

14th, 19th; New River Inlet and Wilmington, 23d; Charlotte, 1st; Scotts Hill, 19th, 22d.

*Oregon*.—Albany, 4th; Portland, 4th, 9th.

*Tennessee*.—Austin, 13th; Nashville, 13th, 19th; Knoxville and Chattanooga, 19th.

*Texas*.—Clarksville, 19th, 27th; Cleburne, 15th.

*Utah*.—Logan, 4th; Nephi, 5th, 11th, 18th, 26th.

*Virginia*.—Marion, 14th.

*Washington Territory*.—Crescent Bay, 16th.

*Wisconsin*.—Embarrass, 4th; Franklin, 4th, 11th.

It is probable that some of the above reports are incorrect and should have been recorded as sleet instead of hail.

**WINDS.**

The most frequent directions of the wind during February, 1884, at the Signal Service stations, are shown on chart iii. by arrows flying with the wind. The prevailing directions were from north to west in the upper lake region, upper Mississippi and Missouri valleys; in the Gulf states and Tennessee they were mostly from the south; in the lower lake region, Ohio valley, and on the Atlantic and Pacific coasts they were variable.

**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.....	11,775	New London, Conn.....	5,585
Middle Atlantic states.....	Cape May, N. J.....	12,396	Lynchburg, Va.....	3,154
South Atlantic states.....	Fort Macon, N. C.....	10,649	Augusta, Ga.....	2,958
Florida peninsula.....	Cedar Keys.....	6,186	Sanford.....	4,530
Eastern Gulf states.....	Pensacola, Fla.....	5,800	Montgomery, Ala.....	4,408
Western Gulf states.....	Indianola, Tex.....	10,853	Little Rock, Ark.....	3,539
Ohio valley.....	Louisville, Ky.....	6,041	Cincinnati, Ohio.....	4,213
Tennessee.....	Nashville.....	5,152	Memphis.....	4,462
Lower lake region.....	Rochester, N. Y.....	9,341	Toledo, Ohio.....	5,520
Upper lake region.....	Milwaukee, Wis.....	8,536	Chicago, Ill.....	5,412
Extreme northwest.....	Fort Buford, Dak.....	7,180	Saint Vincent, Minn.....	5,419
Upper Mississippi valley.....	Saint Louis, Mo.....	8,826	Saint Paul, Minn.....	4,401
Missouri valley.....	Huron, Dak.....	7,661	Leavenworth, Kan.....	6,021
Northern slope.....	North Platte, Neb.....	10,247	Deadwood, Dak.....	3,933
Middle slope.....	Dodge City, Kan.....	9,009	Denver, Colo.....	4,782
Southern slope.....	Fort Concho, Tex.....	7,421	Fort Davis, Tex.....	3,888
Southern plateau.....	Prescott, Ariz.....	5,534	El Paso, Tex.....	3,158
Northern plateau.....	Boise City, Idaho.....	3,151	Lewiston, Idaho.....	940
North Pacific coast region.....	Fort Canby, Wash. T.....	7,714	Olympia, Wash. T.....	1,265
Middle Pacific coast region.....	Red Bluff, Cal.....	5,376	San Francisco, Cal.....	5,974
South Pacific coast region.....	Los Angeles, Cal.....	5,483	Yuma, Ariz.....	4,780

On the summits of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the total movements of the air were 24,810 and 21,011 miles, respectively, the record at the first-named station being incomplete on account of frost work. At Salt Lake City, Utah, the total movement was 4,075 miles.

**HIGH WINDS.**

On the summit of Mount Washington velocities of fifty miles or more per hour occurred on the following dates: 1st to 10th, 12th to 18th, 20th to 25th, 29th. The highest velocities recorded were: 80, n.w., 1st; 104, w., 5th; 100, w., 6th; 120, s.w., 13th; 112, w., 14th; 130, s.e., 20th (maximum for the month); 82, n.w., 21st; 80, s.w., 22d; 116, n.w., 24th; 80, n.w., 29th.

