An Analysis of the Case of the Flash Freezing Lake

The radio segment that we listened to described an interesting scene. This event started as a battle during World War 2 in Ukraine. During the commotion, the forest caught fire, and horses escaped from a stable. While trying to escape the flames, they were swimming across a lake. Allegedly, the lake flash froze, trapping the horses, and creating a sculpture garden of suspended horse heads above the frozen lake. According to the radio segment, flash freezing of water is possible under certain conditions. Essentially the water has to be almost perfectly pure, and the dust form the horses becomes a catalyst for the super-cooled water to undergo a phase change into ice. While it is very unlikely that the water was pure enough to undergo these conditions, the story is theoretically possible.

A lot of the topics covered in this story are also topics that we cover in class. For example, in class we cover phase changes, and the fact that the temperature at which a substance undergoes a phase change is not constant. It can vary in terms of pressure, specific volume, and enthalpy. In the radio segment, they go over another variable that can affect the temperature at which a phase change can occur, and that is the purity of the substance. When water is extremely pure, it can go past the temperature at which a phase change normally occurs, and become a super cooled liquid. This is very similar to when a liquid is under pressure, and becomes a compressed liquid.

This story clearly is a strange story. But the reason that this story is so strange is that the path of the system is abnormal. Normally, when water freezes, the path assumes a saturated liquid and vapor mixture for a certain period of time, which causes the water to take a substantial amount of time to freeze. In the path described in the story, the water’s path moved violently quickly through the stage where it was a saturated liquid and vapor mixture. So really, the reason that the story is interesting and unusual is that the path of the system differs from the usual path that water takes in nature.

One of the main reason that this story is not likely to be true is that it does not take into account the energy transfer of the system. There is heat energy stored in the horses, considering that they are warm blooded animals. So the heat energy stored in the horses has to be transferred to the horse’s surroundings, which is the ice. This would cause the ice to melt, which in the case of the story, did not happen. So, considering that this system does not follow the laws of thermodynamics, it seems unlikely to have actually occurred.