

tions possess for the general public the Chief Signal Officer has authorized forecasts for 48 and 72 hours, covering the 2d and 3d days in advance. These are optional with the forecast official, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 111; temperature, 104. Percentages of verifications: weather, 75.8; temperature, 81.2; weather and temperature combined, 77.8. No forecasts for 72 hours were made during the month.

Percentages of verifications of weather and temperature signals reported by directors of the various State Weather Services for September, 1890.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Iowa	90.0	90.0	Nebraska	86.8	91.4
Louisiana, northern	55.0	76.0	New Jersey	83.4	88.9
Louisiana, southern	100.0	88.0	North and South Dakota	92.0	92.0
Michigan	86.5	85.6	Ohio	89.0	88.0
Minnesota	75.0	71.0	Pennsylvania	88.0	90.0
Missouri	84.0	83.0	South Carolina	76.1	81.3

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for September, 1890, of the directors of the various state weather services:

ALABAMA.

The continued wet weather greatly damaged the cotton crop. **Temperature.**—Maximum, 97, at Pine Apple, 10th, and at Union Springs, 19th, 20th, and 21st; minimum, 50, at Florence, 28th, and at Valley Head, 17th and 18th; greatest local monthly range, 45, at Union Springs. **Precipitation.**—Greatest monthly, 10.07, at Valley Head; least monthly, 8.08, at Goodwater. **Wind.**—Prevailing direction, east.—Prof. P. H. Mell, Auburn, director; J. M. Quarles, Private, Signal Corps, assistant.

ARKANSAS.

The month was characterized by unusually heavy rainfall. **Temperature.**—Maximum, 98, at Lead Hill, 7th; minimum, 42, at Winslow, 29th; greatest local monthly range, 52, at Lead Hill; least local monthly range, 32, at Malvern. **Precipitation.**—Greatest monthly, 12.62, at Hot Springs; least monthly, 0.81, at Malvern.—M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Sergeant, Signal Corps, assistant.

COLORADO.

Temperature.—The mean was 2.5 above the average of the last 4 years; maximum, 100, at Bennet, 1st; minimum, 7, at Climax, 26th; greatest local monthly range, 72, at Breckenridge; least local monthly range, 27, at Kit Carson. **Precipitation.**—The rainfall ranged from 2.32, at Climax, to 0.00, at many stations. **Wind.**—Prevailing direction, west.—Prof. F. H. Loud, Colorado Springs, director; W. S. Miller, Sergeant, Signal Corps, assistant.

ILLINOIS.

Temperature.—The mean was 3.2 below the normal of the last 15 years; maximum, 96, at East Peoria, 6th; minimum, 30, at Sycamore, 20th, and at Philo and Pontiac, 28th. **Precipitation.**—The average was 0.43 below the normal of the last 12 years; greatest monthly, 6.32, at Centralia; least monthly, 0.35, at Pontiac. **Wind.**—Prevailing direction, northeast.—John Craig, Sergeant, Signal Corps, Springfield, in charge.

INDIANA.

Temperature.—The average was 2.0 below the normal; maximum, 92, at Huntingburgh and Princeton, 4th, 5th, and 7th; minimum, 31, at Point Isabel, 29th; greatest monthly range, 55, at Delphi and Logansport; least monthly range, 44, at Butlerville and DeGonia Springs. **Precipitation.**—The average was 1.04 in excess of the normal; greatest monthly, 9.02, at Farmland; least monthly, 2.07, at Seymour. **Wind.**—Prevailing direction, northeast.—Prof. H. A. Huston, La Fayette, director; H. R. Patrick, Private, Signal Corps, assistant.

IOWA WEATHER AND CROP SERVICE.

Temperature.—The average was about 2.5 below the normal; maximum, 96, at Carson, 6th; minimum, 23, at Atlantic, 13th; greatest monthly range, 71, at Atlantic; least monthly range, 41, at Independence. **Precipitation.**—There was an average deficiency of about 1.00; greatest monthly, 4.85, at Eagle Grove; least monthly, 1.86, at Carroll. **Wind.**—Prevailing direction, south.—J. R. Sage, Des Moines, director; G. M. Chappel, Sergeant, Signal Corps, assistant.

