

DOCUMENTARY IMAGING: SOME APPLICATIONS FOR FURNITURE

Christopher M. Swan, Getty Intern in Furniture Conservation, Colonial Williamsburg Foundation

Introduction

AS AN INTRODUCTION TO PHOTODOCUMENTING furniture, and in keeping with the theme of *Ethics in Conservation*, furniture conservators may want to recall one of their stated purposes as written in the AIC Code of Ethics and Guidelines for Practice, under Documentation:

The conservation professional has an obligation to produce and maintain accurate, complete, and permanent records of examination, sampling, scientific investigation, and treatment. When appropriate, the records should be both written and pictorial (*AIC 1996*).

Photodocumenting furniture is often complicated by the logistics of large-sized objects. The potential for a fully articulated visual record may also be limited by the awareness and availability of appropriate techniques. Consequently, many of the imaging techniques routinely employed in documenting the traditional *fine arts* are regularly omitted in documenting furniture. Imaging of furniture is important not only for a growing visual archive, but also for the communication of ideas in outreach presentations. If the body of knowledge regarding furniture conservation is to grow, the common perception of the possibilities of the visual document must be expanded.

The topics addressed in this paper comprise some examples of lighting, simple setups for improving standard photographic techniques, a brief review of alternative techniques and their application for imaging in furniture conservation.

Lighting

For furniture's size, number of surfaces to record, and variety of shapes, lighting becomes a crucial illustrative factor and often determines the success or failure of the photographic record. Stan-

dard visible light photography presents our greatest challenge in visually describing furniture.



Figure 1. Foot blocking successfully modeled with raking light. Courtesy of H. Lorenz.

In conservation photography, raking light enjoys noted distinction as the tool most useful for recording the subtle textures of paintings, textiles, and paper artifacts. However, raking light can also model a three dimensional form superbly.

Raking light can subtly model the three-dimensionality of forms such as feet/blocking, or sculptural carving. (*fig. 1*) For relief surfaces, such as *lacunae* or loss of inlay, semi-raking light may be most advantageous. The combination of raking light and an off-center camera placement can present added three-dimensionality in objects with a highlighted side-surface as well as a shadowed opposite edge (*Collins 1986*). The need for good raking light in the examination of objects is obvious; the recording of this information for furniture should be just as obvious.

Specular illumination is simply direct or undiffused lighting. Because reflected light reveals so much about an object's surface quality, it becomes a useful tool when employed to this



Figure 2. Three separate campaigns of brass pull-plates recorded with specular illumination.



Figure 3. Unacceptable glare on curved-front chest of drawers.

end. The use of specular illumination may also uniquely outline an object's history. This drawer front (*fig. 2*) illustrates three different campaigns of brass pull-plates. However, specular lighting can also create *glaring* problems, especially when dealing with highly reflective finishes.

Curved front furniture presents the most difficult challenge in lighting. There is a fine line between a wash of diffused lighting and outright glare. Figure 3 illustrates a serpentine-front chest of drawers with *headlights!* In order to avoid the problem altogether, two things can be done: either lay the piece on its side to facilitate a normal lighting setup, or arrange a simple top-and-bottom setup so that the light is not reflected towards the camera.

Setup

What is *normal* lighting? Normal usually refers to the standard 45° side light placement which allows a maximum of light coverage. If the photograph is boring, but the object is not, the document is usually successful. What should be sought is the anonymity that allows an object to 'tell its story' while the photographic vernacular fades away. For starters, a standard and consistent setup should be habitual. Diffusing screens are a must for most applications. This allows overall even lighting with a minimum of harsh shadowing and glare. PVC-type frames with white nylon screening are especially useful for large objects, and are easily constructed or available from photographic supply houses such as Calumet.

Be consistent within a series of treatment photographs to ensure accuracy. Comparisons become futile without matching lighting placement, point of view, and background. Avoid colored backgrounds. Even with perfect color-vision, tricky neuro-processing can alter our perception of certain juxtaposed colors. Josef Albers (1963) comments on the effect of "vibrating color boundaries," in his *Interaction of Color*,

This initially exciting effect also feels aggressive and often even uncomfortable to our eyes. One finds it rarely used except for a screaming effect in advertising, and as a result it is unpleasant, disliked, and avoided.

Although gray is preferred in most situations, white or black can be an effective background for eliminating shadows. This (*fig. 4*) 19th-century frame was photographed before treatment on a black velvet-covered table.

