

CHICAGO FORECAST DISTRICT.

During the mild weather which prevailed from the 3d to the 24th, long-range temperature forecasts were made from time to time, to the effect that mild temperature would continue several days. This information was of great value to shippers of perishable goods. On the 24th and 25th cold-wave signals were ordered well in advance of a cold wave which extended from the eastern Dakotas over the upper Mississippi Valley and the western Lake region. As this cold wave followed a prolonged mild spell the warnings were of great value to various interests. During the night of the 26th a severe cold wave developed in the extreme northwest, and the following morning cold-wave signals were ordered for the entire district with the exception of Montana and western portions of North Dakota and Colorado, and additional information was given that the cold wave would be exceptionally severe. The cold wave moved rapidly southward, causing intense cold over nearly the entire district. There was a temporary moderation of the cold on the 29th, but more severe weather immediately followed until the close of the month. The warnings which preceded the severe cold of the closing days of the month were of great benefit to shippers and the general public.

Several of the regular steamboat lines and car ferries continue service on Lake Michigan during the winter, and warnings of coming storms are sent to all open ports. That the advices have been heeded and proved of much value is shown by the fact that no casualties occurred to any vessel during the month of January, 1900, although several severe storms passed over the Lake region.—*H. J. Cox, Professor.*

SAN FRANCISCO FORECAST DISTRICT.

The month opened with heavy rain along the California coast. The rain was accurately forecast, and, coming as it did after a period of comparatively dry weather, caused much satisfaction to agriculturists and stockmen.

The Sacramento and San Joaquin rivers rose rapidly, the river at Red Bluff reaching a stage of 20 feet, or 8 feet above the normal. The Sacramento River by the evening of the 3d had reached a stage of 23.5 feet and from this stage rose steadily until the 10th, when it reached its highest stage, 26.8 feet. But little damage was done, in part owing to the warnings given, and chiefly because of the absence of rain during the latter half of the month.

A strong norther on the nights of the 10th and 11th, prevailed in southern California. Some ripe oranges were blown from the trees. Frost occurred on January 11. From the middle to the end of the month tule fog prevailed in the Sacramento and San Joaquin valleys.—*A. G. McAdie, Forecast Official.*

PORTLAND, OREG., FORECAST DISTRICT.

The barometric depressions of the month developed rapidly and moved with great rapidity over British Columbia and the Northwest Territory. No severe wind storms occurred, although high winds prevailed on the 5th, 9th, 22d, and 23d.

Owing to heavy and continued rains and warm weather, the Willamette River rose very rapidly, beginning on the 12th. On the 14th the river at Portland approached the danger line and the forecasts were begun. Each succeeding stage was accurately predicted from twenty-four to forty-eight hours in advance, and the maximum stage forecast within 0.3 of a foot. As the lower wharfs were flooded and the cellar limit nearly reached, there was much anxiety along the river front, which was allayed by the forecasts and special information. Had warehousemen and others taken alarm much money might have been spent unnecessarily.—*G. N. Salisbury, Section Director.*

AREAS OF HIGH AND LOW PRESSURE.

During the month there were thirteen highs and the same number of lows which were sufficiently well-defined to admit of being charted. See Charts I and II.

Highs.—Nine of the highs were first noted in the British Northwest Territory, and the crests of four of these, Nos. I, II, XIII, and one section of No. XI moved southeastward either near or into the west Gulf States where they recurved to the eastward, Nos. I and II moving off the south Atlantic coast, and Nos. XI and XIII continuing up the coast beyond the field of observation. The second section of No. XI first appeared off the California coast, and after moving to Alberta, closely followed the path of the first section which it overtook in central Tennessee. No. III was first noted in southern California, moved to northern Lake Superior, and thence southeastward to the Atlantic by way of southern New York. No. IV remained in the middle Plateau from the evening of the 9th until the morning of the 13th with gradually diminishing intensity. No. VI moved along the Gulf coast disappearing into the ocean off the South Carolina coast. Nos. V, VII, VIII, and X moved over the extreme north without touching United States territory, except in northern New York and New England. No. IX first appeared in southern Illinois and disappeared in twenty-four hours off the North Carolina coast. No. XII originated in the British Northwest, moved south-southeastward to Texas, and thence eastward to Georgia where it disappeared.

