Section C

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Preservation of southern paintings deteriorated by formation of subflorescence

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Southern paintings belonging to the southern school had been produced during the nineteenth century. Most of these paintings are present in the temples along the south-western coastal zone of the island. These paintings are subjected to a high concentration of salt that brings about their deterioration. A systematic study was necessary to deduce the mechanism of decay of these paintings and to develop an appropriate method of preservation. The investigation was carried out using simulated samples that produced according to the traditional production process. Six samples were provided with 2 mL solution containing 1.0 M NaCl and 0.1 M $MgSO_4$ per day for six months. Two control samples were supplied with 2 mL of H_2O per day. Samples were thoroughly observed under the microscope to determine the processes of crystallization of salts and the destruction of the paint layer. Actions occurred in the samples in the following sequential order: crystallization of salts in between the paint layer and the paint-receiving layer, cracking of the paint layer due to the stress imposed by subflorescence, fracturing of the paint layer due to the growth of subflorescence, flaking of fractured paint and formation of lacunae by the loss of paint fragments. The paint layer was destructed by the pressure imposed by the crystallized salts. It was understood that the impermeability of paint layer to water is the reason of the formation of subflorescence. If the paint layer had a sufficient degree of permeability, salts migrate to the surface and crystallize on the surface. Efflorescence could be removed easily. Opening the surface by formation of lacunae exposed the permeable layers. Windows were created in the paint layer. Moisture could evaporate through these windows. This remarkably slowed down formation of subflorescence. Salts could be removed by applying H_2O to lacunae, dissolving salts and absorbing them into a tissue. Fixation of fragmented paint was possible with gum arabic. It was determined that the prevention of salt water contacting the paintings is the best solution available to prevent continuous salt action. However, opening of surface in a sufficient degree is necessary to preserve paintings if salted ground water continues to rise. Efflorescence will be formed afterwards and could be removed with water without a difficulty. Paintings remained without an appreciable degree of behavior change under this condition. Reintegration can be done if necessary with permeable paint. Efflorescence will then form on the paint. Paint can be used as a sacrificial layer. Preservation of southern paintings therefore needs to take their deteriorated structure into account.

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