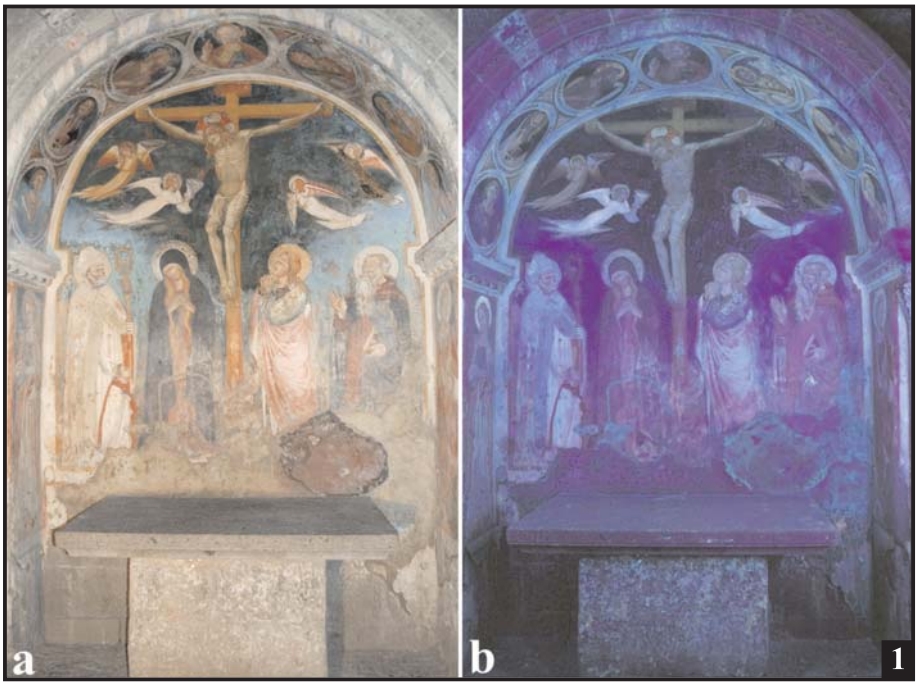


Fig. 1 - The crucifixion attributed to Balletta (15th century): a) visible light; b) UV fluorescence

Point of measurement	Ca	Fe	Cu	Hg	Pb	Sr
X1 yellow of the right Angel's garment	874	447			380	
X2 light yellow of right Angel's garment	650	325	195		579	
X3 dark yellow of right Angel's garment	784	476	146		317	
X4 blue of the background	168	248	4690			
X5 pink of the right Angel's garment	1309	119			81	
X6 pink of the right Angel's garment 2	2360	214			160	152
X7 brown of the right Angel's garment	657	100			53	
X8 white of the right Angel's garment	911	65			63	37
X9 brown area of the St. John's garment	387	154	181		550	
X10 white on St. John face	608	99				
X11 yellow of St. John hair	586	297				
X12 dark area on St. John halo	355	344	236			
X13 dark area on St. John halo 2	466	280	95			
X14 violet of St. Paul's clypeus	550	127				
X15 bright red of the book of St. Paul	179	284		856		
X16 dark grey in the St. Lowrence halo	500	160	573			
X17 dark grey in the St. Lowrence halo 2	431	70	406			
X18 red of the blood of Christ	267	175	65	910	75	
X19 white of a pearl in Christ's perizoma	1024	140	28	113		
X20 white of left Angel's garment	1139	91	25		140	55
X21 bright red of Catherine's garment on the shoulder	144	158		673		
X22 bright red of Catherine's garment on the brest	463	537		257		
X23 yellow of the wheel in the hands of St. Catherine	566	307				

Tab. 1 - Results of the XRF analysis expressed as cps (counts per seconds of the X-rays of each element)

THERMOGRAVIMETRIC ANALYSIS OF PAPER SAMPLES DAMAGED BY FOXING

Nicoleta Melniciuc Puică[1], Gabriela Lisă[2], Elena Ardelean[1] and Iulian Rusu[2*]

[1]'Alexandru Ioan Cuza' University, 'Dumitru Staniloae' Faculty of Orthodox Theology, Department of Sacred Art, Iaşi, 9 Closca Str., 700065, Romania, nicoletamelniciuc@yahoo.com
[2]'Gheorghe Asachi' Technical University, Faculty of Chemical Engineering and Environmental Protection, Bd. D. Mangeron 71, Iaşi, Romania, Corresponding author: rusu_iulian@hotmail.com

ABSTRACT

The presence of small, roundish and reddish spots on old papers is named foxing. The purpose of this research is the assessment of the permanence of foxed and unfoxed paper, by thermogravimetric analysis. The activation energy calculated in conditions of maximum speed of degradation has lower values in foxed area than unfoxed area, especially on older paper samples.

Keywords: foxing, paper deterioration, thermogravimetric analysis, activation energy

INTRODUCTION

Generally, on old papers dated from the beginning of the sixteenth to the twentieth century one observes a kind of spots which doesn't affect the integrity of paper. Foxing is the term that describes these small, roundish stains of reddish or yellowish brown colour, found on old paper documents, books and prints. The term foxed spot, fox spot or foxing, was originally used because the red spots were similar to the red colour of the fox fur. Beckwith realized that the occurrence of foxing is related to the presence of iron in the composition of paper [1]. According to him the presence of metals inside the paper comes from the use of the hollander's beater (introduced in the manufacturing process by the end of the 17thcentury). It is therefore possible that the appearance of foxing to be caused by chemical reactions of iron traces from the paper (iron oxide and iron hydroxide) and organic acids produced by fungus. Hey concurred with Beckwith and proposed these dual mechanisms:

1. damp → mold acid → activation of iron → increased acid → mold death;
2. damp → activation of iron → increased acidity → local encouragement of mold → increased acidity → death of mold [2].

Cain and Miller have developed a classification of foxing types by shape, colour and UV fluorescence examination [3]: bullseye (small and round spots, with a dark centre and concentric rings); snowflake (spots with scalloped edges and/or irregular shapes without a central spots); offprints; shadows.

The chemical nature of foxing stains was investigated by means of instrumental techniques (FTIR spectroscopy, UV fluorescence) or surface analyses (Scanning Electron Microscopy SEM) [4].

Bicchieri [5] notes that the heavy metals cause different degradation mechanisms in the cellulose chain and influence the choice of the restoration methods. He cites as example the need of deacidification, if the paper contains iron and the necessity of a preliminary reduction treatment if copper is present as impurity. Foxing produces a chemical and physical deterioration of paper, hardly corrected or prevented by conservators.

The purpose of our research is the assessment of the permanence of foxed and unfoxed paper, by various methods such as: thermogravimetric analysis (TG), derivative thermogravimetric analysis (DTG) and differential thermal analysis (DTA).

MATERIALS AND METHODS

The paper sheets were obtained from two books without patrimonial value, with industrial papers, one dating from 1883 (Fig. 1a) and one from twenties century (Fig. 1b). Both samples have foxed area (1, 2) and unfoxed area (1', 2').

Thermogravimetric analysis

The thermogravimetric study was performed using a derivatograph of the Mettler Toledo TGA-SDTA851e type. The recordings were made at the heating rates: 8, 10 and 12°C/min, under constant nitrogen flow (20 ml/min), in the temperature range 25-600°C. The mass of the samples ranged between 2 and 3 mg. Curve processing, in order to obtain thermal and kinetic characteristics, was carried out using STAR software, more precisely the 'Kinetics nth order' module from Mettler Toledo.

RESULTS AND DISCUSSION

The main thermogravimetric characteristics are: T_{onset} - onset temperature at which thermal degradation starts, T_{peak} – temperature at which the degradation rate reaches its maximum, Tendset – temperature at which the degradation process ends, in each stage, W% - mass percentage loss per stage and the amount of residue which remains at a temperature of 600°C are reported in Tab. 1 for the various heating rates (β = 8, 10 and 12°C/min).

The results obtained after processing the thermogravimetric curves and the derivative thermogravimetric curves indicate that, in the first stage, at temperatures lower than 100°C, humidity is removed from the samples, the mass loss percentage in this stage being under 5%. The thermal decomposition of all the samples analyzed is incomplete, at a temperature of 600°C, resulting a residue amount ranging between 32 and 37%.

The onset temperature, at which thermal decomposition begins, regardless of heating rate, ranges between 270 and 294°C. Moreover, it can also be noticed that the degradation mechanism does not change with the increase in heating rate, the values of the main thermogravimetric characteristics presented in Tab. 1 changing only very slightly.

The research was extended to include the kinetic processing of the thermogravimetric data.

The n-th order kinetics (Freeman-Carroll methods) allows calculating the activation energy (Ea), pre-exponential factor (A) and reaction order (n) from a single TGA curve and the equation:

$$\frac{d\alpha}{dt} = A \cdot e^{-\frac{Ea}{RT}} (1-\alpha)^n \qquad (1)$$

were dα/dt – rate of reaction in s^{-1}, A – pre-exponential factor, Ea – activation energy in J mol^{-1}, R – gas constant = 8.31 J mol^{-1} K^{-1}, sample temperature in K, α - conversion of reaction and n – order of reaction [6]. The kinetic parameters corresponding to the second degradation stage are presented in table 2. The values of the order of reaction, for the stage of thermal decomposition, are (1 and 1') in the case of the two industrial papers from the end of the 19th century, ranging between 0.002 and 0.016, and (2 and 2'), approximately 0.2, in the case of the ones from the mid-20th century, regardless of heating rate (Tab. 2). The activation energy calculated for this stage by means of the Freeman-Carroll method has lower values in the case of the older industrial papers.

In conditions of maximum speed of degradation, the standardized method ASTM E-698 was applied [7]. The kinetic parameters obtained by applying this method are presented in Tab. 3.

The results obtained by applying the standard method ASTM E-698 indicate lower values for the activation energy from the stage of thermal decomposition of samples 1 and 2 with foxing, compared with the ones obtained for the industrial papers marked with 1' and 2' without foxing.

CONCLUSIONS

The thermogravimetric and non-isothermal kinetic study carried out led to the following conclusions:

• Thermal decomposition, regardless of heating rate, has an onset temperature ranging between 270 and 290°C.

• The heating rate in the range 8-12°C/min does not influence the thermal behavior of the industrial papers analyzed, the degradation mechanism does not change with the increase in the speed of degradation, the TG and DTG curves being similar.

• The activation energy calculated using the Freeman-Carroll method has lower values in the case of the older industrial papers.

• The activation energy calculated in conditions of maximum speed of degradation has lower values in the case of the samples with foxing, than in the case of the samples without foxing, which are just as old.

BIBLIOGRAPHY

[1] T.D. Beckwith, W.H. Swanson and T.M. Iiams, Deterioration of paper. The cause and effect of foxing, University of California at Los Angeles Publications in Biological Sciences, vol. 13, issue 1, (1940), 299-337.

[2] M. Hey, The Antiquarian Book. Monthly Review, Foxing: some unsanswered questions, vol. 10, issue 9, (1983), 341.

[3] C.E. Cain and B.A. Miller, Proposed classification of foxing, 10th Annual Meeting Postprints, American Institute for Conservation, Book and Paper Group, Washington, (1984) 29-30.

[4] C. Relvas, M. Nunes, M. Santos, P. Mourinha, A.T. Caldeira and T. Ferreira, Charactarisation of old paper samples exhibiting foxing, In: "Science, Technology and Cultural Heritage", Taylor & Francis Group, London, (2014) 243-249.

[5] M. Bicchieri, S. Ronconi, F.P. Romano, L. Pappalardo, M. Corsi, G. Cristoforetti, S. Legnaioli, V. Palleschi, A. Salvetti and E. Tognoni, Study of foxing stains on paper by chemical methods, infrared spectroscopy, micro-

X-ray fluorescence spectrometry and laser induced breakdown spectroscopy, Spetrochimica Acta Part B., vol. 57, issue 7, (2002), 1235-1249.
[6] E.S. Freeman and B. Carroll, The application of thermoanalytical techniques to reaction kinetics, J. Phys. Chem., vol. 62, issue 4, (1958), 394-397.
[7] ASTM Test method E698, "Standard Test Method for Arrhenius Kinetic Constants for Thermally Unstable Materials", (1984), 56.

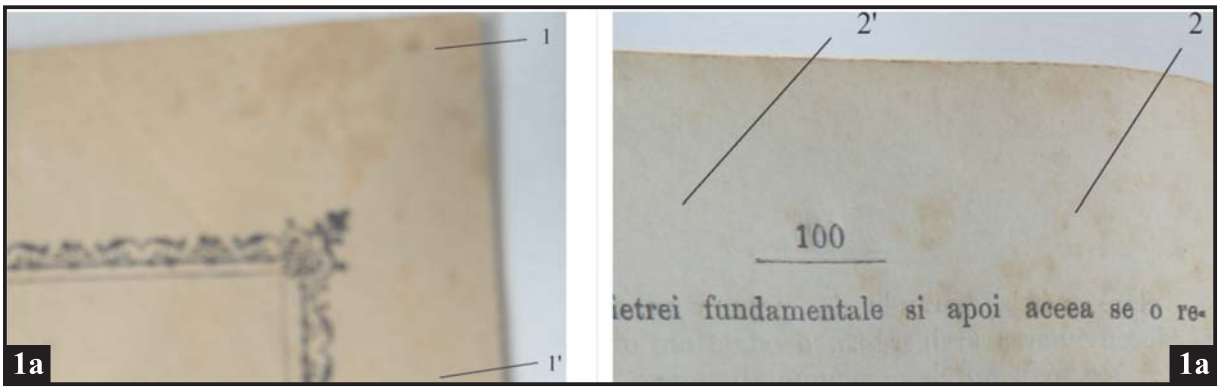


Fig. 1 - Paper samples having foxed area (1, 2) and unfoxed area (1', 2').

