

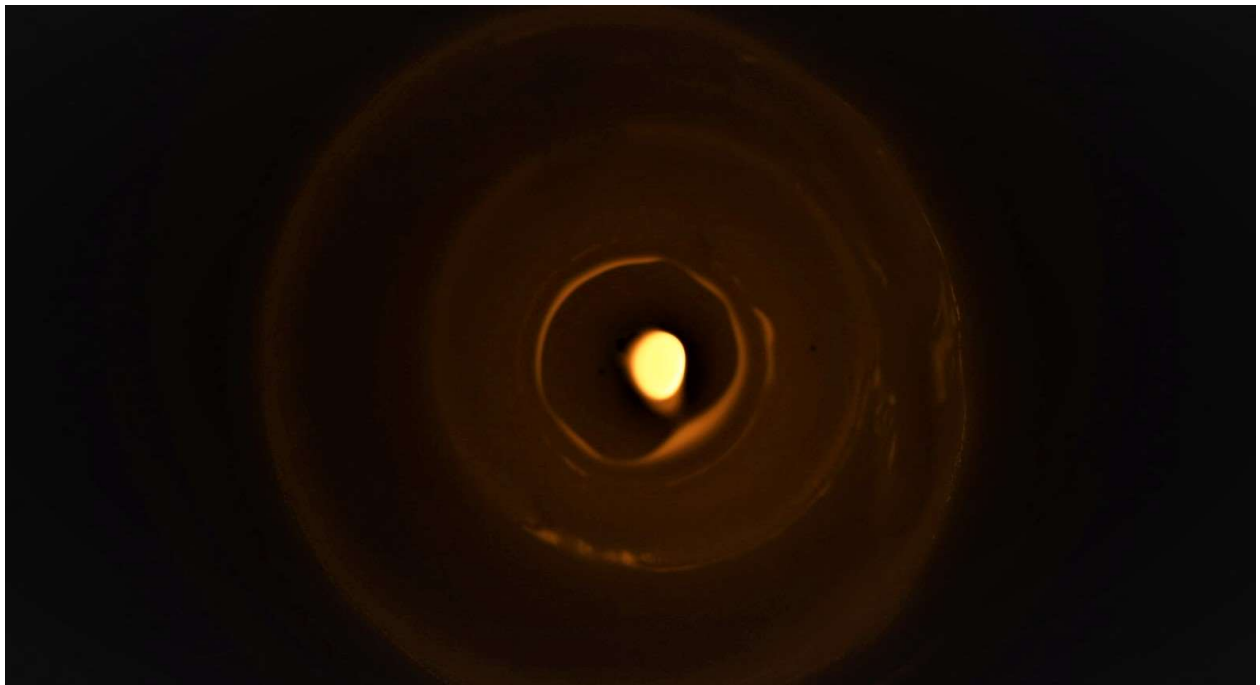
Melting Wax

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Image/Video 3

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I. Image Context

For this image I decided it was time I challenged myself with lighting experimentation. I also had been wanting to try taking a photo of fire for quite a bit, so I landed on it as a light source. I burn candles quite often in my apartment and have one candle that never burns all the way to the edge because the container it is in is too large. This creates ridges of wax at different levels around the edge, which I thought would make a cool image. The element I wanted to highlight the most was the way a candle burns in a drop-like shape using the melted wax around it. Figure 1 shows the raw image.

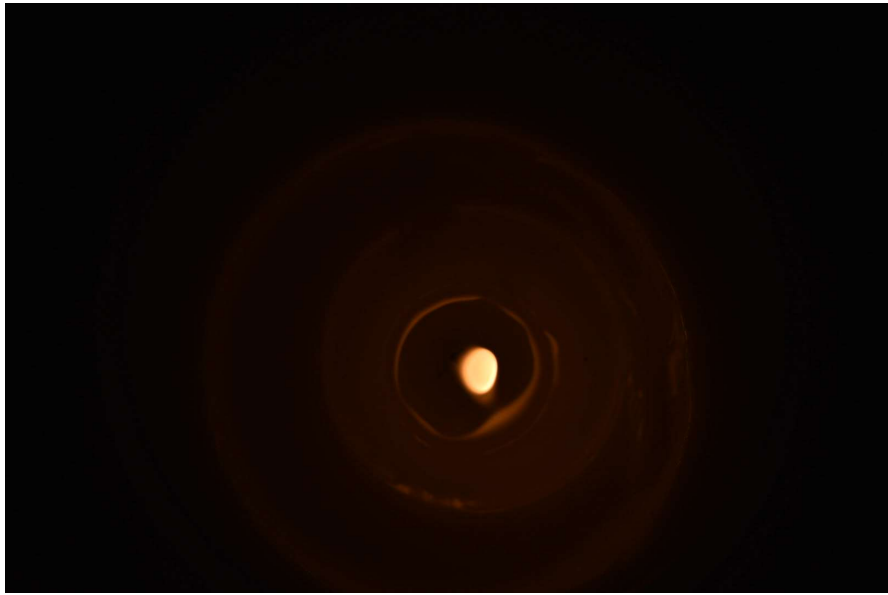


Figure 1. Raw image.

