

Master of Arts SUPSI in Conservation-Restoration

# Blackening of lead-based pigments in wall paintings: Reconversion and stabilisation.

The painted ceiling of Castello Trefogli at Torricella (TI-CH).

The phenomenon of oxidation of lead-based pigments is well known, an example is visible on the wall painting conserved at the Trefogli Castle at Torricella in the Ticino Canton. In this case, the original Pb-based pigment was lead white. The alteration results in the darkening of the paint layer due to the formation of brown-black lead dioxide and severely affects the aesthetical appearance of the paintings. In the 1980s, conservation scientist Mauro Matteini developed a red-ox process for the reconversion of darkened lead-white in wall paintings. This method was implemented in several wall paintings but the alteration reoccurred often after few years. Since the causes of the darkening - linked to the presence of humidity and oxidations factors - cannot be removed, research has focused on stabilizing the reconversion by transformation into a more stable compound, namely lead phosphate. The lead stabilization treatment was tested in vitro in the laboratory, on replicas and finally on site on a portion of the wall painting. In addition, the thesis included the development of the stabilization of the wall painting, which was a necessary step prior to the reconversion. The experimentation results are promising and have been fully documented to allow evaluation over time as part of a post-treatment monitoring and maintenance plan. The long term evaluation of the stability of the reconversion will determine if it is feasible to extend the treatment to the whole painting.



Fig. 1 : The Painting of the North Tower and detail before the interventions.



Fig. 2 : The Painting of the North Tower and detail after the interventions.



Fig. 3 : The Trefogli Castle in Torricella (TI-CH).

