

## HOW KITCHITIKIPI CAME TO BE

So the Indians tell one of the many legends by which their imagery explains Kitchitiki, the beautiful emerald pool hidden near the edge of a coniferous swamp. But the fanciful Indian legend is no more interesting than the way Nature made Big Spring.

Millions of years ago, 375 millions more or less, in a time we call the Silurian, a warm clear sea covered Michigan. Clear streams brought lime water to the sea where myriads of shelled creatures lived and died. Corals of every hue and color floated like stemless chrysanthemums in the clear waters. Some lived in colonies and built apartment houses just as their descendants now build colonial communities we call coral reefs – the Bermudas, Bahamas, and the coral islands of the South Seas. Where they lived, then as now, the sea floor looked like a vast underwater garden. Clams, snails, and other shelled creatures lived, swam, fed, and died among the corals. All took lime from the water to build their shells and when they died the shells--bony structures--fell to the sea floor and--smashed, broken, ground fine--mingled with lime muds chemically precipitated and together built up hundreds of feet, layer upon layer, of soft lime muds. Some shells were preserved intact. Casts and molds of others were preserved as the lime muds gradually dried out when the sea withdrew. The remains of the free swimmers of that ancient sea life are so-called "petrified nuts and buds". The colony corals left us the "petrified honeycombs, chains, and pipes"--all are the fossils found in the great limestone mass that makes the southern half of the Northern Peninsula from Fayette and the Garden Peninsula to Drummond Island--the Niagaran limestone of Silurian time.

The Silurian seas withdrew, but other seas followed and other sediments were deposited on top of the Silurian muds, the graveyards of corals and clams. Pressure compacted the muds to stone. Our Silurian muds became limestones in which pressure and compaction caused vertical cracks or joints. Each layer or stratum of mud became separated from the layers above and below by a plane surface or horizontal crack--a bedding plane--and to the whole mass compacted into a stratified formation that sloped gently southward under the Southern Peninsula.

Millions of years later a great glacier filled with ground-up rock debris spread over the country and in places carved great grooves in the limestone. When the glacier melted it left the group-up rock, clay, sand, and boulders--the glacial drift--plastered over the country. Ponding of the glacial melt waters made a lake that covered the Northern Peninsula. Nature started to fill the glacial lake with sediments, and spread layers of sand and clay on its floor. The ice left. The glacial lakes retreated into the basins of the Great Lakes, but much water remained in the sand below the surface, in surface depressions, as lakes, and as swamp remnants of the glacial lake.

But Nature, never satisfied with what she builds, was busily at work destroying the limestone she had made, to fashion something else. Pure limestone is readily soluble and some of the Silurian limestones are pure lime. Water entered the cracks, dissolved the stone, made funnel-shaped depressions as it went dissolving down the joints, and made caves and caverns as it dissolved its way along the bedding planes. It made one cave above another with a thin cracked layer of stone between and the tops or roofs of the upper caves fell in, making funnel-shaped surface pits and hour-glass fashion carrying down the sands of the glacial drift through the cracks into the cave below. Two such caves united below the surface, and their unsupported roofs collapsed making one oval depression leading to a crack in the floor. Waters from the lower cave bubbled up through the crack bringing a fountain of sands--lime, sand, shell fragments, and exquisitely formed microscopic shells of ostracods. The water-filled depression became a pool and vegetation gave its emerald color in reflection to the clear waters. Big Spring was born. Dying and dead trees fell into the pool. Nature draped them with verdant mosses--making them eerie things of beauty in their watery graves. The Indians built their village Osawanimiki on the southeastern shore of Indian Lake and dreamed the legends of the wonder spring.

In the region west of Indian Lake where the limestone is near the surface with little or no covering of glacial drift, the area is pitted with many depressions or sink holes which range in size from small depressions 15 to 20 feet in diameter and six to eight feet deep to large conical sinks 100 to 150 feet across and 40 to 60 feet deep. All the depressions appear to have been caused by infalling cave roofs. The Big Spring depression is the largest--300 feet along and 175 feet wide with sides that drop abruptly 40 feet to the crack in the floor. Water under strong pressure constantly boils up through the crack bringing sand which may be derived in part from the layers of quicksand found in the glacial drift 47.5 feet below the surface in the park well, or from a fine sand and gravel 55 feet below the surface. Since the sands contain fragments of modern as well as fossil shells, it is possible that the sands have been carried from the surface through underground drainageways to the Big Spring sandy fountain.