

MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

VOL. XXVIII.

APRIL, 1900.

No. 4

INTRODUCTION.

The MONTHLY WEATHER REVIEW for April, 1900, is based on reports from about 3,103 stations furnished by employees and voluntary observers, classified as follows: regular stations of the Weather Bureau, 158; West Indian service stations, 12; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 27; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Canadian Meteorological Service, 32; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3. 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, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Señor A. M. Chaves, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Govern-

ment Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; and Commander Chapman C. Todd, Hydrographer, United States Navy.

The REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe.

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. 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 meridian is mentioned.

FORECASTS AND WARNINGS.

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

During the month of April, 1900, unusually high atmospheric pressure over the Lake region and Ohio Valley and low pressure in the Southwest, were attended by heavy rains in the Southern and southwestern States, and by cool and dry weather in the north-central and northeastern States. In the Gulf States and lower Mississippi Valley considerable damage was caused by floods in the smaller streams.

In Texas heavy rain began during the night of the 5th and continued until the 7th. On the afternoon of the 7th the great-granite dam across the Colorado River, two miles above Austin, gave way causing the loss of several lives and destroying a great amount of property. The second period of heavy rain began in the middle and east Gulf States on the 10th, and continued during the 11th, after which an interval of fair weather prevailed until the 15th, when rain set in along the middle and west Gulf coast. From the 16th to the 18th remarkably heavy rains fell in the middle Gulf States and the lower Mississippi Valley, causing washouts on railroads, and an immense amount of damage to property and crops. At Meridian, Miss., the dam of the waterworks gave way on the 16th, and at Bessemer, Ala., the reservoir of the waterworks broke. Rains continued at intervals during the remainder of the month in the Southern States, and on the 27th exceptionally heavy downpours caused damage at points along the Brazos and Colorado rivers, Texas. At Waco, Tex., a number of persons were drowned, and the property loss was placed at \$150,000. In the various rivers and streams of

Texas the loss by flood was estimated at \$3,000,000 to \$5,000,000.

In districts where the river and flood service of the Weather Bureau has been organized warnings were issued of the floods of the month. The extension of this service over Texas was begun last year and will be improved as rapidly as available funds will permit. Notwithstanding the lack of data and information regarding the rivers of that section the floods of Texas were, in some degree, anticipated by warnings. On the 7th interests along the Colorado River south of Austin were advised of a probable sudden and decided rise in that river. On the 27th all points along the Brazos and Colorado rivers were warned of a rise, and freshets for the smaller streams of Texas were forecast. In Alabama the damage by flood along the Tombigbee and Black Warrior rivers was placed at \$1,500,000, and property to the estimated value of \$250,000 was saved by the Weather Bureau flood warnings sent from Mobile on the 17th. On the 18th Johnsonville, Tenn., was warned by the Weather Bureau office at Cairo, Ill., that the river would rise rapidly at that place to a stage approaching 26 feet within two or three days. Heavy rains were forecast for the 19th and 20th, and these rains caused a further rise at Johnsonville to a stage of 29 feet on the morning of the 23d. No special damage was caused.

The damaging frosts of the month were successfully forecast. In connection with the heavy frosts of the 1st in the interior of the middle and east Gulf and South Atlantic States timely warnings were widely distributed and were of

great benefit to early truck and berry growers. Heavy frost on the 5th in the States of the Ohio Valley resulted in little or no damage, as fruit trees were backward in budding. During the second week in April frost occurred in central and northern California, causing some damage to grape vines and tender vegetation. In the north Pacific coast States frost caused heavy damage to fruit.

No severe wind storms occurred on the Great Lakes or the seacoasts of the United States during the month. Several schooners and fishing boats were reported wrecked by high wind on the Yucatan coast on the 23d. During the afternoon of the 6th high wind caused some damage on the north Pacific coast.

CHICAGO FORECAST DISTRICT.

Warnings were sent of the heavy snowstorms of the month in the middle Rocky Mountain region.

No storm that seriously affected navigation passed over the upper Lake region during the month.—*H. J. Cox, Professor.*

SAN FRANCISCO FORECAST DISTRICT.

The showers of the early part of the month were successfully forecast.

Reports of injury by frost during the second week of April were much exaggerated.

About the middle of the month some interesting experiments were made in forecasting fog for the San Francisco Bay region with a good measure of success.—*A. G. McAdie, Forecast Official.*

PORTLAND, OREG., FORECAST DISTRICT.

Warnings were issued for the only severe storm of the month, which occurred on the 6th. This storm wrecked the new wharfs of the Dunsmuir collieries at Ladysmith, near Victoria, B. C., entailing a loss of over \$10,000.

The severe frosts of the month were successfully forecast. But little attention was paid to these warnings, although the frosts damaged fruit in Oregon alone to the amount of many thousands of dollars. The Oregonian editorially commented upon the apathy of the fruit growers in this connection, as follows:

Are not our farmers and fruit growers sufficiently intelligent to take advantage of the work of agricultural experiment stations, of the Weather Bureau and other scientific agencies, by which they gain a livelihood and feed the world? Is it their only privilege to grumble at the payment of taxes that support such institutions? It is to be hoped that the fruit growers are in a receptive condition of mind and that the lesson will now be learned that untimely frosts may be guarded against without money and without price.