Sample	β (°C/min)	Stage I				Stage II				Residue
		T_{onset} (°C)	T_{peak} (°C)	T_{endset} (°C)	W%	T_{onset} (°C)	T_{peak} (°C)	T_{endset} (°C)	W%	
1	8	44.4	57.7	80.4	3.54	***281.5***	352.8	371.6	60.93	35.53
	10	45.2	64.1	93.2	4.24	***278.4***	352.0	371.2	59.15	36.61
	12	47.0	61.6	88.8	3.73	***286.6***	358.2	379.7	60.56	35.71
1'	8	40.8	60.1	90.5	2.82	***279.4***	354.1	371.2	62.33	34.85
	10	49.3	57.6	86.1	2.50	***293.1***	358.0	377.4	64.65	32.85
	12	52.8	66.7	91.9	3.51	***285.3***	356.0	377.1	61.58	34.91
2	8	43.2	51.8	80.4	3.71	***285.5***	349.8	367.5	61.04	35.25
	10	46.2	56.9	83.5	3.57	***270.7***	355.2	376.3	61.14	35.29
	12	47.9	66.0	86.4	3.67	***270.9***	357.8	382.2	63.68	32.65
2'	8	41.4	54.8	81.0	3.87	***278.1***	350.4	369.3	63.62	32.51
	10	43.5	60.0	85.4	3.13	***274.0***	357.0	374.6	62.40	34.47
	12	53.1	62.7	94.6	2.66	***290.3***	357.0	380.2	63.64	33.70

Tab. 1 - The thermogravimetric characteristics at various heating rates for samples 1, 1' and 2, 2'

Sample	β (°C/min)	Stage II		
		n	Ea (kJ/mol)	lnA
1	8	$3.56 \cdot 10^{-3}$ ±0.001	79.43±1.22	9.40±0.25
	10	$6.14 \cdot 10^{-3}$ ±0.001	74.18±1.34	8.54±0.28
	12	$10.98 \cdot 10^{-3}$ ±0.002	78.99±1.27	9.50±0.26
1'	8	$6.54 \cdot 10^{-3}$ ±0.002	79.38±1.36	9.31±0.28
	10	$15.33 \cdot 10^{-3}$ ±0.001	86.29±1.33	10.86±0.29
	12	$2.80 \cdot 10^{-3}$ ±0.001	79.09±1.22	9.60±0.26
2	8	0.24±0.001	98.98±1.05	13.68±0.22
	10	0.20±0.001	91.60±1.00	12.03±0.20
	12	0.19±0.001	99.75±1.23	14.06±0.25
2'	8	0.17±0.001	92.00±0.93	12.05±0.19
	10	0.24±0.001	97.34±0.96	13.21±0.19
	12	0.29±0.001	96.00±0.73	13.06±0.15

Tab. 2 - The kinetic characteristics at various heating rates for samples 1, 1' and 2, 2'.

Sample	n^a	E_a(kJ/mol)[b]	lnA^c	$r^{2\,d}$
1	1	116.11	17.13	0.992
1'	1	179.26	29.49	0.995
2	1	104.02	14.58	0.994
2'	1	149.73	23.75	0.993

[a] order of reaction; [b] apparent activation energy; [c] pre-exponential factor; [d] correlation coefficient.

Tab. 3 - The values of apparent activation energy calculated using the standard method ASTM E-698 for samples 1,1' and 2,2' (β = 8, 10, 12ºC/min).

RESTORATION AND CONSERVATION OF BUDDHIST ART IN PAKISTAN: AMLUK DHARA STUPA IN THE SWAT VALLEY

Sabelli Roberto

Dipartimento di Architettura (DIDA) dell'Università di Firenze, Firenze, Italy, roberto.sabelli@unifi.it

ABSTRACT

The activities of the Archaeological Italian Mission and the Department of Architecture of Florence, in the restoration and enhancement of cultural heritage (Gandhāran Buddhist art) in the Swat Valley in Pakistan, fight from many years with the difficulties due to the Pakistan and Italian political choices. Despite the difficulties of working in the tribal areas, our intervention is crucial to keep an open dialogue with a people rich in history but who often do not know the real value of their resources.

Keywords: Pakistan, SWAT, Buddhist art, Stupa.

INTRODUCTION

The Swat Valley is located in the province of Khyber-Pakhtunkhwa – formerly North-West Frontier Province, NWFP) – in the piedmont of Hindukhush-Karakorum in Pakistan. The valley is about 1000 m a.s.l. and is flanked by mountains that do not exceed 3000 m a.s.l., while in its upper edge with peaks over 6000 m a.s.l.. Swat is known from classical sources for being the scene of a non-secondary stage of the expedition of Alexander the Great in 327 BC in India – from which the influences of architecture Hellenistic into the Indian architecture [1]. The territory – homeland of Padmasanbhava, Guru Rinpoche, who brought Buddhism to Tibet – from Chinese and Tibetan late ancient sources is mentioned with the Sanskrit name of Uddiyana = *the royal garden*. We know now that swat valley contains many archeological remains of Indo-Aryan people and landscape is dotted with remains of Buddhist stupas built around Pre-Mauryan period. Over the middle ages, the Turkish, Mongols and Islamic hordes have pushed the Hindu, Buddhist inhabitants of valleys, out of the areas to other parts of India. In addition to this problem, when the British conceived the partition plan of the Indian subcontinet, India lost its heritage. Nowadays, the religious extremism puts at risk this priceless heritage. The Italian Archaeological Mission (MAI) – formerly IsMEO, then IsIAO – since 1955, when was founded by Giuseppe Tucci, conducts research and enhancement of the archaeological and anthropological across the valley [2]. In the years 1993-1994 the IsMEO entrusted to Roberto Sabelli, with the Cooperativa Archaeologia of Florence, the survey of the ancient site of Barikot and of some Gandhāran sites of the Swat Valley. In 2012 Dr. Luca Maria Olivieri, director of the Archaeology, Community, Tourism - Field School (ACT) – funded through the Pakistan-Inglese Dept-for-Development Swap Agreement Program (PIDSA) – signed an agreement with the Department of Construction and Restoration of the Florence University (DICR, nowday DIDA) to collaborate in activities for the implementation of projects and professional courses in Pakistan. In May 1012 Roberto Sabelli, coordinator of the Agreement on behalf of DICR, was on a mission in SWAT to collaborate on research and the enhancement of the Gandhāran stupa of Amluk Dhara. The flowering of the Gandhāran Buddhist Monasteries took place roughly during the centuries of the kingdom of Great Kushanas (I-III century AD.). Fulcrum of the sacred Buddhist area and the main object of devotion, the Stupa is an architectural sculpture, does not contain a cell or other environments - inside, near the spot where once stood the pillar axial, generally there was a small recess inaccessible, intended to contain the relics and/or other symbolic objects. It *"is both funerary monument, a symbol of the Buddha and symbolic representation of the tripartite division of the cosmos - the water (the pradakṣiṇā level), Earth (the base), Heaven (the aṇḍa level), crossed and welded to the central pillar, the axis mundi. Fulcrum of the sacred Buddhist and the main object of devotion, the stupa contain a cell or other environments, therefore, strictly speaking, could not be defined architectursal structure... It is a compacted mass of earth and stones, covered by a lining of stone. Inside, near the spot where once stood the axial pillar, there was a small recess, inaccessibile from the outside, intended to contain the sacred remains, that are generally very low, and other symbolic objects (but often only these),*

in a shrine of stone or other material in turn inserted into a cassette; stupas cut into the rock naturally contained no relics" [3] (translation by R. Sabelli).

Amluk-Dhara, is the largest stupa in Swat. Dating back to the third century A.D. the stupa of Amluk-Dara – located two kilometers away from the main road that leads to Buner Barikot, the Saidu Pirbaba road, in the picturesque valley of Amlokdara, about 20 miles south-east of Saidu Sharif. It was discovered for the first time by the archaeologist Sir Aurel Stein Anglo-Hungarian in 1926 and studied in the 60s and 70s, by Domenico Faccena. Unfortunately, the stupa was subject to looting and illegal excavation. However, during the archaeological excavations were found many fragments of sculptural decoration: stucco, ceramic fragments and paintings on Shahi ceramics, dating back to a period between the seventh and eleventh centuries AD.

The height of the stupa from lowest floor up to the dome is about 20 meters. Like many of the great Gandhāran stupa, Amluk Dhara it's divided into different bodies of decreasing size upwards by the insertion of three cylindrical drums (medhi) between the base square (podium) and the hemispherical (*aṇḍa*). Starting from the aṇḍa, that was surmounted by a small balustrade square plan (Harmika), stood a pillar (yaṣṭi), which bore at the upper end a series of umbrellas (chattra) of decreasing diameter upwards. There was a staircase on a side of the base and four columns, located at the corners of the base, symbolic representation of the emanations of Buddha. The height of the stupa from the starting level of the staircase to the top of the dome is about 20 meters. In addition the stupa of Amluk Dhara was enriched by a decorative plaster with Buddhist images and scenes [4].

MATERIALS AND METHODS

The stupa of Amluk Dhara is the largest in the region and extremely well conserved. It was built on a substruction platform – which is needed to offset irregularities in the terrain, probably a terrace with steep sides on the S and to a lesser extent to the E – and comprises a 1st storey, quadrangular in plan, a 2nd storey, circular and set back, both decorated with pilasters, a circular 3rd storey, the drum, set even further back, and then, having the same diameter, the composite dome with the 4th and 5th storey. It has some flights of steps facing N along the same axis corresponding to the 1st and 2nd storey, at the top of which, abutting the 3rd storey, is the base of a probable niche. The facing of the 1st storey is missing on the S and E sides, and partly on the W side; thus part of the 2nd storey; a gap opens above the base on the 3rd and 4th storeys; on the 3rd storey penetrates as far as the core (now used to store hay); the drum is divided by a frame supported by supports spaced 30 centimeters; a second frame protruding runs below the lower reaches of the dome. all the pilasters and cornices above this are missing; the stairways of the 1st and 2nd storeys are in ruins. The Department of Archaeology and Museums carried out restoration work in the years before 1968 involving the partial repair of the 2nd storey wall, of the niche base and the partial closure of the latter. The facing is composed of larger blocks at the lower level, which grow smaller as the level rises, accurately dressed, laid in regular rows, very closely spaced, with the gaps between them filled on all four sides of the block by thin regularly cut slabs. The material consists of fine-grained gneiss for the blocks, dark schist for the thin slabs. The masonry thecnicque used is the diaper type: It "*uses slabs of schist in various sizes… and small thin slabs; togheter, blocks and smaller irregular pieces of stones*" [5-6] – the *Diaper masonry* technique was introduced in Gandhāra, replacing the rubble, in the first century A.D. about [7-10] – the core is made of gneiss blocks, schist slabs, closely spaced and well bonded, and materials of small size materials, solidly bonded using earth. The monument is preserved in good condition, with some missing parts, other ruined and others in which it is grown vegetation. In summary the major factors of degradation are:

- Lack of wall: It occurs in particular on the first and fourth storey due to vandalic actions;
- Disgregation of stone: It comes in a timely manner on the a masonry facing exposed to the direct action of meteorological factors and climate and is an advanced stage of debonding with detachment of granules or crystals also by minimum mechanical stress.
- Infested vegetation: It comes due to the direct action of meteorological and climatic factors and and appears with a settlement into the wall of lichens, mosses and plants;
- Collapse of umbrellas: They, however due to erosion and vandalism, plummeted to the ground, causing further damage to the external structure during their fall. The umbrellas are still in good condition on the basis of the second circular body, which constitutes the second storey.

RESULTS

The investigations that dr. L.M. Olivieri [2] are being to complete, with the studies conducted to

date, give us the opportunity to identify some indispensable actions to secure and enhance this important Gandhāran Buddhist site. Some actions will focus on the consolidation of the structure, especially with the integration of the missing parts that can cause new collapses.
Other actions provide interventions of protection and the dissemination of the information from the Pakistan Ministry of Culture with the creation of a didactic apparatus on site, also by means of 3D graphic reconstructions, and with specialized training courses for school teachers and for the workers to involve in the maintenance activities.

CONCLUSIONS

The research an work carried out to date are a precious example of how even in a risk area, for cultural and political reason, will can achieve significant results in the politic of protection and valorization of Cultural Heritage, property of all of humanity. "*The 60-year presence of the Italian Archaeological Mission in Swat, has built a substantial continuity among the skilled workers from one generation to the next resulting in a working experience that is unique in this field. This experience was transformed in 2011-2014 into a model of intervention, the ACT project. In view of this experience, a specific approach in conservative restoration was designed with special reference to the materials and skills of the local workers. The need was felt to come up with a low cost type of intervention based on clear-cut methodological concepts that would allow government agencies in future to plan maintenance and restoration cycles also on a large scale, that is with an order of magnitude that the administration of cultural heritage has to cope with in Swat and in Pakistan*" [2].

