

# **Digital Imaging Workflow**

## **For Treatment Documentation**

**Conservation Division, Preservation Directorate**  
**Library of Congress**





**Third Edition**

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**Conservation Division, Preservation Directorate**

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The ***Digital Imaging Workflow for Treatment Documentation*** is an internal instructional manual for conservation photodocumentation used in the Conservation Division at the Library of Congress.

### **Acknowledgments:**

The *Digital Imaging Workflow* is based on the protocols presented in *The AIC Guide to Digital Photography and Conservation Documentation* (ed. Jeffrey Warda, 2017, 3rd edition), workshops taught by Jiuan-Jiuan Chen to the Conservation Division in 2016 and 2017, training in conservation graduate programs, and advice from consultants.

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# Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

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# Section 1—Setting Up Preferences

## Digital Imaging Workflow for Treatment Documentation

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### SETTING UP PREFERENCES

## Section 1—Setting Up Preferences

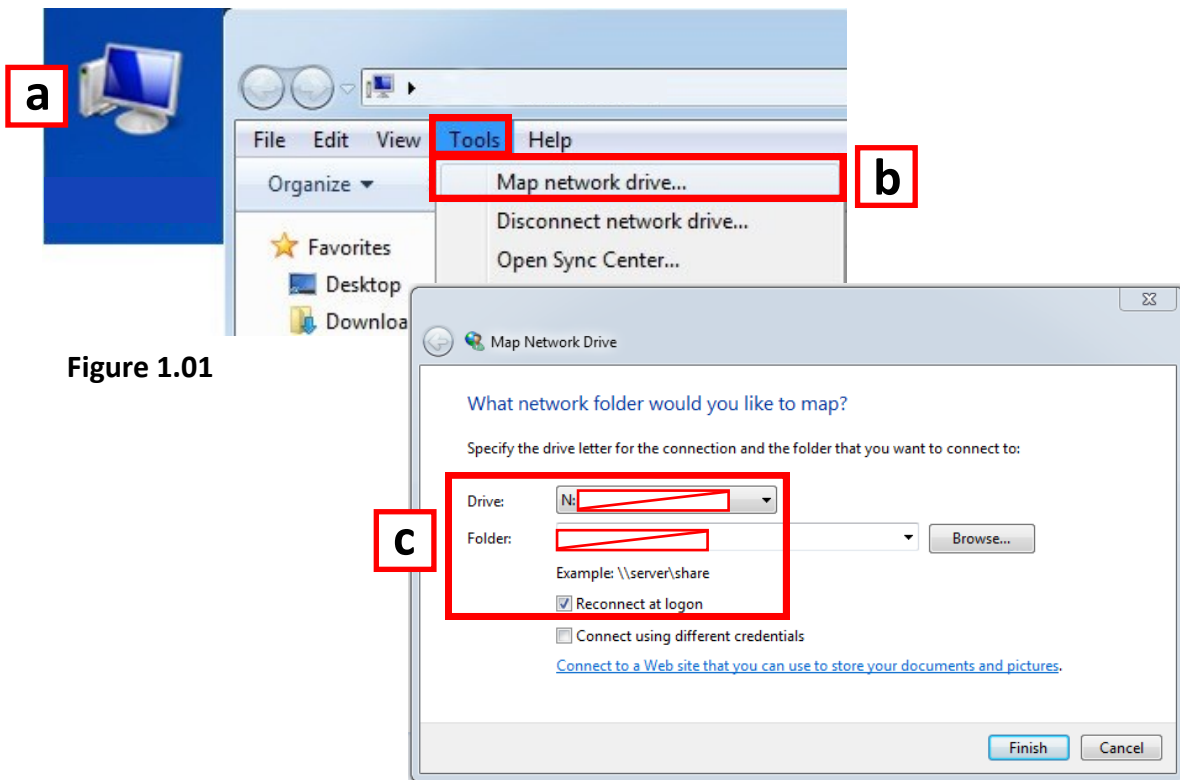


Figure 1.01

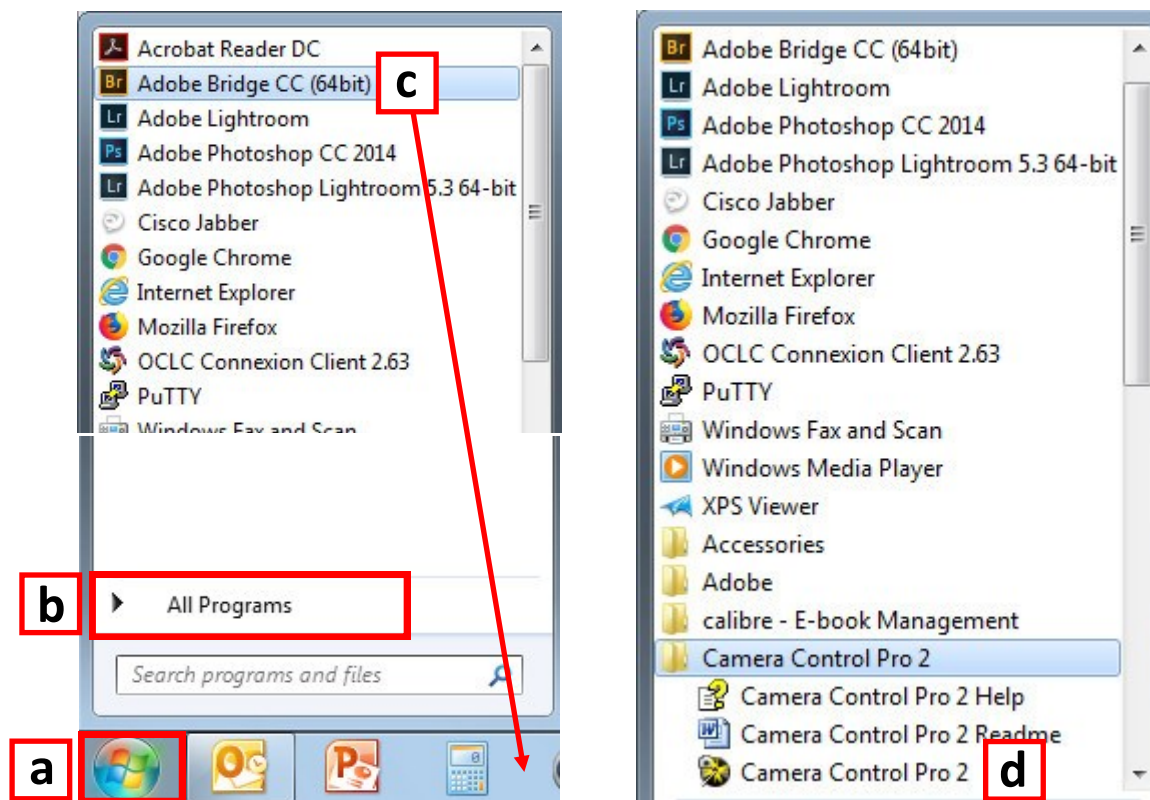


Figure 1.02

# Section 1—Setting Up Preferences

## Your Computer, Photo Studio, Image Processing Room

### Add Calendars for Photo Studio and Image Processing Room to Your Outlook

1. In **Microsoft Outlook**, click *Calendar*.
2. Right click *My Calendars* → Left click *Add Calendar* → Left click *Open Shared Calendar*.
3. Type in: “CD Photo Studio”; click *OK*. Repeat 2-3 for “CD Image Processing.”

## Photo Studio and Image Processing Room

### Map the N: Network Drive (Windows)

1. Double click the computer icon (fig. 1.01a).
2. Click *Tools* → *Map Network Drive* (fig. 1.01b).
3. Input the following (fig. 1.01c):

|                           |                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------|
| <i>Drive</i>              |  |
| <i>Folder</i>             |  |
| <i>Reconnect at login</i> | Check                                                                                |

4. Click *Finish*.

### Pin iDoc Applications to the Task Bar (Windows)

1. Click Windows *Start* button (fig. 1.02a) → *All Programs* (fig. 1.02b).
2. Drag the icon for **Photoshop** to the task bar and release (fig. 1.02c); repeat for **Bridge**. In the Photo Studio only, repeat for **Camera Control Pro**, for which you have to click on the folder to expose the application icon to pick it up to drag (fig. 1.02d).

## Section 1—Setting Up Preferences

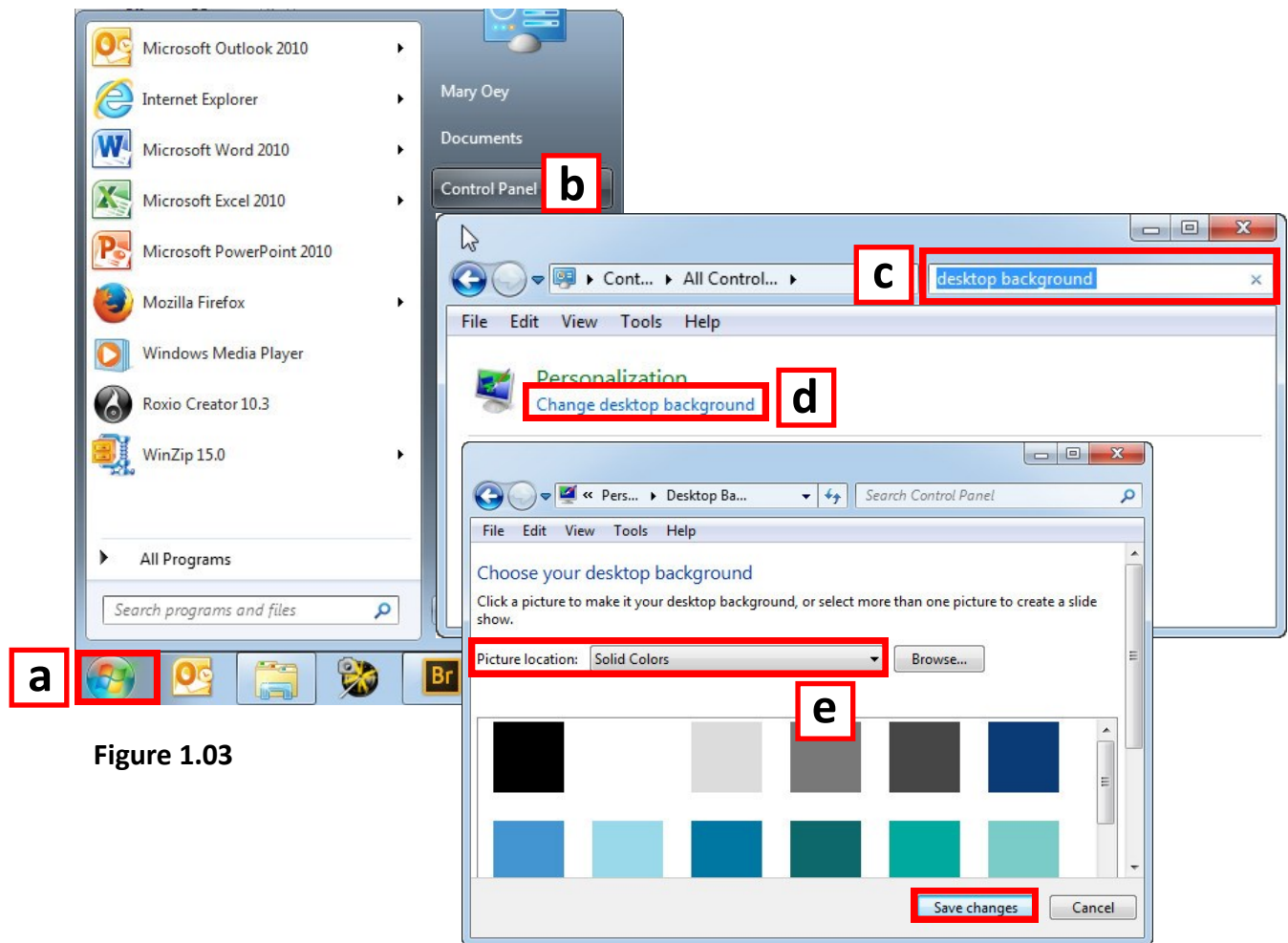


Figure 1.03

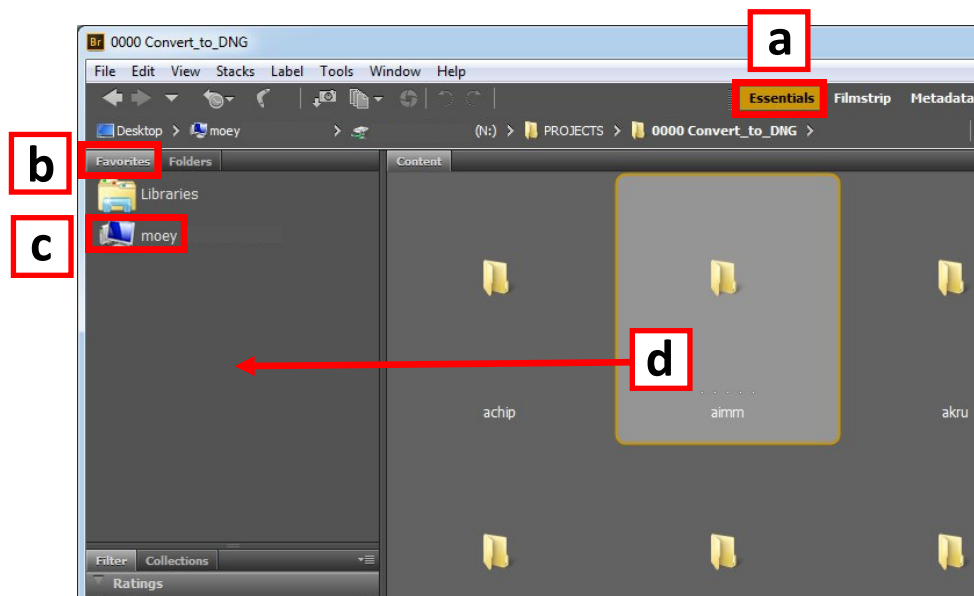


Figure 1.04

# Section 1—Setting Up Preferences

## Photo Studio and Image Processing Room

### Set Desktop Background Color to Neutral Gray (Windows)

---

1. Click *Windows Start* button (fig. 1.03a) → *Control Panel* (fig. 1.03b).
2. In *Search Control Panel* (search box in upper right corner), type in: “Desktop Background” (fig. 1.03c).
3. Click *Change Desktop Background* (fig. 1.03d).
4. Under *Picture location*, select *Solid Colors*.
5. Click on the medium gray patch (fig. 1.03e).
6. Click *Save Changes*.

### Drag Frequently Used Folders into Favorites Area (Bridge)

---

1. Open **Bridge**.
2. Click *ESSENTIALS* (fig. 1.04a) → Click *FAVORITES* (fig. 1.04b) → Click the computer icon (fig. 1.04c).
4. In the *Content* window to the right: Double click through *N: > PROJECTS > 0000 Convert\_to\_DNG*.
5. Drag your user folder from the *CONTENT* window to copy it into the *FAVORITES* area (fig. 1.04d).  
TIP: You can drag/copy any of your project folders into the *FAVORITES* area.
6. To remove any folder from *FAVORITES*, right click the folder and choose “Remove from Favorites.”  
TIP: Remove the autopopulated favorites like *My Documents*, *My Pictures*, *C:*, etc.



## Section 1—Setting Up Preferences

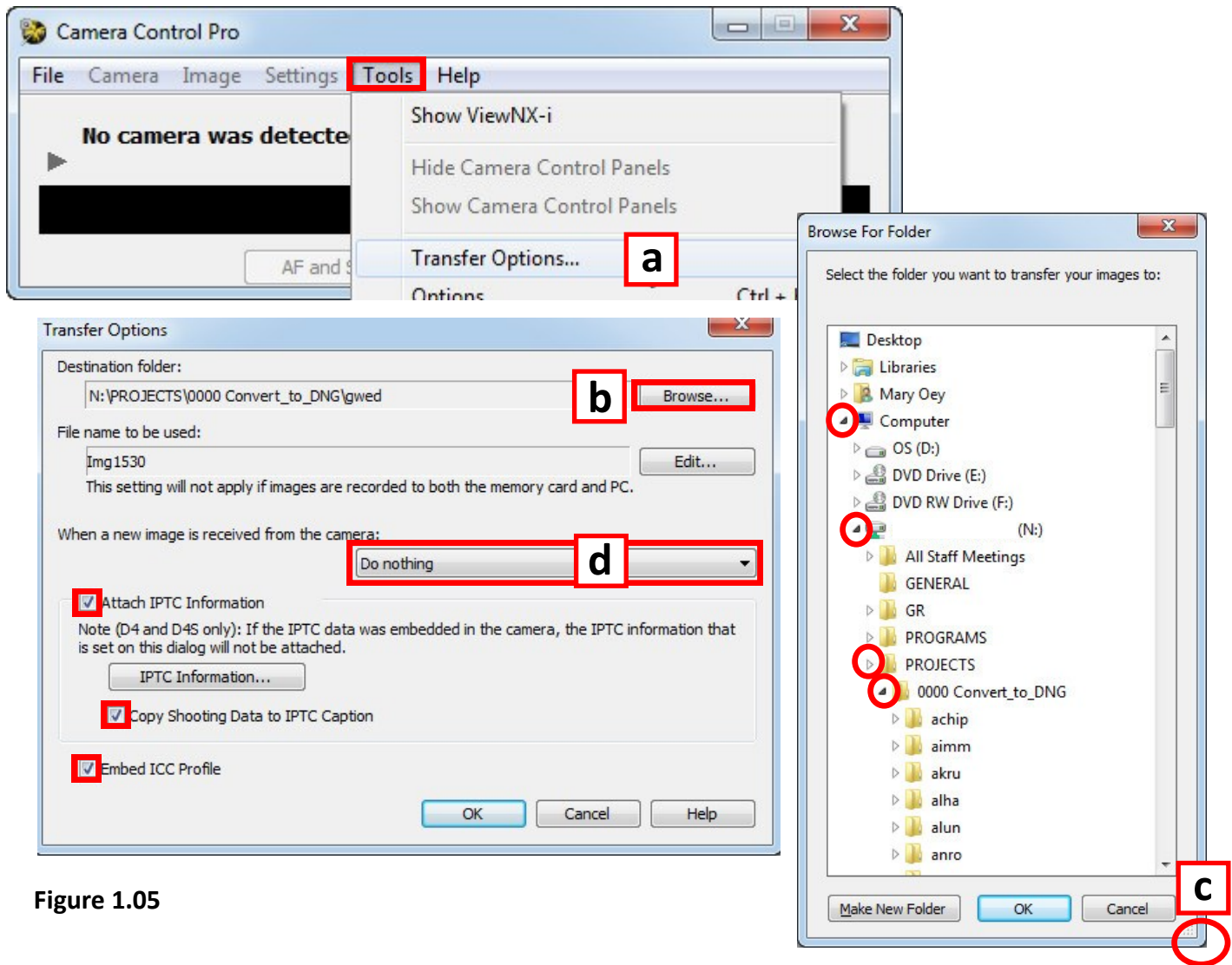


Figure 1.05

# Section 1—Setting Up Preferences

## Photo Studio

### Establish Download Path (Camera Control Pro)

---

1. Open **Camera Control Pro**.
2. Click *Tools* → *Transfer Options* (fig. 1.05a).
3. Click *Browse* (fig. 1.05b). If a window pops up with the warning that you cannot create folders, just keep clicking *OK* until it goes away.
4. Pull on the corner of the *Browse for Folder* window to make it bigger (fig. 1.05c), then use the arrows to expand the following folders: *Computer* > *N:* > *PROJECTS* > *0000 Convert\_to\_DNG*.
5. Under the expanded subfolders for *0000 Convert\_to\_DNG*, scroll to find [your username] folder and click once on it to highlight it. Click *OK*.
6. In the *Transfer Options* window: Check boxes *Attach IPTC Information*, *Copy Shooting Data to IPTC Caption*, *Embed ICC Profile*. After *When a new image is received from the camera*, select *Do nothing* (fig. 1.05d).
7. Click *OK*.

## Section 1—Setting Up Preferences

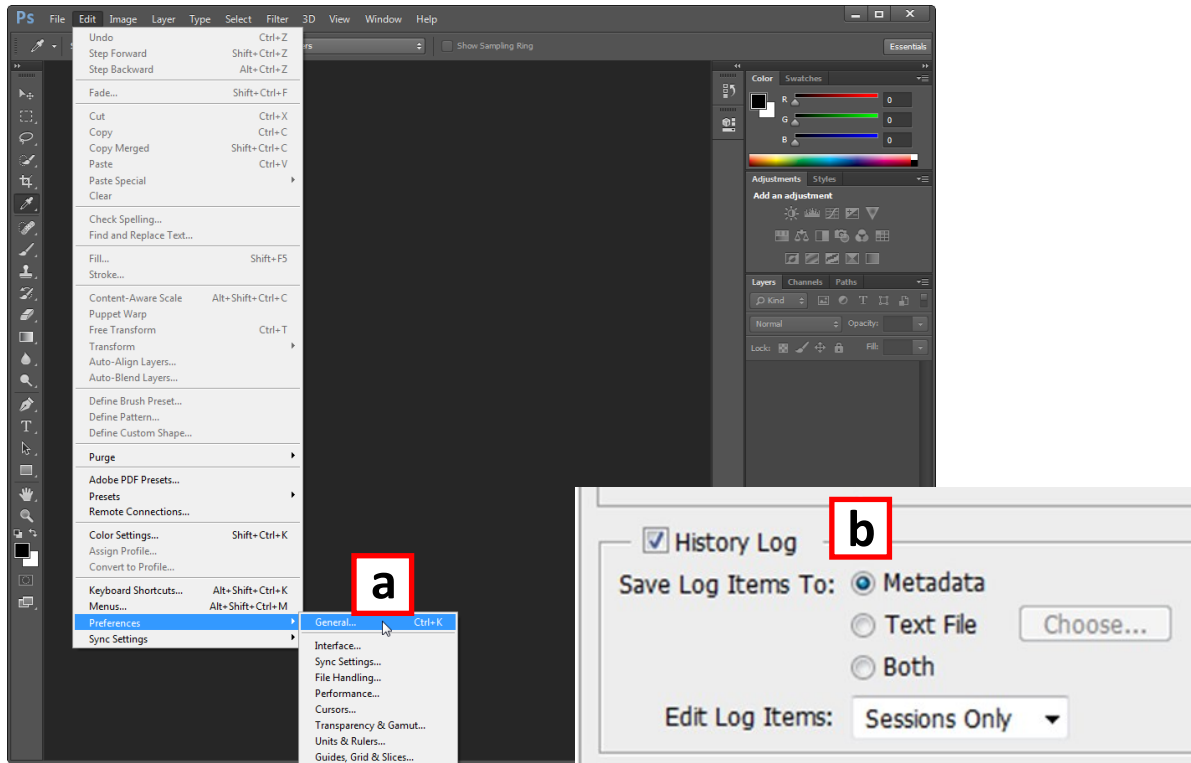


Figure 1.06

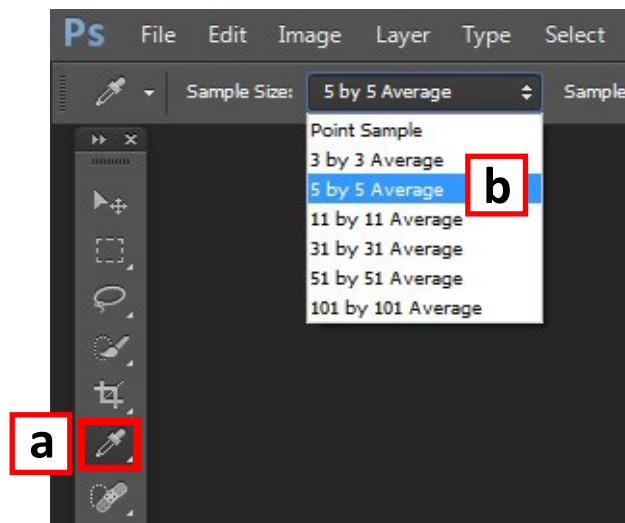


Figure 1.07

# Section 1—Setting Up Preferences

## Image Processing Room

### Turn on Metadata History Log (Photoshop)

---

1. Open **Photoshop**.
2. Click *Edit* → *Preferences* → *General* (fig. 1.06a).
3. Check *History Log* (fig 1.06b); select *Metadata*.
4. Click *OK*.

### Set Eyedropper Tool Diameter (Photoshop)

---

1. Click the *Eyedropper* icon (fig 1.07a).
2. Select *Sample Size: 5 x 5 Average* (fig 1.07b).

## Section 1—Setting Up Preferences

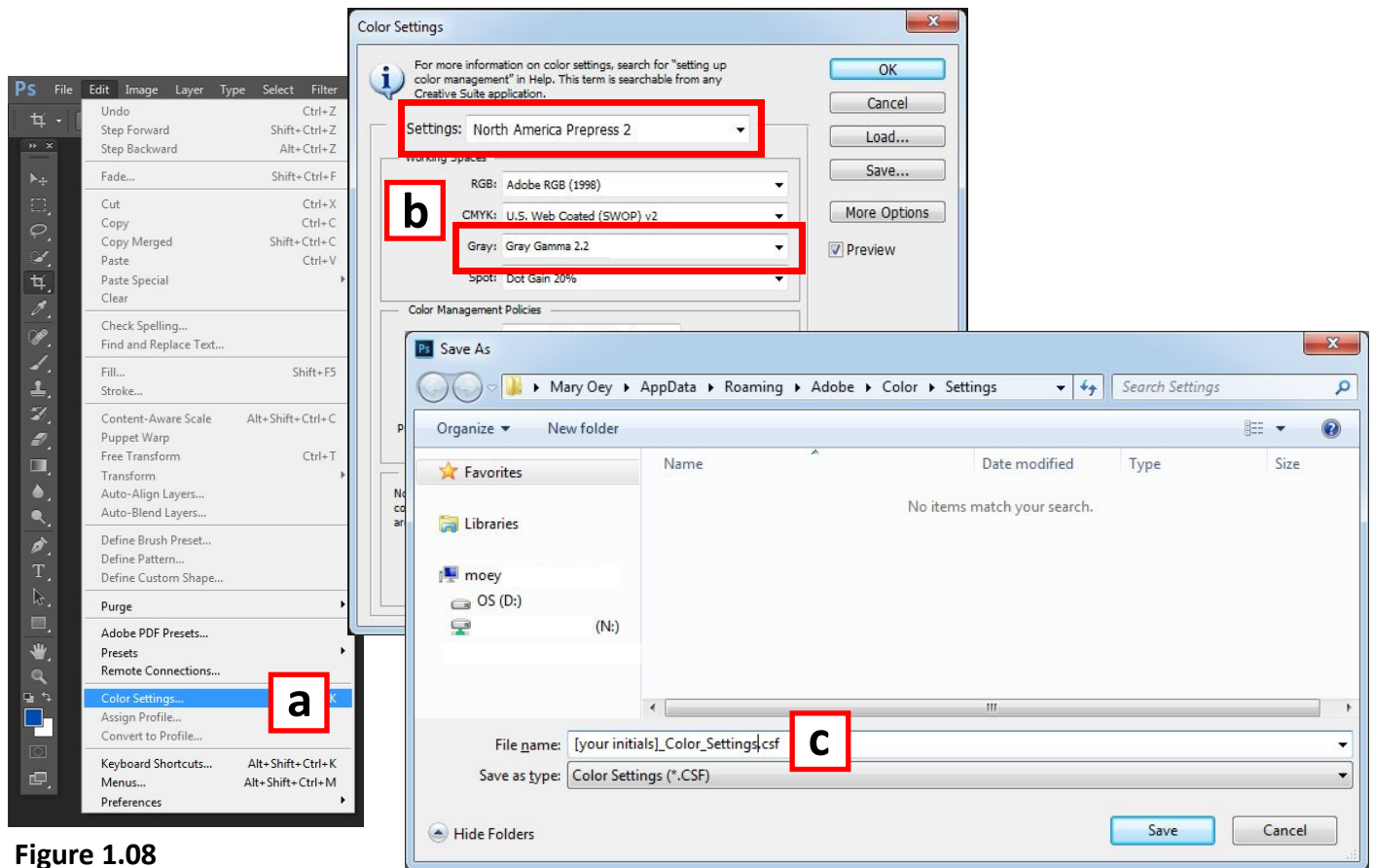


Figure 1.08

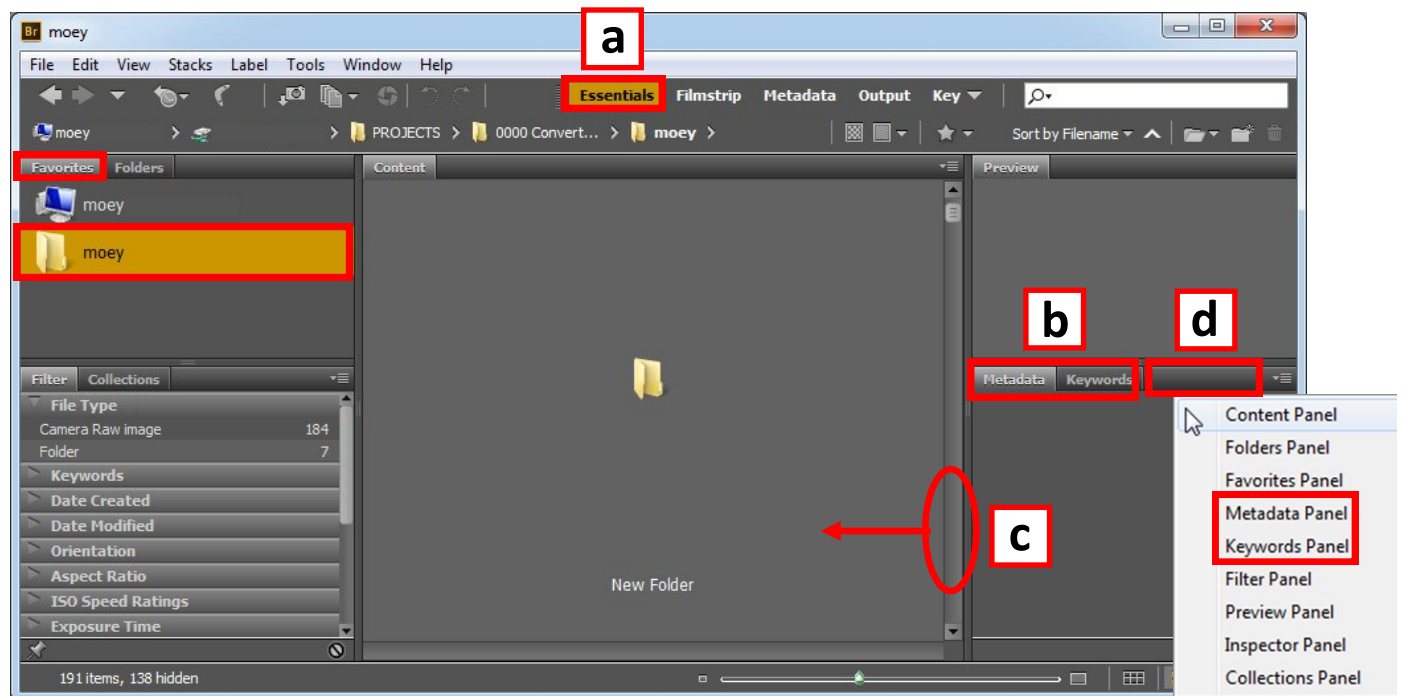


Figure 1.09

# Section 1—Setting Up Preferences

## Image Processing Room

### Set Color Settings (Photoshop)

---

1. Click *Edit* → *Color Settings* (fig. 1.08a).
2. Select the following (fig. 1.08b):

|                              |                          |
|------------------------------|--------------------------|
| <i>Settings:</i>             | North America Prepress 2 |
| <i>Working Spaces: Gray:</i> | Gray Gamma 2.2           |

3. *Settings* will now be labelled *Custom*. Click *Save*.
4. Name the settings: *[your initials]\_Color\_Settings* (fig. 1.08c). Click *Save*. Click *OK* for comment. Click *OK*.

### Create Your General Metadata Template (Bridge)

---

1. Open **Bridge**.
2. Click *ESSENTIALS* (fig. 1.09a).
3. In the right panel, you should see the *METADATA* and *KEYWORDS* tabs (fig. 1.09b). If you don't see the right panel, drag the border between the right and central panels (fig. 1.08c) to the left to reveal the right panel. If you can see the right panel, but don't see the *METADATA* and *KEYWORDS* tabs, right-click in the top border of the panel (fig. 1.08d), then left click *Metadata Panel*; repeat for *Keywords Panel*.
4. Under *FAVORITES* on the left, click *[your username]* folder. Right click in a blank area in the *CONTENT* panel and left click *New Folder*. A new folder appears in the *CONTENT* panel.
5. Name the new folder: *[your initials]\_Metadata\_Templates*.

Continued on next page

## Section 1—Setting Up Preferences

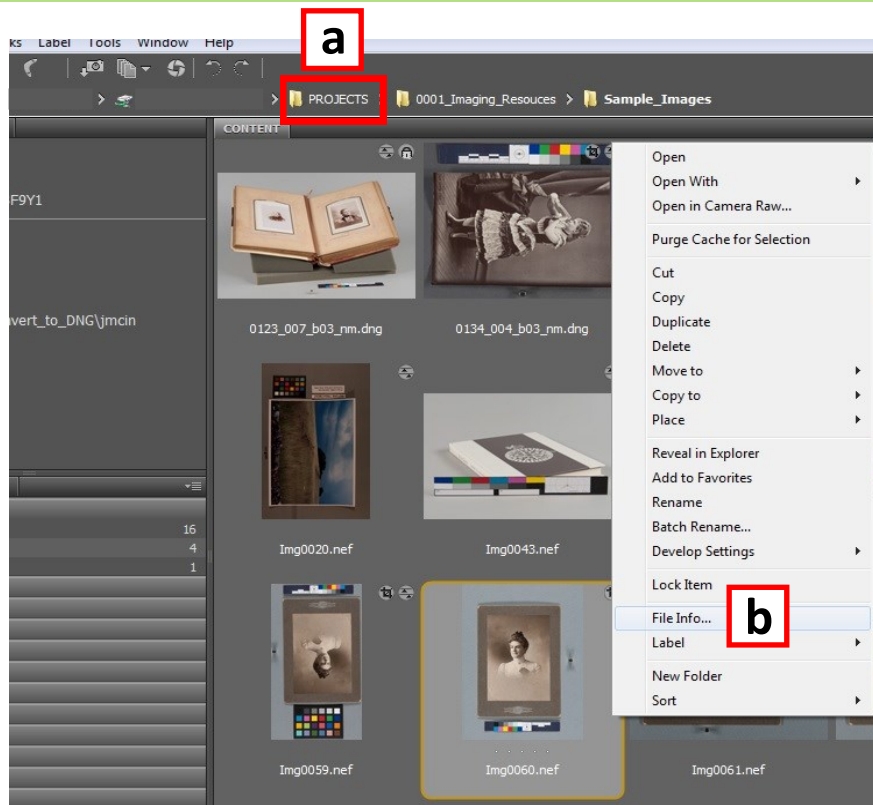


Figure 1.10

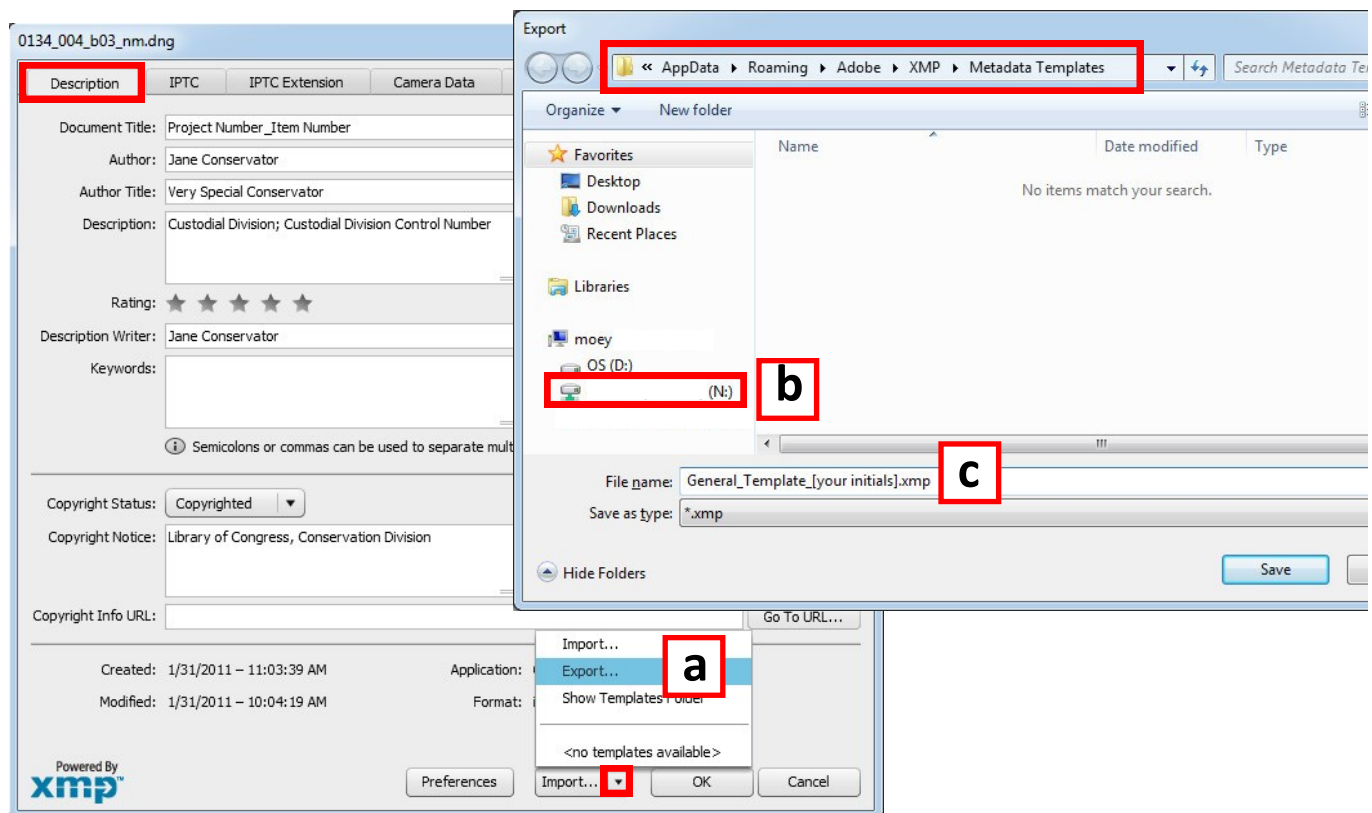


Figure 1.11

## Section 1—Setting Up Preferences

### Image Processing Room

#### Create Your General Metadata Template (Bridge), continued

6. Above the *CONTENT* panel, click the *PROJECTS* folder (fig. 1.10a).
7. Open: *0001\_Imaging Resources* → *Sample\_Images*.
8. Right-click on any image; left click *File Info* (fig. 1.10b).
9. Under the *Description* tab, input the following (fig 1.11):

|                            |                                                       |
|----------------------------|-------------------------------------------------------|
| <i>Document Title:</i>     | Project Number_Item Number                            |
| <i>Author:</i>             | [Your name]                                           |
| <i>Author Title:</i>       | [Your title]                                          |
| <i>Description:</i>        | Custodial Division; Custodial Division Control Number |
| <i>Description Writer:</i> | [Your name]                                           |

10. Click the down-pointing arrow on the *Import* button. Click *Export* (fig. 1.11a).
11. Change the save location (do not save to the default save location, shown in the red box): Click on the *N:* drive from the left side of the window (fig. 1.11b) to click through to *N: > PROJECTS > 0000 Convert\_to\_DNG > [your username] > [your initials]\_Metadata\_Templates*
12. Name the file: *General\_Template\_[your initials]* (fig. 1.11c). Click *Save*.
13. Click *OK*.



## Section 1—Setting Up Preferences

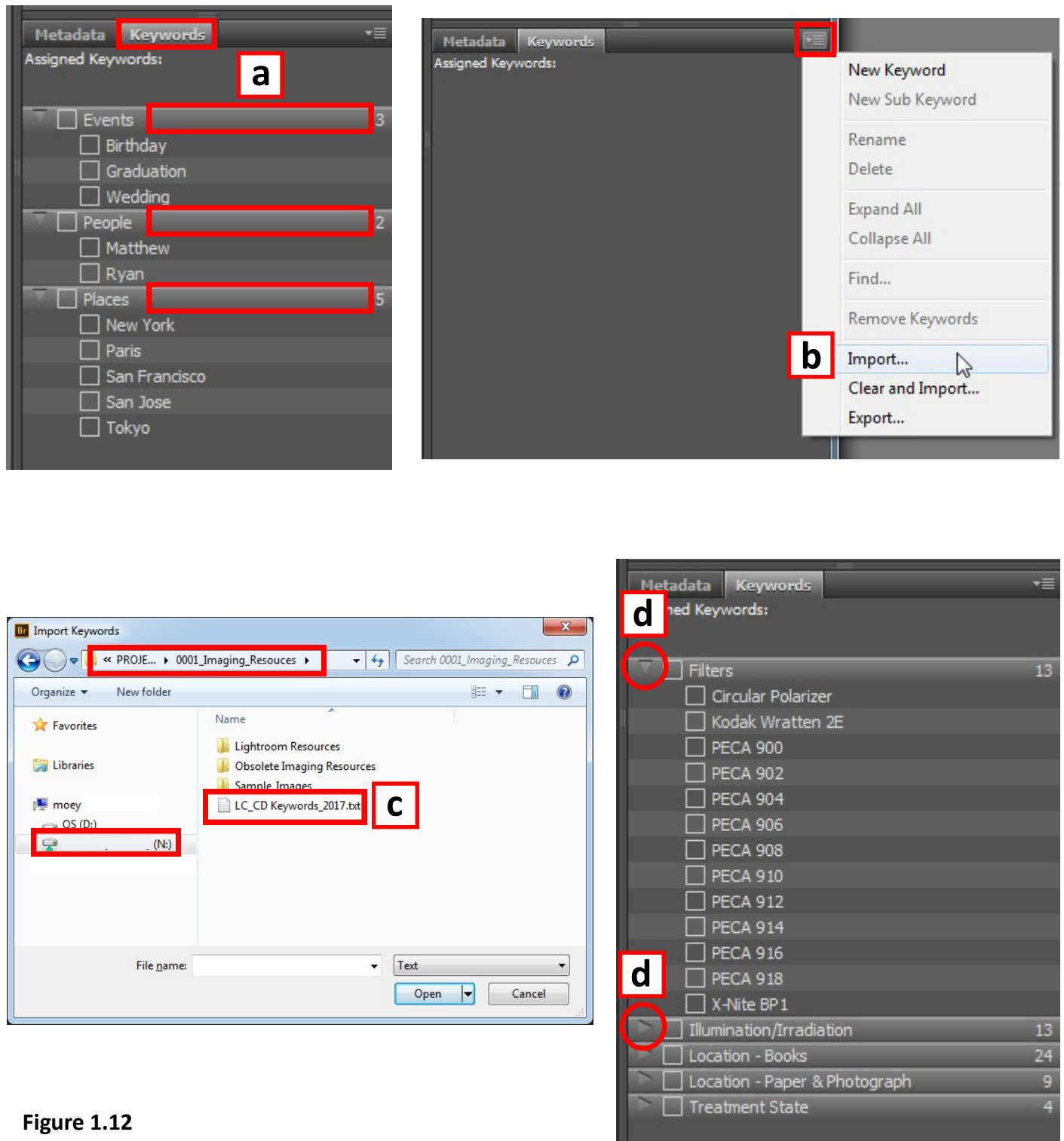


Figure 1.12

## Section 1—Setting Up Preferences

### Image Processing Room

#### Import the LC-CD Keyword List (Bridge)

---

1. Click *KEYWORDS* tab in the right panel.
2. Delete the *Events*, *People*, *Places* keywords: Right click the *Events* folder bar (fig. 1.12a) → left click *Delete*. Repeat for *People* and *Places*.
3. Left click the drop-down button on the far right of the *KEYWORDS* tab then click *Import* (fig. 1.12b).
4. Choose the *N:* drive from the left side of the window, then click through to: *N: > PROJECTS > 0001\_Imaging\_Resources*.
5. Double click *LC\_CD Keywords.txt* (fig. 1.12c).
6. The LC-CD keywords now appear under *KEYWORDS* and should be there every time you open Bridge.
7. To expand each keyword heading, click the arrows (fig. 1.12d).

**DO NOT CREATE OR ADD KEYWORDS TO THE CD KEYWORD LIST**

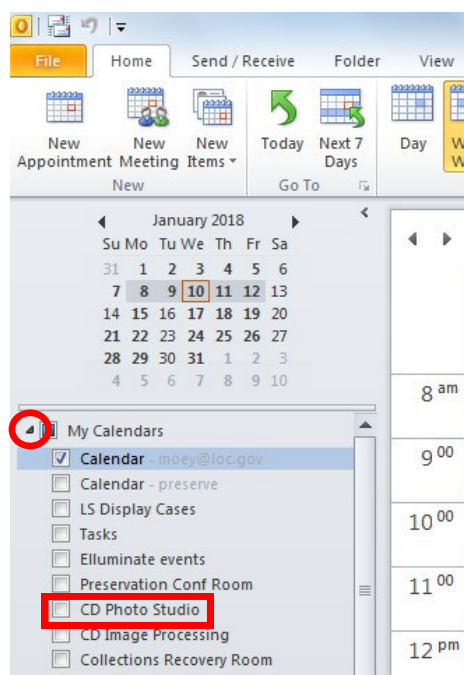
## Section 2—Capture

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### CAPTURE

## Section 2—Capture



**Figure 2.01**

## Section 2—Capture

### Before Your Scheduled Time in the Photo Studio

#### Confirm or Request the Project Folder on N:\PROJECTS (Windows)

---

1. You can do this from any computer in the lab that has the *N:* drive mapped.
2. In **Windows**, click through *N: > PROJECTS* to find your project's folder. If your project folder is there, skip step 3.
3. If your project folder is not on the *N:* drive yet, email  in the following format:

Email subject: **Request new project folder**

Email body: Provide **project number** and **project name as it appears in the Project Database**; CD staff name(s) requiring access

#### Reserve the Photo Studio (Outlook)

---

1. In **Outlook**, click *Calendar*.
2. Under *My Calendars*, check the box *CD Photo Studio* (fig. 2.01).
3. Click on a date/time to create a New Appointment. Put your name as the Subject.

Reserve the Image Processing Room (for Sections 3-5) by repeating steps 1-3, but instead check *CD Image Processing*.

#### Print Your Project Label (Word)

---

Minimum required text on label: Project Number, Date, Treatment State

## Section 2—Capture

## Section 2—Capture

### Photo Studio

#### Tripod Only: Set Up Gray Background Paper

---

1. Position the copystand with the bottom of the collar around 25”.
2. Carefully drape the gray roll paper over the copystand camera and hook the black strap onto the camera column behind the handle that sticks out on the right.
3. Weight the four corners of the gray roll paper on the copystand.

#### Set Up Lights and Computer

---

1. Copystand capture: Confirm each light stand is at the 66” mark on the floor.  
Tripod capture: Position the light stands on the three red tape marks on the floor.
2. Confirm the top of the collar is at the 52” mark on the light stand; to adjust, turn the crank.
3. Turn on the lamps and allow to warm up for 15 minutes before taking any images. If the lights were just turned off, wait 10 minutes before turning on again.
4. Turn on the computer and monitor.
5. Turn on the camera: rotate the *On/Off* switch on top of the camera and remove the lens cap.
6. Close the studio door and turn off the overhead room light.



## Section 2—Capture



Figure 2.02

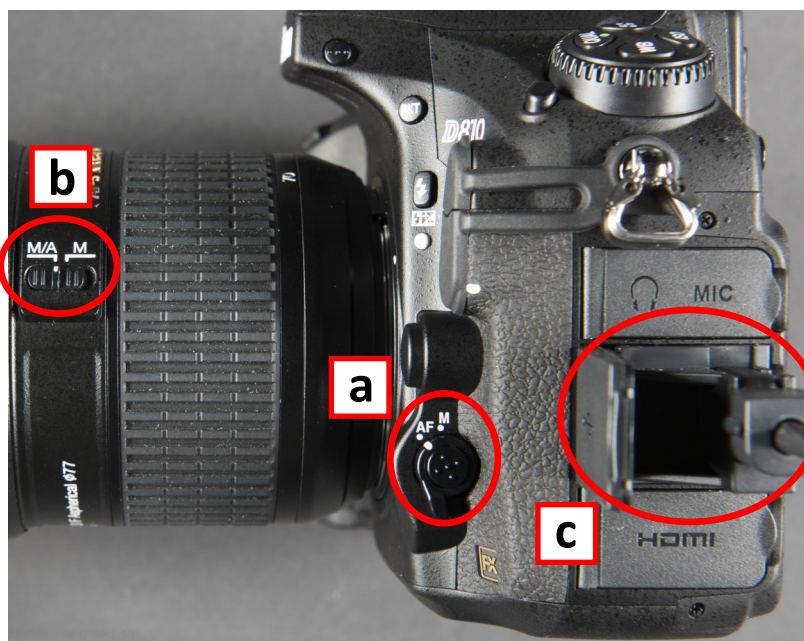


Figure 2.03

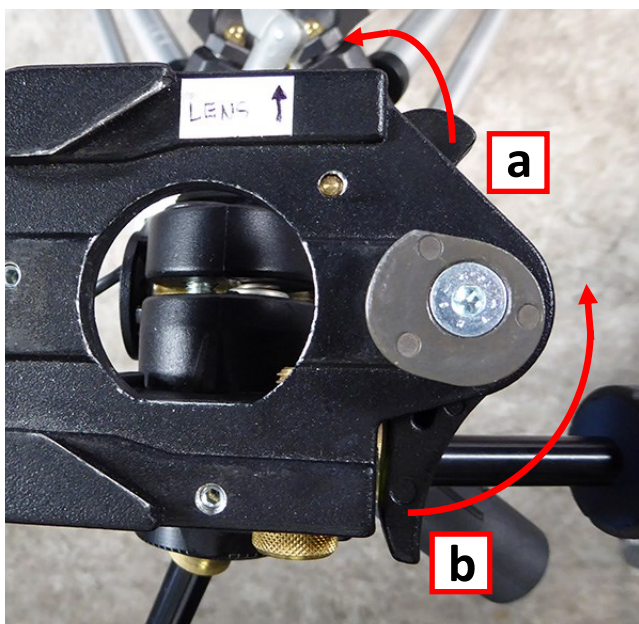


Figure 2.04

**NOTE:** This shows the position of the tripod parts a and b when the camera is mounted (but the camera is not shown mounted so as to better show the tripod parts)

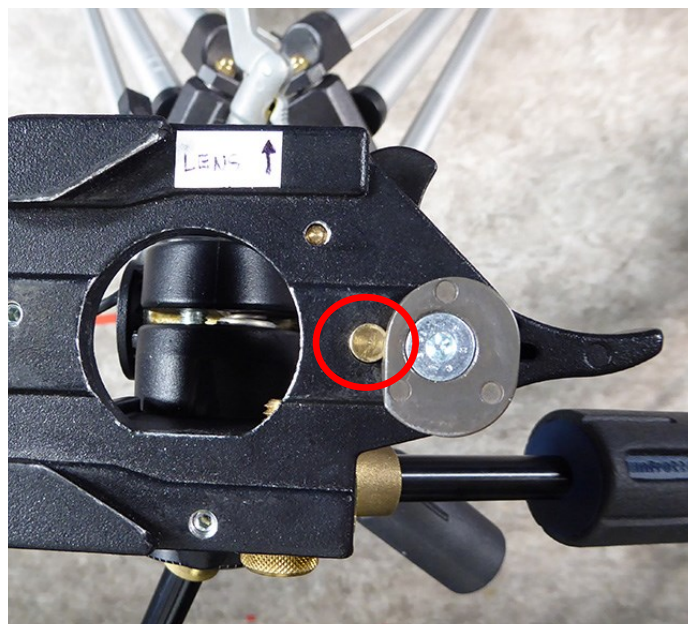


Figure 2.05

**Tripod, ready for camera mounting (the brass button is visible)**



## Section 2—Capture

### Confirm Camera and Lens Settings

---

1. Confirm on camera body: still image function (fig. 2.02).
2. Confirm on camera body: *AF* focus mode (fig. 2.03a).
3. Use the 60 mm lens (which should remain on the camera), unless your object is too big and you need the zoom function of the 24-70 mm lens.
4. Confirm on the lens: *M/A* focus mode (fig. 2.03b).

### Confirm Camera Mount and Cords

---

1. The copystand camera (Camera 1) with its 60 mm lens remains mounted on the copystand. The USB download cord (fig 2.03c) and the power cord (coming out from the bottom of the camera) remain connected to the camera.
2. The tripod camera (Camera 2) with its 60 mm lens remains mounted on the tripod. Pick up the tripod by its legs to move it. Position the tripod on the three marks on the floor. Connect the USB download cord for Camera 2 (coiled behind the computer monitor). Disconnect the power cord from Camera 1 and connect it to Camera 2. Confirm the camera is mounted level on the left-right axis (this arm is labeled on the tripod).

**If you need to release Camera 2 from the tripod:** Cradle the lens with your left hand. Use your right index finger to push back the moon-shaped release (fig. 2.04a) while using your right thumb to push back the paisley-shaped spring (fig. 2.04b) — when you’ve pushed the paisley spring far enough, the tripod will let go of the camera.

**To remount Camera 2 on the tripod:** Confirm (or adjust so) that the *LENS* mark on the bottom of the hexagonal tripod mount is pointing towards the lens. Check whether the brass button (fig 2.05) is visible (if you do not see the brass button, follow the instructions for **Releasing the Camera** until the brass button stays popped up). Align the direction of the camera lens with the label on the tripod, then push the hexagonal mount down onto the brass button, which will trigger the spring-loaded catch. Keep your fingers away from the paisley spring, which will snap with force. Don’t let go until you know the camera is secure.

## Section 2—Capture

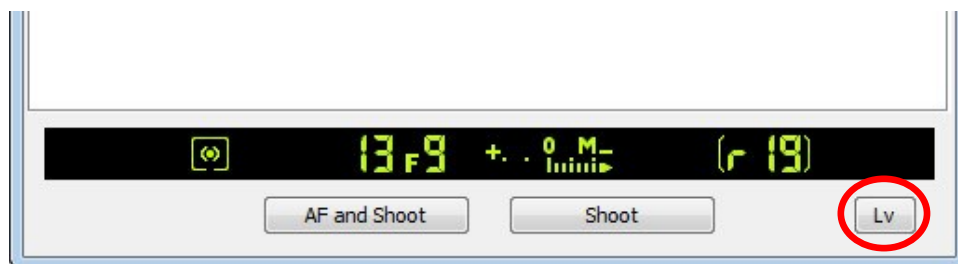


Figure 2.06



Figure 2.07

Note how the color target is positioned so that the lightest gray patch is centered between the left and right (this ensures even exposure)

Note also how the color target is parallel to the bottom of the image field, not parallel to one of the sides of the book in 3/4 view

## Section 2—Capture

### Set Up Object

---

1. Open **Camera Control Pro**. Click the *Lv* button on the bottom right (fig. 2.06) OR click *Camera* → *Live View*.
2. Place your object on the gray background. Place the color target (handle only by its edges) with the gray scale close to the object and with the lightest gray patch midway between both lamps (fig. 2.07). Place the identification label next to the color target or within the blank black area of the color target.

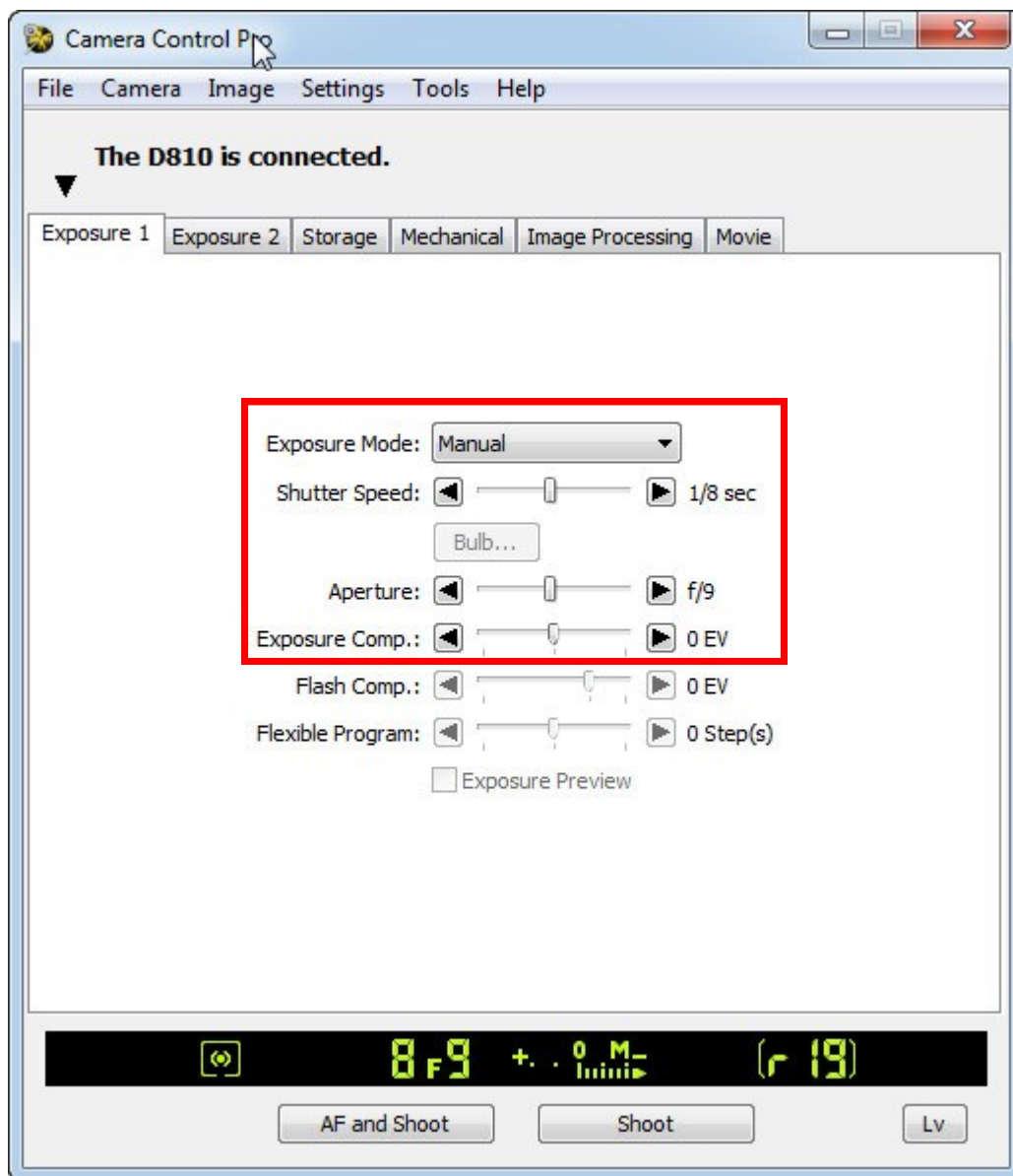
NOTE: When setting up a book for a 3/4 overall shot, use the camera on the copystand as a reference to center the book on the gray paper. This is important because the floor marks for the tripod are centered to the copystand. Place the color target as seen in figure 2.07.

