

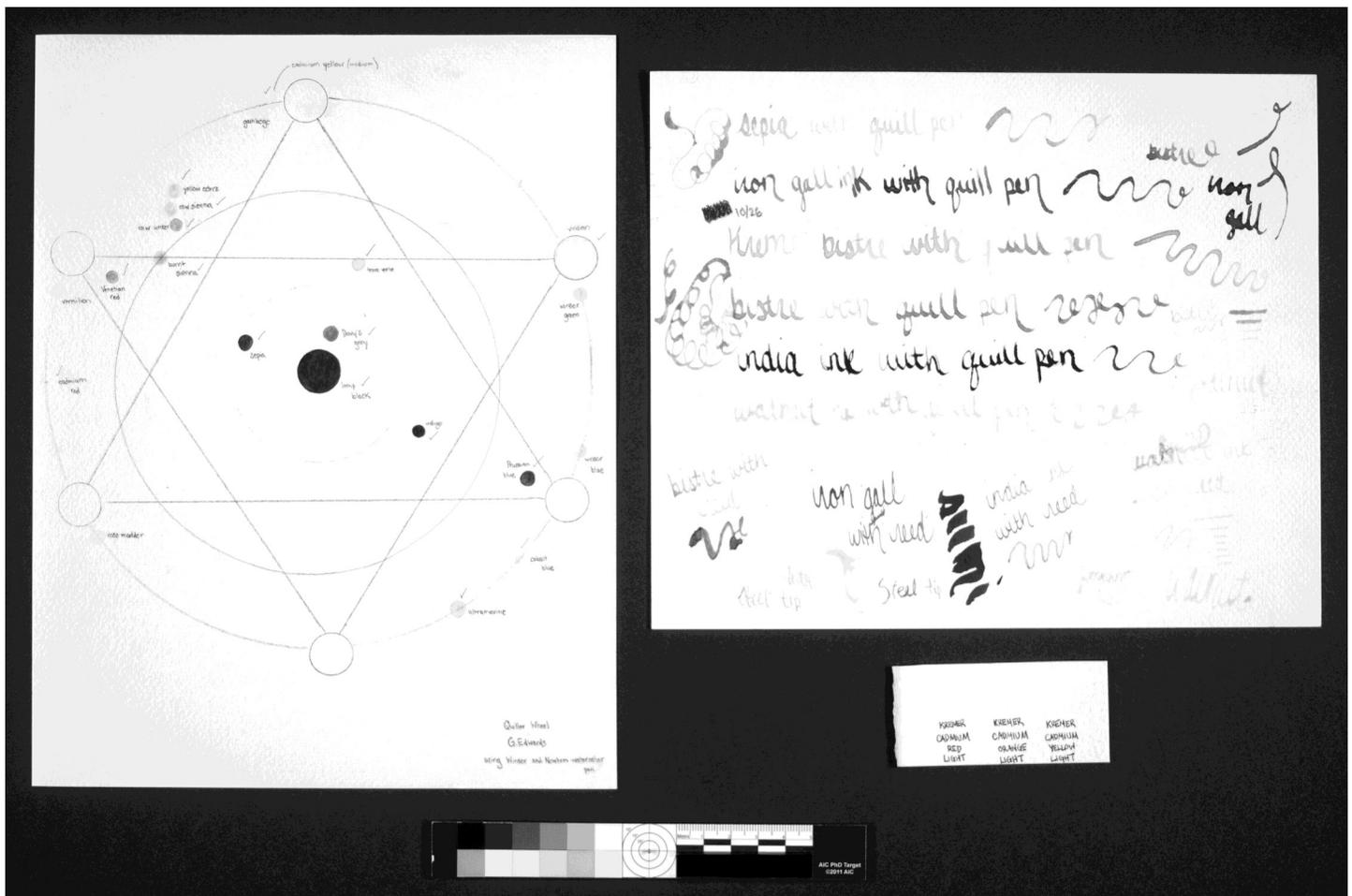
Section 15—Reflected Infrared (Modified Camera)

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

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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 rEE).
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.

