THE FOAM ON KANGAROO LAKE

Perhaps you have noticed the foam formed on Kangaroo Lake during stormy, windy weather. Some people have assumed that soapsuds are floating on the lake. Not so! Foam formation is a natural phenomenon on the lake. We noticed it on the lake in the 1930's. So it is not of recent origin, nor is it unique to Kangaroo Lake. It occurs on Lake Michigan, and on other lakes and rivers, as well as on salt-water of the oceans.

It becomes evident on the lake immediately after the ice melts or sometimes just before winter freezing of the lake when a windstorm can stir up the bottom sediments. We see it here more frequently than other lakes because our lake is so shallow. We see it in particular when the wind is from either north or south directions because of lake length allowing a greater fetch for waves to disturb the lake bottom.

Water molecules that form the surface layer of undisturbed water possess a surface tension. Those molecules of the surface layer tend to 'stick' together more closely than those water molecules below the surface. Thus, the surface layer of molecules forms a sort of 'film' whereas all the other water molecules below the surface layer can move around freely. When waves occur on the lake surface, they tend to break up the 'film' and all molecules including those of the surface layer begin to tumble around from wave action. If the waves are small, only a slight wind, they simply disturb the water surface but do not reach to the lake bottom.

When the wave action reaches to the lake bottom and disturbs the recent organic deposits of decaying algae or plant or animal materials (consisting of decaying proteins and carbohydrates) and the limy deposits of marl, these substances become part of the water column up at the surface of the lake. This suspended material includes a variety of organic substances such as glycoproteins and lipids from decaying material that react with the surface water film by lowering the energy level holding the molecules together as a 'film'. Such organic substances are termed surfactants; they work like soaps that we buy in the store. Thus, the energy from wave action makes all water molecules tumble and disorganize their grouping together. The organic material coats all the water molecules with a microscopic film of the surfactant, and the water becomes 'disorganized' and forms a bubbly or foamy character. In the kitchen commercial soap (surfactants) bubbles are short-lived and collapse quickly. However, in the lake the lime-rich marl provides a stability to the glycoprotein-coated bubbles produced by waves, and they remain clumped together to form mats of floating foam.

Foam appears in long streaks or windrows parallel to the prevailing wind on the lake surface. These streaks alternate with clear areas, which represent areas of water upwelling associated with wave action. The upwellings throughout the lake kind of herd the foam bubbles together in these long streaks.

Lake foam seems to have 'body' in that it will blow onto the shore where it will remain for a few days as a pile of foam. It has no distinctive (maybe a bit fishy) or unpleasant odor. During this time the mass will slowly dry down and then remain as a

thin brownish film on the shore. Foam is quite stable and, with a south wind, can be blown the length of the lake, and through the culverts in the causeway to subsequently accumulate along the shore in the north end whereupon it will degrade.

Chemical analyses of foam from other lakes show that it is not a pollutant. In addition to 'natural' substances from the lake, however, some studies report that air-borne materials, as heavy metals known to be in the air, can be found in foam. We have no chemical studies of foam from Kangaroo Lake, and it is most probable that it contains only the natural substances from the lake as described above.