

COTTON REGION REPORTS.

In the table below are shown the average precipitation and the means of the maximum and minimum temperatures for August, 1884, in the cotton region districts, with the August averages for the two preceding years. From a comparison of these averages it will be seen that in all of the districts, with the exception of that of Charleston, the precipitation was below the average; the deficiencies exceeding three inches in the districts of Atlanta and New Orleans. The means of the minimum temperatures were lower in all districts except for Charleston, while the means of the maximum temperatures do not show any marked departures:

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

Districts.	Rainfall.		Temperature.						Extremes for Aug., 1884.		
	Average for Aug. of two preceding years.	Average for Aug., 1884.	Maximum.			Minimum.					
			Departures.	Mean for Aug. of two preceding years.	Mean for Aug., 1884.	Departures.	Mean for Aug. of two preceding years.	Mean for Aug., 1884.			Departures.
New Orleans.....	5.54	1.93	-3.61	90.4	92.4	+2.0	71.2	69.3	-1.9	104	96
Savannah.....	5.54	4.20	-1.72	90.5	90.4	-0.4	71.2	69.7	-1.5	102	53
Charleston.....	5.54	0.04	+0.15	90.2	88.5	-1.7	68.7	69.1	+0.4	108	55
Atlanta.....	4.51	2.05	-3.48	87.4	88.0	+0.6	67.3	66.6	-0.7	105	43
Wilmington.....	4.60	3.75	-0.85	88.2	88.3	+0.1	67.6	66.7	-0.9	99	52
Memphis.....	3.85	1.70	-2.09	87.2	89.0	+1.7	66.1	64.7	-1.4	100	45
Galveston.....	3.17	1.61	-1.56	94.0	93.9	-0.1	71.3	66.6	-4.7	100	47
Vicksburg.....	3.63	3.33	-0.30	90.8	90.6	-0.2	69.7	68.0	-1.7	100	57
Montgomery.....	3.58	2.65	-0.93	90.4	89.8	-0.6	68.7	66.1	-2.6	104	52
Augusta.....	3.70	3.53	-0.17	89.4	89.7	+0.3	65.4	66.1	+0.7	103	52
Little Rock.....	3.42	1.54	-1.88	90.1	90.0	-0.1	65.4	64.9	-0.5	104	46
Mobile.....	3.64	1.68	-1.96	92.0	92.0	normal	69.4	67.5	-1.9	106	50

WINDS.

The most frequent directions of the winds during the month of August, 1884, are shown on chart ii. by arrows flying with the wind. In New England, the prevailing winds were southerly; in the middle Atlantic states they were northeasterly along the coast from Atlantic City, New Jersey, to Norfolk, Virginia, and southerly at the inland stations and at Sandy Hook, New Jersey, and New York City; in the south Atlantic states they were northeasterly; in the lake region, Ohio valley, east Gulf states, and in the north Pacific coast they were variable; in the extreme northwest, upper Mississippi and Missouri valleys, and in the west Gulf states they were mostly from the south.

TOTAL MOVEMENTS OF THE AIR.

[In miles.]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Block Island, R. I.....	7,452	Eastport, Maine.....	3,133
Middle Atlantic states.....	Del. Breakwater, Del.....	9,192	Lynchburg, Va.....	1,830
South Atlantic states.....	Kitty Hawk, N. C.....	10,441	Augusta, Ga.....	2,818
Florida peninsula.....	Key West.....	5,359	Sanford.....	3,209
Eastern Gulf states.....	Pensacola, Fla.....	4,385	Montgomery, Ala.....	2,829
Western Gulf states.....	Indianola, Tex.....	6,610	Little Rock, Ark.....	2,533
Rio Grande valley.....	Brownsville, Tex.....	4,884	Brownsville, Tex.....	2,798
Tennessee.....	Nashville, Ky.....	3,190	Chattanooga, Ohio.....	3,165
Ohio valley.....	Louisville, Ky.....	3,748	Toledo, Ohio.....	4,754
Lower lake region.....	Sandusky, Ohio.....	7,538	Chicago, Ill.....	4,930
Upper lake region.....	Grand Haven, Mich.....	7,045	Bismarck, Dak.....	5,858
Extreme northwest.....	Fort Totten, Dakota.....	9,828	Dubuque, Iowa.....	3,278
Upper Mississippi valley.....	Saint Louis, Mo.....	7,411	Denver, Dak.....	3,113
Missouri valley.....	Huron, Dak.....	7,030	Leadwood, Dak.....	2,103
Northern slope.....	Cheyenne, Wyo.....	6,741	Denver, Colo.....	4,475
Middle slope.....	Dodge City, Kan.....	8,874	Fort Concho, Tex.....	6,170
Southern slope.....	Fort Stockton, Tex.....	7,146	El Paso, Tex.....	1,474
Southern plateau.....	Fort Grant, Ariz.....	3,828	Lewiston, Idaho.....	987
Middle Plateau.....	Salt Lake City, Utah.....	3,492	Olympia, Wash. T.....	1,225
Northern plateau.....	Dayton, Wash. T.....	4,320	Red Bluff, Cal.....	3,492
North Pacific coast region.....	Fort Canby, Wash. T.....	5,593	Los Angeles, Cal.....	3,095
Middle Pacific coast region.....	Cape Mendocino, Cal.....	10,448		
South Pacific coast region.....	San Diego, Cal.....	4,397		