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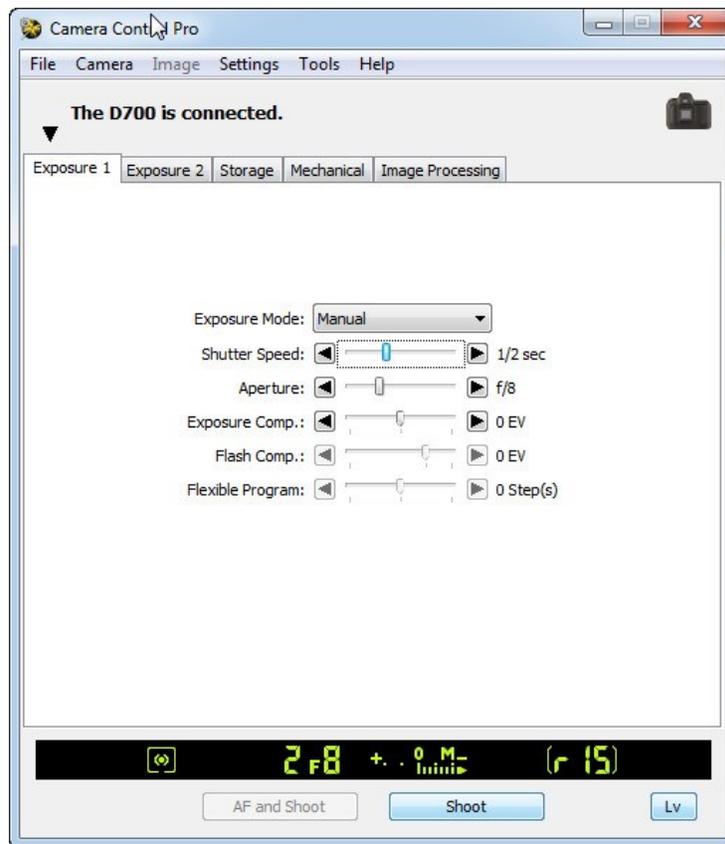


