

WATER-SPOUTS.

The s. s. "City of Para," L. Dexter, commanding, in N. 26° 16', W. 74° 04', on September 5th, passed a water-spout.

The s. s. "Flamborough," P. J. Fraser, commanding, in latitude 28° N., longitude 68° W., saw several water-spouts, the weather being calm and the sea smooth.

The bark "Western Chief," F. Sander, commanding, in N. 41° 20', W. 58° 01', on the 9th, passed a water-spout.

The ship "Hermon," F. N. Marvin, commanding, in N. 52° 09', E. 2° 45', saw a large water-spout. The same vessel, on the 27th, in N. 52° 44', E. 3° 47', saw another.

The British s. s. "Laurestina," Robert Batty, commanding, on the 16th, when fifty miles south-southwest of Cape Hatteras, North Carolina, saw four water-spouts in an east and west line moving eastward. They were about two and one-half miles apart, and were crossing the path of the vessel. The two middle spouts disappeared after a heavy peal of thunder, they having been, apparently, dissipated by it, and the remaining ones were soon after hidden by rain.

Meteorological record of voluntary observers and Army post surgeons, September, 1885.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Table with columns for Stations, Temperature (Maximum, Minimum, Mean), and Rainfall. Includes entries for Alabama, Georgia, Illinois, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

Meteorological record of voluntary observers, etc.—Continued.

Table with columns for Stations, Temperature (Maximum, Minimum, Mean), and Rainfall. Includes entries for Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature.			Rainfall.	Stations.	Temperature.			Rainfall.
	Maximum.	Minimum.	Mean.			Maximum.	Minimum.	Mean.	
Virginia—Cont'd.	°	°	°	Inches	Wisconsin.	°	°	°	Inches
Marion*	84	36	63.9	0.95	Beloit	82	40	60.5	4.56
Monroe, Fort.	86	48	70.2	3.01	Embaras*	86	36	60.9	2.05
Snowville*	80	43	66.7	1.66	Franklin	4.25
Summit*	95	35	66.7	1.66	Madison	79	42	59.9	4.05
Wytheville	82	35	63.1	1.66	Manitowoc	86	34	60.1	3.67
Washington Territory.					Neillsville*	79	22	51.9	4.20
Bainbridge Island*	75	44	60.0	4.27	Prairie du Chien*	83	41	61.4	4.53
Tacoma*	75	46	58.8	2.44	Wausau	85	28	57.4	2.06
Townsend, Fort	75	42	58.8	2.10	Wyoming.				
West Virginia.					Bridger, Fort.	80	29	54.3	0.49
Helvetia*	85	32	59.9	1.43	Fred Steele, Fort.	87	31	57.1	0.44
Parkersburg.	83	37	65.9	0.20					
Wellsburg				1.93					

NOTES AND EXTRACTS.

The following is an extract from the September, 1885, report of the "Alabama Weather Service" under direction of Prof. P. H. Mell, jr., Auburn:

This month has been characterized by conditions almost opposite to those indicated in September, 1884. The atmosphere has been very moist and the precipitation has been frequent; while in September of last year the average rainfall for the state was only 0.40 of an inch—the drouth was excessive and destructive. The rains during the month just closed were injurious to agricultural interests all over the state. The cotton that was open and ready to pick was not only beaten out by the rains, but the bolls were also destroyed in great numbers by rotting and falling from the plant. In many sections of the state the observers report the cotton sprouting on account of the moist condition of the atmosphere. It has also been observed that the numerous cloudy days prevented the plants from receiving as much of the sun's heating and invigorating rays as was required by the bolls, and they did not, therefore, open as rapidly as was consistent with the welfare of the staple. Added to these misfortunes, may be mentioned the vast destruction resulting from the attacks of the cotton caterpillar and the rust. It has, therefore, been estimated that these three counteracting influences will reduce the yield of cotton for the state of Alabama much below the average.

The temperature of the month has been mild, without any sudden, unpleasant changes, and the amount of sickness throughout the state has not been as great as was reported for September bulletin of 1884.

State summary.

