

25th. The storm continued for more than one hour, blowing down a number of houses and trees.

Virginia.—Chincoteague: a severe gale occurred on the 24th, the wind reaching a velocity of forty-six miles per hour. A number of telegraph poles and one building were blown down at this place, and two sloops were capsized.

Petersburg: the counties adjacent to this place were visited by a violent storm during the night of the 5-6th. A number of buildings and other objects were struck by lightning, and orchard trees and telegraph poles were prostrated.

Wisconsin.—Milwaukee, 2d: a severe storm passed over Ozaukee county on the morning of this date, demolishing buildings at numerous points throughout the country. At Oakfield, the damage is estimated at \$15,000. At Necadah, a bridge over the Wisconsin river was damaged to the extent of \$4,000. The width of the storm was about two and one-half miles.

Eau Claire, Eau Claire county: a storm of considerable severity passed over this region during the night of the 12-13th, destroying much farm property at points south and west of this place.

Oconomowoc, Waukesha county: a violent wind and rain storm swept over this section on the afternoon of the 16th. No damage was done in the immediate vicinity of this place, but a violent tornado swept over the county about eight miles south, levelling everything within its path, which was about one-fourth of a mile in width.

Madison: the rain and hail storm of the 16th resulted in serious damage to the crops in localities adjacent to this place. At Syene, Lake View, and Oregon, the fields of corn were stripped and other grain was beaten into the ground by the hail. The damage to crops in Fitchburg township alone is considered to be from \$8,000 to \$10,000. In Madison the shade trees were injured and windows broken, but the damage was comparatively slight.

Fort Atkinson, Jefferson county: At 1.30 p. m., of the 16th, this place was visited by a violent tornado, which struck the town on the south side of the river, and passing eastward, destroyed a number of buildings; several persons were seriously injured. The losses are estimated at \$50,000.

Milwaukee: the storm of the 16th was very severe in this locality, and caused serious damage to various kinds of property. Numerous objects in and about the city were struck by lightning and more or less seriously injured.

Sussex, Waukesha county: on the 16th the town of Ottawa, about sixteen miles southwest of here, was visited by a storm of great severity. Large trees were twisted off and other damage done.

La Crosse: between 2.30 and 5 p. m., of the 20th, this place was visited by a most violent thunder storm. Two barns and one house were struck by lightning and burned; more than 2.50 inches of rain fell during the storm. Trains were delayed from six to eight hours on account of washouts. The storm was accompanied by hail as large as walnuts. A large amount of damage was done to crops in some localities.

Appleton, Outagamie county: the storm of the 21st did damage to the extent of \$200,000 in this city and surrounding localities. This storm was considered the severest that has ever visited this section. The rainfall was very heavy, and resulted in washing out nearly all the culverts in the city. At 3 p. m., of the 22d, a break occurred in the government canal at Kankanna, and more than one hundred and seventy-five feet of the embankment were washed away.

Mineral Point, Iowa county: at 1.30 a. m., of the 21st, a violent storm struck the village of Cobb, in this county, demolishing several buildings and causing loss of life. After leaving Cobb, the storm pressed eastward toward Dodgeville, where buildings were blown down and otherwise damaged.

Milwaukee: a heavy storm of wind and rain occurred on the 20th, during which the wind reached a velocity of forty-six miles from the southwest. The scow "Sea Bird," laden with lumber, was capsized.

Neillsville, Clark county: a severe storm occurred between

12.30 and 1.30 p. m., of the 21st, accompanied by very heavy rain. Streams rose rapidly, washing away several bridges in this vicinity.

Port Edwards, Wood county: the losses caused by the storm of the 21st at this place are estimated at from \$15,000 to \$20,000. Two persons were killed.

NAVIGATION.

STAGE OF WATER IN RIVERS.

The Mississippi river was highest at Saint Paul, Minnesota; Saint Louis, Missouri; and Cairo, Illinois, on the 1st; the month of June having closed with the water above the danger line at Saint Louis. It was highest and stationary at Memphis, Tennessee, on the 1st, 2d, and 3d; at Vicksburg, Mississippi, from the 6th to 12th; and at New Orleans, Louisiana, from the 9th to 15th. Between La Crosse, Wisconsin, and Keokuk, Iowa, the river was highest from the 26th to 31st; and lowest from the 13th to 22d.