The total movements of the air on the summits of Mount Washington, New Hampshire and Pike's Peak, Colorado, were 20,870 and 9,113, respectively.

HIGH WINDS.

On the Summit of Mount Washington, New Hampshire, the following high velocities were registered: 71, nw., 1st; 60, nw., 2d; 52, s., 4th; 50, s., 5th and 6th; 60, n., 15th; 59, sw., 22d; 56, sw., 23d; 80, nw., 24th; 56, nw., 25th; 72, sw., 26th; 64, w., 27th; 88, (maximum), se., 29th.

Other stations reporting high velocities are as follows:

- Cape Mendocino, California, 52, se., 2d.
- Fort Custer, Montana, 52, nw., 15th.
- Pike's Peak, Colorado, 52, w., 20th.
- Cape May, New Jersey, 52, s., 22d.
- Delaware Breakwater, Delaware, 53, sw., 22d.
- Fort Assinaboine, Montana, 48, se., 27th.
- Fort Maginnis, Montana, 48, nw., 1st.
- Saint Paul, Minnesota, 46, se., 10th.

LOCAL STORMS AND TORNADOES.

**California.**—San Diego: at about 3 p. m. on the 22d a heavy rain and hail-storm occurred at Riverside, San Bernardino county. The most violent part of the storm was of about thirty minutes duration. About three inches of rain fell, flooding the cellars and submerging the streets. The width of the storm was about three miles, very little rain having fallen at Colton, and none at San Bernardino; some damage was caused by the high wind.

**Dakota.**—Huron, Beadle county: at 3 p. m. on the 28th a funnel-shaped tornado cloud was observed north of this station moving rapidly in a south-southeasterly direction. Nearly everything within the storm's path, which was from eighty to one hundred yards wide, was destroyed. It passed within three-fourths of a mile of Huron, travelling at an estimated velocity of forty miles per hour. The tornado passed through Beadle, Miner, Hanson, McCook and Hutchinson counties, and resulted in the loss of six lives. The maximum wind velocity at Huron during the passage of the tornado was twenty-three miles per hour.

Mitchell, Davison county: on the afternoon of the 28th, there were three funnel-shaped tornado clouds observed from this place. They were plainly visible and carried sand and dust to a great height into the air. A high wind prevailed at Mitchell, but no damage was done.

Sioux Falls, Minnehaha county: the storm of the 28th caused no damage at this place, but on a farm six miles north, a dwelling and all of the outbuildings were destroyed. A man, who was caught in the storm, was carried high into the air and thrown to the ground and instantly killed. The storm passed four miles west of Sioux Falls, leaving a well-defined path eighty yards in width. Four dwellings, with numerous other buildings, were destroyed, and a number of persons were killed.

**Florida.**—Jacksonville: a severe thunder storm accompanied by heavy rain prevailed at this place from 6.35 to 7.40 p. m. on the 8th. The storm moved from west to east, and was accompanied by a remarkable electrical display; considerable damage was done by lightning.

**Illinois.**—Cairo: a thunder storm, passing from northwest to southeast, occurred at 4 p. m. on the 27th. In thirty-seven minutes 1.12 inches of rain fell, and for five minutes the wind blew at the rate of thirty miles per hour. The storm which occurred on the 29th is reported to have caused considerable damage to the corn crop in Alexander county.

