

with a deafening sound. When the wave entered the shallow water the cloud passed overhead, while scarcely more than a gentle breeze was felt. This intruding of the water was followed by two recoiling waves about one hundred feet apart, which could be seen for a long distance moving back into the lake with about the same velocity as an ordinary storm wave. Following this, the water, which seemed piled up along the shore, soon subsided. Preceding this phenomenon, the lake was unusually calm. At 6.35 a. m., a brisk shower set in lasting fifteen minutes. No peculiar atmospheric conditions preceded the disturbance; the maximum wind velocity in this city for the eight hours preceding 7 a. m. did not exceed ten miles per hour, but the wind blew fiercely south of the city, and at the mouth of the river vessels parted the lines. Hundreds of fish were cast ashore, and the fires in the Lake Erie rolling-mills were put out. A scow loaded with sand at the breakwater was landed high and dry upon the shore. Some iron rails, twenty-eight feet long, piled near the depot, were lifted and scattered in every direction. The wave broke completely over the railroad tracks along the shore, covering them to a depth of several feet and submerging the Erie street pier. On this pier, the flooring of which is eight feet above the level of the lake, a boat-house was wrecked and a man washed overboard and drowned. The damage to property along the shore is roughly estimated at \$30,000. The wave is known to have extended from a point five miles east of this city to Fairport, a distance of thirty-five miles. Steamboat men who arrived during the morning report the occurrence of a short squall and sudden movement of the water off this port, of which no especial notice was taken at the time.

The Signal Service observer at Erie reports that between 1.30 and 2.00 p. m., the tidal wave was also slightly felt at that city; the water suddenly rushed over the piers, floating away lumber, etc.

A similar tidal wave occurred on Lake Erie May 10, 1823 at Otter creek, on the Canada shore, and at Kettle creek, twenty miles distant, which attained a height of nine feet. In 1830, three waves were observed at Madison creek, Ohio, the first rising fifteen or twenty feet. In 1844 or 1845 a wave came into Euclid creek, fifteen feet in height. On June 15, 1872, the water rose twenty-six inches at Charlotte, on the mouth of the Genesee river. On November 18, 1845, the water at Cleveland suddenly fell two and eight-tenths feet during a high wind from the southwest, and, according to the "Toledo Blade," a change of ten feet in the waters of Lake Erie took place December 5, 1856. In May, 1855, a similar phenomenon was observed on Lake Seneca, the water continuing to rise and fall from sixteen and a half inches to two feet during two days. Old residents of Conneaut, Ohio, remember a sudden rise of four feet in the lake, covering the orchards upon the flats for several weeks and compelling the people to gather their fruit in boats. Similar agitations of the waters occurred on Lake Geneva, in Switzerland. In 1841, at Berne, the water receded to such an extent as to leave the ships that were at anchor on bare ground.

Like phenomena have occurred on Lake Superior. In 1789, opposite Isle Royal, the water suddenly fell four feet, returning with a great rush. In 1834 the waters above Sault Rapids suddenly receded, and in half an hour returned with great velocity. In August, 1845, an enormous wave, twenty feet in height, was observed between Copper Harbor and Eagle River, rolling towards the shore. In 1847, 1848, and 1849, sudden rises and falls of the waters were repeatedly observed to precede or follow storms on the lake. In 1851, during a perfect calm, the water suddenly rose one foot and three inches, and during another, two and one-half feet. On July 17, 1855, extreme fluctuations on Lake Superior took place between nine in the morning and four in the evening. Other remarkable phenomena of a like nature occurred at the mouth of the Sault Saint Marie, on Lake Huron, in 1856, and at the head of Lake Erie, at Monroe, Michigan, in 1844.

TEMPERATURE OF WATER.

The temperature of water, as observed in rivers and harbors at Signal Service stations, with the average depth at which observations were taken, is given in the table on the right-hand of chart ii. In the first column of the table is given the maximum temperature observed during the month; and in the second column the minimum temperature observed during the same period.

The following table gives the highest and lowest temperature of water at the several stations, with the range of water temperature, mean temperature of the air at the station, and the depth of water at which the observations were taken. It will be seen that the greatest ranges are: 22° 4 at Thatcher's Island, 22° at Toledo, 21° at Grand Haven, 19° 3 at Alpena, and 19° at Chincoteague. The smallest are: 4° 4 at Key West and 5° 4 at Eastport.

