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Team Project #1 Write Up

The Leidenfrost Effect

<http://vimeo.com/88322684>



For my first group assignment, my group had the idea to do an experiment involving water and a hot plate. The idea was to film steam explosions with a high speed camera and put together a montage of different explosions. The final product ended up being quite a bit different but my team and I would have never got to our final films if we did not start out where we did. After a few failed attempts to capture any noteworthy steam explosions with the high speed camera we began to notice that the water displayed some interesting properties. While water sat on the pizza pan directly on top of the hot plate the water seemed to skate about the heated center. I personally had never seen anything quite like it. With this new found observation we got the idea to get some food coloring and see what kind of images we could capture



The set up for the assignment was quite simple really. The group and I took the hot plate outside for the sun was shining bright and made for good lighting that day. We set the hot plate on a bench and set a cheap round pizza pan on top of the plate. We then filled four petri dishes up with water and placed four different colors in each petri dish (Red, Blue, Green, and Yellow). As my group partners were dropping water and sometimes cooking oil on the pan I decided to use my Nikon D3100 to take some close-up handheld video. We used plastic syringes to drop the water on the middle of the pan because this is where the pan gets the hottest. In this range is where the Leidenfrost effect can take place and cause the water droplets to float about the surface of the hot zone. It was my professor Jean Hertzberg who identified what the effect was that my partners and I had witnessed and caused me to research the topic further.

The Leidenfrost effect is a physical phenomenon that happens when a liquid is exposed to an extremely hot substance. The liquid in immediate contact with the heat vaporizes, and the vapor creates an insulating layer that slows the rate of evaporation and boiling, allowing the remaining liquid to hover... Vapor does not conduct heat very well, so it acts as a barrier between the heat of the pan and the remaining liquid. The droplets might appear to skim on the surface as the vapor drifts. (McMahon)

This quote helped me understand the Leidenfrost effect and helped me to better understand what I saw during my team's experiment. The Leidenfrost effect can be a really amazing thing to witness and with the varying degrees of water our team put on the pan we got a multitude of different shapes and textures. From giant globs of water to a bunch of little ones dancing on the plate. The effect was enough to propel a 3 inch wide puddle of water around for a couple minutes and I'm sure it could have gone on much longer if we didn't tilt the pan and push it outside of the Leidenfrost zone.

When it came to photographing the sequences that I later edited into my film, I kept things rather simple in my approach. Like I stated previously I used a Nikon D3100 with a Nikon DX AF-SNIKKOR 18-55mm 1:3.5-5.6 G II ED lens. I set the aperture to 5.6/f and had the lens zoomed all the way to 55mm. I got the camera 2-3 feet away and opted to do all the takes handheld instead of using a tripod. With the handheld approach and the lens I was using it allowed me to get up close and it allowed me to capture the action from multiple angles. The handheld approach also gives the film a little camera shake that helps the film maintain its sense of energy and movement. With this in mind,

when it came to my decisions editing I wanted to cut on action and movement to give the film a lively feel and display the phenomenon.

I really liked what the video revealed. The movement and editing showed what the Leidenfrost effect can really demonstrate. I feel there is a vast potential for what kind of videos one can make when experimenting with the Leidenfrost effect. I feel perhaps I slowed the pace of the video down too much towards the end and if I went back to redo it I would keep the pace up and try to keep cutting on action. I would have probably wanted to compose some music and create a soundtrack for it but to what end I am not sure. I was thinking a bunch of sound effects and weird ambient guitar and bass noises but I never got around to putting any music to it. This project I see as just a starting point for creating something very similar to it in the future and a really awesome introduction to the Leidenfrost effect.

Bibliography

McMahon, Mary. "What Is the Leidenfrost Effect?" *WiseGeek*. 03 April 2014. Web. 15 April 2014.