Carmi, White county: a severe wind and rain storm occurred on the morning of the 29th. Several buildings were damaged and the corn crop throughout this county was seriously injured. At the village of Centreville, eight miles north, much damage was done, and at Phillipstown a number of buildings were blown down.

**Indiana.**—Evansville, Vanderburg county: a violent storm visited this part of the Ohio valley on the morning of the 29th, during which the transfer steamer "Belmont," plying between Evansville, and Henderson, Kentucky, was capsized and sunk, when near Stanley's Landing. The storm struck the steamer when about five miles below Evansville, where she was capsized

after having forced her way through the storm for a distance of four or five miles. The number of lives lost is reported to have been from twelve to fifteen. The steamer had in tow a barge containing two passenger coaches with about sixty passengers, all of whom were saved. At Evansville, the storm caused damage estimated at \$250,000. Hundreds of houses were injured and a large number of trees were destroyed. One person was killed by the falling wall of a building that was demolished by the storm, and the steamers "Joseph V. Throop," and "Silver Horn," were badly damaged. The storm lasted more than one hour, the wind blowing from north-northwest to northeast.

Jeffersonville, Lawrence county: a severe wind and rain storm passed over this place on the evening of the 28th; no damage was done in this vicinity.

*Indian Territory.*—Mill Creek, Chickasaw Nation: at 7 a. m., on August 1st, a funnel-shaped, or tornado, cloud was observed moving in a northeasterly direction, but the cloud did not reach the ground, and no loss of life or property occurred.

*Kansas.*—Shawnee, Shawnee county: a tornado occurred in this county on the 24th. No lives were lost and but little damage resulted.

Sergeant J. E. Lanouette, Signal Corps, U. S. Army, at Dodge City, Kansas, reports the following relative to the storm of July 26th, at Cimarron, Ford county, Kansas (see reports from Dodge City and Sherlock, page 171, July REVIEW):

The storm occurred on July 26th, the time of its greatest violence, about 9 p. m., corresponding to the hour at which the maximum wind-velocity (84 miles per hour for five minutes) was registered at Dodge City. The wind which had been blowing at Cimarron with the force of a severe gale for about an hour, suddenly moderated at 8.55 p. m., and was followed by a calm of five minutes duration. After the calm, a furious gale set in, and continued for fifteen minutes, causing great damage to property. Numerous buildings were destroyed and several persons injured. At times the centre of the storm seems to have lifted from the ground, leaving objects untouched, and again striking the earth, destroying everything in its path. Several instances occurred which serve to illustrate the great force of the wind. Two tool chests about four feet in length, each weighing three hundred and fifty pounds, were carried a distance of ten rods; and a large draft wagon was entirely demolished, even the spokes being broken from the wheels, while another wagon standing near by was left undisturbed. Only the edge of the storm touched Dodge City.

*Kentucky.*—Louisville: a thunder-storm accompanied by heavy rain prevailed between 11.52 a. m. and 1.37 p. m. on the 21st. The storm moved from west to east, and caused considerable damage in the western part of the city. On the 28th a violent thunder-storm, accompanied by heavy rain and small hail, began at 10.28 p. m. and continued until 2 a. m. of the 29th. The heavy fall of rain caused much damage; the exposition building was flooded in some places to a depth of more than one foot, and a bridge over the Beargrass creek was washed away.

Bardstown, Nelson county: a storm occurred on the morning of the 29th, causing considerable damage to buildings and crops. At Bloomfield a large carriage factory was destroyed, and numerous bridges in that vicinity were washed away.

Uniontown, Union county: several buildings at this place were injured by the storm of the 29th. Great damage was done to the corn crop throughout the surrounding country.

*Manitoba.*—Winnipeg: a violent storm swept over this province during the night of the 27-28th, doing incalculable damage to property in various towns and damaging the crops. About fifty buildings in Winnipeg were damaged. At Portage la Prairie, sixty miles distant, the Canadian Pacific railroad sheds were blown down. At Headingly, fifteen miles west of Winnipeg, a mill was destroyed and a number of buildings were damaged.

*Maryland.*—Annapolis: the schooner "William Henry" was caught in a storm and sunk when off Cape Henry, Virginia, on the 27th.

