A tornado occurred two miles northeast of Vernon, Lamar county, Alabama, at 10 p. m. of the 6th, moving northeast, blowing down houses, trees, etc. The length of the path was thirty miles, and width 300 to 2,700 feet.

A tornado occurred at Estill Springs, Franklin county, Tennessee, at 2 p. m. of the 6th. The tornado-cloud was funnel-shaped, and moved N. 40° E. for a distance of thirty-five miles, with a width of path varying from one hundred and fifty to six hundred feet. Three persons were killed, eight injured, and five houses and a church destroyed.

A tornado occurred at Spartanburg, South Carolina, at 10 a. m. of the 6th, unroofing a hotel and church; no other damage. The path was ninety feet in width.

NAVIGATION.

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 November, 1885, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, November, 1885.

[*Expressed in feet and tenths.*]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, Louisiana	29.9	13, 14, 15	5.7	1, 2, 3	2.0	3.7
Arkansas River:						
Fort Smith, Arkansas	22.0	7	3.6	24 to 30	2.5	1.1
Little Rock, Arkansas	23.0	9	4.2	28, 29, 30	2.9	1.3
Missouri River:						
Yankton, Dakota	24.0	1, 2	11.5	30	10.7	0.8
Omaha, Nebraska	18.0	9	6.5	19,20,21,30	5.8	0.7
Leavenworth, Kansas	20.0	13	7.6	9	6.9	0.7
Mississippi River:						
Saint Paul, Minnesota	14.5	9, 10	3.0	22, 27	1.9	1.1
La Crosse, Wisconsin	24.0	1 to 4, 15, 16	3.7	28, 28, 30	3.4	0.3
Dubuque, Iowa	16.0	1	4.0	28, 29, 30	3.6	0.4
Davenport, Iowa	15.0	8, 9	3.7	30	2.7	1.0
Keokuk, Iowa	14.0	11	5.2	30	3.3	1.1
Saint Louis, Missouri	32.0	9, 10	12.6	30	9.3	3.3
Cairo, Illinois	40.0	14, 15	26.5	2	12.8	13.7
Memphis, Tennessee	34.0	17, 18	19.0	4, 5	7.8	11.2
Vicksburg, Mississippi	41.0	22, 23	23.2	1	7.9	15.3
New Orleans, Louisiana*	13.0	22	6.1	1, 3	2.6	3.5
Ohio River:						
Pittsburg, Pennsylvania	22.0	25	7.3	18, 19	3.4	3.9
Cincinnati, Ohio	50.0	12	20.0	22, 23	11.1	8.9
Louisville, Kentucky	25.0	14	8.7	24 25, 26	6.1	2.6
Cumberland River:						
Nashville, Tennessee	40.0	11	27.0	28, 30	6.5	20.5
Tennessee River:						
Chattanooga, Tennessee	33.0	9	30.4	30	4.4	26.0
Monongahela River:						
Pittsburg, Pennsylvania	29.0	25	7.3	18, 19	3.4	3.9
Savannah River:						
Augusta, Georgia	32.0	9	23.7	5, 6, 22	7.8	15.9
Mobile River:						
Mobile, Alabama		6	17.1	25	14.7	2.4
Sacramento River:						
Red Bluff, California		25	21.0	1, 2, 3	0.3	20.7
Sacramento, California		30	21.2	1, 2, 3	7.5	13.7
Willamette River:						
Portland, Oregon		8, 9	8.3	2	1.3	7.0
Colorado River:						
Yuma, Arizona		20	16.5	11 to 19	15.6	0.9

NOTE.—The zero of river-gauge at New Orleans was changed on November 1, 1885, from high-water of 1874 to low-water of 1876. This change makes the readings 16.2 feet lower than those made previous to November 1, 1885.

ICE IN RIVERS AND HARBORS.

Red River of the North.—Saint Vincent, Minnesota: floating ice on 12th; navigation closed for the season on the 13th.

Missouri River.—Fort Yates, Dakota: floating ice on the 7th, 12th, 17th, and 26th; on the 30th the river was entirely clear of ice, a very unusual occurrence at this date.

Poplar River, Montana, 30th: river gorged with ice; navigation closed.

Fort Buford, Dakota: navigation closed on the 9th.

Fort Sully, Dakota: floating ice observed in the river on the 18th.

Devil's Lake.—Fort Totten, Dakota, 14th: lake nearly frozen over; navigation suspended.

Mississippi River.—Saint Paul, Minnesota: floating ice, 14th; navigation closed on the 16th.

Dubuque, Iowa: the last boat from the south went into ice harbor on the 22d, closing navigation for the season.

Keokuk, Iowa: the last boat from Saint Paul, Minnesota, arrived on the 23d; navigation above this point closed.

Duluth Bay.—Duluth, Minnesota: thin ice formed in the bay on the 24th.

Maumee Bay.—Toledo, Ohio, 29th: ice formed in the bay during the past three nights.

FLOODS.

Nashville, Tennessee: on the 8th the Cumberland River rose ten feet in twenty-four hours, with a large amount of drift-wood. The recent heavy rains that have fallen throughout this section have caused a considerable rise in all the streams, and damaged property to a limited extent.

