

## HIGHLIGHTING CULTURAL HERITAGE AND RELIGIOUS TOURISM THROUGH ADVANCE TECHNOLOGIES

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### ABSTRACT

The present study focuses on the analysis of pigments and the conservation of two post-Byzantine icons: Saint John with scenes from his life (1674) and the Virgin Mary Enthroned with the Child (1687). The icons are works of the Cretan iconographer Antonios Agorastos and are housed in the Churches of Saint John in Skopelos and Saint George in Tyrnavos, respectively. The analysis of the pigments was carried out using non-destructive Raman and XRF spectroscopy techniques. Using the Thunder Optics - Gem Raman System and the Niton XLP 818 spectrometer, inorganic pigments such as lead white, azurite, verdigris, iron ochres, cinnabar and realgar were identified. The analysis was supported by the Spectragryph software.

The icons showed severe damage, such as loss of surface paint, cracks in the wooden substrates, the effect of wood-eating insects and damage from oxidized varnish. The conservation work included fixing the paint layer with acrylic emulsions, disinfestation using an anoxic method, aesthetic restoration with watercolors and the application of new varnish. Surface deposits and oxidized varnish were removed mechanically and chemically, revealing the original painting. The project highlighted the complexity of the conservation of historical objects and the importance of an interdisciplinary approach. The combined Raman and XRF techniques provided valuable information on the composition of the pigments, while the conservation procedures ensured the stability and aesthetic integrity of the icons. The contribution of scientific and artistic methods highlights the possibility of highlighting cultural heritage through conservation.

The study was carried out with the support of the Ephorate of Antiquities of Larissa and the Holy Metropolis of Larissa and Tyrnavos, following the regulatory provisions of the Ministry of Culture.

**Keywords:** Agorastos, portable image, pigment analysis, conservation

### 1.0 INTRODUCTION

#### Saint John with Scenes from His Life (1674)

Saint John with Scenes from His Life (1674) is an icon presented in the Church of Saint John of Molos in Skopelos. It is placed on the iconostasis, to the left of the Beautiful Gate, and exclusively the pigments were analyzed.

The icon depicts Saint John as the central figure, surrounded by ten scenes describing events from the life of the Baptist. In the central theme, the saint is depicted facing forward, wearing a silver-plated halo. With his right hand he gives a blessing, while with his left he holds an open scroll. His clothing includes a light blue hairy garment with sleeves and an olive-colored cloak. The background of the icon is gold.

In the upper zone of the icon, the Annunciation of Zechariah, the Birth of the Forerunner and the Flight of Elizabeth into the desert are depicted. Then, to the left of the central theme, Saint John is shown being guided by an angel into the desert, while on the right, John is depicted baptizing in the Jordan, preaching a baptism of repentance.

In the lower zone, the Finding of the Forerunner's head, the Beheading of the Precious Head of Saint John, as well as the second finding of the Prophet's head are depicted.

The icon bears the inscription Saint John the Forerunner. In one of the scenes depicting the beheading, there is the signature Hand of Anthony of Agoras of Crete, referring to the creator of the icon (Image 1). (Tr. Papazisis, Hagiographers of the 16th - 18th centuries in Tyrnavos and its province. Votokopoulos 1990 1 no.1 Saint John the Baptist).



**Figure 1: Dating of the image and signature of the painter**

### **Church of Saint George, Tyrnavos**

Theotokos Enthroned and Holding the Child (1687)

The icon of the Theotokos Enthroned and Holding the Child (1687) is an important work of post-Byzantine art and is housed in the Church of Saint George, Tyrnavos. The work was the subject of pigment analysis and thorough conservation, in order to restore its original shine and protect its artistic value.

