

## New Directions in the Non-Destructive Analysis of Watercolors by John Marin

### ABSTRACT

The authors will discuss the application of newly developed analytical techniques to characterize colorants in eighteen watercolors by the American modernist artist John Marin, painted between 1895 and 1929.

This presentation will elaborate on the technical examination of Marin's watercolors presented at the AIC meeting in 2005 which focused on the artist's evolving palette, influenced by prevailing color theories and corresponding developments in optical science. Preliminary analysis for that study using air-path X-Ray fluorescence spectroscopy, color spectroscopy, infrared reflectography, and visual examination with ultraviolet radiation will be integrated with data obtained from relatively newer technologies now being developed for the analysis of works on paper such as X-Ray fluorescence spectroscopy using a helium flush and imaging spectrometry.

The qualitative evaluation of colorant responses to ultraviolet and infrared radiation in the previous study have been superseded by hyperspectral and fluorescence emission imaging techniques that gather narrow band reflectance and luminescence data, allowing the resolution of colorants with similar spectral behaviors, the discrimination of colorants in mixtures, and their spatial distribution across a work to be examined. XRF employing a helium flush has the advantage over air-path XRF in that it eliminates spectral noise and identifies atomic weight elements below potassium, enabling the characterization of mordants and fillers used in the manufacture of watercolors.

These new analysis techniques not only offer the promise of a considerably richer understanding of John Marin's color palette as his technical abilities matured, but may also provide a template of options for colorant analysis on art and historic artifacts where sampling is not permitted.

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