KANSAS.

Temperature.—The temperature was normal in the northern and western parts of Gove, the eastern and southern portions of Logan, and the northern portion of Scott, Wichita, and Greeley counties, while a deficiency existed throughout the rest of the state, which increased eastward until it culminated in an area extending from Dickinson, Geary, and Riley southeastward down the Neosho Valley to Bourbon, Neosho, and Wilson, in which area the temperature was 4 below normal: maximum, 106, at Gove City, 1st, and at Page City, 2d and 3d; minimum, 20, at Lakin, 13th, and at Luray, 19th; greatest

local monthly range, 83, at Lakin; least local monthly range, 48, at Weskan and Abilene.

Precipitation.—Greatest monthly, 6.62, at Horton; least monthly, 0.20, at Wallace and McAllaster. **Wind.**—Prevailing direction, south.—Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.

KENTUCKY.

Temperature.—The average was about 2 below the normal; maximum, 95, at Harrodsburgh, 7th; minimum, 86, at Central City, 28th; greatest monthly range, 57, at Harrodsburgh; least monthly range, 38, at Edmonton. **Precipitation.**—The rainfall was well distributed over the state and was about normal in amount; greatest monthly, 5.34, at Edmonton; least monthly, 1.65, at Frankfort. **Wind.**—Prevailing direction, northeast.—Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.

LOUISIANA.

Temperature.—The mean was 1.7 below the normal for the state, being somewhat greater in the southern portion than in the northern; maximum, 100, at Cameron, 6th; minimum, 41, at Maurepas, 30th; greatest local monthly range, 53, at Minden; least monthly range, 38, at Edgard and New Orleans. **Precipitation.**—The average was 0.40 above the normal for the northern, and 0.75 below for the southern section; greatest monthly, 10.68, at Minden; least monthly, 0.87, at Mandeville. **Wind.**—Prevailing direction, south and southeast.—George E. Hunt, Sergeant, Signal Corps, New Orleans, in charge.

MICHIGAN.

The notable features of the month were the low temperature of the last week, and the light and unevenly distributed rainfall. **Temperature.**—The mean was 3.5 below the normal of 15 years; maximum, 94, at Alma, 3d; minimum, 19, at Roscommon, 28th; greatest monthly range, 69, at Grayling; least monthly range, 34, at Atlantic. **Precipitation.**—The average was 1.11 below the normal for 15 years; in Cass, Berrien, Calhoun, Delta, south Van Buren, a part of Branch, and Saint Joseph and Kalamazoo counties the rainfall was above the normal; greatest monthly, 5.25, at Vandalia; least monthly, 0.21, at Standish. **Wind.**—Prevailing direction, northeast.—N. B. Conger, Sergeant, Signal Corps, Lansing, director.

MINNESOTA.

Temperature.—The month was generally less than 1 cooler than usual; maximum, 89, at Grand Meadow, 6th; minimum, 24, at Pokegama Falls, 16th and 27th, and at Medford, 28th; greatest local monthly range, 63, at Medford; least local monthly range, 46, at Duluth. **Precipitation.**—The rainfall was in excess 2.02 at Saint Vincent and 0.52 at Moorhead, while at Saint Paul and Duluth it was deficient 0.65 and 2.14, respectively; greatest monthly, 4.74, at Lake Winnibigoshish Dam; least monthly, 1.06, at Morris. **Wind.**—Prevailing direction, south.—John Healy, Corporal, Signal Corps, Saint Paul, in charge.

MISSISSIPPI.

Temperature.—The deficiency in temperature was greatest in the northern part of the state. The temperature generally remained above the normal during the first half of the month, and there was then a gradual fall to the lowest on the 29th and 30th; maximum, 98, at Vaiden, 10th; minimum, 40, at Macon, 28th; greatest local monthly range, 50, at Macon. **Precipitation.**—There was an excess of precipitation in the northern half of the state amounting to several inches, and a deficiency of from 1.00 to 2.00 in the southern portion; greatest monthly, 13.07, at Corinth; least monthly, 1.80, at Bay Saint Louis.—R. B. Fulton, Signal Corps, University, director.

