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# **HYPERSPECTRAL IMAGING OF DAGUERREOTYPES**

**DOUGLAS GOLTZ AND GREG HILL**

*Presented at the 2011 PMG Winter Meeting in Ottawa, Canada*

The hyperspectral camera can be a powerful tool for the examination and assessment of photographic materials. Hyperspectral imaging involves the acquisition of multiple spatial images of a single object at different wavelengths. In this manner both spatial and spectral information is acquired and combined in a 3-dimensional image cube file. Image properties acquired at different wavelengths depend on the structural and surface properties of a given object. In this sense the hyperspectral camera can provide quantitative spatial and spectral information to the conservator.

For this work one visible (420-720 nm) hyperspectral imaging camera and two near infrared (650-1100 nm and 1200-2200 nm) hyperspectral imaging cameras were used. Each of these cameras was capable of acquiring images in 10 nm bands. Imaging was typically carried out by placing light sources at 45° between the camera and the photographic surface. A 250 mm Nikor lens (f-stop 5.6) was used for visible imaging and a 50 mm Specim lens (f-stop 5.6) was used for near infrared imaging. Exposures times for image acquisition varied from 100 ms up to a maximum of 5 seconds depending on the wavelength. The use of hyperspectral imaging was explored for the assessment of different photographic materials including daguerrotypes and painted photographs. Near infrared imaging was especially useful for the examination of tarnished daguerreotypes. Viewing them under narrow bands of the near IR spectrum, previously obscured images become visible.

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