Temperature of Water for June, 1882.

STATION.	Temperature at bottom.		Range.	Average depth in feet and inches.	Mean temperature of the air at station.
	Max.	Min.			
Atlantic City.....	71.5	55.3	16.2	6 7	66.6
Alpena.....	69.8	50.5	19.3	12 0	57.3
Augusta.....	88.8	75.	10.8	6 6	78.6
Baltimore.....	79.5	68.	11.5	9 9	74.0
Boston.....	66.5	51.	15.5	25 0	65.9
Buffalo.....	71.	64.3	16.7	10 5	62.4
Burlington.....					
Cedar Keys.....	67.	74.	13.0	9 7	79.9
Charleston.....	84.1	75.4	8.7	41 5	79.3
*Chicago.....	67.	64.	3.0	7 9	63.6
Chincoteague.....	83.	64.	19.0	6 0	69.7
Cleveland.....	72.2	56.1	16.1	14 0	66.2
Detroit.....	70.	54.	16.0	24 4	67.2
Duluth.....	62.	45.	17.0	14 4	57.9
Delaware Breakwater.....	69.4	57.	12.4	8 2	67.9
Eastport.....	44.2	38.8	5.4	17 3	56.2
Escanaba.....	67.	49.	18.0	15 0	59.5
Galveston.....	85.	69.	16.0	14 8	81.3
Grand Haven.....	72.5	51.5	21.0	19 0	62.9
Indianola.....	86.3	76.4	9.9	9 4	81.1
Jacksonville.....	87.	77.	10.0	18 0	91.1
Key West.....	89.1	84.7	4.4	16 8	84.3
Marquette.....	62.9	45.9	7.0	10 11	56.5
Milwaukee.....	61.5	44.8	16.9	8 0	61.4
Mobile.....	86.3	74.5	11.8	15 11	81.3
New Haven.....	75.2	58.	17.2	15 2	66.2
New London.....	63.	56.	8.0	12 8	65.9
Newport.....	67.5	52.	15.5	11 0	64.2
New York.....	73.	59.	14.0	22 11	66.1
New Shoreham.....	63.5	51.	12.5	8 7	66.4
Norfolk.....	83.	69.	14.0	17 2	75.2
Pensacola.....	83.8	74.5	9.3	17 10	79.8
Portland, Me.....	57.6	45.	12.6	19 0	65.1
Portland, Oreg.....	64.5	53.4	11.1	82 3	62.7
Port Eads.....					
Provincetown.....	68.5	53.	15.5	14 0	64.1
Punta Rasa.....	90.5	80.1	10.4	11 9	80.5
Sandusky.....	78.4	59.3	17.1	10 0	67.0
Sandy Hook.....	67.2	55.	12.2	1 5	68.7
San Francisco.....	61.5	55.9	5.6	28 7	57.0
Savannah.....	87.4	76.8	10.6	12 2	80.3
Smithville.....	83.	74.	9.0	10 0	76.9
Thatcher's Island.....	67.4	45.	22.4	7 0	61.7
Toledo.....	81.	59.	22.0	11 8	68.1
Wilmington.....	86.5	76.	10.5	13 0	76.9

*Observations wanting, from 1st to 26th, inclusive.

ATMOSPHERIC ELECTRICITY.

AURORAS.

The most extensive display of the month occurred on the evening of the 14th. It was reported by numerous stations throughout the northern part of the United States. The line of observation extended from Mount Washington, New Hampshire, to Dayton, Washington territory. The most southerly stations at which it was observed, were Springfield, Illinois, and New Corydon, Indiana.

On the summit of Mount Washington, it is reported to have been a faint display, lasting from 8.20 p. m., to the morning of the 15th. Buffalo, from 11.15 p. m., to 1.40 a. m., of the 15th, faint aurora, consisting of a whitish light, seen through the broken clouds. Davenport, Iowa, 11 p. m., until midnight, consisting of a diffuse yellow light, extending to an altitude of 30°. Saint Paul, 10.20 p. m., aurora consisting of a diffuse light of a pale straw color, with dark segment beneath. At 11 p. m., vertical beams shot upward to an altitude of