Mean temperature, 73°.1; highest temperature, 95°, at Livingston, on the 8th; lowest temperature, 40°, at Gadsden and Pine Apple, on the 24th; range of temperature, 49°; greatest monthly range of temperature, 43°, at Pine Apple; least monthly range of temperature, 26°, at Lafayette; mean daily range, 13°.4; greatest daily range of temperature, 37°, at Pine Apple, on the 24th; least daily range of temperature, 0°.6, at Union Springs, on the 21st.

Mean depth of rainfall, 5.24 inches; mean daily rainfall, 0.18; greatest depth of monthly rainfall, 10.00 inches, at Roanoke; least depth of monthly rainfall, 0.70, at Selma; greatest daily rainfall average for state, 0.695 of an inch, on the 29th; greatest daily local rainfall, 6.33 inches, at Tuscombhia, on the 29th.

Average number of days on which rain fell, 11; average number of cloudy days, 14; average number of fair days, 8; average number of clear days, 8; warmest day, 15th; Coldest day, 24th.

Prevailing direction of wind, east.

Chattanooga reports that the greatest velocity of wind was nineteen miles per hour from the northeast. Montgomery, twenty-two miles from the east.

The following meteorological summary and accompany remarks are from the Georgia "Crop Report," prepared under direction of Hon. J. T. Henderson, Commissioner, at Atlanta, Georgia:

Districts.	Temperature.			Average precipitation.
	Highest.	Lowest.	Monthly means.	
Northern Georgia	88	42	67.4	7.05
Middle Georgia	92	54	72.7	8.35
Southwestern Georgia	94	64	72.3	5.66
Eastern Georgia	88	56	70.1	5.42
Southeastern Georgia	92	68	77.9	20.75
State.....	94	42	72.5	9.43

The rainfall of September has been excessive, and damaging to the crops in all parts of the state. In middle and southeast Georgia there has been about three times the usual amount for September. On the 19th, at Saint Mary's,

there was a fall of over 5.5 inches; on the 26th, at Brunswick, 4.75 inches; and on the 20th, 3.5 inches at La Grange, and 4 inches on Lookout Mountain. At Saint Mary's a total rainfall of 27 inches was recorded for the month. The total mean for the month, in inches, in north Georgia is 7.04; in middle Georgia, 8.36; in southwest Georgia, 5.66; in east Georgia, 4.42; and in southeast Georgia, 20.73.

The average precipitation of rain for September, as deduced from the meteorological observations of a series of years, in north Georgia is 4.25 inches; in middle Georgia, 2.71; in southwest Georgia, 4.20; in east Georgia, 4.08; in southeast Georgia, 7.03; and the average for the state, 4.45.

The following meteorological summary and accompanying remarks are from the September, 1885, report of the "Indiana Weather Service," under direction of Prof. H. A. Huston, of Purdue University, Lafayette:

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Monthly mean.	
Northern counties	95.0	34	61.62	3.30
Central counties	88.0	33	63.33	3.37
Southern counties	93.0	37	65.57	5.05
State.....	95.0	33	63.51	3.91

The mean temperature of the state for September is 6°.42 below that for September of last year; 0°.19 above the mean of fourteen years at Indianapolis; 2°.25 below the mean of twenty-six years at Logansport; 5°.19 below the mean of twenty-one years at Vevay; 0°.19 below the mean of thirty-two years at Spiceland; 1°.84 below the mean of six years at Mauzy; 4°.57 below the mean of four years at Blue Lick; 3°.30 below the mean of four years at Worthington; 4°.84 below the mean of two years at Knightstown; and 1°.70 below the mean of six years at this station. With two exceptions the temperatures at the various stations are below the average, ranging from 0°.5 to 2°.7.

The mean precipitation for the state is 0.47 inch below that for last year; 1.11 above the mean of fourteen years at Indianapolis; 1.01 above the mean of twenty-six years at Logansport; 0.48 above the mean of twenty-one years at Vevay; 0.54 above the mean of twenty-six years at Spiceland; 1.25 above the mean of six years at Mauzy; 0.03 above the mean of four years at Blue Lick; 0.39 above the mean of four years at Worthington; and 0.84 above the mean of two years at Knightstown; and 1.31 above the mean of six years at this station. Six stations report rainfall above the mean, 0.35 to 2.22 inches, and three report rainfall below the mean, 0.19 to 1.31 inches.