MISSOURI.

Temperature.—The mean was 3.8 below the normal; maximum, 98, at Protem; minimum, 34, at Miami.

Precipitation.—The average was 2.19 below the normal; greatest monthly, 12.08, at Protem; least monthly, 1.10, at Shelbina.—Prof. Francis E. Nipher, Saint Louis, director.

METEOROLOGICAL REPORT OF THE MISSOURI STATE BOARD OF AGRICULTURE.

Temperature.—Maximum, 98, at Protem, 7th; minimum, 27, at Adrian, 12th; greatest monthly range, 63, at Adrian; least monthly range, 42, at Cairo, Ill., and Steelville.

Precipitation.—Greatest monthly, 14.41, at Sarcoux; least monthly, 1.75, at Saint Charles.—Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McKee, Sergeant, Signal Corps, assistant.

NEBRASKA.

The month has been one of extremes in temperature, early frosts, lack of rain, and considerable cloudiness.

Temperature.—The mean was 2.0 below the normal; maximum, 104, at Wilcox; minimum, 18, at Fort Niobrara.

Precipitation.—The rainfall varied from 0.00 to trace in the extreme west to 1.00 through the middle and northeast parts of the state; over the remainder of the state from 1.00 to 3.00 fell.—Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Sergeant, Signal Corps, assistant.

NEW ENGLAND METEOROLOGICAL SOCIETY.

Temperature.—The average was 0.3 above the normal; maximum, 86, at Lowell, 5th; minimum, 20, at Berlin Mills, 25th; greatest monthly range, 62, at Lake Cochituate; least monthly range, 26, at Block Island.

Precipitation.—The average was 1.75 above the normal; greatest, 11.14, at Chicopee; least, 2.69, at Block Island.

Wind.—Prevailing direction, southwest.—Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. Warren Smith, Private, Signal Corps, assistant.

NEW JERSEY.

Temperature.—The mean was 0.9 below the normal; highest monthly mean, 68.5, at Bridgeton; lowest monthly mean, 60.8, at Newton; maximum, 91, at Woodbury, 5th; minimum, 33, at Madison, Tenafly, and Newton, 25th, and at Gillette, 30th; greatest local monthly range, 56, at Madison; least local monthly range, 26, at Ocean City.

Precipitation.—The average was 0.86 above the normal; greatest monthly, 8.61, at Egg Harbor City; least monthly, 3.60, at Ocean City.

Wind.—Prevailing direction, southwest.—E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.

NEW YORK.

Temperature.—Maximum, 90, at Addison, 8th; minimum, 22, at Utica, 28th; greatest local monthly range, 65, at Hyndsville.

Precipitation.—Greatest monthly, 12.72, at South Canisteo; least monthly, 2.41, at Massena.

Wind.—Prevailing direction, southwest.—Prof. E. A. Fuertes, Ithaca, director; R. M. Hardinge, Private, Signal Corps, assistant.

NORTH CAROLINA.

The month was unusually damp and cloudy and unfavorable for the growth of crops, especially the maturing of cotton. Picking was greatly delayed.

Temperature.—The mean was 1.0 above the normal; maximum, 94, at Chapel Hill, 7th; minimum, 44, at Highlands, 17th, and at Mount Airy, 18th; greatest monthly range, 45, at Marion; least monthly range, 17, at Hatteras.

Precipitation.—The rainfall was heaviest in the southeastern part of the state. The average was 0.67 above the normal; greatest monthly, 10.77, at New Berne; least monthly, 1.94, at Lynchburgh, Va.

Wind.—Prevailing direction, northeast.—Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Sergeant, Signal Corps, assistant.

NORTH AND SOUTH DAKOTA.

Temperature.—The mean was 1.2 above the normal; maximum, 97, at Milbank, S. Dak., 23d, and at Steele, N. Dak., 17th; minimum, 18, at Steele, N. Dak., 19th; greatest local monthly range, 79, at Steele, N. Dak.; least local monthly range, 53, at Sioux Falls, S. Dak.