BIBLIOGRAPHY

[1] A. Foucher. L'art gréco-bouddhique de Gandhāra. Étude sur les origins de l'influence classique dans l'art bouddhique de l'Inde et de l'Estrême-Orient, I-II. Paris-Hanoi, (1905-51).
[2] L. Olivieri. Restauro conservativo e mobilizzazione sociale in siti archeologici della valle dello Swat (Pakistan). Restauro Archeologico, 1 (2014).
[3] C. Lo Muzio. L'architettura religiosa. In: L'architettura: caratteri e modelli. Subcontinente indiano, De Marco, G. Michell, C. Lo Muzio. (eds), Enc.Treccani, Roma, (2002).
[4] G. De Marco. Aspetti decorativi. In: De Marco, G. Michell, C. Lo Muzio. L'architettura: caratteri e modelli. Subcontinente indiano. Enciclopedia Treccani, (2002).
[5] D. Faccenna, Saidu Sharif I (SWAT, Pakistan). The Buddhist Sacred Area, The Stupa terrace. Roma, (1995).
[6] D. Faccenna, P. Spagnesi. Buddhist Architecture in the Swat valley, Pakistan. Stupas, Viharas, a Dwelling Unit. Lahore, (2014).
[7] P. Brown. Indian Architecture: Buddhist and Hindu. Bombay, (1956).
[8] P. Callieri. Saidu Sharif I (Swāt, Pakistan), 1. The Buddhist Sacred Area, The Monastery, IsMEO Reports and Memoirs, XXIII, 1, IsMEO. Rome, (1989).
[9] J.H. Marshall. Taxila, I-II. Cambridge, (1951).
[10] M. Taddei. Ghandara. In: EAA, Roma, (1994).

Fig. 1 - Amluk Dhara: view from the north (M. L. Olivieri, 2012)

Fig. 4 - SWAT VALLEY: Buddha carved into the rock partially destroyed during the Taliban occupation (R. Sabelli, 2012)

Fig. 2 - Amluk Dhara: analysis of decay (R. Sabelli, N. Pericoli, 2012)

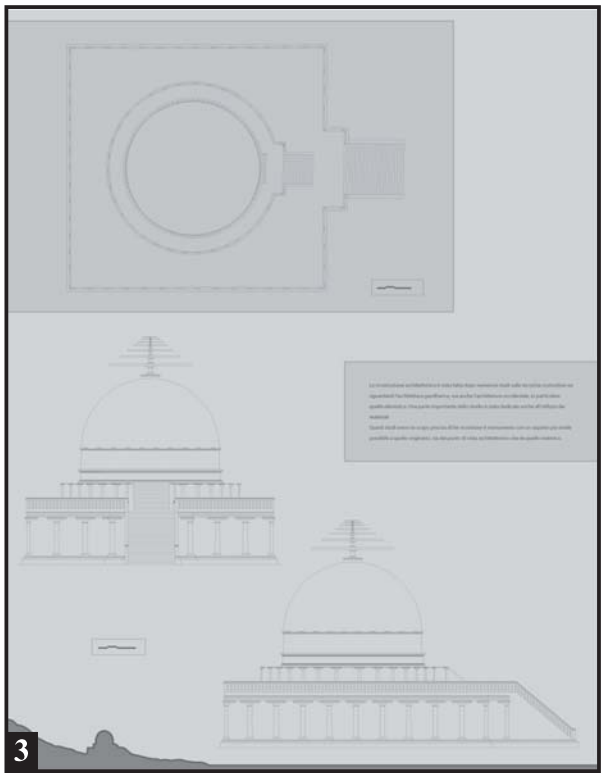


Fig. 3 - Amluk Dhara: graphic reconstruction of the stupa (R. Sabelli, N. Pericoli, 2012)

SURFACE ENHANCED RAMAN SPECTROSCOPY AS THE ULTRASENSETIVE TECHNIQUE FOR INORGANIC ART MATERIALS IDENTIFICATION

Shabunya-Klyachkovskaya E., Kulakovich O.

National Academy of Sciences of Belarus, B.I. Stepanov Institute of Physics, Nezavisimosti Avenue 68, 220072 Minsk, Belarus, e.sh-k@imaph.bas-net.by

ABSTRACT

The using of plasmon Au films atop the inorganic pigments surfaces provide a huge enhancement (10^5-10^7 times) of Raman scattering. The technique of sample preparation proposed has been applied for the inorganic art pigment identification in the several works of art. The masses of the fragments under investigation were not bigger than 1 μg. Obtained Surface Enhanced Raman spectra are characterized with significant signal/noise ratio while the Raman spectra in the absence of gold nanoparticles have not been recorded at all. So, the presented ultrasensitive technique could be successfully applied in the daily practice of Cultural heritage study.

Keywords: SERS, plasmon Au films, inorganic pigment identification, ultramarine blue, malachite, azurite, cerulean blue

INTRODUCTION

Raman spectroscopy is one of the most effective techniques of substances identification owing to the facts that the frequency set of the Raman spectrum is determined by the structure of the substance under investigation. However, Raman scattering has very low yield and therefore it needs large amount of material to be examined. Additionally, since Raman scattering is rather weak it is readily masked by uncontrollable intrinsic fluorescence of the analysed probe. That is why Raman spectroscopy has a very limited application in the cultural heritage study.

The Surface-Enhanced Raman Scattering (SERS) effect significantly enhances the scattering probability when the analyte is spatially confined within the electromagnetic field generated upon excitation of the Localized Surface Plasmon Resonance (LSPR) in a nanotextured surface of a noble metal [1]. There are the number techniques of synthesis and growing nanotexturized substrates with the SERS-active properties [2].

Recently, a number of papers have reported successful application of SERS to identify organic art materials [3-5]. However, there is some challenge to apply this technique for inorganic pigments study mainly because of the relatively large particle size of these pigments.

In our previous works [3] we noted the systematic enhancement of Raman scattering of micrometer sized inorganic crystallites using substrates based on colloidal Ag nanoparticles and Ag- or Au-coated Ge/Si- nanostructures. In the work [4] it has been shown that the dripping Au-sol on the top of the pigments represents itself more easy and rapid way of sample preparation and in the same time provides the enhancement of the Raman scattering on 4-6 order of magnitude. The aim of this work is approbation developed in the [4] technique for the inorganic art pigment identification in the works of art.

MATERIALS AND METHODS

The microfragments of paints have been safely taken from the Belarusian icon “Guiding Virgin” (XVIII century), canvas painting “The removing from the Cross” of unknowing Italian artist (XVII century) and canvas painting “The Undine” of unknowing artist (XX century) and used in the experiment as the analytes.

The monodisperse (12±2 nm) sol of gold nanoparticles has been prepared via citrate reduction of $HAuCl_4$ aqueous solution [5]. Optical density spectrum of the obtained Au-sol is characterized with the maximum on 518 nm (Fig. 1, dashed line).

According to the theoretical calculations performed for silver nanoparticle of 20 nm in the diameter [3] the SERS enhancement factor achieve his maximal value when analyte is placed in the close vicinity from the silver nanoparticle and recently decay with the increasing the distance between them.

In the reality artists paints represent themselves the multiphase system of binding media and pigment microcrystals. To provide close interaction between pigment microcrystals and gold nanoparticles binding media have been dissolved in alcohol and chloroform under the slight heating and centrifuged during the 2

minutes. Obtained chloroform suspensions of the analytes were deposited immediately on the glass surfaces and dried in the horizontal position at the room temperature. Then Au-sol was dripped atop the samples and also dried. The extinction peak of Au plasmon shifts to 562 nm and the peak on 705 nm appear in optical density spectrum in the result of nanoparticles aggregation during the Au-sol drying (see Figure 1, solid line). According to [6] local enhancement in the hot spots of aggregates could be several orders of magnitude lager than the average.

The Raman measurements were performed in the backscattering configuration at the room temperature. The Nd:YAG laser (531 nm) has been used for Raman spectra excitation. The registration system consists of a spectrograph with a diffraction grating 1200 lines/mm (Solar TII S3901) and a cooled CCD matrix (Princeton instruments).

RESULTS

Obtained SERS spectra of paints under the studying are presented in the Figure 2. It should be noted the masses of the fragments for investigation were not bigger than 1 μg. In the same time the signal-to-noise ratio in the obtained SERS spectra is better than 25:1 while the Raman spectra in the absence of gold nanoparticles have not been recorded at all.

Spectra interpretation has been performed with the using of the base of art pigment Raman spectra [7]. So, a lot of narrow peaks are observed in the SERS spectrum of blue paint taken from the icon “Guiding Virgin” of XVIII century (Fig. 2a). The peak at 406 cm^{-1} and some peaks in the region 800-1000 cm^{-1} could be ascribed to the azurite ($2CuCO_3.Cu(OH)_2$). The other peaks belong to the organic dye indigo.

In the SERS spectrum of blue paint taken from the canvas painting “Guiding Virgin” of XVII century the peaks of ultramarine blue ($Na_8[Al_6Si_6O_{24}]S_n$) has been appeared at 235, 563 and 1102 cm-1. Malahite green pigment ($CuCO_3.Cu(OH)_2$) has been also identified by the peaks at 333, 410, 498, 645 and 1045 cm^{-1} (Fig. 2b).

In the blue paints taken from the canvas painting “The Undine” azurite in the mixture with cerulean blue ($CoO.nSnO_2$) had been identified.

CONCLUSIONS

So, we can conclude the presented way of sample preparation for Surface enhanced Raman spectroscopy provides huge SERS enhancement and could be successfully applied as the ultrasensitive technique in the daily practice of Cultural heritage study.

ACKNOWLEDGEMENTS

The authors are very gratefull to Belarusian Republican Foundation for Fundamental Research for the financial support of the investigations and The National Art Museum of the Republic of Belarus for the provided samples for the examination.

BIBLIOGRAPHY

[1] C. L. Haynes, R. P. Van Duyne. Nanosphere lithography: a versatile nanofabrication tool for studies of size-dependent nanoparticle optics. J. Phys. Chem. B, 105 (2001) 5599–5611.

[2] K. Chen, M. Leona, T. Vo-Dinh. Surface-enhanced Raman scattering for identification of organic pigments and dyes in works of art and cultural heritage material. Sensor Review, 27, April (2007) 109 – 120.

[3] E. V. Klyachkovskaya, D. V. Guzatov, N. D. Strekal, S. V. Vaschenko, A. N. Harbachova, M. V. Belkov, S. V. Gaponenko. Enhancement of Raman scattering of light by ultramarine microcrystals in presence of silver nanoparticles. J. Raman Spectrosc., 43, June (2012) 741-744.

[4] E. Shabunya-Klyachkovskaya, O. Kulakovich, V. Stankevich, D. Guzatov. The plasmon Au-films for Surface enhanced Raman scattering of blue and green inorganic art pigments. Physics, Chemistry and Application of nanostructures, (2015) in press.

[5] J. Turkevich, P. C. Stevenson, J. Hillier. A study of the nucleation and growth processes in the synthesis of colloidal gold. Discuss. Faraday Soc., 11 (1951) 55-75.

[6] V. M. Shalaev, A. K. Sarychev. Nonlinear optics of random metal-dielectric films. Physical Review B, 57, May (1998) 13265.

[7] I. M. Bell, R. J. H. Clark, P. J. Gibbs. Raman spectroscopic library of natural and synthetic pigments (Pre- ~1850 AD). Spectrochim. Acta, A, 53 (1997) 2159-2179.

