MONTHLY WEATHER REVIEW.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for December, 1902, is based on reports from about 3100 stations furnished by employees and voluntary observers, classified as follows: Regular stations of the Weather Bureau, 160; West Indian service stations, 8; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Company, 96; Hawaiian Meteorological Office, 75; Canadian Meteorological Service, 33; Jamaica Weather Service, 130; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3; Costa Rican Service, 7. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Territorial Meteorologist, Honolulu, H. I.; 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, Superintendent of the United States Life-Saving Service; Lieut. Commander W. H. H. Southerland, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San José, Costa Rica; Capt. François S. Chaves, Director of the Meteorological Observatory, Ponta Delgada, St. Michaels, Azores; W. M. Shaw, Esq., Secretary, Meteorological Office, London; Rev. Josef Algué, S. J., Director, Philippine Weather Service; and H. H. Cousins, Chemist, in charge of the Jamaica Weather Office.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary 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° 30′, or $10^h\ 30^m$ west of Greenwich. The Costa Rican standard of time is that of San José, $0^h\ 36^m\ 13^s$ slower than seventy-fifth meridian time, corresponding to $5^h\ 36^m$ west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

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.

FORECASTS AND WARNINGS.

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

December was marked by a succession of severe gales on the British coasts. The most important storm of the month over the western Atlantic advanced from the west coast of the Gulf of Mexico to the middle Atlantic coast of the United States from the 3d to the 5th. Warnings and advisory messages in connection with this storm were telegraphed to Gulf ports on the 3d and to Atlantic coast ports on the 4th, and on the morning of the 5th hurricane warnings were ordered for the southern New England coast. Transatlantic shipping interests were also advised on the morning of the 5th that a severe storm would move northeastward from the middle Atlantic coast of the United States, and cablegrams to this effect were sent to Lloyds, London, the Meteorological Observatory at Horta (Fayal), Azores, and the office of the Halifax and Bermuda Cable Company, Halifax, Nova Scotia. A number of sailing vessels were wrecked along the middle and north Atlantic coasts of the United States during the 5th; off the New England coast the wind attained hurricane force during the evening and night of the 5th. Advices indicate that the northeastern advance of this storm was attended by many marine disasters of a minor character on the coasts of the Canadian Maritime Provinces, and that the subsequent course of the disturbance was south of east, toward the Azores and the southern European coasts. On the Great Lakes the severer windstorms of the month occurred on the 2d, 3d, and 15th, and ample warnings were given of their approach.

Warnings were displayed well in advance of the storms that appeared on the Pacific coast. An interesting feature of Pacific coast weather was a storm that reached the southern California coast on the 16th and traversed the United States during the succeeding six days. It is thought that the cable steamer *Silverton* ran through the north end of this storm when nearly 300 miles southwest of San Francisco.

On the 3d cold wave warnings were ordered for east Texas, Arkansas, and Louisiana, and sugar planters and truck growers in the west Gulf districts were warned of the freezing temperature that occurred in that section on the morning of the 5th. On the 26th and 27th a cold wave swept over the Gulf and South Atlantic States, attended by freezing temperature in the sugar and trucking districts of the middle and west Gulf States and northern Florida, and by frost in central portions of the Florida Peninsula. Ample warnings were given of the freezing weather and frosts of these dates. No very severe cold waves visited the central and northern districts, and interests were cautioned against the moderate cold waves that appeared on the 6th, 7th, 23d, and 24th. The following is an extract from the Galveston, Tex., News, of December 4, 1902, with regard to the cold wave warnings of the 3d:

> Last winter the Weather Bureau saved many thousand dollars to the farmers and truck growers of south Texas by timely warnings of heavy freezes, and yesterday morning when the warnings were telegraphed and telephoned to points of interest no time was lost in getting the tender vegetation under cover. The Weather Bureau's notice was practically two days in advance because the coldest period is expected to-night and early Friday morning. When Sugarland was communicated with the