

on the middle-eastern slope. Strong anticyclonic conditions were notably absent, however, in more northerly districts, and and practically no warnings were issued or needed.

The precipitation, which was prolonged in the southwestern mountain region during the closing days of the month, was fully covered in the forecasts from twenty-four to thirty-six hours in advance. Great loss of life and property resulted from snow slides.—*F. H. Brandenburg, Forecast Official.*

**SAN FRANCISCO FORECAST DISTRICT.**

The month, as a whole, was an unusually stormy one on the California coast, and in marked contrast to the earlier part of the winter. From a dry season there was a decided change in the other direction, and the month closed with a record of the heaviest rainfall for many years, insuring an ample supply of water for the growing season.

The month began with heavy frosts generally, which were followed by rain or light snow from the Tehachapi northward. On the 21st heavy rain fell generally over California. On the 24th warnings were sent to points in the Sacramento Valley that the rivers would rise rapidly Monday night and Tuesday. River warnings were continued until the 27th, and in every case verified. The most pronounced storm of the season was shown on the morning map of February 25. Pressure readings below 29.00 inches were recorded during the day. Southeast storm warnings were displayed on the entire coast of California and verified at nearly all points. At Point Reyes Light, Cal., the 25th opened with light rain and a terrific southeast storm in progress. The wind increased rapidly to 90 miles an hour at 10:15 a. m., and continued at that velocity until after 12 noon, very frequently reaching velocities of 98 to 100 miles an hour. A maximum velocity of 98 miles occurred at 11:15 a. m., at which time an extreme velocity of 103 miles was recorded, one mile being registered in thirty-five seconds. On the 25th warnings of high southerly winds in Nevada and a rapid rise in the Sacramento River were also issued.—*A. G. McAdie, Professor.*

**PORTLAND, OREG., FORECAST DISTRICT.**

The weather in the North Pacific States during February was unusually stormy, with an excess of precipitation, and with temperature above the normal. Incoming vessels reported gales of hurricane strength near the American coast, which caused considerable damage to rigging, etc. On account of rough seas and strong head winds, many ships were kept off the mouth of the Columbia River or near the entrance to the Strait of Juan de Fuca two to three weeks before they were able to enter the harbors they sought. The Alaska steamers brought the information that southern Alaska was bare of snow and that the winter there had been unusually mild.

February storms passed across this district in a lower latitude than usual, and the month was a phenomenal one in many respects. Two severe windstorms swept between the coast and the Cascade Mountains, and both were successfully forecast. The other storms of the month passed across the district without causing unusually high winds. During the passage of a disturbance on the 25th, the extraordinary low barometer reading of 28.84 inches was recorded at Neah Bay.—*E. A. Beals, Forecast Official.*

**HAVANA FORECAST DISTRICT.**

On the 20th the following forecast was issued for the entire Island of Cuba:

12:30.—A storm of some energy is central in the Gulf of Mexico south-southeast of New Orleans. Brisk to high southeast winds will gradually veer and become northwesterly during Friday, with falling temperature.

Daily forecasts for the benefit of the marine interests were furnished the captain of the port of Havana during the month.—*W. B. Stockman, Forecast Official.*

**AREAS OF HIGH AND LOW PRESSURE.**

*Movements of centers of areas of high and low pressure.*

Number.	First observed.			Last observed.			Path.		Average velocity.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
<b>High areas.</b>										
I.	31, p. m.*	51	120	3, a. m.	36	87	2,200	2:5	880	36.7
II.	2, p. m.	54	114	6, a. m.	38	75	2,800	2:5	800	33.3
III.	7, a. m.	53	108	11, p. m.	30	80	2,300	2:3	511	21.3
IV.	12, p. m.	50	97	16, p. m.	27	97	1,950	2:0	488	20.3
V.	18, p. m.	47	96	22, a. m.	48	68	2,050	2:5	586	24.4
Sums							11,300	18.0	3,265	136.0
Mean of 5 paths							2,260		653	27.2
Mean of 18.0 days									628	26.2
<b>Low areas.</b>										
I.	31, p. m.*	29	95	3, p. m.	48	68	2,300	3.0	767	32.0
II.	4, a. m.	46	84	6, a. m.	47	54	1,500	2.0	750	31.2
III.	14, p. m.	37	75	19, a. m.	46	60	1,400	1.3	1,077	45.2
IV.	12, p. m.	38	105	22, p. m.	82	65	3,250	6.5	500	20.8
V.	17, a. m.	51	120	27, a. m.	45	64	4,250	3.5	773	32.2
VI.	20, p. m.	53	114	28, p. m.	46	87	3,750	6.5	577	24.0
	25, p. m.	48	125				2,550	3.0	850	35.4
Sums							19,000	27.8	5,294	220.8
Mean of 7 paths							2,714		756	31.5
Mean of 27.8 days									695	29.0

\*February.