Nearly every station reports severe weather on the 8th, the date of the tornado in Ohio.

The following is the "Iowa Weather Bulletin" for September, 1885, prepared by Dr. Gustavus Hinrichs, director of the Iowa Weather Service:

September, 1885, was nearly normal in temperature and cloudiness, southerly winds prevailing. The first twelve days were cold and very rainy; the balance of the month was remarkably fine and warm till the 28th, when another rainy spell began. No general frost has occurred yet, and the corn crop of this year is safe.

The mean temperature of the month was one-fifth of a degree above normal. The first decade was very cold, being ten degrees below normal. The first frost of the season occurred on the 5th, in northern Iowa, where the corn was nipped on lowlands. The second and third decades were quite warm, being five and a half degrees above the normal temperature of the season.

The total rainfall at the central station was but three-fourths of the normal amount. In southern and central Iowa the rainfall has considerably exceeded the normal, doing much damage to grain-stacks and interfering with the fairs held during the first twelve days of the month.

From the 13th to the 27th, inclusive, the weather has been generally warm, dry, and very beautiful. Threshing and all other early fall work was favored, and the great corn crop ripened.

No severe wind-storm has occurred in Iowa. On the day of the tornado at Washington Court House, Ohio, the weather was cold and rainy in Iowa.

Northern lights were seen on the 15th. The haze was most general after the extended prairie fires in Dakota Territory.

The following is an extract from the September, 1885, report of the "Minnesota Weather Service" under direction of Prof. Wm. W. Payne, Northfield:

Reports from the sixteen stations of the Minnesota Weather Service give an average mean temperature for Minnesota, for September, of 58°.7. This is only 4°.4 lower than for the preceding month of August.

The warmest station was La Crosse (61°.1), situated in the southeastern corner of the state, at the lowest elevation of any station, and sheltered by the high hills which there enclose the valley of the Mississippi River. The next warmest was Winona, situated under the same conditions.

The highest temperature of the month was registered at Morris, Stevens county, 93°.0; the next highest was at Moorhead, where 92° was recorded. It

will be seen that these stations are in the northwestern part of the state. These are very high temperatures for the season, but they have been exceeded in that region several times since observations have begun.

The lowest degree of heat was at Park Rapids, Hubbard county, where, on the 4th, 22° 2 was recorded. The next lowest was at Saint Vincent, Kittson county, 24°. The lowest average was also at Saint Vincent, 53° 1, and the next lowest at Duluth, 53° 9.

The average temperature varied but slightly from the normal in any part of the state, being slightly above the average at most stations in the west and in the Red River Valley. The only considerable departure from the normal was at Duluth, where the month averaged 2° 1 colder than usual. The abnormal cold of the last thirteen days of August was continued into the first seven days of the month, during which time, with the exception of the 2d, frosts of more or less severity were of nightly occurrence throughout all sections. After the 8th the weather became warmer, and a season of delightful, warm weather, free from frost, continued until the last day of the month, when a slight cold wave made its appearance, causing frosts in the northern part of the state. South of a line drawn from Morris, Stevens county, through Mankato and a little north of Winona, the average temperature of the month was above 60°, except for the elevated counties of Dodge and Freeborn, where it was slightly below that point. North of that line the average was below that point.

The rainfall for September was quite evenly distributed throughout all sections. In the extreme northwest there was less than one inch. In all other districts it was over two inches. The belt of greatest precipitation was in the central-eastern part of the state, and included the counties of Goodhue, Rice, and Blue Earth. The counties of Winona and Fillmore also had over four inches of rainfall. The largest amount recorded was at Minneapolis, 5.27 inches, and the next La Crosse, where 5.78 inches was measured. The least amount was at Saint Vincent, 0.98 inches, and next Morris, 2.16 inches.

