CREATING PHANTOGRAMS STEPS

TRIPOD/CAMERA

__Place tripod on table
__Attach camera on slide bar
__Raise camera to between 20-24" from table
__Make sure it is level (adjust legs)
Use bubble level
__Tilt slide bar/camera to exactly 45 degrees
Use protractor or angle

TARGET

__Place a frame on the table
__Adjust the table so the center is 20-24" (same distance as camera is high) forming 2 sides of a right angle
Use ruler or stick
__Square the target with the table
Use T-square, laser guides
__Make sure the camera is square to the target
Use laser or view bottom of camera screen
__Take an 8/5 x 11 sheet of paper and "x" in each corner
If your frame is darker than the paper, you don't have to X the corners
__Place the paper on the frame
__Place the object to photograph in the bottom 1/3 of the paper.
Important – view through camera to be sure object stays inside the paper area (height and width)
__Use flood lights to illuminate the object.
__Move the camera ¾ inch to left of center, take photo
__Move the camera ¾ inch to the right of center, take photo

PHOTOSHOP CROP PERSPECTIVE

__Load both camera files into Photoshop of equivalent
__Crop tool, create crop box
__Click perspective box (very important)
__Zoom in on image
__Move crop area so each corner aligns with X or corner of paper, crop
__Adjust image size
Original dpi,
Disable constraint proportions - important
Set height to 8.5, width to 11
__Adjust brightness, contrast, color, etc
__Save left image "name_l" repeat for right image

STEREOPHOTO MAKER OR EQUIVALENT

__Open left and right images
__Create anaglyph
I found auto align not necessary if your setup is correctly aligned
__Crop to remove X marks
__Save stereo image
__Print anaglyph image

A Phantogram is a special type of anaglyph which when viewed with red/cyan glasses from the same angle and position to that when the photograph was taken, looks exactly as the original. If done correctly, the “phantom” image has the same dimensions as the original and if it is placed next to the virtual image, it is difficult to distinguish between these two. Usually phantograms are created by photographing an object from a 45° angle and is then viewed from the same position. Although it is possible to use a film camera, it is advised, especially for the beginner, to use a digital camera because the results are obtainable immediately and any necessary corrections are easy to implement on the spot.

There are three stages in creating phantograms:

1. Taking the photographs
2. Correcting the perspective distortion that was introduced in shooting
3. Converting the corrected images into anaglyphs and printing them out

The tools that are needed:

1. A digital camera
2. A sturdy tripod
3. A slide bar
4. A low table to place the object to be photographed
5. Special background targets as discussed below
6. Controllable lighting
7. A computer into which the images from the camera can be downloaded
8. Photoshop software (other software is possible to use, but the steps delineated below refer to Photoshop)
9. A good inkjet printer and high quality photo-grade inkjet paper
10. A small object to photograph
11. Software to create a anaglyph (StereoPhoto Maker, Pokescope or Photoshop)

<u>The quality of the final result is directly proportional to the accuracy of the setup and adherence to the basic steps.</u>
(see end of this file for a step by step list)

STEPS FOR MAKING A PHANTOGRAM

1. Making the target: on a piece of cardboard, draw **accurately an 8” x 10”** rectangle with small 0**.5” circles at each intersection.**
2. Place this target about **2’ lower than the camera/tripod**
3. Assemble the slide bar and the camera on the tripod and locate the assembly **exactly in a center** line with the target on the table so that the camera lens is about 2’ above the table. If you draw an imaginary vertical line from the lens to the floor then locate it 2’ to the center of the target. In other words, the camera is located at one end of a right angle triangle, which has two sides of 2’. Make sure that the slide bar is **absolutely level and parallel to the table and the target.**
4. Look through your camera viewfinder or LCD display. Place the camera so that it is aimed exactly at the center of the target and make sure you can see the full target and that it occupies about **75% of your display**. Move the camera on the slide bar .**75 - 1.25**” (experiment) to the left and the same amount to the right. When doing so, make sure that the full target is still visible in the display. If necessary, zoom out or move the camera back.

5. Place the small object you wish to photograph in the **center of the target's width and about 3/4 way to the front**. The idea is to position the object in such a way that when you look through the camera, **you can still see the full rectangle around the object.**
6. At this stage you need to refine the position of the camera in relation to the object so that the camera is aimed at the center of the object and no longer at the center of the target. This may require you to shift the camera back and higher an inch or so, still keeping in mind the absolute necessity that all angles and distances should be precise.
7. Locate the lights to give your subject a nice illumination with a gentle shadow. A natural mid-morning illumination works well. That is, the main light is located about 45° above and about 45° to the right of the subject which creates a nice shadow to the back and left of the subject.
8. Take your first shot from the left point, (the one which is 1.25" left of the center line) then without changing anything else in the setup, move your camera to the right point and take a second shot. We are aiming at a total movement of 2.5" from left to right. In other words, our stereo base is 2.5"
9. Download your two pictures to your computer and open each one in Photoshop. **Save your files as left and right files** with an appropriate title as in this example: "Figurine L" and "Figurine R"
10. Now we need to **correct the perspective distortion** of the images that we created when we shot the object from an angle. The pictures are showing the rectangle of the target as a trapezoid with the object inside it. We will do the same operations to both files. Click on the **Crop tool** in the main tool box palette. **Drag a rectangle** as close as possible to the trapezoid. Make sure that the **Perspective correction box is checked**! With your Crop tool active, **move the four points of the rectangle precisely on top of the centers of the circles at each corner of the rectangles**. You can achieve greater accuracy **by zooming** into the picture. Once you have the dotted line of the Crop tool exactly above the trapezoid, click on **Enter to execute the perspective correction**. The resulting image is more than likely badly distorted.
Using the *Crop* tool with the perspective box activated and with with *Constrain Proportions* disabled results in the above screen shots.
11. At this stage we need to re-create the original size of the rectangle of your physical target. We do this by **entering the dimensions of 8" x 10"** as follows: On the main menu click on **Image>Image Size** and enter the dimension in inches. Click OK and save this image as "Figurine Phanto L" We are doing this step, so that if you need to return later to correct something, you wouldn't have to start all the way from the beginning. Do the same with the right image and save it as "Figurine Phanto R"
Applying the Perspective correction to each image, and recreating the original size of 8" x 10" of the target, gives us these images. Note the quarter circles at each corner, remaining after the perspective cropping.