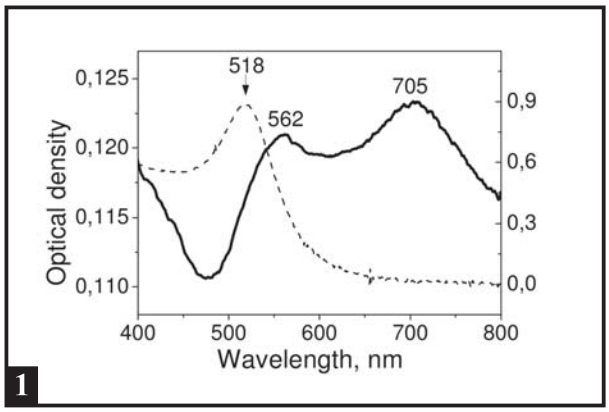
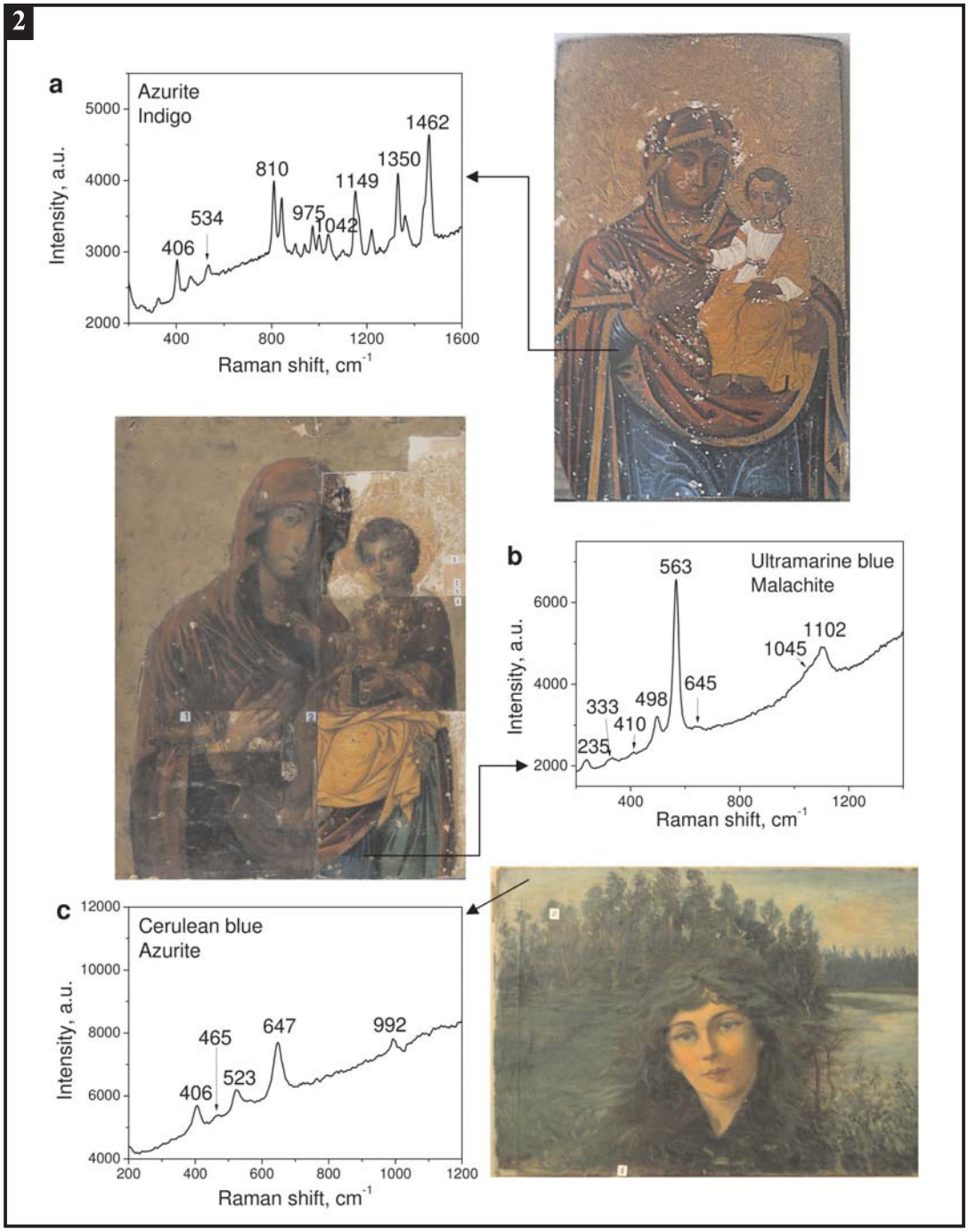


Fig. 1 - Optical density spectra of Au-sol (dash line) and dried Au-sol drop on the glass surface (solid line).

Fig. 2 - SERS spectra of paints taken from Belarusian icon "Guiding Virgin" of XVIII century (a), Belarusian icon "Guiding Virgin" of XVII century (b) and canvas painting "The Undine" of unknowing artist of XX century (c)



APPLICATION OF NEW PROTEASES IN REMOVAL PROTEIN LAYERS FROM ARTISTIC WORKS SURFACES

Palla Franco[1], Ferrara Giuliana[1], Richiusa Adriana[1], Teri Rosalia Maria Chiara[1], Sebastianelli Mauro[2]

[1]Laboratory of Biology and Biotecnology for Cultural Heritage - Department STEBICEF, University of Palermo, Italy, franco.palla@unipa.it, molbiolab@unipa.it
[2]Diocesan Museum, Restoration Laboratory, Palermo, Italy, maurosebastianelli@diocesipa.it

ABSTRACT

In this study proteis layers on different works of art surfaces are removed by new protease (BMP) isolated from marine invertebrate organisms. Particularly, the enzymatic cleaning are performed on selected areas of wax or papier-mache sculptures, and to facilitate the removing an old *velinatura* (japanise paper binded by aninmal glue) from oil painting surfaces.
BMP show a significant cleaning efficiency after 10 minutes of application with a enzyme concentration equal to 1mg/ml, at temperatures ranging between 20°C to 25.5°C, without the heating of the enzyme solutions or of the surfaces on which they are applied. The animal glue layers are selectively removed without any undesired effects on artfacts surface and avoiding damage to the costitutive materials in heritage object, operating safely for both operator and environment.

Keywords: biocleaning, bioactive molecules, animal glue, environmental temperature

INTRODUCTION

The action of cleaning represents one of the first and most important steps in conservative restoration of historical-artistic manufacts and must be performed carefully, through a selective way, avoiding irreversible alterations of the manufact surface. Purified enzymes or living bacteria cells, seems to meet these standards of accuracy. In particular, several bacterial strains with specific cellular activities have been used for the remediation of stone manufacts [1-3], while enzymatic purified protein isolated from different biological systems, were mainly applied to remove organic layers (protein, oily, strach) from paintings, sculptures. The first biocleaning attempts by enzymes, dates back to 1970 [4], by using commercial enzymes that acts at temperature > 30°C [5, 6]. As we previously described, bioactive molecules with protease activity (BMP), isolated from invertebrate marine organisms (Anthozoa), can be utilized at temperature < 30°C to carried out the bioremoval of protein layers [7-9]. In this study bio-cleaning tests were performed on three works of art, with clear differences in the constitutive materials, artistic manufacture and historic-artistic context, that showed surfaces alterations related to protein layers. Particularly, enzymatic cleaning tests were performed on papier-mache (*Christ Crucified*, XIX century) and wax (*Virgin Mary child*, XIX century) scultures, and to remove the *velinatura* (japanese paper/animal glue) on oil painting (*Noli me tangere*, XVIII century). Before application, enzyme solutions were gelled in Klucel G (Idrossi-propilcellulose) pH7.5, in order to guarantee stable reaction conditions, viscosity and control of water release, also facilitating the cleaning procedure [10]. Skillful results were observed at room temperature (21-25.5°C) without providing the heating of the enzyme solutions, peculiarity that makes these proteases more appropriate than commericial one, which usually are activate at higher temperatures (≥ 30°C). The results of this study provide additional information about the use of BMP for the biological removal of protein layers from artwork surfaces, utilizing operator and environmental friendly molecules.

MATERIALS AND METHODS

Characterization of protein layers

Microfragments were sampled form the surfaces of the three manufacts and the proteinaceous nature was revealed by: *i)* High Pressure Liquid Chromatography (HPLC) for the papier-mache manufact [11]; *ii)* Sodium Dodecyl Sulphate - Polyacrylamide gel electrophoresis (SDS-PHAGE) for wax sculpture [12]; *iii)* Fourier Transform Infrared Spectroscopy (FTIR) for the *velinatura* in painting surface [13].

Bioremoval assay

BMP at a final concentration of 1mg/ml have been applied on 2cm^2 protein layer as gelled (2 - 2.5% Klucel G) pH 7.5 solutions. The enzymes gellified solutions were applied for 5 and 10 minutes, at environmental temperatures (20°C - 25.5°C); a

control test was performed for each experiment, applying the gelled solution (pH 7.5) without BMP, for 10 minutes. After applications, the enzyme solution was removed by dry swab first and subsequently by dH_2O wetted swabs [7].

RESULTS

Christ Crucified, XIX century

In relationship with the constitutive materials (pigments, plaster-binder preparation) of this manufact, particular attention was paid on removing the protein layer. Both Control (10 mM TRIS-HCl pH 7.5) and Enzyme solutions (10 mM TRIS-HCl pH 7.5 + 1mg/ml of BMP) were gelled by addition of 2% Klucel-G. Gellified solutions were gently applied by brusch (Fig 1a) on the test areas (Fig. 1b). As showed in white squared areas, an increasing of cleaning is showed from 5' to 10' of application. In C, a reduced removing was observed, mainly related to the cleaning effect of Klucel G on incoherent layers. Bioremoval was performed at an environmental temperature of 25.5°C.

Virgin Mary child, XIX century

Attepts to perform enzymatic cleaning of wax manufacts are very few, mainly due to the impossibility of applying heated solutions [14].
In the present study, for the first time, proteolytic enzyme (MBP) extracted from invertebrate organisms was tested for removing of protein layer. Both Control (10 mM TRIS-HCl pH 7.5) and Enzyme solutions (10 mM TRIS-HCl pH 7.5 + 1mg/ml of BMP) gelled by addition of 2.5% Klucel-G, were stratified by plastic tips of variable volume piptette, interposing a Japanese paper fragment. As showed in the test areas the application of enzyme solution (10 mM TRIS-HCl pH 7.5 + 1mg/ml of BMP in 2.5% Klucel G) for 5 or 10 minutes (Fig. 2 - Panes 5' and 10') allowed the removing of protein layer.
Concerning the Control (Fig.2 - Pane C) and dWater (Fig. 2 - Pane W) test areas, a reduced bioremoval effect was revealed, but after drying the whitening of the surface appeared. Bioremoval was performed at the environmental temperature of 21°C.

Noli me tangere, XVIII century

To remove the *velinatura* the Enzyme solution (10 mM TRIS-HCl pH 7.5 + 1mg/ml of BMP) was gellified with 2.5 % of Carboxymethylcellulose, stratified in the red boxed areas (Fig. 3) and maintained in contact for 2 and 5 minutes. Contextually, in the control (C) area the same gelled solution without BMP, was applied for 5 minutes. Tests were performed at the environmental temperature of 24°C.

CONCLUSIONS

The rational use of an enzyme or enzyme mixture requires information on their hydrolytic activity, on the specificity of action, on the nature of the material to be removed (proteins, starches, oils, fats), on temperature, pH and salt concentrations that must be optimal for the reaction. In this study, the proteolytic enzyme isolated from marine invertebrate organisms (Bioactive Molecules with Protease activity, BMP), allow us to remove protein layers (mainly animal glue) under "room temperature" (21°C - 25.5°C) conditions, without heating the enzyme solution or the artwork surface on which it is applied.
Bioremoval by BMP allowed us to obtain very satisfactory results under different points of view.
Concerning the papier-mache manufact, the application for 10 minutes of the gelled enzyme solution allowed the total removal of "coherent protein layer" (Fig. 1b – Pane 10'). Instead, by the use of the gelled solution without MBP, after 10 minutes , only of the "surface deposit" was removed (Fig. 1b, Pane C).
Tests performed on wax manufact showed an good proteolytic activity, which allowed the complete removal of the protein layer without producing whitening phenomena (Fig. 2, Panes 5'-10'). Furthermore, for these artifacts of fundamental importance it is the ability to operate at room temperature avoiding any heating, even minimum of both enzyme solution or artwork surface.
For the oil painting on canvas, the removal of *velinatura* is targeted to the solubilization of the adhesive layer (animal glue) without altering the preparatory layers. The traditional methods based on the use of warm water, applied in a free form, acts in a not controllable way with a high risk of alteration of the constitutive materials [15]. The cleaning by enzyme solutions allowed a fast removal of *velinatura*, in a time equivalent to use of warmed water (40°C - 60°C), but carried out at room temperature (24°C). Moreover, the observation of the biocleaned surfaces, throught visible and UV light, confirmed the complete removal of the binder, without residue (Fig. 3, pane 5').
We hypothesize that this novel enzyme will implement the efficiency in bioremoving protocols, according to the conservative procedures, reducing costs and operator time, without negative impact on operators and environment, as also tested for the oil painting on

canvas, *Noli me tangere*, in Fig 4.

ACKNOWLEDGEMENTS

Authors thank M. Bruno and M. Cammarata (Department STEBICEF) and C. Pellerito (Department of Phisic and Chemistry) - University of Palermo, for analyzing the protein layers.

BIBLIOGRAPHY

[1] F. Cappitelli, E. Zanardini, G. Ranalli, E. Mello, I. Daffonchio, C. Sorlini. Improved methodology for bioremoval of black crust on historical stone artworks by use of sulfate reducing bacteria. Applied and Environmental Microbiology, 72 (2006) 3733-3737.

[2] C. Sorlini, G. Ranalli, E. Zanardini. Stone bioconservation. In: "Cultural heritage microbiology: fundamental studies in conservation science", ASM, New York, (2010) 290-303.

[3] P.Bosch. Biocleaning of animal glue on wall paintings by Pseudomonas stutzeri. Chemistry Today, 31 (2013) 50-53.

[4] O. Wendelbo, B. Fosse. Protein surgery: a restoring procedure applied on paper. Restaurator, 1 (1970) 245-248.

[5] J. Segal, D. Cooper. The use of enzymes to release adhesives. Paper Conservator, 2 (1977) 47-50.

