Comp Photography (Fall 2015)
HW 5

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The Setup

The Scene

The Image

I built my own camera obscura out of a cardboard box and tracing paper. With considerable effort, I attempted to capture an outdoor landscape of a water tower.

1. What was the site of your camera obscura experiment?

The site of my camera obscura experiment was a water tower in Round Rock, Texas. I stood a few hundred meters from the tower to include a nearby pond in the foreground of the image. This also allowed me to have a nice blue, partly cloudy sky as a backdrop.

2. Why was it appropriate? What did you have to do to make it appropriate?

This scene was appropriate because it was very well illuminated (images were taken around high noon). The bright outdoor scene creates a better image for the camera obscura, which houses a screen in near complete darkness. For the best results, I had to ensure that very little light penetrated the box housing of the camera obscura.

3. Was the image visible to naked eye?

Yes, the image was visible to the naked eye. Because the outdoor scene was very well illuminated, I did not need to use a long exposure to capture the final image. However, the result was grainy/blurry, reminiscent of an old low-resolution camera. Perhaps if I chose subjects closer to the camera, it would have improved the contrast and overall resolution.

4. Who helped you with this assignment? In what way?

I was inspired to build my own camera obscura after watching the video linked in the assignment description. Nobody else helped my physically, but I did use a local machine shop to build the camera and make precise pinhole cuts in the cardboard.

The “Scene”

A landscape view of a water tower and pond in Round Rock, Texas. I chose a bright, partly cloudy day in an attempt to capture a nice skyscape.

The “Image”

This was captured using a ¼ inch pinhole and 5x magnifying lens. The final image was quite blurry, but you can make out the water tower and even see the painted symbol.

I rotated the image 180 degrees and cropped the image to remove the blank parts of the screen. The image only took up ~1/3 of the overall screen size, which was 9” x 9”.

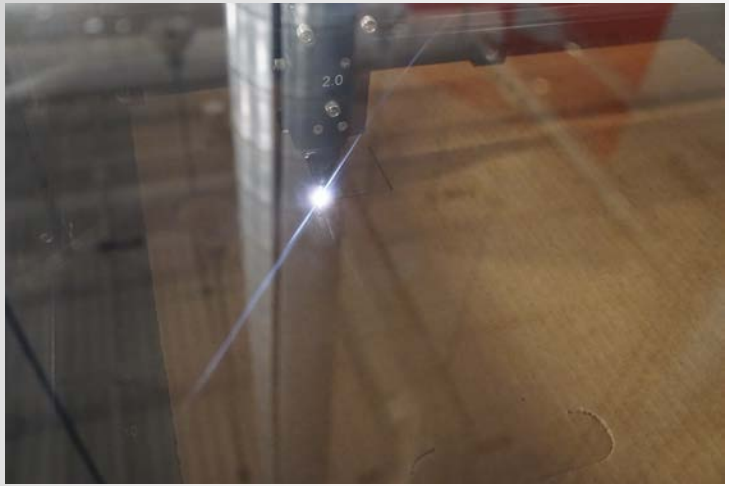
Camera settings:
- f/5.6
- 1/200 second exposure
- ISO-3200

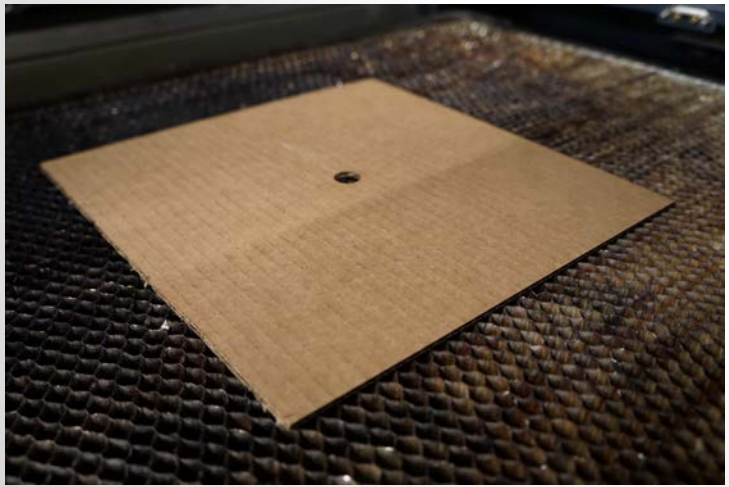
The “Setup”

It all started with a cardboard box.

