

Valley Traffic Association, Wenatchee, Wash., with the view of protecting their fruit in shipment to the east; and forecasts for three or four days in advance were sent to various transportation interests throughout the West and Northwest. In response to the request of the *Reporter-Enterprise*, a weekly newspaper in Oconto, Wis., forecasts were sent to it each Thursday morning which included the period ending with the following Sunday.

There is constantly an increasing pressure for forecasts for several days in advance, and it is believed that those of that character that were issued during the month were fairly accurate and most acceptable to the recipients.—*H. J. Cox.*

NEW ORLEANS FORECAST DISTRICT.

Storm warnings were issued for the Texas coast on the 6th, 12th, 14th, 21st, 23d, and 28th, and on the Louisiana coast on the 6th, 15th, and 28th. The warnings were generally justified.

Cold-wave warnings were issued for northern and central Oklahoma and Bentonville, Ark., on the 1st, and they were partially justified. Cold-wave warnings were issued for Oklahoma and Bentonville, afternoon of the 11th, and extended on the 12th over Arkansas, northern Louisiana, the interior of east Texas, and the northern portion of west Texas. The high-pressure area moved eastward instead of southward and the warnings were verified only in the northern portion of the district. Cold-wave warnings were issued afternoon of the 21st for Oklahoma and Bentonville, Ark., were repeated and extended to the northern portion of the district on the morning of the 22d, and on the morning of the 23d the warnings were extended over Louisiana and repeated for the northeast and southwest portions of east Texas. An unusually intense cold wave made its appearance over the northern portion of the district on the 27th, and moved slowly southward, carrying freezing weather to the Gulf coast. Timely warnings were issued for this cold wave; the temperature fall in Louisiana and Arkansas was so gradual that the required fall in 24 hours was not reached.

Live-stock warnings were issued when conditions required such action.

Fire-weather warnings were issued for forest reservations in Arkansas and Oklahoma, February 21.—*I. M. Cline.*

DENVER FORECAST DISTRICT.

An unusually large number of low-pressure areas prevailed in the Denver Forecast District during February, 1922, and two South Pacific disturbances crossed the district in the third decade.

Cold-wave and live-stock warnings were issued for the eastern portions of Colorado and New Mexico on the morning of the 10th, an anticyclonic area, attended by temperatures below zero, having appeared over Alberta. The crest of the anticyclone moved eastward, however, and an area of low barometer from the North Pacific spread rapidly over the mountains, being central in southeastern Colorado by 8 p. m. of the 11th. The warnings were verified only in extreme eastern Colorado. On the morning of the 12th cold-wave warnings were issued for extreme northeastern Colorado and southeastern New Mexico. A further fall in temperature was reported in the former region and a cold wave occurred at Roswell. A disturbance appeared on the northern California coast on the morning of the 19th, moved slowly across the district, and by the 21st was over southwestern Utah. Twenty-four hours later it had

reached southeastern Colorado, while the crest of a marked high-pressure area was over Saskatchewan. Cold-wave and live-stock warnings were issued for eastern Colorado. The fall in temperature in eastern Colorado was more than 30° in localities, with zero temperatures in the greater part of the area.

The cold-wave warnings were extended to that portion of New Mexico east of the mountains on the morning of the 22d. On the morning of the 23d the front of the anticyclone had spread southward to eastern Colorado, and the warnings were repeated for southeastern Colorado and southeastern New Mexico. The temperatures in eastern Colorado were close to zero, at Roswell 12° above zero, and freezing temperature occurred at El Paso. Another anticyclonic area that appeared on the northeastern slope on the 26th spread southward rapidly, and cold-wave warnings were issued on the evening of the 27th for southeastern Colorado. A disturbance from the South Pacific, central in southwestern Utah, having increased in intensity, with a barometer reading of 29.52 inches, and readings of 30.9 inches being reported in eastern Montana, a cold-wave warning for northeastern New Mexico and live-stock and heavy snowfall warnings for Colorado, northern New Mexico, northern Arizona, and Utah were issued on the morning of the 27th. Snow fell in the areas indicated, except in extreme northern Utah, with moderate to heavy amounts in Colorado and parts of northern New Mexico, and was followed by a marked cold wave in nearly all of the area for which the warnings were issued. Zero temperatures were reported in eastern Colorado and temperatures close to zero in eastern New Mexico. A still further decline in temperature occurred on the morning of March 1, the temperatures in eastern Colorado ranging from 6° to 14° below zero at regular Weather Bureau stations and from 2° above to 2° below zero in eastern New Mexico and 6° to 10° above zero in Utah and northern Arizona.—*Frederick W. Brist.*

SAN FRANCISCO FORECAST DISTRICT.

