

SPACES WITH A SPECIFIC MORPHOLOGY OF MURAL PAINTINGS DEGRADATION: THE PORCHES OF ORTHODOX CHURCHES*

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Summary: The degradation morphology and its evolution in the space of our medieval churches, indicates the existence of an architectural zone with a specific behavior due to the environment. Its impact has to be studied *before any other interventions* which should completely modify the transitory condition – outdoor / indoor – of the porch.

Rezumat: Morfologia degradărilor și evoluția lor în spațiul pridvoarelor bisericilor noastre medievale, indică existența unei zone arhitecturale cu un comportament specific față de factorii de mediu. Impactul acestora va trebui studiat *înainte de realizarea* oricăror intervenții care ar putea modifica radical condiția tranzitorie – *interior / exterior* – a pridvorului. Am ales, în sprijinul analizei noastre, trei cazuri din epoci diferite pe care le cunoaștem îndeaproape și mai cu seamă, pe care le-am putut urmări într-un amplu interval de timp. Este vorba de pridvorul Bisericii Mănăstirii Humor (sec. XVI), de cel al Bisericii Doamnei din București (sec. XVII) și de pridvorul, datorat unei refaceri ulterioare a ctitoriei, al Bisericii Mănăstirii Stavropoleos (sec. XVIII).

Preliminary observations

One of the conditions for a correct diagnosis of the architectural “epidermis” degradation if this being a simple plaster finish or a complex multi-strata structure is a careful morphological analysis corroborated with a correct explanation of destructive phenomena according to their complexity. A correct diagnosis should place the morphological and etiological analysis inside the given architectural place and as it is generally done in the restoration documents, in a space of general aspects considered to be always correct. This attitude often prevented a correct understanding of some degradation processes specific for different architectural spaces, consequently to adequate conservation solutions. This is the case of some architectural spaces with a particular shape such as the porches of orthodox churches, spaces designed in order to facilitate the transition from inside to outside, a preparatory function amplified by a complex iconographic program, with a strong eschatologic message.

Mural painting degradation has to be correlated with the specificity of the architectural space to which they belong. To sustain our analysis three cases were selected, ones that are familiar to us, belonging to different historical epoch and which could be observed during a large period of time.¹ These are the porch of the Humor Monastery Church (16th Cent.), that of Doamnei’s Church – Bucharest (17th Cent.) and the porch which is due to a subsequent restoration of the church of Stavropoleos Monastery (18th Cent.).

The case of Humor: 1973-1996

At the beginning of the 70s of the 20th century, the ICCROM mission dedicated to the North Moldavian mural paintings² – entrusted to the team of most outstanding personalities of conservation and restoration domain, Laura and Paolo Mora, together with Paul Philippot – discovered a very dangerous aspect: even if they are situated in a quite protective space, compared to the iconography of the facades, the mural paintings of the porch of Humor Monastery have suffered a process of defoliation of an unexpected extension.

* The present contribution represents a development of the paper *Un spațiu cu o morfologie specifică a degradărilor suprafeței murale: pridvorul bisericilor ortodoxe* given at the Symposium “Architecture. Restoration. Archaeology”, 2010 (ARA 11).

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¹ In the case of Humor Monastery the author took part in the conservation activity of the porch mural painting, first time in 1973. Between 1996/1998 the conservation of the porch mural painting was retaken due to the fact that a process of adhesion loss of the pictorial stratum and an extension of the phenomenon to the outdoor facades was detected. At Stavropoleos Church the degradation of the pictorial stratum of the porch was detected and cured between 1998-2001. Similar degradation phenomena were detected at the porch of Doamnei’s Church in Bucharest, where the consolidation work and further monitoring activity took place between 2005-2011.

² Draguț 1977, p. 11.

Images taken into a grazing light in 1973 for the first time pointed out a morphology of degradation, later on considered more as a formal pattern for a specific restoration terminology, but less used as a methodological pattern for understanding the degradation phenomena and establishing of a correct treatment.