Chattanooga, Tennessee: at 2 p. m. on the 8th the river had risen fourteen feet in the preceding twenty-four hours, which is the most rapid rise recorded since the establishment of this station. At 9 p. m. the river reached twenty-eight feet, and at 2 p. m. of the 9th it was thirty and four-tenths feet, the highest stage for the month.

Yuma, Arizona: the rain of the 19th and 20th was the heaviest that has fallen in this vicinity for a long time, and great damage was done to the track of the Southern Pacific railroad, causing delay of trains.

San Francisco, California, 20th: the rainfall for the month at this place has never been exceeded. Reports from Los Angeles state that washouts have occurred on the Southern Pacific railroad, and a portion of the San Fernando tunnel has caved in; the railroad bridge at Cajon Pass was carried away, and great damage done by freshets in all sections of the state.

Petaluma, Sonoma county, California: the storm which set in on the 15th caused Petaluma Creek to overflow, flooding the cellars in the town, and carrying away quantities of cord wood and lumber.

Los Angeles, California, 20th: the heavy rains of the past few days have been unprecedented at this station, and have caused serious damage to railroads and other property.

San Luis Obispo, San Luis Obispo county, California: a remarkably heavy rain fell during the night and early morning of the 18th, and continued at intervals until 2.30 p. m., the total rainfall for this storm being 10.04 inches. This rainfall is generally considered to have been the heaviest that has ever occurred here. All the bridges on the creek running through this town, with one exception, were washed away; in one case a bridge carried with it a large adjoining house. The water-works were also seriously damaged. Telegraph lines were prostrated, and mails delayed. The damage in this vicinity is estimated at $13,000.

Red Bluff, California, 24th: the continuous, heavy rains have caused a rapid rise in the river. On this date a portion of the track of the California and Oregon railroad was washed away, also several hundred logs from the boom of the Redding Lumber Company. At this place 120,000 bricks in a kiln were dissolved by the heavy rain. All small creeks in the county are much swollen, impeding travel, and drowning considerable stock.

Santa Cruz, Santa Cruz county, California: on the 24th the Lorenzo River overflowed. The rise was so sudden that the people scarcely realized danger until their houses were flooded. Large quantities of drift-wood lodged against the railroad bridge.

Santa Rosa, Sonoma county, California: the creeks in this vicinity were much swollen on the 25th. Many bridges and buildings, and much fencing, were washed away.

HIGH TIDES.

New Haven, Connecticut: the tide rose to an unusual height on the morning of the 2d, and damaged wharf property.

Fort Macon, North Carolina, 23d: the tide was extremely high, for westerly winds, the entire marsh lands being submerged.

Little Egg Harbor, New Jersey: a very high tide occurred on the 23d; out-houses, pavilions, and wharves were flooded.

Newport, Rhode Island: the wharves were flooded by the very high tide of the 23d.

New York City: the highest tide known for forty-five years occurred on the 24th; much damage resulted from cellars and sewers overflowing. At 10 a. m. the water had reached a mark four inches higher than the flood of February, 1885, when the East River was higher than for a quarter of a century. The Harlem River rose three feet and eight inches above high-water mark. Wharves along the Hudson River, as far as Poughkeepsie, were flooded.

Long Branch, New Jersey, 24th: the damage caused by high tides along this part of the New Jersey coast is very heavy; bathing houses were washed away, and wharves badly damaged.

Cape Mendocino, California: the highest tide ever known in Humboldt county occurred on the 24th; the water backed up to a great distance on every side from the main rivers; from the adjoining hills the lowlands looked like a vast ocean. At Eureka the lumber mills were compelled to shut down, the water overflowing the wharves. Thousands of acres supposed to have been above high-water mark were inundated.

Pysht, Washington Territory, 24th: an unusually high tide at 2 p. m.; the highest known for several years.

Chatham, Massachusetts: an unusually high tide occurred on the 24th; Chatham beach was almost submerged.

Atlantic City, New Jersey, 24th: the tide this morning is the heaviest for years. Much damage was done to property along the ocean front.

Cape May, New Jersey: very high tides occurred on the 23d and 24th. Much of the beach front was washed away, and wharves, etc., demolished and carried out to sea. Railroad travel was suspended on account of the high water.

New Haven, Connecticut: the highest tide in twenty-nine years occurred on the 24th; it rose three feet above high-water mark, and covered the warves.

