

Impact of decay on the structure and behavior of traditional mural paintings

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Traditional mural paintings are composed of most stable natural material and produced to be in dynamic favorable interaction with environment. Decay is the actions occurring in paintings that bring about a change in material and/or structure. Decay is a result of interaction of environment with paintings. Decay makes paintings impossible to act in coordination with their respective environments. Decay also results in the formation of defects. Analysis of decay is therefore a prime need in conservation research. Simulated samples were used in this study. Samples were subjected to destructive intervention and their physical, chemical and material properties were continuously measured. Chemical reactions resulted in a change in chemical and physical properties of material. Physical actions led to structural deformations and a change in material properties. Microbiological actions caused physical change and chemical destruction. Decay actions seldom took place in isolation but combined into decay processes. A decay process is a group of actions confined into a particular space or combined to cause a particular change. Final outcome of decay was reduction of adhesion and cohesion, change in color and texture and decomposition of material. Alteration in material properties and deformations in the structure led to a change in behavior. This gave rise to acceleration in the rate of decay. Final outcome was the formation of defects. Defects were structural discontinuities. They acted as centers of decay. Behavior of painting samples became destructive after formation of defects. Differential distribution of moisture created deformations in the structural layer of ground. This led to a reduction in structural stability and strength. Defects grew with the action of stress. Fractures that cleaved mass affected water transmission. Differential moisture content in different areas disturbed behavior. Cracks and fractures in the paint layer created by stress reduced stability of the layer. Loss of adhesion of paint layer with paint-receiving layer followed by action of stress caused flaking. Flaking resulted in material loss creating lacunae. These defects in the surface layer increased moisture evaporation. It adversely affected behavior of paintings. Decay separates life of a mural painting into few phases. After the initial stable phase, decay continues at a very slow rate but changes resulted by decay accelerates the rate of decay. Paintings enter into the decaying phase. Decay gives rise to defects. Defects migrate during the deteriorating phase until complete destruction of the paint layer takes place.

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