[6] P. Cremonesi. Gli enzimi nella pulitura di opere policrome. Il Prato, Padova, (1999).

[7] F. Palla, M. Cammarata, MR. Trapani, G. Ghersi, M. Salamone, M. Sebastianelli. Novel protease from marine organisms with potential interest in restoration procedure. Science and Technology for the Conservation of Cultural Heritage, MA. Rogerio-Candelera, M. Lazzari & E. Cano (eds), CRC Press, Taylor & Francis Group, London, (2013) 279-282.

[8] F. Palla. Bioactive molecules: innovative contributions of biotechnology to the restoration of Cultural Heritage. Conservation Science in Cultural Heritage, 13 (2013) 369-378.

[9] G. Barresi, E. Di Carlo, M. R. Trapani, M. G. Parisi, C. Chillè, M. F. Mulè, M. Cammarata, F. Palla. Marine organisms as source of bioactive molecules applied in restoration projects. Heritage Science, (2015) in press

[10] F. Talarico, C. Caldi, M. Valenzuela, C. Zaccheo, A. Zampa, M. P. Nugari. Applicazioni dei gel come supportanti nel restauro. Bollettino ICR, 3 (2001) 101-118.

[11] F. Palla, M. Cammarata, M. Salamone, M. Sebastianelli, A. Cuttitta, L. Tutino, M. G. Parisi, N. Billeci, G. Ghersi. Bio-pulitura: proteasi da organismi marini. VII Congresso Nazionale AIAR: Scienza e Beni Culturali, 22-24 Febbraio, Modena, (2012) 1-8.

[12] U. K. Laemmli. Cleavage of structural proteins during the assembly of the head of bacteriophage T4. Nature, 227 (1970) 680-685.

[13] A. Sarmiento, M. Pérez-Alonso, M. Olivares, K. Castro, I. Martínez-Arkarazo, L. A. Fernández, J. M. Madariaga. Classification and identification of organic binding media in artworks by means of Fourier transform infrared spectroscopy and principal component analysis, Springer-Verlag, GmbH, Heidelberg, (2011).

[14] M. L. Amadori, M. Buresta, A. Casoli, M. Sebastianelli. La Ceroplastica in Sicilia, storia e restauro. Aracne Editrice, Roma, (2011).

[15] P. Cremonesi, M. Fratelli, D. Riggiardi. Opere senza veli. La criticità della *velinatura* dei dipinti e le alternative possibili. IV Congresso Nazionale IGIIC - Lo Stato dell'Arte IV, 28-30 settembre 2006, Siena, (2006) 173-178.

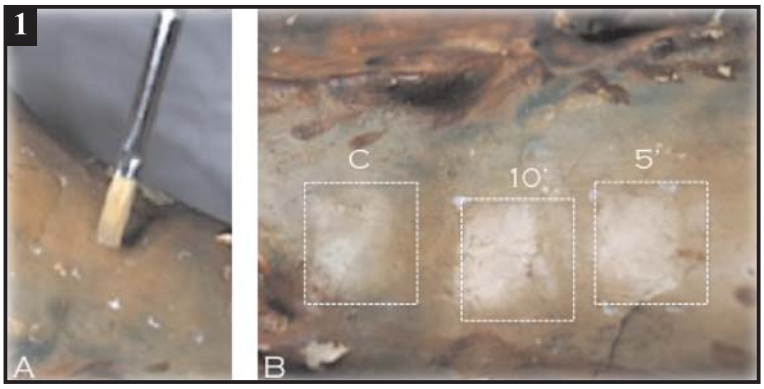
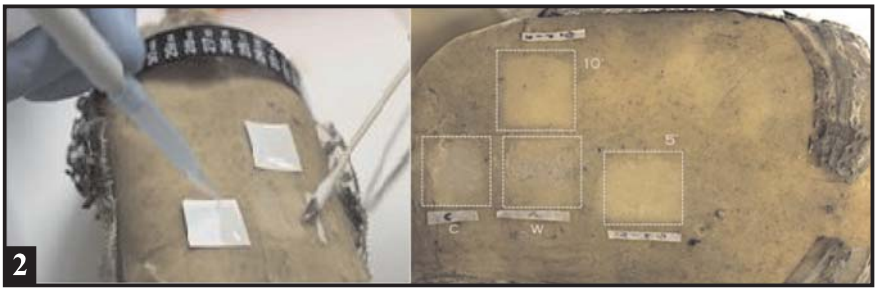


Fig. 1 - Bioremoving of protein layer (B) from papier-mache surface sculpture. The control (C) and enzymatic solutions (5', 10') were gently applied by brush.

Fig. 2 - Test on wax sculpture. Left: gelled solution applied, by pastic tip of a volume variable pipette, on japanese paper fragments. Rigth: protein layers removed, without any indesired effect, by enzyme solution applied for 5 and 10 minutes; a surface whitening appered in control (C) and water (W) after drying of the test areas.



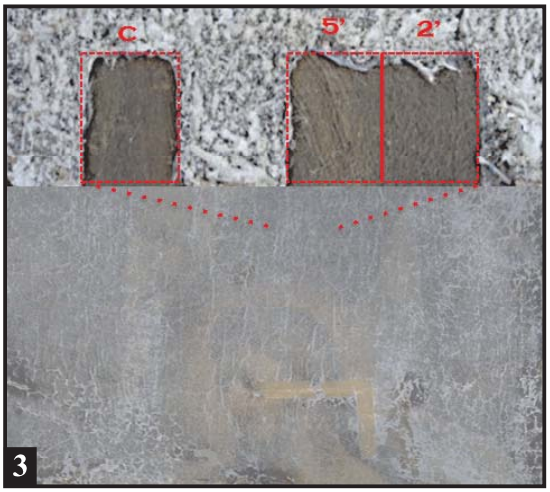


Fig. 3 - Enzymatic removing of *velinatura* (japanese paper/animal glue) in oil painting. In all tree areas the paper sheet was removed, but residues of animal glue are still present in control (C) and 2 minutes (2') red panes. The complete removal of both paper and animal glue was reached after 5 minutes of application, 5' red pane.

Fig. 4 - Oil painting on canvas *Noli me tangere*:
a) before; b) during; c) after bioremoving of *velinatura*.

MONITORING OF THE HEAT AND MOISTURE TRANSPORT THROUGH WALLS OF THE CULTURAL OBJECTS

Kubičár Ľudovít[1], Hudec Ján[1], Dieška Peter[2], Vitkovič Martin[3]

[1]Institute of Physics SAS, Bratislava, Slovakia, kubicar@savba.sk
[2]Institute of Nuclear Science and Physical Engineering, Faculty of Electrical Engineering, STU, Bratislava, Slovakia, peter.dieska@stuba.sk
[3]Institute of Inorganic Chemistry SAS, Bratislava, Slovakia, martin.vitkovic@savba.sk

ABSTRACT

Our contribution is devoted to methodology for monitoring the effectiveness of restoration works. Hygrothermal regime is monitored to look at critical places of the object after restoration works. The monitoring technique is applied on UNESCO object, namely the church of St. James in Levoča. We found a high level of moisture in the pillar of the church. The data show relatively strong effects of the freezing – thawing phenomena. Effects may have a destructive impact on the structure of sandstone blocks from which the pillar is built.

Keywords: monitoring of the hygrothermal regime, moisture sensor, cultural monument

INTRODUCTION

Historic monuments are subject to degradation due to exposition to surrounding meteorological conditions and groundwater. Construction of cultural objects consists of components (bricks, mortars, stones, plaster, etc.) that have porous structure. Air, vapor, water or ice can be found in pores depending on surrounding environmental conditions. Processes like heat transport, moisture diffusion, wetting and drying, freezing and thawing can be found in such structures. Understanding the moisture transport in a building structure, its distribution and temporal variation is crucial in the prediction of material decay. Moisture in the walls has a destructive impact caused by cycles of drying-wetting and freezing - thawing. Modern building technology can significantly suppress the moisture diffusion into the wall structure. The suppression of moisture in historic buildings requires sometimes expensive protective measures. However, it remains an open question how effective the measures are. This question can only be answered by appropriate monitoring of the hygrothermal regime [1]. Therefore, monitoring has high priority in the preservation and restoration of historic structures.

Several projects have dealt with historic monument deterioration. Saas and Viles studied the spatial distribution of moisture and its time variations in ruined walls [2]. Kramer et al. analyzed the effect of interior operating conditions on historic building enclosure components [3]. Bruggerhoff et al. studied water circulation in stones in the wall of Saint-Gatien Cathedral in Tours [4]. Results have shown that water transport through porous structures is a complex process where an entire set of environmental factors must be considered to obtain a clear picture of deterioration processes. Our contribution is devoted to methodology for monitoring the effectiveness of restoration works. The restoration work is performed on UNESCO object, namely the church of St. James in Levoča. Brief description of the monitoring technique and its installation in the walls of the church is presented. First results of the monitoring period from September 15, 2014 to February 15, 2015 are given. We concentrate primarily on effects that are responsible for the deterioration of the pillar structure.

EXPERIMENTAL TECHNIQUE

The experimental technique is based on measuring thermal conductivity of the surrounding porous material. The thermal conductivity of porous media is a function of the skeleton and the pore content. In a real environment, the pores can be filled with air/vapor, water, or ice, depending on the thermodynamic state. We use the hot-ball method for measuring thermophysical properties [5]. The method makes use of a small ball that generates a transient temperature field in its vicinity and simultaneously measures the temperature. The ball temperature is a measure of the thermal conductivity of the surrounding material. The diameter of the ball is around 3 mm. A photo of the hot ball sensor is shown in Fig. 1a.

The moisture sensor (Fig. 1b) is composed of a cylindrical body with a diameter of 30 mm and length around 20 mm [6]. A hole with a diameter of 3.1 mm is drilled along the axis of the cylinder, where the hot ball is inserted and fixed by epoxy resin. The sensor body is made from a core taken from the borehole drilled in the porous material in which the moisture will be monitored. The moisture sensor is inserted back in the borehole and it ensures that the properties of the sensor and the porous material are identical. For practical use the moisture sensor has to be calibrated for both dry and water-saturated conditions.
The electronic device is constructed for use in real environmental conditions. The device handles all operations needed for a measurement, namely energizing the hot-ball sensor, measuring its temperature response, storing the scanned data and wireless data communication for managing the device using a laptop.

DESCRIPTION OF ASSEMBLING OF SENSORS

St Jame's church in Levoča belongs to the biggest gothic churches in Slovakia. The church is consecrated to St. James sr. the apostle, protector of the fighters, the pilgrim and the workers venerated by the whole medieval Europe. Roman Catholic Paris Church of St. James belongs to the most important monuments of sacral arts in Slovakia. Apart from the church architecture, the works of the medieval well-known woodcarver Majster Pavol from Levoča as well as the works of the jeweler Jan Szilassy are included into UNESCO list. Geographical position of the church is in 49.1°N, 20.4°E and at an altitude of 570 m. Levoča is located on the northern edge of the boiler Hornádska Basin in a distance of around 40 km from High Tatras Mountains. The climate is strongly influenced by the High Tatras, therefore winters are cold and summers are rainy. The sensors are placed in the south pillar of the church in a depth of 100 and 400 mm at a height of 2 m above ground. Pillar's width is 1000 mm. The pillars are built of sandstone blocks. The church is built on the wet ground. Hygrothermal data collected in the period from September 15, 2014 to February 15, 2015 at a depth of 400 mm are shown in Fig. 2. After reaching the hygrothermal equilibrium around the sensor, we have found a high level of moisture in the sandstone blocks, namely above 60%. In these conditions effects of freezing – thawing were found during winter-time. Effects of freezing - thawing for saturated porous structures can be found only in materials having higher porosities [7 - 8]. Data on Sander sandstone with porosity 17% show change of thermal conductivity due to freezing – thawing effect of 10% published by Hammerschmidt et al [8] or 6% published by Kubicar et al [7]. Differences found can be caused by use of different measuring techniques. Sandstone used in pillars has porosity around 10% and its change of thermal conductivity ranges around 7%. When water freezes below 0oC its volume increases by around 9%. This has destructive impact on pore structure providing full saturation. Our data show a 60% moisture level. Then part of the pores is filled with water. The destructive nature of freezing manifests itself fully in the corresponding pores. In any case, definitive conclusions can be formulated only after several annual cycles. We used calibrated moisture sensors. After installing sensors in the pillar we found shift of the calibration scale that caused uncertainty around 10% in the determination of the absolute value of moisture. A detailed study needs to be done to find the reason of the calibrated scale shift.

CONCLUSIONS

This paper presents a methodology for monitoring the hygrothermal regime of the cultural monuments. Suitable location of the sensors in the walls of the object allows you to track the effectiveness of the restoration interventions. The methodology was applied to the southern pillar of the St. Jame's Church in Levoča. We found a high level of moisture in the pillar at 2 m height above ground surface and in a depth of 400 mm in the pillar body. The data show relatively strong effects of the freezing – thawing phenomena. Effects may have a destructive impact on the structure of sandstone blocks from which the pillar is built.