3. While viewing on the computer monitor, move the camera closer to or away from the object to fill the image field.

NOTE: Even for books as large as 20" tall x 16" wide (and possibly larger, but not much larger can fit on the copystand in 3/4 view anyway), just moving the tripod back one foot from the floor marks is enough to accommodate the entire book, in 3/4 view, in the 60 mm lens image field.

NOTE: When using the 24-70 mm zoom lens to shoot oversized objects, if you do not need to zoom all the way out to 24 mm, try to stay as close to the 50 mm focal length as possible.

## Section 2—Capture



**Figure 2.08**

Exposure settings shown for using the 60 mm lens, on the copystand with the bottom of the camera collar below 26"; see settings recommendations at right for settings when the camera is above 26", for tripod, and when using the 24-70 mm zoom lens

## Section 2—Capture

### Confirm Settings in Camera Control Pro

1. In **Camera Control Pro**, confirm/select the following in the *Exposure 1* tab.

Copystand capture with the standard 60 mm lens (fig 2.08):

|                       |                                                 |                                                  |
|-----------------------|-------------------------------------------------|--------------------------------------------------|
| <i>Exposure Mode</i>  | Manual                                          | Manual                                           |
| <i>Shutter Speed</i>  | 1/8 s when bottom of copystand collar above 26" | 1/10 s when bottom of copystand collar below 26" |
| <i>Aperture</i>       | f9                                              | f9                                               |
| <i>Exposure Comp.</i> | 0                                               | 0                                                |

Tripod capture with the standard 60 mm lens (use as a starting point):

|                       |                                          |                        |
|-----------------------|------------------------------------------|------------------------|
| <i>Exposure Mode</i>  | Manual                                   | Manual                 |
| <i>Shutter Speed</i>  | 1/6 s for books about 10" tall x 8" wide | 1/4 s for larger books |
| <i>Aperture</i>       | f13                                      | f16                    |
| <i>Exposure Comp.</i> | 0                                        | 0                      |

Oversize copystand capture with the 24-70 mm zoom lens (use as a starting point):

|                       |                             |                             |
|-----------------------|-----------------------------|-----------------------------|
| <i>Exposure Mode</i>  | Manual                      | Manual                      |
| <i>Shutter Speed</i>  | 1/6 s at 50 mm focal length | 1/8 s at 24 mm focal length |
| <i>Aperture</i>       | f9                          | f9                          |
| <i>Exposure Comp.</i> | 0                           | 0                           |

**NOTE:** Starting guidelines for tripod capture with the 24-70 mm zoom lens are not given here. If you find you must use the 24-70 mm zoom lens, use the copystand guidelines as a starting point.

## Section 2—Capture

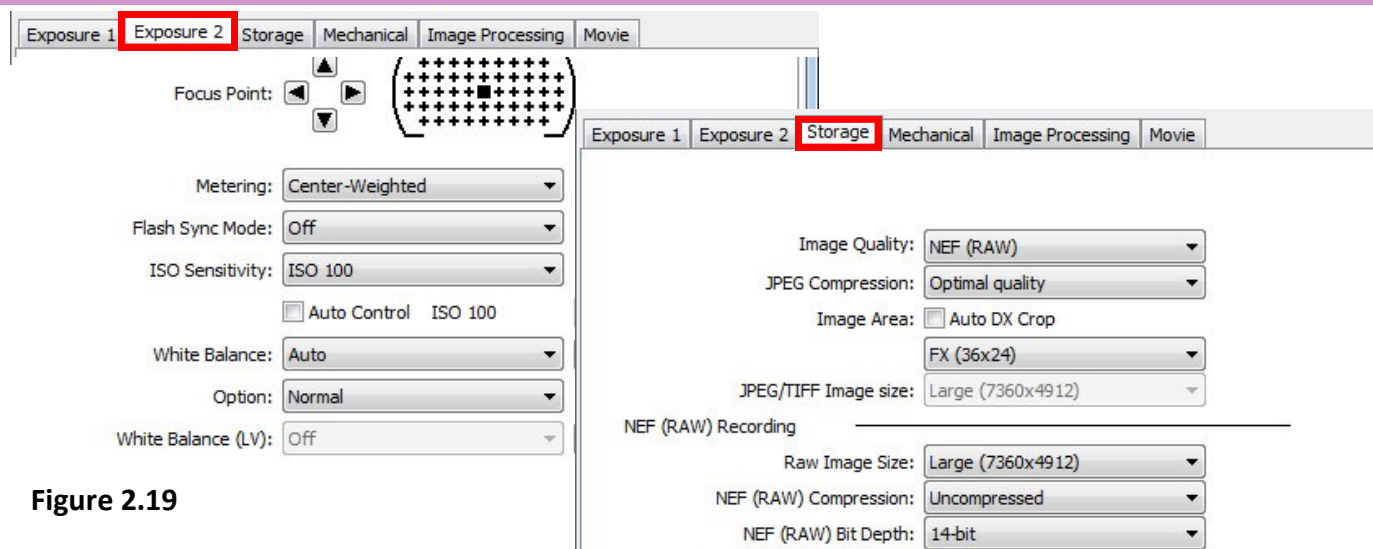


Figure 2.19

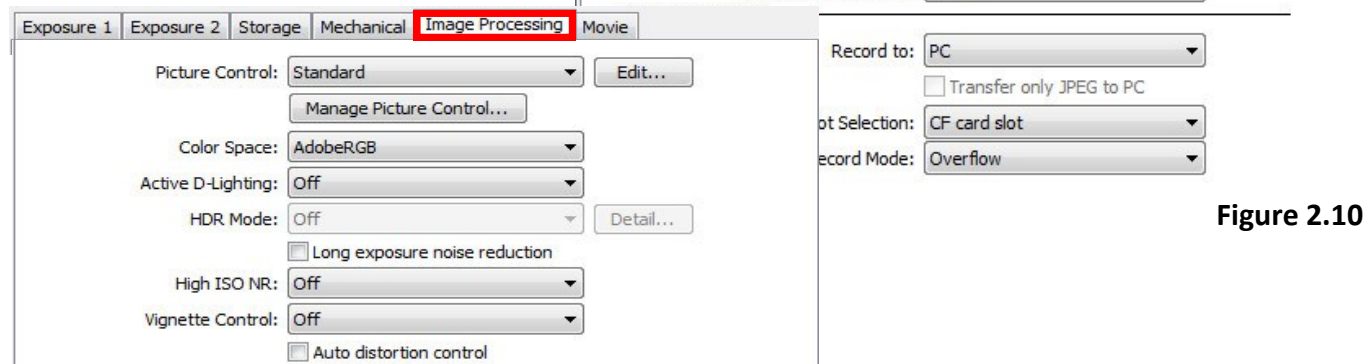


Figure 2.10

Figure 2.11

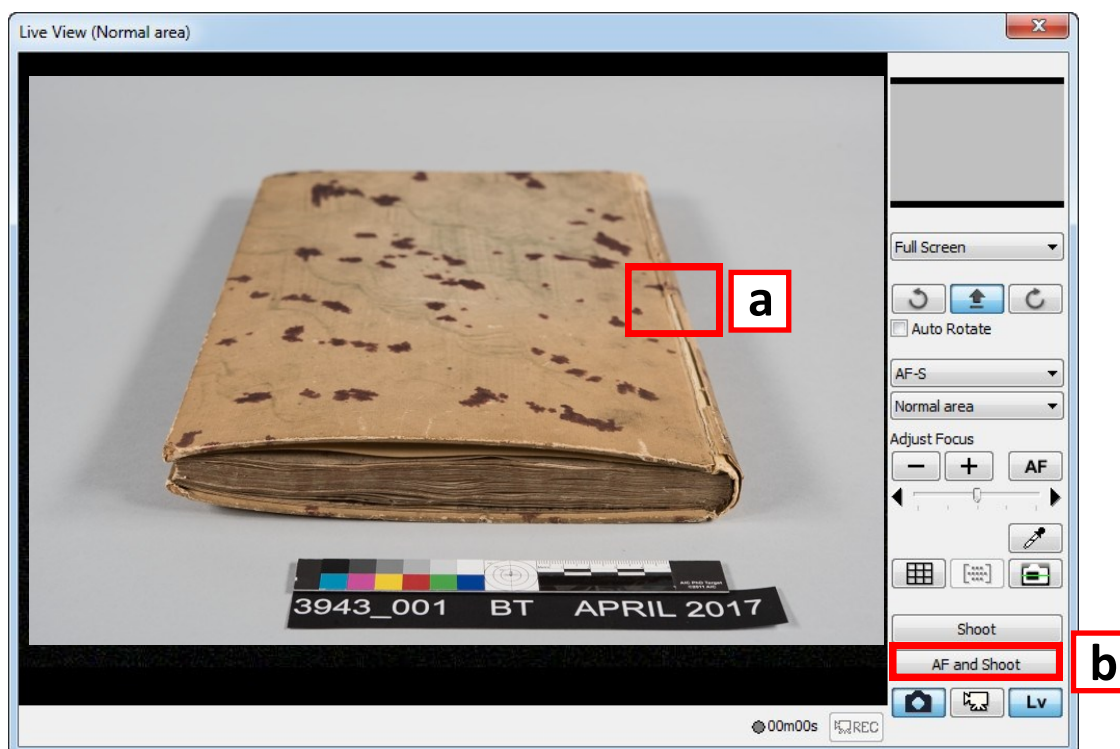


Figure 2.12

## Section 2—Capture

### Confirm Settings in Camera Control Pro, continued

---

2. Click *Exposure 2* tab. Confirm/select the following (fig. 2.09):

|                        |                 |
|------------------------|-----------------|
| <i>Metering</i>        | Center-Weighted |
| <i>ISO Sensitivity</i> | ISO 100         |
| <i>White Balance</i>   | Auto            |

3. Click the *Storage* tab. Confirm/select the following (fig. 2.10):

|                        |              |
|------------------------|--------------|
| <i>Image Quality</i>   | NEF (RAW)    |
| <i>NEF Compression</i> | Uncompressed |
| <i>NEF Bit Depth</i>   | 14-bit       |

4. Click the *Image Processing* tab. Confirm/select the following (fig. 2.11):

|                          |          |
|--------------------------|----------|
| <i>Picture Control</i>   | Standard |
| <i>Color Space</i>       | AdobeRGB |
| <i>Active D-Lighting</i> | Off      |
| <i>High ISO NR</i>       | Off      |
| <i>Vignette Control</i>  | Off      |

### Take Your Desired Shots (Camera Control Pro)

---

1. In *Live View*, drag the red box (fig. 2.12a) to focus on the object, choosing a spot that (i) contains image elements that help the camera focus and (ii) if using the tripod, a point that splits the depth between the farthest and nearest points.
2. Click the *AF and Shoot* button (fig. 2.12b). The red box (fig. 2.12a) will turn green and the shutter will release. Wait for the image to fully transfer/download to:  
(N:\PROJECTS\0000 Convert\_to\_DNG\[your username]).



## Section 2—Capture

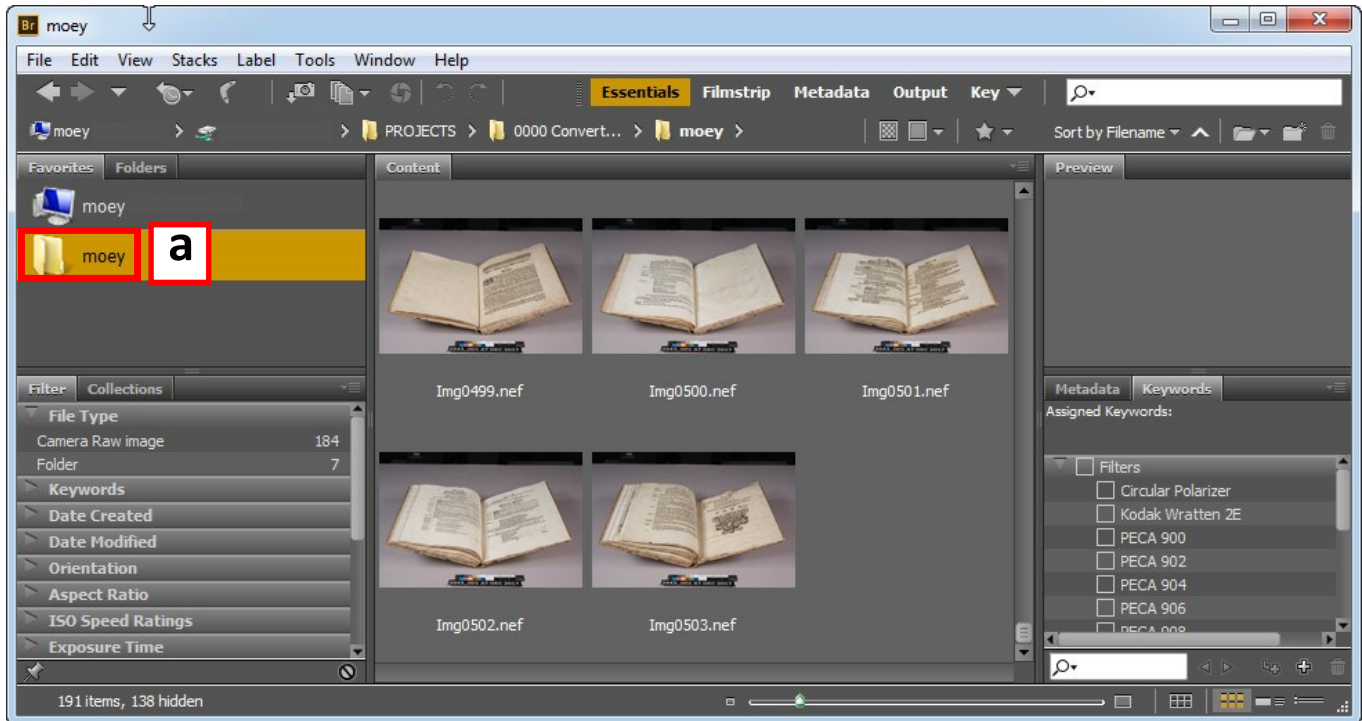


Figure 2.13

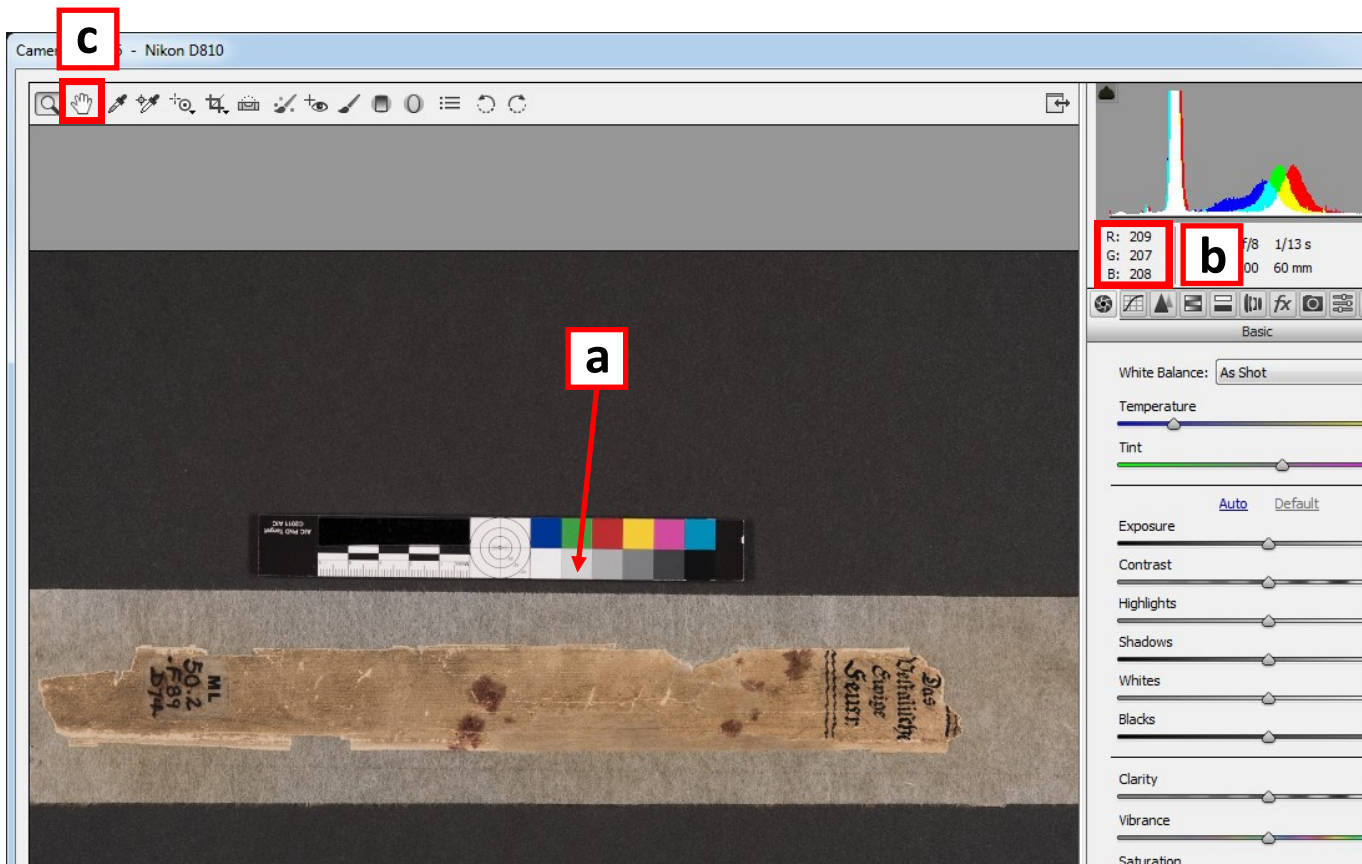


Figure 2.14



## Section 2—Capture

### Preview Images and Adjust Camera Settings If Necessary (Bridge)

---

1. In **Bridge**, under *FAVORITES*, click on your user folder (fig. 2.13a).
2. Find the image you just took in the center *CONTENT* panel. Double click on the thumbnail and the file opens in **Camera Raw**.
3. In **Camera Raw**, position the cursor/magnifying glass over the lightest gray patch (fig. 2.14a). Confirm the RGB values are between 190-210 (fig. 2.14b). If the gray patch is too small, use keyboard shortcut Ctrl + to zoom in on the image. If the gray patch is outside the field of view, use the hand tool (fig. 2.14c) to move the image around.
4. If the RGB values are less than 190 or greater than 210, you must adjust exposure. In **Camera Control Pro**, change the shutter speed. Note: adjusting EV has no effect on exposure when camera is in Manual mode. Reshoot and evaluate new exposure following steps 2-3 above.
5. Delete unwanted images NOW (e.g., shots you retook because the RGB values were > 210 or < 190) from your *0000 Convert\_to\_DNG* folder. Right click on the image and left click *Delete*.

### Finish

---

1. Turn on the room light.
2. If the Photo Studio Calendar in Outlook shows no one in the room after you, turn off the lamps.
3. Close all programs; log off of the computer; and turn off the computer monitor.
4. Put the lens cap on and turn off the camera: Rotate the *ON/OFF* switch on the top of the camera.
5. Put the target (handle only by its edges) back in the box.
6. Tripod only: Completely lower the center column of the tripod: press the labeled tab and turn the column crank. Hold the tripod by the legs to move it to the wall. Move the lamp stands back to the copystand position.

## Section 3—Metadata

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### METADATA

## Section 3—Metadata

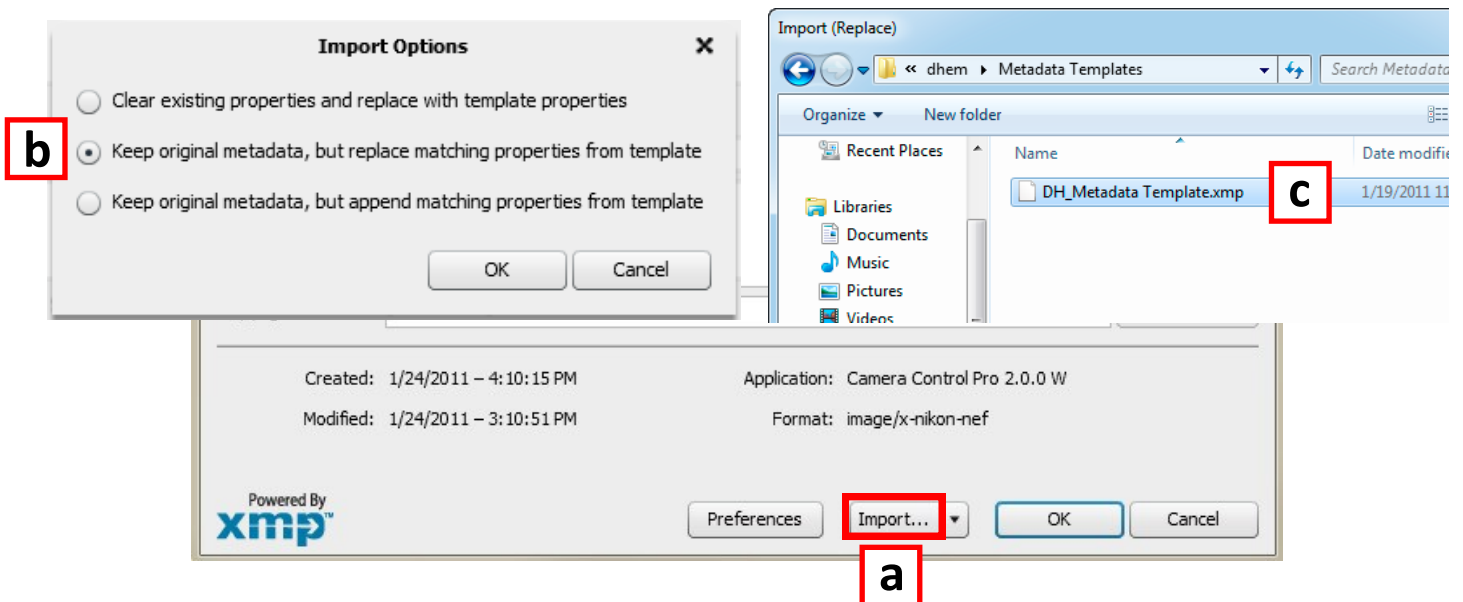


Figure 3.01

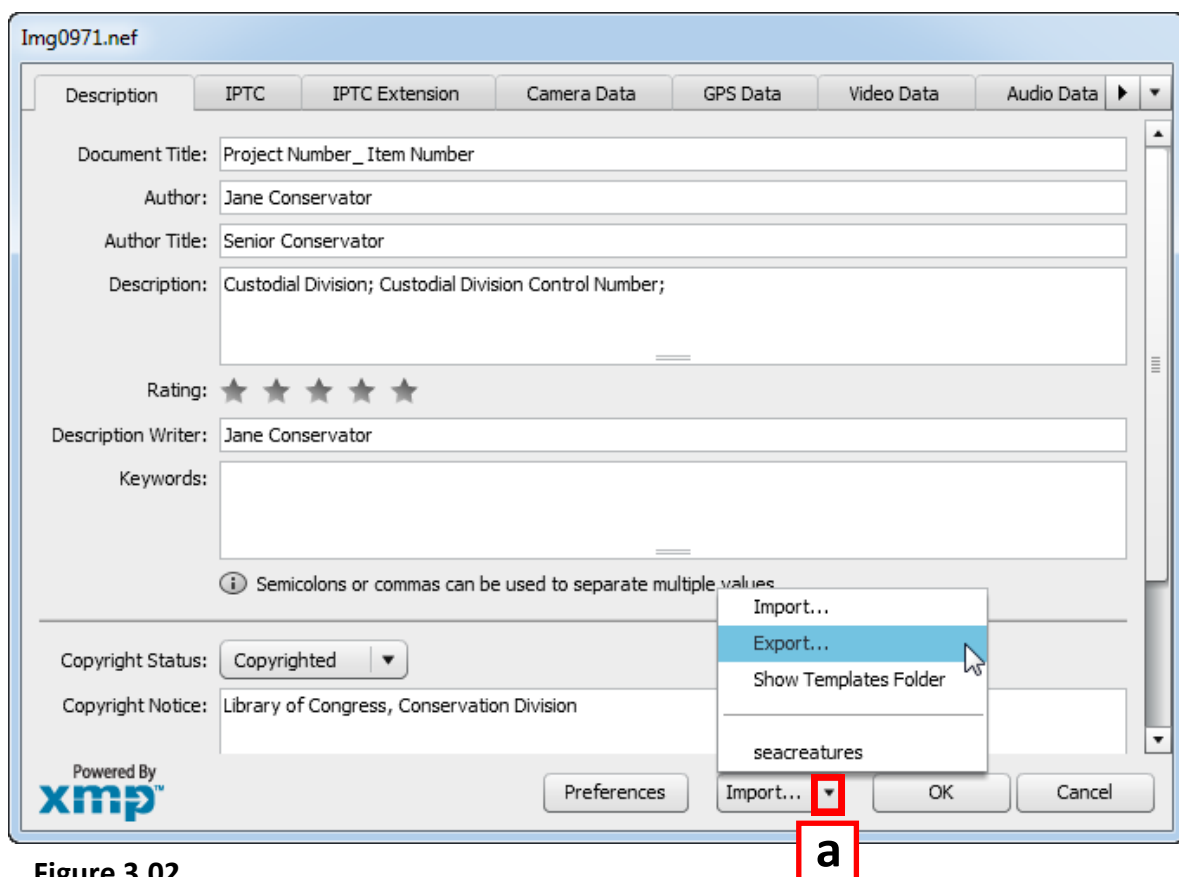


Figure 3.02

## Section 3—Metadata

### Image Processing Room

#### Create the Project-Specific Metadata Template (New Projects Only)

---

1. The workflow on this page is needed only for a new project — if you already created the project-specific metadata, skip to the next page: *Apply the Project Metadata Template*.
2. In **Bridge**, under *FAVORITES*, click on your user folder.
3. In the center *CONTENT* panel, right click on one of your new project images → Left click *File Info*.
4. Click *Import* (fig. 3.01a).
5. Select *Keep original metadata, but replace matching properties from template* (fig 3.01b). Click *OK*.
6. Click through to *N: > PROJECTS > 0000 Convert\_to\_DNG > [your username] > [your initials]\_Metadata\_Templates* (fig. 3.01c).
7. Double click to open the file: *General\_Template\_[your initials].xmp*.
8. Click on the *Description* tab (fig 3.02).
9. After *Document Title*: Type in the [project number\_item number].
10. After *Description*: Type in the [custodial division and the custodial division object identifying number].
11. Confirm your name and title appear after *Author*, *Author Title*, and *Description Writer*.
12. Click the arrow next to the *Import* button → Click *Export* (fig. 3.02a).
13. Name the file: “[project number\_item number]\_Template\_[your initials]” and save it in *N:\PROJECTS\0000 Convert\_to\_DNG\[your username]\[your initials]\_Metadata\_Templates*. Click *OK*.

## Section 3—Metadata

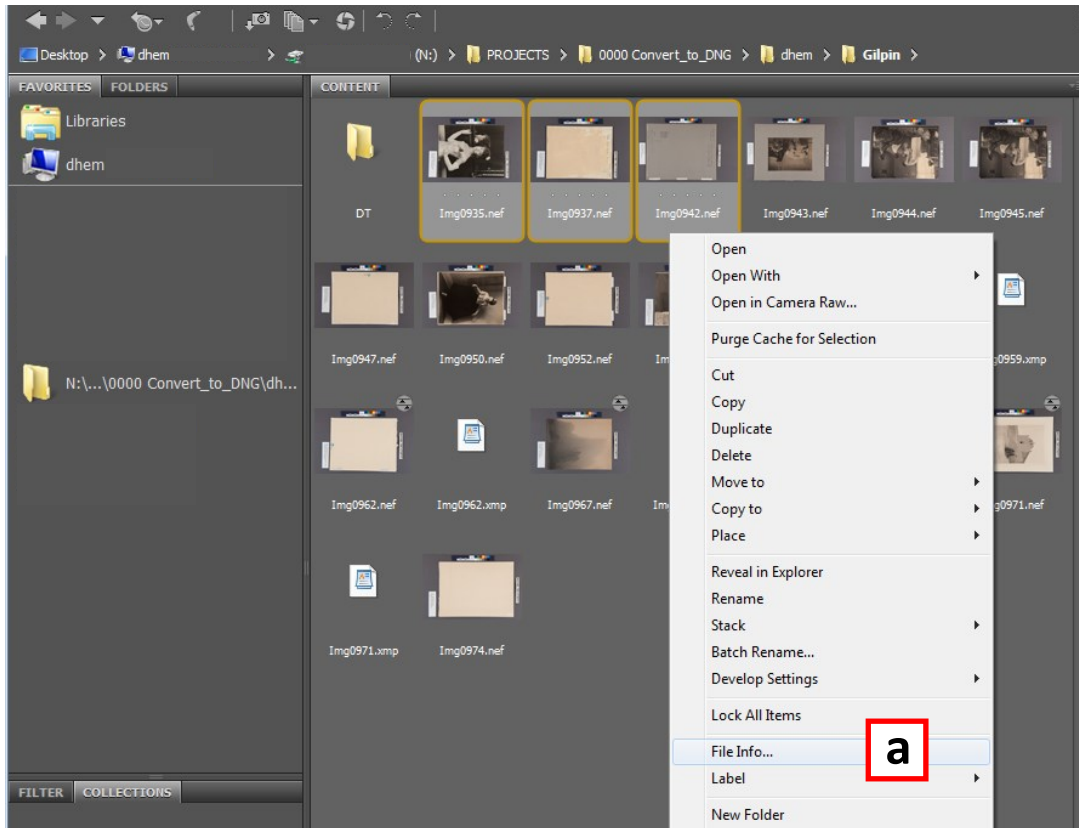


Figure 3.03

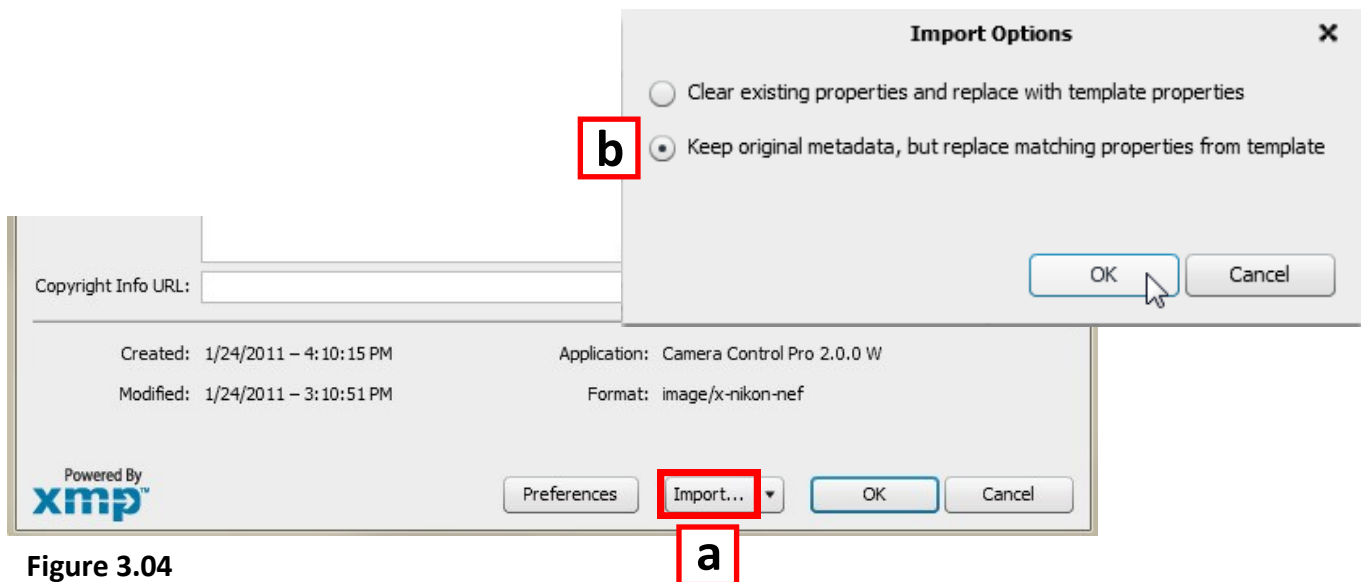


Figure 3.04

## Section 3—Metadata

### Apply the Project Metadata Template to Images

---

1. In **Bridge**, open the folder with the images you need to apply the project metadata template to.
2. Highlight all of the images that need the project metadata template added.
3. Right click one of the highlighted images → Left click *File Info* (fig. 3.03a).
4. Click *Import* (fig. 3.04a).
5. Click *Keep original metadata, but replace matching properties from template* (fig. 3.04b).
6. Click *OK*.
7. Click through to *N: > PROJECTS > 0000 Convert\_to\_DNG > [your username] > [your initials]\_Metadata\_Templates*.
8. Double click to open the project template: *[project number\_item number]\_Template\_[your initials]* (you made the project template on the previous page).
9. Confirm correct information in *Document Title, Author, Author Title, Description, Description Writer*.
10. Click *OK*.

**NOTE:** Metadata added to RAW (.nef) files are stored as a separate .xmp file. Do not delete any .xmp files from your folders!

## Section 3—Metadata

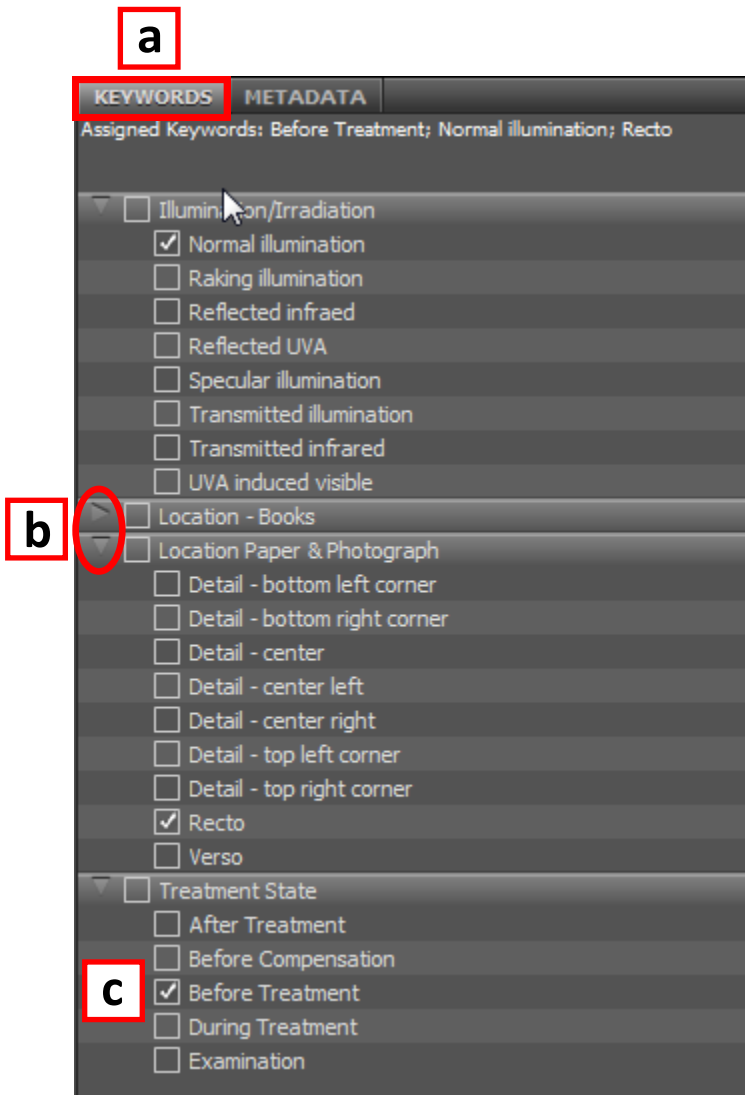


Figure 3.05

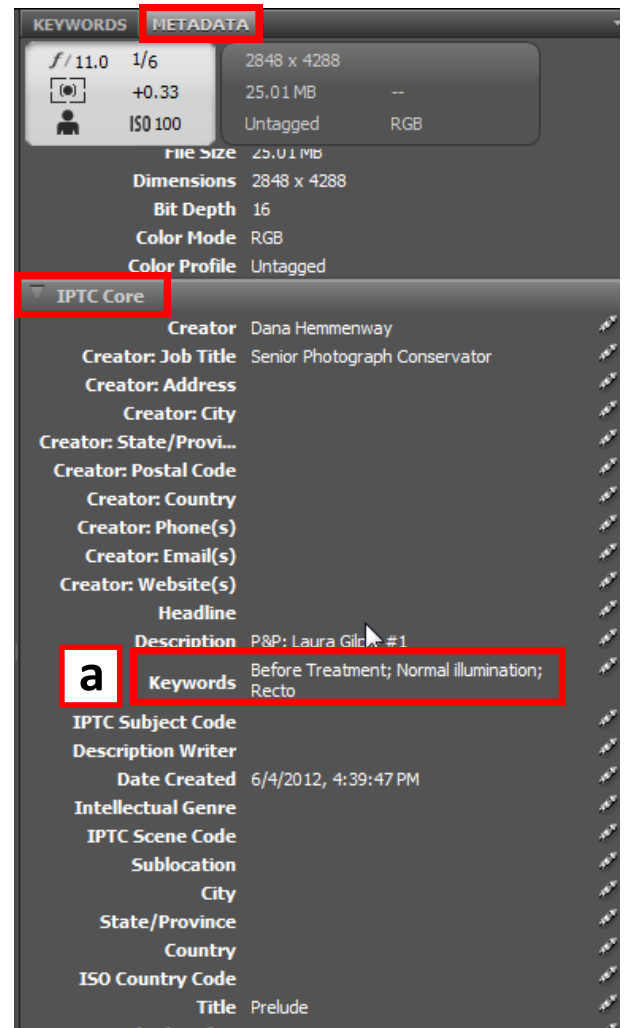


Figure 3.06

## Section 3—Metadata

### Applying Keywords (Bridge)

---

1. In **Bridge**, open the folder with the images you want to add keywords to.
2. Highlight the image(s) you want to add keywords to.
3. Click the *KEYWORDS* tab in the right panel (fig. 3.05a).
4. Click the arrows to the left of each heading to expand the keyword list (fig. 3.05b).
5. Check the appropriate box(es) to add keywords for the image(s) you highlighted (fig. 3.05c).

Time saving tip: First add keywords that are relevant to the greatest number of images. For example, highlight all *Before Treatment* images and check the *Before Treatment* metadata box. Then highlight the few *Before Treatment* image that are *Recto* and check the *Recto* metadata box. What you should be do last is add the metadata checkmarks that are relevant to only one image; in other words, there's no need to spend time applying keywords one image at a time, until you get to the few images you took to illustrate something unique that will have keywords no other image will need.

6. To see each image's keywords: Highlight the image → Click the *METADATA* tab in the right panel → Click *IPTC Core* (fig 3.06a). To see camera and technical metadata (e.g., date created, file size, resolution, f-stop, shutter speed, camera mode, lens, focal length, etc.): Highlight the image → Click the *METADATA* tab in the right panel → Click *File Properties* and *Camera Data*.

**DO NOT CREATE OR ADD KEYWORDS TO THE CD KEYWORD LIST**



## Section 4—Image Processing

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### IMAGE PROCESSING

## Section 4—Image Processing

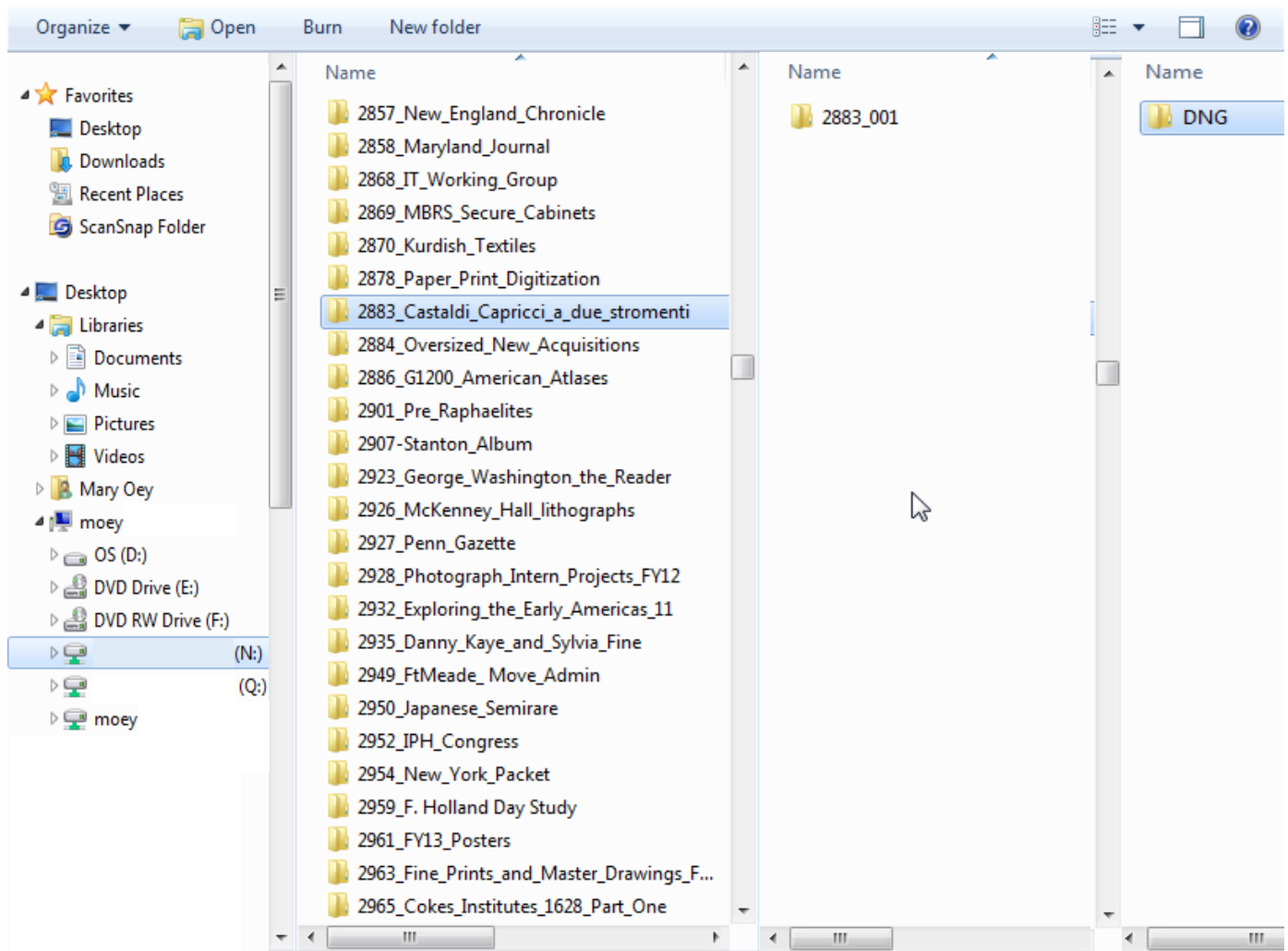


Figure 4.01

## Section 4—Image Processing

### Image Processing Room

#### Create Project Item Subfolder(s) (Windows)

---

1. In **Windows**, click through to *N: > PROJECTS > [your project number]*. Your 4-digit project folder should already be on the N: drive. If it isn't, see *Section 2: Capture: Confirm or Request the Project Folder*.
2. Right-click inside [your project number] folder → left click *New* → *Folder*.
3. Name the new folder: [your project number]\_[item number]
4. Repeat steps 2-3 to add additional item subfolders as needed.
5. If you don't have the Windows permissions to complete steps 2-4 above, email  and request permissions for your project number folder.

#### Create DNG Subfolder(s) (Windows)

---

1. In **Windows**, click through to: *N: > PROJECTS > [your project number] > [your project number]\_[item\_number]*
2. Right-click inside the folder [your project number]\_[item\_number] → left click *New* → *Folder*.
3. Name the new folder: DNG
4. Repeat steps 2-3 to create DNG subfolders for each item number.

EXAMPLE: In Figure 4.01, the project folder 2883 has one subfolder, 2883\_001, and this subfolder has the newly created DNG folder.

## Section 4—Image Processing

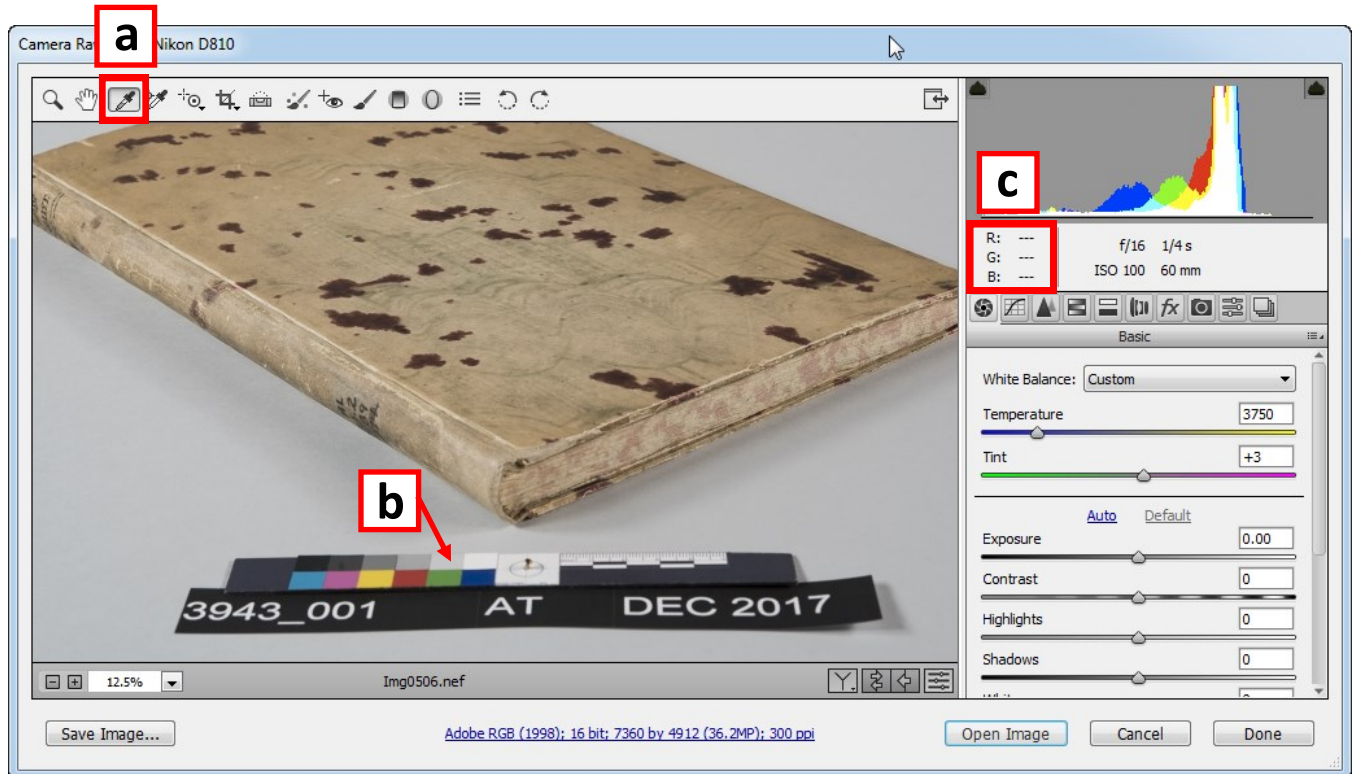


Figure 4.02

## Section 4—Image Processing

### Choose An Image to Process (Bridge)

---

1. In **Bridge**, click [your username] folder under *FAVORITES*.
2. Double click on the image you want to process. The image will open in **Camera Raw**.

TIP: Batch process any time you have two or more shots taken under the same setup (same camera, lens, lighting distance, camera distance to object, and **Camera Control Pro** settings). In **Bridge**, highlight all images taken under the same setup and double click to open in **Camera Raw**. Use keyboard shortcut Ctrl A to select all images in the filmstrip. White balance, adjust exposure, sharpen, and confirm workflow options (pg. 4.4-4.9) for the first image in the filmstrip then click *Done* to accept changes. Changes will be applied to all images selected. Straightening and cropping (pg. 4.10-4.11) must be done one image at a time.

### White Balance (Camera Raw)

---

1. In **Camera Raw**, click on the *White Balance Tool* (fig. 4.02a). Use the eyedropper to click on the lightest gray patch (fig. 4.02b). Now the R, G, B values under the histogram (fig. 4.02c) should all be equal or nearly equal.

## Section 4—Image Processing

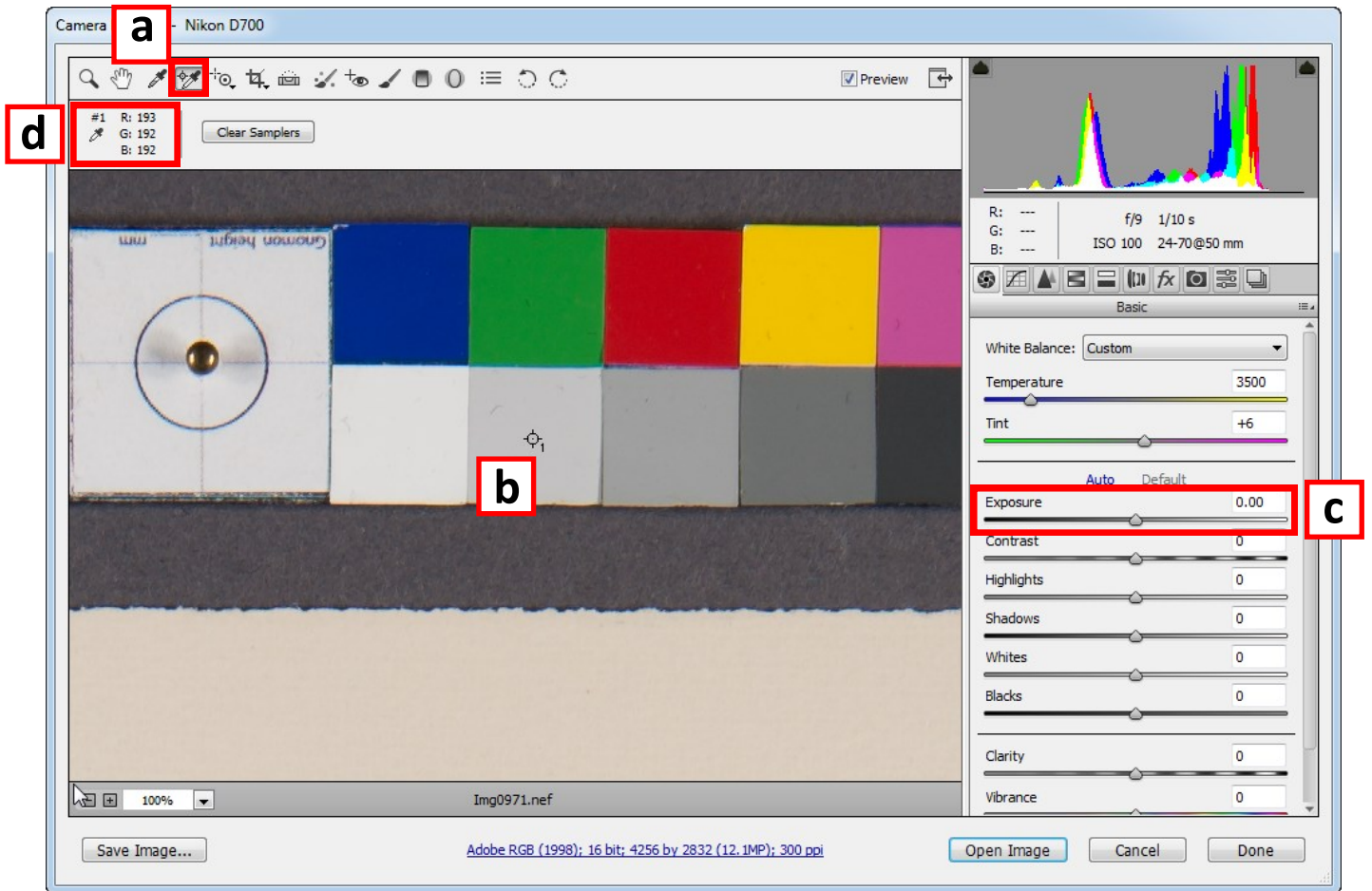


Figure 4.03

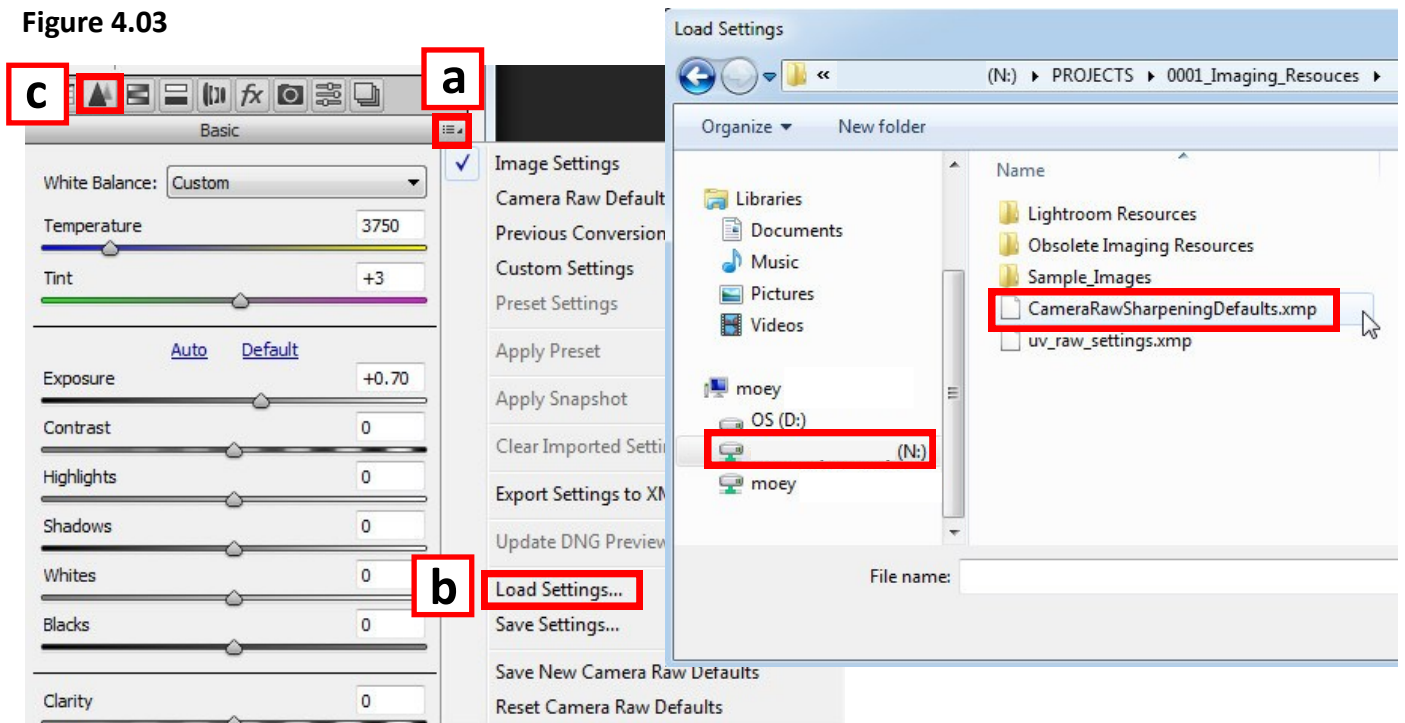


Figure 4.04

## Section 4—Image Processing

### Exposure (Camera Raw)

---

1. In **Camera Raw**, click on the *Color Sampler Tool* (fig. 4.03a). Use the eyedropper to click on the lightest gray patch (fig. 4.03b).
2. Drag the *Exposure* slider bar (fig. 4.03c) to the right or left so that the R, G, B values are each as close to **200** as possible (fig. 4.03d).

