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CONSERVING MURAL PAINTINGS AS INTERMEDIATE LAYERS BETWEEN IMMOVABLE AND MOVABLE HERITAGE: CASE STUDIES FROM CENTRAL AND EAST ASIA

Mural paintings are of great importance as the “skin” of architectural surfaces. They are exposed to indoor (or outdoor) ambient environments and have contact with architectural fabrics such as stone, wood and natural rocks. In order to achieve successful conservation work, it is indispensable to consider moisture movement, soluble salts, porosity, adherence, fluctuations of environment, etc., as well as the murals’ own fragility, paint stratigraphy, condition, etc., all of which are quite complicated. In this way, conserving murals *in-situ* is always a big challenge, but something fundamentally and ethically important.

In the past hundreds of years, a lot of earthen-rendered *secco* paintings from Silk Road and other regions have been cut and detached from the original sites. Most of them are now exhibited or stored in museums of other countries including Japan and Germany. Those detached pieces without original context (physical history) become movable properties and require different approaches and methodologies for conservation. Some cases from Sogdiana, Bamiyan, Kizil, Ajanta, and Takamatsuzuka shall be discussed.

Paint materials in such *secco* paintings tend to alter or discolour chemically and biologically. It is frequently observed that mural pieces do not retain the majority of their original tones and vividness any longer. Until now, very little was known about the painting techniques and materials of Asian murals. These should be well understood prior to any interventions. Unfortunately, most of the cases are not studied well enough to take any decisions.

Conservation work in Bamiyan allowed for the discovery of a multi-layered structure of various organic substances including drying oils. A series of scientific analyses (BM/PLM on cross-sections, SEM-EDS, synchrotron-based μFTIR and simultaneous μXRF/μXRD, GC/MS, and ELISA) confirmed the stratigraphical structure of the paintings and their constituent materials. Since many of the samples contained very thin and multi-layered structures composed of a variety of inorganic/organic substances, the synchrotron-based microanalyses provided excellent results. This technique allowed a layer-by-layer analysis of organic and inorganic components.

This is the first and oldest identified example of the use of drying oils in mural paintings within Central Asia as well as within the world of painting at this stage. In particular, the use of highly sophisticated painting techniques, such as the inclusion of lead white in drying oils and multi-layered painting structures that generate the optical effect of different colour hues and tones, are our very first links in Central Asia connecting these Bamiyan paintings to painting technologies spanning the range between East and West. This discovery provided technical information in order to select suitable cleaning and consolidation materials, and moreover, to reconstruct original “images” of colourful Buddhist paintings which had disappeared long ago.