The first consolidation tests showed to foreign specialists an interesting Romanian experience, which apart of the difficult communication with foreign professional staff and information limits had a great capacity to adapt to the modern requirements of conservation and restoration and to a restricted range of materials with long term certified qualities of traditional materials. Out of this experience came the fixative for the powdery mural paintings and for those ready to exfoliate. The dispersion of transparent calcium caseinate used in the '70 in order to save the mural paintings from Humor porch³ represented for almost twenty years the only fixative used by Romanian restorers to consolidate the colour strata, due to its compatibility with the materials that are part of the mural paintings.

Between 1973-1995, the system of interventions and monitoring of the mural paintings was abandoned in favor of what was then called the *policy of emergency in restoration*,⁴ and the consequence was the recurrence of the degradation phenomenon of the paintings of the Humor porch, showing a great progress of the disappearance of the painting from the 16th century. Comparing the critical zones, with exfoliation in *roof slope* and *scales*, visible in grazing light images of 1973, the same zone examined in 1995 (Fig. 1) showed a dramatic situation: not only that the degradation process reappeared with similar morphologies, but it generated visible losses of precious details of the painting stratum. At the same time it was obvious that the defoliation process exceeded the porch limits and turned into a characteristic of the entire outdoor painting.



Fig. 1. The porch of the church of Humor, in a view from 1995. The iconographic scheme contains a large development of the Last Judgment.

From the case of Humor to the comparative analysis: the churches of Humor, Stavropoleos and Doamnei.

Under those conditions restarting the emergency intervention at the church of Humor monastery made the initial diagnosis of 1973 questionable. Firstly a morphological analysis of different degradation stages was taken into consideration.

³ Neagoe 1977, pp. 87-92.

⁴ Mohanu 1977.



Fig. 2

a. Humor, porch, 1973. Examined in grazing light, the image of Jesus as Judge is just as other large areas of the Last Judgment, exposed to a process of defoliation. This was noticed for the first time.

b. Observed in 1993, the same detail, the head of Jesus as a Judge shows an equally extended process of defoliation, with visible loss of pictorial strata.

a

b

A first preliminary observation was that the previous analysis made in the 70s by Șerban Angelescu,⁵ mainly the monitoring of the mural painting, was not used to its full potential, in order to allow for a more accurate diagnosis and for a complex treatment.

A second observation, made twenty years after the phenomenon of de-cohesion of the painting stratum of Humor porch has been discovered, concerns the extension of the degradation phenomenon in similar shape on the exterior walls of the church, raising the dramatic problem of the exterior painting survival, generally speaking that of all painted facades in North Moldavia.



Fig. 3

a. Porch vault of Humor Monastery Church.

b. Porch of the church of Stavropoleos Monastery.

a

b

⁵ Angelescu 1977.

The third important observation for our study refers to the similarities of the morphology of the degradation of the mural painting from porches belonging to the same large family of medieval ecclesial Romanian architecture of the 16th-18th centuries (Figs. 2-3).

The first step of restarting the research concerning the causes of mural paintings' degradation in the space of Humor Monastery porch means to revise the morphology of de-cohesion phenomena of the colour strata. A revision of the restoration analyzing methodology initiated in the 70s, which was abandoned as soon as the austerity policy was adopted, as well as that of pure conservation of the endangered mural paintings, a solution dominated by the spectacular attitude of esthetic recuperation of the image.

A second step is represented by the experience of working in similar spaces such as the porches of Stavropoleos and Doamnei Churches in Bucharest. This allowed us to devise a comparative analysis of the degradation process of the inside of the orthodox churches using the morphological analysis as a starting point.

De-cohesion and colour strata adhesion loss.

First presented in the reports of the Suceava Colloquium held on July 2-7 1977,⁶ the analysis of the degradation process of the exterior and interior paintings from North Moldavia was connected to the mission of the working site of Humor and to a unitary policy of conservation of mural paintings in Romania, based on the concept of emergency intervention. The analysis of the de-cohesion process as well as that of the progressive disappearance of the colour strata offered at the same time a specialized terminology and



Fig. 4 a. Incipient signs of cohesion loss of the pictorial strata and of the support, point shape. The porch of the Humor Church.



b. Point shape craters which appeared due to an older process of defoliation of the pictorial stratum. The porch of Doamnei Church.

a description of the phenomenon in which the outside causes – humidity taking different shapes, microclimatic conditions entropic factor – were correlated with processes developed inside the porous structure of the mural paintings and their support. The descriptions made by Șerban Angelescu, unfortunately forgotten for a long

time, represent the starting point of the presentation of the specific degradation morphology detected in the porches of the churches which represent the bases of this study.

