

## 23. The preparatory layer, impression layer

### 1. The preparatory layer, the gesso

The preparatory layer of *'the Painting'* is composed of gesso, traditionally a mixture of ground calcium sulphate (gypsum) and animal glue (usually rabbit-skin glue).

There are three types of gesso obtained by processing calcium sulphate (gypsum), according to their degree of hydration:

- Gypsum or calcium sulphate dehydrated ( $\text{CaSO}_4\cdot 2\text{H}_2\text{O}$ ), generally finely ground, called *'gesso sottile'*.
- Bassanite or calcium sulphate hemihydrated ( $\text{CaSO}_4\cdot 1/2\text{H}_2\text{O}$ ), more commonly known as plaster of Paris.
- Anhydrite ( $\text{CaSO}_4$ ), a calcium sulphate heated to a certain temperature and generally coarser-grained, or *'gesso grosso'*.

*'Gesso grosso'* was usually<sup>102</sup> applied before *'gesso sottile'*.

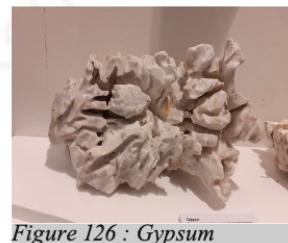


Figure 126 : Gypsum

The presence of gesso in *'the Painting'* can also be detected using X-ray imaging<sup>103</sup>.

### 2. Results of gesso layer surveys

SIK ISEA (Zurich) (1991)

This initial survey of three paint samples revealed a gypsum-based layer with a protein binder.

Professor Seracini's survey (Florence - 2011)

Gesso grosso ( $\text{CaSO}_4$ ) was found in five of the eight samples taken from the pictorial layer:

- N°1: flesh (gesso thickness removed<sup>104</sup> approx. 0.35mm).
- N°2: Christ's red robe (sample does not allow calculation of thickness removed).
- N°5: green collar of *'the Character'* (thickness removed approx. 0.2mm).
- N°6: earth-ochre pattern (thickness removed less than 0.1mm).
- N°7: black background top left (thickness removed approx. 0.2mm).

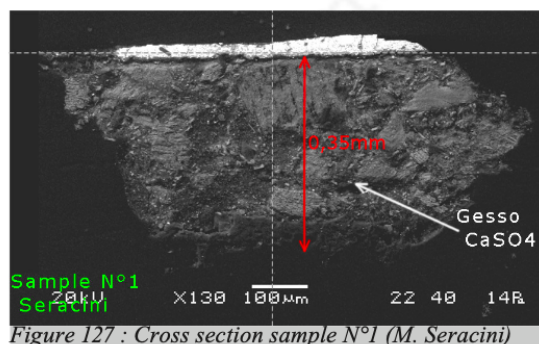


Figure 127 : Cross section sample N°1 (M. Seracini)

University of Bologna report (2022)

The laboratory uses two methods to examine the pictorial layer:

- Firstly, X-ray fluorescence spectrometry (XRF), a non-invasive method that allows the nature of the pigments to be identified with a certain degree of approximation, based on the chemical composition of the points detected.

The fifty or so XRF points show a calcium-based compound.

- Second method: paint layer sampling, an invasive method for obtaining a cross-sectional view and determining the nature of the pigments. This method gives better results than X-ray fluorescence spectroscopy but may slightly alter the paint layer.

In the three laboratory samples, the layer is composed of gesso with the formula  $\text{CaSO}_4\cdot\text{H}_2\text{O}$  or *'gesso sottile'*. It was applied in a single operation.

102 : The practice differed from region to region. It evolved at the end of the 15th century.

103 : Seracini's report (Support p18) - image comment X-rays: *"The significant radiopacity of the filling of the grooves on the recto, is an indication of the presence of a Gesso ground layer"*.

104 : The thickness of the sample corresponds to the thickness of the gesso in the paint layer sample.

### 3. Priming (imprimitura or primer)

The primer is applied on top of the gesso.

- SIK ISEA (1990)

On top of the gypsum-based layer is a thin layer of protein (organic layer).

- Professor Seracini survey (Florence - 2011)

The Professor Seracini has not identified any primer: *'No priming was identified on top of the Gesso Ground'* (conclusion). However, an organic layer is present in sample No. 1 (M. Seracini - Analytical diagnostic).

- University of Bologna (2022)

According to the University, a primer<sup>105</sup> based on organic components was applied in a single coat over the gesso layer (image opposite, red arrow). It is rich in resin-based binder, or the same glue used in the preparation, or an unpigmented dry oil.

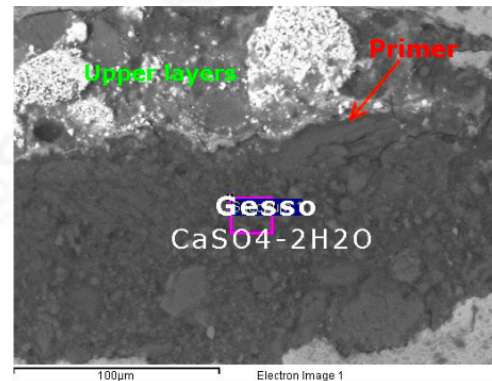


Figure 128 : Cross section 'Giallo Bottone', image UNIBO

### 4. Summary of results

- SIK ISEA Zurich (1990): gypsum-based layer and organic 'primer'.
- Professor M. Seracini (Florence - 2011): *'Gesso grosso'*, without 'primer'.
- University of de Bologna (2022): *'Gesso sottile'*, with organic 'primer'.

Note: according to the Centre de Recherches des Musées de France (C2RMF)<sup>106</sup>, for a complete analysis of the preparatory layer of Italian paintings, it is advisable to take a sample down to the wood, which was not the case for the samples taken by the Professor Seracini<sup>107</sup> (Florence) and the University of Bologna.

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105 : Primer or imprimitura.

106 : *'Contribution to the study of white preparations for Italian paintings on wood'* (C2RMF - Elisabeth Martin, Naoko Sonoda Alain R. Duval (1991)).

107 : Except for sample N°2, where the thickness of the paint layer is very low.