High tides also occurred at the following places:

Portland, Maine, 24th, 25th.
Eastport, Maine, 24th, 25th, 26th.
Narragansett Pier, Rhode Island, 24th.
Chincoteague, Virginia, 23d, 24th.
Sandy Hook, New Jersey, 23d, 24th.
Cedar Keys, Florida, 22d.
Pysht, Washington Territory, 23d.
Tatoosh Island, Washington Territory, 7th.
Taunton, Massachusetts, 24th, 25th.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for November, 1885, with the telegraphic reports for the succeeding thirty-two hours, shows the general average percentage of verifications to be 79.90 per cent. The percentages for the four elements are: Weather, 84.25; direction of the wind, 76.88; temperature, 77.23; barometer, 84.83 per cent. By geographical districts, they are: For New England, 75.48; middle Atlantic states, 83.01; south Atlantic states, 85.28; eastern Gulf states, 84.15; western Gulf states, 82.27; lower lake region, 77.27; upper lake region, 76.66; Ohio Valley and Tennessee, 82.31; upper Mississippi valley, 76.11; Missouri Valley, 77.17. There were twenty-four omissions to predict, out of 2,934, or 0.82 per cent. Of the 2,910 predictions that have been made, one hundred and twenty-seven, or 4.36 per cent., are considered to have entirely failed; one hundred and forty-eight, or 5.09 per cent., were one-fourth verified; four hundred and forty-nine, or 15.43 per cent., were one-half verified; four hundred and eighty-nine, or 16.80 per cent., were three-fourths verified; 1,697, or 58.32 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

The percentages of verifications of special predictions for certain localities are, as follows:

Omaha, Nebraska (twenty-five days), 84.69; Arkansas, (twenty-five days), 82.00; Tennessee (twenty-four days), 84.26; Georgia (twenty-five days), 86.50; Washington City (twenty-nine days), 79.31; Baltimore, Maryland (twenty-eight days), 86.11; Erie, Pennsylvania, 66.25; Boston, Massachusetts, 77.50; Portland, Maine (twenty-nine days), 72.41; Albany, New York, 81.67; Pittsburg, Pennsylvania, 66.67; Cincinnati, Ohio, 77.50; Louisville, Kentucky, 83.33; Columbus, Ohio, 71.67; Cleveland, Ohio, 57.64; Indiana, 83.33; Oswego, New York, 63.33; Rochester, New York, 63.33; Buffalo, New York, 62.50; Milwaukee, Wisconsin, 73.33; Chicago, Illinois, 76.67; Detroit, Michigan, 74.17; Toledo, Ohio, 73.33; Sandusky, Ohio, 67.50; Cairo, Illinois, 87.71; Saint Louis, Missouri, 88.56; Memphis, Tennessee, 80.83: Shreveport, Louisiana, 87.91; Iowa (twenty-nine days), 76.21.

CAUTIONARY SIGNALS.

During November, 1885, two hundred and fourteen cautionary signals were ordered. Of these, one hundred and fifty-eight, or 73.83 per cent., were justified by winds of twenty-five miles or more per hour, at or within one hundred miles of the station. Sixty-two cautionary off-shore signals were ordered, of which number, forty, or 64.52 per cent., were fully justified both as to direction and velocity; fifty-six, or 90.32 per cent., were justified as to direction, and forty-eight, or 77.42 per cent. were justified as to velocity. Two hundred and seventy-six signals of all kinds were ordered, one hundred and ninety-eight, or 71.74 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, forty-one were changed from cautionary signals. Five signals were ordered late. In forty-two cases, winds of twenty-five miles or more per hour were reported for which no signals were ordered.

COLD-WAVE SIGNALS.

During the month there were one hundred and fifty cold-wave signals displayed. Of these, there were one hundred and twenty-six, or 84.0 per cent., justified. In eight cases the signals were considered to have been ordered late.

RAILWAY WEATHER SIGNALS.

Prof. P. H. Mell, jr., director of the "Alabama Weather Service," in the report for November, 1885, states:

The verifications of predictions for the whole area was 86 per cent. for temperature, and 90 per cent. for weather.

The following roads comprise this system: Western of Alabama; South and North; Montgomery and Mobile; Mobile and Girard; Georgia Pacific; East Tennessee, Virginia and Georgia system in Alabama; Memphis and Charleston; Columbus Western; Atlanta and West Point of Georgia; Northeastern of Georgia; Atlanta and Charlotte Air Line; Western and Atlantic; Georgia; East Tennessee, Virginia and Georgia system in Georgia; and Savannah, Florida and Western.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays occurred during November, as follows:

Alpena, Michigan, 7th: an aurora was observed at 7.20 p. m., consisting of a diffused light, resting on a dark segment, from which a few small streamers, having an apparent motion from east to west, were noted; the display disappeared at 10.30 p. m.

Mackinaw City, Michigan, 7th: an aurora was observed from 9.30 to 10.30 p. m., consisting of a segment above a bank of clouds of 30° altitude; the light was of a pale yellow color; occasionally a streamer was observed to shoot up above the clouds to an altitude of 65°. At 10 p. m. the sky became obscured.

Fort Buford, Dakota, 7th: an aurora, consisting of a pale white light, was visible from 9.22 p. m. until near midnight; the sky was obscured at intervals.

Fort Totten, Dakota, 7th: an auroral light, of pale yellow color, was observed in the north from 8 to 11 p. m.; the display was partially obscured by clouds.

Fort Sully, Dakota, 7th: there was a faint auroral glow in the north between 8 p. m. and 12.30 a. m. of the 8th.

Fort Bennett, Dakota, 7th: a faint auroral light was observed between 8.10 and 11.30 p. m., in the north-northeast,