

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for December, 1905, is based on data from about 3470 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 13; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; cooperative observers, domestic and foreign, 2565; total Weather Bureau Service, 3267; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Jamaica Weather Service, 130.

Since December, 1904, the Weather Bureau has received an average of about 1700 reports from as many observers and vessels, giving international simultaneous observations over the Atlantic and Pacific oceans at 12 noon, Greenwich time, or 7 a. m., seventy-fifth meridian time. These are charted, and, with the corresponding land observations, will form the framework for daily weather charts of the globe.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S. I. Kimball, General Superintendent of the United States Life-Saving Service; Capt. H. M. Hodges, U. S. N. (Retired), Hydrographer, United States Navy; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of

the Jamaica Weather Office; Señor Enrique A. Del Monte, Director of the Meteorological Service of the Republic of Cuba; Rev. L. Gangoit, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on the respective local standards of time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the REVIEW. The standards used by the public in the United States and Canada and by the cooperative observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is $157^{\circ} 30'$, or $10^{\text{h}} 30^{\text{m}}$ west of Greenwich. The Costa Rican standard meridian is that of San José, $5^{\text{h}} 36^{\text{m}}$ west of Greenwich.

Barometric pressures, whether "station pressures" or "sea-level pressures", are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

In conformity with Instructions No. 43, March 29, 1905, the designation "voluntary", as applied to the class of observers performing services under the direction of the Weather Bureau without a stated compensation in money, is discontinued, and the designation "cooperative", will be used instead in all official publications and correspondence.

Hereafter the titles of the respective forecast districts will be as used in the current REVIEW to accord with paragraph 236 of Station Regulations, dated June 15, 1905.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

On December 20 the first regular meteorological observation at noon, Greenwich time, received by the Weather Bureau at Washington from mid-ocean was dispatched through the Marconi Company by the American S. S. *New York*, in latitude 40° north, longitude 48° west. The service of transmitting observations from vessels equipped with the Marconi apparatus is now regularly conducted by the *New York*, *Philadelphia*, *St. Louis* and *St. Paul*, of the American Steamship Line, and an extension of the service to the other steamships, as facilities for transmission and the needs of the Weather Bureau demand, is contemplated.

Along the transatlantic steamer routes east of the Banks of Newfoundland and thence southward over the Azores the weather of the latter part of December was severe. Over the western Atlantic storms of pronounced severity occurred with intervening intervals of about five days.

In the United States a larger proportion of the barometric disturbances crossed the southeastern districts, where the month was cold and wet. The remaining low areas passed from the British Northwest Territory over or near the Great Lakes, and the weather of the northern portions of the United States east of the Rocky Mountains was unusually warm and

dry. No well-defined low area traversed the Plateau and Pacific coast States, and the month in those States was generally cool and dry. During the latter half of the month, however, the passage of barometric depressions over the British Possessions was attended by gales on the north Pacific coast.

The first important storm of the month in the United States moved from the southeastern portion of the Gulf of Mexico to the Canadian Maritime Provinces from the 8th to 10th. This storm increased in strength during its passage up the coast, and on the 10th was attended by wind velocities of 60 miles an hour on the New York and New England coasts. Five days later a storm that had apparently originated in the subtropical regions of the West Indies appeared off Hatteras and moved slowly northeastward. Vessel reports indicate that from the 14th to 16th the gales that attended this storm were violent. Under the influence of this low area, and of high area VI, the first snowstorm of the season in the Middle Atlantic States occurred on the 15th. Low area IX was attended by heavy rain in the west Gulf States on the 19th, and in the east Gulf and South Atlantic States on the 20th. During the 20th low area IXa moved northward near the south Atlantic coast causing heavy rain at night in the Middle Atlantic States.

On the 28th low area XII developed marked intensity over the middle Mississippi Valley; during the 29th it moved northeastward over the upper Lakes, with high winds that extended over the middle Atlantic and New England coasts, heavy rains in Eastern and Southeastern States, and rain or snow in the Lake region. On the 30th barometric pressure below 29.00 inches attended the passage of the low area over the Canadian Maritime Provinces.

In advance of high area III the principal cold wave of the month swept from the Northwestern States to the Atlantic coast, carrying the line of freezing temperature southward to the middle Gulf coast, and causing light frost at Jacksonville, Fla., on the mornings of the 4th and 5th. On the 25th and 26th heavy frosts occurred on the Gulf coast and light frost at Jacksonville. In California the latter part of the month was cold, with snow in the mountains and frost in the citrus fruit districts.

On the 11th four inches of snow fell at El Paso, Tex.