The rain was very unevenly distributed throughout the month, and was nearly all included in three rainy terms. The first of these terms was on the 7th, 8th, and 9th, when, during that time, southern Minnesota was enveloped in the northwest quadrant of a cyclone, which, during those dates, passed from Las Animas, Colorado, to the Saint Lawrence. This cyclone gave rise to conditions which produced disastrous tornadoes in Ohio, causing the loss of six lives and doing \$1,000,000 of damage. In Minnesota its energy was expended in producing heavy rains, and on these dates the long local drouth at Mankato was terminated by a rainfall of 2.17 inches. On the 11th and 12th the barometer was again very low, and general rains fell throughout the state, the largest amount falling in the northern sections. On the 19th, without any marked depression of the barometer, heavy rain was incident to that part of the state southeast of Saint Paul, and along the Mississippi River. The last decade of the month was without rain.

An examination of the records show that the first killing frost south of the 45th parallel occurred on the morning of the 5th, when, with the exception of Saint Vincent and Park Rapids, the lowest temperatures for the month were recorded at all stations. This frost was severe enough to kill corn and tender vegetation. Throughout the southern part of the state, notable exceptions to this were the limited localities of high-lying ground in the northern part of Dakota county, and the land elevated 1,300 feet above the sea south of Saint Charles, Olmsted county, where at the end of the month the corn and sugarcane were still green and untouched by frost.

The following is an extract from the September, 1885, report of the "Missouri Weather Service," under direction of Prof. Francis E. Nipher, Saint Louis:

September has had a temperature slightly below the normal of forty-eight years, although a degree above the average of the last ten years. The extremes of temperature were 42° and 89°, which are very common temperatures for September. The early part of the month was cool and unusually wet, the rainfall for the first decade having been fifty per cent. more than the normal for the month. The second decade was warm, and in general fair, although the rain of 2.74 on the 13th was nearly as much as the normal rainfall for the whole month. The last decade was dry and slightly cooler than the second, and slightly warmer than the first, decade. The heaviest rainfall of the month was 3.45, on the 4th.

The total rainfall of the month was 8.62, which has been exceeded but once in September since 1839, viz., in 1863, when the rainfall was 10.53.

In the state the rainfall exceeded seven inches in a belt stretching southwestwardly from Saint Louis to Springfield, and extending northwardly to Sedalia and Mexico. To the north and south the fall diminishes to less than four inches. The lowest temperatures observed in the state were 42°, at Miami, and 43°, at Glasgow. Very light hoar frosts are reported from a few stations, but tender plants like the castor-oil bean are uninjured. At Saint Louis the temperature of the air has never been known to fall below 35° in September.

The highest temperatures reported from stations are, Protom, 95°; Orogon and Miami, 90°. In 1864, on the 2d and 3d, Engelmann observed a temperature of 102°, and in 1881, on the 4th and 5th, a temperature of 100° was also reached.

The following is an extract from the September, 1885, report of the "Nebraska Weather Service," under direction of Prof. Goodwin D. Swezey, Crete, Nebraska:

September has been in no respect a marked month, the temperature, precipitation, cloudiness, and number of storms of all kinds being about normal.

The extremes of temperature have not been as great as usual, and the wind record has also been small.

No cold waves have developed during the month. On the 5th a cool wave overspread the states east of us and moved towards the Gulf, accompanied by a slight fall of temperature in our region. On the 22d a decidedly cool wave, extending from Lake Superior to Colorado, advanced southeastward to the Gulf and Atlantic coast, disappearing on the 24th; another came from the Pacific coast and moved eastward over the Rocky Mountains to our region, disappearing in the Missouri Valley on the 27th; another slight cool wave overspread Dakota and the upper lake region during the 29th and 30th, lowering the temperature in our region a few degrees. The second cool wave mentioned was accompanied by frosts in some parts of Nebraska.

The average rain for the different sections of the state for September, 1885, is as follows: Northeast section, 2.37 inches; southeast section, 2.37 inches; northwest section, 2.62 inches; southwest section, 1.99 inches. Greatest number of days of appreciable precipitation, 9, at Stromsburg and De Soto.