The icon is framed around the perimeter by a red ribbon, which, however, has suffered serious damage to its left and lower sides. At the same time, damage is also observed on the left part

of the painted surface, where the damage is evident. In the center of the icon, the Theotokos is depicted seated on an elaborate marble throne. Her feet rest gently on a white stone, which bears a semicircular protrusion in the middle. The throne has a high backrest consisting of pillars decorated with Corinthian-style capitals, while in its central part there are columns, which rest on round pedestals and support curved handrails. The decoration of the throne includes green marble in the semicircle, a white seat, pink bases and pillars with cornices. (Votokopoulos, ,Icones of Corfu, Athens1990)

Christ is depicted sitting tenderly in the arms of his mother, while he blesses with his right hand. He supports a closed scroll on his thigh. His garment is white, decorated with elaborate floral motifs, and his orange robe is enriched with gold beads. The Virgin Mary, facing slightly to the right in relation to the viewer, wears a light blue dress and a phlox. The purple maphorion that covers her head falls richly to her feet, lending authority and grandeur to the composition.

At the top of the throne, three Old Testament prophets can be seen emerging from thorns. They hold scrolls with inscriptions related to prophecies about the Virgin Mary and look in her direction. David and the young Solomon are located on either side of the Virgin Mary's halo, while Aaron is placed on the right side. The prophets wear royal garments, fastened at the base of the neck, and their headgear varies, with some wearing the well-known kidari, a symbol of the high priesthood. (Chontrogiannis St. Antivouniotissa Museum, Corfu, Thessaloniki, 2010)

The painted composition includes monochrome depictions of prophets on the front parts of the throne, while the background of the icon is gold and the ground is green. In the central field, within a red cinnabar medallion, the name of the Virgin Mary is inscribed in gold engraving. Due to wear, the left medallion has been lost. In the lower right corner of the image, in front of the pedestal, the artist's signature can be seen, written in capital letters in black: HAND OF ANTONIOS AGORASTOS TKRTOs achiz' (Figure 2).



**Figure 2: Signature of the painter**

## 2.0 MATERIALS AND METHODOLOGY

## 2.1 Material

For the analysis of the pigments contained in the images, two different and complementary techniques were applied. More specifically, the following were used: a) Raman spectroscopy using the Thunder Optics - Gem Raman System, which operates with a 532 nm laser excitation. Before the pigment identification process, the resulting spectra were processed, which included baseline correction, application of the Savitzky-Golay smoothing method and normalization, according to the methodology described by Lycke et al. (2023). In addition, b) the XRF technique was used, utilizing the Niton XLP 818 spectrometer, operating with a 241 Am excitation source (Figure 3).