BOSTON FORECAST DISTRICT.

Four well-defined storms, attended by moderate to heavy precipitation, and by gales along the coast, visited New England; the gale of the 10-11th wrecked the Nantucket lightship No. 58 which had weathered many great storms. Timely warnings alone prevented the loss of many staunch vessels during the month.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

No severe windstorms occurred in the Gulf States and conditions did not justify cold-wave warnings. Frost warnings were issued on several dates, and the warnings were generally justified. Freezing temperature, for which timely warnings were issued, occurred in the sugar and trucking regions on the 4th and 5th.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

Several pronounced disturbances passed over the district. Cold-wave warnings were not issued or required.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.

The month was exceptionally free from gales, the temperature continued mild, and but little rain or snow fell.

No warnings for general cold waves were issued, and warnings of heavy snow were not required.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.

In New Mexico the month was unusually cold, and in the southeastern part of that territory heavy snow was a feature; elsewhere in the middle and southern Rocky Mountain districts the month was dry and cool. Several sharp falls in temperature, of a local character, occurred and warnings were issued on the morning of the 29th for a cold wave that visited northern Arizona.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The month, as a whole, was one of deficient rainfall. Severe

sandstorms occurred in the valleys of southern California on the 9th. The most important work of the month was in connection with the frost warnings.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND FORECAST DISTRICT.

No important storms occurred on the north Pacific coast until the 16-18th. On those dates, and on the 24th and 25th, 28th and 29th, severe weather attended the passage of barometric depressions from the Pacific.

Storm warnings were ordered in advance of the gales. Cold-wave warnings were not issued or required.—*A. B. Wollaber, Acting District Forecaster.*

RIVERS AND FLOODS.

The heavy rains of November 29 and December 3 caused a moderate flood in the Allegheny and Monongahela rivers. As a rule, danger-line stages were not quite reached, except at Pittsburg, where the crest stage on December 4 was 23.5 feet or 1.5 feet above the danger line. As usual, all interests were given timely warning, and no damage was reported.

The same general conditions produced a decided rise in the Ohio River without danger-line stages. No inconvenience resulted, except in the vicinity of Evansville, Ind., where the rising water necessitated the removal of a large amount of freight on the levee. Warnings of the rise were sent to Evansville on the 3d, and the crest stage of 32 feet was reached on the 9th.

The Missouri and upper Mississippi rivers were somewhat lower than during the preceding month, while the lower Mississippi rose from five to seven feet on account of the rise in the Ohio River and a supplementary rise out of the Red River. There were no high waters of consequence during the month, except in the Carolinas, where the heavy rains of the 21st were followed by moderate floods on the 22d and 23d, with stages as a rule somewhat above the danger lines.

Owing to the mildness of the season there was much less ice in the rivers at the end of the year than at the corresponding period of the year 1904, except in the extreme upper Missouri River, where the quantity was somewhat in excess of that of the previous year. The Mississippi was open below LeClaire, Iowa, and none of the eastern rivers, except those of northern New England, were closed.

The highest and lowest water, mean stage, and monthly range at 279 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Division.

The following summaries relating to the general weather and crop conditions during December are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

Alabama.—The month, as a whole, was moderately cold, wet, and unfavorable for farm work: freezing temperatures prevailed on several dates; rains were frequent, but not damaging to land. Little progress was made in seeding oats and wheat, though the early sown made good growth. The little cotton outstanding at beginning of month was about all gathered by the 15th, after being damaged somewhat by wet weather. Late fall crops were all housed, with satisfactory yields.—*F. P. Chaffee.*

Arizona.—Temperature greatly deficient. Precipitation slightly below normal. There was an unusual depth of snowfall in the northern sec-

tion. Plowing and seeding for winter wheat, barley, and oats progressed satisfactorily. Citrus fruits yielded largely; olive picking continued. Vegetables were abundant and growing well in the central and southern sections. Ranges were in excellent condition in the southern, and covered by snow in the northern counties. There was a bountiful supply of water; all river beds were full during the entire month.—*L. N. Jesunofsky.*

Arkansas.—Temperature decidedly below and precipitation slightly above the normal. The month was unfavorable for farm work on account of the cold, wet weather, and not much was accomplished. Wheat, oats, and rye made fair growth and did well. Late crops about all secured. Some cotton unpicked, but badly damaged as a result of the wet weather. Pastures still good and stock doing well. Fruit in fair condition.—*Chas. M. Strong.*

California.—Weather conditions during almost the entire month were unfavorable for agricultural interests. The temperature and precipitation were much below normal. Severe frosts near the end of the month