II. Fluid Dynamics

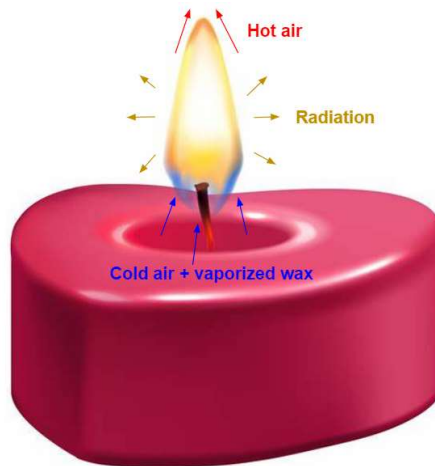


Figure 2. Flow apparatus of the honey pour.

The flow apparatus of the candle burning is shown in Figure 2. The radiation from the candles vaporizes the wax and pulls the heat of the cold air in. This turns the hydrocarbons of the wax into water vapor, carbon dioxide, heat, and light when it is combined with oxygen molecules [1]. In my image in particular, the candle is underburned with ridges on the edges because the radiation of the fire can only expand so far. This causes the center to melt and edges to remain solid. Equation 1 [2] shows how the heat transfer of the candle is dependent on the area the burn is occurring across, in this case it would be the surface area of the wick. If the candle had a thicker wick or more wicks, it would transmit more heat and melt more wax.

$$\dot{q} = h(T_{Hot} - T_{Cold})A \quad \text{Eq. 1}$$

III. Visualization Technique

To visualize the candle, I took a few different approaches before landing on my final image. I first took a couple of images with a light on in addition to the candle, but had a hard time capturing the drama and warmth of the flame. I then turned the lights off and was much more satisfied with the contrast it created. I decided to take the image from above because I liked how it captured the glow of the candle against the ridges of the wax. I also felt it showed the reflection of the light against the melted wax the best.

IV. Photographic Technique

The field of view for my image was about 7 x 4.66 in. I used this field because I wanted the candle to be in the center of the image as well as have it hit the top and bottom of the frame. My camera lens focal length is 18-55mm and I use a Nikon digital camera D5500. The original photo was taken with the pixels 6000x4000. The camera was on ISO setting A 3000. The aperture was on F/ 4. The shutter speed was 1/60. These are the standard settings for my camera, except for the fact that I manually lowered the exposure a bit so that the candle glowed more dramatically.

Figure 4 shows the raw and edited image side-by-side. In editing, I increased the saturation, increased the contrast, and made the image a bit sharper. All of these edits held the purpose of trying to make the reflections of the candle glow on the ridges and melted wax more visible.

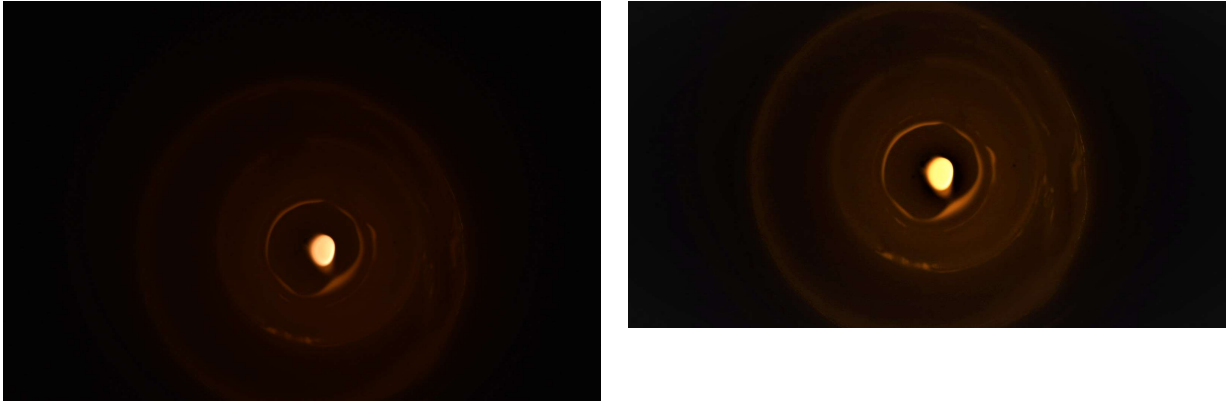


Figure 5. Left: Raw image. Right: Final edited image.

V. Image Overview

In total, I am generally satisfied with my image. I think the image and the post-processing captured the features of the candle I wanted to highlight, especially with how the radiation from the candle wick effects the melting of the wax. The main component I am not completely happy with is the low lighting and fuzziness of the image. One thing I would change if I were to take this image again is that I would add another light source in the room to help accentuate the highlights of the candle and eliminate said fuzziness.

References

[1] *Candle science*. National Candle Association. (2021, January 12). Retrieved December 2, 2021, from <https://candles.org/candle-science/>.

[2] *National Institute of Standards and Technology*. NIST. (2021, December 1). Retrieved December 2, 2021, from <https://www.nist.gov/>.