THE MYSTERY OF THE GREAT LAKES.

On Lake Superior, in 1879, when Alexander Mackenzie was at the Grand Portage, on the north shore, opposite Isle Royal, "he saw the sudden fall of the water, equal to four feet, which soon returned with a rush, and continued to vibrate several hours." Whitney and Foster, in their geological report of the Upper Peninsula of Michigan, record that in the summer of 1834, the water above the falls at the Sault St. Mary, in a calm day, suddenly fell two and one-half feet, and in half an hour came surging back with great velocity. The same thing happened at the same place in 1842, below the falls; the current of the river rushing rapidly up stream toward the cataract.

The most remarkable rise of water was recorded by Dr. Foster to have been seen by him in August, 1845. He says that on that day, when he was coasting in an open boat, between Copper Harbor, and Eagle River, he "observed the water to rise up a fourth of a mile to the northwest, to the height of twenty feet. It curled over like an immense surge, crested with foam, and swept toward the shore, diminishing as it advanced. The voyageurs paused on their oars, having first headed the boat so as to cut the wave. It passed without doing us any injury, succeeded by two or three swells, spent its force on the shore, and the lake resumed its wonted tranquillity." The lake was calm, with clouds at the northwest, indicating that different currents of air were moving in opposite directions.

In November, 1851, at Copper Harbor, the water rose suddenly, in a perfect calm, one foot three inches, and at another time two and one-half feet. At the Sault Canal, July 16, 1855, there was a series of fluctuations during the day, until a maximum fall of two feet ten inches was reached. Then the upward movement commenced, until the previous level was reached towards evening. The wind changed during these fluctuations from northwest to southeast. At Superior City, September 17, 1865, the water of the lake fell twenty-five inches within one hour, and within fifteen minutes rose twenty-five inches above the ordinary level, making fifty inches change in fifteen minutes. The wind was blowing strong from the northwest.

At Milwaukee, in April, 1858, a large wave rushed into the river from the lake, and retired as suddenly. Twenty minutes later the water returned in two waves, and in a few minutes returned to its old level. The difference in half or three-quarters of an hour was full six feet,

A number of sudden fluctuations of level are recorded on Lake Erie. Mr. Taylor, an old settler of Rockport, is quoted by Col. Whittlesey, as stating that, in 1811, during a calm, hot summer day, he saw a white-crested wave approach rapidly toward the beach. It carried a barrel of salt several rods, over what had been a dry ground into a ravine.

Col. Whittlesey says he has never seen an instance of perfect quiescence in the waters of North American lakes. On a shelving sandy beach there is always a slight wave-like ripple, even when the atmosphere appears to be perfectly tranquil, but there never can be a thoroughly quiet atmosphere over a large area of water. Until a better theory is found he adopts that of atmospheric movement as the cause of the undulations under consideration. There is a source of perpetual motion in the atmosphere in the perpetual presence of unequally heated areas. Water is so sensitive to aerial currents that they cannot take place without producing an effect upon the equilibrium of its surface. He shows that all movements of flowing water are in a wave-like or undulatory form, and deduces by analogy, that movements of the atmosphere take the same form, producing pulsations in the waters over which they move. On all shores there is a daily land and water breeze, arising from the unequal effect of solar heat for that day. upon the land and the water. As these movements are almost incessant, and the cause ever present, if it is granted that they follow the general law of undulations he thinks we have in them an explanation of those low but regular pulsations, which take place in the waters of all seas and lakes.

Taking the oscillations together, small and great, Col. Whittlesey says the cause cannot be said to be demonstrated, but the best hypotesis is that of unequal atmospheric or barometric pressure, sometimes in storms of wind and at others by unequal heat.

It may add something to the sum of information on the general subject of barometric connection with water levels to say that after the foregoing was in type, the London Telegraph, of January 18, brought the intelligence that on the 10th, the mercury on the barometer, in London, stood close upon thirty-one inches, the highest recorded in England, since 1849, and that on the same day tide in the Thames rose a foot less at high water, as a consequence of the unusual pressure of the atmosphere which forced up the mercury one inch in the tube of the barometer.—Cleveland *Herald.*

The Comet and Its Tail.