### Sharpening (Camera Raw)

---

1. In **Camera Raw** on the right under the histogram: Click the expand menu icon (fig. 4.04a) → Click *Load Settings* (fig. 4.04b).
2. Click on the N: drive from the left side of the window to click through to *N: > PROJECTS > 0001\_Imaging\_Resources*.
3. Double click *CameraRawSharpeningDefaults.xmp*.
4. Click the Detail Tool [cone icon (fig. 4.04c)] and confirm the following:

|                          |     |
|--------------------------|-----|
| <i>Amount:</i>           | 50  |
| <i>Radius:</i>           | 0.5 |
| <i>Detail:</i>           | 50  |
| <i>Masking:</i>          | 25  |
| <i>Luminance:</i>        | 0   |
| <i>Color:</i>            | 8   |
| <i>Color detail:</i>     | 50  |
| <i>Color Smoothness:</i> | 50  |

## Section 4—Image Processing

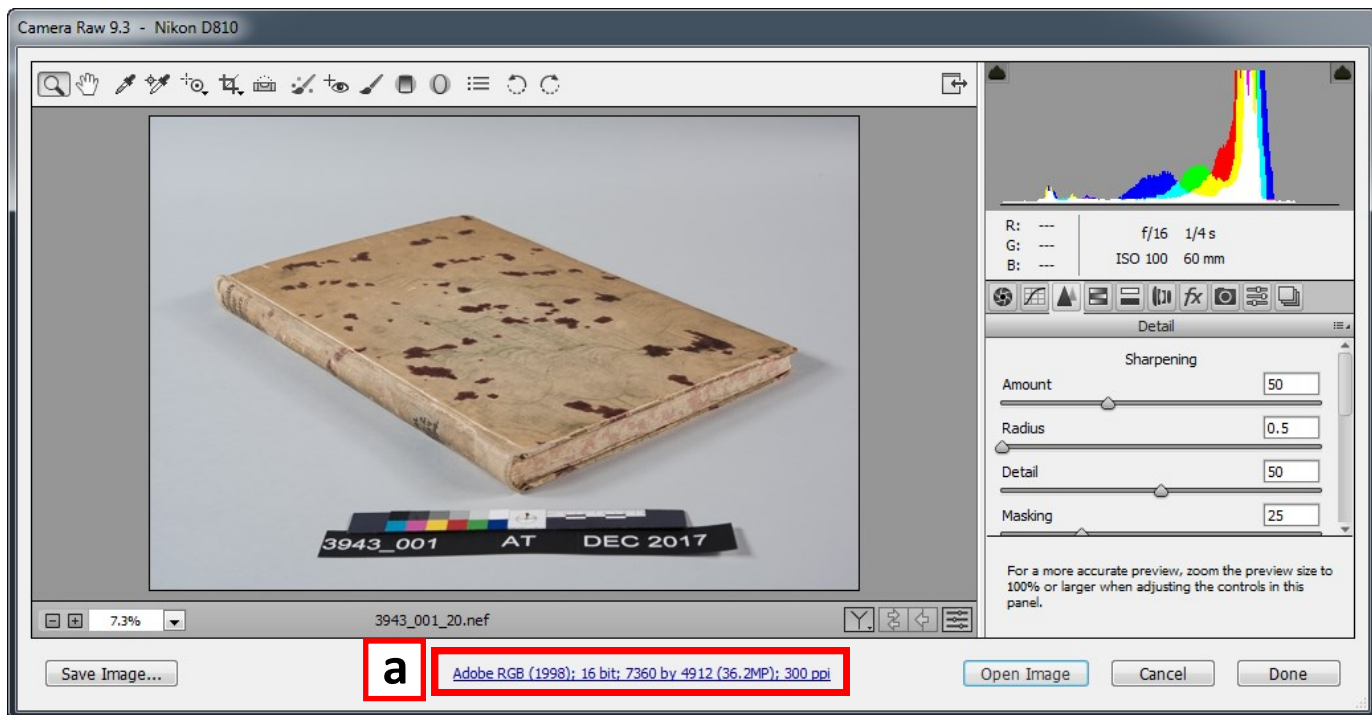


Figure 4.05

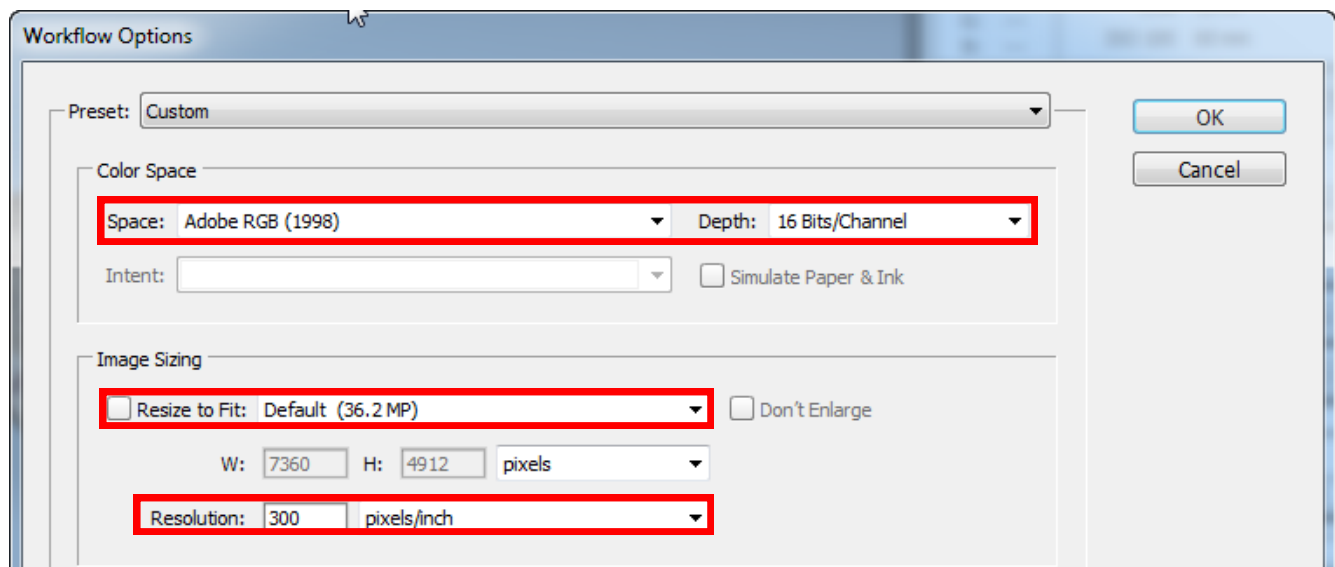


Figure 4.06



## Section 4—Image Processing

### Confirm Workflow Options (Camera Raw)

---

1. In **Camera Raw**, confirm the hyperlinked string at the bottom of the window (fig. 4.05a) says: [Adobe RGB \(1998\); 16 bit; \[dimension\] by \[dimension\]; \(##.#MP\); 300 ppi](#)
2. If the string has other information, click the hyperlink and edit the string (fig. 4.06):

|                    |                |
|--------------------|----------------|
| <i>Color Space</i> | Adobe 1998 RGB |
| <i>Depth</i>       | 16bit/channel  |
| <i>Size</i>        | Default        |
| <i>Resolution</i>  | 300 pixel/inch |

3. Click *OK* to close the Workflow Options window.

## Section 4—Image Processing

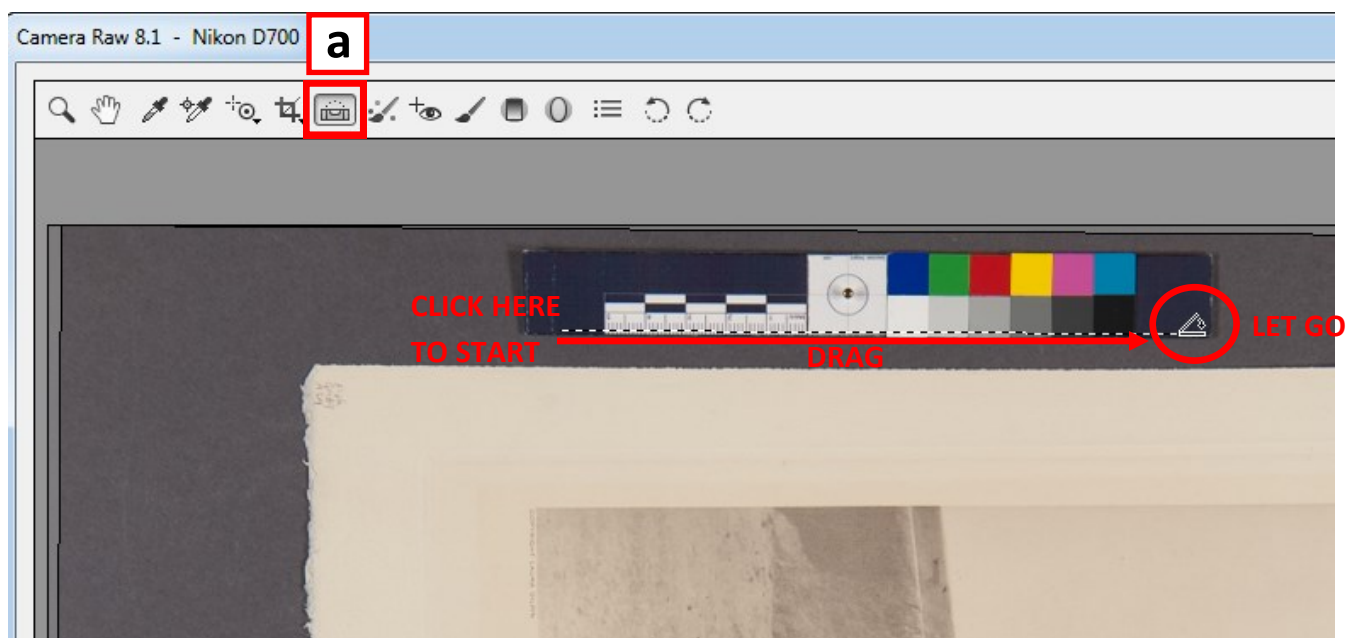


Figure 4.07

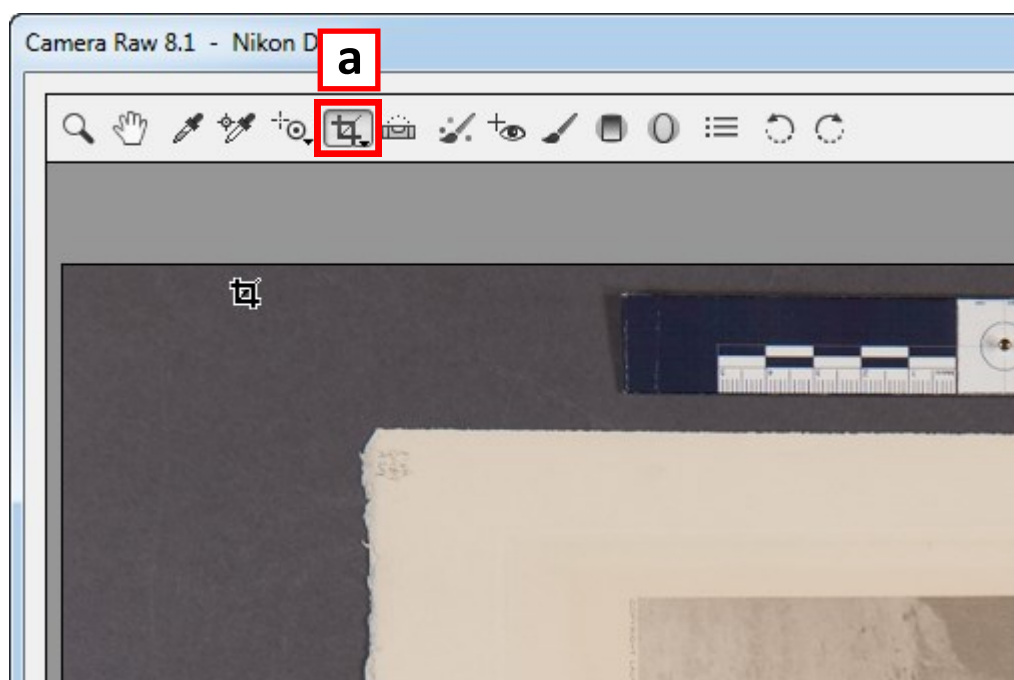


Figure 4.08

## Section 4—Image Processing

### Straightening (Camera Raw)

---

Follow the steps below only if you did not square up your image field during capture in the Photo Studio (See *Section 2: Capture*).

1. In **Camera Raw**, use keyboard shortcut Ctrl - to zoom out so you can see all four edges of your image.
2. Click the *Straighten Tool* [level icon (fig. 4.07a)] → Drag the tool along a known straight edge in the picture (e.g. the side of the color target), then let go (fig. 4.07).
3. Press Enter.

### Cropping (Camera Raw)

---

Follow the steps below only if you did not fill your image field during capture in the Photo Studio (See *Section 2: Capture*).

1. In **Camera Raw**, click the *Crop Tool* (fig. 4.08a).
2. If you straightened the image → Pull on the borders of the image box to achieve the desired crop and then press Enter.
3. If you did not straighten the image → Drag the tool from one corner to the opposite corner, let go, then press Enter.

### Complete Processing of Image (Camera Raw)

---

1. Click *Done* in the **Camera Raw** window to accept changes.

## Section 4—Image Processing

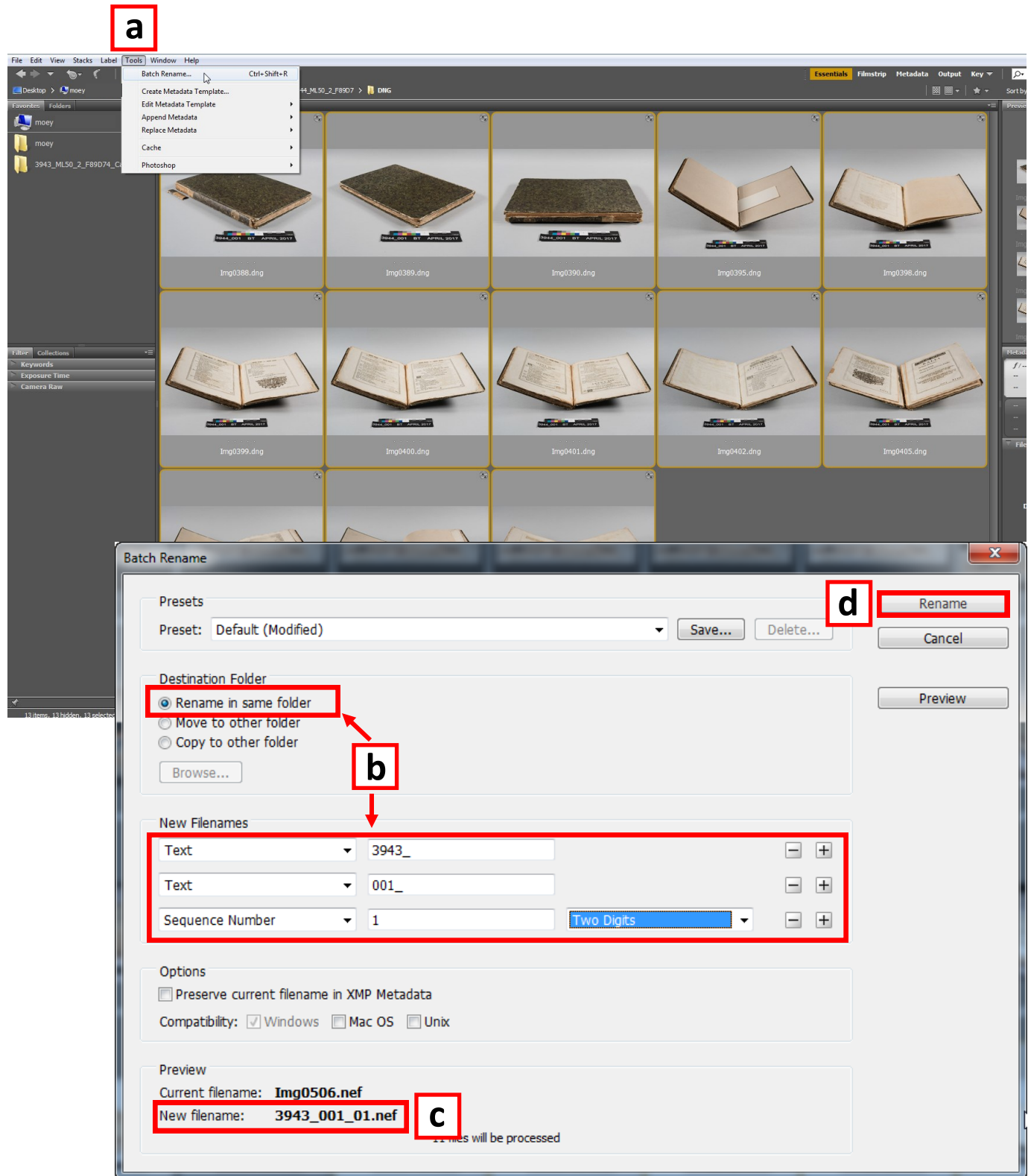


Figure 4.09

## Section 4—Image Processing

### Rename Files (Bridge)

Rename files after you have completed all **Camera Raw** processing and you're ready to move the images out of your *0000\_Convert\_to\_DNG* folder and into the project folder. You should have already deleted image(s) you do not want to process or move into the project folder.

1. In **Bridge**, in your *0000\_Convert\_to\_DNG* folder, highlight all images you want to rename.
2. Click *Tools* → *Batch Rename* (fig. 4.09a).
3. Input the following (fig. 4.09b):

|                            |                                  |              |
|----------------------------|----------------------------------|--------------|
| <i>Destination Folder:</i> | Rename in same folder            |              |
| <i>Text:</i>               | [input project number]_          |              |
| <i>Text:</i>               | [input item number]_             |              |
| <i>Sequence Number:</i>    | [input desired starting number]* | Two Digits** |

\* If you have already saved images for this project, start numbering where you left off.

\*\* If you (will) have more than 99 images, choose Three Digits.

4. Delete any extra filename boxes under *Sequence Number*: Click on - box.
5. If the preview of the filename (fig. 4.09c) is correct, click *Rename* (fig. 4.09d).

## Section 4—Image Processing

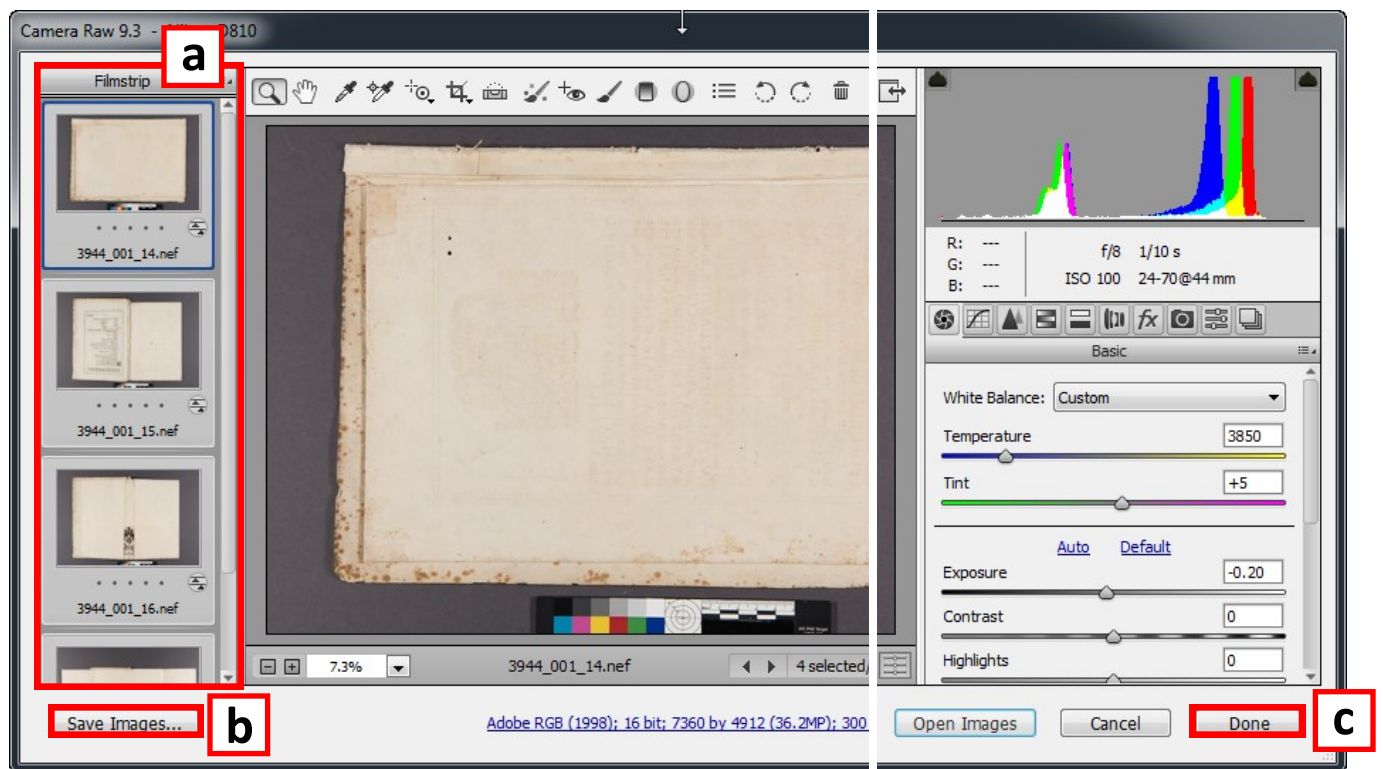


Figure 4.10

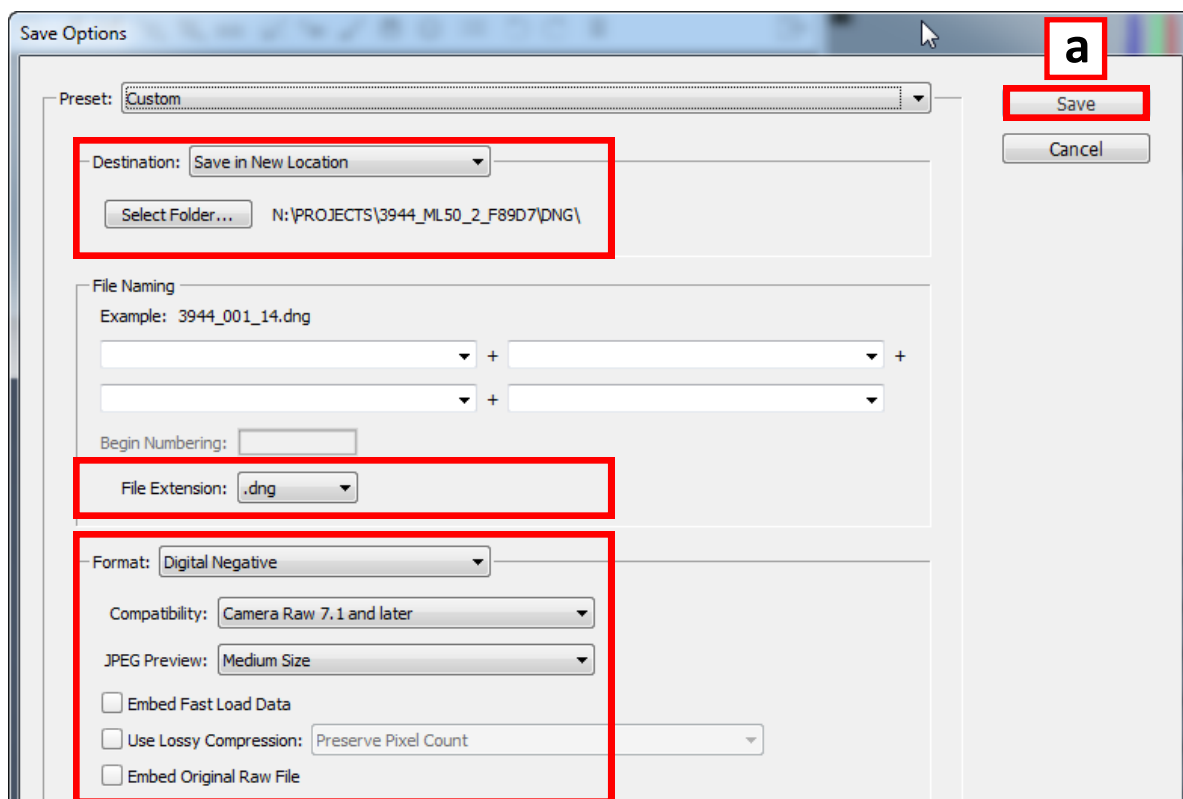


Figure 4.11

## Section 4—Image Processing

### Create .dng Archive Files and Save to Project Folder (Bridge, Camera Raw)

1. In **Bridge**, in your *0000\_Convert\_to\_DNG* folder, highlight all processed images you want to move to out of your *0000\_Convert\_to\_DNG* folder and into the project folder.
2. Double click on one of the highlighted files → All highlighted files will open in **Camera Raw** (this may take some time, depending on how many images you opened).
3. In **Camera Raw**, click in the *Filmstrip* area (fig. 4.10a) → Use keyboard shortcut Ctrl A to highlight all images in the Filmstrip → Click *Save Images* (fig. 4.10b).
4. Select /confirm the following (fig. 4.11):

|                        |                                                        |
|------------------------|--------------------------------------------------------|
| <i>Destination:</i>    | Save in New Location                                   |
| <i>Select Folder:</i>  | N: > PROJECTS > [project number] > [item number] > DNG |
| <i>File Extension:</i> | .dng                                                   |
| <i>Format:</i>         | Digital Negative                                       |
| <i>Compatibility:</i>  | Camera Raw 7.1 and later                               |
| <i>JPEG Preview:</i>   | Medium Size                                            |

5. Click *Save* (fig. 4.11a).
6. Click Done in **Camera Raw** (fig. 4.10c).

## Section 4—Image Processing

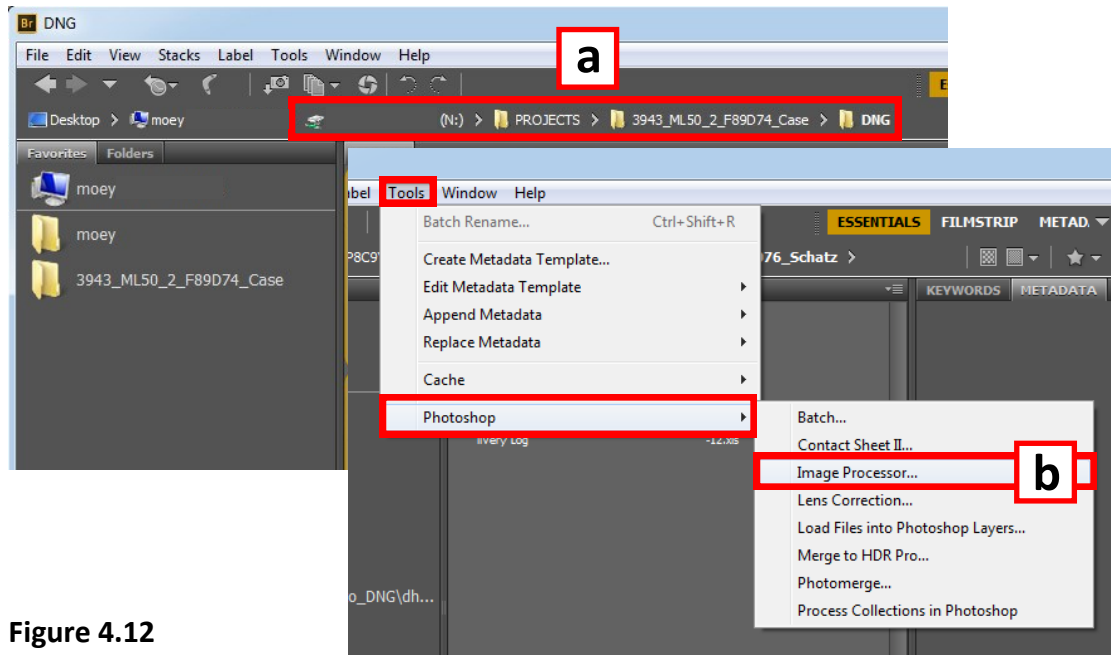


Figure 4.12

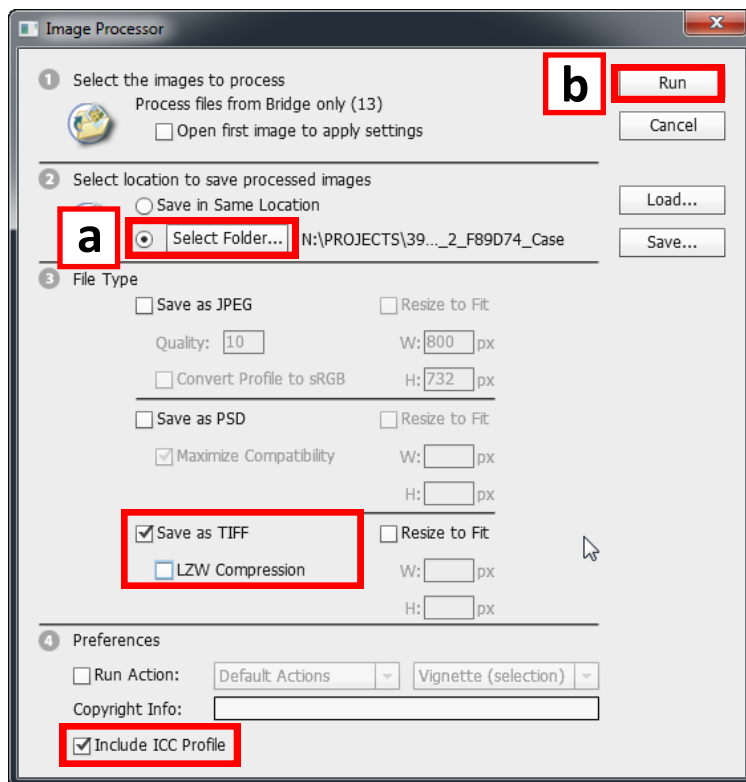


Figure 4.13

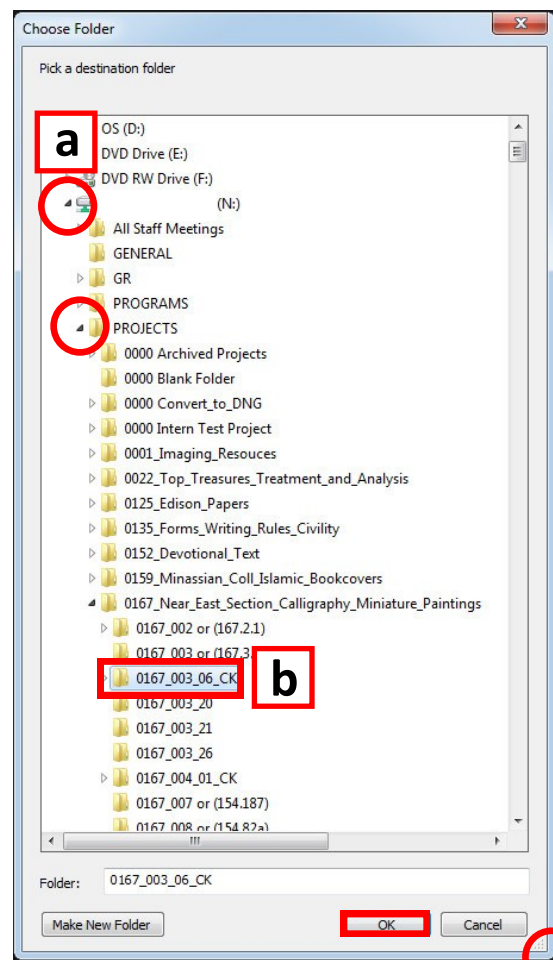


Figure 4.14



## Section 4—Image Processing

### Create .tif Derivative Files and Save to Project Folder (Bridge)

---

1. In **Bridge**, click *PROJECTS* on the *N: > PROJECTS* string under *ESSENTIALS* (fig. 4.12a). Wait for the folder contents to load in the center *CONTENT* panel, then scroll down and click through to open the project DNG folder.
2. Select the .dng files you want to save as .tif.
3. Click *Tools* → Click *Photoshop* → Click *Image Processor* (fig. 4.12b).
4. Click the *Select Folder* button (fig. 4.13a).
5. Pull on the bottom right corner of the *Choose Folder* window that pops up to make it bigger (fig. 4.14).
6. Click on the triangle arrows (fig. 4.14a) to expand the subfolders *N: > PROJECTS*
7. Scroll down to *[project folder]* and click on it to highlight it—do not open the folder, just highlight it (fig. 4.14b).
8. Click *OK* (fig. 4.14). The *Image Processor* window comes to the fore again:
9. In the *Image Processor* window, confirm the same tick marks as in Figure 4.13.
10. Click *Run* (fig. 4.13b).
11. Wait for the tiff processing to complete.
12. In **Windows**, click through to *N: > PROJECTS > [project folder] > [item subfolder]* to confirm you have a DNG and a TIFF folder under the project item subfolder, and that the files are in the DNG and TIFF folders.

## Section 4—Image Processing

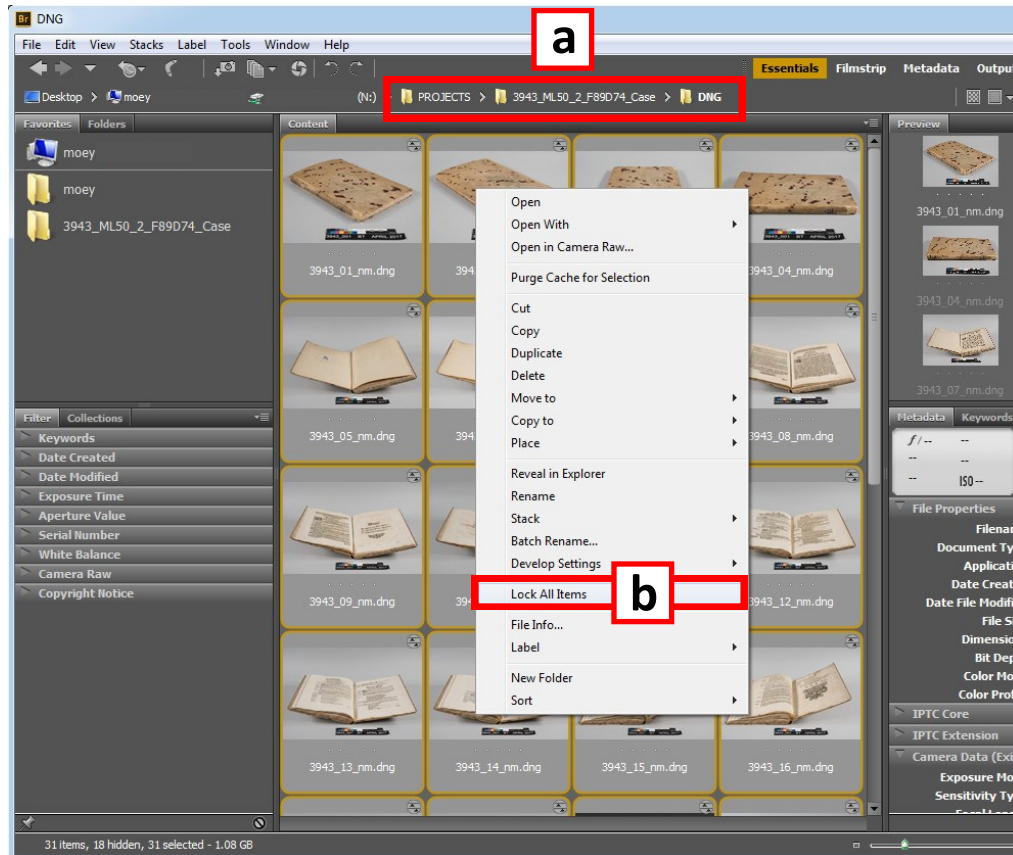


Figure 4.15

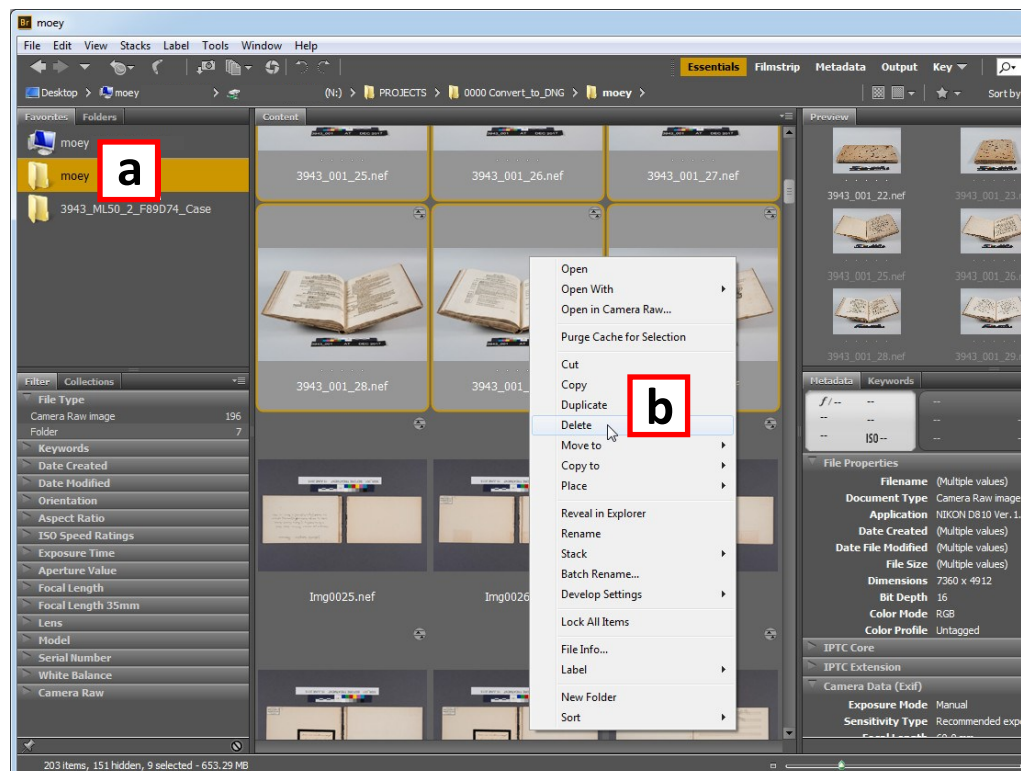


Figure 4.16

## Section 4—Image Processing

### Lock Archive Files (Bridge)

---

1. In **Bridge**, click *PROJECTS* on the *N: > PROJECTS* string under *ESSENTIALS*. Wait for the folder contents to load in the center *CONTENT* panel, then scroll down and click through to open the project DNG folder (fig. 4.15a).
2. Press keys Ctrl A to select all files
3. Right click on one of the highlighted files → Left click *Lock All Items* (fig.4.15b).

NOTE: You can right click to unlock the files if you need to alter the DNG files in the future.

### Clean up Your *0000\_Convert\_to\_DNG* Folder (Bridge)

---

Do this after you have completed the treatment for that project item.

1. Confirm the project DNG and TIFF files are on the *N:* drive.
2. In **Bridge**, click [your username] folder under *FAVORITES* (fig. 4.16a). Wait for the folder contents to load in the center *CONTENT* panel.
3. Delete the project .nef files from your *0000\_Convert\_to\_DNG* folder: Highlight the files → Right click on one of the highlighted files → Left click *Delete* (fig. 4.16b) → Confirm you want to delete.

## Section 5—Output

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### OUTPUT

## Section 5—Output

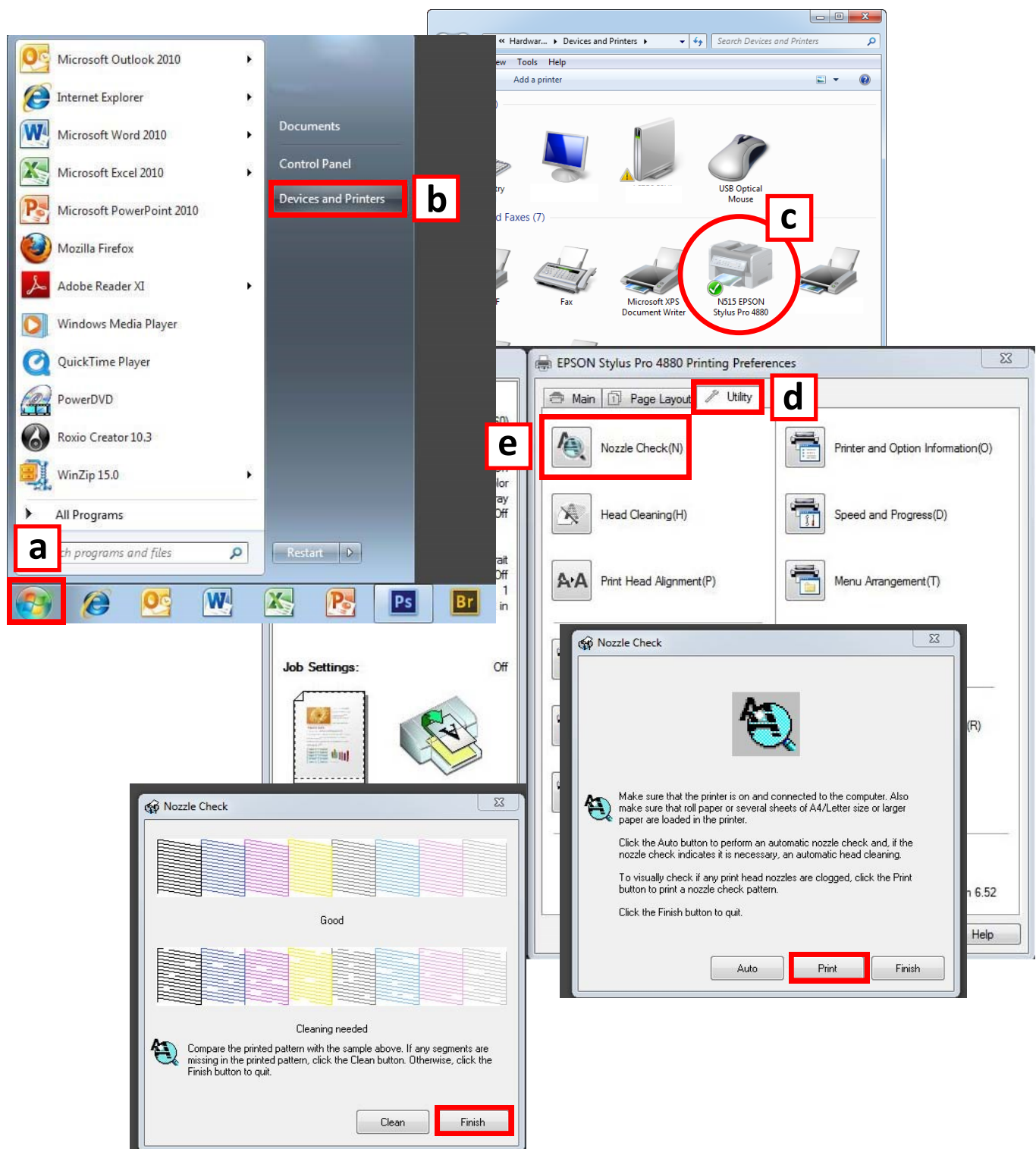


Figure 5.01

## Section 5—Output

### Run a Nozzle Check

---

1. Turn on the **EPSON Stylus 4880** printer (the power button is labeled).
2. Lift the clear gray cover between the ink cartridges and confirm there is Epson paper in the tray, back of the paper (with Epson logo) facing up.
3. Look at the Nozzle Check Calendar above the printer. If someone has put their initials next to today's date, you can skip the rest of the steps (4-11) on this page.
4. Lift the clear gray cover between the ink cartridges to put a single sheet of **nozzle check paper** (regular photocopier paper) on top of the Epson paper.
5. Log onto one of the two image processing computers.
6. Click **Windows** Start button (fig. 5.01a) → *Devices and Printers* (fig. 5.01b).
7. Right click icon: *N515 - EPSON Stylus Pro 4880* (fig 5.01c). Left click: *Printing Preferences*.
8. Click the *Utility* tab (fig. 5.01d) → Click *Nozzle Check* (fig 5.01e).
9. Before clicking *Print* in the window that pops up, confirm that the printer LCD screen says "Ready."
10. If the nozzle check printout looks good, click *Finish* and initial the Nozzle Check Calendar. You are ready for printing.
11. If there are skips in the printout, click *Head Cleaning*; you should get a clean nozzle check printout after head cleaning, if not, ask the iDoctor on call for help.

**Troubleshooting:** The printer is ready when the LCD says "Ready" and no indicator lights are on.

**Blinking light under the droplet icon:** Low ink; consult an iDoctor.

**Solid light under the droplet icon:** No ink; consult an iDoctor.



## Section 5—Output

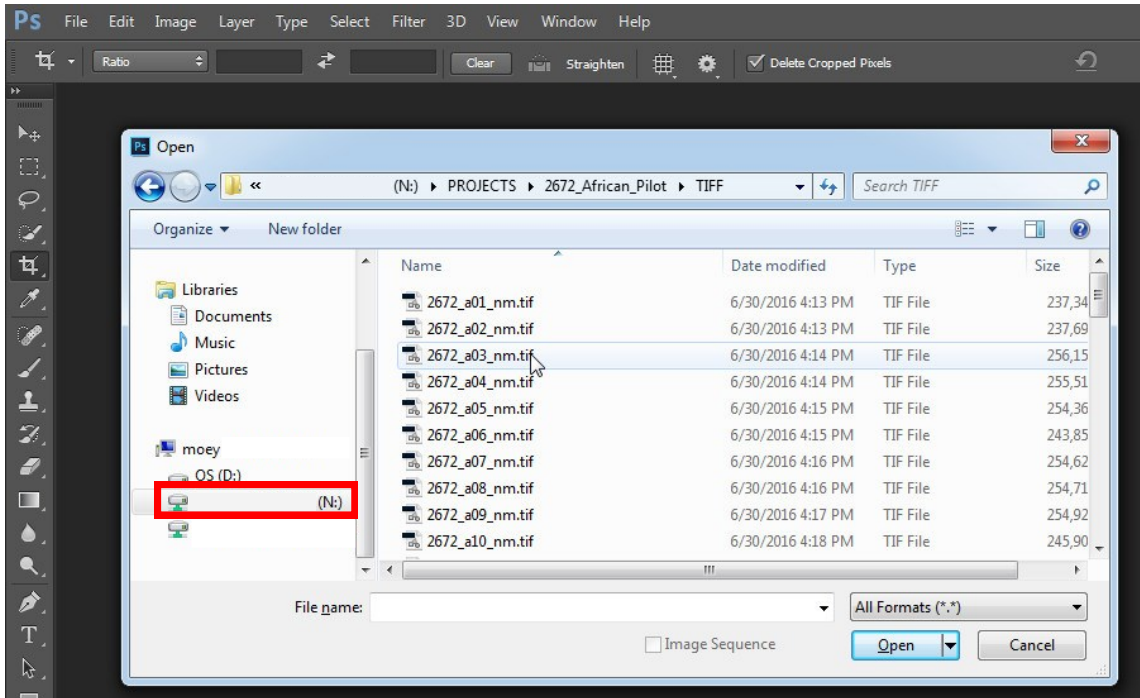


Figure 5.02

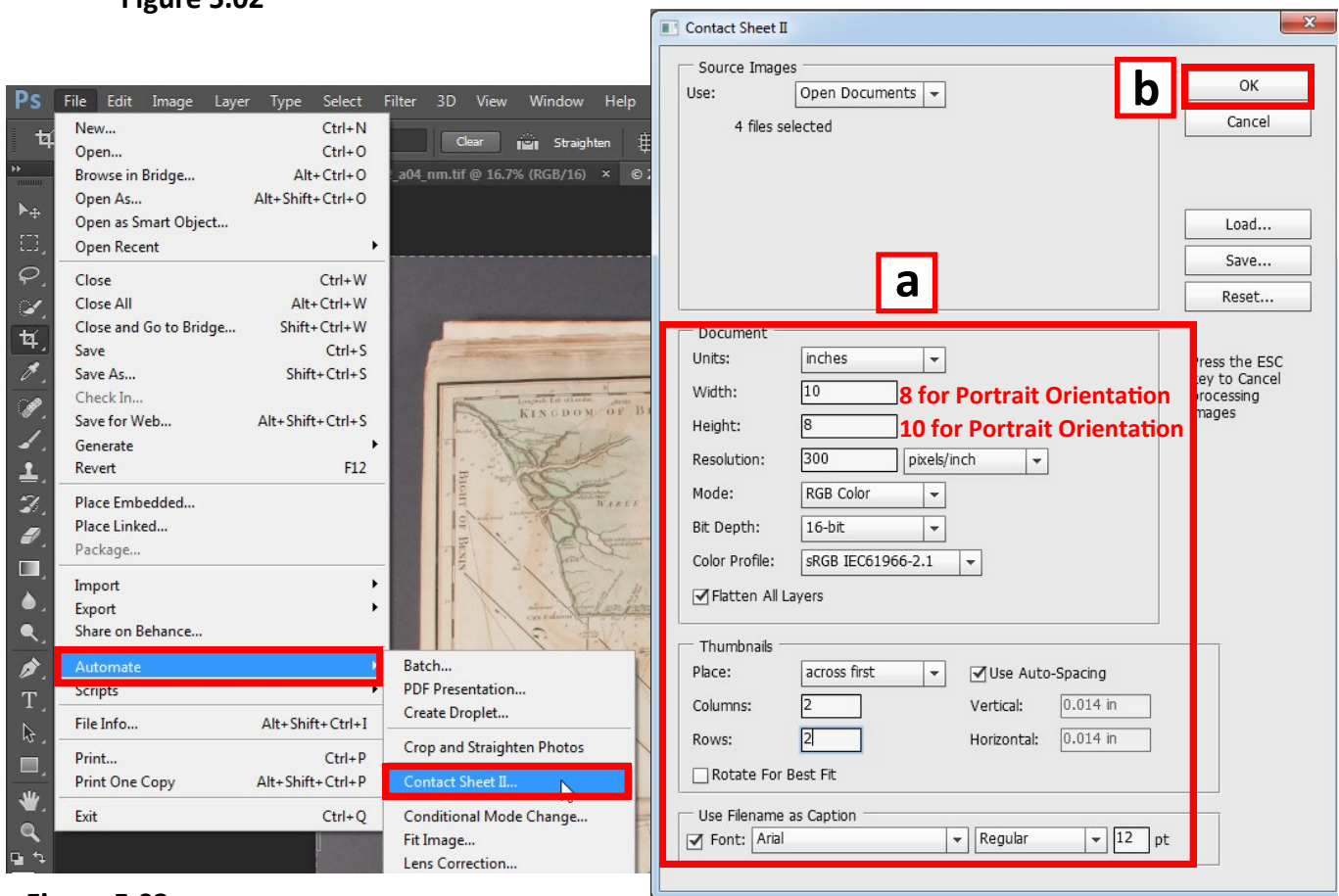


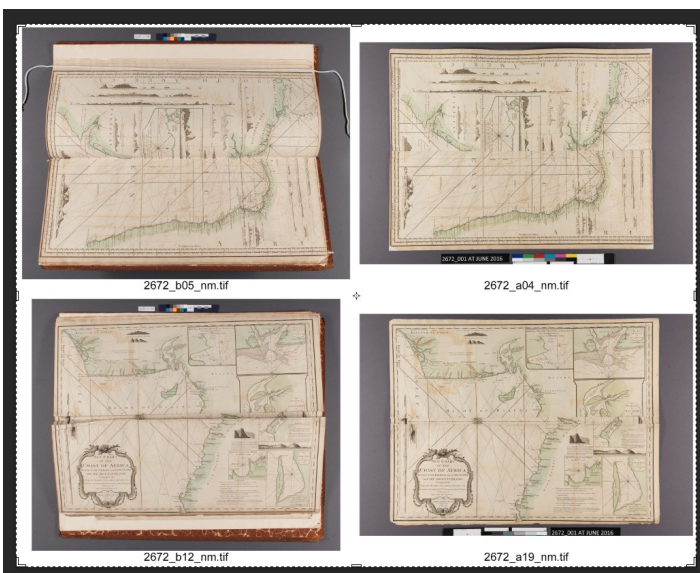
Figure 5.03

## Section 5—Output

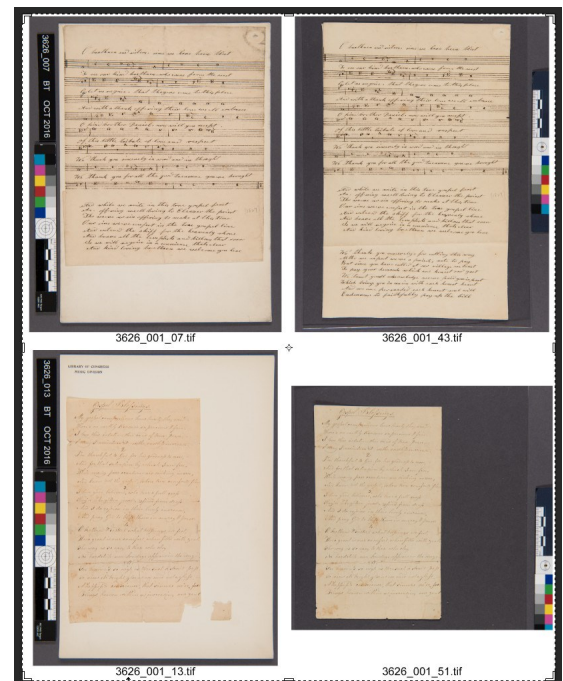
### Print Images (Bridge and Photoshop)

**NOTE:** Printouts are reference copies; the archival copy is the .dng file on the N: drive.

1. In **Bridge**, click *PROJECTS* on the *N: > PROJECTS* string under *ESSENTIALS*. Wait for the folder contents to load in the center *CONTENT* panel, then scroll down and click through to open the project TIFF folder and view all images
2. Identify four images you want to print together on one sheet.
3. In **Photoshop**, press keys Ctrl O.
4. Click through to *N: > PROJECTS > [project number] > [item subfolder] > TIFF* (fig. 5.02), then double click on the first image you want to print.
5. Repeat steps 3-4 to open the other three files in the order you want them laid out on the page.
6. Click: *File* → *Automate* → *Contact Sheet II* (fig. 5.03).
7. Confirm or populate all the fields as shown in Figure 5.03a.
8. Click *OK* (fig. 5.03b) and wait for the Contact Sheet to load.



Landscape Orientation



Portrait Orientation



## Section 5—Output

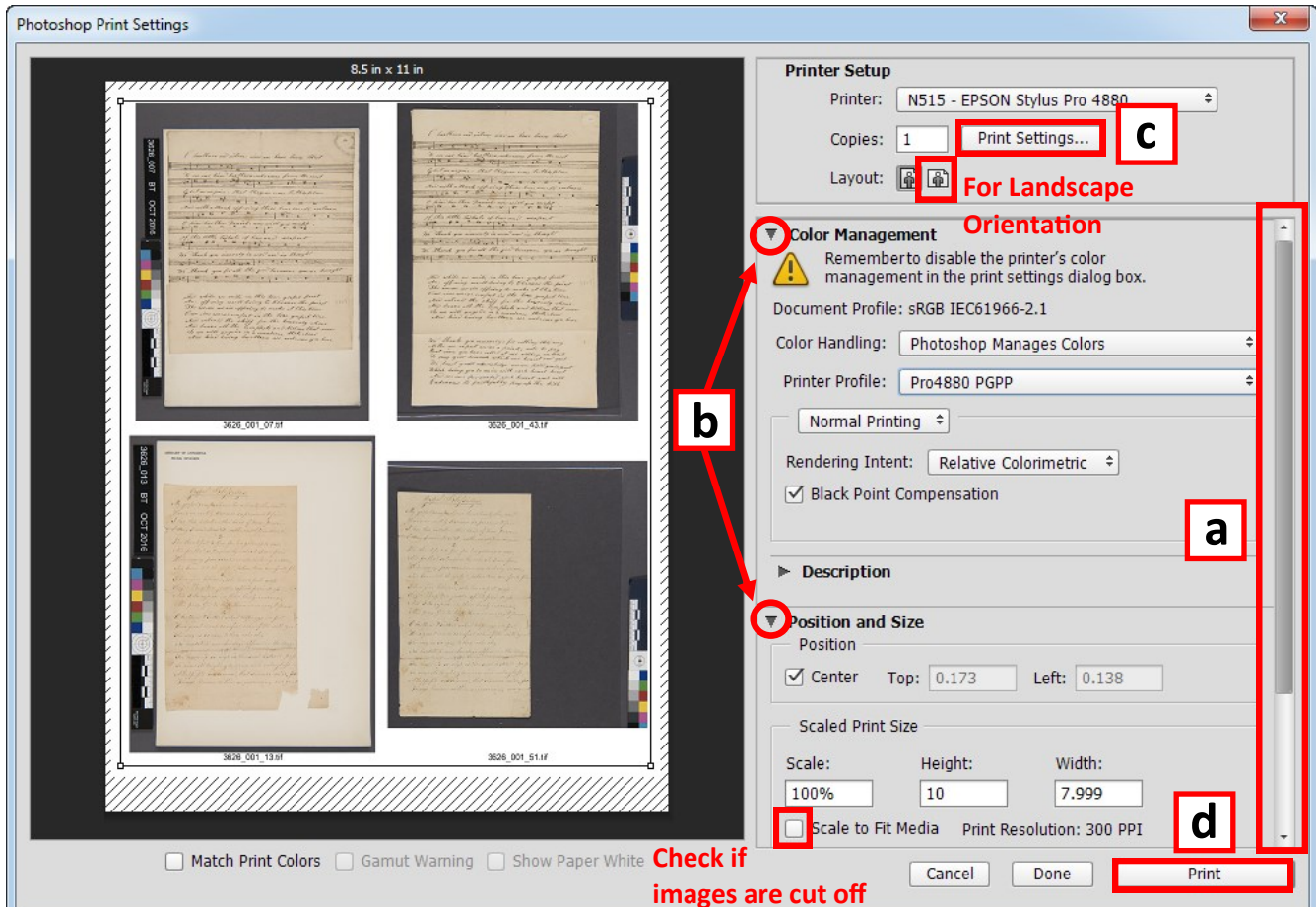


Figure 5.04

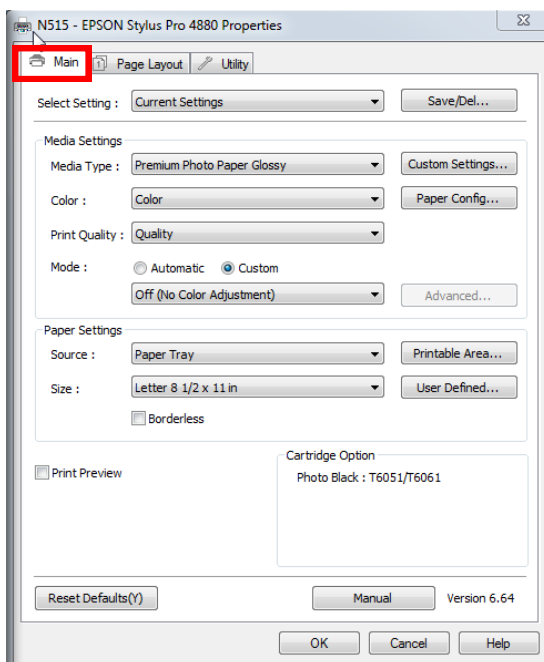


Figure 5.05

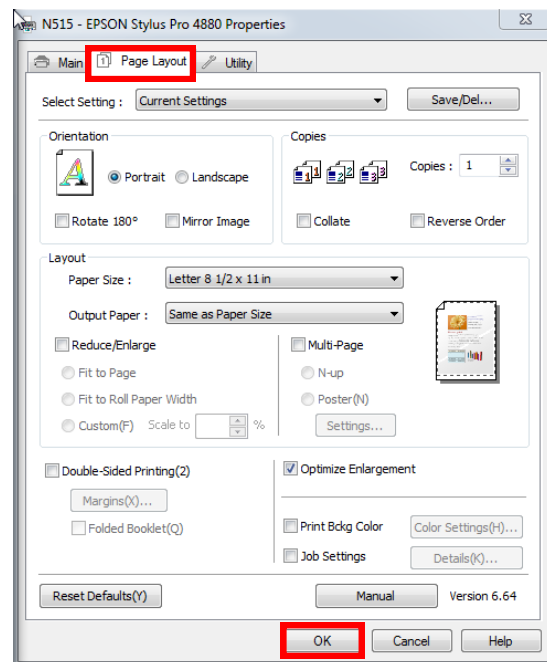


Figure 5.06

## Section 5—Output

### Print Images (Photoshop), continued

---

9. Click *File* → *Print*.
10. Select all the fields as shown in Figure 5.04; you may need to scroll down (fig. 5.04a) and/or click on the black triangles (fig. 5.04.b) to expand the menus.
11. Click *Print Settings* (fig. 5.04c).
12. On the *Main* tab, confirm or populate all the fields as shown in Figure 5.05.
13. On the *Page Layout* tab, confirm or populate all the fields as shown in Figure 5.06.
14. Click *OK* (fig. 5.06).
15. In the Photoshop Print Settings window, click *Print* (fig. 5.04d).
16. Check your printout (avoid touching the image areas).