**Figure 3: Scientific portable instruments Raman and XRF**

## 2.2 Methodology

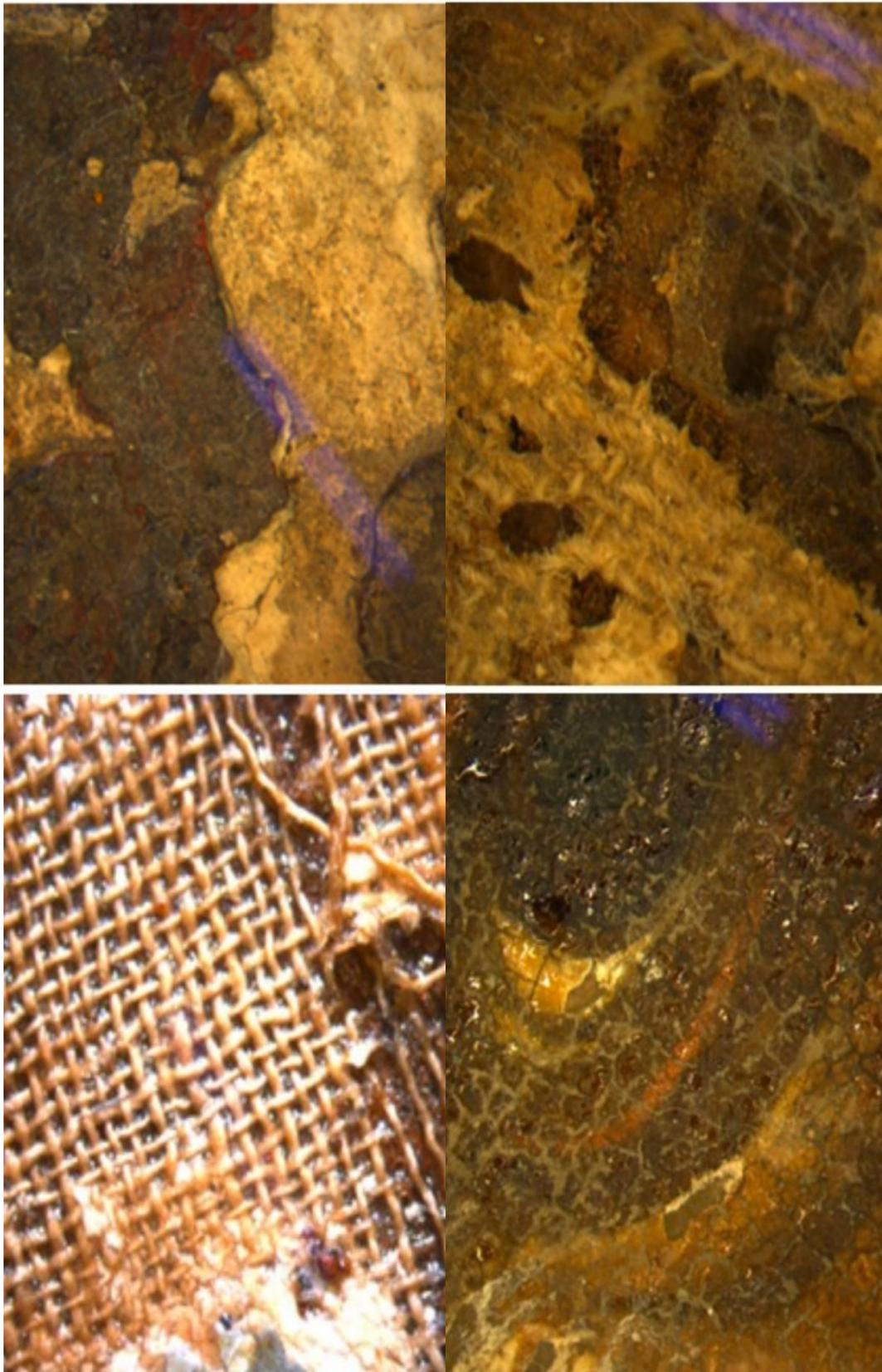
### 2.2.1 Damage Recording

The image is in poor condition (Figure 4). There is fabric placed on the wood, it seems that there are separate fabrics on the two pieces of wood since they are cut correctly. The left vertical wood has a crack that at the top divides the wood in two and fades downwards. One of the tresses has been severely damaged by wood-eating insects and will be removed to replace it with a new one of the same type (Figure 5).

Wood-eating insects and loss of wood at the bottom. The crack that starts at the back reaches the painting and divides it into two parts, as well as the connection of the support wood to the shoulder of Christ. Detachment with loss of fabric is observed at the bottom and left of the painted surface, At the points of the wooden nails of the tresses, there is loss and detachment of preparation and loss of painting surface at the top left and center of the image at the points of the union of the two woods (Figure 6). Torn fabric, shabby preparation, painting is largely missing, wax deposits of animal feces, Soot dust, oxidized craquelured varnish covers the painted surface. Generally good consistency of materials, simply mistreatment has brought the image to this condition (Figure 7).



**Figure 5: Details of the nails joining the two pieces of wood**



**Figure 6: Microscope photographs before preservation**



**Figure 7: Microscope details**

### **2.2.2 Conservation**

Conservation Works of the Images

Below is a detailed and thorough description of the conservation works, which were carried out in accordance with all the regulations applicable to the conservation of works of art, as determined by the Conservation Directorate of the Ministry of Culture (Figure 8):

**a. Fixing the paint layer, gold leaf and preparation:**

Acrylic emulsion in dispersion, dissolved in deionized water at a rate of 5%, was used to fix the paint layer, gold leaf and preparation. The material chosen was primal ws 24, which was applied either with a brush or by injection, depending on the needs of each surface. The material penetrated effectively in the areas where detachments, cracks or crazing had occurred. By placing special weights, in combination with the use of the Melinex material, the leveling and stabilization of the layer was achieved, which was the desired result.