The celestial sphere, dotted with its myriads of far distant suns and at times adorned by the silvery crescent of the moon, but seldom appeals to our sense of ideality, long familiarity with the scene having rendered us unmindful of its real magnificence and sublimity, so that hundreds go out on a beautiful night and scarcely notice the scene, but let an unusual phenomenon occur and sleeping identity shakes off her drowsiness and compels us to take an interest in it. So when a comet rushes into our midst, and as if by magic spreads out its tail upon the sky, every eye is eagerly turned toward it, and every one, from the astronomer to the unlettered rustic, feels his own peculiar interest in the celestial visitor.

The only thing about a comet that makes it generally interesting is its tail, and to the thoughtful, when they see such a comet as the one which appeared last summer, there naturally comes the question, "How do comets get their tails and what are they made of?"

Various answers have been given to this question, some of which may prove interesting to those of our readers not already acquainted with them.

A good many plausible theories concerning their physical constitution, have been put forth, but as yet none of them completely satisfy all the known phenomena connected with comets.

It has long been known that comets do not carry their tails with them through the whole of their orbits, but that these appendages are developed as they approach the sun, and their development is somewhat as follows: whatever may be the exact composition of the comets, it is evident that they contain matter capable of vaporization, and when they begin to approach tolerably near the sun, they are exposed to his heat, and, as the pressure on the surface of the comet is very small, liquids will boil at a very low temperature, and vapours are thrown off in large quantities, forming the tails that attract so much attention.

The matter in the tails of comets is, therefore, gasceous, and not only gasceous, but also very highly attenuated,—so very rare, indeed, that faint stars which would be put out by the thinnest haze that can be detected in our atmosphere have been clearly seen through some of the most imposing. Matter so greatly rarified possesses but little power of cohesion, and in consequence it is known that the tail of a comet does not follow it, but that it is constantly being dissipated into space, and appears to follow only because a new one is being constantly developed. This is known to be true from the observed fact that the tails of comets when passing around the sun at or near the time of perihelion, have changed their positions from one side to the other so quickly that the velocity with which the particles must necessarily have moved, would have thrown them entirely out of the comet's orbit, had the tail in the latter positions been composed of the same molecules as that in the former.

The theory that the appendages are thus formed by the evaporation of matter in the nucleus, is a very plausible one, and satisfies most of the observed phenomena. There is, however, a peculiarity about comets which this theory alone does not satisfy. It is known that their tails always point away from the sun so that, although it is easy to see how they are developed from vapors caused by the sun's heat, some other force must cause their known position.

Perhaps the earliest theory that attempted to explain this was that as the renowned Kelper, who thought that the tail was formed by the impact of the solar rays upon the nucleus from which they carried particles of matter as they proceeded outward into space, but as that was based on Newton's emission theory of light, it has lost its plausibility since the advent of the undulatory theory. Newton explained the phenomenon by assuming a cosmic atmosphere or a very rare medium in space, which he supposed to be warmed by contact with the warmed atmosphere of the comet, and to cause a draft outward by it, much in the same way that a draft is caused in a chimney when the air in it is made warmer than that outside.

There is still a good deal of mystery connected with the physical constitution of comets, but the theory which is now most believed in, and which is probably in the neighborhood of the truth, is that comets are masses of meteroids, and that, when they approach the sun, its heat generates vapor, whose molecules are at the the same time charged with positive electricity. The sun is also supposed to be positively electrified, and as similar electricities repel one another, the highly attenuated vapors are driven back with great velocity in an opposite direction to the sun, forming beautiful cimeter-like appendages, extending off into space for millions of miles.

MOTHER SHIPTON'S SUCCESSOR.

PREDICTIONS REGARDING THE END OF THE WORLD FOR THE NEXT DECADE.

[Mother Shipton's successor has commenced business, and these are her prophecies so far.]

The world shall come to an end—'tis true,
In 1882.

The world itself shall no longer be,
In 1883.

The world itself shall be no more,
In 1884.

The world itself shall not survive,
In 1885.

The world shall vanish into nix,
In 1886.

The world shall burn in fires from heaven,
In 1887.

The world shall end as sure as fate,
In 1888.

The world shall end, if rhyme is a sign,
In 1889

The world can't possibly come to an end in 1890 for there is no rhyme to let it die on:—

But certainly to an end 'twill run,
In 1891.

M. S. L.