NOTE: Allow the printout to dry overnight before putting it into a plastic sleeve.

## Section 6—Raking Illumination

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### RAKING ILLUMINATION

## Section 6—Raking Illumination

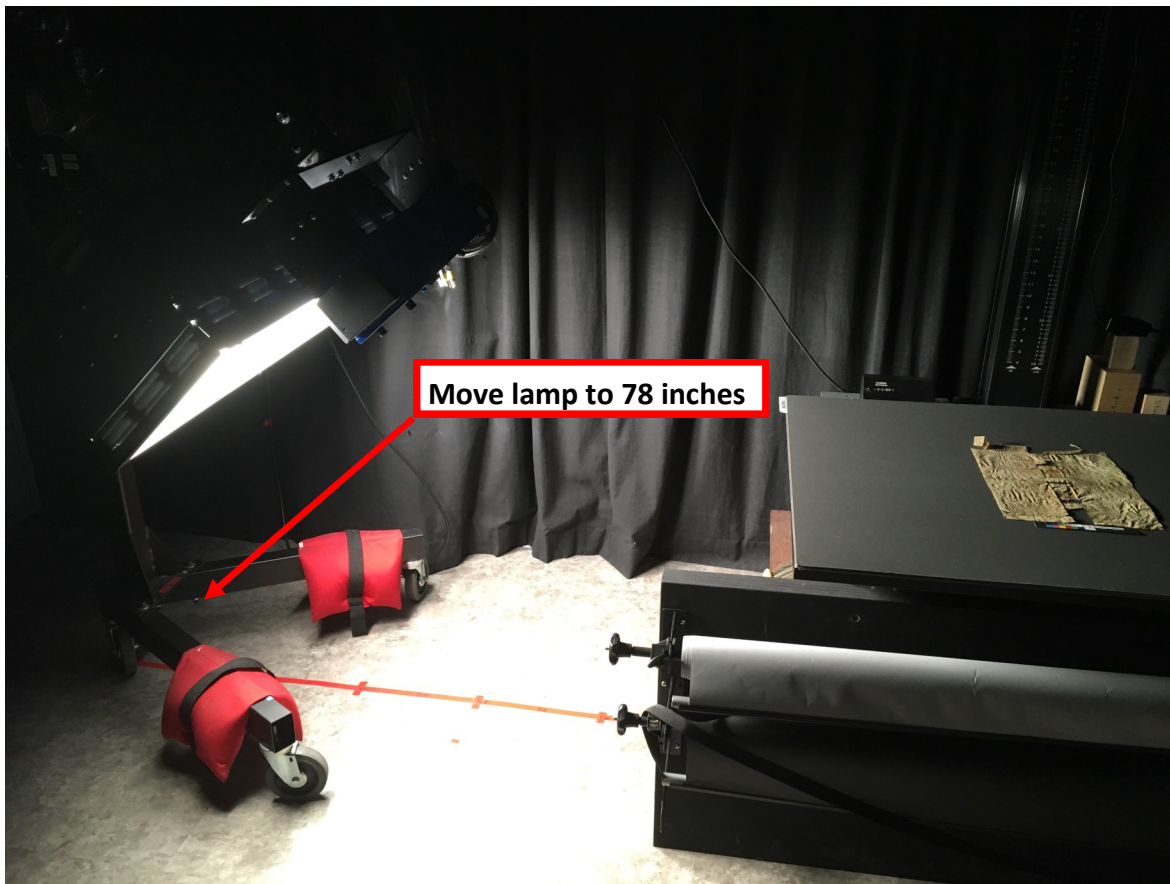


Figure 6.01

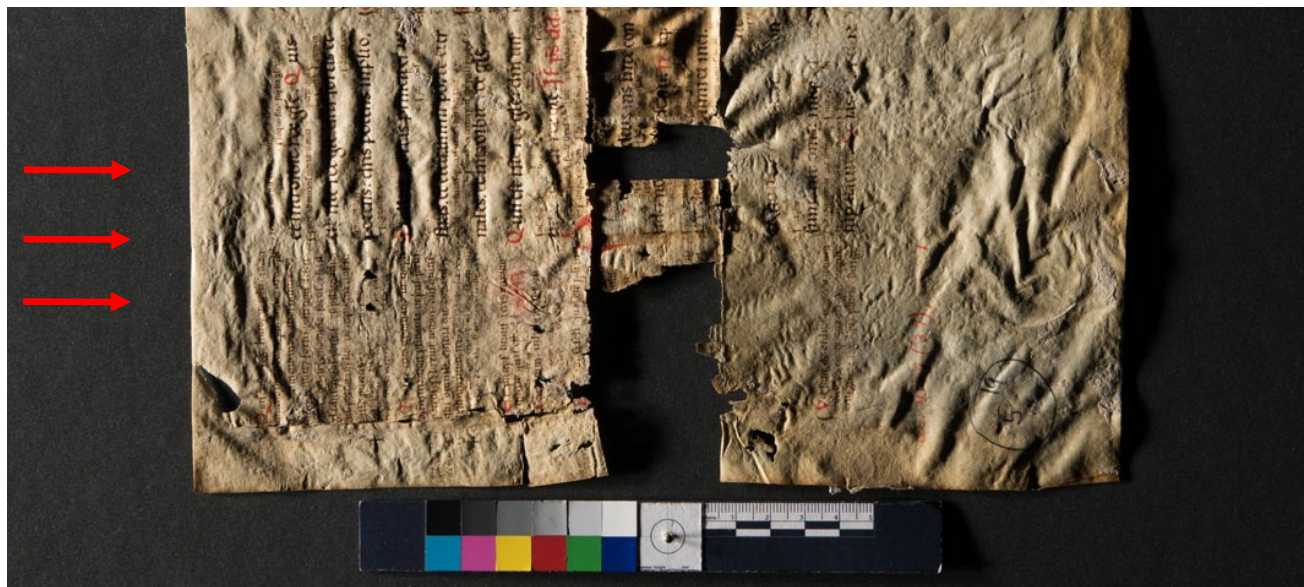


Figure 6.02

## Section 6—Raking Illumination

### Capture

#### Preliminary

---

Image capture under raking light illumination is similar to normal illumination. Follow the instructions for normal illumination capture (Section 2) with the modifications below.

#### Set Up

---

1. Illuminate with only one light.
2. Lower the light: turn the crank on the stand until the bottom of the collar is at 22”.

NOTE: The lamp should be positioned higher for objects with pronounced planar distortions to reduce deep shadows that obscure detail. Make a note of the height of the light to replicate the setup for during and after treatment capture.

NOTE: Never change the angle of the lights!

3. Use the black handles on the stand to move the light to the 78” mark on the floor (fig. 6.01).
4. According to AIC Guidelines, **the light must come from the top or left of the image as it is normally viewed**, so position your object on the copy stand accordingly.
5. Position the color target adjacent to the object with the gray patches positioned closest to the object. The light direction indicator (gnomon) on the target should be placed midway in the image frame (fig. 6.02).



## Section 6—Raking Illumination

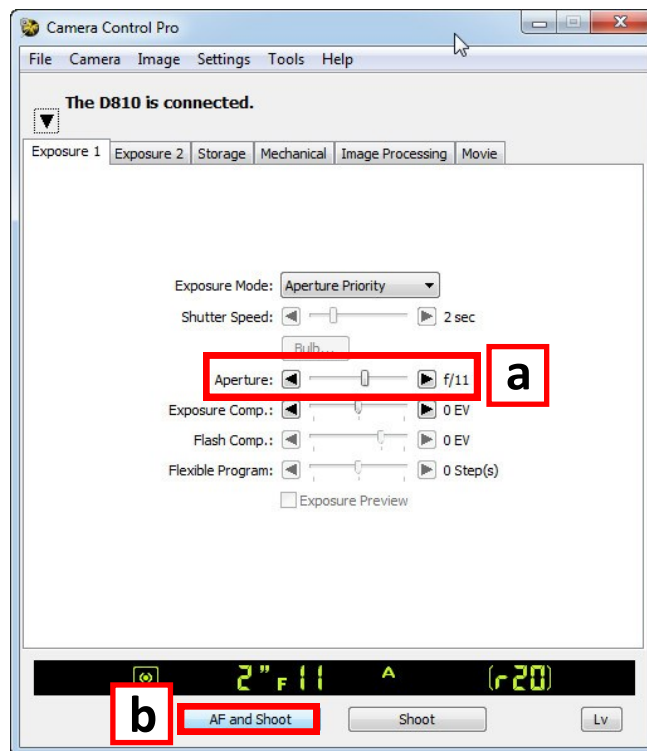


Figure 6.03

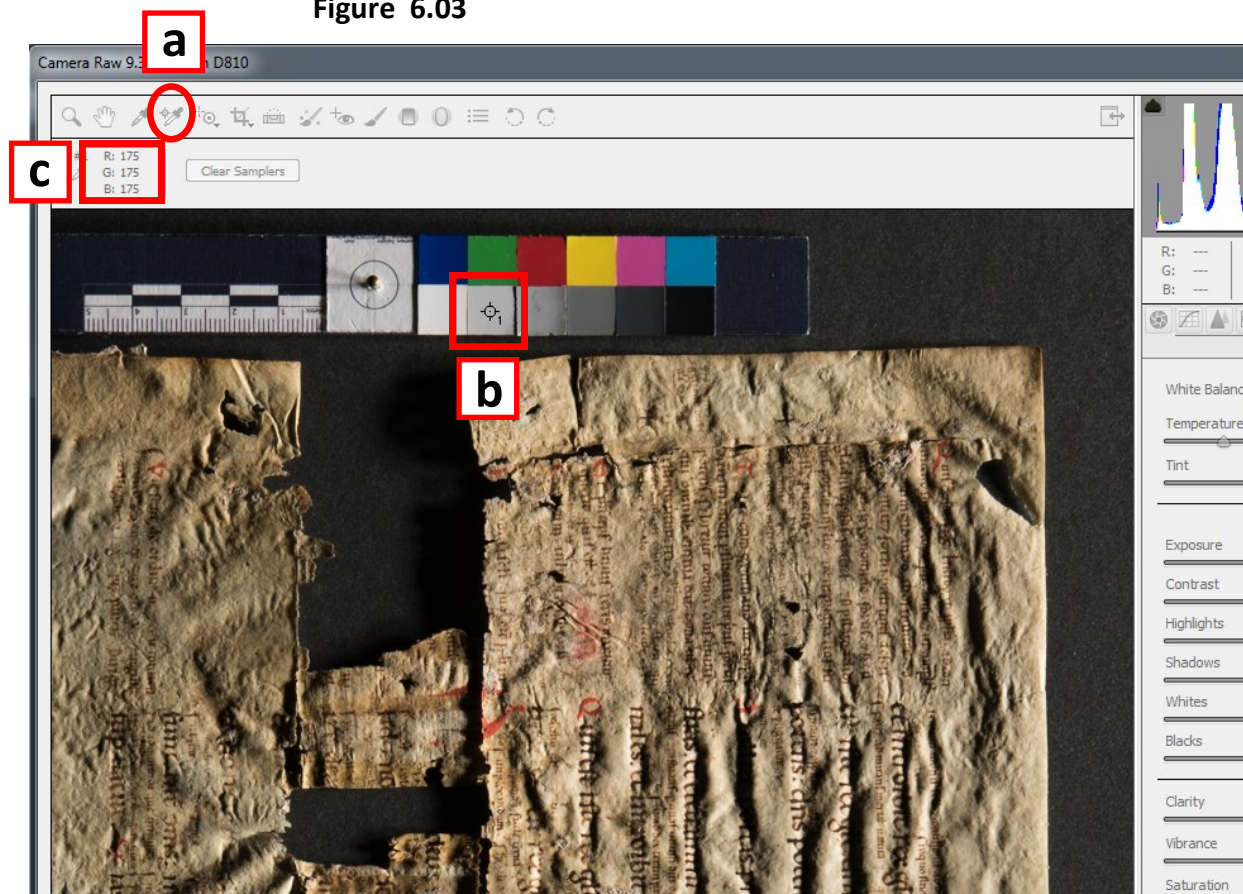


Figure 6.04

## Section 6—Raking Illumination

### Image Capture

---

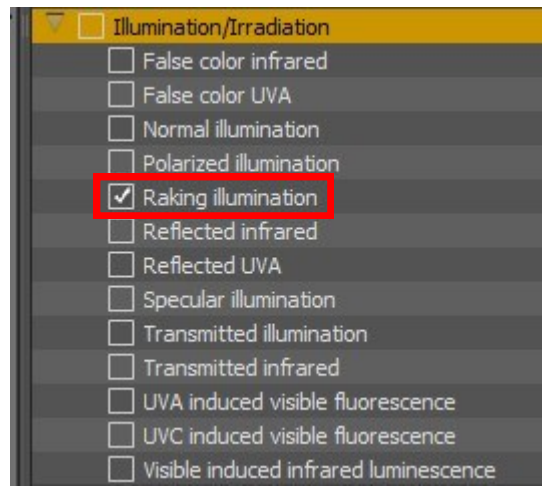
1. In **Camera Control Pro** under the *Exposure 1* tab, select the following (fig. 6.03):  
Exposure Mode: Aperture Priority  
Aperture: f/11  
Exposure Comp.: 0
2. If the object contains significant planar distortion, select a higher f-stop to increase depth of field (fig. 6.03a).
3. Settings under the *Exposure 2* (including auto white balance), *Storage*, and *Image Processing* tabs are the same as with normal illumination (page 2.13).
4. Press *AF and Shoot* (fig. 6.03b).

### Preview Images

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Select the *Color Sampler Tool* (fig. 6.04a) and click on the lightest gray patch on the color target (fig. 6.04b).
3. Exposure level is based on what best illustrates the feature(s) you wish to highlight in raking illumination. Make note of the RGB values (fig. 6.04c) of the lightest gray patch of the color target to replicate for during and after treatment capture. If necessary, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reevaluate in **Camera Raw**.
4. Click *Done* in **Camera Raw** to accept changes.

## Section 6—Raking Illumination



**Figure 6.05**



## Section 6—Raking Illumination

### Finish

---

Finish the photography session as done with normal illumination (Section 2). In addition, reposition the light at the 66" mark on the floor, with the top of collar at 52".

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Select *Raking illumination* under Illumination/Irradiation (fig. 6.05).

### Image Processing

### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. White balance, sharpening, straightening, cropping and confirming workflow procedures are the same as with normal illumination images (Section 4).
3. Click *Done* to save your adjustments.

### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

## Section 7—Transmitted Illumination

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### TRANSMITTED ILLUMINATION

## Section 7—Transmitted Illumination

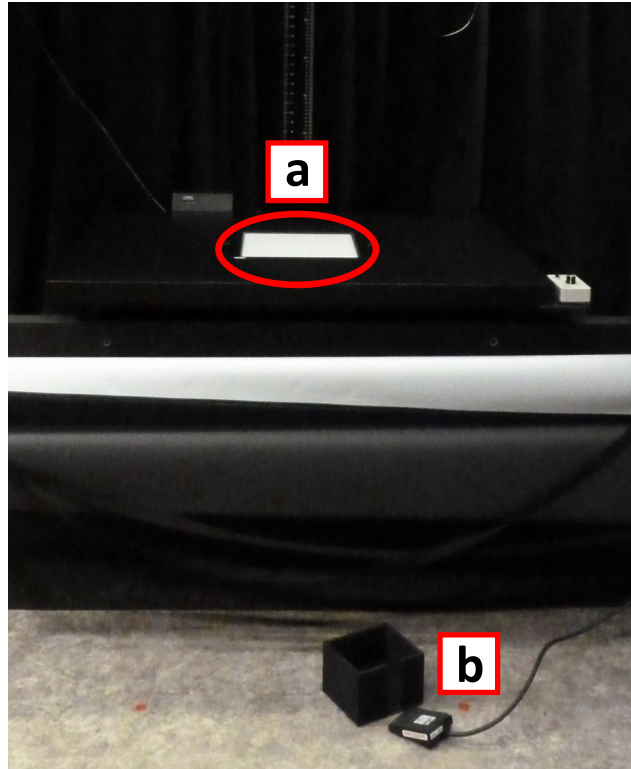


Figure 7.01

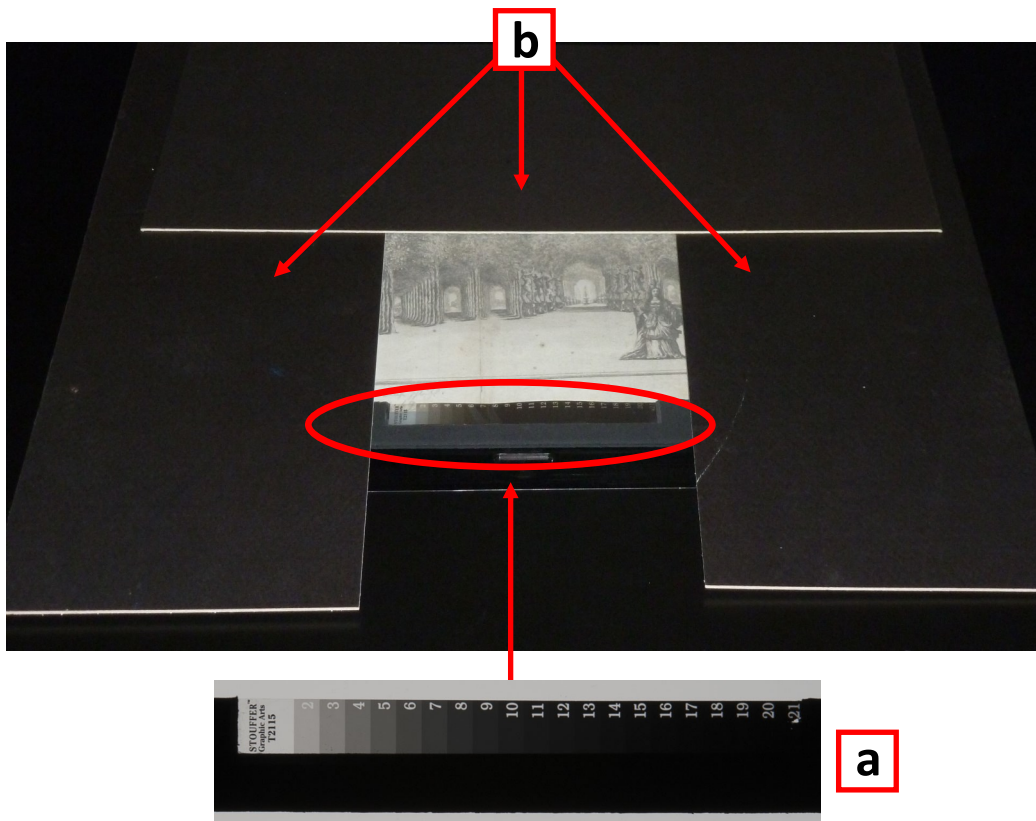


Figure 7.02

## Section 7—Transmitted Illumination

### Capture

### Set Up

---

1. Remove the mat board that covers the base of the copystand to reveal the transmitted light box (fig. 7.01a). Remove the foot pedal from its box, located on the floor to the right of the copystand, and use it to turn on the light source (fig. 7.01b).
2. Position your object on the light box and place the transmitted target along any edge of the object (fig 7.02a). Identification labels will be visible using transmitted light, but somewhat low in contrast.
3. Mask areas around the object and target with black mat board strips located in the studio cabinet (fig. 7.02b). A thin margin of light may be left in order to document the edges of the object.
4. Turn off the overhead light.

## Section 7—Transmitted Illumination

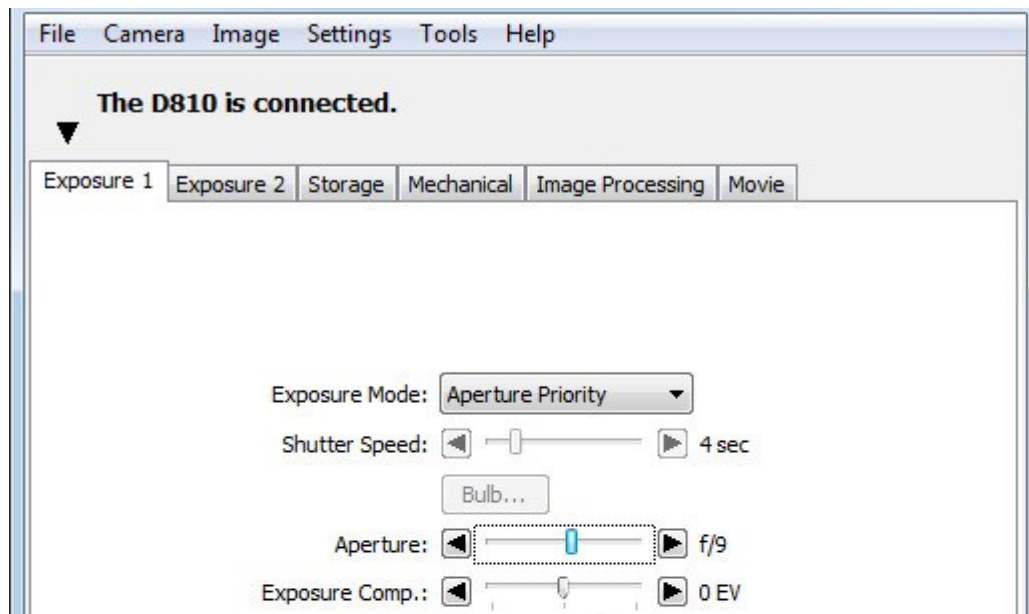


Figure 7.03

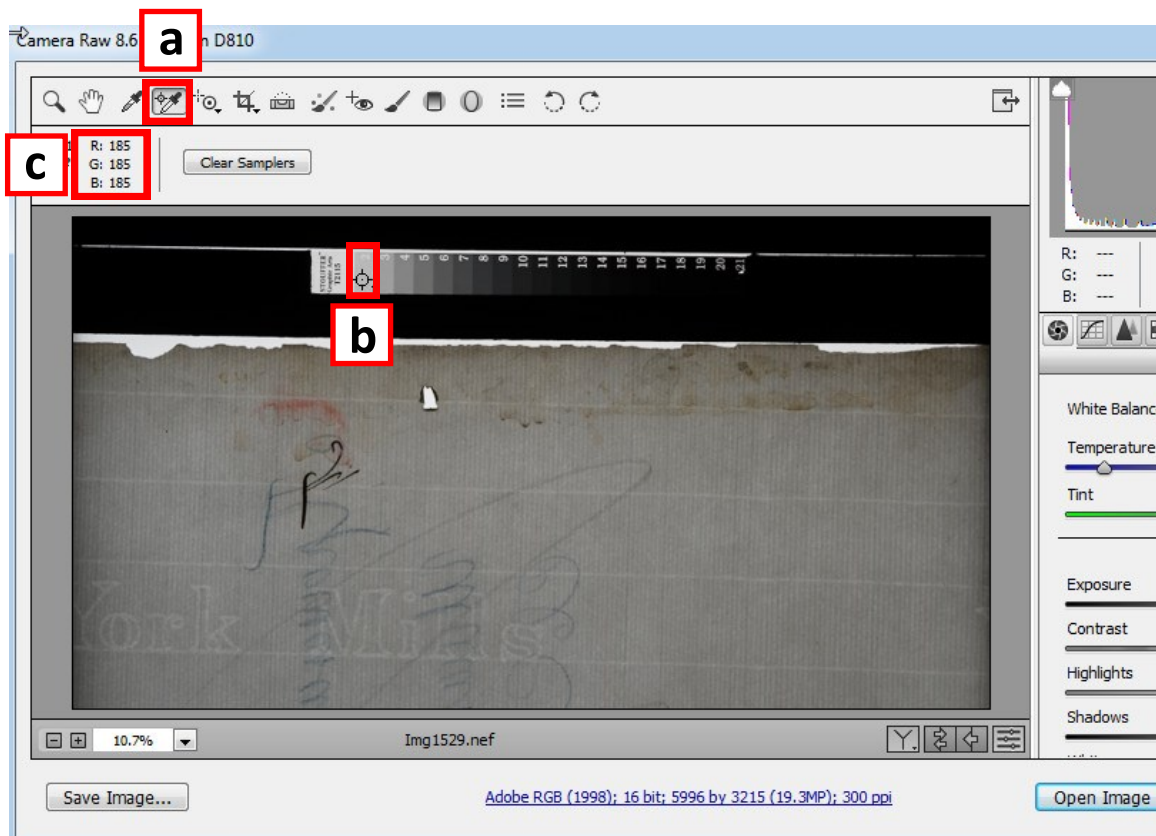


Figure 7.04

## Section 7—Transmitted Illumination

### Image Capture

---

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following (fig. 7.03):  
Exposure Mode: Aperture Priority  
Aperture: f/9  
Exposure Comp.: 0
2. Settings under the *Exposure 2* (including auto white balance), *Storage*, and *Image Processing* tabs are the same as with normal illumination (page 2.13).
3. Press *AF and Shoot*.

### Preview Images

---

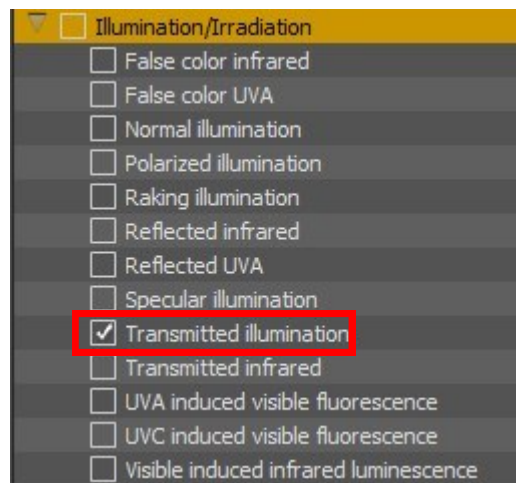
1. In **Bridge**, open the image in **Camera Raw**.
2. Select the *Color Sampler Tool* (fig. 7.04a) and click on Step #2 of the transmitted light target (fig. 7.04b).
3. Exposure level is based on what best illustrates the feature(s) you wish to highlight in transmitted illumination. Make note of the RGB values (fig. 7.04c) of Step #2 of the transmitted light target to replicate for during and after treatment capture. If necessary, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reevaluate in **Camera Raw**.

### Finish

---

Finish the photography session as done with normal illumination (Section 2). In addition, **turn off the transmitted light source**, replace the mat board on the copystand base, and replace the foot pedal in its box.

## Section 7—Transmitted Illumination



**Figure 7.05**



## Section 7—Transmitted Illumination

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Select *Transmitted illumination* under Illumination/Irradiation (fig. 7.05).

### Image Processing

#### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Sharpening, straightening, cropping and confirming workflow procedures are the same as with normal illumination images (Section 4).
3. Use Step #2 of the transmitted light target (fig. 7.04b) to white balance.
4. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

## Section 8—Specular Illumination

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### SPECULAR ILLUMINATION

## Section 8—Specular Illumination

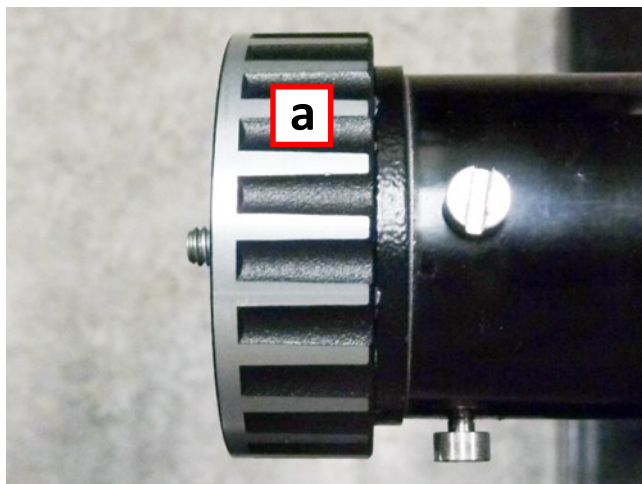


Figure 8.01

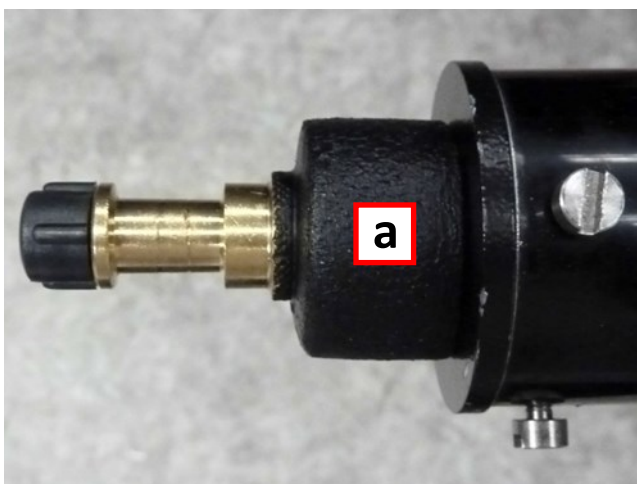


Figure 8.02



Figure 8.03

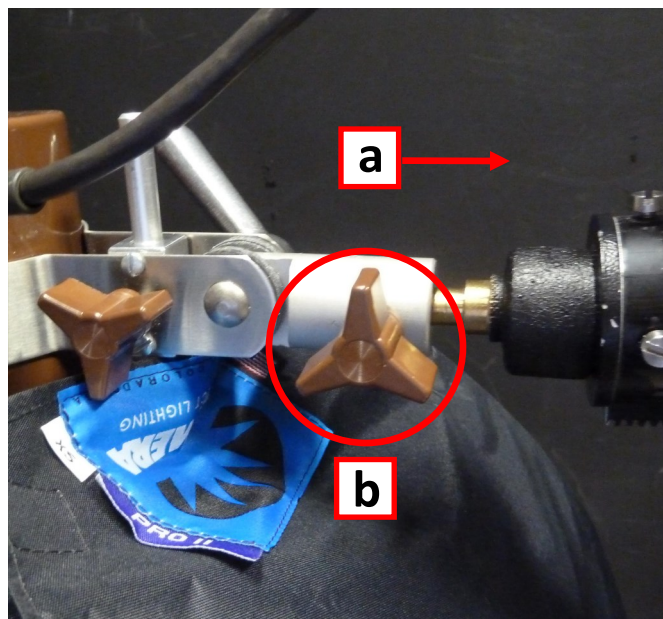


Figure 8.04

## Section 8—Specular Illumination

### Capture

#### Preliminary

---

Specular illumination documents variations in gloss and can be useful in documenting surface damage. Our particular arrangement has a **9 x 12 inch maximum useable area** of a pure specular reflection from very high gloss or mirrored surface. Lustrous objects up to approximately 12 x 20 inches may be photographed with acceptable results due to scattering.

#### Set Up

---

The specular illumination setup requires a lamp to be suspended above the copy stand and be aligned in plane with the object. To achieve this, an incandescent lamp head with a soft box is positioned using the large black camera stand. The equipment used for this setup is stored in a large box in the photo studio.

1. Unscrew and remove the ¼" to ½" adaptor at the end of the stand's horizontal arm (fig. 8.01a) and attach the ¼" to stud adaptor (fig. 8.02a).
2. With the preassembled Speedotron lamp head and soft box (fig 8.03) facing down, slide the adjustment arm of the lamp (fig. 8.04a) onto the 1/4" to stud adaptor now affixed to the studio stand. Use the thumbscrew to tighten the adjustment arm (fig. 8.04b).

## Section 8—Specular Illumination

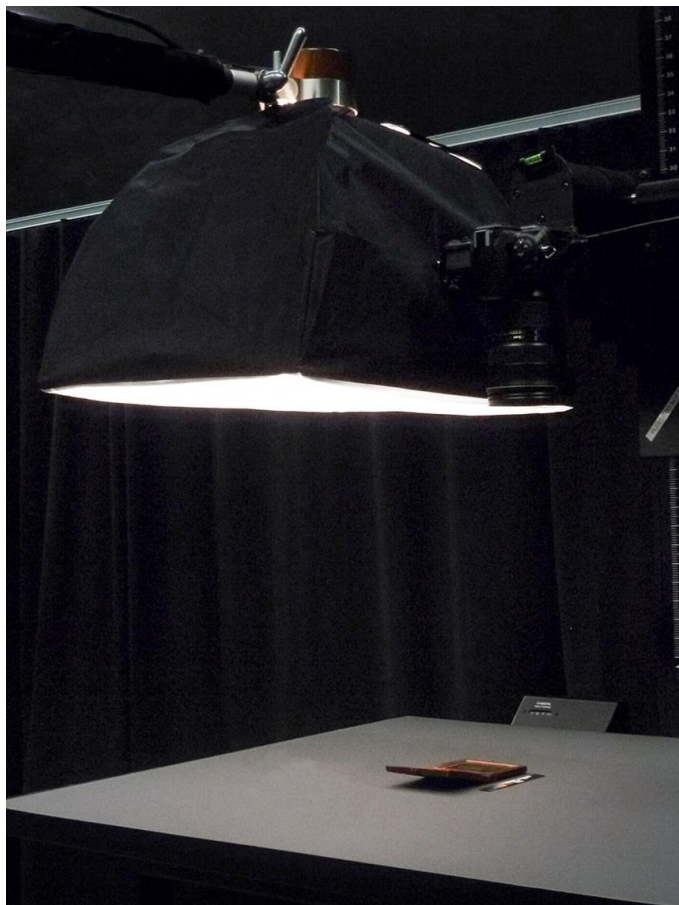


Figure 8.05



Figure 8.06

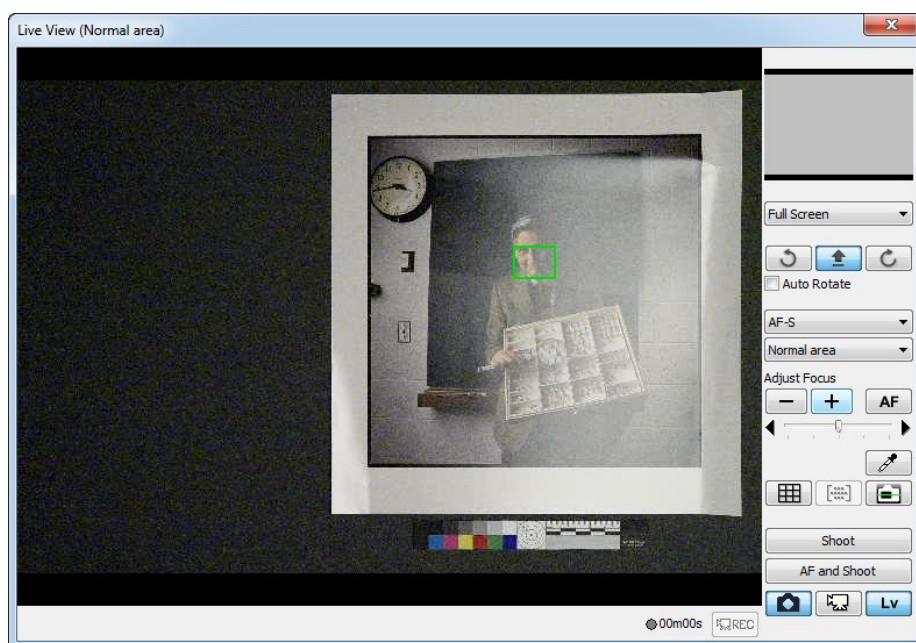


Figure 8.07

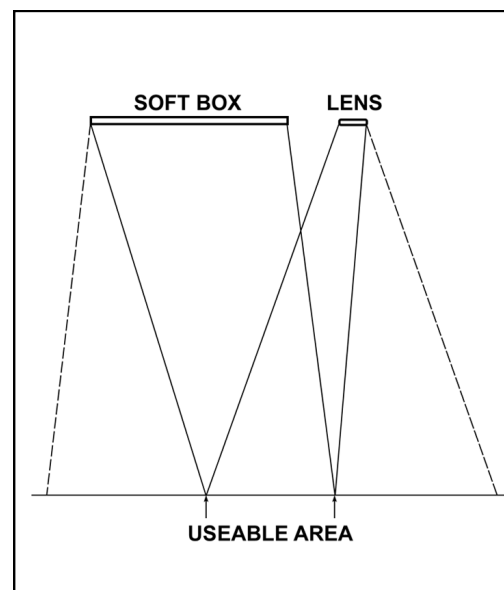


Figure 8.08



## Section 8—Specular Illumination

### Set Up, continued

---

3. Move the stand into position in front of the copystand. Extend the horizontal arm of the stand to position the softbox to the left side of the camera (fig. 8.05).
4. Connect the lamp power cord to its power pack (fig. 8.06a).
5. Connect the power pack power cord to the wall outlet (fig. 8.06b).
6. Turn on the “Model” switch (fig. 8.06c). The “Power” switch should remain in the off position (fig. 8.06d). Turn off the overhead room light.
7. Open **Camera Control Pro** > *Live View*.
8. Position your object to the far right, with the long side parallel to the image frame (fig. 8.07). In this manner of specular illumination, approximately 2/3 of the image will remain empty and should be cropped out in processing (fig. 8.08).
9. Place the color target adjacent to the object.

## Section 8—Specular Illumination

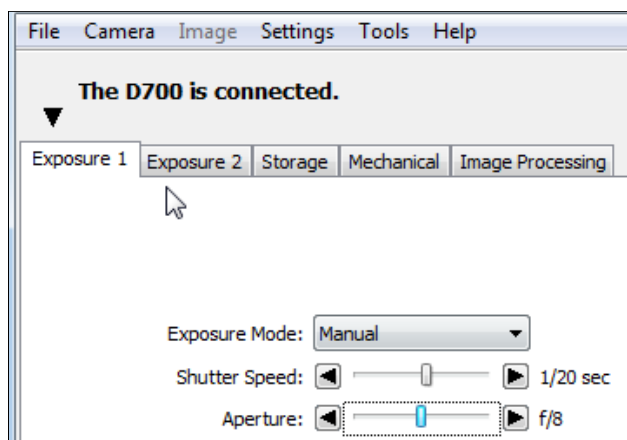


Figure 8.09

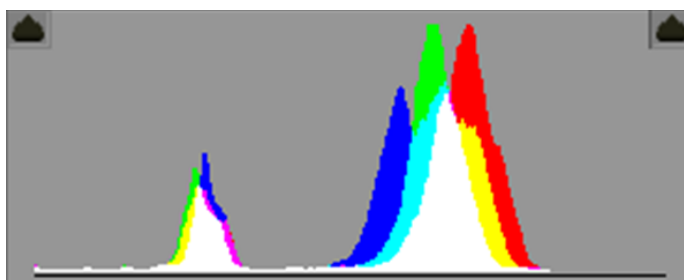


Figure 8.10 (no clipping)

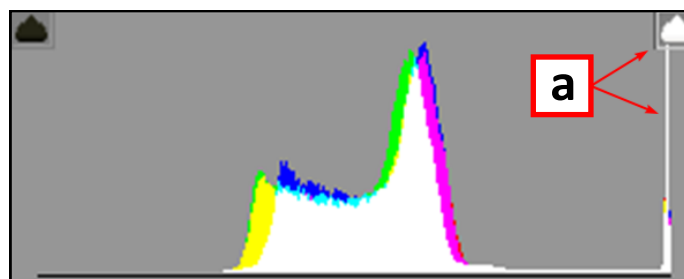


Figure 8.11 (highlight clipping / overexposed)

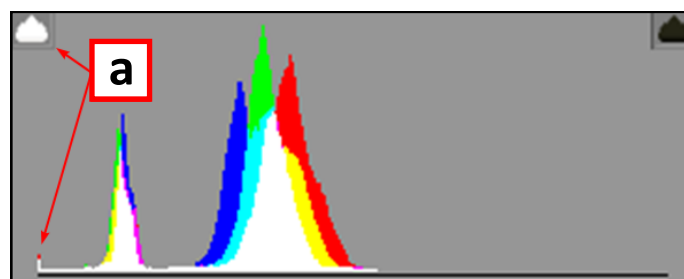


Figure 8.12 (shadow clipping / underexposed)

## Section 8—Specular Illumination

### Image Capture

---

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following (fig. 8.09):
  - Exposure Mode: Manual
  - Shutter Speed: 1/20 (this may need to be adjusted)
  - Aperture: f/8
  - Exposure Comp.: 0
2. Settings under the *Exposure 2* (including auto white balance), *Storage*, and *Image Processing* tabs are the same as with normal illumination (page 2.13).
3. Press *AF and Shoot*.

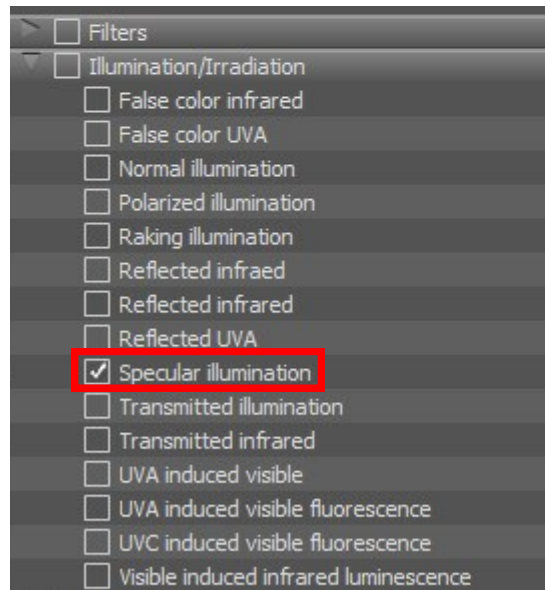
### Preview Images

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Image exposure will be dictated by the surface gloss of the artwork, determined using the histogram displayed in top right of **Camera Raw**. A correct exposure will show no highlight or shadow clipping within the perimeter of the artwork (fig. 8.10).
3. If the histogram shows overexposure (fig. 8.11a), choose a faster shutter speed and reshoot. If the histogram shows underexposure (fig. 8.12a), choose a slower shutter speed and reshoot. Shutter speed may vary between 1/50 second for glossy surfaces and 4 seconds for matte surfaces. Choose the final shutter speed in this range based on visual preference and make note of it to replicate for during and after treatment capture.



## Section 8—Specular Illumination



**Figure 8.13**

## Section 8—Specular Illumination

### Finish

---

Finish the photography session as done with normal illumination (Section 2). In addition:

1. Turn off the lamp and disconnect the power cord from the pack and wall outlet.
2. After the lamp has cooled down, lower the lamp head and detach the lamp and softbox from the stand.
3. Return the lamp soft box assembly, power pack, and the ¼” to stud adaptor to their storage box.
4. Return the studio stand to its storage location along the back wall of the studio.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Select *Specular illumination* under Illumination/Irradiation (fig. 8.13).

### Image Processing

#### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. White balance, sharpening, straightening, cropping and confirming workflow procedures are the same as with normal illumination images (Section 4).
3. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

## Section 9—Polarized Illumination

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### POLARIZED ILLUMINATION

## Section 9—Polarized Illumination



Figure 9.01

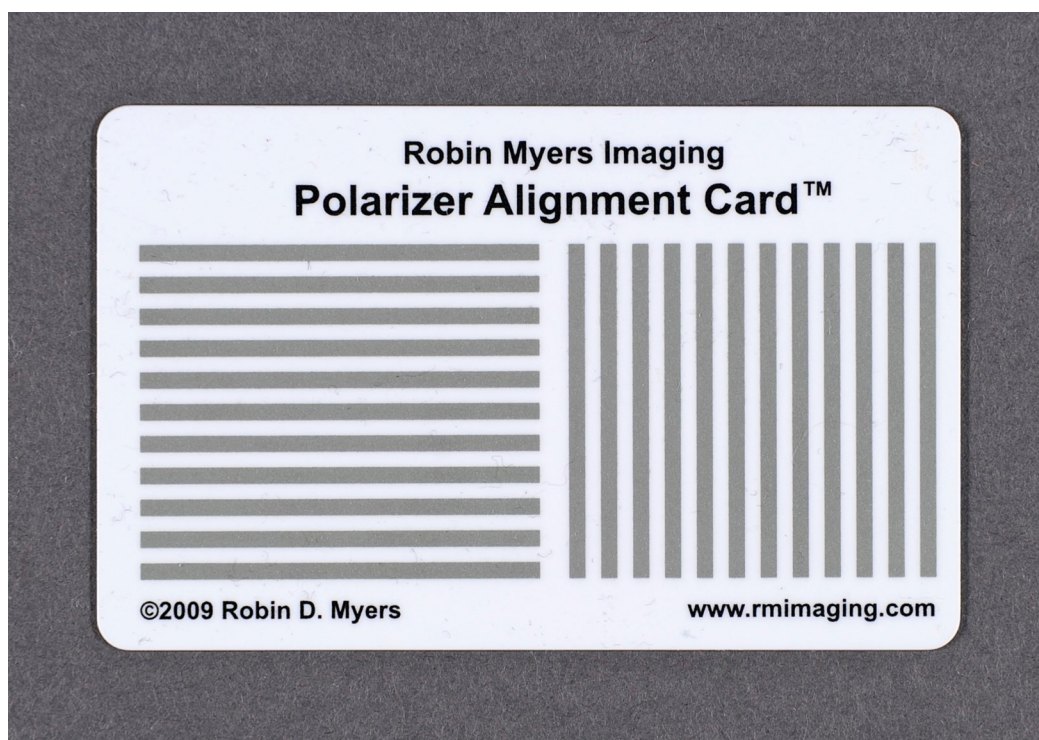


Figure 9.02

## Section 9—Polarized Illumination

### Capture

#### Preliminary

---

Polarized illumination is a form of normal illumination used to reduce or eliminate surface reflections. Because such reflections may provide important information about the texture and condition of an object, this type of photography should be performed with the understanding that it will alter the surface appearance of an object in the captured photograph. Frequently, the colors will also appear saturated and the contrast increased.

#### Set Up

---

Setup for polarized illumination is similar to normal illumination. Follow the instructions for normal illumination with the modifications below.

1. Gather the 77 mm Circular Polarizer (fig. 9.01), the Polarizer Alignment Card (fig. 9.02), and if using the 60 mm lens, the 62-77 mm step-up ring, from the studio cabinet.
2. 24-70 mm lens: Very carefully, screw the 77 mm Circular Polarizer onto the end of the lens.  
60 mm lens: Very carefully, screw the 62-77 mm step-up ring, followed by the 77 mm Circular Polarizer, onto the end of the lens.
3. Place the Polarizer Alignment Card within the image frame, along with your object and the color target.

## Section 9—Polarized Illumination

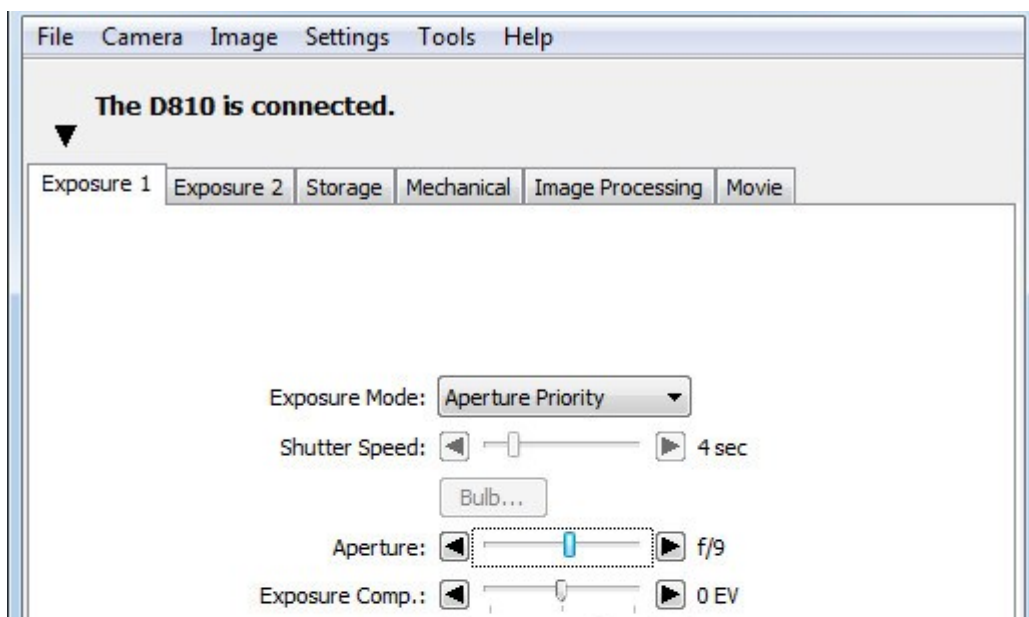


Figure 9.03



Figure 9.04



Figure 9.05



## Section 9—Polarized Illumination

### Image Capture

---

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following (fig. 9.03):  
Exposure Mode: Aperture Priority  
Aperture: f/9  
Exposure Comp.: 0
2. Settings under the *Exposure 2* (including auto white balance), *Storage*, and *Image Processing* tabs are the same as with normal illumination (page 2.13).
3. Open *Live View*, set the *Magnification Ratio* to 100%, and locate the Polarizer Alignment Card within the frame.
4. Rotate the circular polarizer on the end of the camera lens to achieve the level of polarization desired. If full polarization is desired, rotate until the silver lines of the Polarizer Alignment Card turn from silver (fig. 9.04a) to black (fig. 9.05a). Note the slight glare near the upper right edge of the polyester L-sleeve under minimal polarization (fig. 9.04b), and the glare reduction at the same location under full polarization (fig. 9.05b).
5. Press *AF and Shoot*.

### Preview Images

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Select the *Color Sampler Tool* and click on the lightest gray patch on the color target. The RGB values should be 200 +/-5 (fig. 14.09c).
3. If RGB values are outside 200 +/-5, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reevaluate in **Camera Raw**.

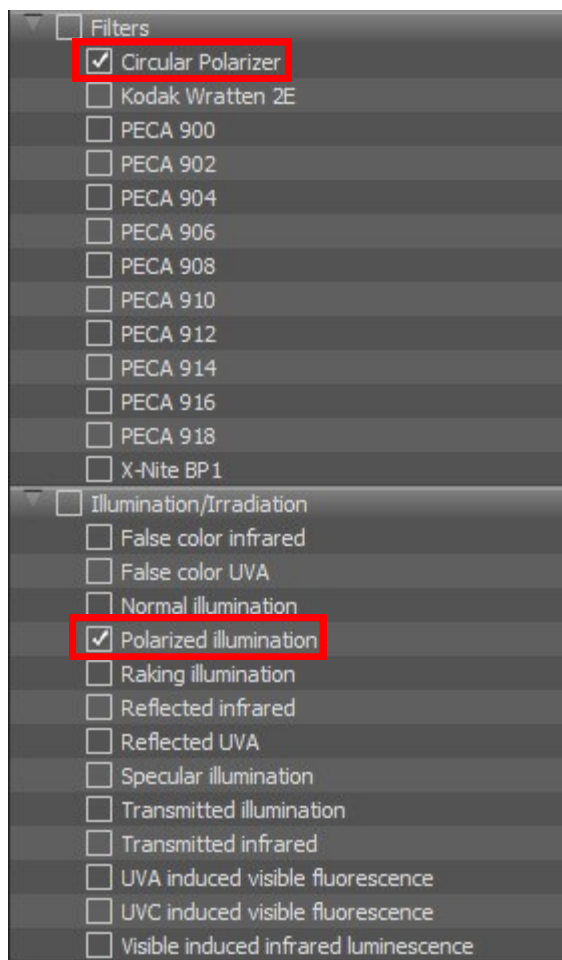
### Finish

---

Finish the photography session as done with normal illumination (Section 2). In addition, return the Circular Polarizer, Polarizing Alignment Card, and if used, the 62-77 mm step-up ring to the studio cabinet.



## Section 9—Polarized Illumination



**Figure 9.06**

## Section 9—Polarized Illumination

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Select *Circular Polarizer* under *Filters* and *Polarized illumination* under *Illumination/Irradiation* (fig. 9.06).

### Image Processing

#### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. White balance, exposure, sharpening, straightening, cropping and confirming workflow procedures are the same as with normal illumination images (Section 4).
3. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### ULTRAVIOLET (UVA)-INDUCED VISIBLE FLUORESCENCE (STANDARD CAMERA)

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)



Figure 10.01



Figure 10.02



Figure 10.03

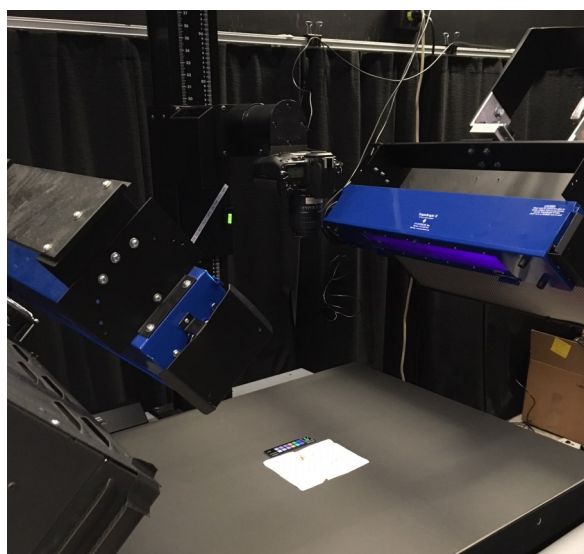


Figure 10.04

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Capture

#### Preliminary

---

Ultraviolet-induced visible fluorescence is used to differentiate and characterize materials. The technique involves excitation of materials with ultraviolet radiation in order to induce fluorescence in visible wavelengths. **Always wear UV goggles when the UV lights are on.**

#### Set Up

---

The supplies used for this setup are stored in the studio cabinet.

1. Mount either the 60 mm lens or 24-70 mm lens on the D810 camera body.
2. The **Kodak 2E** and **PECA 918** filters are used for UV-induced visible fluorescence photography with the standard camera. The two filters have been combined into a single filter holder (fig.10.01).
3. 24-70 mm lens: Very carefully, screw the filter holder onto the end of the lens.  
60 mm lens: Very carefully, screw the 62-77 mm step-up ring, followed by the filter holder, onto the end of the lens.
4. Set the focus-mode switch on the camera lens to *M* for manual focus (fig.10.02).
5. Plug in the UV lamps. **It is important to plug in both cords (two for each lamp) for at least 20 seconds before switching on the lamps.** Neglecting to do this will seriously shorten the life of the tubes. Turn on the lamps using the white toggle switch (fig 10.03) located at the short end of each unit closest to the copystand wall. Let the lamps warm up for at least 5 minutes before capture.
6. Adjust the height of the lamp stands so the bottom of the collar is at 25". Position the lamps equidistant and as close to the copystand as possible (fig. 10.04). Try to achieve even illumination across the area to be photographed. Do not change the angle of the lamps.