(The following is to create an anaglyph in Photoshop, skip this and go to StereoPhoto Maker or Pokescope if you are not using Photoshop for this section)

12. Make sure that the "Layers, Channels, Paths" palette is open and then activate the Channels tab. Select the left image file that you just saved and click on the Red Channel in the palette. In other words, we need only

the red channel from the left image. Select the whole red channel (On the main menu Select>All) and copy it to the clipboard. (Edit>Copy) At this stage, we can close the left image since we don't need it any longer. Do not save it as a different file, just close it!
13. You should have now the right image file active on your Photoshop desktop. In the Channel palette, click on the Red Channel and fill the image with white background. (Edit>Fill) We are doing this to eliminate ghosting later on. Now paste the red channel that is saved on the clipboard onto the open red channel with white background and pay close attention to the following instructions.
14. In the Channels palette, click on the little square on the top left of the palette where the eye icons are. The top icon activates all the channels but keeps them flexible in case we need to adjust the stereo window. If you click by mistake on the box with the name RGB, you won't be able to move the red channel any longer. After you are satisfied with the position of the window, you may click on the RGB box. Now save this file as "Figurine Phantogram" and you are done!

Viewing and Printing the Phantogram

Because the image on the screen is the actual phantogram, looking at it perpendicularly with red/cyan glasses will give us a distorted view. To see the phantogram correctly we need to tilt the screen at 45° away from us. This is easy if we are using a light flat panel display, but the best way is to print it out, place it on a table in front of you and look at it from 45°.

http://www.cs.umanitoba.ca/~gedetil/3d/phanto/howto/
http://anabuilder.free.fr/Phantogram/index.html
http://en.wikipedia.org/wiki/Phantogram
http://www.stereomaker.net/eng/popup/createpopup.htm
http://www.shughes.org/phantograms/nsa_2004_phantogram_workshop.htm

PERSPECTIVE CROPPING

In Photoshop Elements there are four transform options,accessed from the Image>Transform menu, these include: Free Transform, Skew, Distort or Perspective, and perform as follows:
Prespective

Using Paint Shop Pro

To fix this image in Paint Shop Pro 8, you can use the new Perspective Correction tool. (If you're using an older version of Paint Shop Pro, or another image editor, be patient: I'll tell you about another way to do this later.) Select it from the tool palette--it's the second tool from the top, but you might have to choose it from the drop-down menu, since PSP now packs multiple tools into each space.
You should see a box appear in the image. Use the mouse to align the top of the box over the building on the right (the one with the most apparent distortion), and position the box so it outlines the front of the building.
When you're done selecting the building, click the OK check box at the top of the screen. PSP corrects the distortions throughout the image. To finish up, you simply need to crop the image to a more traditional rectangular shape (by cropping out the white portions) and save it.

Or Do It by Hand

What if you're using an image editor that doesn't have a nifty Perspective Correction tool? You can still correct the image, but you'll have to do it yourself. If you use Adobe Photoshop Elements, for instance, you'd open the image and then create a new layer. To do that, double-click the layer's name in the Layers Palette (which usually opens in the lower right corner of the screen). Now choose Image, Transform, Distort from the menu, and you'll see a box appear at the edges of the image window.
At this point, it's easiest to enlarge the image window so you can better see the Distort box. Maximize the image. Now grab the top left and right corners of the box and drag them away from the image, stretching the top of the picture. You'll have to play with it a bit, but you should be able to correct almost all of the distortion in the buildings. When everything looks about right, accept the changes and crop the image back to a rectangle. You're done!

Finally, if you still use Paint Shop Pro 7, you can make a similar correction. Select Effects, Geometric Effects, Perspective--Vertical. Move the slider until the photo looks the way you want it to in the preview box, then click OK to implement the change.
Straightening perspective fixes

Photos taken with the horizon or distinct horizontal features not perfectly aligned can be improved by straightening. To do this, click the Measure tool and drag a line across either the horizon or the line that is at an angle. Now choose ImageRotate CanvasArbitrary, and the angle in the dialog will be set to the angle of the line you just created. Click OK to rotate the image and then straighten it. You'll need to crop the photo when you've done this, because the photo won't be rectangular any longer.
When you shoot tall buildings, you'll often find you get a keystone effect where the top of the building is narrower than the base and the sides lean inwards. To fix this you'll need to fix the perspective, so begin by reducing the size of the image and then enlarging the window containing the image so that there is some gray area around it. Choose Select All and then EditFree Transform. Once you've done this, a set of sizing handles will appear around the image. Hold down the Control key as you drag on a handle to adjust the image, and then continue to do so until the lines that should be truly vertical the sides of buildings, for example) run parallel to the edge of the photo. When you're done, click the Commit transform (Return) button or hit Enter to confirm your changes
Links on perspective cropping
http://www.ephotozine.com/techniques/viewtechnique.cfm?recid=220
http://www.bethelks.edu/bstucky/gimp/perspective_correct/
http://www.aecbytes.com/review/PhotoshopCS2_pr.htm

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