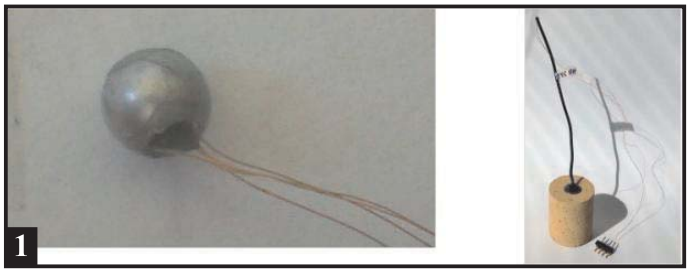
ACKNOWLEDGEMENTS

The authors thank to the Monument Boards of the Slovak Republic, Levoča and the Municipality Office of Levoča for cooperation during experiments. Works was supported by the Slovak Research and Development Agency No. LPP APVV 0442-09.

BIBLIOGRAPHY

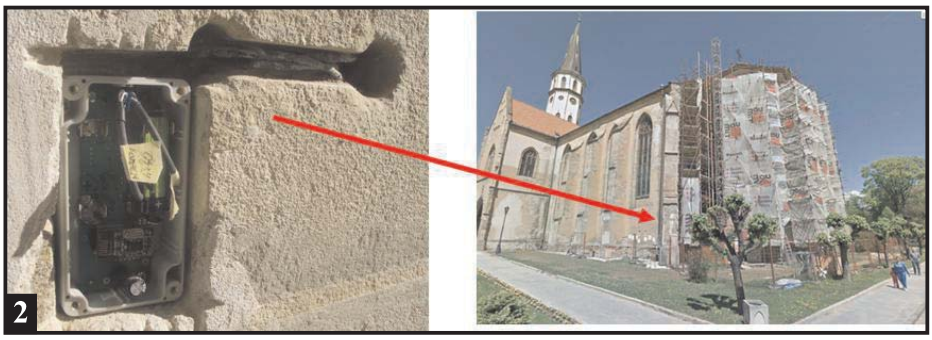
[1] D. Fidríková, V. Greif, P. Dieška, V. Štofanik, L. Kubičár, J. Vlčko. Monitoring of the temperature-moisture regime in St. Martin's Cathedral tower in Bratislava. Environ Earth Sci. 69 (2013) 1481–1489.
[2] M. A. Kramer, K. G. Finch, B. Hubbs, J. Teetaert. Monitoring of historic structures for whole-building improvements. In: "Proceedings from the third international building physics

conference, Montreal, Quebec, 27–31 August 2006".
http://www.ornl.gov/sci/buildings/2012/B11%20papers/142_Kramer.pdf, (2006).
[3] S. Brüggerhoff, G. Wange, P. Morat, J. L. Le Mouël, F. Perrier. Firstresults of using combined mass and temperature measurements to study the water flow at the rock–atmosphere interface. Journal of Cultural Heritage 2 (2001) 117–132.
[4] O. Sass, H. A. Viles. How wet are these walls? Testing a novel technique for measuring moisture in ruined walls. Journal of Cultural Heritage 7 (2006) 257–263
[5] Ľ. Kubičár, V. Vretenár, V. Štofanik, V. Boháč. Hot-ball method for measuring thermal conductivity. International Journal of Thermophysics 31 (2010) 1904–1918.
[6] D. Fidríková, V. Vretenár, I. Šimková , V. Greif, J. Vlčko, P. Dieška, L'. Kubičár. Sensor for Monitoring the Moisture in Porous Materials. International Journal of Thermophysics, 34 (2013) 1918-1929.
[7] Ľ.Kubičár, V. Vretenár, V. Boháč and P. Tiano. Thermophysical analysis of sandstone by pulse transient method. International Journal of Thermophysics, 27 (2006) 200–234.
[8] M. Abid, U. Hammerschmidt, J. Koöhler. Temperature and moisture dependent thermophysical properties of Sander sandstone. International Journal of Thermal Sciences 86 (2014) 88-94.



(a) (b)

Fig. 1 – (a) hot-ball sensor, (b) moisture sensor.



(a) (b)

Fig. 2 – (a) detail of sensors and monitoring instrument placement, (b) position of the sensors on pillar of the St Jame's Church.

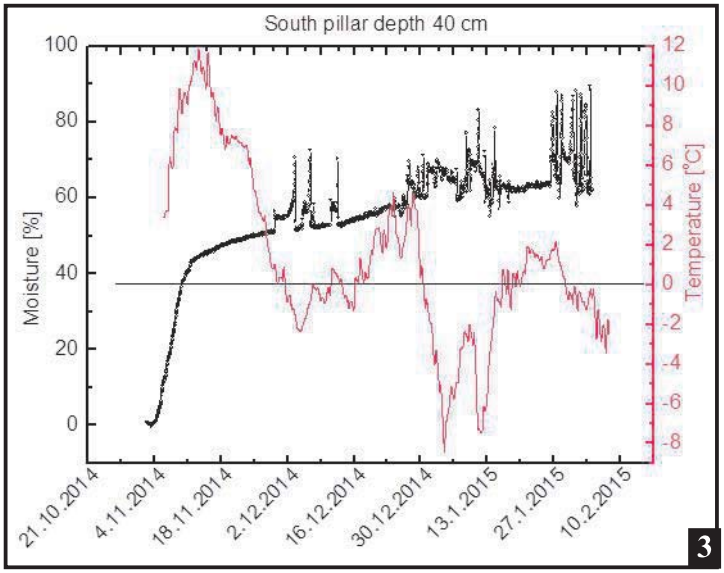


Fig. 3 – Data of moisture (circle) and temperature (line) on south pillar in the depth of 400 mm.

C - SACRAL SIGHTS IN THE LIGHT OF TOURIST TRADE MARKETING

FORMING THE TOURIST DESTINATION´S IMAGE ON THE SACRAL TRADITION OF ITS PATRON (A CASE-STUDY)

Jakubovská Kristína

Constantine The Philosopher University in Nitra, Nitra, Slovakia, kjakubovska@gmail.com

ABSTRACT

The author of the article presents a case study focused on the city of Nitra, being a tourist destination with a sacral tradition connected with its patron, the personality of St. Svorad-Andrew. She presents the possibilities to enrich the offer of the tourist destination by means of creating new tourist products, as well as, she points out at the way how to build the city´s image on the basis of its sacral tradition, especially, in the conditions of a weak local awareness of the tradition and its insufficient presentation and use in the regional and national tourist industry.

Keywords: sacral tradition, patron, tourist destination, destination´s image formation, destination management, intangible cultural heritage

INTRODUCTION

When we talk about tourism and tourist resorts, one of the most frequent and crucial issues is their potential. In general, tourism within a destination is formed upon its recognised natural and cultural potential, being its primary offer and the complex of services integrated within a destination´s infrastructure (accommodation, boarding, transport, communal, commercial, tourist etc.) being its secondary offer [1]. But what in case of a destination which possesses a lack of by tourists ever-desired and unique natural and cultural values or owns values of ´lower importance`? Does it automatically mean the location is seriously limited or even unsuitable for the tourism industry development? Logically, the answer should be yes. There are, of course, cases proving this, however, the opposing examples too. Tourism potential is a dynamic phenomenon, needed to be formed. We can recognise different stages of its usage in accordance with the heritage management activities: it can be used in a full and complex way, partially used, intact and unused, neglected or misused. It is, therefore, a question of the right management which should be pro-conservatory but still progressive, eco- and culturally friendly, well-adopted in connection with the needs and desires of the locals (´the owners`, co-creators and bearers of traditional values), ideally stemming from extraordinary local traditions, which are difficult to be copied by other locations.

In his work entitled *Consuming tradition and manufacturing heritage* Nezar AlSayyad [2] writes about new tendencies in the tourism industry, with more and more products being based on the secondary traditions and values, created without any inbred tradition, made up and well-marketed. So are the destinations presenting `*heritage of the other´* or locations providing crazy festivals and products of amusement parks, places building their images on fictions from films and books (Harry Potter and The Lord of the rings brands etc.). These we consider to some degree ´extreme cases` in connection with our `traditional understanding´ of the resort potential and offer equivalent to it.

In this context another, critical, question can be asked. How to classify the potential of cultural values which once resembled an integral part of everyday sociocultural practice of a community, however, as a result of historical and sociocultural development or due to some ideological and political reasons and steps, lost their relevance (were made lost) for younger generations? Is there still any implicit and relevant potential in them, can they be re-found and developed or are they lost forever? What we would like to emphasize in our article is the fact that tourism potential, just like the image of a destination has to be formed and worked on step by step, which leads to diverse benefits for all the parties involved, providing the steps are right and progressive, of course.

OPERATIONAL GOALS

In the article, we present a valuable religious tradition connected with a city known to be the spiritual centre of the Slovak nation, the city of Nitra. The tradition, we focus on, is the city patronage of St. Svorad[1], which has a great potential for further tourism development, on the one hand, and is currently rather unused and neglected (socially, culturally and economically) on the other hand. In the case-study we aim to

introduce the case, key factors and conditions, a part of the swot analysis as the basis for a future development strategy. We also intend to outline steps needed to be done in order to create the city image based on the almost forgotten tradition and identify theoretical conclusions and relations resulting from the case-study.

RESEARCH RESULTS

St. Svorad – the patron of Nitra

A city patron is an important and prestigious function. The term stems from Latin word *patronus* (the root of *pater*, meaning father). Over the centuries it has been used in many associations, the most crucial ones being a guardian and well-wisher [3]. There are various patronages (of cities, sacral sights, families, nations etc.) and plentiful forms of their worship, also reflected in the traditional culture (mass, pilgrimage, folk celebrations, prayer, heritage in folklore, traditional crafts and visual arts, collective memory etc.). Patrons have always played vital roles in the life of their worshippers: identificational, integrational, ethical and axiological, protective, spiritual, the role of sociocultural life development and community socialisation etc.

St. Svorad (*Swierad, Szórád, Zoerard/us*) is the patron of Nitra and com-patron of Nitra Diocese. He was a Christian monk, hermit and ascet, a representative of the Early Middle Ages (living on the verge of 10th and 11th centuries). He is an important person of the Christian history, one of the first Hungarian and our national saints. His reminiscence resembles an important part of spiritual culture and heritage of Nitra, Slovakia and Europe at all. He was chosen to be Nitra patron in 1740. The life of the saint is depicted in the legend of Vita *Sanctorum Eremitarum Andreae confessioris et Benedicti martyris*, which is thought to have been written by Pecs bishop Maurus between 1064 – 1070. The facts presented in the legend were based on Maurus´s talks with former Svorad´s helpmate, companion and student St. Benedict and abbot Philip (the abbot of St. Hypolitus monastery on the slopes of Zobor Hill)[2] Svorad´s cult started to be formed soon after his death (around 1030 A.D.). It followed up two miracles supposed to have been made by him. In both cases he saved a man´s life (firstly of an outlaw and secondly of a hangman). His cult was spread along with St. Benedict´s cult. They were canonized by Pope George VII with their cults being officially confirmed. The cults of the saints spread not only all over the Middle European Region (Poland, Slovakia, Hungary, The Czech Republic, Austria), but reached further to other regions of Europe and even overseas in connection with the Modern Age migration to new continents and world-wide spread of Christianity. Their holiday was set on July 17th [4].

Uniqueness of St. Svorad´s patronage originates in both the personality of the patron, and character of the object (the city) the patron protects. The city of Nitra has a specific position within the national history and culture in connection with Christian tradition. It is entitled the religious centre of our nation due to many national religious primacies of the past (the first Christian church and monastery in our territory, the first diocese in the Central Europe). However, it is surprising that the local awareness of the patron and the present state of his cult, are rather low. As a result, this is reflected in poor contribution of the tradition to the destination tourist product. We can go on to deduce that there is, firstly, an obvious gap on the local, regional and national tourist market marked with a lack of products based on the tradition and, collaterally, there are limits in self-identification of the locals and their sociocultural and spiritual life due to suppressed and neglected patronage tradition. Secondly, we presume that recognising and using the potential of the tradition is going to bring a lot of benefits to the sociocultural life of the locals and further tourism development and tourism economic activities. In order to benefit from the tradition, targeted and strategic development of the destination´s brand of *´Nitra – St. Svorad´s city`* is required.

Mapping the potential of Nitra´s patronage tradition

If we want to develop tourism of a destination on some particular element of its heritage, we need to map its potential, in this case, we distinguish the potential on three levels in their mutual interaction. Here, we provide only a short insight, focusing on the tradition´s strengths:

A) *The potential based on the personality of St. Svorad:*

- a prestigious city title
- uniqueness of Svorad´s patronage in Nitra
- an important personality of early-medieval culture in the Central European cultural region
- one of the first Hungarian saints
- contributes to the sacral image of the city
- his bond to Nitra, the presence of material values referred to his personality
- the presence of relics of St. Svorad and St. Benedict in the city
- international recognition and expansion of his cult

- existence of the legend depicting his life (being a valuable literary heritage)
- the tradition of Zobor pilgrimage (although not realised over a longer period of time)

B) *The potential based on Nitra as a sacral city (Nitra and Christianity)*
- Nitra´s national Christian primacies
- the presence of various Christian material artefacts
- the seat of a diocese
- historical cumulation of bishop´s and district administrator´s functions
- the presence of numerous historical and contemporary communities of monks, nuns and orders in the city
- continuous tradition of religious pilgrimages (commemorating St. Constantine and Methodius and Virgin Mary)
- influential personalities of religious life connected with Nitra
- the living tradition of St. Constantine and Methodius
- important religious institutions operating in the city: St. Gorazd´s Clerical Seminary, Diocesan Library, Diocesan Museum etc.