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

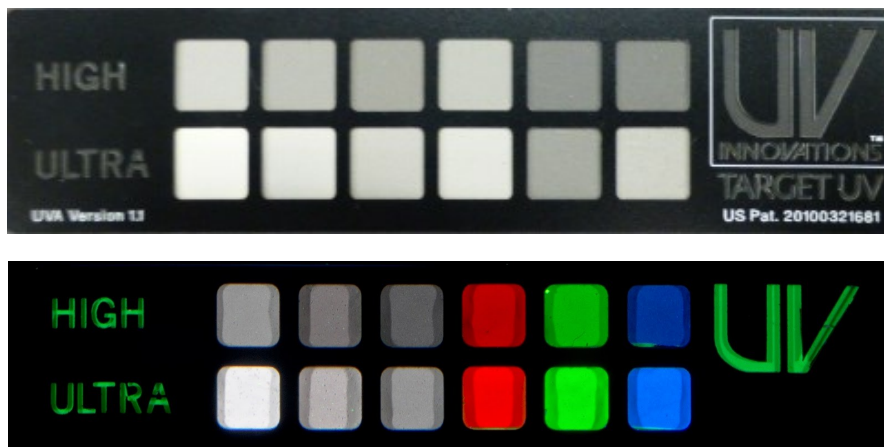


Figure 10.05

2.18.4106.001 Before treatment  
11/20/17 UVA-induced visible fluorescence

Figure 10.06

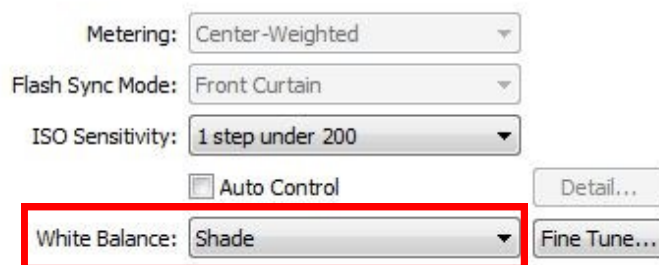


Figure 10.07

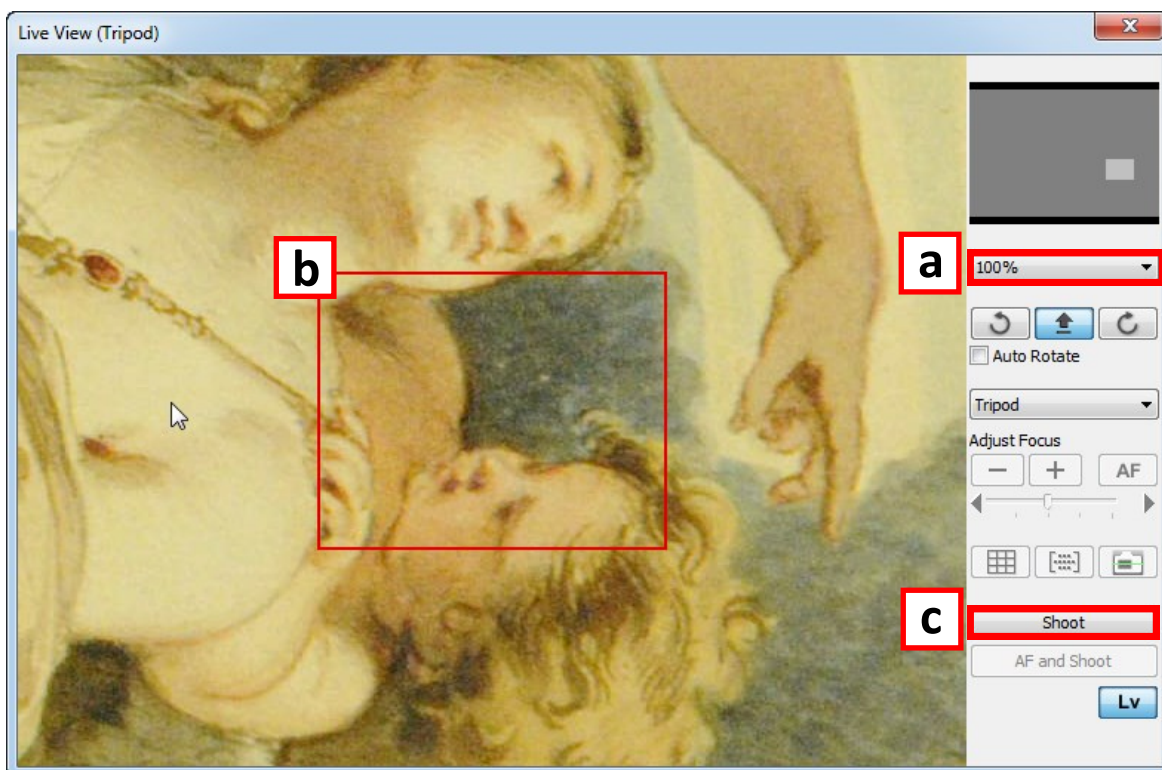


Figure 10.08

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Set Up, continued

---

7. With the UV lamps warmed up and the overhead light off, position the UV target (fig 10.05) adjacent to your object. Compare the intensity levels on the target (Low, Medium, High, or Ultra) with the overall fluorescence of the object and select an intensity with a similar brightness level. If you are still unsure, consult the detailed guide to matching fluorescent targets with fluorescent materials stored in the studio cabinet.
8. Include a paper identification label using white letters on a black background in order to reduce flair from paper fluorescence (fig. 10.06).

### Image Capture

---

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following:
  - Exposure Mode: Aperture Priority
  - Aperture: f/8 (flat objects) or f/11 (3D objects)
  - Exposure Comp.: 0
2. Under the *Exposure 2* tab, set the white balance to **Shade** (fig. 10.07).
3. Settings under the *Storage* and *Image Processing* tabs are the same as with normal illumination (Section 2).
4. Open *Live View*. Position your object and label in the image frame. Place the UV target adjacent to the object so that the gray patches of the intensity level chosen are closest to the object.
5. Set the magnification ratio to 100% (fig 10.08a). With the overhead light on, use the focusing ring on the camera lens to manually focus. The focus frame will remain red (fig. 10.08b).
6. With the overhead light off, place the cursor on the *Shoot* button and cover the monitor with black fabric. Be careful not to move the mouse and left click *Shoot* (fig. 10.08c).



## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

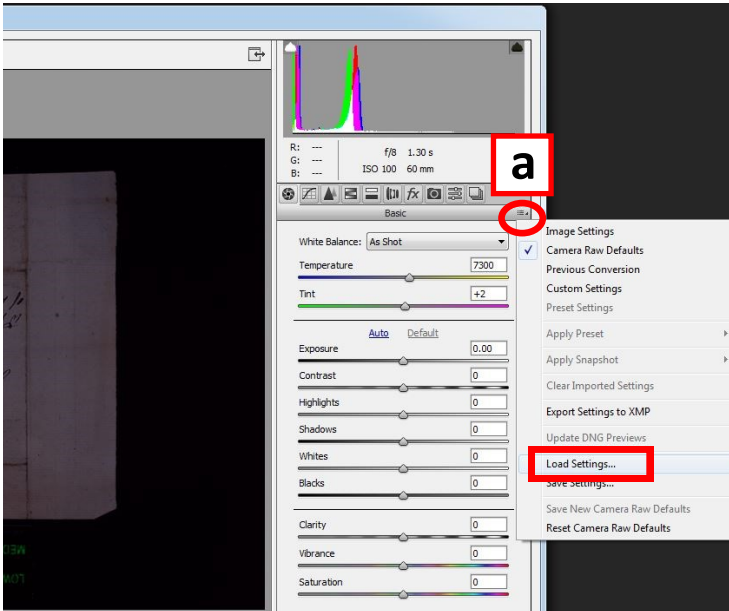


Figure 10.09

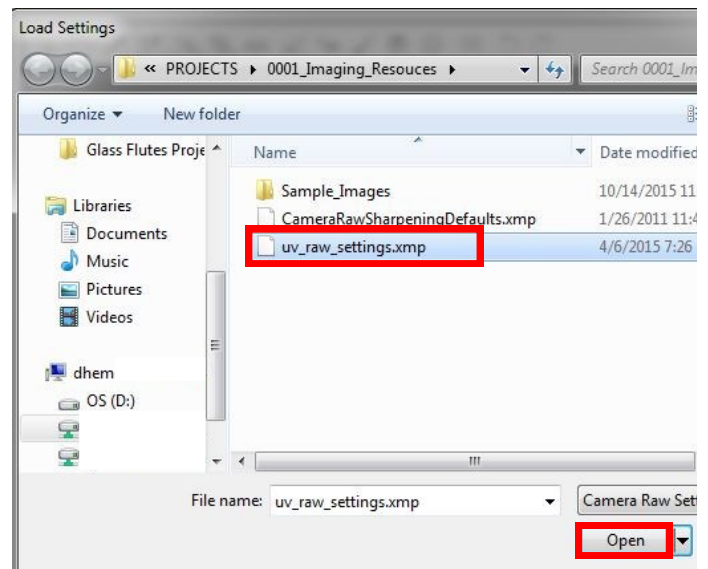


Figure 10.10

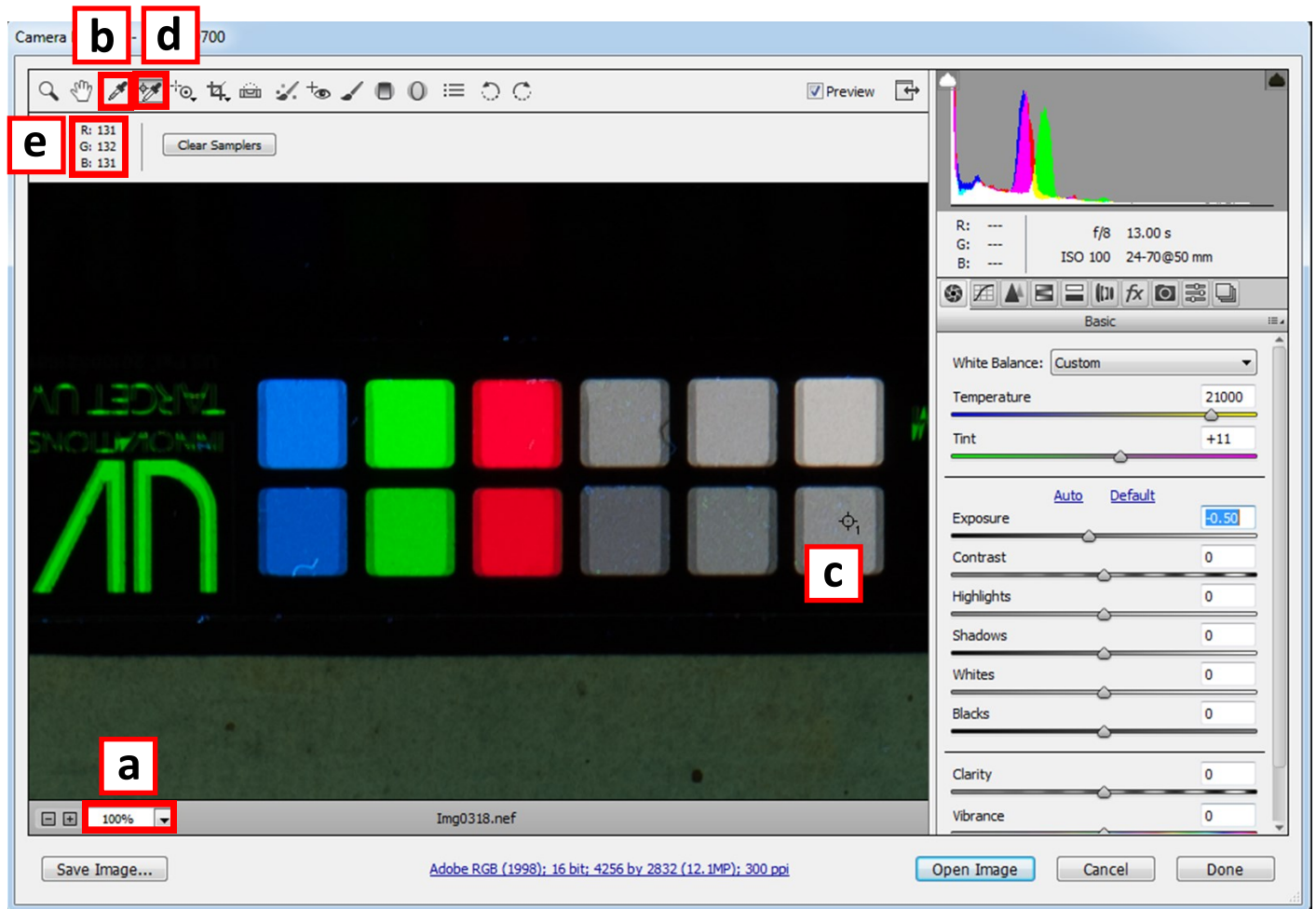


Fig 10.11

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Preview Images

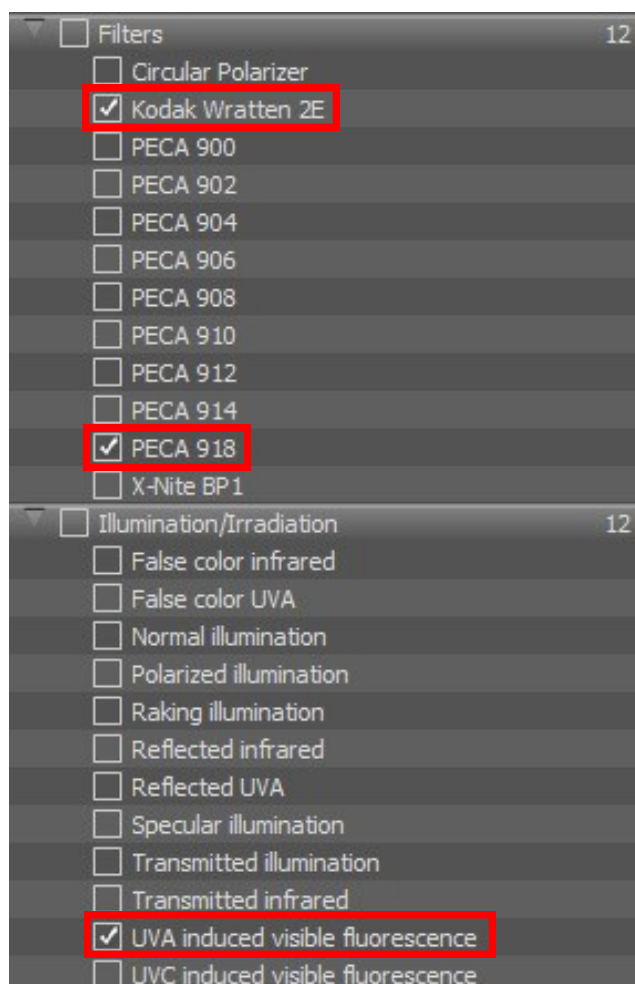
---

1. In **Bridge**, open the image in **Camera Raw**.
2. Left click on the *Camera Raw Settings Menu* in the upper right corner of the **Camera Raw** window (fig. 10.09a). Select *Load Settings*.
3. Navigate to *N: > Projects > 0001\_Imaging\_Resources* and select *uv\_raw\_settings.xmp* (fig. 10.10). Click *Open* to apply UV settings.
4. To white balance, zoom to 100% (fig. 10.11a). Select the *White Balance Tool* (fig. 10.11b) and click on the lightest gray patch for the intensity level chosen (fig. 10.11c). Be careful to click on the gray particles and not the green particles in the gray patch.
5. To check exposure, select the *Color Sampler Tool* (fig. 10.11d). Click on the lightest gray patch for the intensity level chosen (fig. 10.11c). Be careful to click on the gray particles and not the green particles in the gray patch. The RGB values should be 130 +/-3 (fig. 10.11e).
6. If RGB values are outside of 130 +/-3, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reapply UV settings, white balance, and check exposure again in **Camera Raw**.
7. Click *Done* in **Camera Raw** to accept changes.

**NOTE:** It is not uncommon for paper objects to display a weak fluorescence. If the area of interest on your object appears too dark on the monitor when the lightest gray patch is at 130, move the *Color Sampler Tool* to the second or middle gray patch and target 130 again. Note which patch was used to replicate for during and after treatment capture.

**NOTE:** The object as displayed on the monitor may appear slightly blue/green overall as compared to what you observe directly on the copystand. This variation derives from the difference between subjective human perception and the objective responsivity of the camera sensor.

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)



**Fig 10.12**

## Section 10—UV-Induced Visible Fluorescence (Standard Camera)

### Finish

---

Finish the photography session as done with normal illumination (Section 2). In addition, turn off and unplug the UV lamps, wrapping cords around the fixture at the end of the lamp. Reposition the lights at the 66" mark on the floor, with the top of the collar at 52". Set camera lens back to M/A (fig. 10.02). Remove the filters from the lens and replace the lens cap. Return the UV filters, target, black fabric, and goggles to the studio cabinet.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Select *Kodak Wratten 2E* and *PECA 918* under *Filters* and *UVA induced visible fluorescence* under *Illumination/Irradiation* (fig.10.12).

### Image Processing

#### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Adjust *Exposure* to obtain RGB values of 130 in the gray patch targeted (fig. 10.11c-e).
3. Sharpening, straightening, cropping, and confirming workflow options are the same as with normal illumination images (Section 4).
4. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

## Section 11—Slide Capture

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### SLIDE CAPTURE



## Section 11—Slide Capture



Figure 11.01

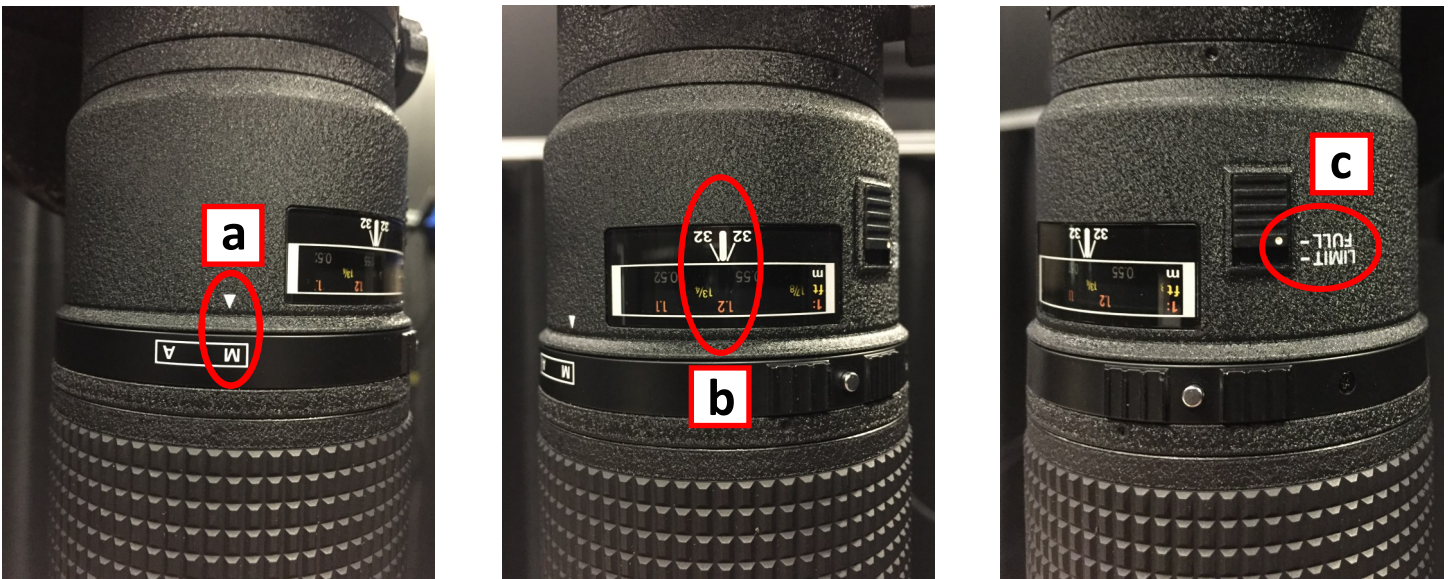


Figure 11.02

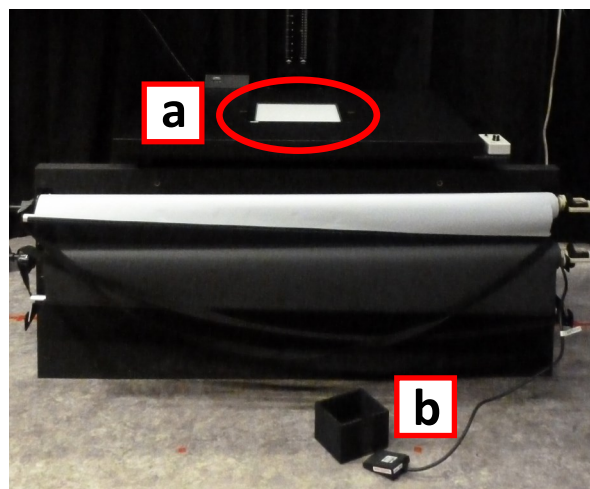


Figure 11.03

## Section 11—Slide Capture

### Capture

#### Preliminary

---

Slide capture is similar to normal illumination capture. Follow the instructions for normal illumination capture (Section 2) with the modifications below.

#### Set Up

---

1. Mount the 200 mm lens on the D810 camera body. Attach the assembled body and lens to the copystand using the upper threaded hole of the tripod collar on the lens (fig. 11.01).
2. Confirm on lens: *M* focus mode (fig. 11.02a).
3. Confirm on lens: *1:2* reproduction ratio (fig. 11.02b).
4. Confirm on lens: *FULL* focusing limit (fig. 11.02c).
5. Adjust the camera height so that the bottom of the copystand collar is at 22”.
6. Remove the mat board that covers the base of the copystand to reveal the transmitted light box (fig. 11.03a). Remove the foot pedal from its box, located on the floor to the right of the copystand, and use it to turn on the light source (fig. 11.03b).



## Section 11—Slide Capture

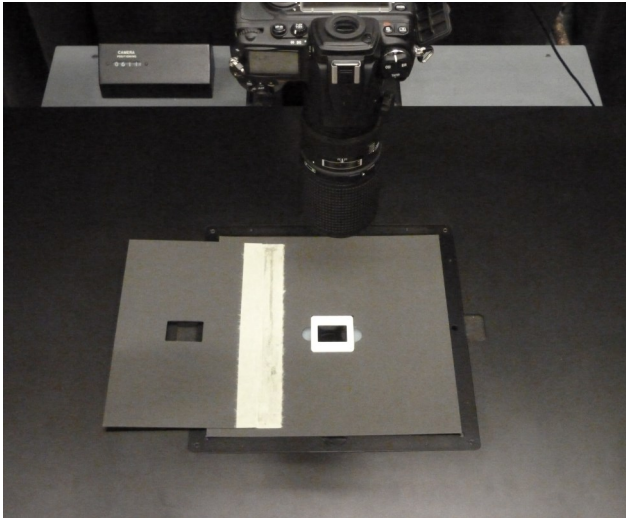


Figure 11.04

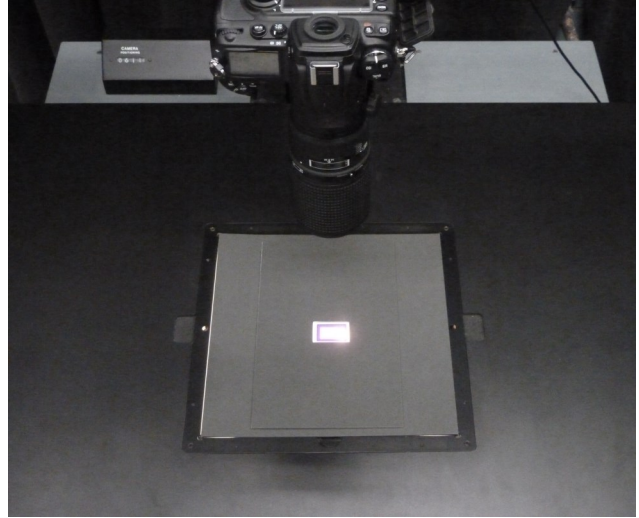


Figure 11.05

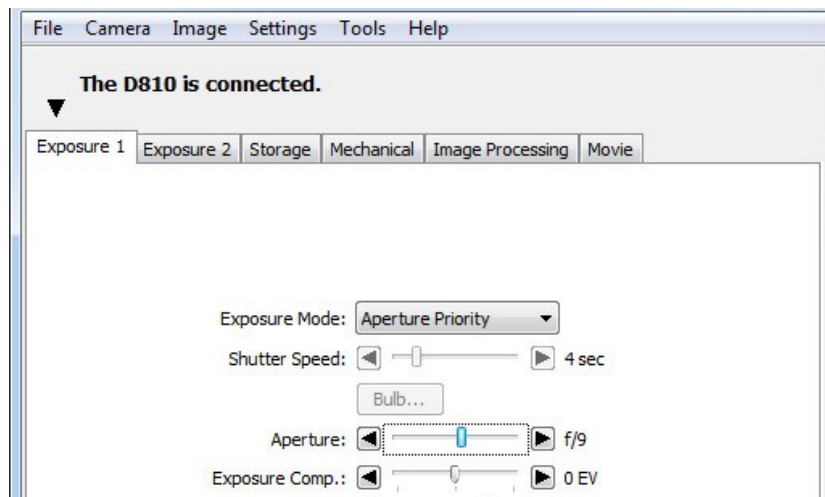


Figure 11.06

## Section 11—Slide Capture

### White Balance

---

1. Measure white balance with the light source filling the image frame.
2. In **Camera Control Pro**, select *Camera > Measure White Balance*.
3. In the window that opens, select *Preset manual d-0*. Click *OK*.

### Image Capture

---

1. Place the black slide positioning mask (stored in the studio cabinet) on the light source and place the slide, emulsion (dull) side down, in the opening of the positioning mask (fig. 11.04). Fold the overmask back on top (fig. 11.05).
2. In **Camera Control Pro** under the *Exposure 1* tab, select the following (fig. 11.06):
  - Exposure Mode: Aperture Priority
  - Aperture: f/9
  - Exposure Comp.: 0
3. Under the *Exposure 2* tab, select *White Balance: Preset manual d-0*.
4. Settings under the *Storage* and *Image Processing* tabs are the same as with normal illumination (page 2.13).
5. Open *Live View*. Set the magnification ratio to 100%. With the overhead light on, use the focusing ring on the camera lens to manually focus. The focus frame will remain red.
6. Turn the overhead light off. Press *Shoot*.

## Section 11—Slide Capture

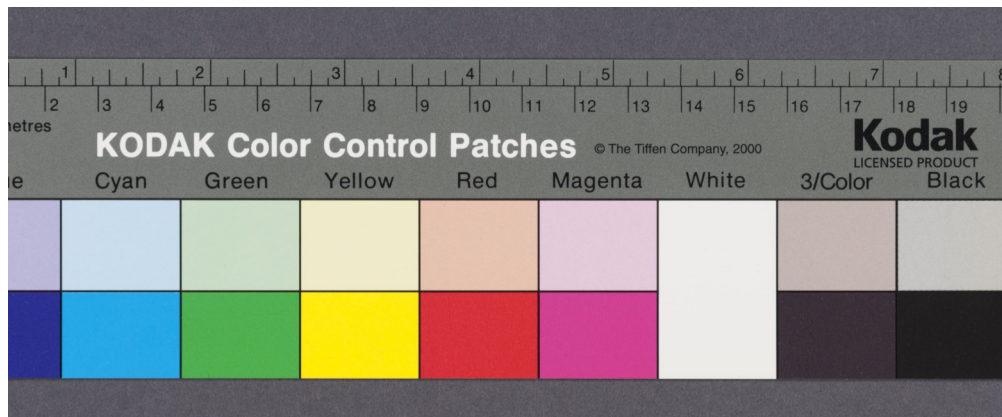


Figure 11.07

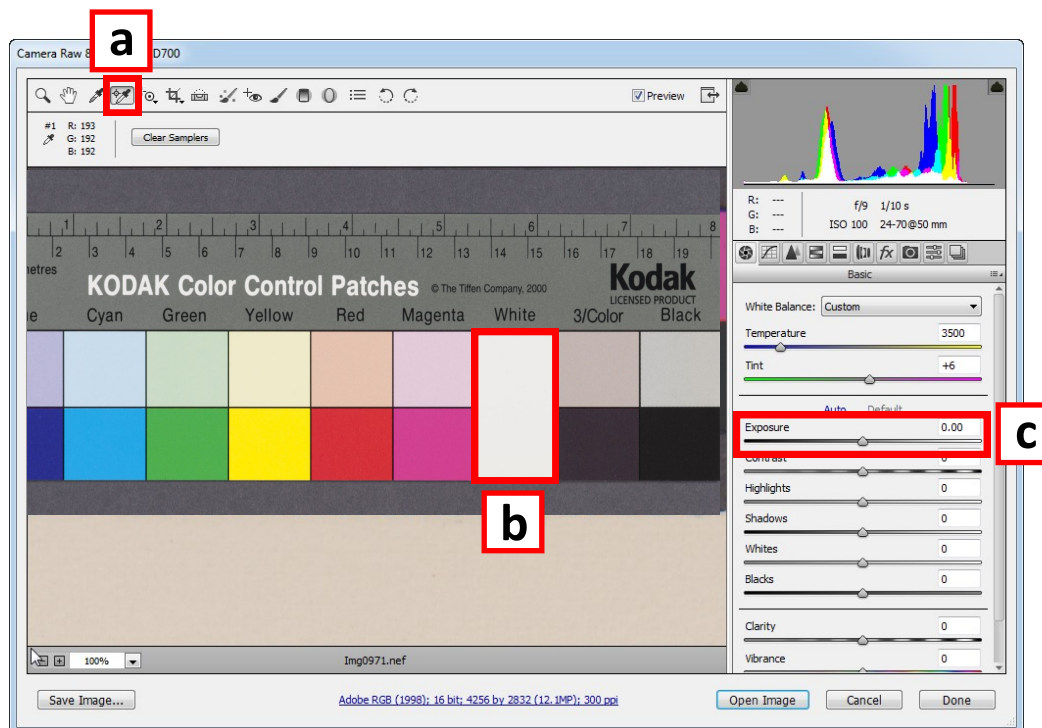


Figure 11.08

## Section 11—Slide Capture

### Preview Images

---

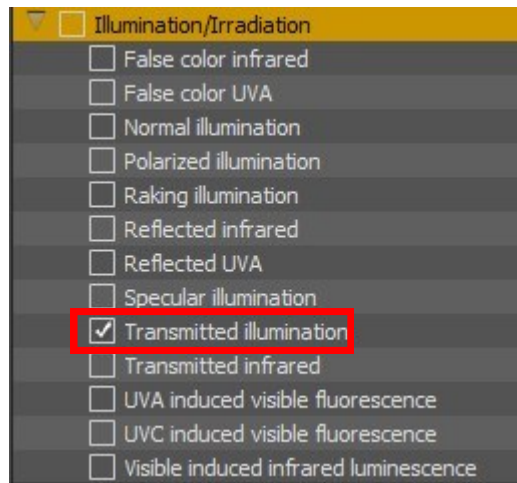
1. In **Bridge**, open the image in **Camera Raw**.
2. If the slide contains a Kodak Q13 color target (fig. 11.07), use the white patch to help evaluate exposure. Select the second *Color Sampler Tool* (fig. 11.08a) and click on the white patch on the color target (fig. 11.08b).  
NOTE: The Q13 target is not neutral; do not use it to white balance.
3. Adjust *Exposure* (fig. 11.08c) to achieve RGB values of 225 +/-5. If necessary, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reevaluate in **Camera Raw**.

### Finish

---

Finish the photography session as done with normal illumination (Section 2). In addition, **turn off the transmitted light source**, replace the mat board on the copystand base, and replace the foot pedal in its box. Remove the 200 mm lens and reattach the 60 mm lens to the camera body.

## Section 11—Slide Capture



**Figure 11.09**

## Section 11—Slide Capture

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *Transmitted illumination* under Illumination/Irradiation (fig. 11.09).

### Image Processing

#### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Sharpening, straightening, cropping and confirming workflow procedures are the same as with normal illumination images (Section 4).
3. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.



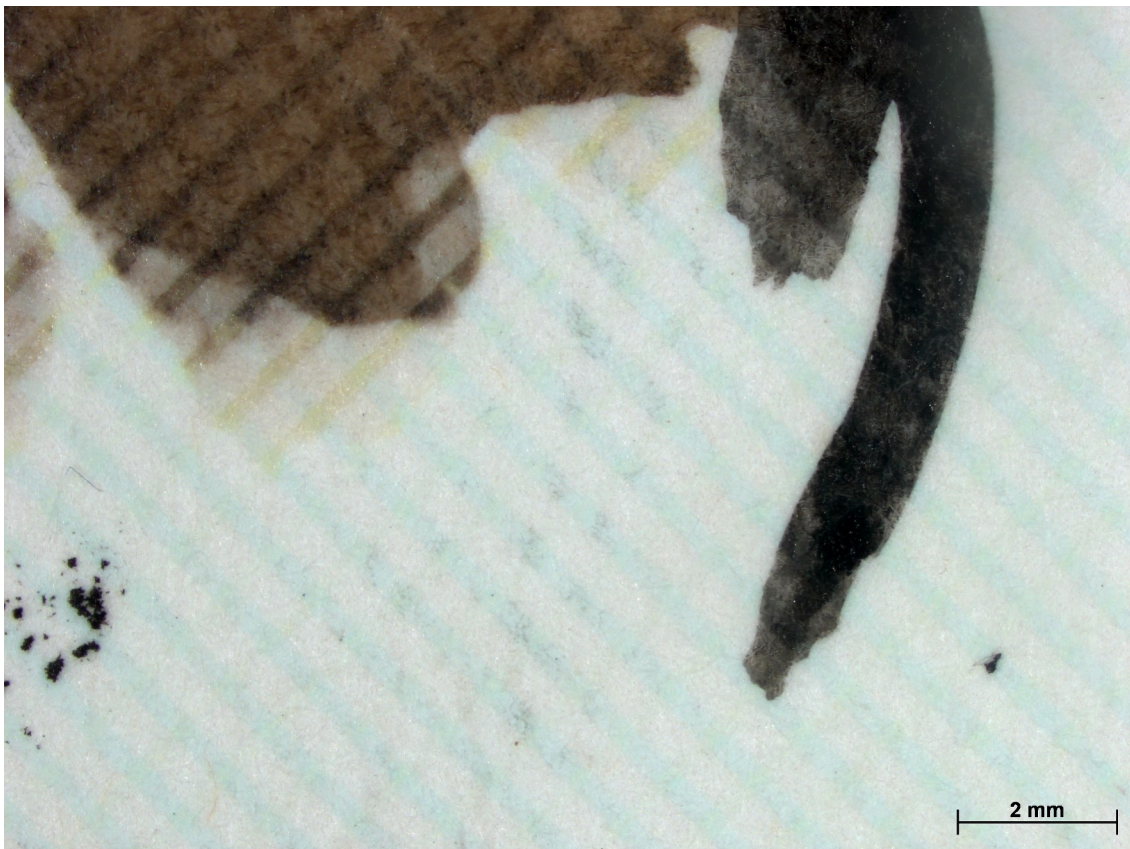
## Section 12—Photomacrography

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### PHOTOMACROGRAPHY

Photomacrographs are produced using the stereomicroscope.



**Photomacrograph**



## Section 12—Photomacrography

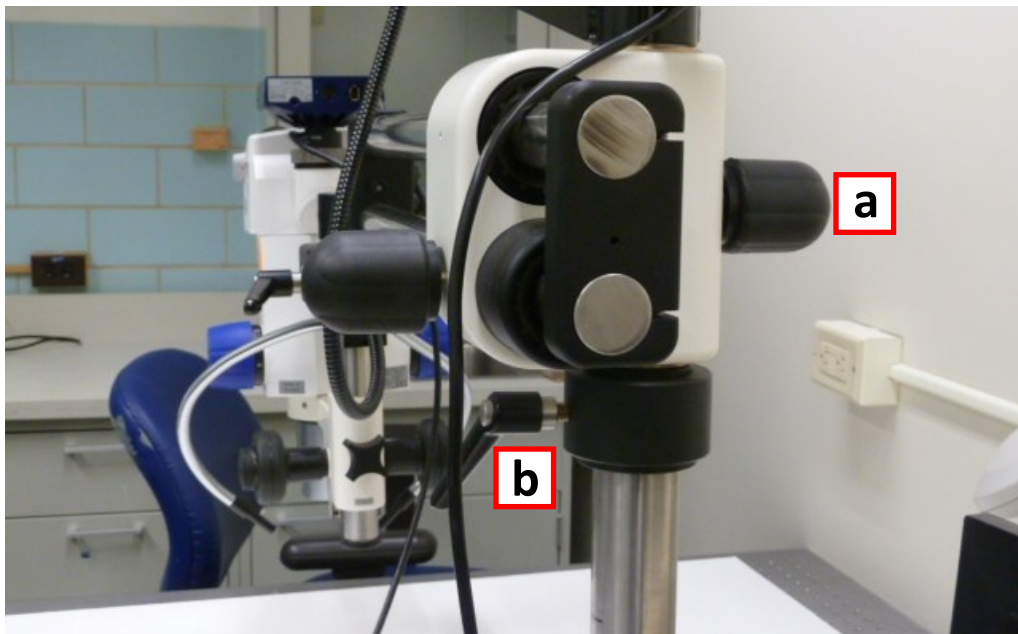


Figure 12.01

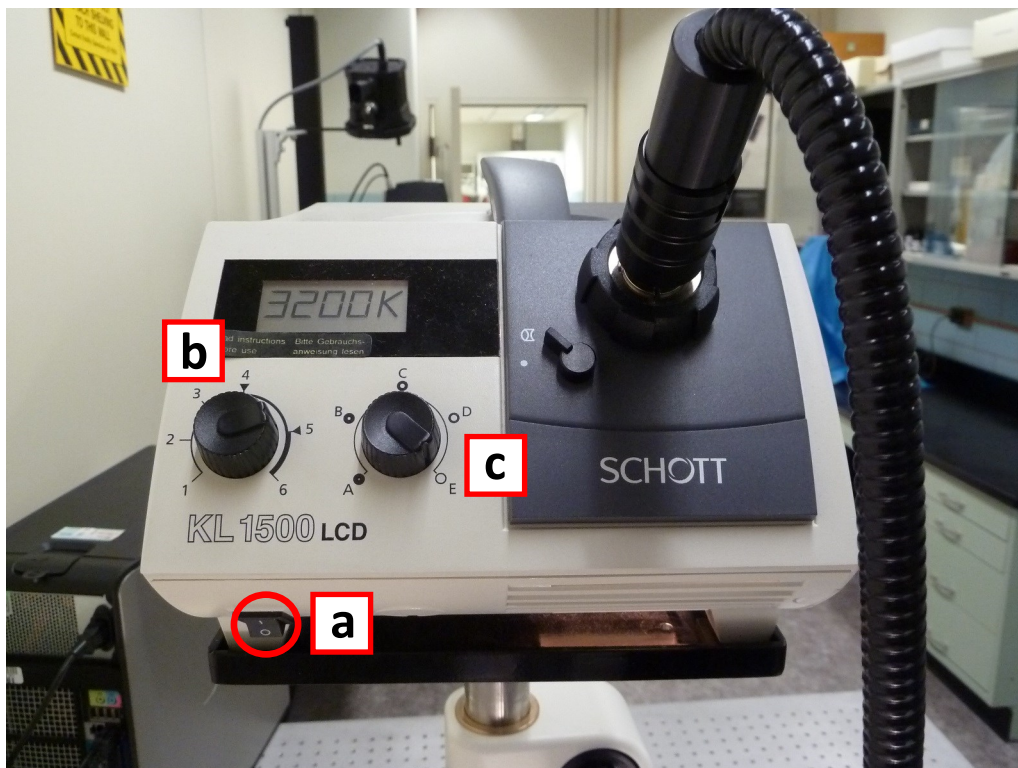


Figure 12.02

## Section 12—Photomacrography

### Capture

Capture takes place in the Microscope Room. Bring your own flash drive.

### Set Up

---

#### Microscope

Adjust the height of the microscope as needed for the object to be examined/photographed. To raise or lower the boom, very carefully release both the pivot lock (fig. 12.01a) and the safety collar (fig. 12.01b). Make note of the height to replicate for during and after treatment capture.

#### Lighting

1. Turn on the Schott KL 1500 light source (fig. 12.02a).
2. Turn the left knob until the display reads 3200° K (fig. 12.02b).
3. Turn the right knob to adjust light intensity (fig. 12.02c). In general, light intensity should be set as high as possible while not losing important details in the image as seen through the monitor. Make note of the intensity setting to replicate for during and after treatment capture.

## Section 12—Photomacrography

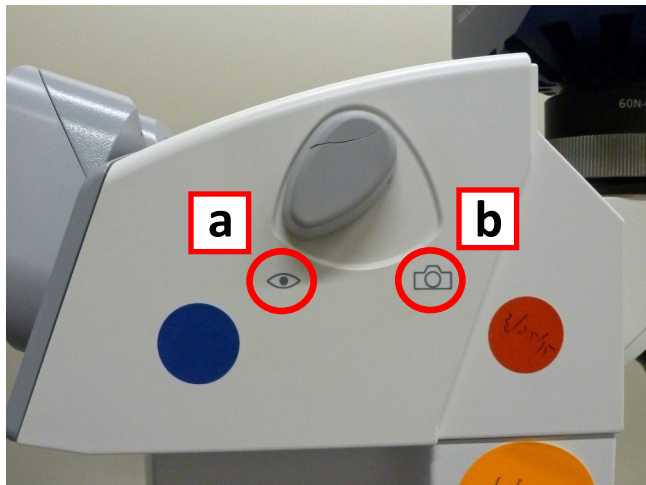


Figure 12.03



Figure 12.04

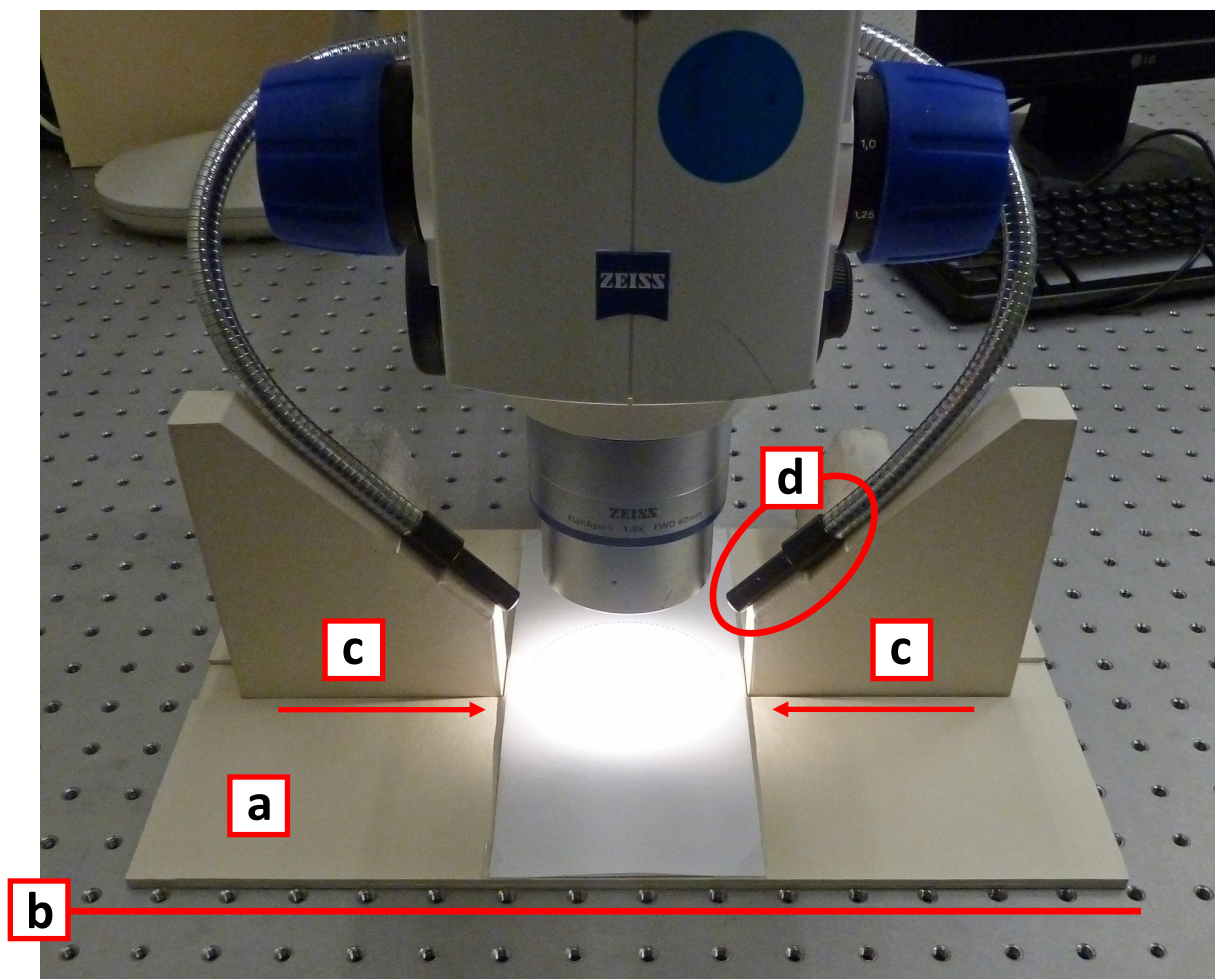


Figure 12.05



## Section 12—Photomacrography

### Set Up, continued

---

#### Lighting

4. Turn the light pathway lever so that it points to the graphic of an eye (fig. 12.03a).
5. Set the microscope magnification dial to *1,0* (fig. 12.04).
6. Retrieve the lighting template stored in the wall cabinet behind the microscope.
7. Position the base of the lighting template under the microscope lens (fig. 12.05a).
8. Center the circle and crosshairs on the template in the field of view. Make sure the template is positioned squarely by using the holes in the tabletop as a guide (fig. 12.05b). Put weights on the upper corners to keep the template from shifting.
9. Slide the light positioning guides (fig. 12.05c) into the slots on the template, moving them all the way in toward the center.
10. Adjust the arms of the lights to rest on the guides (fig. 12.05d), which are constructed to fit the profile of the lights. This centers the lights, fixes the distance between the lights and object, and fixes the angle of the lights at about 45°.
11. Once the lights are positioned, return the template to the wall cabinet.
12. Turn the light pathway lever so that it points to the graphic of a camera (fig. 12.03b).

## Section 12—Photomacrography



Figure 12.06

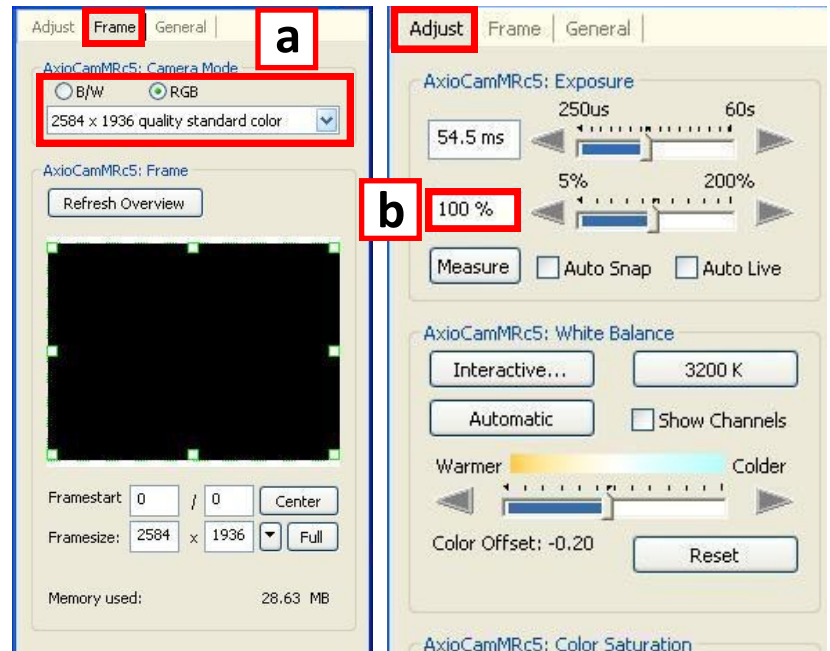


Figure 12.07

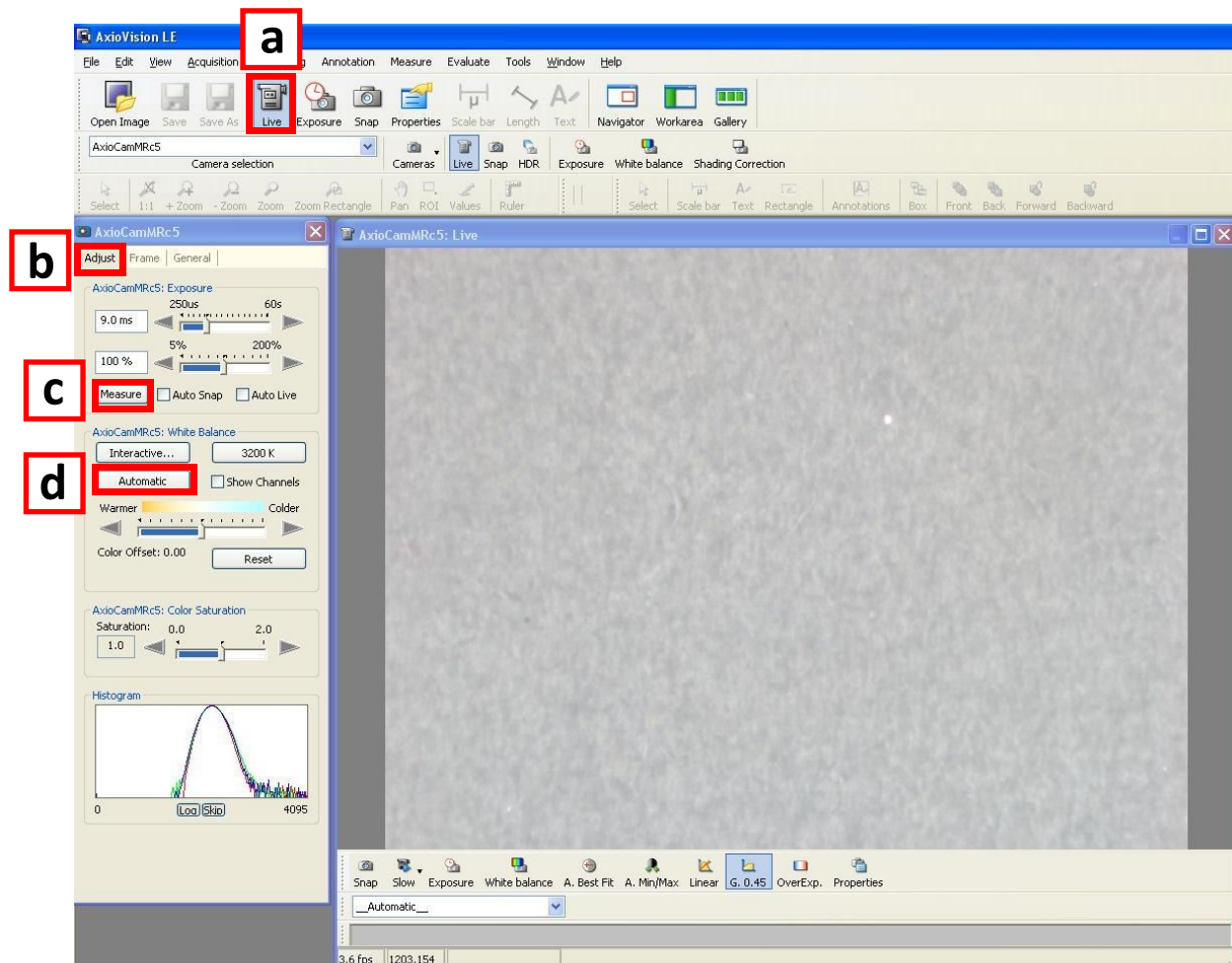


Figure 12.08

## Section 12—Photomacrography

### Set Up, continued

---

#### Computer

1. Turn on the microscope computer monitor.
2. Open *Desktop* > **AxioVision Rel. 4.8**.
3. Click *Cameras* → *AxioCamMRC5* (fig. 12.06a).
4. In the *Properties* box:
  - Under the *Frame* tab: Select *RGB* and *2584 x 1936 quality standard color* (fig. 12.07a).
  - Under the *Adjust* tab: Set exposure to 100% (fig. 12.07b).

#### White Balance

---

1. Retrieve the digital gray card stored in the wall cabinet behind the microscope. Center the gray card under the microscope lens.
2. Turn off the overhead light.
3. In **AxioVision**, click *Live* (fig 12.08a).
4. In the *Properties* box, under the *Adjust* tab (fig. 12.08b):
  - Click *Measure* (fig. 12.08c) to ensure correct exposure when white balancing.
  - Click *Automatic* (fig. 12.08d) to white balance.
5. Return the gray card to the wall cabinet.

## Section 12—Photomacrography

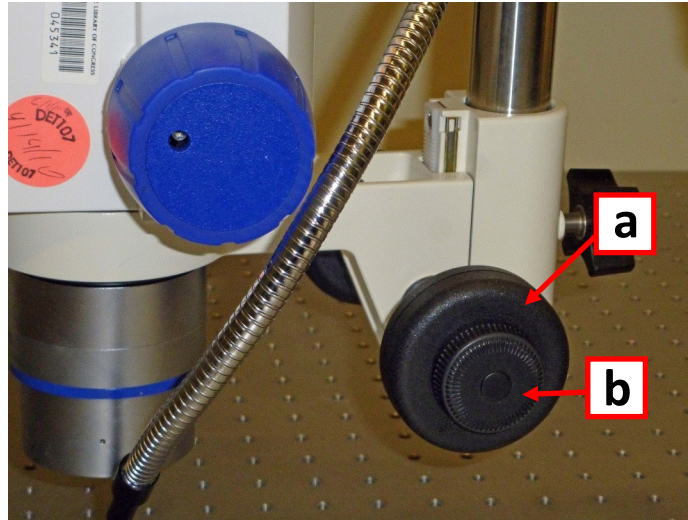


Figure 12.09

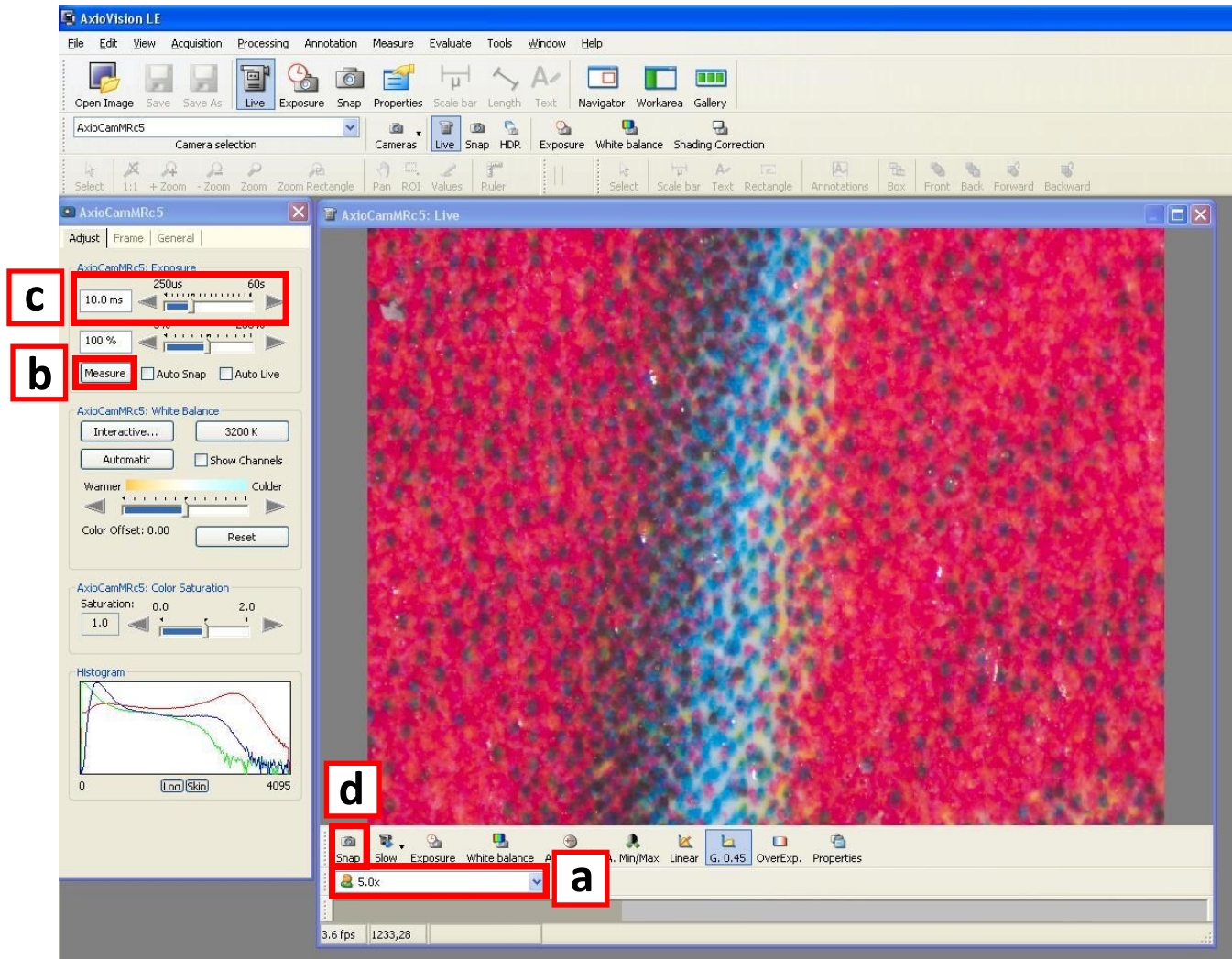


Figure 12.10



## Section 12—Photomacrography

### Image Capture

---

1. Position your object under the microscope lens.
2. Select the desired magnification using the microscope magnification dial (fig. 12.04).
3. Focus the image that is displayed on the monitor using the coarse focus knobs (fig. 12.09a) and the fine focus knob (fig. 12.10b) on the microscope. Do not adjust focus by looking through the eyepieces.
4. In **AxioVision**, match the magnification level to what is set on the microscope (fig. 12.10a).  
**Adjust this anytime the magnification level is changed on the microscope to ensure accuracy of the scale bar added later.**
5. Click *Measure* (fig. 12.10b) to auto adjust exposure. If necessary, manually adjust exposure by changing the exposure time (fig. 12.10c).
6. Click *Snap* (fig. 12.10d).