Notice the inclusion of a little perspective for proper orientation. The frame includes the all-important ruler, date, point in treatment designation, and a standard color (and/or black & white) reference scale, and most important, the identification number (*Kushel 1980*).

Remember to include details in your lineup (*fig 5*). These can include many aspects of an

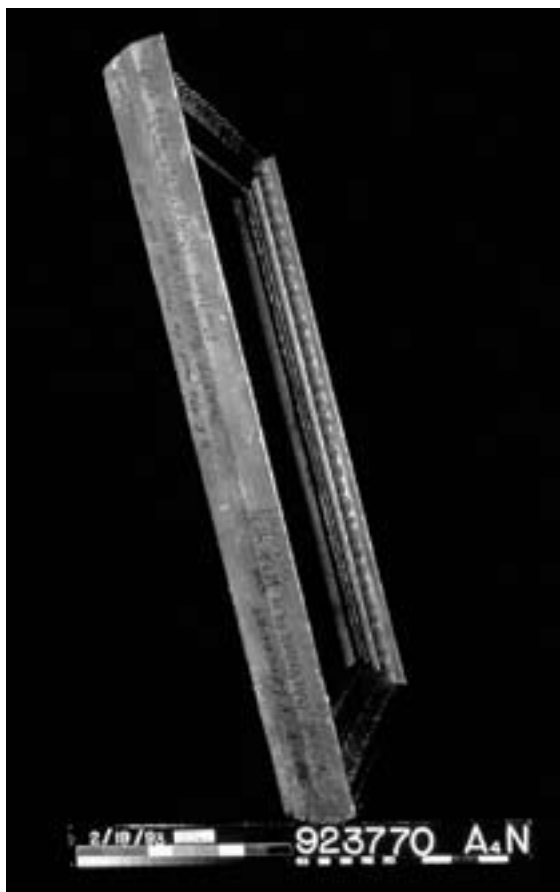


Figure 4. The use of a non-reflecting black background to eliminate shadows. Note use of referential perspective and complete information on identification strip. By the author courtesy of Buffalo State College.



Figure 6 Flemish chair photographed on its side to better facilitate limited space and normal lighting setup. By the author courtesy of Buffalo State College.

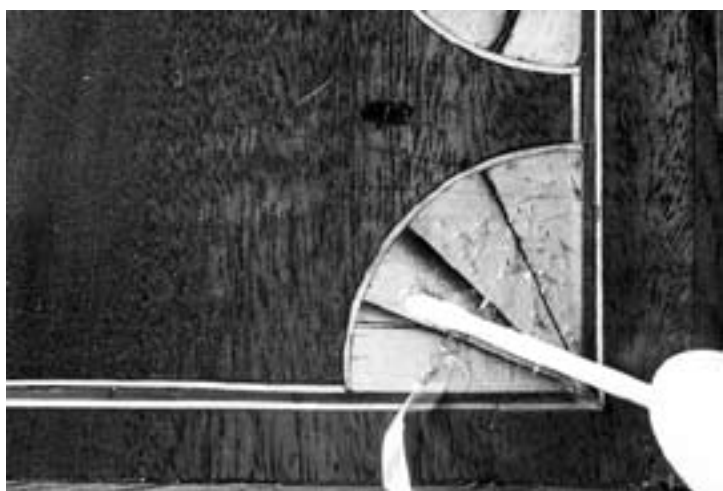


Figure 5. Closeup photograph recording treatment technique.

object such as novel or outstanding treatment techniques, unusual construction features, or individual restorations.

When limited space presents a problem for large or awkward shapes, one solution is to change the orientation of the object to better suit the setup. (*fig. 6*) This Baroque chair with its characteristically tall back was photographed on its side to facilitate a normal setup in a room with a low ceiling.

