

# A Technical Investigation On a 20<sup>th</sup> Century Oil Painting by Jules Gustave Lempereur

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This paper focuses on the results provided by the scientific analysis of an oil painting by Jules Gustave Lempereur (1902–1985). Paint materials used in the creation of the said painting exhibit some degree of decay over time. This investigative study was carried out to analyze the presence of some damage on canvas, paint layer and varnish. To study and identify the materials employed by the artist, previous restorations and the products of their degradation processes samples were analyzed using optical microscopy, Multispectral Imaging (VIS-UV-IR), X-Ray Fluorescence (XRF) and Fourier-Transform Infrared Spectroscopy in attenuated total reflectance (FTIR-ATR).

The study at hand highlights the varied degradation of the two varnishes (old varnish mastic, and new varnish dammar), which demonstrated yellowing, alteration of thermal and spectroscopic features and changes in surface morphology and viscoelasticity. This study reveals, *inter alia*, that the white pigment consisted of calcium carbonate, red pigment stemmed from madder lake and green pigment was possibly created with a mixture of cobalt blue (cobalt (II) oxide-aluminum oxide) with yellow ochre (limonite). Key data gathered in this study sheds a new light on the nature of the constituent materials and the state of retouched areas which in turn facilitated elaboration of correct conservation measures along with suitable restoration interventions.

## References

- [1] B. Hochleitner, V. Desnica, M. Mantler, M. Schreiner. *Atomic Spectroscopy* **58**, 641-649 (2003)
- [2] K. Şerifaki, H. Böke, Ş. Yalçın, B. İpekoğlu. *Materials Characterization* **60**, 303–311, (2009)
- [3] D. Comelli, A. Nevin, A. Brambilla, I. Osticioli, G. Valentini, L. Toniolo, M. Fratelli, R. Cubeddu, *Applied Science A* **23**, (2011)
- [4] F. C. Izzo, B. Ferriani, K. J. Van den Berg, H. Van Keulen, E. Zendri, *Journal of Cultural Heritage* **15**, 557–563 (2014)