1. *Point shaped craters* represent incipient forms of the de-cohesion process of the colour strata of mural paintings from the porch area. (Fig. 4). An evolution of their aspect is registered from the first forms hidden by the colour strata, dislocated together with a section of the support (*intonaco*), to the little gaps made by the

⁶ Colloque 1977.

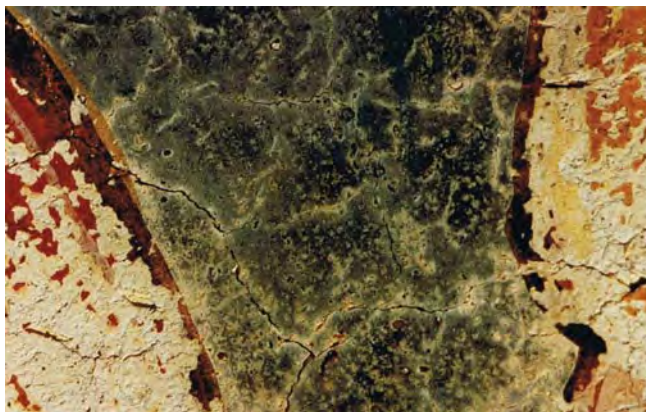
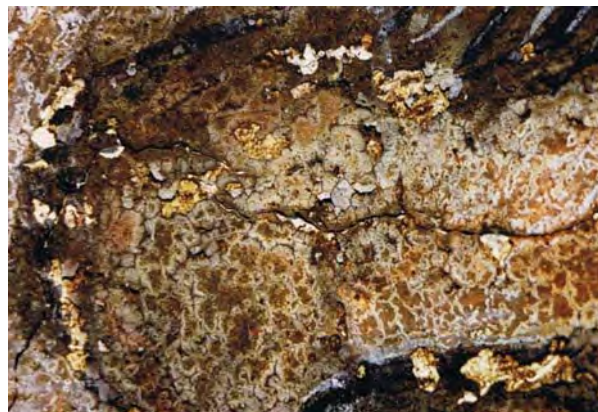


Fig. 5 a. Migration and re-crystallization of mobile salts with the shape of crypto fluorescent and point shape craters, as it appears on the pictorial stratum through the contraction cracks and micro cracks. An example is that of Humor Monastery porch.



b. Humor porch, another example of how the salty efflorescence appears in the micro cracks of pictorial stratum.

expulsion of a small quantity of the support and the pictorial stratum. The pictorial materials are replaced by soluble salts (sulfate, nitrogen) which migrate from the inside of the building into the support and then re-crystallize on the pictorial level stratum (Fig. 5).

Hardly noticeable at the beginning the point-shape craters later turn into a symptom of de-cohesion of the pictorial stratum. The superficial presence of salts into little craters is anticipated by the presence of crypto-fluorescence. A description of the phenomenon was made by Șerban Angelescu in the 70s, procedure that would lead us to a treatment where the colour strata fixation is accompanied by the operation of soluble salt extraction. This is the quoted description: "Watching a detail of the colour surface, in an ex-foliation zone, small craters made by the re-crystallization of salt on the back of the pictorial strata are noticeable".

2. Due to the migration and re-crystallization of soluble salts, the evolution of the de-cohesion phenomenon of the pictorial stratum occurs at the same time as that of its support (*intonaco*) not only because of the occurrence and extension of the micro-craters, but also due to some original technical problems such as the *contraction micro cracks* of the chalk support. Spaces for migration and salts re-crystallization are made when the pores and the contraction micro-cracks turn into over loaded spaces and salt halos appear on the surface of the pictorial strata. (Fig. 6). As in the case of micro-craters this is the symptom of the expansion of a destruction process of the cohesion of pictorial stratum as well as that of the



Fig. 6 a. Doamnei, Church porch. Last Judgment detail, Etimasia Throne, underlines the presence of salty veils on the pictorial stratum.

fragments of its support. Șerban Angelescu wrote in 1977: „*Along the thin cracks of the support, a network of white halos and small points appears and extends gradually leading to a slow destruction*”⁷

⁷ *Ibidem.*



b



c



d

Fig. 6 b, c, d. Macro photos illustrating the process of the appearance of efflorescent crusts on the surface of pictorial stratum. The porch of Doamnei Church.



a



b

Fig. 7 a, b. Defoliation taking the shape of *scales* and *covering slopes*. Doamnei Church.



Fig. 7 c, d. Different morphologies of defoliation in the porch of Humor Monastery Church.



Fig. 7 d, e, f. Stavropoleos Church porch. Details in grazing light which makes visible the morphology of exfoliation: *scales, gonflations and covering slopes*, detached as gondola shape of the pictorial stratum.

Excerpt from ARA Reports 2, 2011.



a



b



c



d

Fig. 8 a, b, c, d. Different morphologies of gaps as result of the adherence and cohesion loss of pictorial stratum in the porch of Doamnei Church (a, b, c) and in the porch of Humor Monastery, where a selective disappearance of the tone of the colour stratum can be noticed.

3. The last stage of the destructive action of salts consists of the fact that they appear on the surface, taking the shape of efflorescence *and salt crusts* (Fig. 7). From the veils of salts, easy to get rid off, to the salty crusts hardly soluble, there is an evolution marked by the progressive loss of colour stratum and part of the support.

The destructive process constituted by the occurrence of salt efflorescence, from the micro-craters to crusts was detected into the three porches that are the subject of the present study. At the same time one may consider a similar morphology of the pictorial stratum degradation at all the analyzed porches.

The Morphology of de-cohesion and adherence loss of pictorial stratum phenomenon

The terminology concerning the degradation of the pictorial stratum reached a final form in the reports of the 1977 Suceava Colloquium and even if it is not set in a glossary it may be extended to all communications. The colloquium mirrored the Romanian experience in the field as well as the results due to the contacts with specialists from ICCROM and that of the Romanian restorers internships abroad.

Taking into consideration the above mentioned terminology a comparative approach of the shapes of the de-cohesion of the colour stratum of the three studied churches was considered necessary in order to define the morphology characteristic for degradations of the porch inside.

1. *Powdery consistence* of the pictorial stratum, hardly noticeable without instruments, without an adhesion test is usually associated to micro craters which are considered to be a primary form of migration and salt re-crystallization.

2. *Defoliation* of colour stratum represents a visible shape as it was detected for the first time in Humor's porch, represents a loss of cohesion and adherence to the support of the of the pictorial stratum.

In the early phase of the process, when behind the colour strata there are crypto inflorescences, the dislocation of colour micro-fragments becomes visible as small bumps noticeable under grazing light. Sometimes the evolution of the phenomenon is defined due to different morphologies of the defoliation: *roof slopes, scales shapes, gondola shape* (Figs. 8 -9).

The coherence and loss of adhesion to the support of the colour strata, in the case of porches, leads to an effective loss of fragments from the pictorial strata. According to the morphology and extension of degradations, *colour layer gaps* consequently reach different shapes, from point shaped micro gaps to large gaps, and as a consequence only the painting support is visible.

Progressive and selective loss of the colour stratum is an other defining aspect of the specific morphology of mural painting degradation in the exterior space of the porch.

Characterizing the degradation process a special place should be reserved to adjacent phenomena, such as physical/chemical alterations of some pigments – azure blue⁸ or lead bronzes⁹ – or bio degradation of mural painting.

Causes of the de-cohesion phenomenon of the pictorial stratum

An etiological approach concerning the degradation of mural painting of the porches due to the loss of cohesion and adherence to the support of mural paintings lead us to a number of common causes for mural painting in general, to specific aspects for mural paintings exposed to external factors and for those under a microclimate and in the functional space inside the church.