Alternatives: Ultraviolet

On the occasion that an antique's finish history becomes relevant to treatment, outlines a significant alteration, or even testifies to forg-



Figure 7 UV induced visible fluorescence photography setup for child's chair with room lights on for illustration.

ery, it becomes necessary to record this information. The use of ultraviolet induced *visible* fluorescence—loosely referred to as *UV*, can effectively capture the subtleties of original and restored finishes. The autofluorescence of a host of natural plant resins is well known, especially the varieties of shellac so often found in historic furniture finishes (Baumeister 1988, and de la Rie 1982). For such a case as this child's chair, (*fig. 7*) the presence of a synthetic-resin coated backslat and arms verses shellac over most of the chair is clear evidence of the extent of restoration. In my setup for such a UV photograph, I include a shellac *graycard*, or any representative average fluorescing surface on the object for exposure levels. For metering off of a shellac graycard, a two pound cut of Orange shellac is liberally sprayed onto blackened Plexiglass, and test exposures are run for the particular UV lighting and setup. For example, this chair was shot

with 100 speed daylight film at *f*8, for 52 seconds. The same setup is used for black and white film with the exception of a yellow no. 8 filter only. *BLB*, or Black Light Blue bulbs, housed in fluorescent lighting fixtures and mounted on sturdy tripods, produce a sufficient level of energy to keep exposures within a couple of minutes. Use a non-fluorescing background, keep the lights around 3-4 feet from the subject, and be sure to shield your eyes from the higher energy uv rays. A setup such as this including fixtures, bulbs, and camera filters could cost as little as \$100 (see *Appendix 3*).

Diagrams

A before treatment photograph may not suffice in conveying past repairs and restorations. Make use of diagrams at any level of sophistication. Recently, much attention has been drawn to the use of computer imaging for documentation (*Godla and Hanlon 1996*). Scanning a photo-



Figure 8 Adobe Photoshop created simple diagram recording high chest restorations. (*original in color.*)

graph and enhancing with a program such as *Adobe Photoshop* offers the most flexibility in manipulating imagery for a variety of purposes. A photograph can easily be transposed into a diagram to illustrate condition, prior restorations, or record current treatments. The high chest diagram illustrated (*fig. 8*) provides a record of new restorations that are not detectable in an overall treatment photograph. Of course, a series of individual repair photographs would also serve the same purpose, but this would be economically unfeasible. Another related application is the use of a computer-aided design (CAD) program for executing measured line drawings of furniture, or of higher precision-type objects such as clocks or musical instruments (*Watson 1995*).

If you are so inclined, *explode* your furniture! Exploded diagrams are especially useful for detailing construction (*Webber 1981*).

Other diagrams that are particularly important are the sketches in a notebook recording the



Figure 9 The author using the Olympus Fiberoptic Scope to investigate suspected inscriptions inside the soundbox of a Spinet Harpsichord at Colonial Williamsburg.

lighting setup and any other out of the ordinary conditions for treatment series photographs. This takes only a minute and is worth the effort, especially when, sometimes months later, final photographs are taken.

Two charts that are most useful for technical information are *Selected Practical Sources of Illumination and Their Color Temperatures*, and the *Nomograph For Light Source Conversion* diagram (see *Appendices 1 and 2*). The latter provides correct filtration given a film type and light source. These are available in various forms from Eastman Kodak (*1990*).

Fiberoptic Scope

After the standard photographs, there remain many alternatives for the special circumstance of gathering visual information. A fiberoptic scope is invaluable for looking into closed spaces. In this example (*fig. 9*), a spinet harpsichord with its inaccessible soundbox interior, was suspected of having been restored. In searching with the flexible tube of the fiberoptic scope, a date of 1898 was found with a signature of the restorer, and was photographed for the record with a camera attachment (*Watson 1995*).

Radiography

Doctors and dentists are often amused and eager to apply their X-ray tubes for objects other than the human anatomy, especially if you are affiliated with a well known cultural institution. However, keep in mind that doctors routinely blast at relatively high levels of kilovoltage for fractions of seconds--while furniture needs usually dictate much lower KV settings for maximum contrast-imaging. It pays to review the mechanisms of X-radiography for art materials before the visit, as this will help to insure better communication with the doctors and technicians. Because of the uniqueness of our profession, even radiographic service centers occasionally provide *gratis* service. A 19th century picture frame examined radiographically communicates the importance of a radiograph in identifying internal structures. This xeroradiograph (*fig. 10*) provides an additional edge-enhanced effect as well as