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.....	1, a. m.	50	0	5, a. m.	33	0	Miles.	Days.	Miles.	Miles.
II.....	3, a. m.	54	105	7, a. m.	37	75	3,625	4.0	906	37.8
III.....	5, p. m.	35	120	9, a. m.	43	74	3,175	4.0	794	33.1
IV.....	8, a. m.	41	124	9, p. m.	42	115	3,075	3.5	878	36.6
V.....	9, a. m.	53	108	12, a. m.	48	54	2,875	1.5	583	24.3
VI.....	12, a. m.	29	96	14, p. m.	33	80	1,700	3.0	925	38.5
VII.....	13, p. m.	53	108	16, a. m.	46	60	2,775	2.5	520	21.7
VIII.....	14, a. m.	47	123	18, a. m.	45	64	2,650	2.5	1,060	44.2
IX.....	21, a. m.	37	89	22, a. m.	87	78	3,275	4.0	819	34.1
X.....	22, a. m.	54	114	25, a. m.	46	60	2,775	1.0	775	32.3
XI.....	23, a. m.	39	123	29, a. m.	48	54	2,675	3.0	892	37.2
XII.....	24, a. m.	50	103	30, a. m.	33	84	5,125	6.0	854	35.6
XIII.....	25, a. m.	54	114	30, a. m.	33	84	3,800	6.0	760	31.7
	26, a. m.	54	114	30, a. m.	33	84	2,950	4.0	738	30.7
	29, p. m.	53	108	75, a. m.	48	54	4,300	6.5	662	26.6
Sums.....							40,375	50.5	11,166	465.4
Mean of 14 paths.....							2,884		798	33.2
Mean of 50.5 days.....									800	33.3
Low areas.										
I.....	3, p. m.	51	104	5, a. m.	48	68	1,650	1.5	1,100	45.8
II.....	5, a. m.	48	125	7, p. m.	48	68	2,825	2.5	1,130	47.1
III.....	7, p. m.	48	125	10, a. m.	48	68	2,725	2.5	1,090	45.4
IV*.....	9, p. m.	51	114	12, a. m.	41	74	2,200	2.5	880	36.7
	8, p. m.	54	112				2,725	3.5	779	32.4
V.....	12, p. m.	53	114	14, p. m.	43	75	2,075	2.0	1,038	43.2
VI.....	14, a. m.	45	109	18, a. m.	40	87	2,800	4.0	700	29.2
VII.....	18, p. m.	30	88	21, a. m.	46	60	2,150	2.5	860	35.8
VIII.....	19, a. m.	53	105	20, a. m.	47	85	1,100	1.0	1,100	45.8
IX.....	20, p. m.	53	114	24, a. m.	48	54	2,925	3.5	836	34.8
X.....	22, p. m.	51	120	26, p. m.	48	68	3,225	4.0	806	33.6
XI.....	23, p. m.	49	97	28, a. m.	47	85	675	1.5	450	18.0
XII.....	27, p. m.	25	82	29, p. m.	48	68	1,975	2.0	988	41.1
XIII.....	28, a. m.	53	109	71, a. m.	48	68	2,675	4.0	669	27.9
Sums.....							81,725	37.0	12,426	517.6
Mean of 14 paths.....							2,266		888	37.0
Mean of 37.0 days.....									887	35.7

* Considered as two in totals and means.

† February.

Lows.—Of the thirteen lows, all but four were first noted on the extreme north Pacific coast or in the British Northwest Territory, and moved eastward through or north of the Lake region. Two of them, Nos. X and XIII, dipped down into southern New England and then turned sharply to the

northward. No. IV, after a slow movement over the British Northwest, advanced with greatly increased velocity from northwestern Lake Superior to western Pennsylvania, where it was joined by a second section, which first appeared in Arizona and had come up by way of southern Texas; the combined storm then moved off the New Jersey coast. No. VI originated in Wyoming, moved south-southeastward to extreme northeastern Mexico, thence north-northeastward to western Indiana, where it dissipated. No. VII was really a secondary development of No. VI, moving up from the western Gulf of Mexico to the westward of the Appalachian Range, over the lower Lake region, and thence east-northeastward. No. XII first appeared in extreme southern Florida, moved along the coast with steadily increasing intensity to New England, and finally disappeared north of the mouth of the St. Lawrence River. This storm and No. X developed the lowest pressures of the month.—*H. C. Frankenfield, Forecast Official.*

RIVERS AND FLOODS.

At the beginning of the month the Mississippi River was practically frozen over as far south as Cairo, Ill., and remained so during the entire month as far south as LeClaire, Iowa. Below LeClaire, however, the ice moved out on various dates, commencing on the 1st at St. Louis, Mo., and on the 20th at Davenport, Iowa. The gorge at St. Louis lasted but a single day; that at Chester, Ill., until the 6th; at Cairo until the 7th, while that at Hannibal, Mo., above the Wabash Bridge, remained until the 15th, the ice going out below the bridge, however, on the 7th. On the 29th the river was once more frozen over from St. Paul, Minn., to the bridge at Hannibal, and on the 30th there was floating ice as far as Cairo.

During the early days of the month new low water records were established at St. Louis and at Chester. At the former place a stage of —2.6 feet was recorded on the 2d, 1.9 feet lower than the record in any previous year, while at the latter place a stage of —4.1 feet was reached, 2.2 feet lower than that of any previous year.

Below the mouth of the Ohio the water fell until about the middle of the month, when a steady rise set in, which continued at the end of the month. South of Memphis, Tenn., and above New Orleans, La., the mean stage of water was over 5 feet higher than during December, 1899.

The Missouri was frozen during the entire month to above Omaha, Nebr., and at the latter place was closed by drift ice during the greater portion of the time. At Kansas City, Mo., the river was blocked from the 3d to the 5th, inclusive. At Hermann, Mo., 103 miles from the mouth of the river, there was a gorge from the 1st until the 7th, after which date the river was practically free from ice. Navigation was resumed at Hermann on the 15th and continued until the 29th, when it was again interrupted by ice.

The upper tributaries of the Ohio were closed by ice during the earlier days of the month, but were generally open by the 12th, and on the 16th navigation was resumed on the Monongahela as far as Greensboro, Pa. All river interests were warned of the coming of heavy ice by the official in charge of the Weather Bureau office at Pittsburg, Pa., and the necessary precautions were taken by those concerned.

The lower tributaries were also frozen until about the 10th, except the lower Tennessee, as was also the main stream from Wheeling to Parkersburg, W. Va., from the 2d until the 7th. A temporary gorge formed at Louisville, Ky., on the 1st. Floating ice was present in greater or less quantities through-

out the most of the month, and navigation was interrupted at various times except during the middle of the month.

After the 10th of the month there was a decided rise in the Ohio, ending at Pittsburg on the 22d and at Cairo on the 30th. The mean stages of water were from 1.5 to 7.5 feet higher than during December, 1899, except at Pittsburg.

In the Tennessee River navigation out of Chattanooga, Tenn., was closed from the 1st until the 11th, although there was but little ice after the 6th. The Cumberland at Burnside, Ky., was frozen until the 8th, and navigation from Nashville, Tenn., to the upper river was interrupted by floating ice until the 12th.

No ice was reported in the Arkansas River east of Wichita, Kans., and none at that place after the first week of the month.

In the Hudson River the ice moved south from Albany, N. Y., on the 21st, and gorged at Cedar Hill, N. Y., remaining so at the close of the month. There was a slight freshet on the 22d, and special river forecasts were made for several days.

The ice in the Susquehanna River at Harrisburg, Pa., went out on the 19th and at Wilkesbarre, Pa., on the 22d, but on the 30th the river was again frozen over at the latter place and heavy floating ice was passing the former. The West Branch of the Susquehanna and the Juniata were practically frozen over until the 20th, and again during the last few days of the month.

There was considerable ice in the Potomac during the early portion of the month, and small gorges were reported 40 miles below Washington, D. C., seriously interfering with navigation. A gorge formed about the middle of the month in the upper river at Greenspring, W. Va., but moved away without causing any damage.

The James was frozen from the 1st to the 5th, inclusive, and heavy rains on the 19th and 20th caused a sharp rise in the river, necessitating the issue of a local flood warning at Richmond, Va., on the 20th, which was fully justified. There was also a considerable rise in the Roanoke at the same time, amounting to 22 feet at Weldon, N. C., but no flood stages occurred.

There was a decided rise in the rivers of South Carolina about the middle of the month, but nothing of particular interest resulted.

The Oostenaula River at Resaca, Ga., was frozen over from the 2d to the 6th, inclusive, and on the 3d and 4th at Rome, Ga.

The rivers of Alabama rose rapidly during the second decade of the month, and reached nearly to the danger line at Demopolis, Ala., on the Tombigbee River. Warnings were issued wherever necessary.

Owing to heavy rains, the Sacramento River was in flood during the early days of the month, and the danger-line stage of 23 feet at Red Bluff, Cal., was exceeded by 1.7 foot on the 3d. The river went out of its banks at noon of the 2d, and on the 4th broke through the levee in two places near Princeton, Cal. Warnings of this flood were issued by the official in charge of the Weather Bureau office at San Francisco, Cal., and were given wide distribution. At Sacramento, Cal., a stage of 27 feet was reached on the 9th, 2 feet above the river danger line, and the river remained above the 25-foot stage from the 6th until the 18th, inclusive.

The Willamette River was also at a flood stage about the middle of the month, reaching 24 feet at Albany, Oreg., 4 feet above the danger line, and 16.7 feet at Portland, Oreg., 1.7 foot above danger line. Ample and accurate warnings of this flood were given by the official in charge of the Weather Bureau office at Portland.

The heavy rains also caused severe floods in the smaller rivers in Idaho and eastern Washington. About the 13th several lives were reported lost at Kendrick, Idaho, where the Potlatch River and Bear Creek converge into a narrow canon.