Technological causes, represent a source of degradation of the pictorial stratum and its support due to the painter failure in taking care of the technical rigours during the execution of the painting. When the *al fresco* technique is used, as in the case of the studied churches, failures can be due to the nature of the materials used for the masonry and the support composition (*arriccio-intonaco*), materials which may become a source of soluble salts. A reason of defoliation presence may be the addition *al secco*, occurred due to the incompatibility

⁸ Istudor 2003, p. 79. There are some conversions, already known like that of azure blue due to humidity into malachit green or that of atacama and paratacamit (basic copper chloride), if the chloride ions are detected into the colour strata.

⁹ Barbu, Mohanu 2009, pp. 113-120.



b



d

Fig. 9 a, b, c. Doamnei porch before (a) and after being closed with double glazing windows (b, c).

of certain pigments – azurite, lead bronzes, gold with the humid support, or to the use of an organic binder which had been expired, for the use of *al fresco* technique.

The wall humidity – taking the well-known forms of capillarity, infiltration and condensation is one of the major causes contributing to the pictorial strata degradation in the porch space, causing destructive phenomena like migration and re-crystallization of salts, frost-defrosting phenomena or bio-deterioration.

Microclimate conditions, represents a number of degradation factors having a decisive role in de cohesion and progressive disappearance of the pictorial stratum, relative humidity and air

temperature, the wall surface temperature, dew point and last but not least airflow and air pollution having a synergistic action in the degradation process of mural paintings of the church porches. Unfortunately a comparative and systematic study was not performed yet, living space to unprofessional initiatives, based on empirical observation and pragmatism.

Among the three monuments that are subject of the present study, only at Doamnei's Church systematical determinations of temperatures and relative humidity of the air have been done up to now in order to achieve proper observations concerning the micro climate changes generated by the recent closure porch.

Conservation Strategy in a Transitional Architectural Space – Inside/Outside

The degradation morphology and its evolution in the space of the porches of medieval churches indicates the presence of an architectural zone having a specific behavior due to environmental factors. This impact has to be studied *before* making any intervention which may lead to complete change of the transitory condition *inside/outside* of the porch. Unfortunately a new tendency generated by the facilities offered by the use of *double-glazing* windows seems to attack religious monuments of great importance, but any minor change in their shape seems hard to imagine. The lack of a clear doctrinal approach concerning the permission of addition and remodeling in the genuine substance of a historical monument, contradiction artificially steeped

based on an educated public conscience concerning the condition of medieval churches and the religious space versus their condition as historic monuments, lead to the recrudescence of initiatives that separate the creative act of restoration from the austerity of pure conservation.

The private space of a porch, as well as the whole church itself, no matter if it is situated in medieval Moldavia or 17th-18th centuries Bucharest, should be studied according to its position as transitional space between inside and outside. Microclimatic changes with the possibility to reach the dew point airflow, main wind impact, air pollution due to urban area or to specific factors such as current candle burning, should be subject of precise diagnosis in the future, in order to sustain a strategy of conservation and restoration.

Nowadays, before establishing a unitary evaluation system of research-diagnosis of the condition of mural painting of Orthodox church porch restoration, the advanced stage of de-cohesion, lack of adherence and progressive disappearance of pictorial strata asks for an urgent intervention accompanied by a permanent surveillance of mural surfaces. The Humor experiment, repeated at other churches such as Stavropoleos and Doamnei, confirmed the necessity of *priority treatment* of the porch compared to the whole interior painting.

Options covering the emergency surgery imposed by the serious degradations threatening with the imminent loss of the colour strata, concern the following methodological aspects:

- consolidation of the powdery colour strata or of those ready to defoliate;
- insurance of the lost support of the painting and its consolidation;
- removal of additions and remodeling contributing to the mural painting degradation;
- removal as much as possible of the degradation factors, soluble salts, bioenergetic factors, polluting agents;
- documents concerning the conservation stage and that of the already made interventions.

Since the emergency intervention from the Humor Monastery porch the fundamental methodological principles have been launched, those that are still correct such as the material compatibility used, their resistance to degradation factors and to natural aging phenomena, the destructive character of the intervention, moreover that of material's reversibility.

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