## Section 12—Photomacrography

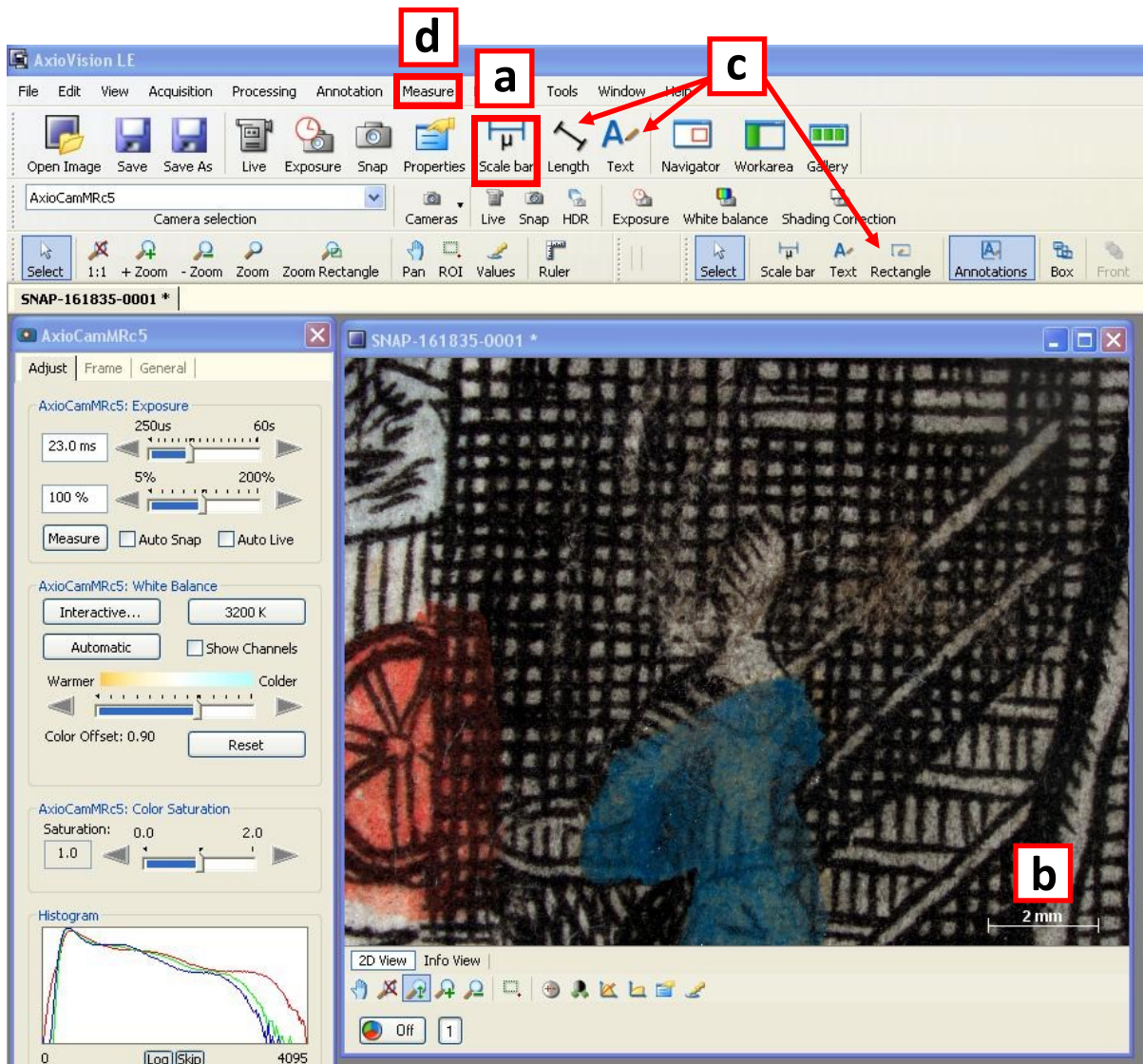


Figure 12.11

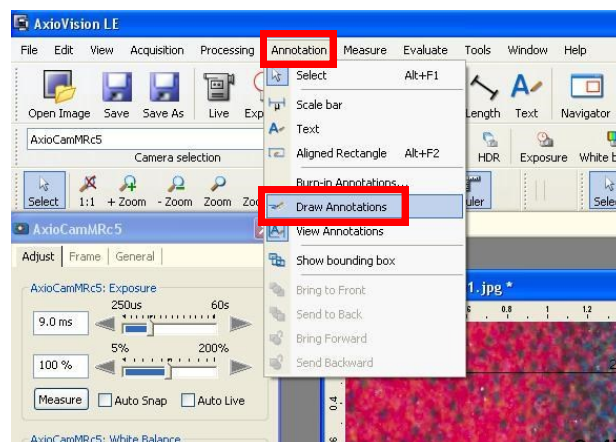


Figure 12.12

## Section 12—Photomacrography

### Annotate Image

---

1. In **AxioVision**, the captured image will appear in a new window.
2. Click *Scale bar* (fig. 12.11a) and draw a scale in the image (fig. 12.11b). **Addition of a scale bar in the image is required.**
3. Optional annotations include: *Length*, *Text*, and *Rectangle* (fig. 12.11c), as well as *Outline* and *Angle* found under *Measure* (fig. 12.11d).
4. To edit annotations, click *Annotation* → *Draw Annotations* (fig. 12.12). A new window with the captured image and all annotations added will open. Edit font style, size, and color; line style, weight, and color; fill color, etc.

## Section 12—Photomacrography

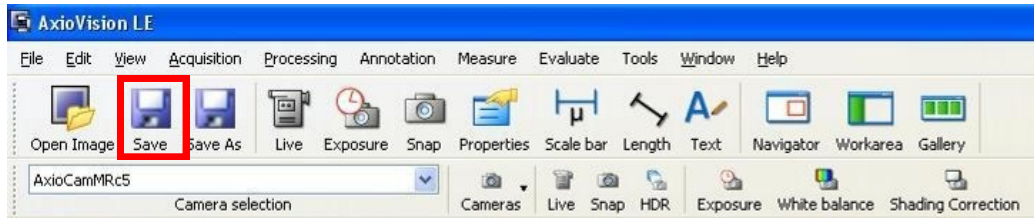


Figure 12.13

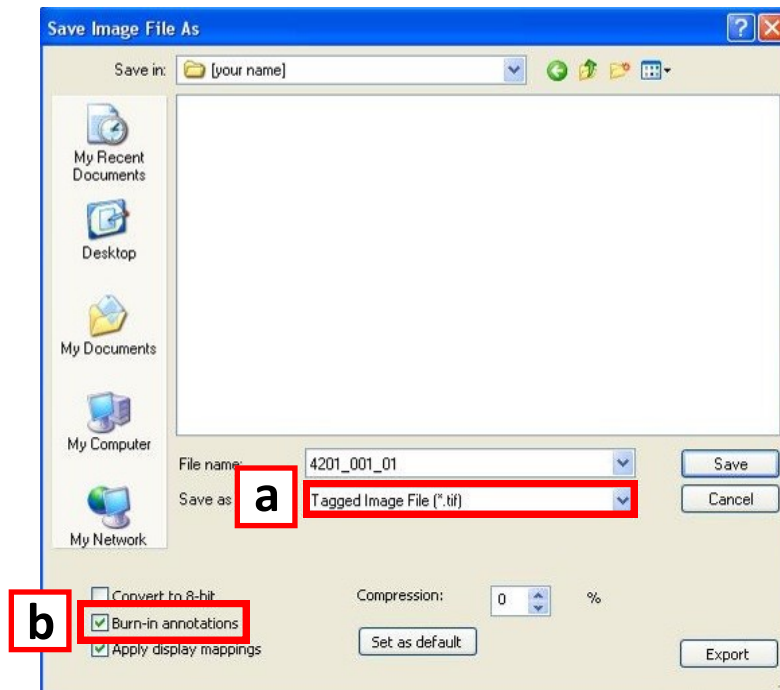


Figure 12.14

## Section 12—Photomacrography

### Save Image

---

1. In **AxioVision**, click *Save* (fig. 12.13).
2. Navigate through to *Desktop > Staff Images > [your folder]*. Create a new folder in *Staff Images* if you do not already have one.
3. Follow the standard file naming protocol (pg. 4.13).
4. Choose *Tagged Image File (\*.tif)* file format (fig. 12.14a).
5. Check *Burn-in annotations* to save annotations on image (fig. 12.14b).
6. Click *Save*.
7. Copy and paste the image(s) onto your flash drive, as the computer is not connected to the network.

### Finish

---

1. Close **AxioVision**, eject your flash drive, and turn off the computer monitor.
2. Turn off the microscope light and replace the microscope cover.

### Metadata

Transfer the image(s) from your flash drive to the project folder on a networked computer. Add metadata as you would for normal illumination (Section 3). Rename as instructed in Section 4. No further image processing is necessary.

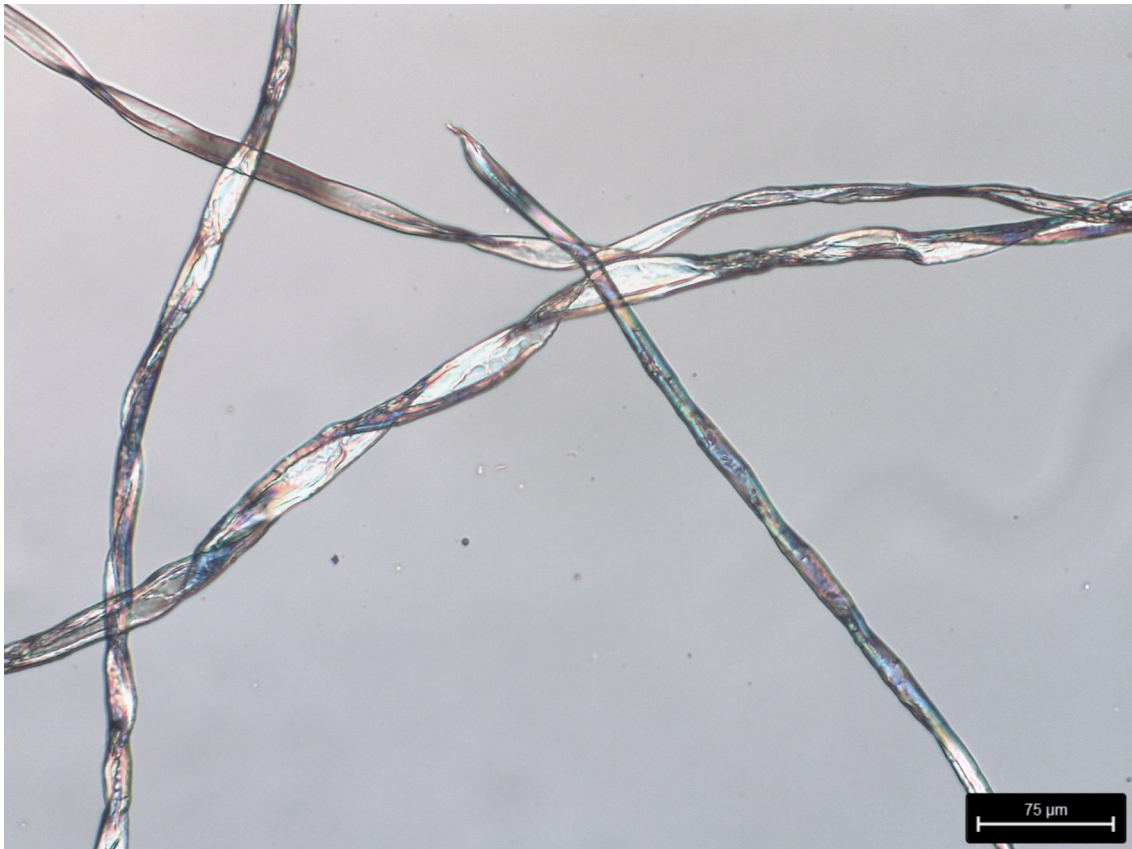
## Section 13—Photomicrography

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### PHOTOMICROGRAPHY

Photomicrographs are produced using the compound microscope.



**Photomicrograph**



## Section 13—Photomicrography

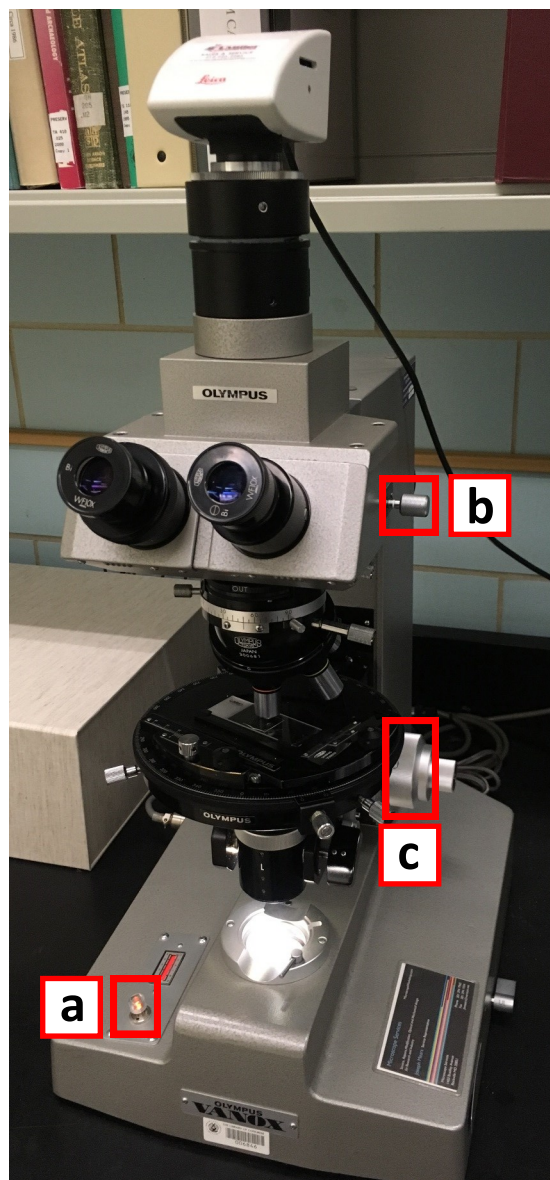


Figure 13.01



Figure 13.02



# Section 13—Photomicrography

## Capture

Capture takes place in the Microscope Room. Bring your own flash drive.

## Set Up

---

### Microscope

1. Remove the microscope cover.
2. Press the button on the bottom left of the microscope to turn on the light (fig. 13.01a).
3. Position your slide on the stage under the microscope lens.
4. Change the objective to the magnification desired (10x, 20x, 40x, or 100x).
5. Push the light path selector (fig. 13.01b) in towards the microscope. When the selector is pushed in (to the white line), the light goes to the microscope eyepieces only; when pulled halfway out (to the green line), the light is split between the eyepieces and camera; when fully extended out (to the red line), the light path goes to the camera only.
6. Adjust the focus on the slide through the eyepieces using the coarse focus knob (fig. 13.01c) on the sides of the microscope. This focus will be further adjusted later.
7. Refer to the black binder labeled “VANOX Universal Research Microscope” for any further assistance needed for microscope use.

### Camera

1. Turn on the LEICA camera mounted on top of the microscope by flipping the right switch on the back of the camera to *ON* (fig. 13.02a). **The camera must be turned on before opening the software.** Make sure the left switch on the back of the camera is in the *HD* position (fig. 13.02b).

## Section 13—Photomicrography

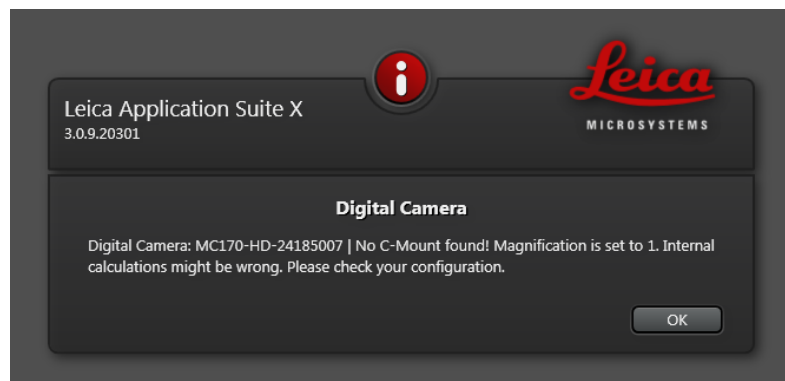


Figure 13.03

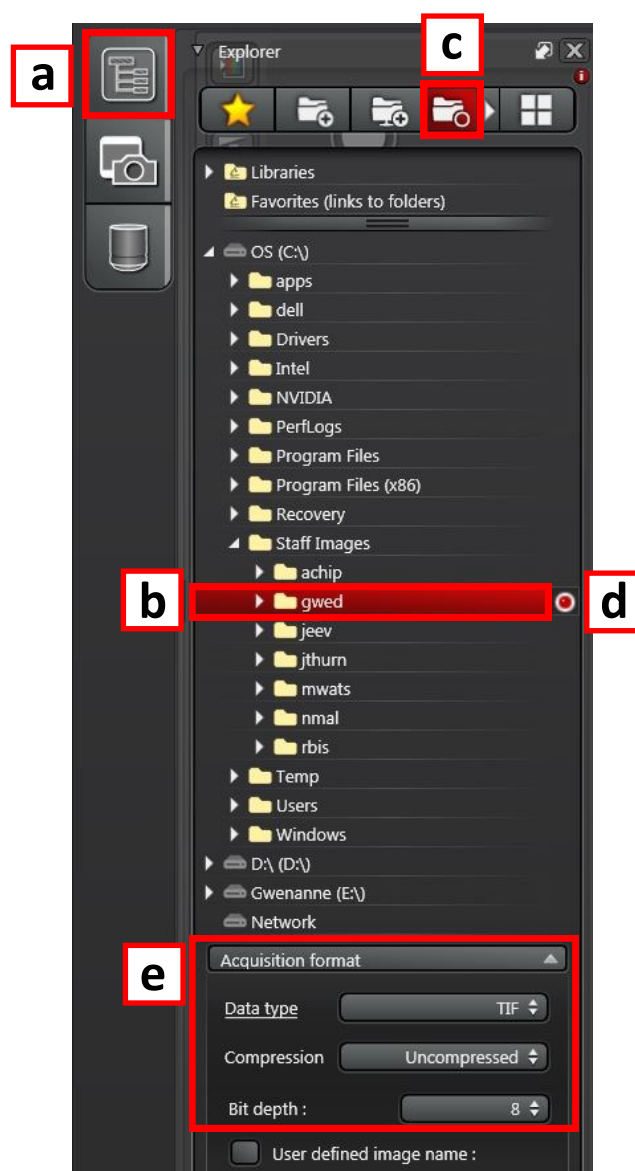


Figure 13.04

## Section 13—Photomicrography

### Set Up, continued

---

#### Computer

1. Turn on the microscope computer and monitor. Turn on the mouse by pressing the power button on the bottom of the mouse.
2. Open the *PresUser* profile.
3. On the desktop, double click **LAS X**.
4. A message will appear asking you to choose configuration settings. Click *OK* or wait 10 seconds until the countdown clock reaches zero and the message disappears.
5. Click *OK* to accept the error message “No C-Mount found” (fig. 13.03).
6. Click the *Explorer* tab in the left panel (fig. 13.04a).
7. If you do not already have a folder in OS (C:\) > Staff Images, create a folder by right clicking *Staff Images* and selecting *Create a new subfolder*. Left click *New Folder* to rename the folder with your LOC user ID. You must create the folder in **LAS X**, not in Windows.
8. Highlight your folder under *Staff Images* (fig. 13.04b), then click the folder icon in the top panel with the red dot (fig. 13.04c) to select your folder as the acquisition location. A red dot will appear to the right of your folder (fig 13.04d).
9. Select the following under the *Acquisition format* drop down tab (13.04e):
  - Data Type: TIFF
  - Compression: Uncompressed
  - Bit depth: 8

## Section 13—Photomicrography

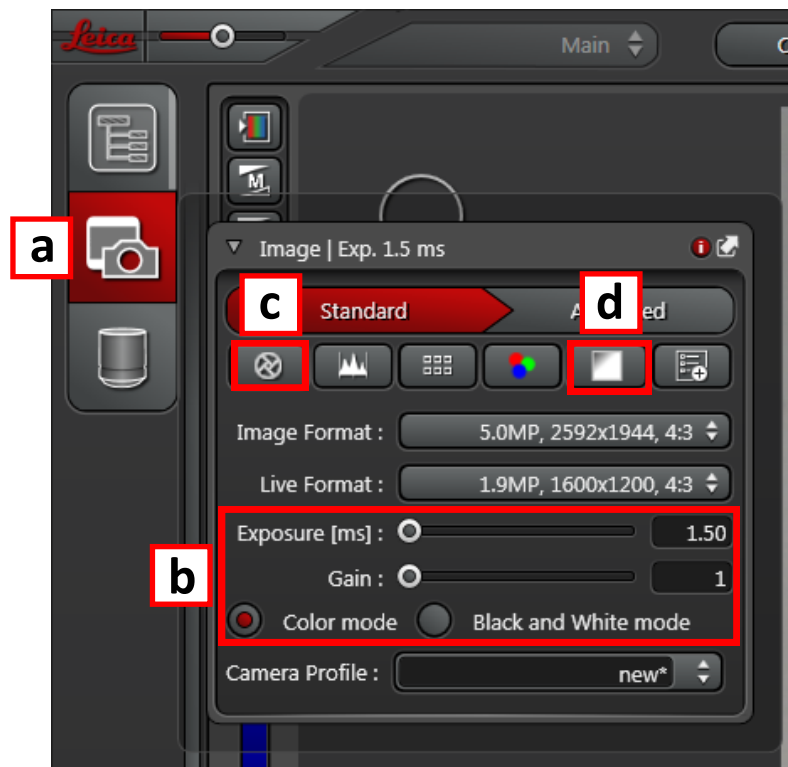


Figure 13.05

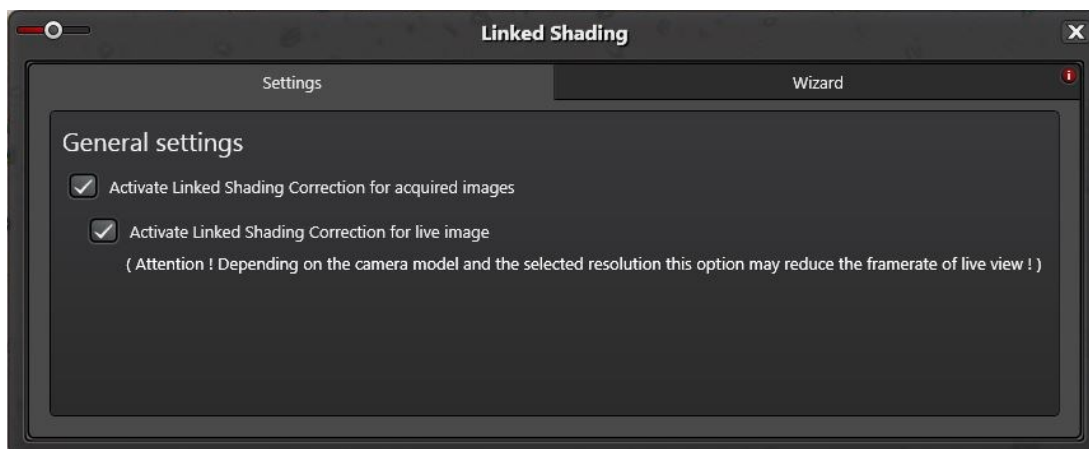


Figure 13.06

## Section 13—Photomicrography

### Set Up, continued

---

#### Microscope and Computer

1. Pull the light path selector on the side of the microscope fully out. The live image of your sample should now appear in **LAS X**.
2. Refine the image focus on the computer monitor by adjusting the fine focus knob on the side of the microscope.

#### Computer

1. In the live image, in an area of the background containing no sample, right click and drag the mouse to create a small rectangle. Select *White Balance*.
2. Click the *Image* tab in the left panel (fig. 13.05a) and set the following (fig. 13.05b):
  - Exposure [ms]: minimum value
  - Gain: 1
  - Color mode
3. In the *Image* tab, click the *Auto Exposure* icon (fig. 13.05c).
4. In the *Image* tab, click the *Linked Shading* icon (fig. 13.05d).
5. In the box that pops up, select *Activate Linked Shading Correction for acquired images* and *Activate Linked Shading Correction for live image* (fig. 13.06). Close the box. The *Linked Shading* icon in the *Image* tab should now appear green.

## Section 13—Photomicrography

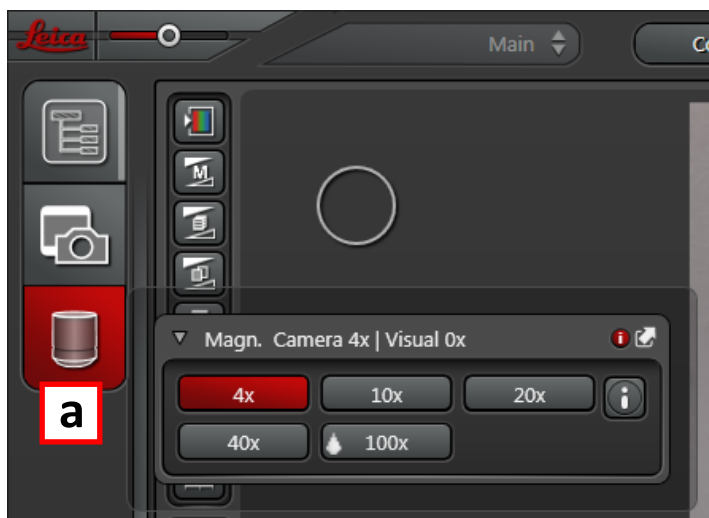


Figure 13.07

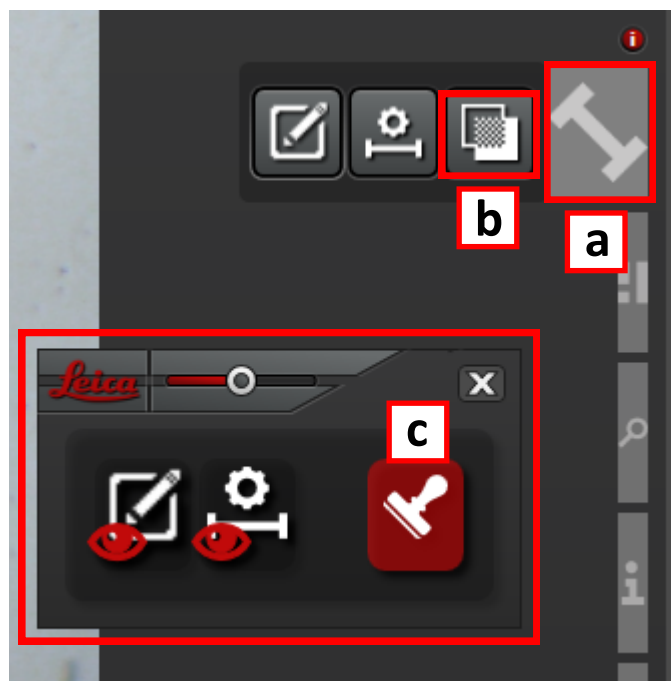


Figure 13.08



Figure 13.09

## Section 13—Photomicrography

### Image Capture

---

1. In **LAS X**, click the *Magnification* tab (fig. 13.07a). Select the magnification level that corresponds to the objective in use on the microscope. Click *OK*. **Adjust this any time the objective is changed on the microscope to ensure accuracy of the scale bar added later.**
2. Click *OK* when asked to “Please turn turret manually to selected objective.”
3. Hover over the *Scale bar* icon at the top of the tool bar on the right panel (fig. 13.08a). Click on the *Overlay* icon (fig. 13.08b).
4. Confirm that the *Stamping* icon is red (fig. 13.08c). If it is not red, click the icon to ensure the scale bar will be added to the image. **Addition of a scale bar in the image is required.**
5. To capture the image, click the camera icon with the blue stamp in the bottom left (fig. 13.09). Confirm the magnification setting and press *OK*.



## Section 13—Photomicrography

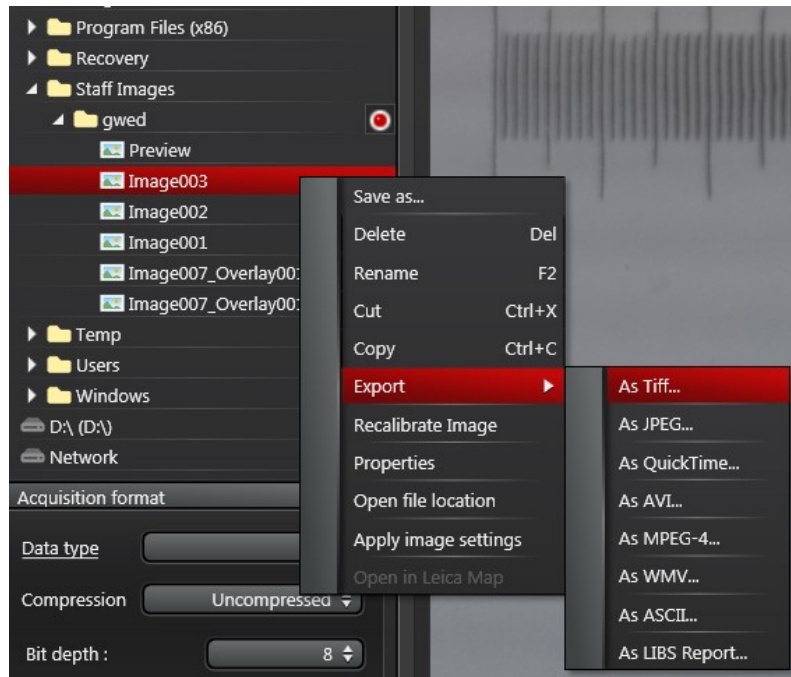


Figure 13.10

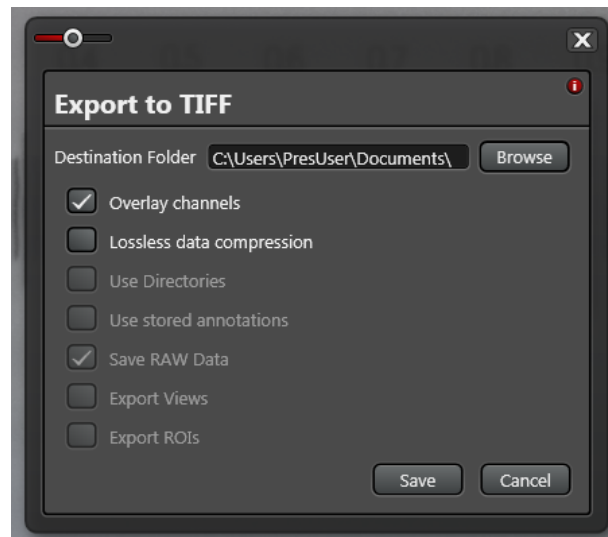


Figure 13.11



Figure 13.12

## Section 13—Photomicrography

### Save Image

---

1. In **LAS X**, click the *Explorer* tab and navigate to your folder in *Staff Images* (fig. 13.10) .
2. Right click on the image and select *Export > As TIFF*.
3. Click *Browse* to select the destination folder. Note: The computer is not connected to the network. You will need to bring a flash drive to save your images. Select your flash drive as the destination.
4. Select *Overlay channels* and deselect *Lossless data compression* (fig. 13.11).
5. Click *Save*.
6. To capture another image, click the *Play* icon in the bottom left (13.12a) to return the screen to live (13.12b).

### Finish

---

1. Close **LAS X** software, eject your flash drive, shut down the computer, and turn off the monitor and mouse.
2. Turn off the microscope camera.
3. Turn off the microscope light, take your slide off the microscope stage, and replace the microscope cover.

### Metadata

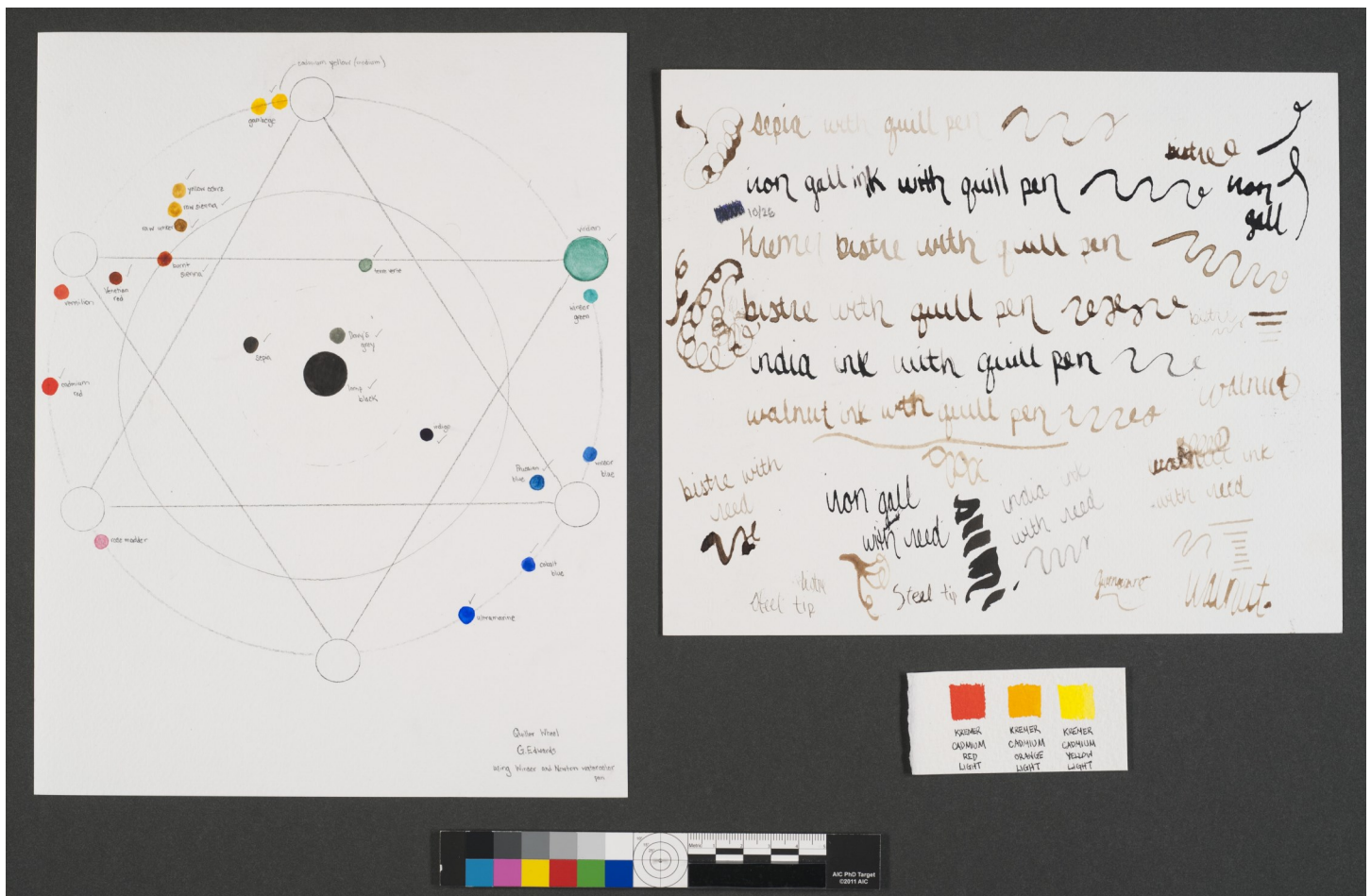
Transfer the image(s) from your flash drive to the project folder on a networked computer. Add metadata as you would for transmitted illumination (Section 3). Rename as instructed in Section 4. No further image processing is necessary.

## Section 14—Visible Illumination (Modified Camera)

# Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

## VISIBLE ILLUMINATION (MODIFIED CAMERA)



### Visible illumination photograph

## Section 14—Visible Illumination (Modified Camera)

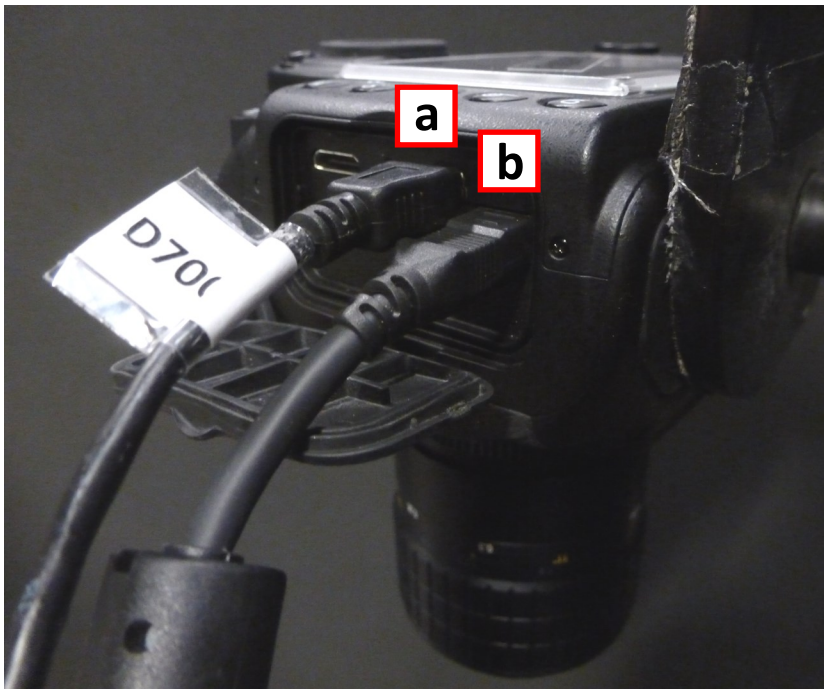


Figure 14.01



Figure 14.02



Figure 14.03

## Section 14—Visible Illumination (Modified Camera)

### Capture

#### Set Up

---

1. Use the Nikon D700 modified camera and the CoastalOpt lens.
2. The USB cable for the D700 is stored in the same box as the camera in the studio cabinet. Attach one end of the D700 USB cable to the camera (14.01a) and the other end to the USB extension cable normally used for the D810. Attach the power cord normally attached to the D810 battery adapter directly to the D700 camera (14.01b).
3. The CoastalOpt lens MUST be set at the minimum aperture setting of f/45 (14.02) to utilize the electronic aperture function (otherwise the camera will display  $f_{EE}$ ).
4. The **PECA 916 and PECA 918** filters are used for visible illumination with the modified camera (fig. 14.03). The filters are stored in the studio cabinet. Very carefully, screw on both filters to the end of the camera lens. The order the filters are screwed on does not matter.
5. Turn on the North Lights and confirm each light stand is at the 66" mark on the floor and the top of the collar is at the 52" mark on the light stand. Allow the lamps to warm up for 15 minutes before taking any images. If the lights were just turned off, wait 10 minutes before turning on again.



## Section 14—Visible Illumination (Modified Camera)

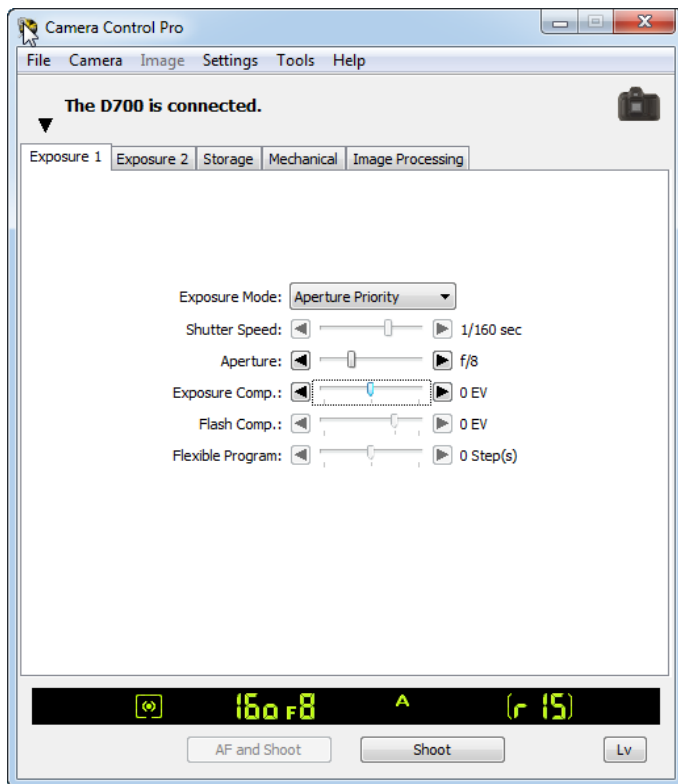


Figure 14.04

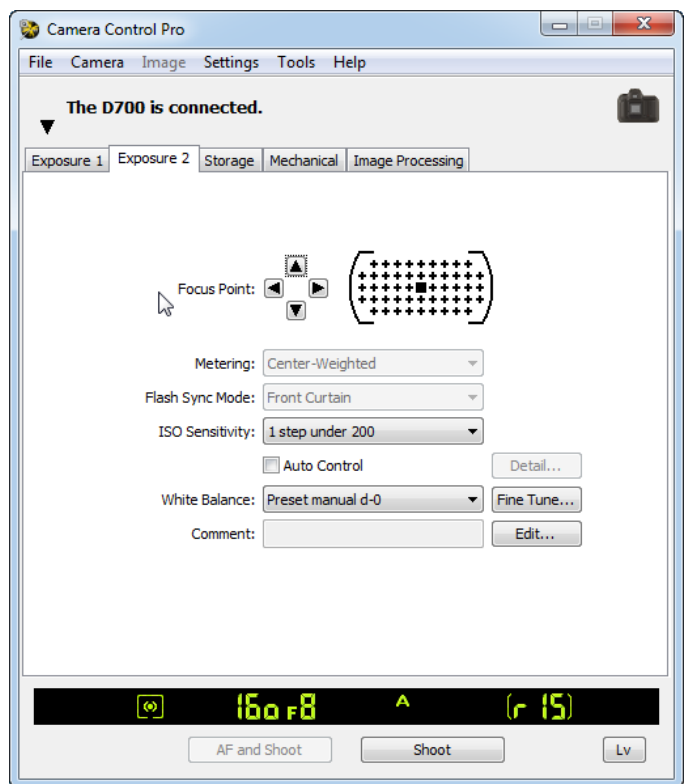


Figure 14.05

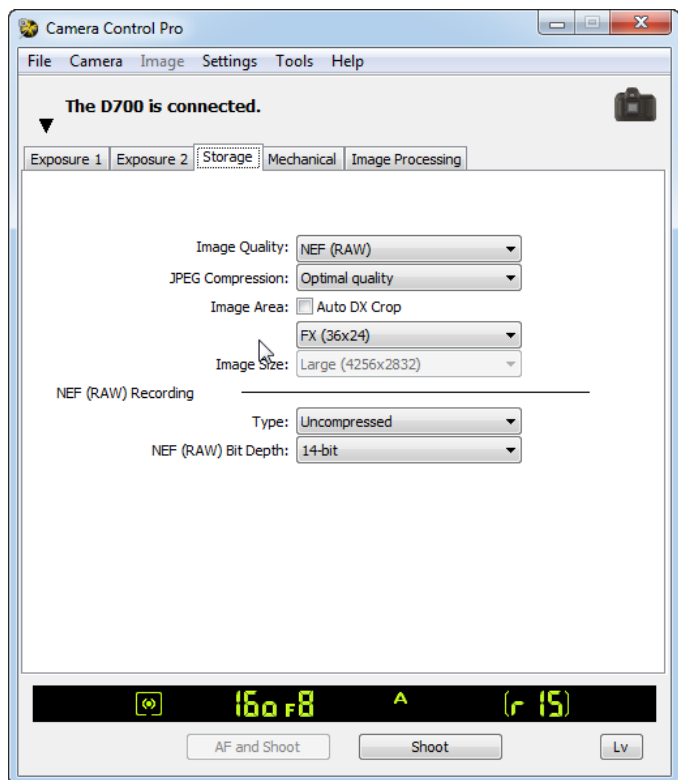


Figure 14.06

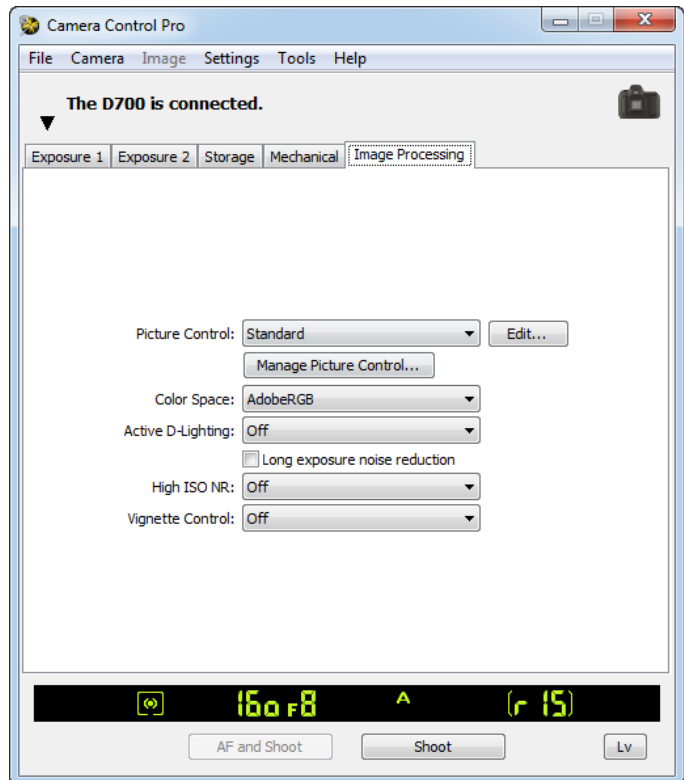


Figure 14.07

## Section 14—Visible Illumination (Modified Camera)

### Adjust and Verify Camera Settings

---

Open **Camera Control Pro** and select the following:

*Exposure 1* tab (fig. 14.04):

Exposure Mode: Aperture Priority

Aperture: f/8 (flat objects) or f/11 (3D objects)

Exposure Comp.: 0

*Exposure 2* tab (fig. 14.05):

ISO Sensitivity: 1 step under 200

White Balance: Preset manual d-0

*Storage* tab (fig. 14.06):

Image Quality: NEF (RAW)

Type: Uncompressed

NEF (RAW) Bit Depth: 14-bit

*Image Processing* tab (fig. 14.07):

Picture Control: Standard

Color Space: Adobe RGB

Active D-Lighting: Off

High ISO NR: Off

Vignette Control: Off



## Section 14—Visible Illumination (Modified Camera)



Figure 14.08

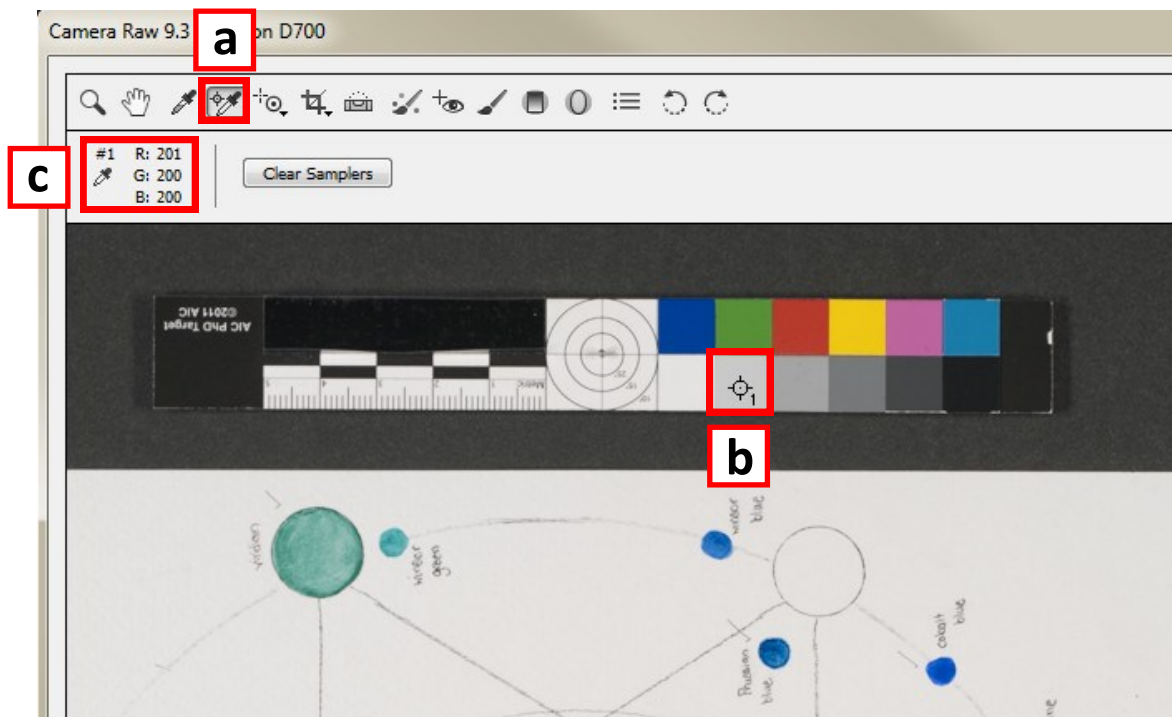


Figure 14.09

## Section 14—Visible Illumination (Modified Camera)

### White Balance

---

1. In **Camera Control Pro**, select *Live View*.
2. Fill the image frame with the X-Rite Color Checker White Balance Card. Close *Live View*.
3. Click *Camera > Measure White Balance*.
4. Select *Preset manual d-0*. Click *OK*.

### Image Capture

---

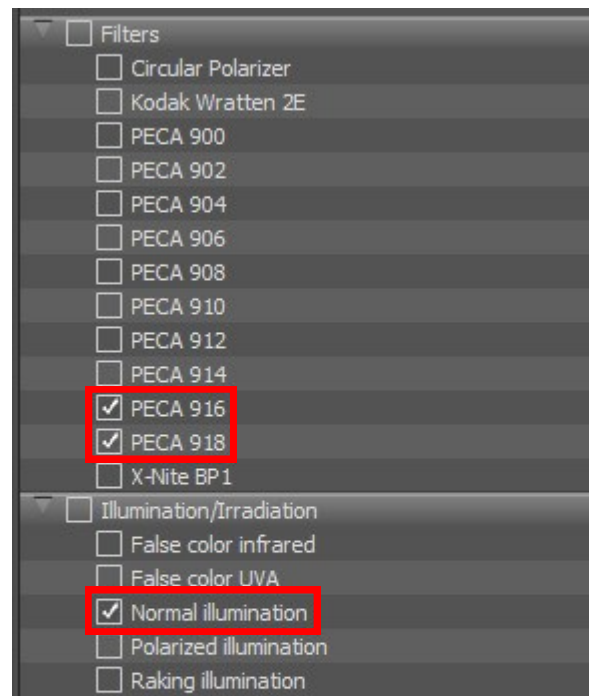
1. In **Camera Control Pro**, select *Live View*.
2. Position your object in the image frame. Place the color target adjacent to the object so that the gray patches are positioned closest to the object and the lightest gray patch is equidistant from each light source.
3. The focus will need to be adjusted manually, so move the computer stand close to the camera. In *Live View*, set the *Magnification Ratio* to 100% (fig 14.08a). The autofocus function is not operational with the CoastalOpt lens, so use the focusing ring on the lens to focus manually. The focus frame will remain red due to manual focusing. When taking a series of multimodality images, **DO NOT change the focus** from what was just set to ensure all images are aligned the same.
4. Set *Magnification Ratio* back to full screen.
5. In *Live View* of **Camera Control Pro**, click *Shoot*.

### Preview Images

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Select the *Color Sampler Tool* (fig. 14.09a) and click on the lightest gray patch on the color target (fig. 14.09b). The RGB values should be 200 +/-5 (fig. 14.09c).
3. If RGB values are outside 200 +/-5, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reevaluate in **Camera Raw**.
4. Click *Done* in **Camera Raw** to accept changes.

## Section 14—Visible Illumination (Modified Camera)



**Figure 14.10**

## Section 14—Visible Illumination (Modified Camera)

### Finish

---

If continuing to another section, remove the PECA 916 and PECA 918 filters before proceeding.

When finished with the session, return the camera, USB cord, filter and target to the studio cabinet and turn off the North Lights.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *PECA 916* and *PECA 918* under Filters and *Normal illumination* under Illumination/Irradiation (fig. 14.10).

### Image Processing

#### Adjust Image Files

---

1. Open the image in **Camera Raw** from **Bridge**.
2. White balance, exposure, sharpening, straightening, cropping, and confirming workflow procedures are the same as with normal illumination images captured with the standard camera (Section 4).
3. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

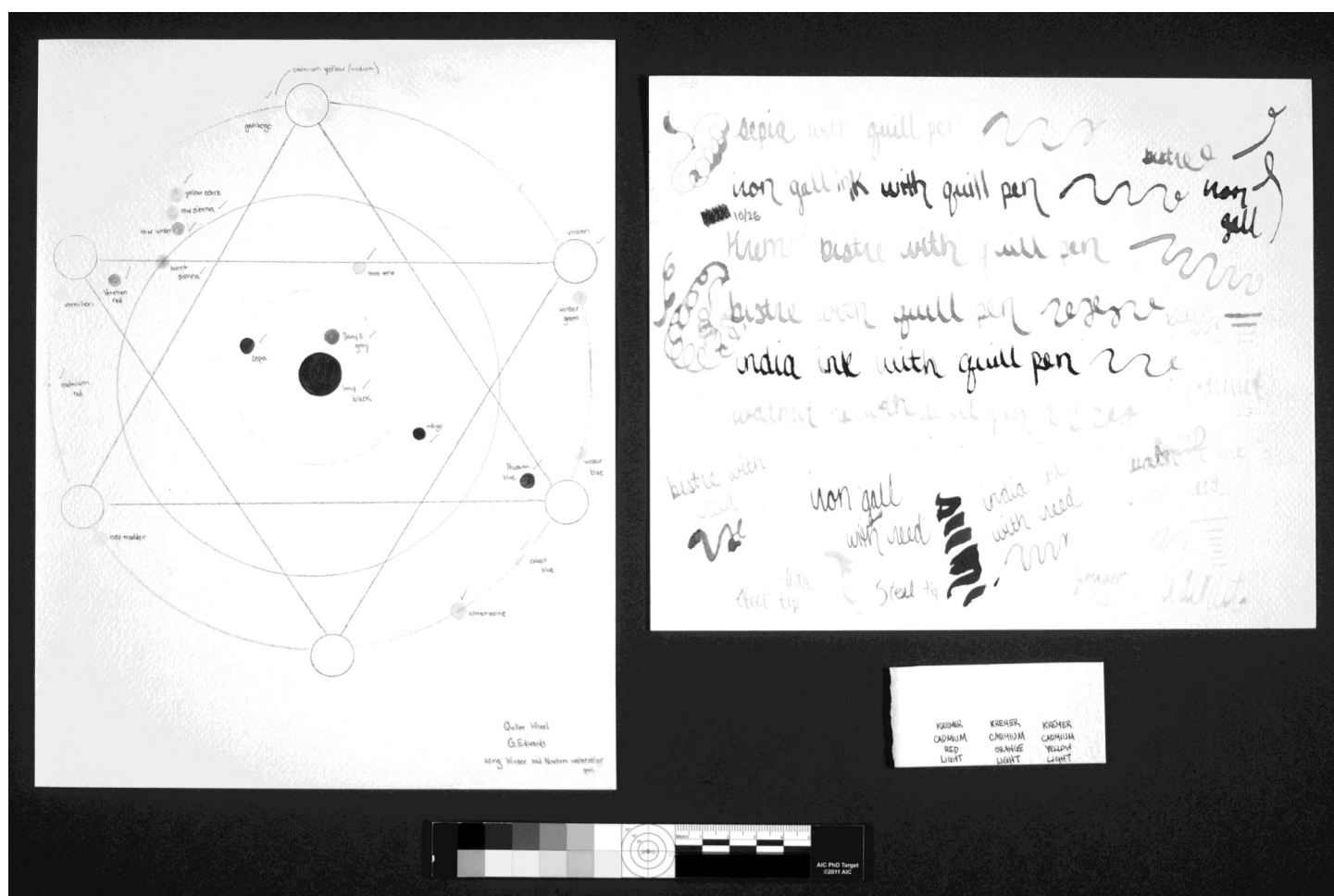
## Section 15—Reflected Infrared (Modified Camera)

# Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

## REFLECTED INFRARED (MODIFIED CAMERA)

This mode is used to examine underdrawings, see obscured or faded inscriptions, and characterize and differentiate materials. The technique involves illuminating the object with visible light and infrared radiation and capturing the infrared wavelengths reflected by the object.



### Reflected infrared photograph

## Section 15—Reflected Infrared (Modified Camera)

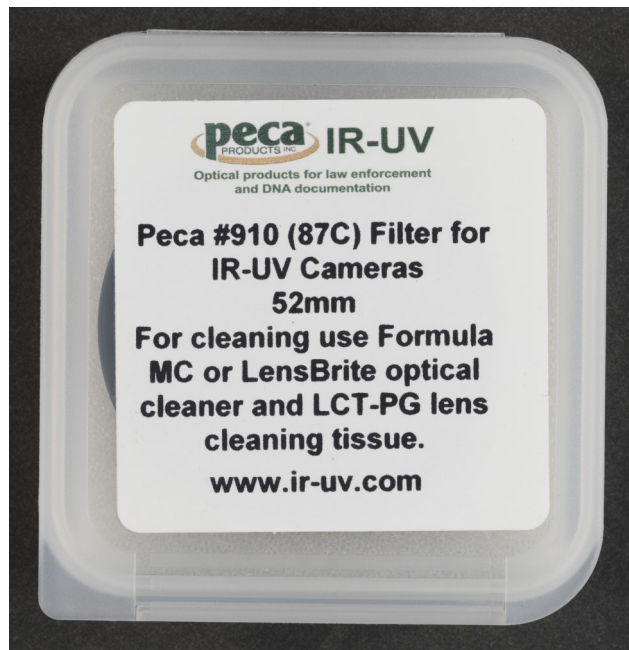


Figure 15.01

## Section 15—Reflected Infrared (Modified Camera)

### Capture

#### Preliminary

---

If not done already, capture a visible illumination image with the modified camera following instructions in Section 14.

#### Set Up

---

1. Set up the North Lights the same as with visible illumination with the modified camera (Section 14).
2. Use the Nikon D700 modified camera and the CoastalOpt lens.
3. The CoastalOpt lens MUST be set at the minimum aperture setting of f/45 to utilize the electronic aperture function (otherwise the camera will display  $\infty$ ).
4. The **PECA 910** filter (850-1000 nm imaging) is used for general reflected infrared photography with the modified camera (fig. 15.01). The filter is stored in the studio cabinet. Very carefully, screw on the filter to the end of the camera lens.



