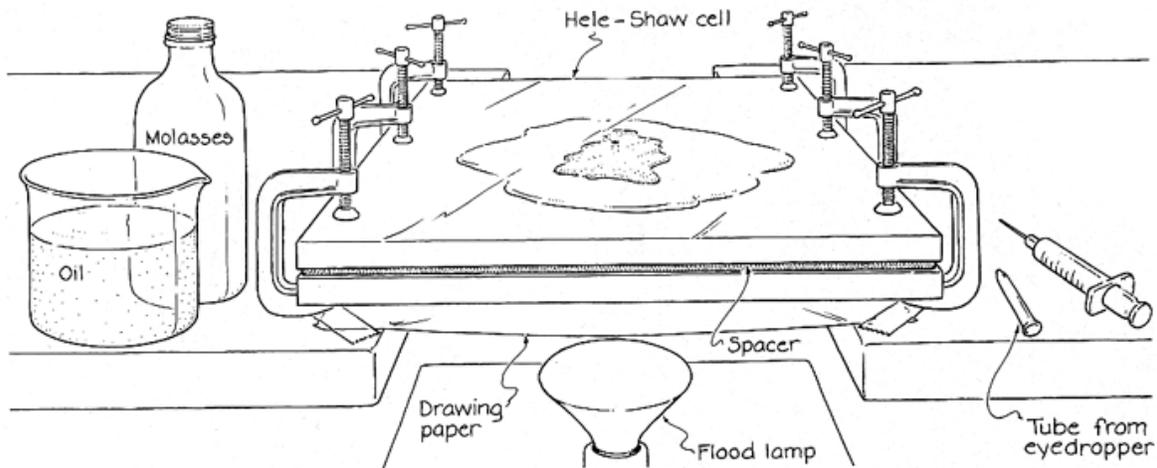


Hele-Shaw Cell
Group Image One
Zac Rice
Film 4200
Hertzberg

A Hele-Shaw cell was used in an attempt to capture the Stokes flow. The group used honey and dyed water to visualize the flow. However, before we used the set up with injection, the group attempted to visualize the flow by coating a mirror in oobleck then surround that with honey. We later gave up this technique because it was too small to capture a good image on. That is what spurred the use of the injection system and the use of the Hele-Shaw cell.

The Hele-Shaw cell that was used to produce the flow was two large pieces of glass that are placed on top of each other. The two panes of glass had four screws that adjusted the height between the two panes of glass. To ensure the flow was as even as possible the screws were adjusted to a single twist after coming into contact with the top pane. The bottom pane has a hole drilled in it to allow the injection of a fluid. A hole was put into a poster board which the tube from the syringe went through so that the tube used to induce the flow was not in our image.



To produce the flow Honey was placed on the pane of glass. Water that had been dyed was injected via a syringe. Although, the syringe did not just deliver water it also had air in the tube. Which resulted in a honey, air, water, then air again interface effect as a result of the fingering. The flow was filmed a foot and a half from florescent lights that were placed directly above. The Hele-Shaw cell was surrounded closely by three white walls on either side as well as a poster board below.

The size of the field of view is just over six inches across. The distance to the injection site was about thirty centimeters. The focal length was about 15mm (no accurate measurement on camera, was a slight zoom, smallest focal length of camera was 5.2mm). The video was capture on a sony HVR-A1U camcorder, a mini dv formatted camera. The video it captures is 1080i.60. However, after processing the footage was rendered into 720i.60. The camcorder's exposure is all in one. That said, exposure is set one notch below what the zebra feature indicated over exposure at. The only post-production done to this video was slowing it to thirty-three percent speed.

The video reveals the surface tension at the interfaces between the fluids and how the different fluids push and deform each other. Since the fluid flow also included some air, there were interfaces between water and air that were flat. Unlike the fingering that occurred with the honey and air that all resulted in round fingers. I would have preferred to have been able to eliminate the reflection of the light in the middle of the frame. However, all attempts were futile at removing the reflection through placement of the Hele-Shaw cell. If I were to expand the idea, I would used a more diverse selection of fluids to create flows.