Figure 15.02

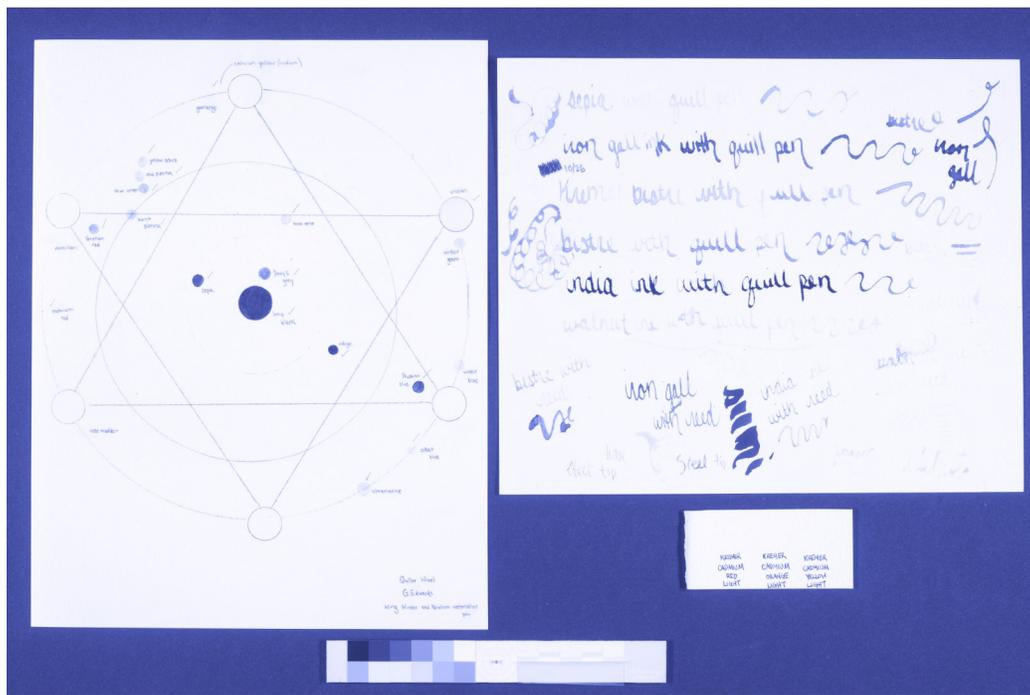


Figure 15.03

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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*.

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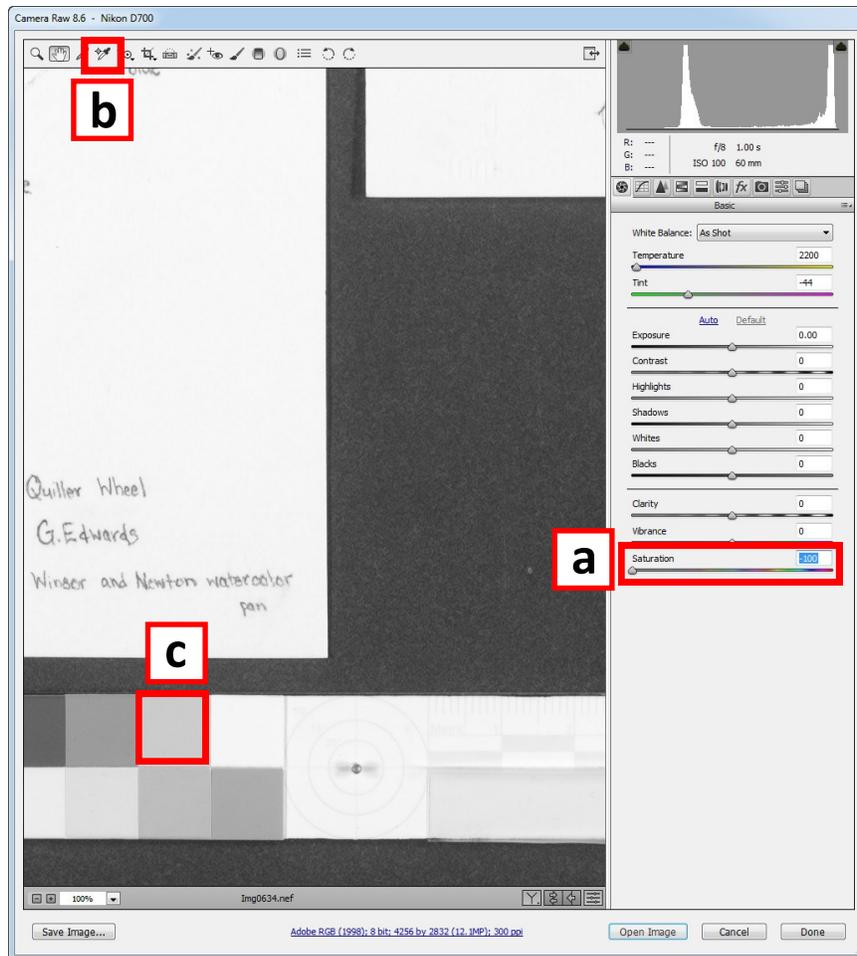