The following is an extract from the September, 1885, "Bulletin of the New England Meteorological Society," under direction of Prof. Winslow Upton, Providence, Rhode Island:

General conditions.—The month was characterized by fair skies, low temperature, and a large deficiency in rainfall. Frosts came early in the month and were numerous until its close, but they were generally light, and but little damage to crops resulted from them.

Precipitation.—The precipitation was light, but one station reporting an excess over the average of former years. The total precipitation for the whole district was about 55 per cent. of the usual amount for September. The rainfall came in connection with the passage of the barometric depressions mentioned below, with the exception of a very few local showers on other days. The chief peculiarity of the precipitation record is the amount of snow which fell in the severe storm of the 22d-24th in New Hampshire and Vermont. At places where no stations are located the snow was abundant, especially in mountainous sections. At Stratford, Vermont, the greatest amount, 9 inches, was noted, and the snow remained on the ground two days. The distribution of the precipitation for the month was irregular, but the northern portion received a greater amount than the southern.

Temperature.—Without a single exception, the stations for which comparisons with former records are available show a deficiency in the average for the month. The average deficiency is 2° 7. The cold weather began early in the month, extensive but light frosts occurring on the 2d and 3d instants. The minimum temperatures were generally in connection with the severe storm of the 22d-24th, when the temperatures noted were near the freezing point.

Pressure.—Three barometric depressions passed in the vicinity of the district during the month, while the rainfall of the 1st and 2d instants was in connection with the depression which passed north of New England on the 31st ultimo. Of these, two moved down the Saint Lawrence Valley on the 3d and 9th, respectively, with the usual attendant conditions, but the third merits a more detailed description. On the 18th indications of a cyclonic disturbance in the Gulf of Mexico were first noted. On the morning of the 22d this storm-centre, moving in a northeasterly direction along the south Atlantic coast, had reached Cape Hatteras. At the same time a second depression, moving easterly over the Lake region, had reached the Province of Quebec. The pressure at the centre of each depression was about 29.5 inches. During the 22d these depressions united over New England, and on the morning of the 23d a single depression existed near Eastport, where the pressure was only 28.76 inches. This storm was the only severe storm of the month. It was attended by rain and high winds; after its passage, before the precipitation had ceased, the temperature fell with great rapidity, causing the precipitation of the 23d to be, in part, snow. This storm furnishes an excellent example of the union of two barometric depressions within the limits of the United States.

Wind.—Severe gales attended the cyclonic disturbance just described. Velocities exceeding thirty miles per hour were as follows: Saint John, 34; Boston, 37; Block Island, 37; Eastport, 40; Blue Hill, 64; Mount Washington, 90. Among the total wind movements for the month are: Saint John, 6,027; Boston, 6,977; Blue Hill, 12,106; Mount Washington, 21,265 miles.

Thunder-storms.—Thunder and lightning accompanied the passage of all the depressions mentioned above, but were noted at a few stations only. In addition, thunder-showers occurred in eastern Massachusetts on the 16th, and in New Brunswick on the 19th. No wide-spread or severe thunder-storms occurred during the month.

Miscellaneous.—Auroras were frequently observed, those of the 14th and 15th having been generally reported. Other dates of observation are: Eastport, 2d, 3d, 4th, 17th; Saint John, 3d, 4th; Provincetown, 1st, 2d; Mayfield, 11th, 13th; Gardiner, 3d; Manchester, New Hampshire, 17th; Woodstock, Vermont, 17th; Cambridge, 5th; Parker's Ridge, 17th.

Prof. B. F. Thomas, of the Ohio State University, Columbus, director of the "Ohio Meteorological Bureau," forwards the following meteorological summary in advance of the regular monthly report:

Temperature.—Mean for the state, as determined from observations at thirty-two stations, 62° 9; station reporting highest monthly mean, Pomeroy, 66° 9; station reporting lowest monthly mean, Youngstown, 60° 0; maximum, 95° 0, at College Hill, on the 19th; minimum, 28° 0, on the 2d, at Junction; monthly range for the state, 67° 6; station reporting greatest monthly range,

Junction, 58°.0; station reporting least monthly range, Oberlin, 40°.0; stations reporting greatest daily range, College Hill and Hanging Rock, 46°.0, on the 25th; station reporting least daily range, Hiram, 3°.0, on the 10th.

