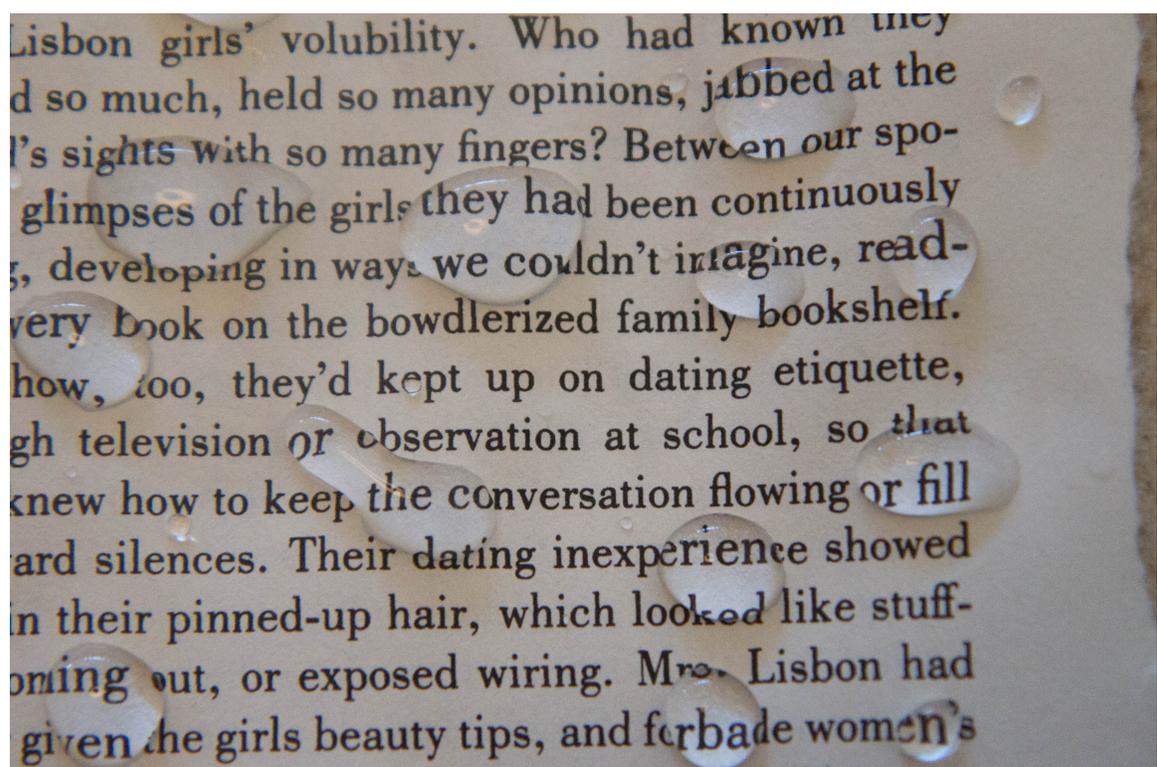


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Flow Visualization 2015
Team 3