More Info/Setup

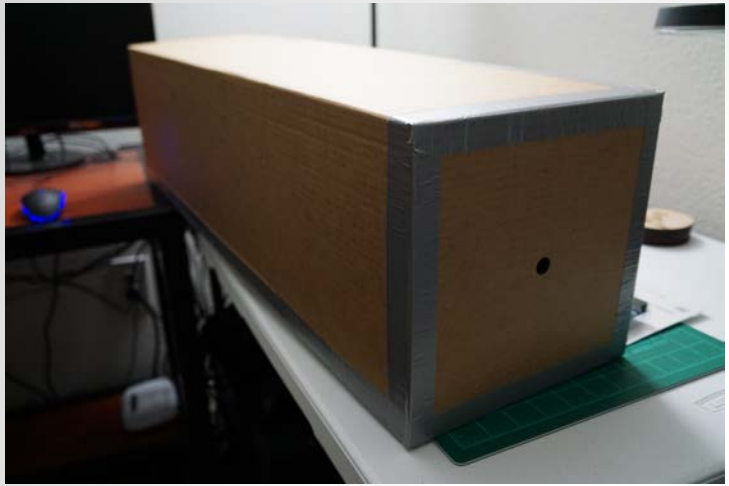
Cut, fold, and tape the cardboard into two rectangular prisms. One is half the length.





More Info/Setup

I used a laser cutter to create precision cuts for the pinhole, or aperture size. This image shows a pinhole of ½ inch.



More Info/Setup

Add the pinhole cardboard piece to the larger rectangular prism. Make sure that light can only enter through the pinhole!

Affix a lens in front of the pinhole. Here, I used a 5x magnifying lens that I salvaged from an old toy.

More Info/Setup

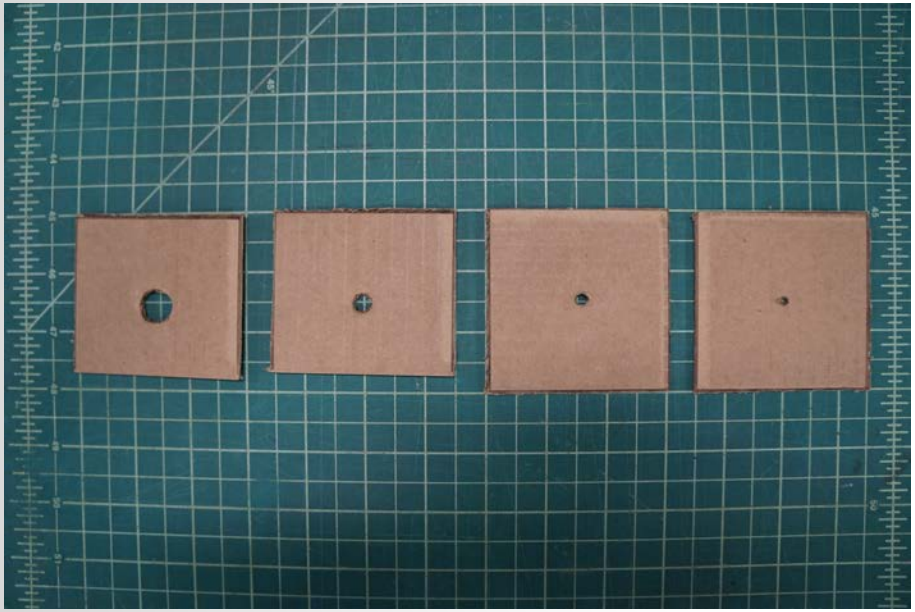
Add tracing paper to the smaller rectangular prism. This will serve as the “image sensor” or screen for the camera obscura.

Insert the smaller rectangle into the larger one. Adjust the screen distance to put the image in focus. This distance is a factor of the lens, pinhole size, and wavelength of the light.

More Info/Setup

Insert a camera into the backside and aim the camera obscura toward the scene. The digital camera will capture the image captured by the camera obscura. Note, the image will be upside down.

More Info/Setup



I also played around with using different pinhole sizes to see the effects on the resultant camera obscura image. I tested with ½ inch, ¼ inch, 1/8 inch, and 1/16 inch aperture sizes.

½ inch

¼ inch

1/8 inch

1/16 inch

More Info/Setup

I think the best result was the ¼ inch pinhole. The ½ inch let in too much light, and the smaller pinholes let in too little. This caused the final image to be over- or under-exposed. However, the image started to get sharper as pinhole size got smaller. I would need to play around with exposure times to take advantage of this.

More details

I enjoyed this project because it gave me a hands on experiment to learn how simple cameras work. It is always cool to see optical physics theory working in action! Next time, I'd like to enhance the camera with variable pinhole apertures and build some sort of interchangeable lens system. I also believe the cardboard body can be further optimized to be smaller (more portable). I'd also like to test different scenes with subjects closer to the camera.