On the summit of Pike's Peak velocities of fifty miles or more per hour occurred on the following dates: 1st, 2d, 3d, 9th, 10th, 14th, 15th, 17th to 23d, 25th, 27th. The highest velocities recorded were: 83, s.w., 10th; 76, w., 14th; 100, w., 15th (maximum for the month); 76, w., 18th; 76, n.w., 19th.

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

Cape May, New Jersey, 58, n.w., 20th; 52, n.w., 23d; 68, w., 28th; 66, w., 29th.

Delaware Breakwater, Delaware, 68, n.w., 20th; 52, n.w., 23d.

Fort Canby, Washington Territory, 64, s., 19th.

Fort Macon, North Carolina, 64, s.w., 28th.

Sandy Hook, New Jersey, 60, n.w., 23d; 62, n.w., 29th.

Cape Henry, Virginia, 60, n.w., 23d.

Fort Maginnis, Montana, 56, s.w., 22d.

Kitty Hawk, North Carolina, 52, s.w., 20th; 56, s.w., 23d.

Moorhead, Minnesota, 56, s.e., 24th.

Eastport, Maine, 55, e., 28th.

Barnegat City, New Jersey, 52, n.w., 28th and 29th.

Buffalo, New York, 52, w., 21st.

Indianola, Texas, 52 n., 27th.

Sandusky, Ohio, 52, w., 20th.

Vicksburg, Mississippi, 52, s.w., 19th.

Cheyenne, Wyoming, 50, n.w., 20th.

Chincoteague, Virginia, 50, n.w., 1st.

**LOCAL STORMS.**

On the afternoon of February 19th several of the Southern states were visited by violent tornadoes. They were most destructive in Alabama, Georgia, and the Carolinas, and appear to have moved, generally, in a direction from southwest to northeast, causing great destruction of life and property. Reports from Atlanta, Georgia, on the 22d, stated that about three hundred persons were killed, nine hundred were injured, and that \$2,000,000 worth of property had been destroyed in that state alone.

Below will be found, arranged by states, brief descriptions of the tornadoes above mentioned, as reported from the various localities in which they occurred; and also reports of other storms which were reported during February, 1884.

*Alabama*.—Montgomery: a storm occurred on the afternoon of the 19th, during which the wind attained a velocity of thirty-two miles per hour, blowing off the roofs of several buildings and causing other damage. The wind veered from south to northwest during the storm and the temperature fell from 80° to 47°. In surrounding localities the storm was much more severe than in the immediate vicinity of Montgomery. From Kelleytown, Coosa county, to Wetumpka, Elmore county, (north-east of Montgomery,) large hail accompanied the storm and numerous buildings were blown down. At Cross Plains, Calhoun county, eight persons were killed and several wounded. At Marion, Perry county, (northwest of Montgomery) much property was destroyed and one person killed.

At Leeds, fifteen miles east of Birmingham, a dense funnel-shaped cloud, of black appearance, was observed at about 1 p. m. approaching from the southwest. When first seen the cloud was several miles distant, advancing with great rapidity and accompanied by a heavy roaring noise. At that time the whole sky was illuminated with a peculiar glow. As it neared Leeds black shafts darted in quick succession from the cloud toward the earth. At 1.30 p. m. the tornado swept over the town, destroying everything in its path. It followed the course of the Georgia Pacific railroad for a distance of six miles, strewing the road with debris throughout its path. The scene at Leeds after the storm was one of great destruction. Houses were blown away and not even their foundations remained; horses, mules, and cattle were killed, and in some instances missiles were driven through the bodies. In Leeds and vicinity, eleven persons were killed and thirty-one were wounded, many of the latter being fatally injured; twenty-seven dwellings were entirely destroyed together with many barns and other out buildings. The tornado was accompanied by hail of unusual size. At Brook's Gap, ten miles below Birmingham, nine houses were blown down and fifteen persons injured. In the vicinity of Ladiga, Calhoun county, and Amberson's, Cherokee county, a violent storm occurred at about 3 p. m. A large number of houses were blown down and fourteen persons were reported to have been killed. Reports from Rock Run, Cherokee county, state that at 2 p. m. a tornado passed through that county, pursuing a northeasterly course and demolishing everything in its path, which was about one-half mile in width. Twenty-six persons in the immediate vicinity of Rock Run were killed and many others were injured.

