HAIL.

Hail has been reported from the several states and territories, as follows:

Arizona.—Fort Apache, 6th; Prescott, 10th.
Connecticut.—Bethel, 18th; North Colebrook, 31st.
Dakota.—Fort Randall, 21st; Deadwood, 31st.
Iowa.—Guttenberg, 16th.
Maine.—Bangor, 3d; Portland and Eastport, 25th.
Massachusetts.—Heath, 12th; Taunton and Westborough, 16th; Worcester, 18th.
Michigan.—Lansing, Northport, and Port Huron, 22d.
Nebraska.—Crete, 3d; Genoa, 6th.
New York.—Auburn, Palermo, and Syracuse, 18th, 23d; Rochester, 23d.
Ohio.—North Lewisburg, 16th.
Pennsylvania.—Erie, 22d.
Utah.—Fort Thornburg, 14th.
Vermont.—Woodstock, 18th.
Washington Territory.—Fort Canby and Olympia, 31st.

COTTON REGION REPORTS.

In the table below are given the average precipitation and the means of the maximum and minimum temperatures for October, 1884, with the October averages for the two preceding years, in the several cotton growing districts. The reports from the district of Galveston are missing.

Temperature and rainfall data for the cotton districts, October, 1884.

Districts.	Rainfall.			Temperature.							
				Maximum.			Minimum.			Extremes for Oct., 1884.	
	Average for Oct. of two preceding years.	Average for Oct., 1884.	Departures.	Mean for Oct. of two preceding years.	Mean for Oct., 1884.	Departures.	Mean for Oct. of two preceding years.	Mean for Oct., 1884.	Departures.	Max.	Min.
				°	°	°	°	°	°	°	°
New Orleans	2.62	2.93	+ 0.31	83.4	81.3	— 2.1	64.0	59.0	— 5.0	96	36
Savannah	2.69	0.47	— 2.22	81.8	84.7	+ 2.9	61.6	59.8	— 1.8	99	27
Charleston	2.76	0.16	— 2.60	78.3	80.8	+ 2.5	55.5	56.8	+ 1.3	99	25
Atlanta	2.26	0.46	— 1.80	76.2	81.2	+ 5.0	56.5	55.9	— 0.6	99	25
Wilmington	2.70	0.64	— 2.06	75.4	79.8	+ 4.4	54.3	55.1	+ 0.8	97	29
Memphis	3.12	2.25	— 0.87	77.3	78.2	+ 0.9	54.6	54.4	— 0.2	96	25
Galveston	4.14			83.1			61.9				
Vicksburg	4.68	1.40	— 3.28	80.4	81.3	+ 0.9	59.2	57.6	— 1.6	94	28
Montgomery	1.77	1.19	— 0.58	81.0	83.4	+ 2.4	58.2	57.2	— 1.0	99	30
Augusta	2.10	0.34	— 1.76	78.0	82.6	+ 4.6	56.7	56.9	+ 0.2	104	24
Little Rock	3.06	0.99	— 2.07	77.7	77.3	— 0.4	52.2	53.0	+ 0.8	95	23
Mobile	2.36	1.72	— 0.64	82.0	82.1	+ 0.1	59.0	57.4	— 1.6	98	27

WINDS.

The most frequent directions of the wind during October, 1884, are shown on chart ii. by arrows flying with the wind. In the lower Missouri and upper Mississippi valleys, the lake region, southern New England, and in the upper Ohio valley the prevailing directions of the winds were generally from southeast to southwest; in the south Atlantic and Gulf states, Tennessee, the upper Missouri valley, and on the coast of Maine they were from northeast to northwest; in the west Gulf states, middle and southern slopes they were from east to south; in the north Pacific coast region they were southerly; in California they were northerly at Red Bluff and Sacramento and westerly at the coast stations.

HIGH WINDS.

On the summit of Mount Washington, New Hampshire, the following velocities of fifty or more miles per hour were recorded: 70, n. and w., 1st; 60, n., 2d; 65, w., 4th; 65, nw., 6th; 70, nw., 7th; 68, nw., 9th; 55, nw., 10th; 75, nw., 11th and 12th; 80, nw., 13th; 60, nw., 14th; 72, nw., 15th; 64, w., 17th; 88, nw., 19th; 92, nw., 20th (maximum for month); 76, nw., 21st; 88, sw., 22d; 60, nw., 25th; 64, nw., 26th; 90, nw., 27th; 68, nw., 28th; 60, nw., 29th.

