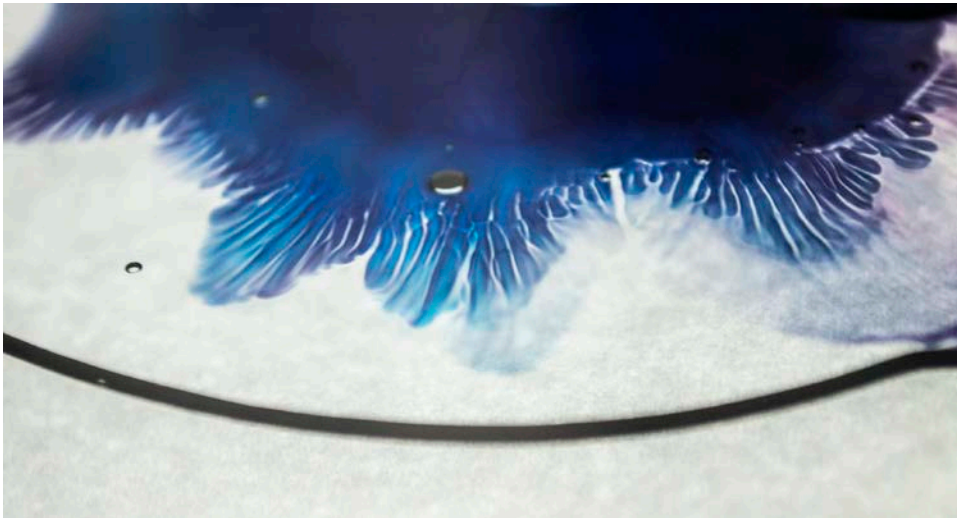


Blake made a Hele-Shaw cell, with a plastic CD case, plastic microscope slides, and clips. The slides bordered the edge, between two cases. We filled gap in between with clear corn syrup, and added dyed water. We photographed while watching the blue water form a shamrock shape, smoothly pushing aside thick corn syrup. We technically examined the conflict of the less viscous water moving through the more viscous corn syrup, but the colored water was our subject.

The water was our subject. The flow boundaries in a Hele-Shaw cell rule by pressure and surface tension. This boundary can be unstable if the driving fluid is less viscous. This instability becomes “round-ended fingers of less dense fluid penetrating into the more dense one.”<sup>i</sup> This explains the large and small lobes we saw. Surface tension affects the shape of the Water's nature of polarization and cohesion allows the water molecules at the boundaries to stick together, strengthening the “heads” of the water pushing against syrup. Had there been less surface tension, I expect to have seen veins form at this point, creating what I will call a Rayleigh-Taylor Instability.



We instead created them from another angle. After injecting a red water sample into the blue, we slowly lifted one plane of the cell. This introduced suction in the cell. Air rushed in from the sides, and the water formed veins where the air didn't go.

Finally, we released the CD casing, and the cell returned to the same volume as before. The tendrils in my image are relaxed veins from a Rayleigh-Taylor Instability.

I borrowed my friend's Nikon D3100 for this assignment. Manual settings are preferable for close-proximity photography. I was able to manipulate the zoom and focus well enough for an adequate picture. If I were to repeat this experiment, I'd utilize a macro lens or reverse macro technique. The high resolution of the RAW files also allowed me crop and reframe my image, but macro capability would have lent me the benefit of a gorgeous shot and adequate from the start.

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<sup>i</sup> <http://rspa.royalsocietypublishing.org/content/245/1242/312.abstract>