

ATMOSPHERIC ELECTRICITY.

THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky Mountains they were reported in the greatest number of states, 12, on the 26th; in 5 to 10 on the 1st to 3d, 6th, and 16th to 18th; and in 1 to 4 on the 4th, 5th, 7th to 9th, 11th to 15th, 19th, 20th, 22d, 23d, 25th, 27th, and 29th to 31st. No thunderstorms were reported on the 10th, 21st, 24th, and 28th.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 12, in Michigan; on 5 to 10 in Florida, Illinois, Iowa, Kansas, New Jersey, New York, Texas, and Wisconsin; and on 1 to 4 in Arkansas, Connecticut, Delaware, District of Columbia, Indiana, Indian Territory, Kentucky, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, North Carolina, North Dakota, Ohio, Pennsylvania, South Dakota, Vermont, Virginia, and West Virginia.

West of the Rocky Mountains thunderstorms were reported in California on the 8th and 9th; in Colorado on the 11th; in Nevada on the 4th, 5th, 9th, and 22d; in New Mexico on the 1st and 12th; in Oregon on the 28th; in Utah on the 1st; and in Washington on the 27th to 29th. No thunderstorms were reported in Alabama, Georgia, Idaho, Maine, Montana, Okla-

homa Territory, Rhode Island, South Carolina, Tennessee, and Wyoming.

AURORAS.

Auroras were reported as follows: 1st, Eastport, Me.; Salem Corners, Pa. 2d, Salem Corners, Pa.; Webster, S. Dak. 5th, Orono, Me. 8th, Alta and Fontanelle, Iowa; Eastport, East Machias, and Portland, Me.; Saint Vincent, Minn.; Spearfish, S. Dak.; Appleton, Peshtigo, and Westfield, Wis. 9th, Riley, Ill.; Alta, Iowa; Mayfield, Me.; Groveton, N. H.; Bismarck, N. Dak.; Salem Corners, Pa.; Frankfort and Webster, S. Dak.; Madison and Westfield, Wis. 10th, Riley, Ill.; Mayfield and Orono, Me.; Madison, Wis. 13th to 16th, Hartington, Nebr. 20th, Alta, Iowa; Mayfield, Me.; Harvey, Wis. 23d, Alta, Iowa; Newburyport, Mass.; Rockland, Mich.; Glendive, Mont.; Grand Rapids and Wild Rice, N. Dak.; Salem Corners, Pa.; Gary and Webster, S. Dak.; Harvey and Peshtigo, Wis.; 24th, East Machias and Mayfield, Me.; Williamstown, Mass.; Fort Assiniboine and Glendive, Mont.; Groveton, N. H.; Le Roy, Pa. 25th, Eastport and Mayfield, Me.; Saint Vincent, Minn.; Fort Assiniboine, Mont.; Wolsey, S. Dak.; Appleton, Delavan, Madison, and Medford, Wis. 27th, Thornville, Mich.; Webster, S. Dak. 28th, Mayfield, Me.; Concord, Mass.; Turin, N. Y.; Grand Rapids, N. Dak.; Webster, S. Dak. 29th, Grand Rapids, N. Dak.; Webster, S. Dak. 31st, Alta, Iowa.

MISCELLANEOUS PHENOMENA.

DROUGHT.

In parts of New England, central Virginia, the south Atlantic and Gulf states, Indian and Oklahoma territories, the north part of the Ohio Valley, Tennessee, Arkansas, Missouri, and Kansas drought prevailed throughout the month. In New Hampshire, Vermont, Massachusetts, and during the early part of the month in Connecticut, streams were low and water was scarce for manufacturing purposes. In the other sections named dry weather interfered with farming operations, streams were very low, wells were failing, and in Texas and Kansas water was scarce on the stock ranges.

PRAIRIE AND FOREST FIRES.

Extensive and destructive prairie fires were reported in Oklahoma Territory, and from the 27th to the 31st near Fort Assiniboine, Mont., in Custer, Cherry, Lincoln, and Logan counties, and the Wood River Valley, Nebr., in Gray, Ford, and Butler counties, Kans., and near Bismarck, N. Dak.

Forest fires were reported in northern Alabama, in Bienville parish, La., in eastern Arkansas, and Johnson county, Ark., near Chattanooga, Tenn., and in the south and west parts of Williamson county, Tenn., near Meadow Valley, Wis., and Red Bluff, Cal., and in the Cascade Mountains near Hot Springs, Wash.

VERIFICATIONS.

[Verifications made by Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Room.]

WIND SIGNALS FOR SEPTEMBER, 1891.

Statement showing percentages of justifications of wind signals for the month of September, 1891.

Wind signals—(Ordered by Major H. H. C. Dunwoody.)—Total number of signals ordered, 50; justified as to velocity, 35; justified as to direction, 43. Of the signals ordered, 49 were cautionary, of which 34 were justified; and 1 storm signal was ordered, which was justified; 22 signals were ordered for easterly winds, of which 19 were justified, and 28 were ordered for westerly winds, of which 24 were justified. Percentage of justifications, 62.6. Number of winds without signals, 18. Number of signals ordered late, 5.