Figure 15.04

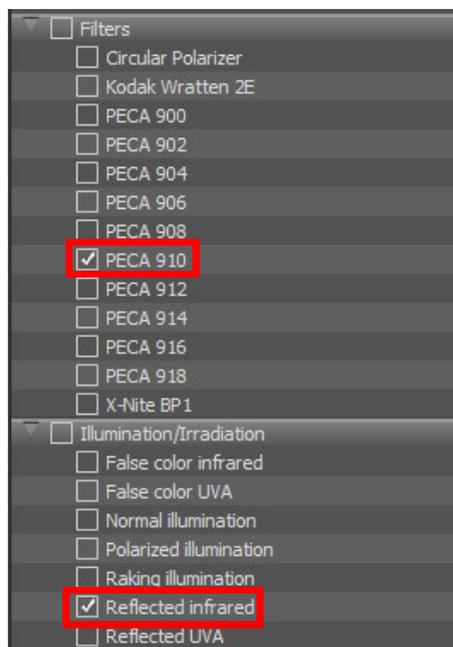
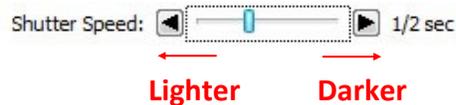


Figure 15.05

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).

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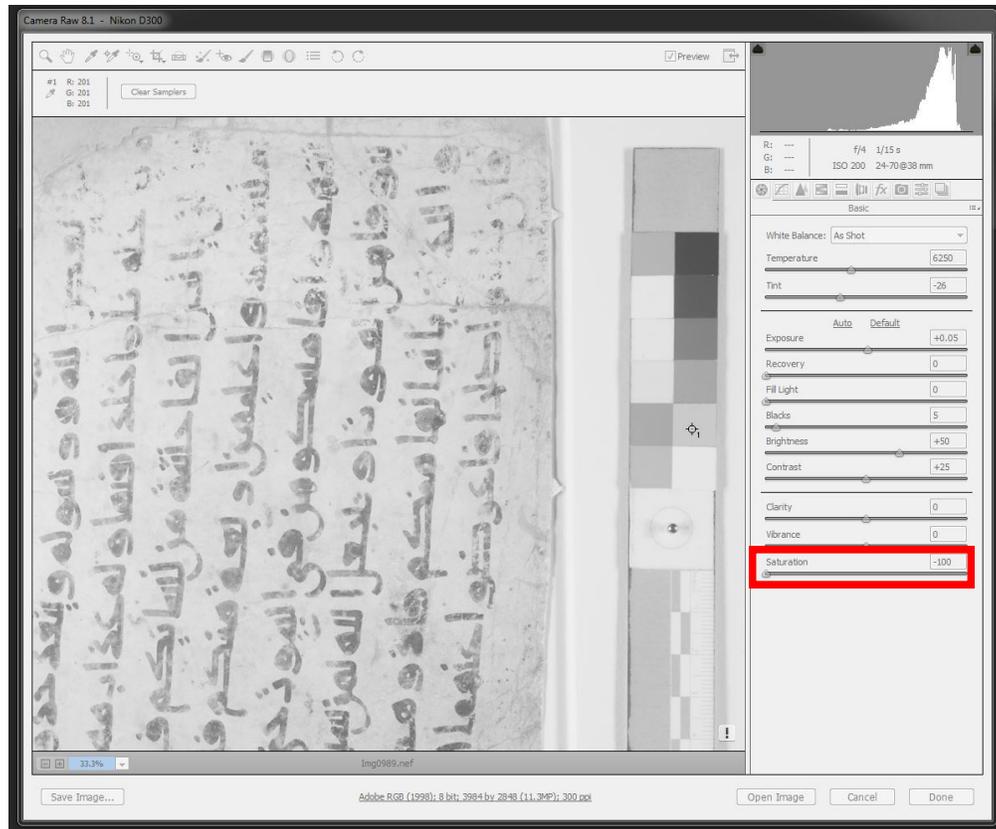