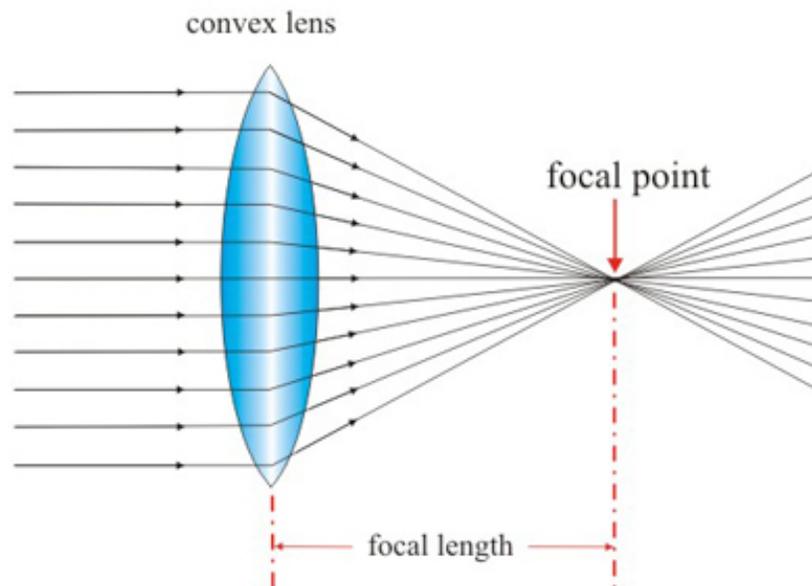
Lisbon girls' volubility. Who had known they
d so much, held so many opinions, jabbed at the
l's sights with so many fingers? Between our spo-
glimpses of the girls they had been continuously
, developing in ways we couldn't imagine, read-
very book on the bowdlerized family bookshelf.
how, too, they'd kept up on dating etiquette,
gh television or observation at school, so that
knew how to keep the conversation flowing or fill
ard silences. Their dating inexperience showed
in their pinned-up hair, which looked like stuff-
oming out, or exposed wiring. Mrs. Lisbon had
given the girls beauty tips, and forbade women's

This image was created for the Flow Visualization 2015 course, Team 3rd assignment. The image sought to capture the magnifying effect of a drop of water. A piece of paper was water proofed, and then drops of water were placed on it. The drops of water act as a simple magnifier, and clearly make the words bigger. This is a very simple, but interesting fluid phenomenon. The following report describes the science behind this magnification and the technical specifications of how the image was captured.

The set up for this image was very simple. The only time consuming part was water proofing the paper. I used Rust-oleum NeverWet spray. It is specified to work for fabrics. However, it worked well to waterproof paper as well. I sprayed several different pieces of paper from different books and let them dry overnight. Then it was as simple as placing drops of water on the pages wherever I wanted them and capturing the image. The light source used was natural light coming in through a window. This eliminated distracting glare that would be reflected in the water from an artificial light source.

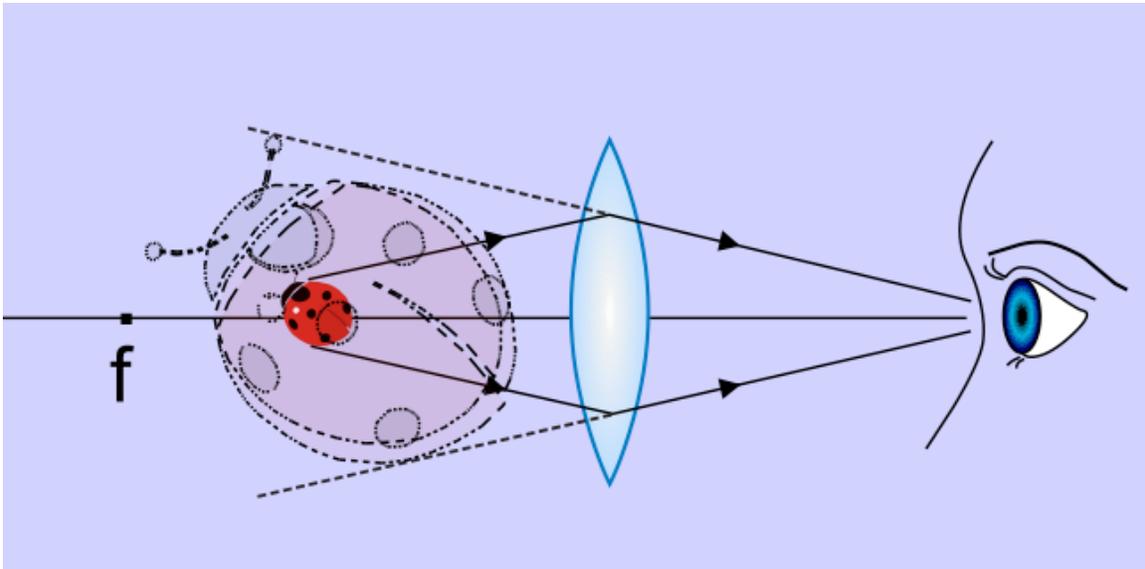
Water droplets act as simple magnifiers. They act as convex lenses that bend light so that it appears as if it was coming from a larger object. The droplets are convex so when light travels through them it refracts, or bends. Parallel light enters the droplet, refracts, and converges to a single point, the focal point, on the other side. Figure 1 below shows how light refracts when it travels through a convex lens, or in this case a water droplet.