E. A. Beals, Forecast Official.

HAVANA FORECAST DISTRICT.

No general storms occurred during the month and no special warnings were issued.

Severe local storms occurred at points in central and western Cuba on the 26th, and in eastern Cuba on the 27th—*W. B. Stockman, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

During the month there were eight highs and eleven lows which could be definitely traced (see Charts I and II). A

brief description of some of their most prominent characteristics is given herewith.

Highs.—None of the highs moved entirely across the country. Those which originated, or were first observed in the extreme West, were dissipated before or by the time the one hundredth meridian was reached, and No. II did not leave the Pacific coast. No. I originated in Manitoba, moved slowly south-eastward, and disappeared in central Tennessee. Nos. VI and VII originated in Tennessee and Kentucky, respectively, and, after very irregular courses, moved into the Atlantic Ocean by way of Cape Breton Island.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.		o	o		o	o	<i>Miles.</i>	<i>Days.</i>	<i>Miles.</i>	<i>Miles.</i>
I.....	3, a. m.	50	100	5, p. m.	36	87	1,350	2.5	540	22.5
II.....	2, a. m.	34	118	4, a. m.	45	123	950	2.0	475	19.8
III.....	7, p. m.	41	124	10, a. m.	50	100	1,800	2.5	720	30.0
IV.....	14, a. m.	45	123	17, a. m.	50	100	1,475	2.0	492	20.5
V.....	17, a. m.	40	115	17, p. m.	40	105	550	0.5	1,100	45.8
VI.....	14, a. m.	35	85	18, a. m.	48	60	1,775	4.0	444	18.5
VII.....	19, a. m.	37	87	22, p. m.	46	60	2,450	3.5	700	29.2
VIII.....	28, a. m.	51	114	30, a. m.	40	105	1,400	2.0	700	29.2
Sums.....							11,750	20.0	5,171	215.5
Mean of 8 paths.....							1,469		646	26.9
Mean of 20 days.....									588	24.5
Low areas.										
I.....	1, p. m.	42	88	4, a. m.	47	65	1,525	2.5	610	25.4
II.....	1, a. m.	43	123	5 1/4, p. m.	48	69	6,300	13.5	467	19.5
III.....	1, a. m.	48	122	1 1/2, a. m.	43	87	4,750	11.0	432	18.0
IV.....	6, a. m.	33	65	3, a. m.	54	114	700	2.0	350	14.6
V.....	6, a. m.	33	65	7, p. m.	46	60	1,050	1.5	700	29.2
VI.....	12, a. m.	43	123	20, a. m.	46	60	4,075	8.0	509	21.2
VII.....	17, p. m.	53	115	18, p. m.	53	105	400	1.0	400	16.7
VIII.....	18, a. m.	26	97	21, a. m.	40	91	1,400	3.0	467	19.5
IX.....	19, p. m.	50	110	21, a. m.	44	103	540	1.5	360	12.5
X.....	20, p. m.	43	112	22, p. m.	46	106	1,150	2.0	575	24.0
XI.....	21, p. m.	48	122	22, p. m.	46	106	950	1.0	950	39.6
XII.....	23, p. m.	37	100	25, p. m.	53	105	1,160	2.0	580	24.2
XIII.....	23, p. m.	50	97	30, a. m.	46	73	1,225	1.5	817	84.0
Sums.....							28,825	50.5	7,217	298.4
Mean of 13 paths.....							2,217		555	23.1
Mean of 50.5 days.....									571	23.8

Lows.—The movements of the lows were extremely erratic throughout the month. No. I originated over northeastern Illinois, moved eastward to the Massachusetts coast, and thence northward. No. II was a remarkable development, occupying thirteen and one-half days for the movement of the main depression across the country, and traversing a path 6,300 miles in length. It originated on the Oregon coast on the morning of the 1st, reaching the Texas panhandle by the evening of the 5th; from this time until the morning of the 10th it shifted irregularly between the Texas coast and southwestern Kansas, again touching the Texas panhandle on the evening of the 8th; it was joined on the morning of the 8th by a secondary depression which had started from western Colorado on the evening before; by the morning of the 11th the center of disturbance had reached central Tennessee, by way of southwestern Mississippi, and there divided, the principal depression moving southward to central Alabama, and thence northeastward and northward to the upper Saint Lawrence Valley. The offshoot continued northward and was lost in western Lower Michigan. During the time this low was moving over Texas there were heavy and persistent rains over the eastern portion of that State. No. III did not move south of the forty-eighth parallel, nor east of the one hundred and fourteenth meridian. No. IV moved northward over the Atlantic Ocean by way of Bermuda, passing off through Newfoundland. No. V originated on the Oregon coast, and, after sending an offshoot to Alberta, moved to western Texas, and