The outstanding feature of the weather in this district during February, was the succession of depressions moving in from the Pacific at a low latitude.

The first and second decades gave almost continuous rain or snow in the northern portion of the district, while the southern portion was subjected to two well-marked rainy periods; the first from the 8th to the 11th in Nevada and California, and the second from the 16th to the 27th in Nevada and northern California and from the 20th to the 27th in southern California.

The temperature was somewhat below normal for the month in all sections, but there were no abnormally cold periods in any portion of the district.

Frost warnings were issued in northern California 10 times and in southern California 7 times. While no material damage resulted frosts occurred on every occasion, and the warnings were justified.

Storm warnings were ordered on 14 days as follows: On the Washington and Oregon coast 7 times, northern California coast 9 times, and southern California coast 5 times. The warnings were generally verified, and are all believed to have been justified, as vessel reports at the time showed gales at sea.

Radio reports from vessels at sea were very beneficial to the forecaster throughout the month. They kept him in fairly close touch with conditions off the coast and indicated the fact that the storms in most instances did not progress directly inland, but upon reaching the coast small portions would become detached from the main

storm and pass inland as minor depressions, while the storm remained in the Pacific, reappearing again at short intervals. Also the end of the storms could be seen or would be indicated in a manner impossible to anticipate from the reports from coast stations.—*G. H. Willson.*

RIVERS AND FLOODS.

By H. C. FRANKENFIELD, Meteorologist.

There were two floods in the rivers of North Carolina during the month of February. The first was caused by rain combined with melting snow and high temperatures; involved the Roanoke, Tar, Neuse and Cape Fear Rivers, and began in the Roanoke River on February 4, extending over the Cape Fear River by February 8, and continuing in the lower Cape Fear until February 19. Stages were not unusually high. The second flood occurred from February 18 to 24, inclusive, and was due to heavy rains from February 13 to 16, inclusive, when the middle and lower reaches were still rather high from the previous flood. Except in the Roanoke River, the crest stages were slightly higher in the second flood than in the first.

Warnings for both floods were issued promptly and the reported losses amounted to only \$10,000, while the value of property saved through the warnings was reported at \$25,000.

The Peedee system of South Carolina was in flood coincidentally with the second flood in the rivers of North Carolina, but the floods in the Santee system closely followed the heavy rains of the middle of the month.

These floods were more severe and the crest stages were from 4 to 9 feet above the flood stages. The Santee River had been in flood for some time past and the additional rains merely accentuated the conditions.

Considerable damage was done to bridges, fences, etc., mainly in the low country between Camden and Columbia. Live-stock losses were comparatively light.

Warnings were issued as occasion arose, and the reported value of property saved through them was \$42,250. Losses amounted to \$1,640, plus an unknown amount for prospective crops over 65 acres of overflowed lands.

The rains of the middle of the month were very general over the South, and the flood conditions were equally general. The flood stage of 32 feet was reached in the Savannah River at Augusta, Ga., during the night of February 16, but without resulting damage except a little that may have been caused by the inundation of some farm lands below Augusta.

Moderate floods also occurred in the other Georgia rivers for which warnings were issued at the proper time. In many places from 4 to 10 days advance notice was given, and much valuable property saved thereby, especially by lumber and cattle interests. Damage so far as reported was light.

In the Coosa, Cahaba, and Alabama Rivers of Alabama the floods were very moderate and presented nothing of special interest. The reported damage amounted to less than \$1,000, and at least \$5,000 worth of live stock was saved through the flood warnings.

In the Black Warrior and Tombigbee Rivers of Alabama the crest stages averaged from 1 to 3½ feet above flood stage. These floods were also well covered by warnings, and it was reported that thousands of cattle had been saved thereby. The floods were likewise of much benefit to lumbermen who depend upon them to move their timber. There was an earlier flood in the lower Tombigbee, but it passed off without incident.