Precipitation.—The average was about 0.45 below the normal; greatest monthly, 3.78, at Sioux Falls, S. Dak.; least monthly, 0.03, at Etta Mine, S. Dak.

Wind.—Prevailing direction, southeast.—S. W. Glenn, Sergeant, Signal Corps, Huron, S. Dak., in charge.

OHIO.

Temperature.—The mean of the northern section, the middle section, the southern section, and of the state was 1.6, 2.1, 0.7, and 1.4, respectively, below the average; maximum, 92, at Sandusky and Logan, 7th; minimum, 33, at Findlay, 29th.

Precipitation.—The rainfall was the largest September rainfall since the opening of the bureau, the average in the northern section, the middle section, the southern section, and the state being 1.49, 3.23, 1.97, and 2.23, respectively, above the normal; greatest monthly, 8.89, at Newcomerstown; least, 1.91, at Clarksville.

Wind.—Prevailing direction, southwest.—Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Sergeant, Signal Corps, assistant.

OREGON.

Temperature.—The mean was 1.1 above the normal; maximum, 98, at Grant's Pass, 4th; minimum, 23, at Beulah, 12th.

Precipitation.—The average was 0.90 below the normal, except in Jackson, Lake, and Gilliam counties, where, owing to heavy rains on the 30th, it was above; generally less than 0.10 fell along the coast and in the Willamette Valley; in southern and eastern parts of the state from 0.11 to over 2.00 fell.

Wind.—Prevailing directions, north and northwest.—Hon. H. E. Hayes, Master State Grange, Oswego, director; B. S. Pague, Sergeant, Signal Corps, assistant.

PENNSYLVANIA.

Temperature.—The mean was 1.0 above the normal; maximum, 91, at Carlisle and Coatsville, 5th, and at McConnellsburgh, 7th; minimum, 25, at Dyberry, 25th; greatest local monthly range, 26, at Philipsburgh; least local monthly range, 14, at Erie.

Precipitation.—The average was 1.00 above the normal; greatest monthly, 8.54, at Ligonier; least monthly, 2.05, at South Eaton.

Wind.—Prevailing direction, northwest.—Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.

SOUTH CAROLINA.

Temperature.—Highest monthly mean, 77, at Chester; lowest monthly mean, 66.3, at Spartanburgh; maximum, 98, at Brewer Mine, 4th; minimum, 49, at Spartanburgh, 25th, and Yorkville, 30th; greatest local monthly range, 43, at Brewer Mine; least local monthly range, 30, at Timmonsville.

Precipitation.—Greatest monthly, 13.68, at Port Royal; least monthly, 3.29, at Spartanburgh.

Wind.—Prevailing direction, northeast.—Hon. A. P. Butler, Columbia, director.

TENNESSEE.

The principal features of the month were the unusual rainfall and the large percentage of cloudiness.

Temperature.—The average was very near the normal for the last 8 years; maximum, 94, at Waynesborough, 5th; minimum, 44, at Clarksville, 14th; greatest monthly range, 48, at Waynesborough; least monthly range, 31, at Cog Hill and Lookout Mountain.

Precipitation.—The average was more than 2.00 in excess of the normal for the last 8 years, and was the greatest average during this period, except in 1889; greatest monthly, 9.07, at Memphis; least monthly, 1.40, at Cog Hill.

Wind.—Prevailing directions, south and northeast.—J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.

TEXAS.

Temperature.—The mean varied but little from the normal; maximum, 100, at Rio Grande City, 19th; minimum, 33, at Ochilree, 30th; greatest local monthly range, 62, at Ochilree; least local monthly range, 31, at Galveston, Hearne, and La Grange.

Precipitation.—The rainfall generally averaged about the normal; greatest monthly, 10.02, at La Grange; least monthly, 0.08, at Coldwater.—D. D. Bryan, Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, September, 1890.

Table with columns for Stations, Temperature (Fahrenheit) (Max, Min, Mean), and Precip. (Ins.). Rows include states like Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming.