The impact of the environmental conditions and conservation treatments on the condition of panel paintings case study on the basis of the panel painting "Concert" from the 16th century, Venetian School

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INTRODUCTION

The Venetian painting "Concert" (inventory No.: 578) by an apprentice or imitator of Paris Bordone, dates to the middle of the 16th century. Little was known of the history of that masterpiece until 1929 when it came into the ownership of the Royal Wawel Castle in Krakow and has been kept in storage premises since then. In December 2009, the physical/chemical examinations were started. As a result of those examinations the structure and condition of the particular technological layers as well as their mutual interactions were identified. The condition of the painting layer largely reflects the processes occurring in the wooden support.

THE STRUCTURE OF THE OBJECT

The wooden support consists of five boards (1,2,3,4 – oak and 5 – poplar) glued horizontally **(Fig. 1)**. The surface of the support (dimensions 110.5 x 140.5 cm) is highly deformed. The boards are permanently dome-shape deflected towards the painting face. During one of the previous conservation interventions, the boards of the support were thinned (to 0.5 cm thickness) and then glued and nailed to the new support. The new support, called "transfer support", consists of five boards (poplar of approx.: 2 cm thickness) assembled vertically and reinforced by two horizontal cross beams (approx.: 3 cm thick) **Figs. 2, 3)**. The boards of the original support are unglued and cracked, and partly detached from the transfer support.

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IMPACT OF THE EXTERNAL AND INTERNAL FACTORS ON THE PAINTING'S CONDITION

Observation of the painting in daylight and analytic (UV, IR) light shows a wide spectrum of damage to the different technological layers (Fig. 4, 5, 6).


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EXTERNAL FACTORS

Changes in the temperature and humidity, both in the past and at present, when the painting has been stored in the museum premises, cause the distortion of hygroscopic material such as wood. Changes in the wood dimensions occurring as a result of desorption and adsorption have influenced the condition of the paint layer since it is less elastic than the support. The wooden support with the paint layer from the front, which blocks the impact of the environmental conditions from the side of the paint (despite the transfer support which in a certain manner delays humidity migration), reacts strongly to changes in humidity. The changes which occurred during the drying of the wooden boards caused permanent cupping oriented towards the paint layer. Due to the changes in board dimensions cracks appeared in the ground, paint and varnish layers. On the paint layer, we can observe a reproduction of the horizontal grains of oak wood which is clearly visible also due to the usage of transparent pigments **(Fig. 7)**. In other parts of the paint layer, the network of cracks of the polychromy layer is diverse (type of pigment, thickness of the applied paint). It should be noted that the craquelures occurring in the paint layer are a consequence of the combined impact of several processes, including those taking place in the support layer, as well as oxidation and polymerization **(Figs. 8, 9, 10)**. The contraction of the boards caused, and is still causing, the occurrence of numerous blisters and roof-shaped bubbles **(Fig 11)**. The noticeable lifting and flaking of the ground and paint layers are concentrated in the area of the panel with the widest annual rings. An increase of the relative humidity causes expansion of the wood boards, which was, and still is, the reason for numerous blisters and losses of the paint layer **(Figs. 12, 13)**. In the painting sections around the extensive losses, the paint layer is more exposed to the impact of the environmental conditions. The drastic fluctuations of the relative humidity have resulted in splits and disintegration of wood boards (though it is not the only cause) **(Fig. 14)**.


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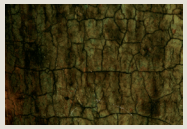
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INTERNAL FACTORS

The previous drastic conservation treatments have had a significant impact on the painting's condition. The support boards were thinned (to 0.5 cm), straightened by force and glued to the wooden support with boards of vertical configuration and a significant thickness of approx.: 2.5 cm. The gluing and nailing of the original object to the transfer support blocked natural wood movements **(Fig. 15)**. The opposite configuration of the wood fibers of the transfer board (poplar) with respect to the fibers of the original wooden support (oak), the different thicknesses and mechanical strengths of those two distinct species of wood of which the support is made constitute some elements of improper conservation which have caused damage. Internal tensions of the transfer support, transferred to the original board, have caused an irreversible damage to the internal structure of the wood and the paint layer. Such static tensions have had a significant impact on the composition of the internal forces in the wood. Accumulation of the internal forces and static tensions has resulted in the occurrence of the splitting and warping processes. Consolidation of certain parts of the painting with a wax-resin mixture increases the differences between the elements absorbing the moisture and those resistant to its influence.


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CONCLUSIONS

Nowadays, conservation treatments of panel paintings vary depending on the techniques and materials used in the past. It should be noted that the choice of the wooden support type, its texture, as well as its subsequent permanent deformations constitute inherent elements of the aesthetics of a historic object.

Repeated tensions connected with changes in the environmental conditions lead to the occurrence of the so-called 'fatigue effect' which results in the deterioration of the wood structure. The paint layer constitutes a matrix reflecting the processes which have occurred in the wooden support, and it is therefore necessary to monitor the wood's behavior in objects of such a complicated, stratified structure which are so sensitive to changes in the environmental conditions.

Bibliography:
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