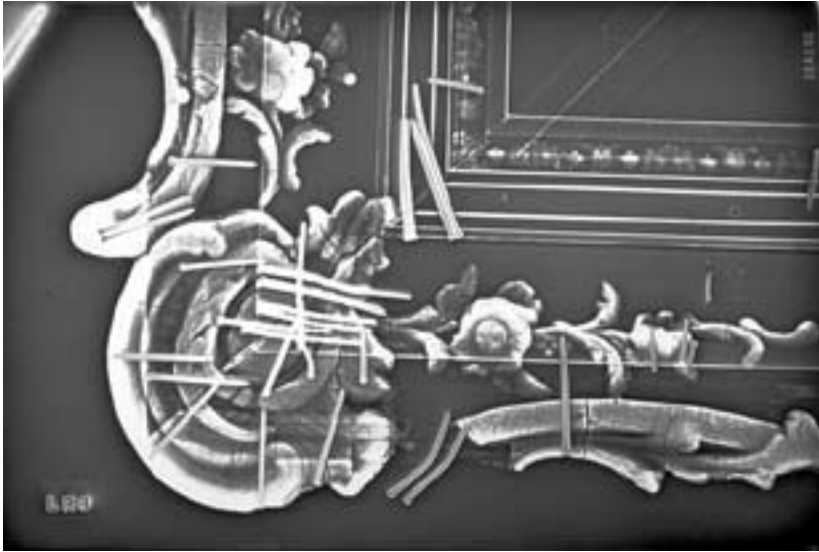


Figure 10. Xeroradiograph of a corner of a 19th century frame showing both original cut nails and restoration wire nails. By the author courtesy of Buffalo State College.

positive/negative capabilities. It also provides an image on paper thereby eliminating the need for the optimum intense light sources required for viewing standard radiographs. The Xerox Company created these machines for the medical industry and although not common, many hospitals make regular use of them (Middleton, Lang and Davis 1991).

Infrared

Reflected Infrared photographs may provide images of inscriptions or underdrawing that are otherwise unreadable (Eastman Kodak 1968).

The least expensive of these techniques is to acquire an IR *Find-R-Scope* (fig. 11) previewer which is around \$1300, yet still considerably less than an IR Vidicon camera and monitor which costs upwards of \$15,000. The *Find-R Scope* is easy and quick to use, and if a permanent image is necessary, IR film produces an image superior to one shot off of a video monitor. In either case, any photoflood lamp produces sufficient IR light, and the film and filters are readily available. If an inscription is present at all, some part of it will usually be



Figure 11. The infrared Find-R-Scope.



Figure 12. Reflected IR photograph executed with Kodak High Speed Infrared (black and white negative) film, with no. 87 filter (Kushel 1980, 31-32). Courtesy of H. Lorenz.

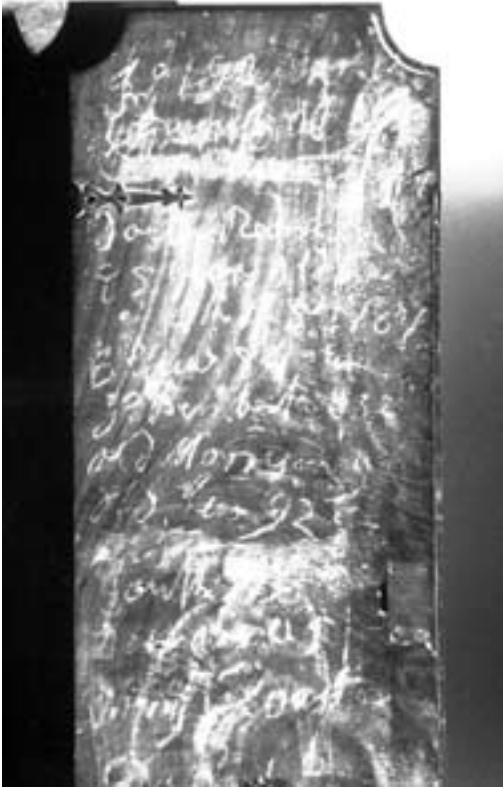


Figure 13. No. 47 Blue filtered black and white photograph enhancing chalk inscription on dark wood. Courtesy of H. Lorenz and T. Swan.

visible with a bright light-source. In fact, knowing that carbonaceous materials strongly absorb IR radiation, with any such faint inscription, producing a reflected IR photograph alone may be sufficient. A sofa frame (fig. 12) photographed with the high-speed IR black & white film captured a black-painted but faded inscription--most of which was illegible with visible light (Lorenz and MacDougal 1995).

Filtration

Polarized light reduces the glare of multi-planar light reflection, while black & white photography filters maximize contrast for image enhancing. For example, the inside of this tall case clock door (fig. 13) was covered with chalk inscriptions that are somewhat more legible with a blue, or a green filter. These absorb a dark, aged, reddish-brown wood thereby increasing the contrast with the white chalk (Lorenz and MacDougal 1995).