## Section 15—Reflected Infrared (Modified Camera)

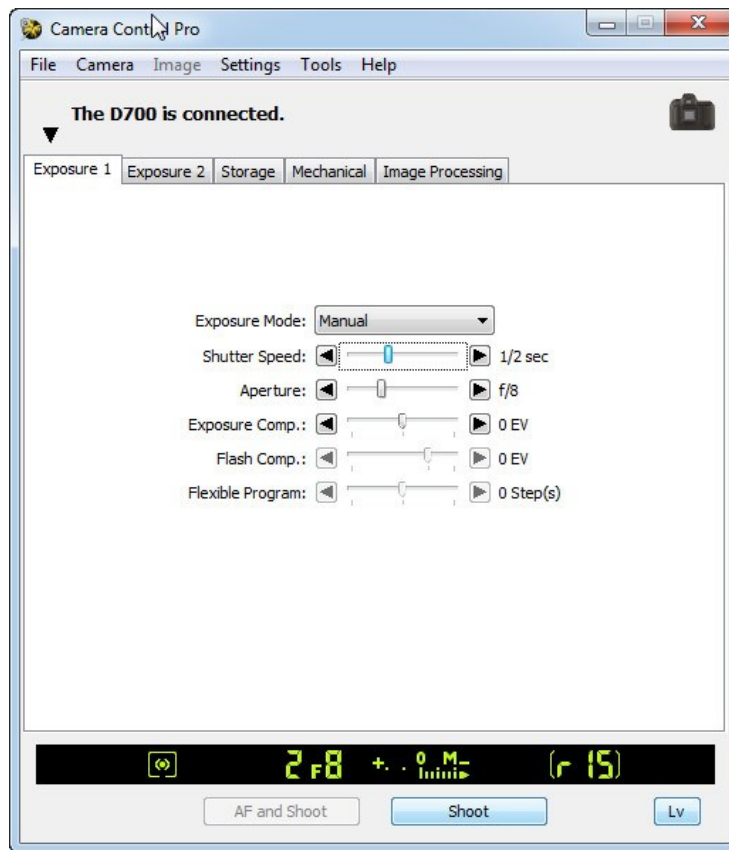


Figure 15.02

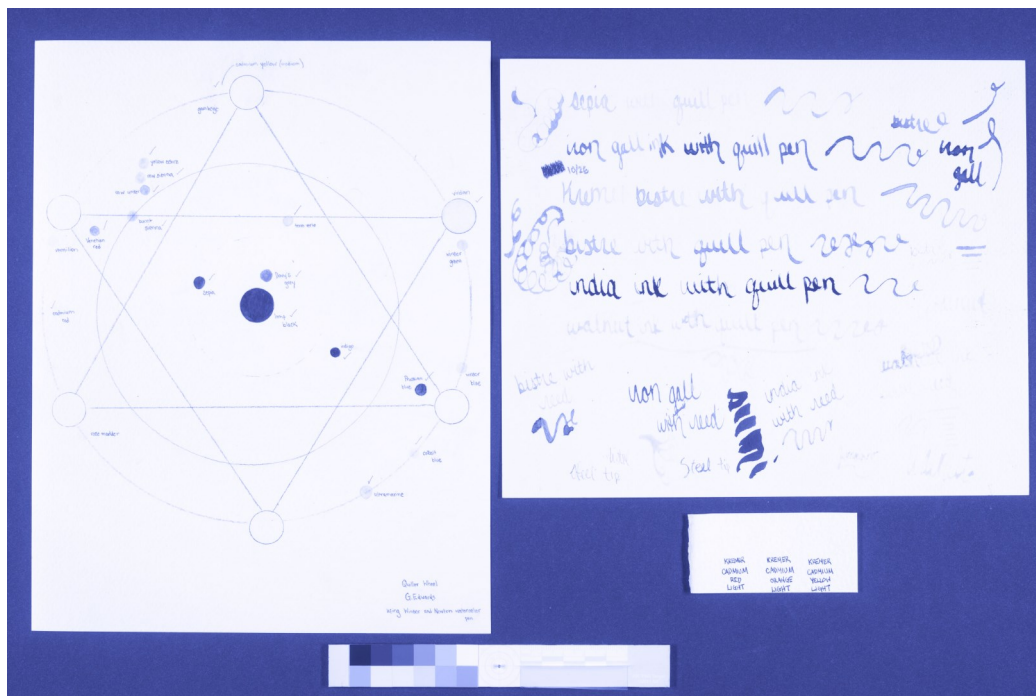


Figure 15.03

## Section 15—Reflected Infrared (Modified Camera)

### Image Capture

---

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following (fig. 15.02):
  - Exposure Mode: Manual
  - Shutter Speed: ½ second (this may need to be adjusted later)
  - Aperture: f/8 (flat objects) or f/11 (3D objects) - select same as used in visible
  - Exposure Comp.: 0
2. Settings under the *Exposure 2* (including white balance), *Storage*, and *Image Processing* tabs are the same as with visible illumination with the modified camera (Section 14).
3. Open *Live View*. Position your object in the image frame. Place the color target adjacent to the object so that the gray patches are positioned closest to the object and the lightest gray patch is equidistant from each light source. The image will appear magenta, violet or blue (fig. 15.03).
4. Use the same focus as set manually for visible illumination with the modified camera (Section 14). The focus frame will remain red due to manual focusing.
5. Click *Shoot*.

## Section 15—Reflected Infrared (Modified Camera)

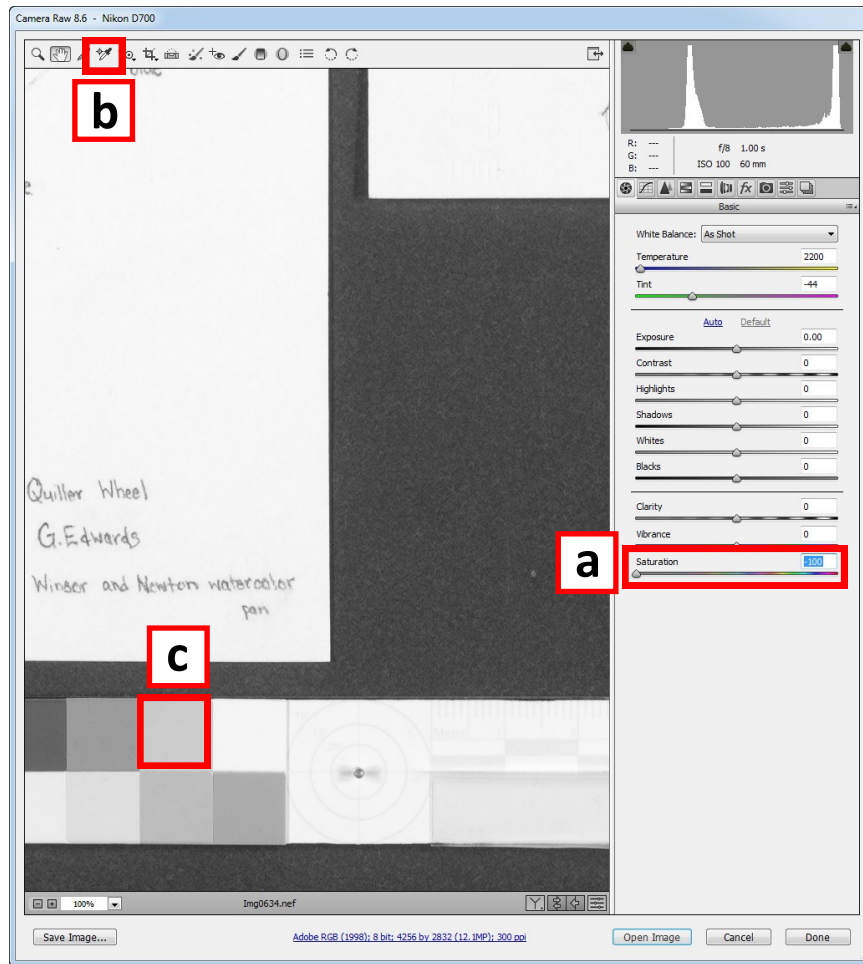


Figure 15.04

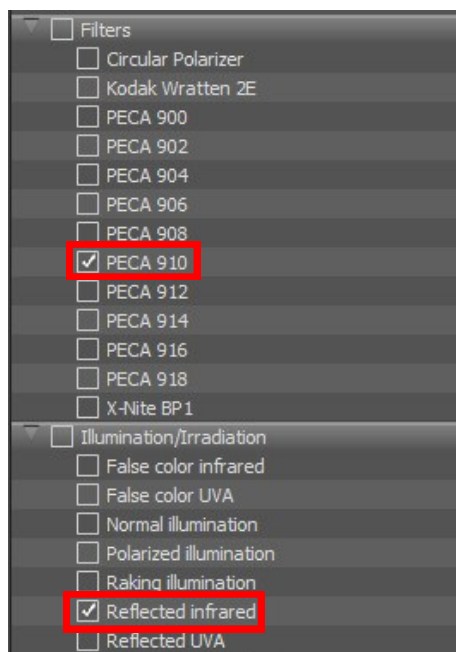


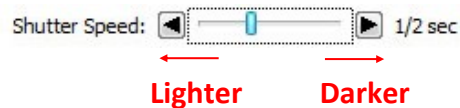
Figure 15.05

## Section 15—Reflected Infrared (Modified Camera)

### Preview Images

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Set the *Saturation* to **-100** (fig. 15.04a).
3. Select the *Color Sampler Tool* (fig. 15.04b) and click on the lightest gray patch on the color target (fig. 15.04c). The RGB values should be 200 +/-5.
4. If RGB values are outside 200 +/-5, adjust the *Shutter Speed* (NOT *Exposure Comp.*) in the *Exposure 1* tab of **Camera Control Pro** and reshoot. For example, if RGB values are too low, decrease the shutter speed and reshoot. Evaluate the new image following steps 1-3.



5. Click *Done* in **Camera Raw** to accept changes.

### Finish

---

If continuing to another section, remove the PECA 910 filter before proceeding.

When finished with the session, return the camera, USB cord, filter and target to the studio cabinet and turn off the North Lights.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *PECA 910* under *Filters* and *Reflected infrared* under *Illumination/Irradiation* (fig. 15.05).

## Section 15—Reflected Infrared (Modified Camera)

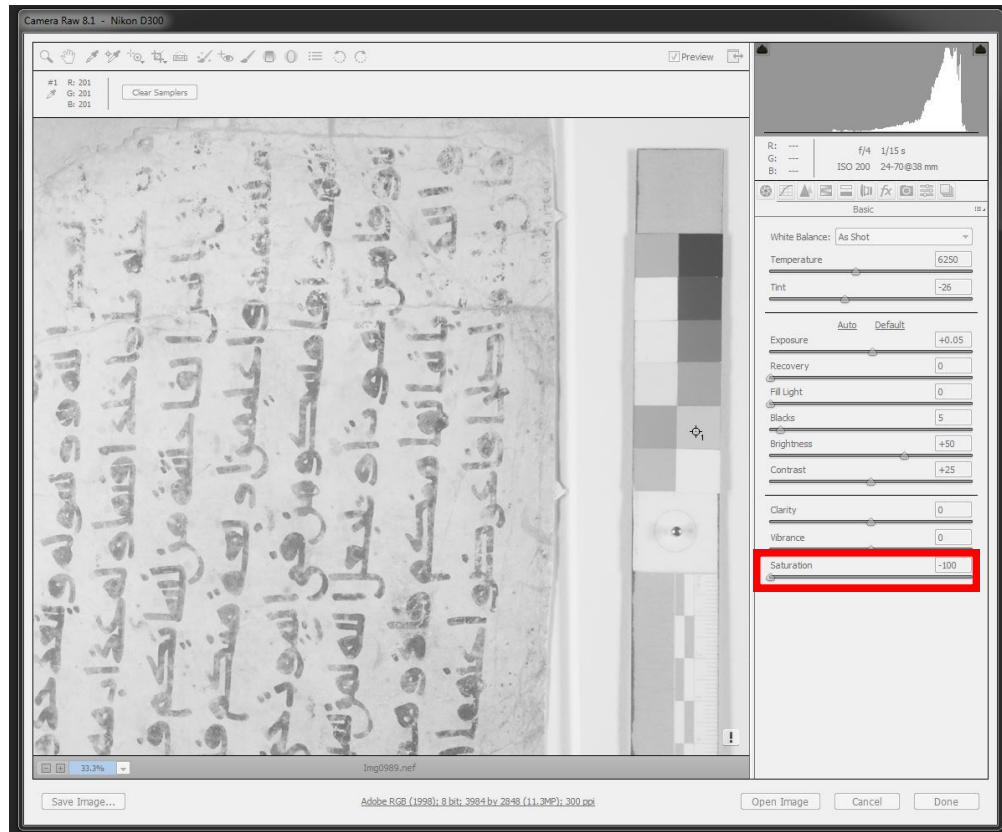


Figure 15.06

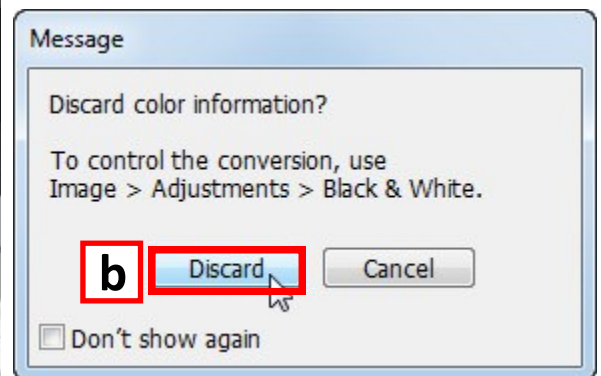
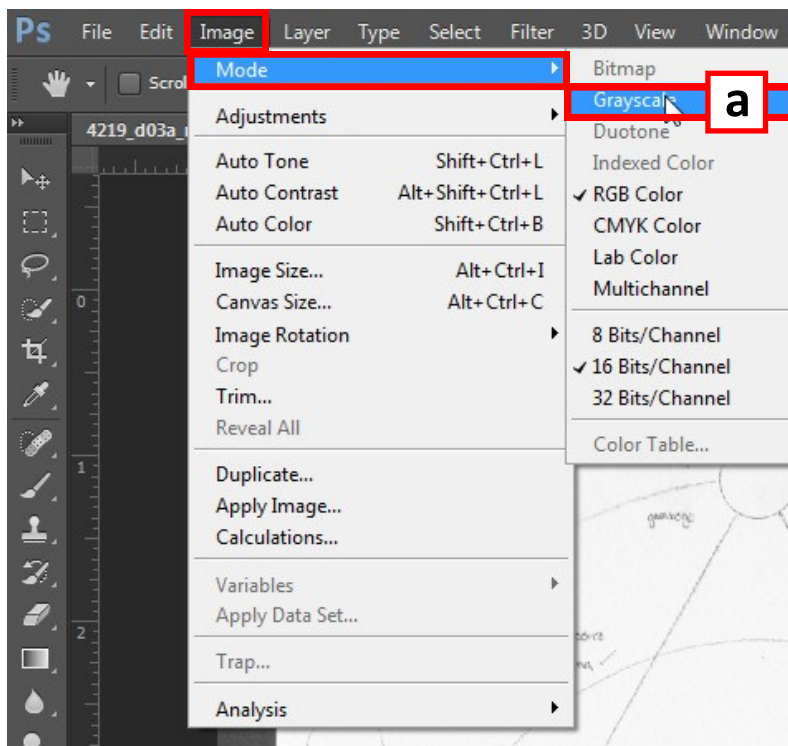


Figure 15.07

## Section 15—Reflected Infrared (Modified Camera)

### Image Processing

#### Adjust Image Files

---

1. Open the image in **Camera Raw** from **Bridge**.
2. Ensure Saturation is set at  $-100$  (fig 15.06).
3. Adjusting exposure, sharpening, straightening, cropping, and confirming workflow procedures are the same as with normal illumination images captured with the standard camera (Section 4). White balance does not need to be adjusted.
4. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

### Image Post-Processing

Post-processing of reflected infrared images is required.

#### Convert to Grayscale

---

1. Open the reflected infrared .tif file in **Photoshop** from **Bridge**.
2. Click *Image > Mode > Grayscale* (fig. 15.07a).
3. Click *Discard* (fig. 15.07b).



## Section 15—Reflected Infrared (Modified Camera)

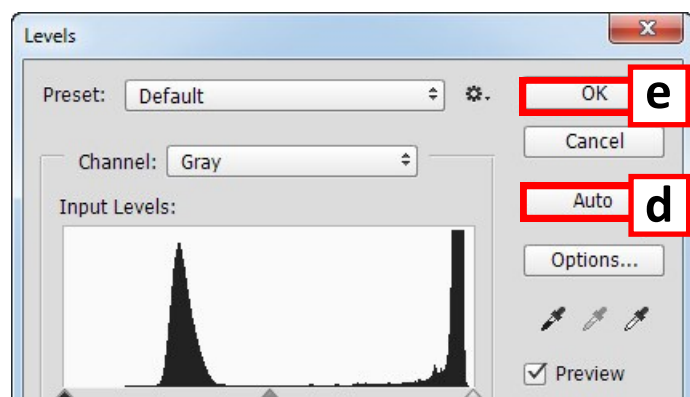
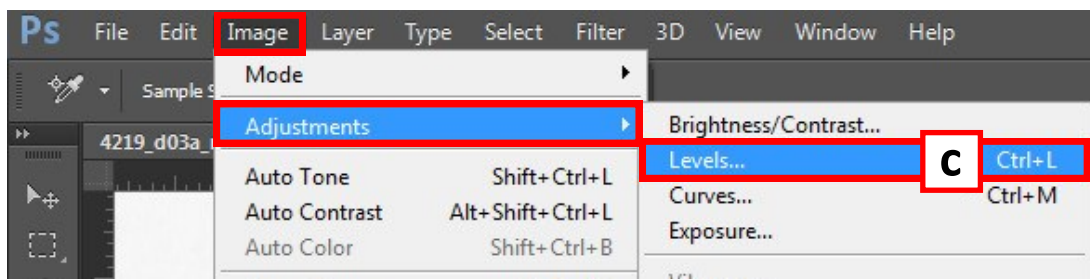
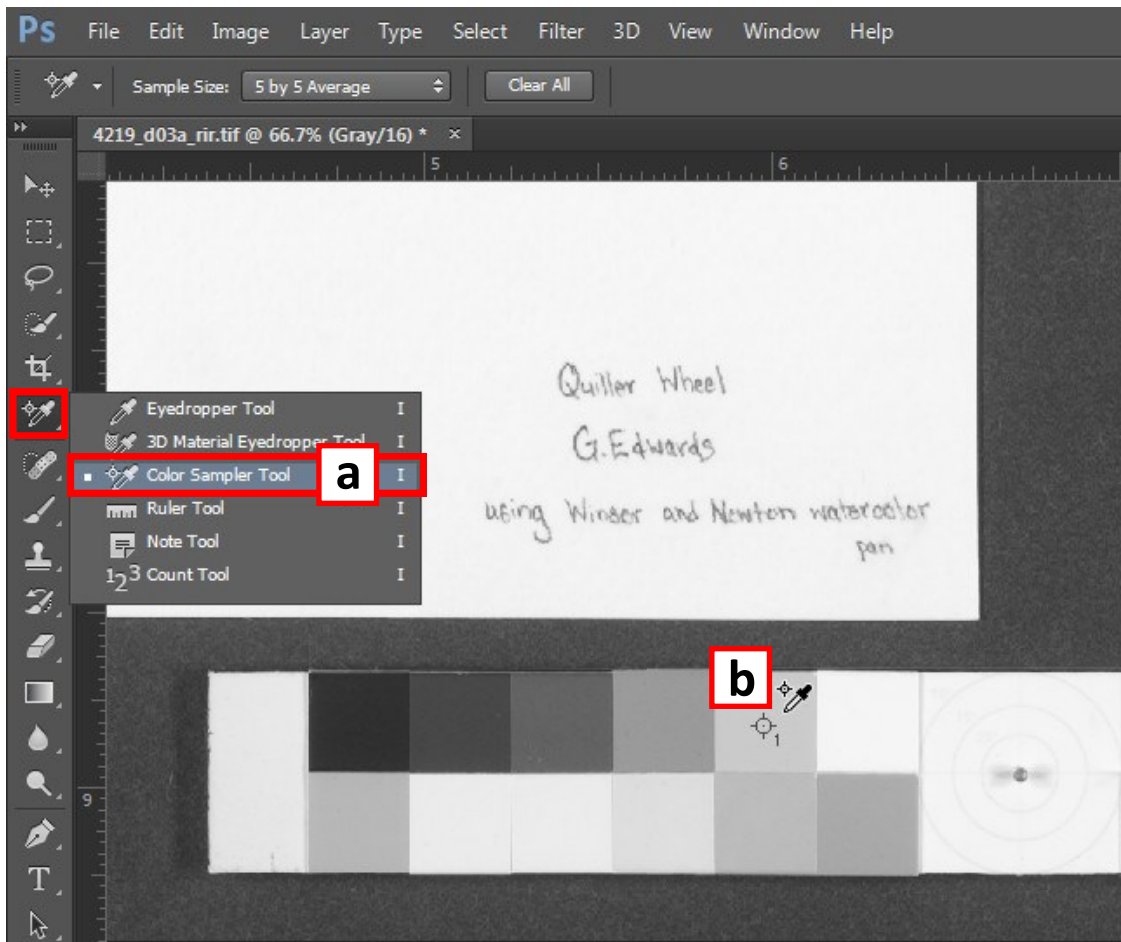


Figure 15.08



## Section 15—Reflected Infrared (Modified Camera)

### Adjust Levels

---

1. In **Photoshop**, right click on the *Eyedropper Tool* and select the *Color Sampler Tool* (fig. 15.08a). Click on the lightest gray patch on the color target (fig. 15.08b).
2. Click *Image > Adjustments > Levels* (fig. 15.08c).
3. Click *Auto* (fig. 15.08d). Click *OK* (fig. 15.08e).
4. Click *File > Save*. Any derivative file should be made from the .tif file. It is unnecessary to adjust the .dng file.
5. Close the file.

## Section 16—Infrared Luminescence (Modified Camera)

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### VISIBLE-INDUCED INFRARED LUMINESCENCE (MODIFIED CAMERA)

This mode is used to characterize some pigments and inks, especially cadmium-based pigments, madder, and Egyptian blue. The technique involves excitation of materials with blue/green visible light in order to capture luminescence in infrared wavelengths.



Visible-induced infrared luminescence photograph

## Section 16—Infrared Luminescence (Modified Camera)



Figure 16.01



Figure 16.02

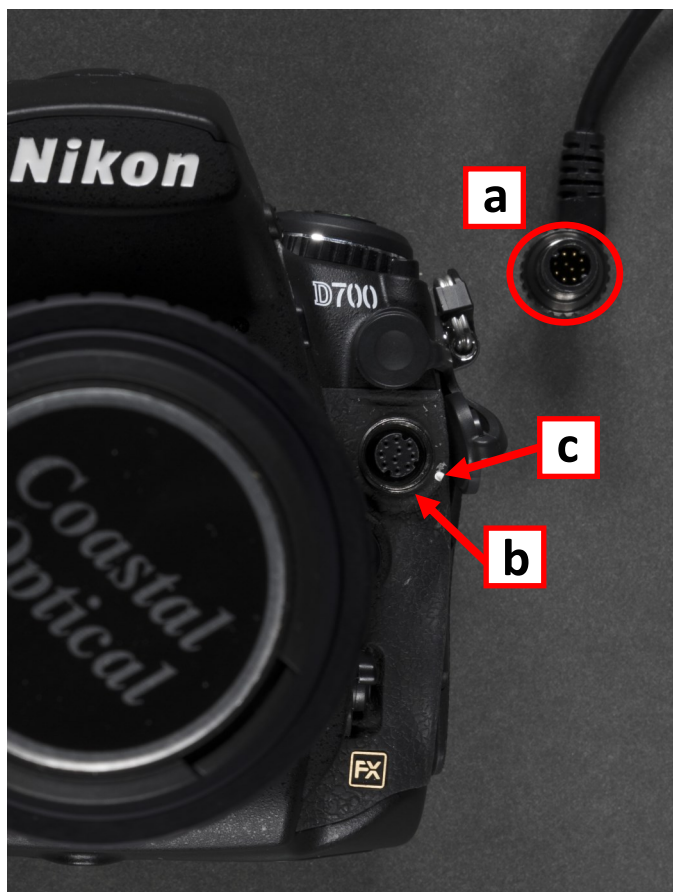


Figure 16.03

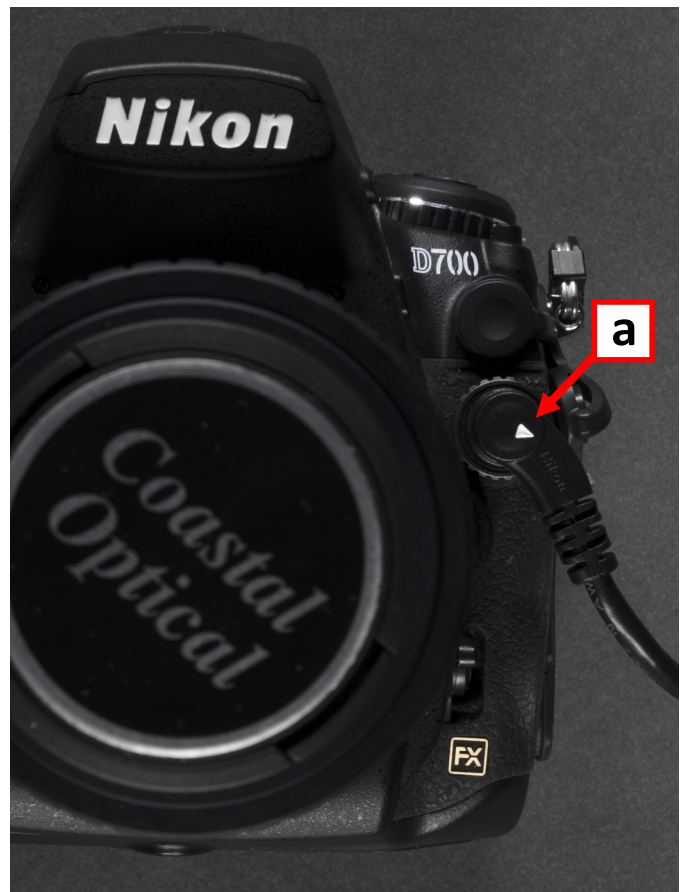


Figure 16.04

## Section 16—Infrared Luminescence (Modified Camera)

### Capture

#### Preliminary

---

If not done already, capture a visible illumination image with the modified camera following instructions in Section 14, then turn off the North Lights.

#### Set Up

---

1. Use the Nikon D700 modified camera and the CoastalOpt lens.
2. The CoastalOpt lens **MUST** be set at the minimum aperture setting of f/45 to utilize the electronic aperture function (otherwise the camera will display  $\infty$ EE).
3. The **PECA 904** filter (fig. 16.01) is used for infrared luminescence photography with the modified camera. The filter is stored in the studio cabinet. Very carefully, screw on the filter to the end of the camera lens.
4. Because infrared luminescence photography usually requires exposure times of at least 30 seconds, you will need to use a remote cord. The remote cord, **Nikon MC-36A** (fig. 16.02), is stored in the studio cabinet with the modified camera and filters. Place the accompanying AAA batteries in the back of the remote to turn it on.
5. To attach the remote cord, first turn off the camera. Align the 10-pin connector on the remote cord (fig 16.03a) with the 10-pin terminal on the camera body (fig 16.03b). The white arrow on the 10-pin connector (fig 16.04a) should be aligned with the white dot next to the 10-pin terminal (fig. 16.03c). Once inserted, press the connector towards the camera and tighten the locking nut, then turn the camera back on.



## Section 16—Infrared Luminescence (Modified Camera)

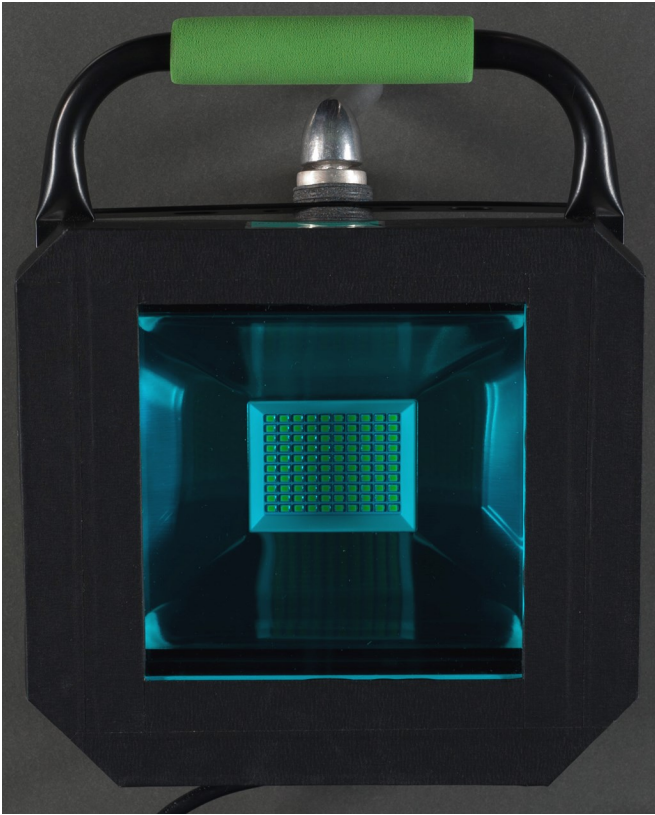


Figure 16.05

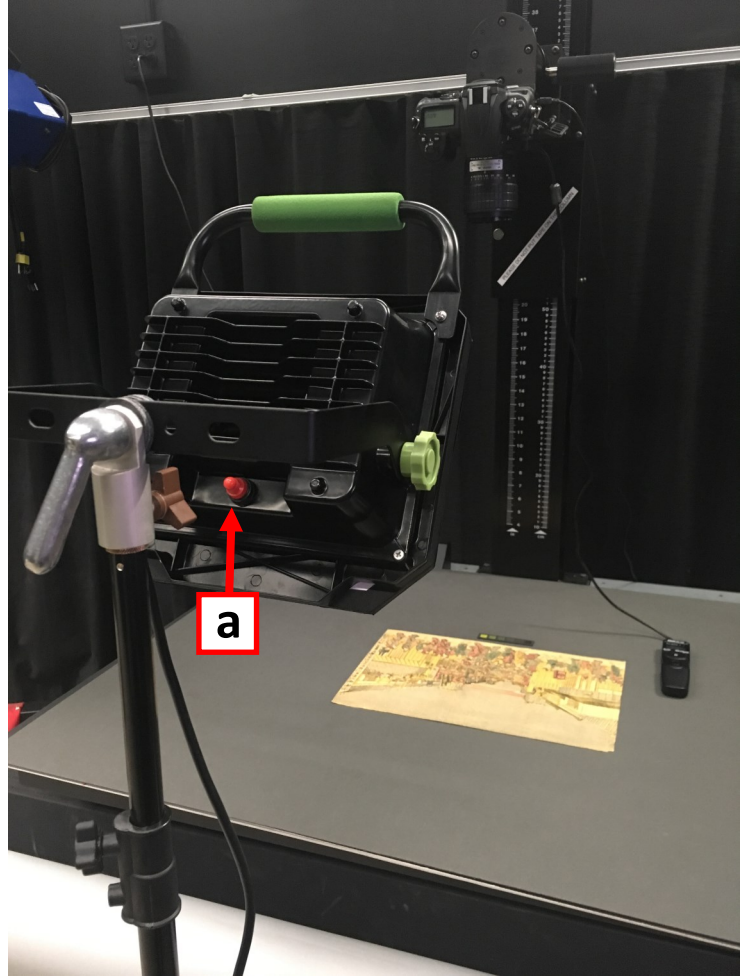


Figure 16.06

## Section 16—Infrared Luminescence (Modified Camera)

### Set Up, continued

---

6. The lamp used for infrared luminescence (fig. 16.05) is on a stand in the photo studio. The LED lamp has been modified with two glass BG38 filters attached to the front. These filters block IR wavelengths and pass visible light. Handle the lamp on its stand very carefully as to prevent damage to these glass filters. Plug the lamp into the power strip next to the copystand and place the base of the stand in front of the copystand (fig. 16.06). Turn the light on by pressing the red button on the back of the lamp (fig. 16.06a). The lamp should be positioned above the object so that the object is evenly illuminated, which may require moving the lamp up or down on its stand.

## Section 16—Infrared Luminescence (Modified Camera)

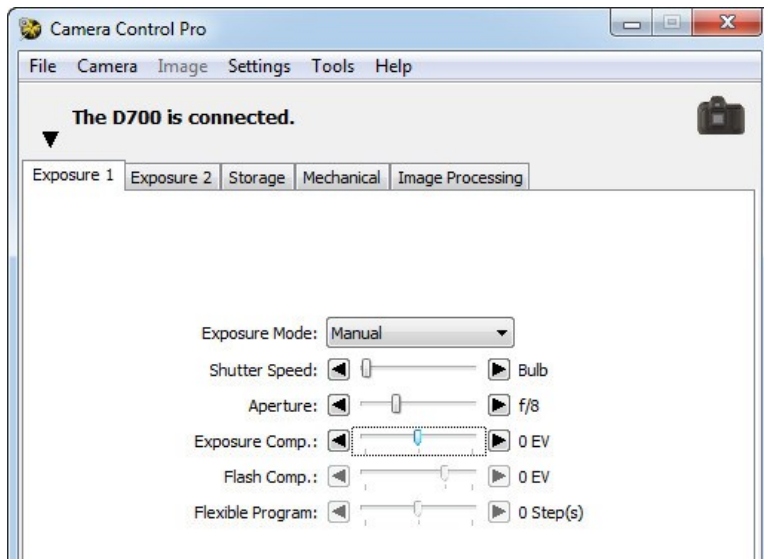


Figure 16.07

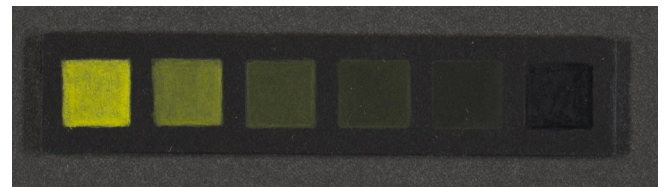


Figure 16.08

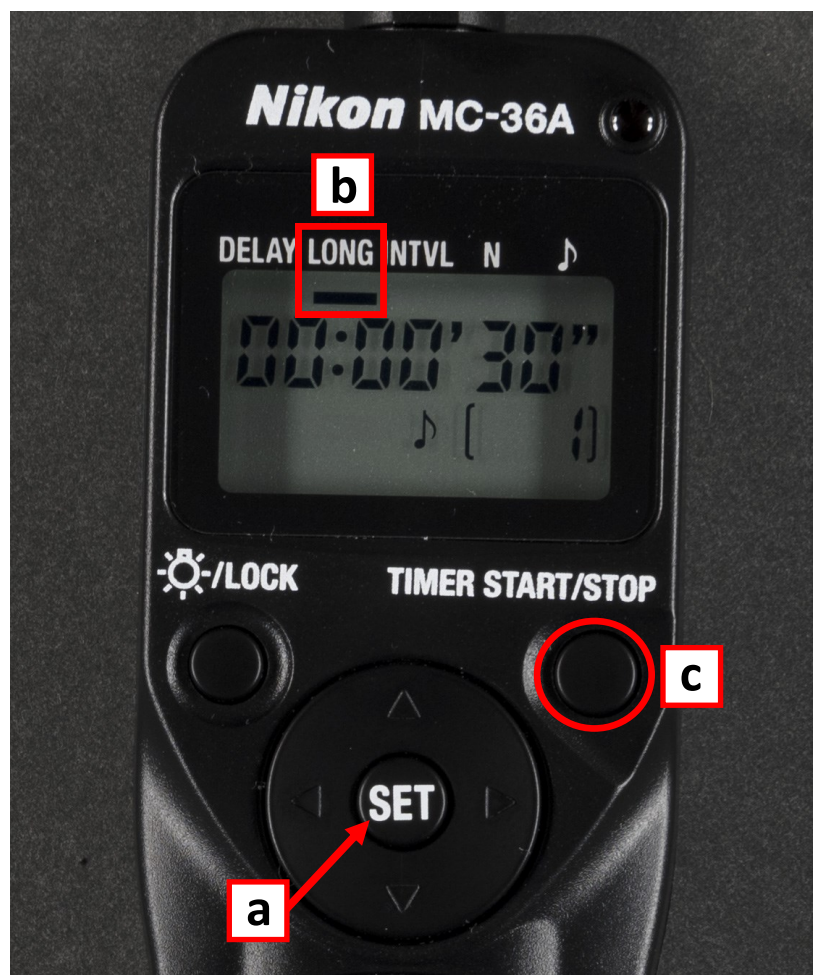


Figure 16.09



## Section 16—Infrared Luminescence (Modified Camera)

### Image Capture

---

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following (fig. 16.07):
  - Exposure Mode: Manual
  - Shutter Speed: Bulb (one click left of 30 seconds)
  - Aperture: f/8 (flat objects) or f/11 (3D objects) - select same as used in visible
  - Exposure Comp.: 0
2. Settings under the *Exposure 2* (including white balance), *Storage*, and *Image Processing* tabs are the same as with visible illumination with the modified camera (Section 14).
3. Open *Live View*. Position your object in the image frame. Place the IR luminescence target (fig. 16.08) adjacent to the object. The target is a gradation between cadmium yellow (which luminesces) and lamp black (which does not luminesce). Close *Live View*.
4. Use the same focus as set manually for visible illumination with the modified camera (Section 14).
5. On the remote cord, press *Set* (fig. 16.09a). Press the right arrow on the remote 3 times until *Long* is underlined (fig. 16.09b). Then use the right arrow to choose the time position.
  - 0:00':00" is hours: minutes: seconds
6. Use the up and down arrows to select an exposure time. Start with an exposure time of 30 seconds (00:00':30"). Exposure times up to 5 minutes may be necessary.
7. Press *Set* again to save the exposure time. The remote will make a beeping sound at this time and the *Set* indicator will disappear.
8. Press *Timer Start/Stop* on the remote (fig. 16.09c) to capture the photograph. The remote will end the exposure automatically when the timer expires.

## Section 16—Infrared Luminescence (Modified Camera)

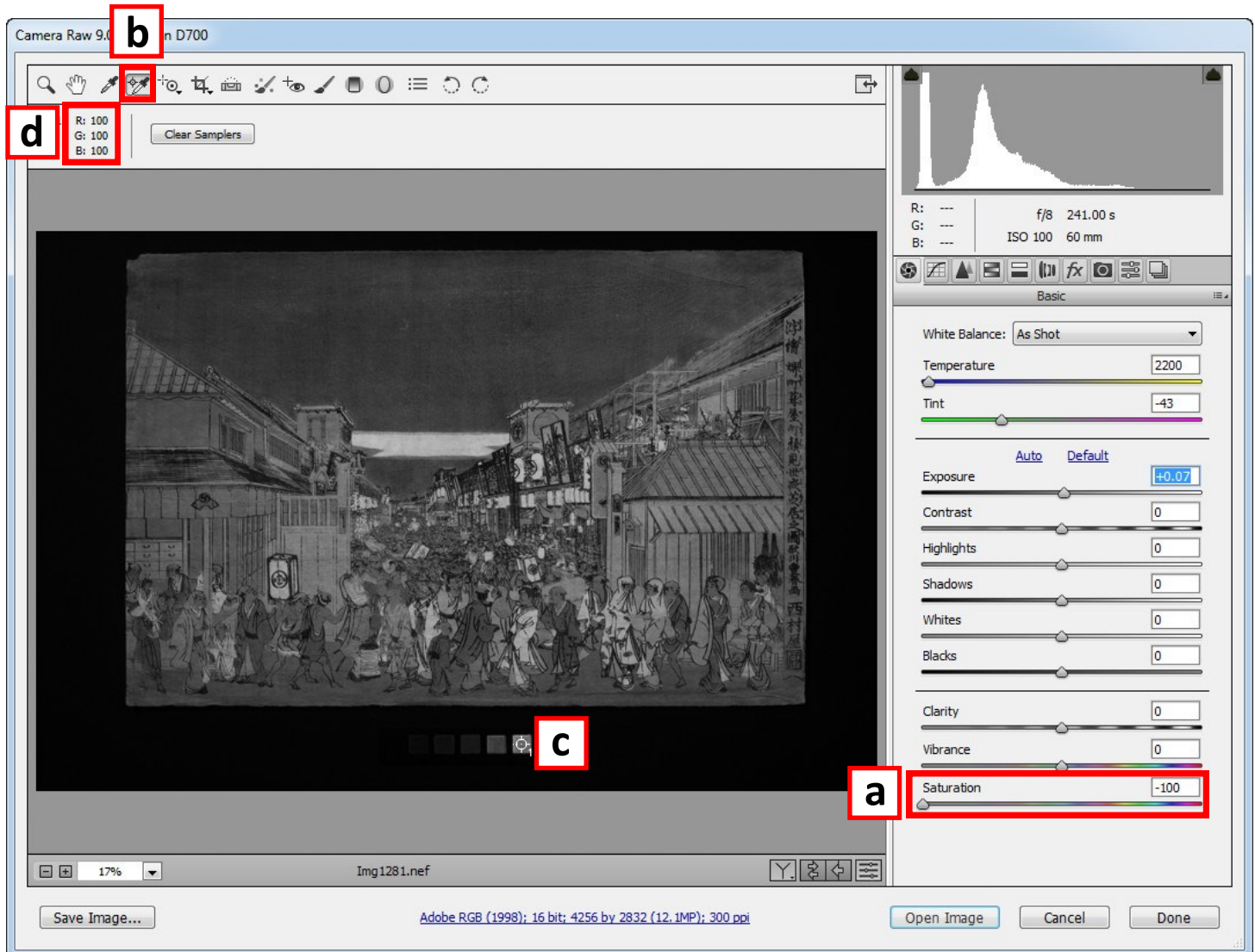


Figure 16.10

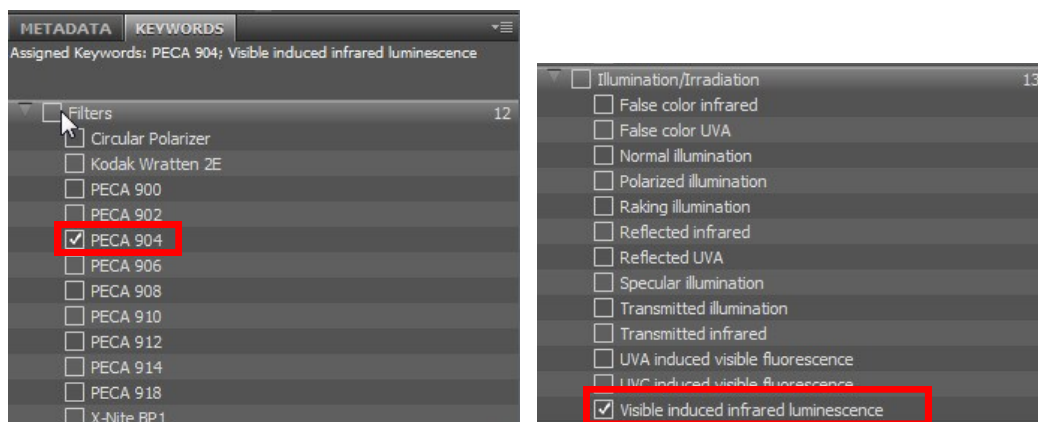


Figure 16.11

## Section 16—Infrared Luminescence (Modified Camera)

### Preview Images

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Set the *Saturation* to **-100** (fig. 16.10a).
3. Select the *Color Sampler Tool* (fig. 16.10b) and click on the pure yellow patch on the target (fig. 16.10c). The RGB values should be 100 +/-5 (fig. 16.10d).
4. If RGB values are outside 100 +/-5, adjust the exposure time on the remote cord, reshoot, and reevaluate in **Camera Raw**.
5. Click *Done* in **Camera Raw** to accept changes.

### Finish

---

If continuing to another section, remove the PECA 904 filter before proceeding.

When finished with the session, **take the batteries out of the remote** and store them in the accompanying bag; return the remote and battery bag to their box; return the camera, USB cord, filter, remote and target to the studio cabinet; turn off and return the lamp used for infrared luminescence near the studio wall.

### Metadata

### Keywords

---

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *PECA 904* under Filters and *Visible induced infrared luminescence* under Illumination/Irradiation (fig. 16.11).

## Section 16—Infrared Luminescence (Modified Camera)

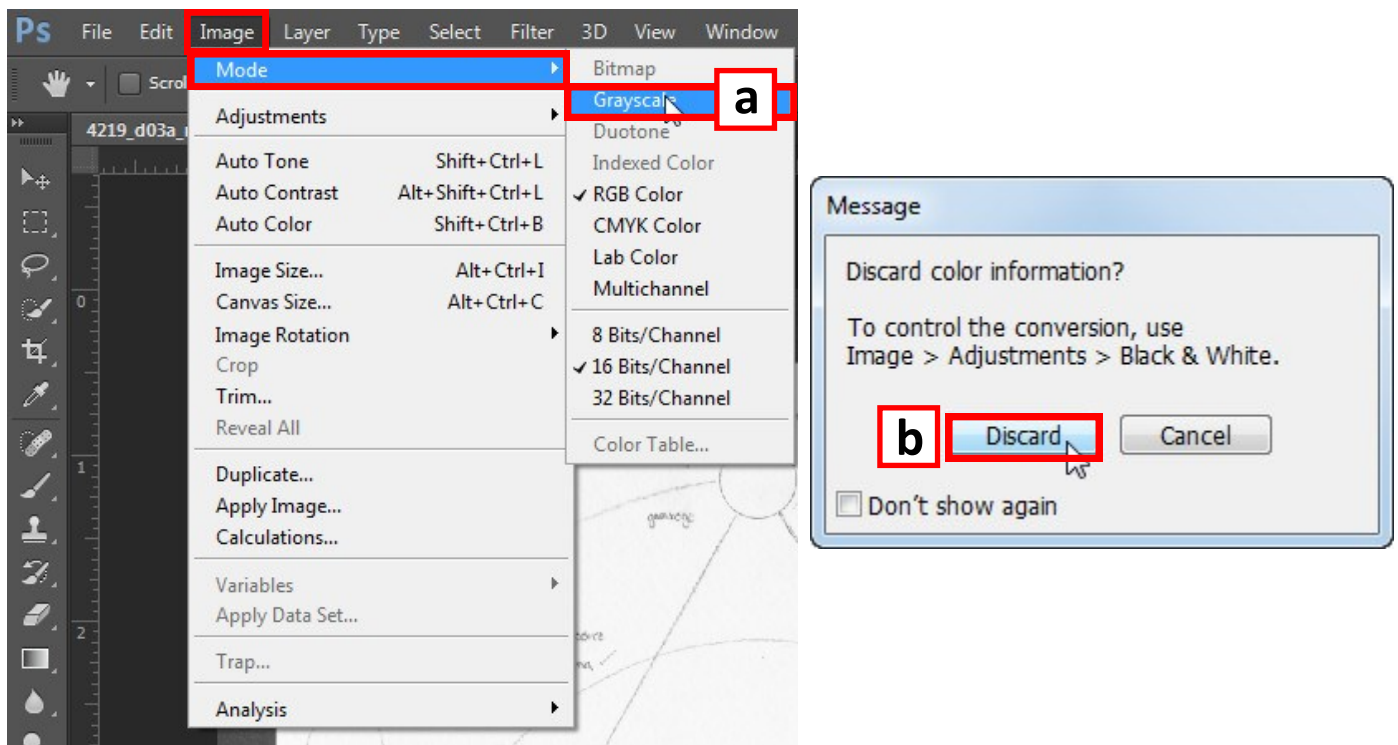


Figure 16.12

## Section 16—Infrared Luminescence (Modified Camera)

### Image Processing

#### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Ensure Saturation is set at  $-100$  (fig 16.10a).
3. Adjust exposure so that the RGB values of the pure yellow patch on the target are 100.
4. Sharpening, straightening and cropping procedures are the same as with normal illumination images captured with the standard camera (Section 4). White balance does not need to be adjusted.
5. Click *Done* to save your adjustments

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

### Image Post-Processing

Post-processing of visible-induced infrared luminescence images is required.

#### Convert to Grayscale

---

1. Open the infrared luminescence .tif file in **Photoshop**.
2. Click *Image > Mode > Grayscale* (fig. 16.12a).
3. Click *Discard* (fig. 16.12b).

## Section 16—Infrared Luminescence (Modified Camera)

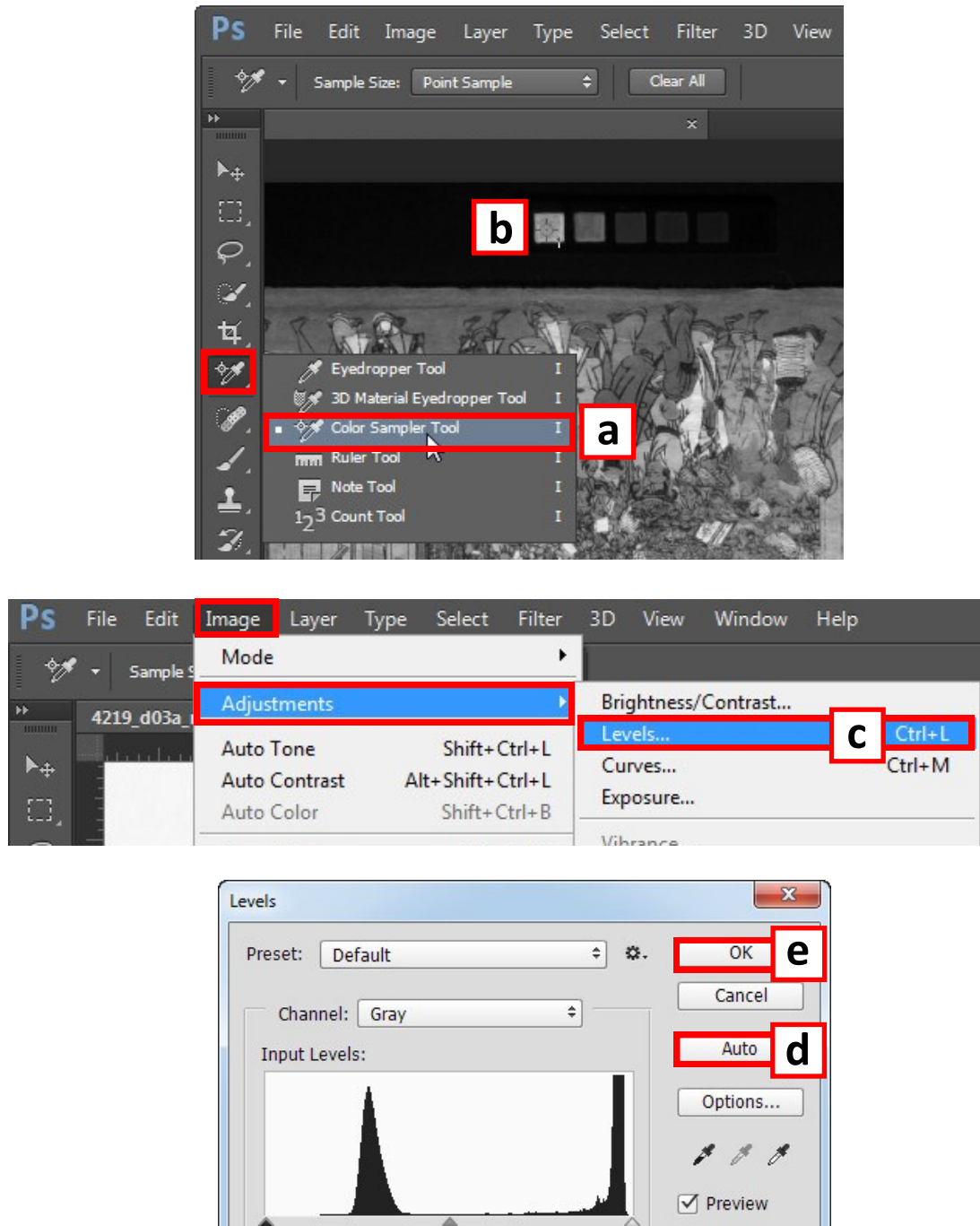


Figure 16.13

## Section 16—Infrared Luminescence (Modified Camera)

### Adjust Levels

---

1. In **Photoshop**, right click on the *Eyedropper Tool* and select the *Color Sampler Tool* (fig. 16.13a). Click on the pure yellow patch of the target (fig. 16.13b).
2. Click *Image > Adjustments > Levels* (fig. 16.13c).
3. Click *Auto* (fig. 16.13d). Click *OK* (fig. 16.13e).
4. Click *File > Save*. Any derivative file should be made from the .tif file. It is unnecessary to adjust the .dng file.
5. Close the file.



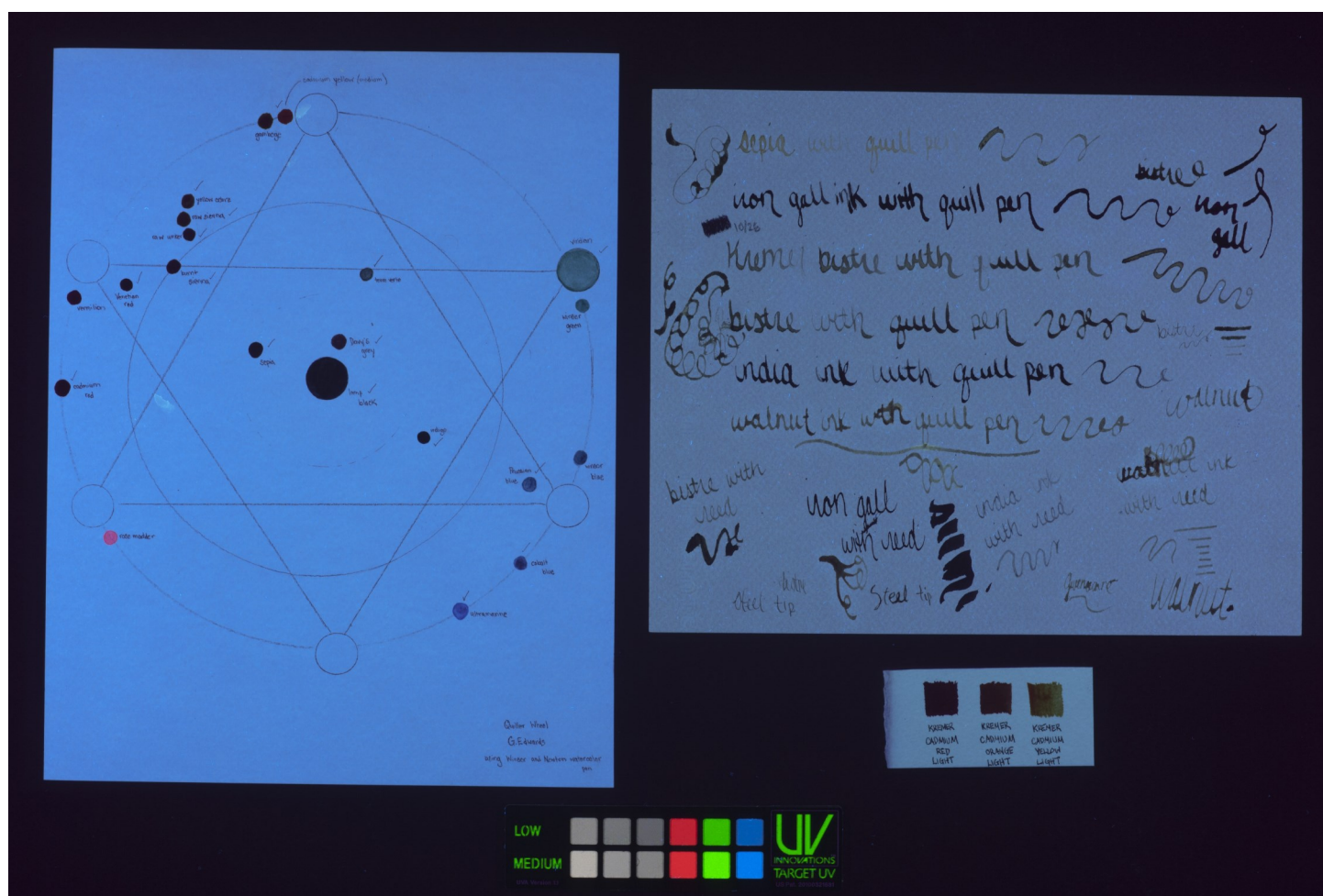
## Section 17—UV-Visible Fluorescence (Modified Camera)

# Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

## ULTRAVIOLET (UVA)-INDUCED VISIBLE FLUORESCENCE (MODIFIED CAMERA)

This mode is used to differentiate and characterize materials. The technique involves excitation of materials with ultraviolet radiation in order to induce fluorescence in visible wavelengths.



### Ultraviolet-induced visible fluorescence photograph

## Section 17—UV-Visible Fluorescence (Modified Camera)



Figure 17.01



Figure 17.02

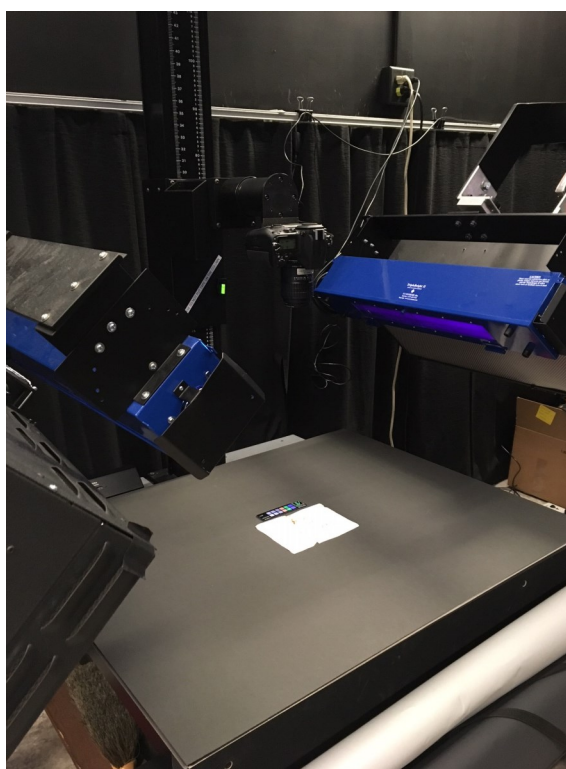


Figure 17.03

## Section 17—UV-Visible Fluorescence (Modified Camera)

### Capture

#### Preliminary

---

If not done already, capture a visible illumination image with the modified camera following instructions in Section 14. **Wear UV goggles when the UV lights are on.**

#### Set Up

---

1. Use the Nikon D700 modified camera and the CoastalOpt lens.
2. The CoastalOpt lens **MUST** be set at the minimum aperture setting of f/45 to utilize the electronic aperture function (otherwise the camera will display  $\infty$ ).
3. The **PECA 916** and **PECA 918** filters are used for UV-induced visible fluorescence photography with the modified camera (fig 17.01). The filters are stored in the studio cabinet. Very carefully, screw on both filters to the end of the camera lens. The order the filters are screwed on does not matter.
4. Plug in the UV lamps. **It is important to plug in both cords (two for each lamp) for at least 20 seconds before switching on lamps.** Neglecting to do this will seriously shorten the life of the tubes. Turn on the lamps using the white toggle switch (fig 17.02) located at the short end of each unit closest to the copystand wall. Let the lamps warm up for at least 5 minutes before capture.
5. Adjust the height of the lamp stands so the bottom of the collar is at 25". Position the lamps equidistant and as close to the copystand as possible (fig. 17.03). Try to achieve even illumination across the area to be photographed. Do not change the angle of the lamps.