The Missouri river was highest at Leavenworth, Kansas, on the 1st; at Omaha, Nebraska, on the 8th; and at Yankton, Dakota, on the 9th. At Omaha it was within ten inches of the danger line, when at its highest point on the 8th. The lowest stages were observed from the 28th to the 31st.

The Ohio river remained low throughout the month.

The observer at Augusta, Georgia, reports that on the 26th navigation was suspended in the Savannah river at all places above a point about seventy-five miles south of Augusta.

Navigation in the Cumberland river, at Nashville, Tennessee, was suspended on the 14th on account of the low stage of water.

The highest and lowest stages of water observed at the Signal-Service stations during July, 1883, are shown in the following table:

Heights of rivers above low-water mark, July, 1883.

Stations.	Danger-point gauge.	Highest water.		Lowest water.	
		Date.	Height.	Date.	Height.
<i>Red River:</i>	<i>Ft. In.</i>		<i>Ft. In.</i>		<i>Ft. In.</i>
Shreveport, La.....	29 9	1	18 10	31	8 5
<i>Arkansas:</i>					
Little Rock, Ark.....	30 0	2	5 11	15, 16, 17	2 6
Fort Smith, Ark.....		13	9 2	13	7 7
<i>Missouri:</i>					
Yankton, Dakota.....	20 0	9	10 2	28 to 31	3 8
Omaha, Nebr.....	16 0	8	15 2	31	9 4
Leavenworth, Kans.....	21 0	1	19 8	31	11 11
<i>Mississippi:</i>					
Saint Paul, Minn.....	14 6	1	5 4	31	3 7
La Crosse, Wis.....	18 0	26	6 10	19	4 6
Dubuque, Iowa.....	21 10	27	12 6	13, 14	7 9
Davenport, Iowa.....	15 0	29, 30	9 11	14, 15, 16	5 8
Keokuk, Iowa.....	14 6	31	10 5	20, 21, 22	7 3
Saint Louis, Mo.....	30 0	1	32 1	29, 30	18 0
Cairo, Ill.....	40 0	1	38 9	31	19 5
Memphis, Tenn.....	31 0	1, 2, 3	31 2	31	15 7
Vicksburg, Miss.....	41 0	6 to 12	39 7	31	31 5
New Orleans, La.....	2 6	9 to 15	2 7	31	3 9
<i>Ohio:</i>					
Pittsburg, Pa.....	20 0	29	10 11	23	2 9
Cincinnati, Ohio.....	50 0	15	15 11	28	9 3
Louisville, Ky.....	24 0	1	8 1	30	5 8
<i>Cumberland:</i>					
Nashville, Tenn.....	42 0	18	8 9	30	2 4
<i>Tennessee:</i>					
Chattanooga, Tenn.....	33 0	1	4 1	31	1 5
<i>Monongahela:</i>					
Pittsburg, Pa.....	29 0	29	10 11	23	2 9
<i>Savannah:</i>					
Augusta, Ga.....	30 0	1	6 0	22	4 5
<i>Willamette:</i>					
Portland, Oreg.....		3	17 5	31	7 5
<i>Sacramento:</i>					
Red Bluff, Cal.....		1, 2	1 0	27 to 31	0 7
Sacramento, Cal.....		1, 2	10 10	29, 30, 31	7 9
<i>Mobile:</i>					
Mobile, Ala.....		4	17 9	26	15 3
<i>Colorado:</i>					
Yuma, Arizona.....		3	24 4	31	18 0

• Below bench-mark. † Observations from 1st to 19th only. ‡ Below high-water marks of 1874 and 1883.

FLOODS.

Saint Thomas, Ontario, 5th.—Owing to the recent heavy rains, the creeks in this vicinity overflowed their banks, carrying away fences and bridges, and flooding lowlands. A washout

occurred on the Port Stanley branch of the Grand Trunk railroad, causing delay of trains.

Galena, Jo Daviess county, Illinois.—A heavy rain storm occurred in this vicinity during the 4th and 5th. Several bridges were washed away, and the roads between this place and Sinsinawa Mound, were ruined in many places. The crops suffered great damage.

Cairo, Illinois.—Some of the farms near the Mississippi river, in this vicinity, that were overflowed by the June rise, remained under water until about the 10th of July. Farms located near the Mississippi, in the northern part of this (Alexander) county, that are seldom overflowed, sustained damage to crops estimated at \$10,000, by this overflow.