On the summit of Pike's Peak, Colorado, the following high velocities were recorded: 52, w., 4th; 68, w., 5th (maximum for month); 54, sw., 6th; 60, w., 31st.

Other stations reporting velocities of fifty or more miles per hour are as follows:

Fort Canby, Washington Territory, 56, s., 8th and 10th.
Cape Mendocino, California, 68, s., 12th; 64, s., 13th.
Fort Assinaboine, Montana, 60, sw., 13th.
Sandy Hook, New Jersey, 52, nw., 18th.
Delaware Breakwater, Delaware, 51, ne., 15th.

LOCAL STORMS AND TORNADOES.

Mannville, Sumter county, South Carolina.—A severe hail-storm occurred in this vicinity at about 8 p. m. on the 9th; the hail-stones were very large and caused considerable damage to the cotton crop.

Harrisburg, Pennsylvania.—The most destructive storm of the season occurred on the evening of the 8th; it came from the northwest, the width of its path being not more than one-half mile. Trees were blown down and several houses unroofed. In one instance the roof of a building was blown across the Susquehanna river. The duration of the storm was not more than ten minutes. On the afternoon of the 12th, a severe hail and wind storm occurred. The hail-stones are reported to have been about as large as marbles of ordinary size, and fell to a depth almost sufficient to cover the ground. The high wind caused considerable damage in the upper part of the city. The rainfall was very heavy and many cellars were flooded.

The following extract is from the "Toledo (Ohio) Evening Bee," of October 11th:

FINDLAY, O., October 11.—News has just reached here of a cyclone which passed through Van Buren township and the southern part of this county, from east to west, devastating everything in its way.. The track of the cyclone is said to have been about ten rods wide, and forests, buildings, fences, corn shocks, and everything in its course, were torn to pieces and scattered far and wide. The storm-cloud was in the shape of an inverted cone, and traveled at the rate of about sixty miles an hour. After it passed, the entire township could have been crossed without laying down a fence, but, although the damage was great, there were no lives lost.

Portland, Maine.—Threatening weather and brisk wind prevailed during the morning of the 13th, the wind reaching a velocity of twenty-four miles per hour, at 11.25 o'clock. A tornado is reported to have occurred north of this place, the width of its path being very narrow. At Lewiston the storm caused damage estimated at $5,000.

The following extract is from "Science" of November 21, 1884:

The Norwegian bark "Loveid," recently arrived in Philadelphia, reports a very peculiar squall experienced October 18th in latitude 39° 49′ north, longitude 69° 5′ west. During fine, clear weather, with a light breeze from the northwest, heavy banks of clouds of most threatening aspect suddenly appeared, driving in every direction. Almost immediately a heavy squall of wind and rain struck the vessel, the wind shifting quickly all around the compass. In the midst of this disturbance, which lasted about an hour, a single peal of thunder was heard, and simultaneously a bolt of lightning struck the fore royal masthead and ran down the mast to the royal yard, which was almost destroyed. The lightning, which looked like a ball of fire, then ran out on the horn of the cross-trees and "burst" with a loud report, scattering sparks all over the vessel. The barometer fell suddenly from 30.00 to 28.60, and then rose as rapidly, the weather becoming pleasant immediately afterwards. This was rather a peculiar squall, considering the locality and the season.

NAVIGATION.

FLOODS.

Scott's Hill, North Carolina: the heavy rains of the 11th, 12th, and 13th caused the streams in the surrounding country to rise rapidly, and several bridges are reported to have been washed away.

Rio Grande City, Texas: heavy rains caused the Rio Grande river to rise rapidly during the 24th; at 3 p. m. it began to overflow, and by 5 p. m. the low lands south of the city were covered to a depth of four feet. On the afternoon of the 25th the river was falling slowly, after having reached a height twelve feet above low-water mark.

Fort Stockton, Texas: rains fell daily from the 21st to 28th; on the afternoon of the 24th two adobe houses were washed away and several others were rendered unsafe.

STAGE OF WATER IN RIVERS.