*Massachusetts.*—Springfield: an unusually severe storm occurred on the afternoon of the 22d. Considerable damage was done to buildings and crops throughout the Connecticut valley. Several washouts occurred on the railroads.

Greenfield, Franklin county: the storm of the 22d caused

damage estimated at \$60,000 to the New London Northern railroad between Miller's Falls and Mann's Ferry. A large amount of damage was done to the crops.

*Michigan.*—Grand Haven: the schooner "C. O. D." was dismantled when north of Muskegon during a squall on the night of the 18th; damage \$1,100.

Escañaba: vessels on Lake Michigan report the occurrence of a severe storm on the morning of the 25th. The maximum velocity of the wind at Escañaba was 33 miles per hour. Captains of vessels that encountered the storm on the lake state that the wind attained a much greater force than the above.

Muskegon, Muskegon county: the schooner "W. W. Brigham," from Milwaukee to Chicago, at about midnight of the 24-25th, when in the middle of Lake Michigan, was struck by a violent south-southeasterly gale, which caused the vessel to spring a leak. The storm continued with but little abatement, and on the morning of the 25th the schooner was capsized.

*Minnesota.*—Saint Vincent: the rainfall accompanying the storm during the night of the 1-2d (3.99 inches) was the heaviest that has occurred since the establishment of this station. Farmers from surrounding localities report that the storm caused much damage to crops.

*Missouri.*—Independence, Jackson county: a very heavy rain storm occurred during the night of the 24-25th, more than four inches of rain having fallen. The storm was accompanied by high wind, which caused some damage to buildings.

*New Hampshire.*—Dover, Strafford county: this place was visited by a heavy thunder and rain storm, lasting several hours, on the afternoon of the 22d. Much damage was caused by lightning in this part of the state.

*New Jersey.*—Sandy Hook, at about 6 p. m., on the 30th, a severe squall occurred, during which the wind reached a velocity of forty miles per hour from the northwest.

*New York.*—Troy, Rensselaer county: during the rain and hail storm of the 21st, several buildings in Lansingburg, this county, were struck by lightning. In various places, trees were torn up, and fences destroyed. A mill at Stillwater, Saratoga county, was partly unroofed.

Albany: a heavy rain storm occurred on the afternoon of the 5th; considerable damage was done in this city by the flooding of cellars.

*North Carolina.*—Wash Woods: at 9 p. m. on the 31st, a violent storm occurred four miles north of this place. It was not accompanied by thunder or lightning, but heavy rain and hail fell. The width of the storm's path was about four miles; no damage was reported.

*Ohio.*—Akron, Summit county: a destructive storm, accompanied by hail, passed over Norton township, in this county, during the night of July 31st-August 1st. The width of the storm was about one-half mile, within which timber, fencing, and grain were prostrated. The fruit trees in numerous orchards were uprooted, and the grain shocks scattered.

*Pennsylvania.*—Pittsburg: between 5 and 6 p. m. on the 16th, one of the severest thunder-storms of the summer occurred. Rain fell in torrents accompanied by hail and high wind. Several buildings were struck by lightning and a frame dwelling was blown down. In all parts of Pittsburg and Allegheny City the cellars were flooded, and in some localities the streets were submerged to a depth of from two to three feet. One inch and eighty-five hundredths of rain fell in thirty-five minutes (from 5.35 to 6.10 p. m.) which is the heaviest precipitation for the same length of time that has occurred since the establishment of the signal office in this city. The storm was entirely local, the neighboring river stations reporting only a light fall of rain.

On the evening of the 21st, Callery Junction, on the Pittsburg and Western railroad, was visited by a violent storm which lasted about one hour. Several houses and many trees were blown down.

*Rhode Island.*—Point Judith: the most severe thunder storm of the summer prevailed at this station from 6.20 to 11 p. m.

on the 22d. The storm came from the southwest and passed off to the northeast.

**Tennessee.**—Chattanooga: a high easterly wind occurred at 5.15 p. m. on the 3d; small trees, etc., were blown down; no serious damage resulted. A violent thunder storm, moving from north to south, began at 8.65 a. m. on the 29th; it lasted fifteen minutes, and was accompanied by blinding sheets of lightning and heavy rain. Two dwellings were struck by lightning and some of the occupants were severely stunned.

Clarksville, Montgomery county: on the 22d a damaging hail storm passed through the southern and western portions of this county, causing, in many localities, total ruin to the tobacco crop. In a few farm houses the windows were broken by the hailstones.

