

## Review of *Science and Art: The Painted Surface*

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**Science and Art: The Painted Surface**, edited by Antonio Sgamellotti, Brunetto G. Brunetti, and Costanza Millani. Royal Society Press: Cambridge, U.K., 2014. 620 pp + xxiv. ISBN: 978-1849738187 (hardcover). \$80.00.

Multiauthored and originating from a variety of research centers, *Science and Art: The Painted Surface* consists of 27 chapters that resemble journal articles and which concentrate on many genres and artists' works. Improved analytical methods are described throughout, many of which are nondestructive and noninvasive. These methods allow analyses of previously inaccessible drawings and watercolors. Features invisible to the naked eye are revealed, as well as methods for damage prevention and retardation.



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Per the title, the art includes multiple surfaces such as walls, panels, and canvas. The studies are classified as “heritage science”: the study, conservation, and preservation of cultural heritage through art. Scientific studies of painted surfaces have been conducted since the time of Humphrey Davy and Michael Faraday and have evolved from research into the pigments used and their deterioration to more advanced investigation of materials and the ability to analyze smaller samples or to not require sampling at all.

The genres and artists examined in *Science and Art* cover a time frame from the ancient past through contemporary. Examples of art include murals from Asia, Roman catacombs, and pre-Hispanic America, medieval European paintings and murals, as well as Renaissance paintings up to van Gogh on through Winslow Homer and Piet Mondrian. Analytical methods include spectrographic (FTIR, Raman, UV–vis and fluorescence, GC–MS) as well as elemental analyses and laser methods. Analytical methods allow investigation of underdrawings or overpainting, and preservation of paintings with laser methods.

Although not an artist, the reviewer has a special appreciation for color. As a result, the chapter on paintings and pigments by

van Gogh is particularly of interest. Innovations in new pigments and paint tubes caused several late 19th-century artists to revise their work in mid-career. For van Gogh, this meant painting over earlier works. He used many new pigments post-1885, but yellow pigments were the most important because they are known to be unstable in hue. The yellow pigments included both chrome yellow and the more stable, but still not permanent, cadmium yellow. Previously used methods for studying underpainting—X-ray radiography and infrared reflectography—have limitations, so the authors of Chapter 18 used additional X-ray methods, including XRF (X-ray fluorescence analysis) and XRD (X-ray diffraction), with data collection by portable apparatus.

Maine is blessed with many examples of watercolor art, including those by Andrew Wyeth (one of the reviewer's favorites) and Winslow Homer. The evolution of Homer's techniques and colorants was examined in Chapter 19. Methods used included optical stereomicroscopy (OM) and XRF. These analytical methods, along with FTIR, Raman, and UV illumination, enable identification of pigments even if mixed or layered. Changes in Winslow's technique, from opaque to transparent, and evolution of his palate of pigments were charted. As with the van Gogh analyses, the methods are noninvasive.

*Science and Art: The Painted Surface* is lavishly illustrated, with many illustrations in color, and many spectra included for the technical details. Although aimed at both scholars and students, the book is more than just technical descriptions: it also covers art history and provenance and should appeal to those who appreciate art, not just artists and curators. At 620 pages and 2.5 pounds in weight, this book may be too heavy on all counts to be considered casual reading. However, although it will probably not be read in its entirety, there should be several chapters of interest to those who appreciate applications of analytical science to works of art representing their personal interests. This book could be an inspiration for courses titled Chemistry for Artists and Art Historians. In addition, various chapters could be inspiration for student research projects, especially for contemporary art. *Science and Art* is recommended for students, teachers, and the general public who are interested in chemistry or other sciences and art, as well as applications of the former to the latter.

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#### Notes

The authors declare no competing financial interest.