No cold-wave signals were ordered during the month.

FORECASTS FOR 48 HOURS IN ADVANCE.

Appreciating the great importance that long time predic-

tions possess for the general public the Chief of the Weather Bureau 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, 103; temperature, 135. Percentages of verifications: weather, 74.5; temperature, 75.1; weather and temperature combined, 74.8.

FORECASTS FOR 24 HOURS IN ADVANCE.

The forecasts for districts east of the Rocky Mountains for September, 1891, were made by Major H. H. C. Dunwoody, Signal Corps, and those for the Pacific coast districts were made at San Francisco, Cal., by 1st Lieutenant John P. Finley, 15th Infantry.

Percentages of forecasts verified, September, 1891.

Table with 3 columns: State, Weather, Temperature, Weather and temperature combined. Lists states from Maine to Texas with their respective forecast verification percentages.

In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. The forecasts of temperature in districts east of the Rocky Mountains for September, 1891, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day.

FORECASTS FOR 48 AND 72 HOURS IN ADVANCE.

Percentages of verifications of forecasts made for second day in advance in October, 1891. Number of predictions made: weather, 409; temperature, 63. Percentages of verifications: weather, 91.6; temperature, 78.3; weather and temperature combined, 90.3.

Percentages of verifications of forecasts made for third day in advance. Number of predictions made: weather, 29; temperature, 3. Percentages of verifications: weather, 89.0; temperature, 100.0; weather and temperature combined, 89.7.

A statement of the percentage of justification of wind signals for October, 1891, will be published in the REVIEW for November, 1891.

FORECASTS FOR 24 HOURS IN ADVANCE.

The forecasts for districts east of the Rocky Mountains for October, 1891, were made by Professor H. A. Hazen, Weather Bureau, and those for the Pacific coast districts were made at San Francisco, Cal., by 1st Lieutenant John P. Finley, 15th Infantry.

Percentages of forecasts verified, October, 1891.

Table with 3 columns: State, Weather, Temperature, Weather and temperature combined. Lists states from Maine to Texas with their respective forecast verification percentages for October.

In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. The forecasts of temperature in districts east of the Rocky Mountains for October, 1891, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day.

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 October, 1891, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 4.1 below the normal; maximum, 96, at Salem, 2d; minimum, 23, at Valley Head, 23d and 28th; greatest monthly range, 66, at Brewton; least monthly range, 38, at Citronelle. Precipitation.—The average was 2.24 below the normal; greatest monthly, 1.83, at Tuscumbia; least monthly, 0.00, at nearly all stations in the state. Wind.—Prevailing direction, northwest—P. H. Mell, Observer, Weather Bureau, Auburn, director.

ARIZONA.

The month was exceedingly dry and warm. Temperature.—Maximum, 102, at Yuma, 9th; minimum, 24, at Holbrook, 14th. Precipitation.—The only precipitation reported was a trace at Mount Huachuca. Wind.—Prevailing direction, southeast.—J. C. Hayden, Observer, Weather Bureau, Tucson, director.

ARKANSAS.

Temperature.—The mean was 1.1 below the normal; maximum, 92, at Hot Springs, Monticello, and Newport, 1st, at Black Rock, 24th, and at Lonoke, 25th; minimum, 27, at Devalls Bluff, 23d and 29th; greatest monthly range, 63, at Devalls Bluff; least monthly range, 41, at Winslow. Precipitation.—The average was 1.51 below the normal; greatest monthly, 2.54, at Pine Bluff; least monthly, 0.00, at Texarkana and Mount Nebo. Wind.—Prevailing direction, north.—M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Observer, Weather Bureau, assistant.

CALIFORNIA.

Temperature.—Maximum, 98, at Needles, 7th, 9th, and 11th; greatest monthly range, 61, at Nordhoff; least monthly range, 23, at Stockton. Precipitation.—Greatest monthly, 4.94, at Upper Mattole; least monthly, 0.00, at a number of stations. Wind.—Prevailing directions, west and northwest.—J. A. Barwick, Observer, Weather Bureau, Sacramento, director.

COLORADO.

Temperature.—The month was slightly warmer than usual; maximum, 88, at Rocky Ford, 28th; minimum, 4, at Climax, 3d. Precipitation.—The average was deficient; greatest monthly, 3.27, at Platora; 0.00 was reported at a number of stations.—W. S. Miller, Observer, Weather Bureau, Denver, director.

FLORIDA.

Temperature.—Maximum, 94, at Archer, 7th; minimum, 32, at Archer, 24th. Precipitation.—The greatest amount of rain fell in the central and eastern portions of the peninsula, while but little is reported in the western counties; greatest monthly, 9.58, at Fort Meade; least monthly, 0.04, at Pensacola.—E. R. Demain, Observer, Weather Bureau, Jacksonville, director.

GEORGIA.

Temperature.—Maximum, 92, at Poulan, 5th; minimum, 30, at Gainesville, 28th; greatest monthly range, 60, at Poulan; least monthly range, 44, at Griffin and West Point. Precipitation.—Greatest monthly, 2.46, at Savannah; least monthly, 0.00,