Group Image 3

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MCEN 4151: Flow Visualization
11/9/15

1 - Introduction:

The goal of this project was to create a cumulus cloud indoors. A Dutch photographer and artist named Berndnaut Smilde inspired this idea. An awesome example of his work can be seen in Figure 1. Creating a good looking cloud proved harder than initially thought. The following report outlines the experimental setup, the physics behind a cloud, and the photographic techniques used to achieve the photo.

Figure 1: Inspiration. Photograph by Berndnaut Smilde [1].

2 - Experimental Setup:

To make the cloud a fog machine was used in conjunction with a 50W light, and a glass filled with ice cubes. A diagram of the set up can be seen in Figure 2. The class of ice cubes helped to direct the fog upwards as well as cool the fog. Cooling the fog helped keep it from rising straight to the ceiling before I could take a photo. The light positioned behind the fog machine helped to give the cloud definition. Lastly the fog machine used was a small Heshan Tongfang Lighting Technology CO Fog Machine. The fog solution was made of glycol and distilled water. Some set up was required to create the optimal cloud conditions and achieve thicker fog. The room was cooled to 50°F and the air was saturated with as much as possible using a spray bottle. The room was also isolated to achieve stagnant air. Even after these precautions the fog dissipates quickly so you have to be quick to capture it.
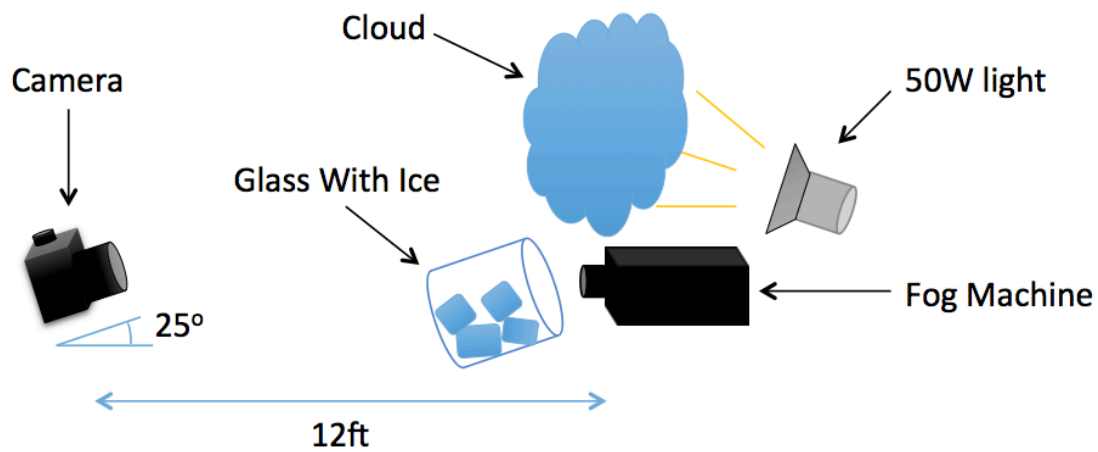
Figure 2: Experimental Setup

3 - Flow Phenomenon:

Although the cloud seen in the image is produced artificially the physics are essentially the same as what happens in nature. The fog machine uses a heat exchanger to heat up and vaporize the water glycerin mixture. This causes rapid expansion and forces the vapor out of the nozzle. Once the vapor mixes with the cooler outside air it instantly condenses forming the opaque fog you see in the image [2]. The same thing happens in nature but without the aid of an electric heat exchanger. Warm moist air rises through the atmosphere and as it raises it cools and condenses forming clouds [3].

4 - Photographic Technique:

The camera used was a digital Canon PowerShot SX530 HS, which comes stock with a 4.3 - 215.0 mm lens. The exposure settings are as follows, aperture of F3.4, shutter speed of 1/125 second, and ISO set to 400. The camera was about 12 feet away from the subject with a field of view of about 10 feet by 14 feet. Post processing was done using Photoshop Element 13. The contrast and brightness of the photo were both increased to help give the cloud better definition. Also some clone stamping was done to remove a distracting power cord. The photo was not cropped. Both the original image and the final image are shown bellow in Figure 3.

Figure 3: Final Image (left), Original Image (right)

5 - Conclusion:

Although my image is not as elegant or as well executed as Berndnaut Smilde's photo, I think I was able to effectively capture the illusion of a miniature cumulus cloud in my kitchen. In order to improve this in the future a much more powerful fog machine would be suggested. In addition adjusting the fog mixture or adding more glycerin can help to produce a thicker cloud.

6 - References:

[1] Smilde, Berndnaut. "Berndnaut - Index." *Berndnaut - Index*. N.p., n.d. Web. 17 Dec. 2015.

[2] "How Fog Machines Work - Rosco.com." *How Fog Machines Work - Rosco.com*. N.p., n.d. Web. 17 Dec. 2015.

[3] Pretor-Pinney, Gavin, and Bill Sanderson. *The Cloudspotter's Guide: The Science, History, and Culture of Clouds*. New York: Berkley Pub. Group, 2006. Print.