

Computational Photography

Assignment #5

Camera Obscura

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The Scene



The Image



The Set-up



Other images

This is my attempt to capture my backyard through a pin hole camera using a box ("box obscura").

The setup involves using an old shoe box which appeared to be built specifically for this project :D I also used holes of various sizes punched into opaque cardboard and a black cloth to cover up any gaps in the edges of the box.

The Scene - what you captured



My backyard. I felt that this was appropriate because of the variety of colours involved – the blue sky, red umbrella and the green tree at the center.

Another reason I had chosen this is because of the location of the sun – it was lighting up the scene. (This was not the case for my room obscura experiment where it was directly facing the camera).

I was also interested in how the aperture size affected colours, if any.

The Set-Up



- A shoebox
- Opaque cardboards with various sized holes
- Black cloth
- A digital camera

Though I started with the original placement of the holes, I had to move them to the middle later on, so that the projected image will be at the center of the 'screen'

The Image(s)



Technically they were visible to the naked eye, but were so faint that you could only see it if you didn't look directly at it (weird quirk in the placement of rods and cones in the eye).

I was really satisfied with the results and was blown away by how much it resembles viewing through the naked eye – all areas in focus (even the part that's reflecting off of the glass on the right side), natural colouring, etc (granted the picture you're seeing above was taken with a digital camera)

Pinhole Dimensions



1 mm



4 mm



7 mm

From the images above, we can clearly see that the larger the aperture is:

1. the more light is let through and so brighter the image is
2. the blurrier it becomes (as the distance of the screen from the aperture remains the same)
3. (and technically), the wider the field of view. But that is almost indistinguishable in this case.

No post processing done
except resize and rotate

Digital Camera Settings

Aperture – f/2

Exposure time – 4s

ISO – 1600

I used a quite capable point-and-shoot camera – the Canon S95, so I was able to control these settings quite well. Also since the camera simply rested on the table, I faced no issues with movement, etc.

Field of View

Theoretically the field-of-view for the camera obscura is almost 180 degrees, however I was able to measure it upto around 95 degrees. Beyond that angle, the light was too faint to detect.

Compared to my camera (with the fixed lens) which could only manage upto 60 degrees.

I had first built a room obscura in my room but I was not very satisfied with the results for a number of reasons (a few are below), and so I decided to build a box obscura instead. I had to make multiple holes and of different sizes (2 cm, 2.7 cm and 3.5 cm) and locations to experiment.



Outside my window



The set-up



The images

1. During this season, the sun always faces my window during the day – this mean a lot of brightness from the sky, realtively dim everything else and shadows of everything.
2. My window has a fly mesh installed on one side and has beams running across it. The sun shade on top also didn't help with the lighting.
3. The room was too wide to get a good picture on my digital camera whose field-of-view was way too narrow.
4. Because of the dimensions of the room, the image projected on the walls closer to the aperture were squished and the image on the far side of the wall, normal.

Resources

"Making your own room with a view", Nat Geo, <https://www.youtube.com/watch?v=gvzpu0Q9RTU>

Above & Beyond

[See above for the room obscura.](#)