Ionia, Ionia county, Michigan.—Great damage was caused by floods along Grand river on the 5th; hundreds of acres of corn and grain were destroyed. A second overflow, causing additional damage, occurred on the 22d.

London, Ontario.—A very heavy rain storm prevailed at this place from 6 p. m. of the 10th until 3 a. m. of the 11th. The Thames river overflowed its banks and flooded the entire western suburbs of the city, compelling about 2,000 persons to leave their homes. All of the bridges across the river were destroyed. The area of the storm did not exceed twenty miles. About twenty persons were drowned, and property valued at \$500,000 was destroyed. (See extract from "Canadian Weather Review" relative to this storm, under "notes and extracts.")

Harrisonburg, Rockingham county, Virginia.—A destructive freshet occurred at this place during the evening of the 12th. Black's run, a small stream running through this place, overflowed its banks and flooded a number of dwellings. Shocks of wheat from the neighboring fields, fences, small buildings, and other property were carried away.

Springfield, Windsor county, Vermont.—The heavy rains in this vicinity on the 12th caused damage estimated at \$50,000. Buildings, bridges, and other property were washed away.

Exeter, Barry county, Missouri.—The heavy rain storm of the 14th caused a large amount of damage in this and the adjoining counties. The streams rose to greater heights than during the floods of 1844.

Easton, Pennsylvania.—The roads throughout Northampton county were badly washed by the heavy rains of the 15th. The track of the Lehigh valley railroad, between this place and Bethlehem, was blockaded by land-slides, and the Eastern and Amboy railroad was covered with two feet of water between Petersburg and Philipsburg.

Lansing, Michigan.—More than four inches of rain fell at this place during the storm of the 21st and 22d, which is the heaviest precipitation ever recorded here. Much damage was done in this city by flooding cellars and basements. The hay and grain crops in this locality were also injured.

The following communication relating to this storm has been received from Dr. Henry S. Baker, Secretary of the Michigan State Board of Health, and Director of the Michigan Weather Service:

Gen. W. B. Hazen, Chief Signal Officer of the Army, Washington, D. C.

DEAR SIR: Since writing you relative to the storm of Saturday, July 21, I have secured information concerning a "tidal wave," which seems connected with that storm, and of which the particulars are somewhat as follows:

About 6 o'clock on Saturday, July 21, gentlemen were standing on the beach at a summer resort called Harbor Point, at the point which runs out into Little Traverse Bay, their conversation being relative to the high water of this year. They were looking at a stump which they knew the year before was entirely above water, when the water began to recede, and according to some of the gentlemen present, it receded about twenty feet down the beach. In about a minute and one-half, some think it may have been five, or even ten minutes, it began to rise again and was soon four feet higher than ever known before. This movement of the water was attended by no disturbance of the water, nothing like a wave or billow. My theory is that the water was pushed ahead of the storm, and that this wave was from that storm and extended into the bay, and that the locality was north of the northern edge of the storm, as it sprinkled a little some time before the wave.

Very respectfully,

HENRY B. BAKER, Secretary.

Fond du Lac, Fond du Lac county, Wisconsin, 21-23d.—The recent heavy rains have overflowed the streams and ravines in

this vicinity. Several streets in this city were covered with water, causing a large amount of damage to various kinds of property. About three hundred feet of the road-bed of the Fond du Lac, Amboy, and Peoria railroad were washed away, near Theresa, in Dodge county. The whole country between this place and Milwaukee was covered with water, and the crops were nearly ruined.

Milwaukee, Wisconsin.—On the 23d the Milwaukee river rose to a height more than four feet above the danger-line, floating away lumber and flooding many stores. Washouts occurred on the various railroads in this state.

Manitowoc, Manitowoc county, Wisconsin.—The heavy rains of the 21st and 22d caused the river at this place to rise to a greater height than has ever been known. Three mill dams and several saw mills have been carried away. Crops were severely injured by the excessive rains.

Salt Lake City, Utah.—During the afternoon of the 29th a destructive flood occurred in the Kanab cañon, in southern Utah. All of the wheat in the upper settlements was washed away, and a number of cattle were drowned. Many wagons and agricultural implements were lost.

LOW TIDES.