A detail of the same door (fig. 14) reveals additional pencil script alternately enhanced with a red filter which absorbs the dark pencil and passes the reddish-brown wood tones. Both were executed by plane polarizing the two light sources in combination with cross-polarizing at the camera (Lorenz and MacDougal 1995). Keep in mind that in many cases simply using a single polarizing filter at the camera cuts out a majority of unwanted glare. Some photographers, like artists who want to leave their mark, might suggest using a filter to enhance wood grain in furniture. While this might be quite effective and aesthetically appealing, filtering can be deceptive unless the heightened effect serves a documentary role.

Conclusions

A short publication highlighting some photodocumentary techniques for furniture can only serve as an introduction. This paper seeks to augment several previous articles on photodocumentation by suggesting solutions to some often encountered problems in photographing furniture (Kushel 1980, 1991). My aim has been to raise our collective awareness to the imaging possibilities for furniture and challenge furniture conservators to maintain high documentary standards. For as many topics as touched on here, there are many subjects unmentioned such as,

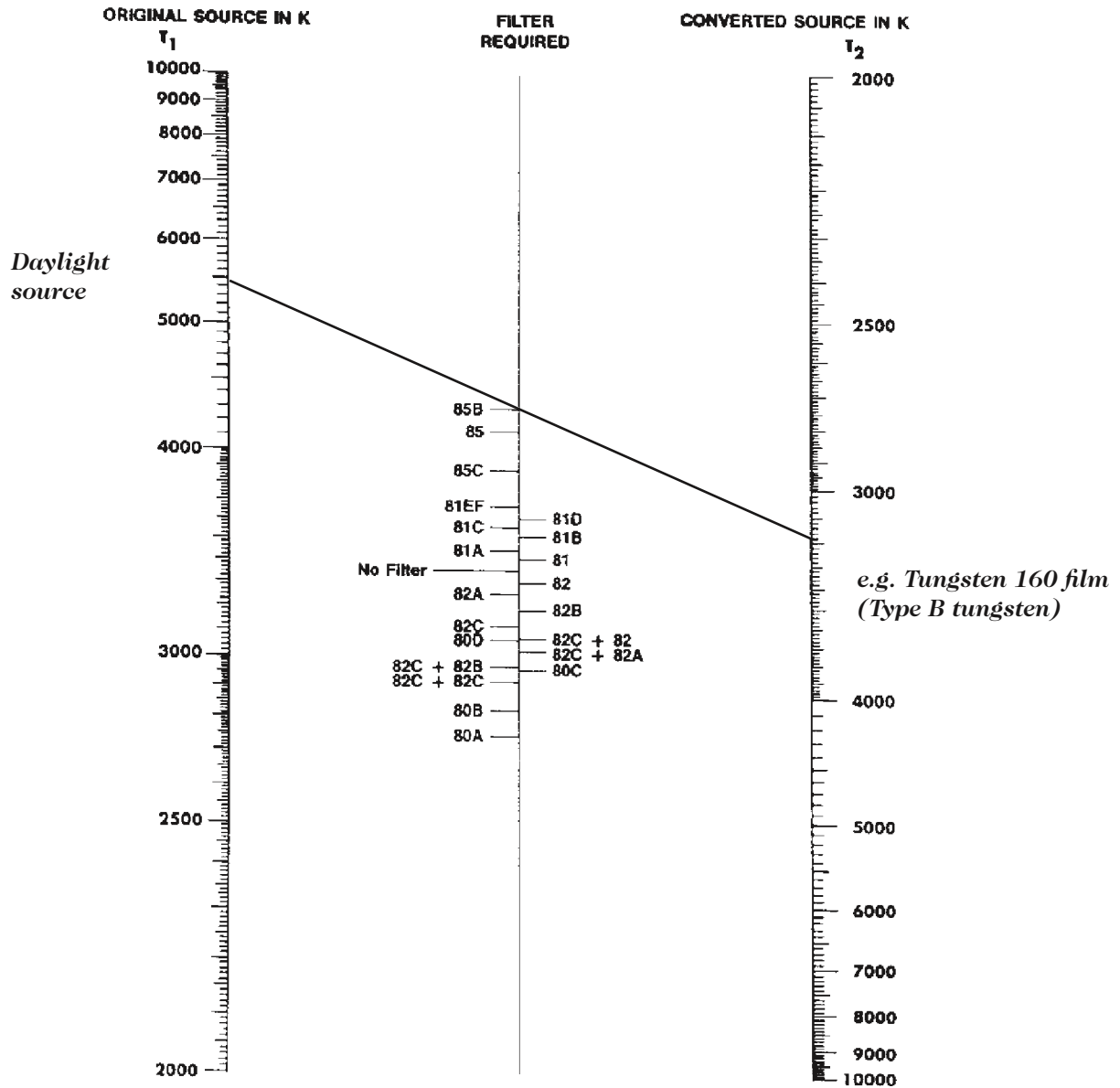


Figure 14. No. 25 Red filtered detail of same object alternately enhancing pencil or charcoal inscription on dark wood. Courtesy of H. Lorenz and T. Swan.

photomacrography, photomicrography, and imaging for presentations. In any case, let the uniqueness of the object at hand dictate the particular articles of the collective visual record. And most importantly, anticipate a maximum imaging potential with a human sensitivity our cultural objects deserve.

Acknowledgements

I would like to thank Buffalo State College professor Dan Kushel, and Colonial Williamsburg staff photographers Hans Lorenz and Craig MacDougal for their technical advice and inspiration, Assistant Furniture Curator Jon Prown



Appendix 1: Nomograph for Light Source Conversion (Eastman Kodak Company 1990)

You can use the nomograph to find the approximate filter for a particular conversion by placing a straightedge from an original source (T₁) to a second source (t₂). You can find the appropriate filter on the center line.