For graphic presentation of the movements of these highs and lows see Charts I and II.—*Geo. E. Hunt, Chief Clerk, Forecast Division.*

**RIVERS AND FLOODS.**

During February the precipitation in the Atlantic and Gulf States ranged from 1 to 4 inches above the normal amount, and as a result all the rivers were in flood at some time during the month. On the Pacific coast the excess was far greater, ranging from 1 inch in the Plateau region to as high as 12 inches on the coast. The distribution of precipitation was such, however, that there were no floods except in the northern California rivers. At Portland, Oreg., unseasonably low water prevailed during the earliest days of the month.

The Mississippi system, except the Ohio, presented nothing of interest, although comparatively high stages prevailed below Cairo, Ill., owing to the moderate flood tide that came out of the Ohio. The crest of this flood passed the mouth of the Great Kanawha River on the 31st of January and reached New Orleans, La., on the 20th of February. The light rains of the last three or four days of January over the South Atlantic and east Gulf States had also materially raised the rivers in that section, and the heavy rain of February 1 rapidly brought them above the danger-line stages. Warnings were issued as usual and no great damage was done.

The Sacramento River was high a great portion of the month, owing to the excessive rains over its watershed. Warnings were given at the proper times for all portable property to be removed to high ground and for levees to be looked after. On the 13th there were four breaks in the levee between Princeton and Colusa, Cal., and a large wheat area was overflowed. Another rapid rise set in on the 23d, and warnings were once more widely distributed. All low lands south of Red Bluff, Cal., were overflowed, and the town of Tehama, Cal., was flooded. Levees were again broken at Colusa and 40,000 acres of wheat lands flooded, making the crop a total

loss. At Red Bluff a stage of 27 feet was made, the highest since the record flood of February, 1881. In the lower Sacramento Valley the damage was not so great.

The only change in the ice situation in the Mississippi and Missouri rivers was the extension of the frozen area to Cairo, Ill., with some slight intervals below St. Louis, Mo. At the latter place the river was frozen over during almost the entire month, while back of Cairo it was frozen from the 3d to the 25th, inclusive.

In the Ohio River ice was present in large quantities during almost the entire month. In the vicinity of Pittsburg, Pa., navigation was practically suspended from the 8th to the 23d, inclusive, on account of ice and low water. There was a gorge above the Baltimore and Ohio Railroad bridge at Parkersburg, W. Va., from the 3d to the 23d, inclusive. At Cincinnati, Ohio, ice compelled a suspension of navigation from the 9th to the 24th, inclusive, the ice practically disappearing on the latter date. At Evansville, Ind., navigation was suspended on the 10th and resumed on the 26th.

In the Hudson River, in the vicinity of Albany, N. Y., the

ice situation became somewhat threatening during the last few days of the month, and merchants on the water front were advised to remove goods from cellars and low districts. In the Susquehanna River at Harrisburg, Pa., the ice began to move out on the 26th, but owing to warnings previously given, no damage of consequence was done. At Binghamton, N. Y., the ice in both the Chenango and Susquehanna rivers went out on the 28th on a fast rising tide.

The severe floods on the last two or three days of the month continued during the early days of March, and will be described in the WEATHER REVIEW for that month.

The highest and lowest water, mean stage, and monthly range at 134 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. Frankenfield, 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 40.4°, or 5.9° below normal; the highest was 73°, at Mobile on the 27th, and the lowest, 11°, at Ashville and Florence on the 3d. The average precipitation was 6.52, or 1.18 above normal; the greatest monthly amount, 15.40, occurred at Union Springs, and the least, 2.71, at Newburg.

Heavy and excessive rains latter part of month caused damaging floods in larger rivers, overflowed lowlands, and washed uplands, leaving ground too wet for plowing, and delaying all farm work.—*F. P. Chaffee.*

**Arizona.**—The mean temperature was 49.4°, or 0.8° above normal; the highest was 90°, at Champaigns Camp on the 16th, and the lowest, 3° below zero, at Fort Defiance on the 2d and 3d. The average precipitation was 0.33, or 0.61 below normal; the greatest monthly amount, 1.80, occurred at Kingman, while none fell at a great number of stations.

On account of scarcity of water for irrigation, wheat, barley, and alfalfa are making slow growth; almonds are in full bloom.—*Wm. G. Burns.*

**Arkansas.**—The mean temperature was 35.0°, or 6.4° below normal; the highest was 72°, at Elon on the 27th and at Pine Bluff on the 28th, and the lowest, 2° below zero, at Corning on the 15th. The average precipitation was 2.60, or 0.53 below normal; the greatest monthly amount, 4.63, occurred at Blanchard, and the least, 0.50, at Texarkana.

Wheat prospects continue unfavorable by reason of the poor start in autumn and damage by the freeze in December. The weather during February was cold, and there was considerable sleet, snow, and ice; these conditions instead of being detrimental to the crops, have, on the whole, been rather beneficial. Early sown wheat and oats are generally in fair to good condition, but the late sown have been seriously injured. Very little farm work has been done, on account of the dry and frozen condition of the ground. The weather has not been warm enough to bring forward the fruit buds, and as yet there has been no damage to the fruit; many trees were broken and damaged by the sleet and ice of the latter part of January.—*Edward B. Richards.*

**California.**—The mean temperature was 50.3°, or 1.7° above normal; the highest was 92°, at Tulare on the 16th, and the lowest, 6° below zero, at Bodie on the 3d. The average precipitation was 8.14, or 5.17 above normal, the greatest monthly amount, 44.35, occurred at Branscomb, Mendocino county, while none fell at Mammoth Tank, Needles, and Ogilby.

Warm weather and heavy rainfall during the month were very beneficial to growing crops. Wheat, barley, and grass were never in better condition at this date. The heavy storm in the central and northern sections about the 25th was one of the most severe on record and caused a rapid rise of creeks and rivers, with slight damage to grain. Early deciduous fruits were in bloom at close of month.—*Alexander G. McAdie.*

**Colorado.**—The mean temperature was 31.5°, or 5.3° above normal; the highest was 76°, at Lamar on the 12th, and the lowest, 28° below zero, at Wagonwheel Gap on the 2d. The average precipitation was 0.58, or

0.33 below normal; the greatest monthly amount, 2.46, occurred at Ruby, and the least, trace, at Fort Morgan and Grover.

The precipitation during February was very unevenly distributed and considerably below normal for the mountain region as a whole; in fact the deficiency was even more marked than for any of the four preceding months. East of the Continental Divide the storms did not make good the loss by evaporation and the same was true of the western slope prior to the prolonged storm that set in on the 25th and continued into March. This storm proved to be the heaviest of the winter in the southwestern part of the State. Over areas on the upper watershed of the Uncompahgre and the San Miguel the snowfall was reported the heaviest in twelve years, the duration of the storm considered. Snow slides were numerous and caused loss of life and property.—*P. H. Brandenburg.*

**Cuba.**—The mean temperature was 71.2°; the highest was 92°, at Soledad (Guantanamo) on the 7th and Nuevitas on the 28th; and the lowest, 42°, at Santa Clara on the 12th. The average precipitation was 1.74; the greatest monthly amount, 4.03, occurred at Cruces, and the least, trace, at Manzanillo.

Several copious showers fell in the western half of the island, but in the eastern half the rainfall was very light. Two cool waves were very generally felt—from the 11th to 13th and on the 18th and 19th; the average temperatures, however, were very seasonable. The rains were quite favorable for the tobacco crop; while they were too late to benefit the first cutting, they caused a vigorous growth of shoots, and in Pinar del Rio and Havana a very good second crop will be harvested; in Santa Clara conditions have also improved, but the rainfall was lighter there than in the two western provinces and more moisture is needed to assure the development of the sprouts. Growing canes were also much stimulated by the showers; cane planting and preparation of ground continued, but were by no means general, while grinding progressed uneventfully, with the exception of a few interruptions caused by heavy roads, which prevented carting. Small crops and pasturage were in good condition at the end of the month.—*W. B. Stockman.*

**Florida.**—The mean temperature was 54.4°, or 4.6° below normal; the highest was 87°, at Miami on the 2d, and the lowest, 21°, at Wewahatchka on the 10th. The average precipitation was 4.88, or 1.09 above normal; the greatest monthly amount, 10.57, occurred at De Funiak Springs, and the least, 0.90, at Flamingo.

During the early part of the month seeding was retarded by dry weather, and the continued low temperatures were unfavorable for vegetable growth. Cane was planted early in the month and the planting of corn and melons began during the second decade. Vegetables made fair progress, with moderate shipments. The orange crop was practically shipped by the 10th. Citrus trees and pineapples did well. Farm work is about two weeks late.—*A. J. Mitchell.*

**Georgia.**—The mean temperature was 42.1°, or 4.8° below normal; the highest was 83°, at Waverly on the 1st, and the lowest, 10°, at Washington on the 5th. The average precipitation was 7.43, or 1.98 above normal; the greatest monthly amount, 16.48, occurred at Woodbury, and the least, 2.34, at Savannah.

The coldest February since 1895, and one of the four wettest in the past eleven years. The continued cold was the main feature of the temperature; the minima were not unusually low. A great amount of snow was deposited in the extreme northern sections by the storm of the 14-