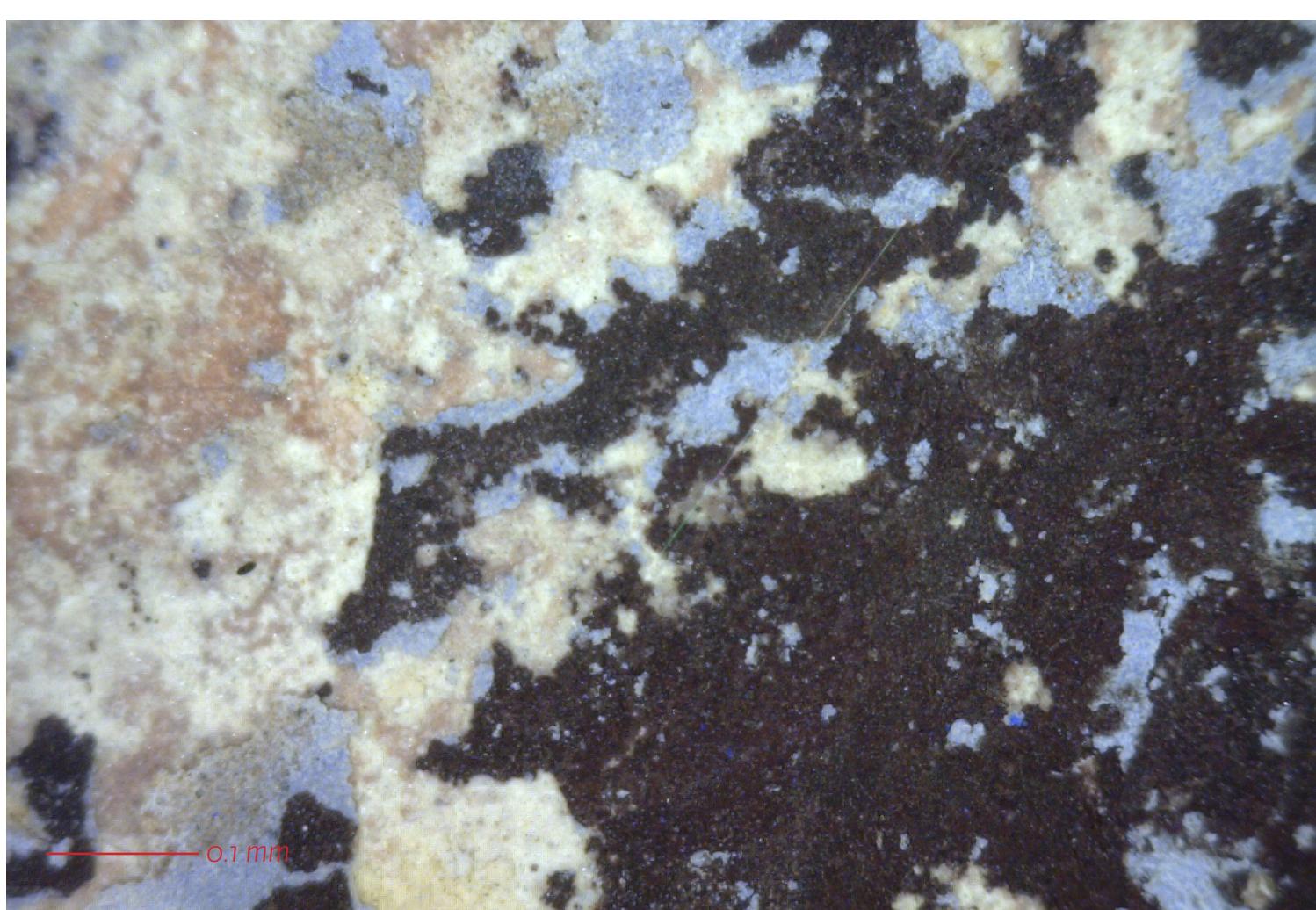


Fig. 4 : Detail of alteration of lead-based pigment. Portable microscope, 50x.



Fig. 5 : Microstratigraphic study of the altered paint layer. Cross section, PLM, 20x.



Fig. 6 : Detail of the re-adhesion intervention of the preparatory layers.

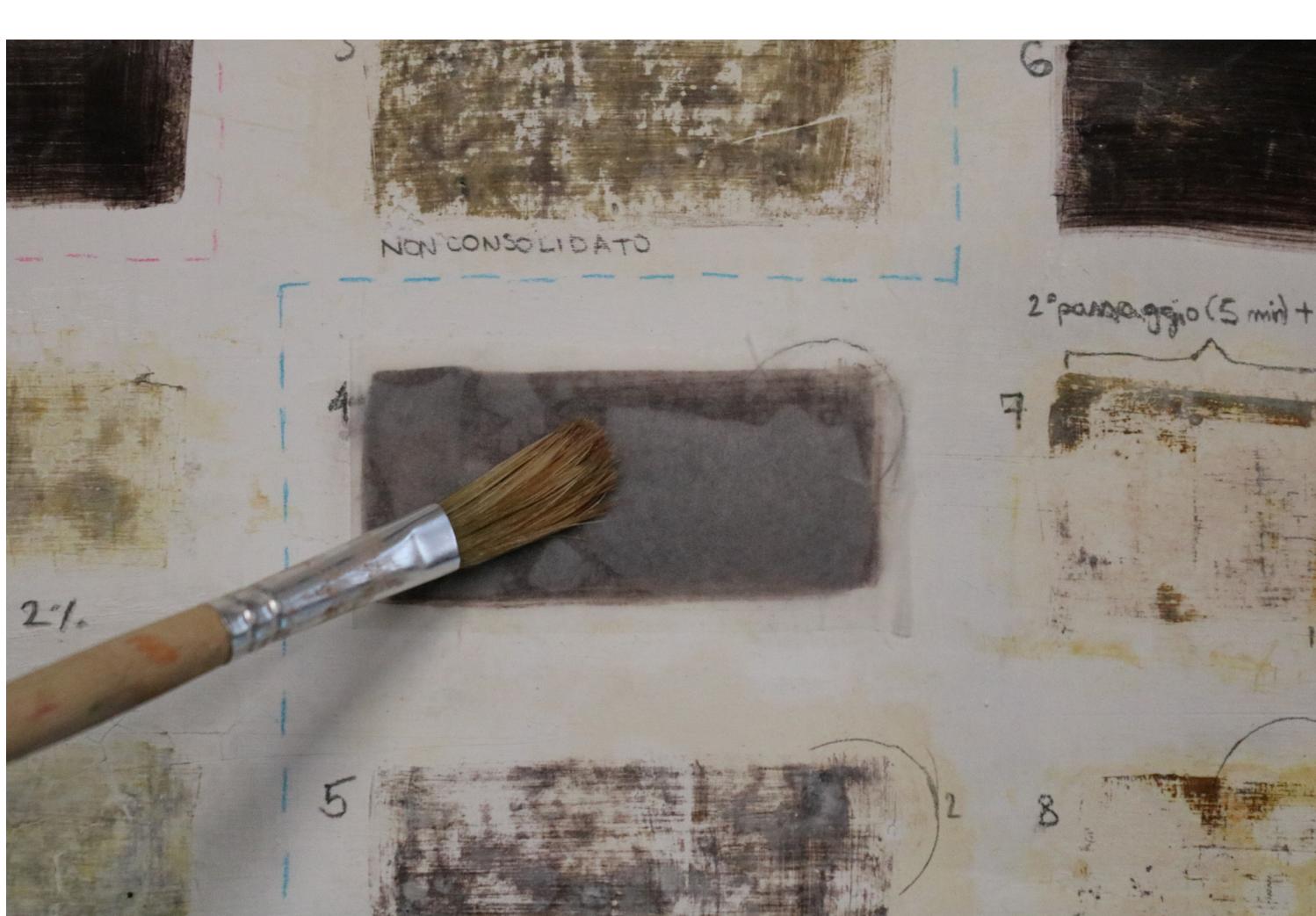


Fig. 7 : Detail of reconversion and stabilisation treatments of Plattnerite on replicas.