In the following table are shown the danger points at the various river stations, the highest and lowest stages for October, 1884, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark. October, 1884.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:	Ft. In.		Ft. In.		Ft. In.	Ft. In.
Shreveport, Louisiana	29 9	5, 6, 7	2 1	27, 28, 29	0 2	1 11
Arkansas:						
Little Rock, Arkansas	33 0	8	12 4	26	3 5	8 11
Fort Smith, Arkansas		5	5 3	22	*—3 10	9 1
Missouri:						
Yankton, Dakota	20 0	2, 3, 4	10 9	31	8 3	2 6
Omaha, Nebraska	16 0	4, 5	8 0	23, 24	6 10	1 2
Leavenworth, Kansas	21 0	13	18 0	1	5 1	12 11
Mississippi:						
Saint Paul, Minnesota	14 6	10	6 6	1	3 10	2 8
La Crosse, Wisconsin	18 0	10, 11	8 9	28, 29, 30	5 1	3 8
Dubuque, Iowa	21 10	10	14 7	31	9 1	5 6
Davenport, Iowa	15 0	11, 19	11 4	31	7 6	3 10
Keokuk, Iowa	14 0	9	13 4	31	8 10	4 6
Saint Louis, Missouri	30 0	2	22 3	31	17 5	4 10
Cairo, Illinois	40 0	5	19 8	25	15 9	3 11
Memphis, Tennessee	34 0	7	14 1	1	5 9	8 4
Vicksburg, Mississippi	41 0	13	18 0	1	5 1	12 11
New Orleans, Louisiana†	—2 6	14, 15, 16, 27	—10 7	7	—12 6	1 11
Ohio:						
Pittsburg, Pennsylvania	20 0	5	6 7	26	0 3	6 4
Cincinnati, Ohio	50 0	14	5 1	31	2 11	2 2
Louisville, Kentucky	24 0	3, 4	3 11	9 to 12, 15	2 7	1 4
Cumberland:						
Nashville, Tennessee	42 0	31	1 4	25, 26, 27	*—0 2	1 6
Tennessee:						
Chattanooga, Tennessee	33 0	31	1 1	19, 20, 21	0 2	0 11
Monongahela:						
Pittsburg, Pennsylvania	29 0	5	6 7	26	0 3	6 4
Savannah:						
Augusta, Georgia		13	5 7	15	4 1	1 6
Willamette:						
Portland, Oregon		13	5 0	1	0 11	4 1
Sacramento:						
Red Bluff, California		15	1 6	1 to 12	0 10	0 8
Sacramento, California		15	10 1	1, 2	7 9	2 4
Mobile:						
Mobile, Alabama		27	18 2	9	15 7	2 7
Colorado:						
Yuma, Arizona						

* Below bench mark. † Below high-water mark of 1874 and 1883.

At Nashville, Tennessee, the Cumberland river was not navigable at any time during the month; on the 25th, 26th, and 27th, the river was two inches below the low-water mark of September 5, 1863.

The Tennessee river at Chattanooga was navigable for small steamers at the close of the month.

HIGH TIDES.

Eastport, Maine, 6th.
New River Inlet, North Carolina, 10th, 11th, 17th.
Jacksonville, Florida, 14th, 15th.
Indianola, Texas, 1st to 6th, 23d, 24th.
Scott's Hill, North Carolina, 11th, 13th, 23d.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for October, 1884, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 82.14 per cent. The percentages for the four elements are: Weather, 87.23; direction of the wind, 80.58; temperature, 78.61; barometer, 80.64 per cent. By geographical districts, they are: For New England, 83.03; middle Atlantic states, 85.77; south Atlantic states, 87.24; eastern Gulf states, 87.32; western Gulf states, 86.27; lower lake region, 79.08; upper lake region, 80.52; Ohio valley and Tennessee, 81.40; upper Mississippi valley, 77.98; Missouri valley, 73.34; north Pacific coast region, 80.53; middle Pacific coast region, 89.17; south Pacific coast region, 86.67. There were sixteen omissions to predict out of 3,211, or 0.50 per cent. Of the 3,195 predictions that have been made, one hundred and twenty-six, or 3.94 per cent., are considered to have entirely failed; one hundred and fifty-five, or 4.85 per cent., were one-fourth verified; three hundred and eighty-one, or 11.93 per cent., were one-half verified; five hundred and fifty-two, or 17.28 per cent., were three-fourths verified; 1,981, or 62.00 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

Professor T. C. Mendenhall, director of the Ohio Meteorological Bureau, reports as follows: The percentage of verification of railway signals for the month was, 91 for temperature and 87 for rain.

CAUTIONARY SIGNALS.