Relative humidity.—Mean for the state, as determined from observations at thirty stations, 75.9 per cent.; station reporting highest monthly mean, Logan, 83°.7 per cent.; station reporting lowest monthly mean, Napoleon, 59.5 per cent.

Precipitation.—Average for the state, as determined from observations at thirty-three stations, 2.49 inches; station reporting largest monthly amount, Upper Sandusky, 3.87 inches; stations reporting least monthly amount, Pomeroy, 0.98.

Winds.—Prevailing direction, southwest. Twenty-nine stations report prevailing winds, as follows: sixteen from southwest; five from southeast; three from west; three from east; one from south and one from northwest.

The following is an extract from the Tennessee "State Board of Health Bulletin" for September, 1885, prepared under the direction of J. D. Plunkett, M. D., president, State Board of Health, and furnished in advance of the regular report:

The mean temperature for the month was 69°.52, 3°.68 below that for the corresponding month last year, and 2° above the mean for September, 1883. The mean of the maximum temperatures was 88°.26, and the mean of the minimum temperatures was 44°.87, respectively, 3°.14 and 6°.13 below those for the corresponding period last year. The highest temperature, which was recorded about the 12th, was slightly below the maximum for September of the past two years. The lowest temperature was recorded on the 24th, at which time slight frosts were reported from most of the stations.

The average precipitation for the month was 3.80 inches, 1.73 inches above the precipitation for the corresponding months of 1883 and 1884. In the eastern division of the state the rainfall was very near the normal, but in the middle and western divisions it was considerably above, especially in the latter. In the distribution, the conditions of last month were almost reversed, the

western division receiving an average of 4.20 inches, the middle division receiving 3.80 inches, and the eastern division receiving 3.40 inches. The days of greatest rainfall were the 8th, 13th, 20th, 27th, 28th, 29th, and 30th, of these, the greatest fall occurred on the 29th, when an average of .87 inch fell throughout the state. The local rains of this date were very heavy at several stations, at least four reporting two or more inches. The greatest local daily fall was at Waynesborough, where 3.65 inches were reported on the above date. The above-named rains were general, but those of the 27th, 28th, and 29th were very light in the eastern division. There were only four rainless days reported during the month, the 10th, 11th, 24th, and 25th.

State summary.

Mean temperature, 69°.52; highest temperature, 93°.00, on the 12th, at Waynesborough; lowest temperature, 34°.00, on the 24th, at Hohenwald; range of temperature, 59°.00; mean monthly range of temperature, 43°.32; greatest monthly range of temperature, 58°.00, at Hohenwald; least monthly range of temperature, 34°.00, at Dickson; mean daily range of temperature, 15°.58; greatest daily range of temperature, 41°, on the 24th, at Riddleton; least daily range of temperature, 2°, on the 8th, at Hurricane Switch, on the 13th, at Bolivar, on the 20th, at Dickson, on the 21st, at Jonesborough, on the 27th, at Ashwood, on the 28th, at Greenville, and on the 30th, at Grief, Riddleton, and Florence Station; mean of maximum temperatures, 88°.26; mean of minimum temperatures, 44°.87.

Mean depth of rainfall, 3.80 inches; mean daily rainfall, 0.127 inch; greatest rainfall, 6.66 inches, at Waynesborough; least rainfall, 0.55 inch, at Jonesborough; greatest local daily rainfall, 3.65 inches, on the 29th, at Waynesborough; days of greatest rainfall, 8th, 13th, 20th, 27th, 28th, 29th, and 30th; day of greatest rainfall, 29th.

Average number of days on which rain fell, 9.5; average number of clear days, 10; average number of fair days, 8.2; average number of cloudy days, 11.8; rainless days, 10th, 11th, 24th, 25th; warmest day, 12th; coldest day, 24th.

Prevailing winds, south and southeast.