C) *Potential derived from genius loci (combining unique cultural values set in the natural environment)*
- ecology of the city and its surrounding
- material values referred to St. Svorad at the foot of Zobor Hill (Svorad´s cave and spring)
- combination of Zobor Hill natural and cultural values
- winegrowing tradition of Zobor Hill (with reference to local Benedictine tradition)

The principles needed to be implemented and framework of potential products based on the tradition

As we can see, there is a wide place for `building´ the destination tourism and marketed brand on this tradition. However, only knowing about the potential is insufficient unless supported with systematic planning, creating a development strategy and its practical implementation. The process will be shaped by several factors and there are potential risks. Therefore, we think, it has to meet with certain principles among which we recognise the following:

- ***effective usage of a destination´s tourism potentia***l (using not only material cultural values but also spiritual heritage of destinations, which can be revived and initiate secondary production of m aterial values);
- ***understanding ideas as sources of competitiveness*** (the idea has a specific role within creative industries where tourism and culture are also positioned; it is a source of potential and competitiveness; it plays a vital role in tourism management and tourist offer formation from the point of view of both the content and form);
- ***destination management and marketing implementation*** (understanding complexity of tourist destinations and their offers; viewing all particular values, services, operational subjects as roofed under one destination and brand; strategies of tourism development have to be created and implemented with all parties involved, including the interests of the locals being advocated) [6];
- ***understanding the sociocultural aspects of tourism development*** (understanding a great importance of involving the locals within tourism development activities; the locals are creators and further bearers of traditions they identify themselves with; they bring additional value of authenticity and unique atmosphere into products; it means that traditions can be revived and even created from nothing, but only with the help of a community of people who accept them and believe in them).

Taking these four main principles into account, the current tourist offer of Nitra could be effectively enlarged in new products. The actual products referring to St. Svorad´s patronage could be enriched in better-prepared, more influential, beneficial and prestigious products reaching the level of international importance.

The current products and values provided are:
- a guided tour around Zobor Hill; there are already information panels about St. Svorad, St. Svorad´s cave and spring can be visited at the foot of the hill
- secondary and rather informational reference to the patron implied in the guided tours around some city parts and sights, e.g St. Emeram´s Cathedral
- portraits of the saint on Zobor Hill panel, in the cave, in St. Emeram´s Cathedral, in printed materials in the form of brochures and historical books
- the saint´s relics in St. Emeram´s Cathedral

The strategy that we prepared and partially present in this paper allows the destination tourism managers and subjects to realise and benefit from other numerous tourist products categorized under various forms of tourism (religious tourism, cultural and heritage tourism, creative tourism, city-break tourism, recreational and countryside tourism etc.). It also leads to further development of cooperation and business partnerships with a

number of subjects on the regional, national and even international tourism markets.

Our suggested products are:
- upgraded and modified guided tours around Zobor Hill thematically prepared for different target groups
- St. Svorad´s festival with revived St. Svorad´s pilgrimage
- a night tour entitled *´Nitra´s Medieval Mystique`* carried out around Nitra on the city´s express train (promotional wheeled train used for tourism purposes)
- local and regional thematic products (tourist cultural routes of *`Nitra´s Christian traditions´* and *`Pilgrimage traditions in Ponitrie region´*)
- weekend city-break products (a combination of cultural, recreational, wine tourism and countryside tourism)
- products of trans-regional and cross-border character (*´The Benedictines in Slovakia`*, *`The Legend of St. Svorad and St. Benedict still alive´* - a cultural route mapping the personalities of St. Svorad, St. Benedict and St. Maurus within the territories of Poland, Slovakia and Hungary)
- integration of the products within the accompanying programme of congress tourism events

CONCLUSIONS

A city patron is an important title with various roles it has played in the life of local communities. It resembles an integral part of their spiritual heritage, shapes and contributes to their cultural identity, linearly joining former, present and future generations of the locals. It integrates people, depicts certain moral qualities and is a source of local cultural life and tourism development. In the case-study, we presented the idea that tourism potential and marketing brand are flexible variables able to be formed and built systematically. This presumption is proved by possible products´ transformation and enrichment in case of Nitra products connected with St. Svorad´ s tradition. However, the transition here requires certain steps to be done and principles to be implemented, which we consider to belong to general principles of strategic tourism development and destination brand marketing. A tradition which has been suppressed and ´forgotten` for a longer period of time, needs to be re-found at first. It means, a period of building the base for future products is needed. The period should be marked with the activities aimed at developing public awareness, their understanding of the tradition, increase in local patriotism and identificational relations to the tradition. Only when the first stage is successfully finished, the second one can start. Unless the activities follow the scheme, there is a great risk of continuing limitation of the tradition´s potential. The approach to practical realisation of the strategy should be then based on effective usage of the potential, using creative approach to products´ formation and other marketing tools implementation[3], maximum coordination of management activities under one destination brand and support of the locals´ participation in the products with the aim to increase their authenticity and stimulate the quality of visitors´ experiences.

BIBLIOGRAPHY

[1] M. Gúčik. Základy cestovného ruchu. Banská Bystrica : Dali-BB , 2010. 307 s. ISBN 978-80-89090-80-8.
[2] N. AlSayyad. Consuming tradition, manufacturing heritage: Global Norms and Urban Forms in the Age of Tourism. [online]. <http://books.google.sk/books?id=1LLAZp3_93MC&pg=PR4&lpg=PP1#v=onepage&q&f=false> . ISBN 0-415-23941-9.
[3] Merriam - Webster [online]. <http://www.merriamwebster.com/dictionary/patron>.
[4] V. Judák. Sv. Svorad : Patrón mesta Nitry. Nitra : Kňazský seminár sv. Gorazda, 1999, 173 s. ISBN 80-88741-28-9.
[5] V. Judák. Hviezdy slovenského neba. Trenčín: Naše kníhkupectvo J. Vojtech Grach, 1993. 153 s.ISBN 80-85598-09-4.
[6] M. Palatková. Marketingová strategie destinace cestovního ruchu. Praha : Grada Publishing a.s., 2006. 341 s. ISBN 80-247-1014-5.

NOTES

[1]Also addressed as St. Svorad-Andrew, with Andrew being his monk name.
[2]St. Svorad was born around 980 in the territory of today´s Poland, supposedly Opatowce on Wisla. It is said he was a fisherman who lived in his homeland most of his life, became a monk, worked in Tropie on Dunajec near the Slovak-Polish borders. Later, in connection with political restricions and persecutions of the orthodox religion in the Polish land, he moved to the territory of today´s Slovakia (of at that time continuing post-Great Moravian religious tradition of the Byzantine rite), in particular, to St. Hyppolitus monastery on the slope of Zobor Hill, and later, to Skalka pri Trenčíne. He left the monastery to become a hermit. At first he lived in

the nearby Zobor cave (now Svorad´s cave) and later in the hermitage in Skalka pri Trenčíne. His life was full of religious devotion, hard physical work of cutting down the Zobor wood and cultivating its land, regular fasting and asceticism (limitations in eating, sleeping, relaxing; and physical self-torture). The symbols of his asceticism were a chain, which he had around his body and later grew into it, and a walnut resembling his only food during Great Lent of 40-days [5].

[3]For example preparing Nitra souvenirs with motives of walnuts and chain, a regular walnut feast, the brand of Svorad´s wine and hotel room, walnut cake, city postcards etc.

RELIGIOUS SITES IN FEUDAL TOWN HLOHOVEC

Jozef Urminsky[1], Soňa Koleničová[2]

[1]Homeland museum in Hlohovec, Franciscan square 1, Hlohovec, Slovakia, urminsky.jozef@zupa-tt.sk
[2]Homeland museum in Hlohovec, Franciscan square 1, Hlohovec, Slovakia

INTRODUCTION

14th century featured some significant and sweeping changes to the life of Hlohovec. After the death of king Ondrej III, in 1301, a merciless fight for Hungarian Crown started in which Karol Róbert ultimately won. The governor of Hlohovec, Aba Pekný was killed in battle by Rozhanovce, and as he had fought the King along with Matúš Čák Trenčiansky, his property was seized by the monarch. All Hlohovec´s governance was administered by Karol Róbert from 1321 – 1349, and later by his son Ľudovít I. The year 1349 was the turning point for Hlohovec. On 19th November, the Hungarian King Ľudovít I gifted his devoted servants by introducing the Act of Donation Document. Mikuláš Kont and his two brothers, Leukuš and Bartolomej were awarded governance of Hlohovec Castle. It was not by chance Mikuláš had chosen this castle. The Castle was situated close to Royal Trnava and one part of the town had a stronger economy due to their tradesman and better conditions for both merchantile and farming activities, especially the vineyards. It was a great foundation for gradual development of the Lordship. The founder of the Lordship from Ilok (The Ujlakys) Mikuláš started to develop it with great effort. First he closed the old ford to build a new bridge over the river in 1353, and began to collect a toll. Together with his wife, he started the construction of one of the first charitable institutions in the region of Horné Uhorsko. This was the Municipal Hospital (*domus hospitalis*) with the Holly Spirit Chapel located at the gate to Hlohovec. In 1362, Nový Hlohovec (New Hlohovec) got the permission and exclusive right from King Ľudovít I to hold a free annual market based on traditions in Budín, for the attendance of royal guests.

The Church of the Holy Spirit The church, one of the oldest religious buildings in the city, dates from the mid-14th century. It was built on the ruins of metallurgical workshop destroyed by Tatars in 1241. The property was donated by palatine Nicholas Kont, the owner of Hlohovec estate, who with his wife Klára ordered the construction of a simple rectangular gothic church building at the entrance to Old Hlohovec, near the bridge over the river Váh. In a short time they added a functional building of a medieval, domus hospitalis', which gave hospitality to poor. From the gothic complex, a single nave floor plan reinforced with abutments to the east and the west portal entrance were preserved. The nave was vaulted and lifted in the 17th century and the church interior got a new baroque decoration. The building was completely renovated in 2000 and a new parish and pastoral center were located within the structure.

The Parish Church of St Michael the Archangel The church was built in the center of the regular square of so-called colonial type. The structure has a single nave with a tower and a polygonal closure to the presbytery. The parish church was mentioned for the first time in 1242. The building core and the nave with presbytery originate from the early 15th century. The building was architecturally inspired by the St Martin's dome in Bratislava. Of interest is the west portal entrance with plastic latticed lining and coat of arms with the monarch's head. The presbytery is backlit by slim gothic stained glass windows from the 19th century. From the original construction of the church there is a richly decorated pastophorium – a tabernacle with a stone sedilia. The church has a neogothic main altar from the early 20th century made by the local carver Joseph Seilnacht. The upper part of the tower was built in 1610 - the developer was the estate owner Stanislav Thurzo.

The Chapel of St Anne Originally, the chapel was a gothic ossuary and later meant to serve as a burial vault to store the deceased members of the Erdődy dynasty. The chapel underwent extensive baroque restoration in 1748. The chapel was never used as the crypt for the noble family because in 1776 the practice of burying on the square on church grounds ended and burials were moved to the hill of where today's calvary stands. The origin of the chapel is disclosed in an oil painting depicting the square in 1735, where we can see the chapel standing on the square next to the church. During the occupation of the Turks in 1663 – 1683, the chapel allegedly served as a Muslim mosque with a minaret attached to it.

The Franciscan monastery The Franciscan monastery in Hlohovec was established in the 15th century. Its beginnings date back to between 1465 and the end of the 15th century. The building itself was most likely erected in 1492, beside which stood the previously built Church of All Saints. Preceeding the foundation of the monastery there existed an L-shaped building, the origin of which is still unknown. In the 14th century, various medieval structures were scattered about surroundings of the monastery. Even earlier settlements had existed on the same grounds during the 12th and 13th centuries.

The Franciscan monastery was established /founded/ on the outskirts of the medieval town of Hlohovec. Both the strong faith of the souvereign of Hlohovec, Mikuláš Uljaky, and the efforts of Ujlaky to strengthen religious faith following the hussite period gave cause to the monastery's establishment.

The monastery at Hlohovec was one of the most important Franciscan monasteries in Slovakia. A number of them built starting from the 13th century, the oldest of which were in Bratislava, Trnava and Nitra. The first Franciscan monks were from german-speaking countries, although some came from Bosnia in the 15th century. They were propably the ones who founded the monastic community in Hlohovec.

The development of the monastic way of life in Hlohovec began in the first half of the 16th century. The first abbey of the monastery in known to us. The development of the monastery was interrupted during the second half of the 16th century. During the reform the monastery was burned down and the monks expelled. The church belonged to the Protestants and apparently a portion /part/ of the monastery was also used as a printing house, the first of which to be established in Slovakia /one of the first printing houses established in Slovakia/.

Occupation of the monastery was restored during the first third of the 17th century. In 1637 Katarína Pálffy had the monastery restored. Thus began a rich period of development for the monastery, only to be interrupted by Turkish occupation between 1663-1683.