During October, 1884, two hundred and five cautionary signals were ordered. Of these, one hundred and forty-nine or 72.2 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. Forty-two cautionary off-shore signals were ordered, of which number thirty-three, or 78.6 per cent., were fully justified, both as to direction and velocity; thirty-seven, or 88.1 per cent., were justified as to direction; and thirty-nine, or 92.9 per cent., were justified as to velocity. Forty-one cautionary northwest signals were ordered at the lake ports, of which, twenty, or 48.8 per cent. were justified both as to direction and velocity; thirty-three, or 80.5 per cent. were justified as to direction only, and twenty-three, or 56.1 per cent. were justified as to velocity only. Of the forty-two cautionary off-shore signals that were ordered, twenty were changed from cautionary displays, and of the forty-one northwest signals ordered, all but four were changed from cautionary displays. Two hundred and eighty-eight signals of all kinds were ordered, two hundred and two, or 70.1 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Eleven signals were ordered late. In one hundred cases winds of twenty-five miles or more per hour were reported, for which no signals were ordered.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of the water at the several stations; the monthly range of water temperature; the average depth at which the observations were made; and the mean temperature of the air at the stations:

Temperature of water for October, 1884.

Station.	Temperature at bottom.		Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	Max.	Min.				
	°	°	°	ft.	in.	°
Atlantic City, New Jersey	72.3	57.0	15.3	2	1	58.5
Alpena, Michigan	58.0	39.0	19.0	11	11	48.3
Augusta, Georgia	84.6	64.5	20.1	4	7	70.0
Baltimore, Maryland	73.0	59.8	13.2	9	11	60.2
Block Island, Rhode Island	65.5	51.1	14.4	7	2	54.9
Boston, Massachusetts	62.2	48.3	13.9	21	0	52.3
Buffalo, New York	68.0	50.2	17.8	10	0	52.0
Canby, Fort, Washington Territory	56.7	51.7	5.0	17	8	52.5
Cedar Keys, Florida	81.6	69.8	11.8	10	8	74.3
Charleston, South Carolina	82.0	66.9	15.1	40	6	71.2
Chicago, Illinois	62.7	48.4	14.3	7	11	56 4
Chincoteague, Virginia	79.2	44.0	35.2	4	0	62.4
Cleveland, Ohio*	69.5	51.7	17.8	14	0	55.7
Detroit, Michigan	66.0	47.6	19.0	24	1	56.3
Delaware Breakwater, Delaware	75.5	59.7	15.8	8	3	67.1
Duluth, Minnesota	51.5	41.9	9.6	10	3	46.7
Eastport, Maine	51.5	47.7	3.8	15	0	45.4
Escanaba, Michigan	59.8	46.6	13.2	17	10	47.5
Galveston, Texas	83.5	65.5	18.0	13	0	74.8
Grand Haven, Michigan	67.4	45.4	22.0	19	0	54.1
Indianola, Texas	84.2	62.4	21.8	9	5	74.0
Jacksonville, Florida	83.2	70.0	13.2	18	0	72.8
Key West, Florida	83.7	76.6	7.1	17	5	78.3
Mackinaw City, Michigan	59.8	46.5	13.3	10	0	48.8
Macon, Fort, North Carolina	82.0	64.2	17.8	6	11	67.7
Marquette, Michigan	55.5	42.7	12.8	10	0	47.5
Milwaukee, Wisconsin	55.2	47.7	7.5	8	0	53.3
Mobile, Alabama	84.4	69.5	14.9	16	9	72.2
New Haven, Connecticut	70.0	50.0	20.0	15	5	53.2
New London, Connecticut	66.0	52.6	13.4	11	9	54.6
New York City	69.2	53.0	16.2	15	10	56.1
Norfolk, Virginia	78.2	53.8	24.4	10	6	64.6
Pensacola, Florida	84.8	67.1	17.7	17	7	73.8
Portland, Maine	56.7	47.6	9.1	16	0	50.6
Portland, Oregon	57.5	49.7	7.8	52	8	51.2
Sandusky, Ohio	71.0	47.0	24.0	10	0	56.6
Sandy Hook, New Jersey	71.4	51.8	19.6	1	10	57.2
San Francisco, California	57.4	54.8	2.6	34	7	56.9
Savannah, Georgia	82.6	66.2	16.4	10	6	70.6
Smithville, North Carolina	81.5	65.8	15.7	10	9	68.0
Toledo, Ohio	69.7	47.5	22.2	10	10	56.3
Wilmington, North Carolina	80.0	66.0	14.0	18	9	68.5

* Record for twenty-eight days.