Nashville: a severe storm occurred during the evening of the 29th. In the surrounding country trees were blown down and the crops damaged. The rain was very heavy and caused several small streams to overflow. Numerous buildings were struck by lightning. At 7 p. m. of the 29th a tornado occurred near Milan, Gibson county. As the funnel-shaped cloud did not reach the ground no loss of life or property occurred.

**Texas.**—Dallas, Dallas county: on the afternoon of the 23d a tornado cloud was observed approaching this place from the northeast. When first seen it was moving with great velocity at an altitude of several hundred feet. Before reaching this place it took an upward course and disappeared among the clouds, but immediately reappeared, striking the town near the south end of Lamar street. The cloud again bounded with great velocity, carrying a large column of sand to a height of five hundred feet, finally disappearing in the southwest.

**Utah.**—Salt Lake City: a "cloud burst" is reported to have occurred on the 8th, in City Creek cañon, about one mile from this place.

**Virginia.**—Fort Myer: a violent squall from the northwest occurred at 2.35 p. m. on the 21st; the wind attained a velocity of forty miles per hour.

Petersburg, Dinwiddie county: the adjoining county (Chesterfield) lying north, was visited by a severe storm on the evening of the 21st, blowing down trees and outbuildings. In some places the storm was accompanied by hail and heavy rain, while in others the precipitation was very light.

**Wisconsin.**—Reedsburg, Sauk county: at 5 p. m. of the 2d a destructive tornado passed north of this village, pursuing an easterly course. It appears to have started in the vicinity of Cazenovia, Richland county, twelve miles west of Reedsburg, where numerous barns and dwellings were demolished, and extended eastward to near Lewiston, Columbia county. The storm cloud was observed to have a rotary motion, and its course throughout was marked by fallen timber, grain, fences, etc. It struck a heavy growth of timber about one mile west of Reedsburg, blowing down and breaking off the trees. The storm's path in that vicinity was about one-half mile wide, while in other localities its width was from ten to twenty rods. Its direction was east, ten degrees north, and its path was about thirty miles in length. No loss of life occurred.

Boscobel, Grant County: at 6.20 p. m. on August 22d a tornado, moved east, ten degrees north, with considerable destruction of property. Also on August 22d, at Montana, Buffalo county, at 4.30 p. m., a tornado, moving eastward, caused considerable destruction to property.

NAVIGATION.

STAGE OF WATER IN RIVERS.

The observer at Nashville, Tennessee, reports that navigation on the Cumberland river was suspended throughout the month on account of the low stage of water.

During the latter part of the month the Tennessee river, at Chattanooga, was navigable only for boats of light draft.

The Ohio river was highest during the first decade of the month and lowest during the last decade. Reports from Vevay, Switzerland county, Indiana, state that numerous boats ran

aground opposite that place on account of the low stage of water during the latter part of the month.

In the upper Mississippi the difference between the highest and lowest stages was from one foot and three inches at Saint Paul, Minnesota and LaCrosse, Wisconsin, to two feet and five inches at Keokuk, Iowa. From Saint Louis, Missouri, to Vicksburg, Mississippi the range varied from seven feet eight inches, at the first named station to slightly over ten feet at Cairo, Illinois. At Saint Paul navigation was suspended on account of low-water on the 5th. The Missouri river was at its highest stage on the 1st, and was lowest from the 18th to 24th.

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

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

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

† Below bench mark.

\* Below high-water mark of 1874 and 1883.

FLOODS.

Eureka, Eureka county, Nevada: a destructive flood occurred at this place on the 7th. The water came from Ruby Hill and entered Adams Hill cañon. When the stream reached the Williamsburg mine it was thirty feet wide and seven feet deep. The Titus mine was filled with water and one man drowned.

Puerto de Luna, San Miguel county, New Mexico: the Rio Pecos river reached a high stage during the latter part of the month. The highest point was attained on the afternoon of the 24th, when the water was only a few inches below the flood marks of 1880. Much damage was done to the dams and irrigating ditches; and the crops on the bottom lands were entirely destroyed. One man and a number of animals were drowned near Puerto de Luna.

HIGH TIDES.

New River Inlet, North Carolina: daily from 5th to 15th.

LOW TIDES.

The following note is taken from the "New York Journal of Commerce," of August 12, 1884: