

Storm, northeast warnings, were ordered for the northern Lake region on the evening of the 21st, and were extended to the balance of the upper lakes on the morning of the 22d. While some wrecks occurred during the month, and a few lives were lost, the warnings were generally heeded by vessel men, and sheltered harbors were sought.—*H. J. Cox, Professor.*

NEW ORLEANS FORECAST DISTRICT.

Frost, or special temperature warnings, were issued for some portion of this district on the 3d, 4th, 7th, 12th, 15th, 16th, 19th, 26th, and 28th. Frost occurred in each instance, and all frosts and freezes that occurred were forecast. The temperature warnings issued for the sugar interests on the 15th and 16th were fully verified. These warnings enabled all those who had not saved their seed cane to complete that work.

There were no well-marked storms during the month.—*I. M. Cline, Forecast Official.*

DENVER FORECAST DISTRICT.

The month was unusually fine, even in the mountain districts, where local storms so frequently occur at this season. Cold-wave warnings were issued on the morning of the 2d for Wyoming and northeastern Colorado, and these were verified except in the immediate vicinity of Denver.—*F. H. Brandenburg, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

The present month may be considered a wet November, the rainfall amounting to 3.48 inches, with ten rainy days and three days on which a trace of rain fell. The first week was marked by a pressure distribution approaching that of a typical dry month. This period marked the close of the raisin drying season. During this period no showers were forecast which did not occur, and no unnecessary warnings were issued.

On the morning of the 9th rain was forecast for southern California, and the forecast was verified. The disturbed condition on the California coast, which began on the 19th was anticipated. The p. m. map of the 18th showed the lowest pressure to be on the coast of northern California; the pressure and temperature change maps indicated on the morning of the 19th that the disturbance had moved northward, and on the 20th that it was in British Columbia and Alberta. Heavy rain which occurred in the vicinity of San Francisco on the night of the 20th was accurately forecast. The end of the month was marked by rainy weather, with conditions favorable for tule fog in the valleys and along the coasts.—*Alexander G. McAdie, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

The centers of storms, which controlled the weather in this district, passed farther north than usual; consequently the month was mild, and in most sections there was a deficiency of precipitation.

Many severe storms occurred on the Alaska and British Columbia coasts, and some of these storms passed far enough south to cause southerly gales along the Oregon and Washington coasts. Timely warnings were issued for all storms which visited the north Pacific coast, and shipping interests

were well advised of their character and progress.—*E. A. Beals, Section Director.*

HAVANA, CUBA, FORECAST DISTRICT.

No important disturbance appeared in the West Indies during the month.—*Montrose W. Hayes, Section Director.*

AREAS OF HIGH AND LOW PRESSURE.

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.										
I.....	2, p. m.	54	114	5, a. m.	48	85	1,325	2.5	530	22.1
II.....	4, a. m.	42	93	7, a. m.	42	76	1,050	3.0	350	14.6
III.....	5, p. m.	45	123	8, p. m.	38	80	2,360	3.0	788	32.6
IV.....	8, a. m.	54	114	11, a. m.	43	74	2,550	3.0	850	35.4
V.....	10, p. m.	45	123	13, a. m.	33	94	1,800	2.5	730	30.0
VI.....	13, a. m.	53	108	18, a. m.	48	85	1,300	†3.0	433	18.0
VII.....	17, p. m.	47	123	22, a. m.	36	75	3,350	4.5	722	30.1
VIII.....	20, p. m.	53	105	24, p. m.	46	60	2,125	3.5	607	25.3
IX.....	23, a. m.	30	99	25, p. m.	25	82	1,400	2.5	560	23.3
X.....	23, p. m.	53	108	27, p. m.	48	85	1,125	†2.0	562	23.4
XI.....	24, p. m.	43	109	27, a. m.	35	85	1,425	2.5	570	23.8
XII.....	26, a. m.	50	100	29, a. m.	34	78	1,750	3.0	533	24.3
Sums.....							26,120	42.0	8,642	360.0
Mean of 14 paths.....							1,866		617	25.7
Mean of 42.0 days.....									620	25.8
Low areas.										
I.....	1, a. m.	51	114	3, p. m.	47	85	1,535	2.5	610	25.4
II.....	2, a. m.	38	108	3, p. m.	36	85	1,075	1.5	717	29.9
III.....	5, a. m.	50	120	4, a. m.	28	82	1,425	2.0	712	29.7
IV.....	7, a. m.	53	117	9, a. m.	48	54	3,425	4.0	856	35.7
V.....	8, a. m.	33	105	9, a. m.	26	97	2,975	4.0	744	31.0
VI.....	9, a. m.	50	120	18, a. m.	48	54	4,450	9.0	950	39.6
VII.....	14, p. m.	41	126	17, p. m.	53	105	1,500	3.0	500	20.8
VIII.....	16, a. m.	43	105	19, p. m.	28	82	2,050	3.5	586	24.4
IX.....	18, p. m.	41	126	20, a. m.	48	125	600	1.5	400	16.7
X.....	20, p. m.	48	110	26, p. m.	46	60	3,525	6.0	688	24.5
XI.....	23, a. m.	50	120	24, a. m.	49	90	3,950	6.0	658	27.4
XII.....	26, a. m.	53	121	29, p. m.	42	74	2,600	3.0	700	29.2
XIII.....	33, a. m.	53	121	*8, a. m.	48	54	3,200	4.0	867	36.1
				*5, a. m.	46	54	4,725	6.0	800	32.3
Sums.....							39,375	59.0	10,970	457.1
Mean of 16 paths.....							2,461		686	28.6
Mean of 59.0 days.....									667	27.8

* December. † Stationary for 2 days.

For graphic presentation of the movements of these highs and lows see Charts I and II.—*H. C. Frankenfeld, Forecast Official.*

RIVERS AND FLOODS.

Low water stages continued during the month in the Mississippi and Missouri rivers. In the Ohio low stages continued until the last week of the month, when a steady, though not heavy, three days rainfall caused a moderate rise in the upper river and tributaries, the crest passing Portsmouth, Ohio, on the 30th. This rise was of the greatest value to all river interests. Thirty hours advance notice of the coming tide was given by the Weather Bureau Official at Pittsburg, and every effort was made by those affected to take immediate advantage of the situation. The coal industry was the one most benefited, since about five million bushels of coal were started on their journey to the mouth of the Mississippi River.

The rivers of the remaining districts of the country pre-

sented nothing of special interest. Lower stages were the rule, except in the Willamette and the Sacramento rivers on the Pacific coast, where the rains of the last week of the month caused a moderate rise.

Running ice was reported in the Mississippi River as follows: St. Paul, Minn., on the 18th and 19th, and from the 24th to the 28th, inclusive; La Crosse, Wis., from the 17th to the 19th, inclusive; and Dubuque, Iowa, on the 16th. On this date the ice harbor at Dubuque was also frozen over.

The Missouri River at Bismarck, N. Dak., froze over on the 7th, closing navigation for a time. There was no ice at the end of the month, although the river was frozen both above and below the city. At Pierre, S. Dak., there was running ice from the 15th to the 25th, inclusive, but not in sufficient quantities to necessitate the closing of navigation. The Red

River of the North froze over at Moorhead, Minn., except at the bridges. In the Susquehanna River, at Wilkesbarre, Pa., the first ice was seen on the 28th; while in the Hudson, it appeared in such quantities as to compel the closing of navigation on the 30th.

The highest and lowest water, mean stage, and monthly range at 135 river stations are given in Table VII. 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. Frankenfeld, Forecast Official.*

CLIMATE AND CROP SERVICE.

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

The following summaries relating to the general weather and crop conditions are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau.

[Temperature is expressed in degrees Fahrenheit and precipitation in inches and hundredths.]

Alabama.—The mean temperature was 48.8°, or 4.6° below normal; the highest was 84°, at Bermuda, Eutaw, and Tuskegee on the 2d, and the lowest, 16°, at Scottsboro on the 16th and at Ashville on the 17th. The average precipitation was 1.85, or 1.38 below normal; the greatest monthly amount, 5.14, occurred at Uniontown, and the least, 0.17, at Cordova.

Conditions favorable for gathering late crops, but only moderately favorable for sowing and germination of fall grains; first killing frost of the season occurred very generally in north-central and northern counties on 5th or 6th, and throughout the rest of the State on the 16th or 17th.—*F. P. Chaffee.*

Arizona.—The mean temperature was 57.1°, or 5.0° above normal; the highest was 94°, at Sentinel and at Signal on the 1st and other dates, and the lowest, 14°, at Flagstaff on 18th and at Fort Defiance on 14th and 27th. The average precipitation was 0.32, or 0.34 below normal; the greatest monthly amount, 1.40, occurred at Prescott, while none fell at a great number of stations.

The principal farming operations of the season are plowing and seeding. The work is very backward on account of the dry and hard condition of the soil, owing to lack of rainfall and a deficient supply of water for irrigation. The gathering of the orange crop was begun the latter part of the month. The yield is below the average.—*Wm. G. Burns.*

Arkansas.—The mean temperature was 50.5°, or about normal; the highest was 88°, at Camden on the 2d, and the lowest, 15°, at Pond on the 16th. The average precipitation was 2.99, or 0.81 below normal; the greatest monthly amount, 4.83, occurred at Mossville, and the least, 1.57, at Corning.

The weather during the month has been generally favorable for wheat; the early sown has generally come up to good stands and looks healthy and vigorous. In some localities the stands are not so good, having been injured by the hessian fly and other insects and the drought. The late sown is much better; the timely rains have been of great benefit and have given it a good start. There have been no severe freezes or frosts sufficiently heavy to damage it. Fall oats and rye are generally up to good stands and are looking well.—*Edward B. Richards.*

California.—The mean temperature was 54.9°, or 2.5° above normal; the highest was 100°, at Craftonville on the 6th, and the lowest, 5°, at Bodie on the 11th. The average precipitation was 2.65, or 0.46 above normal; the greatest monthly amount, 12.85, occurred at Upper Mattole, while none fell at ten stations.

Conditions were favorable for farming operations; no injurious frosts occurred. The rainfall was slightly in excess of the normal, particularly in the central and northern sections, but was deficient in southern California. The rain was very beneficial to early sown grain and pasturage, and caused but little damage to late fall crops.—*Alexander G. McAdie.*

Colorado.—The mean temperature was 40.0°, or 4.8° above normal; the highest was 88°, at Holyoke on the 4th, and the lowest, 3° below zero, at Moraine on the 19th and at Breckenridge on the 12th and 25th. The average precipitation was 0.22, or about one-fourth the normal

amount; the greatest monthly amount, 1.60, occurred at Ruby, while none fell at a number of stations.—*F. H. Brandenburg.*

Cuba.—The mean temperature was 72.2°; the highest was 95°, at San Cayetano on the 8th, and the lowest, 40°, at Central Rosario (Aguacate) on the 22d. The average precipitation was 0.83; the greatest monthly amount, 8.25, occurred at Central Sta. Lucia (Gibara), while none fell at numerous points in the provinces of Pinar del Rio, Havana, Matanzas, and Santa Clara.

The temperature was unusually uniform, but was generally below normal throughout the month. In Santiago de Cuba Province light rains fell with a fair degree of frequency, but over the remainder of the island extremely dry weather prevailed, and numerous localities of the western half of the island received no rain at all. During the first few days of the month both temperature and rainfall conditions were favorable for crops, but their continuance caused this season's cane crop to mature too early and retarded the growth of canes planted last spring and this fall; many tobacco seed beds were entirely ruined, and during the latter part of the month transplanting was impracticable, or was carried on under difficulties, except in those sections with irrigating facilities.—*Montrose W. Hayes.*

Florida.—The mean temperature was 59.1°, or 6.0° below normal; the highest was 90°, at Fort Meade on the 1st and at Hypoluxo on the 3d, and the lowest, 21°, at Wausau on the 17th. The average precipitation was 0.89, or 1.12 below normal; the greatest monthly amount, 2.22, occurred at Titusville, and the least, trace, at Flamingo.

The month was the coldest November since the establishment of the Climate and Crop Service, eleven years ago. Frosts and freezing conditions prevailed over the north half of the State and light frost occurred over the upper portion of the southern district. Considerable damage resulted to vegetables and sugar cane. The month was very dry, the deficiency in precipitation being such as to retard the growth of vegetables and strawberries. Oranges colored nicely and shipments were active.—*A. J. Mitchell.*

Georgia.—The mean temperature was 49.3°, or 5.0° below normal; the highest was 87°, at Fitzgerald and Mauzy on the 1st, and the lowest, 12°, at Greenbush on the 29th. The average precipitation was 0.98, or 1.80 below normal; the greatest monthly amount, 2.58, occurred at Columbus, and the least, 0.10, at Gillsville.

The mean temperature and the average rainfall were the lowest on record for the month during the past eleven years. The weather, although unseasonably cold, was pleasant and invigorating. Rain fell on an average of but four days, and at several stations there was but one day with precipitation. The conditions were unusually favorable for harvesting matured cotton and other late crops. The sowing of fall oats, fall wheat, and rye was retarded by excessive dryness of the soil. Frost formations were exceptionally heavy and numerous.—*J. B. Marbury.*

Idaho.—The mean temperature was 39.4°, or 3.4° above normal; the highest was 78°, at Payette on the 1st, and the lowest, 5°, at Forney on the 11th. The average precipitation was 1.19, or 0.68 below normal; the greatest monthly amount, 5.05, occurred at Murray, and the least, trace, at Blackfoot and Downey.

November was remarkable for excessive temperature and deficient precipitation. The snowfall was light, confined to the high mountains, and disappeared rapidly. October rains caused a fine growth of grass on the stock ranges. The mildness, together with absence of heavy snow, enabled stock to remain on the mountain ranges to within a few days of the close of the month.—*S. M. Blandford.*

Illinois.—The mean temperature was 38.7°, or 1.3° below normal; the highest was 81°, at Centralia on the 1st, and the lowest, 4°, at Dixon