Figure 15.06

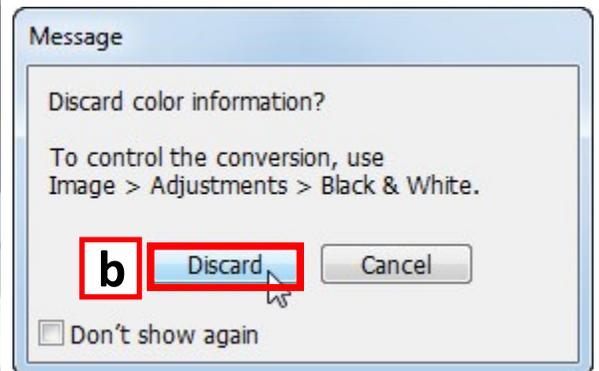
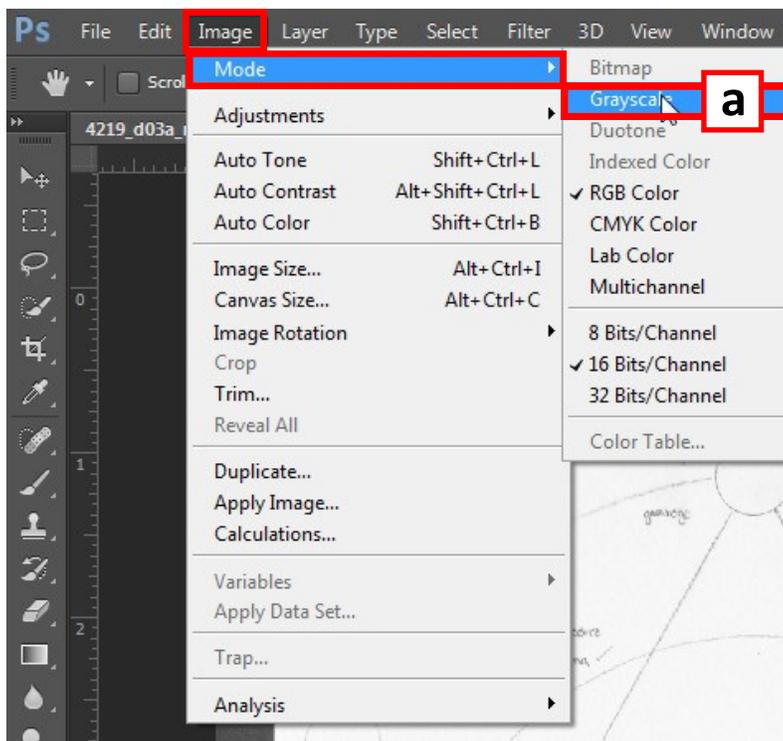


Figure 15.07

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).