*Arizona*.—Prescott: a severe southwesterly storm occurred on the 6th, during which the wind attained a velocity of forty-six miles per hour. Many large trees in the vicinity were prostrated.

*California*.—Cape Mendocino: a hurricane occurred on the

14th, during which the wind reached an estimated velocity of one hundred miles per hour.

*Connecticut.*—New London: a severe gale occurred on the 21st (low area ix.); many coasters put into harbor during the storm. Captains of the sound steamers reported that the storm of the 29th, (low area xiv.), was the severest of the season.

*Georgia.*—Columbus, Muscogee county: the damage caused in this vicinity by the storm of the 19th, is estimated at \$20,000.

Franklin, Heard county: a violent storm passed through a part of this county on the 9th, blowing down many houses and trees.

Newnan, Coweta county: a violent storm accompanied by very large hail, passed through the western part of this county on the afternoon of the 19th, its path being about one mile in width.

Palmetto, Campbell county: three severe storms occurred on the 19th, at 2, 4 and 6 p. m., respectively. The wind blew with considerable violence, scattering fences, etc. These storms were accompanied by hail and an unusually heavy rainfall.

Mount Airy, Harris county: on the evening of the 19th, a severe storm passed about three miles south of this place, unroofing and demolishing houses, and causing other damage. Two persons were killed, and several were injured.

Jasper, Pickens county: at 2 p. m. of the 19th, it grew suddenly dark, and a low, rumbling sound was heard in the distance. Soon afterwards a huge mass of black cloud, bounding upward and downward and swaying to and fro, was seen passing south of this place towards the summit of Grassy Knob. Windows rattled and buildings shook as the whirling cloud passed in sight of, and within three miles of Jasper. The tornado cloud was visible about five minutes. It crossed the Western and Atlantic railroad near Cartersville—moving northeastward—and appears to have caused no damage until within seven or eight miles of Jasper. From that point over a path about fifteen miles in length the destruction of property was very great and about twenty persons were killed.

In Oconee county much fencing was blown down, and at Harmony Grove the storm was accompanied by very large hail, some of the hailstones weighing seven ounces.

Indian Springs, Butts county: the heaviest hail storm ever known in this vicinity occurred at 3 p. m. of the 19th, lasting about thirty minutes. At first the hail-stones were small but they increased to a remarkable size, some of them measuring nine inches in circumference.

Eatonville, Putnam county: two destructive storms passed over this county at about 4 p. m. of the 19th, causing great loss of life and property.

Monticello, Jasper county: on the afternoon of the 19th this place was visited by a tornado and hail storm. It came from the south and west and passed northward within one mile of Monticello, destroying much property in its path.

In Jones county the width of the tornado's path was about two hundred yards. Numerous houses were blown down, and twelve persons were killed. Several persons were also killed at Milledgeville, Butts county.

Warrenton, Warren county: at about dark on the evening of the 19th a violent tornado passed near this place causing great damage.

Louisville, Jefferson county: at 7 p. m. of the 19th a severe storm passed over this county, doing considerable damage. Its path was about one-half mile in width and extended through the entire county.

Union Point, Green county: the severest hail storm ever known here occurred at about 3 p. m., of the 19th. The hail stones were of a variety of shapes, covering the ground to an average depth of three inches, and in places they were drifted to much greater depths. Much damage was done to roofs and windows.