**Selected Practical Sources of Illumination
and Their Color Temperatures**

Source	Color Temperature (K)	Reciprocal Color Temperature (MK ⁻¹)*
Sunlight (mean noon)	5400	185
Skylight	12000 to 18000	83 to 56
Photographic Daylight†	5500	182
Crater of carbon arc (ordinary hard-cored)	4000	250
White-flame carbon arc	5000	200
Flashcube, magicube or flipflash	4950	202
High-intensity carbon arc (sun arc)	5500	182
Clear zirconium wire-filled flash	4200	238
Clear aluminum wire-filled flash	3800	263
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500-watt (photoflood) approx. 34.0 lumens/watt	3400	294
500-watt (3200 K photo-graphic) approx 27.0 lumens/watt	3200	312
200-watt (general service) approx 20.0 lumens/watt	2980	336
100-watt (general service) approx 17.5 lumens/watt	2900	345
75-watt (general service) approx 15.4 lumens/watt	2820	353
40-watt (general service) approx 11.8 lumens/watt	2650	377

* Values in reciprocal megakelvins (MK⁻¹) are equal numerically to values in "mireds."

† Condition of daylight which best represents that encountered in typical photographic situations. Literature reference, "Spectral Distribution of Typical Daylight as a Function of Correlated Color Temperature," D. B. Judd, D. L. MacAdam, G. Wyszecki, *Journal of the Optical Society of America*, Vol. 54, No. 8 (August 1964), pp. 1031-1041.

Appendix 2 (Eastman Kodak Company 1990)

and Furniture Curator Ron Hurst for assisting with images from the collection at Colonial Williamsburg Foundation. Thanks also to C.W.F. Musical Instruments Conservator John Watson for assistance with computer imaging and printing, and C.W.F. Furniture Conservator F. Carey Howlett for his advice and encouragement in presenting this information.

Chris Swan is currently the Getty Intern in Furniture Conservation at Colonial Williamsburg Foundation where he also spent his third year internship. He holds a BA in Art from the University of Dallas, 1985, and an MA with Advanced Certificate in Art Conservation from Buffalo State College, 1995.

Suppliers

Adobe Photoshop, version 3.0

Adobe Systems, Inc.
1585 Charleston Rd., P.O. Box 7900
Mountain View, CA 94039-7900