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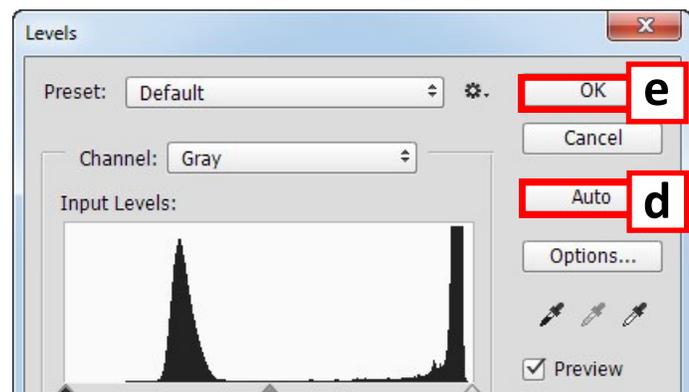
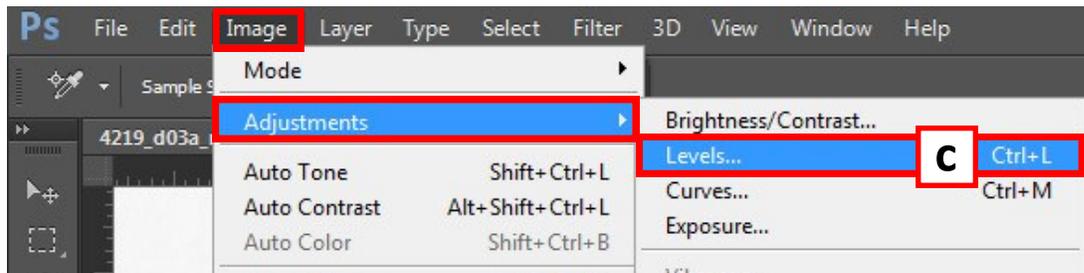
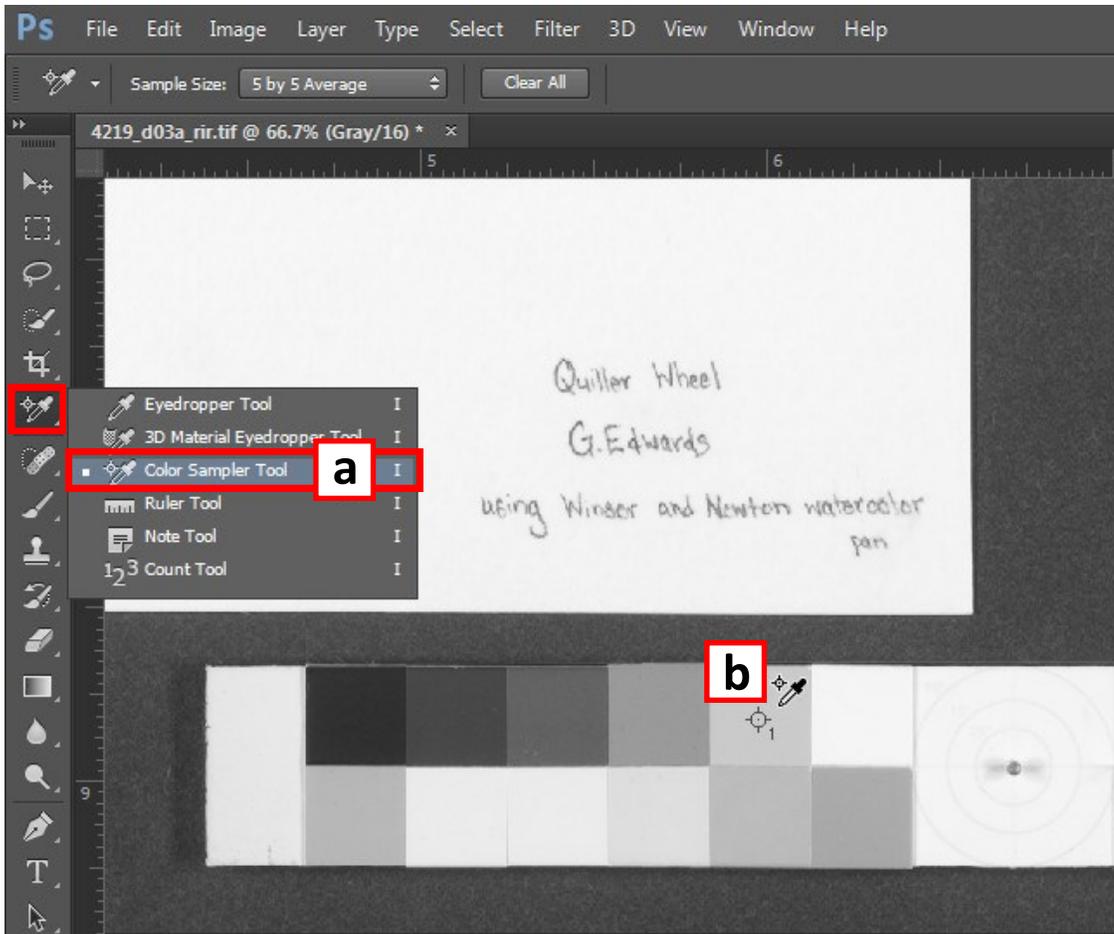


Figure 15.08

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.