The Hlohovec monastery belonging to the province of the Holy Saviour was affiliated with the Hungarian monastery at Gyöngyös, which was the seat of the Salvatorian province and an important religious and cultural centre in the 17th and 19th centuries.

A vast library was established in the monastery and important priests, poets and composers were in its employ. Valuable works of literature were cared for in this monastery (The Hlahol letters of Hlohovec).

Both the monastery and the church are among the important historical monuments in western Slovakia. Both buildings were originally Gothic in style, though the styles ranged in expression from Renaissance to Gothic. The rich stucco decoration of the church ceiling and the rectory dates to the period of reconstruction of both church and the monastery. In 1700 Šimon Forgáč had the chapel of the Holy Christ built.

In 1950, activities of the Franciscan order were violently interrupted. The parish office managed the church and in 1959 the museum was established. In 1991, after 40 years, activities of the order were resumed. Essential reconstruction was done and the monastery again began to be used for its original purpose. Part of the monastery building is used by the museum, which depicts the history and natural beauties of Hlohovec and its surroundings.

BIBLIOGRAPHY

[1] K. Čiefová. Hlohovec a rod Ilockých v rokoch 1349 – 1524. Trnavská univerzita v Trnave, fakulta humanistiky, Trnava (2008).
[2] V. J. Gajdoš. Františkáni v slovenskej literatúre. Prvá katolícka slovenská jednota, Celeveland (1979).
[3] Ľ. Chmelár. Monografia františkánskeho konventu v Hlohovci. Hlohovec (1965).
[4] F. Kadlečík. Latinské nápisy v Hlohovci. In: „Urminský, Jozef (ed.) Jubilejný zborník štúdií Vlastivedného múzea v Hlohovci 2009“, Vlastivedné múzeum v Hlohovci, Hlohovec (2009).
[5] F. Kadlečík. Archív rímskokatolíckej farnosti sv. Michala Archanjela v Hlohovci (Rozbor archívneho fondu a inventár). DP FF UK, Bratislava (2012).
[6] Kanonická vizitácia z roku 1780, Archív Rím.kat.farského úradu v Hlohovci
[7] N. Kirinovičová. Stredoveká architektúra Hlohovca. FF UK, Bratislava (2010).
[8] I. Pastorek. Z histórie rádu františkánov v Hlohovci. In: „Život v Hlohovci XXV“, 1 (1991) 11.
[9] I. Pastorek. a kol. Františkánsky kláštor v Hlohovci. Bratislava (1993).
[10] Slovenský národný archív, fond rodu Erdődy, Conscriptio arcis et dominii Galgócz 1720, fotokópia: Archív Vlastivedné múzeum v Hlohovci.
[11] J. Tassy a kol. Hlohovec. Monografia mesta. Bratislava (1989).
[12] Univerzitná knižnica v Bratislave. Kabinet

rukopisov starých a vzácnych tlačí. Ms 346, Ms 396, Ms 784, Ms 881.
[13] J. Urminský. Conventus Galgociensis v 520 ročnej hlbine času. In: „Život v Hlohovci“, 46/5 (2012) 4.
[14] J. Urminský. Základné znaky regionálnej identity mesta Hlohovec v jeho kultúrnospoločenskom a historickom vývoji. In: “Kultúra a regionálna identita”. Zborník z konferencie konanej dňa 23.05. TTSK. Trnava, (2012) 267-277.

go to contents

Corresponding Authors

TOPIC A: THE SOCIO SPIRITUAL VALUES OF THE RELIGIOUS ART

A1 - ARTISTIC AND CULTURAL EVALUATION

Surename	Name	E-mail	Institution	Country
Baratin	Laura	laura.baratin@uniurb.it	School of Conservation and Restoration, DiSBeF, University of Urbino	Italy
Giannini	Cristina	cristina.giannini@unina2.it; dotcrigianni@gmail.com	Department of Literature and Conservation of Cultural Heritage, University of Naples II, S.M. Capua Vetere, (Caserta) Italy	Italy

A2 - HISTORIC, THEOLOGICAL AND SOCIAL PERSPECTIVES (PAST AND PRESENT)

Surename	Name	E-mail	Institution	Country
Jakubovská	Viera	vjakubovska@ukf.sk	Constantine the Philosopher University in Nitra, Faculty of Arts, Department of Philosophy, Hodžova 1, 949 01 Nitra	Slovakia
Melniciuc Puică	Ilie	bradeail@gmail.com	Faculty of Orthodox Theology, University of "Al. I. Cuza", Iassy	Romania
Zimanová	Lucia	lucia.zimanova@ukf.sk	Constantine the Philosopher University in Nitra, Faculty of Arts, Department of philosophy, Hodžova 1, 949 01 Nitra	Slovakia

TOPIC B: CONSERVATION AND RESTORATION OF RELIGIOUS CULTURAL HERITAGE

B2 - ANALYTICAL, DIAGNOSTIC AND INTERVENTION METHODOLOGIES

Surename	Name	E-mail	Institution	Country
Górecka	Katarzyna	katarzyna_gorecka@wp.pl	Academy of Fine Arts in Warsaw, Faculty of Conservation and Restoration of Art, Wybrzeże Kościuszkowskie 37, 00-379 Warsaw	Poland
Hidaka	Midori	makadih3531@gmail.com	Tokyo University of Arts, 12-8 Ueno-park Taito-ku 110-0007 Tokyo	Japan
Keheyan	Yeghis	yeghis.keheyan@uniroma1.it	CNR, c/o Dipartimento di Chimica, piazzale Aldo Moro, 5 - Rome	Italy
Mareci	Daniel	rusu_iulian@hotmail.com	Gheorghe Asachi' Technical University, Faculty of Chemical Engineering and Environmental Protection, Bd. D. Mangeron 71, Iaşi	Romania
Melniciuc Puica	Nicoleta	nicoletamelniciuc@yahoo.com	Faculty of Orthodox Theology, "Alexandru Ioan Cuza" University of Iasi, Iasi,	Romania
Parisi	Cetty	cettyena@hotmail.it	Department of Cultural Heritage Sciences (DISBEC), University of Tuscia, Viterbo	Italy
Pelosi	Claudia	pelosi@unitus.it	Department of Cultural Heritage Sciences (DISBEC), University of Tuscia, Viterbo	Italy
Rusu	Iulian	rusu_iulian@hotmail.com	Gheorghe Asachi' Technical University, Faculty of Chemical Engineering and Environmental Protection, Bd. D. Mangeron 71, Iaşi	Romania
Sabelli	Roberto	roberto.sabelli@unifi.it	Dipartimento di Architettura (DIDA) dell'Università di Firenze, Firenze	Italy
Shabunya Klyachkovskaya	Elena	e.sh-k@imaph.bas-net.by	National Academy of Sciences of Belarus, B.I. Stepanov Institute of Physics, Nezavisimosti Avenue 68, 220072 Minsk	Belarus

B3 -NEW MATERIALS FOR THE CONSERVATION AND RESTORATION

Surename	Name	E-mail	Institution	Country
Palla	Franco	franco.palla@unipa.it; molbiolab@unipa.it	Laboratory of Biology and Biotecnology for Cultural Heritage - Department STEBICEF, University of Palermo	Italy

B4 – MONITORING AND SCHEDULED MAINTENANCE

Surename	Name	E-mail	Institution	Country
Kubičár	Ľudovít	kubicar@savba.sk	Institute of Physics SAS, Bratislava	Slovakia

TOPIC C: SACRAL SIGHTS IN THE LIGHT OF TOURIST TRADE MARKETING

C1 - MARKETING OF SACRAL SIGHTS AS UNIVERSAL CULTURAL HERITAGE

Surename	Name	E-mail	Institution	Country
Jakubovská	Kristína	kjakubovska@gmail.com	Constantine The Philosopher University in Nitra, Nitra	Slovakia

C3 – SOCIOCULTURAL DEVELOPMENT IN REGIONS

Surename	Name	E-mail	Institution	Country
Urminsky	Jozef	urminsky.jozef@zupa-tt.sk	Homeland museum in Hlohovec, Hlohovec	Slovakia

CONSERVAZIONE E RESTAURO

NARDINI EDITORE® Alcuni titoli nelle librerie e presso la casa editrice. Ordini e informazioni: info@nardinieditore.it; www.nardinieditore.it

PERIODICI

KERMES. LA RIVISTA DEL RESTAURO - *trimestrale*

BOLLETTINO DELL'ISTITUTO CENTRALE PER IL RESTAURO-ICR- *semestrale*

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), *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*

Monitoraggio del patrimonio monumentale e conservazione programmata, *a cura di Paola Croveri, Oscar Chiantore*

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

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

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

Il Laser. Pulitura su materiali di interesse artistico, *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, *edit by Davide Del Curto* (testi in inglese ed italiano)

Roberta Roani, **Per la storia della basilica di Santa Croce a Firenze.** La "Restaurazione generale del tempio" 1815-1824

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

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

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 copertura, *a cura di Manuela Romagnoli e Marco 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*

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

QUADERNI DEL BOLLETTINO ICR – Restauri a Berlino.

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

ARCHITETTURA E RESTAURO / ARCHITECTURE AND RESTORATION – *direzione scientifica dal 2014: Valentina Russo*

Dalla Reversibilità alla Compatibilità // Il recupero del centro storico di Genova // Il Minimo Intervento nel Restauro // La fruizione sostenibile del bene culturale // Il Quartiere del ghetto di Genova

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

QUADERNI DI ARCHITETTURA – *diretti 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 San Domenico a Ravenna, *a cura di Nicola Santopuoli*

CON L'ASSOCIAZIONE GIOVANNI SECCO SUARDO- QUADERNI DELL'ARCHIVIO STORICO NAZIONALE E BANCA DATI DEI RESTAURATORI ITALIANI – *diretti da Giuseppe Basile e Lanfranco Secco Suardo*

Restauratori e restauri in archivio - Vol. I: secc. XVII-XX / **Vol. II:** secc. XIX-XX, *a cura di Giuseppe Basile*

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**

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

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**

Vishwa Raj Mehra, **Foderatura a freddo**

Francesco Pertegato, **Il restauro degli arazzi**

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

Cristina Giannini, Roberta Roani, Giancarlo Lanterna, Marcello Picollo, Deodato Tapete, **Dizionario del restauro.Tecniche Diagnostica Conservazione**

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

Tensionamento dei dipinti su tela. La ricerca del valore di tensionamento, *a cura di Giorgio Capriotti e Antonio Iaccarino Idelson, con contributo di Giorgio Accardo e Mauro Torre, ICR e intervista a Roberto Carità*

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

Manufatti archeologici - CD, *a cura di Salvatore Siano*

Cesare Brandi, **Theory of Restoration**, *a cura di Giuseppe Basile con testi di G. Basile, P. Philippot, G.C. Argan, C. Brandi* (ed. inglese // ed. russa)

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

Lo Stato dell'Arte 3 // 4 // 5 // 6 // 7 // 8 // 9 // 10 // 11, Congressi Nazionali IGIIC

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

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

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

La diagnostica e la conservazione dei manufatti lignei (CD)

Strumenti musicali antichi. La spinetta ovale di Bartolomeo Cristoferi, *a cura di Gabriele Rossi Rognoni* (in italiano e in inglese)

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 e 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*

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 OPD: Cristina Danti, Cecilia Frosinini*

Alberto Felici, **Le impalcature nell'arte per l'arte.** Palchi, ponteggi, trabiccoli e armature per la realizzazione e il restauro 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 e Alberto Felici*

ARTE E RESTAURO/FONTI – *diretta da Caludio 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*

Il mosaico parietale. Trattatistica e ricette dall'Alto Medioevo al Settecento, *a cura di Paola Pogliani, Claudio Seccaroni*

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

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**

Francesco Pertegato, **I tessili**. Degrado e restauro

Gustav A. Berger, **La foderatura**

Dipinti su tela. Metodologie d'indagine per i supporti cellulosici, *a cura di Giovanna C. Scicolone*

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

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

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

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

Encausto. Storia, tecniche e ricerche, *a cura di Sergio Omarini* (in italiano e in inglese)

Il restauro della fotografia. Materiali fotografici e cinematografici, analogici e digitali, *a cura di Barbara Cattaneo* (anche stampato on-demand)

Fotografie, finitura e montaggio, *a cura di Donatella Matè, Maria Carla Sclocchi* (anche stampato 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

Giuliana Labud, **Il restauro delle opere multimediali**

Pietro Librici, **Il restauro delle diapositive di Amundsen.** Le esplorazioni polari tra storia e conferenze pubbliche

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

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*

CON IL CCR "LA VENARIA REALE" – *collane dirette da Carla Enrica Spantigati*

ARCHIVIO – Restauri per gli altari della Chiesa di Sant'Uberto alla Venaria Reale, *a cura di Carla E. Spantigati // Delle cacce ti dono il sommo impero.*

Restauri per la Sala di Diana alla Venaria Reale (con DVD interattivo)**,** *a cura di Carla E. Spantigati*

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

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

Il restauro degli arredi lignei - L'ebanisteria piemontese**,** *a cura di Carla E. Spantigati, Stefania De Blasi*

go to contents