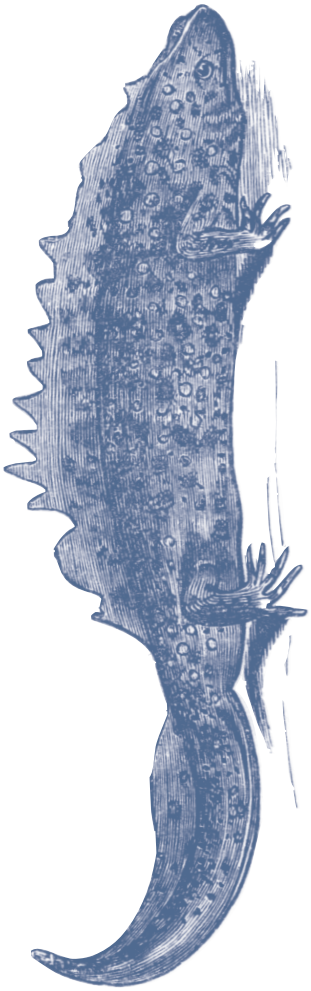
NATURALIST'S CORNER

Nancy's Looking Glass



Newts belong to the "tailed" amphibian family; Urodela.

Bundled from head to toe, I lay prone on the ice, legs sprawled, ten feet from shore. I hadn't fallen. This is intentional! Fingers, toes, thighs and nose are nearly numb, but I don't care. The breeze is negligible, and the sun tries its best to burn through this overcast February sky. With my mittened hand, I sweep away white fluffy snow to reveal clear, smooth ice and peer through my glass-like window down into the watery world below.

I feel like an overlord – an intruder – peering down on unsuspecting life below. I wonder for a moment if the same is done to us mortals here on Earth. Quickly my thoughts turn to more tangible amazements. I am supported by a ceiling of ice! The unique configuration of the H2O molecule allows water to be less dense as a solid than as a liquid. Water is densest at 39°F (4°C). As it cools and hits its freezing point, the molecules arrange themselves into an ice lattice, with space enough to allow it to float. If H2O behaved like other compounds, the solid state would be denser than its liquid state, and ponds, streams, and lakes would instead freeze from the bottom up, making life in that water impossible. Fortunately, this sometimes-snow-covered icy cap I lay on blankets the water from winter winds and, in all but shallow areas, provides aquatic life a liquid medium in which to survive. This ice, from what I can tell, is about six inches thick. Ice must be at least four inches to be safe for a person to walk on. I'm well supported.

I can make out splotches of dark and light under me. Oh, wait. That shadow is moving. It's not a shadow at all. I can make out a fish. Ice anglers know that fish continue to move around under the ice all winter. Fish metabolism slows way down, and they are lethargic, as my lingering fellow below demonstrates. Fish most often congregate near the bottom, where water is warmest. This is where ice anglers put their bait – just a couple feet above the bottom.

I marvel at the ability of any creature to live in water just a few degrees above freezing. As long as they don't freeze, the limiting factor is oxygen. If oxygen runs out, everyone is in trouble. If sunlight can get through the ice allowing aquatic plants to photosynthesize, all is good, but a prolonged blanket of snow slows or stops oxygen production. So, these aquatic creatures have developed ways of minimizing the need for oxygen, hanging on until wind once again stirs the waves and plants photosynthesize again.

I have paddled this pond and remember seeing snapping turtles and painted turtles here. Snapping turtles hunker down for the winter in muddy shallows. They may absorb oxygen directly through exposed skin (probably through the cloaca or linings of the mouth) but how they get enough oxygen to survive is still mystifying. Painted turtles bury themselves in mud – a hard place for oxygen exchange. Painted turtle test subjects have been found to survive with almost no blood oxygen at all for up to three months. The resulting build-up of lactic acid in the blood is neutralized by an accumulation of magnesium, potassium, and calcium.

Frogs and salamanders abound in this pond too. Like the reptiles, these amphibians slow their heartbeat, digestion, metabolism, and body temperature for winter. Aquatic salamanders, like the red-spotted newt, snuggle down in muddy inlets where oxygen-rich water enters the pond, but they can also sluggishly move about under the ice. Frogs too gather at these inlets where water doesn't freeze. They absorb oxygen through their skin, so they don't bury deeply into the mud.

As I feel my own extremities getting colder and colder, a certain frog comes to mind. He's a terrestrial frog so I won't see him down my looking glass, but he's worth mentioning. The wood frog burrows into the leaf litter or under a log for winter. He can freeze solid! If allowed to form, ice crystals can puncture cell membranes and blood vessels, killing an organism handily. With the first sign of freeze, the wood frog floods its cells with glucose, which acts as an anti-freeze. Spaces outside his cells freeze solid, yet his insides stay intact. He thaws out in the spring none the worse. Amazing!

Everything slows down under the icy winter ceiling, but as long as the liquid water below doesn't turn to ice, freezing can be avoided. Minnows, tadpoles and crayfish stay active but are very sluggish. By this time, I'm feeling pretty sluggish myself. I'm getting chilled to the bone out here on the ice. Unlike Alice, I don't fall down the hole or climb through the looking glass to join this alternative universe. Although I've enjoyed looking through my window on the watery world below, I've got to get up and head to my heated abode. That is the way I'll spend the chill of winter.

~ Nancy Condon