RTI in Paper Conservation: A Review of Current Practices and Applications Angela Campbell and Lisa Conte The Sherman Fairchild Center for Works of Art on Paper, The Metropolitan Museum of Art

Introduction

The careful study of the surface topography of a work of art on paper is a critical component to understanding and protecting the object as a whole. Routinely, conservators have relied on multiple raking light images to glean detailed visual information about the surface of both the support and the medium/media on its surface. But with the development, in 2001, of Reflectance Transformation Imaging (RTI) by Cultural Heritage Imaging (CHI), a nonprofit organization based in San Francisco, paper conservators have been better able to digitally capture and analyze the subtle three-dimensionality of paper-based objects.

This poster presents an overview of the usefulness RTI, specifically the highlight method, in paper conservation and will address what types of documentation projects it best supports. Focusing on objects in the Metropolitan Museum of Art's (MMA) collection that were documented using RTI technology, we focus on specific instances where RTI has proven beneficial. With this research, we hope to provide conservators a broad understanding of how this technology can influence conservation practices and be of use to our field.

How does it work?

RTI involves capturing a sequence of digital images of an object with a camera at a fixed position, but with light (for example, a remote flash) positioned at different angles, but at the same distance from the object, for each image. The distance can be maintained using a string. The highlight method incorporates the use of reflecting spheres, which must be placed within the camera's field of view, when capturing an image sequence. The spheres are necessary for the processing software to calculate the lighting angle for each image.

The series of images are then processed using software developed by CHI, to generate a detailed visual of the surface of the object. This model can be actively manipulated in the RTIViewer—the highlights and shadows cast on the object can be subdued or emphasized by changing the simulated direction of light.

Why use it?

- The technique provides data about the object which is not apparent under normal light or by a single angle of raking light
- It is useful as a diagnostic tool to evaluate the effects of a particular treatment
- RTI has the ability to visually communicate the three-dimensional qualities of a work on paper or photograph to a broad audience

Objec

Emile

Fresco Water MMA Purchase Dodge

Richar

Artist

Manu Resur Temp on pa MMA Fletcher

Print Process

William Henry Johnson

Jitterbugs II c. 1941 Silkscreen print (detail) MMA 1999.529.79 Gift of Reba and Dave Williams, 1999

Artist unknown

Surimono Card 19th-Century Woodblock print MMA JP1916 H. O. Havemeyer Collection, Bequest of Mrs. H. O. Havemeyer, 1929

Noël Rouillard

Decorative design 18th-Century Blackwork print MMA 42.40.1(1) Harris Brisbane Dick Fund, 1942















t	Overall	RTI Before Treatment	RTI After Treatment	Notes
Gilliéron <i>capture of a Bull</i> color on paper 12.58.5 ed of E. Gilliéron, und, 1912				Flaking paint and erupting salt crystals were observed before treatment. The paint layer wa consolidated with 1% isinglass. RTI was used to document and assess any changes in the surface topography related to the treatment.
d de Bas laid paper	RTITEST			The sample was washed, air dried, humidified, and flattened. RTI was used to assess the viability of the technique to document changes in the texture of paper following these treatment methods.
Unknown script Leaf with the rection, from a Psalter era, ink, gold, and silver rchment 25.204.3 Fund, 1925	<image/>	<image/>		The flesh tones in this miniature were produced from a paint mixture that includes lead white which discolored over time. After conversion facilitated by 30% hydrogen peroxide in diethyl ether, the impact of this treatment method on the paint layer was evaluated using RTI to compare surface characteristics before and after treatment.

		Materials		
oture	Notes	Camera	Nikon D300s	
	The RTI provides additional	Camera	SanDisk 16GB memory card	
	surface information which	Accessories	Extra battery	
	reveals details about the artist's working method and better documents inherent surface disruptions, especially		AC adapter	
		Lenses	Nikkor 24mm	
		Light Source	Light SourceNikon SB-900 AF Speedlight i-TTL Shoe Mount Flash	
		Light Source	Nikon SD-9 battery pack	
	In the link.	Accessories	Clear acrylic sheet, OP-3 Ultraviolet Filtering	
Again, t imaging texture, emboss difficult	Again the DTI provides clearer		Calumet 7101 Minipod	
	Again, the Kill provides clearer imaging of a complex surface texture, including blind embossing, that is otherwise difficult to document		Slik Monopod 350 4-Section Monopod	
			Calumet umbrella adapter with hot shoe mount	
		Copy Stand	Kaiser re PRO	
		Wireless	Pocket Wizard Plus II Transceiver / Radio Slave (2)	
		Transmitters	Threaded rod to attach Pocket Wizard to monopod	
		Black Spheres	4 sets of 1/2" diameter spheres	
			5 sets of ¼" diameter spheres	
	In this example, the RTI helps	Computer	MacBook Pro 13-inch retina display	
	to identify and evaluate a	Software	Adobe Photoshop	
	distinctive intaglio print		Adobe Bridge	
	process that can be difficult to		RTI Builder	
	distinguish from etching or engraving in raking light.		RTI Viewer	
		Other Equipment and Accessories	Macbeth color checker card	
			Blue tape	
			String	
			Spirit level	

Conclusion

Despite the significant potential of this technology for the documentation and analysis of paper-based objects, it has not been uniformly adopted by paper conservators. Many conservators have taken the workshop hosted by CHI, but do not regularly ncorporate the technique into their workflows. It is mostly used as a qualitative tool to examine and ocument information about paper supports, watermarks, and media and may be used to evaluate process and technique.

Though there are several notable challenges with the highlight method, including the difficulty of capturing multiple sequences under identical conditions and the potential for misinterpretation of information, its use as a diagnostic tool has great potential for the field. The strengths of the system outlined above should be further explored.

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