Washington, Wilkes county: the storm on the afternoon of the 19th, caused much damage at points southeast of this place. The hail accompanying it was unusually large.

Lincolnton, Lincoln county: a severe storm passed through this county within one mile of Lincolnton at about dusk of the 19th, its course being from southwest to northeast. The track of the storm was about one-half mile wide, and nearly every thing within it was destroyed. Four persons were killed.

Augusta: while the storm of the 19th caused no serious damage at this place, it was very destructive in neighboring localities. The greatest damage appears to have been done along the line of the Augusta and Knoxville railroad. The village of Bradley was almost entirely destroyed.

Sparta, Hancock county: a violent storm passed through the northwestern part of this county at about 5 p. m. of the 19th, in almost the exact path of the storm of March, 1875. Numerous out-houses and dwellings were destroyed.

Atlanta: on the 19th the wind attained a velocity of thirty-five miles per hour between 4 and 6 p. m., and was accompanied by heavy rain. On the 27th a storm occurred during which a wind velocity of thirty-six miles was recorded. Several buildings were damaged and chimneys blown off.

Baldwin, Randolph county: at about 4 p. m. of the 19th a storm of considerable violence passed west and south of this place, leveling fences, trees, etc.

*Illinois.*—Cairo: a storm occurred on the 12th between 4 and 6 p. m., during which the wind reached a velocity of forty-eight miles per hour, blowing down fences, signs, etc. At 2.07 p. m. of the 19th a violent storm struck this place. On its approach from the west-southwest, the darkness became so great as to make it necessary to light gas, etc. A violent whirling motion around a horizontal axis was observed in the cloud, and a loud roaring noise was heard during its passage. At Bird's Point, Missouri, (three miles southwest of Cairo) the storm apparently changed its course to the eastward. Over a track about two miles in length and one mile in width in the vicinity of Bird's Point, very large hail fell. Reports from surrounding localities clearly show that the storm was much less severe at Cairo than elsewhere, no damage having been done within the city limits or in the harbor where many boats were lying, although the wind blew, for five minutes, at the rate of 60 miles per hour. At Bird's Point about forty houses were badly damaged. The storm in its passage eastward proved very destructive to the submerged towns on the Ohio river, where so many buildings were weakened or undermined from the inundation. The damage caused at Paducah, Kentucky by the storm and flood during the night of the 19-20th, is estimated at \$125,000.

*Kentucky.*—Mount Sterling, Montgomery county: at 4 p. m. of the 19th a severe storm passed over this place, unroofing buildings and causing other damage.

*Massachusetts.*—Boston: during the storm of the 21st (low area ix.), the brig "Merrimac" went ashore off Nantucket, and was wrecked, the crew being saved by the Life-saving Service. On the 29th a heavy westerly gale (low area xiv.), prevailed during which the brig "Fleeting" was totally wrecked in Chatham bay.

*Mississippi.*—Vicksburg: from 11.50 to 11.55 a. m. of the 19th the wind blew at the rate of 60 miles per hour. The storm continued until 5.50 p. m., resulting in no serious damage in the city, but on the river serious losses were sustained. The steamer "Exchange" broke her lines and was driven upon the river bank and partially sunk. A barge laden with four hundred cords of wood was swamped, and about two hundred cords of wood were lost.

Columbus, Lounds county: a tornado passed through the southern part of this county on the 19th, doing great damage to dwellings and out-houses.

*New Hampshire.*—Mount Washington: during the 20th a violent hurricane prevailed. At 2.30 a. m. the anemometer was broken off. It is estimated that the wind velocity exceeded 160 miles per hour during the greater part of the forenoon.

*New York.*—Oswego: on the 20th (low area ix.) the wind reached a velocity of 37 miles per hour, blowing down trees and telegraph lines.