**b. Disinfestation and Fixation of Wooden Carrier:**

The images identified extensive damage caused by wood-eating insects. To eliminate this damage, the anoxic disinfestation method was applied. Subsequently, the mechanical strength of the wooden carrier was reinforced through fixation using paraloid B72 dissolved in acetone. Initially, a 3% solution was applied for better penetration of the material into the damaged areas, followed by gradual applications with a syringe for deeper reinforcement. In the areas where there were metal nails, a higher 10% paraloid solution was applied, in order to stop the oxidation that affected both the metals and the wood.

**c. Cleaning of the Painting Surface and Back Side:**

The cleaning process was deemed necessary to remove the old, oxidized varnish, which covered the surface of the images and altered the aesthetic effect of the original painting. For this purpose, acetone or a mixture of acetone and ethanol in a ratio of 1:1 was used, with the help of a cotton swab. Wax deposits were removed mechanically with a scalpel and, at the same time, by chemical cleaning using white spirit. Paint deposits were removed mechanically. The back side of the images was cleaned with a solution of deionized water and ethanol (1:1), which ensured rapid evaporation of the water and prevented its possible absorption.

**d. Aesthetic Restoration:**

The chromatic aesthetic restoration of the image was done in a careful and discreet manner, limited only to the areas where there was intense damage, such as in the exposed white preparation. To preserve the authenticity of the work, the restoration was minimal and was visible only from a close distance, while from a distance it ensured a unified appearance. The pigments used were watercolors, due to their reversibility and their discreet application. (Lazidou and Drosaki, Manual of Image Conservation, 2008)

**e. Applying New Varnish:**

The final phase of the conservation work included the application of a new varnish, which was chosen to provide protection and highlight the original painting. The varnish used was from the Talens company, with a mixture containing equal parts of matte and glossy varnish, mixed

with white spirit. The varnish was applied using the pinelanza method, in two cross-layers for a uniform and durable result (Figure 9).



**Εικόνα 8: Image before maintenance**



**Figure 9: The icon of the Virgin Mary enthroned and holding the Child after conservation**



**Figure 10: The icon of Saint John of Molos has not been preserved, only pigment analysis has been performed.**

### **2.3 Pigments identification**

The analysis of the data and spectra produced by the Raman and XRF techniques was carried out with the help of the Spectragryph software (Menges, 2020). The combined approach of these two techniques allowed the identification of various inorganic pigments used in the images.

These pigments include: lead white, copper green (verdigris), copper blue (azurite), yellow (realgar), iron ochres (in red and yellow shades) and cinnabar, which is responsible for the red shades.

### **2.4 Religious tourism**

Religious tourism is a special form of tourism, which expresses the desire of people to move from their place of residence to another place that they consider sacred. It is the form of tourism, where participants start partially or exclusively for religious reasons. It is a subcategory of cultural tourism because participants often visit selected attractions other than religious ones. They belong to all social and economic classes and, based on age, belong mainly to the third. Travel enriched with secular elements has made religious tourism the sector of special and alternative tourism which is gradually replacing organized mass tourism. It concerns all religions and doctrines that exist in the world. According to UNWTO estimates, the turnover, at a global level, is estimated at 15 billion euros per year, while 300 - 330 million tourists visit the most important religious monuments in the world every year.

The development of religious tourism can enhance the conservation and the spatial and developmental dimension preservation of cultural heritage. It is the fastest growing

tourism product since 2007. The benefits associated with its development are not only economic but also help to reduce prejudices, change mentality, and bridge cultural differences through contacts with other cultures. Another interesting fact is that it is a particularly resilient form of tourism in times of economic crisis, in contrast to mass tourism, which is considered leisure tourism. Religious tourism, like all forms of tourism, contributes to national and local development and positively affects the economy of the visited areas or tourist areas. The type and characteristics of tourism shape its effects on a number of economic activities in the visited area and determine the changes in the produced product, employment and economic development.

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