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CMPM 163

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Homework 3 Part C (with extra credit)

Desert Mirages:

A desert mirage has always been a natural phenomenon that has perplexed me. Such a brutal mockery to someone wandering the desert in hopes of water and nourishment. Only to be left feeling foolish for believing that a water source would just surprise them in the midst of their lost-in-the-desert problem. Moving onto actual imagery and how I see mirages. They definitely shimmer in the distance with almost air streaks running through it. The streaks are subtle enough to make the water only seem like it's slightly moving or again just shimmering. These streaks move slightly upwards since the cold air rises. The surfaces of the mirages are very reflective of their surroundings behind them (rocks, mountains, etc). The actual depth of the water based on the reflection does always seem rather shallow. If there were to be depth it's not easy to make out from the distance you'd be seeing a mirage. The actual distance of the camera is very crucial, since mirages will appear and then once close enough suddenly disappear in my experience.

Moving onto how I'd actual recreate this. Well I definitely think using actual water would be the best way to recreate an optical illusion that represents water. Distance would play an important part because the closer you get to the mirage the less you make of it, until ultimately it disappears. So some sort of distance function that wouldn't allow the camera to get closer to a certain point without it disappearing. Angle is key as

well for reflecting its surroundings. I believe the angle would be inherently the same as normal water, so the code wouldn't need to be tweaked much. For the air streaks through the water we can use a noise function that goes mostly horizontal but also bends vertically to help recreate the optical illusion. Since mirages appear vast typically and doesn't really seem to go with the curvature of the earth we would need it to bend the opposite direction. Instead of curving downwards with the Earth's curvature it would go upwards, because the way the light reflects off the different temperature levels. Overall I think recreating a mirage in three js is manageable and sounds pretty exciting.