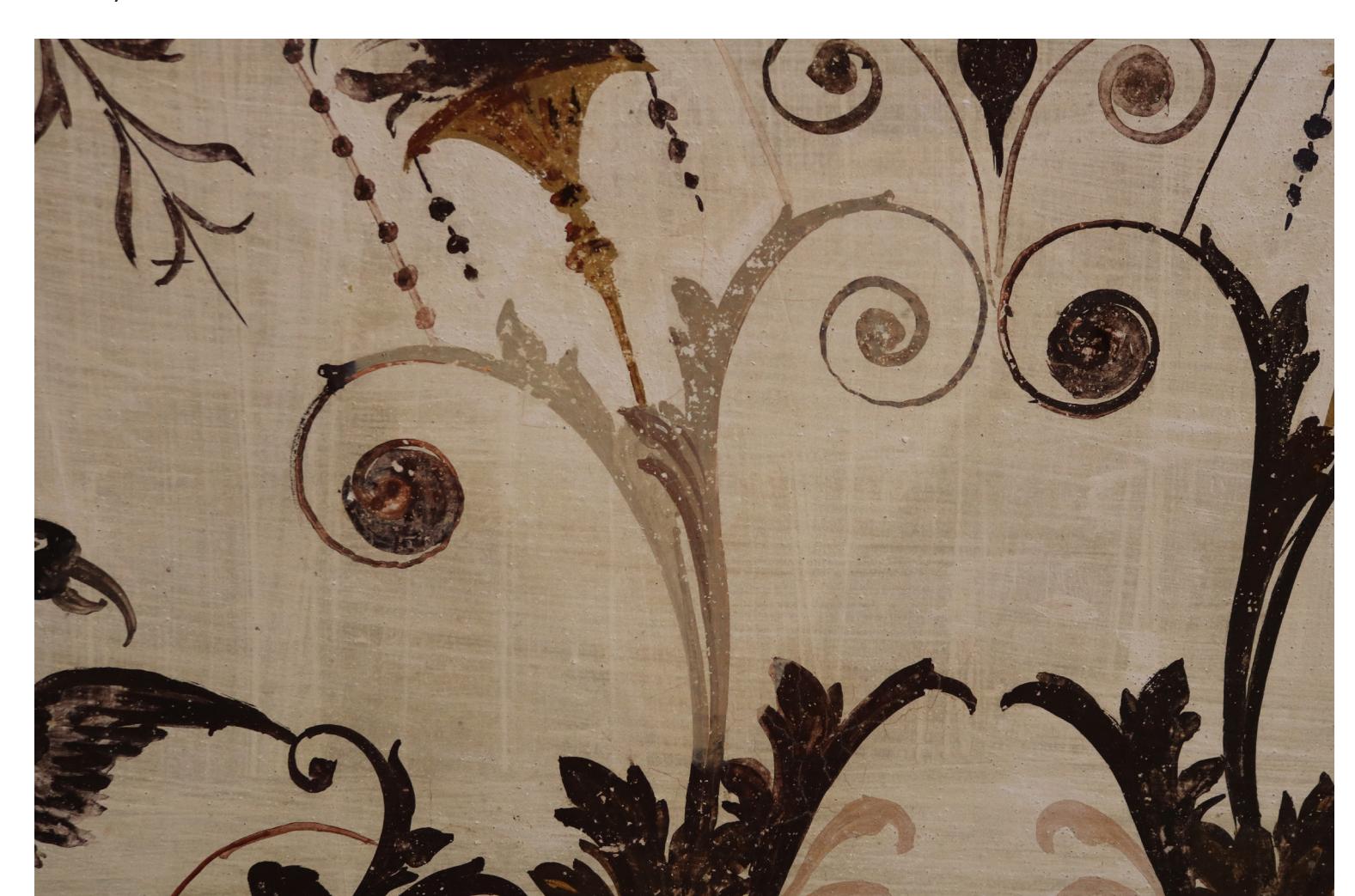


Fig. 8 : Detail of an altered area of the painting after the reconversion and stabilisation treatments.