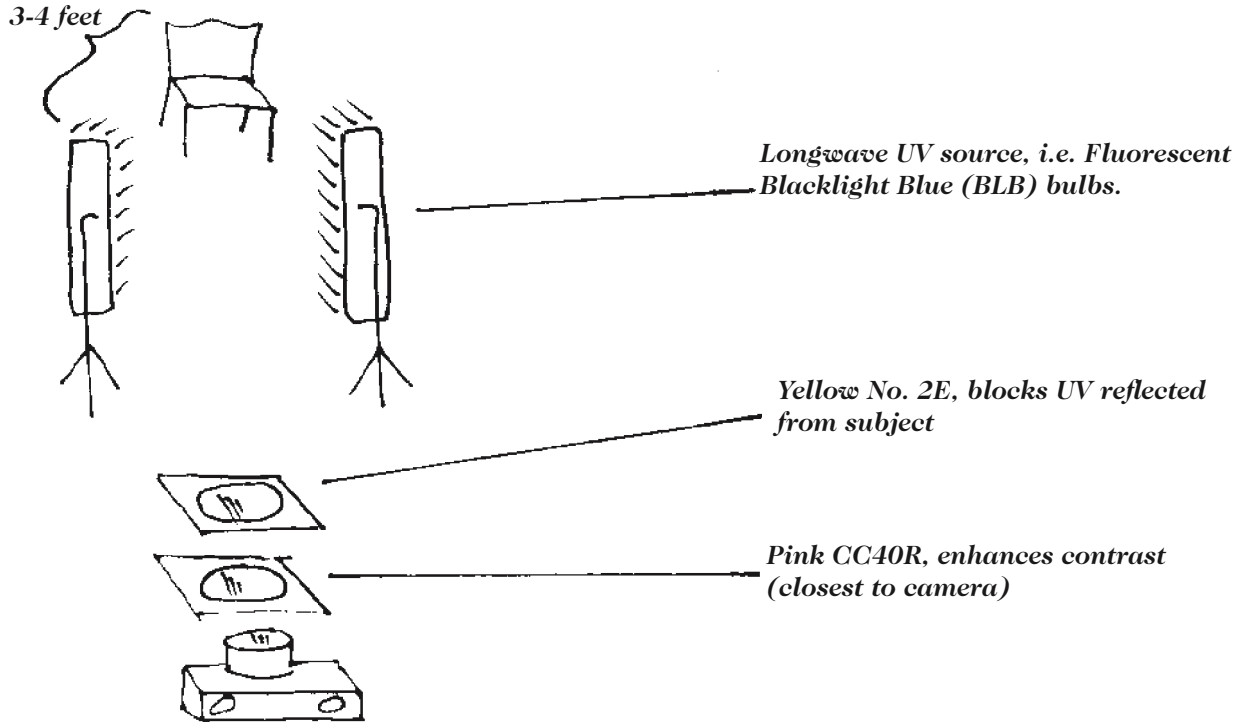
Lee Filters for PVC diffuser screens

Barbizon Capitol
6437 G General Green Way
Alexandria, VA 22312

Photographic supplies including PVC frames

Calumet Photographic, Inc.
890 Supreme Drive
Bensonville, IL 60106

Appendix 3: UV Photography Setup



Procedure:

1. Daylight Color Film: **Base Setting:**
 ISO 100 Film ISO=12
 ISO 200film ISO=24
 (These settings based on camera distance of 4-5 feet.)

2. For overall fluorescing surfaces, take "graycard" reading with light meter off of average fluorescing area. Typical readings will be in the range of f8, 3.5 mins., or f11, 7 mins. Try to maintain as much depth of field as possible, preferably no less than f8, and bracket exposures on the plus side only.

3. For spotted fluorescence, use orange shellac sprayed board for graycard reading, set exposure accordingly. May need to fine tune exposures for your particular shellac mix.

4. Barring a light meter, use Automatic camera metering. Count the exposure in seconds, and bracket manually by doubling exposure time or stopping up, etc.

N.B. Black and White procedures are the same except substitute Yellow No. 8 filter for the two used in color.

Suppliers (cont'd)

Find-R-Scope Infrared Viewing
 FJW Optical Systems, Inc.
 629 S. Vermont St.
 Palatine, IL 60067-6949

Olympus OES Industrial Fiberscope
 Olympus Corporate Industrial Fiberoptics
 4 Nevada Drive
 Lake Success, NY 11042-1179

Reflector screen for PVC screens
 Roseco Soft Frost and Flexible Silver Reflector
 10500 Meadowglen, Suite M.
 Houston, TX 77042

Photographic suppliers
 The Saunders Group
 21 Jet View Drive
 Rochester, NY 14624

PVC diffuser screen frames
 Tinker Tubes
 PO Box 1290
 Santee, CA 92071-0890

Technical applications bulletins for Xeroradiography machines, Operator's Manuals

Xerox Corporation
Xerox Medical Systems
Pasadena, CA

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