**North Carolina.**—Charlotte: the storm of the 19th was very destructive at a colored settlement known as Philadelphia, situated about two miles from Rockingham, on the Carolina Central railroad. The settlement contained about twenty-five cabins, which were all destroyed, and eleven of their occupants were killed. The trees in that vicinity were uprooted or twisted off and carried long distances.

**Ohio.**—Cleveland: during the storm on the 20th (low area ix.), trees were prostrated and telegraphic communication was interrupted; maximum wind velocity, 39 miles.

**Coshocton, Coshocton county:** a violent wind and rain storm (low area ix.) occurred on the 19th, doing great damage to trees and buildings.

**South Carolina.**—Ninety-six, Abbeville county: a dwelling was blown down and one of the inmates killed during the storm of the 19th.

**At Andersonville, Anderson county,** two persons were killed. At Jackson, Aiken county a dwelling and store-house were demolished and five persons killed.

**Columbia, Richland county:** the storms of the 19th were the most destructive ever experienced. At Chester, Chester county, more than forty houses and two churches were blown down, and a number of persons were killed. At Chappell's, Newberry county, on the line of the Greenville and Columbia railroad, not a house was left standing. At that place three freight cars were lifted from the railroad track and carried a distance of fifty yards. At Darlington, Darlington county, a large number of dwellings were wrecked, six persons were killed, and from twenty to thirty were injured.

**Stateburg, Sumter county:** between 10.30 and 11 p. m. of the 19th, a tornado passed within three miles of this place in a direction from southwest to northeast, blowing down trees and houses.

**Tennessee.**—Clarksville, Montgomery county: on the afternoon of the 19th this place was visited by two destructive storms, occurring about two hours apart. They passed through the central part of the city, levelling many dwellings and causing injury to others.

**Knoxville:** the storm on the night of the 19-20th is reported to have been very destructive at points along the railroad.

**Texas.**—Waco, McLennan county: at about 4 a. m. of the 12th a severe storm swept over this place, doing considerable damage to property.

**Galveston:** during a norther (low area xiv.) on the 27th the wind reached a velocity of 42 miles per hour, causing some light damage to shipping interests.

**Virginia.**—Marion, Smyth county: a severe storm occurred on the night of the 13-14th, blowing down trees, chimneys, etc.

**SAND STORMS.**

Yuma, Arizona, 18th.

**NAVIGATION.**

**STAGE OF WATER IN RIVERS.**

The Mississippi river continued frozen during the month at Keokuk, Iowa, and at stations northward. It was highest at Saint Louis, Missouri, on the 19th, and at New Orleans, Louisiana, on the 28th; at the latter station it reached a point one foot and one inch above the danger line.

Under the heading of "floods" will be found a table showing the stages of water for each day in the Ohio river at Pittsburg, Pennsylvania; Cincinnati, Ohio, and Louisville, Kentucky, and in the Mississippi river at Cairo, Illinois; Memphis, Tennessee, and Vicksburg, Mississippi.

The Missouri river was frozen from the 1st to 25th at Leavenworth, Kansas, and throughout the month at Omaha, Nebraska, and at stations northward.

The Red river reached its highest stage at Shreveport, Louisiana, on the 27th, when it was two feet and ten inches above the danger line.

At Chattanooga, the Tennessee river reached a point three feet and ten inches above the danger line on the 11th.

The Cumberland river at Nashville, Tennessee, reached its highest stage on the 28th, when it was four feet and eleven inches above the danger line.