Flood stages during February, 1922.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
ATLANTIC DRAINAGE.					
<i>Roanoke:</i>	<i>Feet.</i>			<i>Feet.</i>	
Weldon, N. C.	30	4	9	35.8	5, 6
	30	17	18	34.0	18
<i>Tar:</i>					
Rocky Mount, N. C.	9	18	18	9.0	18
Tarboro, N. C.	18	9	11	18.7	10
	18	17	22	20.0	20, 21
	14	9	13	15.0	11
Greenville, N. C.	14	17	24	16.0	19-21
<i>Neuse:</i>					
Neuse, N. C.	14	3	10	18.6	6
	14	18	20	18.4	17
	14	4	11	17.6	8-10
Smithfield, N. C.	14	15	21	19.3	18
<i>Cape Fear:</i>					
Fayetteville, N. C.	35	16	19	47.0	17
	22	4	11	26.0	8, 9
Elizabethtown, N. C.	22	16	22	32.2	19
<i>Haw:</i>					
Moncure, N. C.	22	16	16	24.0	16
<i>Peedee:</i>					
Cheraw, S. C.	27	15	18	35.0	17
<i>Lynch:</i>					
Effingham, S. C.	14	21	23	15.7	21
<i>Santee:</i>					
Rimmi, S. C.	12	4	(1)	21.4	20
Ferguson, S. C.	12	5	(1)	15.8	21
<i>Catawba:</i>					
Catawba, S. C.	12	15	16	16.2	15
<i>Watauga:</i>					
Camden, S. C.	24	16	18	30.2	16
<i>Combahee:</i>					
Columbia, S. C.	15	16	18	22.2	17
<i>Broad:</i>					
Blairs, S. C.	15	15	17	20.3	16
Carlton, Ga.	11	16	16	16.0	15
<i>Saluda:</i>					
Peizer, S. C.	7	15	16	8.4	16
	14	8	8	14.7	8
Chappells, S. C.	14	15	18	20.0	17
<i>Savannah:</i>					
Augusta, Ga.	32	16	16	32.0	16
<i>Oconee:</i>					
Milledgeville, Ga.	22	6	6	23.0	6
	22	17	18	23.3	18
<i>Ocmulgee:</i>					
Macon, Ga.	18	17	17	18.5	17
Abbeville, Ga.	11	11	16	12.7	13
	11	22	25	12.5	23, 24
EAST GULF DRAINAGE.					
<i>Apalachicola:</i>					
Blountstown Fla.	15	6	26	19.7	19
River Junction, Fla.	12	7	13	16.4	9
	12	16	25	18.6	19
<i>Chattahoochee:</i>					
Columbus, Ga.	20	16	16	29.0	16
<i>Alabama:</i>					
Selma, Ala.	35	19	20	36.4	19
<i>Coosa:</i>					
Lock No. 4, Lincoln, Ala.	17	18	18	17.0	18
<i>Etowah:</i>					
Canton, Ga.	11	15	15	11.4	15
<i>Tombigbee:</i>					
Demopolis, Ala.	39	(2)	1	40.3	1
	39	6	10	41.8	3
	39	19	23	42.3	21
<i>Black Warrior:</i>					
Tuscaloosa, Ala.	46	16	17	49.4	17
<i>Pearl:</i>					
Columbia, Miss.	18	8	9	18.8	8
<i>West Pearl:</i>					
Pearl River, La.	13	4	17	14.6	7, 8
GREAT LAKES DRAINAGE.					
<i>Tittabawassee:</i>					
Midland, Mich.	18	24	24	18.9	24
<i>Pine:</i>					
Alma, Mich.	6	23	27	8.2	25
MISSISSIPPI DRAINAGE.					
<i>Kentucky:</i>					
Beattyville, Ky.	30	20	21	35.0	21
<i>Green:</i>					
Lock No. 6, Brownsville, Ky.	30	22	24	33.0	24
Lock No. 4, Woodbury, Ky.	33	21	26	39.0	24
Lock No. 2, Rumsey, Ky.	34	25	(1)	35.6	28
<i>Tennessee:</i>					
Knoxville, Tenn.	12	16	17	14.7	16
Riverton, Ala.	32	20	21	32.4	21
<i>Big Pigcon:</i>					
Newport, Tenn.	6	16	16	6.6	16
PACIFIC DRAINAGE.					
<i>Mokelumne:</i>					
Bensons Ferry, Calif.	12	21	21	12.0	21

1 Continued into March, 1922.

2 Continued from January, 1922.