## Section 17—UV-Visible Fluorescence (Modified Camera)

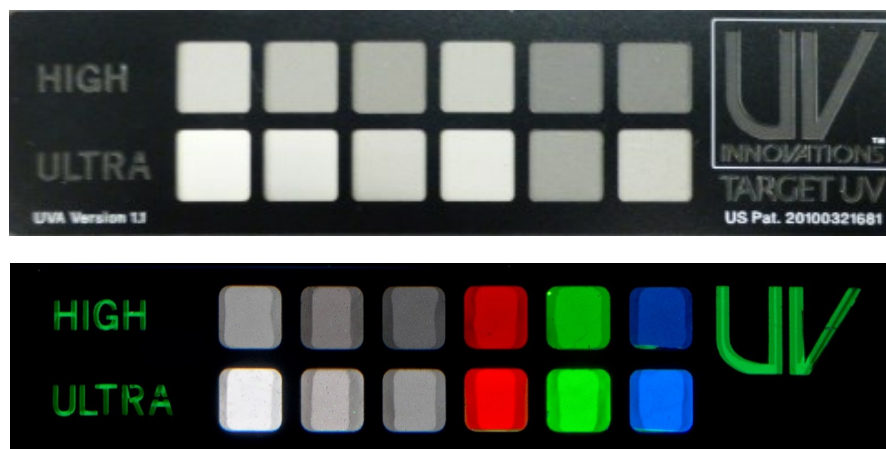


Figure 17.04

2.18.4106.001      Before treatment  
11/20/17      UVA-induced visible fluorescence

Figure 17.05

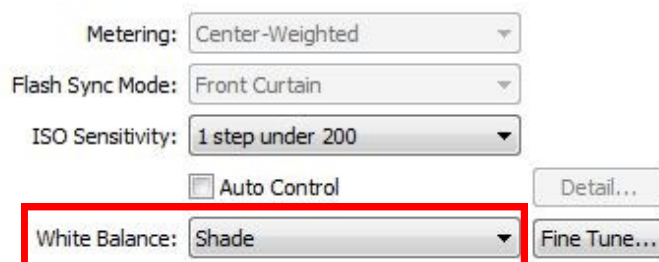


Figure 17.06

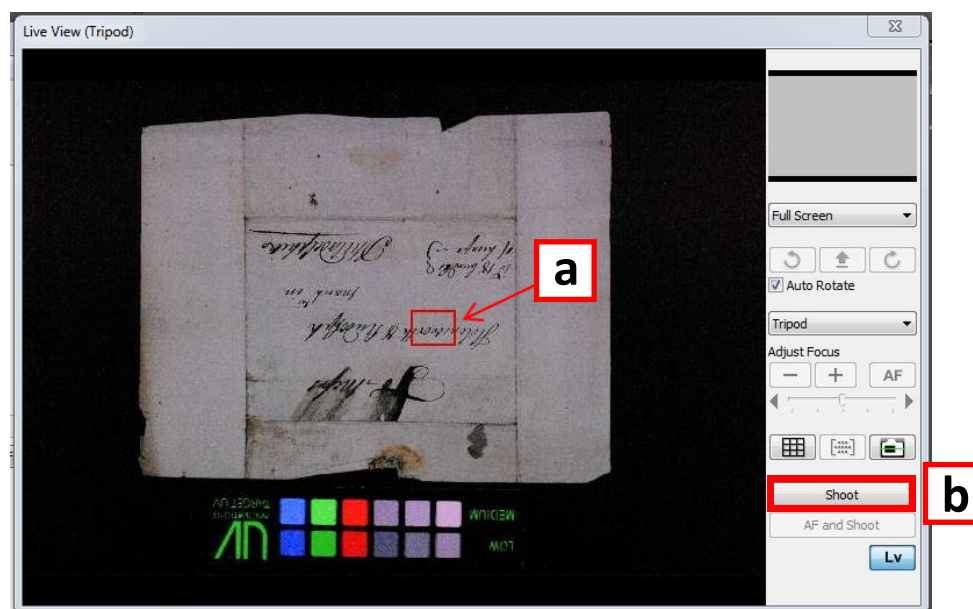


Figure 17.07

## Section 17—UV-Visible Fluorescence (Modified Camera)

### Set Up, continued

---

7. With the UV lamps warmed up and the overhead light off, position the UV target (fig 17.04) adjacent to your object. Compare the intensity levels on the target (Low, Medium, High, or Ultra) with the overall fluorescence of the object and select an intensity with a similar brightness level. If you are still unsure, consult the detailed guide to matching fluorescent targets with fluorescent materials which is kept in the studio cabinet.
8. Include a paper identification label using white letters on a black background in order to reduce flair from paper fluorescence (fig. 17.05).

### Image Capture

---

1. In **Camera Control Pro** under the *Exposure 1* tab, select the following:  
Exposure Mode: Aperture Priority  
Aperture: f/8 (flat objects) or f/11 (3D objects) - select same as used in visible  
Exposure Comp.: 0
2. Under the *Exposure 2* tab, set the white balance to **Shade** (fig. 17.06).
3. Settings under the *Storage* and *Image Processing* tabs are the same as with visible illumination with the modified camera (Section 14).
4. Open *Live View*. Position your object and label in the image frame. Place the UV target adjacent to the object so that the gray patches of the intensity level chosen are closest to the object.
5. Use the same focus as set manually for visible illumination with the modified camera (Section 14). The focus frame will remain red due to manual focusing (fig. 17.07a).
6. With the overhead light off, place the cursor on the *Shoot* button and cover the monitor with black fabric from the studio cabinet. Be careful not to move the mouse and left click *Shoot* (fig. 17.07b).

## Section 17—UV-Visible Fluorescence (Modified Camera)

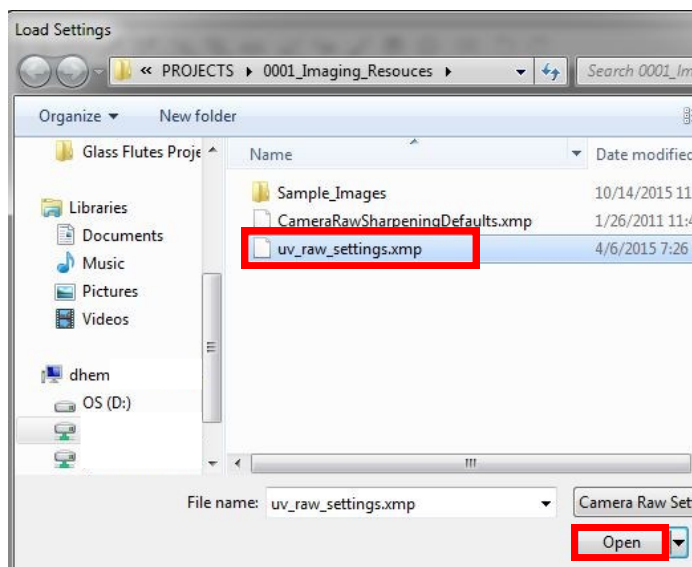
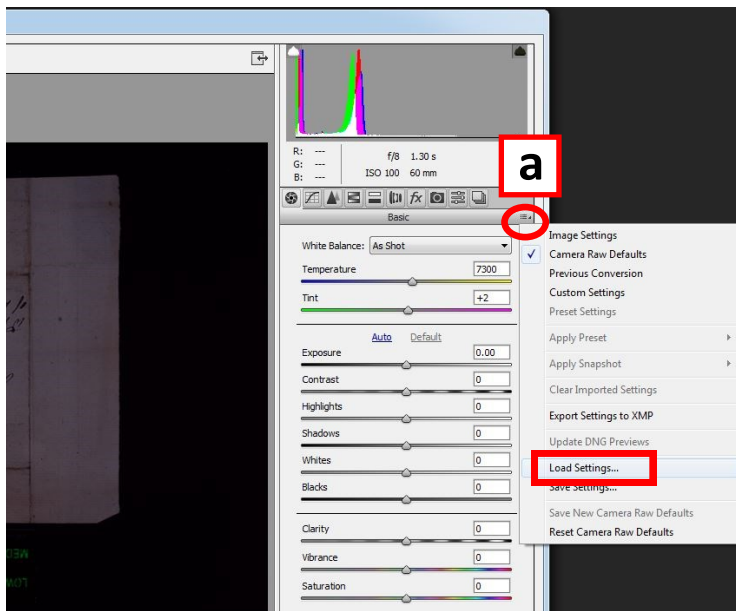


Figure 17.08

Figure 17.09

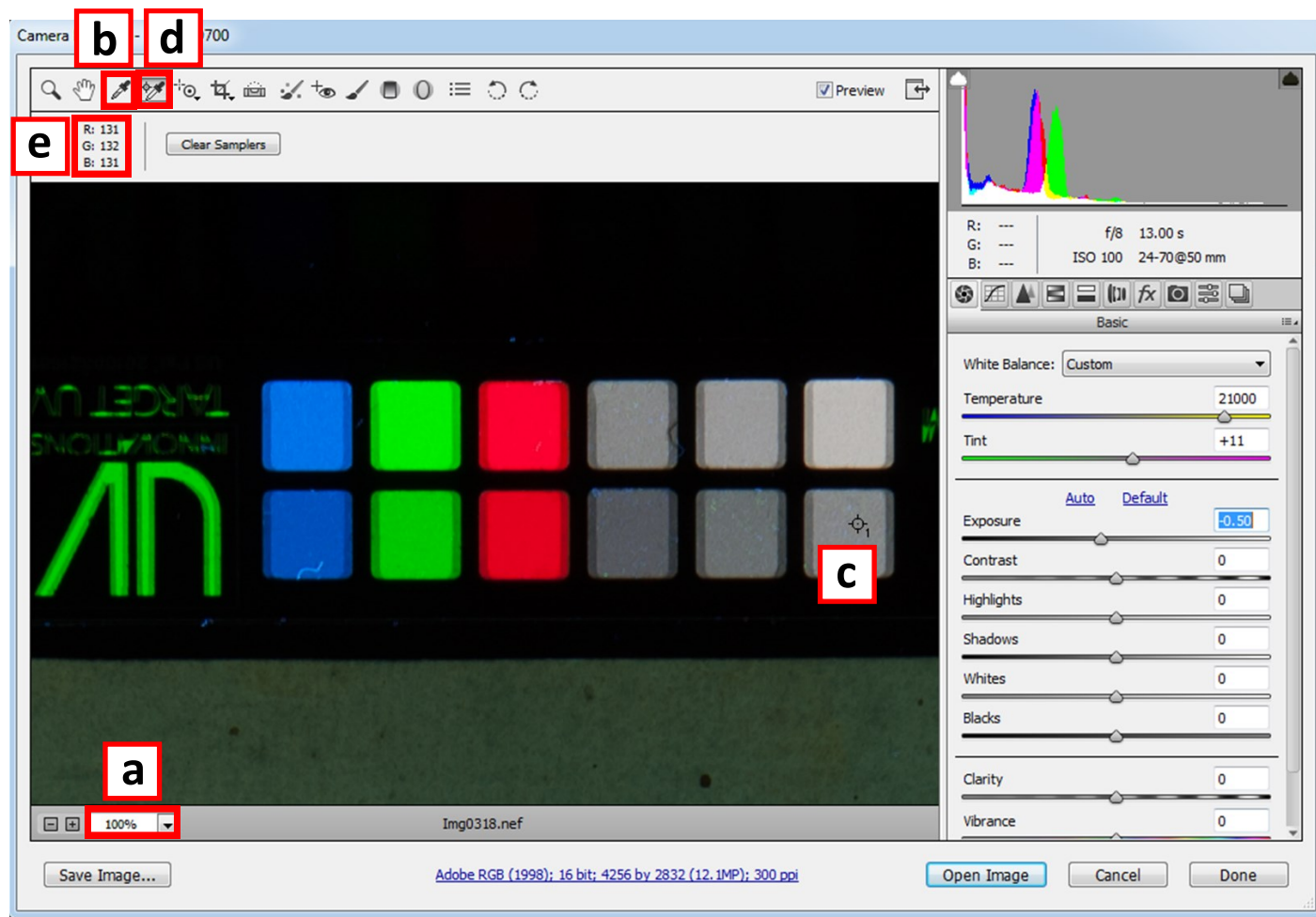


Figure 17.10

## Section 17—UV-Visible Fluorescence (Modified Camera)

### Preview Images

---

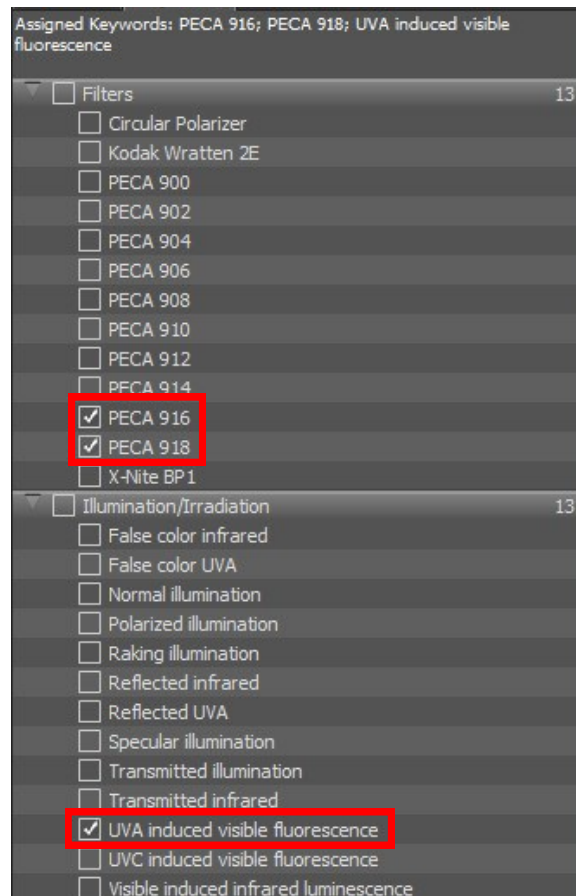
1. In **Bridge**, open the image in **Camera Raw**.
2. Left click on the *Camera Raw Settings Menu* in the upper right corner of the *Camera Raw* window (fig. 17.08a). Select *Load Settings*.
3. Navigate to *N: > Projects > 0001\_Imaging\_Resources* and select *uv\_raw\_settings.xmp* (fig. 17.09). Click *Open* to apply UV settings.
4. To white balance, zoom to 100% (fig. 17.10a). Select the *White Balance Tool* (fig. 17.10b) and click on the lightest gray patch for the intensity level chosen (fig. 17.10c). Be careful to click on the gray particles and not the green particles in the gray patch.
5. To check exposure, select the *Color Sampler Tool* (fig. 17.10d). Click on the lightest gray patch for the intensity level you have chosen (fig. 17.10c). Be careful to click on the gray particles and not the green particles in the gray patch. The RGB values should be 130 +/-3 (fig. 17.10e).
6. If RGB values are outside of 130 +/-3, adjust *Exposure Comp.* in the *Exposure 1* tab of **Camera Control Pro** and reshoot. Reapply UV settings, white balance, and check exposure again in **Camera Raw**.
7. Click *Done* in **Camera Raw** to accept changes.

**NOTE:** It is not uncommon for paper objects to display a weak fluorescence. If the area of interest on your object appears too dark on the monitor when the lightest gray patch is at 130, move the *Color Sampler Tool* to the second or middle gray patch and target 130 again. Note which patch was used to replicate for during and after treatment capture.

**NOTE:** The object as displayed on the monitor may appear slightly blue/green overall as compared to what you observe directly on the copystand. This variation derives from the difference between subjective human perception and the objective responsivity of the camera sensor.



## Section 17—UV-Visible Fluorescence (Modified Camera)



**Figure 17.11**

## Section 17—UV-Visible Fluorescence (Modified Camera)

### Finish

---

If continuing to another section, remove the PECA 916 and 918 filters before proceeding.

When finished with the session, return the camera, USB cord, filters, goggles, and target to the studio cabinet; turn off and unplug the UV lamps, wrapping cords around fixture at the end of the lamp; reposition the light at the 66" mark on the floor, with the top of collar at 52".

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *PECA 916* and *PECA 918* under Filters and *UVA induced visible fluorescence* under Illumination/Irradiation (fig.17.11).

### Image Processing

#### Adjust Image Files

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Adjust *Exposure* to obtain RGB values of 130 in the gray patch targeted (fig. 17.10c-e).
3. Sharpening, straightening, cropping, and confirming workflow options are the same as with normal illumination images (Section 4).
4. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

## Section 18—Reflected Ultraviolet (Modified Camera)

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### REFLECTED ULTRAVIOLET (MODIFIED CAMERA)

This mode can be useful for enhancing the visibility of surface coatings and adhesives. It can also be a useful tool for documenting surface abrasions, accretions, and retouching. Materials that visibly fluoresce when induced by UVA will appear dark in reflected ultraviolet photography. In cases where fluorescence is weak, reflected UV may be helpful.



Visible illumination



Reflected ultraviolet



## Section 18—Reflected Ultraviolet (Modified Camera)



Figure 18.01



Figure 18.02

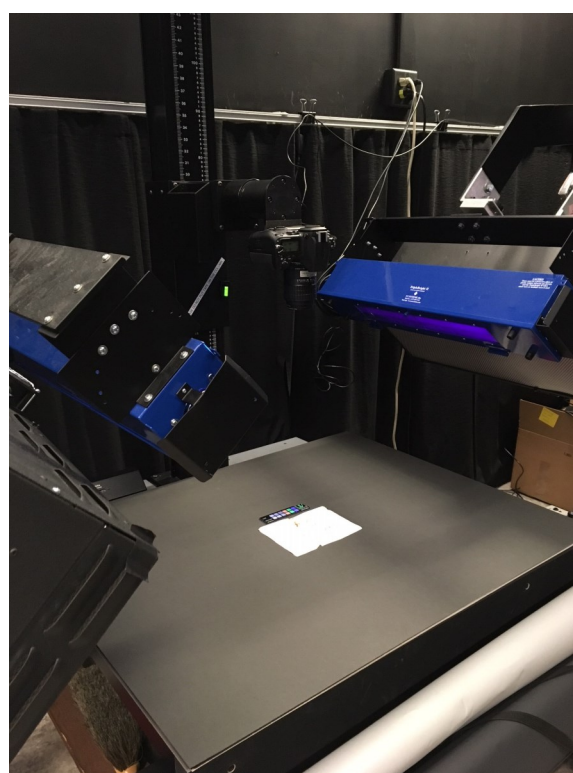


Figure 18.03

## Section 18—Reflected Ultraviolet (Modified Camera)

### Capture

#### Preliminary

---

If not done already, capture a visible illumination image with the modified camera following instructions in Section 14. **Wear UV goggles when the UV lights are on.**

#### Set Up

---

1. Use the Nikon D700 modified camera and the CoastalOpt lens.
2. The CoastalOpt lens **MUST** be set at the minimum aperture setting of f/45 to utilize the electronic aperture function (otherwise the camera will display **EE**).
3. The **PECA 900** and **X-Nite BP1** filters are used for reflected ultraviolet photography with the modified camera (fig 18.01). The filters are stored in the studio cabinet. Very carefully, screw on both filters to the end of the camera lens. The order the filters are screwed on does not matter.
4. Plug in the UV lamps. **It is important to plug in both cords (two for each lamp) for at least 20 seconds before switching on lamps.** Neglecting to do this will seriously shorten the life of the tubes. Turn on the lamps using the white toggle switch (fig 18.02) located at the short end of each unit closest to the copystand wall. Let the lamps warm up for at least 5 minutes before capture.
5. Adjust the height of the lamp stands so the bottom of the collar is at 25". Position the lamps equidistant and as close to the copystand as possible (fig. 18.03). Try to achieve even illumination across the area to be photographed. Do not change the angle of the lamps.

## Section 18—Reflected Ultraviolet (Modified Camera)

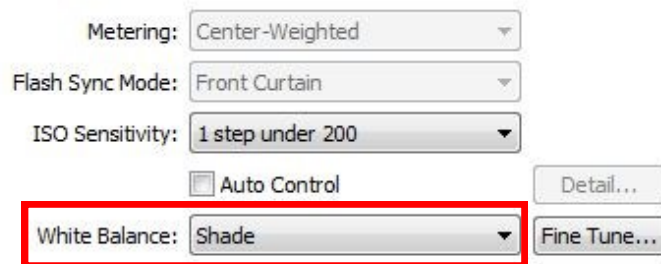


Figure 18.04

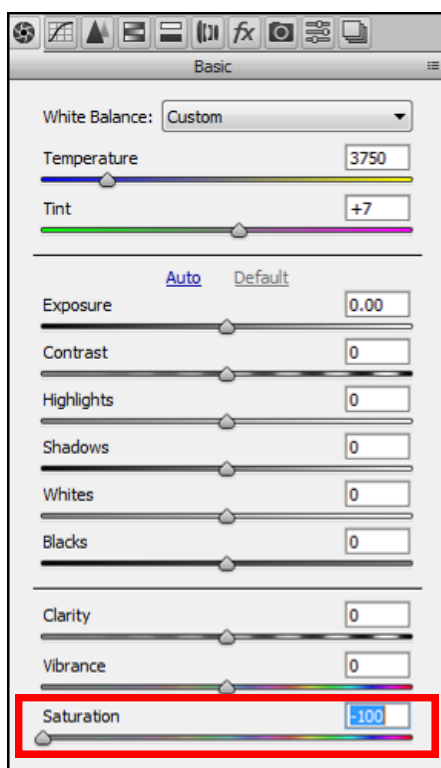


Figure 18.05

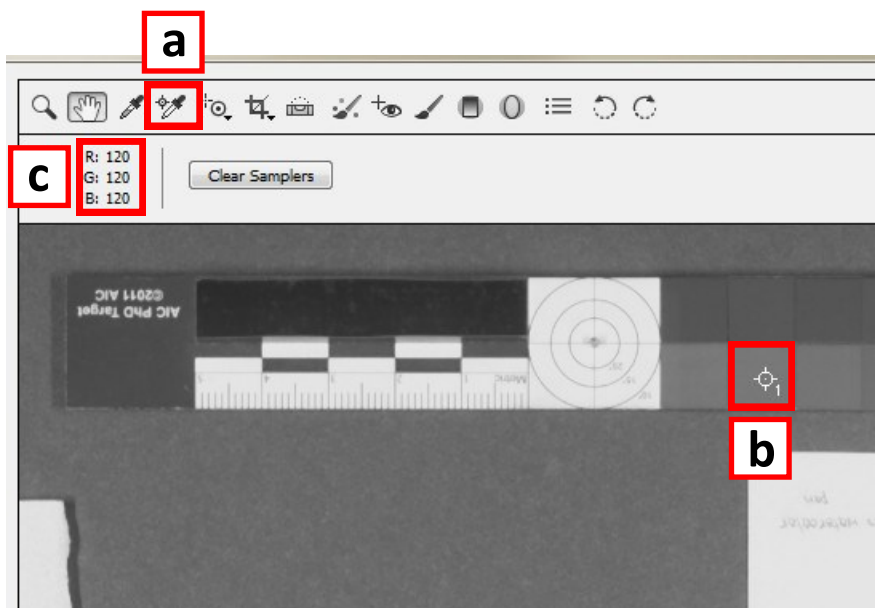


Figure 18.06



## Section 18—Reflected Ultraviolet (Modified Camera)

### Image Capture

---

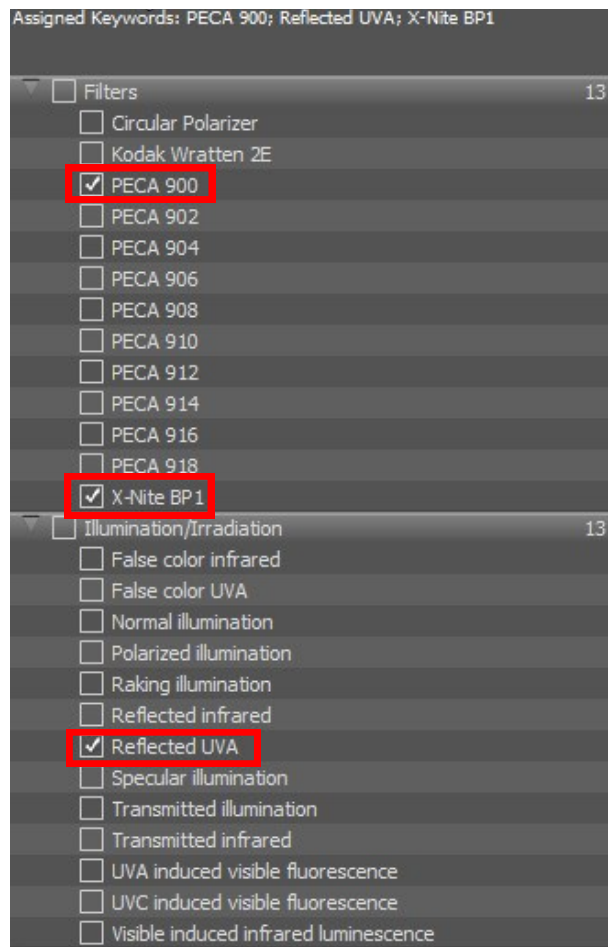
1. In **Camera Control Pro** under the *Exposure 1* tab, select the following:  
Exposure Mode: Aperture Priority  
Aperture: f/8 (flat objects) or f/11 (3D objects) - select same as used in visible  
Exposure Comp.: 0
2. Under the *Exposure 2* tab, set the white balance to **Shade** (fig. 18.04).
3. Settings under the *Storage* and *Image Processing* tabs are the same as with visible illumination with the modified camera (Section 14).
4. Open *Live View*. Position your object in the image frame. Place the color target adjacent to the object so that the gray patches are positioned closest to the object and the lightest gray patch is equidistant from each light source. (fig. 15.03).
5. Use the same focus as set manually for visible illumination with the modified camera (Section 14). The focus frame will remain red due to manual focusing.
6. Click *Shoot* (fig. 17.07b). The overhead light may remain on.

### Preview Images

---

1. In **Bridge**, open the image in **Camera Raw**.
2. Set the *Saturation* to **-100** (fig. 18.05).
3. Select the *Color Sampler Tool* (fig. 18.06a) and click on the lightest gray patch on the color target (fig. 18.06b). The RGB values should be 120 +/-5 (fig. 18.06c).
4. If RGB values are outside 120 +/-5, adjust *Exposure Comp.* in *Exposure 1* tab of **Camera Control Pro** and reshoot. Reevaluate in **Camera Raw**.
5. Click *Done* in **Camera Raw** to accept changes.

## Section 18—Reflected Ultraviolet (Modified Camera)



**Figure 18.07**

## Section 18—Reflected Ultraviolet (Modified Camera)

### Finish

---

If continuing to another section, remove the PECA 900 and X-Nite BP1 filters before proceeding.

When finished with the session, return the camera, USB cord, filters, goggles, and target to the studio cabinet; turn off and unplug the UV lamps, wrapping cords around fixture at the end of the lamp; reposition the light at the 66" mark on the floor, with the top of collar at 52".

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *PECA 900* and *X-Nite BP1* under *Filters* and *Reflected UVA* under *Illumination/Irradiation* (fig. 18.07).

### Image Processing

#### Adjust Image Files

---

1. Open the image in **Camera Raw** from **Adobe Bridge**.
2. Ensure Saturation is set at *-100* (fig 18.05).
3. Adjust exposure so that the RGB values of the lightest gray patch on the target are 120.
4. Sharpening, straightening and cropping procedures are the same as with normal illumination images captured with the standard camera (Section 4). White balance does not need to be adjusted.
5. Click *Done* to save your adjustments.

#### Rename and Save

---

Follow the instructions in Section 4 for renaming and to create .dng archive files and .tiff derivative files.

## Section 18—Reflected Ultraviolet (Modified Camera)

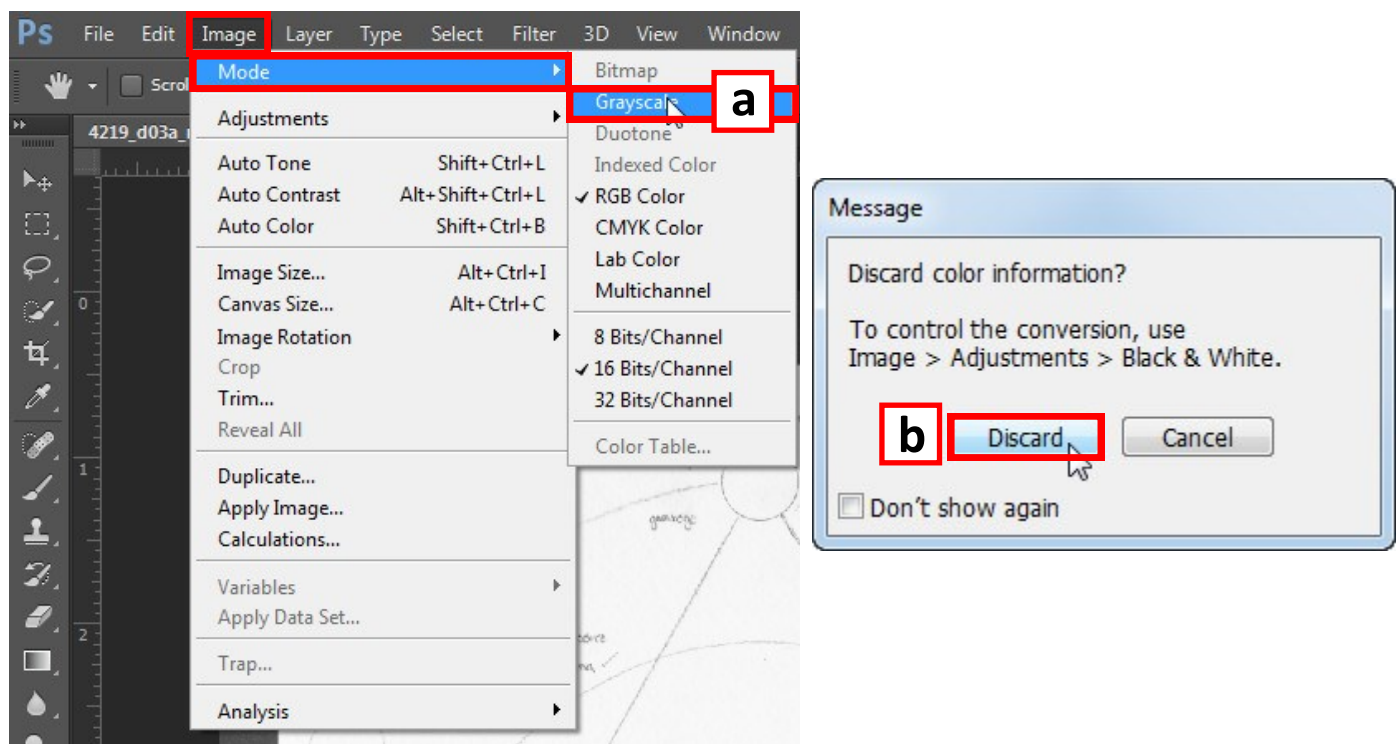


Figure 18.08

## Section 18—Reflected Ultraviolet (Modified Camera)

### Image Post-Processing

Post-processing of reflected ultraviolet images is required.

#### Convert to Grayscale

---

1. Open the reflected ultraviolet .tif file in **Photoshop**.
2. Click *Image > Mode > Grayscale* (fig. 18.08a).
3. Click *Discard* (fig. 18.08b).
4. Click *File > Save*. Any derivative file should be made from the .tif file. It is unnecessary to adjust the .dng file.
5. Close the file.

## Section 19—False Color Infrared

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### FALSE COLOR INFRARED (MODIFIED CAMERA)

FCIR is a processing technique that combines channels from two images captured with the modified camera: visible and reflected infrared, resulting in one false color image.



False color infrared photograph



## Section 19—False Color Infrared



Figure 19.01

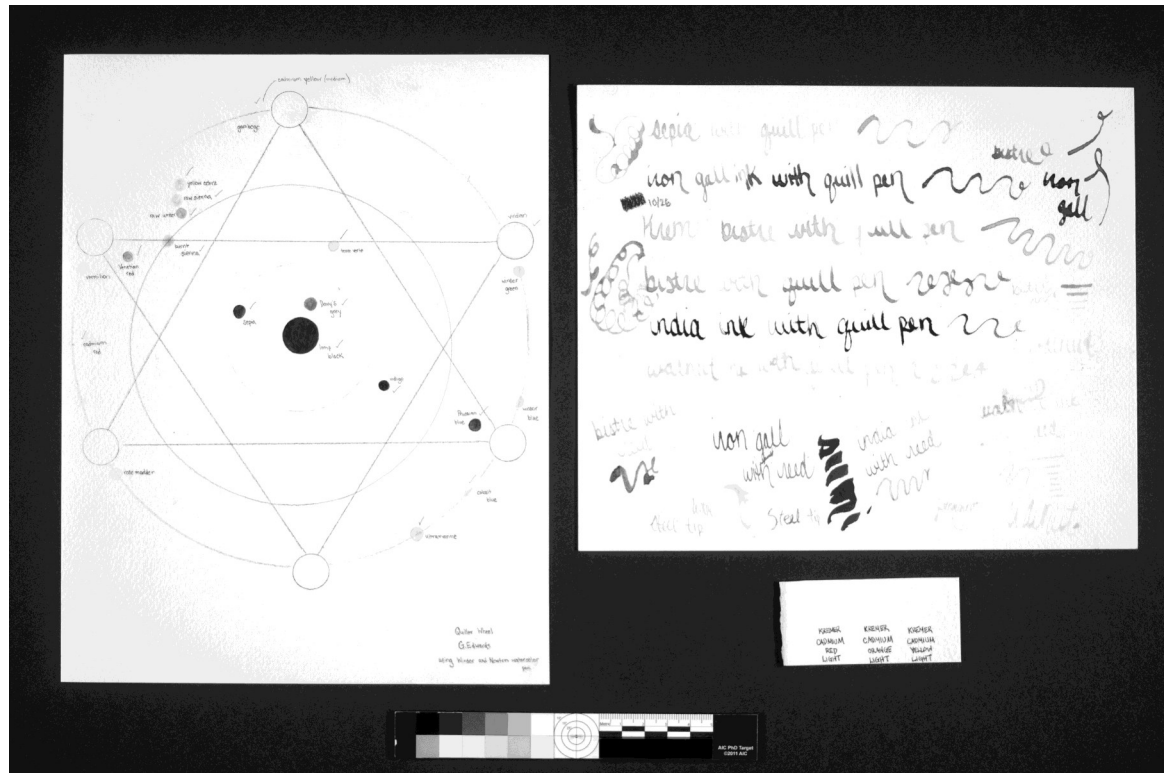


Figure 19.02

## Section 19—False Color Infrared

### Capture

#### Image Capture

---

If not already done:

1. Using the modified camera with the CostalOpt lens, capture and process a visible illumination image (fig. 19.01) following instructions in Section 14. Do not crop or straighten the image.
2. **Without moving the camera position or object position,** capture and process a reflected infrared image (fig. 19.02) following instructions in Section 15. Do not crop or straighten the image.

## Section 19—False Color Infrared

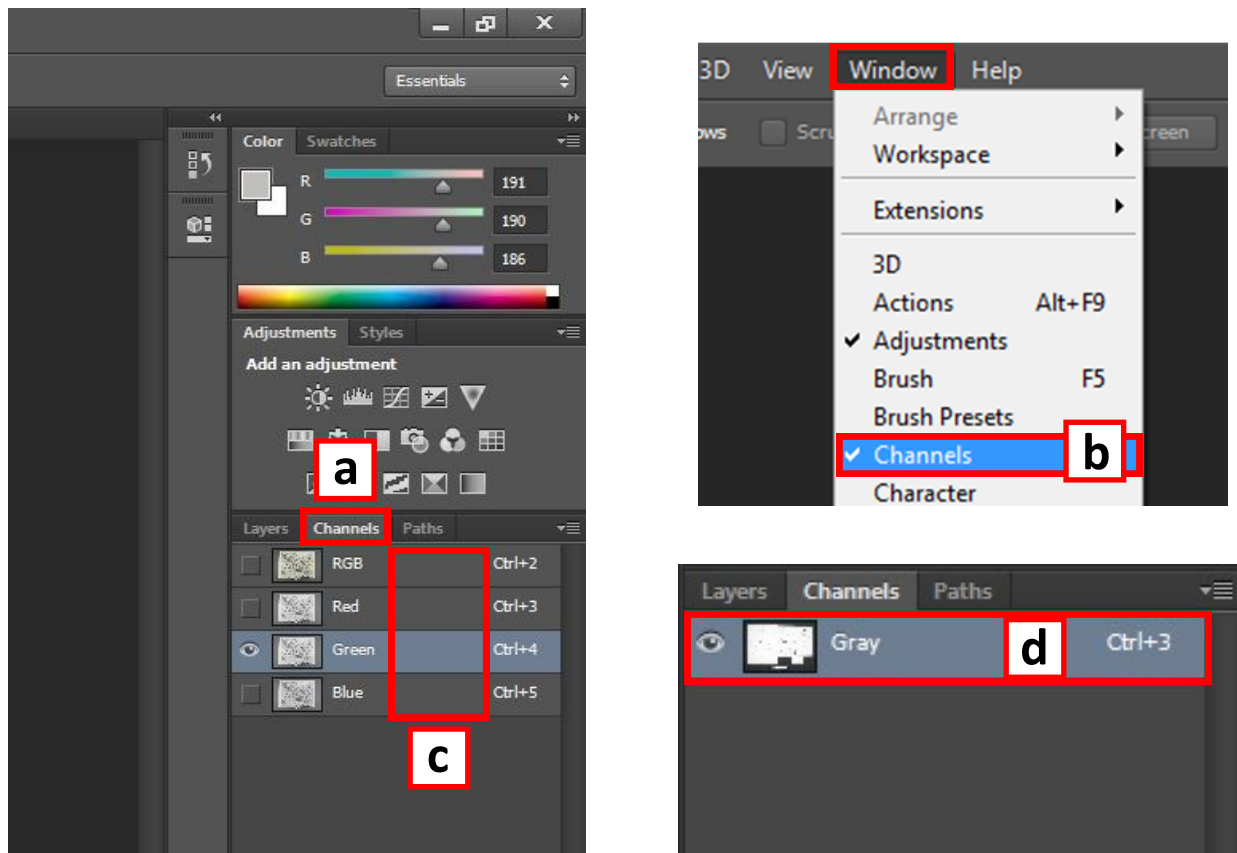


Figure 19.03

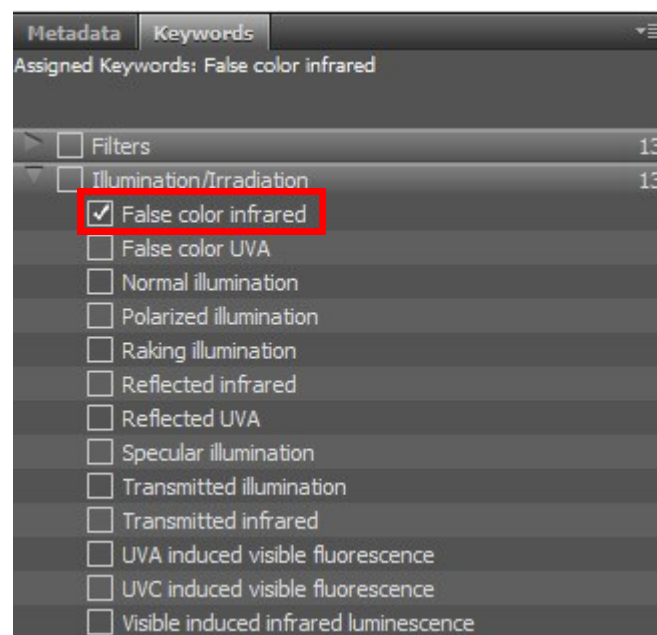


Figure 19.04

## Section 19—False Color Infrared

### Image Processing

#### Create the FCIR Image File

---

1. Open both the reflected infrared and visible illumination .tif files in **Photoshop**. If the *Channels* tab is not already displayed in a right panel (fig. 19.03a), select *Window > Channels* (fig. 19.03b).
2. Select the visible illumination image file. When selecting a channel, make sure to click in the middle of the channel bar (fig. 19.03c). In the *Channels* window:
  - i. Click on the *Green* channel. Click *Ctrl A* then *Ctrl C*.
  - ii. Click on the *Blue* channel. Click *Ctrl V*.
  - iii. Click on the *Red* channel. Click *Ctrl A* then *Ctrl C*.
  - iv. Click on the *Green* channel. Click *Ctrl V*.
3. Select the reflected infrared image file. In the *Channels* window:
  - i. Click on the *Gray* channel (fig. 19.03d). Click *Ctrl A* then *Ctrl C*.
4. Return to the visible illumination image. In the *Channels* window:
  - i. Click on the *Red* channel. Click *Ctrl V*.
4. Click on *RGB* in the *Channels* window to see the final FCIR image.
5. Save the final FCIR image as a new .tif file, following the naming protocol in Section 4.
6. Close the other images without saving the changes that were made to create the FCIR file.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *False color infrared* under Illumination/Irradiation (fig.19.04). No filters should be selected.

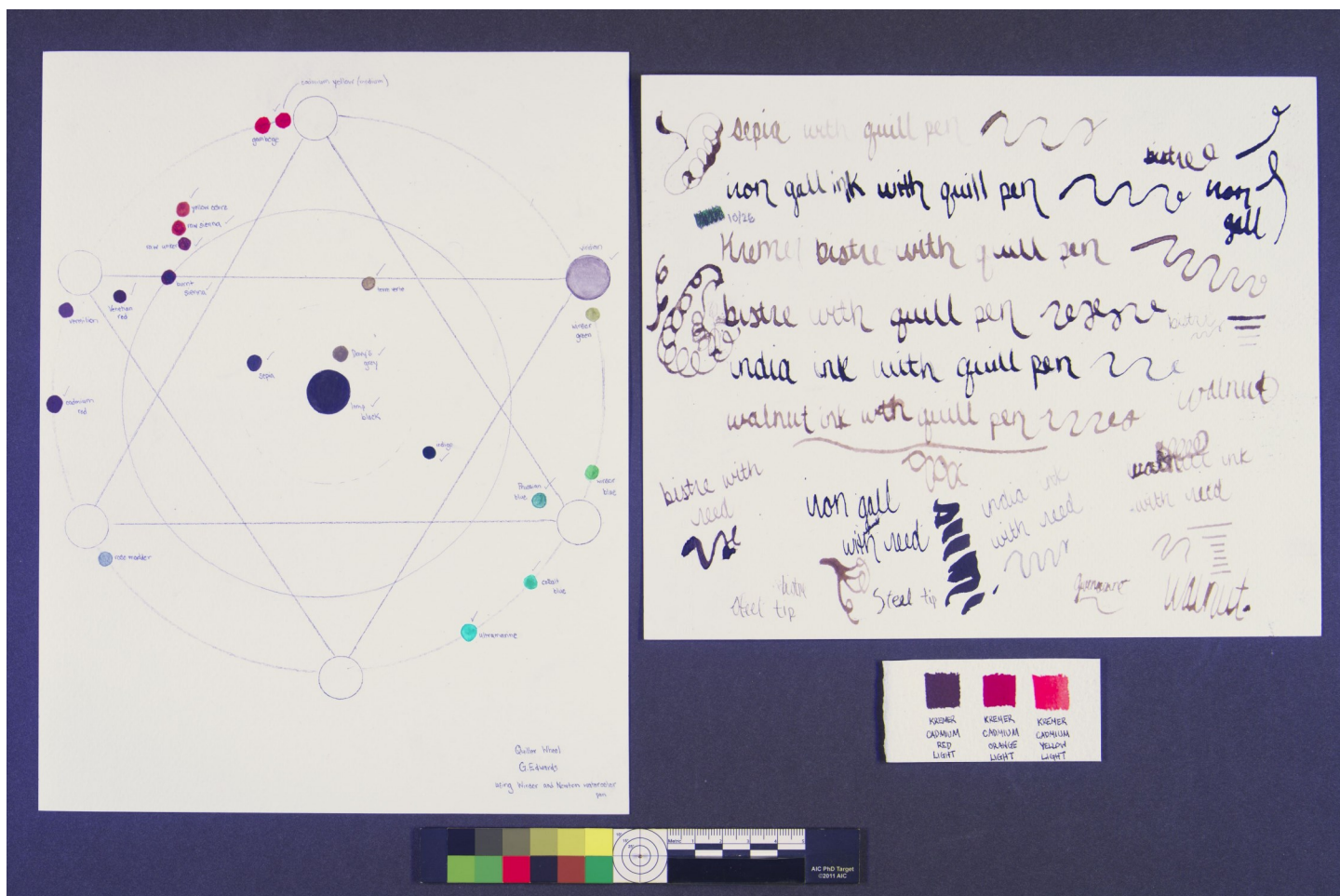
## Section 20—False Color Ultraviolet

### Digital Imaging Workflow for Treatment Documentation

Conservation Division, Preservation Directorate, Library of Congress

#### FALSE COLOR ULTRAVIOLET (MODIFIED CAMERA)

FCUV is a processing technique that combines channels from two images captured with the modified camera: visible and reflected ultraviolet, resulting in one false color image.



False color ultraviolet photograph



## Section 20—False Color Ultraviolet

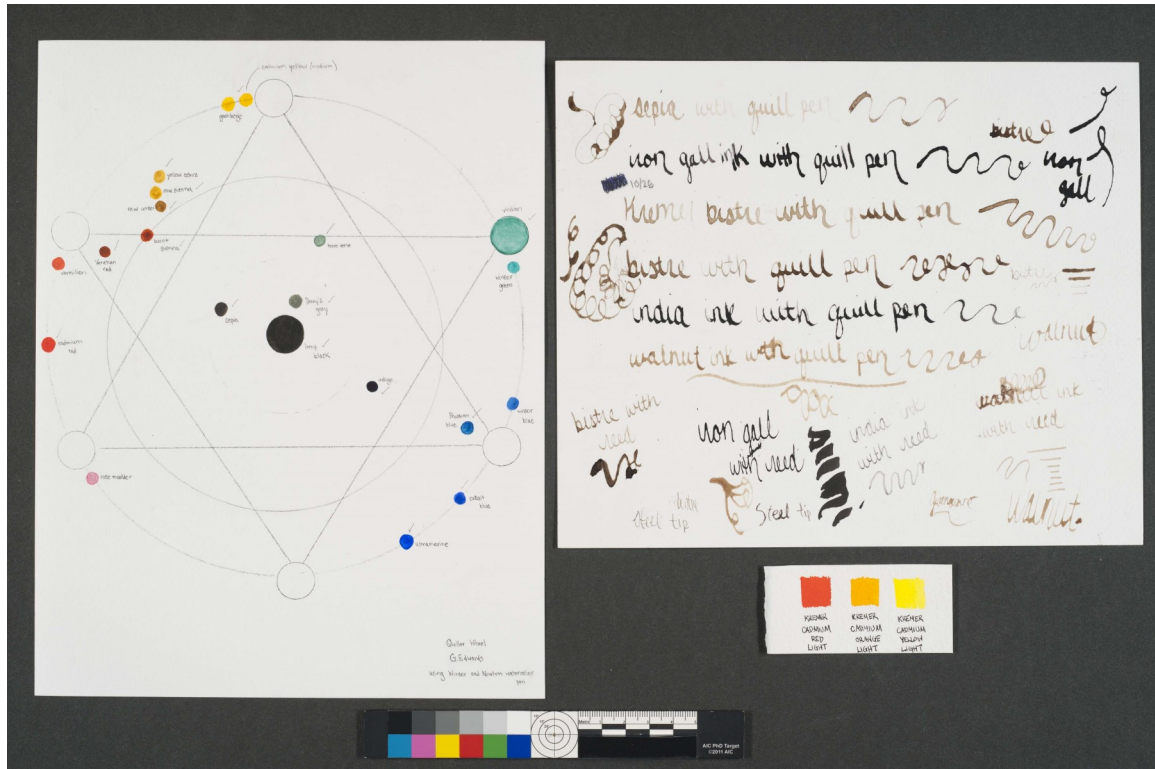


Figure 20.01

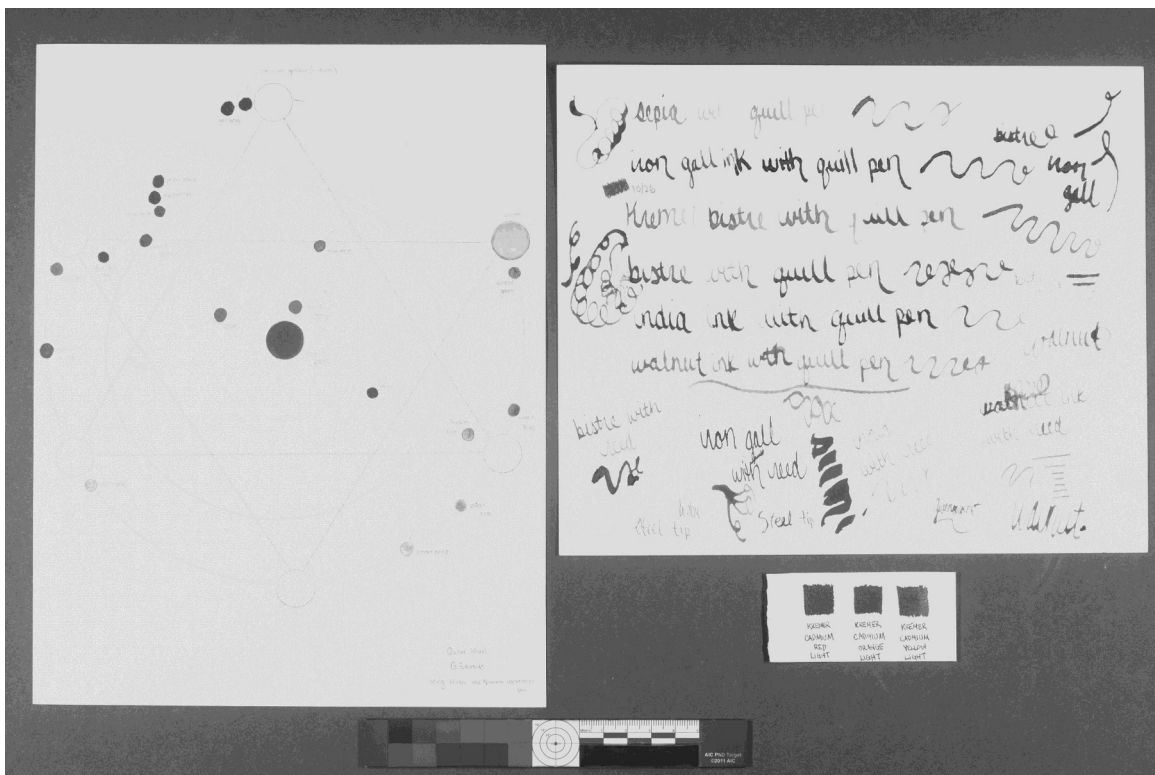


Figure 20.02



## Section 20—False Color Ultraviolet

### Capture

#### Image Capture

---

If not already done:

1. Using the modified camera with the CostalOpt lens, capture and process a visible illumination image (Fig. 20.01) following instructions in Section 14. Do not crop or straighten the image.
2. **Without moving the camera position or object position,** capture and process a reflected ultraviolet image (Fig. 20.02) following instructions in Section 18. Do not crop or straighten the image.

## Section 20—False Color Ultraviolet

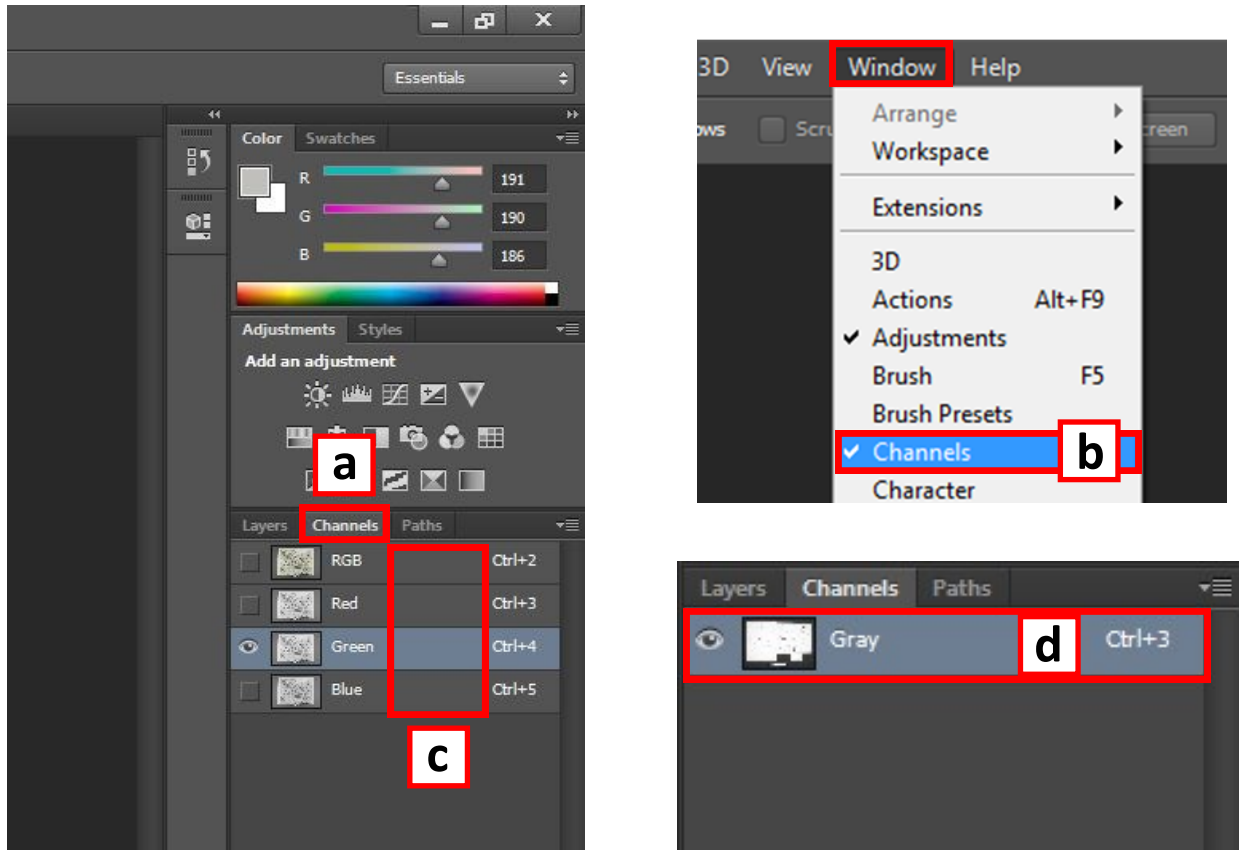


Figure 20.03

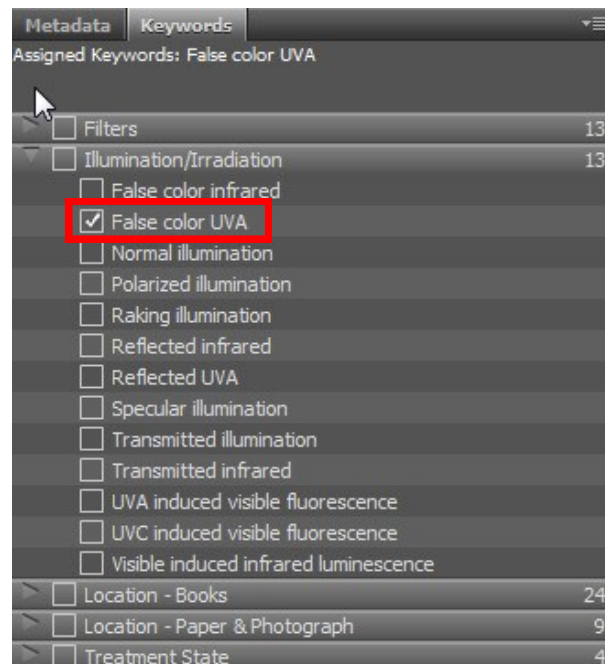


Figure 20.04

## Section 20—False Color Ultraviolet

### Image Processing

#### Create the FCUV Image File

---

1. Open both the reflected ultraviolet and visible illumination .tif files in **Photoshop**. If the *Channels* tab is not already displayed in a right panel (fig. 20.03a), select *Window > Channels* (fig. 20.03b).
2. Select the visible illumination image file. When selecting a channel, make sure to click in the middle of the channel bar (fig. 20.03c). In the *Channels* window:
  - i. Click on the *Green* channel. Click *Ctrl A* then *Ctrl C*.
  - ii. Click on the *Red* channel. Click *Ctrl V*.
  - iii. Click on the *Blue* channel. Click *Ctrl A* then *Ctrl C*.
  - iv. Click on the *Green* channel. Click *Ctrl V*.
3. Select the reflected ultraviolet image file. In the *Channels* window:
  - i. Click on the *Gray* channel (fig. 20.03d). Click *Ctrl A* then *Ctrl C*.
4. Return to the visible illumination image. In the *Channels* window:
  - i. Click on the *Blue* channel. Click *Ctrl V*.
4. Click on *RGB* in the *Channels* window to see the final FCUV image.
5. Save the final FCUV image as a new .tif file, following the naming protocol in Section 4.
6. Close the other images without saving the changes that were made to create the FCUV file.

### Metadata

Add metadata as you would for normal illumination except when applying *Keywords* (Section 3). Choose *False color ultraviolet* under Illumination/Irradiation (fig.20.04). No filters should be selected.