Figure 1



A magnified image is seen when the distance between the object being magnified and the convex lens is shorter than the focal length. Therefore, a magnified image is observed if the viewer's eye is before the focal point. Figure 2 below shows how the image formed from the lens is upright and virtual. The small ladybug is the actual size. The larger ladybug is the magnified version seen because your eye traces the light rays back along the larger angle created by the light refractions. ¹

Figure 2



Below outlines the photographic specifications that were used to create this image.

Camera	Canon Rebel t5i
Lens	17-55mm f/2.8
Aperture	f/2.8
Shutter Speed	1/500
ISO	3200
Focal Length	55 mm
RAW image size	5184 x 3456
Final Edit image size	4447 x 2964

The image itself was not hard to capture. Natural light was used coming in from a window, so I adjusted my camera settings based on the built in light meter. The ISO was relatively high, and the aperture was large to let in enough light.

Below, figure 1 shows the raw image, and figure 2 shows the final edited image. The original image was exposed perfectly, so I did not have to do any post

processing other than cropping. I cropped the image to focus on a smaller portion of the page.

Figure 1

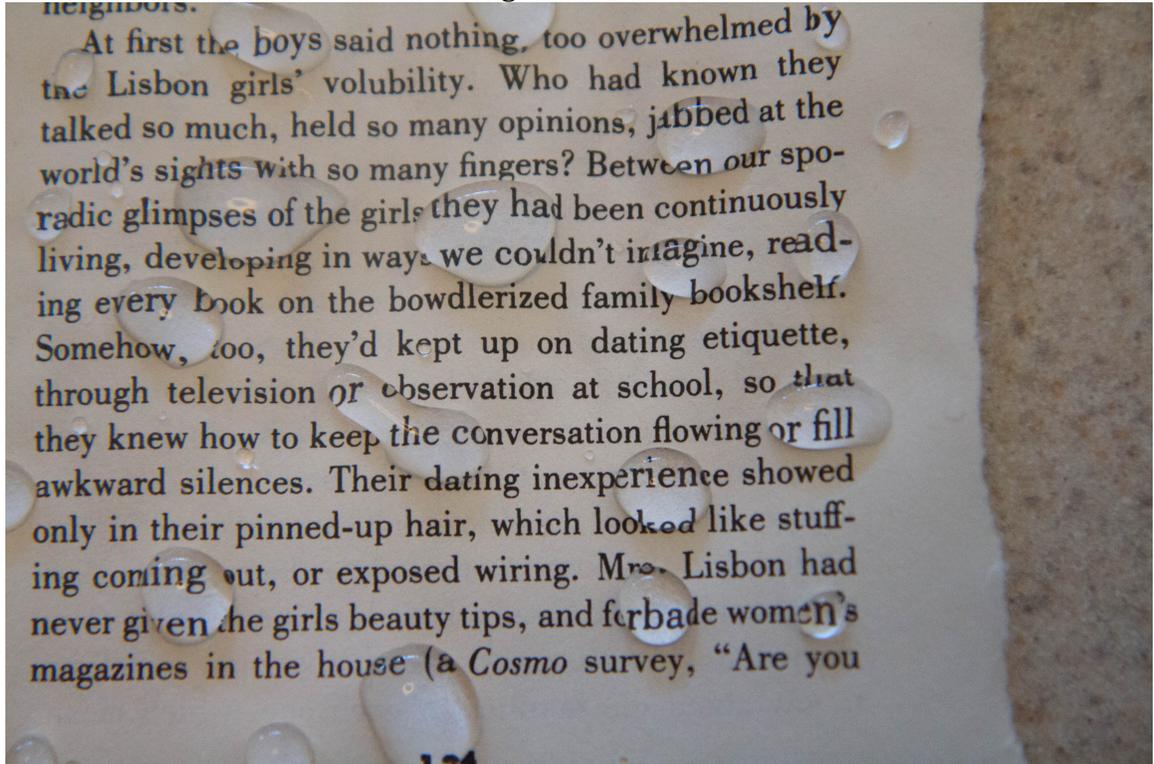
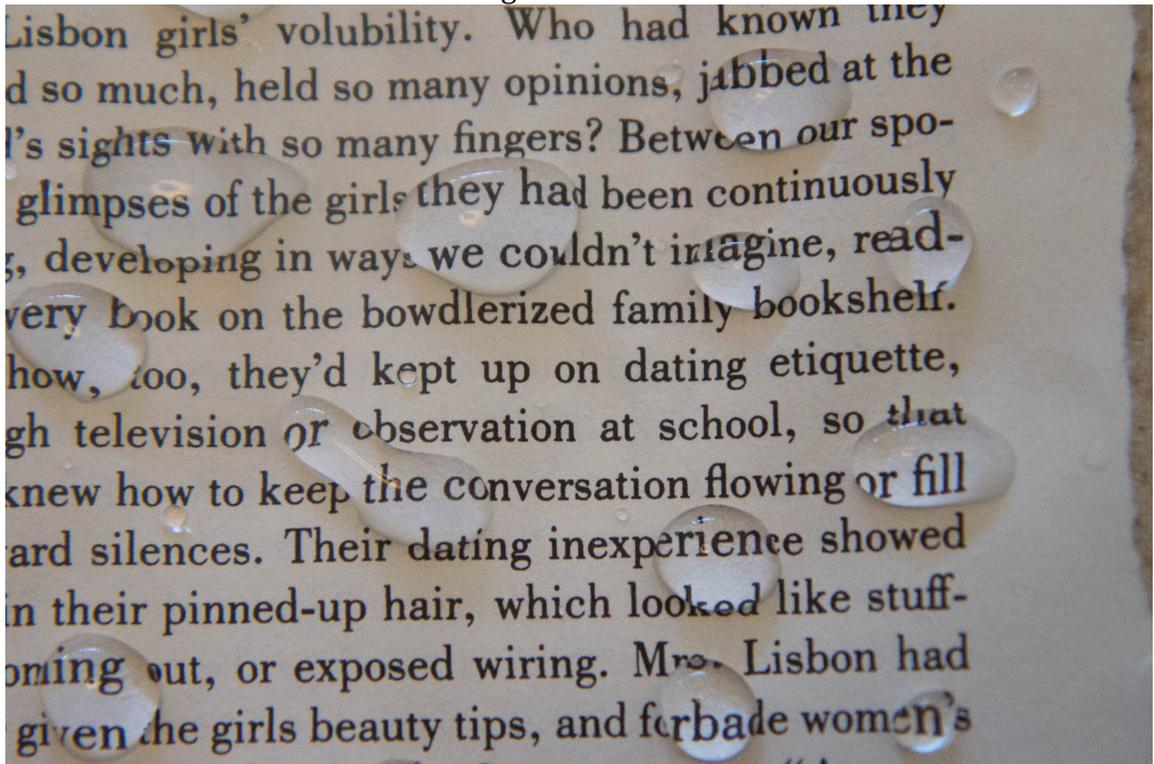


Figure 2



I am very pleased with how this image came out. I think it clearly shows a very interesting optical phenomenon. Several people in the class suggested that it would be interesting if I had carefully chosen which words were magnified. This could somehow be used to create a deeper meaning in the image. This is a very good suggestion that could be tried at a different time.

References

[1] "Convex & Concave Lenses." N.p., n.d. Web. 17 Dec. 2015.
<<http://www.passmyexams.co.uk/GCSE/physics/concave-lenses-convex-lenses.html>>.