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

*Heights of rivers above low-water mark, February, 1884.*

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.	
		Date.	Height.	Date.	Height.	Fl.	In.
<i>Red River:</i>							
Shreveport, Louisiana.....	29 9	27	32 7	6	9 3	23	4
<i>Arkansas:</i>							
Little Rock, Arkansas.....	33 0	16	26 3	1	4 3	22	0
Port Smith, Arkansas.....		14	21 0	2	-1 7 $\frac{1}{2}$	22	7
<i>Missouri:</i>							
Yankton, Dakota †.....	20 0						
Omaha, Nebraska †.....	16 0						
Leavenworth, Kansas †.....	21 0	26	5 6	28	5 1	0	5
<i>Mississippi:</i>							
Saint Paul, Minnesota †.....	14 6						
La Crosse, Wisconsin †.....	18 0						
Dubuque, Iowa †.....	21 10						
Davenport, Iowa †.....	15 0						
Keokuk, Iowa †.....	14 6						
Saint Louis, Missouri.....	30 0	19	15 9	2	8 11	6	10
Cairo, Illinois.....	40 0	21, 22, 24	51 10	1	25 8	26	2
Memphis, Tennessee.....	34 0	29	35 1	1	19 2	15	11
Vicksburg, Mississippi.....	41 0	29	44 11	6	30 8	14	3
New Orleans, Louisiana *.....	-2 6	28	-1 5	10	-5 6	4	1
<i>Ohio:</i>							
Pittsburg, Pennsylvania.....	20 0	6	33 4	29	6 4	27	0
Cincinnati, Ohio.....	50 0	14	71 3 $\frac{1}{2}$	29	26 2	44	10 $\frac{1}{2}$
Louisville, Kentucky.....	24 0	15, 16	46 7	29	10 10	35	9
<i>Cumberland:</i>							
Nashville, Tennessee.....	42 0	15	46 11	28	15 6	31	5
<i>Tennessee:</i>							
Chattanooga, Tennessee.....	33 0	11	36 10	29	9 7	27	3
<i>Monongahela:</i>							
Pittsburg, Pennsylvania.....	29 0	6	33 4	29	6 4	27	0
<i>Savannah:</i>							
Augusta, Georgia.....		18	22 6	7, 8	7 0	15	6
<i>Willamette:</i>							
Portland, Oregon.....		25	12 0	12, 13	1 5	10	7
<i>Sacramento:</i>							
Red Bluff, California.....		18	8 0	13, 14, 15	1 3	6	9
Sacramento, California.....		18	17 7	15	10 1	7	6
<i>Mobile:</i>							
Mobile, Alabama.....		19	16 8	20	14 1	2	7
<i>Colorado:</i>							
Yuma, Arizona.....		12	21 3	1	14 5	6	10

\* Below high-water mark of 1874 and 1883. † Frozen throughout the month. ‡ Frozen part of month: see text. § below bench-mark.

**ICE IN RIVERS AND HARBOES.**

**Broad lake.**—Burlington, Vermont: the lake continues frozen from the 1st to 29th. Towards the close of the month a partial breaking up occurred in the Winooski and other rivers in this section.

**Taunton river.**—Taunton, Massachusetts: the river became free of ice on the 20th.

**Connecticut river.**—New Haven, Connecticut: ice in the river broke on the 20th.

**Hudson river.**—Albany, New York: the ice opposite Troy broke on the 8th, and the river became clear of ice for a distance of about one mile. Considerable damage was done to the bridge and other property along the docks. On the 14th, the ice broke at Albany and moved down the river forming an ice-dam at a point two miles below the city. The water rose rapidly and flooded the docks and lower parts of the city. The ice-dam was still intact on the 20th.

**Salem creek.**—Salem, Salem county, New Jersey: during the winter, the ice in the creek reached a thickness of ten inches. On the 18th, the creek was clear of ice, and navigation was resumed.

**Lackawanna river.**—Millville Depot, Lake county, Pennsylvania: ice broke up and went out of the river during the 7th and 8th.

**Susquehanna river.**—Port Deposit, Maryland: on the 8th, the solid field of ice which extended from this place to within a short distance of Havre de Grace gave way and passed out of the river into the bay.

**Susquehanna river, (north branch).**—Wilkesbarre, Pennsylvania: ice broke on the afternoon of the 7th, and the river rose