Indianola, Texas, 10th, 11th, 17th, 18th, 19th, 25th to 29th.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors at the Signal Service stations, during July, 1883, with the average depth at which the observations were made, are given in the table below. Monthly ranges exceeding 14° occurred as follows: Duluth, Minnesota, 19° 8; Provincetown, Massachusetts, 19°; Marquette, Michigan, 14° 5. The smallest monthly ranges are: 2° 1 at Sandy Hook, New Jersey; 2° 7 at Portland, Oregon; 3° 5 at Wilmington, North Carolina; 3° 6 at Portland, Maine; 4° at Galveston, Texas. The highest water temperature recorded during the month, 93°, occurred at Jacksonville, Florida, on the 18th; the lowest, 43° 3, occurred at Duluth, Minnesota, on the 29th.

Temperature of Water for July, 1883.

STATION.	Temperature at bottom.		Range.	Average depth, feet and inches.	Mean temperature of the air at station.
	Max.	Min.			
Atlantic City, New Jersey.....	75.6	67.6	8.0	ft. in. 3 11	73.0
Alpena, Michigan.....	68.7	62.0	5.0	12 7	63.2
Augusta, Georgia.....	91.0	83.0	8.0	5 1	85.4
Baltimore, Maryland.....	82.0	77.0	5.0	9 10	76.8
Block Island, Rhode Island.....	72.4	62.5	9.9	8 6	69.9
Boston, Massachusetts.....	67.4	61.5	5.9	20 7	71.3
Buffalo, New York.....	74.5	67.2	7.3	10 10	67.2
Cedar Keys, Florida.....	91.9	79.5	12.4	11 2	83.8
Charleston, South Carolina.....	87.6	80.2	7.4	40 5	83.4
Chicago, Illinois.....	66.0	53.2	12.8	7 11	71.0
Chincoteague, Virginia.....	85.0	71.0	14.0	5 9	74.9
Cleveland, Ohio.....	74.1	72.0	2.1	14 0	70.7
Detroit, Michigan.....	71.0	66.0	5.0	23 5	71.0
Delaware Breakwater, Delaware.....	75.1	67.3	7.8	9 3	73.6
Duluth, Minnesota.....	63.1	43.3	19.8	14 8	66.0
Eastport, Maine.....	47.7	43.7	4.0	16 4	66.2
Escondido, Michigan.....	67.0	53.5	13.5	15 0	63.8
Fort Macon, North Carolina.....	85.0	78.0	7.0	12 3	79.8
Galveston, Texas.....	86.0	82.0	4.0	12 6	83.9
Grand Haven, Michigan.....	77.6	69.8	7.8	19 0	67.8
Indianola, Texas.....	88.7	81.5	7.2	7 11	82.5
Jacksonville, Florida.....	93.0	86.5	6.5	18 0	84.1
Key West, Florida.....	89.6	85.0	4.6	16 11	84.8
MacKinaw City, Michigan.....	65.0	55.8	9.2	13 0	62.5
Marquette, Michigan.....	58.5	44.0	14.5	9 10	63.0
Milwaukee, Wisconsin.....	82.4	48.7	13.7	8 0	67.6
Mobile, Alabama.....	89.2	84.3	4.9	16 6	83.6
New Haven, Connecticut.....	77.9	67.2	10.7	15 3	71.1
New London, Connecticut.....	70.0	62.0	8.0	12 11	71.2
New York City.....	76.5	71.0	5.5	17 5	73.3
Norfolk, Virginia.....	84.0	79.2	4.8	16 10	79.3
Pensacola, Florida.....	84.3	79.4	4.9	17 1	82.1
Portland, Maine.....	62.8	59.0	3.6	18 10	69.8
Portland, Oregon.....	67.8	65.1	2.7	62 10	66.9
Provincetown, Massachusetts.....	73.0	54.0	19.0	12 9	69.8
Sandy Hook, New Jersey.....	72.1	70.0	2.1	1 6	69.8
San Francisco, California.....	62.4	57.5	4.9	30 6	68.8
Savannah, Georgia.....	87.8	83.8	4.0	11 2	85.4
Smithville, North Carolina.....	67.0	61.0	6.0	10 0	61.5
Toledo, Ohio.....	80.7	69.7	11.0	11 7	73.5
Wilmington, North Carolina.....	86.0	82.5	3.5	20 6	81.5

* No record from 1st to 10th.